February 16, 2022

Kisinger Campo & Associates
201 N. Franklin Street, Suite 400
Tampa, FL 33602

Attn: Mr. Thomas J. Shaw, P.E.
Cc: Mr. Alfredo Layrisse, P.E.

RE: Final Bridge Geotechnical Report
Big Carlos Pass Project Development & Environment Study
Lee County, Florida
Lee County Project No. CN-160002
Tierra Project No. 6511-16-051

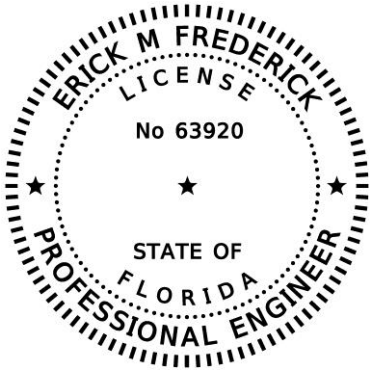
Mr. Shaw:

Tierra, Inc. has performed a geotechnical study for the proposed bridge structure, fishing pier and retaining walls associated with the project referenced above. This report has been prepared to support the project Structure Plans set. This report presents the results of our geotechnical study including field and laboratory testing, the foundation design analysis and our geotechnical recommendations for the proposed bridge and associated walls.

Tierra, Inc. appreciates the opportunity to be of service to Kisinger Campo & Associates, (KCA) on this project. If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Respectfully Submitted,

TIERRA, INC.



This item has been digitally signed and sealed by:

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1.0 PROJECT INFORMATION

1.1 Project Description

The project consists of the proposed replacement of the Big Carlos Pass Bridge, which carries CR 865 (Estero Boulevard) over Big Carlos Pass. The existing bridge (Bridge No. 120028) over Big Carlos Pass is functionally obsolete and has exceeded its service life of 50 years. This proposed bridge replacement project includes the construction of a new bridge built to modern transportation and structural standards, improving the safety and reliability for users of this facility.

The new, high-level fixed bridge will be constructed to the south of the existing bridge. As the Big Carlos Pass bridge is only one of two bridges leading to Lover's Key, with the Big Carlos Pass Bridge accessing Lover's Key from the north, the construction will be phased so as to allow traffic to continue over the Big Carlos Pass. The design of the new bridge will maintain a minimum vertical clearance of 60'-0" over the channel. Horizontally, the clearance at the channel is designed for a minimum width of 100'-0", for which the United States Coast Guard has designated that a fender system will not be required.

The proposed bridge will consist of two 12'-0" lanes, two 7'-0" bicycle lanes, a 10'-0" shared use path, and a 6'-0" sidewalk. The overall proposed width is 61'-8". The traffic railings are Florida Department of Transportation (FDOT) standard 36" single-slope barriers, and the pedestrian railings are FDOT standard 27" concrete parapets with aluminum bullet railings. Mechanically Stabilized Embankment (MSE) walls are proposed at each bridge end bent to support the roadway alignment transition to the typical section line and grade.

This report has been prepared to provide geotechnical input to support the 100% Plans submittal associated with the design of the proposed bridge structure over Big Carlos Pass. This report will be revised in later phases, if necessary, to update our geotechnical evaluations based on the final design information. The subsurface information obtained to date and engineering analysis for the proposed foundation is provided herein. Reports addressing the roadway associated with the project will be submitted under separate cover.

1.2 General Site Description

The existing CR 865 typical section is a two-lane rural section (flush shoulders with open drainage swales). There is a 6-foot sidewalk along the westbound lane of the roadway north of Big Carlos Pass. The length of the existing bridge has two approximately five feet wide sidewalks along both sides of the travel lanes. Land use adjacent to CR 865 in the project area generally consists of residential land, beautiful beaches and coastal wetlands.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study is to provide geotechnical (i.e. subsurface soil conditions and related engineering properties) input to the design team to assist with the design and construction of the proposed CR 865 Bridge over Big Carlos Pass. The following services were provided in order to achieve the preceding objective:

1. Reviewed soil information from the "Soil Survey of Lee County, Florida" published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Reviewed topographic and potentiometric information obtained from the "Fort Myers Beach, Florida" Quadrangle map and the "Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida" maps published by the United States Geological Survey (USGS), respectively. Reviewed existing bridge plans and soil boring data provided by KCA.

2. Conducted a reconnaissance of the project site and located and coordinated utility clearance via Sunshine State One Call.

3. Executed a program of subsurface exploration consisting of subsurface sampling and field-testing. Performed a total of fourteen (14) Standard Penetration Test (SPT) borings along the Big Carlos Pass bridge alignment advanced to depths ranging from approximately 110 to 220 feet below existing grade/mudline. Twelve (12) additional SPT borings were performed to depths ranging from 30 to 50 feet below existing grades to provide subsurface data for the proposed MSE walls.

4. Visually classified and stratified the obtained soil samples in the laboratory using the Unified Soil Classification System (USCS) in general accordance with the American Society of Testing and Materials (ASTM) test designation D-2488. Conducted laboratory testing to confirm the visual classification and water and provide grain size values for use in the scour analysis.

5. Evaluated foundation criteria and performed engineering analyses to develop preliminary design recommendations for the foundation alternatives associated with the proposed bridge structure.

6. Prepared this formal engineering report, which summarizes the course of study pursued, the field and laboratory data generated, the subsurface conditions encountered and the geotechnical recommendations for the design and construction of the proposed bridge structure.

3.0 REVIEW OF PUBLISHED DATA

3.1 Regional Geology

The Lee County Soil Survey published by the USDA was reviewed for information concerning the geology in the project area. In addition, the following paragraphs were paraphrased from the Florida Geological Survey, Open-File Report 80, 2001 and other geologic references:

The near surface geologic deposits and formations from youngest to oldest in Lee County include: Holocene Sediment (Qh), Undifferentiated sediments (Qu), Shelly sediments (TQsu), the Tamiami Formation (Tt), the Peace River Formation (Thp) and the Arcadia Formation (Tha).

The Holocene sediments generally occur near the coastline and with river flood plains and includes; quartz sands, carbonate sand and muds with organics. The Undifferentiated sediments are siliciclastics that are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. The Shelly sediments are variably calcareous and fossiliferous quartz sands to well indurated, sandy, fossiliferous limestone with clayey sands and sandy clays present.

The Tamiami Formation is a poorly defined lithostratigraphic unit containing a wide range of mixed carbonate-siliciclastic lithologies. The lithologies include: 1) light gray to tan, unconsolidated, fine to coarse grained, fossiliferous sand; 2) light gray to green, poorly consolidated, fossiliferous sandy clay to clayey sand; 3) light gray, poorly consolidated, very fine to medium grained, calcareous, fossiliferous sand; 4) white to light gray, poorly consolidated, sandy, fossiliferous limestone; and 5) white to light gray, moderately to well indurated, sandy, fossiliferous limestone. The Tamiami Formation has from highly permeable to impermeable lithologies that form a complex aquifer and primarily outcrops in most of eastern Lee County and can reach thicknesses of greater than 100 feet.

The Peace River Formation is primarily found near sea level elevation and is approximately 50 to 150 feet thick under the county. The Peace River Formation is composed of interbedded sands, clays and carbonates. The sands are generally light gray to olive gray, poorly consolidated, clayey, variably dolomitic, very fine to medium grained and phosphatic. The clays are yellowish gray to olive gray, poorly to moderately consolidated sandy, silty, phosphatic and dolomitic. The carbonates are light gray to yellowish gray, poorly to well indurated, variably sandy and clayey, and phosphatic. The carbonates often include opaline chert.

The Arcadia Formation is predominantly a carbonate unit with variable siliciclastic component and is found about 150 to 200 feet below land surface (bls) in Lee County. The Arcadia Formation is composed of yellowish gray to light olive gray to light brown, micro to finely crystalline, variably sandy, clayey and phosphatic, fossiliferous limestone and dolostone. Thin beds of sand and clay are common. The sands are yellowish gray, very fine to medium grained, poorly to moderately indurated, clayey, dolomitic and phosphatic. The clays are yellowish gray to light olive gray, poorly to moderately indurated, sandy, silty, phosphatic and dolomitic.

3.2 USDA Soil Survey

Based on a review of the Soil Survey for Lee County published by the USDA NRCS, it appears that there are four (4) primary soil-mapping units noted in the vicinity of the bridge site. The general soil descriptions as described in the Soil Survey are presented in the following table. The USDA Soil Survey map for the bridge site is illustrated in **Appendix A**.

SUMMARY OF USDA SOIL SURVEY
LEE COUNTY, FLORIDA

USDA Map Symbol and Soil Name	Depth (in)	Soil Classification		Permeability (in/hr)	pH	Seasonal High Water Table	
		USCS	AASHTO			Depth (feet)	Months
(2) Canaveral	0 - 7	SP-SM, SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4	1.5 - 3.5	June - Dec
	7 - 15	SP-SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4		
	15 - 80	SP-SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4		
(4) Canaveral - Urban Land	0 - 7	SP-SM, SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4	1.5 - 3.5	June - Dec
	7 - 15	SP-SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4		
	15 - 80	SP-SM	A-3, A-2-4	20.0 - 40.0	6.6 - 8.4		
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(48) St. Augustine Sand	0 - 30	SP-SM	A-3, A-2-4	6.0 - 20.0	6.6 - 8.4	1.5 - 3.5	July - Dec
	30 - 40	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	6.6 - 8.4		
	40 - 80	SM, SP-SM	A-2-4, A-3	6.0 - 20.0	6.6 - 8.4		
(135) St. Augustine Sand - Urban Land Complex	0 - 30	SP-SM	A-3	6.0 - 20.0	6.6 - 8.4	1.5 - 3.5	June - Dec
	30 - 40	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	6.6 - 8.4		
	40 - 80	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	6.6 - 8.4		
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(1) AASHTO and USCS do not provide classification for weathered/unweathered bedrock.

It should be noted that information contained in the USDA Soil Survey may not be reflective of actual soil and groundwater conditions, particularly if development in the project vicinity has modified soil conditions or surface/subsurface drainage.

3.3 USGS Quadrangle Map

Based on a review of the "Fort Myers Beach, Florida" USGS Quadrangle Map, it appears that the natural elevation at the bridge site ranges from approximately 0 to +5 feet National Geodetic Vertical Datum of 1929 (NGVD 29) as illustrated on the **USGS Quadrangle Map** in **Appendix A**.

3.4 Potentiometric Surface Maps

Based on a review of the "Potentiometric Surface of the Upper Floridan Aquifer in Florida" maps published by the USGS, the potentiometric surface elevation of the upper Floridan Aquifer in the project vicinity is not available due to lack of water-level data in this area from wells open only to the Upper Floridan Aquifer. For the area generally south of Latitude 27°N, no interpretation was made because of a lack of control points and the complexity of the flow system, which includes several permeable zones.

3.5 Existing Plans, Soil Borings, and Pile Driving Logs

Original design level plans for the existing bridge were reviewed as part of the geotechnical study. Based on a review of the existing bridge plans, the existing bridge consists of two (2) end bents and twenty-eight (28) intermediate bents/piers. In addition, one (1) trunnion pier is utilized to support the bascule span for the existing bridge. Based on the 1961 plans, the foundations at the end bents and intermediate bents appear to consist of a combination of 18-inch and 20-inch Pre-Stressed, Pre-Cast, Square Concrete (PPSC) piles. The trunnion pier appears to be supported by a mat footing founded within the very hard limestone/caprock substrata.

Fifteen (15) test borings provided in the original 1961 design plan set were reviewed as part of the geotechnical study. The original bridge design test borings were performed to depths on the order of 35 to 75 feet below mean sea level (msl) and indicated subsurface conditions including the presence of shelly sands and silts underlain by shallow very hard limestone/caprock layers. Pile driving records were not available for review at the time of this report.

The bridge plans and soil boring data reviewed for this study are provided in **Appendix A.**

4.0 SUBSURFACE EXPLORATION

4.1 Boring Location Plan

Prior to commencing our subsurface explorations, a boring location plan for the proposed bridge structure was developed based on design information provided by KCA. This boring location plan was generated based on our engineering judgment and guidelines provided in the "Soils and Foundations Handbook" published by the FDOT. In addition, the locations of the soil borings performed were coordinated with USCG due to the close proximity to the Gulf Intracoastal Waterway channel.

Generally, the borings were performed at the proposed boring locations. When not possible due to access or utility constraints, the boring locations were offset and the GPS coordinates of the relocated positions were recorded on the field boring logs.

At some of the soil borings, the boring locations were surveyed by the project surveyor providing elevations and state plane coordinates. At other locations, the GPS coordinates were recorded by Tierra personnel in the field utilizing a hand-held GPS device with a manufactures report accuracy of ± 10 feet. The GPS coordinates provided by the project surveyor and the GPS coordinates recorded by Tierra were then converted to station and offset using the Microstation files provided by KCA. The locations of the soil borings performed are presented on the **Report of Core Borings** sheets in **Appendix A.**

Utility clearances were coordinated by Tierra via Sunshine State One Call and updated as required prior to performing the soil borings in order to reduce the potential for damage to the utilities during drilling.

4.2 Soil Borings

Subsurface conditions were explored at the bridge site with twenty-six (26) SPT borings. The results of the SPT borings are presented on the **Report of Core Borings** sheets in **Appendix A** of this report.

The land-based SPT borings were performed with the use of a truck mounted drill rig using Bentonite Mud drilling procedures with an automatic hammer. The SPT borings within Big Carlos Pass were performed with barge mounted drilling equipment with both safety and automatic hammers. The soil sampling was performed in general accordance with the ASTM test designation D-1586. SPT resistance N-values were taken continuously from the existing ground surface/mudline to a depth of 10 feet and on intervals of 5 feet thereafter to the boring termination depth. At some locations, the boring was initially advanced with a hand auger or light down pressure of the drill rod in order to further verify utility clearance. Representative portions of these soil samples were sealed in glass jars, labeled and transferred to our laboratory for classification and analyses.

Soil stratification was determined based on a review of recovered samples, laboratory test results, and interpretation of field boring logs. Stratification lines represent approximate boundaries between soil layers of different engineering properties; however actual transitions between layers may be gradual. In some cases, small variations in properties that were not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The soil profiles represent the conditions at the particular boring location; variations do occur among the borings. Specific details about subsurface conditions and materials encountered at each test location can be obtained from the soil profiles presented on the **Report of Core Borings** sheets in **Appendix A**.

5.0 LABORATORY TESTING

5.1 General

Representative soil samples collected from the SPT borings were classified and stratified in general accordance with the Unified Soil Classification System (USCS). Our classification was based on visual observations, using the results from the laboratory testing as confirmation. Laboratory testing consisted of fines content (percentage passing No. 200 mesh sieve), full sieve analysis, Atterberg Limits, and natural moisture content determination.

5.2 Test Designation

The following list summarizes the laboratory tests performed and respective test methods.

- Fines Content/Grain-Size Analyses - The fines content tests and grain-size analyses were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designation D-422).

- Atterberg Limits - The liquid limit and the plastic limit tests ("Atterberg Limits") were conducted in general accordance with the AASHTO test designations T-089 and T-090, respectively (ASTM test designation D-4318).

- Natural Moisture Content - The moisture content tests were conducted in general accordance with the AASHTO test designation T-265 (ASTM test designation D-2216).

The results of the laboratory tests are presented on the **Report of Core Borings** sheets in **Appendix A**.

6.0 RESULTS OF SUBSURFACE EXPLORATION

6.1 General Subsurface Conditions

In general, the borings performed encountered loose to medium dense shelly sand to silty sand from the ground surface/mudline to elevations ranging from approximately -11 to -46 feet, North American Vertical Datum of 1988 (NAVD 88). The sandy/silty soils were underlain by very soft to firm silt to silty-clay and/or dense/hard weathered limestone (caprock) to approximate elevations of -43 to -63 feet, NAVD 88, which was underlain by very loose to medium dense sandy soils and/or firm to hard silt and clay to the boring termination depths.

Specific information on the soil conditions encountered can be found on the **Report of Core Borings** sheets. These conditions are generally consistent with the borings provided in the 1961 plans. The soil descriptions and classifications of the SPT borings performed at the bridge site are listed below.

Soil Description	USCS Symbol
Gray to Brown Fine Sand to Sand with Silt, occasionally with Shell	SP/SP-SM
Gray to Brown Silty Sand, occasionally with Shell	SM
Weathered Limestone/Caprock	---(1)
Gray to Green-Gray to Light Brown Silt to Clayey-Silt	ML/MH/ML-CL
Gray to Light Brown Silt, occasionally Indurated	ML
Gray to Brown Shelly Sand	SP/SP-SM
Gray to Dark Gray Indurated Clay	CL/CH
Gray to Dark Gray Clay	CL/CH
Dark Brown Organic Sand to Organic Silty Sand to Peat	Pt
Gray to Light Brown Clayey-Silty Sand to Clayey Sand	(SM-SC/SC)
(1) USCS does not include nomenclature for Limestone/Caprock	

6.2 Groundwater

The groundwater table or water line was measured at each of the boring locations during our drilling activities. The groundwater table at the land borings was measured at elevations of approximately -1 to +3 feet, NAVD 88. The water line at the water borings was estimated at the elevation of approximately 0 feet, NAVD 88. As Big Carlos Pass is a marine water body, the water levels at the bridge site are tidally influenced. The groundwater table information and depth of water at the test borings are presented on the **Report of Core Borings** sheets.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, tidal conditions, as well as man-made influences (i.e. existing water management canals, swales, drainage ponds, underdrains and impervious areas). The water levels in Big Carlos Pass are tidal and can therefore influence the groundwater tables in the vicinity of the bridge end bents and MSE walls.

7.0 FOUNDATION DESIGN RECOMMENDATIONS

7.1 General

Based on discussions with the KCA design team that the proposed foundation system for the bridge over the Big Carlos Pass and the proposed fishing pier will consist of 24-inch Pre-cast Pre-stressed Square Concrete (PPSC) Piles. The following sections present the results of the engineering analyses for the proposed deep foundation system.

7.2 Downdrag (Negative Skin Friction)

Negative side friction (downdrag) occurs when compressible soils move downward relative to driven piles resulting from an increased overburden pressure. As the soils compress, a downward force on the pile is created.

Based on the roadway cross sections provided by KCA, the maximum fill height at the end bents ranges from approximately 12 to 18 feet. In addition, boings performed for the bridge near End Bent No. 15 encountered very loose sandy soil at an approximate depth of 10 to 13 feet below grade immediately above the hard limestone stratum. Therefore, downdrag loads acting on the End Bent No. 15 piles are anticipated.

Based on our evaluation of the subsurface soil conditions encountered in the borings and the proposed embankment fill heights, the effects of downdrag loads acting on the piles at End Bent No. 15 are anticipated to be 7 tons. Tierra has coordinated with KCA to include downdrag for End Bent No. 15 on the **Pile Data Table**.

Based on the evaluation of the subsurface soil conditions encountered in the borings, the effects of downdrag loads acting on the piles for End Bent No. 1 will be negligible at the deep foundation locations. **Sample Downdrag Calculations** are presented in **Appendix D**.

The portion of the end bent piles within the embankment should be provided with a double wrap of polyethylene sheeting according to Section 459 of the FDOT Specifications.

7.3 Scour

According to the plan sheets provided by KCA, the 100-year scour elevations for the new proposed Bridge over Big Carlos Pass varies from -14 to -32 feet, NAVD 88. Based on this information and the results from our SPT borings, the net scour resistance is anticipated to be 0 tons. Information has been coordinated with KCA to be submitted as a part of the **Pile Data Table** in **Appendix A**. Net scour resistance for both the bridge and proposed fishing pier can be found on the respective **Pile Data Table** for each specific pier location.

Tierra completed grain size analysis testing and estimated a D_{50} value on samples obtained from the borings for use by the design team in performing scour analysis. The **Grain Size Distribution Curves** and estimated D_{50} values are presented in **Appendix B.**

7.4 Preforming

Based on the presence of very dense limestone/caprock and/or hard silts to clays within the borings, preforming is anticipated at the pier locations in order to obtain minimum pile penetration requirements for lateral stability. Minimum tip elevation at the end bents is required to ensure penetration through the dense limestone substratum. The preforming elevations shown in the **Pile Data Tables** were taken into account when evaluating nominal bearing resistances.

The Contractor should anticipate the use of specialized equipment and/or methods including, but not limited to, core barrels, rock augers, punches, drill bits, etc., to complete preforming and/or predrilling. If drilling equipment with a tapered end is used to construct the preformed pile holes, the maximum diameter of the drilling equipment has to reach the required preform elevation.

7.5 Pile Axial Capacity

Axial capacities for 24-inch PPSC piles were analyzed based on the subsurface conditions encountered in the borings. The Axial Nominal Bearing Resistances (R_n) for 24-inch PPSC piles were computed using the program FB-Deep. The R_n is taken as the Davisson Capacity. The Davisson axial capacity consists of the ultimate skin friction and mobilized end bearing (i.e., one-third of the ultimate end bearing). The results of the axial pile analyses are presented in **Appendix C**, including the axial capacity curves and FB-Deep computer output files.

As previously mentioned, very dense limestone/caprock and/or hard silts to clays were encountered within the borings. Preforming of pile holes will be required to allow piles to penetrate these very dense or hard materials to obtain minimum tip elevations for pile lateral stability and/or minimum penetration requirements. For the purposes of this report, Tierra recommends that pile holes be preformed to elevations of approximately -35 to -63 feet, NAVD 88 at the locations where these very dense or hard materials are anticipated. The Davisson axial capacities presented in this report were evaluated taking into account the preformed elevations of -35 to -63 feet, NAVD 88, where applicable. However, the preformed elevations for each of the bridge pier locations will be re-evaluated prior to the next plans submittal based on additional analysis and information, if any.

As indicated in the FDOT Structures Design Guidelines (SDG), the required R_n must satisfy the following requirement:

$$R_n > \frac{\text{(Factored Design Load + Downdrag + Net Scour)}}{\phi}$$

Where ϕ = 0.65; assuming dynamic load testing will be performed on at least five percent of the piles. Other ϕ factors may be used based on the type of foundation testing recommended by the structural engineer. The results of our analyses to establish test pile lengths for the bridge and fishing pier based on R_n are summarized below:

Big Carlos Pass Bridge (Bridge No. 124143)

Bent/Pier Location	Factored Design Load (tons)	R_n (tons)	Approximate Cut-off Elevation (ft. NAVD 88)	Reference Boring Number	Estimated Pile Tip Elevation[(1)] (ft. NAVD 88)	Test Pile Length (feet)
1	266	410	10.9	BB-414	-132	160
2	216	333	-13.4	BB-415	-128	140
3	197	304	-1.3	BB-417	-136	155
4	191	294	-1.3	BB-417/BB-420	-137	155
5	202	311	1.7	BB-420	-138	155
6	229	353	0.7	BB-422L	-93	110
7	237	365	0.7	BB-423	-173	190
8	223	344	0.7	BB-425	-147	165
9	238	367	0.7	BB-427	-159	175
10	205	316	1.7	BB-428	-159	180
11	210	324	1.7	BB-431	-117	135
12	202	311	-0.5	BB-431/BB-433	-157	175
13	182	280	-3.0	BB-433	-155	170
14	184	284	-3.0	BB-435	-158	175
15	253	390	14.2	BB-436	-161	195

(1) Estimated pile tip elevations based on FB-Deep analyses, minimum tip elevations provided by the structural engineer, encountered subsurface conditions, our experience and our engineering judgment.

Big Carlos Pass Fishing Pier

Bent/Pier Location	Factored Design Load (tons)	R_n (tons)	Approximate Cut-off Elevation (ft. NAVD 88)	Reference Boring Number	Estimated Pile Tip Elevation[(1)] (ft. NAVD 88)	Test Pile Length (feet)
1-2	52	79	5.9	BB-427	-154	175
1-3	45	70	5.9	BB-427/BB-428	-154	175
1-4	52	80	5.9	BB-428	-135	160
2-2	52	80	5.9	BB-428	-138	160
2-3	45	70	5.9	BB-428	-143	165
2-4	52	80	5.9	BB-428/BB-431	-144	165
3-2	55	85	4.6	BB-431	-75	110
3-3	20	31	3.0	BB-431	-59	100

(1) Estimated pile tip elevations based on FB-Deep analyses, minimum tip elevations provided by the structural engineer, encountered subsurface conditions, our experience and our engineering judgment.

Because the FB-Deep program can be conservative in computing end bearing when piles penetrate into the hard silt or clay layer (occasionally indurated), driving refusal and the design capacities may be reached at penetrations less than those indicated by the curves during actual pile installation.

Tierra will coordinate with the KCA design team to establish the test pile locations to be shown on the project **Foundation Layout** sheets. The recommended test pile lengths per bent/pier are presented on the **Pile Data Tables** in **Appendix A**.

7.6 Uplift Resistance

Based on information provided by KCA, some piles will be subject to uplift. The mainline bridge piers with piles subject to uplift include Bridge Pier Nos. 2, 5, 6, 7, 8, 9, 10, 11 and 12. All of the fishing pier piles are subject to uplift. The maximum factored uplift loads for these piles range from 7 to 90 tons. Based on the FDOT SDG, the required uplift resistance per pile was determined by dividing the maximum factored uplift load by a resistance factor (ϕ) of 0.55 on the condition that dynamic load testing on at least 5% of the final production piles will be performed during a test pile program. As a result, the required nominal uplift resistance per pile (i.e. ultimate skin friction) was calculated to range between 13 and 224 tons. These values are presented on the **Pile Data Tables** in **Appendix A**.

The FDOT program FB-Deep was used to perform an analysis to establish the minimum tip elevation to achieve the nominal uplift load requirement (i.e. ultimate skin friction) for each of the piles based on the calculated nominal uplift resistance. As discussed in **Section 7.4**, preforming will be required for the piles to achieve minimum tip requirements for lateral stability and to satisfy minimum penetration requirements at some locations. The minimum tip elevations established met the required uplift resistance for the subject pier locations.

7.7 Minimum Tip Elevation

Tierra anticipates that minimum pile penetration requirements for the mainline bridge End Bent 1 and End Bent 15 will be governed by Section 455 of the FDOT Specifications.

Piles at mainline Bridge Pier Nos. 2, 5, 6, 7, 8, 9, 10, 11 and 12 as well as all of the fishing pier piles are subject to uplift. Based on the results of Tierra's analyses for uplift capacity and KCA's analyses for lateral capacity, the minimum tip elevation will be governed by the uplift requirement at Bridge Pier Nos. 2, 7, 8, 9, 10 and 11 and by the lateral stability requirement at Bridge Pier Nos. 3, 4, 12, 13, and 14.

At the fishing pier, the minimum tip elevations for Bent Nos. 1-2, 1-3, 1-4, 2-2, 2-3 and 2-4 minimum tip elevations will be governed by the uplift requirement. The lateral stability requirements based on the results of KCA's analyses will govern minimum tip elevations at Bent Nos. 3-2 and 3-3.

The minimum tip elevations are presented on the **Pile Data Tables** in **Appendix A**. The **Geotechnical Parameters for FB-MultiPier Input** are provided in **Appendix C**.

7.8 Group Action

No reductions of the individual pile capacities will be required if piles are spaced center-to-center at 3 times their width or greater. Caps may contribute to the overall bearing capacity of the group, provided that the bottom of the cap is directly in contact with the soils underneath the cap. However, it is not recommended to include this additional capacity because of the potential for loss of soil at the cap.

7.9 Settlement

Settlement of pile supported bridge bents should be small and tolerable for a typical single row group. However, the tolerance should be confirmed by the structural engineer. Based on subsurface conditions encountered at the boring locations, individual pile head settlements are estimated to be on the order of ½ inch or less. Group settlements are estimated to be on the same order of magnitude for a single row group pattern but will increase slightly for other group configurations.

8.0 RETAINING WALL SYSTEM RECOMMENDATIONS

8.1 MSE Walls

This submittal package includes permanent retaining walls along the northbound and southbound approaches to the new Big Carlos Pass Mainline Bridge. In addition, temporary MSE walls are proposed to support the construction on the western end of the bridge, and to support the pedestrian sidewalk proposed along the north side of the western end of the bridge. Tierra has performed evaluations based on the Wall Plan Sheets and roadway plans provided by KCA and borings performed near the proposed permanent and temporary wall alignments.

MSE wall leveling pads should be constructed in accordance with Lee County requirements appropriate FDOT Specifications and Standard Plans Indices. Backfill materials used in the wall construction shall meet the gradation and electro-chemical requirements and requirements for Design High Water (DHW) in accordance with Lee County requirements and FDOT Specifications.

Factored bearing resistances and associated settlements for the proposed MSE walls are dependent upon wall heights, soil reinforcement lengths, and the wall locations. External stability analyses, global stability analyses, settlement estimates, and design recommendations will be discussed in subsequent sections of this report. **In addition, it is our understanding that internal wall stability analyses will be performed by the wall supplier.**

8.2 MSE Wall Reinforcement Straps

At the time of this report, the Design High Water (DHW) elevation provided by the Design Team in the vicinity of the proposed permanent retaining walls was reported to be +14.3 feet, NAVD 88. Based on a review of environmental classification data and the proposed wall locations and surrounding environment, Tierra recommends that the FDOT **Wall Type 2F with plastic soil reinforcement** be used for the proposed permanent MSE wall construction due to the extremely aggressive (corrosive) nature of the environment at the wall site.

8.3 MSE Walls External Stability Analyses

External and global (slope) stability analyses were performed for the proposed permanent and temporary MSE walls utilizing soil strength properties estimated based on their empirical correlations with SPT blow counts. The analyses were performed using the LRFD method for external stability of the walls and the computer program "ReSSA 3.0" (developed by ADAMA Engineering, Inc.) for slope stability of the walls. The soil parameters utilized in the wall design calculations are summarized in **Appendix D**.

Based on the FDOT Structures Design Guidelines and AASHTO LRFD Bridge Design Specifications, the required load and resistance factors in performing external stability analyses are summarized in the following table.

Load Factors				
Limit State/ Group	Earth Vertical E_V	Earth Horizontal E_H	Live Load Surcharge Vertical L_{SV}	Live Load Surcharge Horizontal L_{SH}
Strength I-a	1.00	1.50	1.75	1.75
Strength I-b	1.35	1.50	1.75	1.75
Strength IV	1.35	1.50	----	----
Service (For Slope Stability)	1.0	1.0	1.0	1.0
Resistance Factors				
Resistance Factor for Sliding			1.00	
Resistance Factor for Bearing			0.55	
Resistance Factor for Slope Stability			0.65	

The external stability analyses were performed for the proposed MSE walls along the project alignment up to the anticipated maximum wall height of each wall. The results of the permanent retaining wall analyses are presented in **Appendix D** on the **Soil Reinforcement Lengths for External Stability** tables. Sample computer outputs for the analyses are also presented in **Appendix D**.

The factored bearing resistances provided in **Appendix D** were estimated based on the provided DHW.

Based on the AASHTO LRFD Bridge Design Specifications, global stability was evaluated using Service 1 Load Combination (i.e. load factor = 1.0) and a resistance factor of 0.65, which is equivalent to an ASD factor of safety of 1.5. The computer program "ReSSA 3.0" was used to compute factors of safety against global stability failure, which were then used as a basis to evaluate the global stability of the walls using the LRFD methodology. The global stability analyses were performed based on the critical geometry of the proposed permanent MSE walls as shown on the Roadway Plans and Structure Plans provided by KCA.

Based on the results of the global stability analyses, the minimum factor of safety against slope stability for each wall exceeded 1.5. Sample computer outputs for the analyses are presented in **Appendix D**.

8.4 MSE Wall Settlement

Settlements for the proposed MSE walls were estimated using the computer program "FoSSA 2.0" developed by ADAMA Engineering, Inc. The analyses were performed using the proposed maximum wall heights, the associated embankment widths and geometry and a surcharge traffic load of 250 psf. The results of the analyses are presented in **Appendix D** on the **Permanent MSE Wall Variables**, **Temporary MSE Wall Variables** and **Temporary MSE Wall Variables – Pedestrian Sidewalk** tables. Sample computer outputs for the analyses are also provided in **Appendix D**.

In general, MSE walls can tolerate large settlements. However, the total settlement of concrete fascia in permanent walls is typically limited to six (6) inches. Beyond this limit, the fascia may develop unsightly cracks or misaligned panels. Based on the results of the settlement analyses, the permanent walls are anticipated to remain under the threshold of the six (6) inch limit.

8.5 Temporary Sheet Pile Seawalls

Temporary sheet pile seawalls will be installed as part of the project to facilitate construction along the west bridge approach near End Bent No. 1. It is the understanding of Tierra that engineering analyses for these walls are being performed by the KCA Design Team. Tierra has provided recommended soil parameters for use by the structural engineer in performing the analyses for these walls. The **Recommended Soil Parameters for Temporary Seawalls** table is presented in **Appendix D**.

The SPT borings near proposed temporary seawalls encountered dense limestone/caprock that started at an elevation of approximately -16 feet, NAVD88. In addition, very dense compacted/cemented sands are anticipated to exist within the existing embankment. The installation of the sheet pile walls through these materials can be difficult. Tierra recommends the following note be added to the plans:

"Anticipate that difficult installation of sheet piles may be encountered due to the presence of compacted dense sands, cemented sands, and dense limestone/caprock at the project site. Variations in the depth and relative density/consistency of such materials shall be anticipated. Specialized equipment and/or installation methods, including the use of preformed pile holes, punching, and/or other methods may be required to install the sheet piles to the required minimum tip elevation. Jetting is not allowed. The cost associated with the difficult installation including the cost of preformed pile holes, punching, and/or other methods shall be included in the unit bid price."

Due to the close proximity of the permanent MSE walls, Tierra also recommends that the following note be added to the plans to protect the MSE walls during the extraction of the temporary sheet pile walls:

"Extract temporary sheet piling without damaging adjacent MSE walls, structures and bridge approach slabs. Within 30 feet distance from any permanent MSE wall panels, structures, and bridge approach slabs, temporary sheet piles shall be cutoff to 2 feet below finish grade or existing grade after the sheet piles are installed, whichever is

lower. Alternatively, those sheet piles may be extracted using non-vibratory, non-impact methods (such as hydraulic jacking). Due to the proximity of the temporary sheet piling wall proposed near End Bent No. 1, the sheet piles should be abandoned in place and not removed in order to avoid potential damage to the adjacent pile group. The cost to cut the sheet piles, material costs of sheet piles, sheet pile extraction using non-vibratory, non-impact methods, sheet piles abandoned in place, and all associated costs with the sheet piles shall be included in the unit bid price."

9.0 CONSTRUCTION CONSIDERATIONS

9.1 General

The overall site preparation and construction should be in accordance with the Lee County requirements, FDOT Specifications and Standard Plans Index requirements.

9.2 Excavations and Temporary Side Slopes

Excavations and temporary side slopes should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

9.3 Groundwater Control

Depending upon groundwater levels and tidal levels at the time of construction, some form of dewatering will be required based on the anticipated construction activities. Due to groundwater levels anticipated during the wet season of the year, seepage may enter the bottom and sides of excavated areas. Such seepage will act to loosen soils and create difficult working conditions. Groundwater levels should be determined immediately prior to construction. Shallow groundwater should be kept below the lowest working area to facilitate proper material placement and compaction in accordance with Lee County requirements and the FDOT Specifications.

9.4 Protection of Existing Structures

The FDOT Specifications should be followed for protection of existing structures during foundation construction operations.

9.5 Dynamic Load Testing

We recommend that a test pile program be conducted for the proposed bridge construction. Test pile lengths and locations have been depicted in the plans. The test piles should be monitored dynamically utilizing the Pile Driving Analyzer (PDA). The monitoring will provide estimates of pile capacity versus pile penetration, stresses in the pile, and other relevant parameters used to evaluate the pile driving process. CAPWAP analyses should be performed on selected conditions for evaluation of the PDA results. The results of the CAPWAP analyses

will provide information for developing production pile length and driving criteria recommendations.

The installation of the piles should be carried out in accordance with the FDOT Specifications. During pile installation, the Contractor should exercise caution as not to overstress the piles. Piles should not be driven beyond practical refusal (as defined in the FDOT Specifications) to meet the bearing requirements.

10.0 ENVIRONMENTAL CLASSIFICATION

The proposed replacement bridge spans Big Carlos Pass, a marine waterway. Information provided in the FDOT Bridge Environmental Data indicates that the chloride content is greater than 18,000 ppm and the sulfate content is greater than 2,800 ppm. Based on the FDOT Structures Design Guidelines (SDG), the environmental classification of the proposed bridge structure is Extremely Aggressive for both substructures and superstructures due to the marine environment at the site. Environmental classification testing will be performed to support associated retaining wall and drainage structures as the project progresses.

The recommended environmental classification for the proposed bridge are provided on the **Report of Core Borings** sheets.

11.0 REPORT LIMITATIONS

Our services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted Geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions, or recommendations made by others based on this data.

The scope of the investigation was intended to evaluate subsurface conditions within the influence zone of the deep foundations. The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed structure.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of the KCA design team, Lee County and the FDOT.

APPENDIX A

USDA Soil Survey & USGS Quadrangle Maps

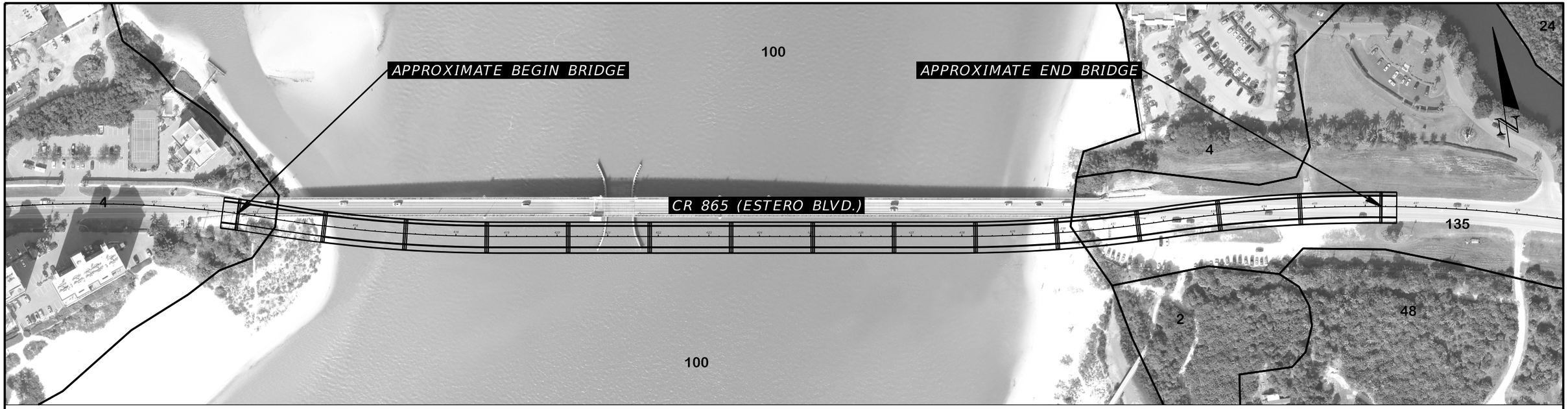
Existing Bridge Plans

Report of Core Borings Sheets – Bridge Structure

Report of Core Borings Sheets – MSE Walls

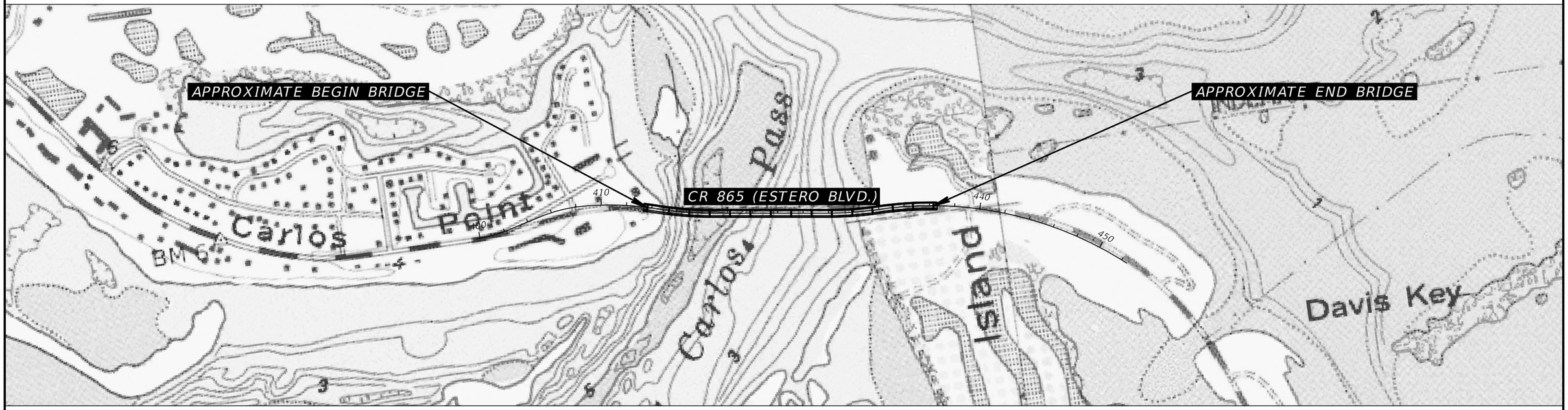
Pile Data Table – Main Bridge Structure

Pile Data Table – Fishing Pier Structure



REFERENCE: USDA SOIL SURVEY OF LEE COUNTY, FLORIDA

0 40 200
Feet



REFERENCE: USGS QUADRANGLE MAP OF "FORT MYERS BEACH, FLORIDA"

0 200 800
Feet

TOWNSHIP: 47S
RANGE: 24E
SECTION: 3 & 11

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
BJS	TM	BJS	EMF

LEE COUNTY FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT ID
CR 865	LEE	CN-1600002

SHEET TITLE: USDA SOIL SURVEY & USGS QUADRANGLE MAPS

REF. DWG. NO.

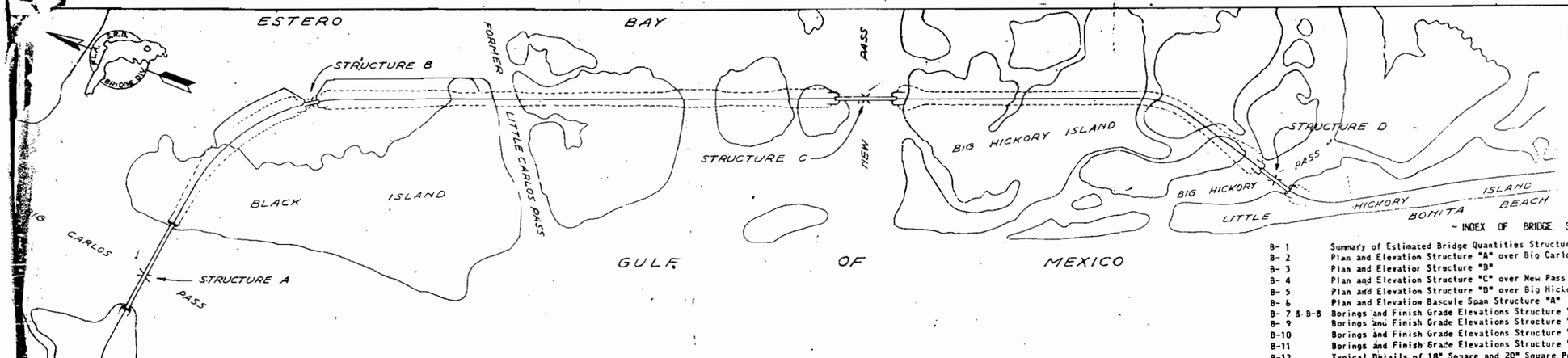
PROJECT NAME: BIG CARLOS PASS BRIDGE PD&E STUDY

SHEET NO.

EB-1

BIG CARLOS (BR.# 120028)

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEARS	SHEET NO.
3	FLA.	12530-3153	61	B-1



SUMMARY OF ESTIMATED BRIDGE QUANTITIES

ITEM NO.	ITEM		UNIT	QUANTITY STRUCTURE A	STRUCTURE B	STRUCTURE C	STRUCTURE D	TOTAL	
① 56-1	Excavation for Structures		Cu. Yd.	480	—	—	—	480	
300-1A	Class A Concrete (Approach Spans)	2,256	Cu. Yd.	2,083	312	1,126	678	4,199	4,378
300-1B	Class A Concrete (Trunnion Pier & Rest Pier)		Cu. Yd.	841	—	—	—	841	800
300-1C	Class A Concrete (Counterweight)		Cu. Yd.	115	—	—	—	115	
300-4	Seal Concrete		Cu. Yd.	459	—	—	—	459	490
300-8	Concrete Handrail	3,214	Lin. Ft.	2,926	480	1,872	1,104	6,382	4,620
310-1	Reinforcing Steel	517,800	Lb.	482,600	65,500	242,400	144,900	935,400	
② 320-2A	Structural Steel (Bascule Leaf)		Lump Sum	1	—	—	—	1	
③ 320-2B	Structural Steel (Flanking Spans Ladders & Platforms)		Lump Sum	1	—	—	—	1	
④ 320-2C	Structural Steel (Access Ladders all Fixed Bridges)		Lump Sum	—	—	—	—	1	
⑤ 320-2D	Structural Steel (Shoe Assemblies)		Lump Sum	1	—	—	—	1	
320-4	Machinery and Castings		Lump Sum	1	—	—	—	1	
340-1	Treated Structural Timber (12 lb. Treatment)	18.46	M.F.B.M.	18.75	5.78	5.78	5.78	36.09	37.80
401-1A	Prestressed Beams (Type II-18-10)	4,163	Lin. Ft.	5,595	946	3,406	1,892	5,839	10,407
401-1B	Prestressed Beams (Type III-18-10)		Lin. Ft.	2,496	—	356.5	356.5	3,209	
403-2	Treated Timber Piling		Lin. Ft.	6,240	3,220	3,220	2760	15,480	
403-3	Precast Concrete Piling Furnished (20"□ Prestressed)		Lin. Ft.	—	2,200	6,800	3100	12,100	
403-4	Precast Concrete Piling Driven (20"□ Prestressed)	9,050	Lin. Ft.	—	2,200	6,800	3100	12,100	
403-5	Composite Concrete & Steel Piling Furnished (20"□ Prestressed)		Lin. Ft.	8,000	—	—	—	8,000	2,050
403-6	Composite Concrete & Steel Piling Driven (20"□ Prestressed)		Lin. Ft.	18,000	—	—	—	18,000	5,050
403-7	Steel Piling Furnished (14 BP 73)	9,050	Lin. Ft.	1,400	—	—	—	1,400	350
403-8	Steel Piling Driven (14 BP 73)	350	Lin. Ft.	1,400	—	—	—	1,400	350
403-9A	Unloaded Test Piles (20"□ Prestressed)	350	Lin. Ft.	—	140	360	190	690	
403-9B	Unloaded Test Piles (20"□ Prestressed Composite)		Lin. Ft.	440	—	—	—	440	
403-9C	Unloaded Test Piles (14 BP 73)		Lin. Ft.	100	—	—	—	100	
⑥ 403-10	Test Loads (110 Tons)		Each	1	1	1	1	4	
403-14	Punching		Per Pile Hole	271	—	—	—	271	
403-20	Shoes for Timber Piles		Each	156	—	—	—	156	
406-1	Shear Connectors		Lb.	973	—	—	—	973	
408-1A	Steel Roadway Floor (5" deep)		Sq. Ft.	1,785	—	—	—	1,785	
408-1B	Steel Roadway Floor (3" deep, Armored)		Sq. Ft.	389	—	—	—	389	
408-2	Steel Sidewalk Floor (11" deep)		Sq. Ft.	525	—	—	—	525	
410-1	Electrical Equipment		Lump Sum	1	—	—	—	1	
411-1	Navigation Lights		Lump Sum	—	—	—	1	1	
416-1	Control House		Lump Sum	1	—	—	—	1	
456-1	Riprap (Sand-Cement)		Cu. Yd.	195	—	—	—	195	
465-1	Guardrail (Aluminum)	3,210	Lin. Ft.	2,922	583	1,895	1127	6,447	6,735

NOTE: Payment for incidental items not specifically covered in the individual bid items shall be included in the Contract Prices for bid items.

① Excavation for Structures (Bascule Pier and Rest Pier) See Section 56 of the Specifications.
② Item No. 320-2A includes all Structural Steel in Bascule Leaf and Machinery Supports, approximately 182,000 lbs.
③ Item No. 320-2B includes all Structural Steel not included in Items Nos. 320-2A, 320-2C and 320-2D, approximately 41,900 lbs.
④ Item No. 320-2C includes all Structural Steel in ladders for Structures B, C and D, approximately 2,380 lbs.
⑤ Item No. 320-2D Structural Steel (Shoe Assemblies) Approximately 10,500 lbs.
⑥ The number of Test Loads may be increased or decreased as directed by the Engineer.

~ GENERAL NOTES ~

DESIGN SPECIFICATIONS: A.A.S.H.O., 1961 44
LOADING: H20-S16
PAINT FOR STRUCTURAL STEEL: All Structural Steel shall be painted in accordance with Article 478 of the Specifications. No paint shall be applied to the surfaces of top flanges of beams that are to be covered with concrete. No paint shall be applied to surfaces within two (2) inches of any field weld until after weld is completed.
BOLTS: Bolts shall be in accordance with A.S.T.M. Specification A-307, except High Strength Bolts.
SURFACE FINISH: In addition to those surfaces specified in Article 300.21 of the Specifications, the following Surfaces shall be given Class 1 Surface Finish, the coping around the top of the Bascule Pier, all exterior Surfaces of the Machinery Room and all exposed Surfaces of the End Bents
STRUCTURAL STEEL: All Structural Steel to be welded shall be in accordance with A.S.T.M. Specification A-36 or A-373.

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B- 3 Plan and Elevation Structure "B"
B- 4 Plan and Elevation Structure "C" over New Pass
B- 5 Plan and Elevation Structure "D" over Big Hickory Pass
B- 6 Plan and Elevation Bascule Span Structure "A"
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SUMMARY OF ESTIMATED BRIDGE QUANTITIES STRUCTURES A, B, C AND D

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

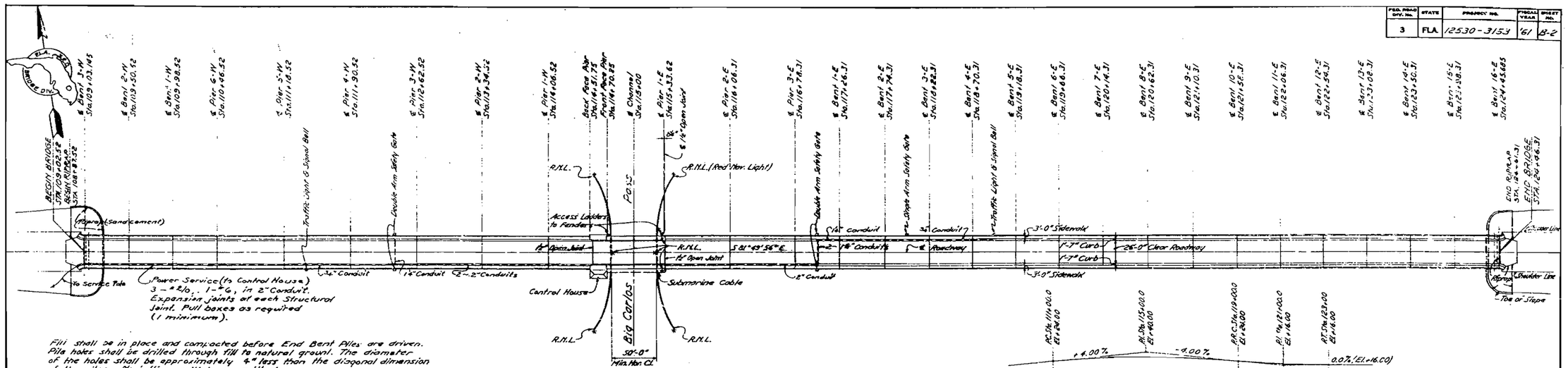
REVISIONS Dates	Descriptions
2-1964	Construction Plans Sent To Bonded Co.

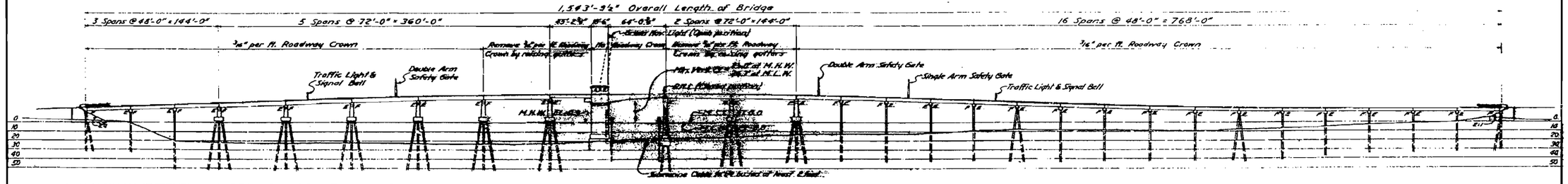
ROAD NO.	COUNTY	PROJECT NO.
S-865	LEE	12530-3153

	Names	Dates	APPROVED BY
Detailed by	C.E.S.	2-61	
Checked by	R.C.B.	1-63	
Quantities by	R.C.B.	1-63	T. W. Jestram
Checked by	R.L.S.	1-63	Assistant State Engineer
Traced by	C.E.S.	2-61	Drawing No. 1 of 20 Index No. 7780

EB-2

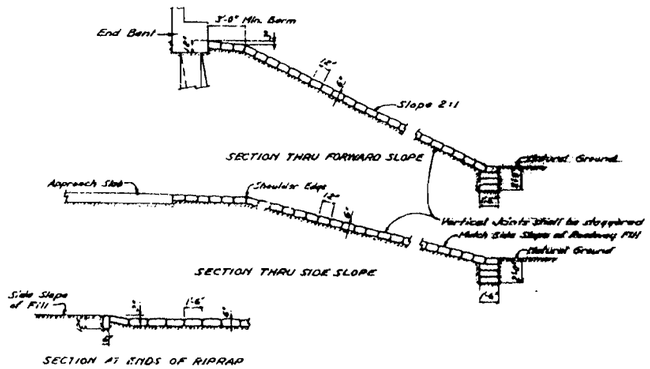
FED. ROAD DIV. No.	STATE	PROJECT No.	FISCAL YEAR	SHEET No.
3	FLA.	12530-3153	'61	B-2





ELEVATION

FOR 3-SPAN EXTENSION AT BEGIN BRIDGE SEE SHEET B-2A



SAND - CEMENT RIPRAP DETAILS

REFERENCE SHEETS

B-1	Summary of Estimated Bridge Quantities Structures "A" thru "D"	B-47	Counterweight - General Details
A-2	Plan and Elevation Structure "A"	B-48	Bascule Span Machinery Layout
A-6	Plan and Elevation Bascule Structure "A"	B-49	Bascule Span Machinery Supports
B-7 & B-8	Bascule and Fender Guide Catwalk Structure "A"	B-50	Bascule Span Trunnion and Related Details
B-12	Precast Concrete Piling (Lean Prestressed)	B-51	Lock Assembly and Live Load Shoes
B-13	Bents 1-W & 16-E Sta. Back 36 M.H.W. & 10-S Structure "C" and 6-W Structure "D"	B-52	Buffer Details
B-14	Intermediate Bents Structures "A", "B", "C" and "D"	B-53	Concrete Control House
B-15	Piers 6-W & 5-W Structure "A"	B-54	Bascule Span Wiring Diagram
B-16	Piers 4-W thru 2-W & 6-E Structure "A"	B-55	Rest Pier Access Ladder and Platform
B-17	Pier 1-W, Structure "A"	B-56	Fender Details Structure "A"
B-23	48'-0" Deck Superstructure Structures "A", "C" and "D"		
B-24	72'-0" Deck Superstructure Structures "A", "C" and "D"		
B-30	Prestressed Deck Panels (E-10) Structures "A" thru "D"		
B-31	Prestressed Deck Panels (E-10) Structures "A", "C" and "D"		
B-32	Bascule Span Structure 72'-0" Span Structure "A"		
B-33	Abutments		
B-34	Substructure		
B-35	Concrete Railing, Traffic Rail Posts and Curbs and Handrail Spacing 48'-0" Span Structure "A"		
B-36	Concrete Railing, Traffic Rail Posts and Curbs and Handrail Spacing 72'-0" Span Structure "A"		
B-37	Expansion Joints, Bascule Span		
B-38	Expansion Joints		
E-39 & B-40	Traffic Signal Layout		
A-41 & B-42	Traffic Signal Installation Sheet		
B-43	Navigation Lighting and Fendering Sheet		
B-44	Concrete Quantities, Reinforcing Steel Geometry and Stress Sheet		
B-45	Bascule Span Structural Steel Framing		
B-46	Bascule Span - Main Girder		

PLAN AND ELEVATION
STRUCTURE "A"
OVER BIG CARLOS PASS

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Date	Description	S-865	LEE	ACE-30-3153
1/64	Added Typical Sand Cement Riprap Detail and Revised Sheet Numbers		Name	Date
		Detailed by	C.R.S.	1-61
		Checked by	R.C.E.	3-61
		Quantities by		
		Checked by		
		Traced by	C.R.S.	3-61

APPROVED BY: T.W.S.

Design Engr.

Scale: 2" = 1'-0"

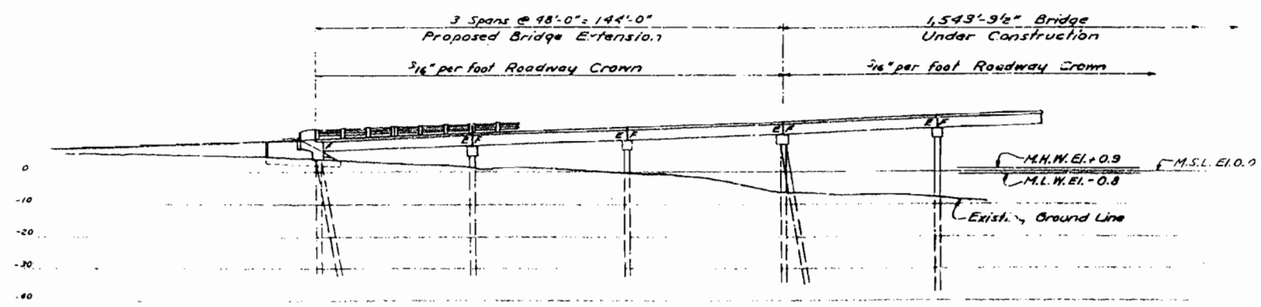
EB-3

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.		'64	B-2A



Fill shall be in place and compacted before End Bent Piles are driven. Pile holes shall be drilled through Fill to natural ground. The diameter of the holes shall be approximately 4" less than the diagonal dimension of the piles. No jetting will be permitted.

PLAN



ELEVATION

PLAN AND ELEVATION
PROPOSED EXTENSION
STRUCTURE "A"
OVER BIG CARLOS PASS

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Date	Description

ROAD NO.	COUNTY	PROJECT NO.
S-865	LEE	12530-3153

	Name	Date
Detailed by	C.E.S.	1-64
Checked by		
Quantities by		
Checked by		
Traced by	C.E.S.	1-66

APPROVED BY

Assistant State Highway Engineer

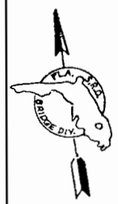
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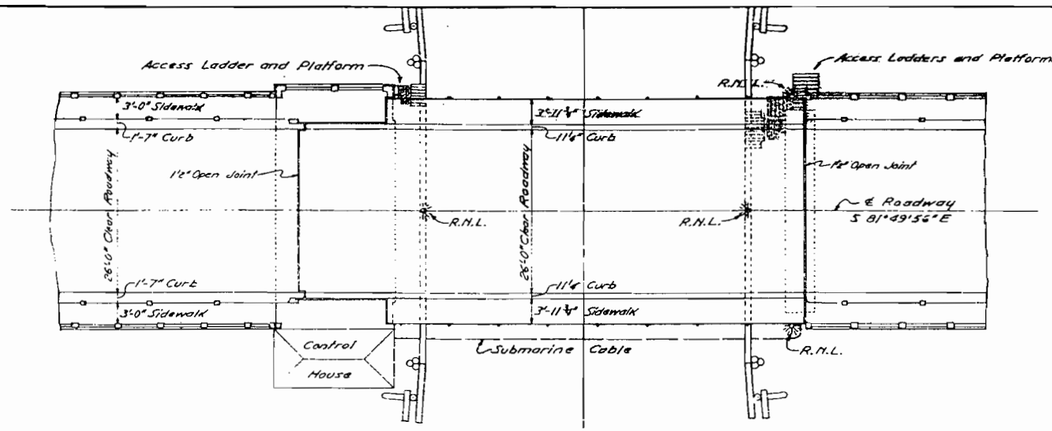
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(1)

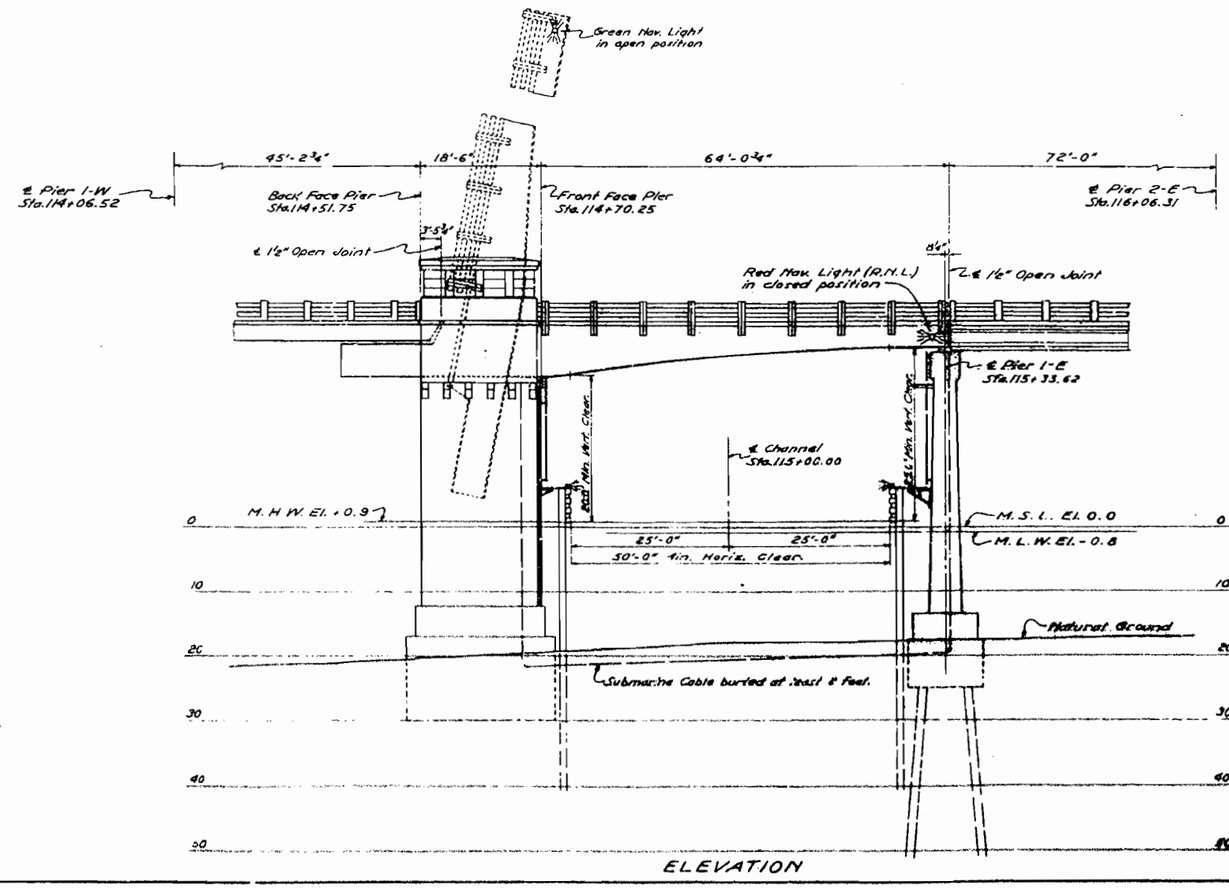
EB-4

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	12530-3153	'61	B-6





PLAN



ELEVATION

PLAN AND ELEVATION BASCULE SPAN STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Date	Description
1/64	Piles Removed Seal depth increased

ROAD NO.	COUNTY	PROJECT NO.
S-865	LEE	12530-3153

	Name	Date
Detailed by	C. E. S.	1-61
Checked by	R. E. N.	6-61
Quantities by		
Checked by		
Traced by	C. E. S.	1-61

APPROVED BY: T. W. [illegible]
Assistant State Bridge Engineer

Drawing No. 6 of 60
Index No. 7700

EB-5

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA	12530-3153	61	B-7

Note: Finish Grade Elevations are at ℄ Roadway at locations as shown.

El + 10.341

℄ Joint Bent S-W El + 12.261

℄ Joint Bent 4-W El + 4.181

℄ Jt. Bent 3-W El. +6.101

℄ Jt. Bent 2-W El. +8.021

℄ Jt. Bent 1-W El. +9.941

℄ Jt. Pier 6-W El. +21.861

℄ Jt. Pier 5-W El. +24.724

℄ Jt. Pier 4-W El. +27.211

℄ Jt. Pier 3-W El. +29.180

℄ Jt. Pier 2-W El. +30.631

℄ Jt. Pier 1-W El. +31.563

℄ 120'-0" Span Joint El. +...900

℄ (14'-0" Span) Joint Pier 1-E El. +31.341

℄ Jt. Pier 2-E El. +31.435

℄ Jt. Pier 3-E El. +31.410

℄ Jt. Bent 1-E El. +29.419

℄ Jt. Bent 2-E El. +29.278

M.S.L. El. 0.0

0 10 20 30 40 50 60 70 80 90

Fine sand and Limerock shell

Hard limestone

Very firm, brittle shell limestone with thin layers of hard limestone

Stiff shell marl

Fine sand & shell with limestone rock

Very hard, partly crystalized limestone

Fairly hard, brittle, sandy, shell, limestone

Very firm stiff shell marl

Hard, partly crystalized limestone

Fairly hard, brittle shell limestone with thin layers of stiff marl

Very firm stiff shell marl

Stiff white shell marl

Fine sand & shell with limestone rock

Very hard limestone

Soft shell marl

Hard limestone

Very firm shell marl

Hard limestone

Firm shell marl with thin layers of hard limestone

Fine sand & shell

Hard limestone

Soft shell marl

Very hard limestone

Hard limestone

Fine sand & shell

Hard limestone

Firm sandy shell marl

Hard limestone

Very firm shell marl

Hard limestone

Fine sand & shell

Hard limestone

Very firm, sandy, shell marl

Fairly hard, brittle limestone

Very hard limestone

Firm shell marl

Hard, brittle, limestone with thin layers of stiff marl

Firm shell marl

Fine sand & shell

Stiff white shell marl

Hard limestone

Very firm

Fairly hard brittle limestone

Very hard limestone

Fine sand & shell

Hard limestone

Fine sand with pieces of shell

Hard limestone

Very firm

Hard shell marl

Hard limestone

Firm shell marl

Hard shell limestone

Firm shell marl

Drive one Unloaded Composite Concrete and Steel Test Pile (20"ø) 50 feet long in tile position of a permanent plumb pile in Bent 2-W located as directed by the Engineer.

Drive one Unloaded Composite Concrete and Steel Test Pile (20"ø) 35 feet long located as directed by the Engineer.

Drive one Unloaded Composite Concrete and Steel Test Pile (20"ø) 55 feet long located as directed by the Engineer.

Drive one Unloaded 14 BP 73 Steel Test Pile 50 feet long located as directed by the Engineer.

Drive one Unloaded Composite Concrete and Steel Test Pile (20"ø) 45 feet long located as directed by the Engineer.

109 110 111 112 113 114 115 116 117 118

Note: Numbers at left of Boring Columns are blows per foot* on the Casing. Numbers at right of Boring Columns are blows per foot* on the Spoon.
* unless shown as being in inches.

Note: Borings were made along ℄ of Roadway at locations shown.

TYPE OF RIG ~ SILLIVAN HD-22

	CASING	SPOON
Inside Diameter	2.5"	1.5"
Outside Diameter	2.9"	2.0"
Weight of Hammer	490 Lbs.	140 Lbs.
Average Drop of Hammer	24"	30"

BORINGS AND FINISH GRADE ELEVATIONS STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Date	Description	ROAD NO.	COUNTY	PROJECT NO.
1-61	Three 48' Spans added.	S-865	LEE	12530-3153

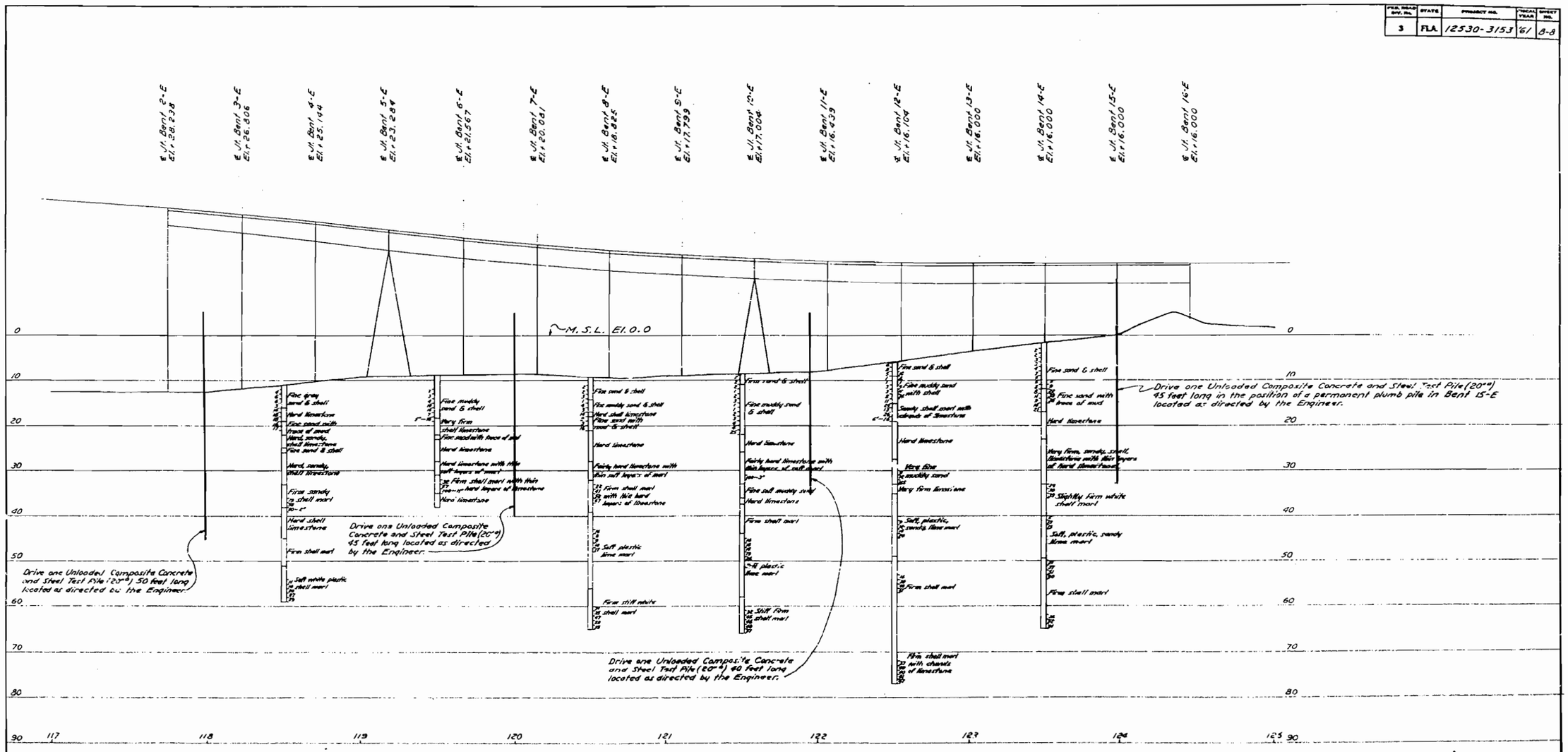
	Names	Dates
Detailed by	C.E.S.	1-61
Checked by	R.C.B.	2-61
Quantities by		
Checked by		
Traced by	C.E.S.	1-61

APPROVED BY T. W. Jennings
Bridge Engineer

SHEET NO. 7 of 20 | DRAWING NO. 7700

EB-6

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	12530-3153	61	B-8



BORINGS AND FINISH GRADE ELEVATIONS
STRUCTURE "A"

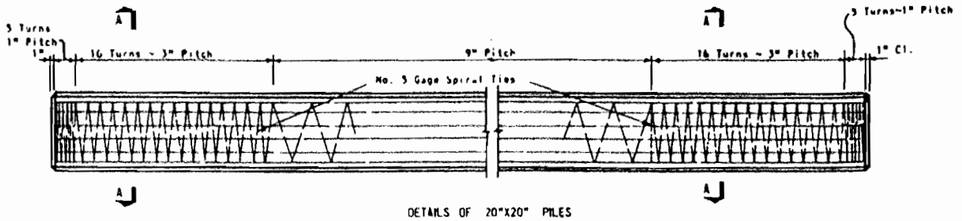
STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

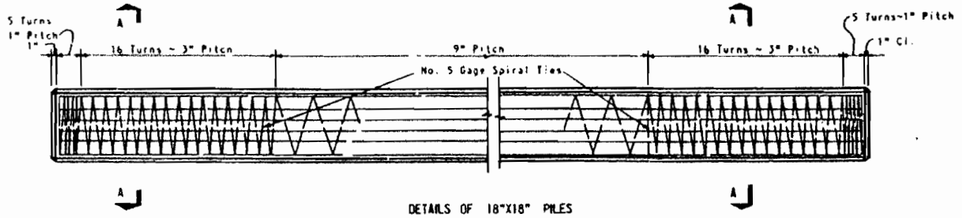
REVISIONS		ROAD NO.	COUNTY		PROJECT NO.
Date	Description	S-865	LEE		12530-3153
			Name	Date	APPROVED BY
		Detailed by	C.E.S.	1-61	
		Checked by	R.C.B.	2-61	T. W. Jennings
		Quantities by			Assistant State Bridge Engineer
		Checked by			Drawing No. 8 of 60
		Traced by	C.E.S.	1-61	Index No. 7700

EB-7

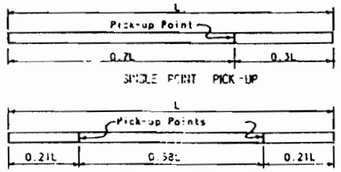
FED. ROAD DIV. NO.	STATE	PROJECT NO.	ROAD PROJECT NO.	SHEET NO.
3	FLA.	12530-3153		



DETAILS OF 20"X20" PILES
Maximum Length~ 75 Ft.~Single Point Pick-up
Maximum Length~107 Ft.~Double Point Pick-up



DETAILS OF 18"X18" PILES
Maximum Length~70 Ft.~Single Point Pick-up
Maximum Length~95 Ft.~Double Point Pick-up



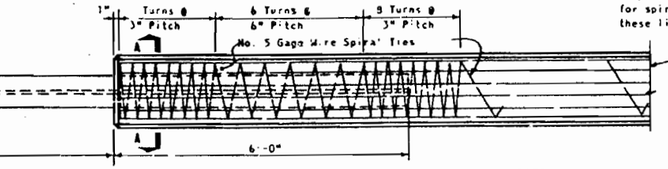
NOTE: Piles shall be marked at Pick-up Points to indicate proper points for utilizing handling lines.

DETAILS OF PRESTRESSED CONCRETE PILES

TYPICAL BONDING DETAILS FOR 18"□ & 20"□ PILE

ALTERNATE EPOXY BONDED SPLICE



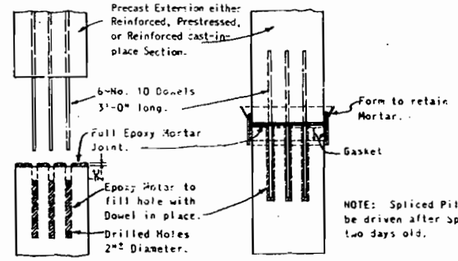


8 BP 36 or built-up Section (8"X8") having flange plates ½" min. thickness and a web plate ½" min. thickness or 2~90 lb. per yard Rails welded back to back.

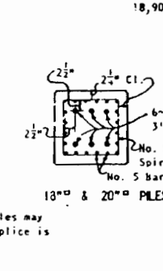
DETAILS OF 18"X18" COMPOSITE PILES

NOTE: Two ~ 90 lb. per yard or heavier Rails welded base to base or 10 WF 89. Salvaged Rails may be used.

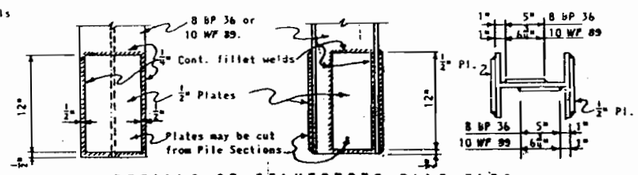
DETAILS OF 20"X20" COMPOSITE PILES



NOTE: Spliced Piles may be driven after splice is two days old.

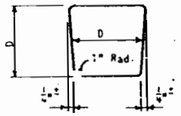


18"□ & 20"□ PILES

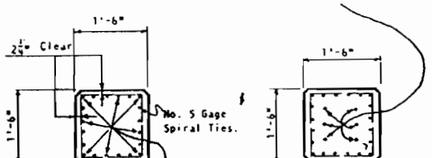


DETAILS OF REINFORCED PILE TIPS

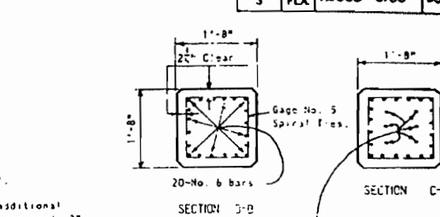
NOTE: Reinforced Pile Tips required only when shown on the Plans or ordered by the Engineer. Each Authorized Reinforced Tip shall be paid for as four additional feet of Composite Concrete and Steel Pile furnished.



TYPICAL PILE SHAPE FOR MOLD FORMS



NOTE: All build-ups shall be made with Class P Concrete.



GENERAL NOTES

SPIRAL TIES: Each wrap of spiral shall be tied to at least two corner Cables.

MATERIAL FOR SPIRAL TIES: Spirals may be manufactured from stock meeting requirements of any grade of reinforcing steel or hard drawn wire.

PILE CUTOFFS: In cutting of Concrete Piles an abrasive saw shall be used to score the Concrete at cut off Elevation to the approximate depth of Reinforcing Steel. As an alternate to sawing, scoring may be done with a templated power drill.

OCTAGONAL PILES: Prestressed Octagonal Piles of equivalent strength may be substituted for square piles. Details of pile shall be submitted to the Engineer for Approval.

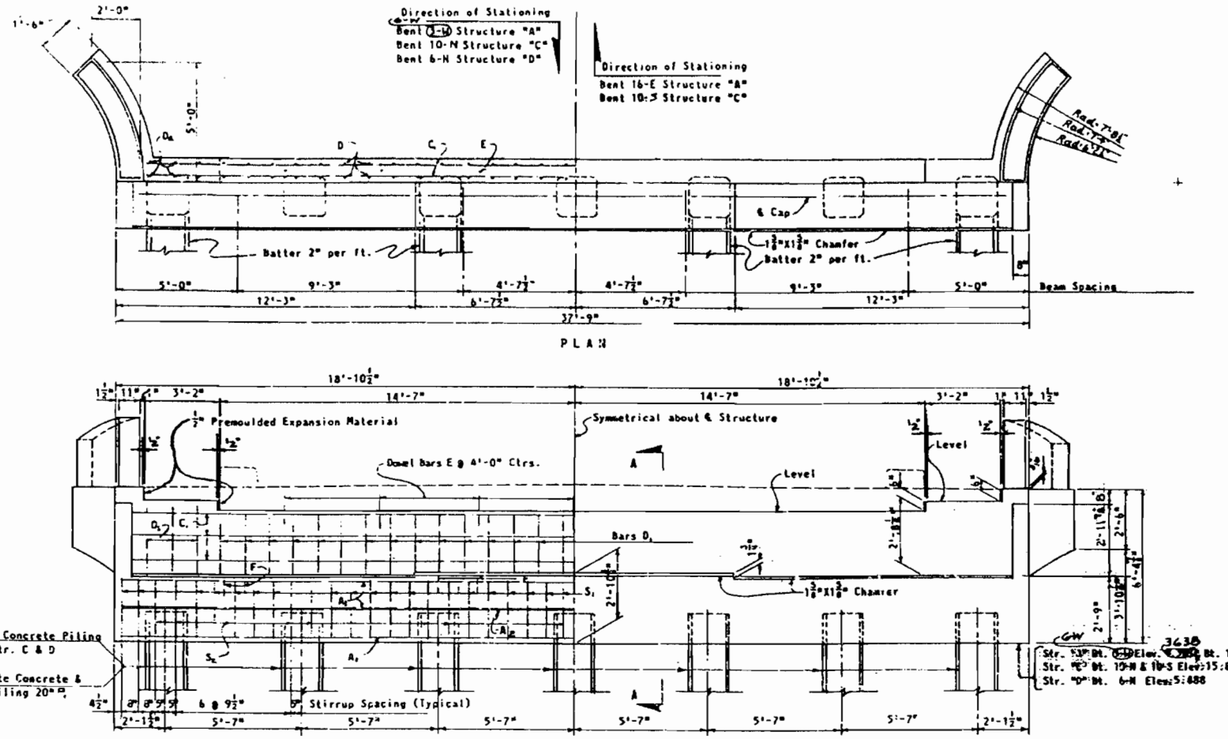
STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

TYPICAL DETAILS OF 18" SQUARE AND 20" SQUARE PRESTRESSED PILES

REVISIONS		ROAD NO.	COUNTY		PROJECT NO.
Date	Description	S-865	LEE		12530-3153
			Names	Date	APPROVED BY
		Detailed by	C.T.F.	11-61	
		Checked by	J.L.W.	11-61	T. W. Jennings
		Quantities by			Bridge Engineer
		Checked by			Drawing No. 141
		Traced by	C.T.F.	11-61	Sht. No. 3615

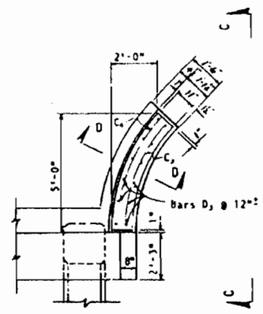
EB-8

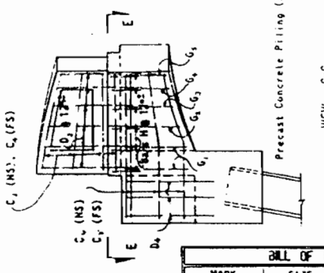
FED. ROAD DIV. No.	STATE	PROJECT No.	FISCAL YEAR	SHEET No.
3	FLA.	12530-3153	61	B-13

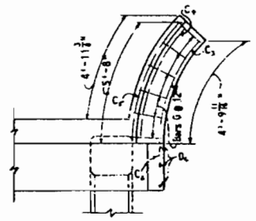


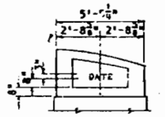
PLAN

ELEVATION



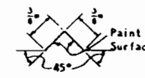






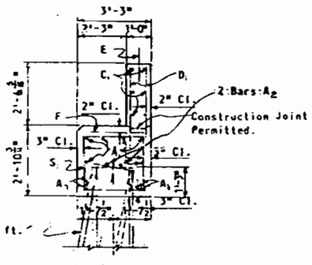
ELEVATION OF HANDRAIL POST
(Showing Date)

The date shall be placed on the South West End Post at Begin Bridge and on the North East End Post at End Bridge on Structures "A". On Structure "C" & "D" the date shall placed on the West End Post at Begin Bridge and the East End Post at End Bridge. The "Date" shall be the year the Bridge is constructed.

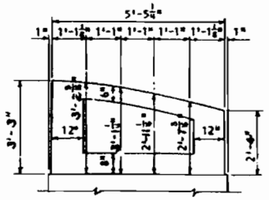


SECTION THRU RECESSED "V" TO FORM INSCRIBED LETTERS

NOTE: Black Plastic Letters 3" in height may be used in lieu of the letters formed by V-Grooves.

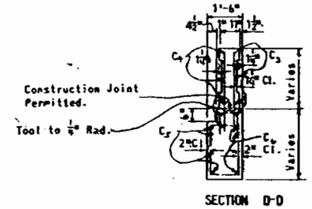


SECTION A-A



ELEVATION OF HANDRAIL POST
(Showing Dimensions)

NOTE: Quantities for the Handrail Post are included in the Estimated Quantities for the End Bent.



SECTION D-D

ESTIMATED QUANTITIES **		
ITEM	UNIT	QUANTITY
Class A Concrete (Approach Spans)	Cu. Yd.	18.30
Reinforcing Steel	Lb.	2165
Precast Concrete Piling (20"ø)	Lin. Ft.	*
Composite Concrete & Steel Piling (20"ø)	Lin.Ft.	*

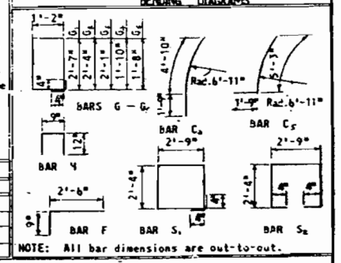
Structures C & D
Structure A

* See Estimated Bridge Quantities.
** Quantities shown are for one bent only.

BILL OF REINFORCING STEEL

MARK	SIZE	NO. REQ'D.	LENGTH
A	8	70	37'- 3"
A_s	6	2	37'- 3"
C	4	6	37'- 3"
C_3	4	8	4'- 7"
C_4	4	10	5'- 0"
C_5	6	8	7'- 0"
C_6	6	8	6'- 7"
D	4	60	3'- 5"
D_1	4	12	3'-11"
D_2	4	24	4'- 0"
D_3	4	6	3'-10"
E	6	7	1'- 6"
F	4	10	3'- 3"
G_1	4	4	8'- 2"
G_3	4	2	7'- 8"
G_2	4	2	7'- 2"
G_4	4	2	6'- 8"
G_5	4	2	6'- 4"
H	4	12	2'- 9"
S_1	4	34	10'-10"
S_2	4	14	8'- 1"

BENDING DIAGRAMS



NOTE: All bar dimensions are out-to-out.

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O., 1961.
LOADING: H20-44.
DESIGN LOAD FOR PILES: 45 Tons
DOWELS: Set Anchor Bolts shown on Superstructure Drawings.

BEARING SURFACES: All bearing surfaces on top of substructure caps for prestressed beams seated on 1" pads shall be finished to a plane parallel to the beam slope

BENTS (C-W) & 16-E STRUCTURE "A"
BENTS 10-N & 10-S STRUCTURE "C"
BENTS 6-N STRUCTURE "D"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Date	Descriptions	S-865	LEE	12530-3153
1-64	Added Str. "D" and Bent No. 6-N			

	Name	Date
Detailed by	J.J.M.	5-60
Checked by	R.C.B.	6-60
Quantities by	J.J.M.	5-60
Checked by	R.C.B.	6-60
Traced by	J.J.M.	5-60

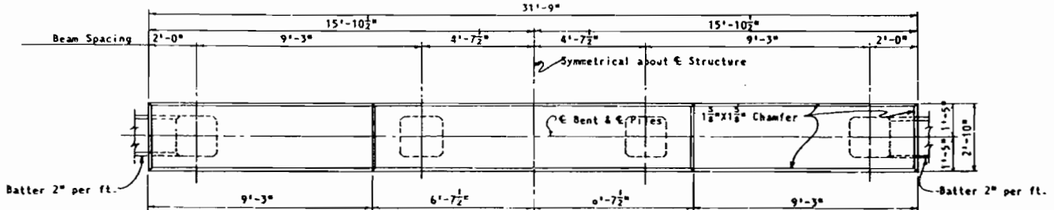
APPROVED BY: J. W. Jennings, Assistant State Highway Engineer

Drawing No. 12 of 60. Index No. 7700

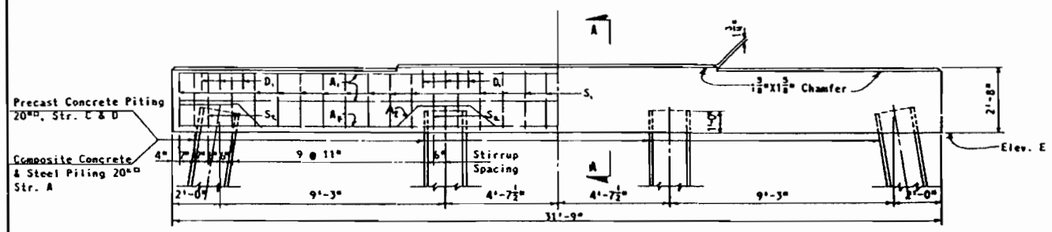
13

EB-9

FED. ROAD DIST. No.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	12530-3153	61	B-14

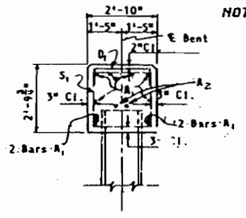


PLAN



ELEVATION

INTERMEDIATE BENT (TYPE A)



SECTION A-A

TABLE OF ELEVATIONS "E"

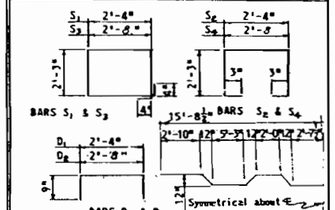
STRUCTURE "A"		STRUCTURE "C"		STRUCTURE "D"	
BENT	ELEV. "E"	BENT	ELEV. "E"	BENT	ELEV. "E"
2-W	11.401	9-N & S	18.380	5-N	6.781
1-W	13.321	8-N & S	20.731	4-N	7.760
1-E	22.819	7-N & S	22.519	3-N	8.509
2-E	21.618	6-N & S	24.619	2-N	9.027
3-E	20.186	5-N & S	26.131		
4-E	18.524	4-N & S	27.355		
5-E	16.664	3-N & S	28.291		
6-E	14.947	2-N & S	28.939		
7-E	13.461				
8-E	12.205				
9-E	11.179				
10-E	10.384				
11-E	9.819				
12-E	9.484				
13-E	9.380				
14-E	9.380				
15-E	9.380				
4-W	7.541				
5-W	5.641				

NOTE: Bent 3-W Structure "A" is not included. For Details of Bent 3-W See Sheet No. B-14A.

BILL OF REINFORCING STEEL #

MARK	SIZE	NO. REQUIRED TYPE A	NO. REQUIRED TYPE B	LENGTH
A_1	8	10	—	31'- 3"
A_2	8	2	—	33'-11"
D_1	4	12	—	3'-10"
D_2	4	—	12	4'- 2"
S_1	4	28	—	9'-10"
S_2	4	8	—	7'- 4"
S_3	4	—	34	10'- 6"
S_4	4	—	12	7'- 8"
A_3	10	—	10	31'- 3"
C	6	—	2	31'- 3"

BENDING DIAGRAMS



NOTE: All bar dimensions are out-to-out.

ESTIMATED QUANTITIES #

ITEM	UNIT	QUANTITY TYPE A	QUANTITY TYPE B
Class A Concrete (Approach Spans)	Cu.Yd.	8.68	9.54
Reinforcing Steel	Lb.	1270	1772
Precast Concrete Piling (20"□)	Lin.Ft.	*	*
Composite Concrete & Steel Piling (20"□)	Lin.Ft.	*	*

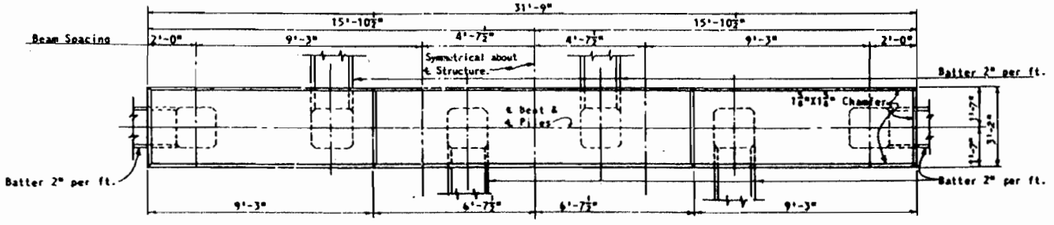
Structure C & D

Structure A

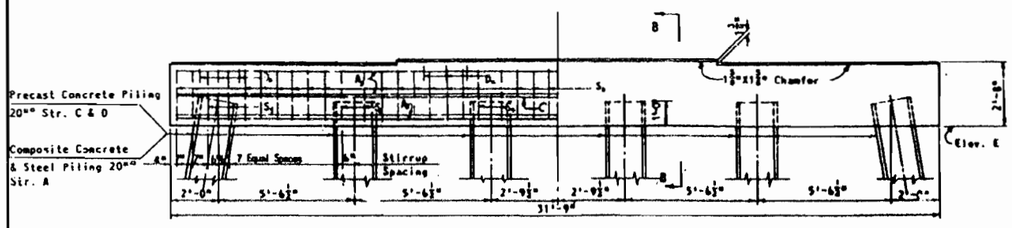
* See Estimated Bridge Quantities.

\# Bill of Reinforcing Steel and Estimated Quantities are for One Bent only.

NOTE: For location of Intermediate Tower Bents, (Type B) See Sheet No. B-2 & B-4.

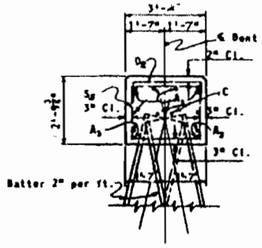


PLAN



ELEVATION

INTERMEDIATE TOWER BENT (TYPE B)



SECTION B-B

GENERAL NOTES

DESIGN LOAD FOR PILES: 55 Tons.

DOWELS AND ANCHOR BOLTS: Set Anchor Bolts shown on Superstructure Drawings.

BEARING SURFACES: All bearing surfaces on top of substructure caps for Prestressed Beams seated on 1" pads shall be finished to a plane parallel to the beam slope.

INTERMEDIATE BENTS FOR STRUCTURE "A" "C" & "D"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Date	Description	ROAD NO.	COUNTY	PROJECT NO.
1-64	Beams 4-W 15-W Added.	S-865	LEE	12530-3153

	Name	Date
Detailed by	J.J.M.	4-60
Checked by	R.C.B.	5-60
Quantities by	J.J.M.	5-60
Checked by	R.C.B.	5-60
Traced by	J.J.M.	4-60

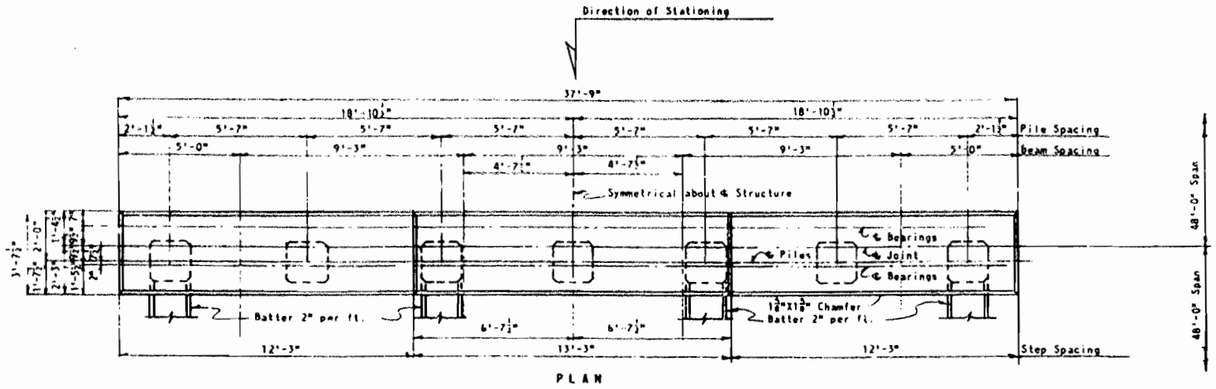
APPROVED BY: [signature]

Date: 13 JUNE 60

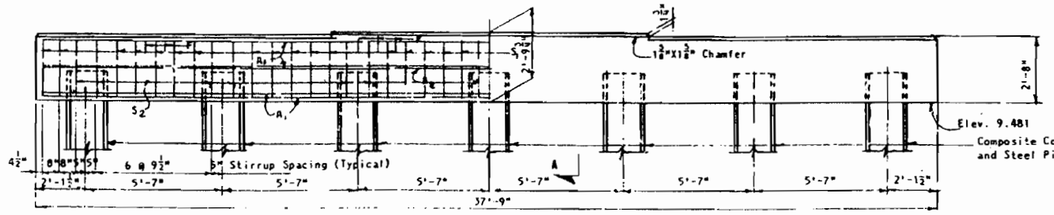
Index No. 7700

EB·10

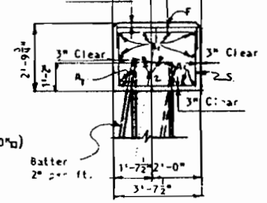
FINAL DRAWING REVISION NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.		64	8-M



PLAN



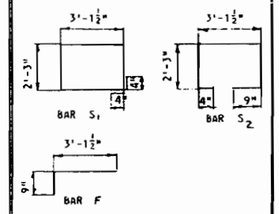
ELEVATION



SECTION A-A

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D.	LENGTH
A1	8	10	37'- 3"
A2	6	2	37'- 3"
F	4	10	3'- 11"
S1	4	34	11'- 5"
S2	4	14	8'- 8"

BENDING DIAGRAMS



NOTE: All bar dimensions are out-to-out.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A Concrete (Approach Spans)	Cu. Yd.	12.93
Reinforcing Steel	Lb.	1473
Precast Concrete and Steel Piling (20"□)	Lin.Ft.	*

* See Estimated Bridge Quantities.

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O., 1961
LOADING: H20-44
DESIGN LOAD FOR PILES: 45 Tons
DOWELS: Set Anchor Bolts shown on Superstructure Drawings.
BEARING SURFACES: All bearing surfaces on top of Substructure Caps for prestressed beams seated on 1" pads shall be finished to a plane parallel to the beam slope.

INTERMEDIATE BENT 3 W FOR STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Date	Description	S-865	LEE	12530-3153

	Name	Date
Detailed by	AGM	1-64
Checked by	A.C.B.	1-64
Quantities by	AGM	1-64
Checked by	A.C.B.	1-64
Traced by	AGM	1-64

APPROVED BY

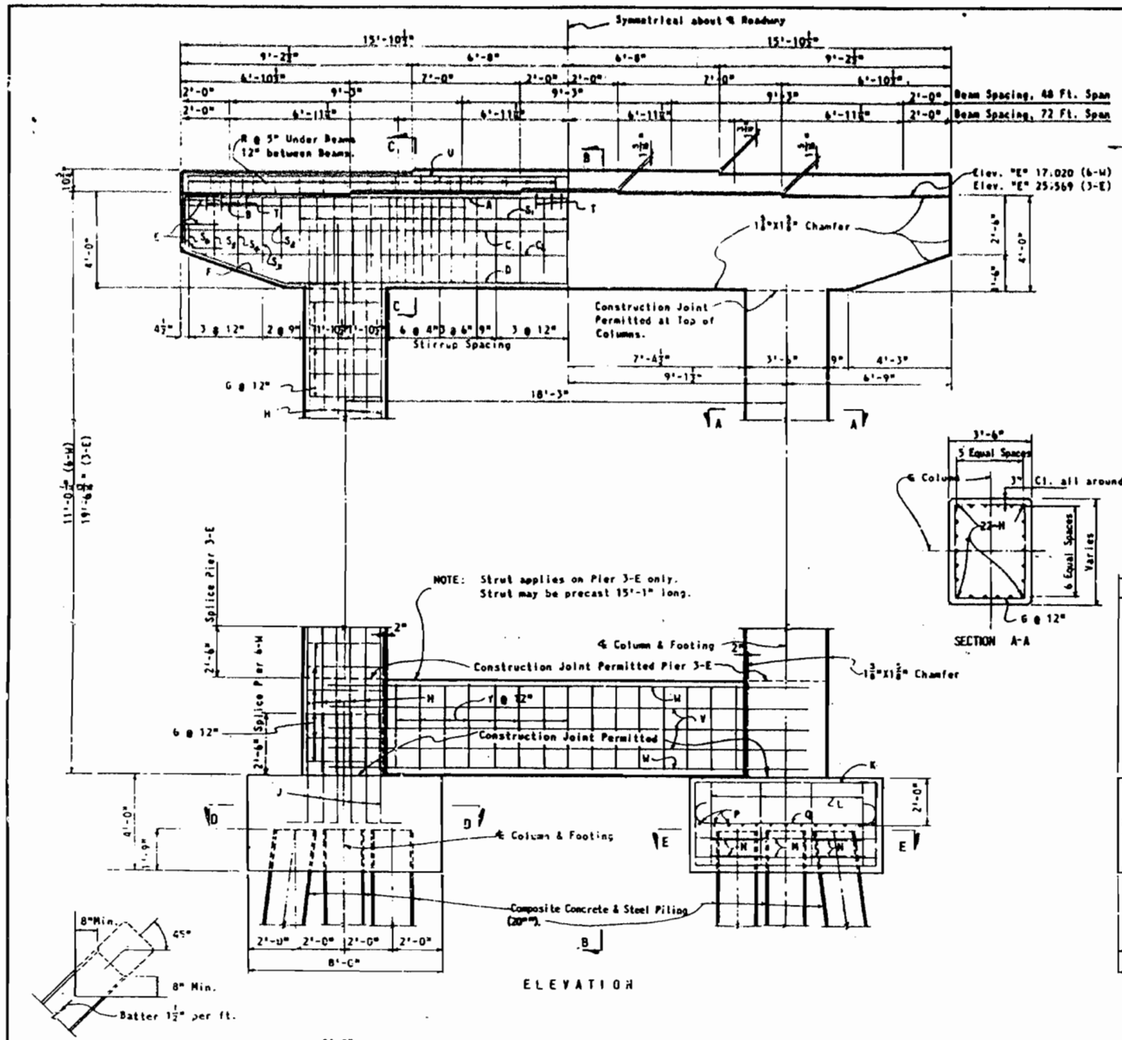
Assistant State Highway Engineer

Drawing No. 2 of 2

Index No. 8330

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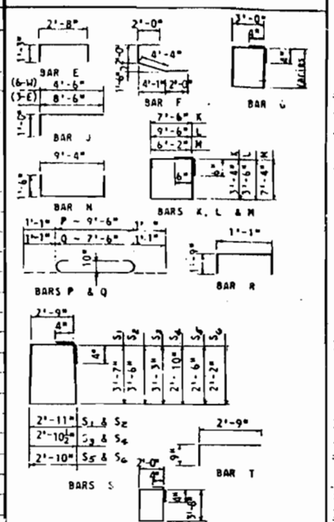
FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	12530-3153	61	B-15



BILL OF CONSTANT REINFORCING STEEL

MARK	SIZE	NO. REQ'D.	LENGTH
A	10	7	31'- 3"
B	10	4	11'- 6"
C_1	8	2	31'- 3"
C_2	8	2	29'- 9"
D	10	7	22'- 9"
E	6	6	5'- 2"
F	6	6	10'- 4"
K	8	8	22'- 8"
L	8	8	27'- 0"
M	6	8	28'- 0"
N	6	8	12'- 4"
P	9	26	11'- 8"
Q	8	30	9'- 8"
R	4	42	4'- 7"
S_1	5	37	13'- 6"
S_2	5	2	13'- 4"
S_3	5	2	12'-10"
S_4	5	2	12'- 0"
S_5	5	2	11'- 3"
S_6	5	2	10'- 7"
T	4	14	3'- 6"
U	5	2	31'- 3"

BENDING DIAGRAMS



BILL OF VARIABLE REINFORCING STEEL

MARK	SIZE	PIER 6-W NO. REQ'D.	PIER 6-W LENGTH	PIER 3-E NO. REQ'D.	PIER 3-E LENGTH
J	8	44	5'-6"	44	9'-6"
G	4	24	Varies	40	Varies
H	8	44	10'-0"	44	14'-6"
V	5			6	20'-0"
W	7			10	20'-0"
Y	4			15	11'-8"

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY 6-W	QUANTITY 3-E
Class A Concrete (Approach Spans)	Cu.Yd.	45.55	59.12
Reinforcing Steel	Lb.	8540	10,335
Composite Concrete & Steel Piling (20"ø)	Lin.Ft.	*	*

* See Estimated Bridge Quantities.

GENERAL NOTES

DESIGN LOAD FOR PILES: 55 Tons.
BEARING SURFACES: All bearing surfaces on top of Substructure Caps for Prestressed Beams seated on 1" pads shall be finished to a plane parallel to the beam slope.
Bearing surfaces for all other types shall be finished level.
DOWELS AND ANCHOR BOLTS: Set Anchor Bolts shown on Superstructure Drawings.

PIER NO. 6-W & 3-E FOR STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Dates	Descriptions

ROAD NO.	COUNTY	PROJECT NO.
S-385	LEE	12530-3153

	Names	Dates
Detailed by	E.C.B.	5-60
Checked by	MEP	5-60
Quantities by	E.C.B.	5-60
Checked by	NWB	1-61
Traced by		

APPROVED BY

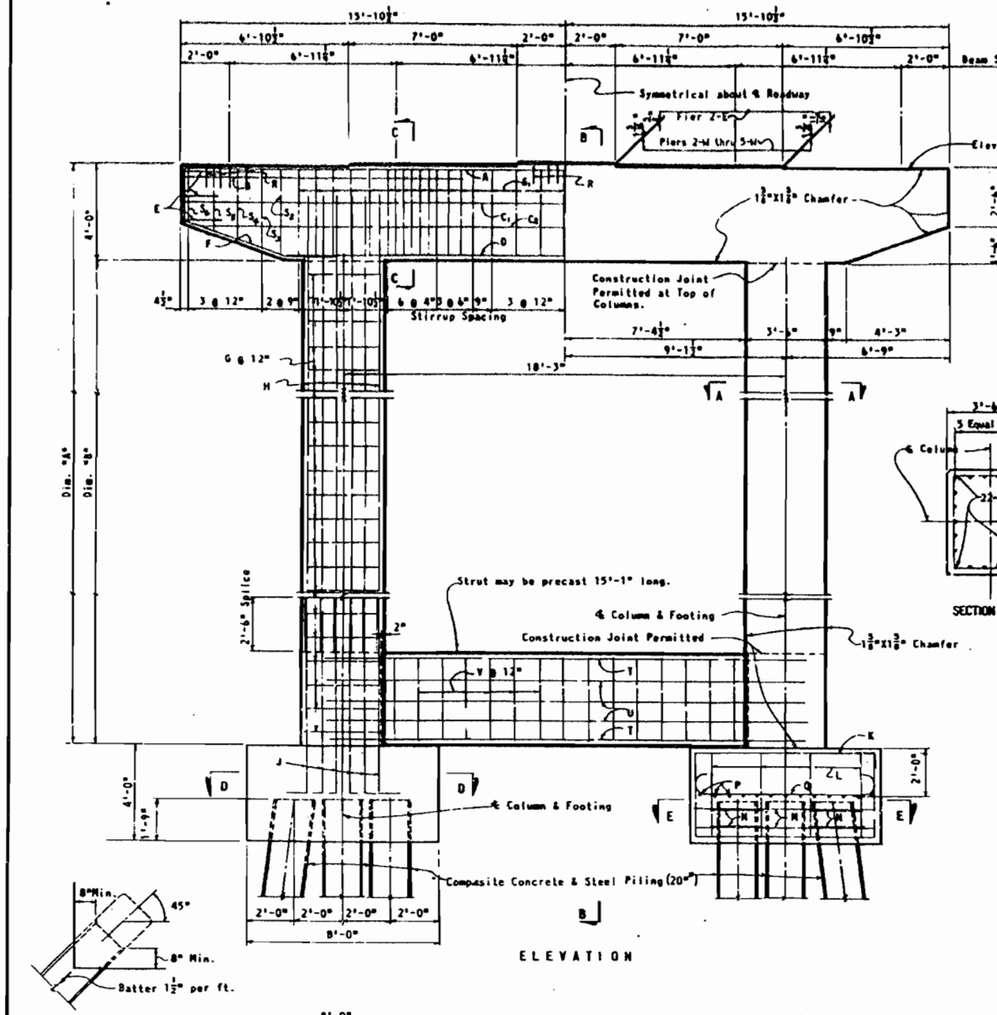
Assistant State Highway Engineer

Drawing No. 7700

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EB-12

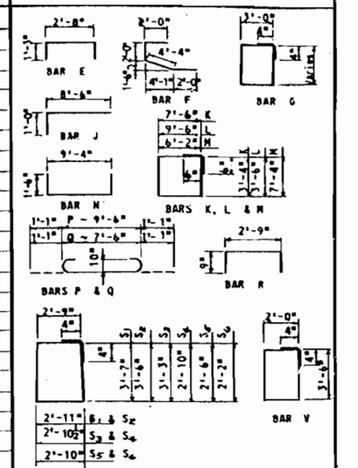
Revision Number	Date	Project No.	Sheet No.
3	FLA.	12530-3153	8-13-46



BILL OF CONSTANT REINFORCING STEEL

MARK	SIZE	NO. REQ'D.	LENGTH
A	10	7	31'- 3"
B	10	4	11'- 6"
C_1	8	2	31'- 3"
C_2	8	2	29'- 9"
D	10	7	22'- 9"
E	6	6	5'- 2"
F	6	6	10'- 4"
G	4	See Table	Varies
H	8	44	See Table
J	8	44	9'- 6"
K	8	8	22'- 8"
L	8	8	27'- 0"
M	6	8	28'- 0"
N	6	8	12'- 4"
P	9	26	11'- 8"
Q	8	30	9'- 8"
R	3	14	4'- 3"
S_1	5	37	13'- 6"
S_2	5	2	13'- 4"
S_3	5	7	12'- 10"
S_4	5	2	12'- 0"
S_5	5	2	11'- 3"
S_6	5	2	10'- 7"
T	7	10	20'- 0"
U	5	6	20'- 0"
V	4	15	11'- 8"

BENDING DIAGRAMS



NOTE: All bar dimensions are out-to-out.

BILL OF VARIABLE REINFORCING STEEL

ITEM	2-W	3-W	4-W	5-W	2-E
G Bars Req'd.	32	30	26	20	34
H Bar Length	14'-10"	13'-4"	11'-5"	8'-10"	15'-9"

BILL OF VARIABLE DIMENSIONS

ITEM	2-W	3-W	4-W	5-W	2-E
Dim. "A"	19'-9 7/16"	18'-4 7/16"	16'-4 7/16"	13'-10 3/8"	20'-8 3/8"
" "B"	15'-9 7/16"	14'-4 7/16"	12'-4 7/16"	9'-10 3/8"	16'-8 3/8"
" "C"	4'-0 6/8"	4'-0 6/8"	3'-11 5/8"	3'-10"	4'-1 2/8"
" "D"	2'-11 2/8"	2'-11 2/8"	3'-0 2/8"	3'-1"	2'-11 3/8"
Elev. "E"	25.789	24.339	22.370	19.833	26.707

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY						
		2-W	3-W	4-W	5-W	2-E		
Class A Concrete (Approach Spans)	Cu. Yd.	57.86	56.36	54.33	51.82	58.70		
Reinforcing Steel	Lb.	10,178	9,923	9,662	9,385	10,244		
Composite Concrete & Steel Piling (20")	Lin. Ft.	*	*	*	*	*	*	*

* See Estimated Bridge Quantities.

NOTE: Bill of Reinforcing Steel and Estimated Quantities are for One Pier only.

NOTE: For General Notes see Sheet No. 8-15.

PIERS 2-W THRU 5-W & 2-E FOR STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES BETWEEN ESTERO ISLAND AND BONITA BEACH

REVISIONS Dates	Descriptions

ROAD NO.	COUNTY	PROJECT NO.
S-865	LEE	12530-3153

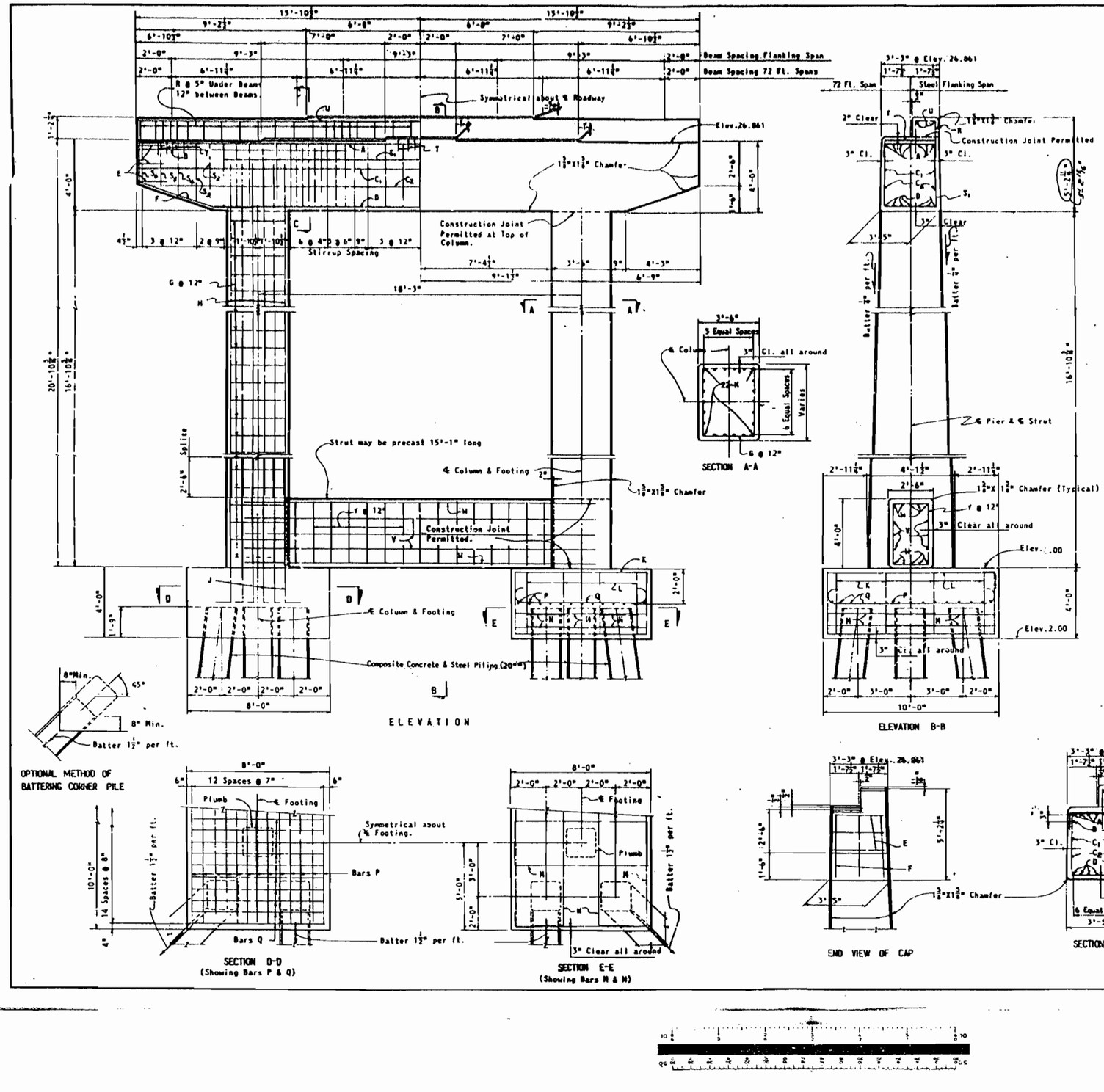
	Names	Dates
Detailed by	R.C.B.	5-60
Checked by	M.E.F.	6-60
Quantities by	R.C.B.	5-60
Checked by	NWB	1-61
Traced by		

APPROVED BY: T. W. Lawrence, Assistant State Engineer, Bridge Engineer

Sheet No. 15 of 60 | Contract No. 7700

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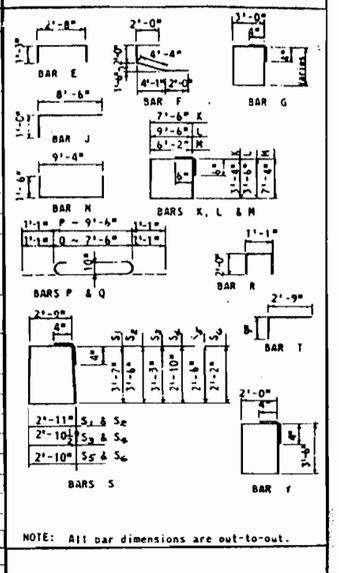
FED. ROAD DIST. NO.	STATE	PROJECT NO.	FINAL VOL.	SHEET NO.
3	FLA.	12530-3153	61	847



BILL OF REINFORCING STEEL

MARK	SIZE	NO. REQ'D.	LENGTH
A	10	7	31'- 3"
B	10	4	11'- 6"
C_1	8	2	31'- 3"
C_2	8	2	29'- 9"
D	10	7	22'- 9"
E	6	6	5'- 2"
F	6	6	10'- 4"
G	4	34	Varies
H	8	44	16'- 0"
J	8	44	9'- 6"
K	8	8	22'- 8"
L	8	8	27'- 0"
M	6	8	28'- 0"
N	6	8	12'- 4"
P	9	26	11'- 8"
Q	8	30	9'- 8"
R	4	42	5'- 1"
S_1	5	37	13'- 6"
S_2	5	2	13'- 4"
S_3	5	2	12'-10"
S_4	5	2	12'- 0"
S_5	5	2	11'- 3"
S_6	5	2	10'- 7"
T	4	14	3'- 6"
U	5	2	31'- 3"
V	5	6	20'- 0"
W	7	10	20'- 0"
Y	4	15	11'- 8"

BENDING DIAGRAMS



NOTE: All bar dimensions are out-to-out.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class A Concrete (Approach:Spans)	Cu. Yd.	61.10
Reinforcing Steel	Lb.	10,473
Composite Concrete & Steel Piling (20"ø)	Lin. Ft.	*

* See Estimated Bridge Quantities.

NOTE: For General Notes see Sheet No. B-15 .

PIER 1-W FOR STRUCTURE "A"

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

BRIDGES OVER ESTERO ISLAND AND BONITA BEACH

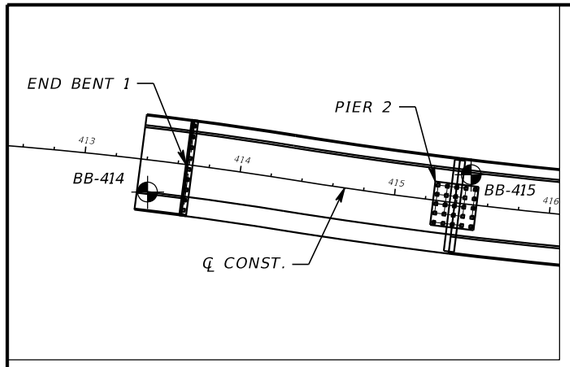
REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Dates	Descriptions	S-865	LEE	12530-3153
1-60	Cap depth revised elevation "B"			

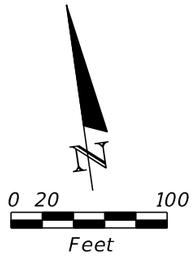
	Names	Dates
Detailed by	R.C.B.	5-60
Checked by	M.F.S.	5-60
Quantities by	R.C.B.	5-60
Checked by	N/A	1-61
Traced by		

APPROVED BY

Standard No. 16 of 60

Index No. 7700





BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

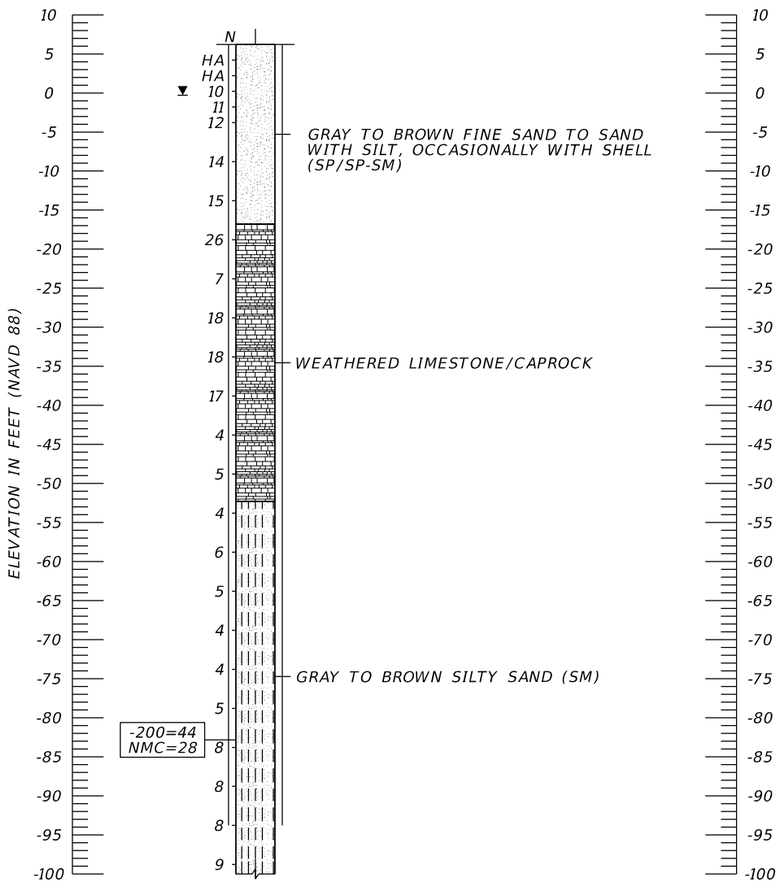
- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

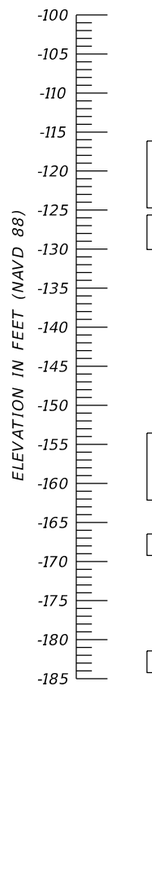
℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

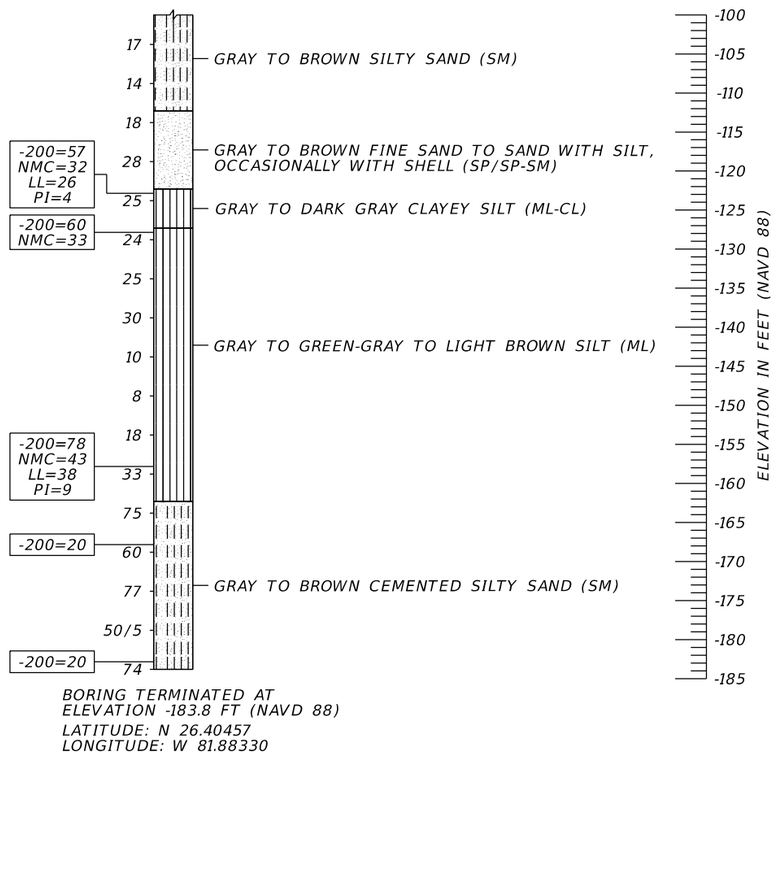
	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BB-414
STA. 413+40
REF. ℄ CONST.
OFF. 21' RT.
ELEV. 6.2
DATE 7/21/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BB-414 (CONTINUED)





BORING TERMINATED AT ELEVATION -183.8 FT (NAVD 88)
LATITUDE: N 26.40457
LONGITUDE: W 81.88330

BRIDGE NO. 124143

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

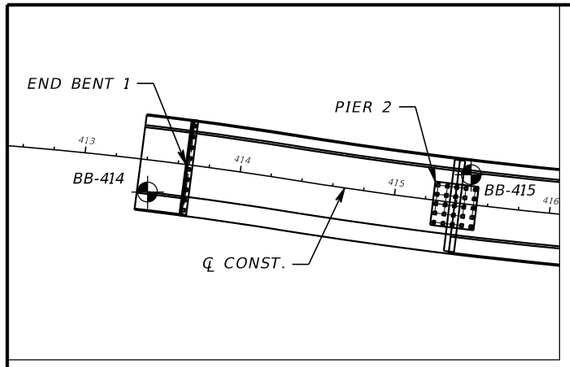
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

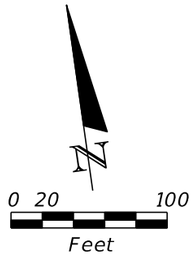
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

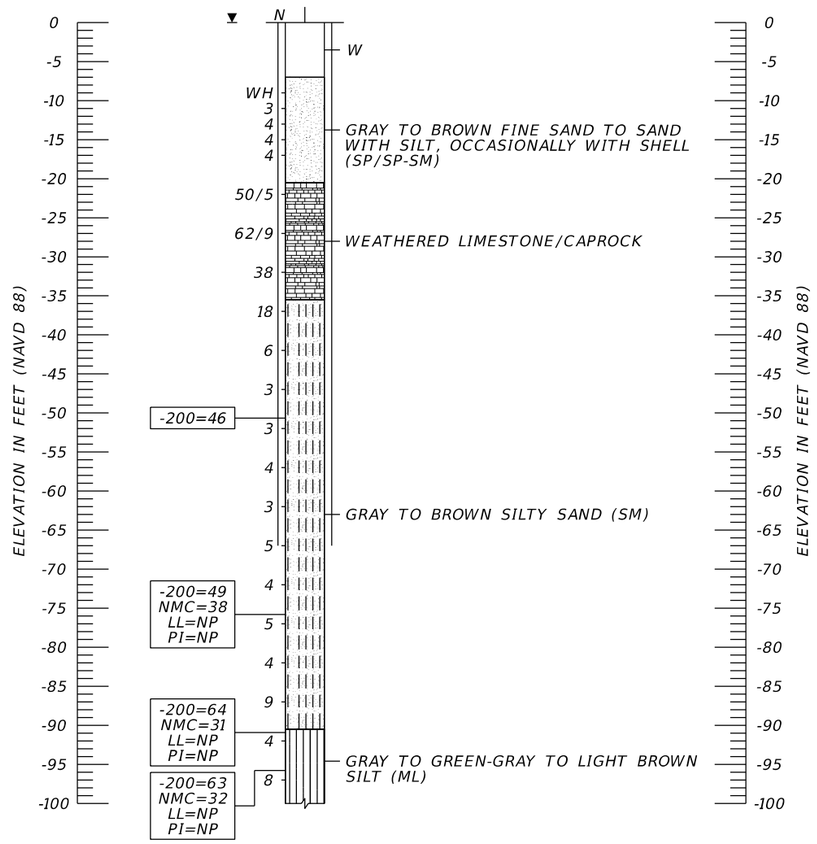
SHEET TITLE: REPORT OF CORE BORINGS (1)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



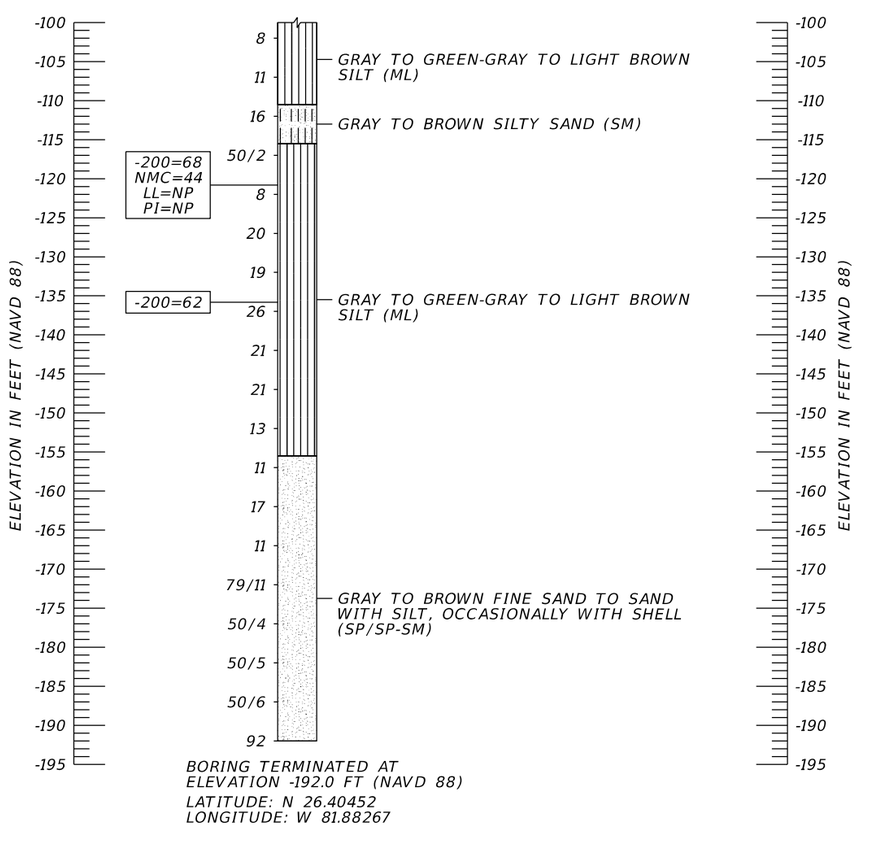


BORING LOCATION PLAN

BOR # BB-415
STA. 415+47
REF. ℄ CONST.
OFF. 19' LT.
ELEV. -7.0 (MUDLINE)
DATE 6/1/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55



BB-415 CONTINUED



BORING TERMINATED AT
ELEVATION -192.0 FT (NAVD 88)
LATITUDE: N 26.40452
LONGITUDE: W 81.88267

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

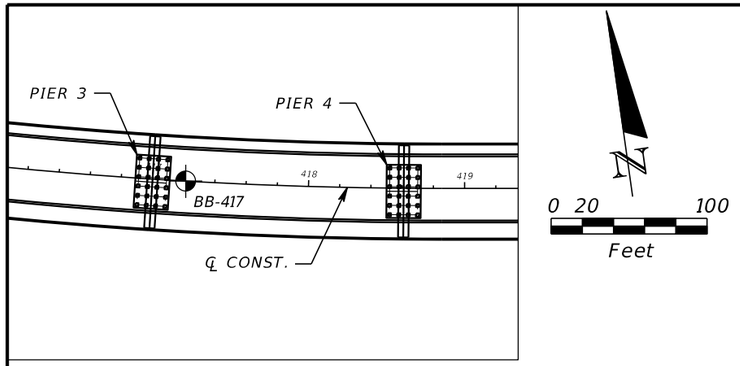
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

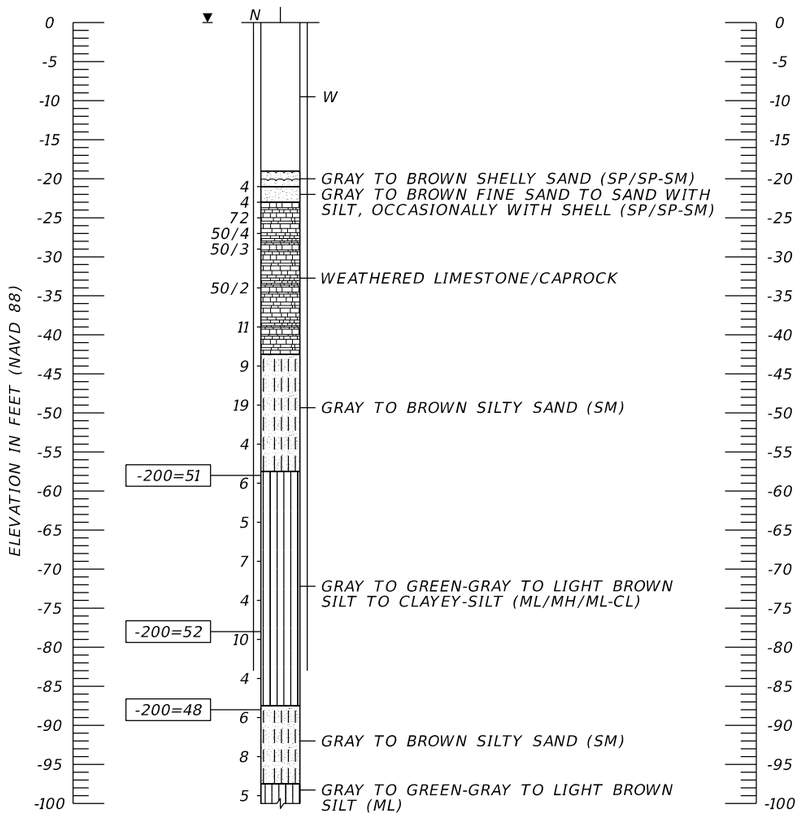
ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

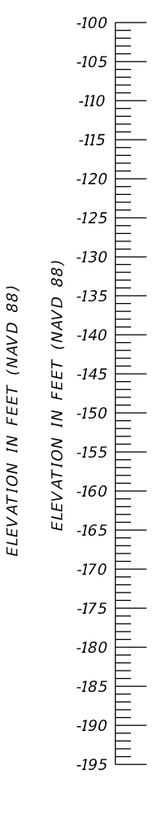
SHEET TITLE: REPORT OF CORE BORINGS (2)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN

BOR # BB-417
STA. 417+21
REF. ℄ CONST.
OFF. CENTERLINE
ELEV. -19.0 (MUDLINE)
DATE 6/10/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55



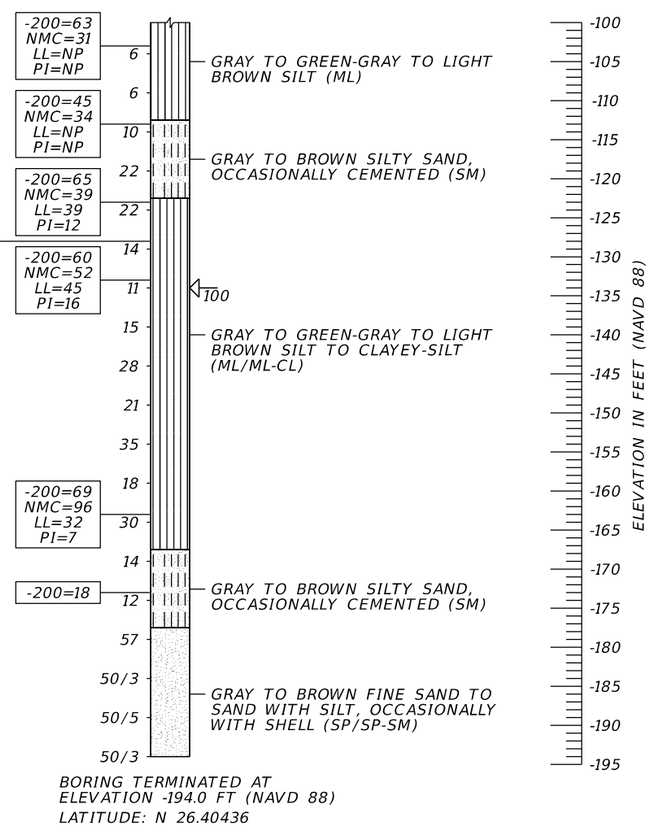


RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BB-417 CONTINUED



BORING TERMINATED AT
ELEVATION -194.0 FT (NAVD 88)
LATITUDE: N 26.40436
LONGITUDE: W 81.88217

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

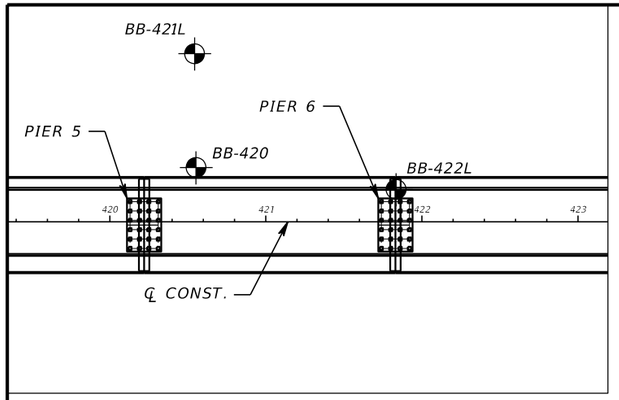
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

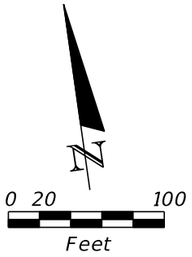
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (3)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.





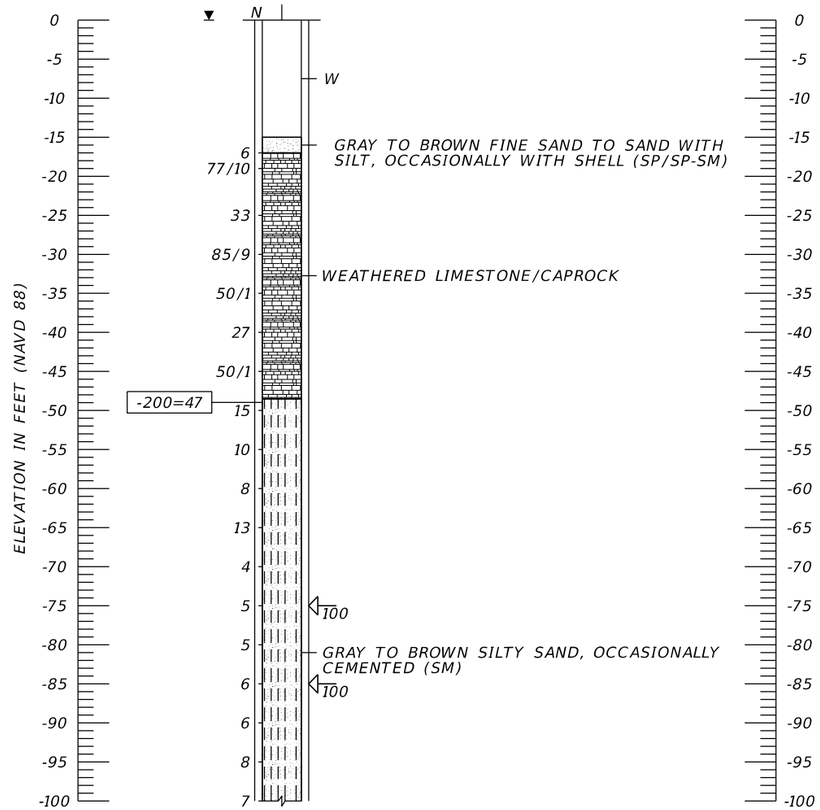
BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

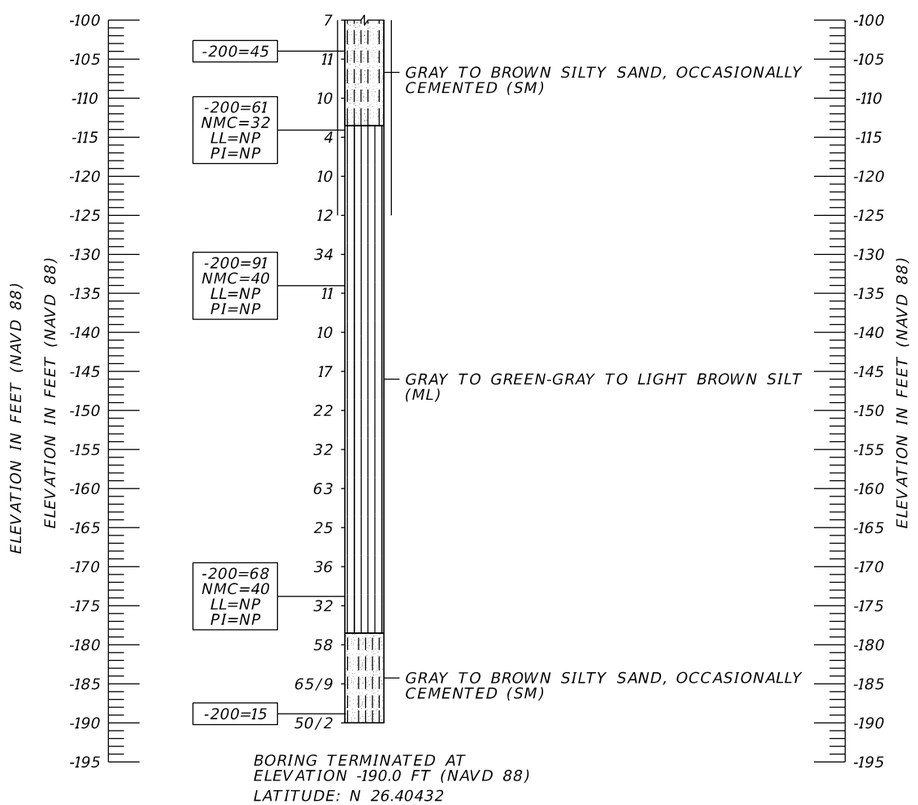
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BOR # BB-420
STA. 420+55
REF. ℄ CONST.
OFF. 35' LT.
ELEV. -15.0 (MUDLINE)
DATE 5/28/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55



BB-420 CONTINUED



BORING TERMINATED AT
ELEVATION -190.0 FT (NAVD 88)
LATITUDE: N 26.40432
LONGITUDE: W 81.88115

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

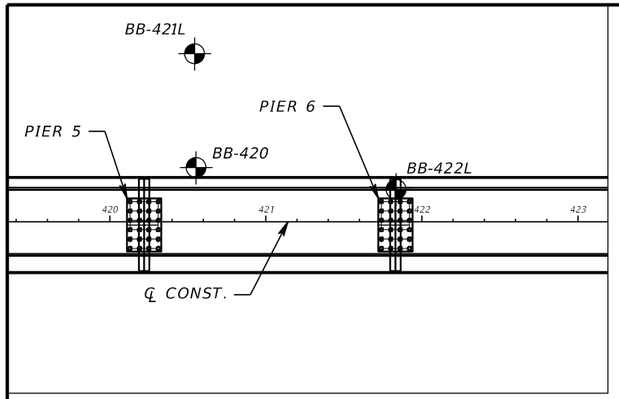
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

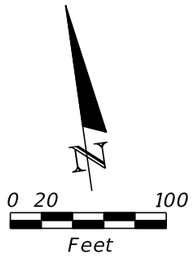
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (4)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN

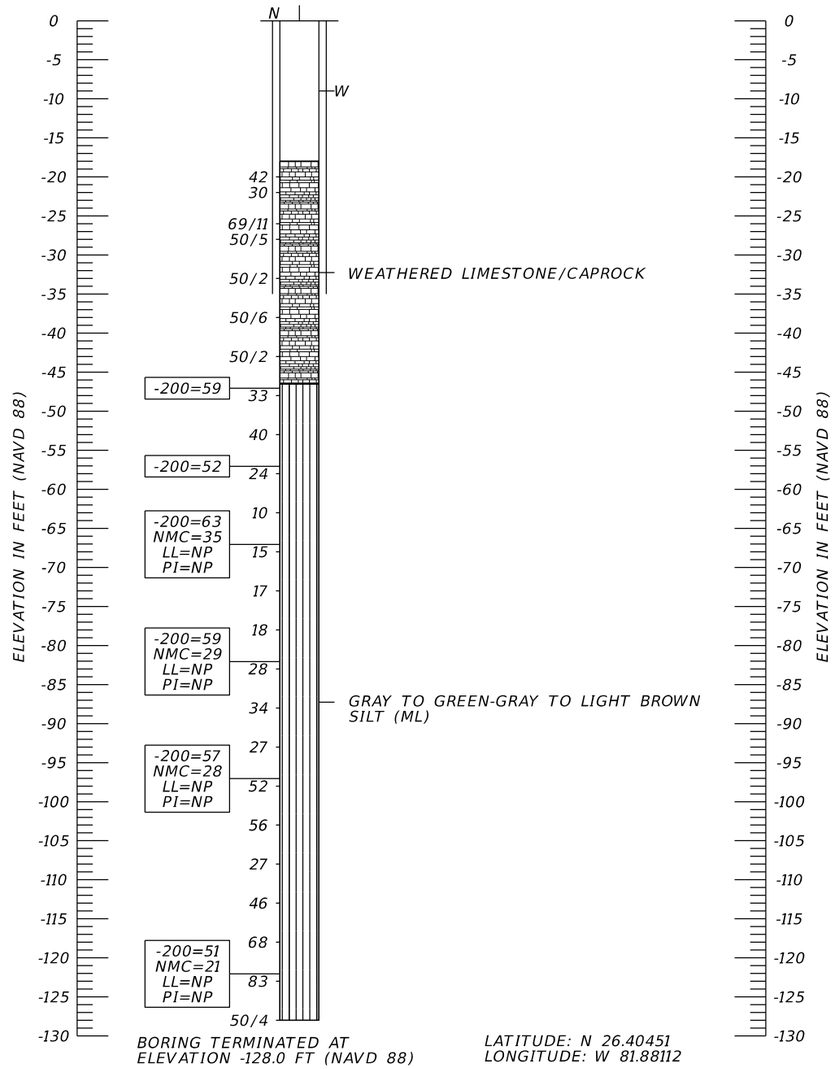


RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BOR # BB-421L
STA. 420+54
REF. ℄ CONST.
OFF. 108' LT.
ELEV. -18.0 (MUDLINE)
DATE 12/2/2017
DRILLER J. ERICKSON
HAMMER SAFETY
RIG D-25



BORING TERMINATED AT ELEVATION -128.0 FT (NAVD 88)

LATITUDE: N 26.40451
LONGITUDE: W 81.88112

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

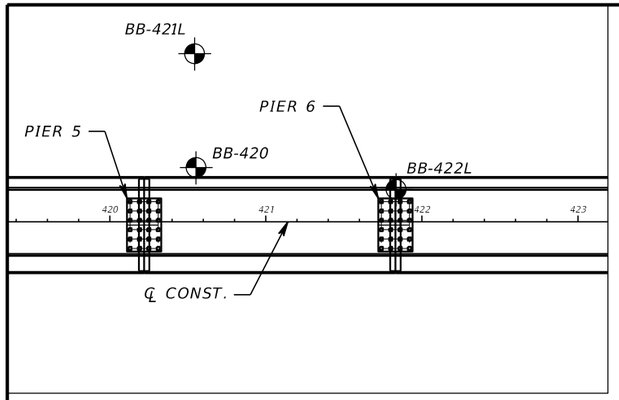
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

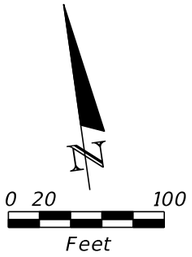
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (5)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN

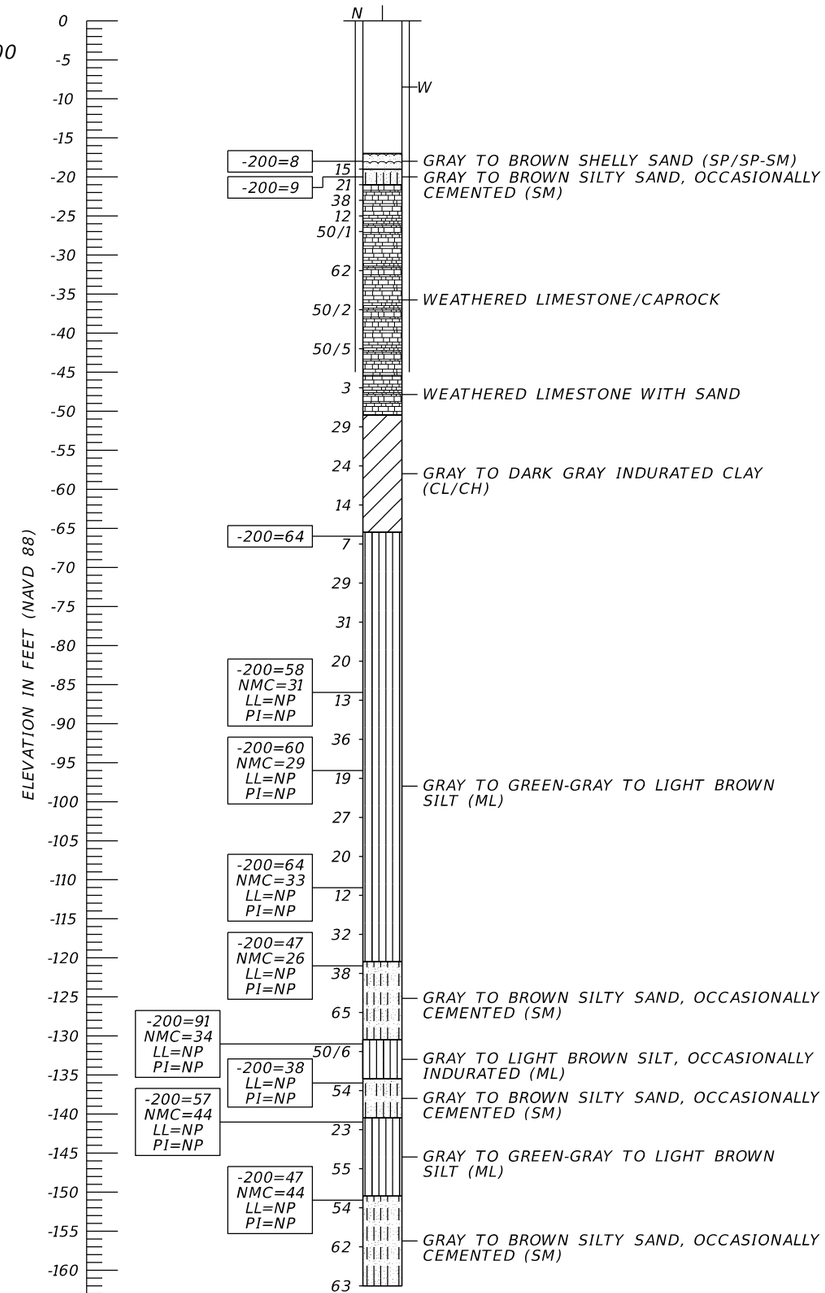


RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BOR # BB-422L
STA. 421+83
REF. ℄ CONST.
OFF. 21' LT.
ELEV. -17.0 (MUDLINE)
DATE 12/3/2017
DRILLER J. ERICKSON
HAMMER SAFETY
RIG D-25



BORING TERMINATED AT ELEVATION -162.0 FT (NAVD 88)

LATITUDE: N 26.40423
LONGITUDE: W 81.88076

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

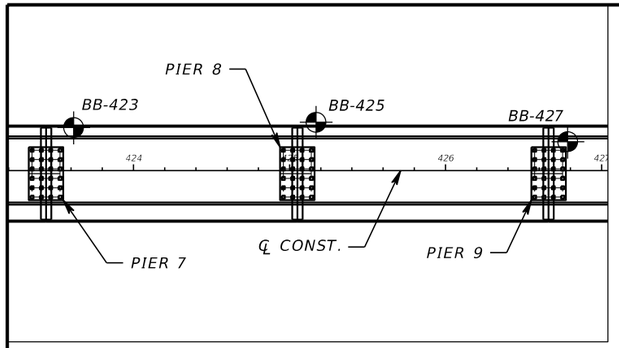
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

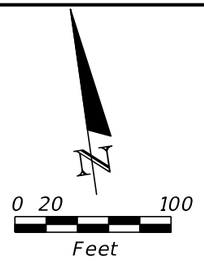
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (6)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.





RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

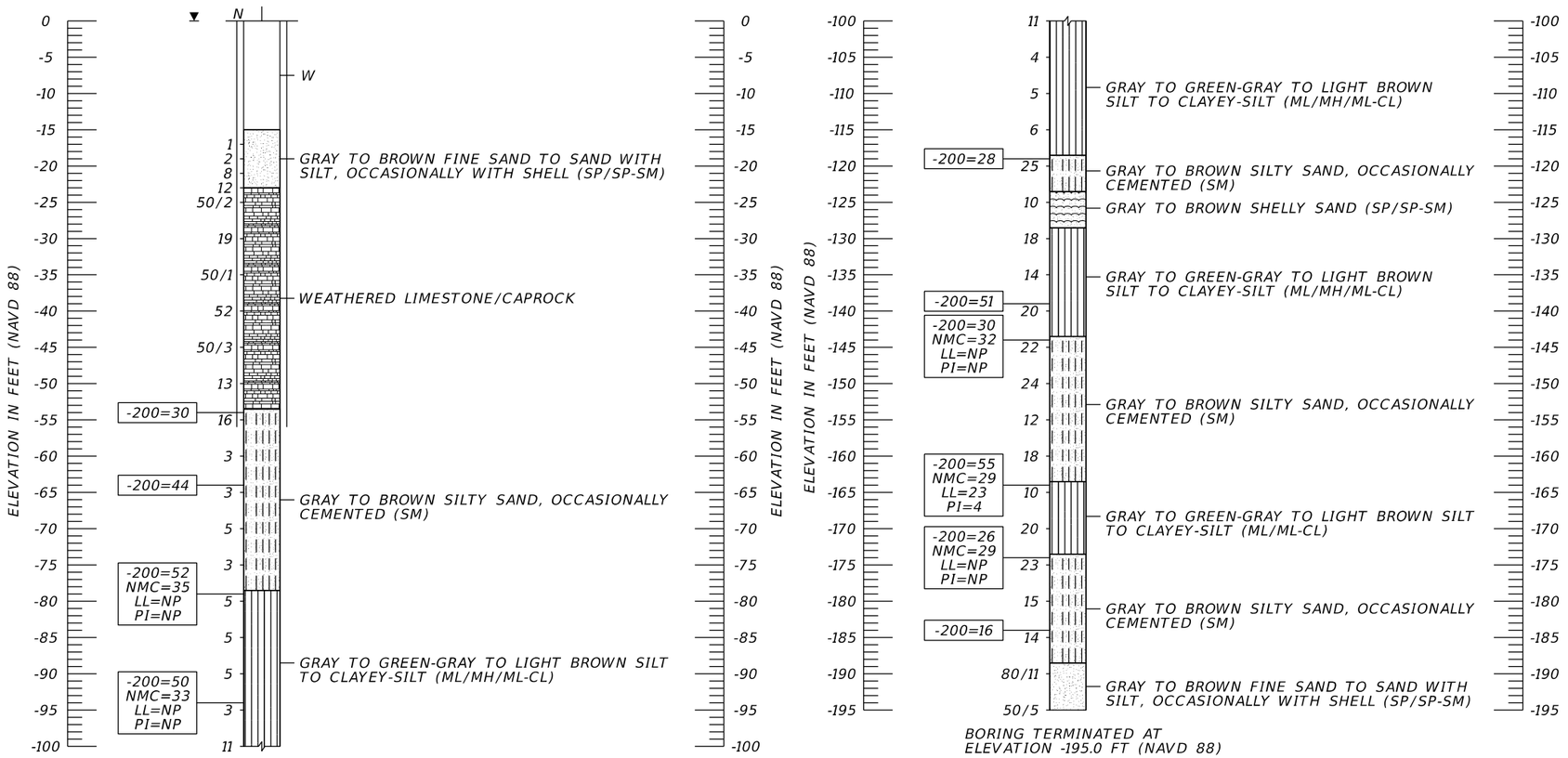
LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
℄ CONST.	CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

BORING LOCATION PLAN

BOR # BB-423
STA. 423+62
REF. ℄ CONST.
OFF. 28' LT.
ELEV. -15.0 (MUDLINE)
DATE 6/12/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55



BB-423 CONTINUED

BORING TERMINATED AT
ELEVATION -195.0 FT (NAVD 88)
LATITUDE: N 26.40418
LONGITUDE: W 81.88022

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

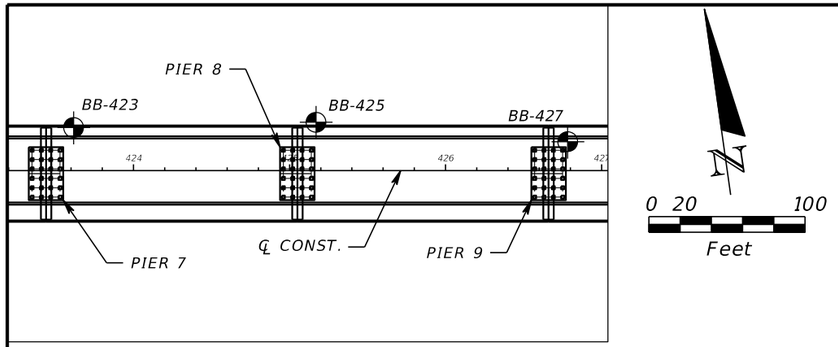
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

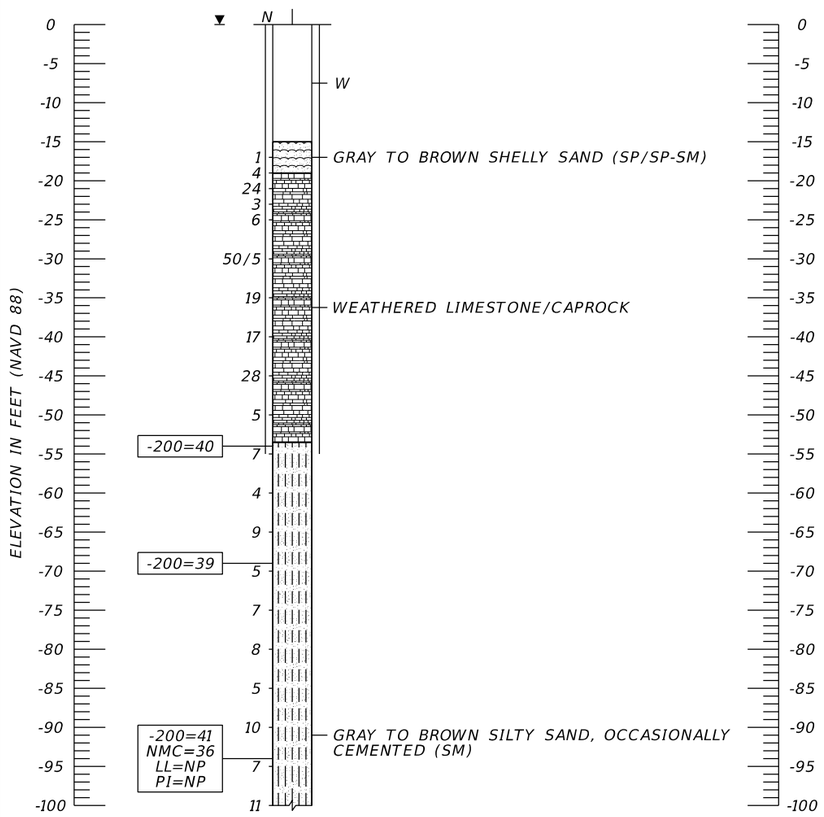
ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

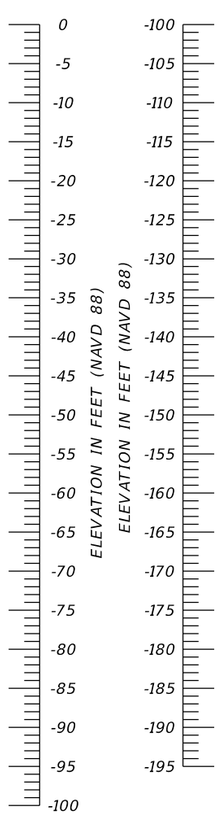
SHEET TITLE: REPORT OF CORE BORINGS (7)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN

BOR # BB-425
STA. 425+17
REF. ℄ CONST.
OFF. 31' LT.
ELEV. -15.0 (MUDLINE)
DATE 6/15/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55



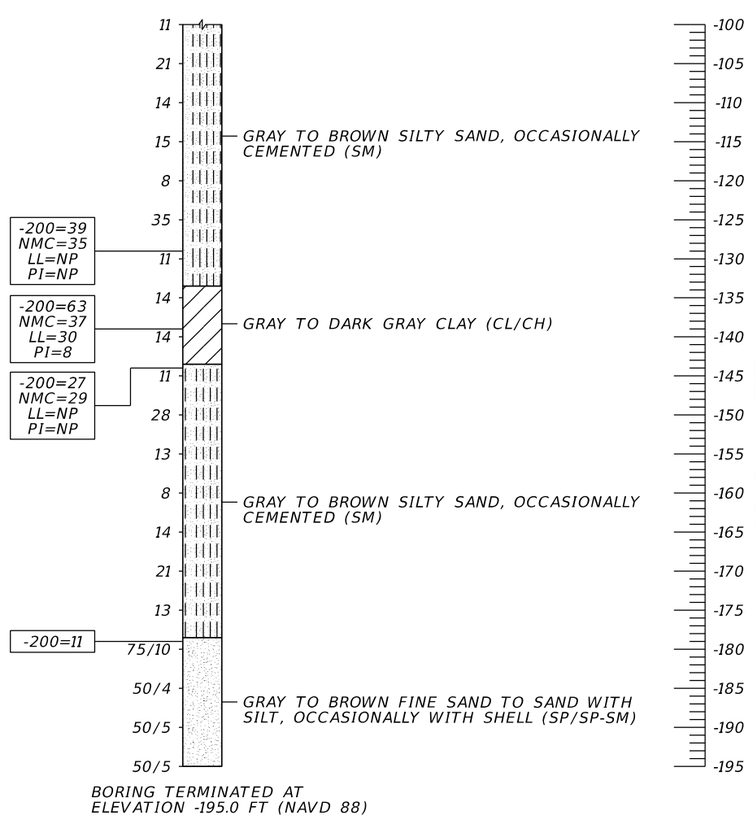


RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BB-425 CONTINUED



BORING TERMINATED AT ELEVATION -195.0 FT (NAVD 88)
LATITUDE: N 26.40413
LONGITUDE: W 81.87975

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

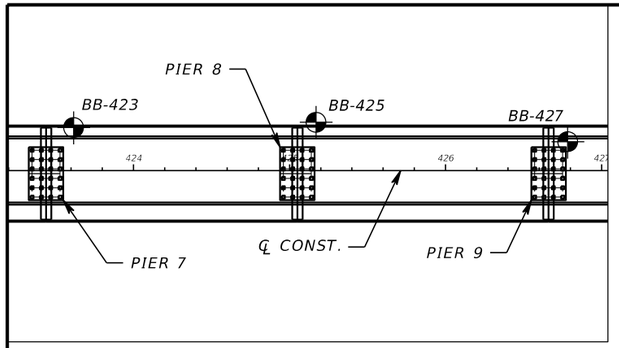
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

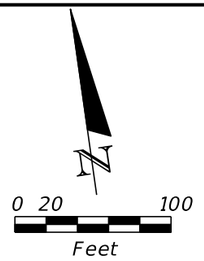
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (8)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.





RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988

APPROXIMATE SPT BORING LOCATION

GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

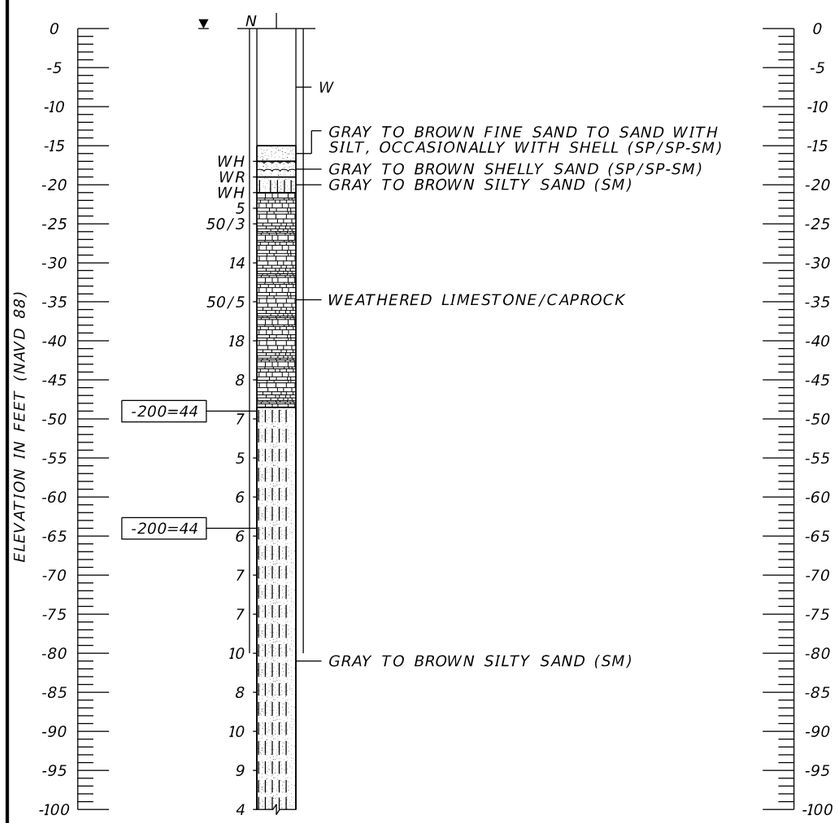
100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

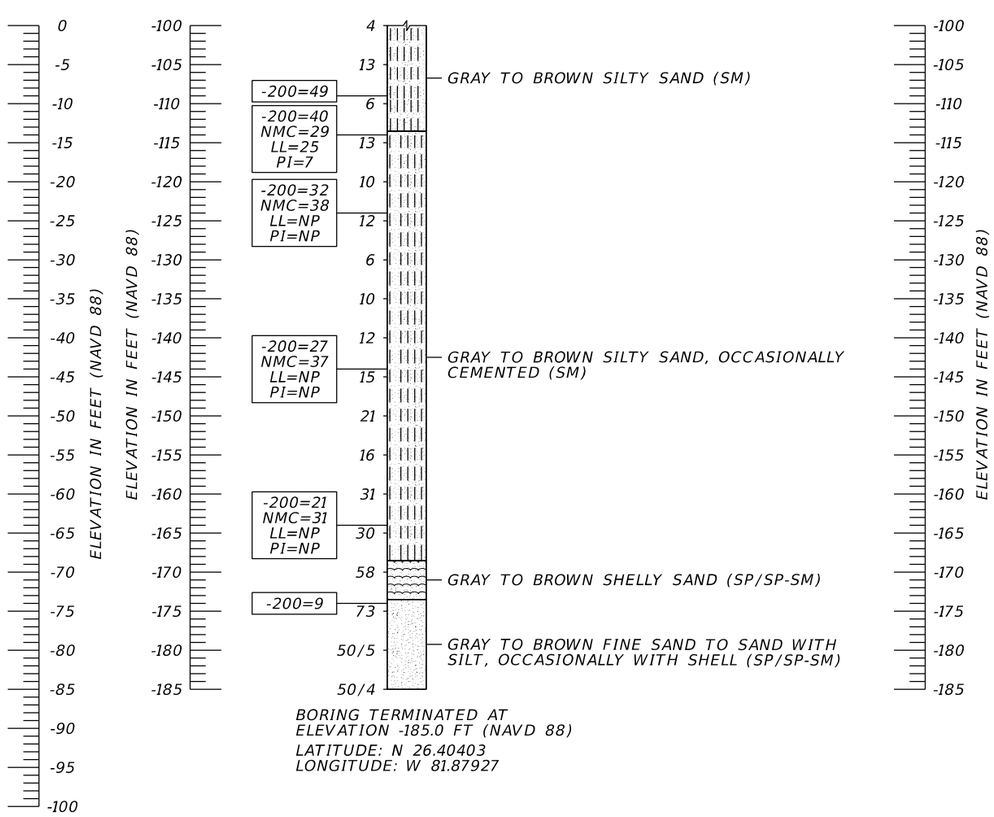
CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

BORING LOCATION PLAN

BOR # BB-427
STA. 426+78
REF. ℄ CONST.
OFF. 18' LT.
ELEV. -15.0 (MUDLINE)
DATE 6/25/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55





BB-427 CONTINUED

BORING TERMINATED AT
ELEVATION -185.0 FT (NAVD 88)
LATITUDE: N 26.40403
LONGITUDE: W 81.87927

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY:	BJS
CHECKED BY:	TM
DESIGNED BY:	BJS
CHECKED BY:	EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

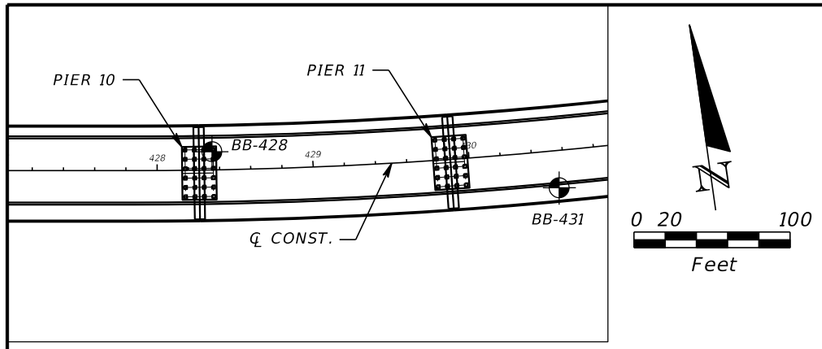
SHEET TITLE: REPORT OF CORE BORINGS (9)

REF. DWG. NO.

PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS

SHEET NO.

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BORING LOCATION PLAN

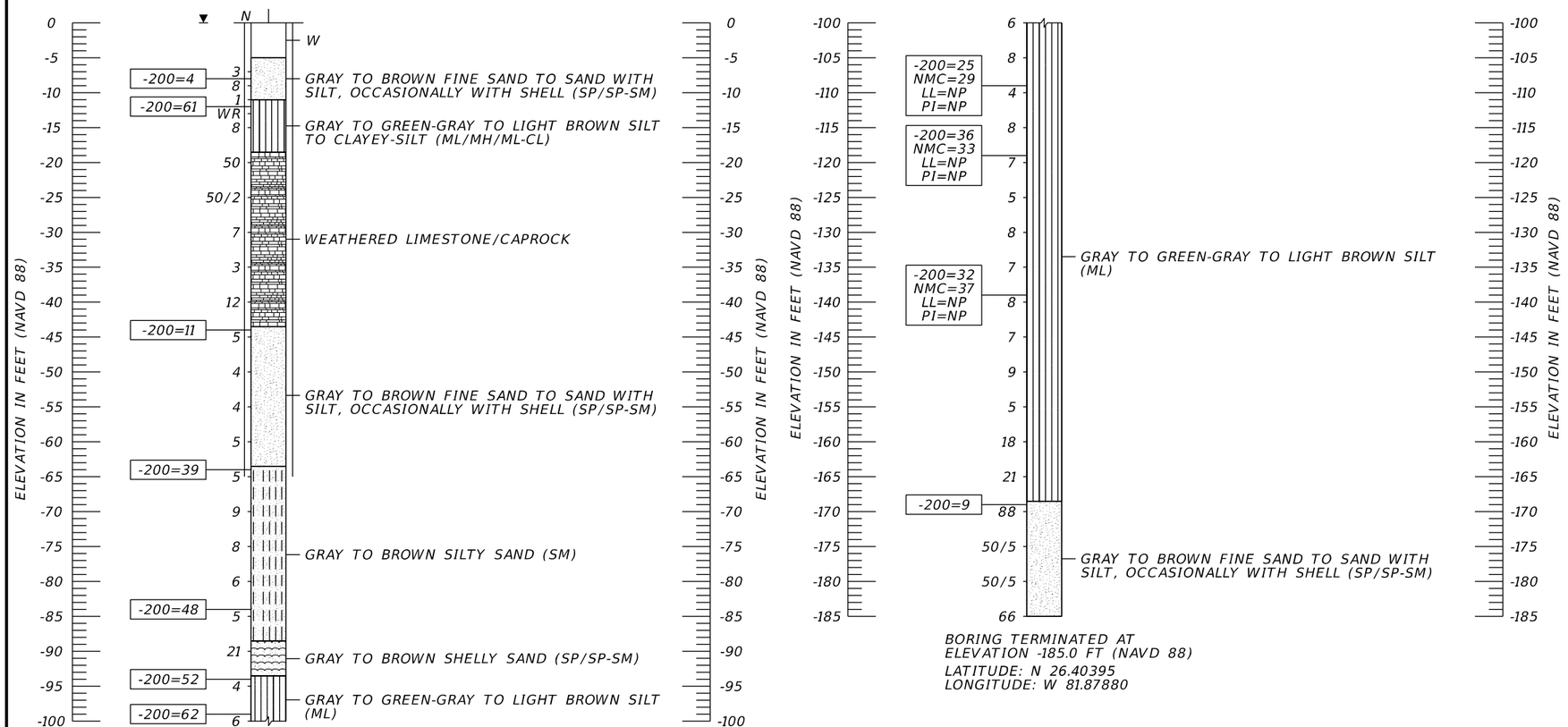
RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BOR # BB-428
STA. 428+35
REF. ℄ CONST.
OFF. 12' LT.
ELEV. -5.0 (MUDLINE)
DATE 6/23/2020
DRILLER D. MCKENZIE
HAMMER AUTOMATIC
RIG CME 55

BB-428 CONTINUED



BORING TERMINATED AT
ELEVATION -185.0 FT (NAVD 88)
LATITUDE: N 26.40395
LONGITUDE: W 81.87880

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
℄ CONST.	CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

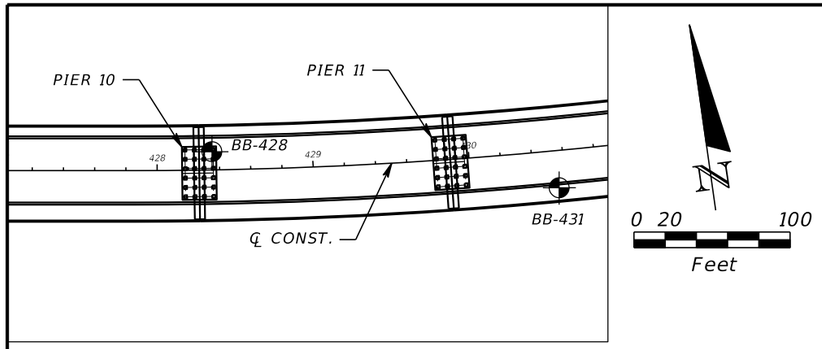
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (10)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.

bgarcia 5/25/2021 10:00:07 AM J:\6511\2016 Files\6511-16-051 Big Carlos Pass\Microstation\B1Boring10.dgn



BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988

APPROXIMATE SPT BORING LOCATION

GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

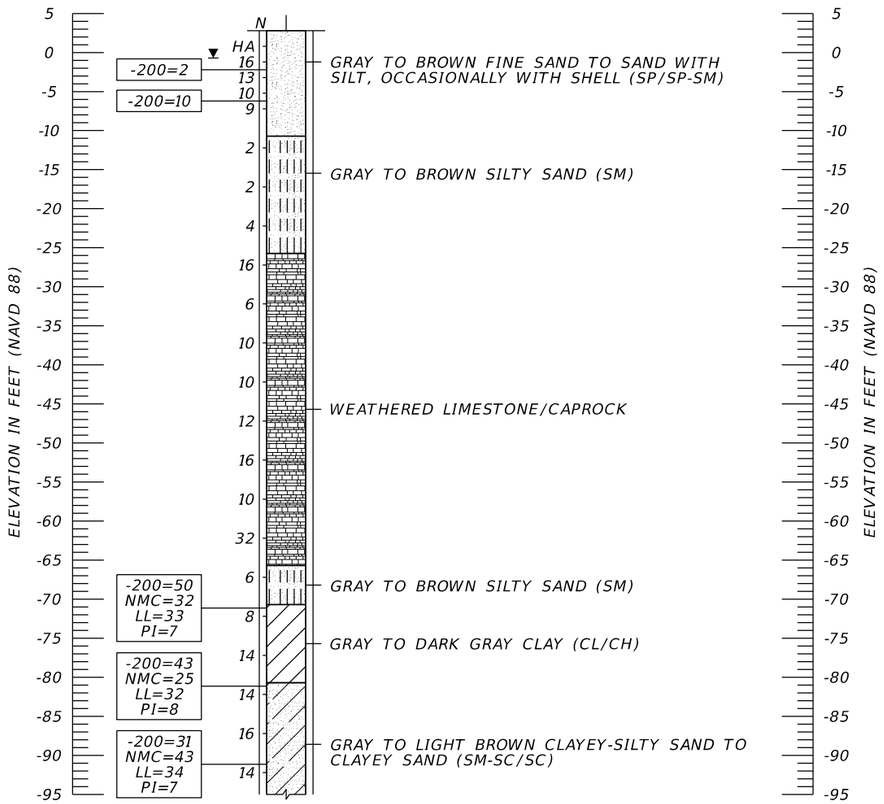
100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

CASING

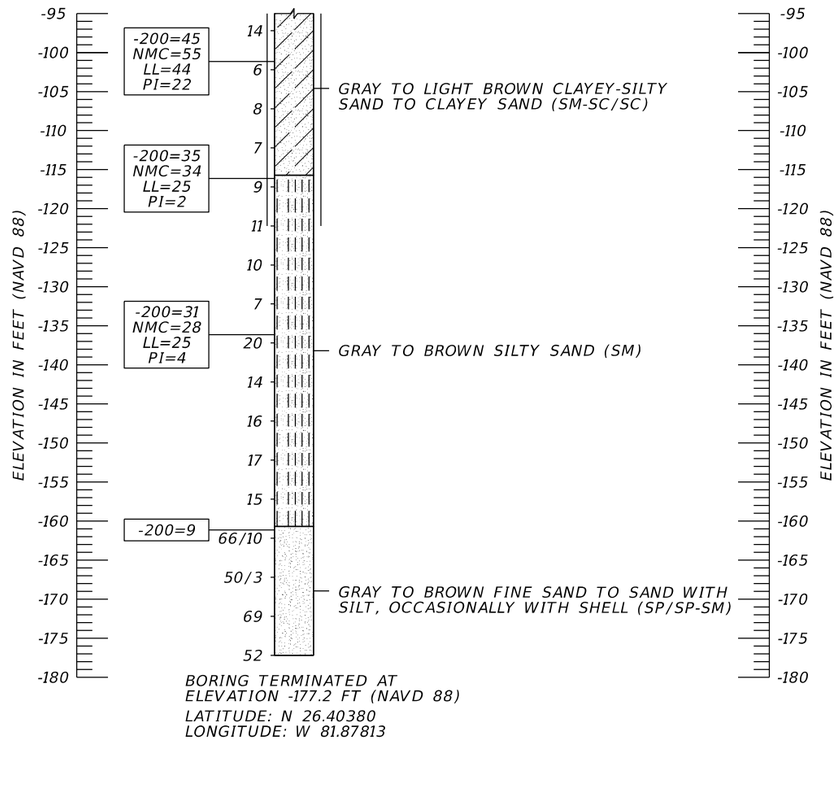
℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BOR # BB-431
STA. 430+54
REF. ℄ CONST.
OFF. 23' RT.
ELEV. 2.8
DATE 7/16/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BB-431 (CONTINUED)



BORING TERMINATED AT ELEVATION -177.2 FT (NAVD 88)
LATITUDE: N 26.40380
LONGITUDE: W 81.87813

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

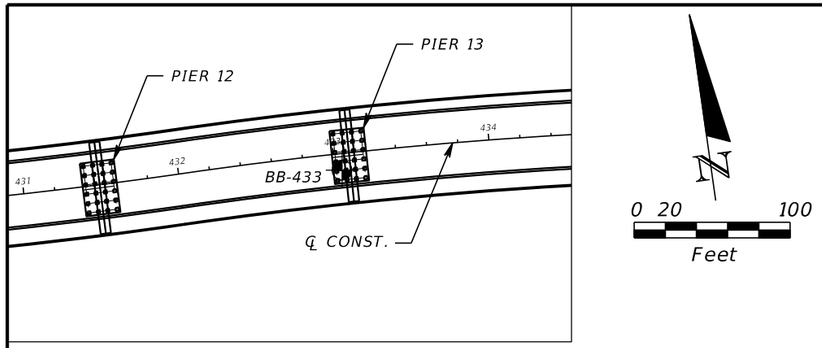
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (11)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



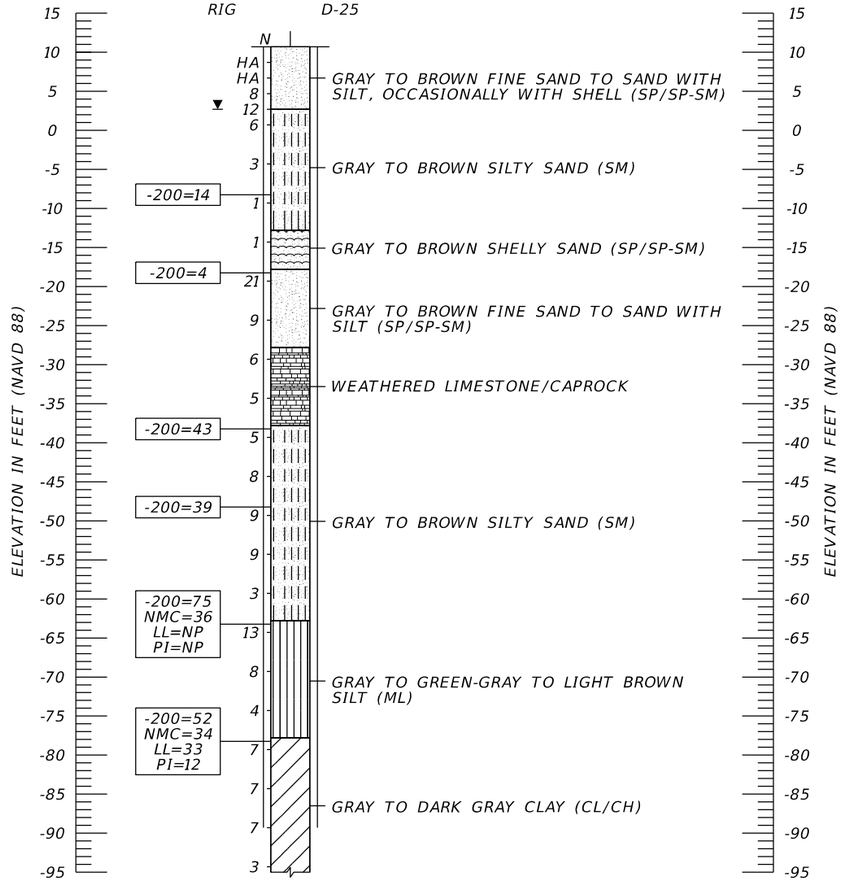
BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

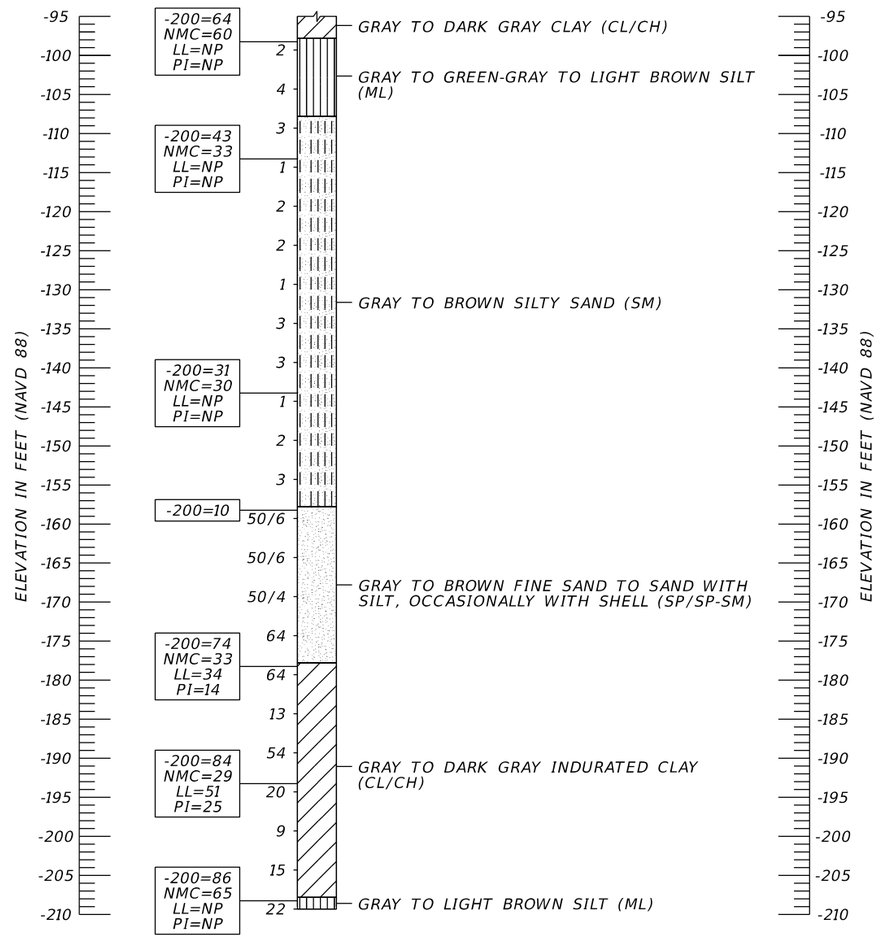
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

BOR # BB-433*
STA. 433+02
REF. ℄ CONST.
OFF. 9' RT.
ELEV. 10.7
DATE 11/18/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BB-433 (CONTINUED)



BORING TERMINATED AT ELEVATION -209.3 FT (NAVD 88)
LATITUDE: N 26.40382
LONGITUDE: W 81.87737

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

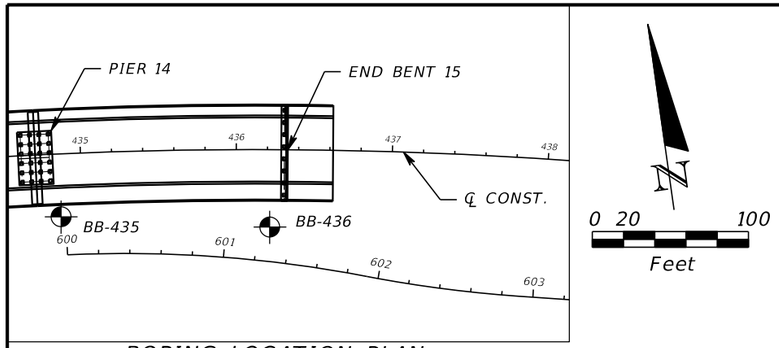
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (12)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

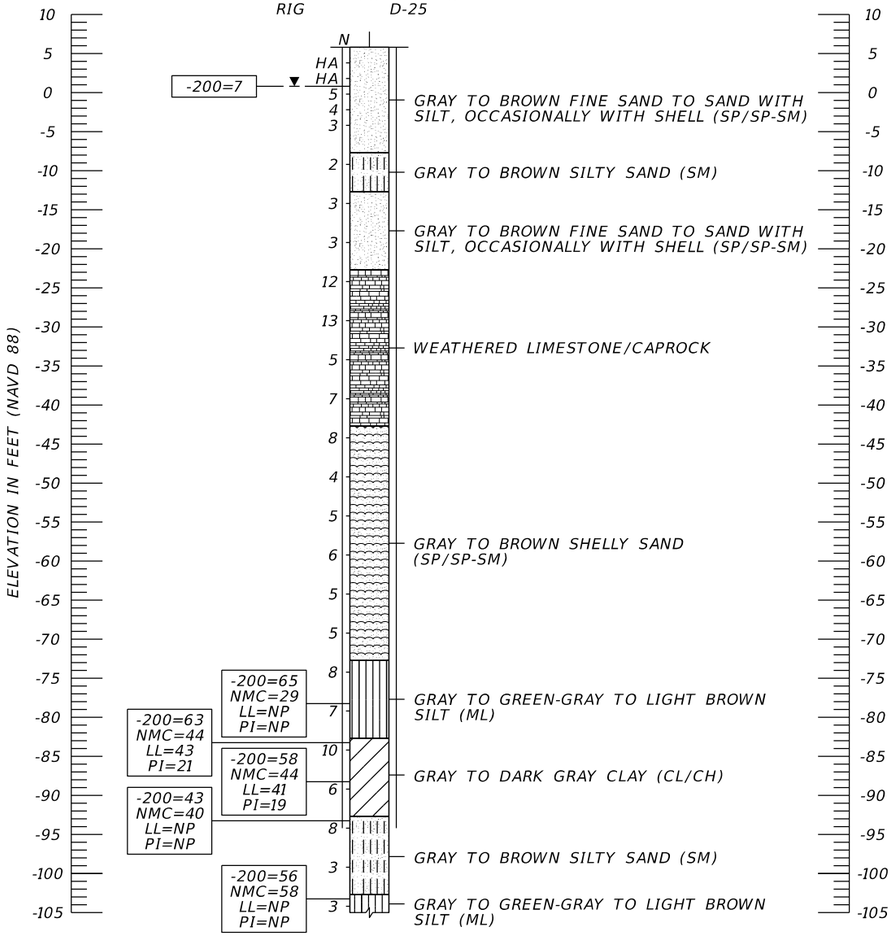
LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

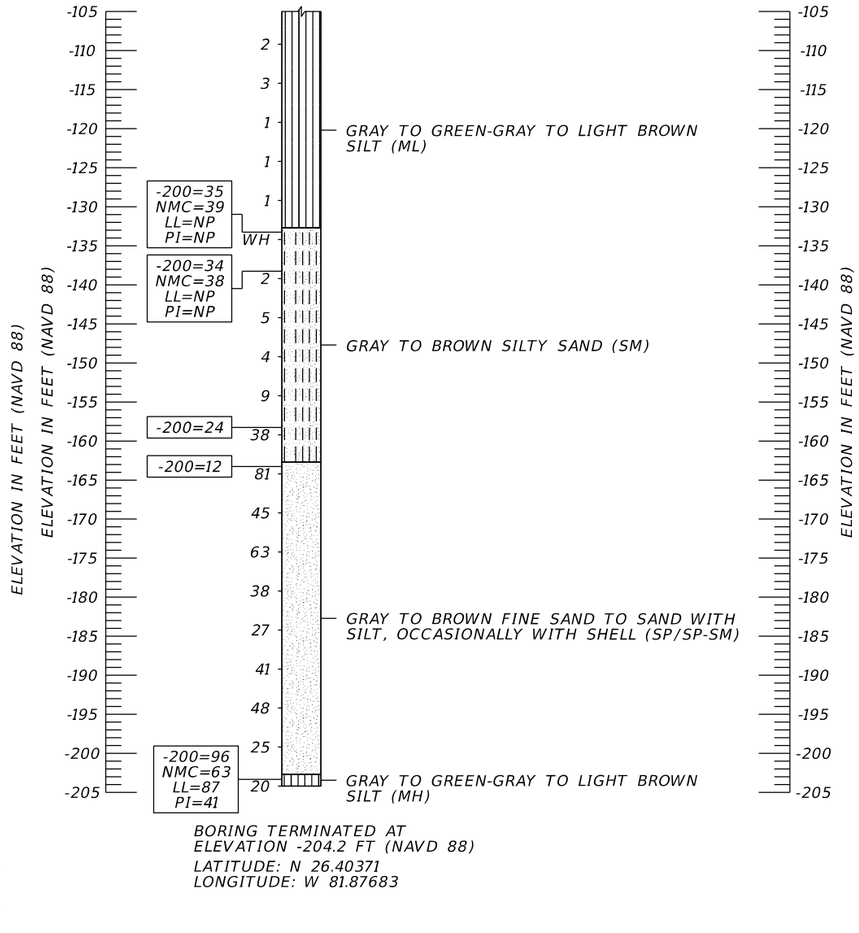
W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
℄ CONST.	CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BOR # BB-435
STA. 434+84
REF. ℄ CONST.
OFF. 39' RT.
ELEV. 5.8
DATE 12/3/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BB-435R (CONTINUED)



BORING TERMINATED AT
ELEVATION -204.2 FT (NAVD 88)
LATITUDE: N 26.40371
LONGITUDE: W 81.87683

BRIDGE NO. 124143

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

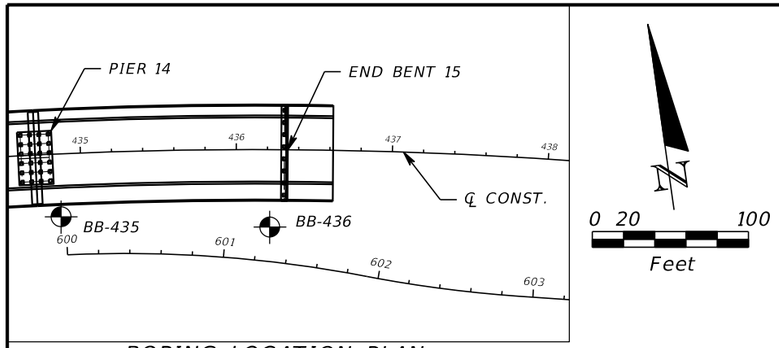
DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (13)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.

bgarcia 5/25/2021 10:00:09 AM J:\6511\2016 Files\6511-16-051 Big Carlos Pass\Microstation\B1Boring13.dgn



BORING LOCATION PLAN

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE: BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. BORING LOCATIONS AND ELEVATIONS NOT DENOTED WITH AN ASTERISK "*" WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

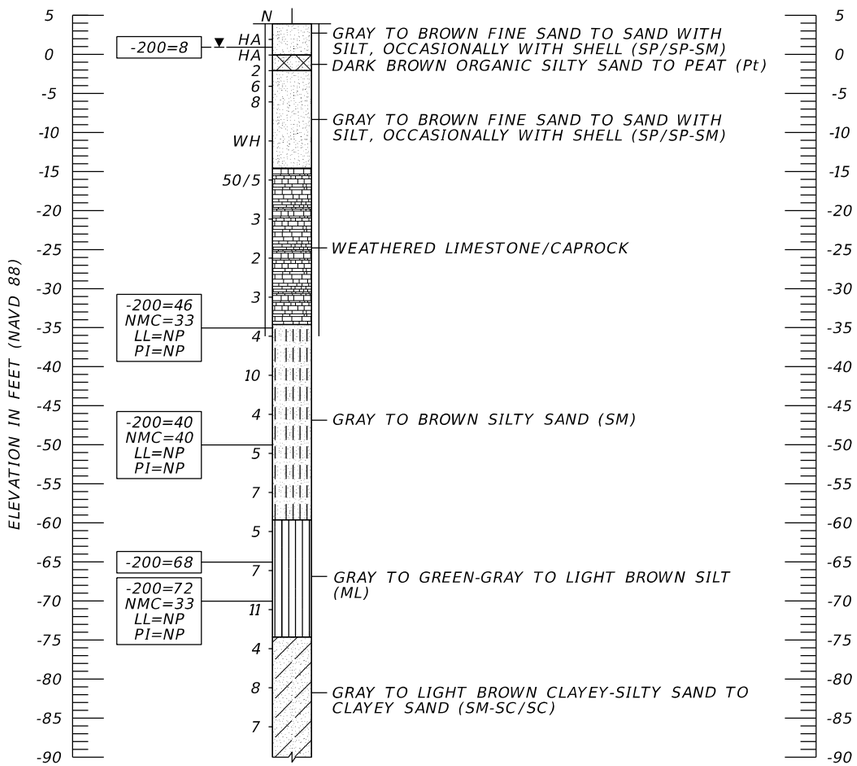
- GRAY TO BROWN FINE SAND TO SAND WITH SILT, OCCASIONALLY WITH SHELL (SP/SP-SM)
- GRAY TO BROWN SILTY SAND, OCCASIONALLY CEMENTED (SM)
- WEATHERED LIMESTONE/CAPROCK
- GRAY TO GREEN-GRAY TO LIGHT BROWN SILT TO CLAYEY-SILT (ML/MH/ML-CL)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- GRAY TO DARK GRAY CLAY (CL/CH)
- DARK BROWN ORGANIC SILTY SAND TO PEAT (Pt)
- GRAY TO LIGHT BROWN CLAYEY-SILTY SAND TO CLAYEY SAND (SM-SC/SC)

W	WATER LEVEL AT TIME OF FIELD ACTIVITIES
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
WR	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING

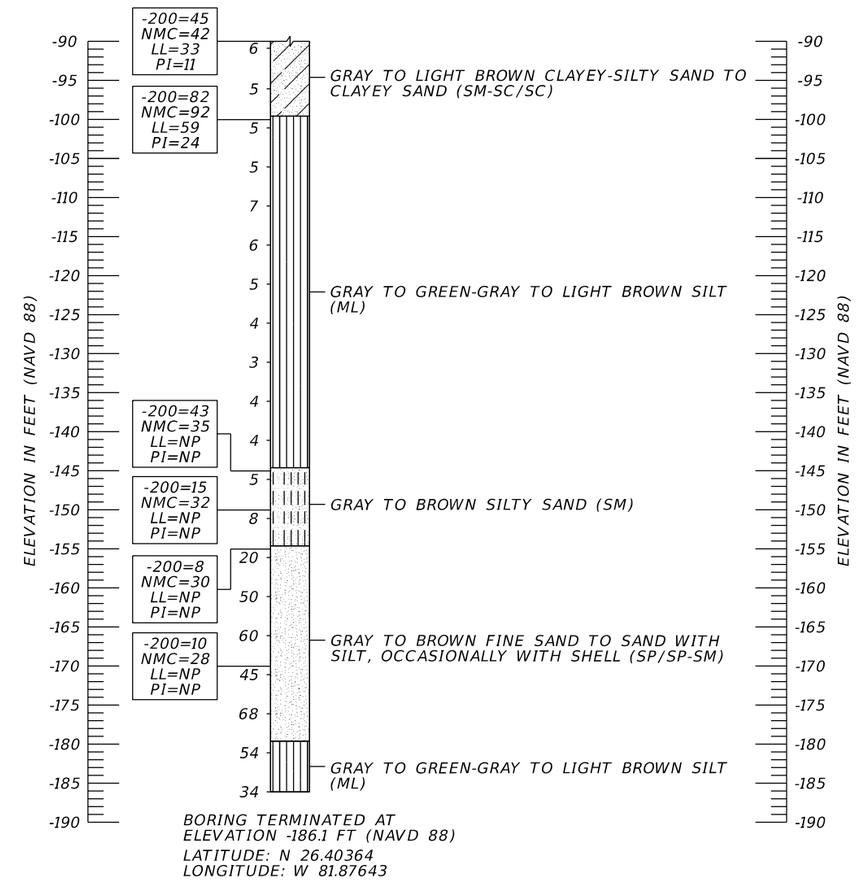
℄ CONST. CENTERLINE CONSTRUCTION OF ESTERO BLVD. (CR 865)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BOR # BB-436*
STA. 436+19
REF. ℄ CONST.
OFF. 48' RT.
ELEV. 3.9
DATE 12/10/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BB-436 (CONTINUED)



BORING TERMINATED AT ELEVATION -186.1 FT (NAVD 88)
LATITUDE: N 26.40364
LONGITUDE: W 81.87643

BRIDGE NO. 124143

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

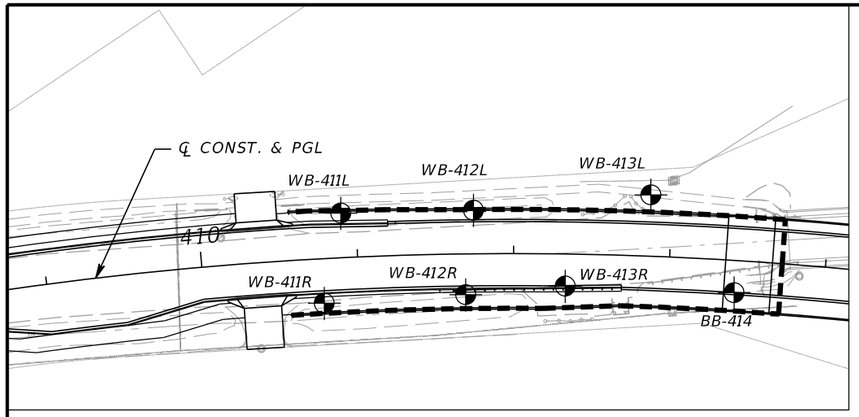
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: TM
DESIGNED BY: BJS
CHECKED BY: EMF

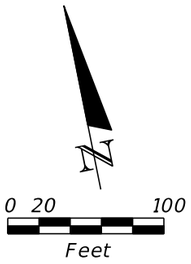
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (14)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

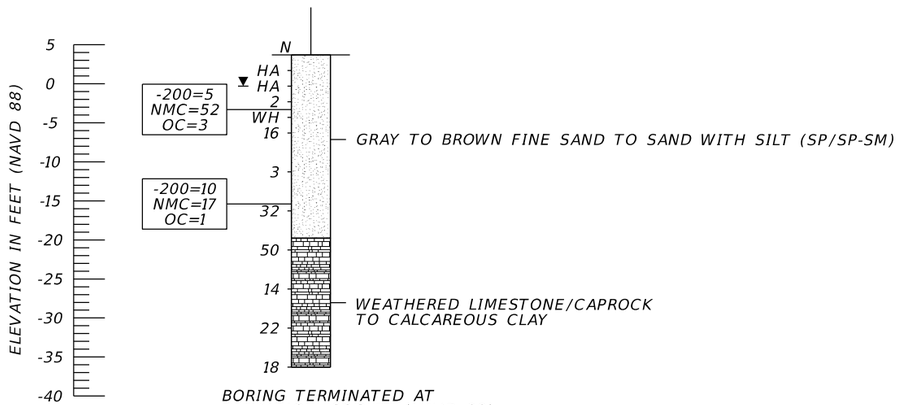
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. ALL OTHER BORING LOCATIONS AND ELEVATIONS WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

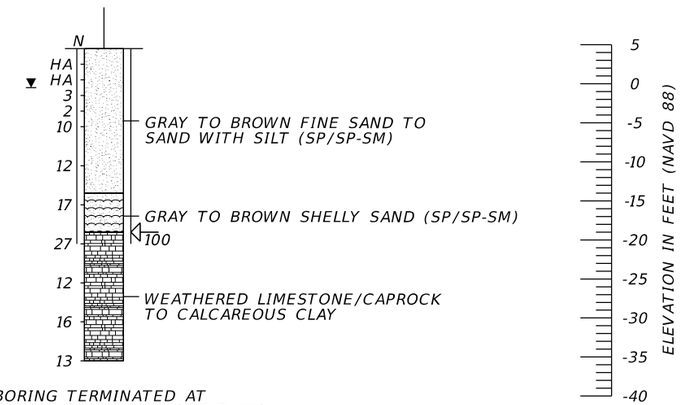
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # WB-411L*
STA. 410+91
REF. ℄ CONST.
OFF. 29' LT
ELEV. 3.7
DATE 11/22/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -36.3 FT (NAVD 88)
LATITUDE: N 26.40485
LONGITUDE: W 81.88403

BOR # WB-411R*
STA. 410+77
REF. ℄ CONST.
OFF. 28' RT
ELEV. 4.5
DATE 11/22/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -35.5 FT (NAVD 88)
LATITUDE: N 26.40470
LONGITUDE: W 81.88409

GRANULAR MATERIALS- RELATIVE DENSITY	SAFETY HAMMER SPT N-VALUE (BLOWS/FT.)	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	**SPT N-VALUE (BLOWS/FT.)**	**SPT N-VALUE (BLOWS/FT.)**
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 1

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

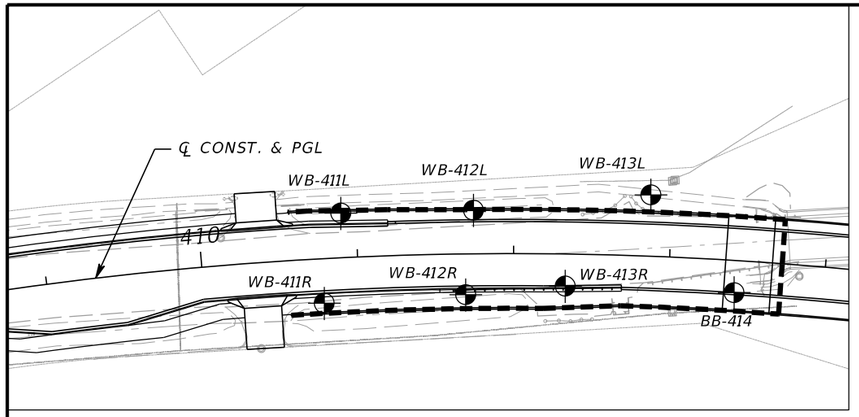
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

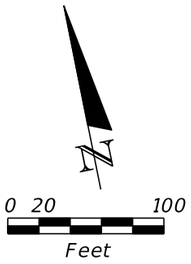
DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (1)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.





BORING LOCATION PLAN

LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

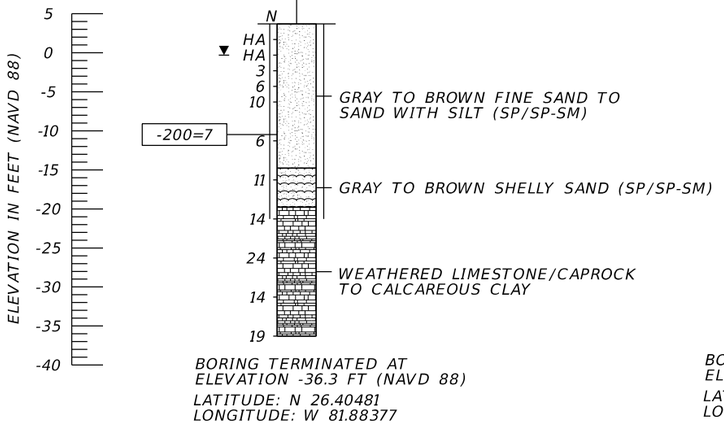
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. ALL OTHER BORING LOCATIONS AND ELEVATIONS WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

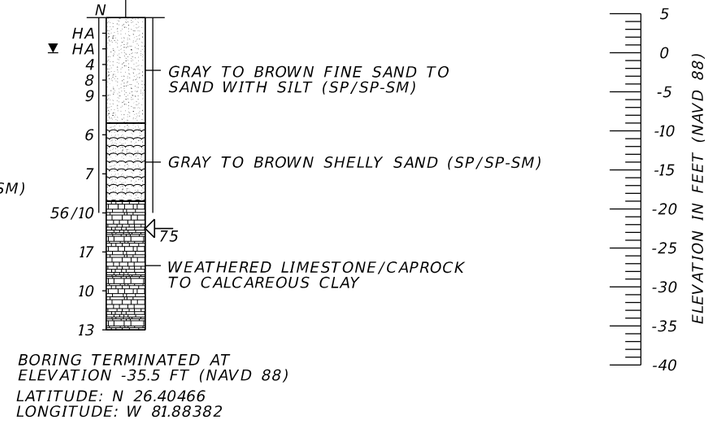
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # WB-412L*
STA. 411+75
REF. ℄ CONST.
OFF. 28' LT
ELEV. 3.7
DATE 11/22/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -36.3 FT (NAVD 88)
LATITUDE: N 26.40481
LONGITUDE: W 81.88377

BOR # WB-412R*
STA. 411+69
REF. ℄ CONST.
OFF. 26' RT
ELEV. 4.5
DATE 11/24/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -35.5 FT (NAVD 88)
LATITUDE: N 26.40466
LONGITUDE: W 81.88382

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 1

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

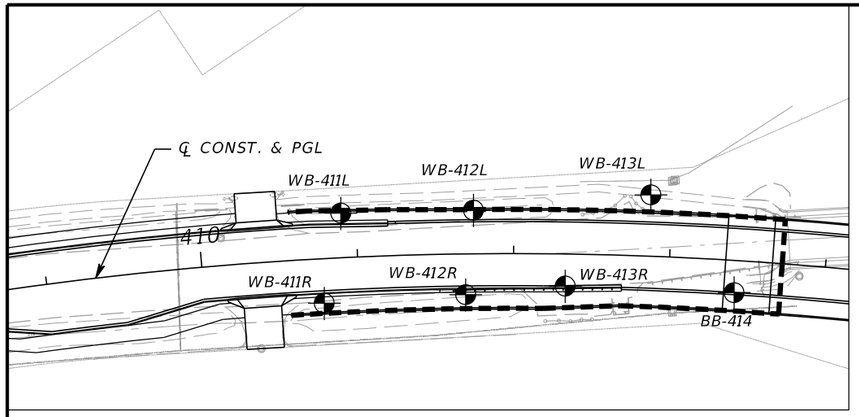
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

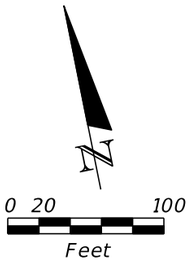
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (2)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

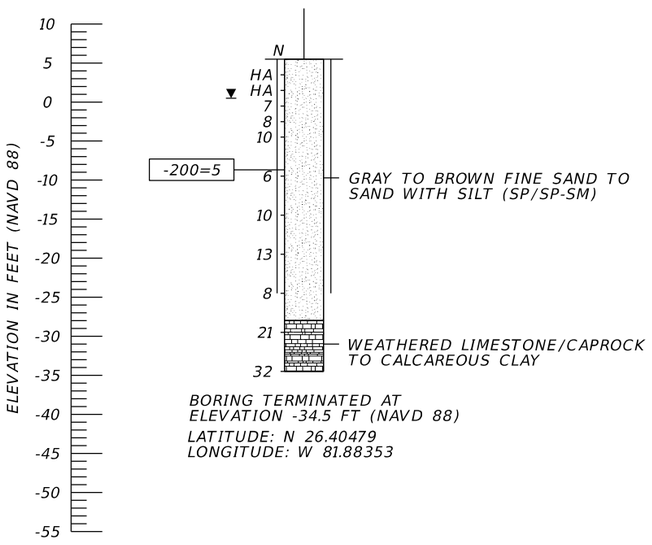
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. ALL OTHER BORING LOCATIONS AND ELEVATIONS WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

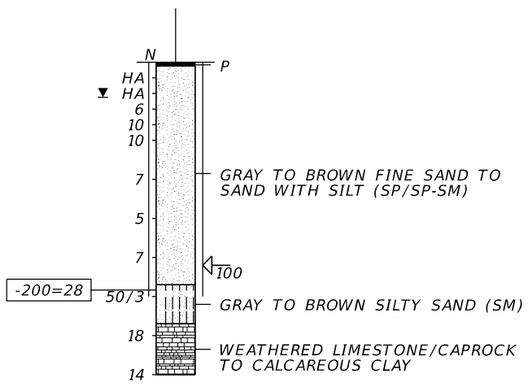
BOR # WB-413L* | STA. 412+85 | REF. ℄ CONST. | OFF. 40' LT | ELEV. 5.5 | DATE 11/21/2019 | DRILLER I. POORAN | HAMMER AUTOMATIC | RIG D-25



BORING TERMINATED AT ELEVATION -34.5 FT (NAVD 88)

LATITUDE: N 26.40479
LONGITUDE: W 81.88353

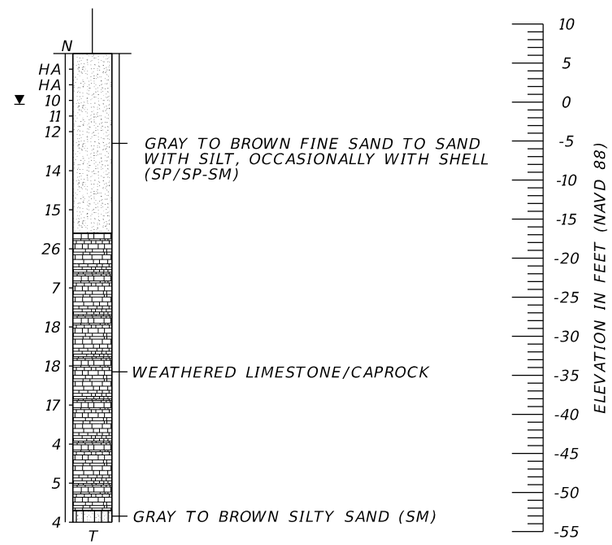
BOR # WB-413R | STA. 412+31 | REF. ℄ CONST. | OFF. 19' RT | ELEV. 5.1 | DATE 11/24/2019 | DRILLER I. POORAN | HAMMER AUTOMATIC | RIG D-25



BORING TERMINATED AT ELEVATION -34.9 FT (NAVD 88)

LATITUDE: N 26.40429
LONGITUDE: W 81.88382

BOR # BB-414 | STA. 413+40 | REF. ℄ CONST. | OFF. 21' RT. | ELEV. 6.2 | DATE 7/21/2019 | DRILLER I. POORAN | HAMMER AUTOMATIC | RIG D-25



BORING TERMINATED AT ELEVATION -53.8 FT (NAVD 88)

LATITUDE: N 26.40457
LONGITUDE: W 81.88330

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 1

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS | CHECKED BY: FM | DESIGNED BY: BJS | CHECKED BY: TEM

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

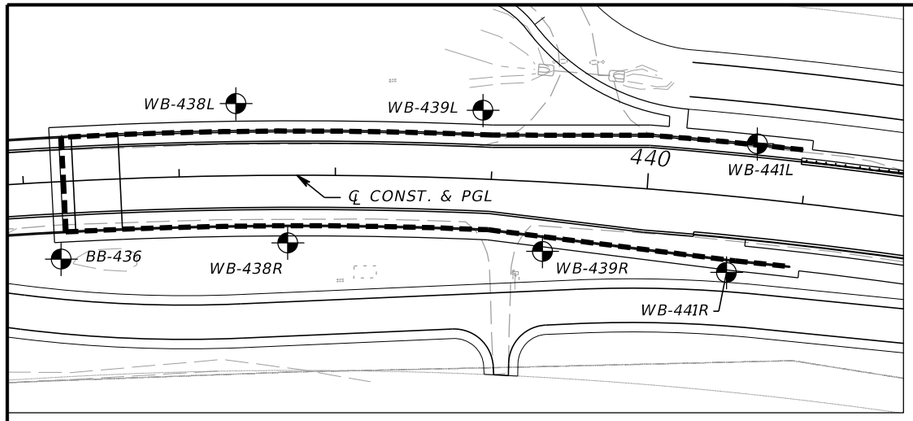
ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (3)

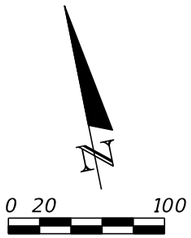
REF. DWG. NO.

PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS

SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

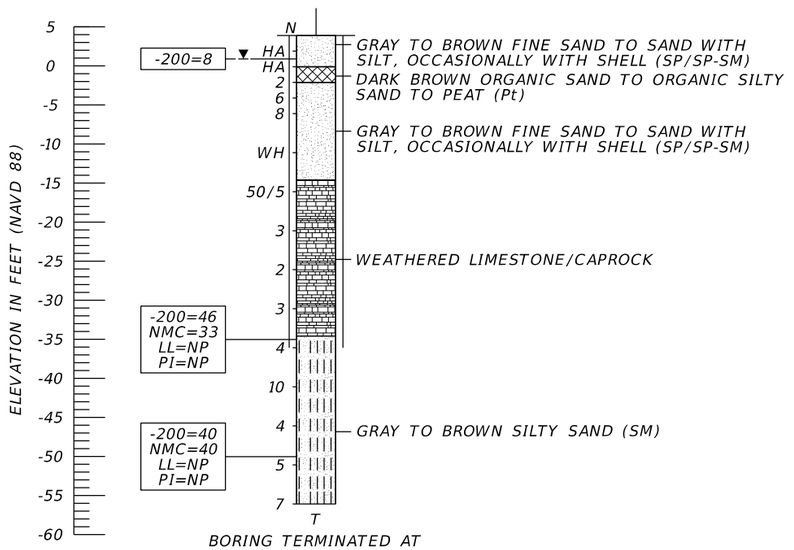
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. ALL OTHER BORING LOCATIONS AND ELEVATIONS WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

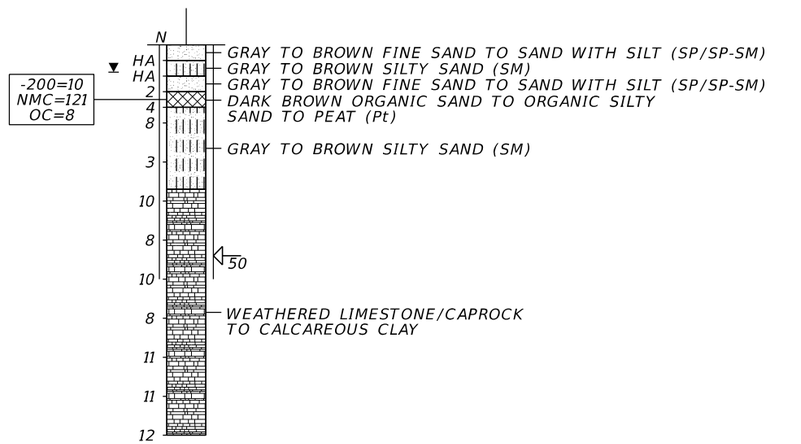
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # BB-436*
STA. 436+19
REF. ℄ CONST.
OFF. 48' RT.
ELEV. 3.9
DATE 12/10/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25

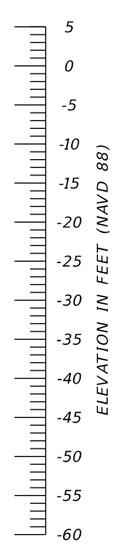


BORING TERMINATED AT
ELEVATION -56.1 FT (NAVD 88)
LATITUDE: N 26.40364
LONGITUDE: W 81.87643

BOR # WB-438L*
STA. 437+37
REF. ℄ CONST.
OFF. 46' LT
ELEV. 2.7
DATE 11/20/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -47.3 FT (NAVD 88)
LATITUDE: N 26.40385
LONGITUDE: W 81.87603



	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 2

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

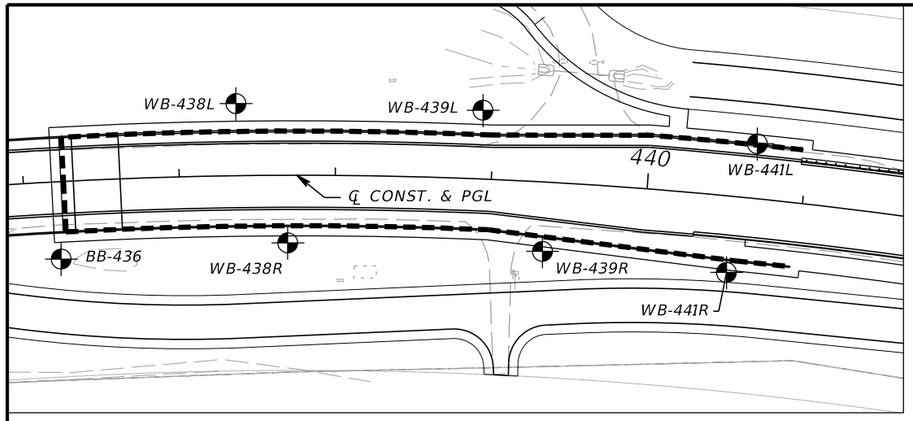
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

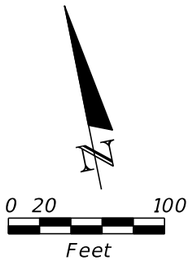
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (4)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

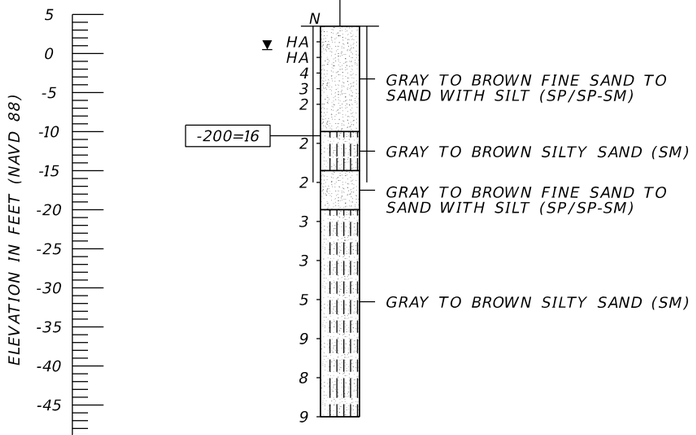
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

BORING LOCATIONS AND ELEVATIONS DENOTED WITH AN ASTERISK "*" WERE PROVIDED BY THE PROJECT SURVEYOR. ALL OTHER BORING LOCATIONS AND ELEVATIONS WERE DETERMINED USING PROJECT DESIGN FILES PROVIDED BY KISINGER CAMPO AND ASSOCIATES, CORP. IN CONJUNCTION WITH GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD AND SHOULD BE CONSIDERED APPROXIMATE.

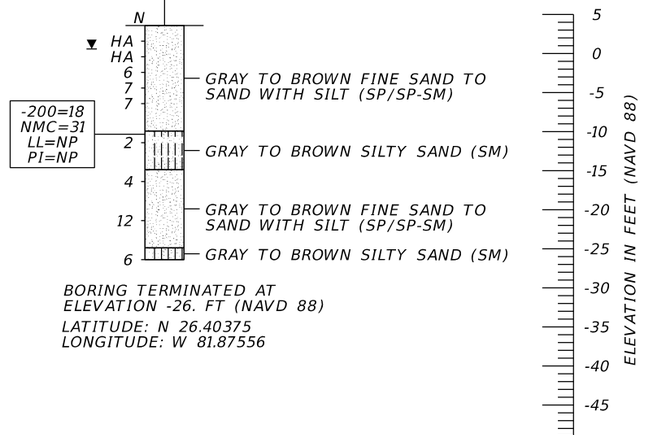
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # WB-438R*
STA. 437+72
REF. ℄ CONST.
OFF. 40' RT
ELEV. 3.5
DATE 11/22/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG CME 55



BORING TERMINATED AT
ELEVATION -46.5 FT (NAVD 88)
LATITUDE: N 26.40360
LONGITUDE: W 81.87598

BOR # WB-439L*
STA. 438+93
REF. ℄ CONST.
OFF. 44' LT
ELEV. 3.6
DATE 11/19/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -26. FT (NAVD 88)
LATITUDE: N 26.40375
LONGITUDE: W 81.87556

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 2

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

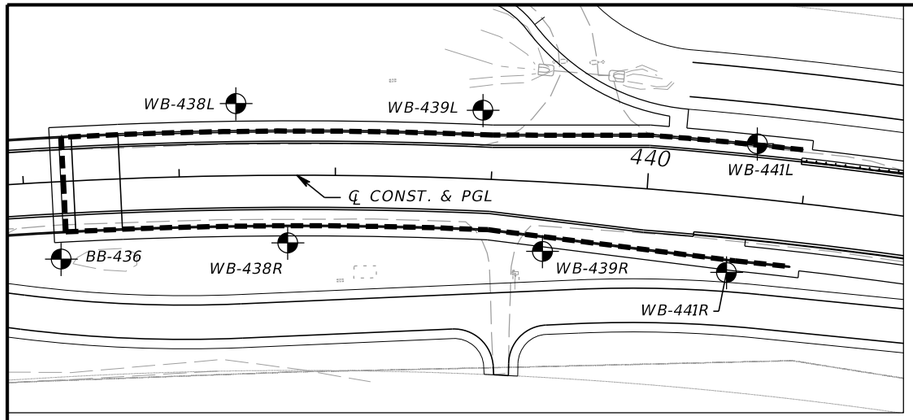
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

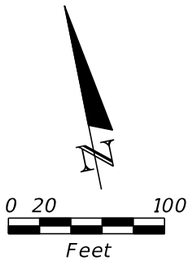
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (5)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

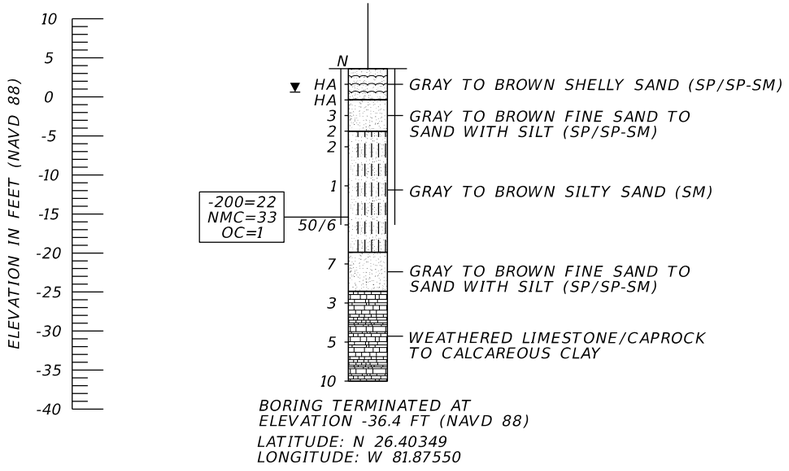
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

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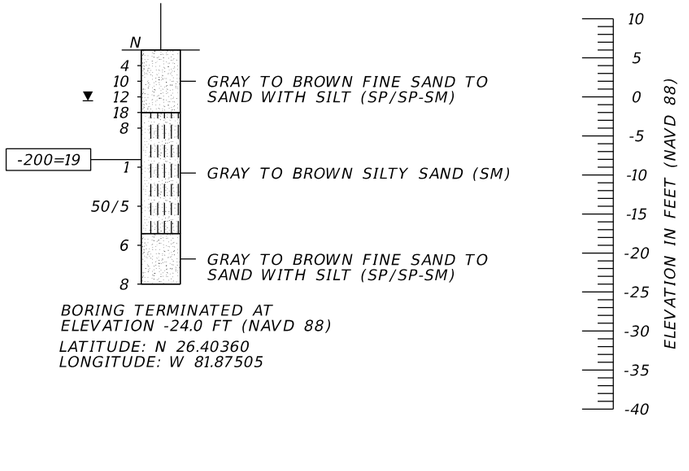
SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # WB-439R*
STA. 439+35
REF. ℄ CONST.
OFF. 44' RT
ELEV. 3.6
DATE 11/22/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG CME 55



BORING TERMINATED AT
ELEVATION -36.4 FT (NAVD 88)
LATITUDE: N 26.40349
LONGITUDE: W 81.87550

BOR # WB-441L*
STA. 440+67
REF. ℄ CONST.
OFF. 35' LT
ELEV. 6.0
DATE 11/19/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -24.0 FT (NAVD 88)
LATITUDE: N 26.40360
LONGITUDE: W 81.87505

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 2

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

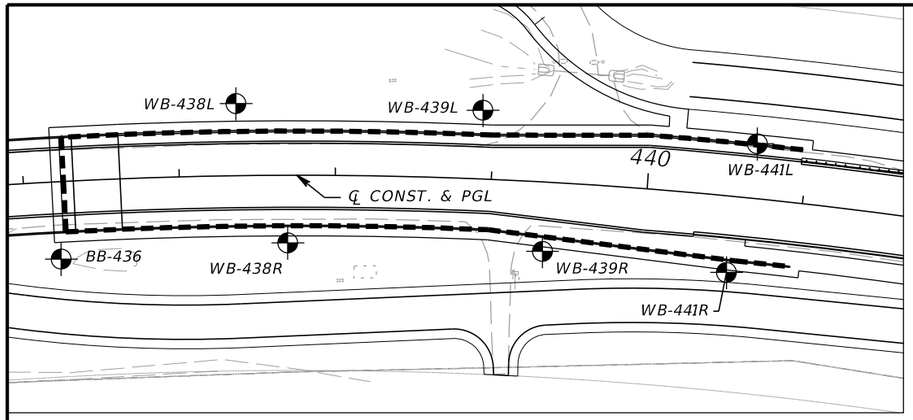
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

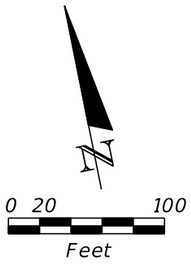
LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (6)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.



BORING LOCATION PLAN



LEGEND

- GRAY TO BROWN FINE SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY TO BROWN SILTY SAND (SM)
- WEATHERED LIMESTONE/CAPROCK TO CALCAREOUS CLAY
- GRAY TO BROWN SHELLY SAND (SP/SP-SM)
- GRAY TO DARK GRAY INDURATED CLAY (CL/CH)
- DARK BROWN ORGANIC SAND TO ORGANIC SILTY SAND TO PEAT (Pt)

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:

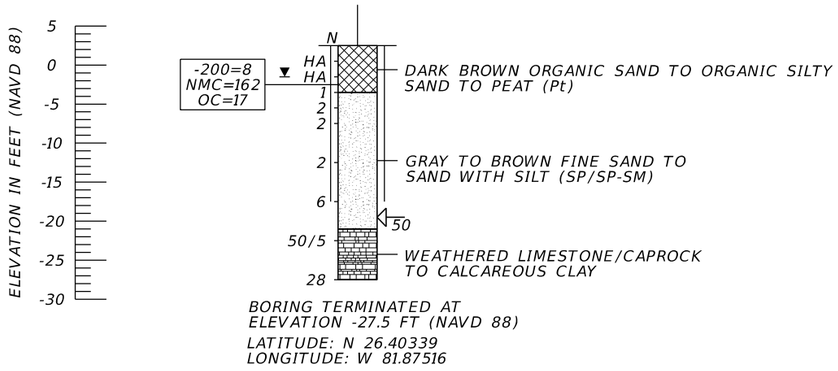
SUBSTRUCTURE	CONCRETE: EXTREMELY AGGRESSIVE
SUBSTRUCTURE	STEEL: EXTREMELY AGGRESSIVE
SUPERSTRUCTURE	EXTREMELY AGGRESSIVE

NOTE:

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SP	UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
	APPROXIMATE SPT BORING LOCATION
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
P	ASPHALT PAVEMENT AND/OR BASE MATERIAL
T	BORINGS PROFILE TRUNCATED FOR CLARITY. FOR FULL BORING PROFILE PLEASE REFER TO THE BRIDGE REPORT OF CORE BORINGS SHEETS.

BOR # WB-441R*
STA. 440+56
REF. ℄ CONST.
OFF. 49' RT
ELEV. 2.5
DATE 11/20/2019
DRILLER I. POORAN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -27.5 FT (NAVD 88)
LATITUDE: N 26.40339
LONGITUDE: W 81.87516

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MSE WALL NO. 2

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

DRAWN BY: BJS
CHECKED BY: FM
DESIGNED BY: BJS
CHECKED BY: TEM

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN16002

SHEET TITLE: REPORT OF CORE BORINGS (7)
REF. DWG. NO.
PROJECT NAME: CR 865 (ESTERO BOULEVARD) OVER BIG CARLOS PASS
SHEET NO.

PILE DATA TABLE

INSTALLATION CRITERIA									DESIGN CRITERIA								
PIER or BENT NUMBER	PILE SIZE (in.)	NOMINAL BEARING RESISTANCE (tons)	NOMINAL UPLIFT RESISTANCE (tons)	MINIMUM TIP ELEVATION (ft.)	TEST PILE LENGTH (ft.)	REQUIRED JET ELEVATION (ft.)	REQUIRED PREFORM ELEVATION (ft.)	MINIMUM PILE SPLICE ELEVATION (ft.) (SEE NOTE 5)	FACTORED DESIGN LOAD (tons)	FACTORED DESIGN UPLIFT LOAD (tons)	DOWN DRAG (tons)	TOTAL SCOUR RESISTANCE (tons)	NET SCOUR RESISTANCE (tons)	100-YEAR SCOUR ELEVATION (ft.)	Ø COMPRESSION	Ø UPLIFT	PILE CUT-OFF ELEVATIONS
END BENT 1	24	410	N/A	-40	160	N/A	-40	N/A	266	N/A	N/A	N/A	N/A	N/A	0.65	0.55	10.9
PIER 2	24	333	160	-113	140	N/A	-35	-75.0	216	88	N/A	27	0	-22	0.65	0.55	*
PIER 3	24	304	N/A	-55	155	N/A	-38	-80.5	197	N/A	N/A	2	0	-25	0.65	0.55	*
PIER 4	24	294	N/A	-55	155	N/A	-48	-81.0	191	N/A	N/A	17	0	-25	0.65	0.55	*
PIER 5	24	311	40	-54	155	N/A	-48	-78.5	202	22	N/A	3	0	-19	0.65	0.55	*
PIER 6	24	353	90	-53	110	N/A	-48	N/A	229	49	N/A	14	0	-23	0.65	0.55	*
PIER 7	24	365	68	-94	190	N/A	-53	-100.0	237	37	N/A	35	0	-27	0.65	0.55	*
PIER 8	24	344	122	-110	165	N/A	-53	-89.5	223	67	N/A	45	0	-32	0.65	0.55	*
PIER 9	24	367	142	-123	175	N/A	-48	-93.0	238	78	N/A	24	0	-27	0.65	0.55	*
PIER 10	24	316	55	-71	180	N/A	-43	-90.5	205	30	N/A	33	0	-22	0.65	0.55	*
PIER 11	24	324	79	-73	135	N/A	-63	-70.5	210	43	N/A	29	0	-24	0.65	0.55	*
PIER 12	24	311	13	-59	175	N/A	-63	-89.5	202	7	N/A	42	0	-22	0.65	0.55	*
PIER 13	24	280	N/A	-51	170	N/A	-38	-85.5	182	N/A	N/A	24	0	-16	0.65	0.55	*
PIER 14	24	284	N/A	-49	175	N/A	-43	-86.0	184	N/A	N/A	9	0	-14	0.65	0.55	*
END BENT 15	24	400	N/A	-35	195	N/A	-35	N/A	253	N/A	7	N/A	N/A	N/A	0.65	0.55	14.2

$$\frac{\text{Factored Design Load + Net Scour Resistance + Down Drag}}{\text{Ø}} \leq \text{Nominal Bearing Resistance}$$

UPLIFT RESISTANCE – The ultimate side friction capacity that must be obtained below the 100 year scour elevation to resist pullout of the pile (Specify only when design requires uplift capacity).

TOTAL SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the scourable soil.

NET SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the soil from the required preformed or jetting elevation to the scour elevation.

100-YEAR SCOUR ELEVATION – Estimated elevation of scour due to the 100 year storm event.

The contractor should anticipate the use of specialized equipment and/or methods including, but not limited to, core barrels, rock augers, punches, drill bits, etc. to complete preforming. If drilling equipment with a tapered end is used to construct the preformed pile holes, the maximum diameter of the drilling equipment has to reach the required preformed elevation.

Do not advance preformed pile holes deeper than the preformed elevations shown in the table without approval of the engineer. If actual preforming elevations differ from those shown in the table, the engineer shall determine the required driving resistance.

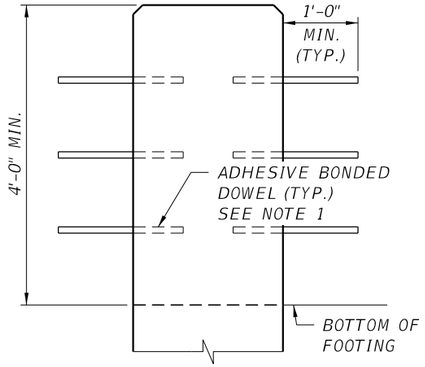
* FOR PILE CUT-OFF ELEVATIONS, SEE 'FOOTING CAP REINFORCING' SHEETS.

PILE INSTALLATION NOTES:

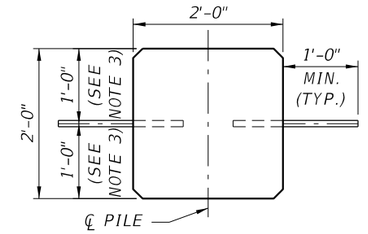
1. The portion of the end bent piles exposed above the existing ground line and below the bottom of the concrete cap shall be wrapped with polyethylene sheeting to minimize downdrag. Refer to section 459 of the fdot specifications.
2. Minimum tip elevation at the intermediate Pier Nos. 3, 4, 12, 13 and 14 is required for lateral stability. Minimum tip elevation at Pier Nos. 2, 7, 8, 9, 10 and 11 are required for uplift resistance. Minimum tip elevation at the end bents is required to ensure penetration through the dense limestone substratum.
3. Contractor to verify location of all utilities prior to any pile installation activities.
4. When a required jetting elevation is shown, the jet shall be lowered to the elevation and continue to operate at this elevation until the pile driving is completed. If jetting or preforming elevations differ from those shown on the table, the Engineer shall be responsible for determination of the required driving resistance.
5. No jetting will be allowed without the approval of the Engineer.
6. The Contractor should not anticipate being allowed to jet piles below the 100-year scour elevation or required jet elevation, whichever is deeper.
7. For pile groups, pile driving is to commence at the center of the group and proceed outward.
8. Fullfill requirements of section 455-7.8 for pre-planned splices
9. The soil conditions encountered within the borings are susceptible to pile rebound.
10. Pile rebound potential should be considered during pile hammer selection. Anticipate set-checks and re-drives during pile driving operations to achieve the required nominal bearing resistance. Anticipate set-checks and re-drives when developing the pile driving schedule.

NOTES:

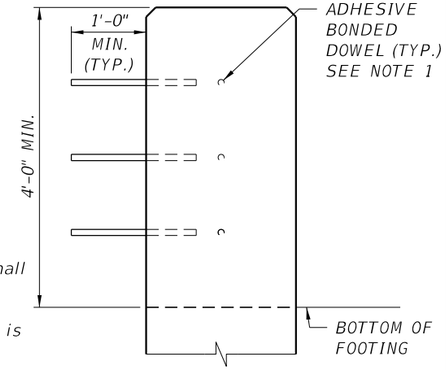
1. MINIMUM BAR SIZE IS #8
2. SEE INDEX 455-001.
3. SHIFT BAR SLIGHTLY AS REQUIRED TO CLEAR STRANDS LOCATED AT CENTERLINE OF THE PILE FACE.
4. UTILIZE PRE-APPROVED ADHESIVE BONDING MATERIAL SYSTEM. COMPLY WITH SPECIFICATIONS 937 AND 416.
5. WHEN REQUIRED, SPLICE LOCATION TO BE POSITIONED BELOW DENOTED ELEVATION. ALL SPLICES ARE TO BE MECHANICAL.



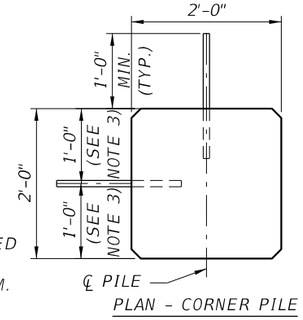
ELEVATION - INTERIOR OR EDGE PILE



PLAN - INTERIOR OR EDGE PILE



ELEVATION - CORNER PILE



PLAN - CORNER PILE

BRIDGE NO. 124143

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kisinger Campo & Associates Corp.
201 N. Franklin Street
Suite 400
Tampa, FL 33602
Alfredo Jose Layrisse, PE No. 75610

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SKB 04-21	DAA 04-21	SKB 04-21	DAA 04-21

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN160002

SHEET TITLE: PILE DATA TABLE

REF. DWG. NO.

PROJECT NAME: ESTERO BLVD. (CR 865) OVER BIG CARLOS PASS

SHEET NO. B1-33

PILE DATA TABLE

INSTALLATION CRITERIA									DESIGN CRITERIA								
PIER or BENT NUMBER	PILE SIZE (in.)	NOMINAL BEARING RESISTANCE (tons)	NOMINAL UPLIFT RESISTANCE (tons)	MINIMUM TIP ELEVATION (ft.)	TEST PILE LENGTH (ft.)	REQUIRED JET ELEVATION (ft.)	REQUIRED PREFORM ELEVATION (ft.)	MINIMUM PILE SPLICE ELEVATION (ft.) (SEE NOTE)	FACTORED DESIGN LOAD (tons)	FACTORED DESIGN UPLIFT LOAD (tons)	DOWN DRAG (tons)	TOTAL SCOUR RESISTANCE (tons)	NET SCOUR RESISTANCE (tons)	100-YEAR SCOUR ELEVATION (ft.)	Ø COMPRESSION	Ø UPLIFT	PILE CUT-OFF ELEVATIONS
BENT 1-2	24	79	204	-123	175	N/A	-48	-75.0	52	112	N/A	24	0	-27	0.65	0.55	5.915
BENT 1-3	24	70	217	-126	175	N/A	-48	-76.5	45	119	N/A	68	0	-27	0.65	0.55	5.915
BENT 1-4	24	80	208	-113	160	N/A	-43	-70.0	52	114	N/A	68	0	-27	0.65	0.55	5.915
BENT 2-2	24	80	208	-114	160	N/A	-43	-70.5	52	114	N/A	68	0	-27	0.65	0.55	5.915
BENT 2-3	24	70	224	-115	165	N/A	-43	-68.5	45	123	N/A	33	0	-22	0.65	0.55	5.915
BENT 2-4	24	80	215	-98	165	N/A	-63	-61.5	52	118	N/A	55	0	-25	0.65	0.55	5.915
BENT 3-2	24	85	100	-86	110	N/A	-63	-55.5	55	55	N/A	28	0	-25	0.65	0.55	4.600
BENT 3-3	24	31	51	-79	100	N/A	-63	-52.0	20	28	N/A	28	0	-25	0.65	0.55	3.000

$$\frac{\text{Factored Design Load} + \text{Net Scour Resistance} + \text{Down Drag}}{\text{Ø}} \leq \text{Nominal Bearing Resistance}$$

UPLIFT RESISTANCE – The ultimate side friction capacity that must be obtained below the 100 year scour elevation to resist pullout of the pile (Specify only when design requires uplift capacity).

TOTAL SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the scourable soil.

NET SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the soil from the required preformed or jetting elevation to the scour elevation.

100-YEAR SCOUR ELEVATION – Estimated elevation of scour due to the 100 year storm event.

The contractor should anticipate the use of specialized equipment and/or methods including, but not limited to, core barrels, rock augers, punches, drill bits, etc. to complete preforming. If drilling equipment with a tapered end is used to construct the preformed pile holes, the maximum diameter of the drilling equipment has to reach the required preformed elevation.

Do not advance preformed pile holes deeper than the preformed elevations shown in the table without approval of the engineer. If actual preforming elevations differ from those shown in the table, the engineer shall determine the required driving resistance.

NOTE:

WHEN REQUIRED, SPLICE LOCATION TO BE POSITIONED BELOW DENOTED ELEVATION. ALL SPLICES ARE TO BE MECHANICAL.

PILE INSTALLATION NOTES:

Contractor to verify location of all utilities prior to any pile installation activities.

Minimum Tip Elevation at Bent Nos. 3-2 and 3-3 is required for lateral stability. Minimum Tip Elevation at Bent Nos. 1-2, 1-3, 1-4, 2-2, 2-3 and 2-4 are required for Uplift Resistance.

When a required jetting elevation is shown, the jet shall be lowered to the elevation and continue to operate at this elevation until the pile driving is completed. If jetting or preforming elevations differ from those shown on the table, the Engineer shall be responsible for determination of the required driving resistance.

No jetting will be allowed without the approval of the Engineer.

The Contractor should not anticipate being allowed to jet piles below the 100-year scour elevation or required jet elevation, whichever is deeper.

For pile groups, pile driving is to commence at the center of the group and proceed outward.

Fullfill requirements of Section 455-7.5 for pre-planned splices.

BRIDGE NO. 124143

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kisinger Campo & Associates Corp.
201 N. Franklin Street
Suite 400
Tampa, FL 33602
Alfredo Jose Layrisse, PE No. 75610

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
JHJ 12-21	DAA 04-21	JHJ 12-21	UYC 12-21

LEE COUNTY PUBLIC WORKS
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	COUNTY PROJECT No
CR 865	LEE	CN160002

SHEET TITLE: FISHING PIER PILE DATA TABLE

REF. DWG. NO.:

PROJECT NAME: ESTERO BLVD. (CR 865) OVER BIG CARLOS PASS

SHEET NO.: B2-3

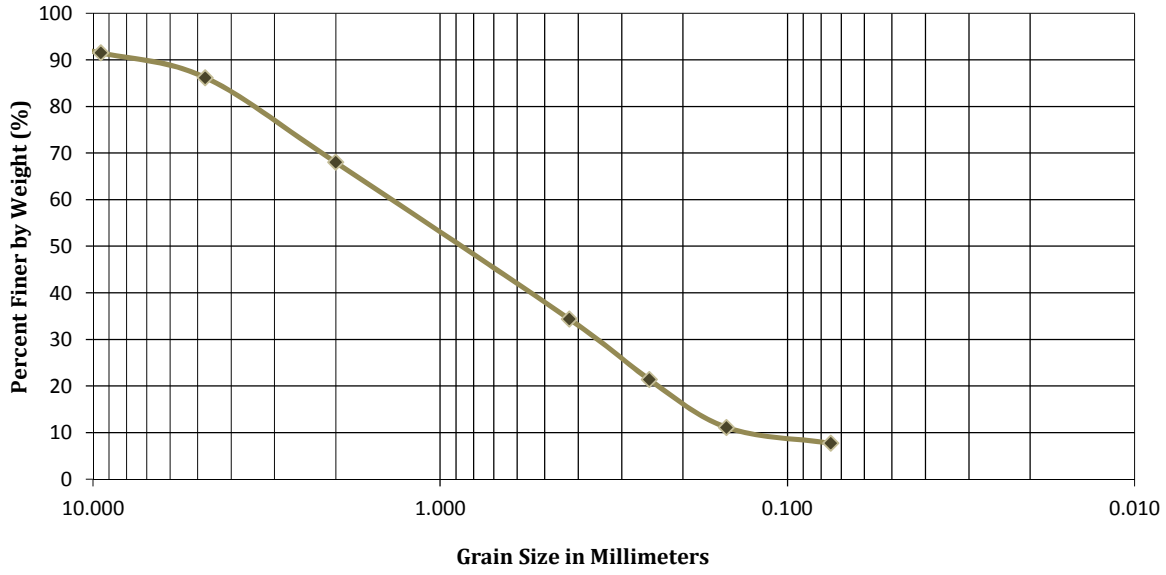
APPENDIX B

Grain Size Test Results for D_{50} Analysis

Grain Size Distribution Report
Big Carlos Pass Project Development & Environment Study
CN-160002
Tierra Project No.: 6511-16-051

Station	Offset	Boring No.	Depth (ft)
421+81	99' RT.	BB-4	0.0-2.0 (below mudline)

Grain Size Distribution Curve



Material Description	Classification	
	USCS	AASHTO
	SP/SP-SM	A-1-b

Sieve Number	Diameter (mm)	Percent Finer by Weight (%)
3/4"	19.000	96
3/8"	9.500	92
4	4.750	86
10	2.000	68
40	0.425	34
60	0.250	21
100	0.150	11
200	0.075	8

Coefficients

D_{10}	0.120	D_{30}	0.355
D_{50}	*0.872*	D_{60}	1.383
D_{85}	4.487	D_{90}	7.808
D_{95}	17.167		
C_U	11.539	C_C	0.761

(1) Station and Offset is referenced to the Centerline of Construction of Estero Boulevard and estimated using project design files.

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Grain Size Distribution Report
Big Carlos Pass Project Development & Environment Study
CN-160002
Tierra Project No.: 6511-16-051

Station	Offset	Boring No.	Depth (ft)
421+81	99' RT.	BB-4	2.0-4.0 (below mudline)

Grain Size Distribution Curve



Material Description	Classification	
	USCS	AASHTO

Sieve Number	Diameter (mm)	Percent Finer by Weight (%)
3/4"	19.000	100
3/8"	9.500	84
4	4.750	69
10	2.000	48
40	0.425	41
60	0.250	39
100	0.150	29
200	0.075	9

Coefficients

D_{10}	0.079	D_{30}	0.158
D_{50}	*2.181*	D_{60}	3.292
D_{85}	10.118	D_{90}	12.483
D_{95}	15.400		
C_U	41.857	C_C	0.097

(1) Station and Offset is referenced to the Centerline of Construction of Estero Boulevard and estimated using project design files.

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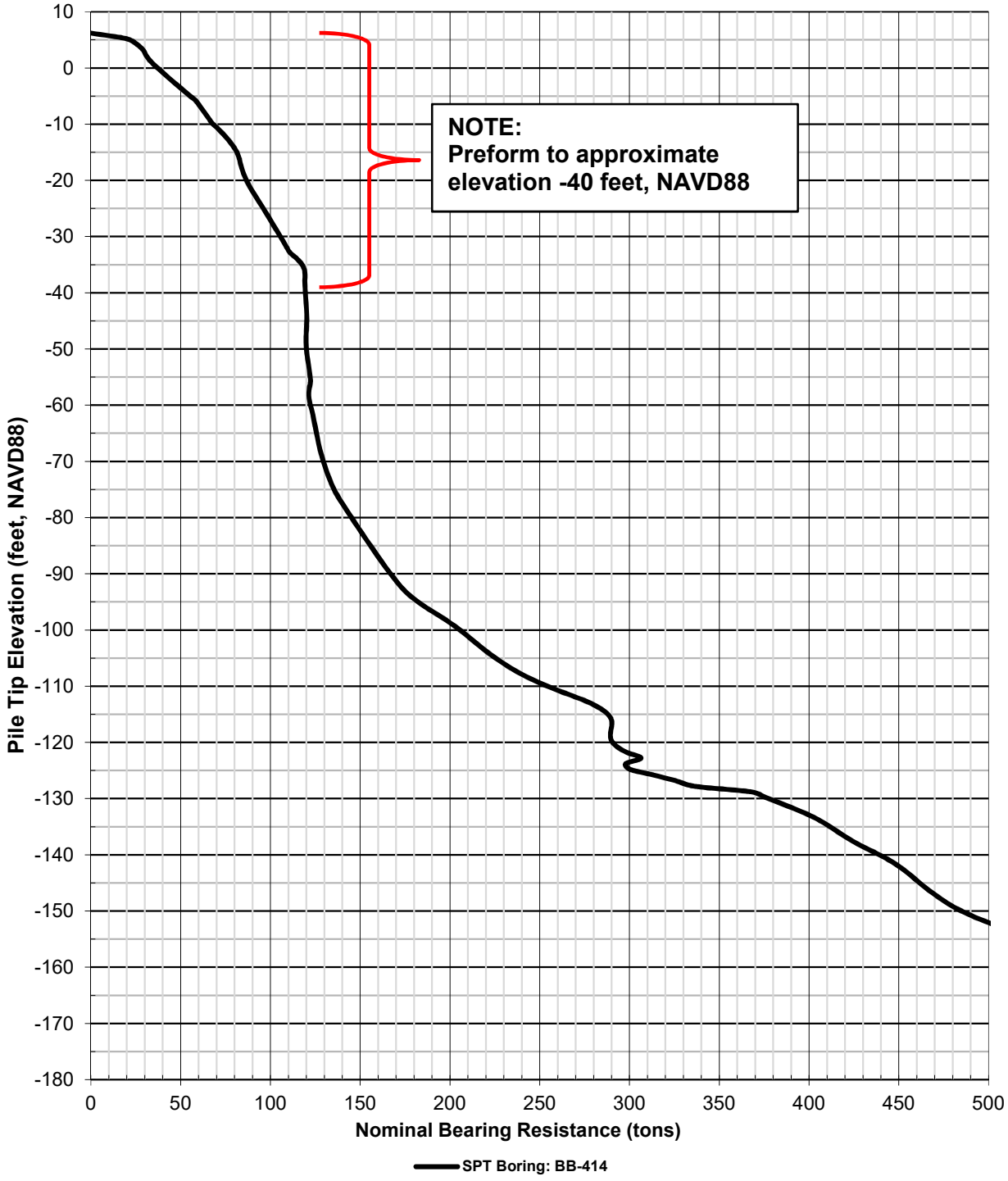
APPENDIX C

Axial Pile Capacity Curves

FB-Deep Output Files

Geotechnical Parameters for FB-MultiPier Input

End Bent No. 1
24-inch PPSC Driven Piles

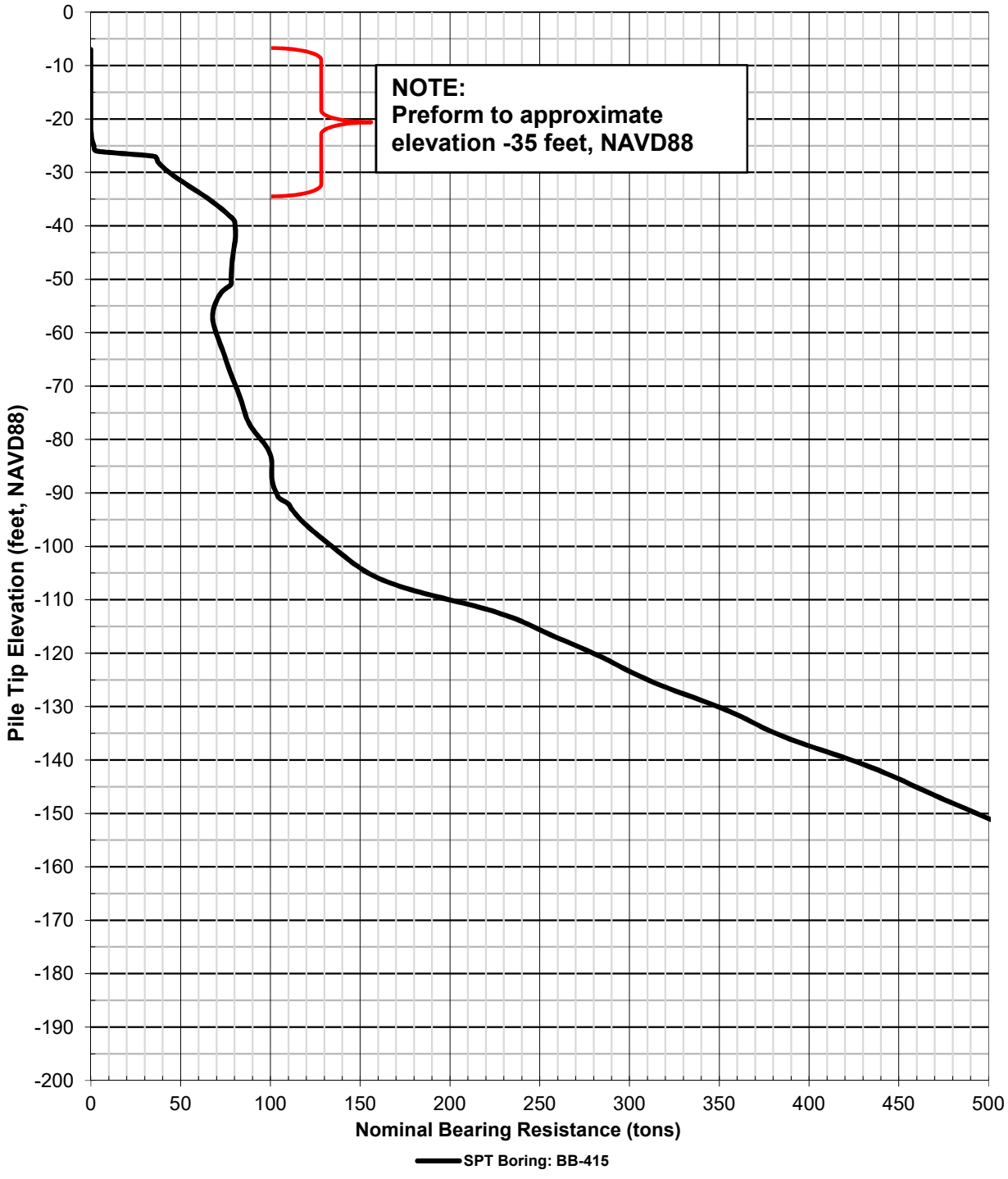


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 2
24-inch PPSC Driven Piles

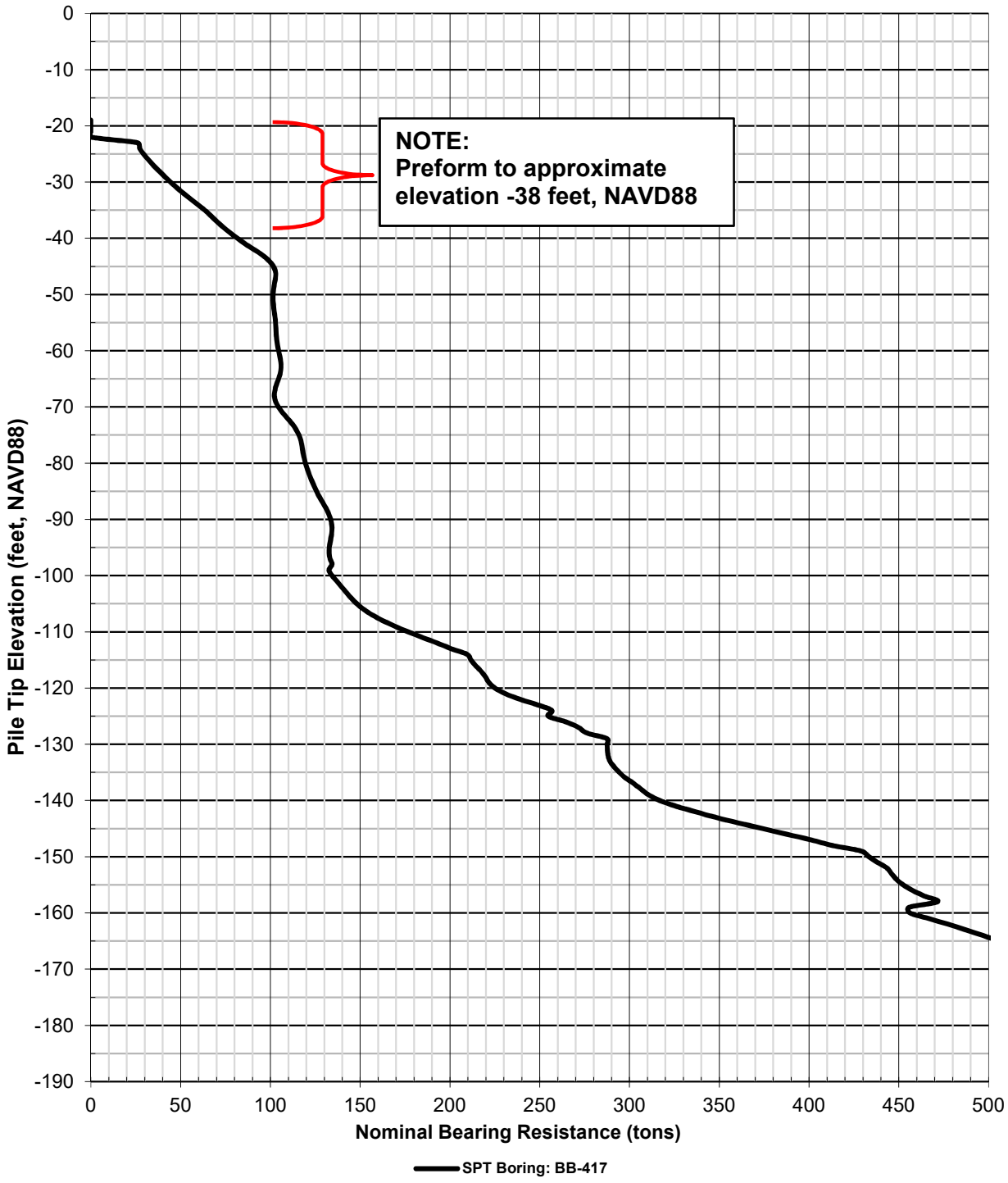


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 3
24-inch PPSC Driven Piles

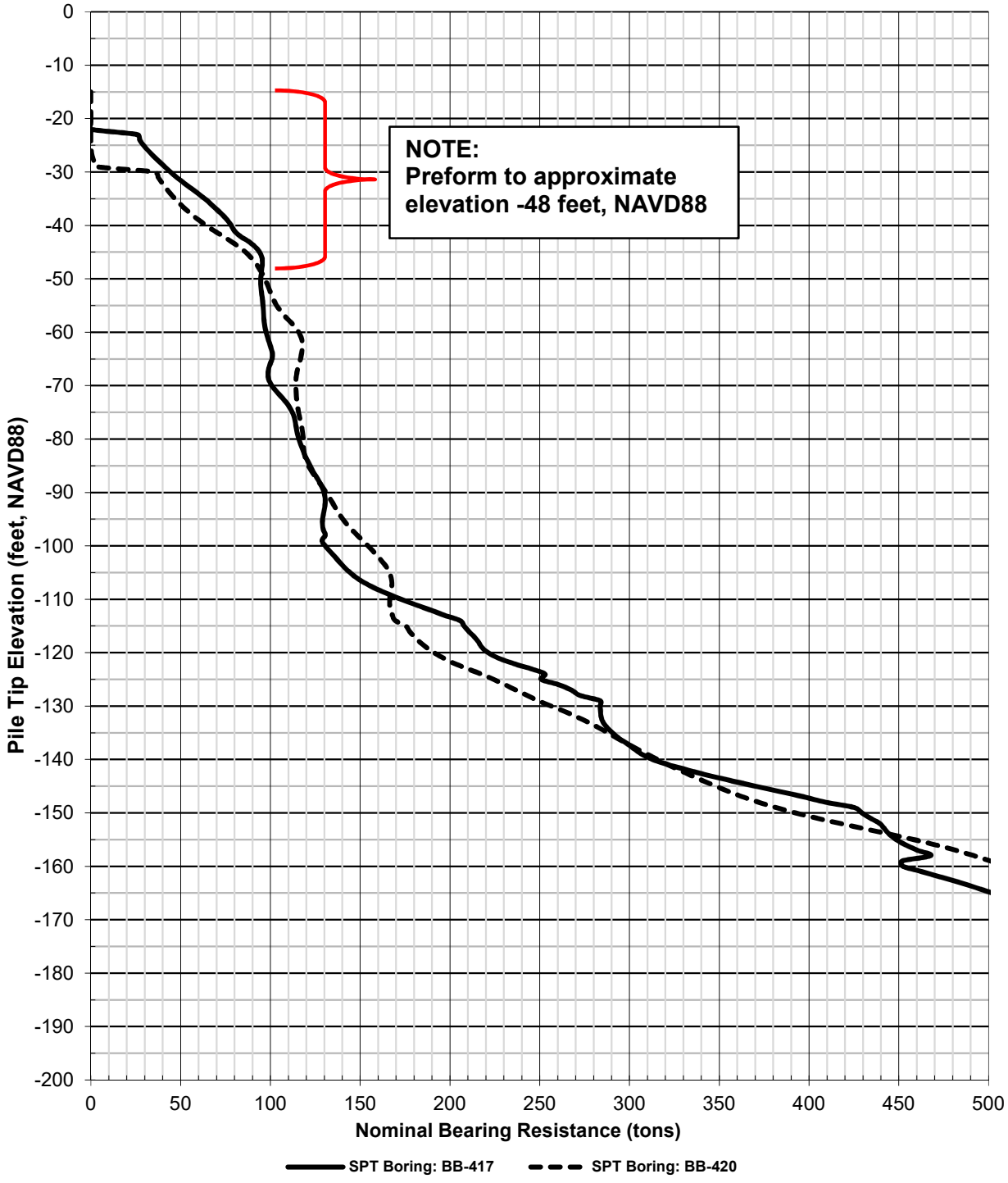


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 4
24-inch PPSC Driven Piles

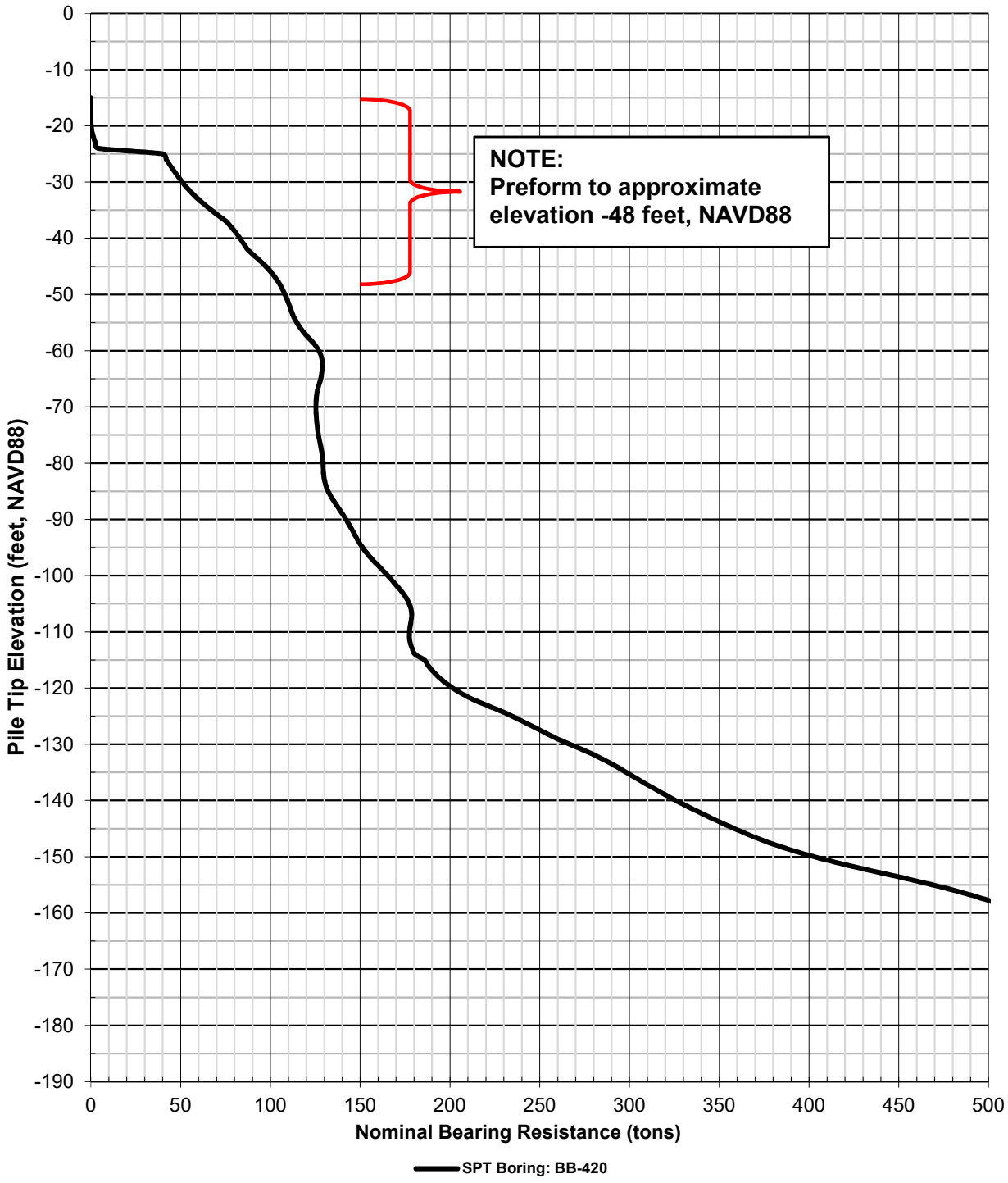


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 5
24-inch PPSC Driven Piles

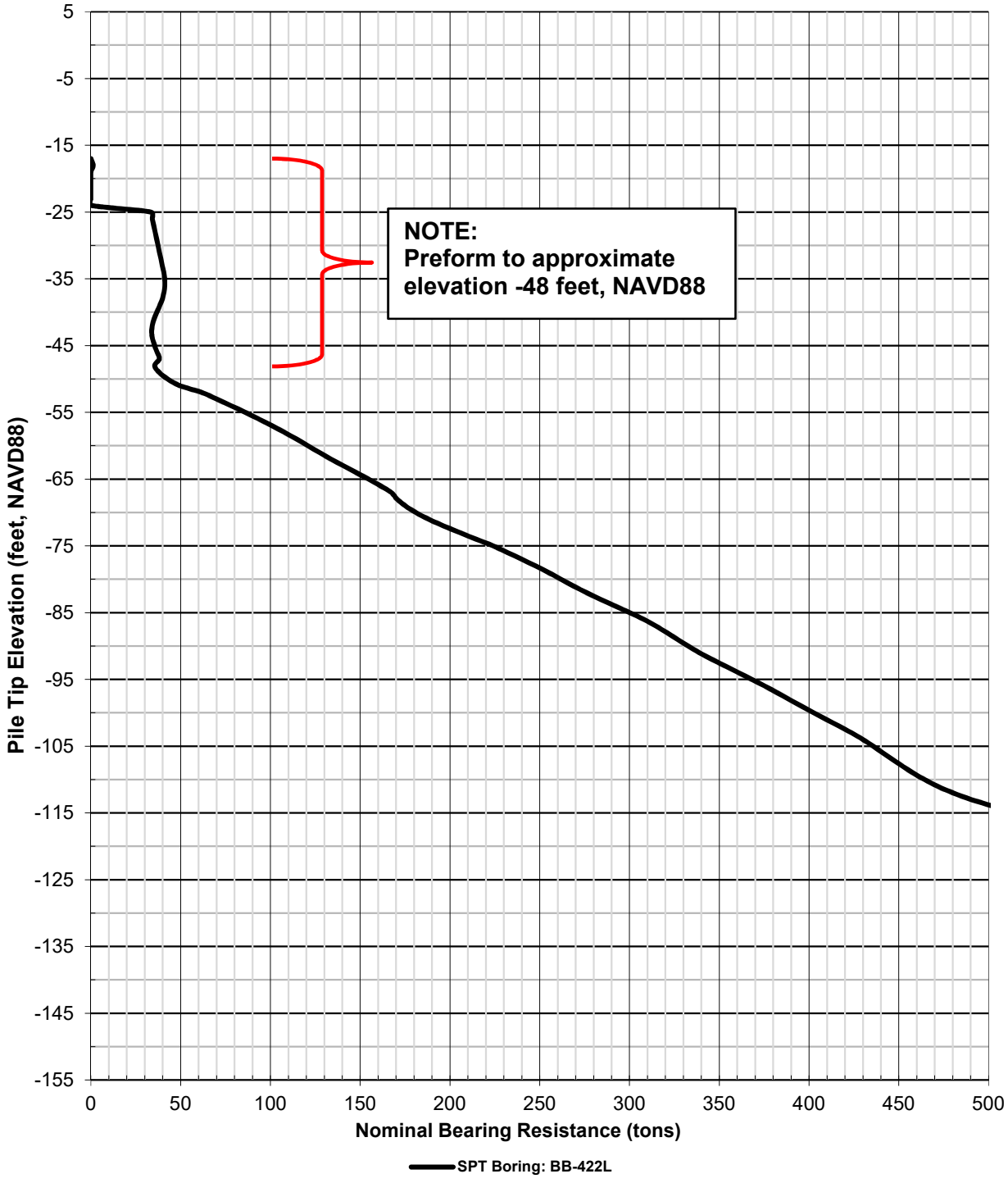


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 6
24-inch PPSC Driven Piles

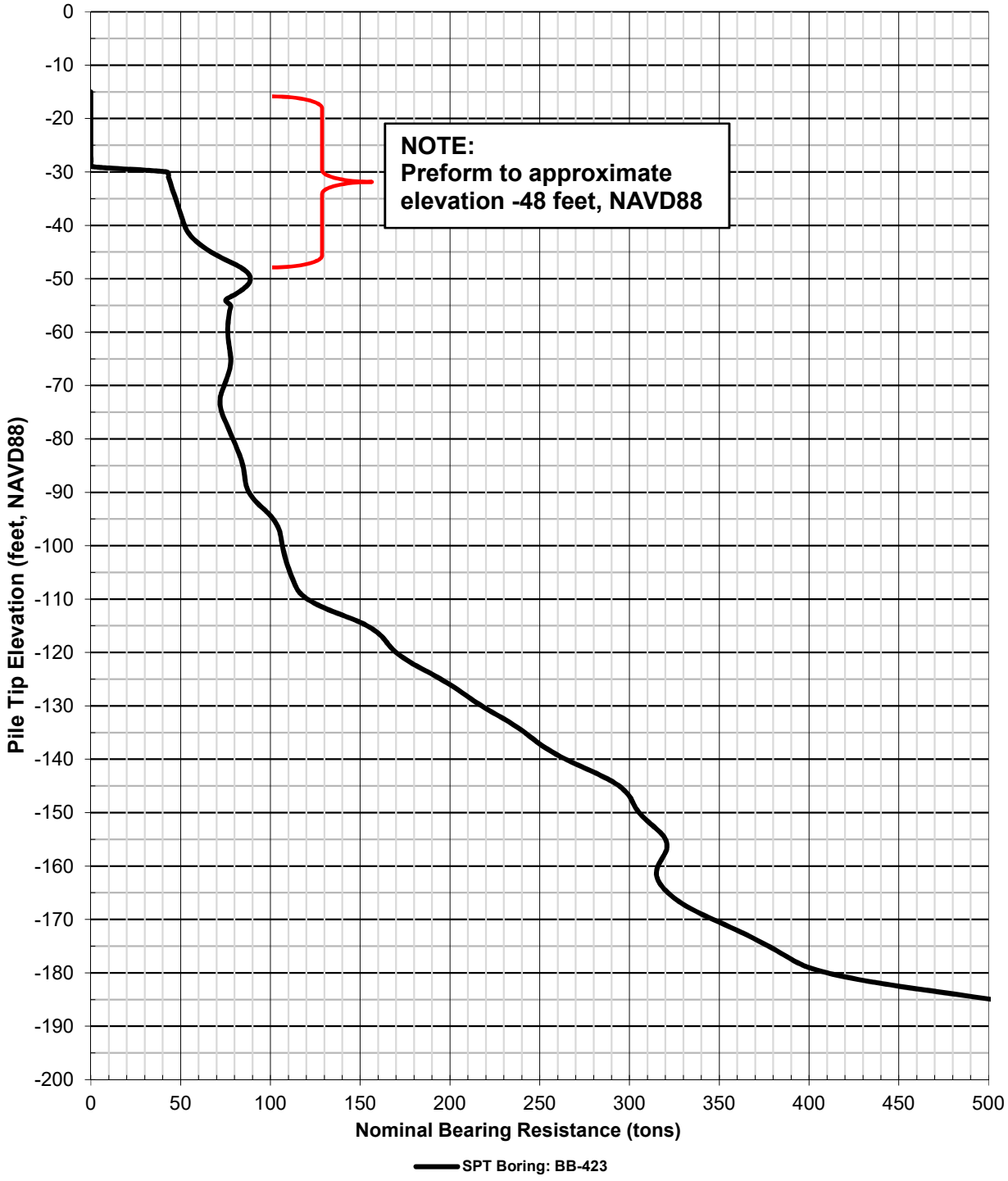


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 7
24-inch PPSC Driven Piles

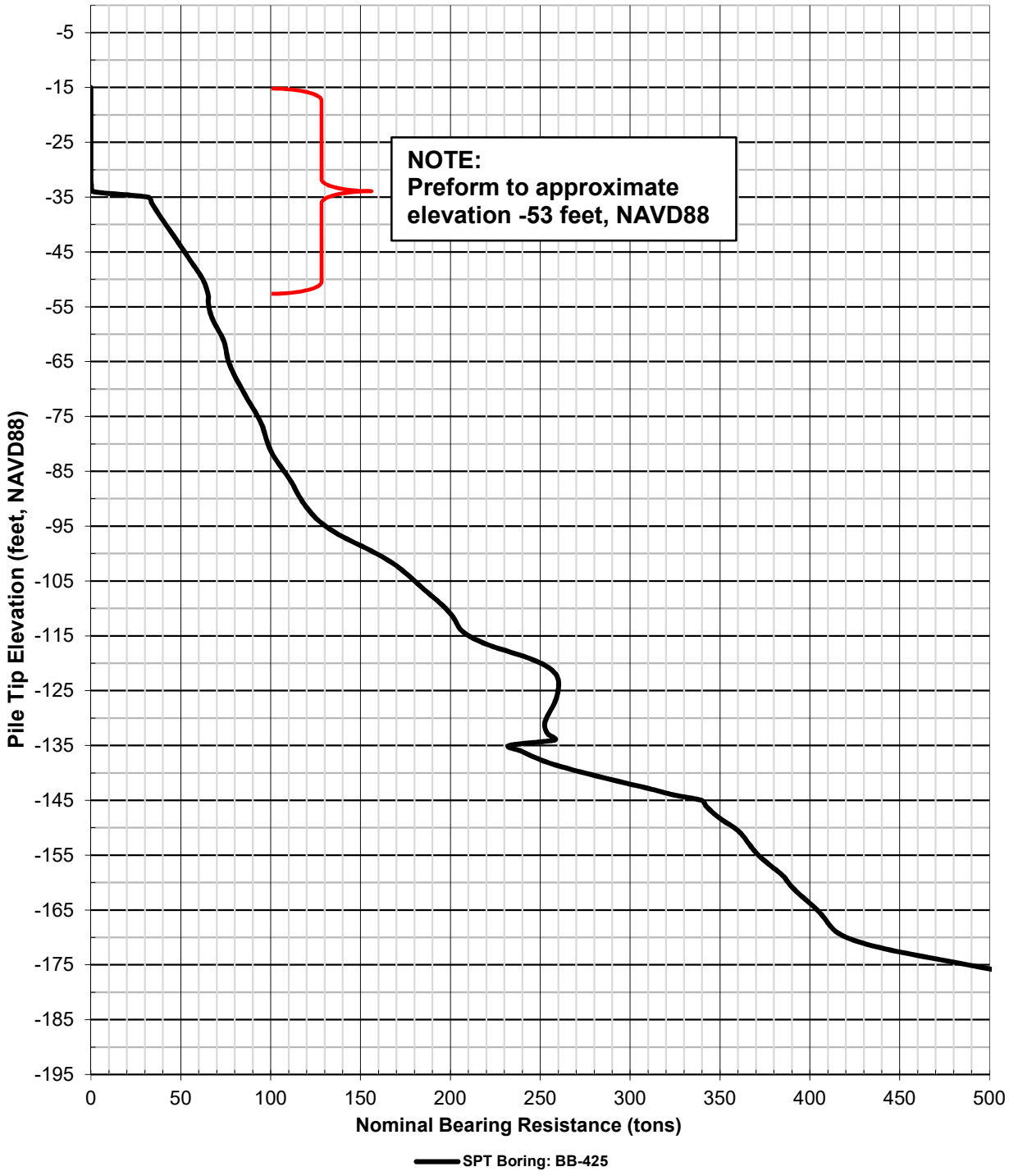


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EMF	May 2021	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 8
24-inch PPSC Driven Piles

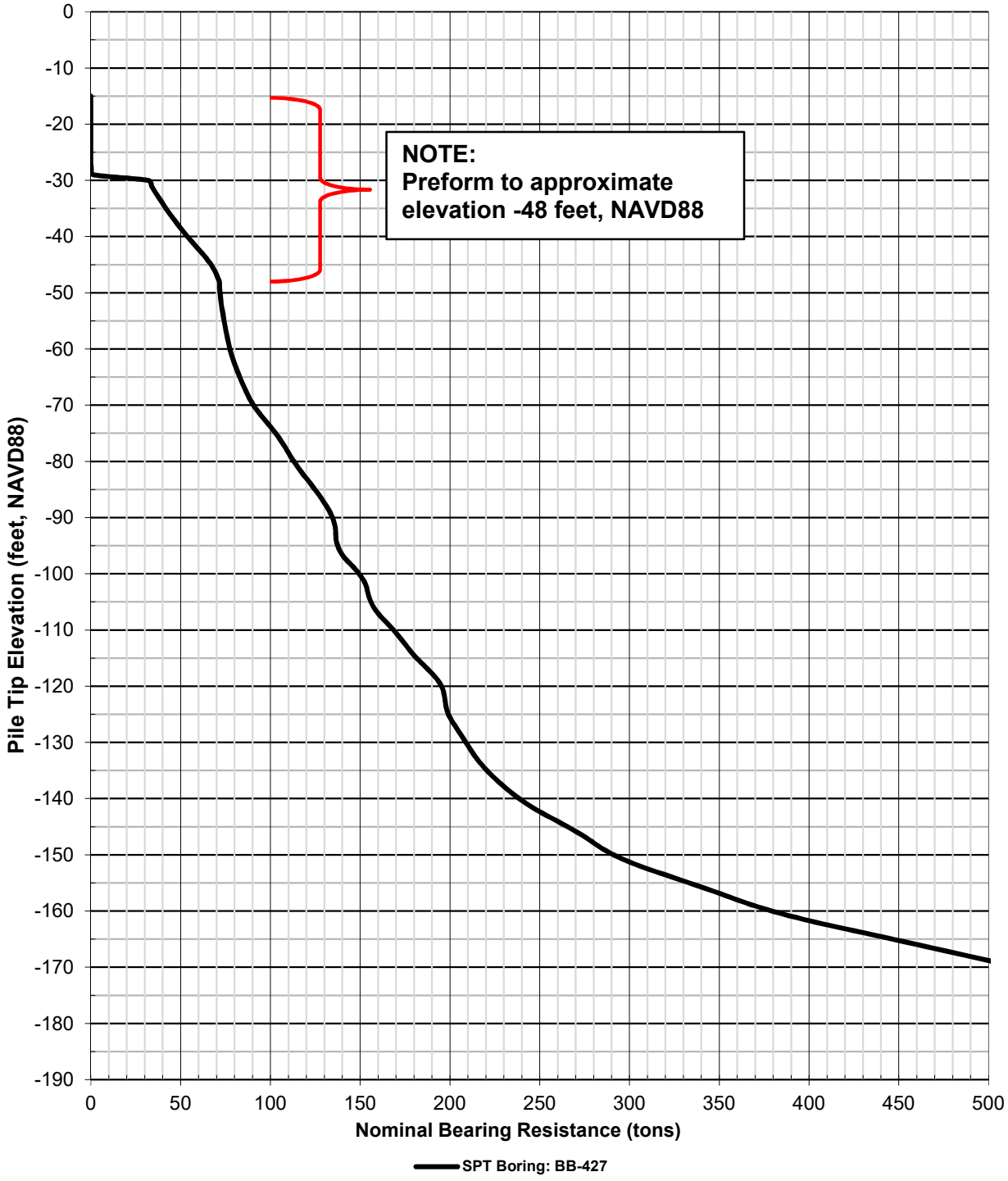


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 9
24-inch PPSC Driven Piles

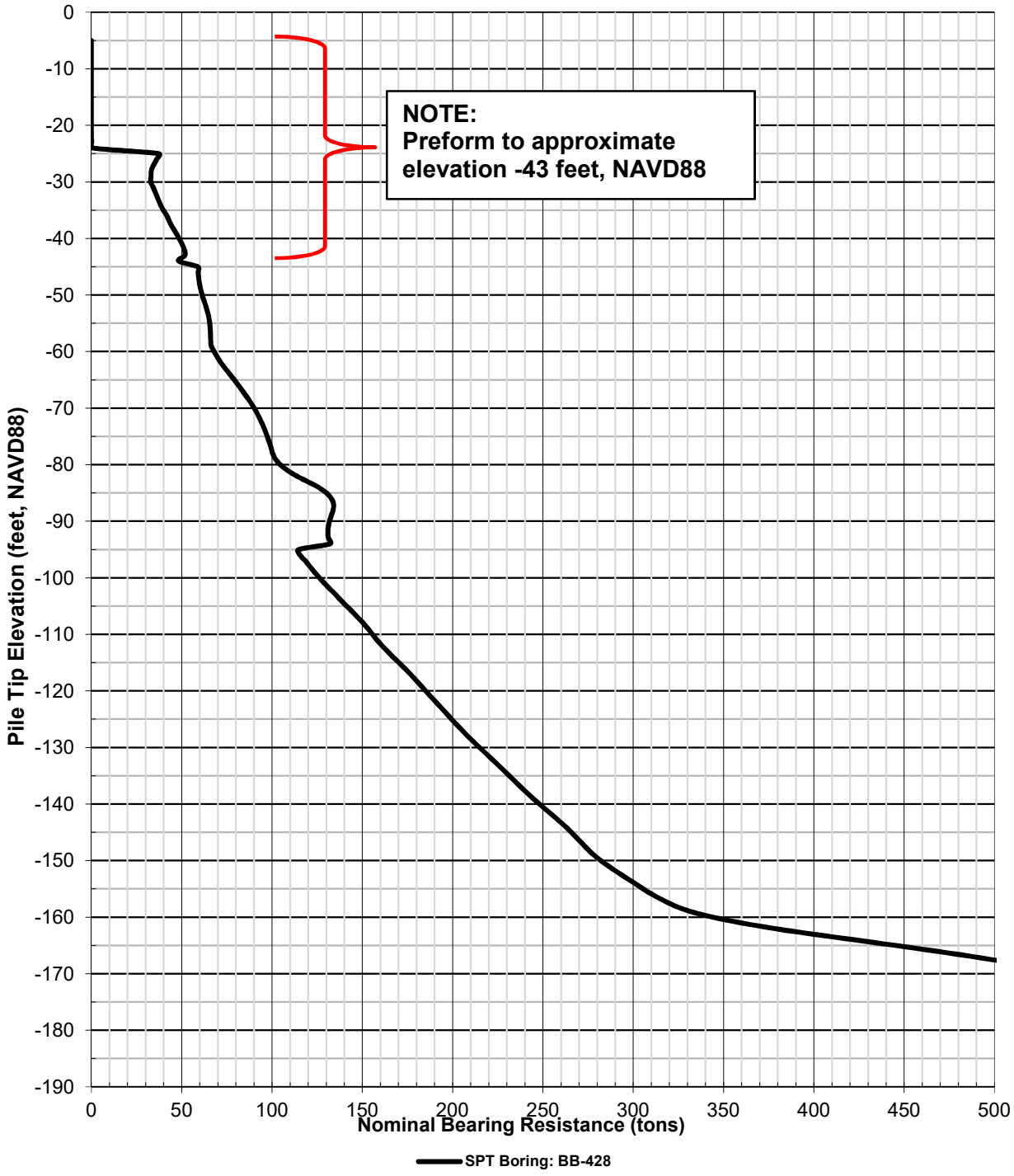


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 10
24-inch PPSC Driven Piles

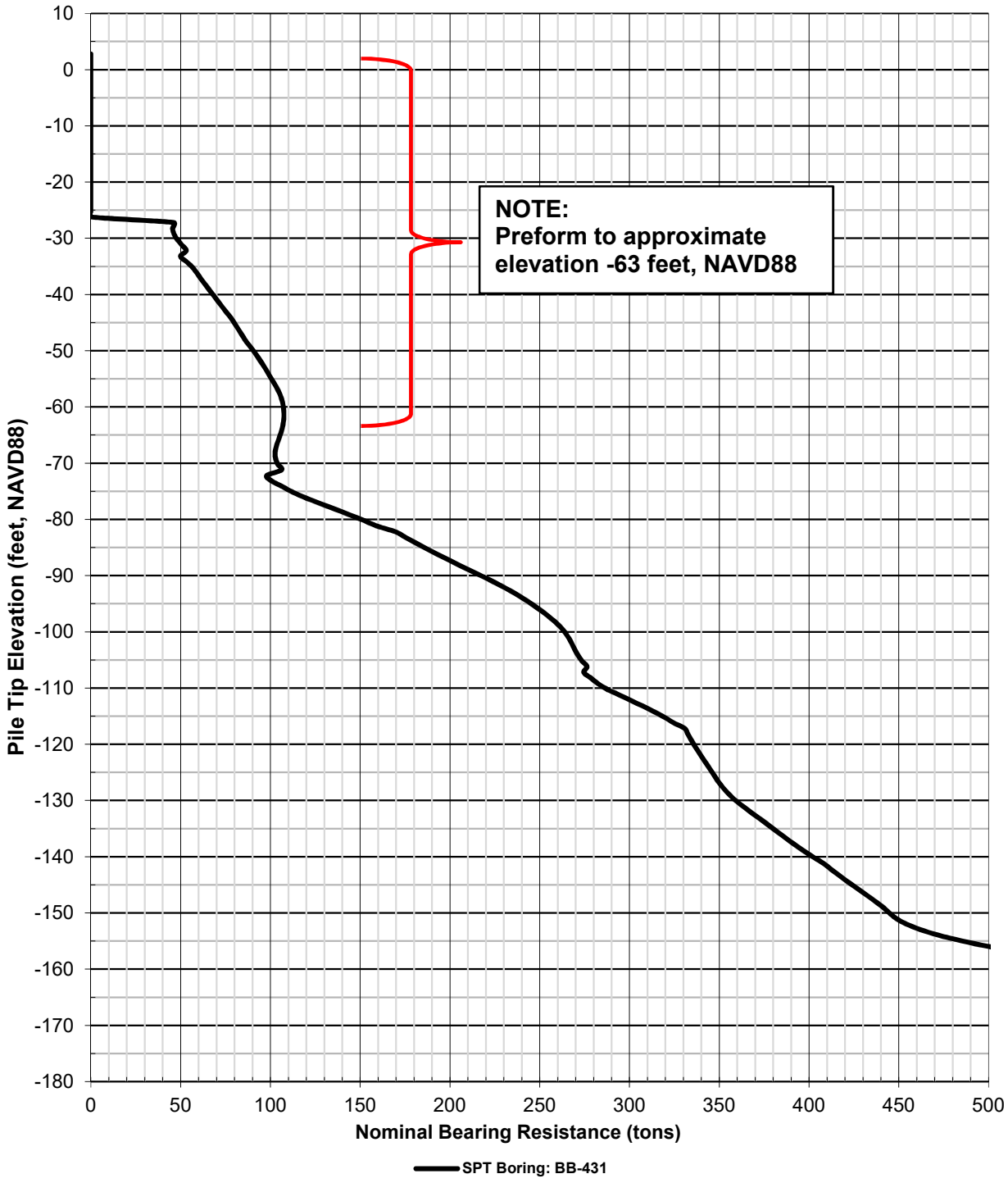


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 11
24-inch PPSC Driven Piles

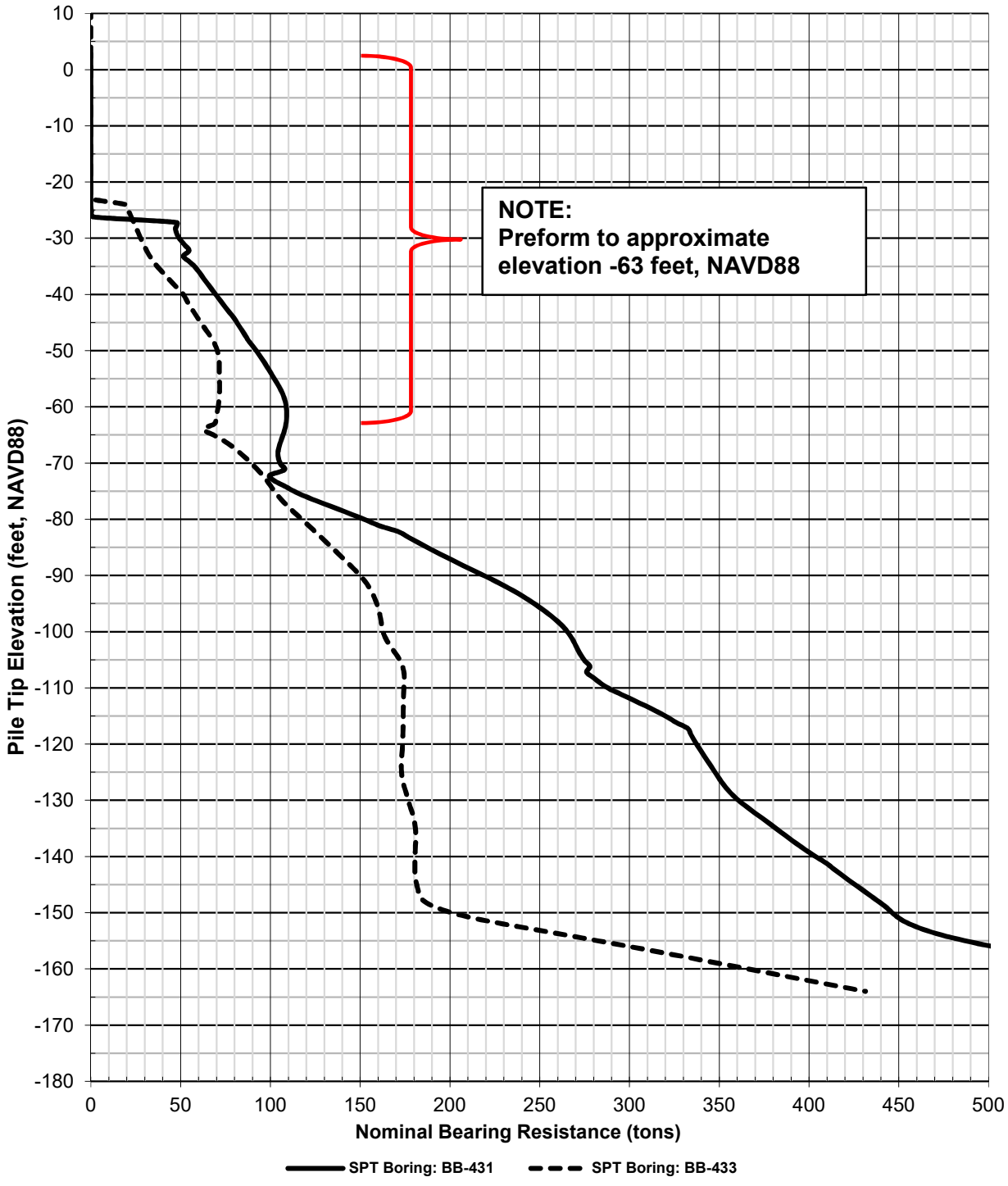


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 12
24-inch PPSC Driven Piles

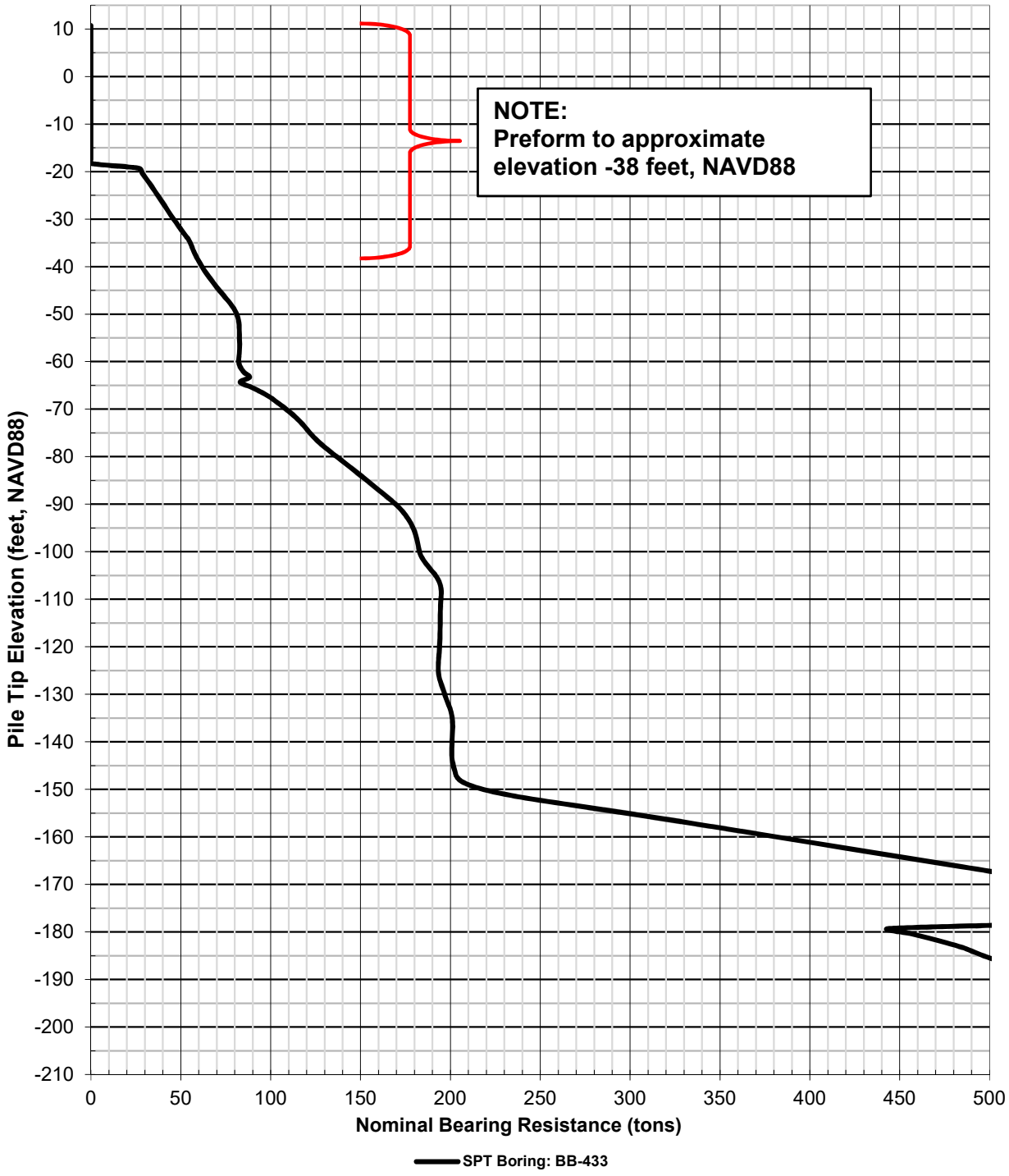


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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 13
24-inch PPSC Driven Piles

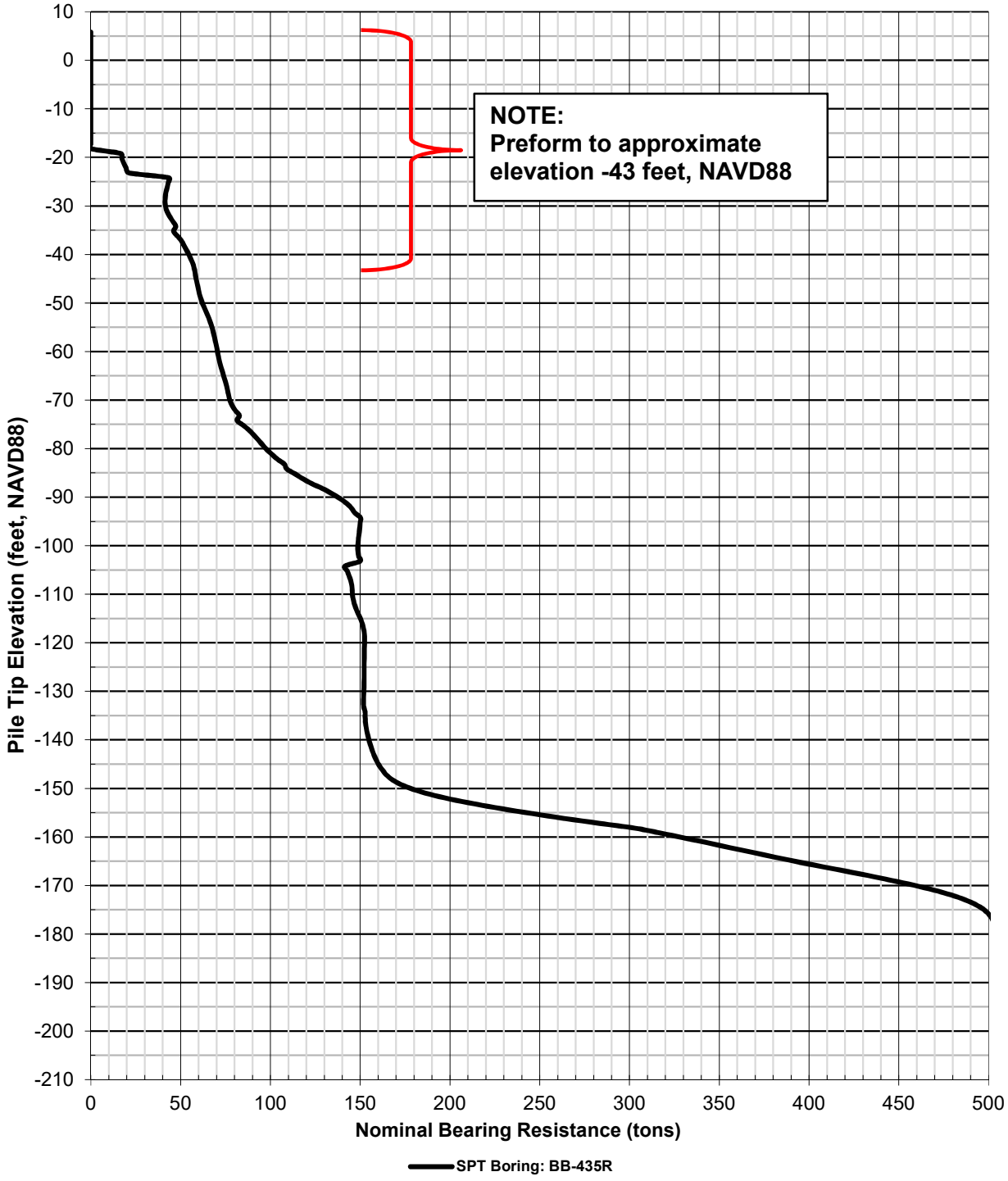


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TEM	Noted	6511-16-051
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EMF	July 2020	

Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier No. 14
24-inch PPSC Driven Piles

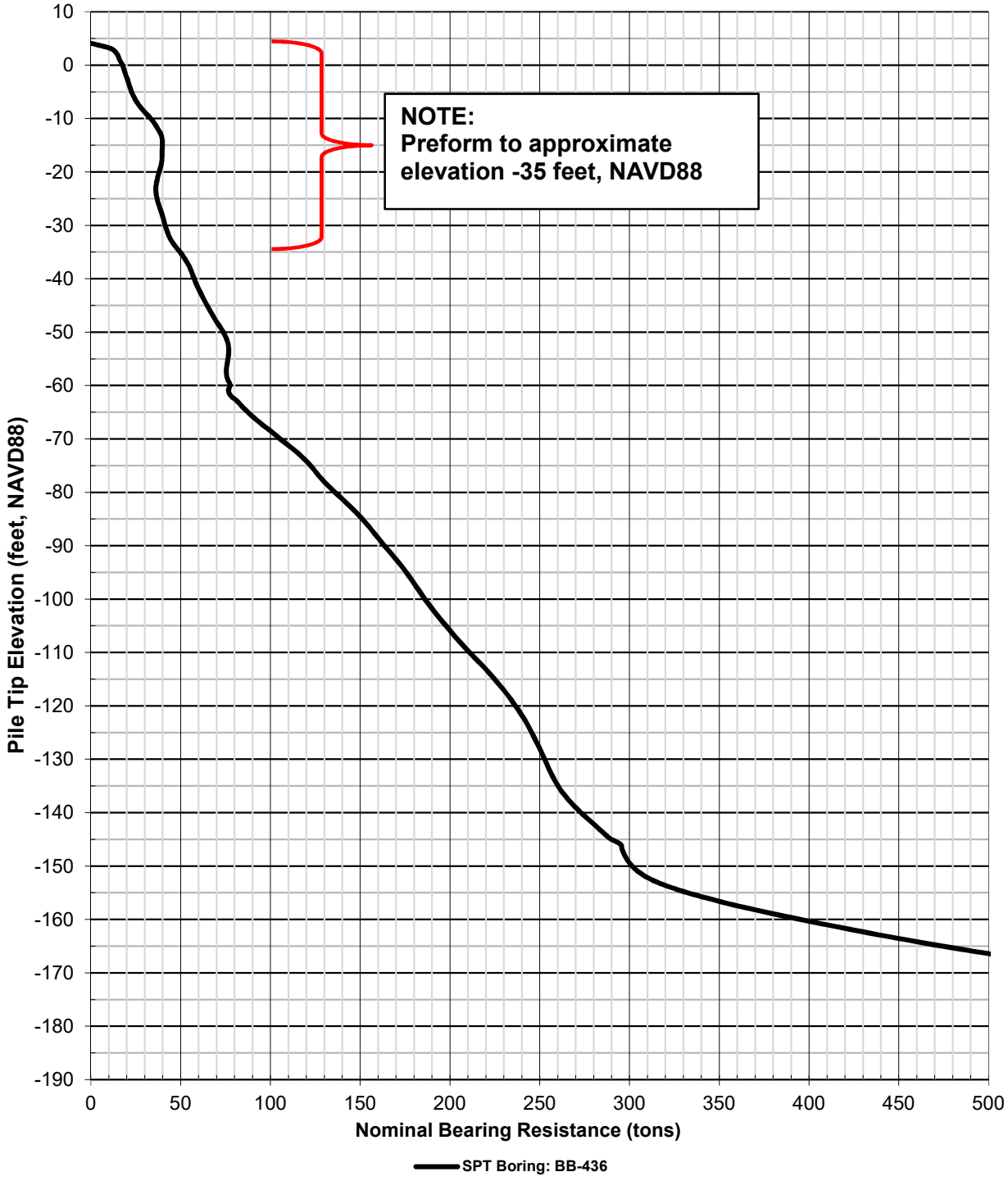


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TEM	Noted	6511-16-051
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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

End Bent No. 15
24-inch PPSC Driven Piles



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DRAWN BY:	SCALE:	PROJECT NO.
TEM	Noted	6511-16-051
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Big Carlos Pass Bridge Replacement
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

General Information:
====================
Input file: .....s Pass\FB-Deep\Tom M Final\BB-414_24-inch PPSC_PREFORM(-40).in
Project number: 6511-16-051
Job name: Big Carlos Bridge
Engineer: Tierra Inc. - TM
Units: English

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

Soil Information:
=================
Boring date: 7/21/2019, Boring Number: BB-414
Station number: 413+40 Offset: 21' RT.

Ground Elevation: 6.200(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	3- Clean sand
2	2.00	4.00	3- Clean sand
3	4.00	4.00	3- Clean sand
4	6.00	10.00	3- Clean sand
5	8.00	10.00	3- Clean sand
6	10.00	10.00	3- Clean sand
7	15.00	10.00	3- Clean sand
8	20.00	10.00	3- Clean sand
9	25.00	10.00	3- Clean sand
10	30.00	7.00	3- Clean sand
11	35.00	10.00	3- Clean sand
12	40.00	10.00	3- Clean sand
13	45.00	10.00	3- Clean sand
14	46.20	10.00	3- Clean sand
15	46.30	17.00	3- Clean sand
16	50.00	4.00	3- Clean sand
17	55.00	5.00	3- Clean sand
18	60.00	4.00	3- Clean sand
19	65.00	6.00	3- Clean sand

20	70.00	5.00	3- Clean sand
21	75.00	4.00	3- Clean sand
22	80.00	4.00	3- Clean sand
23	85.00	5.00	3- Clean sand
24	90.00	8.00	3- Clean sand
25	95.00	8.00	3- Clean sand
26	100.00	8.00	3- Clean sand
27	105.00	9.00	3- Clean sand
28	110.00	17.00	3- Clean sand
29	115.00	14.00	3- Clean sand
30	120.00	18.00	3- Clean sand
31	125.00	28.00	3- Clean sand
32	130.00	25.00	1- Plastic Clay
33	135.00	24.00	2- Clay and silty sand
34	140.00	25.00	2- Clay and silty sand
35	145.00	30.00	2- Clay and silty sand
36	150.00	10.00	2- Clay and silty sand
37	155.00	8.00	2- Clay and silty sand
38	160.00	18.00	2- Clay and silty sand
39	165.00	33.00	2- Clay and silty sand
40	170.00	75.00	2- Clay and silty sand
41	175.00	60.00	2- Clay and silty sand
42	180.00	77.00	2- Clay and silty sand
43	185.00	100.00	2- Clay and silty sand
44	190.00	74.00	2- Clay and silty sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	6.20	-123.80	130.00	9.25	3-Clean Sand
2	-123.80	-128.80	5.00	25.00	1-Plastic Clay
3	-128.80	-183.80	55.00	41.82	2-Clay and Silty Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)

24.00	1.00	5.20
24.00	2.00	4.20
24.00	3.00	3.20
24.00	4.00	2.20
24.00	5.00	1.20
24.00	6.00	0.20
24.00	7.00	-0.80
24.00	8.00	-1.80
24.00	9.00	-2.80
24.00	10.00	-3.80
24.00	11.00	-4.80
24.00	12.00	-5.80
24.00	13.00	-6.80
24.00	14.00	-7.80
24.00	15.00	-8.80
24.00	16.00	-9.80
24.00	17.00	-10.80
24.00	18.00	-11.80
24.00	19.00	-12.80
24.00	20.00	-13.80
24.00	21.00	-14.80
24.00	22.00	-15.80
24.00	23.00	-16.80
24.00	24.00	-17.80
24.00	25.00	-18.80
24.00	26.00	-19.80
24.00	27.00	-20.80
24.00	28.00	-21.80
24.00	29.00	-22.80
24.00	30.00	-23.80
24.00	31.00	-24.80
24.00	32.00	-25.80
24.00	33.00	-26.80
24.00	34.00	-27.80
24.00	35.00	-28.80
24.00	36.00	-29.80
24.00	37.00	-30.80
24.00	38.00	-31.80
24.00	39.00	-32.80
24.00	40.00	-33.80
24.00	41.00	-34.80
24.00	42.00	-35.80
24.00	43.00	-36.80
24.00	44.00	-37.80
24.00	45.00	-38.80
24.00	46.00	-39.80
24.00	47.00	-40.80
24.00	48.00	-41.80
24.00	49.00	-42.80
24.00	50.00	-43.80

24.00	51.00	-44.80
24.00	52.00	-45.80
24.00	53.00	-46.80
24.00	54.00	-47.80
24.00	55.00	-48.80
24.00	56.00	-49.80
24.00	57.00	-50.80
24.00	58.00	-51.80
24.00	59.00	-52.80
24.00	60.00	-53.80
24.00	61.00	-54.80
24.00	62.00	-55.80
24.00	63.00	-56.80
24.00	64.00	-57.80
24.00	65.00	-58.80
24.00	66.00	-59.80
24.00	67.00	-60.80
24.00	68.00	-61.80
24.00	69.00	-62.80
24.00	70.00	-63.80
24.00	71.00	-64.80
24.00	72.00	-65.80
24.00	73.00	-66.80
24.00	74.00	-67.80
24.00	75.00	-68.80
24.00	76.00	-69.80
24.00	77.00	-70.80
24.00	78.00	-71.80
24.00	79.00	-72.80
24.00	80.00	-73.80
24.00	81.00	-74.80
24.00	82.00	-75.80
24.00	83.00	-76.80
24.00	84.00	-77.80
24.00	85.00	-78.80
24.00	86.00	-79.80
24.00	87.00	-80.80
24.00	88.00	-81.80
24.00	89.00	-82.80
24.00	90.00	-83.80
24.00	91.00	-84.80
24.00	92.00	-85.80
24.00	93.00	-86.80
24.00	94.00	-87.80
24.00	95.00	-88.80
24.00	96.00	-89.80
24.00	97.00	-90.80
24.00	98.00	-91.80
24.00	99.00	-92.80
24.00	100.00	-93.80

24.00	101.00	-94.80
24.00	102.00	-95.80
24.00	103.00	-96.80
24.00	104.00	-97.80
24.00	105.00	-98.80
24.00	106.00	-99.80
24.00	107.00	-100.80
24.00	108.00	-101.80
24.00	109.00	-102.80
24.00	110.00	-103.80
24.00	111.00	-104.80
24.00	112.00	-105.80
24.00	113.00	-106.80
24.00	114.00	-107.80
24.00	115.00	-108.80
24.00	116.00	-109.80
24.00	117.00	-110.80
24.00	118.00	-111.80
24.00	119.00	-112.80
24.00	120.00	-113.80
24.00	121.00	-114.80
24.00	122.00	-115.80
24.00	123.00	-116.80
24.00	124.00	-117.80
24.00	125.00	-118.80
24.00	126.00	-119.80
24.00	127.00	-120.80
24.00	128.00	-121.80
24.00	129.00	-122.80
24.00	130.00	-123.80
24.00	131.00	-124.80
24.00	132.00	-125.80
24.00	133.00	-126.80
24.00	134.00	-127.80
24.00	135.00	-128.80
24.00	136.00	-129.80
24.00	137.00	-130.80
24.00	138.00	-131.80
24.00	139.00	-132.80
24.00	140.00	-133.80
24.00	141.00	-134.80
24.00	142.00	-135.80
24.00	143.00	-136.80
24.00	144.00	-137.80
24.00	145.00	-138.80
24.00	146.00	-139.80
24.00	147.00	-140.80
24.00	148.00	-141.80
24.00	149.00	-142.80
24.00	150.00	-143.80

24.00	151.00	-144.80
24.00	152.00	-145.80
24.00	153.00	-146.80
24.00	154.00	-147.80
24.00	155.00	-148.80
24.00	156.00	-149.80
24.00	157.00	-150.80
24.00	158.00	-151.80
24.00	159.00	-152.80
24.00	160.00	-153.80
24.00	161.00	-154.80
24.00	162.00	-155.80
24.00	163.00	-156.80
24.00	164.00	-157.80
24.00	165.00	-158.80
24.00	166.00	-159.80
24.00	167.00	-160.80
24.00	168.00	-161.80
24.00	169.00	-162.80
24.00	170.00	-163.80
24.00	171.00	-164.80
24.00	172.00	-165.80
24.00	173.00	-166.80
24.00	174.00	-167.80
24.00	175.00	-168.80
24.00	176.00	-169.80
24.00	177.00	-170.80
24.00	178.00	-171.80
24.00	179.00	-172.80
24.00	180.00	-173.80
24.00	181.00	-174.80
24.00	182.00	-175.80
24.00	183.00	-176.80
24.00	184.00	-177.80
24.00	185.00	-178.80
24.00	186.00	-179.80
24.00	187.00	-180.80
24.00	188.00	-181.80
24.00	189.00	-182.80
24.00	190.00	-183.80

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.19	19.65	19.84	9.92	59.14
2.00	24.0	0.75	24.94	25.70	12.85	75.58
3.00	24.0	1.43	27.65	29.08	14.54	84.38
4.00	24.0	1.97	28.85	30.82	15.41	88.51
5.00	24.0	2.71	30.52	33.22	16.61	94.26
6.00	24.0	3.86	32.56	36.43	18.21	101.55
7.00	24.0	5.24	34.70	39.95	19.97	109.36
8.00	24.0	6.66	36.85	43.51	21.76	117.20
9.00	24.0	8.14	38.99	47.13	23.56	125.10
10.00	24.0	9.68	41.13	50.81	25.40	133.07
11.00	24.0	11.29	43.27	54.56	27.28	141.10
12.00	24.0	12.96	45.41	58.37	29.19	149.20
13.00	24.0	14.75	45.99	60.73	30.37	152.71
14.00	24.0	16.55	46.48	63.03	31.51	155.99
15.00	24.0	18.36	46.91	65.27	32.63	159.09
16.00	24.0	20.18	47.29	67.46	33.73	162.03
17.00	24.0	22.01	48.77	70.78	35.39	168.33
18.00	24.0	23.84	49.93	73.77	36.89	173.63
19.00	24.0	25.68	50.81	76.49	38.25	178.11
20.00	24.0	27.53	51.46	78.99	39.49	181.91
21.00	24.0	29.37	51.64	81.01	40.51	184.29
22.00	24.0	31.22	51.09	82.32	41.16	184.50
23.00	24.0	33.08	50.07	83.15	41.58	183.30
24.00	24.0	34.94	49.05	83.99	41.99	182.09
25.00	24.0	36.80	48.26	85.05	42.53	181.57
26.00	24.0	38.61	47.76	86.36	43.18	181.87
27.00	24.0	40.31	47.61	87.92	43.96	183.13
28.00	24.0	41.92	47.81	89.73	44.87	185.35
29.00	24.0	43.42	48.26	91.68	45.84	188.20
30.00	24.0	44.82	48.83	93.65	46.82	191.31
31.00	24.0	46.21	49.41	95.62	47.81	194.43
32.00	24.0	47.71	49.85	97.56	48.78	197.27
33.00	24.0	49.31	50.17	99.48	49.74	199.83
34.00	24.0	51.02	50.36	101.38	50.69	202.11
35.00	24.0	52.83	50.43	103.26	51.63	204.11
36.00	24.0	54.70	50.43	105.13	52.56	205.98
37.00	24.0	56.57	50.43	107.00	53.50	207.85
38.00	24.0	58.44	50.43	108.87	54.43	209.72
39.00	24.0	60.31	50.43	110.73	55.37	211.59
40.00	24.0	62.18	52.09	114.26	57.13	218.43
41.00	24.0	64.05	53.14	117.19	58.59	223.46
42.00	24.0	65.92	52.91	118.83	59.42	224.66

43.00	24.0	67.79	51.46	119.25	59.63	222.16
44.00	24.0	69.67	49.47	119.14	59.57	218.09
45.00	24.0	71.54	47.67	119.21	59.60	214.55
46.00	24.0	73.42	46.04	119.45	59.73	211.52
47.00	24.0	76.07	43.55	119.62	59.81	206.71
48.00	24.0	78.45	41.37	119.82	59.91	202.57
49.00	24.0	80.19	39.85	120.05	60.02	199.75
50.00	24.0	81.31	38.90	120.21	60.10	198.01
51.00	24.0	82.13	38.12	120.25	60.13	196.50
52.00	24.0	82.98	37.18	120.16	60.08	194.52
53.00	24.0	83.86	36.12	119.98	59.99	192.23
54.00	24.0	84.78	35.06	119.84	59.92	189.95
55.00	24.0	85.74	34.10	119.84	59.92	188.04
56.00	24.0	86.69	33.29	119.99	59.99	186.57
57.00	24.0	87.61	32.68	120.29	60.15	185.66
58.00	24.0	88.49	32.26	120.75	60.38	185.28
59.00	24.0	89.33	31.93	121.26	60.63	185.11
60.00	24.0	90.14	31.56	121.69	60.85	184.80
61.00	24.0	90.96	31.09	122.05	61.02	184.22
62.00	24.0	91.85	30.46	122.31	61.16	183.23
63.00	24.0	92.82	28.94	121.76	60.88	179.65
64.00	24.0	93.85	27.53	121.39	60.69	176.46
65.00	24.0	94.96	26.55	121.51	60.75	174.60
66.00	24.0	96.09	26.04	122.13	61.07	174.21
67.00	24.0	97.18	25.78	122.96	61.48	174.51
68.00	24.0	98.23	25.44	123.68	61.84	174.57
69.00	24.0	99.25	25.09	124.34	62.17	174.51
70.00	24.0	100.23	24.74	124.97	62.48	174.44
71.00	24.0	101.17	24.40	125.57	62.78	174.36
72.00	24.0	102.08	24.10	126.18	63.09	174.37
73.00	24.0	102.95	23.88	126.82	63.41	174.58
74.00	24.0	103.78	23.77	127.55	63.77	175.08
75.00	24.0	104.57	23.81	128.38	64.19	176.00
76.00	24.0	105.35	23.98	129.33	64.67	177.30
77.00	24.0	106.12	24.21	130.34	65.17	178.77
78.00	24.0	106.90	24.46	131.35	65.68	180.26
79.00	24.0	107.67	24.78	132.45	66.23	182.01
80.00	24.0	108.45	25.27	133.71	66.86	184.25
81.00	24.0	109.24	25.89	135.13	67.57	186.92
82.00	24.0	110.06	26.69	136.75	68.38	190.13
83.00	24.0	110.93	27.70	138.63	69.31	194.02
84.00	24.0	111.83	28.81	140.64	70.32	198.27
85.00	24.0	112.76	29.92	142.68	71.34	202.52
86.00	24.0	113.77	30.97	144.74	72.37	206.69
87.00	24.0	114.89	31.93	146.82	73.41	210.68
88.00	24.0	116.12	32.80	148.92	74.46	214.51
89.00	24.0	117.46	33.57	151.02	75.51	218.15
90.00	24.0	118.91	34.24	153.15	76.57	221.63
91.00	24.0	120.41	34.89	155.30	77.65	225.07
92.00	24.0	121.92	35.55	157.46	78.73	228.56

93.00	24.0	123.42	36.21	159.63	79.81	232.04
94.00	24.0	124.92	36.91	161.83	80.92	235.65
95.00	24.0	126.43	37.68	164.11	82.06	239.47
96.00	24.0	127.93	38.53	166.46	83.23	243.53
97.00	24.0	129.44	39.44	168.88	84.44	247.76
98.00	24.0	130.94	40.39	171.33	85.67	252.12
99.00	24.0	132.45	41.65	174.10	87.05	257.40
100.00	24.0	133.95	43.48	177.43	88.72	264.40

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	135.47	45.86	181.34	90.67	273.06
102.00	24.0	137.03	48.74	185.77	92.89	283.25
103.00	24.0	138.63	52.08	190.71	95.35	294.87
104.00	24.0	140.26	55.47	195.73	97.87	306.66
105.00	24.0	141.93	58.49	200.42	100.21	317.39
106.00	24.0	143.77	60.99	204.76	102.38	326.73
107.00	24.0	145.90	62.87	208.77	104.39	334.52
108.00	24.0	148.33	64.19	212.52	106.26	340.90
109.00	24.0	151.05	65.21	216.26	108.13	346.67
110.00	24.0	154.07	66.18	220.25	110.13	352.62
111.00	24.0	157.18	67.36	224.54	112.27	359.25
112.00	24.0	160.18	68.96	229.14	114.57	367.06
113.00	24.0	163.07	70.99	234.06	117.03	376.05
114.00	24.0	165.85	73.68	239.53	119.77	386.90
115.00	24.0	168.52	77.26	245.78	122.89	400.29
116.00	24.0	171.21	81.57	252.78	126.39	415.91
117.00	24.0	174.05	86.44	260.49	130.24	433.38
118.00	24.0	177.03	91.87	268.90	134.45	452.65
119.00	24.0	180.16	96.63	276.79	138.40	470.04
120.00	24.0	183.45	99.47	282.92	141.46	481.87
121.00	24.0	186.99	100.29	287.28	143.64	487.85
122.00	24.0	190.90	98.82	289.72	144.86	487.37
123.00	24.0	195.18	94.97	290.15	145.07	480.09
124.00	24.0	199.83	89.82	289.65	144.83	469.29
125.00	24.0	204.85	84.47	289.33	144.66	458.27
126.00	24.0	210.51	79.62	290.13	145.06	449.37
127.00	24.0	217.04	76.14	293.18	146.59	445.46
128.00	24.0	224.46	74.21	298.67	149.33	447.09
129.00	24.0	232.77	73.60	306.37	153.18	453.57
130.00	24.0	246.52	51.30	297.82	148.91	400.41

131.00	24.0	256.15	44.16	300.31	150.16	388.63
132.00	24.0	265.50	47.75	313.25	156.62	408.74
133.00	24.0	274.56	50.88	325.44	162.72	427.19
134.00	24.0	282.53	53.63	336.16	168.08	443.42
135.00	24.0	291.81	75.95	367.76	183.88	519.66
136.00	24.0	300.16	75.67	375.84	187.92	527.19
137.00	24.0	308.56	75.34	383.90	191.95	534.57
138.00	24.0	317.01	74.83	391.84	195.92	541.51
139.00	24.0	325.49	73.70	399.19	199.59	546.58
140.00	24.0	334.02	71.45	405.47	202.74	548.37
141.00	24.0	342.66	68.06	410.72	205.36	546.83
142.00	24.0	351.48	64.01	415.49	207.74	543.50
143.00	24.0	360.48	59.84	420.32	210.16	540.00
144.00	24.0	369.67	55.89	425.56	212.78	537.35
145.00	24.0	379.03	52.51	431.54	215.77	536.57
146.00	24.0	387.96	49.96	437.92	218.96	537.84
147.00	24.0	395.85	48.02	443.87	221.93	539.92
148.00	24.0	402.68	46.22	448.90	224.45	541.34
149.00	24.0	408.48	44.77	453.25	226.63	542.80
150.00	24.0	413.23	43.92	457.14	228.57	544.98
151.00	24.0	417.37	43.46	460.83	230.42	547.74
152.00	24.0	421.37	43.30	464.67	232.34	551.27
153.00	24.0	425.22	43.55	468.76	234.38	555.86
154.00	24.0	428.91	44.29	473.20	236.60	561.79
155.00	24.0	432.45	45.63	478.08	239.04	569.34
156.00	24.0	436.25	47.43	483.69	241.84	578.55
157.00	24.0	440.73	49.54	490.27	245.14	589.35
158.00	24.0	445.88	51.92	497.80	248.90	601.64
159.00	24.0	451.70	54.58	506.28	253.14	615.44
160.00	24.0	458.20	57.52	515.72	257.86	630.77
161.00	24.0	465.33	60.70	526.03	263.02	647.44
162.00	24.0	473.07	64.27	537.34	268.67	665.87
163.00	24.0	481.42	68.42	549.85	274.92	686.70
164.00	24.0	490.38	72.88	563.27	281.63	709.04
165.00	24.0	499.95	77.36	577.30	288.65	732.02
166.00	24.0	509.87	81.84	591.71	295.86	755.38
167.00	24.0	519.92	86.17	606.10	303.05	778.44
168.00	24.0	530.09	90.21	620.31	310.15	800.73
169.00	24.0	540.39	93.96	634.34	317.17	822.26
170.00	24.0	550.80	97.41	648.21	324.10	843.03
171.00	24.0	561.27	100.73	662.00	331.00	863.47
172.00	24.0	571.74	103.99	675.73	337.87	883.71
173.00	24.0	582.22	107.08	689.30	344.65	903.46
174.00	24.0	592.69	110.01	702.69	351.35	922.71
175.00	24.0	603.16	112.77	715.93	357.96	941.46
176.00	24.0	613.63	115.36	728.99	364.50	959.71
177.00	24.0	624.11	117.75	741.86	370.93	977.35
178.00	24.0	634.58	119.89	754.47	377.23	994.24
179.00	24.0	645.05	121.78	766.83	383.42	1010.39
180.00	24.0	655.53	123.42	778.95	389.48	1025.80

181.00	24.0	666.00	124.82	790.82	395.41	1040.46
182.00	24.0	676.47	125.96	802.44	401.22	1054.37
183.00	24.0	686.94	126.86	813.80	406.90	1067.51
184.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
185.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
186.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
187.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
188.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
189.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
190.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-415_24-inch PPSC_SCOUR(-22)PREFORM(-35).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/1/2020, Boring Number: BB-415
Station number: Offset:

Ground Elevation: -7.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	1.00	5- Cavity layer
3	4.00	3.00	5- Cavity layer
4	6.00	4.00	5- Cavity layer
5	8.00	4.00	5- Cavity layer
6	10.00	4.00	5- Cavity layer
7	15.00	10.00	5- Cavity layer
8	20.00	10.00	3- Clean sand
9	25.00	10.00	3- Clean sand
10	28.00	10.00	3- Clean sand
11	28.10	38.00	3- Clean sand
12	30.00	18.00	3- Clean sand
13	35.00	6.00	3- Clean sand
14	40.00	3.00	3- Clean sand
15	45.00	3.00	3- Clean sand
16	50.00	4.00	3- Clean sand
17	55.00	3.00	3- Clean sand
18	60.00	5.00	3- Clean sand
19	65.00	4.00	3- Clean sand

20	70.00	5.00	3- Clean sand
21	75.00	4.00	3- Clean sand
22	80.00	9.00	3- Clean sand
23	85.00	4.00	2- Clay and silty sand
24	90.00	8.00	2- Clay and silty sand
25	95.00	8.00	2- Clay and silty sand
26	100.00	11.00	2- Clay and silty sand
27	105.00	16.00	2- Clay and silty sand
28	110.00	100.00	2- Clay and silty sand
29	115.00	8.00	2- Clay and silty sand
30	120.00	20.00	2- Clay and silty sand
31	125.00	19.00	2- Clay and silty sand
32	130.00	26.00	2- Clay and silty sand
33	135.00	21.00	2- Clay and silty sand
34	140.00	21.00	2- Clay and silty sand
35	145.00	13.00	2- Clay and silty sand
36	150.00	11.00	3- Clean sand
37	155.00	17.00	3- Clean sand
38	160.00	100.00	3- Clean sand
39	165.00	79.00	3- Clean sand
40	170.00	100.00	3- Clean sand
41	175.00	100.00	3- Clean sand
42	180.00	100.00	3- Clean sand
43	185.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-7.00	-27.00	20.00	4.70	5-Void
2	-27.00	-92.00	65.00	7.28	3-Clean Sand
3	-92.00	-157.00	65.00	21.15	2-Clay and Silty Sand
4	-157.00	-192.00	35.00	72.43	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)

24.00	1.00	-8.00
24.00	2.00	-9.00
24.00	3.00	-10.00
24.00	4.00	-11.00
24.00	5.00	-12.00
24.00	6.00	-13.00
24.00	7.00	-14.00
24.00	8.00	-15.00
24.00	9.00	-16.00
24.00	10.00	-17.00
24.00	11.00	-18.00
24.00	12.00	-19.00
24.00	13.00	-20.00
24.00	14.00	-21.00
24.00	15.00	-22.00
24.00	16.00	-23.00
24.00	17.00	-24.00
24.00	18.00	-25.00
24.00	19.00	-26.00
24.00	20.00	-27.00
24.00	21.00	-28.00
24.00	22.00	-29.00
24.00	23.00	-30.00
24.00	24.00	-31.00
24.00	25.00	-32.00
24.00	26.00	-33.00
24.00	27.00	-34.00
24.00	28.00	-35.00
24.00	29.00	-36.00
24.00	30.00	-37.00
24.00	31.00	-38.00
24.00	32.00	-39.00
24.00	33.00	-40.00
24.00	34.00	-41.00
24.00	35.00	-42.00
24.00	36.00	-43.00
24.00	37.00	-44.00
24.00	38.00	-45.00
24.00	39.00	-46.00
24.00	40.00	-47.00
24.00	41.00	-48.00
24.00	42.00	-49.00
24.00	43.00	-50.00
24.00	44.00	-51.00
24.00	45.00	-52.00
24.00	46.00	-53.00
24.00	47.00	-54.00
24.00	48.00	-55.00
24.00	49.00	-56.00
24.00	50.00	-57.00

24.00	51.00	-58.00
24.00	52.00	-59.00
24.00	53.00	-60.00
24.00	54.00	-61.00
24.00	55.00	-62.00
24.00	56.00	-63.00
24.00	57.00	-64.00
24.00	58.00	-65.00
24.00	59.00	-66.00
24.00	60.00	-67.00
24.00	61.00	-68.00
24.00	62.00	-69.00
24.00	63.00	-70.00
24.00	64.00	-71.00
24.00	65.00	-72.00
24.00	66.00	-73.00
24.00	67.00	-74.00
24.00	68.00	-75.00
24.00	69.00	-76.00
24.00	70.00	-77.00
24.00	71.00	-78.00
24.00	72.00	-79.00
24.00	73.00	-80.00
24.00	74.00	-81.00
24.00	75.00	-82.00
24.00	76.00	-83.00
24.00	77.00	-84.00
24.00	78.00	-85.00
24.00	79.00	-86.00
24.00	80.00	-87.00
24.00	81.00	-88.00
24.00	82.00	-89.00
24.00	83.00	-90.00
24.00	84.00	-91.00
24.00	85.00	-92.00
24.00	86.00	-93.00
24.00	87.00	-94.00
24.00	88.00	-95.00
24.00	89.00	-96.00
24.00	90.00	-97.00
24.00	91.00	-98.00
24.00	92.00	-99.00
24.00	93.00	-100.00
24.00	94.00	-101.00
24.00	95.00	-102.00
24.00	96.00	-103.00
24.00	97.00	-104.00
24.00	98.00	-105.00
24.00	99.00	-106.00
24.00	100.00	-107.00

24.00	101.00	-108.00
24.00	102.00	-109.00
24.00	103.00	-110.00
24.00	104.00	-111.00
24.00	105.00	-112.00
24.00	106.00	-113.00
24.00	107.00	-114.00
24.00	108.00	-115.00
24.00	109.00	-116.00
24.00	110.00	-117.00
24.00	111.00	-118.00
24.00	112.00	-119.00
24.00	113.00	-120.00
24.00	114.00	-121.00
24.00	115.00	-122.00
24.00	116.00	-123.00
24.00	117.00	-124.00
24.00	118.00	-125.00
24.00	119.00	-126.00
24.00	120.00	-127.00
24.00	121.00	-128.00
24.00	122.00	-129.00
24.00	123.00	-130.00
24.00	124.00	-131.00
24.00	125.00	-132.00
24.00	126.00	-133.00
24.00	127.00	-134.00
24.00	128.00	-135.00
24.00	129.00	-136.00
24.00	130.00	-137.00
24.00	131.00	-138.00
24.00	132.00	-139.00
24.00	133.00	-140.00
24.00	134.00	-141.00
24.00	135.00	-142.00
24.00	136.00	-143.00
24.00	137.00	-144.00
24.00	138.00	-145.00
24.00	139.00	-146.00
24.00	140.00	-147.00
24.00	141.00	-148.00
24.00	142.00	-149.00
24.00	143.00	-150.00
24.00	144.00	-151.00
24.00	145.00	-152.00
24.00	146.00	-153.00
24.00	147.00	-154.00
24.00	148.00	-155.00
24.00	149.00	-156.00
24.00	150.00	-157.00

24.00	151.00	-158.00
24.00	152.00	-159.00
24.00	153.00	-160.00
24.00	154.00	-161.00
24.00	155.00	-162.00
24.00	156.00	-163.00
24.00	157.00	-164.00
24.00	158.00	-165.00
24.00	159.00	-166.00
24.00	160.00	-167.00
24.00	161.00	-168.00
24.00	162.00	-169.00
24.00	163.00	-170.00
24.00	164.00	-171.00
24.00	165.00	-172.00
24.00	166.00	-173.00
24.00	167.00	-174.00
24.00	168.00	-175.00
24.00	169.00	-176.00
24.00	170.00	-177.00
24.00	171.00	-178.00
24.00	172.00	-179.00
24.00	173.00	-180.00
24.00	174.00	-181.00
24.00	175.00	-182.00
24.00	176.00	-183.00
24.00	177.00	-184.00
24.00	178.00	-185.00
24.00	179.00	-186.00
24.00	180.00	-187.00
24.00	181.00	-188.00
24.00	182.00	-189.00
24.00	183.00	-190.00
24.00	184.00	-191.00
24.00	185.00	-192.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile	Pile Width	Ultimate Side	Mobilized End	Estimated Davisson	Allowable Pile	Ultimate Pile

Length (ft)	(in)	Friction (tons)	Bearing (tons)	Capacity (tons)	Capacity (tons)	Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.19	0.00	0.19	0.09	0.19
17.00	24.0	0.75	0.00	0.75	0.38	0.75
18.00	24.0	1.70	0.00	1.70	0.85	1.70
19.00	24.0	3.02	0.00	3.02	1.51	3.02
20.00	24.0	4.71	30.59	35.30	17.65	96.47
21.00	24.0	6.50	30.72	37.23	18.61	98.68
22.00	24.0	7.52	32.54	40.07	20.03	105.16
23.00	24.0	8.51	35.19	43.70	21.85	114.08
24.00	24.0	9.58	38.13	47.71	23.86	123.98
25.00	24.0	10.71	41.40	52.11	26.06	134.91
26.00	24.0	11.94	44.77	56.71	28.35	146.24
27.00	24.0	13.29	48.01	61.30	30.65	157.31
28.00	24.0	14.77	50.89	65.67	32.83	167.45
29.00	24.0	19.84	49.89	69.73	34.86	169.51
30.00	24.0	23.92	49.52	73.44	36.72	172.48
31.00	24.0	27.13	49.70	76.83	38.41	176.23
32.00	24.0	30.11	49.69	79.79	39.90	179.16
33.00	24.0	32.43	47.89	80.32	40.16	176.09
34.00	24.0	34.37	46.15	80.52	40.26	172.83
35.00	24.0	35.91	44.60	80.51	40.25	169.70
36.00	24.0	37.18	43.03	80.22	40.11	166.28
37.00	24.0	38.34	41.43	79.76	39.88	162.62
38.00	24.0	39.37	39.95	79.32	39.66	159.22
39.00	24.0	40.28	38.64	78.92	39.46	156.21
40.00	24.0	41.08	37.53	78.61	39.31	153.68
41.00	24.0	41.81	36.56	78.37	39.19	151.50
42.00	24.0	42.52	35.67	78.19	39.10	149.54
43.00	24.0	43.22	34.85	78.08	39.04	147.79
44.00	24.0	43.91	34.04	77.95	38.98	146.03
45.00	24.0	44.59	29.45	74.05	37.02	132.95
46.00	24.0	45.28	26.27	71.55	35.78	124.09
47.00	24.0	46.00	24.04	70.03	35.02	118.11

48.00	24.0	46.74	22.08	68.82	34.41	112.99
49.00	24.0	47.51	20.52	68.03	34.02	109.08
50.00	24.0	48.31	19.47	67.78	33.89	106.71
51.00	24.0	49.11	18.96	68.07	34.04	105.99
52.00	24.0	49.87	18.89	68.76	34.38	106.55
53.00	24.0	50.59	19.12	69.71	34.85	107.95
54.00	24.0	51.27	19.53	70.80	35.40	109.85
55.00	24.0	51.91	20.00	71.91	35.96	111.91
56.00	24.0	52.57	20.47	73.04	36.52	113.99
57.00	24.0	53.30	20.84	74.13	37.07	115.81
58.00	24.0	54.09	21.04	75.13	37.56	117.21
59.00	24.0	54.95	21.16	76.11	38.05	118.42
60.00	24.0	55.88	21.27	77.15	38.57	119.68
61.00	24.0	56.83	21.43	78.26	39.13	121.12
62.00	24.0	57.74	21.69	79.44	39.72	122.82
63.00	24.0	58.62	22.04	80.66	40.33	124.75
64.00	24.0	59.45	22.40	81.86	40.93	126.66
65.00	24.0	60.25	22.70	82.95	41.47	128.34
66.00	24.0	61.05	22.88	83.93	41.97	129.69
67.00	24.0	61.89	22.95	84.83	42.42	130.72
68.00	24.0	62.76	22.93	85.68	42.84	131.54
69.00	24.0	63.66	23.05	86.71	43.35	132.81
70.00	24.0	64.60	23.54	88.14	44.07	135.22
71.00	24.0	65.54	24.44	89.98	44.99	138.87
72.00	24.0	66.44	25.75	92.19	46.09	143.69
73.00	24.0	67.30	27.41	94.71	47.36	149.53
74.00	24.0	68.13	28.97	97.10	48.55	155.05
75.00	24.0	68.92	29.98	98.90	49.45	158.86
76.00	24.0	69.79	30.31	100.10	50.05	160.71
77.00	24.0	70.83	29.88	100.71	50.36	160.47
78.00	24.0	72.06	28.74	100.80	50.40	158.28
79.00	24.0	73.46	27.23	100.69	50.35	155.16
80.00	24.0	75.05	25.70	100.75	50.37	152.14
81.00	24.0	76.74	24.39	101.13	50.56	149.91
82.00	24.0	78.45	23.53	101.98	50.99	149.04
83.00	24.0	80.19	23.09	103.28	51.64	149.45
84.00	24.0	81.95	22.98	104.94	52.47	150.90
85.00	24.0	86.65	23.14	109.79	54.90	156.07
86.00	24.0	88.61	23.17	111.78	55.89	158.13
87.00	24.0	90.88	23.24	114.12	57.06	160.60
88.00	24.0	93.47	23.32	116.79	58.40	163.44
89.00	24.0	96.38	23.43	119.81	59.90	166.67
90.00	24.0	99.58	23.61	123.18	61.59	170.40
91.00	24.0	102.89	23.90	126.79	63.39	174.59
92.00	24.0	106.18	24.30	130.48	65.24	179.08
93.00	24.0	109.50	24.73	134.23	67.11	183.69
94.00	24.0	112.95	24.98	137.93	68.96	187.88
95.00	24.0	116.41	25.25	141.65	70.83	192.15
96.00	24.0	119.97	25.51	145.48	72.74	196.51
97.00	24.0	123.76	25.93	149.69	74.85	201.56

98.00	24.0	127.77	26.71	154.48	77.24	207.90
99.00	24.0	132.00	28.36	160.37	80.18	217.09
100.00	24.0	136.46	31.41	167.87	83.93	230.68

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	141.19	35.82	177.01	88.51	248.66
102.00	24.0	146.25	41.44	187.69	93.84	270.56
103.00	24.0	151.64	48.10	199.74	99.87	295.95
104.00	24.0	157.36	54.45	211.81	105.90	320.70
105.00	24.0	163.41	59.09	222.50	111.25	340.68
106.00	24.0	170.04	61.74	231.79	115.89	355.27
107.00	24.0	177.51	62.15	239.66	119.83	363.97
108.00	24.0	185.83	60.34	246.17	123.08	366.85
109.00	24.0	194.98	57.31	252.29	126.14	366.91
110.00	24.0	204.97	54.04	259.01	129.51	367.10
111.00	24.0	214.69	51.31	266.01	133.00	368.63
112.00	24.0	223.03	49.87	272.90	136.45	372.64
113.00	24.0	229.99	49.69	279.67	139.84	379.05
114.00	24.0	235.55	50.53	286.08	143.04	387.13
115.00	24.0	239.72	52.13	291.86	145.93	396.13
116.00	24.0	243.59	53.96	297.55	148.77	405.46
117.00	24.0	248.23	55.42	303.65	151.83	414.49
118.00	24.0	253.65	56.51	310.16	155.08	423.17
119.00	24.0	259.85	57.37	317.22	158.61	431.96
120.00	24.0	266.82	58.16	324.98	162.49	441.30
121.00	24.0	274.15	59.02	333.17	166.58	451.20
122.00	24.0	281.44	59.85	341.28	170.64	460.98
123.00	24.0	288.67	60.43	349.09	174.55	469.95
124.00	24.0	295.84	60.53	356.38	178.19	477.45
125.00	24.0	302.97	59.94	362.90	181.45	482.78
126.00	24.0	310.23	58.55	368.78	184.39	485.88
127.00	24.0	317.82	56.89	374.71	187.36	488.50
128.00	24.0	325.74	55.57	381.30	190.65	492.44
129.00	24.0	333.98	54.66	388.64	194.32	497.97
130.00	24.0	342.55	54.28	396.83	198.41	505.39
131.00	24.0	351.17	54.54	405.72	202.86	514.80
132.00	24.0	359.57	55.15	414.72	207.36	525.01
133.00	24.0	367.75	55.66	423.41	211.71	534.73
134.00	24.0	375.71	55.93	431.64	215.82	543.49
135.00	24.0	383.45	55.80	439.24	219.62	550.84

136.00	24.0	391.07	55.22	446.29	223.15	556.74
137.00	24.0	398.69	54.26	452.95	226.48	561.47
138.00	24.0	406.32	53.00	459.32	229.66	565.33
139.00	24.0	413.94	51.79	465.73	232.87	569.30
140.00	24.0	421.57	50.93	472.49	236.25	574.35
141.00	24.0	428.96	50.51	479.47	239.73	580.48
142.00	24.0	435.88	50.55	486.43	243.22	587.53
143.00	24.0	442.34	50.98	493.32	246.66	595.29
144.00	24.0	448.33	51.87	500.20	250.10	603.94
145.00	24.0	453.85	53.27	507.12	253.56	613.65
146.00	24.0	458.82	54.99	513.80	256.90	623.78
147.00	24.0	463.14	56.95	520.10	260.05	634.01
148.00	24.0	466.83	59.27	526.10	263.05	644.63
149.00	24.0	469.88	62.88	532.76	266.38	658.53
150.00	24.0	473.82	68.76	542.58	271.29	680.11
151.00	24.0	475.78	69.10	544.88	272.44	683.08
152.00	24.0	477.49	70.30	547.78	273.89	688.37
153.00	24.0	478.96	72.61	551.57	275.78	696.79
154.00	24.0	480.30	76.11	556.41	278.21	708.64
155.00	24.0	481.65	80.67	562.32	281.16	723.66
156.00	24.0	483.34	86.12	569.46	284.73	741.70
157.00	24.0	485.67	92.22	577.89	288.95	762.33
158.00	24.0	488.65	98.84	587.48	293.74	785.16
159.00	24.0	492.30	105.82	598.12	299.06	809.76
160.00	24.0	496.68	113.02	609.69	304.85	835.73
161.00	24.0	501.48	120.59	622.07	311.03	863.24
162.00	24.0	506.39	128.72	635.12	317.56	892.56
163.00	24.0	511.46	137.35	648.81	324.41	923.51
164.00	24.0	516.71	146.45	663.16	331.58	956.05
165.00	24.0	522.15	156.00	678.15	339.08	990.16
166.00	24.0	527.82	165.99	693.80	346.90	1025.78
167.00	24.0	533.72	176.37	710.09	355.04	1062.83
168.00	24.0	539.87	187.12	726.98	363.49	1101.21
169.00	24.0	546.28	198.19	744.47	372.24	1140.85
170.00	24.0	552.97	209.58	762.54	381.27	1181.69
171.00	24.0	559.93	221.24	781.17	390.59	1223.66
172.00	24.0	567.22	232.79	800.01	400.00	1265.58
173.00	24.0	574.88	243.72	818.60	409.30	1306.05
174.00	24.0	582.91	253.92	836.83	418.42	1344.68
175.00	24.0	591.34	255.48	846.82	423.41	1357.78
176.00	24.0	599.82	256.00	855.82	427.91	1367.82
177.00	24.0	608.35	256.00	864.35	432.18	1376.35
178.00	24.0	616.93	256.00	872.93	436.46	1384.93
179.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
180.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
181.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
182.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
183.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
184.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
185.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-417_24-inch PPSC_SCOUR(-25)PREFORM(-38).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/10/2020, Boring Number: BB-417
Station number: 417+21 Offset: C/L

Ground Elevation: -19.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	3.00	4.00	5- Cavity layer
4	4.00	4.00	3- Clean sand
5	6.00	10.00	3- Clean sand
6	8.00	10.00	3- Clean sand
7	10.00	10.00	3- Clean sand
8	15.00	10.00	3- Clean sand
9	19.00	10.00	3- Clean sand
10	19.10	11.00	3- Clean sand
11	20.00	11.00	3- Clean sand
12	25.00	9.00	3- Clean sand
13	30.00	19.00	3- Clean sand
14	35.00	4.00	3- Clean sand
15	40.00	6.00	3- Clean sand
16	45.00	5.00	3- Clean sand
17	50.00	7.00	3- Clean sand
18	55.00	4.00	3- Clean sand
19	60.00	10.00	3- Clean sand

20	65.00	4.00	3- Clean sand
21	70.00	6.00	3- Clean sand
22	75.00	8.00	3- Clean sand
23	80.00	5.00	2- Clay and silty sand
24	85.00	6.00	2- Clay and silty sand
25	90.00	6.00	2- Clay and silty sand
26	95.00	10.00	3- Clean sand
27	100.00	22.00	3- Clean sand
28	105.00	22.00	1- Plastic Clay
29	110.00	14.00	3- Clean sand
30	115.00	11.00	2- Clay and silty sand
31	120.00	5.00	2- Clay and silty sand
32	125.00	28.00	2- Clay and silty sand
33	130.00	21.00	3- Clean sand
34	135.00	35.00	3- Clean sand
35	140.00	18.00	2- Clay and silty sand
36	145.00	30.00	2- Clay and silty sand
37	150.00	14.00	3- Clean sand
38	155.00	12.00	3- Clean sand
39	160.00	57.00	3- Clean sand
40	165.00	100.00	3- Clean sand
41	170.00	100.00	3- Clean sand
42	175.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-19.00	-23.00	4.00	2.00	5-Void
2	-23.00	-99.00	76.00	8.08	3-Clean Sand
3	-99.00	-114.00	15.00	5.67	2-Clay and Silty Sand
4	-114.00	-124.00	10.00	16.00	3-Clean Sand
5	-124.00	-129.00	5.00	22.00	1-Plastic Clay
6	-129.00	-134.00	5.00	14.00	3-Clean Sand
7	-134.00	-149.00	15.00	14.67	2-Clay and Silty Sand
8	-149.00	-159.00	10.00	28.00	3-Clean Sand
9	-159.00	-169.00	10.00	24.00	2-Clay and Silty Sand
10	-169.00	-194.00	25.00	56.60	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-20.00
24.00	2.00	-21.00
24.00	3.00	-22.00
24.00	4.00	-23.00
24.00	5.00	-24.00
24.00	6.00	-25.00
24.00	7.00	-26.00
24.00	8.00	-27.00
24.00	9.00	-28.00
24.00	10.00	-29.00
24.00	11.00	-30.00
24.00	12.00	-31.00
24.00	13.00	-32.00
24.00	14.00	-33.00
24.00	15.00	-34.00
24.00	16.00	-35.00
24.00	17.00	-36.00
24.00	18.00	-37.00
24.00	19.00	-38.00
24.00	20.00	-39.00
24.00	21.00	-40.00
24.00	22.00	-41.00
24.00	23.00	-42.00
24.00	24.00	-43.00
24.00	25.00	-44.00
24.00	26.00	-45.00
24.00	27.00	-46.00
24.00	28.00	-47.00
24.00	29.00	-48.00
24.00	30.00	-49.00
24.00	31.00	-50.00
24.00	32.00	-51.00
24.00	33.00	-52.00
24.00	34.00	-53.00
24.00	35.00	-54.00
24.00	36.00	-55.00
24.00	37.00	-56.00
24.00	38.00	-57.00
24.00	39.00	-58.00
24.00	40.00	-59.00
24.00	41.00	-60.00
24.00	42.00	-61.00
24.00	43.00	-62.00
24.00	44.00	-63.00
24.00	45.00	-64.00

24.00	46.00	-65.00
24.00	47.00	-66.00
24.00	48.00	-67.00
24.00	49.00	-68.00
24.00	50.00	-69.00
24.00	51.00	-70.00
24.00	52.00	-71.00
24.00	53.00	-72.00
24.00	54.00	-73.00
24.00	55.00	-74.00
24.00	56.00	-75.00
24.00	57.00	-76.00
24.00	58.00	-77.00
24.00	59.00	-78.00
24.00	60.00	-79.00
24.00	61.00	-80.00
24.00	62.00	-81.00
24.00	63.00	-82.00
24.00	64.00	-83.00
24.00	65.00	-84.00
24.00	66.00	-85.00
24.00	67.00	-86.00
24.00	68.00	-87.00
24.00	69.00	-88.00
24.00	70.00	-89.00
24.00	71.00	-90.00
24.00	72.00	-91.00
24.00	73.00	-92.00
24.00	74.00	-93.00
24.00	75.00	-94.00
24.00	76.00	-95.00
24.00	77.00	-96.00
24.00	78.00	-97.00
24.00	79.00	-98.00
24.00	80.00	-99.00
24.00	81.00	-100.00
24.00	82.00	-101.00
24.00	83.00	-102.00
24.00	84.00	-103.00
24.00	85.00	-104.00
24.00	86.00	-105.00
24.00	87.00	-106.00
24.00	88.00	-107.00
24.00	89.00	-108.00
24.00	90.00	-109.00
24.00	91.00	-110.00
24.00	92.00	-111.00
24.00	93.00	-112.00
24.00	94.00	-113.00
24.00	95.00	-114.00

24.00	96.00	-115.00
24.00	97.00	-116.00
24.00	98.00	-117.00
24.00	99.00	-118.00
24.00	100.00	-119.00
24.00	101.00	-120.00
24.00	102.00	-121.00
24.00	103.00	-122.00
24.00	104.00	-123.00
24.00	105.00	-124.00
24.00	106.00	-125.00
24.00	107.00	-126.00
24.00	108.00	-127.00
24.00	109.00	-128.00
24.00	110.00	-129.00
24.00	111.00	-130.00
24.00	112.00	-131.00
24.00	113.00	-132.00
24.00	114.00	-133.00
24.00	115.00	-134.00
24.00	116.00	-135.00
24.00	117.00	-136.00
24.00	118.00	-137.00
24.00	119.00	-138.00
24.00	120.00	-139.00
24.00	121.00	-140.00
24.00	122.00	-141.00
24.00	123.00	-142.00
24.00	124.00	-143.00
24.00	125.00	-144.00
24.00	126.00	-145.00
24.00	127.00	-146.00
24.00	128.00	-147.00
24.00	129.00	-148.00
24.00	130.00	-149.00
24.00	131.00	-150.00
24.00	132.00	-151.00
24.00	133.00	-152.00
24.00	134.00	-153.00
24.00	135.00	-154.00
24.00	136.00	-155.00
24.00	137.00	-156.00
24.00	138.00	-157.00
24.00	139.00	-158.00
24.00	140.00	-159.00
24.00	141.00	-160.00
24.00	142.00	-161.00
24.00	143.00	-162.00
24.00	144.00	-163.00
24.00	145.00	-164.00

24.00	146.00	-165.00
24.00	147.00	-166.00
24.00	148.00	-167.00
24.00	149.00	-168.00
24.00	150.00	-169.00
24.00	151.00	-170.00
24.00	152.00	-171.00
24.00	153.00	-172.00
24.00	154.00	-173.00
24.00	155.00	-174.00
24.00	156.00	-175.00
24.00	157.00	-176.00
24.00	158.00	-177.00
24.00	159.00	-178.00
24.00	160.00	-179.00
24.00	161.00	-180.00
24.00	162.00	-181.00
24.00	163.00	-182.00
24.00	164.00	-183.00
24.00	165.00	-184.00
24.00	166.00	-185.00
24.00	167.00	-186.00
24.00	168.00	-187.00
24.00	169.00	-188.00
24.00	170.00	-189.00
24.00	171.00	-190.00
24.00	172.00	-191.00
24.00	173.00	-192.00
24.00	174.00	-193.00
24.00	175.00	-194.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00

3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.38	25.51	25.89	12.94	76.90
5.00	24.0	1.27	25.87	27.14	13.57	78.88
6.00	24.0	2.44	26.84	29.28	14.64	82.96
7.00	24.0	3.73	28.20	31.93	15.96	88.33
8.00	24.0	5.00	29.79	34.79	17.39	94.37
9.00	24.0	6.29	31.54	37.83	18.92	100.90
10.00	24.0	7.64	33.39	41.03	20.51	107.80
11.00	24.0	9.04	35.32	44.36	22.18	115.00
12.00	24.0	10.52	37.31	47.82	23.91	122.44
13.00	24.0	12.01	39.61	51.62	25.81	130.84
14.00	24.0	13.58	41.96	55.55	27.77	139.47
15.00	24.0	15.25	44.26	59.51	29.75	148.02
16.00	24.0	17.02	46.44	63.47	31.73	156.35
17.00	24.0	18.89	47.95	66.83	33.42	162.73
18.00	24.0	20.75	49.30	70.05	35.03	168.65
19.00	24.0	22.62	50.95	73.58	36.79	175.48
20.00	24.0	24.65	52.83	77.47	38.74	183.13
21.00	24.0	26.65	54.91	81.56	40.78	191.39
22.00	24.0	28.59	57.34	85.93	42.97	200.62
23.00	24.0	30.47	60.37	90.83	45.42	211.57
24.00	24.0	32.28	63.29	95.57	47.78	222.14
25.00	24.0	34.03	65.16	99.19	49.59	229.50
26.00	24.0	35.91	65.72	101.63	50.82	233.08
27.00	24.0	38.12	64.73	102.85	51.43	232.32
28.00	24.0	40.67	62.18	102.85	51.43	227.22
29.00	24.0	43.57	58.71	102.28	51.14	219.71
30.00	24.0	46.81	54.97	101.78	50.89	211.73
31.00	24.0	49.98	51.49	101.46	50.73	204.44
32.00	24.0	52.64	48.79	101.44	50.72	199.02
33.00	24.0	54.80	46.89	101.69	50.84	195.46
34.00	24.0	56.44	45.66	102.10	51.05	193.42
35.00	24.0	57.57	44.99	102.56	51.28	192.54
36.00	24.0	58.47	44.36	102.83	51.41	191.56
37.00	24.0	59.42	43.60	103.03	51.51	190.23
38.00	24.0	60.45	42.75	103.19	51.60	188.69
39.00	24.0	61.53	41.91	103.45	51.72	187.27
40.00	24.0	62.69	41.21	103.90	51.95	186.31
41.00	24.0	63.86	40.70	104.56	52.28	185.96
42.00	24.0	64.98	40.25	105.24	52.62	185.75
43.00	24.0	66.08	39.67	105.75	52.87	185.09
44.00	24.0	67.13	38.76	105.89	52.95	183.41
45.00	24.0	68.15	37.34	105.48	52.74	180.16
46.00	24.0	69.18	35.33	104.51	52.26	175.18
47.00	24.0	70.28	33.10	103.38	51.69	169.58
48.00	24.0	71.44	31.05	102.50	51.25	164.61
49.00	24.0	72.68	29.53	102.21	51.11	161.27
50.00	24.0	73.99	28.87	102.86	51.43	160.60
51.00	24.0	75.28	29.18	104.46	52.23	162.83
52.00	24.0	76.46	30.29	106.75	53.37	167.33

53.00	24.0	77.53	31.91	109.44	54.72	173.27
54.00	24.0	78.49	33.60	112.09	56.05	179.29
55.00	24.0	79.35	34.89	114.24	57.12	184.02
56.00	24.0	80.25	35.60	115.85	57.93	187.05
57.00	24.0	81.37	35.58	116.96	58.48	188.12
58.00	24.0	82.71	34.89	117.60	58.80	187.38
59.00	24.0	84.26	33.82	118.08	59.04	185.73
60.00	24.0	86.02	32.69	118.71	59.35	184.09
61.00	24.0	87.78	31.74	119.52	59.76	183.00
62.00	24.0	89.33	31.17	120.51	60.25	182.86
63.00	24.0	90.67	30.95	121.62	60.81	183.52
64.00	24.0	91.78	31.07	122.85	61.43	184.99
65.00	24.0	92.68	31.53	124.21	62.11	187.27
66.00	24.0	93.51	32.16	125.66	62.83	189.98
67.00	24.0	94.40	32.87	127.27	63.64	193.01
68.00	24.0	95.37	33.74	129.12	64.56	196.61
69.00	24.0	96.41	34.50	130.92	65.46	199.92
70.00	24.0	97.52	34.86	132.38	66.19	202.10
71.00	24.0	98.71	34.81	133.52	66.76	203.15
72.00	24.0	99.96	34.22	134.18	67.09	202.62
73.00	24.0	101.29	32.92	134.22	67.11	200.07
74.00	24.0	102.69	31.16	133.85	66.92	196.16
75.00	24.0	104.16	29.15	133.31	66.65	191.60
76.00	24.0	105.74	27.05	132.79	66.39	186.88
77.00	24.0	107.46	25.22	132.68	66.34	183.12
78.00	24.0	109.33	23.86	133.19	66.60	180.92
79.00	24.0	111.33	22.96	134.29	67.15	180.21
80.00	24.0	117.66	14.93	132.59	66.29	162.44
81.00	24.0	119.95	14.38	134.33	67.16	163.08
82.00	24.0	122.32	14.64	136.96	68.48	166.25
83.00	24.0	124.77	14.87	139.64	69.82	169.39
84.00	24.0	127.12	15.13	142.25	71.13	172.50
85.00	24.0	129.24	15.77	145.00	72.50	176.54
86.00	24.0	131.13	17.01	148.14	74.07	182.16
87.00	24.0	132.89	19.04	151.93	75.97	190.02
88.00	24.0	134.65	22.07	156.72	78.36	200.86
89.00	24.0	137.29	25.22	162.51	81.25	212.94
90.00	24.0	139.94	29.26	169.20	84.60	227.72
91.00	24.0	142.52	34.11	176.63	88.31	244.84
92.00	24.0	144.97	39.61	184.57	92.29	263.78
93.00	24.0	147.27	45.70	192.96	96.48	284.36
94.00	24.0	149.42	51.23	200.65	100.33	303.11
95.00	24.0	154.62	54.89	209.52	104.76	319.30
96.00	24.0	156.66	55.01	211.67	105.84	321.70
97.00	24.0	159.10	55.19	214.28	107.14	324.65
98.00	24.0	162.16	55.10	217.26	108.63	327.47
99.00	24.0	165.78	53.96	219.74	109.87	327.66
100.00	24.0	169.70	51.93	221.63	110.81	325.48

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	174.34	50.68	225.02	112.51	326.38
102.00	24.0	179.94	50.85	230.80	115.40	332.50
103.00	24.0	186.52	52.45	238.97	119.49	343.87
104.00	24.0	194.07	54.81	248.88	124.44	358.49
105.00	24.0	202.60	54.14	256.74	128.37	365.02
106.00	24.0	210.97	43.75	254.72	127.36	342.22
107.00	24.0	218.07	46.36	264.43	132.22	357.16
108.00	24.0	223.90	47.64	271.53	135.77	366.81
109.00	24.0	228.45	47.78	276.23	138.12	371.80
110.00	24.0	231.72	55.75	287.47	143.74	398.97
111.00	24.0	234.56	52.93	287.49	143.74	393.34
112.00	24.0	237.78	49.93	287.71	143.85	387.56
113.00	24.0	241.39	46.66	288.06	144.03	381.39
114.00	24.0	245.40	43.69	289.08	144.54	376.46
115.00	24.0	249.79	41.54	291.33	145.67	374.42
116.00	24.0	254.15	40.12	294.26	147.13	374.50
117.00	24.0	258.03	39.77	297.80	148.90	377.35
118.00	24.0	261.45	40.99	302.44	151.22	384.43
119.00	24.0	263.88	42.58	306.46	153.23	391.61
120.00	24.0	265.42	45.24	310.65	155.33	401.12
121.00	24.0	267.26	49.54	316.80	158.40	415.88
122.00	24.0	270.39	55.19	325.58	162.79	435.95
123.00	24.0	274.89	61.80	336.69	168.35	460.30
124.00	24.0	281.47	66.47	347.94	173.97	480.88
125.00	24.0	289.34	71.40	360.74	180.37	503.55
126.00	24.0	297.46	76.70	374.16	187.08	527.56
127.00	24.0	304.75	82.74	387.49	193.74	552.97
128.00	24.0	311.15	89.83	400.97	200.49	580.62
129.00	24.0	316.63	96.44	413.07	206.54	605.95
130.00	24.0	328.01	101.07	429.09	214.54	631.23
131.00	24.0	332.13	101.18	433.31	216.66	635.67
132.00	24.0	336.77	101.29	438.06	219.03	640.64
133.00	24.0	342.22	101.11	443.33	221.67	645.55
134.00	24.0	348.07	97.80	445.86	222.93	641.46
135.00	24.0	354.40	94.18	448.57	224.29	636.92
136.00	24.0	361.02	91.36	452.38	226.19	635.10
137.00	24.0	367.69	89.96	457.65	228.82	637.57
138.00	24.0	374.40	89.74	464.15	232.07	643.63
139.00	24.0	381.16	90.44	471.60	235.80	652.48
140.00	24.0	387.97	67.72	455.69	227.85	591.13

141.00	24.0	395.06	61.11	456.17	228.09	578.39
142.00	24.0	402.68	64.02	466.70	233.35	594.73
143.00	24.0	410.83	66.40	477.22	238.61	610.02
144.00	24.0	419.32	67.97	487.29	243.64	623.22
145.00	24.0	428.00	68.78	496.78	248.39	634.35
146.00	24.0	436.46	69.42	505.87	252.94	644.71
147.00	24.0	443.81	69.74	513.55	256.78	653.03
148.00	24.0	450.01	69.72	519.73	259.87	659.17
149.00	24.0	454.74	70.60	525.34	262.67	666.54
150.00	24.0	458.92	84.78	543.70	271.85	713.26
151.00	24.0	461.43	84.90	546.34	273.17	716.15
152.00	24.0	463.58	85.52	549.10	274.55	720.14
153.00	24.0	465.22	87.10	552.32	276.16	726.52
154.00	24.0	466.46	89.87	556.32	278.16	736.05
155.00	24.0	467.45	93.83	561.28	280.64	748.93
156.00	24.0	468.80	98.90	567.70	283.85	765.49
157.00	24.0	471.00	104.70	575.70	287.85	785.09
158.00	24.0	474.04	110.90	584.94	292.47	806.75
159.00	24.0	477.93	117.30	595.23	297.61	829.82
160.00	24.0	482.74	123.65	606.39	303.20	853.70
161.00	24.0	488.06	130.12	618.18	309.09	878.41
162.00	24.0	493.46	137.01	630.47	315.23	904.48
163.00	24.0	498.95	144.37	643.33	321.66	932.08
164.00	24.0	504.56	152.23	656.79	328.39	961.24
165.00	24.0	510.30	160.57	670.87	335.44	992.00
166.00	24.0	516.20	169.40	685.60	342.80	1024.40
167.00	24.0	522.27	178.74	701.01	350.50	1058.48
168.00	24.0	528.53	188.60	717.13	358.56	1094.33
169.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
170.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
171.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
172.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
173.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-417_24-inch PPSC_SCOUR(-25)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/10/2020, Boring Number: BB-417
Station number: 417+21 Offset: C/L

Ground Elevation: -19.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	3.00	4.00	5- Cavity layer
4	4.00	4.00	3- Clean sand
5	6.00	10.00	3- Clean sand
6	8.00	10.00	3- Clean sand
7	10.00	10.00	3- Clean sand
8	15.00	10.00	3- Clean sand
9	19.00	10.00	3- Clean sand
10	19.10	11.00	3- Clean sand
11	20.00	11.00	3- Clean sand
12	25.00	9.00	3- Clean sand
13	29.00	9.00	3- Clean sand
14	29.10	9.00	3- Clean sand
15	30.00	19.00	3- Clean sand
16	35.00	4.00	3- Clean sand
17	40.00	6.00	3- Clean sand
18	45.00	5.00	3- Clean sand
19	50.00	7.00	3- Clean sand

20	55.00	4.00	3- Clean sand
21	60.00	10.00	3- Clean sand
22	65.00	4.00	3- Clean sand
23	70.00	6.00	3- Clean sand
24	75.00	8.00	3- Clean sand
25	80.00	5.00	2- Clay and silty sand
26	85.00	6.00	2- Clay and silty sand
27	90.00	6.00	2- Clay and silty sand
28	95.00	10.00	3- Clean sand
29	100.00	22.00	3- Clean sand
30	105.00	22.00	1- Plastic Clay
31	110.00	14.00	3- Clean sand
32	115.00	11.00	2- Clay and silty sand
33	120.00	5.00	2- Clay and silty sand
34	125.00	28.00	2- Clay and silty sand
35	130.00	21.00	3- Clean sand
36	135.00	35.00	3- Clean sand
37	140.00	18.00	2- Clay and silty sand
38	145.00	30.00	2- Clay and silty sand
39	150.00	14.00	3- Clean sand
40	155.00	12.00	3- Clean sand
41	160.00	57.00	3- Clean sand
42	165.00	100.00	3- Clean sand
43	170.00	100.00	3- Clean sand
44	175.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-19.00	-23.00	4.00	2.00	5-Void
2	-23.00	-99.00	76.00	8.08	3-Clean Sand
3	-99.00	-114.00	15.00	5.67	2-Clay and Silty Sand
4	-114.00	-124.00	10.00	16.00	3-Clean Sand
5	-124.00	-129.00	5.00	22.00	1-Plastic Clay
6	-129.00	-134.00	5.00	14.00	3-Clean Sand
7	-134.00	-149.00	15.00	14.67	2-Clay and Silty Sand
8	-149.00	-159.00	10.00	28.00	3-Clean Sand
9	-159.00	-169.00	10.00	24.00	2-Clay and Silty Sand
10	-169.00	-194.00	25.00	56.60	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-20.00
24.00	2.00	-21.00
24.00	3.00	-22.00
24.00	4.00	-23.00
24.00	5.00	-24.00
24.00	6.00	-25.00
24.00	7.00	-26.00
24.00	8.00	-27.00
24.00	9.00	-28.00
24.00	10.00	-29.00
24.00	11.00	-30.00
24.00	12.00	-31.00
24.00	13.00	-32.00
24.00	14.00	-33.00
24.00	15.00	-34.00
24.00	16.00	-35.00
24.00	17.00	-36.00
24.00	18.00	-37.00
24.00	19.00	-38.00
24.00	20.00	-39.00
24.00	21.00	-40.00
24.00	22.00	-41.00
24.00	23.00	-42.00
24.00	24.00	-43.00
24.00	25.00	-44.00
24.00	26.00	-45.00
24.00	27.00	-46.00
24.00	28.00	-47.00
24.00	29.00	-48.00
24.00	30.00	-49.00
24.00	31.00	-50.00
24.00	32.00	-51.00
24.00	33.00	-52.00
24.00	34.00	-53.00
24.00	35.00	-54.00
24.00	36.00	-55.00
24.00	37.00	-56.00
24.00	38.00	-57.00
24.00	39.00	-58.00
24.00	40.00	-59.00
24.00	41.00	-60.00
24.00	42.00	-61.00
24.00	43.00	-62.00

24.00	44.00	-63.00
24.00	45.00	-64.00
24.00	46.00	-65.00
24.00	47.00	-66.00
24.00	48.00	-67.00
24.00	49.00	-68.00
24.00	50.00	-69.00
24.00	51.00	-70.00
24.00	52.00	-71.00
24.00	53.00	-72.00
24.00	54.00	-73.00
24.00	55.00	-74.00
24.00	56.00	-75.00
24.00	57.00	-76.00
24.00	58.00	-77.00
24.00	59.00	-78.00
24.00	60.00	-79.00
24.00	61.00	-80.00
24.00	62.00	-81.00
24.00	63.00	-82.00
24.00	64.00	-83.00
24.00	65.00	-84.00
24.00	66.00	-85.00
24.00	67.00	-86.00
24.00	68.00	-87.00
24.00	69.00	-88.00
24.00	70.00	-89.00
24.00	71.00	-90.00
24.00	72.00	-91.00
24.00	73.00	-92.00
24.00	74.00	-93.00
24.00	75.00	-94.00
24.00	76.00	-95.00
24.00	77.00	-96.00
24.00	78.00	-97.00
24.00	79.00	-98.00
24.00	80.00	-99.00
24.00	81.00	-100.00
24.00	82.00	-101.00
24.00	83.00	-102.00
24.00	84.00	-103.00
24.00	85.00	-104.00
24.00	86.00	-105.00
24.00	87.00	-106.00
24.00	88.00	-107.00
24.00	89.00	-108.00
24.00	90.00	-109.00
24.00	91.00	-110.00
24.00	92.00	-111.00
24.00	93.00	-112.00

24.00	94.00	-113.00
24.00	95.00	-114.00
24.00	96.00	-115.00
24.00	97.00	-116.00
24.00	98.00	-117.00
24.00	99.00	-118.00
24.00	100.00	-119.00
24.00	101.00	-120.00
24.00	102.00	-121.00
24.00	103.00	-122.00
24.00	104.00	-123.00
24.00	105.00	-124.00
24.00	106.00	-125.00
24.00	107.00	-126.00
24.00	108.00	-127.00
24.00	109.00	-128.00
24.00	110.00	-129.00
24.00	111.00	-130.00
24.00	112.00	-131.00
24.00	113.00	-132.00
24.00	114.00	-133.00
24.00	115.00	-134.00
24.00	116.00	-135.00
24.00	117.00	-136.00
24.00	118.00	-137.00
24.00	119.00	-138.00
24.00	120.00	-139.00
24.00	121.00	-140.00
24.00	122.00	-141.00
24.00	123.00	-142.00
24.00	124.00	-143.00
24.00	125.00	-144.00
24.00	126.00	-145.00
24.00	127.00	-146.00
24.00	128.00	-147.00
24.00	129.00	-148.00
24.00	130.00	-149.00
24.00	131.00	-150.00
24.00	132.00	-151.00
24.00	133.00	-152.00
24.00	134.00	-153.00
24.00	135.00	-154.00
24.00	136.00	-155.00
24.00	137.00	-156.00
24.00	138.00	-157.00
24.00	139.00	-158.00
24.00	140.00	-159.00
24.00	141.00	-160.00
24.00	142.00	-161.00
24.00	143.00	-162.00

24.00	144.00	-163.00
24.00	145.00	-164.00
24.00	146.00	-165.00
24.00	147.00	-166.00
24.00	148.00	-167.00
24.00	149.00	-168.00
24.00	150.00	-169.00
24.00	151.00	-170.00
24.00	152.00	-171.00
24.00	153.00	-172.00
24.00	154.00	-173.00
24.00	155.00	-174.00
24.00	156.00	-175.00
24.00	157.00	-176.00
24.00	158.00	-177.00
24.00	159.00	-178.00
24.00	160.00	-179.00
24.00	161.00	-180.00
24.00	162.00	-181.00
24.00	163.00	-182.00
24.00	164.00	-183.00
24.00	165.00	-184.00
24.00	166.00	-185.00
24.00	167.00	-186.00
24.00	168.00	-187.00
24.00	169.00	-188.00
24.00	170.00	-189.00
24.00	171.00	-190.00
24.00	172.00	-191.00
24.00	173.00	-192.00
24.00	174.00	-193.00
24.00	175.00	-194.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)

1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.38	25.51	25.89	12.94	76.90
5.00	24.0	1.27	25.87	27.14	13.57	78.88
6.00	24.0	2.44	26.84	29.28	14.64	82.96
7.00	24.0	3.73	28.20	31.93	15.96	88.33
8.00	24.0	5.00	29.79	34.79	17.39	94.37
9.00	24.0	6.29	31.54	37.83	18.92	100.90
10.00	24.0	7.64	33.39	41.03	20.51	107.80
11.00	24.0	9.04	35.32	44.36	22.18	115.00
12.00	24.0	10.52	37.31	47.82	23.91	122.44
13.00	24.0	12.01	39.61	51.62	25.81	130.84
14.00	24.0	13.58	41.96	55.55	27.77	139.47
15.00	24.0	15.25	44.26	59.51	29.75	148.02
16.00	24.0	17.02	46.44	63.47	31.73	156.35
17.00	24.0	18.89	47.95	66.83	33.42	162.73
18.00	24.0	20.75	49.30	70.05	35.03	168.65
19.00	24.0	22.62	50.57	73.20	36.60	174.34
20.00	24.0	24.65	51.32	75.96	37.98	178.59
21.00	24.0	26.65	51.51	78.16	39.08	181.18
22.00	24.0	28.59	51.30	79.89	39.94	182.48
23.00	24.0	30.47	52.62	83.09	41.54	188.33
24.00	24.0	32.28	55.54	87.82	43.91	198.90
25.00	24.0	34.03	57.41	91.44	45.72	206.26
26.00	24.0	35.74	58.19	93.93	46.97	210.31
27.00	24.0	37.46	57.83	95.29	47.65	210.96
28.00	24.0	39.17	56.35	95.51	47.76	208.21
29.00	24.0	40.88	54.37	95.25	47.62	203.98
30.00	24.0	43.35	51.58	94.93	47.46	198.10
31.00	24.0	46.50	48.10	94.60	47.30	190.80
32.00	24.0	49.15	45.40	94.56	47.28	185.36
33.00	24.0	51.30	43.50	94.80	47.40	181.79
34.00	24.0	52.93	42.27	95.20	47.60	179.73
35.00	24.0	54.04	41.60	95.64	47.82	178.84
36.00	24.0	54.93	40.97	95.90	47.95	177.85
37.00	24.0	55.88	40.21	96.09	48.05	176.52
38.00	24.0	56.89	39.36	96.25	48.12	174.97
39.00	24.0	57.97	38.52	96.49	48.25	173.54
40.00	24.0	59.11	37.82	96.93	48.47	172.57
41.00	24.0	60.27	37.31	97.58	48.79	172.21
42.00	24.0	61.40	37.03	98.43	49.21	172.49
43.00	24.0	62.48	36.94	99.42	49.71	173.31
44.00	24.0	63.53	36.86	100.39	50.19	174.11
45.00	24.0	64.54	36.59	101.13	50.57	174.32
46.00	24.0	65.56	35.33	100.90	50.45	171.56
47.00	24.0	66.66	33.10	99.76	49.88	165.96
48.00	24.0	67.82	31.05	98.87	49.44	160.98
49.00	24.0	69.05	29.53	98.58	49.29	157.64
50.00	24.0	70.35	28.87	99.22	49.61	156.97

51.00	24.0	71.63	29.18	100.82	50.41	159.19
52.00	24.0	72.81	30.29	103.10	51.55	163.68
53.00	24.0	73.88	31.91	105.79	52.90	169.62
54.00	24.0	74.84	33.60	108.44	54.22	175.63
55.00	24.0	75.69	34.89	110.58	55.29	180.36
56.00	24.0	76.59	35.60	112.19	56.10	183.39
57.00	24.0	77.71	35.58	113.29	56.64	184.45
58.00	24.0	79.04	34.89	113.93	56.96	183.71
59.00	24.0	80.58	33.82	114.41	57.20	182.06
60.00	24.0	82.34	32.69	115.03	57.52	180.41
61.00	24.0	84.10	31.74	115.84	57.92	179.31
62.00	24.0	85.65	31.17	116.82	58.41	179.17
63.00	24.0	86.98	30.95	117.93	58.97	179.84
64.00	24.0	88.09	31.07	119.16	59.58	181.30
65.00	24.0	88.99	31.53	120.52	60.26	183.58
66.00	24.0	89.81	32.16	121.97	60.98	186.28
67.00	24.0	90.71	32.87	123.57	61.79	189.31
68.00	24.0	91.67	33.74	125.42	62.71	192.91
69.00	24.0	92.71	34.50	127.21	63.61	196.22
70.00	24.0	93.82	34.86	128.68	64.34	198.40
71.00	24.0	95.00	34.81	129.81	64.91	199.44
72.00	24.0	96.25	34.22	130.47	65.24	198.91
73.00	24.0	97.58	32.92	130.50	65.25	196.35
74.00	24.0	98.98	31.16	130.13	65.07	192.45
75.00	24.0	100.45	29.15	129.59	64.80	187.88
76.00	24.0	102.02	27.05	129.07	64.54	183.16
77.00	24.0	103.74	25.22	128.96	64.48	179.40
78.00	24.0	105.61	23.86	129.47	64.73	177.20
79.00	24.0	107.61	22.96	130.57	65.28	176.48
80.00	24.0	113.79	14.93	128.72	64.36	158.58
81.00	24.0	116.08	14.38	130.46	65.23	159.22
82.00	24.0	118.45	14.64	133.10	66.55	162.39
83.00	24.0	120.91	14.87	135.78	67.89	165.52
84.00	24.0	123.26	15.13	138.39	69.19	168.64
85.00	24.0	125.37	15.77	141.14	70.57	172.67
86.00	24.0	127.27	17.01	144.28	72.14	178.30
87.00	24.0	129.03	19.04	148.07	74.03	186.16
88.00	24.0	130.78	22.07	152.85	76.43	197.00
89.00	24.0	133.43	25.22	158.64	79.32	209.08
90.00	24.0	136.08	29.26	165.33	82.67	223.85
91.00	24.0	138.66	34.11	172.76	86.38	240.98
92.00	24.0	141.10	39.61	180.71	90.35	259.92
93.00	24.0	143.40	45.70	189.10	94.55	280.49
94.00	24.0	145.56	51.23	196.79	98.39	299.24
95.00	24.0	150.76	54.89	205.65	102.83	315.44
96.00	24.0	152.79	55.01	207.81	103.90	317.84
97.00	24.0	155.23	55.19	210.42	105.21	320.79
98.00	24.0	158.29	55.10	213.40	106.70	323.60
99.00	24.0	161.92	53.96	215.88	107.94	323.79
100.00	24.0	165.84	51.93	217.76	108.88	321.61

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	170.47	50.68	221.15	110.58	322.52
102.00	24.0	176.08	50.85	226.93	113.47	328.64
103.00	24.0	182.66	52.45	235.11	117.55	340.01
104.00	24.0	190.21	54.81	245.01	122.51	354.63
105.00	24.0	198.73	54.14	252.87	126.44	361.15
106.00	24.0	207.11	43.75	250.86	125.43	338.36
107.00	24.0	214.21	46.36	260.57	130.29	353.29
108.00	24.0	220.03	47.64	267.67	133.84	362.95
109.00	24.0	224.58	47.78	272.37	136.18	367.94
110.00	24.0	227.86	55.75	283.61	141.80	395.11
111.00	24.0	230.69	52.93	283.62	141.81	389.48
112.00	24.0	233.92	49.93	283.84	141.92	383.70
113.00	24.0	237.53	46.66	284.19	142.10	377.52
114.00	24.0	241.53	43.69	285.22	142.61	372.59
115.00	24.0	245.93	41.54	287.47	143.74	370.56
116.00	24.0	250.28	40.12	290.40	145.20	370.63
117.00	24.0	254.17	39.77	293.94	146.97	373.49
118.00	24.0	257.58	40.99	298.58	149.29	380.57
119.00	24.0	260.02	42.58	302.59	151.30	387.74
120.00	24.0	261.55	45.24	306.79	153.39	397.26
121.00	24.0	263.39	49.54	312.93	156.47	412.02
122.00	24.0	266.52	55.19	321.71	160.86	432.09
123.00	24.0	271.02	61.80	332.83	166.41	456.44
124.00	24.0	277.60	66.47	344.08	172.04	477.02
125.00	24.0	285.47	71.40	356.88	178.44	499.69
126.00	24.0	293.60	76.70	370.30	185.15	523.69
127.00	24.0	300.88	82.74	383.62	191.81	549.11
128.00	24.0	307.28	89.83	397.11	198.55	576.76
129.00	24.0	312.77	96.44	409.21	204.60	602.09
130.00	24.0	324.15	101.07	425.22	212.61	627.37
131.00	24.0	328.27	101.18	429.45	214.72	631.80
132.00	24.0	332.90	101.29	434.19	217.10	636.78
133.00	24.0	338.36	101.11	439.47	219.73	641.69
134.00	24.0	344.20	97.80	442.00	221.00	637.60
135.00	24.0	350.54	94.18	444.71	222.36	633.06
136.00	24.0	357.16	91.36	448.52	224.26	631.23
137.00	24.0	363.82	89.96	453.79	226.89	633.71
138.00	24.0	370.54	89.74	460.28	230.14	639.77

139.00	24.0	377.30	90.44	467.74	233.87	648.62
140.00	24.0	384.11	67.72	451.83	225.91	587.27
141.00	24.0	391.20	61.11	452.31	226.15	574.52
142.00	24.0	398.82	64.02	462.84	231.42	590.87
143.00	24.0	406.96	66.40	473.36	236.68	606.16
144.00	24.0	415.46	67.97	483.43	241.71	619.36
145.00	24.0	424.14	68.78	492.92	246.46	630.49
146.00	24.0	432.59	69.42	502.01	251.01	640.84
147.00	24.0	439.95	69.74	509.69	254.84	649.16
148.00	24.0	446.15	69.72	515.87	257.93	655.30
149.00	24.0	450.87	70.60	521.47	260.74	662.68
150.00	24.0	455.05	84.78	539.84	269.92	709.40
151.00	24.0	457.57	84.90	542.47	271.24	712.28
152.00	24.0	459.71	85.52	545.24	272.62	716.28
153.00	24.0	461.36	87.10	548.45	274.23	722.65
154.00	24.0	462.59	89.87	552.46	276.23	732.19
155.00	24.0	463.59	93.83	557.41	278.71	745.07
156.00	24.0	464.94	98.90	563.83	281.92	761.62
157.00	24.0	467.13	104.70	571.83	285.92	781.23
158.00	24.0	470.17	110.90	581.08	290.54	802.88
159.00	24.0	474.07	117.30	591.36	295.68	825.95
160.00	24.0	478.88	123.65	602.53	301.27	849.84
161.00	24.0	484.20	130.12	614.31	307.16	874.55
162.00	24.0	489.60	137.01	626.60	313.30	900.62
163.00	24.0	495.09	144.37	639.46	319.73	928.21
164.00	24.0	500.70	152.23	652.92	326.46	957.38
165.00	24.0	506.44	160.57	667.01	333.50	988.14
166.00	24.0	512.34	169.40	681.74	340.87	1020.53
167.00	24.0	518.41	178.74	697.15	348.57	1054.62
168.00	24.0	524.66	188.60	713.26	356.63	1090.47
169.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
170.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
171.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
172.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
173.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
174.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
175.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS
2 x THE MOBILIZED END BEARING.

General Information:
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Input file: .....Final\60 PERCENT\BB-420_24-inch PPSC_SCOUR(-19)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 5/28/2020, Boring Number: BB-420
Station number: 420+55 Offset: 35 LT.

Ground Elevation: -15.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	6.00	5- Cavity layer
3	4.00	6.00	5- Cavity layer
4	10.00	10.00	3- Clean sand
5	15.00	10.00	3- Clean sand
6	20.00	10.00	3- Clean sand
7	25.00	10.00	3- Clean sand
8	30.00	10.00	3- Clean sand
9	33.00	10.00	3- Clean sand
10	33.10	10.00	3- Clean sand
11	35.00	15.00	3- Clean sand
12	40.00	10.00	3- Clean sand
13	45.00	8.00	3- Clean sand
14	50.00	13.00	3- Clean sand
15	55.00	4.00	3- Clean sand
16	60.00	5.00	3- Clean sand
17	65.00	5.00	3- Clean sand
18	70.00	6.00	3- Clean sand
19	75.00	6.00	3- Clean sand

20	80.00	8.00	3- Clean sand
21	85.00	7.00	3- Clean sand
22	90.00	11.00	3- Clean sand
23	95.00	10.00	3- Clean sand
24	100.00	4.00	2- Clay and silty sand
25	105.00	10.00	2- Clay and silty sand
26	110.00	12.00	2- Clay and silty sand
27	115.00	34.00	2- Clay and silty sand
28	120.00	11.00	2- Clay and silty sand
29	125.00	10.00	2- Clay and silty sand
30	130.00	17.00	2- Clay and silty sand
31	135.00	22.00	2- Clay and silty sand
32	140.00	32.00	2- Clay and silty sand
33	145.00	63.00	2- Clay and silty sand
34	150.00	25.00	2- Clay and silty sand
35	155.00	36.00	2- Clay and silty sand
36	160.00	32.00	2- Clay and silty sand
37	165.00	58.00	3- Clean sand
38	170.00	65.00	3- Clean sand
39	175.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-15.00	-25.00	10.00	4.80	5-Void
2	-25.00	-115.00	90.00	8.78	3-Clean Sand
3	-115.00	-180.00	65.00	23.69	2-Clay and Silty Sand
4	-180.00	-190.00	10.00	61.50	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-16.00
24.00	2.00	-17.00
24.00	3.00	-18.00
24.00	4.00	-19.00

24.00	5.00	-20.00
24.00	6.00	-21.00
24.00	7.00	-22.00
24.00	8.00	-23.00
24.00	9.00	-24.00
24.00	10.00	-25.00
24.00	11.00	-26.00
24.00	12.00	-27.00
24.00	13.00	-28.00
24.00	14.00	-29.00
24.00	15.00	-30.00
24.00	16.00	-31.00
24.00	17.00	-32.00
24.00	18.00	-33.00
24.00	19.00	-34.00
24.00	20.00	-35.00
24.00	21.00	-36.00
24.00	22.00	-37.00
24.00	23.00	-38.00
24.00	24.00	-39.00
24.00	25.00	-40.00
24.00	26.00	-41.00
24.00	27.00	-42.00
24.00	28.00	-43.00
24.00	29.00	-44.00
24.00	30.00	-45.00
24.00	31.00	-46.00
24.00	32.00	-47.00
24.00	33.00	-48.00
24.00	34.00	-49.00
24.00	35.00	-50.00
24.00	36.00	-51.00
24.00	37.00	-52.00
24.00	38.00	-53.00
24.00	39.00	-54.00
24.00	40.00	-55.00
24.00	41.00	-56.00
24.00	42.00	-57.00
24.00	43.00	-58.00
24.00	44.00	-59.00
24.00	45.00	-60.00
24.00	46.00	-61.00
24.00	47.00	-62.00
24.00	48.00	-63.00
24.00	49.00	-64.00
24.00	50.00	-65.00
24.00	51.00	-66.00
24.00	52.00	-67.00
24.00	53.00	-68.00
24.00	54.00	-69.00

24.00	55.00	-70.00
24.00	56.00	-71.00
24.00	57.00	-72.00
24.00	58.00	-73.00
24.00	59.00	-74.00
24.00	60.00	-75.00
24.00	61.00	-76.00
24.00	62.00	-77.00
24.00	63.00	-78.00
24.00	64.00	-79.00
24.00	65.00	-80.00
24.00	66.00	-81.00
24.00	67.00	-82.00
24.00	68.00	-83.00
24.00	69.00	-84.00
24.00	70.00	-85.00
24.00	71.00	-86.00
24.00	72.00	-87.00
24.00	73.00	-88.00
24.00	74.00	-89.00
24.00	75.00	-90.00
24.00	76.00	-91.00
24.00	77.00	-92.00
24.00	78.00	-93.00
24.00	79.00	-94.00
24.00	80.00	-95.00
24.00	81.00	-96.00
24.00	82.00	-97.00
24.00	83.00	-98.00
24.00	84.00	-99.00
24.00	85.00	-100.00
24.00	86.00	-101.00
24.00	87.00	-102.00
24.00	88.00	-103.00
24.00	89.00	-104.00
24.00	90.00	-105.00
24.00	91.00	-106.00
24.00	92.00	-107.00
24.00	93.00	-108.00
24.00	94.00	-109.00
24.00	95.00	-110.00
24.00	96.00	-111.00
24.00	97.00	-112.00
24.00	98.00	-113.00
24.00	99.00	-114.00
24.00	100.00	-115.00
24.00	101.00	-116.00
24.00	102.00	-117.00
24.00	103.00	-118.00
24.00	104.00	-119.00

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24.00     105.00    -120.00
24.00     106.00    -121.00
24.00     107.00    -122.00
24.00     108.00    -123.00
24.00     109.00    -124.00
24.00     110.00    -125.00
24.00     111.00    -126.00
24.00     112.00    -127.00
24.00     113.00    -128.00
24.00     114.00    -129.00
24.00     115.00    -130.00
24.00     116.00    -131.00
24.00     117.00    -132.00
24.00     118.00    -133.00
24.00     119.00    -134.00
24.00     120.00    -135.00
24.00     121.00    -136.00
24.00     122.00    -137.00
24.00     123.00    -138.00
24.00     124.00    -139.00
24.00     125.00    -140.00
24.00     126.00    -141.00
24.00     127.00    -142.00
24.00     128.00    -143.00
24.00     129.00    -144.00
24.00     130.00    -145.00
24.00     131.00    -146.00
24.00     132.00    -147.00
24.00     133.00    -148.00
24.00     134.00    -149.00
24.00     135.00    -150.00
24.00     136.00    -151.00
24.00     137.00    -152.00
24.00     138.00    -153.00
24.00     139.00    -154.00
24.00     140.00    -155.00
24.00     141.00    -156.00
24.00     142.00    -157.00
24.00     143.00    -158.00
24.00     144.00    -159.00
24.00     145.00    -160.00
24.00     146.00    -161.00
24.00     147.00    -162.00
24.00     148.00    -163.00
24.00     149.00    -164.00
24.00     150.00    -165.00
24.00     151.00    -166.00
24.00     152.00    -167.00
24.00     153.00    -168.00
24.00     154.00    -169.00
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24.00	155.00	-170.00
24.00	156.00	-171.00
24.00	157.00	-172.00
24.00	158.00	-173.00
24.00	159.00	-174.00
24.00	160.00	-175.00
24.00	161.00	-176.00
24.00	162.00	-177.00
24.00	163.00	-178.00
24.00	164.00	-179.00
24.00	165.00	-180.00
24.00	166.00	-181.00
24.00	167.00	-182.00
24.00	168.00	-183.00
24.00	169.00	-184.00
24.00	170.00	-185.00
24.00	171.00	-186.00
24.00	172.00	-187.00
24.00	173.00	-188.00
24.00	174.00	-189.00
24.00	175.00	-190.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.16	0.00	0.16	0.08	0.16
6.00	24.0	0.63	0.00	0.63	0.31	0.63
7.00	24.0	1.41	0.00	1.41	0.71	1.41
8.00	24.0	2.51	0.00	2.51	1.26	2.51
9.00	24.0	3.93	0.00	3.93	1.96	3.93
10.00	24.0	5.65	34.39	40.04	20.02	108.82
11.00	24.0	7.45	34.53	41.98	20.99	111.04

12.00	24.0	9.14	34.90	44.04	22.02	113.85
13.00	24.0	10.76	35.46	46.22	23.11	117.13
14.00	24.0	12.36	36.15	48.51	24.25	120.81
15.00	24.0	13.94	36.96	50.90	25.45	124.83
16.00	24.0	15.54	37.86	53.40	26.70	129.12
17.00	24.0	16.98	39.40	56.38	28.19	135.19
18.00	24.0	18.42	41.22	59.65	29.82	142.09
19.00	24.0	19.89	43.32	63.21	31.60	149.84
20.00	24.0	21.39	45.69	67.08	33.54	158.45
21.00	24.0	22.96	48.21	71.17	35.59	167.58
22.00	24.0	24.63	50.70	75.34	37.67	176.74
23.00	24.0	26.52	51.67	78.18	39.09	181.52
24.00	24.0	28.40	52.36	80.76	40.38	185.47
25.00	24.0	30.29	52.77	83.06	41.53	188.59
26.00	24.0	32.17	52.91	85.08	42.54	190.89
27.00	24.0	34.06	53.31	87.37	43.68	193.99
28.00	24.0	35.94	54.70	90.64	45.32	200.05
29.00	24.0	37.83	56.40	94.23	47.11	207.03
30.00	24.0	39.71	57.72	97.44	48.72	212.89
31.00	24.0	41.60	58.67	100.27	50.13	217.61
32.00	24.0	43.48	59.24	102.72	51.36	221.19
33.00	24.0	45.37	59.43	104.79	52.40	223.64
34.00	24.0	47.44	59.12	106.56	53.28	224.81
35.00	24.0	49.96	58.11	108.08	54.04	224.30
36.00	24.0	52.63	56.78	109.41	54.71	222.97
37.00	24.0	55.14	55.51	110.64	55.32	221.65
38.00	24.0	57.47	54.29	111.76	55.88	220.35
39.00	24.0	59.62	53.41	113.03	56.52	219.85
40.00	24.0	61.60	53.11	114.72	57.36	220.94
41.00	24.0	63.46	53.34	116.80	58.40	223.49
42.00	24.0	65.24	54.04	119.28	59.64	227.36
43.00	24.0	66.96	55.20	122.15	61.08	232.55
44.00	24.0	68.60	56.29	124.88	62.44	237.46
45.00	24.0	70.17	56.78	126.95	63.47	240.52
46.00	24.0	71.79	56.54	128.32	64.16	241.39
47.00	24.0	73.58	55.39	128.98	64.49	239.77
48.00	24.0	75.56	53.36	128.92	64.46	235.65
49.00	24.0	77.72	50.81	128.53	64.27	230.16
50.00	24.0	80.05	47.95	128.00	64.00	223.91
51.00	24.0	82.32	44.82	127.14	63.57	216.77
52.00	24.0	84.26	42.01	126.27	63.13	210.28
53.00	24.0	85.88	39.82	125.70	62.85	205.34
54.00	24.0	87.17	38.22	125.39	62.70	201.83
55.00	24.0	88.14	37.16	125.30	62.65	199.63
56.00	24.0	88.96	36.45	125.41	62.70	198.30
57.00	24.0	89.82	35.80	125.62	62.81	197.22
58.00	24.0	90.70	35.18	125.89	62.94	196.25
59.00	24.0	91.63	34.62	126.25	63.12	195.49
60.00	24.0	92.59	34.16	126.75	63.37	195.07
61.00	24.0	93.56	33.82	127.38	63.69	195.02

62.00	24.0	94.54	33.51	128.04	64.02	195.05
63.00	24.0	95.51	33.10	128.61	64.31	194.81
64.00	24.0	96.48	32.57	129.05	64.53	194.19
65.00	24.0	97.45	31.87	129.32	64.66	193.07
66.00	24.0	98.44	30.99	129.43	64.71	191.41
67.00	24.0	99.46	30.13	129.59	64.80	189.85
68.00	24.0	100.52	29.53	130.05	65.02	189.10
69.00	24.0	101.61	29.25	130.87	65.43	189.37
70.00	24.0	102.75	29.38	132.13	66.06	190.90
71.00	24.0	103.89	29.94	133.84	66.92	193.73
72.00	24.0	105.04	30.79	135.83	67.91	197.40
73.00	24.0	106.19	31.75	137.94	68.97	201.43
74.00	24.0	107.33	32.71	140.05	70.02	205.48
75.00	24.0	108.48	33.57	142.05	71.03	209.20
76.00	24.0	109.66	34.28	143.94	71.97	212.50
77.00	24.0	110.92	34.81	145.72	72.86	215.34
78.00	24.0	112.24	35.18	147.42	73.71	217.77
79.00	24.0	113.65	35.57	149.22	74.61	220.36
80.00	24.0	115.12	36.19	151.31	75.65	223.68
81.00	24.0	116.61	37.08	153.69	76.85	227.86
82.00	24.0	118.07	38.31	156.37	78.19	232.98
83.00	24.0	119.49	39.84	159.33	79.66	239.01
84.00	24.0	120.87	41.50	162.37	81.18	245.36
85.00	24.0	122.21	43.09	165.30	82.65	251.48
86.00	24.0	123.61	44.51	168.12	84.06	257.14
87.00	24.0	125.16	45.67	170.83	85.41	262.16
88.00	24.0	126.85	46.58	173.43	86.72	266.59
89.00	24.0	128.69	46.98	175.67	87.84	269.64
90.00	24.0	130.68	46.61	177.29	88.64	270.50
91.00	24.0	132.73	45.57	178.29	89.15	269.42
92.00	24.0	134.73	43.93	178.66	89.33	266.52
93.00	24.0	136.70	41.66	178.37	89.18	261.70
94.00	24.0	138.64	39.19	177.82	88.91	256.20
95.00	24.0	140.53	36.91	177.45	88.72	251.27
96.00	24.0	142.41	34.99	177.40	88.70	247.37
97.00	24.0	144.27	33.62	177.88	88.94	245.12
98.00	24.0	146.11	32.84	178.96	89.48	244.65
99.00	24.0	147.95	32.60	180.54	90.27	245.74
100.00	24.0	152.93	32.80	185.73	92.86	251.32

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)

101.00	24.0	154.96	32.85	187.81	93.91	253.51
102.00	24.0	157.44	32.98	190.42	95.21	256.38
103.00	24.0	160.39	33.12	193.51	96.76	259.75
104.00	24.0	163.76	33.39	197.15	98.58	263.93
105.00	24.0	167.42	34.10	201.51	100.76	269.71
106.00	24.0	171.14	35.49	206.63	103.31	277.60
107.00	24.0	174.75	37.90	212.65	106.33	288.46
108.00	24.0	178.32	41.70	220.02	110.01	303.43
109.00	24.0	182.94	44.75	227.68	113.84	317.17
110.00	24.0	187.70	46.91	234.61	117.31	328.43
111.00	24.0	193.02	47.98	241.00	120.50	336.97
112.00	24.0	199.30	47.87	247.16	123.58	342.90
113.00	24.0	206.54	46.68	253.22	126.61	346.58
114.00	24.0	214.77	44.83	259.60	129.80	349.27
115.00	24.0	223.97	42.75	266.72	133.36	352.22
116.00	24.0	233.18	40.90	274.08	137.04	355.88
117.00	24.0	241.40	39.59	280.98	140.49	360.15
118.00	24.0	248.60	38.62	287.22	143.61	364.47
119.00	24.0	254.77	38.16	292.94	146.47	369.27
120.00	24.0	259.92	38.36	298.28	149.14	375.00
121.00	24.0	264.52	38.97	303.49	151.75	381.44
122.00	24.0	269.04	39.81	308.85	154.42	388.46
123.00	24.0	273.48	40.90	314.38	157.19	396.17
124.00	24.0	277.86	42.20	320.06	160.03	404.46
125.00	24.0	282.16	43.68	325.84	162.92	413.19
126.00	24.0	286.64	45.25	331.90	165.95	422.40
127.00	24.0	291.58	46.66	338.24	169.12	431.57
128.00	24.0	296.96	47.75	344.71	172.36	440.22
129.00	24.0	302.79	48.62	351.41	175.70	448.64
130.00	24.0	309.07	49.34	358.42	179.21	457.10
131.00	24.0	315.72	49.95	365.67	182.83	465.58
132.00	24.0	322.62	50.85	373.47	186.73	475.16
133.00	24.0	329.78	52.39	382.17	191.09	486.96
134.00	24.0	337.21	54.71	391.92	195.96	501.34
135.00	24.0	344.90	57.92	402.82	201.41	518.66
136.00	24.0	352.91	61.97	414.88	207.44	538.82
137.00	24.0	361.28	66.63	427.91	213.95	561.16
138.00	24.0	370.02	71.70	441.73	220.86	585.14
139.00	24.0	379.13	76.46	455.59	227.79	608.50
140.00	24.0	388.61	80.13	468.73	234.37	628.99
141.00	24.0	398.34	82.65	480.99	240.50	646.29
142.00	24.0	408.22	83.89	492.12	246.06	659.90
143.00	24.0	418.25	83.78	502.04	251.02	669.61
144.00	24.0	428.43	82.98	511.41	255.70	677.37
145.00	24.0	438.75	82.13	520.88	260.44	685.13
146.00	24.0	448.96	81.65	530.61	265.31	693.91
147.00	24.0	458.80	81.98	540.78	270.39	704.75
148.00	24.0	468.26	83.15	551.41	275.70	717.70
149.00	24.0	477.34	84.86	562.20	281.10	731.92

150.00	24.0	486.05	86.83	572.88	286.44	746.55
151.00	24.0	494.73	88.71	583.44	291.72	760.85
152.00	24.0	503.73	90.07	593.81	296.90	773.95
153.00	24.0	513.06	90.89	603.95	301.97	785.72
154.00	24.0	522.71	92.45	615.16	307.58	800.06
155.00	24.0	532.68	96.06	628.74	314.37	820.86
156.00	24.0	542.78	101.88	644.66	322.33	848.42
157.00	24.0	552.79	110.01	662.80	331.40	882.83
158.00	24.0	562.71	120.41	683.12	341.56	923.94
159.00	24.0	572.54	131.84	704.39	352.19	968.08
160.00	24.0	582.29	143.09	725.38	362.69	1011.57
161.00	24.0	591.93	153.42	745.36	372.68	1052.21
162.00	24.0	601.46	162.44	763.90	381.95	1088.77
163.00	24.0	610.86	170.46	781.32	390.66	1122.24
164.00	24.0	620.14	177.49	797.63	398.82	1152.62
165.00	24.0	635.64	183.53	819.18	409.59	1186.24
166.00	24.0	644.49	183.77	828.27	414.13	1195.81
167.00	24.0	652.85	184.50	837.34	418.67	1206.34
168.00	24.0	660.80	185.69	846.49	423.24	1217.87
169.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
170.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
171.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
172.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
173.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-420_24-inch PPSC_SCOUR(-25)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 5/28/2020, Boring Number: BB-420
Station number: 420+55 Offset: 35 LT.

Ground Elevation: -15.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	6.00	5- Cavity layer
3	10.00	10.00	5- Cavity layer
4	15.00	10.00	3- Clean sand
5	20.00	10.00	3- Clean sand
6	25.00	10.00	3- Clean sand
7	30.00	10.00	3- Clean sand
8	33.00	10.00	3- Clean sand
9	33.10	10.00	3- Clean sand
10	35.00	15.00	3- Clean sand
11	40.00	10.00	3- Clean sand
12	45.00	8.00	3- Clean sand
13	50.00	13.00	3- Clean sand
14	55.00	4.00	3- Clean sand
15	60.00	5.00	3- Clean sand
16	65.00	5.00	3- Clean sand
17	70.00	6.00	3- Clean sand
18	75.00	6.00	3- Clean sand
19	80.00	8.00	3- Clean sand

20	85.00	7.00	3- Clean sand
21	90.00	11.00	3- Clean sand
22	95.00	10.00	3- Clean sand
23	100.00	4.00	2- Clay and silty sand
24	105.00	10.00	2- Clay and silty sand
25	110.00	12.00	2- Clay and silty sand
26	115.00	34.00	2- Clay and silty sand
27	120.00	11.00	2- Clay and silty sand
28	125.00	10.00	2- Clay and silty sand
29	130.00	17.00	2- Clay and silty sand
30	135.00	22.00	2- Clay and silty sand
31	140.00	32.00	2- Clay and silty sand
32	145.00	63.00	2- Clay and silty sand
33	150.00	25.00	2- Clay and silty sand
34	155.00	36.00	2- Clay and silty sand
35	160.00	32.00	2- Clay and silty sand
36	165.00	58.00	3- Clean sand
37	170.00	65.00	3- Clean sand
38	175.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-15.00	-30.00	15.00	6.53	5-Void
2	-30.00	-115.00	85.00	8.71	3-Clean Sand
3	-115.00	-180.00	65.00	23.69	2-Clay and Silty Sand
4	-180.00	-190.00	10.00	61.50	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-16.00
24.00	2.00	-17.00
24.00	3.00	-18.00
24.00	4.00	-19.00
24.00	5.00	-20.00

24.00	6.00	-21.00
24.00	7.00	-22.00
24.00	8.00	-23.00
24.00	9.00	-24.00
24.00	10.00	-25.00
24.00	11.00	-26.00
24.00	12.00	-27.00
24.00	13.00	-28.00
24.00	14.00	-29.00
24.00	15.00	-30.00
24.00	16.00	-31.00
24.00	17.00	-32.00
24.00	18.00	-33.00
24.00	19.00	-34.00
24.00	20.00	-35.00
24.00	21.00	-36.00
24.00	22.00	-37.00
24.00	23.00	-38.00
24.00	24.00	-39.00
24.00	25.00	-40.00
24.00	26.00	-41.00
24.00	27.00	-42.00
24.00	28.00	-43.00
24.00	29.00	-44.00
24.00	30.00	-45.00
24.00	31.00	-46.00
24.00	32.00	-47.00
24.00	33.00	-48.00
24.00	34.00	-49.00
24.00	35.00	-50.00
24.00	36.00	-51.00
24.00	37.00	-52.00
24.00	38.00	-53.00
24.00	39.00	-54.00
24.00	40.00	-55.00
24.00	41.00	-56.00
24.00	42.00	-57.00
24.00	43.00	-58.00
24.00	44.00	-59.00
24.00	45.00	-60.00
24.00	46.00	-61.00
24.00	47.00	-62.00
24.00	48.00	-63.00
24.00	49.00	-64.00
24.00	50.00	-65.00
24.00	51.00	-66.00
24.00	52.00	-67.00
24.00	53.00	-68.00
24.00	54.00	-69.00
24.00	55.00	-70.00

24.00	56.00	-71.00
24.00	57.00	-72.00
24.00	58.00	-73.00
24.00	59.00	-74.00
24.00	60.00	-75.00
24.00	61.00	-76.00
24.00	62.00	-77.00
24.00	63.00	-78.00
24.00	64.00	-79.00
24.00	65.00	-80.00
24.00	66.00	-81.00
24.00	67.00	-82.00
24.00	68.00	-83.00
24.00	69.00	-84.00
24.00	70.00	-85.00
24.00	71.00	-86.00
24.00	72.00	-87.00
24.00	73.00	-88.00
24.00	74.00	-89.00
24.00	75.00	-90.00
24.00	76.00	-91.00
24.00	77.00	-92.00
24.00	78.00	-93.00
24.00	79.00	-94.00
24.00	80.00	-95.00
24.00	81.00	-96.00
24.00	82.00	-97.00
24.00	83.00	-98.00
24.00	84.00	-99.00
24.00	85.00	-100.00
24.00	86.00	-101.00
24.00	87.00	-102.00
24.00	88.00	-103.00
24.00	89.00	-104.00
24.00	90.00	-105.00
24.00	91.00	-106.00
24.00	92.00	-107.00
24.00	93.00	-108.00
24.00	94.00	-109.00
24.00	95.00	-110.00
24.00	96.00	-111.00
24.00	97.00	-112.00
24.00	98.00	-113.00
24.00	99.00	-114.00
24.00	100.00	-115.00
24.00	101.00	-116.00
24.00	102.00	-117.00
24.00	103.00	-118.00
24.00	104.00	-119.00
24.00	105.00	-120.00

24.00	106.00	-121.00
24.00	107.00	-122.00
24.00	108.00	-123.00
24.00	109.00	-124.00
24.00	110.00	-125.00
24.00	111.00	-126.00
24.00	112.00	-127.00
24.00	113.00	-128.00
24.00	114.00	-129.00
24.00	115.00	-130.00
24.00	116.00	-131.00
24.00	117.00	-132.00
24.00	118.00	-133.00
24.00	119.00	-134.00
24.00	120.00	-135.00
24.00	121.00	-136.00
24.00	122.00	-137.00
24.00	123.00	-138.00
24.00	124.00	-139.00
24.00	125.00	-140.00
24.00	126.00	-141.00
24.00	127.00	-142.00
24.00	128.00	-143.00
24.00	129.00	-144.00
24.00	130.00	-145.00
24.00	131.00	-146.00
24.00	132.00	-147.00
24.00	133.00	-148.00
24.00	134.00	-149.00
24.00	135.00	-150.00
24.00	136.00	-151.00
24.00	137.00	-152.00
24.00	138.00	-153.00
24.00	139.00	-154.00
24.00	140.00	-155.00
24.00	141.00	-156.00
24.00	142.00	-157.00
24.00	143.00	-158.00
24.00	144.00	-159.00
24.00	145.00	-160.00
24.00	146.00	-161.00
24.00	147.00	-162.00
24.00	148.00	-163.00
24.00	149.00	-164.00
24.00	150.00	-165.00
24.00	151.00	-166.00
24.00	152.00	-167.00
24.00	153.00	-168.00
24.00	154.00	-169.00
24.00	155.00	-170.00

24.00	156.00	-171.00
24.00	157.00	-172.00
24.00	158.00	-173.00
24.00	159.00	-174.00
24.00	160.00	-175.00
24.00	161.00	-176.00
24.00	162.00	-177.00
24.00	163.00	-178.00
24.00	164.00	-179.00
24.00	165.00	-180.00
24.00	166.00	-181.00
24.00	167.00	-182.00
24.00	168.00	-183.00
24.00	169.00	-184.00
24.00	170.00	-185.00
24.00	171.00	-186.00
24.00	172.00	-187.00
24.00	173.00	-188.00
24.00	174.00	-189.00
24.00	175.00	-190.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.19	0.00	0.19	0.09	0.19
12.00	24.0	0.75	0.00	0.75	0.38	0.75

13.00	24.0	1.70	0.00	1.70	0.85	1.70
14.00	24.0	3.02	0.00	3.02	1.51	3.02
15.00	24.0	4.71	30.86	35.57	17.79	97.30
16.00	24.0	6.52	30.98	37.50	18.75	99.45
17.00	24.0	8.17	31.37	39.54	19.77	102.27
18.00	24.0	9.71	32.03	41.75	20.87	105.81
19.00	24.0	11.18	32.97	44.16	22.08	110.11
20.00	24.0	12.60	34.19	46.79	23.40	115.18
21.00	24.0	14.00	35.68	49.69	24.84	121.05
22.00	24.0	15.40	37.45	52.85	26.43	127.76
23.00	24.0	16.82	39.50	56.32	28.16	135.31
24.00	24.0	18.27	41.82	60.09	30.04	143.72
25.00	24.0	19.77	44.41	64.18	32.09	153.00
26.00	24.0	21.32	47.28	68.60	34.30	163.16
27.00	24.0	22.91	50.66	73.57	36.79	174.90
28.00	24.0	24.79	53.21	78.01	39.00	184.44
29.00	24.0	26.68	55.74	82.42	41.21	193.90
30.00	24.0	28.56	57.56	86.12	43.06	201.24
31.00	24.0	30.45	58.67	89.12	44.56	206.46
32.00	24.0	32.33	59.24	91.57	45.79	210.04
33.00	24.0	34.22	59.43	93.64	46.82	212.49
34.00	24.0	36.28	59.12	95.40	47.70	213.65
35.00	24.0	38.78	58.11	96.89	48.45	213.12
36.00	24.0	41.42	56.78	98.20	49.10	211.76
37.00	24.0	43.90	55.51	99.41	49.71	210.42
38.00	24.0	46.22	54.29	100.52	50.26	209.11
39.00	24.0	48.38	53.41	101.78	50.89	208.60
40.00	24.0	50.36	53.11	103.47	51.74	209.70
41.00	24.0	52.22	53.34	105.57	52.78	212.25
42.00	24.0	54.01	54.04	108.05	54.03	216.13
43.00	24.0	55.73	55.20	110.93	55.47	221.32
44.00	24.0	57.39	56.29	113.67	56.84	226.25
45.00	24.0	58.96	56.78	115.75	57.87	229.32
46.00	24.0	60.59	56.54	117.13	58.56	230.20
47.00	24.0	62.40	55.39	117.79	58.90	228.58
48.00	24.0	64.37	53.36	117.73	58.87	224.46
49.00	24.0	66.52	50.81	117.34	58.67	218.96
50.00	24.0	68.85	47.95	116.80	58.40	212.71
51.00	24.0	71.11	44.82	115.93	57.97	205.57
52.00	24.0	73.06	42.01	115.06	57.53	199.08
53.00	24.0	74.68	39.82	114.50	57.25	194.14
54.00	24.0	75.99	38.22	114.20	57.10	190.64
55.00	24.0	76.97	37.16	114.13	57.07	188.46
56.00	24.0	77.81	36.45	114.26	57.13	187.15
57.00	24.0	78.68	35.80	114.48	57.24	186.08
58.00	24.0	79.58	35.18	114.76	57.38	185.12
59.00	24.0	80.52	34.62	115.14	57.57	184.38
60.00	24.0	81.49	34.16	115.65	57.83	183.97
61.00	24.0	82.48	33.82	116.30	58.15	183.94
62.00	24.0	83.46	33.51	116.97	58.48	183.98

63.00	24.0	84.44	33.10	117.55	58.77	183.75
64.00	24.0	85.42	32.57	117.99	59.00	183.14
65.00	24.0	86.40	31.87	118.28	59.14	182.03
66.00	24.0	87.40	30.99	118.39	59.19	180.37
67.00	24.0	88.43	30.13	118.56	59.28	178.82
68.00	24.0	89.50	29.53	119.02	59.51	178.07
69.00	24.0	90.60	29.25	119.85	59.92	178.35
70.00	24.0	91.73	29.38	121.12	60.56	179.88
71.00	24.0	92.88	29.94	122.83	61.41	182.72
72.00	24.0	94.04	30.79	124.82	62.41	186.40
73.00	24.0	95.19	31.75	126.94	63.47	190.43
74.00	24.0	96.34	32.71	129.05	64.53	194.48
75.00	24.0	97.49	33.57	131.06	65.53	198.20
76.00	24.0	98.67	34.28	132.95	66.48	201.51
77.00	24.0	99.93	34.81	134.74	67.37	204.35
78.00	24.0	101.26	35.18	136.44	68.22	206.79
79.00	24.0	102.66	35.57	138.23	69.12	209.38
80.00	24.0	104.14	36.19	140.32	70.16	212.70
81.00	24.0	105.63	37.08	142.71	71.36	216.87
82.00	24.0	107.08	38.31	145.39	72.70	222.00
83.00	24.0	108.50	39.84	148.34	74.17	228.03
84.00	24.0	109.89	41.50	151.39	75.69	234.38
85.00	24.0	111.23	43.09	154.32	77.16	240.51
86.00	24.0	112.63	44.51	157.14	78.57	246.16
87.00	24.0	114.18	45.67	159.85	79.92	251.18
88.00	24.0	115.87	46.58	162.45	81.23	255.61
89.00	24.0	117.71	46.98	164.69	82.35	258.65
90.00	24.0	119.70	46.61	166.30	83.15	259.52
91.00	24.0	121.74	45.57	167.30	83.65	258.43
92.00	24.0	123.74	43.93	167.67	83.83	255.53
93.00	24.0	125.71	41.66	167.37	83.69	250.70
94.00	24.0	127.64	39.19	166.82	83.41	245.20
95.00	24.0	129.53	36.91	166.44	83.22	240.27
96.00	24.0	131.40	34.99	166.39	83.20	236.37
97.00	24.0	133.26	33.62	166.88	83.44	234.11
98.00	24.0	135.11	32.84	167.95	83.98	233.64
99.00	24.0	136.94	32.60	169.54	84.77	234.73
100.00	24.0	142.56	32.80	175.36	87.68	240.95

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)

101.00	24.0	144.60	32.85	177.45	88.72	243.14
102.00	24.0	147.07	32.98	180.05	90.03	246.01
103.00	24.0	150.03	33.12	183.14	91.57	249.38
104.00	24.0	153.40	33.39	186.78	93.39	253.56
105.00	24.0	157.05	34.10	191.15	95.57	259.34
106.00	24.0	160.77	35.49	196.26	98.13	267.24
107.00	24.0	164.38	37.90	202.28	101.14	278.09
108.00	24.0	167.95	41.70	209.66	104.83	293.07
109.00	24.0	172.57	44.75	217.32	108.66	306.81
110.00	24.0	177.34	46.91	224.25	112.12	318.07
111.00	24.0	182.65	47.98	230.64	115.32	326.60
112.00	24.0	188.93	47.87	236.80	118.40	332.53
113.00	24.0	196.18	46.68	242.85	121.43	336.21
114.00	24.0	204.40	44.83	249.23	124.62	338.90
115.00	24.0	213.61	42.75	256.36	128.18	341.85
116.00	24.0	222.82	40.90	263.72	131.86	345.52
117.00	24.0	231.03	39.59	270.61	135.31	349.79
118.00	24.0	238.23	38.62	276.85	138.43	354.10
119.00	24.0	244.41	38.16	282.57	141.29	358.90
120.00	24.0	249.56	38.36	287.92	143.96	364.63
121.00	24.0	254.15	38.97	293.13	146.56	371.07
122.00	24.0	258.67	39.81	298.48	149.24	378.10
123.00	24.0	263.12	40.90	304.01	152.01	385.81
124.00	24.0	267.49	42.20	309.69	154.85	394.09
125.00	24.0	271.79	43.68	315.47	157.74	402.83
126.00	24.0	276.28	45.25	321.53	160.76	412.03
127.00	24.0	281.21	46.66	327.88	163.94	421.20
128.00	24.0	286.59	47.75	334.35	167.17	429.86
129.00	24.0	292.42	48.62	341.04	170.52	438.27
130.00	24.0	298.71	49.34	348.05	174.02	446.73
131.00	24.0	305.35	49.95	355.30	177.65	455.21
132.00	24.0	312.25	50.85	363.10	181.55	464.79
133.00	24.0	319.42	52.39	371.81	185.90	476.59
134.00	24.0	326.84	54.71	381.55	190.78	490.97
135.00	24.0	334.54	57.92	392.45	196.23	508.29
136.00	24.0	342.54	61.97	404.51	202.26	528.45
137.00	24.0	350.91	66.63	417.54	208.77	550.79
138.00	24.0	359.66	71.70	431.36	215.68	574.77
139.00	24.0	368.76	76.46	445.22	222.61	598.13
140.00	24.0	378.24	80.13	458.37	229.18	618.62
141.00	24.0	387.98	82.65	470.63	235.31	635.92
142.00	24.0	397.86	83.89	481.75	240.87	649.53
143.00	24.0	407.89	83.78	491.67	245.84	659.24
144.00	24.0	418.06	82.98	501.04	250.52	667.00
145.00	24.0	428.39	82.13	510.51	255.26	674.77
146.00	24.0	438.60	81.65	520.24	260.12	683.54
147.00	24.0	448.43	81.98	530.41	265.21	694.38
148.00	24.0	457.89	83.15	541.04	270.52	707.33
149.00	24.0	466.98	84.86	551.83	275.92	721.55
150.00	24.0	475.68	86.83	562.52	281.26	736.19

151.00	24.0	484.36	88.71	573.07	286.54	750.49
152.00	24.0	493.37	90.07	583.44	291.72	763.58
153.00	24.0	502.69	90.89	593.58	296.79	775.35
154.00	24.0	512.34	92.45	604.79	302.40	789.69
155.00	24.0	522.32	96.06	618.38	309.19	810.50
156.00	24.0	532.41	101.88	634.29	317.15	838.05
157.00	24.0	542.42	110.01	652.43	326.22	872.46
158.00	24.0	552.34	120.41	672.75	336.38	913.57
159.00	24.0	562.18	131.84	694.02	347.01	957.71
160.00	24.0	571.92	143.09	715.02	357.51	1001.20
161.00	24.0	581.57	153.42	734.99	367.50	1041.84
162.00	24.0	591.09	162.44	753.53	376.76	1078.40
163.00	24.0	600.49	170.46	770.95	385.48	1111.87
164.00	24.0	609.77	177.49	787.27	393.63	1142.25
165.00	24.0	625.28	183.53	808.81	404.41	1175.88
166.00	24.0	634.13	183.77	817.90	408.95	1185.44
167.00	24.0	642.48	184.50	826.98	413.49	1195.98
168.00	24.0	650.43	185.69	836.12	418.06	1207.50
169.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
170.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
171.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
172.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
173.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
174.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
175.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....inal\60 PERCENT\BB-422L_24-inch PPSC_SCOUR(-23)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 12/4/2017, Boring Number: BB-422L
Station number: 421+83 Offset: 21' LT.

Ground Elevation: -17.000(ft)

Hammer type: Safety Hammer

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	3- Clean sand
2	2.00	15.00	5- Cavity layer
3	4.00	21.00	5- Cavity layer
4	6.00	38.00	5- Cavity layer
5	8.00	10.00	4- Lime Stone/Very shelly sand
6	10.00	10.00	4- Lime Stone/Very shelly sand
7	15.00	10.00	4- Lime Stone/Very shelly sand
8	20.00	10.00	4- Lime Stone/Very shelly sand
9	25.00	10.00	4- Lime Stone/Very shelly sand
10	30.00	3.00	3- Clean sand
11	31.00	3.00	3- Clean sand
12	31.10	3.00	3- Clean sand
13	35.00	29.00	1- Plastic Clay
14	40.00	24.00	1- Plastic Clay
15	45.00	14.00	1- Plastic Clay
16	50.00	7.00	2- Clay and silty sand
17	55.00	29.00	2- Clay and silty sand
18	60.00	31.00	2- Clay and silty sand
19	65.00	20.00	2- Clay and silty sand

20	70.00	13.00	2- Clay and silty sand
21	75.00	36.00	2- Clay and silty sand
22	80.00	19.00	2- Clay and silty sand
23	85.00	27.00	2- Clay and silty sand
24	90.00	20.00	2- Clay and silty sand
25	95.00	12.00	2- Clay and silty sand
26	100.00	32.00	2- Clay and silty sand
27	105.00	38.00	3- Clean sand
28	110.00	65.00	3- Clean sand
29	115.00	100.00	2- Clay and silty sand
30	120.00	54.00	3- Clean sand
31	125.00	23.00	2- Clay and silty sand
32	130.00	55.00	2- Clay and silty sand
33	135.00	54.00	3- Clean sand
34	140.00	62.00	3- Clean sand
35	145.00	63.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-17.00	-19.00	2.00	0.00	3-Clean Sand
2	-19.00	-25.00	6.00	24.67	5-Void
3	-25.00	-47.00	22.00	10.00	4-Limestone, Very Shelly Sand
4	-47.00	-52.00	5.00	3.00	3-Clean Sand
5	-52.00	-67.00	15.00	22.33	1-Plastic Clay
6	-67.00	-122.00	55.00	22.36	2-Clay and Silty Sand
7	-122.00	-132.00	10.00	51.50	3-Clean Sand
8	-132.00	-137.00	5.00	100.00	2-Clay and Silty Sand
9	-137.00	-142.00	5.00	54.00	3-Clean Sand
10	-142.00	-152.00	10.00	39.00	2-Clay and Silty Sand
11	-152.00	-162.00	10.00	58.00	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)

24.00	1.00	-18.00
24.00	2.00	-19.00
24.00	3.00	-20.00
24.00	4.00	-21.00
24.00	5.00	-22.00
24.00	6.00	-23.00
24.00	7.00	-24.00
24.00	8.00	-25.00
24.00	9.00	-26.00
24.00	10.00	-27.00
24.00	11.00	-28.00
24.00	12.00	-29.00
24.00	13.00	-30.00
24.00	14.00	-31.00
24.00	15.00	-32.00
24.00	16.00	-33.00
24.00	17.00	-34.00
24.00	18.00	-35.00
24.00	19.00	-36.00
24.00	20.00	-37.00
24.00	21.00	-38.00
24.00	22.00	-39.00
24.00	23.00	-40.00
24.00	24.00	-41.00
24.00	25.00	-42.00
24.00	26.00	-43.00
24.00	27.00	-44.00
24.00	28.00	-45.00
24.00	29.00	-46.00
24.00	30.00	-47.00
24.00	31.00	-48.00
24.00	32.00	-49.00
24.00	33.00	-50.00
24.00	34.00	-51.00
24.00	35.00	-52.00
24.00	36.00	-53.00
24.00	37.00	-54.00
24.00	38.00	-55.00
24.00	39.00	-56.00
24.00	40.00	-57.00
24.00	41.00	-58.00
24.00	42.00	-59.00
24.00	43.00	-60.00
24.00	44.00	-61.00
24.00	45.00	-62.00
24.00	46.00	-63.00
24.00	47.00	-64.00
24.00	48.00	-65.00
24.00	49.00	-66.00
24.00	50.00	-67.00

24.00	51.00	-68.00
24.00	52.00	-69.00
24.00	53.00	-70.00
24.00	54.00	-71.00
24.00	55.00	-72.00
24.00	56.00	-73.00
24.00	57.00	-74.00
24.00	58.00	-75.00
24.00	59.00	-76.00
24.00	60.00	-77.00
24.00	61.00	-78.00
24.00	62.00	-79.00
24.00	63.00	-80.00
24.00	64.00	-81.00
24.00	65.00	-82.00
24.00	66.00	-83.00
24.00	67.00	-84.00
24.00	68.00	-85.00
24.00	69.00	-86.00
24.00	70.00	-87.00
24.00	71.00	-88.00
24.00	72.00	-89.00
24.00	73.00	-90.00
24.00	74.00	-91.00
24.00	75.00	-92.00
24.00	76.00	-93.00
24.00	77.00	-94.00
24.00	78.00	-95.00
24.00	79.00	-96.00
24.00	80.00	-97.00
24.00	81.00	-98.00
24.00	82.00	-99.00
24.00	83.00	-100.00
24.00	84.00	-101.00
24.00	85.00	-102.00
24.00	86.00	-103.00
24.00	87.00	-104.00
24.00	88.00	-105.00
24.00	89.00	-106.00
24.00	90.00	-107.00
24.00	91.00	-108.00
24.00	92.00	-109.00
24.00	93.00	-110.00
24.00	94.00	-111.00
24.00	95.00	-112.00
24.00	96.00	-113.00
24.00	97.00	-114.00
24.00	98.00	-115.00
24.00	99.00	-116.00
24.00	100.00	-117.00

24.00	101.00	-118.00
24.00	102.00	-119.00
24.00	103.00	-120.00
24.00	104.00	-121.00
24.00	105.00	-122.00
24.00	106.00	-123.00
24.00	107.00	-124.00
24.00	108.00	-125.00
24.00	109.00	-126.00
24.00	110.00	-127.00
24.00	111.00	-128.00
24.00	112.00	-129.00
24.00	113.00	-130.00
24.00	114.00	-131.00
24.00	115.00	-132.00
24.00	116.00	-133.00
24.00	117.00	-134.00
24.00	118.00	-135.00
24.00	119.00	-136.00
24.00	120.00	-137.00
24.00	121.00	-138.00
24.00	122.00	-139.00
24.00	123.00	-140.00
24.00	124.00	-141.00
24.00	125.00	-142.00
24.00	126.00	-143.00
24.00	127.00	-144.00
24.00	128.00	-145.00
24.00	129.00	-146.00
24.00	130.00	-147.00
24.00	131.00	-148.00
24.00	132.00	-149.00
24.00	133.00	-150.00
24.00	134.00	-151.00
24.00	135.00	-152.00
24.00	136.00	-153.00
24.00	137.00	-154.00
24.00	138.00	-155.00
24.00	139.00	-156.00
24.00	140.00	-157.00
24.00	141.00	-158.00
24.00	142.00	-159.00
24.00	143.00	-160.00
24.00	144.00	-161.00
24.00	145.00	-162.00

Driven Pile Capacity:

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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	1.26	1.26	0.63	3.78
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.20	0.00	0.20	0.10	0.20
8.00	24.0	0.80	32.57	33.37	16.69	98.52
9.00	24.0	1.60	32.57	34.17	17.09	99.32
10.00	24.0	2.40	32.57	34.97	17.49	100.12
11.00	24.0	3.20	32.57	35.77	17.89	100.92
12.00	24.0	4.00	32.57	36.57	18.29	101.72
13.00	24.0	4.80	32.57	37.37	18.69	102.52
14.00	24.0	5.60	32.57	38.17	19.09	103.32
15.00	24.0	6.40	32.57	38.97	19.49	104.12
16.00	24.0	7.20	32.57	39.77	19.89	104.92
17.00	24.0	8.00	32.57	40.57	20.29	105.72
18.00	24.0	8.80	32.32	41.12	20.56	105.77
19.00	24.0	9.60	31.58	41.18	20.59	104.35
20.00	24.0	10.40	30.35	40.75	20.37	101.44
21.00	24.0	11.20	28.62	39.82	19.91	97.05
22.00	24.0	12.00	26.39	38.39	19.20	91.18
23.00	24.0	12.80	23.92	36.72	18.36	84.57
24.00	24.0	13.60	21.64	35.24	17.62	78.51
25.00	24.0	14.40	19.80	34.20	17.10	73.81
26.00	24.0	15.17	18.68	33.84	16.92	71.20
27.00	24.0	15.86	18.50	34.36	17.18	71.37
28.00	24.0	16.49	18.99	35.48	17.74	73.46
29.00	24.0	17.05	19.86	36.91	18.45	76.62
30.00	24.0	17.54	20.58	38.12	19.06	79.29
31.00	24.0	18.00	17.54	35.54	17.77	70.63
32.00	24.0	19.38	18.59	37.97	18.99	75.16
33.00	24.0	23.04	19.68	42.72	21.36	82.07
34.00	24.0	28.99	20.49	49.48	24.74	90.46
35.00	24.0	37.22	24.29	61.51	30.76	110.09
36.00	24.0	46.49	23.47	69.96	34.98	116.89
37.00	24.0	55.53	22.55	78.08	39.04	123.19

38.00	24.0	64.34	21.54	85.88	42.94	128.96
39.00	24.0	72.92	20.51	93.44	46.72	134.46
40.00	24.0	81.28	19.55	100.83	50.41	139.93
41.00	24.0	89.23	18.67	107.90	53.95	145.24
42.00	24.0	96.61	17.95	114.57	57.28	150.47
43.00	24.0	103.42	17.46	120.88	60.44	155.80
44.00	24.0	109.65	17.52	127.17	63.58	162.20
45.00	24.0	115.30	18.44	133.74	66.87	170.63
46.00	24.0	120.39	20.19	140.58	70.29	180.95
47.00	24.0	124.90	22.66	147.55	73.78	192.86
48.00	24.0	128.84	25.73	154.57	77.29	206.03
49.00	24.0	132.21	29.04	161.25	80.63	219.34
50.00	24.0	135.01	32.29	167.30	83.65	231.87
51.00	24.0	137.85	32.66	170.51	85.26	235.83
52.00	24.0	141.37	33.69	175.07	87.53	242.45
53.00	24.0	145.64	35.28	180.92	90.46	251.47
54.00	24.0	150.82	37.21	188.02	94.01	262.44
55.00	24.0	157.12	39.17	196.29	98.15	274.64
56.00	24.0	164.22	41.05	205.28	102.64	287.38
57.00	24.0	171.73	42.81	214.54	107.27	300.17
58.00	24.0	179.69	44.35	224.04	112.02	312.74
59.00	24.0	187.89	44.13	232.02	116.01	320.29
60.00	24.0	196.21	43.72	239.93	119.97	327.38
61.00	24.0	204.39	43.24	247.62	123.81	334.10
62.00	24.0	212.18	42.75	254.93	127.46	340.42
63.00	24.0	219.57	42.22	261.79	130.90	346.24
64.00	24.0	226.54	42.12	268.66	134.33	352.90
65.00	24.0	233.09	42.90	275.99	137.99	361.78
66.00	24.0	239.25	44.51	283.77	141.88	372.80
67.00	24.0	245.05	46.80	291.85	145.93	385.46
68.00	24.0	250.49	49.62	300.11	150.05	399.34
69.00	24.0	255.56	52.35	307.91	153.96	412.61
70.00	24.0	260.27	54.39	314.66	157.33	423.44
71.00	24.0	265.25	55.48	320.73	160.37	431.70
72.00	24.0	271.16	55.50	326.66	163.33	437.66
73.00	24.0	277.99	54.58	332.57	166.29	441.74
74.00	24.0	285.76	53.10	338.87	169.43	445.08
75.00	24.0	294.48	51.45	345.93	172.96	448.83
76.00	24.0	303.35	49.96	353.32	176.66	453.24
77.00	24.0	311.61	49.07	360.68	180.34	458.82
78.00	24.0	319.25	48.86	368.10	184.05	465.82
79.00	24.0	326.25	49.10	375.35	187.68	473.55
80.00	24.0	332.63	49.57	382.20	191.10	481.33
81.00	24.0	338.87	50.04	388.91	194.46	489.00
82.00	24.0	345.45	50.29	395.74	197.87	496.32
83.00	24.0	352.38	50.28	402.66	201.33	503.21
84.00	24.0	359.65	50.00	409.64	204.82	509.64
85.00	24.0	367.27	49.43	416.69	208.35	515.54
86.00	24.0	374.91	48.70	423.61	211.80	521.00
87.00	24.0	382.26	47.74	430.00	215.00	525.47

88.00	24.0	389.31	46.35	435.65	217.83	528.34
89.00	24.0	396.06	44.95	441.01	220.50	530.91
90.00	24.0	402.51	43.98	446.49	223.24	534.45
91.00	24.0	408.59	43.44	452.03	226.02	538.91
92.00	24.0	414.26	43.61	457.86	228.93	545.08
93.00	24.0	419.49	44.75	464.24	232.12	553.73
94.00	24.0	424.30	47.23	471.53	235.76	565.98
95.00	24.0	428.68	51.41	480.09	240.05	582.91
96.00	24.0	433.30	57.06	490.36	245.18	604.47
97.00	24.0	438.81	63.76	502.58	251.29	630.11
98.00	24.0	445.23	71.36	516.59	258.30	659.32
99.00	24.0	452.54	79.85	532.39	266.20	692.10
100.00	24.0	460.76	89.23	549.99	275.00	728.46

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	469.14	99.30	568.44	284.22	767.04
102.00	24.0	476.95	109.95	586.90	293.45	806.79
103.00	24.0	484.18	121.27	605.46	302.73	848.00
104.00	24.0	490.84	131.70	622.54	311.27	885.93
105.00	24.0	504.23	139.63	643.86	321.93	923.11
106.00	24.0	510.12	139.85	649.97	324.98	929.68
107.00	24.0	516.42	140.33	656.75	328.37	937.40
108.00	24.0	523.43	140.74	664.16	332.08	945.64
109.00	24.0	531.18	141.05	672.23	336.12	954.33
110.00	24.0	539.45	141.50	680.95	340.48	963.96
111.00	24.0	547.71	142.42	690.13	345.07	974.98
112.00	24.0	555.39	144.23	699.62	349.81	988.08
113.00	24.0	562.41	147.15	709.57	354.78	1003.88
114.00	24.0	569.33	150.72	720.06	360.03	1021.51
115.00	24.0	590.45	183.47	773.92	386.96	1140.85
116.00	24.0	600.70	160.96	761.66	380.83	1083.58
117.00	24.0	610.49	162.13	772.62	386.31	1096.89
118.00	24.0	619.83	159.25	779.08	389.54	1097.59
119.00	24.0	628.72	154.10	782.82	391.41	1091.03
120.00	24.0	637.15	117.73	754.88	377.44	990.34
121.00	24.0	643.31	119.31	762.62	381.31	1001.25
122.00	24.0	650.56	119.67	770.23	385.11	1009.58
123.00	24.0	658.61	119.25	777.86	388.93	1016.36
124.00	24.0	666.90	118.55	785.44	392.72	1022.54
125.00	24.0	675.14	99.41	774.55	387.27	973.38

126.00	24.0	682.48	86.08	768.56	384.28	940.72
127.00	24.0	690.54	98.56	789.10	394.55	986.22
128.00	24.0	697.15	104.01	801.17	400.58	1009.19
129.00	24.0	703.66	112.11	815.77	407.89	1040.00
130.00	24.0	710.67	123.12	833.79	416.90	1080.03
131.00	24.0	718.01	136.84	854.84	427.42	1128.52
132.00	24.0	725.46	152.92	878.38	439.19	1184.22
133.00	24.0	733.21	170.90	904.11	452.05	1245.91
134.00	24.0	742.17	180.03	922.20	461.10	1282.25
135.00	24.0	765.92	192.31	958.23	479.11	1342.85
136.00	24.0	774.13	192.39	966.53	483.26	1351.32
137.00	24.0	782.36	192.65	975.02	487.51	1360.32
138.00	24.0	790.51	193.20	983.71	491.86	1370.12
139.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
140.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
141.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
142.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
143.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
144.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
145.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-423_24-inch PPSC_SCOUR(-27)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/12/2020, Boring Number: BB-423
Station number: 423+62 Offset: 28' LT.

Ground Elevation: -15.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	1.00	5- Cavity layer
3	4.00	2.00	5- Cavity layer
4	6.00	8.00	5- Cavity layer
5	8.00	12.00	5- Cavity layer
6	10.00	100.00	5- Cavity layer
7	12.00	0.00	5- Cavity layer
8	15.00	10.00	4- Lime Stone/Very shelly sand
9	20.00	10.00	4- Lime Stone/Very shelly sand
10	25.00	10.00	4- Lime Stone/Very shelly sand
11	30.00	10.00	4- Lime Stone/Very shelly sand
12	33.00	10.00	4- Lime Stone/Very shelly sand
13	33.10	10.00	4- Lime Stone/Very shelly sand
14	35.00	13.00	4- Lime Stone/Very shelly sand
15	40.00	16.00	3- Clean sand
16	45.00	3.00	3- Clean sand
17	47.00	3.00	3- Clean sand
18	47.10	3.00	3- Clean sand
19	50.00	3.00	3- Clean sand

20	55.00	5.00	3- Clean sand
21	60.00	3.00	3- Clean sand
22	65.00	5.00	3- Clean sand
23	70.00	5.00	3- Clean sand
24	75.00	5.00	3- Clean sand
25	80.00	3.00	3- Clean sand
26	85.00	11.00	3- Clean sand
27	90.00	4.00	3- Clean sand
28	95.00	5.00	3- Clean sand
29	100.00	6.00	3- Clean sand
30	105.00	25.00	3- Clean sand
31	110.00	10.00	3- Clean sand
32	115.00	18.00	3- Clean sand
33	120.00	14.00	3- Clean sand
34	125.00	20.00	3- Clean sand
35	130.00	22.00	3- Clean sand
36	135.00	24.00	3- Clean sand
37	140.00	12.00	3- Clean sand
38	145.00	18.00	3- Clean sand
39	150.00	10.00	2- Clay and silty sand
40	155.00	20.00	2- Clay and silty sand
41	160.00	23.00	2- Clay and silty sand
42	165.00	15.00	2- Clay and silty sand
43	170.00	13.00	2- Clay and silty sand
44	175.00	80.00	3- Clean sand
45	180.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-15.00	-30.00	15.00	16.40	5-Void
2	-30.00	-55.00	25.00	10.60	4-Limestone, Very Shelly Sand
3	-55.00	-165.00	110.00	10.77	3-Clean Sand
4	-165.00	-190.00	25.00	16.20	2-Clay and Silty Sand
5	-190.00	-195.00	5.00	80.00	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-16.00
24.00	2.00	-17.00
24.00	3.00	-18.00
24.00	4.00	-19.00
24.00	5.00	-20.00
24.00	6.00	-21.00
24.00	7.00	-22.00
24.00	8.00	-23.00
24.00	9.00	-24.00
24.00	10.00	-25.00
24.00	11.00	-26.00
24.00	12.00	-27.00
24.00	13.00	-28.00
24.00	14.00	-29.00
24.00	15.00	-30.00
24.00	16.00	-31.00
24.00	17.00	-32.00
24.00	18.00	-33.00
24.00	19.00	-34.00
24.00	20.00	-35.00
24.00	21.00	-36.00
24.00	22.00	-37.00
24.00	23.00	-38.00
24.00	24.00	-39.00
24.00	25.00	-40.00
24.00	26.00	-41.00
24.00	27.00	-42.00
24.00	28.00	-43.00
24.00	29.00	-44.00
24.00	30.00	-45.00
24.00	31.00	-46.00
24.00	32.00	-47.00
24.00	33.00	-48.00
24.00	34.00	-49.00
24.00	35.00	-50.00
24.00	36.00	-51.00
24.00	37.00	-52.00
24.00	38.00	-53.00
24.00	39.00	-54.00
24.00	40.00	-55.00
24.00	41.00	-56.00
24.00	42.00	-57.00
24.00	43.00	-58.00
24.00	44.00	-59.00
24.00	45.00	-60.00
24.00	46.00	-61.00

24.00	47.00	-62.00
24.00	48.00	-63.00
24.00	49.00	-64.00
24.00	50.00	-65.00
24.00	51.00	-66.00
24.00	52.00	-67.00
24.00	53.00	-68.00
24.00	54.00	-69.00
24.00	55.00	-70.00
24.00	56.00	-71.00
24.00	57.00	-72.00
24.00	58.00	-73.00
24.00	59.00	-74.00
24.00	60.00	-75.00
24.00	61.00	-76.00
24.00	62.00	-77.00
24.00	63.00	-78.00
24.00	64.00	-79.00
24.00	65.00	-80.00
24.00	66.00	-81.00
24.00	67.00	-82.00
24.00	68.00	-83.00
24.00	69.00	-84.00
24.00	70.00	-85.00
24.00	71.00	-86.00
24.00	72.00	-87.00
24.00	73.00	-88.00
24.00	74.00	-89.00
24.00	75.00	-90.00
24.00	76.00	-91.00
24.00	77.00	-92.00
24.00	78.00	-93.00
24.00	79.00	-94.00
24.00	80.00	-95.00
24.00	81.00	-96.00
24.00	82.00	-97.00
24.00	83.00	-98.00
24.00	84.00	-99.00
24.00	85.00	-100.00
24.00	86.00	-101.00
24.00	87.00	-102.00
24.00	88.00	-103.00
24.00	89.00	-104.00
24.00	90.00	-105.00
24.00	91.00	-106.00
24.00	92.00	-107.00
24.00	93.00	-108.00
24.00	94.00	-109.00
24.00	95.00	-110.00
24.00	96.00	-111.00

24.00	97.00	-112.00
24.00	98.00	-113.00
24.00	99.00	-114.00
24.00	100.00	-115.00
24.00	101.00	-116.00
24.00	102.00	-117.00
24.00	103.00	-118.00
24.00	104.00	-119.00
24.00	105.00	-120.00
24.00	106.00	-121.00
24.00	107.00	-122.00
24.00	108.00	-123.00
24.00	109.00	-124.00
24.00	110.00	-125.00
24.00	111.00	-126.00
24.00	112.00	-127.00
24.00	113.00	-128.00
24.00	114.00	-129.00
24.00	115.00	-130.00
24.00	116.00	-131.00
24.00	117.00	-132.00
24.00	118.00	-133.00
24.00	119.00	-134.00
24.00	120.00	-135.00
24.00	121.00	-136.00
24.00	122.00	-137.00
24.00	123.00	-138.00
24.00	124.00	-139.00
24.00	125.00	-140.00
24.00	126.00	-141.00
24.00	127.00	-142.00
24.00	128.00	-143.00
24.00	129.00	-144.00
24.00	130.00	-145.00
24.00	131.00	-146.00
24.00	132.00	-147.00
24.00	133.00	-148.00
24.00	134.00	-149.00
24.00	135.00	-150.00
24.00	136.00	-151.00
24.00	137.00	-152.00
24.00	138.00	-153.00
24.00	139.00	-154.00
24.00	140.00	-155.00
24.00	141.00	-156.00
24.00	142.00	-157.00
24.00	143.00	-158.00
24.00	144.00	-159.00
24.00	145.00	-160.00
24.00	146.00	-161.00

24.00	147.00	-162.00
24.00	148.00	-163.00
24.00	149.00	-164.00
24.00	150.00	-165.00
24.00	151.00	-166.00
24.00	152.00	-167.00
24.00	153.00	-168.00
24.00	154.00	-169.00
24.00	155.00	-170.00
24.00	156.00	-171.00
24.00	157.00	-172.00
24.00	158.00	-173.00
24.00	159.00	-174.00
24.00	160.00	-175.00
24.00	161.00	-176.00
24.00	162.00	-177.00
24.00	163.00	-178.00
24.00	164.00	-179.00
24.00	165.00	-180.00
24.00	166.00	-181.00
24.00	167.00	-182.00
24.00	168.00	-183.00
24.00	169.00	-184.00
24.00	170.00	-185.00
24.00	171.00	-186.00
24.00	172.00	-187.00
24.00	173.00	-188.00
24.00	174.00	-189.00
24.00	175.00	-190.00
24.00	176.00	-191.00
24.00	177.00	-192.00
24.00	178.00	-193.00
24.00	179.00	-194.00
24.00	180.00	-195.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length	Pile Width	Ultimate Side Friction	Mobilized End Bearing	Estimated Davisson Capacity	Allowable Pile Capacity	Ultimate Pile Capacity

(ft)	(in)	(tons)	(tons)	(tons)	(tons)	(tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.17	0.00	0.17	0.08	0.17
14.00	24.0	0.66	0.00	0.66	0.33	0.66
15.00	24.0	1.49	40.73	42.21	21.11	123.66
16.00	24.0	2.48	40.73	43.21	21.60	124.66
17.00	24.0	3.47	40.73	44.20	22.10	125.65
18.00	24.0	4.46	40.73	45.19	22.59	126.64
19.00	24.0	5.46	40.73	46.18	23.09	127.63
20.00	24.0	6.45	40.73	47.17	23.59	128.62
21.00	24.0	7.44	40.73	48.17	24.08	129.62
22.00	24.0	8.43	40.73	49.16	24.58	130.61
23.00	24.0	9.42	40.73	50.15	25.07	131.60
24.00	24.0	10.42	40.73	51.14	25.57	132.59
25.00	24.0	11.41	40.73	52.13	26.07	133.58
26.00	24.0	12.40	41.07	53.47	26.73	135.61
27.00	24.0	13.39	42.26	55.65	27.83	140.17
28.00	24.0	14.38	44.26	58.64	29.32	147.16
29.00	24.0	15.38	47.04	62.41	31.21	156.49
30.00	24.0	16.37	50.59	66.96	33.48	168.13
31.00	24.0	17.36	54.92	72.28	36.14	182.11
32.00	24.0	18.35	60.02	78.37	39.19	198.41
33.00	24.0	19.34	64.65	83.99	42.00	213.29
34.00	24.0	20.40	67.22	87.62	43.81	222.05
35.00	24.0	21.61	67.22	88.83	44.42	223.27
36.00	24.0	23.07	64.69	87.76	43.88	217.15
37.00	24.0	24.88	59.67	84.55	42.27	203.88
38.00	24.0	27.03	53.01	80.04	40.02	186.06
39.00	24.0	29.53	45.57	75.11	37.55	166.26
40.00	24.0	32.37	45.40	77.78	38.89	168.59
41.00	24.0	35.14	42.14	77.28	38.64	161.57
42.00	24.0	37.43	39.43	76.85	38.43	155.71
43.00	24.0	39.22	37.27	76.49	38.24	151.03
44.00	24.0	40.52	35.74	76.26	38.13	147.74
45.00	24.0	41.33	34.91	76.24	38.12	146.07
46.00	24.0	41.89	34.52	76.41	38.20	145.44
47.00	24.0	42.46	34.27	76.73	38.36	145.26
48.00	24.0	43.02	34.17	77.19	38.60	145.54

49.00	24.0	43.59	34.08	77.66	38.83	145.81
50.00	24.0	44.15	33.74	77.90	38.95	145.38
51.00	24.0	44.76	33.00	77.76	38.88	143.77
52.00	24.0	45.44	31.83	77.26	38.63	140.91
53.00	24.0	46.19	30.22	76.41	38.20	136.84
54.00	24.0	47.02	28.33	75.35	37.67	132.01
55.00	24.0	47.92	26.32	74.24	37.12	126.87
56.00	24.0	48.83	24.26	73.09	36.54	121.61
57.00	24.0	49.66	22.56	72.21	36.11	117.33
58.00	24.0	50.41	21.52	71.93	35.97	114.97
59.00	24.0	51.09	21.07	72.16	36.08	114.31
60.00	24.0	51.69	21.14	72.83	36.42	115.12
61.00	24.0	52.30	21.64	73.94	36.97	117.22
62.00	24.0	52.97	22.27	75.24	37.62	119.78
63.00	24.0	53.73	22.81	76.54	38.27	122.16
64.00	24.0	54.56	23.27	77.83	38.91	124.37
65.00	24.0	55.46	23.64	79.11	39.55	126.39
66.00	24.0	56.41	23.97	80.38	40.19	128.33
67.00	24.0	57.35	24.27	81.62	40.81	130.16
68.00	24.0	58.29	24.50	82.79	41.40	131.80
69.00	24.0	59.23	24.59	83.82	41.91	133.01
70.00	24.0	60.17	24.46	84.64	42.32	133.57
71.00	24.0	61.12	24.12	85.24	42.62	133.48
72.00	24.0	62.06	23.62	85.68	42.84	132.93
73.00	24.0	63.00	23.04	86.04	43.02	132.13
74.00	24.0	63.94	22.75	86.70	43.35	132.21
75.00	24.0	64.89	23.14	88.02	44.01	134.30
76.00	24.0	65.79	24.23	90.02	45.01	138.49
77.00	24.0	66.62	26.02	92.64	46.32	144.68
78.00	24.0	67.37	28.43	95.80	47.90	152.66
79.00	24.0	68.05	30.89	98.95	49.47	160.73
80.00	24.0	68.66	32.85	101.51	50.75	167.20
81.00	24.0	69.37	34.08	103.45	51.73	171.62
82.00	24.0	70.39	34.41	104.80	52.40	173.63
83.00	24.0	71.71	33.87	105.58	52.79	173.33
84.00	24.0	73.33	32.77	106.10	53.05	171.64
85.00	24.0	75.25	31.40	106.65	53.33	169.45
86.00	24.0	77.19	30.08	107.28	53.64	167.45
87.00	24.0	78.87	29.14	108.01	54.01	166.30
88.00	24.0	80.29	28.57	108.86	54.43	166.00
89.00	24.0	81.44	28.38	109.81	54.91	166.56
90.00	24.0	82.32	28.55	110.87	55.44	167.98
91.00	24.0	83.09	28.93	112.03	56.01	169.89
92.00	24.0	83.90	29.38	113.28	56.64	172.04
93.00	24.0	84.75	29.93	114.68	57.34	174.53
94.00	24.0	85.64	31.25	116.89	58.44	179.39
95.00	24.0	86.56	34.04	120.60	60.30	188.67
96.00	24.0	87.52	38.28	125.80	62.90	202.36
97.00	24.0	88.52	43.82	132.34	66.17	219.98
98.00	24.0	89.56	50.49	140.04	70.02	241.02

99.00	24.0	90.63	57.00	147.63	73.82	261.63
100.00	24.0	91.75	62.07	153.81	76.91	277.95

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	93.23	65.32	158.55	79.28	289.18
102.00	24.0	95.44	66.61	162.05	81.02	295.26
103.00	24.0	98.36	66.19	164.55	82.27	296.92
104.00	24.0	102.00	64.92	166.92	83.46	296.77
105.00	24.0	106.35	63.69	170.04	85.02	297.43
106.00	24.0	110.78	63.21	173.99	87.00	300.41
107.00	24.0	114.65	64.07	178.71	89.36	306.85
108.00	24.0	117.94	66.14	184.08	92.04	316.36
109.00	24.0	120.68	68.96	189.64	94.82	327.57
110.00	24.0	122.84	72.09	194.93	97.47	339.11
111.00	24.0	124.88	75.03	199.91	99.96	349.97
112.00	24.0	127.22	77.30	204.51	102.26	359.10
113.00	24.0	129.86	78.89	208.74	104.37	366.51
114.00	24.0	132.80	80.18	212.97	106.49	373.33
115.00	24.0	136.04	81.55	217.59	108.79	380.69
116.00	24.0	139.36	83.26	222.61	111.31	389.13
117.00	24.0	142.52	85.26	227.78	113.89	398.29
118.00	24.0	145.54	87.25	232.79	116.40	407.30
119.00	24.0	148.40	89.09	237.50	118.75	415.68
120.00	24.0	151.12	90.63	241.74	120.87	423.00
121.00	24.0	153.87	91.64	245.51	122.75	428.79
122.00	24.0	156.85	92.48	249.33	124.66	434.29
123.00	24.0	160.05	93.72	253.77	126.88	441.20
124.00	24.0	163.48	95.35	258.83	129.41	449.52
125.00	24.0	167.14	97.36	264.50	132.25	459.23
126.00	24.0	170.94	99.86	270.81	135.40	470.53
127.00	24.0	174.83	102.54	277.37	138.68	482.45
128.00	24.0	178.79	105.02	283.80	141.90	493.84
129.00	24.0	182.82	106.77	289.59	144.80	503.14
130.00	24.0	186.93	107.27	294.20	147.10	508.73
131.00	24.0	191.11	106.51	297.62	148.81	510.63
132.00	24.0	195.37	104.69	300.06	150.03	509.44
133.00	24.0	199.71	102.01	301.72	150.86	505.74
134.00	24.0	204.12	99.15	303.27	151.63	501.58
135.00	24.0	208.60	96.80	305.40	152.70	498.99
136.00	24.0	212.90	95.24	308.14	154.07	498.61

137.00	24.0	216.75	94.61	311.35	155.68	500.57
138.00	24.0	220.14	94.75	314.88	157.44	504.37
139.00	24.0	223.08	94.93	318.01	159.00	507.87
140.00	24.0	225.57	94.44	320.01	160.00	508.90
141.00	24.0	227.94	92.90	320.84	160.42	506.65
142.00	24.0	230.54	89.99	320.54	160.27	500.52
143.00	24.0	233.37	85.78	319.15	159.57	490.71
144.00	24.0	236.42	80.94	317.36	158.68	479.25
145.00	24.0	239.70	76.16	315.86	157.93	468.19
146.00	24.0	243.18	71.84	315.02	157.51	458.70
147.00	24.0	246.82	68.39	315.21	157.60	451.98
148.00	24.0	250.63	65.80	316.42	158.21	448.02
149.00	24.0	254.60	63.94	318.54	159.27	446.41
150.00	24.0	258.75	62.68	321.42	160.71	446.78
151.00	24.0	263.29	61.64	324.92	162.46	448.19
152.00	24.0	268.46	60.66	329.12	164.56	450.44
153.00	24.0	274.26	59.98	334.24	167.12	454.21
154.00	24.0	280.69	59.39	340.08	170.04	458.87
155.00	24.0	287.75	58.69	346.44	173.22	463.81
156.00	24.0	295.20	57.94	353.14	176.57	469.01
157.00	24.0	302.80	56.92	359.72	179.86	473.56
158.00	24.0	310.54	55.34	365.88	182.94	476.56
159.00	24.0	318.43	53.31	371.74	185.87	478.36
160.00	24.0	326.47	50.94	377.41	188.70	479.28
161.00	24.0	334.36	48.35	382.71	191.36	479.41
162.00	24.0	341.82	45.97	387.79	193.89	479.72
163.00	24.0	348.85	44.11	392.96	196.48	481.18
164.00	24.0	355.43	44.40	399.83	199.92	488.63
165.00	24.0	361.59	48.45	410.04	205.02	506.95
166.00	24.0	367.46	56.21	423.67	211.83	536.08
167.00	24.0	373.20	67.31	440.50	220.25	575.11
168.00	24.0	378.80	81.45	460.25	230.13	623.14
169.00	24.0	384.28	97.05	481.33	240.66	675.42
170.00	24.0	389.63	112.52	502.16	251.08	727.20
171.00	24.0	395.30	126.97	522.26	261.13	776.20
172.00	24.0	401.73	139.52	541.25	270.63	820.30
173.00	24.0	408.93	150.25	559.18	279.59	859.67
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
176.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
177.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
178.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
179.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
180.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA,

AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-425_24-inch PPSC_SCOUR(-32)PREFORM(-53).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/15/220, Boring Number: BB-425
Station number: 425+17 Offset: 31' LT.

Ground Elevation: -15.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	1.00	5- Cavity layer
3	4.00	4.00	5- Cavity layer
4	6.00	24.00	5- Cavity layer
5	8.00	3.00	5- Cavity layer
6	10.00	6.00	5- Cavity layer
7	15.00	100.00	5- Cavity layer
8	17.00	0.00	5- Cavity layer
9	20.00	10.00	3- Clean sand
10	25.00	10.00	3- Clean sand
11	30.00	10.00	3- Clean sand
12	35.00	5.00	3- Clean sand
13	38.00	5.00	3- Clean sand
14	38.10	5.00	3- Clean sand
15	40.00	7.00	3- Clean sand
16	45.00	4.00	3- Clean sand
17	50.00	9.00	3- Clean sand
18	52.00	9.00	3- Clean sand
19	52.10	9.00	3- Clean sand

20	55.00	5.00	3- Clean sand
21	60.00	7.00	3- Clean sand
22	65.00	8.00	3- Clean sand
23	70.00	5.00	3- Clean sand
24	75.00	10.00	3- Clean sand
25	80.00	7.00	3- Clean sand
26	85.00	11.00	3- Clean sand
27	90.00	21.00	3- Clean sand
28	95.00	14.00	3- Clean sand
29	100.00	15.00	3- Clean sand
30	105.00	8.00	3- Clean sand
31	110.00	35.00	3- Clean sand
32	115.00	11.00	3- Clean sand
33	120.00	14.00	1- Plastic Clay
34	125.00	14.00	1- Plastic Clay
35	130.00	11.00	3- Clean sand
36	135.00	28.00	3- Clean sand
37	140.00	13.00	3- Clean sand
38	145.00	8.00	3- Clean sand
39	150.00	14.00	3- Clean sand
40	155.00	21.00	3- Clean sand
41	160.00	13.00	3- Clean sand
42	165.00	75.00	3- Clean sand
43	170.00	100.00	3- Clean sand
44	175.00	100.00	3- Clean sand
45	180.00	100.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-15.00	-35.00	20.00	14.70	5-Void
2	-35.00	-135.00	100.00	10.60	3-Clean Sand
3	-135.00	-145.00	10.00	14.00	1-Plastic Clay
4	-145.00	-195.00	50.00	38.30	3-Clean Sand

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

Pile Geometry:

Width	Length	Tip Elev.

(in)	(ft)	(ft)
24.00	1.00	-16.00
24.00	2.00	-17.00
24.00	3.00	-18.00
24.00	4.00	-19.00
24.00	5.00	-20.00
24.00	6.00	-21.00
24.00	7.00	-22.00
24.00	8.00	-23.00
24.00	9.00	-24.00
24.00	10.00	-25.00
24.00	11.00	-26.00
24.00	12.00	-27.00
24.00	13.00	-28.00
24.00	14.00	-29.00
24.00	15.00	-30.00
24.00	16.00	-31.00
24.00	17.00	-32.00
24.00	18.00	-33.00
24.00	19.00	-34.00
24.00	20.00	-35.00
24.00	21.00	-36.00
24.00	22.00	-37.00
24.00	23.00	-38.00
24.00	24.00	-39.00
24.00	25.00	-40.00
24.00	26.00	-41.00
24.00	27.00	-42.00
24.00	28.00	-43.00
24.00	29.00	-44.00
24.00	30.00	-45.00
24.00	31.00	-46.00
24.00	32.00	-47.00
24.00	33.00	-48.00
24.00	34.00	-49.00
24.00	35.00	-50.00
24.00	36.00	-51.00
24.00	37.00	-52.00
24.00	38.00	-53.00
24.00	39.00	-54.00
24.00	40.00	-55.00
24.00	41.00	-56.00
24.00	42.00	-57.00
24.00	43.00	-58.00
24.00	44.00	-59.00
24.00	45.00	-60.00
24.00	46.00	-61.00
24.00	47.00	-62.00
24.00	48.00	-63.00

24.00	49.00	-64.00
24.00	50.00	-65.00
24.00	51.00	-66.00
24.00	52.00	-67.00
24.00	53.00	-68.00
24.00	54.00	-69.00
24.00	55.00	-70.00
24.00	56.00	-71.00
24.00	57.00	-72.00
24.00	58.00	-73.00
24.00	59.00	-74.00
24.00	60.00	-75.00
24.00	61.00	-76.00
24.00	62.00	-77.00
24.00	63.00	-78.00
24.00	64.00	-79.00
24.00	65.00	-80.00
24.00	66.00	-81.00
24.00	67.00	-82.00
24.00	68.00	-83.00
24.00	69.00	-84.00
24.00	70.00	-85.00
24.00	71.00	-86.00
24.00	72.00	-87.00
24.00	73.00	-88.00
24.00	74.00	-89.00
24.00	75.00	-90.00
24.00	76.00	-91.00
24.00	77.00	-92.00
24.00	78.00	-93.00
24.00	79.00	-94.00
24.00	80.00	-95.00
24.00	81.00	-96.00
24.00	82.00	-97.00
24.00	83.00	-98.00
24.00	84.00	-99.00
24.00	85.00	-100.00
24.00	86.00	-101.00
24.00	87.00	-102.00
24.00	88.00	-103.00
24.00	89.00	-104.00
24.00	90.00	-105.00
24.00	91.00	-106.00
24.00	92.00	-107.00
24.00	93.00	-108.00
24.00	94.00	-109.00
24.00	95.00	-110.00
24.00	96.00	-111.00
24.00	97.00	-112.00
24.00	98.00	-113.00

24.00	99.00	-114.00
24.00	100.00	-115.00
24.00	101.00	-116.00
24.00	102.00	-117.00
24.00	103.00	-118.00
24.00	104.00	-119.00
24.00	105.00	-120.00
24.00	106.00	-121.00
24.00	107.00	-122.00
24.00	108.00	-123.00
24.00	109.00	-124.00
24.00	110.00	-125.00
24.00	111.00	-126.00
24.00	112.00	-127.00
24.00	113.00	-128.00
24.00	114.00	-129.00
24.00	115.00	-130.00
24.00	116.00	-131.00
24.00	117.00	-132.00
24.00	118.00	-133.00
24.00	119.00	-134.00
24.00	120.00	-135.00
24.00	121.00	-136.00
24.00	122.00	-137.00
24.00	123.00	-138.00
24.00	124.00	-139.00
24.00	125.00	-140.00
24.00	126.00	-141.00
24.00	127.00	-142.00
24.00	128.00	-143.00
24.00	129.00	-144.00
24.00	130.00	-145.00
24.00	131.00	-146.00
24.00	132.00	-147.00
24.00	133.00	-148.00
24.00	134.00	-149.00
24.00	135.00	-150.00
24.00	136.00	-151.00
24.00	137.00	-152.00
24.00	138.00	-153.00
24.00	139.00	-154.00
24.00	140.00	-155.00
24.00	141.00	-156.00
24.00	142.00	-157.00
24.00	143.00	-158.00
24.00	144.00	-159.00
24.00	145.00	-160.00
24.00	146.00	-161.00
24.00	147.00	-162.00
24.00	148.00	-163.00

24.00	149.00	-164.00
24.00	150.00	-165.00
24.00	151.00	-166.00
24.00	152.00	-167.00
24.00	153.00	-168.00
24.00	154.00	-169.00
24.00	155.00	-170.00
24.00	156.00	-171.00
24.00	157.00	-172.00
24.00	158.00	-173.00
24.00	159.00	-174.00
24.00	160.00	-175.00
24.00	161.00	-176.00
24.00	162.00	-177.00
24.00	163.00	-178.00
24.00	164.00	-179.00
24.00	165.00	-180.00
24.00	166.00	-181.00
24.00	167.00	-182.00
24.00	168.00	-183.00
24.00	169.00	-184.00
24.00	170.00	-185.00
24.00	171.00	-186.00
24.00	172.00	-187.00
24.00	173.00	-188.00
24.00	174.00	-189.00
24.00	175.00	-190.00
24.00	176.00	-191.00
24.00	177.00	-192.00
24.00	178.00	-193.00
24.00	179.00	-194.00
24.00	180.00	-195.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)

1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.31	0.00	0.31	0.16	0.31
19.00	24.0	1.26	0.00	1.26	0.63	1.26
20.00	24.0	2.83	28.93	31.76	15.88	89.63
21.00	24.0	4.61	29.03	33.64	16.82	91.69
22.00	24.0	6.23	29.30	35.53	17.77	94.13
23.00	24.0	7.72	29.76	37.48	18.74	97.00
24.00	24.0	9.15	30.36	39.51	19.75	100.23
25.00	24.0	10.58	31.02	41.60	20.80	103.64
26.00	24.0	12.05	31.67	43.72	21.86	107.07
27.00	24.0	13.60	32.26	45.85	22.93	110.37
28.00	24.0	15.24	32.71	47.95	23.98	113.38
29.00	24.0	16.96	33.07	50.03	25.01	116.16
30.00	24.0	18.72	33.39	52.11	26.06	118.90
31.00	24.0	20.39	33.76	54.15	27.08	121.68
32.00	24.0	21.81	34.36	56.17	28.09	124.90
33.00	24.0	22.90	35.43	58.33	29.16	129.19
34.00	24.0	23.84	36.61	60.45	30.22	133.67
35.00	24.0	24.81	37.42	62.23	31.11	137.06
36.00	24.0	25.91	37.66	63.57	31.78	138.89
37.00	24.0	27.16	37.39	64.55	32.28	139.33
38.00	24.0	28.50	36.80	65.30	32.65	138.89
39.00	24.0	29.58	35.69	65.27	32.64	136.65
40.00	24.0	30.83	34.74	65.57	32.79	135.05
41.00	24.0	32.12	34.12	66.24	33.12	134.48
42.00	24.0	33.31	34.00	67.31	33.65	135.31
43.00	24.0	34.38	34.39	68.77	34.39	137.56
44.00	24.0	35.35	35.10	70.45	35.23	140.65
45.00	24.0	36.21	35.93	72.15	36.07	144.01
46.00	24.0	37.11	36.51	73.62	36.81	146.64
47.00	24.0	38.17	36.44	74.61	37.31	147.50
48.00	24.0	39.41	35.81	75.22	37.61	146.83
49.00	24.0	40.82	34.94	75.76	37.88	145.63
50.00	24.0	42.41	34.17	76.58	38.29	144.93

51.00	24.0	44.09	33.62	77.71	38.85	144.94
52.00	24.0	45.77	33.30	79.06	39.53	145.66
53.00	24.0	47.35	33.24	80.59	40.30	147.08
54.00	24.0	48.69	33.60	82.29	41.14	149.48
55.00	24.0	49.78	34.25	84.03	42.02	152.53
56.00	24.0	50.78	34.91	85.69	42.85	155.51
57.00	24.0	51.86	35.52	87.38	43.69	158.42
58.00	24.0	53.00	36.22	89.22	44.61	161.67
59.00	24.0	54.22	36.86	91.08	45.54	164.80
60.00	24.0	55.50	37.29	92.79	46.40	167.37
61.00	24.0	56.84	37.53	94.37	47.19	169.42
62.00	24.0	58.22	37.46	95.68	47.84	170.60
63.00	24.0	59.63	36.96	96.59	48.30	170.51
64.00	24.0	61.08	36.33	97.41	48.70	170.06
65.00	24.0	62.57	35.86	98.43	49.21	170.16
66.00	24.0	64.01	35.66	99.67	49.83	170.98
67.00	24.0	65.35	35.87	101.22	50.61	172.97
68.00	24.0	66.59	36.59	103.18	51.59	176.36
69.00	24.0	67.71	37.61	105.32	52.66	180.53
70.00	24.0	68.72	38.75	107.47	53.74	184.97
71.00	24.0	69.77	39.85	109.62	54.81	189.33
72.00	24.0	71.00	40.60	111.60	55.80	192.79
73.00	24.0	72.41	40.83	113.25	56.62	194.92
74.00	24.0	74.01	40.83	114.84	57.42	196.51
75.00	24.0	75.78	40.85	116.64	58.32	198.34
76.00	24.0	77.60	41.07	118.66	59.33	200.80
77.00	24.0	79.30	41.66	120.96	60.48	204.29
78.00	24.0	80.89	42.66	123.55	61.78	208.86
79.00	24.0	82.38	44.27	126.65	63.33	215.20
80.00	24.0	83.76	46.74	130.49	65.25	223.97
81.00	24.0	85.15	49.90	135.06	67.53	234.87
82.00	24.0	86.69	53.69	140.38	70.19	247.76
83.00	24.0	88.38	58.16	146.54	73.27	262.87
84.00	24.0	90.21	62.68	152.89	76.44	278.24
85.00	24.0	92.19	66.59	158.78	79.39	291.96
86.00	24.0	94.43	69.78	164.21	82.10	303.76
87.00	24.0	97.03	71.97	169.01	84.50	312.96
88.00	24.0	100.01	73.05	173.06	86.53	319.17
89.00	24.0	103.35	73.32	176.66	88.33	323.29
90.00	24.0	107.05	73.06	180.12	90.06	326.24
91.00	24.0	110.82	72.66	183.47	91.74	328.79
92.00	24.0	114.33	72.59	186.92	93.46	332.10
93.00	24.0	117.58	73.00	190.58	95.29	336.57
94.00	24.0	120.58	73.57	194.15	97.07	341.30
95.00	24.0	123.32	74.02	197.34	98.67	345.37
96.00	24.0	125.95	74.16	200.11	100.05	348.43
97.00	24.0	128.62	73.71	202.33	101.17	349.76
98.00	24.0	131.33	72.56	203.89	101.94	349.01
99.00	24.0	134.07	71.99	206.06	103.03	350.05
100.00	24.0	136.85	73.29	210.14	105.07	356.72

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	139.52	76.62	216.15	108.07	369.39
102.00	24.0	141.94	82.06	224.00	112.00	388.13
103.00	24.0	144.10	89.51	233.61	116.80	412.62
104.00	24.0	146.00	97.04	243.03	121.52	437.11
105.00	24.0	147.64	102.72	250.36	125.18	455.79
106.00	24.0	149.65	105.83	255.48	127.74	467.13
107.00	24.0	152.66	105.93	258.58	129.29	470.44
108.00	24.0	156.66	103.30	259.95	129.98	466.54
109.00	24.0	161.66	98.54	260.20	130.10	457.28
110.00	24.0	167.65	92.27	259.92	129.96	444.46
111.00	24.0	173.71	85.57	259.28	129.64	430.41
112.00	24.0	178.88	79.38	258.26	129.13	417.03
113.00	24.0	183.16	73.59	256.75	128.38	403.93
114.00	24.0	186.56	68.48	255.04	127.52	392.00
115.00	24.0	189.08	64.36	253.44	126.72	382.15
116.00	24.0	191.58	60.88	252.46	126.23	374.22
117.00	24.0	194.93	57.84	252.77	126.39	368.46
118.00	24.0	199.13	55.37	254.51	127.25	365.25
119.00	24.0	204.19	53.77	257.96	128.98	365.50
120.00	24.0	214.17	18.60	232.77	116.38	269.97
121.00	24.0	220.50	18.68	239.18	119.59	276.53
122.00	24.0	225.91	19.80	245.71	122.86	285.32
123.00	24.0	230.84	22.43	253.27	126.64	298.12
124.00	24.0	235.75	27.34	263.09	131.55	317.78
125.00	24.0	242.17	32.27	274.44	137.22	338.98
126.00	24.0	248.21	38.53	286.74	143.37	363.80
127.00	24.0	253.44	45.98	299.42	149.71	391.37
128.00	24.0	257.84	54.42	312.26	156.13	421.11
129.00	24.0	261.40	62.55	323.95	161.97	449.05
130.00	24.0	267.52	72.11	339.63	169.82	483.86
131.00	24.0	269.82	72.23	342.05	171.03	486.52
132.00	24.0	272.65	72.47	345.13	172.56	490.07
133.00	24.0	276.15	72.64	348.79	174.40	494.08
134.00	24.0	280.46	72.60	353.06	176.53	498.26
135.00	24.0	285.72	72.28	357.99	179.00	502.55
136.00	24.0	290.89	70.60	361.49	180.75	502.70
137.00	24.0	295.32	68.69	364.01	182.01	501.40
138.00	24.0	299.18	67.04	366.22	183.11	500.30

139.00	24.0	302.48	66.06	368.54	184.27	500.67
140.00	24.0	305.21	66.18	371.39	185.70	503.75
141.00	24.0	307.57	67.17	374.74	187.37	509.09
142.00	24.0	309.74	68.70	378.44	189.22	515.84
143.00	24.0	311.72	70.63	382.35	191.17	523.61
144.00	24.0	313.11	72.63	385.74	192.87	531.01
145.00	24.0	313.49	74.45	387.95	193.97	536.86
146.00	24.0	313.89	76.68	390.56	195.28	543.91
147.00	24.0	314.63	79.06	393.69	196.84	551.80
148.00	24.0	315.75	81.47	397.22	198.61	560.16
149.00	24.0	317.41	83.43	400.84	200.42	567.69
150.00	24.0	319.76	84.35	404.11	202.05	572.81
151.00	24.0	322.81	84.04	406.86	203.43	574.95
152.00	24.0	326.48	82.79	409.27	204.64	574.86
153.00	24.0	330.60	80.99	411.59	205.80	573.57
154.00	24.0	334.57	80.22	414.79	207.40	575.23
155.00	24.0	338.36	81.93	420.29	210.15	584.16
156.00	24.0	342.13	86.84	428.97	214.48	602.65
157.00	24.0	345.61	95.10	440.70	220.35	630.89
158.00	24.0	348.81	106.53	455.33	227.67	668.39
159.00	24.0	351.71	119.80	471.52	235.76	711.13
160.00	24.0	354.33	133.59	487.92	243.96	755.09
161.00	24.0	357.45	146.95	504.40	252.20	798.30
162.00	24.0	361.84	158.79	520.64	260.32	838.23
163.00	24.0	367.53	168.94	536.46	268.23	874.33
164.00	24.0	374.50	177.37	551.88	275.94	906.63
165.00	24.0	382.78	184.11	566.89	283.44	935.10
166.00	24.0	391.71	189.89	581.60	290.80	961.39
167.00	24.0	400.64	195.46	596.11	298.05	987.03
168.00	24.0	409.59	200.80	610.39	305.20	1011.99
169.00	24.0	418.55	205.91	624.46	312.23	1036.27
170.00	24.0	427.51	210.78	638.30	319.15	1059.86
171.00	24.0	436.48	215.43	651.91	325.96	1082.76
172.00	24.0	445.46	220.09	665.55	332.78	1105.73
173.00	24.0	454.45	225.01	679.46	339.73	1129.49
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
176.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
177.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
178.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
179.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
180.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-427_24-inch PPSC_SCOUR(-27)PREFORM(-48).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/2/2020, Boring Number: BB-427
Station number: 426+78 Offset: 18' LT.

Ground Elevation: -15.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	1.00	5- Cavity layer
3	4.00	1.00	5- Cavity layer
4	6.00	1.00	5- Cavity layer
5	8.00	5.00	5- Cavity layer
6	10.00	100.00	5- Cavity layer
7	12.00	0.00	5- Cavity layer
8	15.00	10.00	3- Clean sand
9	20.00	10.00	3- Clean sand
10	25.00	10.00	3- Clean sand
11	30.00	8.00	3- Clean sand
12	33.00	8.00	3- Clean sand
13	33.10	8.00	3- Clean sand
14	35.00	7.00	3- Clean sand
15	40.00	5.00	3- Clean sand
16	45.00	6.00	3- Clean sand
17	50.00	6.00	3- Clean sand
18	52.00	6.00	3- Clean sand
19	52.10	6.00	3- Clean sand

20	55.00	7.00	3-	Clean sand
21	60.00	7.00	3-	Clean sand
22	65.00	10.00	3-	Clean sand
23	70.00	8.00	3-	Clean sand
24	75.00	10.00	3-	Clean sand
25	80.00	9.00	3-	Clean sand
26	85.00	4.00	3-	Clean sand
27	90.00	13.00	3-	Clean sand
28	95.00	6.00	3-	Clean sand
29	100.00	13.00	3-	Clean sand
30	105.00	10.00	3-	Clean sand
31	110.00	12.00	3-	Clean sand
32	115.00	6.00	3-	Clean sand
33	120.00	10.00	3-	Clean sand
34	125.00	12.00	3-	Clean sand
35	130.00	15.00	3-	Clean sand
36	135.00	21.00	3-	Clean sand
37	140.00	16.00	3-	Clean sand
38	145.00	31.00	3-	Clean sand
39	150.00	30.00	3-	Clean sand
40	155.00	58.00	3-	Clean sand
41	160.00	73.00	3-	Clean sand
42	165.00	100.00	3-	Clean sand
43	170.00	100.00	3-	Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-15.00	-30.00	15.00	14.40	5-Void
2	-30.00	-185.00	155.00	17.52	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-16.00
24.00	2.00	-17.00

24.00	3.00	-18.00
24.00	4.00	-19.00
24.00	5.00	-20.00
24.00	6.00	-21.00
24.00	7.00	-22.00
24.00	8.00	-23.00
24.00	9.00	-24.00
24.00	10.00	-25.00
24.00	11.00	-26.00
24.00	12.00	-27.00
24.00	13.00	-28.00
24.00	14.00	-29.00
24.00	15.00	-30.00
24.00	16.00	-31.00
24.00	17.00	-32.00
24.00	18.00	-33.00
24.00	19.00	-34.00
24.00	20.00	-35.00
24.00	21.00	-36.00
24.00	22.00	-37.00
24.00	23.00	-38.00
24.00	24.00	-39.00
24.00	25.00	-40.00
24.00	26.00	-41.00
24.00	27.00	-42.00
24.00	28.00	-43.00
24.00	29.00	-44.00
24.00	30.00	-45.00
24.00	31.00	-46.00
24.00	32.00	-47.00
24.00	33.00	-48.00
24.00	34.00	-49.00
24.00	35.00	-50.00
24.00	36.00	-51.00
24.00	37.00	-52.00
24.00	38.00	-53.00
24.00	39.00	-54.00
24.00	40.00	-55.00
24.00	41.00	-56.00
24.00	42.00	-57.00
24.00	43.00	-58.00
24.00	44.00	-59.00
24.00	45.00	-60.00
24.00	46.00	-61.00
24.00	47.00	-62.00
24.00	48.00	-63.00
24.00	49.00	-64.00
24.00	50.00	-65.00
24.00	51.00	-66.00
24.00	52.00	-67.00

24.00	53.00	-68.00
24.00	54.00	-69.00
24.00	55.00	-70.00
24.00	56.00	-71.00
24.00	57.00	-72.00
24.00	58.00	-73.00
24.00	59.00	-74.00
24.00	60.00	-75.00
24.00	61.00	-76.00
24.00	62.00	-77.00
24.00	63.00	-78.00
24.00	64.00	-79.00
24.00	65.00	-80.00
24.00	66.00	-81.00
24.00	67.00	-82.00
24.00	68.00	-83.00
24.00	69.00	-84.00
24.00	70.00	-85.00
24.00	71.00	-86.00
24.00	72.00	-87.00
24.00	73.00	-88.00
24.00	74.00	-89.00
24.00	75.00	-90.00
24.00	76.00	-91.00
24.00	77.00	-92.00
24.00	78.00	-93.00
24.00	79.00	-94.00
24.00	80.00	-95.00
24.00	81.00	-96.00
24.00	82.00	-97.00
24.00	83.00	-98.00
24.00	84.00	-99.00
24.00	85.00	-100.00
24.00	86.00	-101.00
24.00	87.00	-102.00
24.00	88.00	-103.00
24.00	89.00	-104.00
24.00	90.00	-105.00
24.00	91.00	-106.00
24.00	92.00	-107.00
24.00	93.00	-108.00
24.00	94.00	-109.00
24.00	95.00	-110.00
24.00	96.00	-111.00
24.00	97.00	-112.00
24.00	98.00	-113.00
24.00	99.00	-114.00
24.00	100.00	-115.00
24.00	101.00	-116.00
24.00	102.00	-117.00

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24.00     103.00    -118.00
24.00     104.00    -119.00
24.00     105.00    -120.00
24.00     106.00    -121.00
24.00     107.00    -122.00
24.00     108.00    -123.00
24.00     109.00    -124.00
24.00     110.00    -125.00
24.00     111.00    -126.00
24.00     112.00    -127.00
24.00     113.00    -128.00
24.00     114.00    -129.00
24.00     115.00    -130.00
24.00     116.00    -131.00
24.00     117.00    -132.00
24.00     118.00    -133.00
24.00     119.00    -134.00
24.00     120.00    -135.00
24.00     121.00    -136.00
24.00     122.00    -137.00
24.00     123.00    -138.00
24.00     124.00    -139.00
24.00     125.00    -140.00
24.00     126.00    -141.00
24.00     127.00    -142.00
24.00     128.00    -143.00
24.00     129.00    -144.00
24.00     130.00    -145.00
24.00     131.00    -146.00
24.00     132.00    -147.00
24.00     133.00    -148.00
24.00     134.00    -149.00
24.00     135.00    -150.00
24.00     136.00    -151.00
24.00     137.00    -152.00
24.00     138.00    -153.00
24.00     139.00    -154.00
24.00     140.00    -155.00
24.00     141.00    -156.00
24.00     142.00    -157.00
24.00     143.00    -158.00
24.00     144.00    -159.00
24.00     145.00    -160.00
24.00     146.00    -161.00
24.00     147.00    -162.00
24.00     148.00    -163.00
24.00     149.00    -164.00
24.00     150.00    -165.00
24.00     151.00    -166.00
24.00     152.00    -167.00
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24.00	153.00	-168.00
24.00	154.00	-169.00
24.00	155.00	-170.00
24.00	156.00	-171.00
24.00	157.00	-172.00
24.00	158.00	-173.00
24.00	159.00	-174.00
24.00	160.00	-175.00
24.00	161.00	-176.00
24.00	162.00	-177.00
24.00	163.00	-178.00
24.00	164.00	-179.00
24.00	165.00	-180.00
24.00	166.00	-181.00
24.00	167.00	-182.00
24.00	168.00	-183.00
24.00	169.00	-184.00
24.00	170.00	-185.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.31	0.00	0.31	0.16	0.31
14.00	24.0	1.26	0.00	1.26	0.63	1.26

15.00	24.0	2.83	29.10	31.93	15.96	90.12
16.00	24.0	4.62	29.18	33.80	16.90	92.17
17.00	24.0	6.25	29.45	35.70	17.85	94.59
18.00	24.0	7.75	29.90	37.65	18.82	97.44
19.00	24.0	9.16	30.51	39.68	19.84	100.71
20.00	24.0	10.54	31.27	41.80	20.90	104.33
21.00	24.0	11.90	32.12	44.02	22.01	108.27
22.00	24.0	13.26	33.06	46.33	23.16	112.46
23.00	24.0	14.65	34.06	48.72	24.36	116.84
24.00	24.0	16.06	35.13	51.19	25.60	121.46
25.00	24.0	17.48	36.30	53.78	26.89	126.39
26.00	24.0	18.87	37.60	56.47	28.24	131.67
27.00	24.0	20.23	39.00	59.23	29.62	137.23
28.00	24.0	21.58	40.43	62.01	31.00	142.86
29.00	24.0	22.99	41.66	64.65	32.32	147.96
30.00	24.0	24.50	42.43	66.93	33.47	151.79
31.00	24.0	26.17	42.60	68.77	34.38	153.97
32.00	24.0	27.98	42.27	70.26	35.13	154.80
33.00	24.0	29.88	41.66	71.54	35.77	154.86
34.00	24.0	31.39	40.28	71.67	35.83	152.22
35.00	24.0	32.81	39.08	71.89	35.95	150.06
36.00	24.0	34.15	38.06	72.21	36.11	148.34
37.00	24.0	35.42	37.20	72.62	36.31	147.03
38.00	24.0	36.62	36.50	73.12	36.56	146.13
39.00	24.0	37.74	35.93	73.67	36.83	145.52
40.00	24.0	38.79	35.44	74.23	37.11	145.10
41.00	24.0	39.82	34.97	74.79	37.39	144.72
42.00	24.0	40.88	34.49	75.37	37.68	144.34
43.00	24.0	41.97	34.03	76.00	38.00	144.06
44.00	24.0	43.09	33.60	76.69	38.34	143.88
45.00	24.0	44.24	33.19	77.43	38.71	143.81
46.00	24.0	45.40	32.88	78.28	39.14	144.04
47.00	24.0	46.56	32.73	79.30	39.65	144.76
48.00	24.0	47.72	32.71	80.44	40.22	145.87
49.00	24.0	48.88	32.76	81.64	40.82	147.17
50.00	24.0	50.04	32.84	82.88	41.44	148.57
51.00	24.0	51.20	33.01	84.21	42.10	150.23
52.00	24.0	52.35	33.26	85.61	42.80	152.13
53.00	24.0	53.53	33.54	87.07	43.53	154.15
54.00	24.0	54.77	33.93	88.69	44.35	156.55
55.00	24.0	56.06	34.54	90.60	45.30	159.67
56.00	24.0	57.39	35.40	92.79	46.40	163.59
57.00	24.0	58.72	36.51	95.22	47.61	168.24
58.00	24.0	60.04	37.81	97.85	48.93	173.47
59.00	24.0	61.37	39.12	100.48	50.24	178.72
60.00	24.0	62.69	40.24	102.93	51.47	183.41
61.00	24.0	64.07	41.11	105.18	52.59	187.41
62.00	24.0	65.55	41.69	107.25	53.62	190.63
63.00	24.0	67.15	41.99	109.14	54.57	193.12
64.00	24.0	68.85	42.16	111.01	55.50	195.34

65.00	24.0	70.65	42.36	113.01	56.51	197.73
66.00	24.0	72.48	42.69	115.16	57.58	200.53
67.00	24.0	74.23	43.25	117.48	58.74	203.97
68.00	24.0	75.91	44.05	119.96	59.98	208.05
69.00	24.0	77.53	44.94	122.47	61.24	212.36
70.00	24.0	79.07	45.79	124.86	62.43	216.45
71.00	24.0	80.61	46.51	127.12	63.56	220.15
72.00	24.0	82.22	47.04	129.27	64.63	223.35
73.00	24.0	83.91	47.41	131.32	65.66	226.14
74.00	24.0	85.67	47.47	133.13	66.57	228.07
75.00	24.0	87.50	47.06	134.56	67.28	228.68
76.00	24.0	89.35	46.26	135.60	67.80	228.11
77.00	24.0	91.16	45.07	136.22	68.11	226.35
78.00	24.0	92.94	43.44	136.38	68.19	223.26
79.00	24.0	94.68	41.91	136.59	68.29	220.41
80.00	24.0	96.38	41.00	137.39	68.69	219.39
81.00	24.0	97.98	40.80	138.79	69.39	220.39
82.00	24.0	99.40	41.48	140.88	70.44	223.85
83.00	24.0	100.64	43.12	143.75	71.88	229.99
84.00	24.0	101.69	45.11	146.80	73.40	237.02
85.00	24.0	102.56	46.85	149.41	74.71	243.12
86.00	24.0	103.51	48.04	151.55	75.78	247.64
87.00	24.0	104.78	48.32	153.10	76.55	249.75
88.00	24.0	106.38	47.63	154.00	77.00	249.26
89.00	24.0	108.30	46.48	154.78	77.39	247.75
90.00	24.0	110.55	45.42	155.97	77.98	246.80
91.00	24.0	112.84	44.77	157.61	78.81	247.16
92.00	24.0	114.88	44.94	159.81	79.91	249.69
93.00	24.0	116.66	45.96	162.62	81.31	254.54
94.00	24.0	118.18	47.47	165.65	82.83	260.59
95.00	24.0	119.45	49.08	168.53	84.27	266.69
96.00	24.0	120.72	50.50	171.22	85.61	272.22
97.00	24.0	122.25	51.49	173.74	86.87	276.72
98.00	24.0	124.03	52.12	176.15	88.08	280.40
99.00	24.0	126.07	52.59	178.65	89.33	283.83
100.00	24.0	128.36	53.07	181.43	90.71	287.56

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	130.73	53.78	184.51	92.25	292.07
102.00	24.0	132.99	54.71	187.69	93.85	297.10

103.00	24.0	135.13	55.61	190.75	95.37	301.97
104.00	24.0	137.17	56.20	193.37	96.69	305.77
105.00	24.0	139.10	56.16	195.26	97.63	307.59
106.00	24.0	141.01	55.39	196.41	98.20	307.20
107.00	24.0	143.00	54.05	197.05	98.53	305.16
108.00	24.0	145.06	52.41	197.47	98.73	302.28
109.00	24.0	147.19	50.83	198.02	99.01	299.69
110.00	24.0	149.40	49.71	199.10	99.55	298.51
111.00	24.0	151.53	49.20	200.73	100.36	299.12
112.00	24.0	153.44	49.25	202.69	101.34	301.19
113.00	24.0	155.14	49.62	204.76	102.38	304.01
114.00	24.0	156.61	50.25	206.86	103.43	307.36
115.00	24.0	157.86	51.05	208.91	104.46	311.01
116.00	24.0	159.08	51.81	210.89	105.45	314.52
117.00	24.0	160.44	52.49	212.93	106.47	317.92
118.00	24.0	161.95	53.25	215.20	107.60	321.70
119.00	24.0	163.61	54.13	217.73	108.87	325.99
120.00	24.0	165.41	55.16	220.57	110.29	330.89
121.00	24.0	167.33	56.39	223.72	111.86	336.49
122.00	24.0	169.31	57.78	227.09	113.55	342.65
123.00	24.0	171.38	59.24	230.62	115.31	349.10
124.00	24.0	173.51	60.89	234.41	117.20	356.19
125.00	24.0	175.72	62.85	238.57	119.28	364.27
126.00	24.0	178.02	65.09	243.11	121.55	373.28
127.00	24.0	180.43	67.72	248.15	124.07	383.58
128.00	24.0	182.95	70.87	253.82	126.91	395.56
129.00	24.0	185.59	74.13	259.72	129.86	407.98
130.00	24.0	188.33	77.09	265.42	132.71	419.59
131.00	24.0	191.24	79.67	270.91	135.46	430.25
132.00	24.0	194.37	81.65	276.03	138.01	439.33
133.00	24.0	197.73	82.87	280.60	140.30	446.34
134.00	24.0	201.30	84.08	285.38	142.69	453.55
135.00	24.0	205.10	86.04	291.14	145.57	463.21
136.00	24.0	208.91	88.97	297.89	148.94	475.83
137.00	24.0	212.55	93.16	305.70	152.85	492.01
138.00	24.0	216.00	98.62	314.61	157.31	511.85
139.00	24.0	219.26	104.76	324.02	162.01	533.53
140.00	24.0	222.34	110.97	333.31	166.65	555.24
141.00	24.0	225.61	116.82	342.43	171.21	576.07
142.00	24.0	229.43	121.88	351.31	175.65	595.07
143.00	24.0	233.80	126.13	359.93	179.96	612.19
144.00	24.0	238.73	130.29	369.02	184.51	629.61
145.00	24.0	244.21	135.11	379.33	189.66	649.56
146.00	24.0	249.96	140.93	390.88	195.44	672.74
147.00	24.0	255.66	148.02	403.69	201.84	699.73
148.00	24.0	261.33	156.35	417.69	208.84	730.39
149.00	24.0	266.97	165.22	432.19	216.10	762.63
150.00	24.0	272.57	173.93	446.50	223.25	794.37
151.00	24.0	278.49	182.08	460.57	230.29	824.73
152.00	24.0	285.09	189.43	474.52	237.26	853.37

153.00	24.0	292.38	196.16	488.53	244.27	880.85
154.00	24.0	300.34	202.27	502.61	251.31	907.15
155.00	24.0	308.99	207.77	516.75	258.38	932.29
156.00	24.0	317.97	213.04	531.01	265.51	957.09
157.00	24.0	326.96	218.15	545.11	272.56	981.40
158.00	24.0	335.95	222.76	558.71	279.36	1004.23
159.00	24.0	344.95	226.87	571.82	285.91	1025.56
160.00	24.0	353.94	230.49	584.43	292.22	1045.41
161.00	24.0	362.94	233.61	596.55	298.28	1063.78
162.00	24.0	371.94	236.50	608.44	304.22	1081.45
163.00	24.0	380.94	239.43	620.36	310.18	1099.22
164.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
165.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
166.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
167.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
168.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
169.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
170.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-428_24-inch PPSC_SCOUR(-22)PREFORM(-43).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

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

Soil Information:
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Boring date: 6/23/220, Boring Number: BB-428
Station number: 428+35 Offset: 12' LT.

Ground Elevation: -5.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	3.00	5- Cavity layer
3	4.00	8.00	5- Cavity layer
4	6.00	1.00	5- Cavity layer
5	8.00	1.00	5- Cavity layer
6	10.00	8.00	5- Cavity layer
7	15.00	50.00	5- Cavity layer
8	17.00	0.00	5- Cavity layer
9	20.00	10.00	4- Lime Stone/Very shelly sand
10	25.00	7.00	3- Clean sand
11	30.00	3.00	3- Clean sand
12	35.00	10.00	3- Clean sand
13	38.00	10.00	3- Clean sand
14	38.10	12.00	1- Plastic Clay
15	40.00	5.00	3- Clean sand
16	45.00	4.00	3- Clean sand
17	50.00	4.00	3- Clean sand
18	55.00	5.00	3- Clean sand
19	57.00	5.00	3- Clean sand

20	57.10	5.00	3- Clean sand
21	60.00	5.00	3- Clean sand
22	65.00	9.00	3- Clean sand
23	70.00	8.00	3- Clean sand
24	75.00	6.00	3- Clean sand
25	80.00	5.00	3- Clean sand
26	85.00	21.00	3- Clean sand
27	90.00	4.00	2- Clay and silty sand
28	95.00	6.00	2- Clay and silty sand
29	100.00	8.00	2- Clay and silty sand
30	105.00	4.00	2- Clay and silty sand
31	110.00	8.00	2- Clay and silty sand
32	115.00	7.00	2- Clay and silty sand
33	120.00	5.00	2- Clay and silty sand
34	125.00	8.00	2- Clay and silty sand
35	130.00	7.00	2- Clay and silty sand
36	135.00	8.00	2- Clay and silty sand
37	140.00	7.00	2- Clay and silty sand
38	145.00	9.00	2- Clay and silty sand
39	150.00	5.00	2- Clay and silty sand
40	155.00	18.00	2- Clay and silty sand
41	160.00	21.00	2- Clay and silty sand
42	165.00	88.00	3- Clean sand
43	170.00	100.00	3- Clean sand
44	175.00	100.00	3- Clean sand
45	180.00	66.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	-5.00	-25.00	20.00	8.30	5-Void
2	-25.00	-30.00	5.00	10.00	4-Limestone, Very Shelly Sand
3	-30.00	-43.10	13.10	6.18	3-Clean Sand
4	-43.10	-45.00	1.90	12.00	1-Plastic Clay
5	-45.00	-95.00	50.00	7.20	3-Clean Sand
6	-95.00	-170.00	75.00	8.33	2-Clay and Silty Sand
7	-170.00	-185.00	15.00	96.00	3-Clean Sand

Driven Pile Data:

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	-6.00
24.00	2.00	-7.00
24.00	3.00	-8.00
24.00	4.00	-9.00
24.00	5.00	-10.00
24.00	6.00	-11.00
24.00	7.00	-12.00
24.00	8.00	-13.00
24.00	9.00	-14.00
24.00	10.00	-15.00
24.00	11.00	-16.00
24.00	12.00	-17.00
24.00	13.00	-18.00
24.00	14.00	-19.00
24.00	15.00	-20.00
24.00	16.00	-21.00
24.00	17.00	-22.00
24.00	18.00	-23.00
24.00	19.00	-24.00
24.00	20.00	-25.00
24.00	21.00	-26.00
24.00	22.00	-27.00
24.00	23.00	-28.00
24.00	24.00	-29.00
24.00	25.00	-30.00
24.00	26.00	-31.00
24.00	27.00	-32.00
24.00	28.00	-33.00
24.00	29.00	-34.00
24.00	30.00	-35.00
24.00	31.00	-36.00
24.00	32.00	-37.00
24.00	33.00	-38.00
24.00	34.00	-39.00
24.00	35.00	-40.00
24.00	36.00	-41.00
24.00	37.00	-42.00
24.00	38.00	-43.00
24.00	39.00	-44.00
24.00	40.00	-45.00
24.00	41.00	-46.00
24.00	42.00	-47.00
24.00	43.00	-48.00
24.00	44.00	-49.00

24.00	45.00	-50.00
24.00	46.00	-51.00
24.00	47.00	-52.00
24.00	48.00	-53.00
24.00	49.00	-54.00
24.00	50.00	-55.00
24.00	51.00	-56.00
24.00	52.00	-57.00
24.00	53.00	-58.00
24.00	54.00	-59.00
24.00	55.00	-60.00
24.00	56.00	-61.00
24.00	57.00	-62.00
24.00	58.00	-63.00
24.00	59.00	-64.00
24.00	60.00	-65.00
24.00	61.00	-66.00
24.00	62.00	-67.00
24.00	63.00	-68.00
24.00	64.00	-69.00
24.00	65.00	-70.00
24.00	66.00	-71.00
24.00	67.00	-72.00
24.00	68.00	-73.00
24.00	69.00	-74.00
24.00	70.00	-75.00
24.00	71.00	-76.00
24.00	72.00	-77.00
24.00	73.00	-78.00
24.00	74.00	-79.00
24.00	75.00	-80.00
24.00	76.00	-81.00
24.00	77.00	-82.00
24.00	78.00	-83.00
24.00	79.00	-84.00
24.00	80.00	-85.00
24.00	81.00	-86.00
24.00	82.00	-87.00
24.00	83.00	-88.00
24.00	84.00	-89.00
24.00	85.00	-90.00
24.00	86.00	-91.00
24.00	87.00	-92.00
24.00	88.00	-93.00
24.00	89.00	-94.00
24.00	90.00	-95.00
24.00	91.00	-96.00
24.00	92.00	-97.00
24.00	93.00	-98.00
24.00	94.00	-99.00

24.00	95.00	-100.00
24.00	96.00	-101.00
24.00	97.00	-102.00
24.00	98.00	-103.00
24.00	99.00	-104.00
24.00	100.00	-105.00
24.00	101.00	-106.00
24.00	102.00	-107.00
24.00	103.00	-108.00
24.00	104.00	-109.00
24.00	105.00	-110.00
24.00	106.00	-111.00
24.00	107.00	-112.00
24.00	108.00	-113.00
24.00	109.00	-114.00
24.00	110.00	-115.00
24.00	111.00	-116.00
24.00	112.00	-117.00
24.00	113.00	-118.00
24.00	114.00	-119.00
24.00	115.00	-120.00
24.00	116.00	-121.00
24.00	117.00	-122.00
24.00	118.00	-123.00
24.00	119.00	-124.00
24.00	120.00	-125.00
24.00	121.00	-126.00
24.00	122.00	-127.00
24.00	123.00	-128.00
24.00	124.00	-129.00
24.00	125.00	-130.00
24.00	126.00	-131.00
24.00	127.00	-132.00
24.00	128.00	-133.00
24.00	129.00	-134.00
24.00	130.00	-135.00
24.00	131.00	-136.00
24.00	132.00	-137.00
24.00	133.00	-138.00
24.00	134.00	-139.00
24.00	135.00	-140.00
24.00	136.00	-141.00
24.00	137.00	-142.00
24.00	138.00	-143.00
24.00	139.00	-144.00
24.00	140.00	-145.00
24.00	141.00	-146.00
24.00	142.00	-147.00
24.00	143.00	-148.00
24.00	144.00	-149.00

24.00	145.00	-150.00
24.00	146.00	-151.00
24.00	147.00	-152.00
24.00	148.00	-153.00
24.00	149.00	-154.00
24.00	150.00	-155.00
24.00	151.00	-156.00
24.00	152.00	-157.00
24.00	153.00	-158.00
24.00	154.00	-159.00
24.00	155.00	-160.00
24.00	156.00	-161.00
24.00	157.00	-162.00
24.00	158.00	-163.00
24.00	159.00	-164.00
24.00	160.00	-165.00
24.00	161.00	-166.00
24.00	162.00	-167.00
24.00	163.00	-168.00
24.00	164.00	-169.00
24.00	165.00	-170.00
24.00	166.00	-171.00
24.00	167.00	-172.00
24.00	168.00	-173.00
24.00	169.00	-174.00
24.00	170.00	-175.00
24.00	171.00	-176.00
24.00	172.00	-177.00
24.00	173.00	-178.00
24.00	174.00	-179.00
24.00	175.00	-180.00
24.00	176.00	-181.00
24.00	177.00	-182.00
24.00	178.00	-183.00
24.00	179.00	-184.00
24.00	180.00	-185.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test	Pile	Ultimate	Mobilized	Estimated	Allowable	Ultimate

Pile Length (ft)	Width (in)	Side Friction (tons)	End Bearing (tons)	Davisson Capacity (tons)	Pile Capacity (tons)	Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.17	0.00	0.17	0.08	0.17
19.00	24.0	0.66	0.00	0.66	0.33	0.66
20.00	24.0	1.49	35.81	37.30	18.65	108.91
21.00	24.0	2.51	33.54	36.05	18.03	103.13
22.00	24.0	3.60	30.84	34.44	17.22	96.11
23.00	24.0	4.76	28.42	33.18	16.59	90.03
24.00	24.0	5.98	27.03	33.01	16.50	87.07
25.00	24.0	7.27	25.55	32.81	16.41	83.91
26.00	24.0	8.33	25.93	34.26	17.13	86.13
27.00	24.0	9.29	26.28	35.57	17.78	88.12
28.00	24.0	10.08	26.78	36.86	18.43	90.43
29.00	24.0	10.68	27.57	38.26	19.13	93.41
30.00	24.0	11.13	28.68	39.81	19.90	97.17
31.00	24.0	11.59	30.21	41.80	20.90	102.22
32.00	24.0	12.48	30.70	43.18	21.59	104.59
33.00	24.0	13.59	31.27	44.86	22.43	107.41
34.00	24.0	14.96	31.77	46.73	23.37	110.27
35.00	24.0	16.65	31.88	48.54	24.27	112.31
36.00	24.0	18.58	31.55	50.13	25.07	113.23
37.00	24.0	20.63	30.79	51.42	25.71	113.01
38.00	24.0	22.46	29.28	51.75	25.87	110.31
39.00	24.0	28.22	20.10	48.32	24.16	88.52
40.00	24.0	30.40	28.46	58.86	29.43	115.79
41.00	24.0	31.32	27.76	59.09	29.54	114.62
42.00	24.0	32.21	27.19	59.40	29.70	113.77
43.00	24.0	33.06	26.78	59.84	29.92	113.40
44.00	24.0	33.87	26.59	60.46	30.23	113.64
45.00	24.0	34.64	26.65	61.29	30.65	114.59
46.00	24.0	35.39	26.94	62.33	31.17	116.21

47.00	24.0	36.15	27.25	63.40	31.70	117.91
48.00	24.0	36.90	27.41	64.31	32.16	119.13
49.00	24.0	37.66	27.38	65.03	32.52	119.78
50.00	24.0	38.41	27.11	65.52	32.76	119.74
51.00	24.0	39.18	26.59	65.77	32.89	118.95
52.00	24.0	39.99	25.91	65.90	32.95	117.73
53.00	24.0	40.84	25.19	66.03	33.02	116.41
54.00	24.0	41.73	24.58	66.31	33.15	115.46
55.00	24.0	42.65	25.30	67.95	33.98	118.56
56.00	24.0	43.59	26.16	69.75	34.88	122.08
57.00	24.0	44.54	27.24	71.77	35.89	126.24
58.00	24.0	45.48	28.65	74.12	37.06	131.41
59.00	24.0	46.42	30.20	76.62	38.31	137.03
60.00	24.0	47.36	31.72	79.08	39.54	142.51
61.00	24.0	48.38	33.10	81.48	40.74	147.69
62.00	24.0	49.55	34.26	83.81	41.90	152.33
63.00	24.0	50.87	35.17	86.04	43.02	156.38
64.00	24.0	52.34	35.80	88.14	44.07	159.74
65.00	24.0	53.96	36.11	90.07	45.03	162.28
66.00	24.0	55.64	36.20	91.84	45.92	164.23
67.00	24.0	57.28	36.17	93.44	46.72	165.77
68.00	24.0	58.88	35.99	94.87	47.44	166.85
69.00	24.0	60.44	35.71	96.16	48.08	167.58
70.00	24.0	61.97	35.37	97.34	48.67	168.07
71.00	24.0	63.44	34.98	98.42	49.21	168.37
72.00	24.0	64.84	34.58	99.42	49.71	168.58
73.00	24.0	66.15	34.19	100.35	50.17	168.73
74.00	24.0	67.40	34.46	101.86	50.93	170.77
75.00	24.0	68.57	36.02	104.58	52.29	176.62
76.00	24.0	69.68	38.85	108.53	54.26	186.23
77.00	24.0	70.75	42.87	113.62	56.81	199.35
78.00	24.0	71.79	48.00	119.79	59.90	215.80
79.00	24.0	72.79	52.94	125.73	62.86	231.60
80.00	24.0	73.75	56.35	130.10	65.05	242.79
81.00	24.0	74.99	57.87	132.86	66.43	248.59
82.00	24.0	76.84	57.22	134.06	67.03	248.51
83.00	24.0	79.29	54.49	133.79	66.89	242.77
84.00	24.0	82.35	50.44	132.78	66.39	233.66
85.00	24.0	86.00	45.81	131.81	65.91	223.44
86.00	24.0	89.75	41.36	131.10	65.55	213.82
87.00	24.0	93.06	37.84	130.90	65.45	206.57
88.00	24.0	95.95	35.26	131.21	65.61	201.74
89.00	24.0	98.41	33.64	132.05	66.03	199.33
90.00	24.0	100.44	14.28	114.73	57.36	143.30
91.00	24.0	102.35	13.23	115.57	57.79	142.03
92.00	24.0	104.42	14.02	118.44	59.22	146.48
93.00	24.0	106.48	14.48	120.96	60.48	149.93
94.00	24.0	108.57	14.89	123.46	61.73	153.23
95.00	24.0	110.85	15.32	126.17	63.09	156.82
96.00	24.0	113.38	15.70	129.08	64.54	160.48

97.00	24.0	116.19	15.94	132.13	66.06	164.01
98.00	24.0	119.32	15.95	135.27	67.64	167.17
99.00	24.0	122.52	15.65	138.16	69.08	169.45
100.00	24.0	125.87	15.42	141.29	70.64	172.12

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	129.14	15.31	144.45	72.23	175.07
102.00	24.0	132.11	15.38	147.49	73.74	178.25
103.00	24.0	134.75	15.66	150.41	75.21	181.74
104.00	24.0	137.08	16.08	153.16	76.58	185.32
105.00	24.0	139.08	16.55	155.63	77.82	188.74
106.00	24.0	141.08	17.01	158.09	79.04	192.10
107.00	24.0	143.40	17.49	160.89	80.44	195.86
108.00	24.0	146.04	17.81	163.85	81.93	199.47
109.00	24.0	149.01	17.96	166.96	83.48	202.88
110.00	24.0	152.29	17.91	170.21	85.10	206.03
111.00	24.0	155.70	17.73	173.43	86.72	208.89
112.00	24.0	159.04	17.45	176.49	88.25	211.40
113.00	24.0	162.30	17.09	179.39	89.69	213.58
114.00	24.0	165.48	16.74	182.22	91.11	215.70
115.00	24.0	168.58	16.49	185.07	92.54	218.05
116.00	24.0	171.56	16.35	187.92	93.96	220.62
117.00	24.0	174.39	16.38	190.77	95.39	223.54
118.00	24.0	177.05	16.64	193.69	96.84	226.96
119.00	24.0	179.55	17.04	196.59	98.29	230.67
120.00	24.0	181.88	17.51	199.39	99.70	234.42
121.00	24.0	184.25	18.00	202.26	101.13	238.26
122.00	24.0	186.87	18.39	205.26	102.63	242.04
123.00	24.0	189.72	18.61	208.33	104.17	245.56
124.00	24.0	192.82	18.70	211.52	105.76	248.93
125.00	24.0	196.16	18.70	214.86	107.43	252.26
126.00	24.0	199.57	18.65	218.22	109.11	255.53
127.00	24.0	202.91	18.63	221.55	110.77	258.82
128.00	24.0	206.18	18.69	224.87	112.44	262.26
129.00	24.0	209.36	18.79	228.15	114.08	265.73
130.00	24.0	212.47	18.89	231.36	115.68	269.13
131.00	24.0	215.58	18.96	234.54	117.27	272.46
132.00	24.0	218.76	19.00	237.76	118.88	275.77
133.00	24.0	222.02	19.02	241.04	120.52	279.08
134.00	24.0	225.37	19.07	244.43	122.22	282.56

135.00	24.0	228.79	19.20	247.99	123.99	286.38
136.00	24.0	232.21	19.44	251.65	125.83	290.53
137.00	24.0	235.55	19.77	255.32	127.66	294.87
138.00	24.0	238.82	20.15	258.97	129.48	299.27
139.00	24.0	242.00	20.46	262.46	131.23	303.39
140.00	24.0	245.11	20.59	265.71	132.85	306.89
141.00	24.0	248.26	20.51	268.77	134.39	309.80
142.00	24.0	251.56	20.22	271.78	135.89	312.23
143.00	24.0	255.02	19.76	274.77	137.39	314.29
144.00	24.0	258.63	19.44	278.06	139.03	316.94
145.00	24.0	262.39	19.58	281.97	140.99	321.13
146.00	24.0	266.08	20.25	286.33	143.16	326.83
147.00	24.0	269.44	21.50	290.94	145.47	333.94
148.00	24.0	272.49	23.31	295.80	147.90	342.41
149.00	24.0	275.22	25.49	300.71	150.35	351.68
150.00	24.0	277.63	27.85	305.48	152.74	361.17
151.00	24.0	280.34	30.21	310.55	155.27	370.97
152.00	24.0	283.96	32.41	316.37	158.18	381.18
153.00	24.0	288.49	34.46	322.95	161.47	391.87
154.00	24.0	293.93	37.74	331.67	165.83	407.15
155.00	24.0	300.28	43.63	343.91	171.95	431.16
156.00	24.0	307.17	52.22	359.39	179.69	463.83
157.00	24.0	314.21	63.61	377.82	188.91	505.04
158.00	24.0	321.42	77.76	399.18	199.59	554.70
159.00	24.0	328.79	93.25	422.04	211.02	608.54
160.00	24.0	336.32	108.64	444.96	222.48	662.24
161.00	24.0	344.07	123.16	467.23	233.62	713.55
162.00	24.0	352.12	136.09	488.21	244.11	760.39
163.00	24.0	360.47	147.47	507.94	253.97	802.88
164.00	24.0	369.12	157.31	526.42	263.21	841.04
165.00	24.0	379.61	165.60	545.21	272.61	876.41
166.00	24.0	388.34	165.91	554.26	277.13	886.08
167.00	24.0	396.40	166.85	563.25	281.62	896.95
168.00	24.0	403.93	168.39	572.31	286.16	909.09
169.00	24.0	411.06	170.49	581.55	290.77	922.53
170.00	24.0	417.89	173.14	591.02	295.51	937.30
171.00	24.0	424.50	176.30	600.80	300.40	953.40
172.00	24.0	430.94	179.98	610.92	305.46	970.87
173.00	24.0	437.26	184.17	621.44	310.72	989.79
174.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
175.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
176.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
177.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
178.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
179.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
180.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....inal\60 PERCENT\BB-431_24-inch PPSC_SCOUR(-244)PREFORM(-63).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 7/16/2019, Boring Number: BB-431
Station number: 430+54 Offset: 23' RT.

Ground Elevation: 2.800(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	4.00	16.00	5- Cavity layer
4	6.00	13.00	5- Cavity layer
5	8.00	10.00	5- Cavity layer
6	10.00	9.00	5- Cavity layer
7	15.00	2.00	5- Cavity layer
8	20.00	2.00	5- Cavity layer
9	25.00	4.00	5- Cavity layer
10	26.80	0.00	5- Cavity layer
11	30.00	16.00	4- Lime Stone/Very shelly sand
12	35.00	6.00	3- Clean sand
13	40.00	10.00	3- Clean sand
14	45.00	10.00	3- Clean sand
15	50.00	10.00	3- Clean sand
16	55.00	10.00	3- Clean sand
17	60.00	10.00	3- Clean sand
18	65.00	10.00	3- Clean sand
19	65.80	10.00	3- Clean sand

20	65.90	10.00	3- Clean sand
21	70.00	6.00	3- Clean sand
22	75.00	8.00	1- Plastic Clay
23	80.00	14.00	1- Plastic Clay
24	85.00	14.00	2- Clay and silty sand
25	90.00	16.00	2- Clay and silty sand
26	95.00	14.00	2- Clay and silty sand
27	100.00	14.00	2- Clay and silty sand
28	105.00	6.00	2- Clay and silty sand
29	110.00	8.00	1- Plastic Clay
30	115.00	7.00	1- Plastic Clay
31	120.00	9.00	3- Clean sand
32	125.00	11.00	3- Clean sand
33	130.00	10.00	3- Clean sand
34	135.00	7.00	3- Clean sand
35	140.00	20.00	3- Clean sand
36	145.00	14.00	3- Clean sand
37	150.00	16.00	3- Clean sand
38	155.00	17.00	3- Clean sand
39	160.00	15.00	3- Clean sand
40	165.00	66.00	3- Clean sand
41	170.00	100.00	3- Clean sand
42	175.00	69.00	3- Clean sand
43	180.00	52.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	2.80	-27.20	30.00	5.27	5-Void
2	-27.20	-32.20	5.00	16.00	4-Limestone, Very Shelly Sand
3	-32.20	-72.20	40.00	9.00	3-Clean Sand
4	-72.20	-82.20	10.00	11.00	1-Plastic Clay
5	-82.20	-107.20	25.00	12.80	2-Clay and Silty Sand
6	-107.20	-117.20	10.00	7.50	1-Plastic Clay
7	-117.20	-177.20	60.00	29.50	3-Clean Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	1.80
24.00	2.00	0.80
24.00	3.00	-0.20
24.00	4.00	-1.20
24.00	5.00	-2.20
24.00	6.00	-3.20
24.00	7.00	-4.20
24.00	8.00	-5.20
24.00	9.00	-6.20
24.00	10.00	-7.20
24.00	11.00	-8.20
24.00	12.00	-9.20
24.00	13.00	-10.20
24.00	14.00	-11.20
24.00	15.00	-12.20
24.00	16.00	-13.20
24.00	17.00	-14.20
24.00	18.00	-15.20
24.00	19.00	-16.20
24.00	20.00	-17.20
24.00	21.00	-18.20
24.00	22.00	-19.20
24.00	23.00	-20.20
24.00	24.00	-21.20
24.00	25.00	-22.20
24.00	26.00	-23.20
24.00	27.00	-24.20
24.00	28.00	-25.20
24.00	29.00	-26.20
24.00	30.00	-27.20
24.00	31.00	-28.20
24.00	32.00	-29.20
24.00	33.00	-30.20
24.00	34.00	-31.20
24.00	35.00	-32.20
24.00	36.00	-33.20
24.00	37.00	-34.20
24.00	38.00	-35.20
24.00	39.00	-36.20
24.00	40.00	-37.20
24.00	41.00	-38.20
24.00	42.00	-39.20
24.00	43.00	-40.20
24.00	44.00	-41.20
24.00	45.00	-42.20
24.00	46.00	-43.20

24.00	47.00	-44.20
24.00	48.00	-45.20
24.00	49.00	-46.20
24.00	50.00	-47.20
24.00	51.00	-48.20
24.00	52.00	-49.20
24.00	53.00	-50.20
24.00	54.00	-51.20
24.00	55.00	-52.20
24.00	56.00	-53.20
24.00	57.00	-54.20
24.00	58.00	-55.20
24.00	59.00	-56.20
24.00	60.00	-57.20
24.00	61.00	-58.20
24.00	62.00	-59.20
24.00	63.00	-60.20
24.00	64.00	-61.20
24.00	65.00	-62.20
24.00	66.00	-63.20
24.00	67.00	-64.20
24.00	68.00	-65.20
24.00	69.00	-66.20
24.00	70.00	-67.20
24.00	71.00	-68.20
24.00	72.00	-69.20
24.00	73.00	-70.20
24.00	74.00	-71.20
24.00	75.00	-72.20
24.00	76.00	-73.20
24.00	77.00	-74.20
24.00	78.00	-75.20
24.00	79.00	-76.20
24.00	80.00	-77.20
24.00	81.00	-78.20
24.00	82.00	-79.20
24.00	83.00	-80.20
24.00	84.00	-81.20
24.00	85.00	-82.20
24.00	86.00	-83.20
24.00	87.00	-84.20
24.00	88.00	-85.20
24.00	89.00	-86.20
24.00	90.00	-87.20
24.00	91.00	-88.20
24.00	92.00	-89.20
24.00	93.00	-90.20
24.00	94.00	-91.20
24.00	95.00	-92.20
24.00	96.00	-93.20

24.00	97.00	-94.20
24.00	98.00	-95.20
24.00	99.00	-96.20
24.00	100.00	-97.20
24.00	101.00	-98.20
24.00	102.00	-99.20
24.00	103.00	-100.20
24.00	104.00	-101.20
24.00	105.00	-102.20
24.00	106.00	-103.20
24.00	107.00	-104.20
24.00	108.00	-105.20
24.00	109.00	-106.20
24.00	110.00	-107.20
24.00	111.00	-108.20
24.00	112.00	-109.20
24.00	113.00	-110.20
24.00	114.00	-111.20
24.00	115.00	-112.20
24.00	116.00	-113.20
24.00	117.00	-114.20
24.00	118.00	-115.20
24.00	119.00	-116.20
24.00	120.00	-117.20
24.00	121.00	-118.20
24.00	122.00	-119.20
24.00	123.00	-120.20
24.00	124.00	-121.20
24.00	125.00	-122.20
24.00	126.00	-123.20
24.00	127.00	-124.20
24.00	128.00	-125.20
24.00	129.00	-126.20
24.00	130.00	-127.20
24.00	131.00	-128.20
24.00	132.00	-129.20
24.00	133.00	-130.20
24.00	134.00	-131.20
24.00	135.00	-132.20
24.00	136.00	-133.20
24.00	137.00	-134.20
24.00	138.00	-135.20
24.00	139.00	-136.20
24.00	140.00	-137.20
24.00	141.00	-138.20
24.00	142.00	-139.20
24.00	143.00	-140.20
24.00	144.00	-141.20
24.00	145.00	-142.20
24.00	146.00	-143.20

24.00	147.00	-144.20
24.00	148.00	-145.20
24.00	149.00	-146.20
24.00	150.00	-147.20
24.00	151.00	-148.20
24.00	152.00	-149.20
24.00	153.00	-150.20
24.00	154.00	-151.20
24.00	155.00	-152.20
24.00	156.00	-153.20
24.00	157.00	-154.20
24.00	158.00	-155.20
24.00	159.00	-156.20
24.00	160.00	-157.20
24.00	161.00	-158.20
24.00	162.00	-159.20
24.00	163.00	-160.20
24.00	164.00	-161.20
24.00	165.00	-162.20
24.00	166.00	-163.20
24.00	167.00	-164.20
24.00	168.00	-165.20
24.00	169.00	-166.20
24.00	170.00	-167.20
24.00	171.00	-168.20
24.00	172.00	-169.20
24.00	173.00	-170.20
24.00	174.00	-171.20
24.00	175.00	-172.20
24.00	176.00	-173.20
24.00	177.00	-174.20
24.00	178.00	-175.20
24.00	179.00	-176.20
24.00	180.00	-177.20

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length	Pile Width	Ultimate Side Friction	Mobilized End Bearing	Estimated Davisson Capacity	Allowable Pile Capacity	Ultimate Pile Capacity

(ft)	(in)	(tons)	(tons)	(tons)	(tons)	(tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.00	0.00	0.00	0.00	0.00
19.00	24.0	0.00	0.00	0.00	0.00	0.00
20.00	24.0	0.00	0.00	0.00	0.00	0.00
21.00	24.0	0.00	0.00	0.00	0.00	0.00
22.00	24.0	0.00	0.00	0.00	0.00	0.00
23.00	24.0	0.00	0.00	0.00	0.00	0.00
24.00	24.0	0.00	0.00	0.00	0.00	0.00
25.00	24.0	0.00	0.00	0.00	0.00	0.00
26.00	24.0	0.00	0.00	0.00	0.00	0.00
27.00	24.0	0.01	0.00	0.01	0.00	0.01
28.00	24.0	0.36	0.00	0.36	0.18	0.36
29.00	24.0	1.20	0.00	1.20	0.60	1.20
30.00	24.0	2.54	45.11	47.65	23.82	137.86
31.00	24.0	4.08	43.00	47.09	23.54	133.10
32.00	24.0	5.53	42.31	47.84	23.92	132.46
33.00	24.0	6.89	42.76	49.65	24.83	135.17
34.00	24.0	8.16	44.09	52.25	26.12	140.42
35.00	24.0	9.33	45.35	54.68	27.34	145.38
36.00	24.0	10.54	40.96	51.51	25.75	133.44
37.00	24.0	11.90	43.08	54.98	27.49	141.14
38.00	24.0	13.41	44.90	58.30	29.15	148.09
39.00	24.0	14.96	45.70	60.66	30.33	152.06
40.00	24.0	16.59	46.29	62.88	31.44	155.47
41.00	24.0	18.30	46.92	65.22	32.61	159.07
42.00	24.0	20.03	47.55	67.58	33.79	162.69
43.00	24.0	21.77	48.18	69.96	34.98	166.32
44.00	24.0	23.54	48.81	72.35	36.18	169.98
45.00	24.0	25.33	49.44	74.77	37.39	173.66
46.00	24.0	27.14	50.07	77.21	38.61	177.36
47.00	24.0	28.97	50.70	79.68	39.84	181.08
48.00	24.0	30.85	50.87	81.72	40.86	183.47

49.00	24.0	32.73	51.02	83.75	41.87	185.78
50.00	24.0	34.61	51.14	85.75	42.88	188.04
51.00	24.0	36.49	51.25	87.74	43.87	190.25
52.00	24.0	38.37	51.85	90.22	45.11	193.91
53.00	24.0	40.25	52.31	92.56	46.28	197.18
54.00	24.0	42.13	52.64	94.77	47.39	200.06
55.00	24.0	44.01	52.84	96.85	48.43	202.53
56.00	24.0	45.89	52.91	98.80	49.40	204.61
57.00	24.0	47.78	52.91	100.68	50.34	206.50
58.00	24.0	49.66	52.91	102.56	51.28	208.38
59.00	24.0	51.54	52.90	104.45	52.22	210.26
60.00	24.0	53.42	52.68	106.11	53.05	211.47
61.00	24.0	55.31	52.09	107.40	53.70	211.59
62.00	24.0	57.19	51.14	108.32	54.16	210.60
63.00	24.0	59.07	49.81	108.88	54.44	208.50
64.00	24.0	60.96	48.14	109.09	54.55	205.36
65.00	24.0	62.84	46.14	108.98	54.49	201.27
66.00	24.0	64.72	43.83	108.55	54.28	196.21
67.00	24.0	66.50	41.32	107.81	53.91	190.45
68.00	24.0	68.09	38.69	106.78	53.39	184.17
69.00	24.0	69.51	36.16	105.67	52.83	178.00
70.00	24.0	70.74	33.94	104.68	52.34	172.56
71.00	24.0	72.16	32.01	104.17	52.09	168.20
72.00	24.0	74.14	30.36	104.50	52.25	165.23
73.00	24.0	76.67	28.99	105.67	52.83	163.65
74.00	24.0	79.77	28.00	107.77	53.88	163.78
75.00	24.0	84.61	14.91	99.52	49.76	129.35
76.00	24.0	88.82	13.62	102.45	51.22	129.69
77.00	24.0	93.33	15.14	108.47	54.23	138.74
78.00	24.0	97.50	16.70	114.20	57.10	147.60
79.00	24.0	102.15	19.32	121.46	60.73	160.09
80.00	24.0	108.21	21.31	129.52	64.76	172.15
81.00	24.0	114.47	23.30	137.77	68.89	184.38
82.00	24.0	120.59	25.24	145.83	72.92	196.31
83.00	24.0	126.58	27.06	153.64	76.82	207.75
84.00	24.0	132.42	28.64	161.07	80.53	218.35
85.00	24.0	140.67	30.49	171.16	85.58	232.14
86.00	24.0	146.30	30.52	176.83	88.41	237.87
87.00	24.0	151.98	30.63	182.60	91.30	243.85
88.00	24.0	157.70	30.81	188.51	94.25	250.12
89.00	24.0	163.46	31.10	194.56	97.28	256.75
90.00	24.0	169.25	31.54	200.79	100.40	263.87
91.00	24.0	174.94	32.21	207.14	103.57	271.55
92.00	24.0	180.45	33.10	213.56	106.78	279.76
93.00	24.0	185.91	34.17	220.08	110.04	288.42
94.00	24.0	191.72	34.72	226.44	113.22	295.87
95.00	24.0	197.41	34.96	232.37	116.18	302.28
96.00	24.0	203.04	34.87	237.91	118.95	307.66
97.00	24.0	208.66	34.40	243.06	121.53	311.86
98.00	24.0	214.28	33.50	247.78	123.89	314.77

99.00	24.0	219.91	32.26	252.17	126.08	316.69
100.00	24.0	225.53	30.80	256.33	128.17	317.94

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	230.86	29.21	260.07	130.03	318.48
102.00	24.0	235.61	27.60	263.22	131.61	318.43
103.00	24.0	239.79	26.04	265.83	132.92	317.92
104.00	24.0	243.39	24.56	267.95	133.98	317.08
105.00	24.0	246.40	23.20	269.61	134.80	316.01
106.00	24.0	249.25	21.91	271.16	135.58	314.97
107.00	24.0	252.35	20.65	272.99	136.50	314.28
108.00	24.0	255.70	19.45	275.15	137.58	314.06
109.00	24.0	259.30	18.62	277.92	138.96	315.17
110.00	24.0	265.30	10.77	276.07	138.04	297.62
111.00	24.0	269.06	10.90	279.96	139.98	301.77
112.00	24.0	272.00	11.96	283.96	141.98	307.89
113.00	24.0	274.57	14.39	288.96	144.48	317.74
114.00	24.0	277.30	18.41	295.71	147.85	332.53
115.00	24.0	280.89	21.39	302.28	151.14	345.07
116.00	24.0	284.28	24.59	308.87	154.44	358.06
117.00	24.0	287.33	27.86	315.19	157.60	370.92
118.00	24.0	290.03	31.02	321.05	160.53	383.10
119.00	24.0	292.38	33.86	326.24	163.12	393.96
120.00	24.0	297.01	35.29	332.31	166.15	402.89
121.00	24.0	298.68	35.35	334.03	167.02	404.74
122.00	24.0	300.30	35.53	335.83	167.92	406.89
123.00	24.0	301.91	35.80	337.72	168.86	409.32
124.00	24.0	303.54	36.15	339.69	169.84	411.99
125.00	24.0	305.22	36.53	341.75	170.88	414.81
126.00	24.0	306.92	36.92	343.85	171.92	417.69
127.00	24.0	308.61	37.32	345.93	172.97	420.57
128.00	24.0	310.30	37.69	347.99	174.00	423.38
129.00	24.0	311.85	38.24	350.09	175.05	426.58
130.00	24.0	313.07	39.28	352.35	176.18	430.92
131.00	24.0	313.93	40.96	354.89	177.45	436.81
132.00	24.0	314.50	43.36	357.86	178.93	444.58
133.00	24.0	314.87	46.54	361.41	180.71	454.50
134.00	24.0	315.25	50.20	365.45	182.72	465.84
135.00	24.0	315.75	53.89	369.64	184.82	477.43
136.00	24.0	316.59	57.33	373.92	186.96	488.59

137.00	24.0	317.98	60.22	378.20	189.10	498.64
138.00	24.0	319.90	62.48	382.38	191.19	507.34
139.00	24.0	322.31	64.22	386.54	193.27	514.98
140.00	24.0	325.21	65.60	390.81	195.40	522.00
141.00	24.0	328.29	66.90	395.19	197.59	528.99
142.00	24.0	331.21	68.54	399.75	199.88	536.84
143.00	24.0	333.96	70.62	404.58	202.29	545.81
144.00	24.0	336.54	73.14	409.68	204.84	555.97
145.00	24.0	339.16	74.50	413.65	206.83	562.65
146.00	24.0	341.73	76.04	417.77	208.89	569.86
147.00	24.0	344.37	77.65	422.02	211.01	577.31
148.00	24.0	347.07	79.34	426.42	213.21	585.10
149.00	24.0	349.85	81.01	430.86	215.43	592.88
150.00	24.0	352.69	82.54	435.23	217.62	600.32
151.00	24.0	355.58	83.96	439.55	219.77	607.47
152.00	24.0	358.52	85.02	443.54	221.77	613.58
153.00	24.0	361.49	85.45	446.95	223.47	617.85
154.00	24.0	364.50	86.60	451.11	225.55	624.31
155.00	24.0	367.56	89.80	457.36	228.68	636.96
156.00	24.0	370.60	95.12	465.71	232.86	655.95
157.00	24.0	373.59	102.92	476.51	238.25	682.35
158.00	24.0	376.51	113.54	490.05	245.03	717.12
159.00	24.0	379.39	125.70	505.08	252.54	756.47
160.00	24.0	382.20	138.14	520.33	260.17	796.61
161.00	24.0	385.51	150.11	535.62	267.81	835.84
162.00	24.0	389.90	160.73	550.64	275.32	872.10
163.00	24.0	395.39	169.87	565.26	282.63	904.99
164.00	24.0	401.98	177.52	579.49	289.75	934.52
165.00	24.0	409.68	183.68	593.36	296.68	960.72
166.00	24.0	417.96	189.07	607.03	303.51	985.16
167.00	24.0	426.28	194.40	620.68	310.34	1009.49
168.00	24.0	434.63	199.71	634.34	317.17	1033.76
169.00	24.0	443.01	204.98	647.99	324.00	1057.96
170.00	24.0	451.42	210.22	661.64	330.82	1082.08
171.00	24.0	459.86	215.43	675.29	337.64	1106.14
172.00	24.0	468.33	220.65	688.97	344.49	1130.27
173.00	24.0	476.82	225.94	702.75	351.38	1154.63
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
176.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
177.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
178.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
179.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
180.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA,

AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-431_24-inch PPSC_SCOUR(-26)PREFORM(-63).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 7/16/2019, Boring Number: BB-431
Station number: 430+54 Offset: 23' RT.

Ground Elevation: 2.800(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	4.00	16.00	5- Cavity layer
4	6.00	13.00	5- Cavity layer
5	8.00	10.00	5- Cavity layer
6	10.00	9.00	5- Cavity layer
7	15.00	2.00	5- Cavity layer
8	20.00	2.00	5- Cavity layer
9	25.00	4.00	5- Cavity layer
10	28.80	0.00	5- Cavity layer
11	30.00	16.00	4- Lime Stone/Very shelly sand
12	35.00	6.00	3- Clean sand
13	40.00	10.00	3- Clean sand
14	45.00	10.00	3- Clean sand
15	50.00	10.00	3- Clean sand
16	55.00	10.00	3- Clean sand
17	60.00	10.00	3- Clean sand
18	65.00	10.00	3- Clean sand
19	65.80	10.00	3- Clean sand

20	65.90	10.00	3- Clean sand
21	70.00	6.00	3- Clean sand
22	75.00	8.00	1- Plastic Clay
23	80.00	14.00	1- Plastic Clay
24	85.00	14.00	2- Clay and silty sand
25	90.00	16.00	2- Clay and silty sand
26	95.00	14.00	2- Clay and silty sand
27	100.00	14.00	2- Clay and silty sand
28	105.00	6.00	2- Clay and silty sand
29	110.00	8.00	1- Plastic Clay
30	115.00	7.00	1- Plastic Clay
31	120.00	9.00	3- Clean sand
32	125.00	11.00	3- Clean sand
33	130.00	10.00	3- Clean sand
34	135.00	7.00	3- Clean sand
35	140.00	20.00	3- Clean sand
36	145.00	14.00	3- Clean sand
37	150.00	16.00	3- Clean sand
38	155.00	17.00	3- Clean sand
39	160.00	15.00	3- Clean sand
40	165.00	66.00	3- Clean sand
41	170.00	100.00	3- Clean sand
42	175.00	69.00	3- Clean sand
43	180.00	52.00	3- Clean sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	2.80	-27.20	30.00	5.54	5-Void
2	-27.20	-32.20	5.00	16.00	4-Limestone, Very Shelly Sand
3	-32.20	-72.20	40.00	9.00	3-Clean Sand
4	-72.20	-82.20	10.00	11.00	1-Plastic Clay
5	-82.20	-107.20	25.00	12.80	2-Clay and Silty Sand
6	-107.20	-117.20	10.00	7.50	1-Plastic Clay
7	-117.20	-177.20	60.00	29.50	3-Clean Sand

Driven Pile Data:

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	1.80
24.00	2.00	0.80
24.00	3.00	-0.20
24.00	4.00	-1.20
24.00	5.00	-2.20
24.00	6.00	-3.20
24.00	7.00	-4.20
24.00	8.00	-5.20
24.00	9.00	-6.20
24.00	10.00	-7.20
24.00	11.00	-8.20
24.00	12.00	-9.20
24.00	13.00	-10.20
24.00	14.00	-11.20
24.00	15.00	-12.20
24.00	16.00	-13.20
24.00	17.00	-14.20
24.00	18.00	-15.20
24.00	19.00	-16.20
24.00	20.00	-17.20
24.00	21.00	-18.20
24.00	22.00	-19.20
24.00	23.00	-20.20
24.00	24.00	-21.20
24.00	25.00	-22.20
24.00	26.00	-23.20
24.00	27.00	-24.20
24.00	28.00	-25.20
24.00	29.00	-26.20
24.00	30.00	-27.20
24.00	31.00	-28.20
24.00	32.00	-29.20
24.00	33.00	-30.20
24.00	34.00	-31.20
24.00	35.00	-32.20
24.00	36.00	-33.20
24.00	37.00	-34.20
24.00	38.00	-35.20
24.00	39.00	-36.20
24.00	40.00	-37.20
24.00	41.00	-38.20
24.00	42.00	-39.20
24.00	43.00	-40.20
24.00	44.00	-41.20
24.00	45.00	-42.20
24.00	46.00	-43.20

24.00	47.00	-44.20
24.00	48.00	-45.20
24.00	49.00	-46.20
24.00	50.00	-47.20
24.00	51.00	-48.20
24.00	52.00	-49.20
24.00	53.00	-50.20
24.00	54.00	-51.20
24.00	55.00	-52.20
24.00	56.00	-53.20
24.00	57.00	-54.20
24.00	58.00	-55.20
24.00	59.00	-56.20
24.00	60.00	-57.20
24.00	61.00	-58.20
24.00	62.00	-59.20
24.00	63.00	-60.20
24.00	64.00	-61.20
24.00	65.00	-62.20
24.00	66.00	-63.20
24.00	67.00	-64.20
24.00	68.00	-65.20
24.00	69.00	-66.20
24.00	70.00	-67.20
24.00	71.00	-68.20
24.00	72.00	-69.20
24.00	73.00	-70.20
24.00	74.00	-71.20
24.00	75.00	-72.20
24.00	76.00	-73.20
24.00	77.00	-74.20
24.00	78.00	-75.20
24.00	79.00	-76.20
24.00	80.00	-77.20
24.00	81.00	-78.20
24.00	82.00	-79.20
24.00	83.00	-80.20
24.00	84.00	-81.20
24.00	85.00	-82.20
24.00	86.00	-83.20
24.00	87.00	-84.20
24.00	88.00	-85.20
24.00	89.00	-86.20
24.00	90.00	-87.20
24.00	91.00	-88.20
24.00	92.00	-89.20
24.00	93.00	-90.20
24.00	94.00	-91.20
24.00	95.00	-92.20
24.00	96.00	-93.20

24.00	97.00	-94.20
24.00	98.00	-95.20
24.00	99.00	-96.20
24.00	100.00	-97.20
24.00	101.00	-98.20
24.00	102.00	-99.20
24.00	103.00	-100.20
24.00	104.00	-101.20
24.00	105.00	-102.20
24.00	106.00	-103.20
24.00	107.00	-104.20
24.00	108.00	-105.20
24.00	109.00	-106.20
24.00	110.00	-107.20
24.00	111.00	-108.20
24.00	112.00	-109.20
24.00	113.00	-110.20
24.00	114.00	-111.20
24.00	115.00	-112.20
24.00	116.00	-113.20
24.00	117.00	-114.20
24.00	118.00	-115.20
24.00	119.00	-116.20
24.00	120.00	-117.20
24.00	121.00	-118.20
24.00	122.00	-119.20
24.00	123.00	-120.20
24.00	124.00	-121.20
24.00	125.00	-122.20
24.00	126.00	-123.20
24.00	127.00	-124.20
24.00	128.00	-125.20
24.00	129.00	-126.20
24.00	130.00	-127.20
24.00	131.00	-128.20
24.00	132.00	-129.20
24.00	133.00	-130.20
24.00	134.00	-131.20
24.00	135.00	-132.20
24.00	136.00	-133.20
24.00	137.00	-134.20
24.00	138.00	-135.20
24.00	139.00	-136.20
24.00	140.00	-137.20
24.00	141.00	-138.20
24.00	142.00	-139.20
24.00	143.00	-140.20
24.00	144.00	-141.20
24.00	145.00	-142.20
24.00	146.00	-143.20

24.00	147.00	-144.20
24.00	148.00	-145.20
24.00	149.00	-146.20
24.00	150.00	-147.20
24.00	151.00	-148.20
24.00	152.00	-149.20
24.00	153.00	-150.20
24.00	154.00	-151.20
24.00	155.00	-152.20
24.00	156.00	-153.20
24.00	157.00	-154.20
24.00	158.00	-155.20
24.00	159.00	-156.20
24.00	160.00	-157.20
24.00	161.00	-158.20
24.00	162.00	-159.20
24.00	163.00	-160.20
24.00	164.00	-161.20
24.00	165.00	-162.20
24.00	166.00	-163.20
24.00	167.00	-164.20
24.00	168.00	-165.20
24.00	169.00	-166.20
24.00	170.00	-167.20
24.00	171.00	-168.20
24.00	172.00	-169.20
24.00	173.00	-170.20
24.00	174.00	-171.20
24.00	175.00	-172.20
24.00	176.00	-173.20
24.00	177.00	-174.20
24.00	178.00	-175.20
24.00	179.00	-176.20
24.00	180.00	-177.20

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length	Pile Width	Ultimate Side Friction	Mobilized End Bearing	Estimated Davisson Capacity	Allowable Pile Capacity	Ultimate Pile Capacity

(ft)	(in)	(tons)	(tons)	(tons)	(tons)	(tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.00	0.00	0.00	0.00	0.00
19.00	24.0	0.00	0.00	0.00	0.00	0.00
20.00	24.0	0.00	0.00	0.00	0.00	0.00
21.00	24.0	0.00	0.00	0.00	0.00	0.00
22.00	24.0	0.00	0.00	0.00	0.00	0.00
23.00	24.0	0.00	0.00	0.00	0.00	0.00
24.00	24.0	0.00	0.00	0.00	0.00	0.00
25.00	24.0	0.00	0.00	0.00	0.00	0.00
26.00	24.0	0.00	0.00	0.00	0.00	0.00
27.00	24.0	0.00	0.00	0.00	0.00	0.00
28.00	24.0	0.00	0.00	0.00	0.00	0.00
29.00	24.0	0.03	0.00	0.03	0.01	0.03
30.00	24.0	0.95	45.11	46.06	23.03	136.27
31.00	24.0	2.49	43.00	45.50	22.75	131.51
32.00	24.0	3.94	42.31	46.26	23.13	130.88
33.00	24.0	5.30	42.76	48.06	24.03	133.58
34.00	24.0	6.57	44.09	50.66	25.33	138.83
35.00	24.0	7.75	45.35	53.10	26.55	143.79
36.00	24.0	8.95	40.96	49.92	24.96	131.85
37.00	24.0	10.31	43.08	53.39	26.70	139.55
38.00	24.0	11.82	44.90	56.71	28.36	146.50
39.00	24.0	13.37	45.70	59.07	29.53	150.47
40.00	24.0	15.00	46.29	61.30	30.65	153.88
41.00	24.0	16.71	46.92	63.64	31.82	157.48
42.00	24.0	18.44	47.55	65.99	33.00	161.10
43.00	24.0	20.19	48.18	68.37	34.19	164.74
44.00	24.0	21.95	48.81	70.77	35.38	168.39
45.00	24.0	23.74	49.44	73.19	36.59	172.07
46.00	24.0	25.55	50.07	75.63	37.81	175.77
47.00	24.0	27.39	50.70	78.09	39.04	179.49
48.00	24.0	29.26	50.87	80.13	40.07	181.88

49.00	24.0	31.14	51.02	82.16	41.08	184.19
50.00	24.0	33.02	51.14	84.16	42.08	186.45
51.00	24.0	34.90	51.25	86.15	43.08	188.66
52.00	24.0	36.78	51.85	88.63	44.31	192.33
53.00	24.0	38.66	52.31	90.97	45.49	195.60
54.00	24.0	40.54	52.64	93.18	46.59	198.47
55.00	24.0	42.42	52.84	95.26	47.63	200.95
56.00	24.0	44.31	52.91	97.21	48.61	203.03
57.00	24.0	46.19	52.91	99.10	49.55	204.91
58.00	24.0	48.07	52.91	100.98	50.49	206.79
59.00	24.0	49.95	52.90	102.86	51.43	208.67
60.00	24.0	51.84	52.68	104.52	52.26	209.89
61.00	24.0	53.72	52.09	105.81	52.91	210.00
62.00	24.0	55.60	51.14	106.74	53.37	209.01
63.00	24.0	57.49	49.81	107.29	53.65	206.91
64.00	24.0	59.37	48.14	107.50	53.75	203.78
65.00	24.0	61.25	46.14	107.39	53.70	199.68
66.00	24.0	63.14	43.83	106.96	53.48	194.62
67.00	24.0	64.91	41.32	106.23	53.11	188.86
68.00	24.0	66.51	38.69	105.20	52.60	182.58
69.00	24.0	67.92	36.16	104.08	52.04	176.41
70.00	24.0	69.15	33.94	103.09	51.55	170.97
71.00	24.0	70.57	32.01	102.59	51.29	166.61
72.00	24.0	72.55	30.36	102.91	51.46	163.64
73.00	24.0	75.09	28.99	104.08	52.04	162.07
74.00	24.0	78.18	28.00	106.18	53.09	162.19
75.00	24.0	83.02	14.91	97.94	48.97	127.76
76.00	24.0	87.23	13.62	100.86	50.43	128.10
77.00	24.0	91.74	15.14	106.88	53.44	137.15
78.00	24.0	95.92	16.70	112.61	56.31	146.01
79.00	24.0	100.56	19.32	119.88	59.94	158.51
80.00	24.0	106.62	21.31	127.94	63.97	170.57
81.00	24.0	112.88	23.30	136.18	68.09	182.79
82.00	24.0	119.01	25.24	144.25	72.12	194.72
83.00	24.0	124.99	27.06	152.05	76.02	206.16
84.00	24.0	130.84	28.64	159.48	79.74	216.76
85.00	24.0	139.08	30.49	169.57	84.79	230.56
86.00	24.0	144.72	30.52	175.24	87.62	236.28
87.00	24.0	150.39	30.63	181.01	90.51	242.27
88.00	24.0	156.11	30.81	186.92	93.46	248.54
89.00	24.0	161.87	31.10	192.97	96.49	255.17
90.00	24.0	167.67	31.54	199.21	99.60	262.29
91.00	24.0	173.35	32.21	205.55	102.78	269.96
92.00	24.0	178.87	33.10	211.97	105.98	278.17
93.00	24.0	184.32	34.17	218.49	109.25	286.83
94.00	24.0	190.13	34.72	224.85	112.42	294.28
95.00	24.0	195.82	34.96	230.78	115.39	300.69
96.00	24.0	201.45	34.87	236.32	118.16	306.07
97.00	24.0	207.07	34.40	241.47	120.74	310.28
98.00	24.0	212.70	33.50	246.19	123.10	313.19

99.00	24.0	218.32	32.26	250.58	125.29	315.11
100.00	24.0	223.94	30.80	254.74	127.37	316.35

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	229.27	29.21	258.48	129.24	316.89
102.00	24.0	234.03	27.60	261.63	130.82	316.84
103.00	24.0	238.20	26.04	264.25	132.12	316.33
104.00	24.0	241.80	24.56	266.36	133.18	315.49
105.00	24.0	244.82	23.20	268.02	134.01	314.43
106.00	24.0	247.66	21.91	269.57	134.78	313.38
107.00	24.0	250.76	20.65	271.41	135.70	312.70
108.00	24.0	254.11	19.45	273.56	136.78	312.47
109.00	24.0	257.71	18.62	276.33	138.17	313.58
110.00	24.0	263.71	10.77	274.49	137.24	296.03
111.00	24.0	267.47	10.90	278.38	139.19	300.18
112.00	24.0	270.41	11.96	282.37	141.19	306.30
113.00	24.0	272.98	14.39	287.37	143.68	316.15
114.00	24.0	275.71	18.41	294.12	147.06	330.94
115.00	24.0	279.30	21.39	300.70	150.35	343.49
116.00	24.0	282.69	24.59	307.28	153.64	356.47
117.00	24.0	285.74	27.86	313.60	156.80	369.33
118.00	24.0	288.44	31.02	319.47	159.73	381.51
119.00	24.0	290.80	33.86	324.65	162.33	392.37
120.00	24.0	295.43	35.29	330.72	165.36	401.30
121.00	24.0	297.09	35.35	332.45	166.22	403.15
122.00	24.0	298.72	35.53	334.25	167.12	405.30
123.00	24.0	300.33	35.80	336.13	168.06	407.74
124.00	24.0	301.95	36.15	338.10	169.05	410.40
125.00	24.0	303.63	36.53	340.16	170.08	413.22
126.00	24.0	305.34	36.92	342.26	171.13	416.11
127.00	24.0	307.02	37.32	344.34	172.17	418.98
128.00	24.0	308.72	37.69	346.41	173.20	421.79
129.00	24.0	310.26	38.24	348.51	174.25	424.99
130.00	24.0	311.48	39.28	350.76	175.38	429.33
131.00	24.0	312.34	40.96	353.30	176.65	435.22
132.00	24.0	312.91	43.36	356.27	178.13	442.99
133.00	24.0	313.28	46.54	359.83	179.91	452.92
134.00	24.0	313.66	50.20	363.86	181.93	464.26
135.00	24.0	314.16	53.89	368.05	184.03	475.84
136.00	24.0	315.00	57.33	372.34	186.17	487.00

137.00	24.0	316.39	60.22	376.61	188.31	497.05
138.00	24.0	318.31	62.48	380.79	190.40	505.76
139.00	24.0	320.73	64.22	384.95	192.47	513.39
140.00	24.0	323.62	65.60	389.22	194.61	520.41
141.00	24.0	326.70	66.90	393.60	196.80	527.40
142.00	24.0	329.62	68.54	398.17	199.08	535.25
143.00	24.0	332.37	70.62	402.99	201.50	544.23
144.00	24.0	334.95	73.14	408.09	204.05	554.38
145.00	24.0	337.57	74.50	412.07	206.03	561.06
146.00	24.0	340.14	76.04	416.19	208.09	568.28
147.00	24.0	342.78	77.65	420.43	210.21	575.72
148.00	24.0	345.49	79.34	424.83	212.41	583.51
149.00	24.0	348.26	81.01	429.27	214.64	591.29
150.00	24.0	351.10	82.54	433.65	216.82	598.73
151.00	24.0	354.00	83.96	437.96	218.98	605.88
152.00	24.0	356.93	85.02	441.95	220.98	611.99
153.00	24.0	359.91	85.45	445.36	222.68	616.27
154.00	24.0	362.92	86.60	449.52	224.76	622.72
155.00	24.0	365.97	89.80	455.77	227.89	635.37
156.00	24.0	369.01	95.12	464.13	232.06	654.36
157.00	24.0	372.00	102.92	474.92	237.46	680.77
158.00	24.0	374.93	113.54	488.46	244.23	715.54
159.00	24.0	377.80	125.70	503.49	251.75	754.88
160.00	24.0	380.61	138.14	518.75	259.37	795.02
161.00	24.0	383.92	150.11	534.03	267.02	834.26
162.00	24.0	388.32	160.73	549.05	274.52	870.51
163.00	24.0	393.80	169.87	563.67	281.83	903.40
164.00	24.0	400.39	177.52	577.91	288.95	932.94
165.00	24.0	408.09	183.68	591.77	295.89	959.13
166.00	24.0	416.37	189.07	605.44	302.72	983.57
167.00	24.0	424.69	194.40	619.10	309.55	1007.91
168.00	24.0	433.04	199.71	632.75	316.38	1032.17
169.00	24.0	441.42	204.98	646.40	323.20	1056.37
170.00	24.0	449.83	210.22	660.05	330.03	1080.50
171.00	24.0	458.27	215.43	673.70	336.85	1104.55
172.00	24.0	466.74	220.65	687.39	343.69	1128.69
173.00	24.0	475.23	225.94	701.17	350.58	1153.04
174.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
175.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
176.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
177.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
178.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
179.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
180.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA,

AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-433_24-inch PPSC_SCOUR(-18)PREFORM(-38).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 11/18/2019, Boring Number: BB-433
Station number: 433+02 Offset: 9' RT.

Ground Elevation: 10.700(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	4.00	4.00	5- Cavity layer
4	6.00	8.00	5- Cavity layer
5	8.00	12.00	5- Cavity layer
6	10.00	6.00	5- Cavity layer
7	15.00	3.00	5- Cavity layer
8	20.00	1.00	5- Cavity layer
9	25.00	1.00	5- Cavity layer
10	28.70	0.00	5- Cavity layer
11	30.00	10.00	3- Clean sand
12	35.00	9.00	3- Clean sand
13	40.00	6.00	3- Clean sand
14	45.00	5.00	3- Clean sand
15	49.00	5.00	3- Clean sand
16	49.10	5.00	3- Clean sand
17	50.00	5.00	3- Clean sand
18	55.00	8.00	3- Clean sand
19	60.00	9.00	3- Clean sand

20	65.00	9.00	3- Clean sand
21	70.00	3.00	3- Clean sand
22	75.00	13.00	1- Plastic Clay
23	80.00	8.00	1- Plastic Clay
24	85.00	4.00	1- Plastic Clay
25	90.00	7.00	1- Plastic Clay
26	95.00	7.00	1- Plastic Clay
27	100.00	7.00	1- Plastic Clay
28	105.00	3.00	1- Plastic Clay
29	110.00	2.00	1- Plastic Clay
30	115.00	4.00	1- Plastic Clay
31	120.00	3.00	3- Clean sand
32	125.00	1.00	3- Clean sand
33	130.00	2.00	3- Clean sand
34	135.00	2.00	3- Clean sand
35	140.00	1.00	3- Clean sand
36	145.00	3.00	3- Clean sand
37	150.00	3.00	3- Clean sand
38	155.00	1.00	3- Clean sand
39	160.00	2.00	3- Clean sand
40	165.00	3.00	3- Clean sand
41	170.00	100.00	3- Clean sand
42	175.00	100.00	3- Clean sand
43	180.00	100.00	3- Clean sand
44	185.00	64.00	3- Clean sand
45	190.00	64.00	1- Plastic Clay
46	195.00	13.00	1- Plastic Clay
47	200.00	54.00	1- Plastic Clay
48	205.00	20.00	1- Plastic Clay
49	210.00	9.00	1- Plastic Clay
50	215.00	15.00	1- Plastic Clay
51	220.00	22.00	2- Clay and silty sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	10.70	-19.30	30.00	3.66	5-Void
2	-19.30	-64.30	45.00	7.11	3-Clean Sand
3	-64.30	-109.30	45.00	6.11	1-Plastic Clay
4	-109.30	-179.30	70.00	27.50	3-Clean Sand
5	-179.30	-209.30	30.00	29.17	1-Plastic Clay
6	-209.30	-209.30	0.00	22.00	2-Clay and Silty Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	9.70
24.00	2.00	8.70
24.00	3.00	7.70
24.00	4.00	6.70
24.00	5.00	5.70
24.00	6.00	4.70
24.00	7.00	3.70
24.00	8.00	2.70
24.00	9.00	1.70
24.00	10.00	0.70
24.00	11.00	-0.30
24.00	12.00	-1.30
24.00	13.00	-2.30
24.00	14.00	-3.30
24.00	15.00	-4.30
24.00	16.00	-5.30
24.00	17.00	-6.30
24.00	18.00	-7.30
24.00	19.00	-8.30
24.00	20.00	-9.30
24.00	21.00	-10.30
24.00	22.00	-11.30
24.00	23.00	-12.30
24.00	24.00	-13.30
24.00	25.00	-14.30
24.00	26.00	-15.30
24.00	27.00	-16.30
24.00	28.00	-17.30
24.00	29.00	-18.30
24.00	30.00	-19.30
24.00	31.00	-20.30
24.00	32.00	-21.30
24.00	33.00	-22.30
24.00	34.00	-23.30
24.00	35.00	-24.30
24.00	36.00	-25.30
24.00	37.00	-26.30
24.00	38.00	-27.30
24.00	39.00	-28.30
24.00	40.00	-29.30

24.00	41.00	-30.30
24.00	42.00	-31.30
24.00	43.00	-32.30
24.00	44.00	-33.30
24.00	45.00	-34.30
24.00	46.00	-35.30
24.00	47.00	-36.30
24.00	48.00	-37.30
24.00	49.00	-38.30
24.00	50.00	-39.30
24.00	51.00	-40.30
24.00	52.00	-41.30
24.00	53.00	-42.30
24.00	54.00	-43.30
24.00	55.00	-44.30
24.00	56.00	-45.30
24.00	57.00	-46.30
24.00	58.00	-47.30
24.00	59.00	-48.30
24.00	60.00	-49.30
24.00	61.00	-50.30
24.00	62.00	-51.30
24.00	63.00	-52.30
24.00	64.00	-53.30
24.00	65.00	-54.30
24.00	66.00	-55.30
24.00	67.00	-56.30
24.00	68.00	-57.30
24.00	69.00	-58.30
24.00	70.00	-59.30
24.00	71.00	-60.30
24.00	72.00	-61.30
24.00	73.00	-62.30
24.00	74.00	-63.30
24.00	75.00	-64.30
24.00	76.00	-65.30
24.00	77.00	-66.30
24.00	78.00	-67.30
24.00	79.00	-68.30
24.00	80.00	-69.30
24.00	81.00	-70.30
24.00	82.00	-71.30
24.00	83.00	-72.30
24.00	84.00	-73.30
24.00	85.00	-74.30
24.00	86.00	-75.30
24.00	87.00	-76.30
24.00	88.00	-77.30
24.00	89.00	-78.30
24.00	90.00	-79.30

24.00	91.00	-80.30
24.00	92.00	-81.30
24.00	93.00	-82.30
24.00	94.00	-83.30
24.00	95.00	-84.30
24.00	96.00	-85.30
24.00	97.00	-86.30
24.00	98.00	-87.30
24.00	99.00	-88.30
24.00	100.00	-89.30
24.00	101.00	-90.30
24.00	102.00	-91.30
24.00	103.00	-92.30
24.00	104.00	-93.30
24.00	105.00	-94.30
24.00	106.00	-95.30
24.00	107.00	-96.30
24.00	108.00	-97.30
24.00	109.00	-98.30
24.00	110.00	-99.30
24.00	111.00	-100.30
24.00	112.00	-101.30
24.00	113.00	-102.30
24.00	114.00	-103.30
24.00	115.00	-104.30
24.00	116.00	-105.30
24.00	117.00	-106.30
24.00	118.00	-107.30
24.00	119.00	-108.30
24.00	120.00	-109.30
24.00	121.00	-110.30
24.00	122.00	-111.30
24.00	123.00	-112.30
24.00	124.00	-113.30
24.00	125.00	-114.30
24.00	126.00	-115.30
24.00	127.00	-116.30
24.00	128.00	-117.30
24.00	129.00	-118.30
24.00	130.00	-119.30
24.00	131.00	-120.30
24.00	132.00	-121.30
24.00	133.00	-122.30
24.00	134.00	-123.30
24.00	135.00	-124.30
24.00	136.00	-125.30
24.00	137.00	-126.30
24.00	138.00	-127.30
24.00	139.00	-128.30
24.00	140.00	-129.30

24.00	141.00	-130.30
24.00	142.00	-131.30
24.00	143.00	-132.30
24.00	144.00	-133.30
24.00	145.00	-134.30
24.00	146.00	-135.30
24.00	147.00	-136.30
24.00	148.00	-137.30
24.00	149.00	-138.30
24.00	150.00	-139.30
24.00	151.00	-140.30
24.00	152.00	-141.30
24.00	153.00	-142.30
24.00	154.00	-143.30
24.00	155.00	-144.30
24.00	156.00	-145.30
24.00	157.00	-146.30
24.00	158.00	-147.30
24.00	159.00	-148.30
24.00	160.00	-149.30
24.00	161.00	-150.30
24.00	162.00	-151.30
24.00	163.00	-152.30
24.00	164.00	-153.30
24.00	165.00	-154.30
24.00	166.00	-155.30
24.00	167.00	-156.30
24.00	168.00	-157.30
24.00	169.00	-158.30
24.00	170.00	-159.30
24.00	171.00	-160.30
24.00	172.00	-161.30
24.00	173.00	-162.30
24.00	174.00	-163.30
24.00	175.00	-164.30
24.00	176.00	-165.30
24.00	177.00	-166.30
24.00	178.00	-167.30
24.00	179.00	-168.30
24.00	180.00	-169.30
24.00	181.00	-170.30
24.00	182.00	-171.30
24.00	183.00	-172.30
24.00	184.00	-173.30
24.00	185.00	-174.30
24.00	186.00	-175.30
24.00	187.00	-176.30
24.00	188.00	-177.30
24.00	189.00	-178.30
24.00	190.00	-179.30

24.00	191.00	-180.30
24.00	192.00	-181.30
24.00	193.00	-182.30
24.00	194.00	-183.30
24.00	195.00	-184.30
24.00	196.00	-185.30
24.00	197.00	-186.30
24.00	198.00	-187.30
24.00	199.00	-188.30
24.00	200.00	-189.30
24.00	201.00	-190.30
24.00	202.00	-191.30
24.00	203.00	-192.30
24.00	204.00	-193.30
24.00	205.00	-194.30
24.00	206.00	-195.30
24.00	207.00	-196.30
24.00	208.00	-197.30
24.00	209.00	-198.30
24.00	210.00	-199.30
24.00	211.00	-200.30
24.00	212.00	-201.30
24.00	213.00	-202.30
24.00	214.00	-203.30
24.00	215.00	-204.30
24.00	216.00	-205.30
24.00	217.00	-206.30
24.00	218.00	-207.30
24.00	219.00	-208.30
24.00	220.00	-209.30

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00

3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.00	0.00	0.00	0.00	0.00
19.00	24.0	0.00	0.00	0.00	0.00	0.00
20.00	24.0	0.00	0.00	0.00	0.00	0.00
21.00	24.0	0.00	0.00	0.00	0.00	0.00
22.00	24.0	0.00	0.00	0.00	0.00	0.00
23.00	24.0	0.00	0.00	0.00	0.00	0.00
24.00	24.0	0.00	0.00	0.00	0.00	0.00
25.00	24.0	0.00	0.00	0.00	0.00	0.00
26.00	24.0	0.00	0.00	0.00	0.00	0.00
27.00	24.0	0.00	0.00	0.00	0.00	0.00
28.00	24.0	0.00	0.00	0.00	0.00	0.00
29.00	24.0	0.07	0.00	0.07	0.03	0.07
30.00	24.0	1.23	25.37	26.60	13.30	77.35
31.00	24.0	3.04	25.43	28.48	14.24	79.35
32.00	24.0	4.76	25.59	30.34	15.17	81.52
33.00	24.0	6.42	25.78	32.20	16.10	83.77
34.00	24.0	8.04	26.00	34.05	17.02	86.06
35.00	24.0	9.63	26.25	35.89	17.94	88.39
36.00	24.0	11.15	26.54	37.69	18.85	90.78
37.00	24.0	12.54	26.90	39.44	19.72	93.25
38.00	24.0	13.82	27.34	41.16	20.58	95.84
39.00	24.0	14.97	27.91	42.88	21.44	98.69
40.00	24.0	15.99	28.65	44.64	22.32	101.93
41.00	24.0	16.94	29.55	46.50	23.25	105.61
42.00	24.0	17.87	30.61	48.49	24.24	109.71
43.00	24.0	18.95	31.33	50.28	25.14	112.95
44.00	24.0	19.98	32.21	52.19	26.10	116.61
45.00	24.0	20.98	33.30	54.28	27.14	120.87
46.00	24.0	21.95	33.67	55.62	27.81	122.97
47.00	24.0	22.92	33.66	56.58	28.29	123.89
48.00	24.0	23.89	33.90	57.79	28.89	125.59
49.00	24.0	24.85	34.33	59.18	29.59	127.83
50.00	24.0	25.81	34.86	60.67	30.34	130.40
51.00	24.0	26.82	35.45	62.27	31.13	133.16
52.00	24.0	27.94	36.04	63.98	31.99	136.06

53.00	24.0	29.17	36.68	65.85	32.93	139.22
54.00	24.0	30.51	37.33	67.84	33.92	142.51
55.00	24.0	31.95	37.96	69.91	34.95	145.83
56.00	24.0	33.47	38.60	72.06	36.03	149.26
57.00	24.0	35.02	39.26	74.28	37.14	152.79
58.00	24.0	36.61	39.91	76.52	38.26	156.34
59.00	24.0	38.24	40.32	78.57	39.28	159.22
60.00	24.0	39.91	40.28	80.18	40.09	160.74
61.00	24.0	41.59	39.79	81.38	40.69	160.96
62.00	24.0	43.28	38.86	82.14	41.07	159.86
63.00	24.0	44.96	37.48	82.44	41.22	157.41
64.00	24.0	46.65	35.87	82.52	41.26	154.26
65.00	24.0	48.33	34.25	82.58	41.29	151.08
66.00	24.0	49.91	32.74	82.65	41.33	148.13
67.00	24.0	51.27	31.43	82.70	41.35	145.55
68.00	24.0	52.41	30.25	82.66	41.33	143.17
69.00	24.0	53.33	29.19	82.52	41.26	140.91
70.00	24.0	54.02	28.20	82.23	41.11	138.64
71.00	24.0	55.14	27.17	82.31	41.15	136.64
72.00	24.0	57.33	25.98	83.31	41.66	135.28
73.00	24.0	60.59	24.69	85.28	42.64	134.67
74.00	24.0	64.92	23.30	88.22	44.11	134.82
75.00	24.0	71.94	11.06	83.00	41.50	105.12
76.00	24.0	77.28	11.35	88.64	44.32	111.34
77.00	24.0	82.93	11.24	94.17	47.08	116.64
78.00	24.0	88.19	10.62	98.82	49.41	120.06
79.00	24.0	92.78	9.90	102.69	51.34	122.49
80.00	24.0	96.96	9.32	106.27	53.14	124.90
81.00	24.0	100.73	8.86	109.59	54.80	127.32
82.00	24.0	104.13	8.54	112.67	56.34	129.75
83.00	24.0	107.15	8.34	115.49	57.75	132.17
84.00	24.0	109.80	8.24	118.04	59.02	134.51
85.00	24.0	112.07	8.20	120.27	60.14	136.68
86.00	24.0	114.29	8.22	122.51	61.26	138.95
87.00	24.0	116.80	8.25	125.05	62.53	141.55
88.00	24.0	119.60	8.28	127.88	63.94	144.43
89.00	24.0	122.68	8.30	130.98	65.49	147.57
90.00	24.0	126.05	8.29	134.34	67.17	150.93
91.00	24.0	129.56	8.28	137.84	68.92	154.41
92.00	24.0	133.07	8.08	141.16	70.58	157.32
93.00	24.0	136.59	7.92	144.51	72.25	160.35
94.00	24.0	140.10	7.76	147.86	73.93	163.38
95.00	24.0	143.61	7.57	151.18	75.59	166.32
96.00	24.0	147.12	7.35	154.47	77.24	169.18
97.00	24.0	150.63	7.10	157.73	78.87	171.93
98.00	24.0	154.15	6.81	160.95	80.48	174.57
99.00	24.0	157.66	6.49	164.15	82.07	177.12
100.00	24.0	161.17	6.15	167.32	83.66	179.62

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	164.49	5.81	170.30	85.15	181.91
102.00	24.0	167.42	5.46	172.88	86.44	183.79
103.00	24.0	169.97	5.07	175.04	87.52	185.18
104.00	24.0	172.13	4.71	176.84	88.42	186.26
105.00	24.0	173.90	4.43	178.33	89.16	187.19
106.00	24.0	175.32	4.23	179.55	89.77	188.00
107.00	24.0	176.42	4.11	180.53	90.27	188.75
108.00	24.0	177.21	4.08	181.30	90.65	189.46
109.00	24.0	177.69	4.20	181.89	90.94	190.28
110.00	24.0	177.84	4.50	182.35	91.17	191.36
111.00	24.0	178.05	4.96	183.02	91.51	192.94
112.00	24.0	178.68	5.55	184.22	92.11	195.32
113.00	24.0	179.72	6.26	185.97	92.99	198.48
114.00	24.0	181.17	6.89	188.07	94.03	201.85
115.00	24.0	183.05	7.27	190.31	95.16	204.84
116.00	24.0	184.97	7.35	192.32	96.16	207.02
117.00	24.0	186.60	7.13	193.73	96.86	207.98
118.00	24.0	187.92	6.62	194.54	97.27	207.78
119.00	24.0	188.94	5.94	194.88	97.44	206.75
120.00	24.0	189.66	5.19	194.85	97.43	205.24
121.00	24.0	190.17	4.49	194.66	97.33	203.65
122.00	24.0	190.57	3.95	194.52	97.26	202.42
123.00	24.0	190.85	3.56	194.40	97.20	201.52
124.00	24.0	191.02	3.31	194.33	97.16	200.95
125.00	24.0	191.07	3.21	194.29	97.14	200.72
126.00	24.0	191.07	3.20	194.28	97.14	200.68
127.00	24.0	191.07	3.19	194.26	97.13	200.64
128.00	24.0	191.07	3.15	194.22	97.11	200.51
129.00	24.0	191.07	3.07	194.15	97.07	200.29
130.00	24.0	191.07	2.97	194.05	97.02	199.99
131.00	24.0	191.07	2.84	193.92	96.96	199.60
132.00	24.0	191.07	2.66	193.74	96.87	199.06
133.00	24.0	191.07	2.41	193.49	96.74	198.31
134.00	24.0	191.07	2.20	193.28	96.64	197.69
135.00	24.0	191.07	2.15	193.23	96.61	197.54
136.00	24.0	191.07	2.26	193.33	96.67	197.86
137.00	24.0	191.07	2.61	193.68	96.84	198.90
138.00	24.0	191.07	3.28	194.36	97.18	200.92
139.00	24.0	191.07	4.17	195.24	97.62	203.57
140.00	24.0	191.07	5.15	196.23	98.11	206.53

141.00	24.0	191.00	6.05	197.05	98.52	209.15
142.00	24.0	191.06	6.95	198.01	99.01	211.92
143.00	24.0	191.24	7.81	199.05	99.53	214.68
144.00	24.0	191.53	8.50	200.03	100.02	217.04
145.00	24.0	191.96	8.72	200.68	100.34	218.13
146.00	24.0	192.44	8.65	201.10	100.55	218.40
147.00	24.0	192.93	8.35	201.29	100.64	218.00
148.00	24.0	193.43	7.83	201.26	100.63	216.92
149.00	24.0	193.93	7.19	201.12	100.56	215.51
150.00	24.0	194.43	6.55	200.99	100.49	214.10
151.00	24.0	194.90	5.98	200.88	100.44	212.84
152.00	24.0	195.26	5.53	200.80	100.40	211.86
153.00	24.0	195.53	5.22	200.75	100.37	211.18
154.00	24.0	195.71	5.14	200.85	100.42	211.12
155.00	24.0	195.79	5.41	201.20	100.60	212.03
156.00	24.0	195.81	5.98	201.79	100.90	213.75
157.00	24.0	195.84	6.72	202.56	101.28	216.01
158.00	24.0	195.86	7.60	203.46	101.73	218.65
159.00	24.0	195.88	10.20	206.08	103.04	226.47
160.00	24.0	195.90	16.13	212.03	106.02	244.29
161.00	24.0	195.97	25.33	221.30	110.65	271.96
162.00	24.0	196.14	37.78	233.92	116.96	309.49
163.00	24.0	196.41	53.54	249.95	124.98	357.03
164.00	24.0	196.79	70.88	267.67	133.83	409.43
165.00	24.0	197.26	88.10	285.36	142.68	461.55
166.00	24.0	198.56	104.28	302.84	151.42	511.41
167.00	24.0	201.40	118.59	319.99	159.99	557.17
168.00	24.0	205.80	131.07	336.86	168.43	599.00
169.00	24.0	211.76	141.71	353.48	176.74	636.90
170.00	24.0	219.30	150.53	369.83	184.92	670.89
171.00	24.0	227.64	158.48	386.12	193.06	703.08
172.00	24.0	236.02	166.48	402.50	201.25	735.46
173.00	24.0	244.42	174.48	418.90	209.45	767.86
174.00	24.0	252.85	182.48	435.33	217.67	800.29
175.00	24.0	261.30	190.48	451.78	225.89	832.74
176.00	24.0	269.78	198.48	468.26	234.13	865.22
177.00	24.0	278.28	206.43	484.71	242.36	897.57
178.00	24.0	286.80	214.28	501.09	250.54	929.65
179.00	24.0	295.35	220.61	515.95	257.98	957.16
180.00	24.0	303.91	223.97	527.88	263.94	975.82
181.00	24.0	312.49	224.38	536.87	268.43	985.64
182.00	24.0	321.08	221.14	542.22	271.11	984.49
183.00	24.0	329.70	213.53	543.23	271.61	970.29
184.00	24.0	338.33	202.71	541.03	270.52	946.44
185.00	24.0	346.97	189.79	536.76	268.38	916.35
186.00	24.0	355.90	175.60	531.50	265.75	882.69
187.00	24.0	365.37	161.68	527.04	263.52	850.40
188.00	24.0	375.39	148.78	524.16	262.08	821.71
189.00	24.0	385.95	137.48	523.44	261.72	798.40
190.00	24.0	411.91	32.01	443.92	221.96	507.94

191.00	24.0	421.15	34.21	455.36	227.68	523.77
192.00	24.0	430.68	35.38	466.06	233.03	536.81
193.00	24.0	439.55	36.40	475.95	237.97	548.75
194.00	24.0	447.46	37.63	485.09	242.54	560.35
195.00	24.0	454.28	37.51	491.79	245.89	566.80
196.00	24.0	461.03	37.60	498.63	249.32	573.84
197.00	24.0	468.89	37.62	506.51	253.25	581.75
198.00	24.0	477.88	37.19	515.07	257.54	589.45
199.00	24.0	488.03	36.25	524.28	262.14	596.79
200.00	24.0	499.33	34.84	534.17	267.09	603.85

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
201.00	24.0	510.89	33.05	543.94	271.97	610.05
202.00	24.0	521.77	31.15	552.92	276.46	615.22
203.00	24.0	531.96	29.23	561.18	280.59	619.63
204.00	24.0	541.46	27.48	568.94	284.47	623.91
205.00	24.0	550.26	26.12	576.38	288.19	628.61
206.00	24.0	558.32	25.08	583.40	291.70	633.55
207.00	24.0	565.59	23.77	589.36	294.68	636.90
208.00	24.0	572.05	22.92	594.97	297.49	640.81
209.00	24.0	577.72	22.77	600.49	300.25	646.03
210.00	24.0	582.59	23.56	606.15	303.08	653.27
211.00	24.0	587.29	25.21	612.51	306.25	662.94
212.00	24.0	592.46	27.40	619.85	309.93	674.65
213.00	24.0	598.09	29.85	627.94	313.97	687.64
214.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
215.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
216.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
217.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
218.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
219.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
220.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-433_24-inch PPSC_SCOUR(-24)PREFORM(-63).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 11/18/2019, Boring Number: BB-433
Station number: 433+02 Offset: 9' RT.

Ground Elevation: 11.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	4.00	4.00	5- Cavity layer
4	6.00	8.00	5- Cavity layer
5	8.00	12.00	5- Cavity layer
6	10.00	6.00	5- Cavity layer
7	15.00	3.00	5- Cavity layer
8	20.00	1.00	5- Cavity layer
9	25.00	1.00	5- Cavity layer
10	30.00	21.00	5- Cavity layer
11	34.70	0.00	5- Cavity layer
12	35.00	9.00	3- Clean sand
13	40.00	6.00	3- Clean sand
14	45.00	5.00	3- Clean sand
15	50.00	5.00	3- Clean sand
16	55.00	8.00	3- Clean sand
17	60.00	9.00	3- Clean sand
18	65.00	9.00	3- Clean sand
19	70.00	3.00	3- Clean sand

20	73.70	3.00	3- Clean sand
21	73.80	3.00	3- Clean sand
22	75.00	13.00	1- Plastic Clay
23	80.00	8.00	1- Plastic Clay
24	85.00	4.00	1- Plastic Clay
25	90.00	7.00	1- Plastic Clay
26	95.00	7.00	1- Plastic Clay
27	100.00	7.00	1- Plastic Clay
28	105.00	3.00	1- Plastic Clay
29	110.00	2.00	1- Plastic Clay
30	115.00	4.00	1- Plastic Clay
31	120.00	3.00	3- Clean sand
32	125.00	1.00	3- Clean sand
33	130.00	2.00	3- Clean sand
34	135.00	2.00	3- Clean sand
35	140.00	1.00	3- Clean sand
36	145.00	3.00	3- Clean sand
37	150.00	3.00	3- Clean sand
38	155.00	1.00	3- Clean sand
39	160.00	2.00	3- Clean sand
40	165.00	3.00	3- Clean sand
41	170.00	100.00	3- Clean sand
42	175.00	100.00	3- Clean sand
43	180.00	100.00	3- Clean sand
44	185.00	64.00	3- Clean sand
45	190.00	64.00	1- Plastic Clay
46	195.00	13.00	1- Plastic Clay
47	200.00	54.00	1- Plastic Clay
48	205.00	20.00	1- Plastic Clay
49	210.00	9.00	1- Plastic Clay
50	215.00	15.00	1- Plastic Clay
51	220.00	22.00	2- Clay and silty sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	11.00	-24.00	35.00	5.99	5-Void
2	-24.00	-64.00	40.00	6.75	3-Clean Sand
3	-64.00	-109.00	45.00	6.11	1-Plastic Clay
4	-109.00	-179.00	70.00	27.50	3-Clean Sand
5	-179.00	-209.00	30.00	29.17	1-Plastic Clay
6	-209.00	-209.00	0.00	22.00	2-Clay and Silty Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	10.00
24.00	2.00	9.00
24.00	3.00	8.00
24.00	4.00	7.00
24.00	5.00	6.00
24.00	6.00	5.00
24.00	7.00	4.00
24.00	8.00	3.00
24.00	9.00	2.00
24.00	10.00	1.00
24.00	11.00	0.00
24.00	12.00	-1.00
24.00	13.00	-2.00
24.00	14.00	-3.00
24.00	15.00	-4.00
24.00	16.00	-5.00
24.00	17.00	-6.00
24.00	18.00	-7.00
24.00	19.00	-8.00
24.00	20.00	-9.00
24.00	21.00	-10.00
24.00	22.00	-11.00
24.00	23.00	-12.00
24.00	24.00	-13.00
24.00	25.00	-14.00
24.00	26.00	-15.00
24.00	27.00	-16.00
24.00	28.00	-17.00
24.00	29.00	-18.00
24.00	30.00	-19.00
24.00	31.00	-20.00
24.00	32.00	-21.00
24.00	33.00	-22.00
24.00	34.00	-23.00
24.00	35.00	-24.00
24.00	36.00	-25.00
24.00	37.00	-26.00
24.00	38.00	-27.00
24.00	39.00	-28.00
24.00	40.00	-29.00

24.00	41.00	-30.00
24.00	42.00	-31.00
24.00	43.00	-32.00
24.00	44.00	-33.00
24.00	45.00	-34.00
24.00	46.00	-35.00
24.00	47.00	-36.00
24.00	48.00	-37.00
24.00	49.00	-38.00
24.00	50.00	-39.00
24.00	51.00	-40.00
24.00	52.00	-41.00
24.00	53.00	-42.00
24.00	54.00	-43.00
24.00	55.00	-44.00
24.00	56.00	-45.00
24.00	57.00	-46.00
24.00	58.00	-47.00
24.00	59.00	-48.00
24.00	60.00	-49.00
24.00	61.00	-50.00
24.00	62.00	-51.00
24.00	63.00	-52.00
24.00	64.00	-53.00
24.00	65.00	-54.00
24.00	66.00	-55.00
24.00	67.00	-56.00
24.00	68.00	-57.00
24.00	69.00	-58.00
24.00	70.00	-59.00
24.00	71.00	-60.00
24.00	72.00	-61.00
24.00	73.00	-62.00
24.00	74.00	-63.00
24.00	75.00	-64.00
24.00	76.00	-65.00
24.00	77.00	-66.00
24.00	78.00	-67.00
24.00	79.00	-68.00
24.00	80.00	-69.00
24.00	81.00	-70.00
24.00	82.00	-71.00
24.00	83.00	-72.00
24.00	84.00	-73.00
24.00	85.00	-74.00
24.00	86.00	-75.00
24.00	87.00	-76.00
24.00	88.00	-77.00
24.00	89.00	-78.00
24.00	90.00	-79.00

24.00	91.00	-80.00
24.00	92.00	-81.00
24.00	93.00	-82.00
24.00	94.00	-83.00
24.00	95.00	-84.00
24.00	96.00	-85.00
24.00	97.00	-86.00
24.00	98.00	-87.00
24.00	99.00	-88.00
24.00	100.00	-89.00
24.00	101.00	-90.00
24.00	102.00	-91.00
24.00	103.00	-92.00
24.00	104.00	-93.00
24.00	105.00	-94.00
24.00	106.00	-95.00
24.00	107.00	-96.00
24.00	108.00	-97.00
24.00	109.00	-98.00
24.00	110.00	-99.00
24.00	111.00	-100.00
24.00	112.00	-101.00
24.00	113.00	-102.00
24.00	114.00	-103.00
24.00	115.00	-104.00
24.00	116.00	-105.00
24.00	117.00	-106.00
24.00	118.00	-107.00
24.00	119.00	-108.00
24.00	120.00	-109.00
24.00	121.00	-110.00
24.00	122.00	-111.00
24.00	123.00	-112.00
24.00	124.00	-113.00
24.00	125.00	-114.00
24.00	126.00	-115.00
24.00	127.00	-116.00
24.00	128.00	-117.00
24.00	129.00	-118.00
24.00	130.00	-119.00
24.00	131.00	-120.00
24.00	132.00	-121.00
24.00	133.00	-122.00
24.00	134.00	-123.00
24.00	135.00	-124.00
24.00	136.00	-125.00
24.00	137.00	-126.00
24.00	138.00	-127.00
24.00	139.00	-128.00
24.00	140.00	-129.00

24.00	141.00	-130.00
24.00	142.00	-131.00
24.00	143.00	-132.00
24.00	144.00	-133.00
24.00	145.00	-134.00
24.00	146.00	-135.00
24.00	147.00	-136.00
24.00	148.00	-137.00
24.00	149.00	-138.00
24.00	150.00	-139.00
24.00	151.00	-140.00
24.00	152.00	-141.00
24.00	153.00	-142.00
24.00	154.00	-143.00
24.00	155.00	-144.00
24.00	156.00	-145.00
24.00	157.00	-146.00
24.00	158.00	-147.00
24.00	159.00	-148.00
24.00	160.00	-149.00
24.00	161.00	-150.00
24.00	162.00	-151.00
24.00	163.00	-152.00
24.00	164.00	-153.00
24.00	165.00	-154.00
24.00	166.00	-155.00
24.00	167.00	-156.00
24.00	168.00	-157.00
24.00	169.00	-158.00
24.00	170.00	-159.00
24.00	171.00	-160.00
24.00	172.00	-161.00
24.00	173.00	-162.00
24.00	174.00	-163.00
24.00	175.00	-164.00
24.00	176.00	-165.00
24.00	177.00	-166.00
24.00	178.00	-167.00
24.00	179.00	-168.00
24.00	180.00	-169.00
24.00	181.00	-170.00
24.00	182.00	-171.00
24.00	183.00	-172.00
24.00	184.00	-173.00
24.00	185.00	-174.00
24.00	186.00	-175.00
24.00	187.00	-176.00
24.00	188.00	-177.00
24.00	189.00	-178.00
24.00	190.00	-179.00

24.00	191.00	-180.00
24.00	192.00	-181.00
24.00	193.00	-182.00
24.00	194.00	-183.00
24.00	195.00	-184.00
24.00	196.00	-185.00
24.00	197.00	-186.00
24.00	198.00	-187.00
24.00	199.00	-188.00
24.00	200.00	-189.00
24.00	201.00	-190.00
24.00	202.00	-191.00
24.00	203.00	-192.00
24.00	204.00	-193.00
24.00	205.00	-194.00
24.00	206.00	-195.00
24.00	207.00	-196.00
24.00	208.00	-197.00
24.00	209.00	-198.00
24.00	210.00	-199.00
24.00	211.00	-200.00
24.00	212.00	-201.00
24.00	213.00	-202.00
24.00	214.00	-203.00
24.00	215.00	-204.00
24.00	216.00	-205.00
24.00	217.00	-206.00
24.00	218.00	-207.00
24.00	219.00	-208.00
24.00	220.00	-209.00

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00

3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00
10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.00	0.00	0.00	0.00	0.00
19.00	24.0	0.00	0.00	0.00	0.00	0.00
20.00	24.0	0.00	0.00	0.00	0.00	0.00
21.00	24.0	0.00	0.00	0.00	0.00	0.00
22.00	24.0	0.00	0.00	0.00	0.00	0.00
23.00	24.0	0.00	0.00	0.00	0.00	0.00
24.00	24.0	0.00	0.00	0.00	0.00	0.00
25.00	24.0	0.00	0.00	0.00	0.00	0.00
26.00	24.0	0.00	0.00	0.00	0.00	0.00
27.00	24.0	0.00	0.00	0.00	0.00	0.00
28.00	24.0	0.00	0.00	0.00	0.00	0.00
29.00	24.0	0.00	0.00	0.00	0.00	0.00
30.00	24.0	0.00	0.00	0.00	0.00	0.00
31.00	24.0	0.00	0.00	0.00	0.00	0.00
32.00	24.0	0.00	0.00	0.00	0.00	0.00
33.00	24.0	0.00	0.00	0.00	0.00	0.00
34.00	24.0	0.00	0.00	0.00	0.00	0.00
35.00	24.0	0.25	18.78	19.03	9.52	56.59
36.00	24.0	1.88	18.80	20.67	10.34	58.27
37.00	24.0	3.34	18.86	22.21	11.10	59.93
38.00	24.0	4.66	18.99	23.65	11.83	61.63
39.00	24.0	5.83	19.20	25.03	12.51	63.43
40.00	24.0	6.83	19.54	26.36	13.18	65.43
41.00	24.0	7.73	20.00	27.73	13.87	67.74
42.00	24.0	8.57	20.60	29.18	14.59	70.38
43.00	24.0	9.38	21.34	30.72	15.36	73.41
44.00	24.0	10.13	22.32	32.45	16.22	77.09
45.00	24.0	10.80	23.67	34.47	17.24	81.82
46.00	24.0	11.45	25.44	36.89	18.45	87.77
47.00	24.0	12.12	27.66	39.78	19.89	95.11
48.00	24.0	13.10	29.51	42.61	21.30	101.63
49.00	24.0	14.07	31.51	45.58	22.79	108.60
50.00	24.0	15.04	33.58	48.62	24.31	115.79
51.00	24.0	16.05	35.45	51.50	25.75	122.39
52.00	24.0	17.17	36.04	53.21	26.60	125.29

53.00	24.0	18.38	36.68	55.06	27.53	128.43
54.00	24.0	19.70	37.33	57.03	28.52	131.70
55.00	24.0	21.12	37.96	59.08	29.54	134.99
56.00	24.0	22.61	38.60	61.21	30.60	138.40
57.00	24.0	24.14	39.26	63.40	31.70	141.91
58.00	24.0	25.71	39.91	65.62	32.81	145.44
59.00	24.0	27.31	40.32	67.64	33.82	148.29
60.00	24.0	28.96	40.28	69.23	34.62	149.79
61.00	24.0	30.62	39.79	70.41	35.20	149.99
62.00	24.0	32.28	38.86	71.15	35.57	148.87
63.00	24.0	33.95	37.48	71.44	35.72	146.40
64.00	24.0	35.62	35.88	71.50	35.75	143.25
65.00	24.0	37.29	34.27	71.56	35.78	140.11
66.00	24.0	38.86	32.79	71.65	35.83	137.24
67.00	24.0	40.21	31.52	71.73	35.87	134.77
68.00	24.0	41.36	30.37	71.72	35.86	132.46
69.00	24.0	42.29	29.31	71.59	35.80	130.20
70.00	24.0	43.00	28.32	71.32	35.66	127.95
71.00	24.0	43.60	27.27	70.88	35.44	125.43
72.00	24.0	44.21	26.08	70.29	35.14	122.45
73.00	24.0	44.81	24.78	69.58	34.79	119.13
74.00	24.0	45.49	23.36	68.85	34.43	115.57
75.00	24.0	51.60	11.06	62.66	31.33	84.79
76.00	24.0	56.95	11.35	68.30	34.15	91.01
77.00	24.0	62.60	11.24	73.83	36.92	96.31
78.00	24.0	67.86	10.62	78.49	39.24	99.73
79.00	24.0	72.45	9.90	82.35	41.18	102.16
80.00	24.0	76.62	9.32	85.94	42.97	104.57
81.00	24.0	80.40	8.86	89.26	44.63	106.99
82.00	24.0	83.80	8.54	92.34	46.17	109.42
83.00	24.0	86.82	8.34	95.16	47.58	111.84
84.00	24.0	89.47	8.24	97.71	48.85	114.18
85.00	24.0	91.74	8.20	99.94	49.97	116.35
86.00	24.0	93.96	8.22	102.18	51.09	118.62
87.00	24.0	96.47	8.25	104.72	52.36	121.22
88.00	24.0	99.27	8.28	107.54	53.77	124.10
89.00	24.0	102.35	8.30	110.64	55.32	127.24
90.00	24.0	105.72	8.29	114.01	57.01	130.60
91.00	24.0	109.23	8.28	117.51	58.76	134.08
92.00	24.0	112.74	8.08	120.83	60.41	136.99
93.00	24.0	116.25	7.92	124.17	62.09	140.02
94.00	24.0	119.77	7.76	127.53	63.76	143.05
95.00	24.0	123.28	7.57	130.85	65.42	145.99
96.00	24.0	126.79	7.35	134.14	67.07	148.85
97.00	24.0	130.30	7.10	137.40	68.70	151.60
98.00	24.0	133.81	6.81	140.62	70.31	154.24
99.00	24.0	137.33	6.49	143.82	71.91	156.79
100.00	24.0	140.84	6.15	146.99	73.49	159.29

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	144.16	5.81	149.96	74.98	161.58
102.00	24.0	147.09	5.46	152.55	76.27	163.46
103.00	24.0	149.63	5.07	154.71	77.35	164.85
104.00	24.0	151.79	4.71	156.50	78.25	165.92
105.00	24.0	153.57	4.43	158.00	79.00	166.86
106.00	24.0	154.99	4.23	159.21	79.61	167.67
107.00	24.0	156.09	4.11	160.20	80.10	168.42
108.00	24.0	156.88	4.08	160.96	80.48	169.13
109.00	24.0	157.35	4.20	161.55	80.78	169.95
110.00	24.0	157.51	4.50	162.02	81.01	171.02
111.00	24.0	157.72	4.96	162.68	81.34	172.61
112.00	24.0	158.35	5.55	163.89	81.95	174.99
113.00	24.0	159.39	6.26	165.64	82.82	178.15
114.00	24.0	160.84	6.89	167.73	83.87	181.52
115.00	24.0	162.71	7.27	169.98	84.99	184.51
116.00	24.0	164.64	7.35	171.99	86.00	186.69
117.00	24.0	166.27	7.13	173.40	86.70	187.65
118.00	24.0	167.59	6.62	174.21	87.11	187.45
119.00	24.0	168.61	5.94	174.55	87.27	186.42
120.00	24.0	169.33	5.19	174.52	87.26	184.90
121.00	24.0	169.84	4.49	174.33	87.17	183.32
122.00	24.0	170.23	3.95	174.18	87.09	182.09
123.00	24.0	170.52	3.56	174.07	87.04	181.18
124.00	24.0	170.69	3.31	174.00	87.00	180.62
125.00	24.0	170.74	3.21	173.96	86.98	180.39
126.00	24.0	170.74	3.20	173.95	86.97	180.35
127.00	24.0	170.74	3.19	173.93	86.97	180.31
128.00	24.0	170.74	3.15	173.89	86.94	180.18
129.00	24.0	170.74	3.07	173.82	86.91	179.96
130.00	24.0	170.74	2.97	173.71	86.86	179.66
131.00	24.0	170.74	2.84	173.58	86.79	179.27
132.00	24.0	170.74	2.66	173.40	86.70	178.73
133.00	24.0	170.74	2.41	173.15	86.58	177.98
134.00	24.0	170.74	2.20	172.95	86.47	177.36
135.00	24.0	170.74	2.15	172.90	86.45	177.21
136.00	24.0	170.74	2.26	173.00	86.50	177.52
137.00	24.0	170.74	2.61	173.35	86.68	178.57
138.00	24.0	170.74	3.28	174.02	87.01	180.58
139.00	24.0	170.74	4.17	174.91	87.45	183.24
140.00	24.0	170.74	5.15	175.89	87.95	186.20

141.00	24.0	170.67	6.05	176.72	88.36	188.82
142.00	24.0	170.73	6.95	177.68	88.84	191.59
143.00	24.0	170.91	7.81	178.72	89.36	194.35
144.00	24.0	171.20	8.50	179.70	89.85	196.70
145.00	24.0	171.63	8.72	180.35	90.18	197.80
146.00	24.0	172.11	8.65	180.76	90.38	198.07
147.00	24.0	172.60	8.35	180.96	90.48	197.66
148.00	24.0	173.10	7.83	180.93	90.46	196.59
149.00	24.0	173.60	7.19	180.79	90.40	195.17
150.00	24.0	174.10	6.55	180.66	90.33	193.77
151.00	24.0	174.56	5.98	180.54	90.27	192.50
152.00	24.0	174.93	5.53	180.46	90.23	191.53
153.00	24.0	175.20	5.22	180.42	90.21	190.85
154.00	24.0	175.38	5.14	180.51	90.26	190.79
155.00	24.0	175.45	5.41	180.87	90.43	191.69
156.00	24.0	175.48	5.98	181.46	90.73	193.42
157.00	24.0	175.50	6.72	182.23	91.11	195.68
158.00	24.0	175.53	7.60	183.12	91.56	198.32
159.00	24.0	175.55	10.20	185.75	92.87	206.14
160.00	24.0	175.57	16.13	191.70	95.85	223.96
161.00	24.0	175.64	25.33	200.97	100.49	251.63
162.00	24.0	175.81	37.78	213.59	106.80	289.16
163.00	24.0	176.08	53.54	229.62	114.81	336.69
164.00	24.0	176.46	70.88	247.34	123.67	389.10
165.00	24.0	176.93	88.10	265.03	132.51	441.22
166.00	24.0	178.23	104.28	282.51	141.25	491.08
167.00	24.0	181.07	118.59	299.66	149.83	536.84
168.00	24.0	185.47	131.07	316.53	158.27	578.67
169.00	24.0	191.43	141.71	333.14	166.57	616.57
170.00	24.0	198.97	150.53	349.50	174.75	650.56
171.00	24.0	207.31	158.48	365.79	182.90	682.75
172.00	24.0	215.69	166.48	382.17	191.08	715.13
173.00	24.0	224.09	174.48	398.57	199.28	747.53
174.00	24.0	232.52	182.48	415.00	207.50	779.96
175.00	24.0	240.97	190.48	431.45	215.73	812.41
176.00	24.0	249.45	198.48	447.93	223.97	844.89
177.00	24.0	257.95	206.43	464.38	232.19	877.24
178.00	24.0	266.47	214.28	480.75	240.38	909.32
179.00	24.0	275.01	220.61	495.62	247.81	936.83
180.00	24.0	283.58	223.97	507.55	253.77	955.49
181.00	24.0	292.16	224.38	516.54	258.27	965.30
182.00	24.0	300.75	221.14	521.89	260.94	964.16
183.00	24.0	309.37	213.53	522.90	261.45	949.96
184.00	24.0	318.00	202.71	520.70	260.35	926.11
185.00	24.0	326.64	189.79	516.43	258.22	896.02
186.00	24.0	335.56	175.60	511.16	255.58	862.36
187.00	24.0	345.04	161.68	506.71	253.36	830.07
188.00	24.0	355.05	148.78	503.83	251.92	801.38
189.00	24.0	365.62	137.48	503.10	251.55	778.07
190.00	24.0	391.58	32.01	423.59	211.79	487.61

191.00	24.0	400.82	34.21	435.02	217.51	503.44
192.00	24.0	410.35	35.38	445.73	222.86	516.48
193.00	24.0	419.22	36.40	455.62	227.81	528.42
194.00	24.0	427.13	37.63	464.76	232.38	540.01
195.00	24.0	433.94	37.51	471.45	235.73	546.47
196.00	24.0	440.70	37.60	478.30	239.15	553.51
197.00	24.0	448.56	37.62	486.18	243.09	561.41
198.00	24.0	457.55	37.19	494.74	247.37	569.12
199.00	24.0	467.70	36.25	503.95	251.97	576.46
200.00	24.0	479.00	34.84	513.84	256.92	583.52

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
201.00	24.0	490.56	33.05	523.61	261.81	589.72
202.00	24.0	501.43	31.15	532.58	266.29	594.89
203.00	24.0	511.62	29.23	540.85	270.43	599.30
204.00	24.0	521.12	27.48	548.61	274.30	603.58
205.00	24.0	529.93	26.12	556.05	278.02	608.28
206.00	24.0	537.99	25.08	563.07	281.53	613.22
207.00	24.0	545.25	23.77	569.02	284.51	616.56
208.00	24.0	551.72	22.92	574.64	287.32	620.48
209.00	24.0	557.39	22.77	580.16	290.08	625.70
210.00	24.0	562.26	23.56	585.82	292.91	632.94
211.00	24.0	566.96	25.21	592.17	296.09	642.60
212.00	24.0	572.13	27.40	599.52	299.76	654.31
213.00	24.0	577.76	29.85	607.61	303.80	667.31
214.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
215.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
216.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
217.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
218.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
219.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
220.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....Final\60 PERCENT\BB-435_24-inch PPSC_SCOUR(-18)PREFORM(-43).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra Inc. - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 12/3/2019, Boring Number: BB-435R
Station number: 434+84 Offset: 39' RT.

Ground Elevation: 5.800(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	5- Cavity layer
2	2.00	4.00	5- Cavity layer
3	4.00	4.00	5- Cavity layer
4	6.00	5.00	5- Cavity layer
5	8.00	4.00	5- Cavity layer
6	10.00	3.00	5- Cavity layer
7	15.00	2.00	5- Cavity layer
8	20.00	3.00	5- Cavity layer
9	23.80	0.00	5- Cavity layer
10	25.00	3.00	3- Clean sand
11	30.00	10.00	4- Lime Stone/Very shelly sand
12	35.00	10.00	4- Lime Stone/Very shelly sand
13	40.00	5.00	3- Clean sand
14	45.00	7.00	3- Clean sand
15	48.80	7.00	3- Clean sand
16	48.90	7.00	3- Clean sand
17	50.00	8.00	3- Clean sand
18	55.00	4.00	3- Clean sand
19	60.00	5.00	3- Clean sand

20	65.00	6.00	3- Clean sand
21	70.00	5.00	3- Clean sand
22	75.00	5.00	3- Clean sand
23	80.00	8.00	2- Clay and silty sand
24	85.00	7.00	2- Clay and silty sand
25	90.00	10.00	1- Plastic Clay
26	95.00	6.00	1- Plastic Clay
27	100.00	8.00	3- Clean sand
28	105.00	3.00	3- Clean sand
29	110.00	3.00	1- Plastic Clay
30	115.00	2.00	1- Plastic Clay
31	120.00	3.00	1- Plastic Clay
32	125.00	1.00	1- Plastic Clay
33	130.00	1.00	1- Plastic Clay
34	135.00	1.00	1- Plastic Clay
35	140.00	1.00	3- Clean sand
36	145.00	2.00	3- Clean sand
37	150.00	5.00	3- Clean sand
38	155.00	4.00	3- Clean sand
39	160.00	9.00	3- Clean sand
40	165.00	38.00	3- Clean sand
41	170.00	81.00	3- Clean sand
42	175.00	45.00	3- Clean sand
43	180.00	63.00	3- Clean sand
44	185.00	38.00	3- Clean sand
45	190.00	27.00	3- Clean sand
46	195.00	41.00	3- Clean sand
47	200.00	48.00	3- Clean sand
48	205.00	25.00	3- Clean sand
49	210.00	20.00	2- Clay and silty sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	5.80	-19.20	25.00	2.82	5-Void
2	-19.20	-24.20	5.00	3.00	3-Clean Sand
3	-24.20	-34.20	10.00	10.00	4-Limestone, Very Shelly Sand
4	-34.20	-74.20	40.00	5.63	3-Clean Sand
5	-74.20	-84.20	10.00	7.50	2-Clay and Silty Sand
6	-84.20	-94.20	10.00	8.00	1-Plastic Clay
7	-94.20	-104.20	10.00	5.50	3-Clean Sand
8	-104.20	-134.20	30.00	1.83	1-Plastic Clay

9	-134.20	-204.20	70.00	30.50	3-Clean Sand
10	-204.20	-204.20	0.00	20.00	2-Clay and Silty Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	1.00	4.80
24.00	2.00	3.80
24.00	3.00	2.80
24.00	4.00	1.80
24.00	5.00	0.80
24.00	6.00	-0.20
24.00	7.00	-1.20
24.00	8.00	-2.20
24.00	9.00	-3.20
24.00	10.00	-4.20
24.00	11.00	-5.20
24.00	12.00	-6.20
24.00	13.00	-7.20
24.00	14.00	-8.20
24.00	15.00	-9.20
24.00	16.00	-10.20
24.00	17.00	-11.20
24.00	18.00	-12.20
24.00	19.00	-13.20
24.00	20.00	-14.20
24.00	21.00	-15.20
24.00	22.00	-16.20
24.00	23.00	-17.20
24.00	24.00	-18.20
24.00	25.00	-19.20
24.00	26.00	-20.20
24.00	27.00	-21.20
24.00	28.00	-22.20
24.00	29.00	-23.20
24.00	30.00	-24.20
24.00	31.00	-25.20
24.00	32.00	-26.20
24.00	33.00	-27.20
24.00	34.00	-28.20
24.00	35.00	-29.20
24.00	36.00	-30.20
24.00	37.00	-31.20

24.00	38.00	-32.20
24.00	39.00	-33.20
24.00	40.00	-34.20
24.00	41.00	-35.20
24.00	42.00	-36.20
24.00	43.00	-37.20
24.00	44.00	-38.20
24.00	45.00	-39.20
24.00	46.00	-40.20
24.00	47.00	-41.20
24.00	48.00	-42.20
24.00	49.00	-43.20
24.00	50.00	-44.20
24.00	51.00	-45.20
24.00	52.00	-46.20
24.00	53.00	-47.20
24.00	54.00	-48.20
24.00	55.00	-49.20
24.00	56.00	-50.20
24.00	57.00	-51.20
24.00	58.00	-52.20
24.00	59.00	-53.20
24.00	60.00	-54.20
24.00	61.00	-55.20
24.00	62.00	-56.20
24.00	63.00	-57.20
24.00	64.00	-58.20
24.00	65.00	-59.20
24.00	66.00	-60.20
24.00	67.00	-61.20
24.00	68.00	-62.20
24.00	69.00	-63.20
24.00	70.00	-64.20
24.00	71.00	-65.20
24.00	72.00	-66.20
24.00	73.00	-67.20
24.00	74.00	-68.20
24.00	75.00	-69.20
24.00	76.00	-70.20
24.00	77.00	-71.20
24.00	78.00	-72.20
24.00	79.00	-73.20
24.00	80.00	-74.20
24.00	81.00	-75.20
24.00	82.00	-76.20
24.00	83.00	-77.20
24.00	84.00	-78.20
24.00	85.00	-79.20
24.00	86.00	-80.20
24.00	87.00	-81.20

24.00	88.00	-82.20
24.00	89.00	-83.20
24.00	90.00	-84.20
24.00	91.00	-85.20
24.00	92.00	-86.20
24.00	93.00	-87.20
24.00	94.00	-88.20
24.00	95.00	-89.20
24.00	96.00	-90.20
24.00	97.00	-91.20
24.00	98.00	-92.20
24.00	99.00	-93.20
24.00	100.00	-94.20
24.00	101.00	-95.20
24.00	102.00	-96.20
24.00	103.00	-97.20
24.00	104.00	-98.20
24.00	105.00	-99.20
24.00	106.00	-100.20
24.00	107.00	-101.20
24.00	108.00	-102.20
24.00	109.00	-103.20
24.00	110.00	-104.20
24.00	111.00	-105.20
24.00	112.00	-106.20
24.00	113.00	-107.20
24.00	114.00	-108.20
24.00	115.00	-109.20
24.00	116.00	-110.20
24.00	117.00	-111.20
24.00	118.00	-112.20
24.00	119.00	-113.20
24.00	120.00	-114.20
24.00	121.00	-115.20
24.00	122.00	-116.20
24.00	123.00	-117.20
24.00	124.00	-118.20
24.00	125.00	-119.20
24.00	126.00	-120.20
24.00	127.00	-121.20
24.00	128.00	-122.20
24.00	129.00	-123.20
24.00	130.00	-124.20
24.00	131.00	-125.20
24.00	132.00	-126.20
24.00	133.00	-127.20
24.00	134.00	-128.20
24.00	135.00	-129.20
24.00	136.00	-130.20
24.00	137.00	-131.20

24.00	138.00	-132.20
24.00	139.00	-133.20
24.00	140.00	-134.20
24.00	141.00	-135.20
24.00	142.00	-136.20
24.00	143.00	-137.20
24.00	144.00	-138.20
24.00	145.00	-139.20
24.00	146.00	-140.20
24.00	147.00	-141.20
24.00	148.00	-142.20
24.00	149.00	-143.20
24.00	150.00	-144.20
24.00	151.00	-145.20
24.00	152.00	-146.20
24.00	153.00	-147.20
24.00	154.00	-148.20
24.00	155.00	-149.20
24.00	156.00	-150.20
24.00	157.00	-151.20
24.00	158.00	-152.20
24.00	159.00	-153.20
24.00	160.00	-154.20
24.00	161.00	-155.20
24.00	162.00	-156.20
24.00	163.00	-157.20
24.00	164.00	-158.20
24.00	165.00	-159.20
24.00	166.00	-160.20
24.00	167.00	-161.20
24.00	168.00	-162.20
24.00	169.00	-163.20
24.00	170.00	-164.20
24.00	171.00	-165.20
24.00	172.00	-166.20
24.00	173.00	-167.20
24.00	174.00	-168.20
24.00	175.00	-169.20
24.00	176.00	-170.20
24.00	177.00	-171.20
24.00	178.00	-172.20
24.00	179.00	-173.20
24.00	180.00	-174.20
24.00	181.00	-175.20
24.00	182.00	-176.20
24.00	183.00	-177.20
24.00	184.00	-178.20
24.00	185.00	-179.20
24.00	186.00	-180.20
24.00	187.00	-181.20

24.00	188.00	-182.20
24.00	189.00	-183.20
24.00	190.00	-184.20
24.00	191.00	-185.20
24.00	192.00	-186.20
24.00	193.00	-187.20
24.00	194.00	-188.20
24.00	195.00	-189.20
24.00	196.00	-190.20
24.00	197.00	-191.20
24.00	198.00	-192.20
24.00	199.00	-193.20
24.00	200.00	-194.20
24.00	201.00	-195.20
24.00	202.00	-196.20
24.00	203.00	-197.20
24.00	204.00	-198.20
24.00	205.00	-199.20
24.00	206.00	-200.20
24.00	207.00	-201.20
24.00	208.00	-202.20
24.00	209.00	-203.20
24.00	210.00	-204.20

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.00	0.00	0.00	0.00	0.00
2.00	24.0	0.00	0.00	0.00	0.00	0.00
3.00	24.0	0.00	0.00	0.00	0.00	0.00
4.00	24.0	0.00	0.00	0.00	0.00	0.00
5.00	24.0	0.00	0.00	0.00	0.00	0.00
6.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
8.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	0.00	0.00	0.00	0.00

10.00	24.0	0.00	0.00	0.00	0.00	0.00
11.00	24.0	0.00	0.00	0.00	0.00	0.00
12.00	24.0	0.00	0.00	0.00	0.00	0.00
13.00	24.0	0.00	0.00	0.00	0.00	0.00
14.00	24.0	0.00	0.00	0.00	0.00	0.00
15.00	24.0	0.00	0.00	0.00	0.00	0.00
16.00	24.0	0.00	0.00	0.00	0.00	0.00
17.00	24.0	0.00	0.00	0.00	0.00	0.00
18.00	24.0	0.00	0.00	0.00	0.00	0.00
19.00	24.0	0.00	0.00	0.00	0.00	0.00
20.00	24.0	0.00	0.00	0.00	0.00	0.00
21.00	24.0	0.00	0.00	0.00	0.00	0.00
22.00	24.0	0.00	0.00	0.00	0.00	0.00
23.00	24.0	0.00	0.00	0.00	0.00	0.00
24.00	24.0	0.01	0.00	0.01	0.00	0.01
25.00	24.0	0.34	16.22	16.56	8.28	49.01
26.00	24.0	0.88	16.40	17.28	8.64	50.09
27.00	24.0	1.40	16.91	18.31	9.16	52.14
28.00	24.0	1.93	17.70	19.63	9.82	55.04
29.00	24.0	2.52	18.68	21.20	10.60	58.57
30.00	24.0	4.23	39.12	43.35	21.68	121.59
31.00	24.0	5.22	37.87	43.10	21.55	118.84
32.00	24.0	6.22	36.27	42.48	21.24	115.01
33.00	24.0	7.21	34.61	41.82	20.91	111.05
34.00	24.0	8.20	33.23	41.43	20.71	107.88
35.00	24.0	9.19	32.10	41.30	20.65	105.50
36.00	24.0	10.18	31.42	41.60	20.80	104.45
37.00	24.0	11.16	31.37	42.52	21.26	105.25
38.00	24.0	12.12	31.80	43.92	21.96	107.51
39.00	24.0	13.08	32.58	45.67	22.83	110.83
40.00	24.0	14.03	33.26	47.28	23.64	113.80
41.00	24.0	15.01	31.06	46.07	23.04	108.20
42.00	24.0	16.06	32.12	48.19	24.09	112.44
43.00	24.0	17.20	33.24	50.43	25.22	116.91
44.00	24.0	18.30	33.58	51.88	25.94	119.03
45.00	24.0	19.49	33.88	53.37	26.68	121.12
46.00	24.0	20.77	34.03	54.80	27.40	122.87
47.00	24.0	22.12	33.95	56.07	28.03	123.97
48.00	24.0	23.56	33.55	57.11	28.55	124.21
49.00	24.0	24.96	32.79	57.75	28.87	123.32
50.00	24.0	26.38	31.85	58.24	29.12	121.94
51.00	24.0	27.82	30.93	58.75	29.37	120.61
52.00	24.0	29.10	30.17	59.27	29.63	119.61
53.00	24.0	30.23	29.62	59.85	29.92	119.09
54.00	24.0	31.21	29.32	60.52	30.26	119.16
55.00	24.0	32.04	29.28	61.32	30.66	119.89
56.00	24.0	32.81	29.44	62.25	31.12	121.12
57.00	24.0	33.62	29.82	63.44	31.72	123.07
58.00	24.0	34.47	30.17	64.63	32.32	124.96
59.00	24.0	35.36	30.40	65.76	32.88	126.57

60.00	24.0	36.28	30.46	66.74	33.37	127.65
61.00	24.0	37.24	30.33	67.57	33.78	128.22
62.00	24.0	38.24	30.05	68.29	34.14	128.38
63.00	24.0	39.28	29.65	68.92	34.46	128.22
64.00	24.0	40.35	29.17	69.52	34.76	127.86
65.00	24.0	41.46	28.65	70.11	35.05	127.40
66.00	24.0	42.57	28.03	70.61	35.30	126.67
67.00	24.0	43.65	27.45	71.10	35.55	126.01
68.00	24.0	44.69	27.05	71.74	35.87	125.84
69.00	24.0	45.68	26.78	72.47	36.23	126.04
70.00	24.0	46.65	26.62	73.26	36.63	126.49
71.00	24.0	47.59	26.53	74.11	37.06	127.17
72.00	24.0	48.53	26.41	74.94	37.47	127.76
73.00	24.0	49.47	26.19	75.66	37.83	128.03
74.00	24.0	50.41	25.87	76.29	38.14	128.03
75.00	24.0	51.36	25.49	76.84	38.42	127.82
76.00	24.0	52.55	25.05	77.60	38.80	127.71
77.00	24.0	54.25	24.59	78.84	39.42	128.02
78.00	24.0	56.46	24.10	80.55	40.28	128.75
79.00	24.0	59.16	23.55	82.71	41.36	129.81
80.00	24.0	62.38	19.07	81.44	40.72	119.57
81.00	24.0	65.72	19.13	84.85	42.42	123.10
82.00	24.0	69.15	18.95	88.10	44.05	126.01
83.00	24.0	72.42	18.28	90.70	45.35	127.26
84.00	24.0	75.61	17.56	93.17	46.58	128.29
85.00	24.0	78.72	16.81	95.53	47.77	129.16
86.00	24.0	81.96	16.03	98.00	49.00	130.07
87.00	24.0	85.56	15.24	100.80	50.40	131.27
88.00	24.0	89.51	14.44	103.95	51.98	132.83
89.00	24.0	93.82	13.94	107.76	53.88	135.64
90.00	24.0	98.48	10.62	109.09	54.55	130.33
91.00	24.0	102.71	10.92	113.63	56.82	135.48
92.00	24.0	106.14	11.88	118.02	59.01	141.77
93.00	24.0	109.01	13.92	122.92	61.46	150.76
94.00	24.0	111.85	17.02	128.87	64.44	162.92
95.00	24.0	115.21	18.72	133.93	66.96	171.37
96.00	24.0	118.24	20.15	138.39	69.19	178.69
97.00	24.0	120.95	21.17	142.12	71.06	184.47
98.00	24.0	123.35	21.61	144.96	72.48	188.19
99.00	24.0	125.44	21.47	146.91	73.45	189.85
100.00	24.0	129.56	20.54	150.10	75.05	191.18

Section Type: Square
Pile Width: 24.00 (in)

Test Pile	Pile Width	Ultimate Side	Mobilized End	Estimated Davisson	Allowable Pile	Ultimate Pile

Length (ft)	(in)	Friction (tons)	Bearing (tons)	Capacity (tons)	Capacity (tons)	Capacity (tons)
101.00	24.0	130.98	19.05	150.03	75.01	188.12
102.00	24.0	132.20	17.62	149.83	74.91	185.07
103.00	24.0	133.24	16.28	149.52	74.76	182.07
104.00	24.0	134.09	15.07	149.16	74.58	179.31
105.00	24.0	134.75	14.08	148.82	74.41	176.98
106.00	24.0	135.41	13.23	148.64	74.32	175.10
107.00	24.0	136.28	12.47	148.75	74.38	173.69
108.00	24.0	137.35	11.79	149.14	74.57	172.71
109.00	24.0	138.63	11.23	149.86	74.93	172.33
110.00	24.0	140.11	1.44	141.55	70.77	144.42
111.00	24.0	141.10	1.62	142.73	71.36	145.98
112.00	24.0	142.10	1.72	143.82	71.91	147.27
113.00	24.0	142.89	1.81	144.70	72.35	148.32
114.00	24.0	143.43	1.91	145.34	72.67	149.16
115.00	24.0	143.66	1.88	145.55	72.77	149.32
116.00	24.0	143.87	1.87	145.74	72.87	149.48
117.00	24.0	144.36	1.84	146.20	73.10	149.87
118.00	24.0	145.14	1.75	146.90	73.45	150.41
119.00	24.0	146.23	1.63	147.86	73.93	151.13
120.00	24.0	147.61	1.49	149.10	74.55	152.08
121.00	24.0	149.00	1.33	150.33	75.17	152.99
122.00	24.0	150.10	1.18	151.28	75.64	153.63
123.00	24.0	150.89	1.05	151.94	75.97	154.03
124.00	24.0	151.38	0.94	152.32	76.16	154.21
125.00	24.0	151.56	0.87	152.43	76.21	154.16
126.00	24.0	151.58	0.81	152.40	76.20	154.02
127.00	24.0	151.60	0.72	152.32	76.16	153.75
128.00	24.0	151.62	0.64	152.26	76.13	153.54
129.00	24.0	151.64	0.59	152.23	76.11	153.40
130.00	24.0	151.66	0.55	152.21	76.10	153.32
131.00	24.0	151.67	0.54	152.21	76.11	153.30
132.00	24.0	151.68	0.53	152.21	76.11	153.28
133.00	24.0	151.69	0.50	152.19	76.10	153.19
134.00	24.0	151.70	0.44	152.15	76.07	153.04
135.00	24.0	151.71	0.37	152.08	76.04	152.82
136.00	24.0	151.72	0.27	151.99	76.00	152.54
137.00	24.0	151.73	0.17	151.91	75.95	152.25
138.00	24.0	151.74	0.10	151.84	75.92	152.03
139.00	24.0	151.75	0.23	151.98	75.99	152.44
140.00	24.0	151.95	0.77	152.72	76.36	154.25
141.00	24.0	151.95	0.81	152.75	76.38	154.37
142.00	24.0	151.95	0.95	152.90	76.45	154.81
143.00	24.0	151.95	1.26	153.21	76.60	155.73
144.00	24.0	151.95	1.73	153.68	76.84	157.15
145.00	24.0	151.95	2.35	154.30	77.15	158.99
146.00	24.0	151.97	3.06	155.03	77.51	161.15
147.00	24.0	152.03	3.82	155.85	77.93	163.50

148.00	24.0	152.13	4.60	156.74	78.37	165.94
149.00	24.0	152.30	5.44	157.74	78.87	168.62
150.00	24.0	152.54	6.43	158.96	79.48	171.82
151.00	24.0	152.82	7.64	160.46	80.23	175.74
152.00	24.0	153.13	9.18	162.31	81.15	180.67
153.00	24.0	153.45	11.11	164.55	82.28	186.76
154.00	24.0	153.78	13.99	167.77	83.89	195.76
155.00	24.0	154.13	18.57	172.70	86.35	209.84
156.00	24.0	154.53	25.04	179.57	89.79	229.66
157.00	24.0	155.04	33.57	188.61	94.31	255.76
158.00	24.0	155.67	44.42	200.08	100.04	288.91
159.00	24.0	156.42	57.26	213.68	106.84	328.19
160.00	24.0	157.32	71.67	228.99	114.49	372.34
161.00	24.0	158.56	87.29	245.85	122.92	420.42
162.00	24.0	160.40	103.57	263.97	131.98	471.10
163.00	24.0	162.91	120.36	283.27	141.64	524.00
164.00	24.0	166.15	137.08	303.23	151.62	577.38
165.00	24.0	170.17	146.94	317.11	158.56	610.99
166.00	24.0	174.79	155.54	330.34	165.17	641.42
167.00	24.0	179.84	163.38	343.22	171.61	669.98
168.00	24.0	185.30	170.56	355.85	177.93	696.97
169.00	24.0	191.17	177.32	368.50	184.25	723.14
170.00	24.0	197.46	183.94	381.40	190.70	749.27
171.00	24.0	204.00	190.69	394.69	197.35	776.07
172.00	24.0	210.62	197.78	408.40	204.20	803.96
173.00	24.0	217.29	205.10	422.40	211.20	832.60
174.00	24.0	224.01	212.14	436.15	218.08	860.43
175.00	24.0	230.76	218.37	449.13	224.56	885.86
176.00	24.0	237.60	223.65	461.25	230.63	908.55
177.00	24.0	244.63	227.44	472.06	236.03	926.94
178.00	24.0	251.83	229.34	481.16	240.58	939.84
179.00	24.0	259.19	229.33	488.52	244.26	947.18
180.00	24.0	266.73	227.38	494.11	247.06	948.88
181.00	24.0	274.25	223.80	498.04	249.02	945.64
182.00	24.0	281.55	219.17	500.72	250.36	939.06
183.00	24.0	288.63	213.81	502.44	251.22	930.06
184.00	24.0	295.47	208.66	504.13	252.07	921.45
185.00	24.0	302.06	204.67	506.73	253.37	916.07
186.00	24.0	308.39	201.84	510.24	255.12	913.93
187.00	24.0	314.44	200.43	514.87	257.43	915.73
188.00	24.0	320.19	200.66	520.85	260.42	922.16
189.00	24.0	325.65	202.25	527.90	263.95	932.41
190.00	24.0	330.80	204.96	535.76	267.88	945.68
191.00	24.0	336.00	208.24	544.24	272.12	960.73
192.00	24.0	341.61	211.46	553.07	276.54	975.99
193.00	24.0	347.64	214.50	562.14	281.07	991.14
194.00	24.0	354.10	216.23	570.33	285.16	1002.78
195.00	24.0	360.99	215.51	576.50	288.25	1007.52
196.00	24.0	368.21	212.50	580.70	290.35	1005.69
197.00	24.0	375.66	207.56	583.22	291.61	998.34

198.00	24.0	383.34	200.93	584.27	292.14	986.14
199.00	24.0	391.26	192.92	584.17	292.09	970.00
200.00	24.0	399.41	183.81	583.22	291.61	950.84

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
201.00	24.0	407.35	174.25	581.60	290.80	930.11
202.00	24.0	414.60	164.90	579.50	289.75	909.29
203.00	24.0	421.17	155.75	576.92	288.46	888.41
204.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
205.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
206.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
207.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
208.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
209.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				
210.00	24.0	Soil Elevations Must Extend At or Below Contribution Zone				

NOTES

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

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

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

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

General Information:
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Input file: .....eep\Tom M Final\60 PERCENT\BB-436_24-inch PPSC_PREFORM(-35).in
Project number: 6511-16-051
Job name: Big Carlos Pass
Engineer: Tierra - TM
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 12/10/2019, Boring Number: BB-436
Station number: 436+19 Offset: 48' RT.

Ground Elevation: 4.100(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	0.00	3- Clean sand
2	2.00	4.00	3- Clean sand
3	4.00	4.00	3- Clean sand
4	5.00	2.00	3- Clean sand
5	8.00	6.00	3- Clean sand
6	10.00	8.00	3- Clean sand
7	15.00	1.00	3- Clean sand
8	20.00	10.00	3- Clean sand
9	25.00	3.00	3- Clean sand
10	30.00	2.00	3- Clean sand
11	35.00	3.00	3- Clean sand
12	38.90	3.00	3- Clean sand
13	40.00	4.00	3- Clean sand
14	45.00	10.00	3- Clean sand
15	50.00	4.00	3- Clean sand
16	55.00	5.00	3- Clean sand
17	60.00	7.00	3- Clean sand
18	65.00	5.00	2- Clay and silty sand
19	70.00	7.00	2- Clay and silty sand

20	75.00	11.00	2- Clay and silty sand
21	80.00	4.00	2- Clay and silty sand
22	85.00	8.00	2- Clay and silty sand
23	90.00	7.00	2- Clay and silty sand
24	95.00	6.00	2- Clay and silty sand
25	100.00	5.00	2- Clay and silty sand
26	105.00	5.00	2- Clay and silty sand
27	110.00	5.00	2- Clay and silty sand
28	115.00	7.00	2- Clay and silty sand
29	120.00	6.00	2- Clay and silty sand
30	125.00	5.00	2- Clay and silty sand
31	130.00	4.00	2- Clay and silty sand
32	135.00	3.00	2- Clay and silty sand
33	140.00	4.00	2- Clay and silty sand
34	145.00	4.00	2- Clay and silty sand
35	150.00	5.00	3- Clean sand
36	155.00	8.00	3- Clean sand
37	160.00	20.00	3- Clean sand
38	165.00	50.00	3- Clean sand
39	170.00	60.00	3- Clean sand
40	175.00	45.00	3- Clean sand
41	180.00	68.00	3- Clean sand
42	185.00	54.00	2- Clay and silty sand
43	190.00	34.00	2- Clay and silty sand

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	4.10	-60.90	65.00	4.85	3-Clean Sand
2	-60.90	-145.90	85.00	5.65	2-Clay and Silty Sand
3	-145.90	-180.90	35.00	36.57	3-Clean Sand
4	-180.90	-185.90	5.00	54.00	2-Clay and Silty Sand

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

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)

24.00	1.00	3.10
24.00	2.00	2.10
24.00	3.00	1.10
24.00	4.00	0.10
24.00	5.00	-0.90
24.00	6.00	-1.90
24.00	7.00	-2.90
24.00	8.00	-3.90
24.00	9.00	-4.90
24.00	10.00	-5.90
24.00	11.00	-6.90
24.00	12.00	-7.90
24.00	13.00	-8.90
24.00	14.00	-9.90
24.00	15.00	-10.90
24.00	16.00	-11.90
24.00	17.00	-12.90
24.00	18.00	-13.90
24.00	19.00	-14.90
24.00	20.00	-15.90
24.00	21.00	-16.90
24.00	22.00	-17.90
24.00	23.00	-18.90
24.00	24.00	-19.90
24.00	25.00	-20.90
24.00	26.00	-21.90
24.00	27.00	-22.90
24.00	28.00	-23.90
24.00	29.00	-24.90
24.00	30.00	-25.90
24.00	31.00	-26.90
24.00	32.00	-27.90
24.00	33.00	-28.90
24.00	34.00	-29.90
24.00	35.00	-30.90
24.00	36.00	-31.90
24.00	37.00	-32.90
24.00	38.00	-33.90
24.00	39.00	-34.90
24.00	40.00	-35.90
24.00	41.00	-36.90
24.00	42.00	-37.90
24.00	43.00	-38.90
24.00	44.00	-39.90
24.00	45.00	-40.90
24.00	46.00	-41.90
24.00	47.00	-42.90
24.00	48.00	-43.90
24.00	49.00	-44.90
24.00	50.00	-45.90

24.00	51.00	-46.90
24.00	52.00	-47.90
24.00	53.00	-48.90
24.00	54.00	-49.90
24.00	55.00	-50.90
24.00	56.00	-51.90
24.00	57.00	-52.90
24.00	58.00	-53.90
24.00	59.00	-54.90
24.00	60.00	-55.90
24.00	61.00	-56.90
24.00	62.00	-57.90
24.00	63.00	-58.90
24.00	64.00	-59.90
24.00	65.00	-60.90
24.00	66.00	-61.90
24.00	67.00	-62.90
24.00	68.00	-63.90
24.00	69.00	-64.90
24.00	70.00	-65.90
24.00	71.00	-66.90
24.00	72.00	-67.90
24.00	73.00	-68.90
24.00	74.00	-69.90
24.00	75.00	-70.90
24.00	76.00	-71.90
24.00	77.00	-72.90
24.00	78.00	-73.90
24.00	79.00	-74.90
24.00	80.00	-75.90
24.00	81.00	-76.90
24.00	82.00	-77.90
24.00	83.00	-78.90
24.00	84.00	-79.90
24.00	85.00	-80.90
24.00	86.00	-81.90
24.00	87.00	-82.90
24.00	88.00	-83.90
24.00	89.00	-84.90
24.00	90.00	-85.90
24.00	91.00	-86.90
24.00	92.00	-87.90
24.00	93.00	-88.90
24.00	94.00	-89.90
24.00	95.00	-90.90
24.00	96.00	-91.90
24.00	97.00	-92.90
24.00	98.00	-93.90
24.00	99.00	-94.90
24.00	100.00	-95.90

24.00	101.00	-96.90
24.00	102.00	-97.90
24.00	103.00	-98.90
24.00	104.00	-99.90
24.00	105.00	-100.90
24.00	106.00	-101.90
24.00	107.00	-102.90
24.00	108.00	-103.90
24.00	109.00	-104.90
24.00	110.00	-105.90
24.00	111.00	-106.90
24.00	112.00	-107.90
24.00	113.00	-108.90
24.00	114.00	-109.90
24.00	115.00	-110.90
24.00	116.00	-111.90
24.00	117.00	-112.90
24.00	118.00	-113.90
24.00	119.00	-114.90
24.00	120.00	-115.90
24.00	121.00	-116.90
24.00	122.00	-117.90
24.00	123.00	-118.90
24.00	124.00	-119.90
24.00	125.00	-120.90
24.00	126.00	-121.90
24.00	127.00	-122.90
24.00	128.00	-123.90
24.00	129.00	-124.90
24.00	130.00	-125.90
24.00	131.00	-126.90
24.00	132.00	-127.90
24.00	133.00	-128.90
24.00	134.00	-129.90
24.00	135.00	-130.90
24.00	136.00	-131.90
24.00	137.00	-132.90
24.00	138.00	-133.90
24.00	139.00	-134.90
24.00	140.00	-135.90
24.00	141.00	-136.90
24.00	142.00	-137.90
24.00	143.00	-138.90
24.00	144.00	-139.90
24.00	145.00	-140.90
24.00	146.00	-141.90
24.00	147.00	-142.90
24.00	148.00	-143.90
24.00	149.00	-144.90
24.00	150.00	-145.90

24.00	151.00	-146.90
24.00	152.00	-147.90
24.00	153.00	-148.90
24.00	154.00	-149.90
24.00	155.00	-150.90
24.00	156.00	-151.90
24.00	157.00	-152.90
24.00	158.00	-153.90
24.00	159.00	-154.90
24.00	160.00	-155.90
24.00	161.00	-156.90
24.00	162.00	-157.90
24.00	163.00	-158.90
24.00	164.00	-159.90
24.00	165.00	-160.90
24.00	166.00	-161.90
24.00	167.00	-162.90
24.00	168.00	-163.90
24.00	169.00	-164.90
24.00	170.00	-165.90
24.00	171.00	-166.90
24.00	172.00	-167.90
24.00	173.00	-168.90
24.00	174.00	-169.90
24.00	175.00	-170.90
24.00	176.00	-171.90
24.00	177.00	-172.90
24.00	178.00	-173.90
24.00	179.00	-174.90
24.00	180.00	-175.90
24.00	181.00	-176.90
24.00	182.00	-177.90
24.00	183.00	-178.90
24.00	184.00	-179.90
24.00	185.00	-180.90
24.00	186.00	-181.90
24.00	187.00	-182.90
24.00	188.00	-183.90
24.00	189.00	-184.90
24.00	190.00	-185.90

Driven Pile Capacity:
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Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
1.00	24.0	0.19	10.96	11.15	5.57	33.07
2.00	24.0	0.69	13.83	14.52	7.26	42.17
3.00	24.0	1.18	14.71	15.89	7.95	45.31
4.00	24.0	1.65	15.77	17.42	8.71	48.97
5.00	24.0	1.91	16.66	18.57	9.28	51.89
6.00	24.0	2.06	17.44	19.50	9.75	54.38
7.00	24.0	2.53	18.06	20.59	10.29	56.70
8.00	24.0	3.37	18.17	21.54	10.77	57.88
9.00	24.0	4.52	17.98	22.50	11.25	58.46
10.00	24.0	5.84	17.98	23.82	11.91	59.79
11.00	24.0	7.07	18.43	25.50	12.75	62.36
12.00	24.0	7.93	19.75	27.67	13.84	67.16
13.00	24.0	8.68	21.60	30.29	15.14	73.50
14.00	24.0	9.18	23.88	33.06	16.53	80.83
15.00	24.0	9.41	26.00	35.41	17.70	87.41
16.00	24.0	9.66	27.62	37.27	18.64	92.50
17.00	24.0	10.24	28.74	38.97	19.49	96.45
18.00	24.0	11.15	28.58	39.73	19.86	96.89
19.00	24.0	12.41	27.45	39.86	19.93	94.76
20.00	24.0	14.01	25.67	39.68	19.84	91.02
21.00	24.0	15.68	23.93	39.61	19.80	87.46
22.00	24.0	17.11	22.42	39.54	19.77	84.38
23.00	24.0	18.31	20.66	38.97	19.48	80.28
24.00	24.0	19.26	18.86	38.12	19.06	75.85
25.00	24.0	19.97	17.34	37.31	18.66	71.99
26.00	24.0	20.50	16.09	36.60	18.30	68.79
27.00	24.0	20.93	15.25	36.18	18.09	66.68
28.00	24.0	21.25	15.03	36.28	18.14	66.33
29.00	24.0	21.46	15.31	36.77	18.38	67.38
30.00	24.0	21.56	15.98	37.54	18.77	69.51
31.00	24.0	21.66	16.92	38.58	19.29	72.42
32.00	24.0	21.87	17.70	39.56	19.78	74.96
33.00	24.0	22.17	18.22	40.40	20.20	76.84
34.00	24.0	22.59	18.69	41.27	20.64	78.65
35.00	24.0	23.11	19.15	42.25	21.13	80.55
36.00	24.0	23.68	19.67	43.35	21.67	82.68
37.00	24.0	24.25	20.59	44.84	22.42	86.02
38.00	24.0	24.82	22.20	47.02	23.51	91.42
39.00	24.0	25.39	24.04	49.43	24.72	97.51
40.00	24.0	26.06	25.54	51.60	25.80	102.69
41.00	24.0	26.92	26.60	53.52	26.76	106.71
42.00	24.0	28.00	27.11	55.11	27.55	109.32

43.00	24.0	29.29	27.01	56.30	28.15	110.33
44.00	24.0	30.80	26.57	57.37	28.69	110.51
45.00	24.0	32.53	26.05	58.58	29.29	110.67
46.00	24.0	34.26	25.70	59.96	29.98	111.36
47.00	24.0	35.77	25.68	61.46	30.73	112.83
48.00	24.0	37.07	25.90	62.97	31.49	114.77
49.00	24.0	38.16	26.38	64.54	32.27	117.31
50.00	24.0	39.02	27.17	66.19	33.10	120.54
51.00	24.0	39.79	28.12	67.92	33.96	124.17
52.00	24.0	40.60	29.13	69.74	34.87	128.00
53.00	24.0	41.45	30.25	71.70	35.85	132.20
54.00	24.0	42.33	31.23	73.56	36.78	136.03
55.00	24.0	43.25	31.83	75.08	37.54	138.74
56.00	24.0	44.23	31.93	76.16	38.08	140.02
57.00	24.0	45.28	31.43	76.71	38.36	139.58
58.00	24.0	46.40	30.32	76.71	38.36	137.34
59.00	24.0	47.59	28.78	76.37	38.19	133.93
60.00	24.0	48.86	27.04	75.90	37.95	129.97
61.00	24.0	50.25	25.22	75.48	37.74	125.93
62.00	24.0	51.83	23.68	75.51	37.75	122.86
63.00	24.0	53.58	22.60	76.18	38.09	121.38
64.00	24.0	55.52	22.02	77.54	38.77	121.58
65.00	24.0	59.34	17.23	76.58	38.29	111.04
66.00	24.0	61.67	16.21	77.88	38.94	110.31
67.00	24.0	64.16	17.24	81.40	40.70	115.88
68.00	24.0	66.44	17.67	84.11	42.05	119.45
69.00	24.0	68.78	18.32	87.10	43.55	123.74
70.00	24.0	71.34	19.00	90.35	45.17	128.36
71.00	24.0	74.26	19.60	93.86	46.93	133.07
72.00	24.0	77.65	19.98	97.62	48.81	137.58
73.00	24.0	81.58	19.97	101.54	50.77	141.48
74.00	24.0	85.64	19.38	105.02	52.51	143.79
75.00	24.0	90.00	18.82	108.82	54.41	146.46
76.00	24.0	94.26	18.34	112.61	56.30	149.29
77.00	24.0	98.00	18.07	116.07	58.04	152.22
78.00	24.0	101.21	18.06	119.27	59.63	155.38
79.00	24.0	103.89	18.23	122.12	61.06	158.59
80.00	24.0	106.03	18.54	124.56	62.28	161.64
81.00	24.0	108.05	18.87	126.92	63.46	164.65
82.00	24.0	110.39	19.26	129.66	64.83	168.18
83.00	24.0	113.05	19.50	132.55	66.28	171.56
84.00	24.0	116.03	19.59	135.61	67.81	174.79
85.00	24.0	119.32	19.52	138.84	69.42	177.87
86.00	24.0	122.74	19.34	142.08	71.04	180.77
87.00	24.0	126.08	19.10	145.18	72.59	183.39
88.00	24.0	129.34	18.78	148.12	74.06	185.69
89.00	24.0	132.53	18.38	150.91	75.45	187.66
90.00	24.0	135.64	17.89	153.53	76.76	189.31
91.00	24.0	138.67	17.32	155.99	78.00	190.63
92.00	24.0	141.62	16.76	158.38	79.19	191.89

93.00	24.0	144.49	16.29	160.79	80.39	193.38
94.00	24.0	147.29	15.95	163.24	81.62	195.13
95.00	24.0	150.00	15.74	165.74	82.87	197.22
96.00	24.0	152.63	15.67	168.30	84.15	199.64
97.00	24.0	155.18	15.65	170.82	85.41	202.11
98.00	24.0	157.64	15.58	173.22	86.61	204.37
99.00	24.0	160.02	15.46	175.48	87.74	206.41
100.00	24.0	162.32	15.30	177.62	88.81	208.23

Section Type: Square
Pile Width: 24.00 (in)

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
101.00	24.0	164.58	15.09	179.67	89.83	209.84
102.00	24.0	166.84	14.85	181.68	90.84	211.38
103.00	24.0	169.09	14.62	183.72	91.86	212.97
104.00	24.0	171.35	14.45	185.81	92.90	214.72
105.00	24.0	173.61	14.38	187.98	93.99	216.74
106.00	24.0	175.86	14.39	190.26	95.13	219.04
107.00	24.0	178.12	14.50	192.62	96.31	221.62
108.00	24.0	180.37	14.70	195.07	97.54	224.47
109.00	24.0	182.63	14.94	197.56	98.78	227.43
110.00	24.0	184.88	15.15	200.03	100.01	230.33
111.00	24.0	187.21	15.32	202.53	101.27	233.18
112.00	24.0	189.71	15.43	205.14	102.57	236.00
113.00	24.0	192.37	15.47	207.84	103.92	238.79
114.00	24.0	195.19	15.45	210.65	105.32	241.55
115.00	24.0	198.18	15.37	213.55	106.77	244.28
116.00	24.0	201.21	15.25	216.46	108.23	246.96
117.00	24.0	204.15	15.13	219.28	109.64	249.54
118.00	24.0	207.02	14.99	222.01	111.00	251.98
119.00	24.0	209.81	14.83	224.64	112.32	254.30
120.00	24.0	212.51	14.66	227.17	113.58	256.48
121.00	24.0	215.14	14.47	229.60	114.80	258.54
122.00	24.0	217.68	14.26	231.94	115.97	260.46
123.00	24.0	220.14	14.04	234.17	117.09	262.25
124.00	24.0	222.51	13.80	236.31	118.15	263.90
125.00	24.0	224.80	13.54	238.34	119.17	265.43
126.00	24.0	227.01	13.27	240.28	120.14	266.82
127.00	24.0	229.14	12.96	242.10	121.05	268.02
128.00	24.0	231.18	12.61	243.78	121.89	269.00
129.00	24.0	233.13	12.24	245.37	122.68	269.85
130.00	24.0	235.00	11.90	246.90	123.45	270.69

131.00	24.0	236.78	11.58	248.36	124.18	271.53
132.00	24.0	238.48	11.32	249.80	124.90	272.43
133.00	24.0	240.09	11.13	251.22	125.61	273.47
134.00	24.0	241.61	11.00	252.60	126.30	274.60
135.00	24.0	243.04	10.90	253.94	126.97	275.75
136.00	24.0	244.47	10.82	255.30	127.65	276.95
137.00	24.0	245.99	10.74	256.74	128.37	278.22
138.00	24.0	247.60	10.65	258.26	129.13	279.57
139.00	24.0	249.30	10.68	259.97	129.99	281.32
140.00	24.0	251.08	10.92	262.00	131.00	283.83
141.00	24.0	252.90	11.40	264.30	132.15	287.09
142.00	24.0	254.72	12.11	266.84	133.42	291.07
143.00	24.0	256.55	13.08	269.63	134.81	295.78
144.00	24.0	258.37	14.28	272.65	136.33	301.22
145.00	24.0	260.20	15.73	275.93	137.96	307.39
146.00	24.0	261.93	17.36	279.29	139.65	314.01
147.00	24.0	263.49	19.10	282.60	141.30	320.81
148.00	24.0	264.88	20.96	285.85	142.92	327.78
149.00	24.0	266.10	23.28	289.38	144.69	335.94
150.00	24.0	268.48	26.39	294.88	147.44	347.66
151.00	24.0	269.36	26.55	295.91	147.96	349.02
152.00	24.0	270.10	27.11	297.21	148.60	351.42
153.00	24.0	270.73	28.15	298.88	149.44	355.18
154.00	24.0	271.27	29.87	301.14	150.57	360.88
155.00	24.0	271.70	32.58	304.29	152.14	369.45
156.00	24.0	272.19	36.48	308.67	154.33	381.63
157.00	24.0	272.82	41.74	314.56	157.28	398.04
158.00	24.0	273.60	48.57	322.17	161.08	419.31
159.00	24.0	274.59	56.77	331.36	165.68	444.89
160.00	24.0	275.84	65.96	341.79	170.90	473.71
161.00	24.0	277.47	75.92	353.39	176.70	505.23
162.00	24.0	279.66	86.34	366.00	183.00	538.69
163.00	24.0	282.43	97.05	379.48	189.74	573.58
164.00	24.0	285.85	107.79	393.65	196.82	609.23
165.00	24.0	289.98	118.32	408.30	204.15	644.95
166.00	24.0	294.63	128.84	423.47	211.74	681.15
167.00	24.0	299.58	139.65	439.24	219.62	718.54
168.00	24.0	304.85	150.72	455.56	227.78	757.00
169.00	24.0	310.42	162.20	472.61	236.31	797.01
170.00	24.0	316.30	174.29	490.58	245.29	839.15
171.00	24.0	322.45	187.07	509.52	254.76	883.66
172.00	24.0	328.86	200.51	529.37	264.68	930.38
173.00	24.0	335.52	214.47	549.99	274.99	978.93
174.00	24.0	342.46	227.92	570.39	285.19	1026.23
175.00	24.0	349.73	231.12	580.84	290.42	1043.08
176.00	24.0	357.09	232.09	589.17	294.59	1053.35
177.00	24.0	364.62	230.41	595.03	297.51	1055.86
178.00	24.0	372.30	225.83	598.13	299.07	1049.80
179.00	24.0	380.15	218.98	599.13	299.56	1037.09
180.00	24.0	388.15	210.50	598.65	299.33	1019.65

181.00	24.0	396.35	200.98	597.33	298.67	999.30
182.00	24.0	404.80	191.48	596.28	298.14	979.23
183.00	24.0	413.49	182.46	595.95	297.98	960.88
184.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
185.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
186.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
187.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
188.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
189.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					
190.00	24.0 Soil Elevations Must Extend At or Below Contribution Zone					

NOTES

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

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

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

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

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	End Bent 1	Foundation Type	Driven Concrete Pile
Reference Boring	BB-414	Size (inch)	24
Ground Surface Elevation (ft)	6.2	Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0	Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	9	-
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Sand	Sand	Sand-Clay	Sand-Clay	Sand-Clay	Sand	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesive	Cohesive	Cohesionless	-
	Top Boundary Elevation (ft)	6.20	-17.30	-42.30	-52.30	-102.30	-122.30	-142.30	-152.30	-162.30	-
	Bottom boundary Elevation (ft)	-17.30	-42.30	-52.30	-102.30	-122.30	-142.30	-152.30	-162.30	-183.80	-
	Average SPT N-Value (Blows/ft)	12	21	5	7	23	32	12	32	95	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Clay (Stiff, w/ Free Water)	Clay (Stiff, w/ Free Water)	Sand (Reese)	-
LATERAL	Internal Friction Angle, ϕ	31	38	34	30	34	-	-	-	36	-
LATERAL	Total Unit Weight (pcf), γ_t	112	120	115	105	115	125	115	125	125	-
LATERAL	Subgrade Modulus (pci), k	26	113	65	14	59	1333	500	1333	125	-
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	3200	1200	3200	-	-
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	-	-	0.005	0.007	0.005	-	-
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	-	-	3200	1200	3200	-	-
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
AXIAL	Total Unit Weight (pcf), γ_t	112	120	115	105	115	125	115	125	125	-
AXIAL	Shear Modulus (ksi), G	0.96	1.68	0.42	0.58	1.84	4.63	1.81	4.63	3.47	-
AXIAL	Poisson's ratio, v	0.30	0.30	0.25	0.25	0.30	0.50	0.50	0.50	0.30	-
AXIAL	Ultimate Unit Skin Friction (psf)	456	420	100	266	874	2178	1026	2178	2280	-
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	3200	1200	3200	-	-
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-
TORSIONAL	Total Unit Weight (pcf), γ_t	112	120	115	105	115	125	115	125	125	-
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	3200	1200	3200	-	-
TORSIONAL	Shear Modulus (ksi), G	0.96	1.68	0.42	0.58	1.84	4.63	1.81	4.63	3.47	-
TORSIONAL	Torsional Shear Stress (psf)	456	420	100	266	874	2178	1026	2178	2280	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
TIP	Shear Modulus (ksi), G	0.96	1.68	0.42	0.58	1.84	4.63	1.81	4.63	3.47	-
TIP	Poisson's ratio, v	0.30	0.30	0.25	0.25	0.30	0.50	0.50	0.50	0.30	-
TIP	Unit Bearing , ksf	77	107	24	45	147	102	38	102	384	-
TIP	Axial Bearing Failure, kips	307	427	96	179	589	410	154	410	1536	-
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	-	-	3200	1200	3200	-	-
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

	Reference Pier	Pier 2		Foundation Type	Driven Concrete Pile
	Reference Boring	BB-415		Size (inch)	24
	Ground Surface Elevation (ft)	-7.0		Base Area (ft^2)	4.00
	Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	-	-
	Soil Description	Sand	Sand - Limestone	Sand	Sand-Clay	Sand-Clay	Sand-Clay	Sand	Sand	-	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	-	-
	Top Boundary Elevation (ft)	-7.00	-20.00	-35.00	-90.50	-115.50	-120.50	-155.50	-170.50	-	-
	Bottom boundary Elevation (ft)	-20.00	-35.00	-90.50	-115.50	-120.50	-155.50	-170.50	-192.00	-	-
	Average SPT N-Value (Blows/ft)	3	33	5	11	100	22	16	100	-	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	-	-
	Internal Friction Angle, ϕ	29	40	29	31	36	34	32	36	-	-
	Total Unit Weight (pcf), γ_t	102	120	105	112	125	115	112	125	-	-
	Subgrade Modulus (pci), k	6	125	10	23	125	56	38	125	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-
	Total Unit Weight (pcf), γ_t	102	120	105	112	125	115	112	125	-	-
	Shear Modulus (ksi), G	0.25	2.64	0.42	0.88	3.47	1.76	1.28	3.47	-	-
	Poisson's ratio, v	0.25	0.30	0.25	0.30	0.30	0.30	0.30	0.30	-	-
	Ultimate Unit Skin Friction (psf)	114	660	190	950	2640	1690	608	2280	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-	-
	Total Unit Weight (pcf), γ_t	102	120	105	112	125	115	112	125	-	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	0.25	2.64	0.42	0.88	3.47	1.76	1.28	3.47	-	-
	Torsional Shear Stress (psf)	114	660	190	950	2640	1690	608	2280	-	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-
	Shear Modulus (ksi), G	0.25	2.64	0.42	0.88	3.47	1.76	1.28	3.47	-	-
	Poisson's ratio, v	0.25	0.30	0.25	0.30	0.30	0.30	0.30	0.30	-	-
	Unit Bearing , ksf	19	175	32	35	192	70	102	384	-	-
	Axial Bearing Failure, kips	77	700	128	141	768	282	410	1536	-	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 3	Foundation Type	Driven Concrete Pile
Reference Boring	BB-417	Size (inch)	24
Ground Surface Elevation (ft)	-19.0	Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0	Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	-	-
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Sand	Sand-Clay	Sand-Clay	Sand	Sand	-	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	-	-
	Top Boundary Elevation (ft)	-19.00	-23.00	-38.00	-43.00	-58.00	-123.00	-168.00	-178.00	-	-
	Bottom boundary Elevation (ft)	-23.00	-38.00	-43.00	-58.00	-123.00	-168.00	-178.00	-194.00	-	-
	Average SPT N-Value (Blows/ft)	4	50	13	13	9	26	16	100	-	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	-	-
	Internal Friction Angle, ϕ	29	40	36	31	30	-	32	36	-	-
	Total Unit Weight (pcf), γ_t	105	120	120	112	105	120	112	125	-	-
	Subgrade Modulus (pci), k	8	125	89	29	18	1083	38	125	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2600	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	0.005	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	2600	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-
	Total Unit Weight (pcf), γ_t	105	120	120	112	105	120	112	125	-	-
	Shear Modulus (ksi), G	0.33	3.47	1.04	1.04	0.75	3.89	1.28	3.47	-	-
	Poisson's ratio, v	0.25	0.30	0.30	0.30	0.25	0.50	0.30	0.30	-	-
	Ultimate Unit Skin Friction (psf)	152	1000	260	494	793	1906	608	2280	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2600	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-	-
	Total Unit Weight (pcf), γ_t	105	120	120	112	105	120	112	125	-	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2600	-	-	-	-
	Shear Modulus (ksi), G	0.33	3.47	1.04	1.04	0.75	3.89	1.28	3.47	-	-
	Torsional Shear Stress (psf)	152	1000	260	494	793	1906	608	2280	-	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-
	Shear Modulus (ksi), G	0.33	3.47	1.04	1.04	0.75	3.89	1.28	3.47	-	-
	Poisson's ratio, v	0.25	0.30	0.30	0.30	0.25	0.50	0.30	0.30	-	-
	Unit Bearing , ksf	26	283	64	83	29	83	102	384	-	-
	Axial Bearing Failure, kips	102	1131	257	333	115	333	410	1536	-	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2600	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 4 & 5	Foundation Type	Driven Concrete Pile
Reference Boring	BB-420	Size (inch)	24
Ground Surface Elevation (ft)	-15.0	Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0	Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	-	-	-	-
	Soil Description	Sand	Sand - Limestone	Sand	Sand-Clay	Sand-Clay	Sand	-	-	-	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	-	-	-	-
	Top Boundary Elevation (ft)	-15.00	-17.00	-48.00	-113.00	-148.00	-178.00	-	-	-	-
	Bottom boundary Elevation (ft)	-17.00	-48.00	-113.00	-148.00	-178.00	-190.00	-	-	-	-
	Average SPT N-Value (Blows/ft)	7	43	10	13	43	92	-	-	-	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	-	-	-	-
	Internal Friction Angle, ϕ	30	40	31	31	36	36	-	-	-	-
	Total Unit Weight (pcf), γ_t	105	120	112	112	120	125	-	-	-	-
	Subgrade Modulus (pci), k	14	125	20	29	119	125	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-	-	-
	Total Unit Weight (pcf), γ_t	105	120	112	112	120	125	-	-	-	-
	Shear Modulus (ksi), G	0.58	3.45	0.83	1.04	3.45	3.47	-	-	-	-
	Poisson's ratio, v	0.25	0.30	0.25	0.30	0.30	0.30	-	-	-	-
	Ultimate Unit Skin Friction (psf)	266	860	380	1101	2514	2280	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-	-	-	-
	Total Unit Weight (pcf), γ_t	105	120	112	112	120	125	-	-	-	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	0.58	3.45	0.83	1.04	3.45	3.47	-	-	-	-
	Torsional Shear Stress (psf)	266	860	380	1101	2514	2280	-	-	-	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-	-	-
	Shear Modulus (ksi), G	0.58	3.45	0.83	1.04	3.45	3.47	-	-	-	-
	Poisson's ratio, v	0.25	0.30	0.25	0.30	0.30	0.30	-	-	-	-
	Unit Bearing , ksf	45	237	64	42	138	384	-	-	-	-
	Axial Bearing Failure, kips	179	947	256	166	550	1536	-	-	-	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 5		Foundation Type	Driven Concrete Pile		
Reference Boring	BB-421L		Size (inch)	24		
Ground Surface Elevation (ft)	-18.0		Base Area (ft^2)	4.00		
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00		

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	-	-	-	-	-	-	-
	Soil Description	Sand - Limestone	Sand-Clay	Sand-Clay	-	-	-	-	-	-	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	-	-	-	-	-	-	-
	Top Boundary Elevation (ft)	-18.00	-46.50	-96.50	-	-	-	-	-	-	-
	Bottom boundary Elevation (ft)	-46.50	-96.50	-128.00	-	-	-	-	-	-	-
	Average SPT N-Value (Blows/ft)	38	19	61	-	-	-	-	-	-	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	-	-	-	-	-	-	-
	Internal Friction Angle, ϕ	40	33	36	-	-	-	-	-	-	-
	Total Unit Weight (pcf), γ_t	120	112	125	-	-	-	125	-	-	-
	Subgrade Modulus (pci), k	125	47	125	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	-	-	-	-	-	-	-
	Total Unit Weight (pcf), γ_t	120	112	125	-	-	-	125	-	-	-
	Shear Modulus (ksi), G	3.04	1.52	3.47	-	-	-	-	-	-	-
	Poisson's ratio, v	0.30	0.30	0.30	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf)	760	1509	2640	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	-	-	-	-	-	-	-
	Total Unit Weight (pcf), γ_t	120	112	125	-	-	-	125	-	-	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	3.04	1.52	3.47	-	-	-	-	-	-	-
	Torsional Shear Stress (psf)	760	1509	2640	-	-	-	-	-	-	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	3.04	1.52	3.47	-	-	-	-	-	-	-
	Poisson's ratio, v	0.30	0.30	0.30	-	-	-	-	-	-	-
	Unit Bearing , ksf	205	61	192	-	-	-	-	-	-	-
	Axial Bearing Failure, kips	821	243	768	-	-	-	-	-	-	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 6		Foundation Type	Driven Concrete Pile
Reference Boring	BB-422L		Size (inch)	24
Ground Surface Elevation (ft)	-17.0		Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	9	-
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Clay	Sand-Clay	Sand-Clay	Sand	Sand-Clay	Sand	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	-
	Top Boundary Elevation (ft)	-17.00	-21.00	-45.50	-50.50	-65.50	-125.50	-135.50	-140.50	-150.50	-
	Bottom boundary Elevation (ft)	-21.00	-45.50	-50.50	-65.50	-125.50	-135.50	-140.50	-150.50	-162.00	-
	Average SPT N-Value (Blows/ft)	18	34	3	22	23	82	54	39	59	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	-
LATERAL	Internal Friction Angle, ϕ	33	40	34	-	34	36	36	36	36	-
LATERAL	Total Unit Weight (pcf), γ_t	112	120	115	120	115	125	125	120	125	-
LATERAL	Subgrade Modulus (pci), k	44	125	59	917	59	125	125	107	125	-
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	2750	-	-	-	-	-	-
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	0.005	-	-	-	-	-	-
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	2750	-	-	-	-	-	-
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
AXIAL	Total Unit Weight (pcf), γ_t	112	120	115	120	115	125	125	120	125	-
AXIAL	Shear Modulus (ksi), G	1.44	2.72	0.25	3.30	1.84	3.47	3.47	3.13	3.47	-
AXIAL	Poisson's ratio, v	0.30	0.30	0.25	0.50	0.30	0.30	0.30	0.30	0.30	-
AXIAL	Ultimate Unit Skin Friction (psf)	684	680	60	1933	1746	2640	2052	2417	2242	-
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	2750	-	-	-	-	-	-
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-
TORSIONAL	Total Unit Weight (pcf), γ_t	112	120	115	120	115	125	125	120	125	-
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	2750	-	-	-	-	-	-
TORSIONAL	Shear Modulus (ksi), G	1.44	2.72	0.25	3.30	1.84	3.47	3.47	3.13	3.47	-
TORSIONAL	Torsional Shear Stress (psf)	684	680	60	1933	1746	2640	2052	2417	2242	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
TIP	Shear Modulus (ksi), G	1.44	2.72	0.25	3.30	1.84	3.47	3.47	3.13	3.47	-
TIP	Poisson's ratio, v	0.30	0.30	0.25	0.50	0.30	0.30	0.30	0.30	0.30	-
TIP	Unit Bearing , ksf	115	181	14	31	74	192	346	125	378	-
TIP	Axial Bearing Failure, kips	461	724	57	123	294	768	1382	499	1510	-
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	2750	-	-	-	-	-	-
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 7
Reference Boring	BB-423
Ground Surface Elevation (ft)	-15.0
Ground Water Table Elevation (ft)	0.0

Foundation Type	Driven Concrete Pile
Size (inch)	24
Base Area (ft^2)	4.00
Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No.	1	2	3	4	5	6	7	8	9	10	11	12
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Sand	Sand	Sand-Clay	Sand	Sand-Clay	Sand	Sand-Clay	Sand	Sand
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
	Top Boundary Elevation (ft)	-15.00	-23.00	-48.50	-53.50	-58.50	-78.50	-18.50	-128.50	-143.50	-163.50	-173.50	-188.50
	Bottom boundary Elevation (ft)	-23.00	-48.50	-53.50	-58.50	-78.50	-18.50	-128.50	-143.50	-163.50	-173.50	-188.50	-195.00
	Average SPT N-Value (Blows/ft)	4	37	16	19	4	6	21	21	23	18	21	100
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
LATERAL	Internal Friction Angle, ϕ	29	40	37	33	29	30	33	33	34	33	33	36
LATERAL	Total Unit Weight (pcf), γ_t	105	120	120	112	105	105	115	115	115	112	115	125
LATERAL	Subgrade Modulus (pci), k	8	125	98	47	8	12	53	53	59	44	53	125
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-	-	-
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-	-	-	-
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
AXIAL	Total Unit Weight (pcf), γ_t	105	120	120	112	105	105	115	115	115	112	115	125
AXIAL	Shear Modulus (ksi), G	0.33	2.96	1.28	1.52	0.33	0.50	1.68	1.68	1.84	1.44	1.68	3.47
AXIAL	Poisson's ratio, v	0.25	0.30	0.30	0.30	0.25	0.25	0.30	0.30	0.30	0.30	0.30	0.30
AXIAL	Ultimate Unit Skin Friction (psf)	152	740	320	722	152	545	798	1631	874	1445	798	2280
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
TORSIONAL	Total Unit Weight (pcf), γ_t	105	120	120	112	105	105	115	115	115	112	115	125
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Shear Modulus (ksi), G	0.33	2.96	1.28	1.52	0.33	0.50	1.68	1.68	1.84	1.44	1.68	3.47
TORSIONAL	Torsional Shear Stress (psf)	152	740	320	722	152	545	798	1631	874	1445	798	2280
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
TIP	Shear Modulus (ksi), G	0.33	2.96	1.28	1.52	0.33	0.50	1.68	1.68	1.84	1.44	1.68	3.47
TIP	Poisson's ratio, v	0.25	0.30	0.30	0.30	0.25	0.25	0.30	0.30	0.30	0.30	0.30	0.30
TIP	Unit Bearing , ksf	26	199	80	122	26	19	134	67	147	58	134	384
TIP	Axial Bearing Failure, kips	102	797	319	486	102	77	538	269	589	230	538	1536
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-	-	-	-
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 8		Foundation Type	Driven Concrete Pile
Reference Boring	BB-425		Size (inch)	24
Ground Surface Elevation (ft)	-15.0		Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	-
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Sand - Limestone	Sand	Clay	Sand	Sand	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	-
	Top Boundary Elevation (ft)	-15.00	-19.00	-28.50	-33.00	-53.00	-133.00	-143.00	-178.00	-
	Bottom boundary Elevation (ft)	-19.00	-28.50	-33.00	-53.00	-133.00	-143.00	-178.00	-195.00	-
	Average SPT N-Value (Blows/ft)	3	13	50	21	13	17	19	100	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	-
	Internal Friction Angle, ϕ	29	36	40	38	31	-	33	36	-
	Total Unit Weight (pcf), γ_t	102	120	120	120	112	120	112	125	-
	Subgrade Modulus (pci), k	6	89	125	113	29	708	47	125	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2125	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	0.005	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	2125	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
	Total Unit Weight (pcf), γ_t	102	120	120	120	112	120	112	125	-
	Shear Modulus (ksi), G	0.25	1.04	3.47	1.68	1.04	2.56	1.52	3.47	-
	Poisson's ratio, ν	0.25	0.30	0.30	0.30	0.30	0.50	0.30	0.30	-
	Ultimate Unit Skin Friction (psf)	114	260	1000	420	494	1578	722	2280	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2125	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-
	Total Unit Weight (pcf), γ_t	102	120	120	120	112	120	112	125	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2125	-	-	-
	Shear Modulus (ksi), G	0.25	1.04	3.47	1.68	1.04	2.56	1.52	3.47	-
	Torsional Shear Stress (psf)	114	260	1000	420	494	1578	722	2280	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
	Shear Modulus (ksi), G	0.25	1.04	3.47	1.68	1.04	2.56	1.52	3.47	-
	Poisson's ratio, ν	0.25	0.30	0.30	0.30	0.30	0.50	0.30	0.30	-
	Unit Bearing , ksf	19	64	283	107	83	24	122	384	-
	Axial Bearing Failure, kips	77	257	1131	427	333	95	486	1536	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	2125	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 9		Foundation Type	Driven Concrete Pile
Reference Boring	BB-427		Size (inch)	24
Ground Surface Elevation (ft)	-15.0		Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	-	-	-
	Soil Description	Sand	Sand - Limestone	Sand - Limestone	Sand	Sand	Sand	-	-	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	-	-	-
	Top Boundary Elevation (ft)	-15.00	-21.00	-38.00	-48.00	-148.00	-168.00	-	-	-
	Bottom boundary Elevation (ft)	-21.00	-38.00	-48.00	-148.00	-168.00	-185.00	-	-	-
	Average SPT N-Value (Blows/ft)	1	33	16	10	30	100	-	-	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	-	-	-
	Internal Friction Angle, ϕ	28	40	37	31	36	36	-	-	-
	Total Unit Weight (pcf), γ_t	100	120	120	112	115	125	-	-	-
	Subgrade Modulus (pci), k	2	125	98	20	80	125	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-	-
	Total Unit Weight (pcf), γ_t	100	120	120	112	115	125	-	-	-
	Shear Modulus (ksi), G	0.08	2.64	1.28	0.83	2.40	3.47	-	-	-
	Poisson's ratio, ν	0.25	0.30	0.30	0.25	0.30	0.30	-	-	-
	Ultimate Unit Skin Friction (psf)	38	660	320	380	1140	2280	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-	-	-
	Total Unit Weight (pcf), γ_t	100	120	120	112	115	125	-	-	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	0.08	2.64	1.28	0.83	2.40	3.47	-	-	-
	Torsional Shear Stress (psf)	38	660	320	380	1140	2280	-	-	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-	-	-
	Shear Modulus (ksi), G	0.08	2.64	1.28	0.83	2.40	3.47	-	-	-
	Poisson's ratio, ν	0.25	0.30	0.30	0.25	0.30	0.30	-	-	-
	Unit Bearing , ksf	6	175	80	64	192	384	-	-	-
	Axial Bearing Failure, kips	26	700	319	256	768	1536	-	-	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 10		Foundation Type	Driven Concrete Pile
Reference Boring	BB-428		Size (inch)	24
Ground Surface Elevation (ft)	-5.0		Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	8
	Soil Description	Sand	Sand-Clay	Sand - Limestone	Sand - Limestone	Sand	Sand	Sand-Clay	Sand-Clay	Sand
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
	Top Boundary Elevation (ft)	-5.00	-14.00	-18.50	-28.00	-43.00	-88.00	-93.00	-158.00	-168.00
	Bottom boundary Elevation (ft)	-14.00	-18.50	-28.00	-43.00	-88.00	-93.00	-158.00	-168.00	-185.00
	Average SPT N-Value (Blows/ft)	3	8	46	10	7	26	8	24	100
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
	Internal Friction Angle, ϕ	29	30	40	36	30	35	30	34	36
	Total Unit Weight (pcf), γ_t	102	105	120	115	105	115	105	115	125
	Subgrade Modulus (pci), k	6	16	125	80	14	68	16	62	125
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	-	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
	Total Unit Weight (pcf), γ_t	102	105	120	115	105	115	105	115	125
	Shear Modulus (ksi), G	0.25	0.67	3.47	0.83	0.58	2.08	0.67	1.92	3.47
	Poisson's ratio, ν	0.25	0.25	0.30	0.25	0.25	0.30	0.25	0.30	0.30
	Ultimate Unit Skin Friction (psf)	114	712	920	200	266	988	712	1801	2280
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
	Total Unit Weight (pcf), γ_t	102	105	120	115	105	115	105	115	125
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	Shear Modulus (ksi), G	0.25	0.67	3.47	0.83	0.58	2.08	0.67	1.92	3.47
	Torsional Shear Stress (psf)	114	712	920	200	266	988	712	1801	2280
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
	Shear Modulus (ksi), G	0.25	0.67	3.47	0.83	0.58	2.08	0.67	1.92	3.47
	Poisson's ratio, ν	0.25	0.25	0.30	0.25	0.25	0.30	0.25	0.30	0.30
	Unit Bearing , ksf	19	26	256	49	45	166	26	77	384
	Axial Bearing Failure, kips	77	102	1025	195	179	666	102	307	1536
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	-	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 11		Foundation Type	Driven Concrete Pile
Reference Boring	BB-431		Size (inch)	24
Ground Surface Elevation (ft)	2.8		Base Area (ft^2)	4.00
Ground Water Table Elevation (ft)	0.0		Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	-
	Soil Description	Sand	Sand	Sand - Limestone	Sand	Clay	Sand-Clay	Sand	Sand	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesive	Cohesionless	Cohesionless	-
	Top Boundary Elevation (ft)	2.80	-10.70	-25.70	-65.70	-70.70	-80.70	-115.70	-160.70	-
	Bottom boundary Elevation (ft)	-10.70	-25.70	-65.70	-70.70	-80.70	-115.70	-160.70	-177.20	-
	Average SPT N-Value (Blows/ft)	12	3	17	7	13	13	16	88	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	-
LATERAL	Internal Friction Angle, ϕ	31	29	37	30	-	-	32	36	-
LATERAL	Total Unit Weight (pcf), γ_t	112	102	120	105	115	115	112	125	-
LATERAL	Subgrade Modulus (pci), k	26	6	101	14	542	542	38	125	-
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	-	1625	1300	-	-	-
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	-	0.007	0.007	-	-	-
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	-	1625	1300	-	-	-
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
AXIAL	Total Unit Weight (pcf), γ_t	112	102	120	105	115	115	112	125	-
AXIAL	Shear Modulus (ksi), G	0.96	0.25	1.36	0.58	1.96	1.96	1.28	3.47	-
AXIAL	Poisson's ratio, ν	0.30	0.25	0.30	0.25	0.50	0.50	0.30	0.30	-
AXIAL	Ultimate Unit Skin Friction (psf)	456	114	340	266	1259	1101	608	2280	-
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	-	1625	1300	-	-	-
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-
TORSIONAL	Total Unit Weight (pcf), γ_t	112	102	120	105	115	115	112	125	-
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	-	1625	1300	-	-	-
TORSIONAL	Shear Modulus (ksi), G	0.96	0.25	1.36	0.58	1.96	1.96	1.28	3.47	-
TORSIONAL	Torsional Shear Stress (psf)	456	114	340	266	1259	1101	608	2280	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
TIP	Shear Modulus (ksi), G	0.96	0.25	1.36	0.58	1.96	1.96	1.28	3.47	-
TIP	Poisson's ratio, ν	0.30	0.25	0.30	0.25	0.50	0.50	0.30	0.30	-
TIP	Unit Bearing , ksf	77	19	85	45	18	42	102	384	-
TIP	Axial Bearing Failure, kips	307	77	340	179	73	166	410	1536	-
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	-	1625	1300	-	-	-
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 12 & 13
Reference Boring	BB-433
Ground Surface Elevation (ft)	10.7
Ground Water Table Elevation (ft)	0.0

Foundation Type	Driven Concrete Pile
Size (inch)	24
Base Area (ft^2)	4.00
Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	9	10
	Soil Description	Sand	Sand	Sand	Sand - Limestone	Sand	Sand-Clay	Clay	Sand	Sand	Clay
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesive
	Top Boundary Elevation (ft)	10.70	-2.80	-17.80	-27.80	-37.80	-62.80	-77.80	-97.80	-157.80	-177.80
	Bottom boundary Elevation (ft)	-2.80	-17.80	-27.80	-37.80	-62.80	-77.80	-97.80	-157.80	-177.80	-209.30
	Average SPT N-Value (Blows/ft)	8	2	18	6	8	10	7	2	100	34
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)
LATERAL	Internal Friction Angle, ϕ	30	29	33	35	30	31	-	29	36	-
LATERAL	Total Unit Weight (pcf), γ_t	105	102	112	115	105	112	110	102	125	125
LATERAL	Subgrade Modulus (pci), k	16	4	44	68	16	20	0	4	125	1417
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	875	-	-	4250
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	0.010	-	-	0.005
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	875	-	-	4250
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
AXIAL	Total Unit Weight (pcf), γ_t	105	102	112	115	105	112	110	102	125	125
AXIAL	Shear Modulus (ksi), G	0.67	0.17	1.44	0.50	0.67	0.83	1.10	0.17	3.47	4.63
AXIAL	Poisson's ratio, v	0.25	0.25	0.30	0.25	0.25	0.25	0.45	0.25	0.30	0.50
AXIAL	Ultimate Unit Skin Friction (psf)	304	76	684	120	304	873	720	76	2280	2580
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	875	-	-	4250
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
TORSIONAL	Total Unit Weight (pcf), γ_t	105	102	112	115	105	112	110	102	125	125
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	875	-	-	4250
TORSIONAL	Shear Modulus (ksi), G	0.67	0.17	1.44	0.50	0.67	0.83	1.10	0.17	3.47	4.63
TORSIONAL	Torsional Shear Stress (psf)	304	76	684	120	304	873	720	76	2280	2580
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
TIP	Shear Modulus (ksi), G	0.67	0.17	1.44	0.50	0.67	0.83	1.10	0.17	3.47	4.63
TIP	Poisson's ratio, v	0.25	0.25	0.30	0.25	0.25	0.25	0.45	0.25	0.30	0.50
TIP	Unit Bearing , ksf	51	13	115	29	51	32	10	13	384	48
TIP	Axial Bearing Failure, kips	205	51	461	116	205	128	39	51	1536	190
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	875	-	-	4250
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	Pier 14
Reference Boring	BB-435
Ground Surface Elevation (ft)	5.8
Ground Water Table Elevation (ft)	0.0

Foundation Type	Driven Concrete Pile
Size (inch)	24
Base Area (ft^2)	4.00
Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation.**

	Layer No,	1	2	3	4	5	6	7	8	9	-
	Soil Description	Sand	Sand - Limestone	Sand	Sand-Clay	Clay	Sand-Clay	Sand	Sand	Clay	-
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesive	-
	Top Boundary Elevation (ft)	5.80	-22.70	-42.70	-72.70	-82.70	-92.70	-132.70	-152.70	-202.70	-
	Bottom boundary Elevation (ft)	-22.70	-42.70	-72.70	-82.70	-92.70	-132.70	-152.70	-202.70	-204.20	-
	Average SPT N-Value (Blows/ft)	4	11	6	9	9	2	3	46	24	-
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	-
	Internal Friction Angle, ϕ	29	36	30	30	-	29	29	36	-	-
	Total Unit Weight (pcf), γ_t	105	120	105	105	115	102	102	120	120	-
	Subgrade Modulus (pci), k	8	83	12	18	375	4	6	125	1000	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	1125	-	-	-	3000	-
	Major Principal Strain @ ε_{50}	-	-	-	-	0.007	-	-	-	0.005	-
	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-
	Average Undrained Shear Strength (psf)	-	-	-	-	1125	-	-	-	3000	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
	Total Unit Weight (pcf), γ_t	105	120	105	105	115	102	102	120	120	-
	Shear Modulus (ksi), G	0.33	0.88	0.50	0.75	1.41	0.17	0.25	3.47	3.59	-
	Poisson's ratio, v	0.25	0.30	0.25	0.25	0.45	0.25	0.25	0.30	0.50	-
	Ultimate Unit Skin Friction (psf)	152	220	228	793	908	189	114	1748	2061	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	1125	-	-	-	3000	-
	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-
	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-
	Modulus Ratio	-	-	-	-	-	-	-	-	-	-
	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-
	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-
	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-
	Slump (in)	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	-
	Total Unit Weight (pcf), γ_t	105	120	105	105	115	102	102	120	120	-
	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	1125	-	-	-	3000	-
	Shear Modulus (ksi), G	0.33	0.88	0.50	0.75	1.41	0.17	0.25	3.47	3.59	-
	Torsional Shear Stress (psf)	152	220	228	793	908	189	114	1748	2061	-
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	-
	Shear Modulus (ksi), G	0.33	0.88	0.50	0.75	1.41	0.17	0.25	3.47	3.59	-
	Poisson's ratio, v	0.25	0.30	0.25	0.25	0.45	0.25	0.25	0.30	0.50	-
	Unit Bearing , ksf	26	54	38	29	13	6	19	294	34	-
	Axial Bearing Failure, kips	102	216	154	115	50	26	77	1178	134	-
	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-
	Undrained Shear Strength (psf), c_u	-	-	-	-	1125	-	-	-	3000	-
	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-

Geotechnical Parameters for FB-MultiPier Input

Big Carlos Pass Bridge Replacement
Lee County, Florida
Lee County Project No. CN-160002

Reference Pier	End Bent 15
Reference Boring	BB-436
Ground Surface Elevation (ft)	3.9
Ground Water Table Elevation (ft)	0.0

Foundation Type	Driven Concrete Pile
Size (inch)	24
Base Area (ft^2)	4.00
Nominal Area (ft^2)	4.00

*** The soil parameters included herein have been adjusted to the estimated preform elevation**

	Layer No.	1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Description	Sand	Sand	Sand	Sand - Limestone	Sand - Limestone	Sand	Sand-Clay	Sand-Clay	Clay	Sand-Clay	Sand	Sand	Clay
	Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesive
	Top Boundary Elevation (ft)	3.90	-2.10	-9.60	-14.60	-20.00	-34.60	-59.60	-74.60	-99.60	-109.60	-144.60	-154.60	-179.60
	Bottom boundary Elevation (ft)	-2.10	-9.60	-14.60	-20.00	-34.60	-59.60	-74.60	-99.60	-109.60	-144.60	-154.60	-179.60	-186.10
	Average SPT N-Value (Blows/ft)	2	8	1	50	3	7	9	7	6	5	8	60	54
LATERAL	Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)	Clay (Stiff, w/ Free Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff, w/ Free Water)
LATERAL	Internal Friction Angle, ϕ	29	30	28	40	34	30	30	-	-	29	30	36	-
LATERAL	Total Unit Weight (pcf), γ_t	102	105	100	120	115	105	105	110	110	105	105	125	125
LATERAL	Subgrade Modulus (pci), k	4	16	2	125	59	14	18	0	0	10	16	125	2000
LATERAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	700	750	-	-	-	6000
LATERAL	Major Principal Strain @ ε_{50}	-	-	-	-	-	-	-	0.010	0.010	-	-	-	0.004
LATERAL	Major Principal Strain @ ε_{100}	-	-	-	-	-	-	-	-	-	-	-	-	-
LATERAL	Average Undrained Shear Strength (psf)	-	-	-	-	-	-	-	700	750	-	-	-	6000
LATERAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
AXIAL	Total Unit Weight (pcf), γ_t	102	105	100	120	115	105	105	110	110	105	105	125	125
AXIAL	Shear Modulus (ksi), G	0.17	0.67	0.08	3.47	0.25	0.58	0.75	1.10	0.95	0.42	0.67	3.47	4.63
AXIAL	Poisson's ratio, v	0.25	0.25	0.25	0.30	0.25	0.25	0.25	0.45	0.45	0.25	0.25	0.30	0.50
AXIAL	Ultimate Unit Skin Friction (psf)	76	304	38	1000	60	266	793	629	623	458	304	2280	3019
AXIAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	700	750	-	-	-	6000
AXIAL	Ultimate Unit Skin Friction (psf) (Shaft)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Mass Modulus (ksi)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Modulus Ratio	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Surface (Rough/Smooth)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Unconfined Compressive Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Split Tensile Strength (psf)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Concrete Unit Weight (pcf)	-	-	-	-	-	-	-	-	-	-	-	-	-
AXIAL	Slump (in)	-	-	-	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
TORSIONAL	Total Unit Weight (pcf), γ_t	102	105	100	120	115	105	105	110	110	105	105	125	125
TORSIONAL	Internal Friction Angle, ϕ	-	-	-	-	-	-	-	-	-	-	-	-	-
TORSIONAL	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	700	750	-	-	-	6000
TORSIONAL	Shear Modulus (ksi), G	0.17	0.67	0.08	3.47	0.25	0.58	0.75	1.10	0.95	0.42	0.67	3.47	4.63
TORSIONAL	Torsional Shear Stress (psf)	76	304	38	1000	60	266	793	629	623	458	304	2280	3019
TIP	Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
TIP	Shear Modulus (ksi), G	0.17	0.67	0.08	3.47	0.25	0.58	0.75	1.10	0.95	0.42	0.67	3.47	4.63
TIP	Poisson's ratio, v	0.25	0.25	0.25	0.30	0.25	0.25	0.25	0.45	0.45	0.25	0.25	0.30	0.50
TIP	Unit Bearing , ksf	13	51	6	283	14	45	29	22	8	16	51	384	76
TIP	Axial Bearing Failure, kips	51	205	26	1131	57	179	115	90	34	64	205	1536	302
TIP	Uncorrected SPT-N Value (blows/ft)	-	-	-	-	-	-	-	-	-	-	-	-	-
TIP	Undrained Shear Strength (psf), c_u	-	-	-	-	-	-	-	700	750	-	-	-	6000
TIP	IGM Mass Modulus (ksi), E_m	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX D

Recommended Soil Parameters for Permanent MSE Walls

Permanent MSE Wall Variables

Soil Reinforcement Lengths for External Stability

Recommended Soil Parameters for Temporary Seawalls

External Stability Analysis Sample Calculations

Global Stability Sample Calculations

MSE Wall Settlement Sample Calculations

Sample Downdrag Calculations

Recommended Soil Parameters for Permanent MSE Walls

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

GEOTECHNICAL INFORMATION

MSE Walls 1A, 1B & 1C	*Reinforced Soil & Random Backfill*	*Loose Sand with Silt*	*Medium Dense Sand with Silt*	*Loose Sand with Silt*	*Very Dense Silty Sand*	*Weathered Limestone/Caprock*
Depth Below Existing Ground Line (ft.)	----	*0 - 6*	*6 - 13*	*13 - 28*	*28 - 33*	*33 - 40*
Effective Unit Weight (pcf)	*105*	*42.6*	*47.6*	*42.6*	*62.6*	*52.6*
Cohesion (psf)	----	----	----	----	----	----
Internal Friction Angle (degrees)	*30*	*29*	*30*	*29*	*34*	*38*
MSE Walls 2A, 2B & 2C	*Reinforced Soil & Random Backfill*	*Loose to Medium Dense Sand with Silt and Shell*	*Weathered Limestone/Caprock*	*Weathered Limestone/Caprock*	----	----
Depth Below Existing Ground Line (ft.)	----	*0 - 23*	*23 - 28*	*28 - 40*	----	----
Effective Unit Weight (pcf)	*105*	*42.6*	*72.6*	*52.6*	----	----
Cohesion (psf)	----	----	*8,000*	----	----	----
Internal Friction Angle (degrees)	*30*	*29*	----	*37*	----	----

Permanent MSE Wall Variables

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

WALL NO.	*WALL SETTLEMENT*				*DESIGN HIGH WATER ELEVATION (ft., NAVD88)*
	LONG TERM SETTLEMENT (IN.)	*SHORT TERM SETTLEMENT (IN.)*	*DIFFERENTIAL SETTLEMENT*		
			LONGITUDINAL (%) (FT./100FT.)	*TRANSVERSE (IN.)*	
1A, 1B & 1C	*< 0.5*	*0.5 - 1.5*	*0.05*	*N/A*	*+14.3*
2A, 2B & 2C	*< 0.5*	*0.5 - 4.2*	*0.15*	*N/A*	*+14.3*

NOTES:

1. *DESIGN WALLS FOR THE SETTLEMENTS NOTED IN THE TABLE.*
2. *LONG-TERM SETTLEMENT IS MEASURED FROM THE END OF STAGE ONE OF THE WALL CONSTRUCTION THROUGH THE SERVICE LIFE OF THE WALL.*
3. *SHORT-TERM SETTLEMENT IS MEASURED DURING THE BEGINNING OF WALL CONSTRUCTION.*
4. *TRANSVERSE DIFFERENTIAL SETTLEMENT IS ONLY APPLICABLE FOR EMBANKMENT WIDENINGS.*

Soil Reinforcement Lengths for External Stabilty

CR 865 (Estero Boulevard) Over Big Carlos Pass
Lee County Project No. CN-160002
Tierra Project No. 6511-16-051

PERMANENT MSE WALL SYSTEM DATA TABLE

MSE Walls 1A, 1B & 1C	*Wall Height (ft.)*	≤ 8	10	12	14	16	18	20	22	24	-	-	-	-	-	-	-	-
	Reinforcement Length (ft.)	10	12	13	16	18	18	20	22	24	-	-	-	-	-	-	-	-
	Factored Bearing Resistance (psf)	2,603	2,932	2,982	3,590	3,920	3,685	5,499	6,022	6,542	-	-	-	-	-	-	-	-
MSE Walls 2A & 2B	*Wall Height (ft.)*	≤ 8	10	12	14	16	18	20	22	24	-	-	-	-	-	-	-	-
	Reinforcement Length (ft.)	11	14	17	19	22	25	28	30	33	-	-	-	-	-	-	-	-
	Factored Bearing Resistance (psf)	2,869	3,465	4,061	4,397	4,999	5,636	6,272	6,650	7,284	-	-	-	-	-	-	-	-
MSE Wall 2C	*Wall Height (ft.)*	≤ 8	10	12	14	16	18	20	22	24	-	-	-	-	-	-	-	-
	Reinforcement Length (ft.)	10	12	14	17	19	21	24	26	28	-	-	-	-	-	-	-	-
	Factored Bearing Resistance (psf)	2,603	2,932	3,261	3,864	4,200	4,578	5,225	5,602	5,980	-	-	-	-	-	-	-	-

NOTES:

1. *THE REINFORCEMENT STRAP LENGTHS SHOWN ABOVE ARE THE MINIMUM LENGTHS REQUIRED FOR EXTERNAL STABILITY. THE REINFORCEMENT LENGTHS USED IN THE CONSTRUCTION OF THE RETAINING WALLS WILL BE THE LONGER OF THAT REQUIRED FOR EXTERNAL OR INTERNAL STABILITY (DETERMINED BY PROPRIETARY WALL COMPANIES).*
2. *THE FACTORED BEARING RESISTANCES SHOWN ABOVE ARE THE CRITICAL (LOWEST) VALUES FROM ALL THE LOAD CASES ANALYZED USING LRFD METHODOLOGY.*
3. *WALL HEIGHT FOR PERMANENT WALLS IS DEFINED AS THE DISTANCE FROM TOP OF LEVELING PAD TO TOP OF COPING OR GUTTER GRADE; UNDER BRIDGE THE WALL HEIGHT IS MEASURED FROM TOP OF LEVELING PAD TO FINISHED GRADE.*

Recommended Soil Parameters for Temporary MSE Walls

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

GEOTECHNICAL INFORMATION

Temporary MSE Wall	*Reinforced Soil & Random Backfill*	*Loose Sand with Silt*	*Medium Dense Sand with Silt*	*Loose Sand with Silt*	*Very Dense Silty Sand*	*Weathered Limestone/Caprock*
Depth Below Existing Ground Line (ft.)	----	*0 - 6*	*6 - 13*	*13 - 28*	*28 - 33*	*33 - 40*
Effective Unit Weight (pcf)	*105*	*42.6*	*47.6*	*42.6*	*62.6*	*52.6*
Cohesion (psf)	----	----	----	----	----	----
Internal Friction Angle (degrees)	*30*	*29*	*30*	*29*	*34*	*38*

Temporary MSE Wall Variables

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

WALL NO.	*WALL SETTLEMENT*			*AIR CONTAMINATION CLASSIFICATION*
	LONG TERM SETTLEMENT (IN.)	*SHORT TERM SETTLEMENT (IN.)*	*DIFFERENTIAL SETTLEMENT*	
			LONGITUDINAL (%) (FT./100FT.)	
Temp. MSE Walls	*< 0.5*	*0.5 - 1.5*	*0.05*	*HIGH*

NOTES:

1. *DESIGN WALLS FOR THE SETTLEMENTS NOTED IN THE TABLE.*
2. *LONG-TERM SETTLEMENT IS MEASURED FROM THE BEGINNING OF WALL CONSTRUCTION THROUGH THE SERVICE LIFE OF THE WALL.*
3. *SHORT-TERM SETTLEMENT IS MEASURED DURING THE BEGINNING OF WALL CONSTRUCTION.*

Soil Reinforcement Lengths for External Stabilty

CR 865 (Estero Boulevard) Over Big Carlos Pass
Lee County Project No. CN-160002
Tierra Project No. 6511-16-051

TEMPORARY MSE WALL SYSTEM DATA TABLE

Temporary MSE Walls	*Wall Height (ft.)*	≤ 8	10	12	14	16	18	20	22	-	-	-	-	-	-	-	-	-	-
	Reinforcement Length (ft.)	10	12	13	16	18	18	20	22	-	-	-	-	-	-	-	-	-	-
	Factored Bearing Resistance (psf)	1,833	2,162	2,212	2,820	3,149	2,915	4,487	5,009	-	-	-	-	-	-	-	-	-	-

NOTES:

1. *THE REINFORCEMENT STRAP LENGTHS SHOWN ABOVE ARE THE MINIMUM LENGTHS REQUIRED FOR EXTERNAL STABILITY. THE REINFORCEMENT LENGTHS USED IN THE CONSTRUCTION OF THE RETAINING WALLS WILL BE THE LONGER OF THAT REQUIRED FOR EXTERNAL OR INTERNAL STABILITY (DETERMINED BY PROPRIETARY WALL COMPANIES).*
2. *THE FACTORED BEARING RESISTANCES SHOWN ABOVE ARE THE CRITICAL (LOWEST) VALUES FROM ALL THE LOAD CASES ANALYZED USING LRFD METHODOLOGY.*

Recommended Soil Parameters for Temporary MSE Walls - Pedestrian Sidewalk

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

GEOTECHNICAL INFORMATION

Temporary MSE Wall	*Reinforced Soil & Random Backfill*	*Loose Sand with Silt*	*Medium Dense Sand with Silt*	*Loose Sand with Silt*	*Very Dense Silty Sand*	*Weathered Limestone/Caprock*
Depth Below Existing Ground Line (ft.)	*----*	*0 - 6*	*6 - 13*	*13 - 28*	*28 - 33*	*33 - 40*
Effective Unit Weight (pcf)	*105*	*42.6*	*47.6*	*42.6*	*62.6*	*52.6*
Cohesion (psf)	*----*	*----*	*----*	*----*	*----*	*----*
Internal Friction Angle (degrees)	*30*	*29*	*30*	*29*	*34*	*38*

Temporary MSE Wall Variables - Pedestrian Sidewalk

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

WALL NO.	*WALL SETTLEMENT*			*AIR CONTAMINATION CLASSIFICATION*
	LONG TERM SETTLEMENT (IN.)	*SHORT TERM SETTLEMENT (IN.)*	*DIFFERENTIAL SETTLEMENT*	
			LONGITUDINAL (%) (FT./100FT.)	
Temp. MSE Walls for Pedestrian Sidewalk	*< 0.5*	*0.5 - 1.0*	*0.05*	*HIGH*

NOTES:

1. *DESIGN WALLS FOR THE SETTLEMENTS NOTED IN THE TABLE.*
2. *LONG-TERM SETTLEMENT IS MEASURED FROM THE BEGINNING OF WALL CONSTRUCTION THROUGH THE SERVICE LIFE OF THE WALL.*
3. *SHORT-TERM SETTLEMENT IS MEASURED DURING THE BEGINNING OF WALL CONSTRUCTION.*

Soil Reinforcement Lengths for External Stabilty - Pedestraian Sidewalk

CR 865 (Estero Boulevard) Over Big Carlos Pass

Lee County Project No. CN-160002

Tierra Project No. 6511-16-051

TEMPORARY MSE WALL SYSTEM DATA TABLE

Temporary MSE Wallsfor Pedestrian Sidewalk	*Wall Height (ft.)*	≤ 8	9	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reinforcement Length (ft.)	9	10	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
	Factored Bearing Resistance (psf)	2,143	2,020	2,214	2,244	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES:

1. *THE REINFORCEMENT STRAP LENGTHS SHOWN ABOVE ARE THE MINIMUM LENGTHS REQUIRED FOR EXTERNAL STABILITY. THE REINFORCEMENT LENGTHS USED IN THE CONSTRUCTION OF THE RETAINING WALLS WILL BE THE LONGER OF THAT REQUIRED FOR EXTERNAL OR INTERNAL STABILITY (DETERMINED BY PROPRIETARY WALL COMPANIES).*
2. *THE FACTORED BEARING RESISTANCES SHOWN ABOVE ARE THE CRITICAL (LOWEST) VALUES FROM ALL THE LOAD CASES ANALYZED USING LRFD METHODOLOGY.*

RECOMMENDED SOIL PARAMETERS FOR TEMPORARY SEAWALLS
CR 865 (Estero Boulevard) over Big Carlos Pass
Lee County, Florida
Lee County Project No. CN-160002
Tierra Project No. 6511-16-051

Wall Location	Boring Analyzed	Approximate Groundwater Table Elevation (feet, NAVD 88)	Approximate Elevation Range (feet, NAVD 88)		Soil Unit Weight (pcf)		Internal Friction Angle	Cohesion	Wall Friction Angle	Coated Walls Only	
			from	to	Saturated/ Moist	Effective	(°)	(psf)	(°)	Wall/Soil Adhesion (psf)	Wall Friction Angle (°)
Big Carlos Pass Bridge Approach Station 413+80	BB-414	-0.3	> 6.2		---	---	---	---	---	---	---
			6.2	-16	110	47.6	30	---	14	---	0
			-16	-52	120	57.6	34	---	17	---	0
			-52	-102	105	42.6	30	---	14	---	0

NOTES:

1. For design purposes the generalized soil layers presented herein may be considered representative of typical soil conditions at the west seawall locations; however, they should not be considered all-inclusive.
2. For bitumen coated steel sheet piles, Wall Friction Angle is assumed to be taken as zero.
3. Weathered Limestone/Caprock was encountered within the boring performed. Sheet pile installation into and/or through this layer may be difficult and may require specialized equipment to penetrate the limestone layer. Variations in the depth and relative density of the materials should be anticipated.

MSE WALL - LRFD External Stability Analysis

version 2.5.1

CR 865 (Estero Blvd.) over Big Carlos Pass: Permanent MSE Walls 1A, 1B & 1C - DHW Event

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement	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	**8.0**	6.0	2.0	**10.0**	**OK**	**2.84**	**0.70**	**1.01**	**1.97**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
2	**10.0**	8.0	2.0	**12.0**	**OK**	**2.92**	**0.69**	**1.06**	**1.91**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
3	**12.0**	10.0	2.0	**13.0**	**OK**	**2.57**	**0.78**	**1.02**	**1.67**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
4	**14.0**	12.0	2.0	**16.0**	**OK**	**3.04**	**0.66**	**1.12**	**1.84**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
5	**16.0**	14.0	2.0	**18.0**	**OK**	**3.09**	**0.65**	**1.15**	**1.82**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
6	**18.0**	16.0	2.0	**18.0**	**OK**	**2.56**	**0.78**	**1.06**	**1.49**	0.0	0.0	100.0	65.4	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
7	**20.0**	18.0	2.0	**20.0**	**OK**	**2.80**	**0.71**	**1.15**	**1.99**	0.0	0.0	100.0	69.4	105.0	30.0	50.0	30.0	0.0	29.0	250	250	1.00
8	**22.0**	20.0	2.0	**22.0**	**OK**	**3.01**	**0.66**	**1.22**	**1.96**	0.0	0.0	100.0	72.6	105.0	30.0	50.0	30.0	0.0	29.0	250	250	1.00
9	**24.0**	22.0	2.0	**24.0**	**OK**	**3.20**	**0.63**	**1.29**	**1.94**	0.0	0.0	100.0	75.3	105.0	30.0	50.0	30.0	0.0	29.0	250	250	1.00
10	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
11	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
12	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
13	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
14	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
15	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
16	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
17	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
18	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
19	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
20	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!

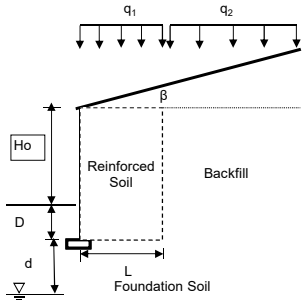
* Indicates required input

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 2.5.1

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]
1357	**2603**	0.00	5200	0	0	4375	0.0	1120	667	1680	2882	5200	11395	26000	56975	9147	9147	1.76	0.80	8.39	27.86	16.44	19.34	0.333	0.000	0.000
1583	**2932**	0.00	7800	0	0	5250	0.0	1750	833	2625	4324	7800	15780	46800	94680	16042	16042	2.06	1.02	9.97	27.86	16.44	19.34	0.333	0.000	0.000
1871	**2982**	0.00	10140	0	0	5688	0.0	2520	1000	3780	5621	10140	19377	65910	125947	25620	25620	2.53	1.32	10.36	27.86	16.44	19.34	0.333	0.000	0.000
2031	**3590**	0.00	14560	0	0	7000	0.0	3430	1167	5145	8071	14560	26656	116480	213248	38302	38302	2.63	1.44	13.13	27.86	16.44	19.34	0.333	0.000	0.000
2253	**3920**	0.00	18720	0	0	7875	0.0	4480	1333	6720	10377	18720	33147	168480	298323	54507	54507	2.91	1.64	14.71	27.86	16.44	19.34	0.333	0.000	0.000
2624	**3685**	0.00	21204	0	0	7875	0.0	5670	1500	8505	11754	21204	36500	190836	328504	74655	74655	3.52	2.05	13.91	27.86	16.44	19.34	0.333	0.000	0.000
2943	**5499**	0.00	27760	0	0	8750	0.0	7000	1667	10500	15388	27760	46226	277600	462260	99167	99167	3.57	2.15	15.71	30.14	18.40	22.40	0.333	0.000	0.000
3262	**6022**	0.00	35156	0	0	9625	0.0	8470	1833	12705	19487	35156	57086	386716	627942	128462	128462	3.65	2.25	17.50	30.14	18.40	22.40	0.333	0.000	0.000
3583	**6542**	0.00	43392	0	0	10500	0.0	10080	2000	15120	24053	43392	69079	520704	828950	162960	162960	3.76	2.36	19.28	30.14	18.40	22.40	0.333	0.000	0.000
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#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!	5.14	1.00	0.00	1.000	0.000	0.000
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#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!	5.14	1.00	0.00	1.000	0.000	0.000
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#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!	5.14	1.00	0.00	1.000	0.000	0.000

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

qvb	Maximum Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr	Minimum 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 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 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

MSE WALL - LRFD External Stability Analysis

version 2.5.1

CR 865 (Estero Blvd.) over Big Carlos Pass: Permanent MSE Walls 2A & 2B - DHW Event

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement	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	**8.0**	6.0	2.0	**11.0**	**OK**	**3.44**	**0.58**	**1.11**	**2.23**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
2	**10.0**	8.0	2.0	**14.0**	**OK**	**3.97**	**0.50**	**1.24**	**2.36**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
3	**12.0**	10.0	2.0	**17.0**	**OK**	**4.40**	**0.45**	**1.33**	**2.46**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
4	**14.0**	12.0	2.0	**19.0**	**OK**	**4.29**	**0.47**	**1.33**	**2.37**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
5	**16.0**	14.0	2.0	**22.0**	**OK**	**4.65**	**0.43**	**1.41**	**2.44**	0.0	0.0	100.0	65.5	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
6	**18.0**	16.0	2.0	**25.0**	**OK**	**5.27**	**0.38**	**1.57**	**2.41**	0.0	0.0	100.0	69.9	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
7	**20.0**	18.0	2.0	**28.0**	**OK**	**5.80**	**0.34**	**1.70**	**2.39**	0.0	0.0	100.0	73.4	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
8	**22.0**	20.0	2.0	**30.0**	**OK**	**5.88**	**0.34**	**1.75**	**2.27**	0.0	0.0	100.0	76.3	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
9	**24.0**	22.0	2.0	**33.0**	**OK**	**6.31**	**0.32**	**1.85**	**2.26**	0.0	0.0	100.0	78.7	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
10	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
11	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
12	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
13	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
14	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
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16	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
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18	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
19	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
20	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!

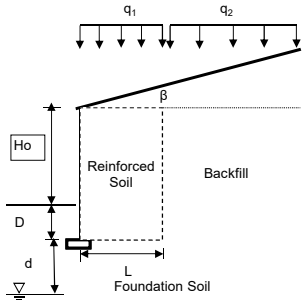
* Indicates required input

Note:

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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 2.5.1

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]
1314	**2869**	0.00	5720	0	0	4813	0.0	1120	667	1680	3171	5720	12535	31460	68940	9147	9147	1.60	0.73	9.54	27.86	16.44	19.34	0.333	0.000	0.000
1502	**3465**	0.00	9100	0	0	6125	0.0	1750	833	2625	5044	9100	18410	63700	128870	16042	16042	1.76	0.87	12.26	27.86	16.44	19.34	0.333	0.000	0.000
1692	**4061**	0.00	13260	0	0	7438	0.0	2520	1000	3780	7350	13260	25339	112710	215377	25620	25620	1.93	1.01	14.98	27.86	16.44	19.34	0.333	0.000	0.000
1909	**4397**	0.00	17290	0	0	8313	0.0	3430	1167	5145	9584	17290	31654	164255	300713	38302	38302	2.22	1.21	16.58	27.86	16.44	19.34	0.333	0.000	0.000
2109	**4999**	0.00	23056	0	0	9625	0.0	4480	1333	6720	12780	23056	40751	253616	448257	54507	54507	2.36	1.34	19.32	27.86	16.44	19.34	0.333	0.000	0.000
2405	**5636**	0.00	31450	0	0	10938	0.0	5670	1500	8505	17433	31450	53395	393125	667438	74655	74655	2.37	1.40	22.20	27.86	16.44	19.34	0.333	0.000	0.000
2702	**6272**	0.00	41104	0	0	12250	0.0	7000	1667	10500	22784	41104	67740	575456	948366	99167	99167	2.41	1.46	25.07	27.86	16.44	19.34	0.333	0.000	0.000
3022	**6650**	0.00	50340	0	0	13125	0.0	8470	1833	12705	27904	50340	81084	755100	1216260	128462	128462	2.55	1.58	26.83	27.86	16.44	19.34	0.333	0.000	0.000
3319	**7284**	0.00	62304	0	0	14438	0.0	10080	2000	15120	34536	62304	98548	1028016	1626040	162960	162960	2.62	1.65	29.69	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	0.000	0.000
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#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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	0.000	0.000

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

qvb Maximum Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr Minimum 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 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 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

MSE WALL - LRFD External Stability Analysis

version 2.5.1

CR 865 (Estero Blvd.) over Big Carlos Pass: Permanent MSE Wall 2C - DHW Event

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement	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	**8.0**	6.0	2.0	**10.0**	**OK**	**2.84**	**0.70**	**1.01**	**1.97**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
2	**10.0**	8.0	2.0	**12.0**	**OK**	**2.92**	**0.69**	**1.06**	**1.91**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
3	**12.0**	10.0	2.0	**14.0**	**OK**	**2.98**	**0.67**	**1.09**	**1.87**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
4	**14.0**	12.0	2.0	**17.0**	**OK**	**3.43**	**0.58**	**1.19**	**2.02**	0.0	0.0	100.0	65.0	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
5	**16.0**	14.0	2.0	**19.0**	**OK**	**3.47**	**0.58**	**1.22**	**1.98**	0.0	0.0	100.0	65.5	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
6	**18.0**	16.0	2.0	**21.0**	**OK**	**3.72**	**0.54**	**1.32**	**1.88**	0.0	0.0	100.0	69.9	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
7	**20.0**	18.0	2.0	**24.0**	**OK**	**4.26**	**0.47**	**1.46**	**1.93**	0.0	0.0	100.0	73.4	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
8	**22.0**	20.0	2.0	**26.0**	**OK**	**4.42**	**0.45**	**1.52**	**1.85**	0.0	0.0	100.0	76.3	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
9	**24.0**	22.0	2.0	**28.0**	**OK**	**4.54**	**0.44**	**1.57**	**1.80**	0.0	0.0	100.0	78.7	105.0	30.0	42.6	29.0	0.0	29.0	250	250	1.00
10	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
11	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
12	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
13	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
14	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
15	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
16	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
17	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
18	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
19	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!
20	**0.0**				**OK**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**													#DIV/0!

* Indicates required input

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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)

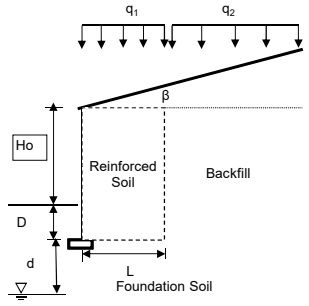
c[fs] — Foundation Soil cohesion (pounds per square foot)

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 2.5.1

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]
1357	**2603**	0.00	5200	0	0	4375	0.0	1120	667	1680	2882	5200	11395	26000	56975	9147	9147	1.76	0.80	8.39	27.86	16.44	19.34	0.333	0.000	0.000
1583	**2932**	0.00	7800	0	0	5250	0.0	1750	833	2625	4324	7800	15780	46800	94680	16042	16042	2.06	1.02	9.97	27.86	16.44	19.34	0.333	0.000	0.000
1808	**3261**	0.00	10920	0	0	6125	0.0	2520	1000	3780	6053	10920	20867	76440	146069	25620	25620	2.35	1.23	11.54	27.86	16.44	19.34	0.333	0.000	0.000
1981	**3864**	0.00	15470	0	0	7438	0.0	3430	1167	5145	8575	15470	28322	131495	240737	38302	38302	2.48	1.35	14.30	27.86	16.44	19.34	0.333	0.000	0.000
2213	**4200**	0.00	19912	0	0	8313	0.0	4480	1333	6720	11037	19912	35194	189164	334340	54507	54507	2.74	1.55	15.90	27.86	16.44	19.34	0.333	0.000	0.000
2538	**4578**	0.00	26418	0	0	9188	0.0	5670	1500	8505	14644	26418	44852	277389	470944	74655	74655	2.83	1.66	17.67	27.86	16.44	19.34	0.333	0.000	0.000
2821	**5225**	0.00	35232	0	0	10500	0.0	7000	1667	10500	19529	35232	58063	422784	696758	99167	99167	2.81	1.71	20.58	27.86	16.44	19.34	0.333	0.000	0.000
3145	**5602**	0.00	43628	0	0	11375	0.0	8470	1833	12705	24183	43628	70273	567164	913546	128462	128462	2.94	1.83	22.34	27.86	16.44	19.34	0.333	0.000	0.000
3469	**5980**	0.00	52864	0	0	12250	0.0	10080	2000	15120	29303	52864	83616	740096	1170630	162960	162960	3.08	1.95	24.10	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	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!	5.14	1.00	0.00	1.000	0.000	0.000

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

qvb Maximum Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr Minimum 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 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 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

CR 865 Over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 Over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	412+50

Description:

Global Stability Analysis for Permanent MSE Walls 1A & 1C using boring WB-412R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... 51 Big Carlos Pass\ReSSA\ReSSA1 412+50_WB-412R.MSE
Original date and time of creating this file: Wed May 19 15:35:28 2021

PROGRAM MODE: Analysis of a General Slope using NO reinforcement material.

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INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

=========== Soil Layer #: ===========	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
1......Embankment Fill..................................	110.0	30.0	0.0
2......Loose Sand with Silt............................	105.0	29.0	0.0
3......Caprock..	135.0	0.0	4000.0
4......Weathered Limestone...........................	115.0	37.0	0.0

REINFORCEMENT

Analysis of slope WITHOUT reinforcement.

WATER

Unit weight of water = 62.45 [lb/ft ³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

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DRAWING OF SPECIFIED GEOMETRY - GENERAL - Quick Input

-- Problem geometry is defined along sections selected by user at x,y coordinates.
-- X1,Y1 represents the coordinates of soil surface. X2,Y2 represent the coordinates of the end of soil layer 1 and start of soil layer 2, and so on.
-- Xw,Yw represents the coordinates of phreatic surface.

GEOMETRY

Soil profile contains 4 layers (see details in next page)

WATER GEOMETRY

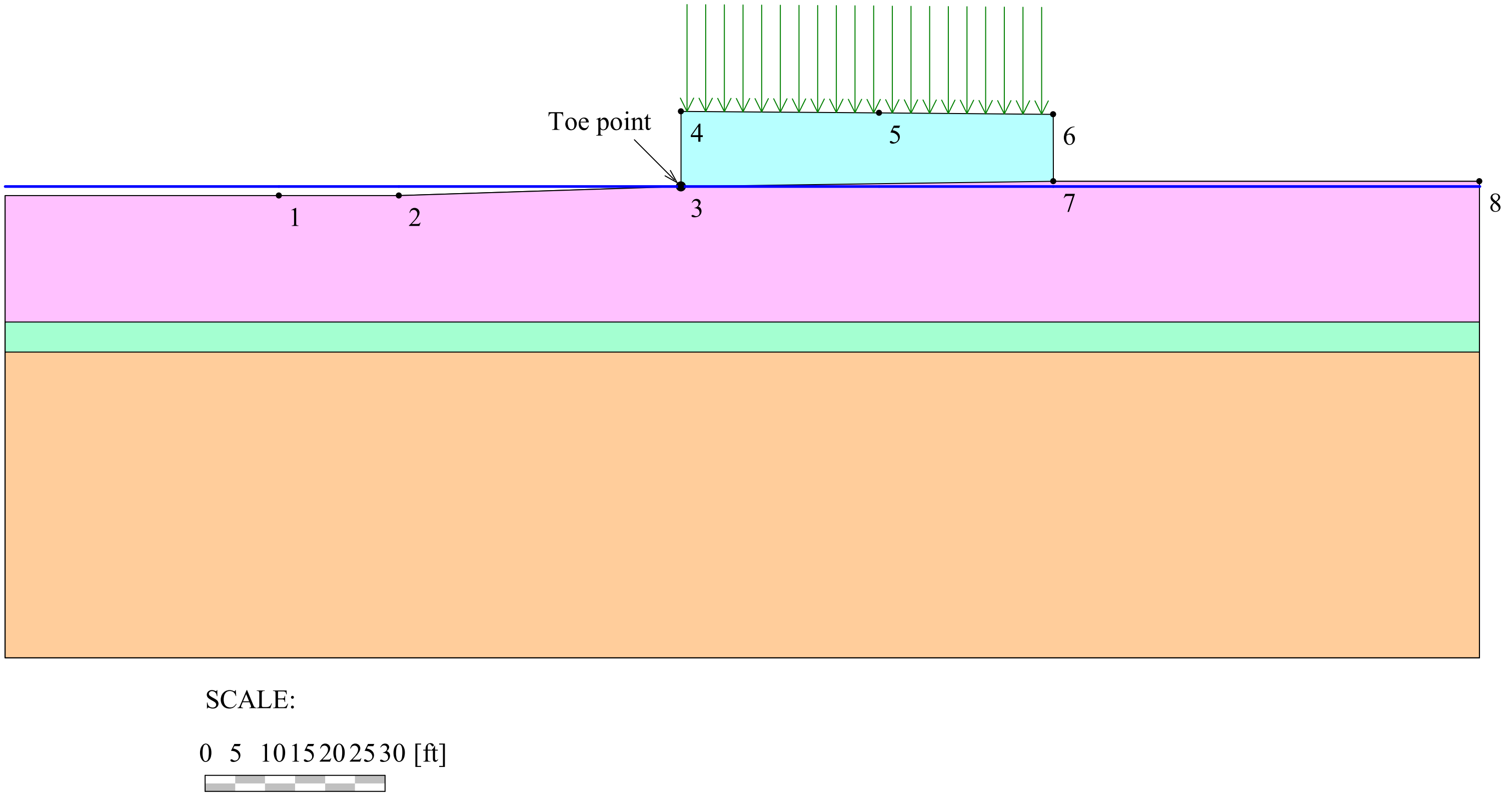
Phreatic line was specified.

UNIFORM SURCHARGE

Load Q1 = 250.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X1s = -32.00 and ends at X1e = 28.00 [ft].
Surcharge load, Q2....................................None
Surcharge load, Q3....................................None

STRIP LOAD

............................None...................................



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TABULATED DETAILS OF GEMERAL SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line.

	#	Xi	Yi
Top of Layer 1	1	-80.00	2.00
	2	-33.01	3.50
	3	-33.00	16.00
	4	0.00	15.75
	5	29.00	15.50
	6	29.01	4.38
Top of Layer 2	7	-80.00	2.00
	8	-33.01	3.50
	9	29.01	4.38
Top of Layer 3	10	0.00	-19.00
Top of Layer 4	11	0.00	-24.00
Top of Phreatic Line	13	-100.00	3.50
	14	100.00	3.50

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TABULATED DETAILS OF SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line. Y values are tabulated in the right most column.

#	X	Y1	Y2	Y3	Y4	(phreatic) Yw
1	-100.00	2.00	2.00	-19.00	-24.00	3.50
2	-80.00	2.00	2.00	-19.00	-24.00	3.50
3	-33.01	3.50	3.50	-19.00	-24.00	3.50
4	-33.00	16.00	3.50	-19.00	-24.00	3.50
5	0.00	15.75	3.97	-19.00	-24.00	3.50
6	29.00	15.50	4.38	-19.00	-24.00	3.50
7	29.01	4.38	4.38	-19.00	-24.00	3.50
8	100.00	4.38	4.38	-19.00	-24.00	3.50

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.) The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)

Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
2	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
3	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
4	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
5	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
6	-33.01	3.50	-33.01	3.50	-33.01	3.50	0.00	N/A	#10 - Overhanging Cliff
7	-8.79	15.82	-49.84	3.19	-31.89	17.88	23.19	1.63	
8	-7.76	15.81	-60.89	2.85	-37.58	22.70	30.61	1.52	
9	-6.72	15.80	-57.96	2.73	-36.05	23.83	30.41	1.52	
10	-5.69	15.79	-60.76	2.68	-37.39	26.74	33.54	1.51	OK
11	-4.65	15.79	-62.12	2.62	-37.99	29.31	35.98	1.52	
12	-3.62	15.78	-64.90	2.55	-39.37	32.82	39.61	1.53	
13	-2.58	15.77	-65.40	2.94	-39.27	35.20	41.51	1.54	
14	-1.55	15.76	-65.31	2.84	-39.20	37.76	43.60	1.56	
15	-0.52	15.75	-65.20	2.74	-39.16	40.54	45.91	1.58	
16	0.52	15.75	-63.64	2.65	-38.39	42.64	47.29	1.60	
17	1.55	15.74	-69.35	2.58	-41.20	48.55	53.90	1.63	
18	2.59	15.73	-66.53	2.63	-39.21	47.38	52.43	1.66	
19	3.62	15.72	-70.67	2.49	-41.56	54.24	59.37	1.69	
20	4.66	15.71	-69.40	2.61	-40.03	52.46	57.86	1.72	
21	5.69	15.70	-73.13	2.24	-41.54	54.75	61.28	1.75	
22	6.73	15.69	-71.86	2.35	-40.03	52.98	59.81	1.78	
23	7.76	15.68	-71.80	2.31	-39.82	55.37	61.95	1.80	
24	8.79	15.67	-73.27	2.32	-40.08	57.18	64.12	1.83	
25	9.83	15.67	-74.63	2.26	-40.63	60.81	67.71	1.86	
26	10.86	15.66	-76.11	2.27	-40.89	62.70	69.94	1.89	
27	11.90	15.65	-74.84	2.39	-39.36	60.63	68.20	1.92	
28	12.93	15.64	-76.32	2.41	-39.61	62.46	70.38	1.95	
29	13.97	15.63	-76.37	2.44	-39.12	63.28	71.33	1.98	
30	15.00	15.62	-80.04	2.03	-40.29	63.15	72.91	2.00	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points).

Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-80.61	2.50	-2.58	15.77	-47.26	42.43	52.03	1.65	
2	-79.17	2.50	-2.58	15.77	-46.52	41.69	51.01	1.63	
3	-77.74	2.50	-2.58	15.77	-45.78	40.94	49.99	1.62	
4	-76.31	2.50	-2.58	15.77	-45.04	40.20	48.98	1.60	
5	-74.97	2.60	-3.62	15.78	-44.39	36.79	45.87	1.59	
6	-73.54	2.60	-3.62	15.78	-43.65	36.10	44.90	1.58	
7	-71.96	2.45	-2.58	15.77	-43.01	39.01	46.63	1.56	
8	-70.53	2.45	-2.58	15.77	-42.27	38.25	45.61	1.56	
9	-69.19	2.54	-3.62	15.78	-41.61	34.95	42.56	1.54	
10	-67.76	2.54	-3.62	15.78	-40.86	34.24	41.57	1.54	
11	-66.41	2.62	-4.65	15.79	-40.24	31.28	38.81	1.52	
12	-64.98	2.62	-4.65	15.79	-39.49	30.62	37.87	1.52	
13	-63.55	2.62	-4.65	15.79	-38.74	29.97	36.92	1.52	
14	-62.18	2.68	-5.69	15.79	-38.14	27.35	34.45	1.51	
15	-60.76	2.68	-5.69	15.79	-37.39	26.74	33.54	1.51 .	OK
16	-59.33	2.68	-5.69	15.79	-36.64	26.14	32.64	1.52	
17	-57.96	2.73	-6.72	15.80	-36.05	23.83	30.41	1.52	
18	-56.97	3.20	-6.72	15.80	-35.30	23.27	29.54	1.52	
19	-55.54	3.18	-6.72	15.80	-34.55	22.71	28.67	1.54	
20	-54.13	3.22	-7.76	15.81	-33.98	20.68	26.67	1.55	
21	-52.69	3.20	-7.76	15.81	-33.22	20.17	25.83	1.58	
22	-51.38	3.28	-6.72	15.80	-32.42	21.54	26.33	1.59	
23	-49.66	2.97	-6.72	15.80	-31.65	20.97	25.46	1.63	
24	-48.41	3.16	-7.76	15.81	-31.06	19.06	23.53	1.67	
25	-47.05	3.22	-7.76	15.81	-30.29	18.54	22.70	1.73	
26	-45.66	3.25	-7.76	15.81	-29.52	18.02	21.87	1.79	
27	-44.17	3.17	-6.72	15.80	-28.70	19.13	22.23	1.87	
28	-42.81	3.25	-7.76	15.81	-28.09	17.35	20.39	1.97	
29	-41.54	3.37	-5.69	15.79	-27.10	19.66	21.76	2.10	
30	-40.04	3.31	-5.69	15.79	-26.31	19.03	20.87	2.26	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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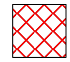
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CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis with slip surfaces excluded from this polygon:

Minimum Factor of Safety = 1.51

Critical Circle: Xc = -37.39[ft], Yc = 26.74[ft], R = 33.54[ft]. (Number of slices used = 54)



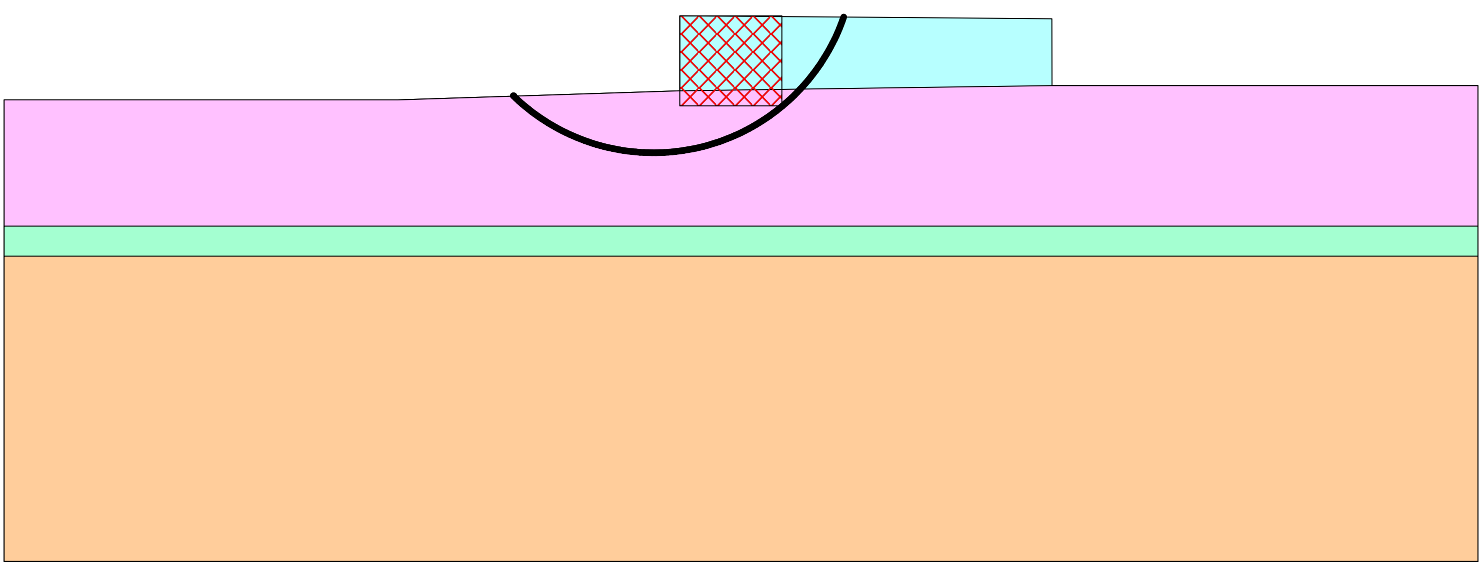
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

N O T   C O N D U C T E D

Three-Part Wedge Stability Analysis

N O T   C O N D U C T E D

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 10 15 20 25 30 [ft]

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CR 865 Over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 Over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	413+50

Description:

Global Stability Analysis for Permanent MSE Walls 1A, 1B & 1C using boring BB-414.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... 051 Big Carlos Pass\ReSSA\ReSSA1_413+50_BB-414.MSE
Original date and time of creating this file: Wed May 19 15:35:28 2021

PROGRAM MODE: Analysis of a General Slope using NO reinforcement material.

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INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

========== Soil Layer #: ==========	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
.1.......Embankment Fill..................................	110.0	30.0	0.0
.2.......Medium Dense Sand with Silt..............	112.0	31.0	0.0
.3.......Caprock..	115.0	0.0	4000.0
.4.......Silty Sand to Sandy Limestone.............	105.0	29.0	0.0

REINFORCEMENT

Analysis of slope WITHOUT reinforcement.

WATER

Unit weight of water = 62.45 [lb/ft ³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

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DRAWING OF SPECIFIED GEOMETRY - GENERAL - Quick Input

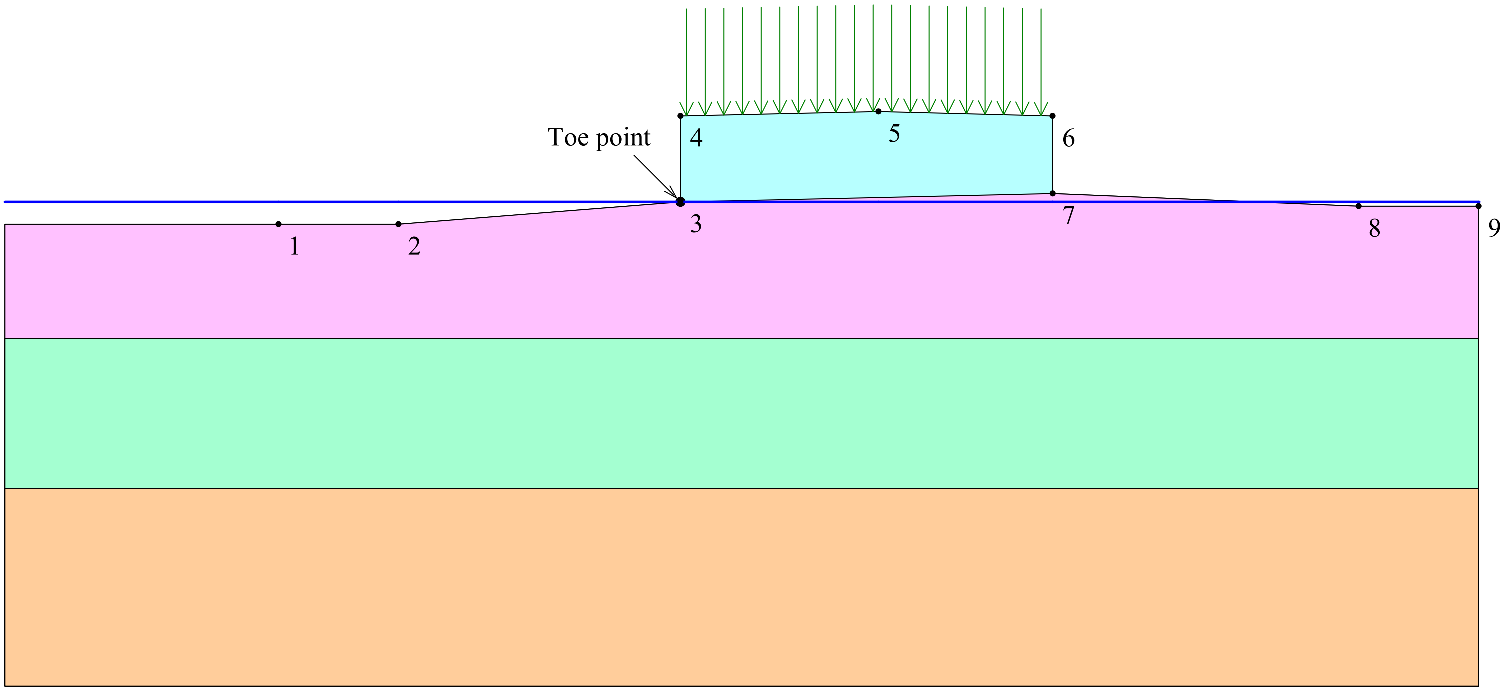
-- Problem geometry is defined along sections selected by user at x,y coordinates.
-- X1,Y1 represents the coordinates of soil surface. X2,Y2 represent the coordinates of the end of soil layer 1 and start of soil layer 2, and so on.
-- Xw,Yw represents the coordinates of phreatic surface.

GEOMETRY
Soil profile contains 4 layers (see details in next page)

WATER GEOMETRY
Phreatic line was specified.

UNIFORM SURCHARGE
Load Q1 = 250.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X1s = -32.00 and ends at X1e = 28.00 [ft].
Surcharge load, Q2....................................None
Surcharge load, Q3....................................None

STRIP LOAD
............................None...................................



SCALE:

0 5 10 15 20 25 30 [ft]

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TABULATED DETAILS OF GEMERAL SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line.

	#	Xi	Yi
Top of Layer 1	1	-80.00	2.00
	2	-33.01	5.70
	3	-33.00	20.00
	4	0.00	20.75
	5	29.00	20.00
	6	29.01	7.10
	7	80.00	5.00
Top of Layer 2	8	-80.00	2.00
	9	-33.01	5.70
	10	29.01	7.10
	11	80.00	5.00
Top of Layer 3	12	0.00	-17.00
Top of Layer 4	13	0.00	-42.00
Top of Phreatic Line	15	-100.00	5.70
	16	100.00	5.70

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TABULATED DETAILS OF SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line. Y values are tabulated in the right most column.

#	X	Y1	Y2	Y3	Y4	(phreatic) Yw
1	-100.00	2.00	2.00	-17.00	-42.00	5.70
2	-80.00	2.00	2.00	-17.00	-42.00	5.70
3	-33.01	5.70	5.70	-17.00	-42.00	5.70
4	-33.00	20.00	5.70	-17.00	-42.00	5.70
5	0.00	20.75	6.45	-17.00	-42.00	5.70
6	29.00	20.00	7.10	-17.00	-42.00	5.70
7	29.01	7.10	7.10	-17.00	-42.00	5.70
8	80.00	5.00	5.00	-17.00	-42.00	5.70
9	100.00	5.00	5.00	-17.00	-42.00	5.70

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.) The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)

Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
2	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
3	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
4	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
5	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
6	-33.01	5.70	-33.01	5.70	-33.01	5.70	0.00	N/A	#10 - Overhanging Cliff
7	-8.79	20.55	-59.42	3.76	-37.38	22.03	28.63	1.60	
8	-7.76	20.57	-60.79	3.64	-38.04	23.91	30.47	1.58	
9	-6.72	20.60	-58.31	4.13	-36.58	25.09	30.19	1.56	
10	-5.69	20.62	-59.69	3.99	-37.29	27.24	32.29	1.54	
11	-4.65	20.64	-61.05	3.84	-38.02	29.60	34.55	1.53	
12	-3.62	20.67	-60.96	3.74	-38.00	31.54	36.06	1.53 .	OK
13	-2.58	20.69	-59.43	3.72	-37.20	32.96	36.73	1.53	
14	-1.55	20.71	-63.69	3.48	-39.37	36.44	40.96	1.54	
15	-0.52	20.74	-64.99	3.30	-40.23	39.67	43.99	1.54	
16	0.52	20.74	-64.94	3.27	-40.04	41.36	45.50	1.56	
17	1.55	20.71	-67.64	3.01	-41.76	45.95	50.14	1.56	
18	2.59	20.68	-69.00	2.89	-42.42	48.85	53.09	1.58	
19	3.62	20.66	-70.36	2.77	-43.09	51.93	56.21	1.60	
20	4.66	20.63	-69.44	3.11	-42.53	54.75	58.23	1.62	
21	5.69	20.60	-69.35	3.06	-42.45	57.24	60.49	1.65	
22	6.73	20.58	-69.25	3.00	-42.38	59.87	62.90	1.67	
23	7.76	20.55	-74.87	2.61	-45.64	67.22	70.92	1.70	
24	8.79	20.52	-74.74	2.55	-45.64	70.39	73.82	1.72	
25	9.83	20.50	-74.60	2.48	-45.67	73.75	76.91	1.75	
26	10.86	20.47	-77.52	2.33	-46.87	77.39	81.07	1.78	
27	11.90	20.44	-77.35	2.26	-46.95	81.14	84.54	1.81	
28	12.93	20.42	-75.96	2.37	-43.68	71.34	76.14	1.84	
29	13.97	20.39	-77.25	2.22	-44.49	75.79	80.53	1.87	
30	15.00	20.36	-78.74	2.16	-44.83	78.01	83.08	1.89	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.) The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points).

Exit Point #	Exit Point (X , Y) [ft]		Entry Point (X , Y) [ft]		Critical Circle (Xc , Yc , R) [ft]			Fs	STATUS
1	-80.10	2.07	-0.52	20.74	-48.62	46.82	54.72	1.62	
2	-78.67	2.15	-0.52	20.74	-47.83	46.08	53.68	1.61	
3	-77.25	2.22	-0.52	20.74	-47.05	45.33	52.64	1.59	
4	-76.40	2.68	0.52	20.74	-46.39	47.71	54.11	1.59	
5	-74.97	2.75	0.52	20.74	-45.60	46.91	53.03	1.58	
6	-73.18	2.60	-2.58	20.69	-44.82	38.74	45.93	1.57	
7	-71.76	2.68	-2.58	20.69	-44.04	38.08	44.96	1.56	
8	-70.86	3.14	-1.55	20.71	-43.31	39.96	45.99	1.55	
9	-69.43	3.21	-1.55	20.71	-42.53	39.26	44.98	1.54	
10	-67.99	3.28	-1.55	20.71	-41.74	38.55	43.97	1.54	
11	-66.56	3.34	-1.55	20.71	-40.95	37.85	42.97	1.54	
12	-65.12	3.41	-1.55	20.71	-40.16	37.14	41.96	1.54	
13	-63.69	3.48	-1.55	20.71	-39.37	36.44	40.96	1.54	
14	-62.37	3.65	-2.58	20.69	-38.56	33.50	38.19	1.54	
15	-60.96	3.74	-3.62	20.67	-38.00	31.54	36.06	1.53 .	OK
16	-59.53	3.81	-3.62	20.67	-37.21	30.92	35.12	1.53	
17	-58.10	3.87	-3.62	20.67	-36.42	30.30	34.19	1.55	
18	-56.75	4.02	-4.65	20.64	-35.66	27.88	31.84	1.56	
19	-55.23	4.00	-3.62	20.67	-34.83	29.08	32.32	1.57	
20	-53.88	4.14	-4.65	20.64	-34.08	26.74	30.05	1.59	
21	-52.45	4.20	-4.65	20.64	-33.28	26.18	29.16	1.61	
22	-51.28	4.49	-4.65	20.64	-32.68	26.16	28.56	1.64	
23	-49.98	4.67	-4.65	20.64	-31.87	25.58	27.66	1.67	
24	-48.30	4.52	-5.69	20.62	-31.14	23.53	25.61	1.72	
25	-47.04	4.74	-6.72	20.60	-30.42	21.67	23.72	1.77	
26	-45.85	4.98	-3.62	20.67	-29.39	25.36	26.19	1.84	
27	-44.38	5.00	-2.58	20.69	-28.53	26.30	26.55	1.92	
28	-43.09	5.21	-4.65	20.64	-27.99	23.17	23.47	2.01	
29	-41.44	5.08	-1.55	20.71	-26.85	26.57	25.97	2.13	
30	-40.38	5.41	-1.55	20.71	-26.02	25.88	25.01	2.27	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

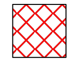
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CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis with slip surfaces excluded from this polygon:



Minimum Factor of Safety = 1.53

Critical Circle: Xc = -38.00[ft], Yc = 31.54[ft], R = 36.06[ft]. (Number of slices used = 53)

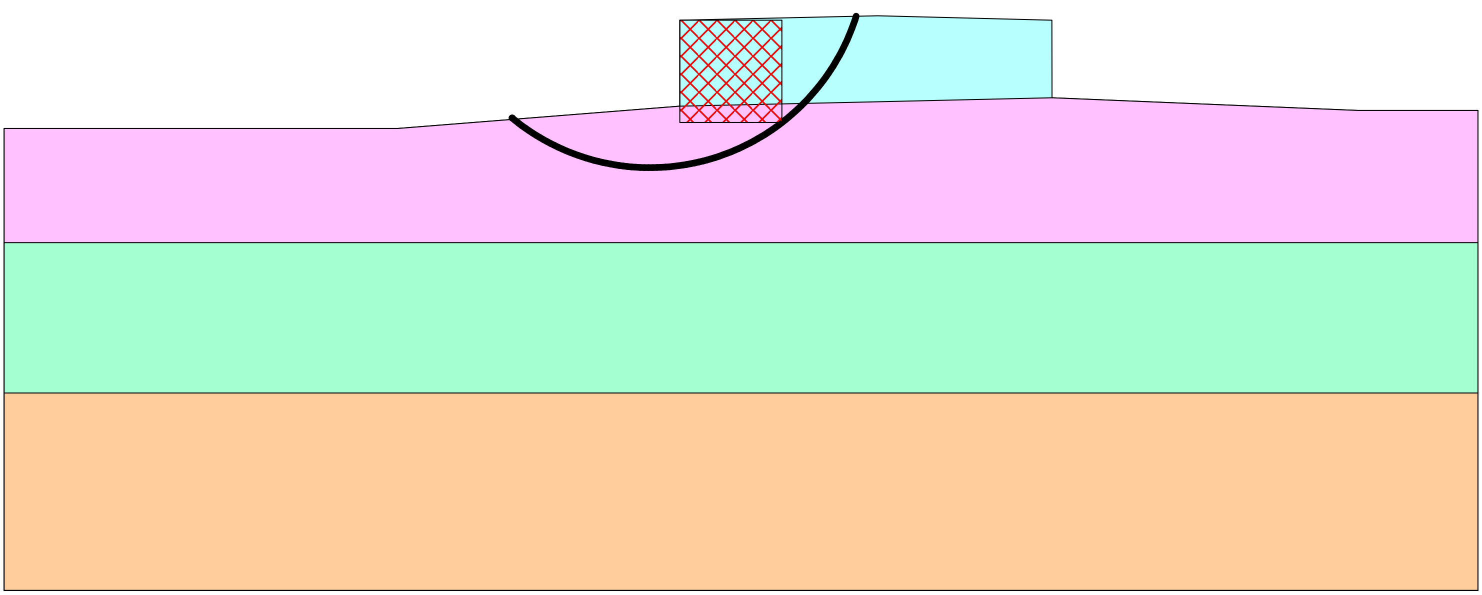
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

N O T C O N D U C T E D

Three-Part Wedge Stability Analysis

N O T C O N D U C T E D

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 1015202530 [ft]

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CR 865 Over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 Over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	436+50

Description:

Global Stability Analysis for Permanent MSE Walls 2A & 2B using boring WB-438L.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... 51 Big Carlos Pass\ReSSA\ReSSA1 436+50_WB-438L.MSE
Original date and time of creating this file: Wed May 19 15:35:28 2021

PROGRAM MODE: Analysis of a General Slope using NO reinforcement material.

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INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

=========== Soil Layer #: ===========	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
1.......Embankment Fill..................................	110.0	30.0	0.0
2.......Loose Sand with Silt............................	105.0	29.0	0.0
3.......Very Loose Sand to Silty Sand.............	112.0	31.0	0.0

REINFORCEMENT

Analysis of slope WITHOUT reinforcement.

WATER

Unit weight of water = 62.45 [lb/ft ³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

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DRAWING OF SPECIFIED GEOMETRY - GENERAL - Quick Input

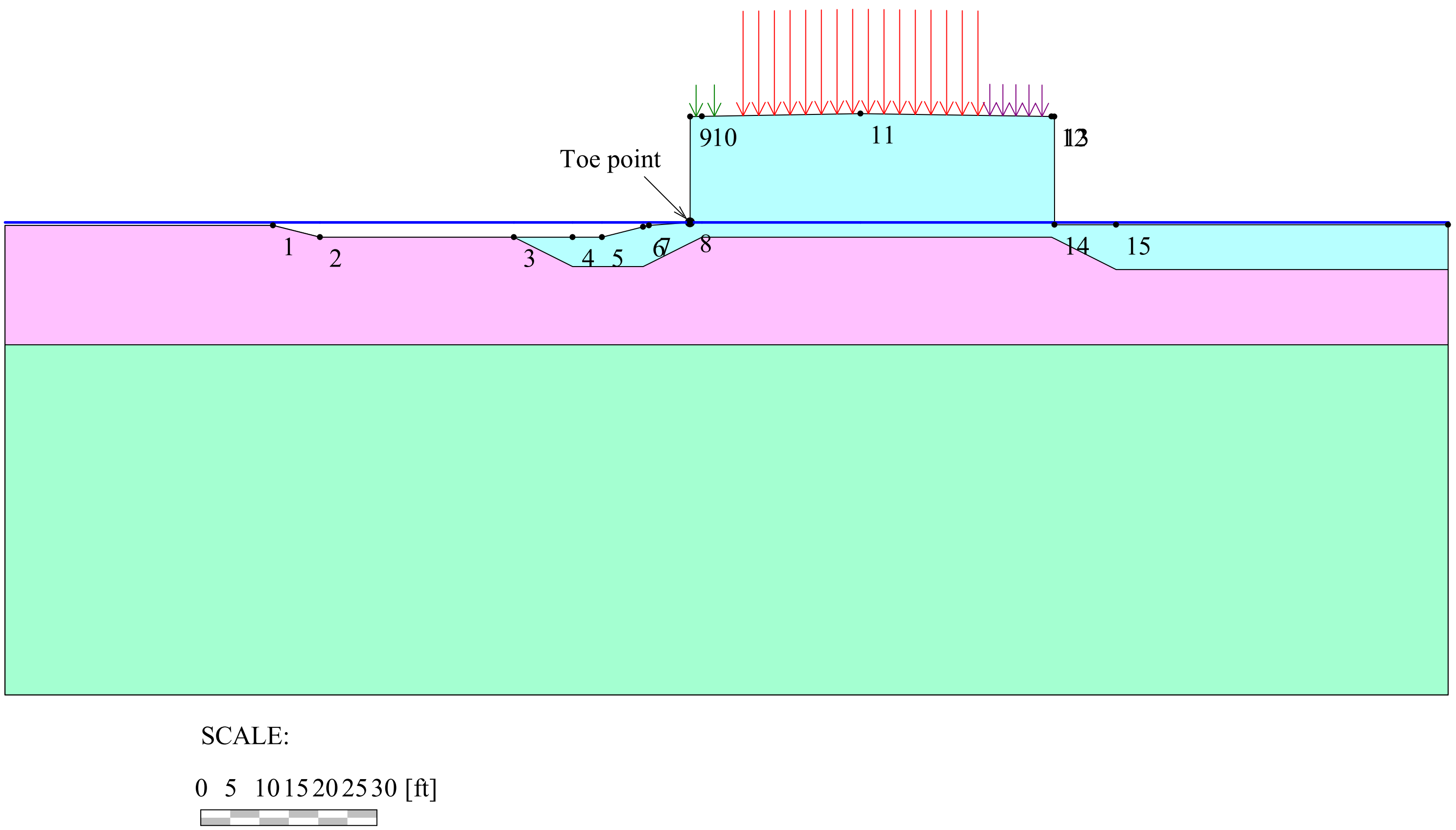
-- Problem geometry is defined along sections selected by user at x,y coordinates.
-- X1,Y1 represents the coordinates of soil surface. X2,Y2 represent the coordinates of the end of soil layer 1 and start of soil layer 2, and so on.
-- Xw,Yw represents the coordinates of phreatic surface.

GEOMETRY
Soil profile contains 3 layers (see details in next page)

WATER GEOMETRY
Phreatic line was specified.

UNIFORM SURCHARGE
Load Q1 = 75.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X1s = -28.00 and ends at X1e = -23.00 [ft].
Load Q2 = 250.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X2s = -20.00 and ends at X2e = 20.00 [ft].
Load Q3 = 75.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X3s = 22.00 and ends at X3e = 32.00 [ft].

STRIP LOAD
...........................None..................................



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TABULATED DETAILS OF GEMERAL SPECIFIED GEOMETRY

Soil profile contains 3 layers. Coordinates in [ft.]
Water was described by phreatic line.

	#	Xi	Yi
Top of Layer 1	1	-100.00	5.00
	2	-92.00	3.00
	3	-44.00	3.00
	4	-36.00	5.00
	5	-29.01	5.50
	6	-29.00	23.50
	7	0.00	24.00
	8	33.00	23.50
	9	33.01	5.10
Top of Layer 2	10	-100.00	5.00
	11	-92.00	3.00
	12	-59.00	3.00
	13	-49.00	-2.00
	14	-37.00	-2.00
	15	-27.00	3.00
	16	32.50	3.00
	17	43.50	-2.50
Top of Layer 3	18	0.00	-15.30
Top of Phreatic Line	20	-100.00	5.50
	21	100.00	5.50

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TABULATED DETAILS OF SPECIFIED GEOMETRY

Soil profile contains 3 layers. Coordinates in [ft.]
Water was described by phreatic line. Y values are tabulated in the right most column.

#	X	Y1	Y2	Y3	(phreatic) Yw
1	-100.00	5.00	5.00	-15.30	5.50
2	-92.00	3.00	3.00	-15.30	5.50
3	-59.00	3.00	3.00	-15.30	5.50
4	-49.00	3.00	-2.00	-15.30	5.50
5	-44.00	3.00	-2.00	-15.30	5.50
6	-37.00	4.75	-2.00	-15.30	5.50
7	-36.00	5.00	-1.50	-15.30	5.50
8	-29.01	5.50	1.99	-15.30	5.50
9	-29.00	23.50	2.00	-15.30	5.50
10	-27.00	23.53	3.00	-15.30	5.50
11	0.00	24.00	3.00	-15.30	5.50
12	32.50	23.51	3.00	-15.30	5.50
13	33.00	23.50	2.75	-15.30	5.50
14	33.01	5.10	2.75	-15.30	5.50
15	43.50	5.10	-2.50	-15.30	5.50
16	100.00	5.10	-2.50	-15.30	5.50

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)

Entry Point #	Entry Point (X , Y) [ft]		Exit Point (X , Y) [ft]		Critical Circle (Xc , Yc , R) [ft]			Fs	STATUS
1	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
2	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
3	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
4	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
5	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
6	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
7	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
8	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
9	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
10	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
11	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
12	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
13	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
14	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
15	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
16	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
17	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
18	-29.01	5.50	-29.01	5.50	-29.01	5.50	0.00	N/A	#10 - Overhanging Cliff
19	7.62	23.88	-58.55	3.59	-29.52	26.96	37.27	1.59	
20	8.66	23.87	-68.35	3.76	-34.34	31.01	43.58	1.55	
21	9.69	23.85	-63.80	3.23	-32.29	32.19	42.80	1.53	
22	10.73	23.84	-68.21	3.52	-34.30	35.27	46.46	1.52	
23	11.76	23.82	-68.15	3.41	-34.32	37.59	48.09	1.51	
24	12.79	23.81	-68.08	3.32	-34.35	40.06	49.87	1.51 .	OK
25	13.83	23.79	-72.21	3.31	-36.39	43.80	54.06	1.51	
26	14.86	23.77	-71.03	3.44	-35.73	45.92	55.22	1.51	
27	15.90	23.76	-75.01	3.31	-37.79	50.14	59.82	1.52	
28	16.93	23.74	-70.89	3.30	-35.68	50.90	59.21	1.53	
29	17.97	23.73	-74.84	3.15	-37.78	55.61	64.22	1.54	
30	19.00	23.71	-74.76	3.09	-37.65	57.82	66.12	1.55	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points).

Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-76.14	3.12	14.86	23.77	-38.43	47.77	58.45	1.52	
2	-75.01	3.31	15.90	23.76	-37.79	50.14	59.82	1.52	
3	-73.40	3.15	12.79	23.81	-37.08	41.77	53.02	1.51	
4	-72.21	3.31	13.83	23.79	-36.39	43.80	54.06	1.51	
5	-71.03	3.44	14.86	23.77	-35.73	45.92	55.22	1.51	
6	-69.19	3.07	13.83	23.79	-34.90	42.35	52.14	1.51	
. 7	-68.08	3.32	12.79	23.81	-34.35	40.06	49.87	1.51 .	OK
8	-66.82	3.40	13.83	23.79	-33.66	41.95	50.84	1.51	
9	-65.60	3.54	13.83	23.79	-32.91	41.21	49.87	1.52	
10	-63.75	3.17	10.73	23.84	-32.29	34.30	44.27	1.52	
11	-62.36	3.14	12.79	23.81	-31.59	38.22	46.67	1.52	
12	-61.04	3.18	12.79	23.81	-30.83	37.51	45.72	1.54	
13	-59.67	3.20	12.79	23.81	-30.07	36.80	44.79	1.55	
14	-58.71	3.59	11.76	23.82	-29.51	34.72	42.68	1.56	
15	-57.22	3.45	12.79	23.81	-28.79	36.25	43.41	1.57	
16	-55.67	3.31	12.79	23.81	-28.02	35.53	42.46	1.59	
17	-54.39	3.40	11.76	23.82	-27.44	33.47	40.37	1.60	
18	-53.00	3.37	12.79	23.81	-26.72	34.90	41.04	1.63	
19	-51.66	3.48	9.69	23.85	-26.07	28.99	36.13	1.66	
20	-50.19	3.34	11.76	23.82	-25.35	32.13	38.03	1.68	
21	-48.71	3.23	12.79	23.81	-24.62	33.45	38.64	1.72	
22	-47.34	3.25	11.76	23.82	-24.02	31.42	36.58	1.75	
23	-45.88	3.17	12.79	23.81	-23.29	32.68	37.16	1.79	
24	-44.41	3.10	13.83	23.79	-22.59	33.97	37.81	1.84	
25	-43.37	3.61	13.83	23.79	-21.75	33.48	36.87	1.91	
26	-41.95	3.92	14.86	23.77	-20.74	34.43	37.16	2.00	
27	-40.56	4.27	13.83	23.79	-19.80	31.96	34.60	2.11	
28	-39.08	4.53	14.86	23.77	-18.78	32.85	34.84	2.23	
29	-37.57	4.78	15.90	23.76	-17.75	33.76	35.10	2.38	
30	-36.31	5.21	16.93	23.74	-16.73	34.68	35.39	2.55	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

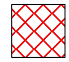
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CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis with slip surfaces excluded from this polygon:



Minimum Factor of Safety = 1.51

Critical Circle: Xc = -34.35[ft], Yc = 40.06[ft], R = 49.87[ft]. (Number of slices used = 56)

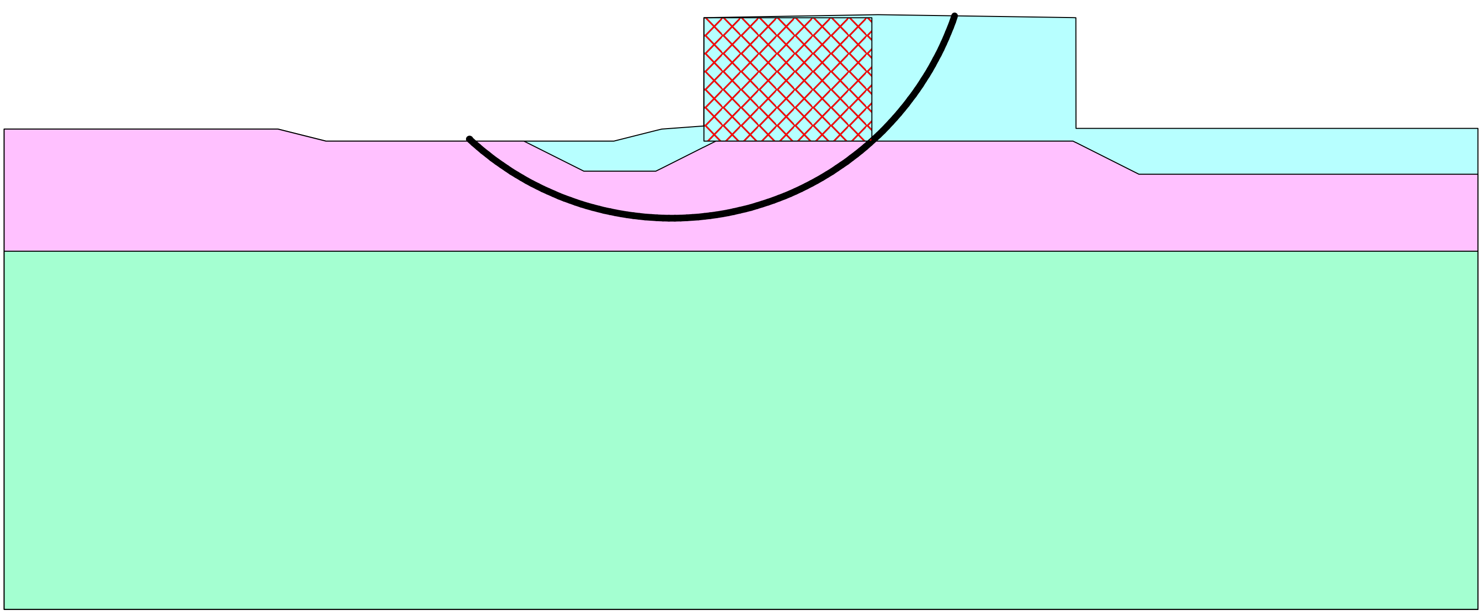
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

N O T C O N D U C T E D

Three-Part Wedge Stability Analysis

N O T C O N D U C T E D

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 10 15 20 25 30 [ft]

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CR 865 Over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 Over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	436+50

Description:

Global Stability Analysis for Permanent MSE Wall 2C using boring WB-438R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... 51 Big Carlos Pass\ReSSA\ReSSA1 436+50_WB-438R.MSE
Original date and time of creating this file: Wed May 19 15:35:28 2021

PROGRAM MODE: Analysis of a General Slope using NO reinforcement material.

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INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

=========== Soil Layer #: ===========	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
.1.......Embankment Fill..................................	110.0	30.0	0.0
.2.......Loose Sand with Silt............................	105.0	29.0	0.0
.3.......Very Loose Sand to Silty Sand.............	100.0	28.0	0.0
.4.......Loose Silty Sand..................................	105.0	29.0	0.0
.5.......Medium Dense Silty Sand....................	110.0	30.0	0.0

REINFORCEMENT

Analysis of slope WITHOUT reinforcement.

WATER

Unit weight of water = 62.45 [lb/ft ³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

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DRAWING OF SPECIFIED GEOMETRY - GENERAL - Quick Input

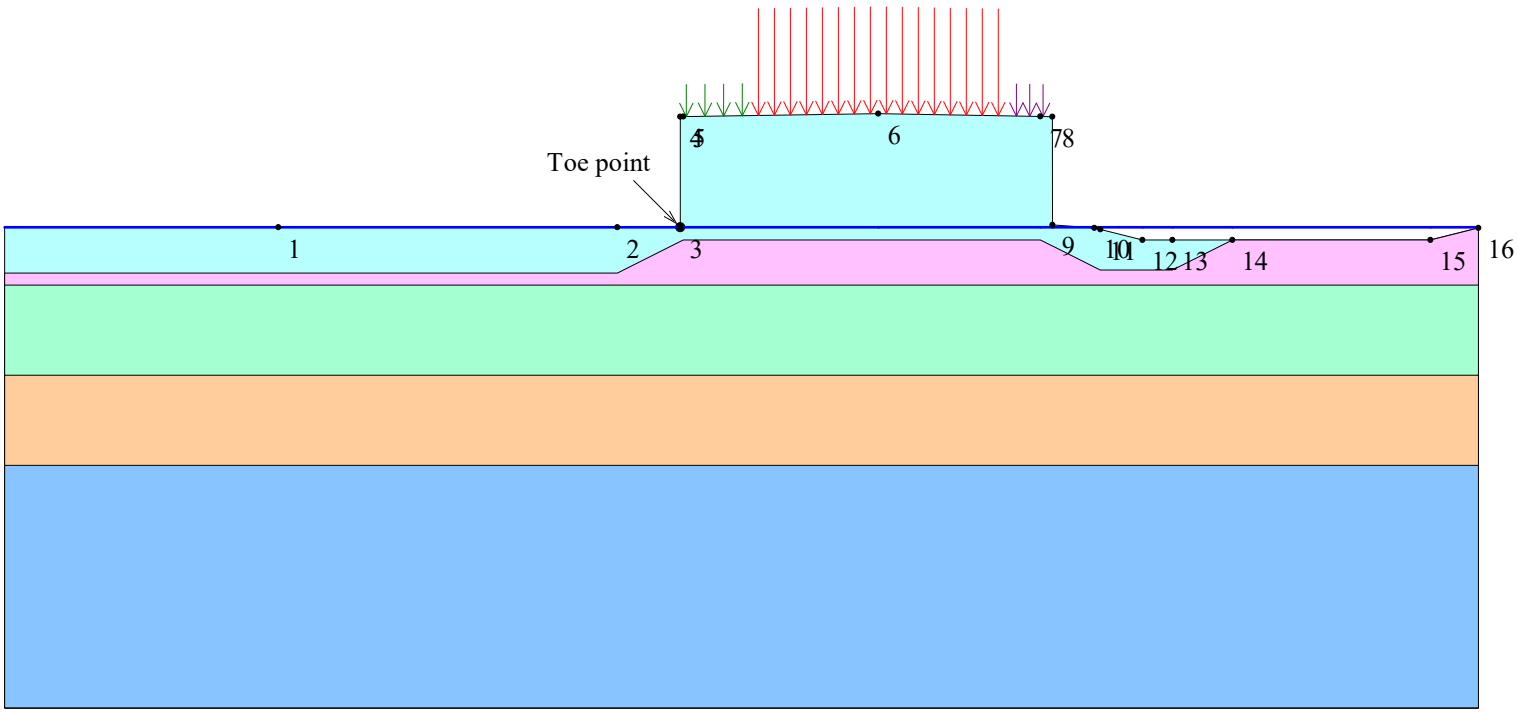
-- Problem geometry is defined along sections selected by user at x,y coordinates.
-- X1,Y1 represents the coordinates of soil surface. X2,Y2 represent the coordinates of the end of soil layer 1 and start of soil layer 2, and so on.
-- Xw,Yw represents the coordinates of phreatic surface.

GEOMETRY
Soil profile contains 5 layers (see details in next page)

WATER GEOMETRY
Phreatic line was specified.

UNIFORM SURCHARGE
Load Q1 = 75.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X1s = -32.00 and ends at X1e = -22.00 [ft].
Load Q2 = 250.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X2s = -20.00 and ends at X2e = 20.00 [ft].
Load Q3 = 75.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X3s = 23.00 and ends at X3e = 28.00 [ft].

STRIP LOAD
.....None.....



SCALE:

0 5 10 15 20 25 30 [ft]

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TABULATED DETAILS OF GEMERAL SPECIFIED GEOMETRY

Soil profile contains 5 layers. Coordinates in [ft.]
Water was described by phreatic line.

	#	Xi	Yi
Top of Layer 1	1	-33.01	5.10
	2	-33.00	23.50
	3	0.00	24.00
	4	29.00	23.50
	5	29.01	5.50
	6	36.00	5.00
	7	44.00	3.00
	8	92.00	3.00
	9	100.00	5.00
Top of Layer 2	10	-43.50	-2.50
	11	-32.50	3.00
	12	27.00	3.00
	13	37.00	-2.00
	14	49.00	-2.00
	15	59.00	3.00
	16	92.00	3.00
	17	100.00	5.00
Top of Layer 3	18	0.00	-4.50
Top of Layer 4	19	0.00	-19.50
Top of Layer 5	20	0.00	-34.50
Top of Phreatic Line	22	-100.00	5.10
	23	100.00	5.10

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TABULATED DETAILS OF SPECIFIED GEOMETRY

Soil profile contains 5 layers. Coordinates in [ft.]
Water was described by phreatic line. Y values are tabulated in the right most column.

#	X	Y1	Y2	Y3	Y4	Y5	(phreatic) Yw
1	-100.00	5.10	-2.50	-4.50	-19.50	-34.50	5.10
2	-43.50	5.10	-2.50	-4.50	-19.50	-34.50	5.10
3	-33.01	5.10	2.75	-4.50	-19.50	-34.50	5.10
4	-33.00	23.50	2.75	-4.50	-19.50	-34.50	5.10
5	-32.50	23.51	3.00	-4.50	-19.50	-34.50	5.10
6	0.00	24.00	3.00	-4.50	-19.50	-34.50	5.10
7	27.00	23.53	3.00	-4.50	-19.50	-34.50	5.10
8	29.00	23.50	2.00	-4.50	-19.50	-34.50	5.10
9	29.01	5.50	1.99	-4.50	-19.50	-34.50	5.10
10	36.00	5.00	-1.50	-4.50	-19.50	-34.50	5.10
11	37.00	4.75	-2.00	-4.50	-19.50	-34.50	5.10
12	44.00	3.00	-2.00	-4.50	-19.50	-34.50	5.10
13	49.00	3.00	-2.00	-4.50	-19.50	-34.50	5.10
14	59.00	3.00	3.00	-4.50	-19.50	-34.50	5.10
15	92.00	3.00	3.00	-4.50	-19.50	-34.50	5.10
16	100.00	5.00	5.00	-4.50	-19.50	-34.50	5.10

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)

Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
2	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
3	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
4	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
5	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
6	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
7	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
8	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
9	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
10	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
11	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
12	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
13	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
14	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
15	-33.01	5.10	-33.01	5.10	-33.01	5.10	0.00	N/A	#10 - Overhanging Cliff
16	0.52	23.99	-56.97	5.61	-31.77	25.89	32.35	1.58	
17	1.55	23.97	-66.50	5.46	-36.61	29.93	38.63	1.51	
18	2.59	23.96	-66.70	5.66	-36.55	31.81	39.91	1.50	
19	3.62	23.94	-66.30	5.20	-36.49	33.79	41.31	1.50	
20	4.66	23.92	-72.19	5.57	-39.22	37.60	45.96	1.50 .	OK
21	5.69	23.90	-70.48	5.22	-38.46	39.29	46.76	1.50	
22	6.73	23.88	-73.13	5.13	-39.71	42.19	49.91	1.51	
23	7.76	23.87	-72.18	5.49	-38.98	44.12	50.94	1.52	
24	8.79	23.85	-74.85	5.40	-40.25	47.37	54.39	1.53	
25	9.83	23.83	-75.01	5.51	-40.04	49.18	55.94	1.54	
26	10.86	23.81	-75.90	5.13	-40.87	53.26	59.53	1.56	
27	11.90	23.79	-77.34	5.17	-41.44	56.23	62.42	1.58	
28	12.93	23.78	-78.09	5.70	-40.95	56.92	63.26	1.59	
29	13.97	23.76	-79.25	5.55	-41.21	58.52	65.22	1.61	
30	15.00	23.74	-79.17	5.49	-40.73	59.21	66.06	1.63	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.) The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points).

Exit Point #	Exit Point X [ft]	Exit Point Y [ft]	Entry Point X [ft]	Entry Point Y [ft]	Critical Circle Xc [ft]	Critical Circle Yc [ft]	Critical Circle R [ft]	Fs	STATUS
1	-80.15	5.24	6.73	23.88	-43.16	44.61	54.02	1.53	
2	-79.28	5.79	4.66	23.92	-42.70	39.79	49.94	1.52	
3	-77.47	5.32	5.69	23.90	-41.93	41.66	50.83	1.51	
4	-76.17	5.40	5.69	23.90	-41.19	41.00	49.91	1.51	
5	-74.87	5.48	5.69	23.90	-40.45	40.34	48.98	1.51	
6	-73.27	5.28	3.62	23.94	-40.01	35.96	45.26	1.50	
. 7	-72.19	5.57	4.66	23.92	-39.22	37.60	45.96	1.50 .	OK
8	-70.90	5.66	4.66	23.92	-38.48	36.97	45.07	1.50	
9	-69.61	5.75	4.66	23.92	-37.73	36.33	44.17	1.50	
10	-67.66	5.18	4.66	23.92	-36.99	35.70	43.28	1.51	
11	-66.30	5.20	3.62	23.94	-36.49	33.79	41.31	1.50	
12	-65.02	5.30	3.62	23.94	-35.74	33.19	40.44	1.51	
13	-63.74	5.40	3.62	23.94	-34.99	32.58	39.57	1.52	
14	-62.46	5.51	3.62	23.94	-34.23	31.98	38.70	1.53	
15	-60.77	5.18	3.62	23.94	-33.68	32.10	38.19	1.53	
16	-59.51	5.31	3.62	23.94	-32.92	31.49	37.32	1.55	
17	-58.26	5.43	3.62	23.94	-32.16	30.87	36.45	1.57	
18	-56.92	5.48	2.59	23.96	-31.64	29.15	34.62	1.58	
19	-55.67	5.62	2.59	23.96	-30.87	28.56	33.78	1.61	
20	-54.07	5.39	2.59	23.96	-30.10	27.98	32.94	1.64	
21	-52.79	5.51	1.55	23.97	-29.58	26.40	31.22	1.67	
22	-51.47	5.61	0.52	23.99	-28.86	24.38	29.38	1.71	
23	-49.86	5.28	4.66	23.92	-27.91	30.12	33.15	1.76	
24	-48.52	5.34	2.59	23.96	-27.37	26.75	30.09	1.81	
25	-46.98	5.17	4.66	23.92	-26.54	29.36	31.67	1.86	
26	-45.54	5.12	2.59	23.96	-25.98	26.05	28.65	1.93	
27	-44.46	5.35	5.69	23.90	-24.95	29.67	31.17	2.02	
28	-42.90	5.20	6.73	23.88	-24.17	30.69	31.63	2.10	
29	-41.75	5.39	5.69	23.90	-23.54	28.77	29.64	2.21	
30	-40.16	5.21	6.73	23.88	-22.76	29.72	30.06	2.33	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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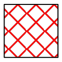
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CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis with slip surfaces excluded from this polygon:

Minimum Factor of Safety = 1.50

Critical Circle: Xc = -39.22[ft], Yc = 37.60[ft], R = 45.96[ft]. (Number of slices used = 56)



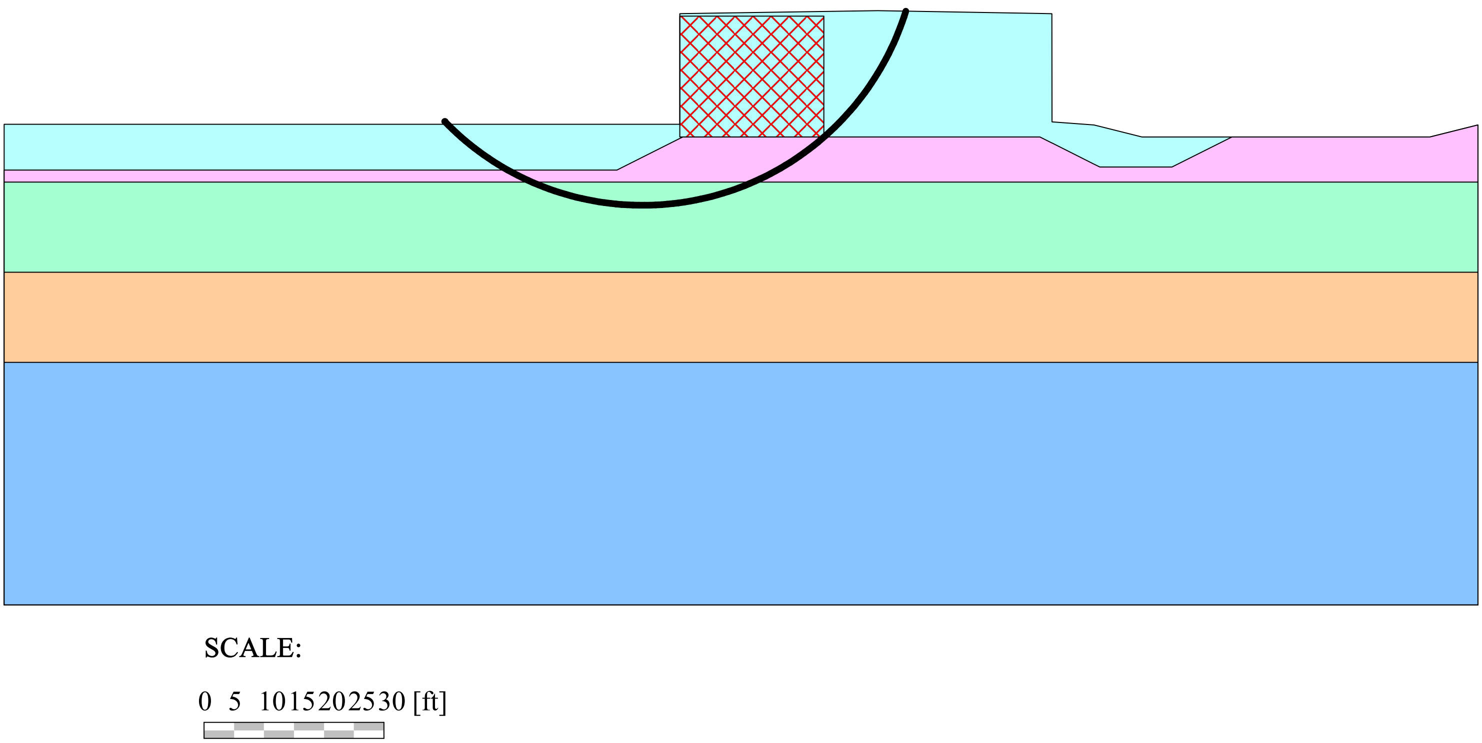
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

N O T C O N D U C T E D

Three-Part Wedge Stability Analysis

N O T C O N D U C T E D

REINFORCEMENT LAYOUT: DRAWING



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CR 865 Over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 Over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - TM
Station Number:	414+40

Description:

Global Stability Analysis for Temporary Sidewalk MSE Walls using boring BB-414.

Company's information:

Name:	Tierra, Inc.
Street:	7351 Temple Terrace Highway Tampa, FL 33637
Telephone #:	
Fax #:	
E-Mail:	

Original file path and name: J:\6511\20 ..... arlos Pass\ReSSA\ReSSA1_414+40_BB-414_Sidewalk.MSE
Original date and time of creating this file: 10/28/2021

PROGRAM MODE: Analysis of a General Slope using NO reinforcement material.

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INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

=========== Soil Layer #: ===========	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
....1.......Embankment Fill..................................	110.0	30.0	0.0
....2.......Medium Dense Sand with Silt..............	112.0	31.0	0.0
....3.......Caprock..	115.0	0.0	4000.0
....4.......Silty Sand to Sandy Limestone.............	105.0	29.0	0.0

REINFORCEMENT

Analysis of slope WITHOUT reinforcement.

WATER

Unit weight of water = 62.45 [lb/ft ³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

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DRAWING OF SPECIFIED GEOMETRY - GENERAL - Quick Input

-- Problem geometry is defined along sections selected by user at x,y coordinates.
-- X1,Y1 represents the coordinates of soil surface. X2,Y2 represent the coordinates of the end of soil layer 1 and start of soil layer 2, and so on.
-- Xw,Yw represents the coordinates of phreatic surface.

GEOMETRY

Soil profile contains 4 layers (see details in next page)

WATER GEOMETRY

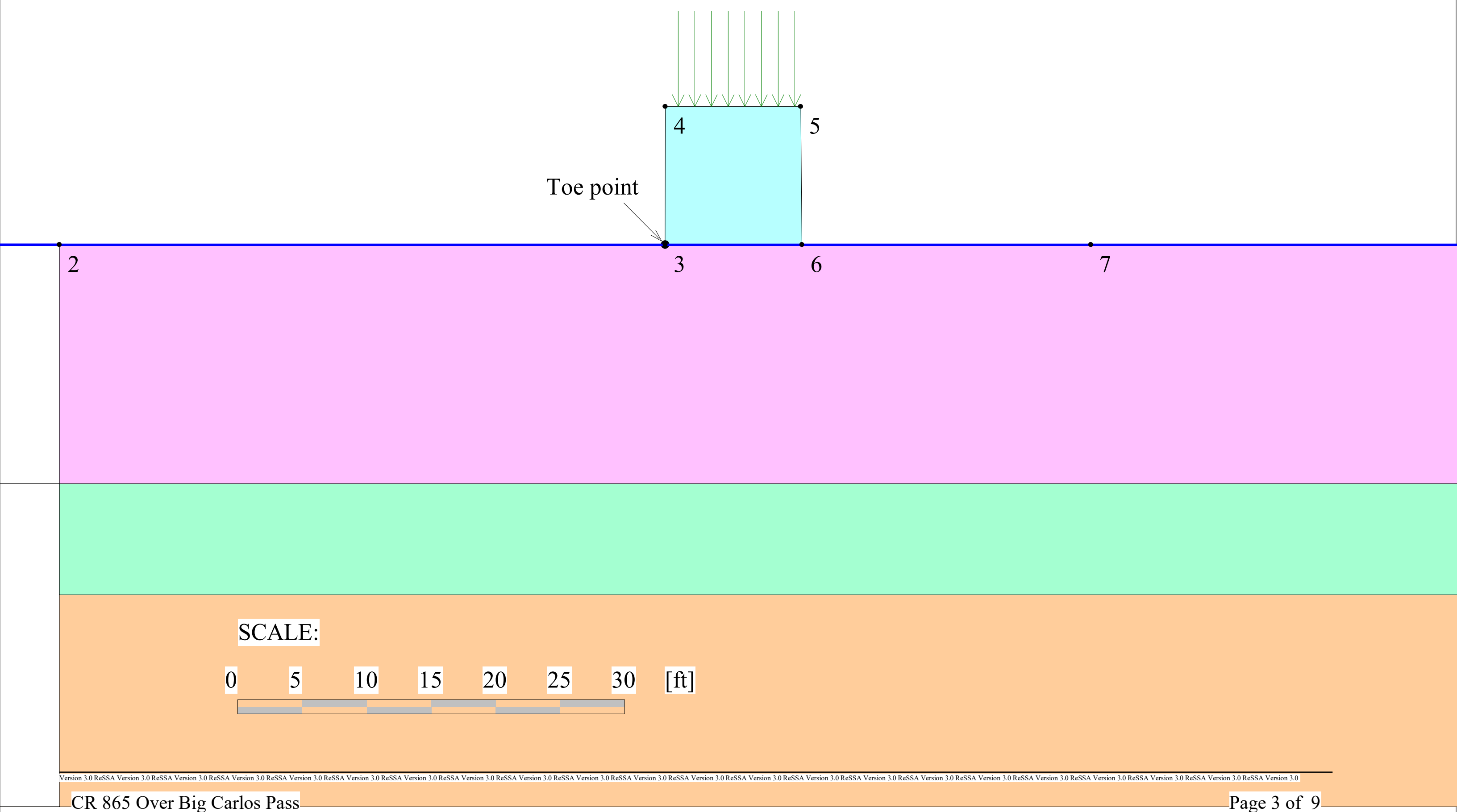
Phreatic line was specified.

UNIFORM SURCHARGE

Load Q1 = 165.00 [lb/ft²] inclined from verical at 0.00 degrees, starts at X1s = -32.00 and ends at X1e = -22.00 [ft].
Surcharge load, Q2.................................... None
Surcharge load, Q3.................................... None

STRIP LOAD

............................None...................................



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TABULATED DETAILS OF QUICK SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line.

	#	Xi	Yi
Top of Layer 1	1	-80.00	1.50
	2	-33.01	1.50
	3	-33.00	12.20
	4	-22.50	12.20
	5	-22.40	1.50
Top of Layer 2	6	-80.00	1.50
	7	-33.01	1.50
	8	29.01	1.50
	9	80.00	1.50
Top of Layer 3	10	0.00	-17.00
Top of Layer 4	11	0.00	-42.00
Top of Phreatic Line	13	-100.00	1.50
	14	100.00	1.50

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TABULATED DETAILS OF SPECIFIED GEOMETRY

Soil profile contains 4 layers. Coordinates in [ft.]
Water was described by phreatic line. Y values are tabulated in the right most column.

#	X	Y1	Y2	Y3	Y4	(phreatic) Yw
1	-100.00	1.50	1.50	-17.00	-42.00	1.50
2	-80.00	1.50	1.50	-17.00	-42.00	1.50
3	-33.01	1.50	1.50	-17.00	-42.00	1.50
4	-33.00	12.20	1.50	-17.00	-42.00	1.50
5	-22.50	12.20	1.50	-17.00	-42.00	1.50
6	-22.40	1.50	1.50	-17.00	-42.00	1.50
7	0.00	1.50	1.50	-17.00	-42.00	1.50
8	29.01	1.50	1.50	-17.00	-42.00	1.50
9	80.00	1.50	1.50	-17.00	-42.00	1.50
10	100.00	1.50	1.50	-17.00	-42.00	1.50

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)

Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
2	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
3	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
4	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
5	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
6	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
7	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
. 8	-19.89	1.50	-53.28	1.80	-36.46	15.40	21.63	2.48 .	OK
9	-18.31	1.50	-56.49	1.84	-37.26	17.40	24.74	2.94	
10	-16.72	1.50	-59.70	1.89	-38.05	19.40	27.84	3.43	
11	-15.14	1.50	-62.92	1.91	-38.84	22.85	31.90	3.97	
12	-13.55	1.50	-64.54	1.91	-38.84	26.79	35.77	4.56	
13	-11.96	1.50	-70.98	1.91	-41.22	37.63	46.49	5.21	
14	-10.38	1.50	-72.58	1.95	-41.22	36.98	47.02	5.87	
15	-8.79	1.50	-72.60	1.97	-40.43	37.90	48.23	6.59	
16	-7.21	1.50	-77.44	1.95	-42.02	49.41	59.22	7.32	
17	-5.62	1.50	-77.43	2.00	-41.22	45.47	56.58	8.19	
18	-4.03	1.50	-80.66	2.00	-42.02	51.91	63.11	9.11	
19	-2.45	1.50	-80.68	2.00	-41.22	54.87	65.97	10.02	
20	-0.86	1.50	-80.68	2.04	-40.43	52.15	64.27	11.22	
21	0.73	1.50	-80.70	2.03	-39.64	55.06	67.07	12.50	
22	2.31	1.50	-80.73	2.00	-38.84	62.52	73.60	14.18	
23	3.90	1.50	-80.74	2.02	-38.05	61.41	73.14	16.08	
24	5.48	1.50	-80.75	2.03	-37.26	62.54	74.52	18.12	
25	7.07	1.50	-80.77	2.03	-36.47	66.04	77.85	20.78	
26	8.66	1.50	-80.79	2.04	-35.67	67.22	79.27	23.89	
27	10.24	1.50	-80.81	2.03	-34.88	70.98	82.85	27.45	
28	11.83	1.50	-80.82	2.04	-34.09	72.20	84.30	32.54	
29	13.41	1.50	-80.83	2.05	-33.29	73.42	85.76	38.87	
30	15.00	1.50	-80.63	1.91	-32.50	74.64	87.21	47.12	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.) The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points).

Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-80.47	2.01	-19.89	1.50	-49.95	29.52	41.09	3.45	
2	-78.87	1.99	-19.89	1.50	-49.15	29.76	40.68	3.35	
3	-77.28	1.97	-19.89	1.50	-48.36	28.99	39.57	3.27	
4	-75.68	1.96	-19.89	1.50	-47.57	28.22	38.47	3.18	
5	-74.08	1.95	-19.89	1.50	-46.77	27.46	37.37	3.10	
6	-72.48	1.93	-19.89	1.50	-45.98	26.69	36.27	3.04	
7	-70.88	1.92	-19.89	1.50	-45.19	25.93	35.16	2.97	
8	-69.28	1.91	-19.89	1.50	-44.40	25.16	34.06	2.90	
9	-67.68	1.90	-19.89	1.50	-43.60	23.61	32.42	2.84	
10	-66.08	1.89	-19.89	1.50	-42.81	22.87	31.33	2.77	
11	-64.48	1.88	-19.89	1.50	-42.02	22.13	30.25	2.71	
12	-62.88	1.87	-19.89	1.50	-41.22	20.70	28.70	2.66	
13	-61.28	1.86	-19.89	1.50	-40.43	19.35	27.21	2.60	
14	-59.67	1.86	-19.89	1.50	-39.64	18.07	25.77	2.56	
15	-58.08	1.83	-19.89	1.50	-38.84	18.56	25.50	2.53	
16	-56.48	1.83	-19.89	1.50	-38.05	16.74	23.70	2.51	
17	-54.88	1.82	-19.89	1.50	-37.26	16.07	22.67	2.49	
18	-53.28	1.80	-19.89	1.50	-36.46	15.40	21.63	2.48 .	OK
19	-51.68	1.79	-19.89	1.50	-35.67	14.74	20.60	2.50	
20	-50.09	1.77	-19.89	1.50	-34.88	14.07	19.56	2.52	
21	-48.49	1.76	-19.89	1.50	-34.08	13.41	18.52	2.60	
22	-46.89	1.74	-19.89	1.50	-33.29	12.74	17.49	2.69	
23	-45.12	1.52	-19.89	1.50	-32.50	12.08	16.45	2.84	
24	-43.62	1.62	-19.89	1.50	-31.71	11.41	15.42	3.08	
25	-42.06	1.66	-19.89	1.50	-30.91	10.75	14.38	3.47	
26	-40.46	1.64	-19.89	1.50	-30.12	10.08	13.35	4.12	
27	-38.79	1.54	-18.31	1.50	-28.53	10.08	13.35	11.57	
28	-37.22	1.56	-18.31	1.50	-27.74	9.41	12.31	89.72	
29	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff
30	-33.01	1.50	-33.01	1.50	-33.01	1.50	0.00	N/A	#10 - Overhanging Cliff

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

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CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis with slip surfaces excluded from this polygon:

Minimum Factor of Safety = 2.48

Critical Circle: Xc = -36.46[ft], Yc = 15.40[ft], R = 21.63[ft]. (Number of slices used = 54)

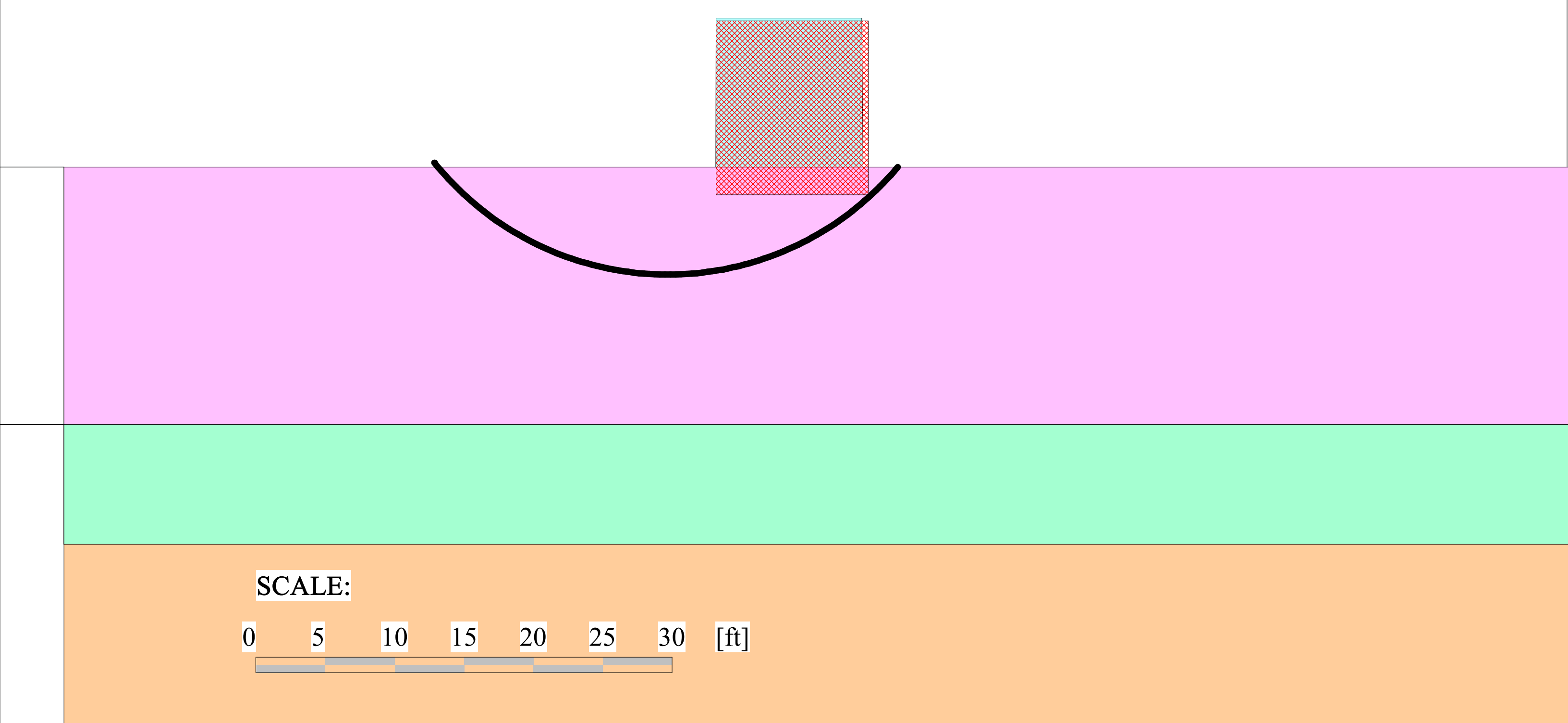
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

N O T C O N D U C T E D

Three-Part Wedge Stability Analysis

N O T C O N D U C T E D

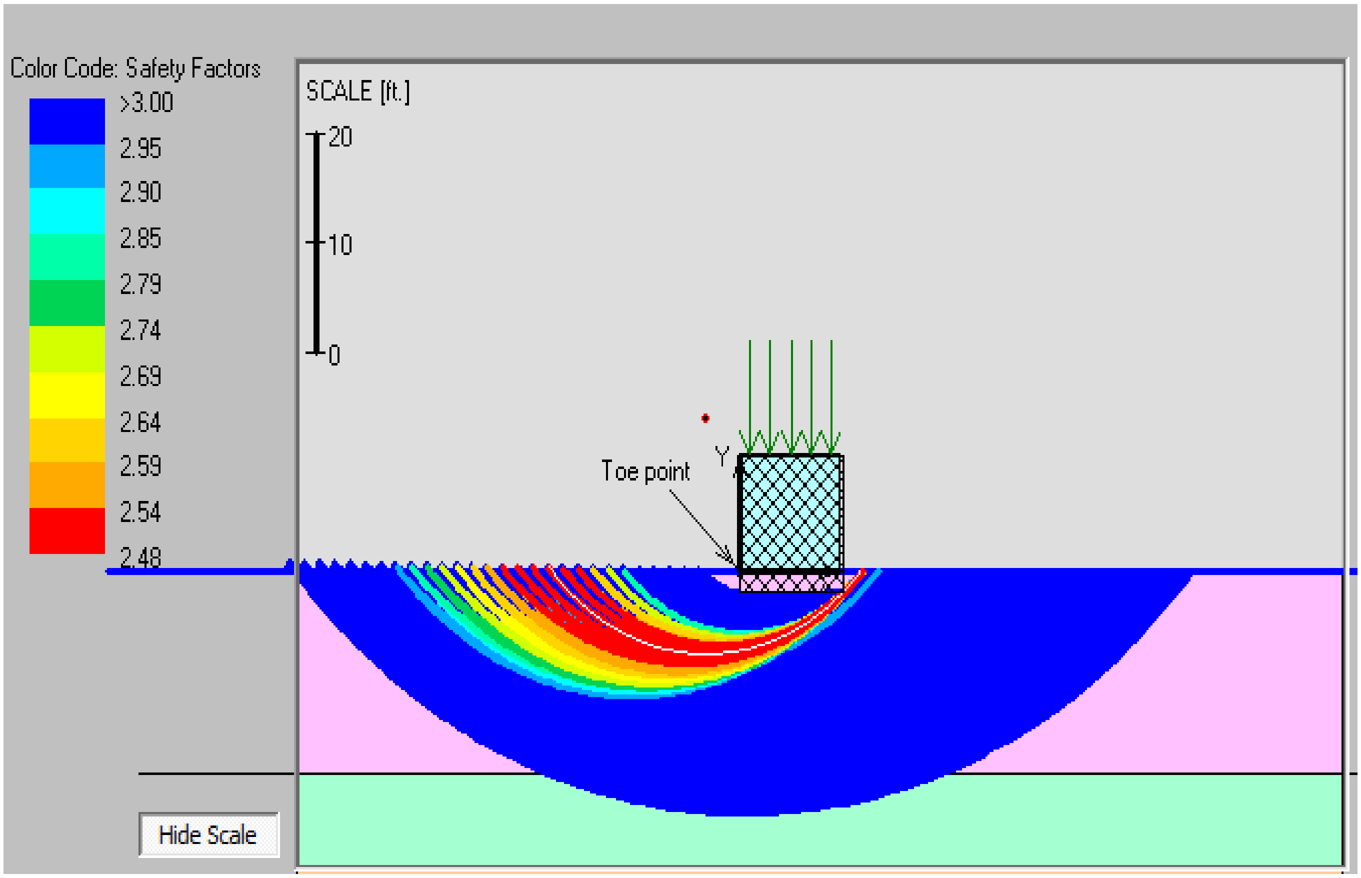
REINFORCEMENT LAYOUT: DRAWING



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SAFETY MAP: BISHOP ROTATIONAL ANALYSIS MODE



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CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	410+55 to 413+72

Description:

Settlement Analysis for Permanent MSE Walls 1A, 1B & 1C using boring WB-413R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\FoSSA MSEW 1A-1B-1C_WB-413R.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

INPUT DATA – FOUNDATION LAYERS – 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.20	Loose Sand
2	110.00	0.25	Medium Dense Sand
3	105.00	0.20	Loose Sand
4	125.00	0.45	Very Dense Silty Sand
5	115.00	0.23	Weathered Limestone/Caprock

INPUT DATA – EMBANKMENT LAYERS – 1 layers

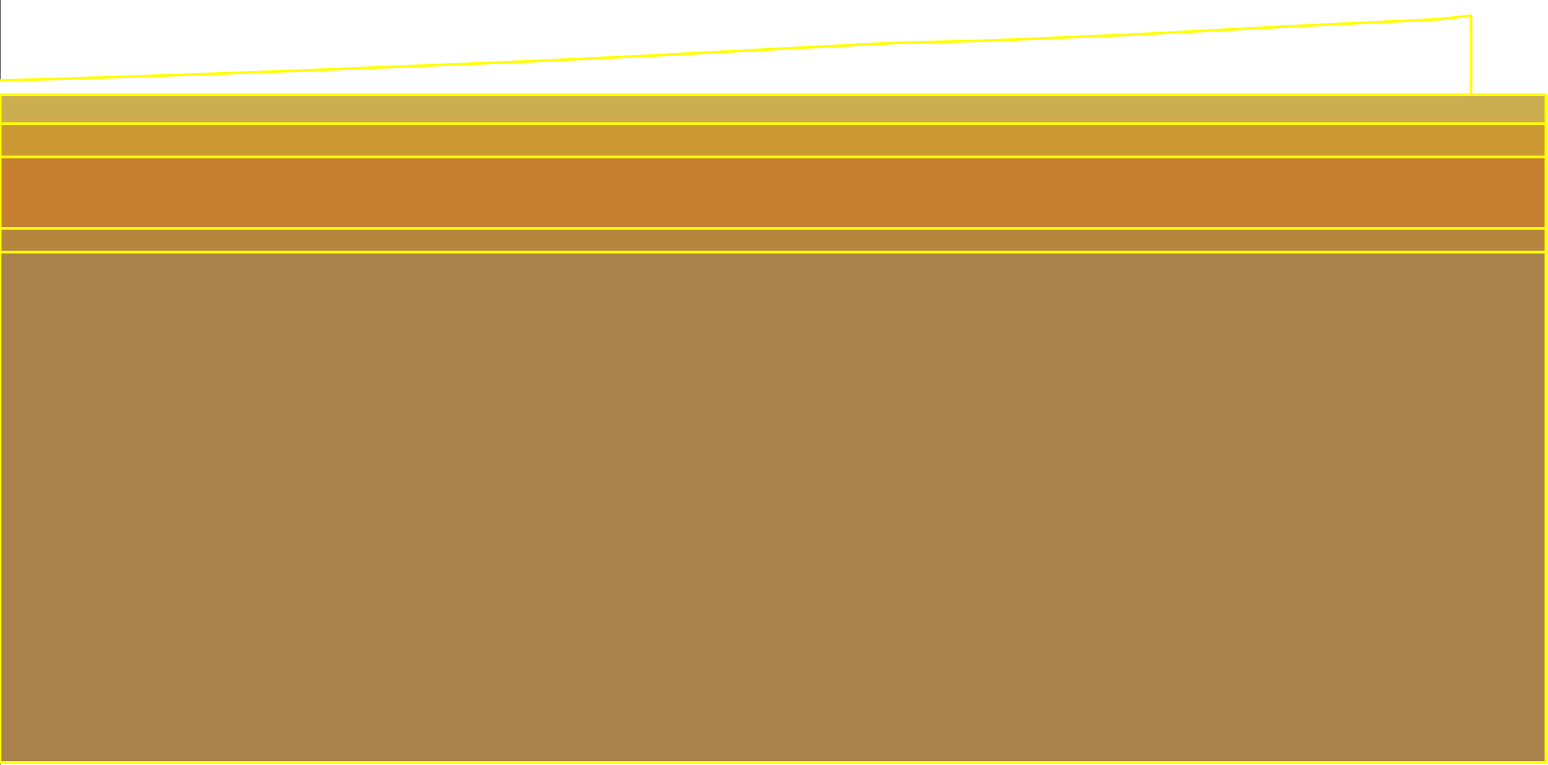
	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

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DRAWING OF SPECIFIED GEOMETRY



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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	41072.00	0.00	1	381000	0.2000	0.0045	5.10	5.08	0.02
			2	544000	0.2500	0.0035			
			3	336000	0.2000	0.0120			
			4	2792000	0.4500	0.0003			
			5	4155000	0.2300	0.0004			
2	41097.00	0.00	1	381000	0.2000	0.0056	5.10	5.07	0.03
			2	544000	0.2500	0.0043			
			3	336000	0.2000	0.0160			
			4	2792000	0.4500	0.0005			
			5	4155000	0.2300	0.0005			
3	41122.00	0.00	1	381000	0.2000	0.0068	5.10	5.07	0.03
			2	544000	0.2500	0.0053			
			3	336000	0.2000	0.0196			
			4	2792000	0.4500	0.0006			
			5	4155000	0.2300	0.0007			
4	41147.00	0.00	1	381000	0.2000	0.0081	5.10	5.06	0.04
			2	544000	0.2500	0.0063			
			3	336000	0.2000	0.0235			
			4	2792000	0.4500	0.0007			
			5	4155000	0.2300	0.0008			
5	41172.00	0.00	1	381000	0.2000	0.0095	5.10	5.05	0.05
			2	544000	0.2500	0.0074			
			3	336000	0.2000	0.0276			
			4	2792000	0.4500	0.0008			
			5	4155000	0.2300	0.0009			
6	41197.00	0.00	1	381000	0.2000	0.0111	5.10	5.05	0.05
			2	544000	0.2500	0.0086			
			3	336000	0.2000	0.0322			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0011			
7	41222.00	0.00	1	381000	0.2000	0.0129	5.10	5.04	0.06
			2	544000	0.2500	0.0100			
			3	336000	0.2000	0.0373			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0012			
8	41247.00	0.00	1	381000	0.2000	0.0146	5.10	5.03	0.07
			2	544000	0.2500	0.0114			
			3	336000	0.2000	0.0421			
			4	2792000	0.4500	0.0012			
			5	4155000	0.2300	0.0014			
9	41272.00	0.00	1	381000	0.2000	0.0156	5.10	5.02	0.08
			2	544000	0.2500	0.0123			
			3	336000	0.2000	0.0457			
			4	2792000	0.4500	0.0014			
			5	4155000	0.2300	0.0015			
10	41297.00	0.00	1	381000	0.2000	0.0170	5.10	5.02	0.08
			2	544000	0.2500	0.0134			
			3	336000	0.2000	0.0499			
			4	2792000	0.4500	0.0015			
			5	4155000	0.2300	0.0017			

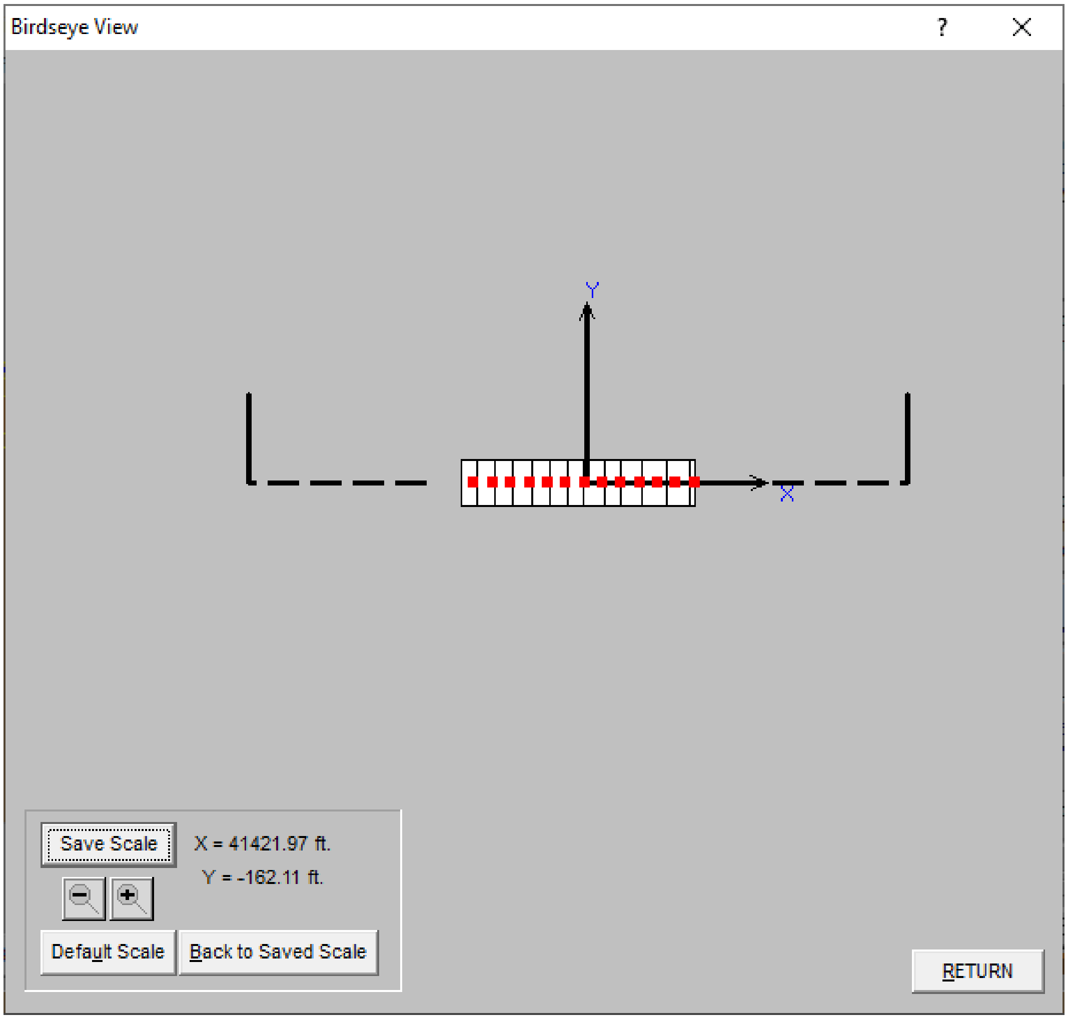
*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, µ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
11	41322.00	0.00	1	381000	0.2000	0.0188	5.10	5.01	0.09
			2	544000	0.2500	0.0149			
			3	336000	0.2000	0.0550			
			4	2792000	0.4500	0.0017			
			5	4155000	0.2300	0.0018			
12	41347.00	0.00	1	381000	0.2000	0.0206	5.10	5.00	0.10
			2	544000	0.2500	0.0165			
			3	336000	0.2000	0.0582			
			4	2792000	0.4500	0.0017			
			5	4155000	0.2300	0.0018			
13	41372.00	0.00	1	381000	0.2000	0.0113	5.10	5.05	0.05
			2	544000	0.2500	0.0087			
			3	336000	0.2000	0.0315			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0010			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.



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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	41055.00	5.10	Loose Sand
	2	41225.00	5.10	
	3	41375.00	5.10	
2	1	0.00	-1.00	Medium Dense Sand
3	1	0.00	-8.00	Loose Sand
4	1	0.00	-23.00	Very Dense Silty Sand
5	1	0.00	-28.00	Weathered Limestone/Caprock

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 41055.00 [ft]	1	41055.00	7.86	New Embankment
	X2 = 41372.00 [ft]	2	41075.00	8.43	
		3	41100.00	9.24	
		4	41125.00	10.14	
		5	41150.00	11.15	
		6	41175.00	12.16	
		7	41200.00	13.35	
		8	41220.00	14.40	
		9	41250.00	15.95	
		10	41270.00	16.45	
		11	41300.00	17.70	
		12	41335.00	19.52	
		13	41365.00	20.95	
		14	41372.00	21.71	

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CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	410+55 to 413+72

Description:

Settlement Analysis for Permanent MSE Walls 1A, 1B & 1C using boring WB-413R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\FoSSA_MSEW 1A-1B-1C_WB-413R.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.20	Loose Sand
2	110.00	0.25	Medium Dense Sand
3	105.00	0.20	Loose Sand
4	125.00	0.45	Very Dense Silty Sand
5	115.00	0.23	Weathered Limestone/Caprock

INPUT DATA – EMBANKMENT LAYERS – 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

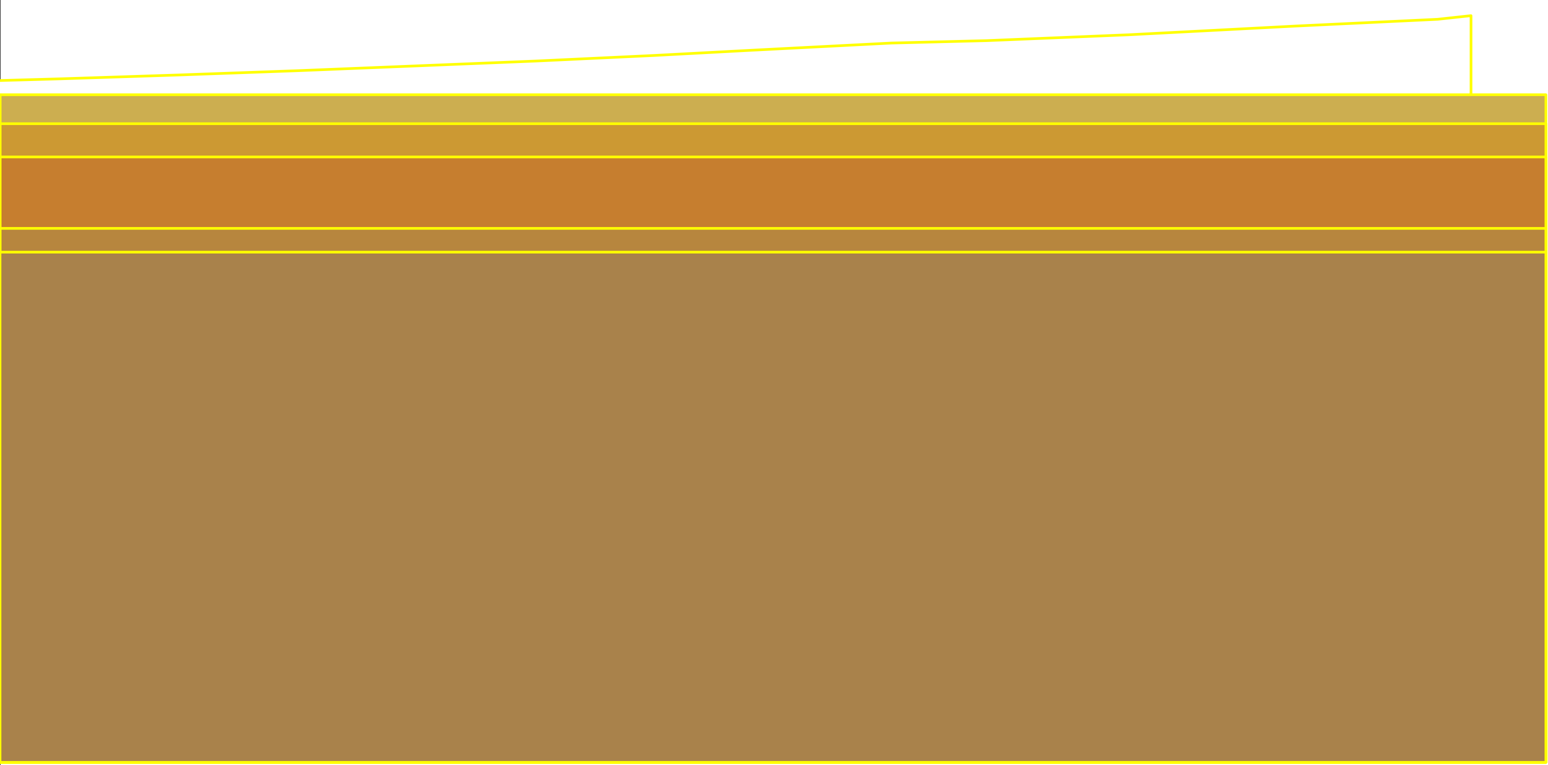
INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	41350.00	-30.00	1	381000	0.2000	0.0160	5.10	5.04	0.06
			2	544000	0.2500	0.0092			
			3	336000	0.2000	0.0306			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0010			
2	41350.00	-25.00	1	381000	0.2000	0.0209	5.10	5.02	0.08
			2	544000	0.2500	0.0145			
			3	336000	0.2000	0.0412			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0012			
3	41350.00	-20.00	1	381000	0.2000	0.0209	5.10	5.01	0.09
			2	544000	0.2500	0.0162			
			3	336000	0.2000	0.0489			
			4	2792000	0.4500	0.0013			
			5	4155000	0.2300	0.0014			
4	41350.00	-15.00	1	381000	0.2000	0.0208	5.10	5.01	0.09
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0536			
			4	2792000	0.4500	0.0015			
			5	4155000	0.2300	0.0015			
5	41350.00	-10.00	1	381000	0.2000	0.0207	5.10	5.00	0.10
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0562			
			4	2792000	0.4500	0.0016			
			5	4155000	0.2300	0.0016			
6	41350.00	-5.00	1	381000	0.2000	0.0207	5.10	5.00	0.10
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0575			
			4	2792000	0.4500	0.0017			
			5	4155000	0.2300	0.0017			
7	41350.00	0.00	1	381000	0.2000	0.0206	5.10	5.00	0.10
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0579			
			4	2792000	0.4500	0.0017			
			5	4155000	0.2300	0.0017			
8	41350.00	5.00	1	381000	0.2000	0.0207	5.10	5.00	0.10
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0576			
			4	2792000	0.4500	0.0017			
			5	4155000	0.2300	0.0017			
9	41350.00	10.00	1	381000	0.2000	0.0207	5.10	5.00	0.10
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0564			
			4	2792000	0.4500	0.0016			
			5	4155000	0.2300	0.0016			
10	41350.00	15.00	1	381000	0.2000	0.0208	5.10	5.01	0.09
			2	544000	0.2500	0.0167			
			3	336000	0.2000	0.0540			
			4	2792000	0.4500	0.0015			
			5	4155000	0.2300	0.0015			

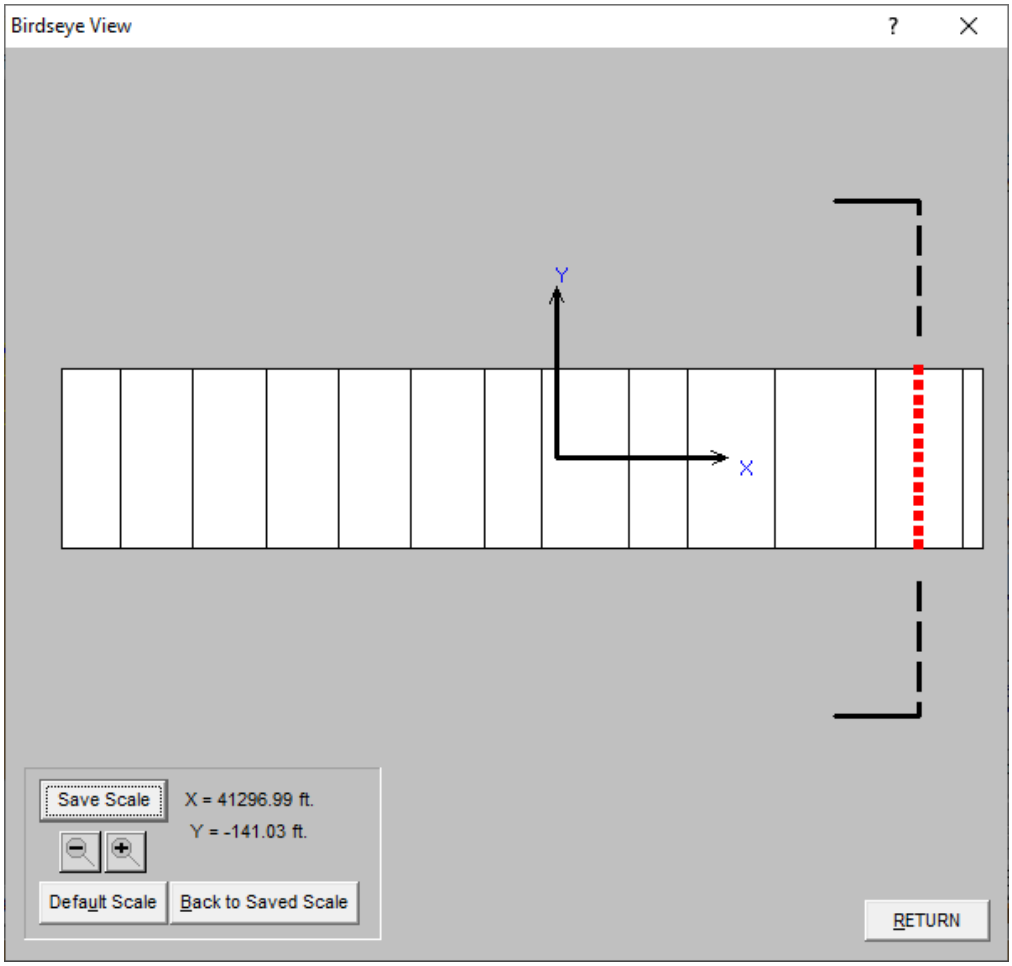
*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
11	41350.00	20.00	1	381000	0.2000	0.0209	5.10	5.01	0.09
			2	544000	0.2500	0.0163			
			3	336000	0.2000	0.0497			
			4	2792000	0.4500	0.0014			
			5	4155000	0.2300	0.0014			
12	41350.00	25.00	1	381000	0.2000	0.0209	5.10	5.02	0.08
			2	544000	0.2500	0.0146			
			3	336000	0.2000	0.0423			
			4	2792000	0.4500	0.0012			
			5	4155000	0.2300	0.0012			
13	41350.00	30.00	1	381000	0.2000	0.0163	5.10	5.04	0.06
			2	544000	0.2500	0.0095			
			3	336000	0.2000	0.0319			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0010			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.



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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	41055.00	5.10	Loose Sand
	2	41225.00	5.10	
	3	41375.00	5.10	
2	1	0.00	-1.00	Medium Dense Sand
3	1	0.00	-8.00	Loose Sand
4	1	0.00	-23.00	Very Dense Silty Sand
5	1	0.00	-28.00	Weathered Limestone/Caprock

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 41055.00 [ft]	1	41055.00	7.86	New Embankment
	X2 = 41372.00 [ft]	2	41075.00	8.43	
		3	41100.00	9.24	
		4	41125.00	10.14	
		5	41150.00	11.15	
		6	41175.00	12.16	
		7	41200.00	13.35	
		8	41220.00	14.40	
		9	41250.00	15.95	
		10	41270.00	16.45	
		11	41300.00	17.70	
		12	41335.00	19.52	
		13	41365.00	20.95	
		14	41372.00	21.71	

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CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	436+26 to 440+96

Description:

Settlement Analysis for Permanent MSE Walls 2A, 2B & 2C using boring WB-438R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\FoSSA_MSEW 2A-2B-2C_WB-438R.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.20	Loose Sand
2	100.00	0.20	Very Loose Sand to Silty Sand
3	105.00	0.20	Loose Silty Sand
4	110.00	0.25	Medium Dense Silty Sand

INPUT DATA – EMBANKMENT LAYERS – 1 layers

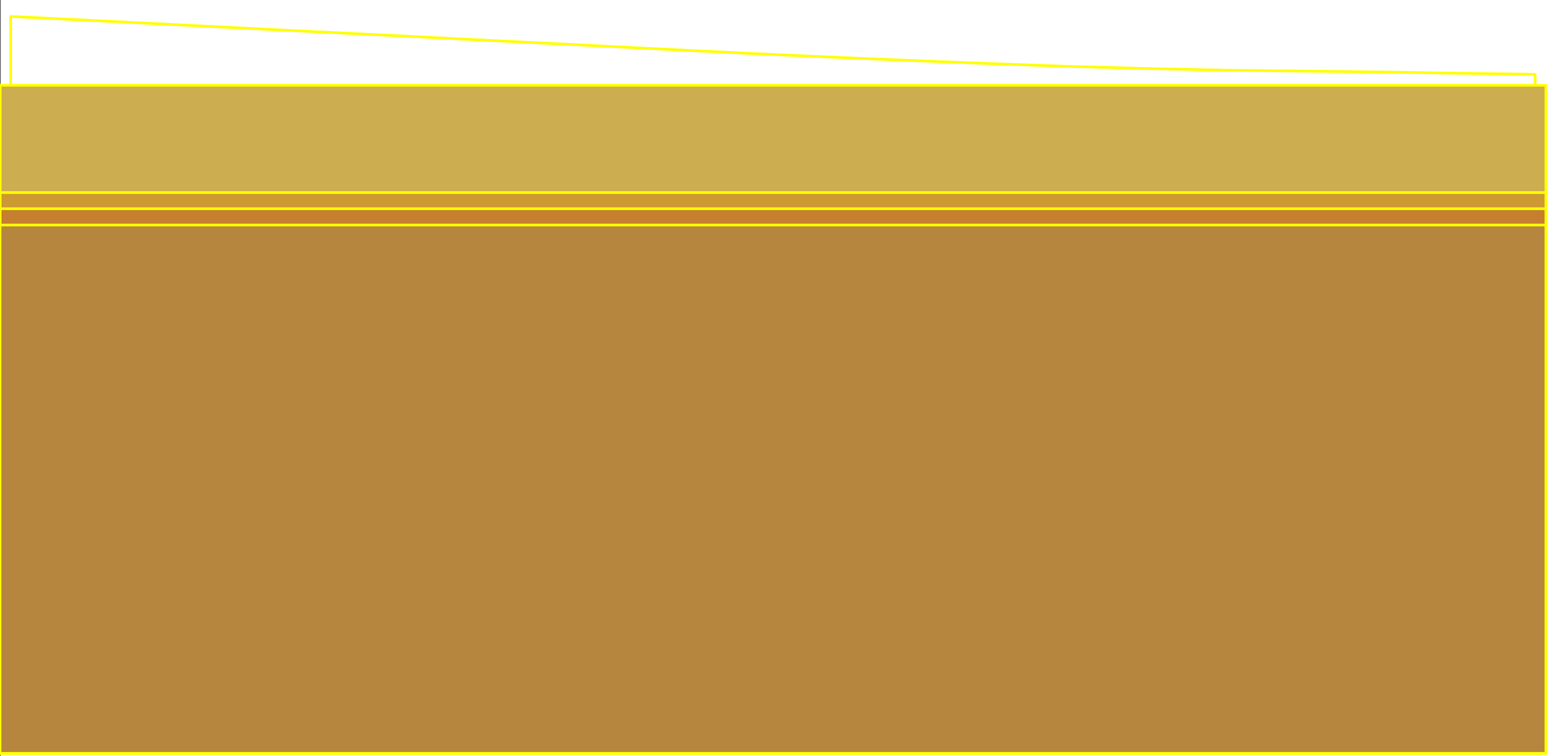
	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	43626.00	0.00	1	224000	0.2000	0.1332	3.50	3.31	0.19
			2	183000	0.2000	0.0231			
			3	272000	0.2000	0.0147			
			4	424000	0.2500	0.0201			
2	43651.00	0.00	1	224000	0.2000	0.2507	3.50	3.15	0.35
			2	183000	0.2000	0.0401			
			3	272000	0.2000	0.0248			
			4	424000	0.2500	0.0327			
3	43676.00	0.00	1	224000	0.2000	0.2401	3.50	3.16	0.34
			2	183000	0.2000	0.0419			
			3	272000	0.2000	0.0265			
			4	424000	0.2500	0.0359			
4	43701.00	0.00	1	224000	0.2000	0.2237	3.50	3.18	0.32
			2	183000	0.2000	0.0397			
			3	272000	0.2000	0.0253			
			4	424000	0.2500	0.0347			
5	43726.00	0.00	1	224000	0.2000	0.2072	3.50	3.20	0.30
			2	183000	0.2000	0.0368			
			3	272000	0.2000	0.0235			
			4	424000	0.2500	0.0325			
6	43751.00	0.00	1	224000	0.2000	0.1909	3.50	3.22	0.28
			2	183000	0.2000	0.0339			
			3	272000	0.2000	0.0217			
			4	424000	0.2500	0.0300			
7	43776.00	0.00	1	224000	0.2000	0.1747	3.50	3.25	0.25
			2	183000	0.2000	0.0310			
			3	272000	0.2000	0.0198			
			4	424000	0.2500	0.0274			
8	43801.00	0.00	1	224000	0.2000	0.1586	3.50	3.27	0.23
			2	183000	0.2000	0.0282			
			3	272000	0.2000	0.0180			
			4	424000	0.2500	0.0248			
9	43826.00	0.00	1	224000	0.2000	0.1426	3.50	3.29	0.21
			2	183000	0.2000	0.0253			
			3	272000	0.2000	0.0162			
			4	424000	0.2500	0.0223			
10	43851.00	0.00	1	224000	0.2000	0.1269	3.50	3.32	0.18
			2	183000	0.2000	0.0225			
			3	272000	0.2000	0.0144			
			4	424000	0.2500	0.0199			
11	43876.00	0.00	1	224000	0.2000	0.1121	3.50	3.34	0.16
			2	183000	0.2000	0.0199			
			3	272000	0.2000	0.0127			
			4	424000	0.2500	0.0176			
12	43901.00	0.00	1	224000	0.2000	0.0986	3.50	3.36	0.14
			2	183000	0.2000	0.0175			
			3	272000	0.2000	0.0112			
			4	424000	0.2500	0.0154			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

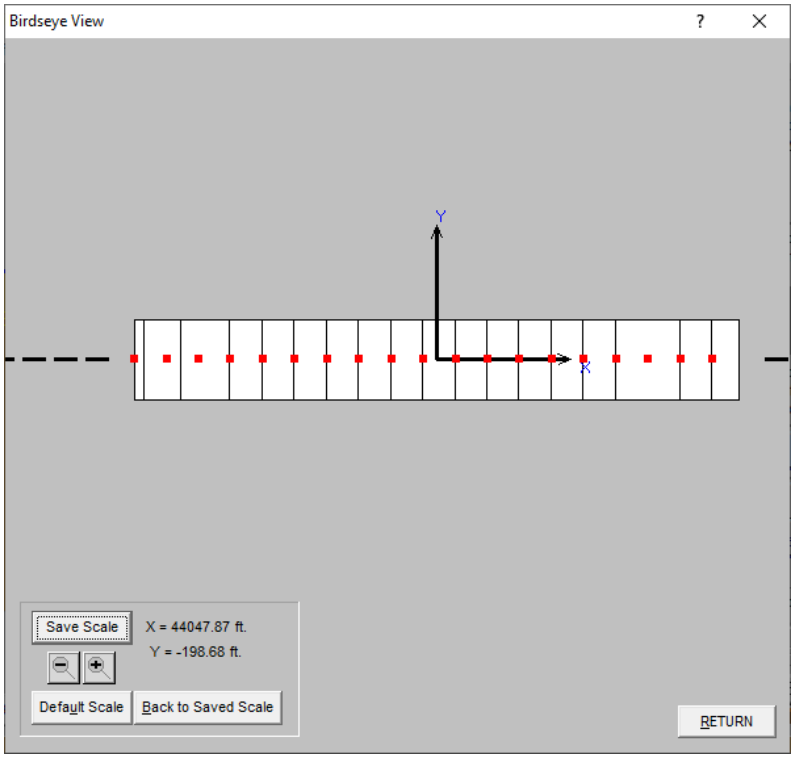
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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
13	43926.00	0.00	1	224000	0.2000	0.0858	3.50	3.38	0.12
			2	183000	0.2000	0.0153			
			3	272000	0.2000	0.0098			
			4	424000	0.2500	0.0135			
14	43951.00	0.00	1	224000	0.2000	0.0746	3.50	3.39	0.11
			2	183000	0.2000	0.0133			
			3	272000	0.2000	0.0085			
			4	424000	0.2500	0.0118			
15	43976.00	0.00	1	224000	0.2000	0.0657	3.50	3.40	0.10
			2	183000	0.2000	0.0117			
			3	272000	0.2000	0.0075			
			4	424000	0.2500	0.0104			
16	44001.00	0.00	1	224000	0.2000	0.0594	3.50	3.41	0.09
			2	183000	0.2000	0.0106			
			3	272000	0.2000	0.0068			
			4	424000	0.2500	0.0093			
17	44026.00	0.00	1	224000	0.2000	0.0553	3.50	3.42	0.08
			2	183000	0.2000	0.0097			
			3	272000	0.2000	0.0062			
			4	424000	0.2500	0.0085			
18	44051.00	0.00	1	224000	0.2000	0.0512	3.50	3.43	0.07
			2	183000	0.2000	0.0088			
			3	272000	0.2000	0.0056			
			4	424000	0.2500	0.0075			
19	44076.00	0.00	1	224000	0.2000	0.0449	3.50	3.44	0.06
			2	183000	0.2000	0.0071			
			3	272000	0.2000	0.0044			
			4	424000	0.2500	0.0058			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.



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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	43626.00	3.50	Loose Sand
	2	43861.00	3.50	
	3	44096.00	3.50	
2	1	0.00	-29.50	Very Loose Sand to Silty Sand
3	1	0.00	-34.50	Loose Silty Sand
4	1	0.00	-39.50	Medium Dense Silty Sand

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 43626.00 [ft]	1	43626.00	24.66	New Embankment
	X2 = 44096.00 [ft]	2	43633.00	24.31	
		3	43662.00	22.88	
		4	43700.00	20.96	
		5	43725.00	19.71	
		6	43750.00	18.46	
		7	43775.00	17.21	
		8	43800.00	15.96	
		9	43825.00	14.71	
		10	43850.00	13.47	
		11	43875.00	12.31	
		12	43900.00	11.26	
		13	43925.00	10.25	
		14	43950.00	9.35	
		15	43975.00	8.65	
		16	44000.00	8.14	
		17	44050.00	7.53	
		18	44075.00	7.13	
		19	44096.00	6.86	

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CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	436+26 to 440+96

Description:

Settlement Analysis for Permanent MSE Walls 2A, 2B & 2C using boring WB-438R.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\FoSSA MSEW 2A-2B-2C_WB-438R.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.20	Loose Sand
2	100.00	0.20	Very Loose Sand to Silty Sand
3	105.00	0.20	Loose Silty Sand
4	110.00	0.25	Medium Dense Silty Sand

INPUT DATA – EMBANKMENT LAYERS – 1 layers

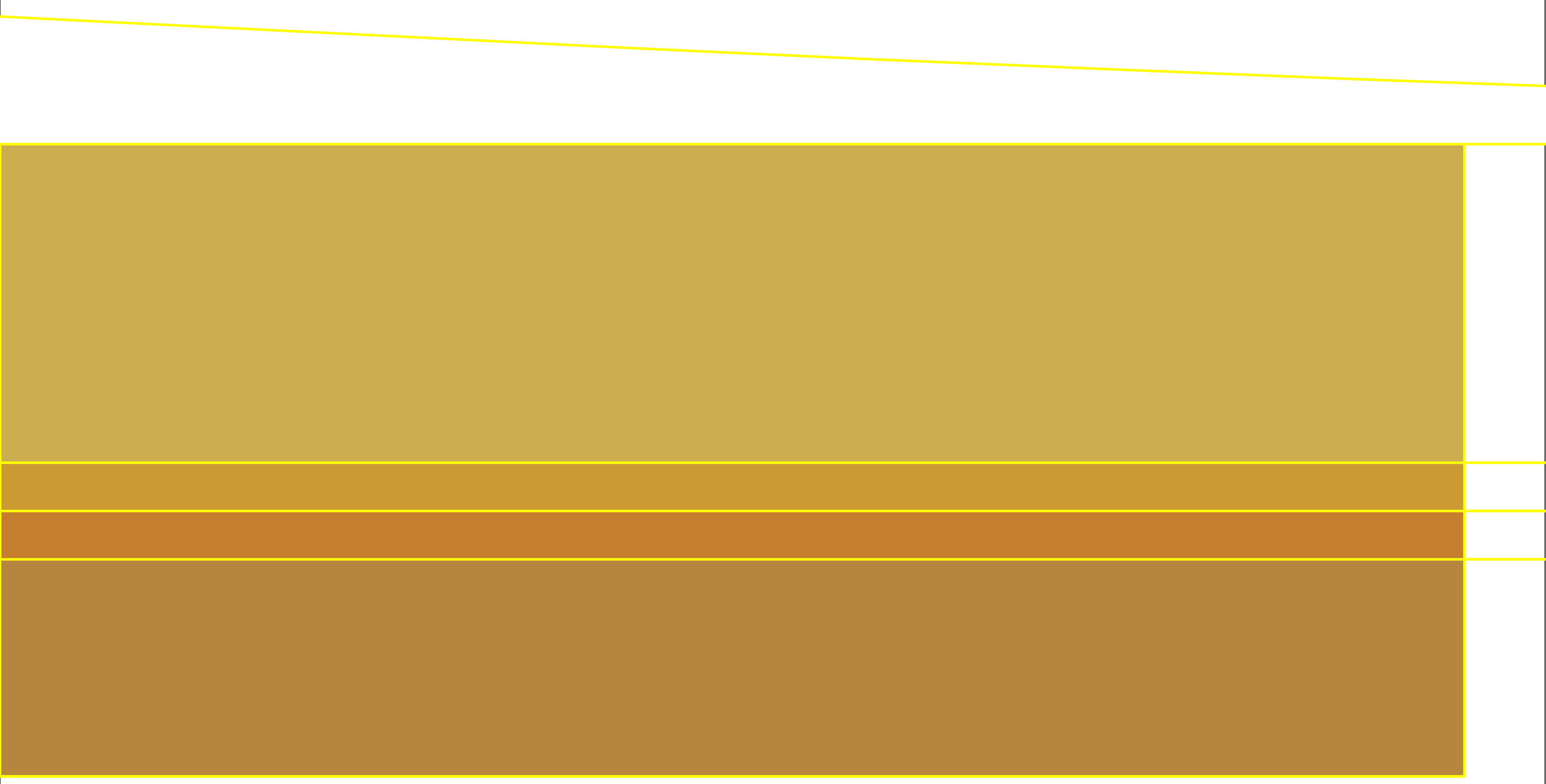
	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	43650.00	-30.00	1	224000	0.2000	0.1455	3.50	3.30	0.20
			2	183000	0.2000	0.0227			
			3	272000	0.2000	0.0145			
			4	424000	0.2500	0.0200			
2	43650.00	-25.00	1	224000	0.2000	0.1986	3.50	3.23	0.27
			2	183000	0.2000	0.0274			
			3	272000	0.2000	0.0171			
			4	424000	0.2500	0.0230			
3	43650.00	-20.00	1	224000	0.2000	0.2239	3.50	3.20	0.30
			2	183000	0.2000	0.0315			
			3	272000	0.2000	0.0195			
			4	424000	0.2500	0.0258			
4	43650.00	-15.00	1	224000	0.2000	0.2375	3.50	3.18	0.32
			2	183000	0.2000	0.0349			
			3	272000	0.2000	0.0214			
			4	424000	0.2500	0.0281			
5	43650.00	-10.00	1	224000	0.2000	0.2449	3.50	3.17	0.33
			2	183000	0.2000	0.0373			
			3	272000	0.2000	0.0228			
			4	424000	0.2500	0.0299			
6	43650.00	-5.00	1	224000	0.2000	0.2485	3.50	3.16	0.34
			2	183000	0.2000	0.0387			
			3	272000	0.2000	0.0237			
			4	424000	0.2500	0.0310			
7	43650.00	0.00	1	224000	0.2000	0.2497	3.50	3.16	0.34
			2	183000	0.2000	0.0393			
			3	272000	0.2000	0.0241			
			4	424000	0.2500	0.0314			
8	43650.00	5.00	1	224000	0.2000	0.2488	3.50	3.16	0.34
			2	183000	0.2000	0.0389			
			3	272000	0.2000	0.0239			
			4	424000	0.2500	0.0311			
9	43650.00	10.00	1	224000	0.2000	0.2454	3.50	3.16	0.34
			2	183000	0.2000	0.0376			
			3	272000	0.2000	0.0231			
			4	424000	0.2500	0.0302			
10	43650.00	15.00	1	224000	0.2000	0.2385	3.50	3.18	0.32
			2	183000	0.2000	0.0353			
			3	272000	0.2000	0.0218			
			4	424000	0.2500	0.0286			
11	43650.00	20.00	1	224000	0.2000	0.2256	3.50	3.20	0.30
			2	183000	0.2000	0.0321			
			3	272000	0.2000	0.0199			
			4	424000	0.2500	0.0264			
12	43650.00	25.00	1	224000	0.2000	0.2014	3.50	3.23	0.27
			2	183000	0.2000	0.0281			
			3	272000	0.2000	0.0177			
			4	424000	0.2500	0.0237			

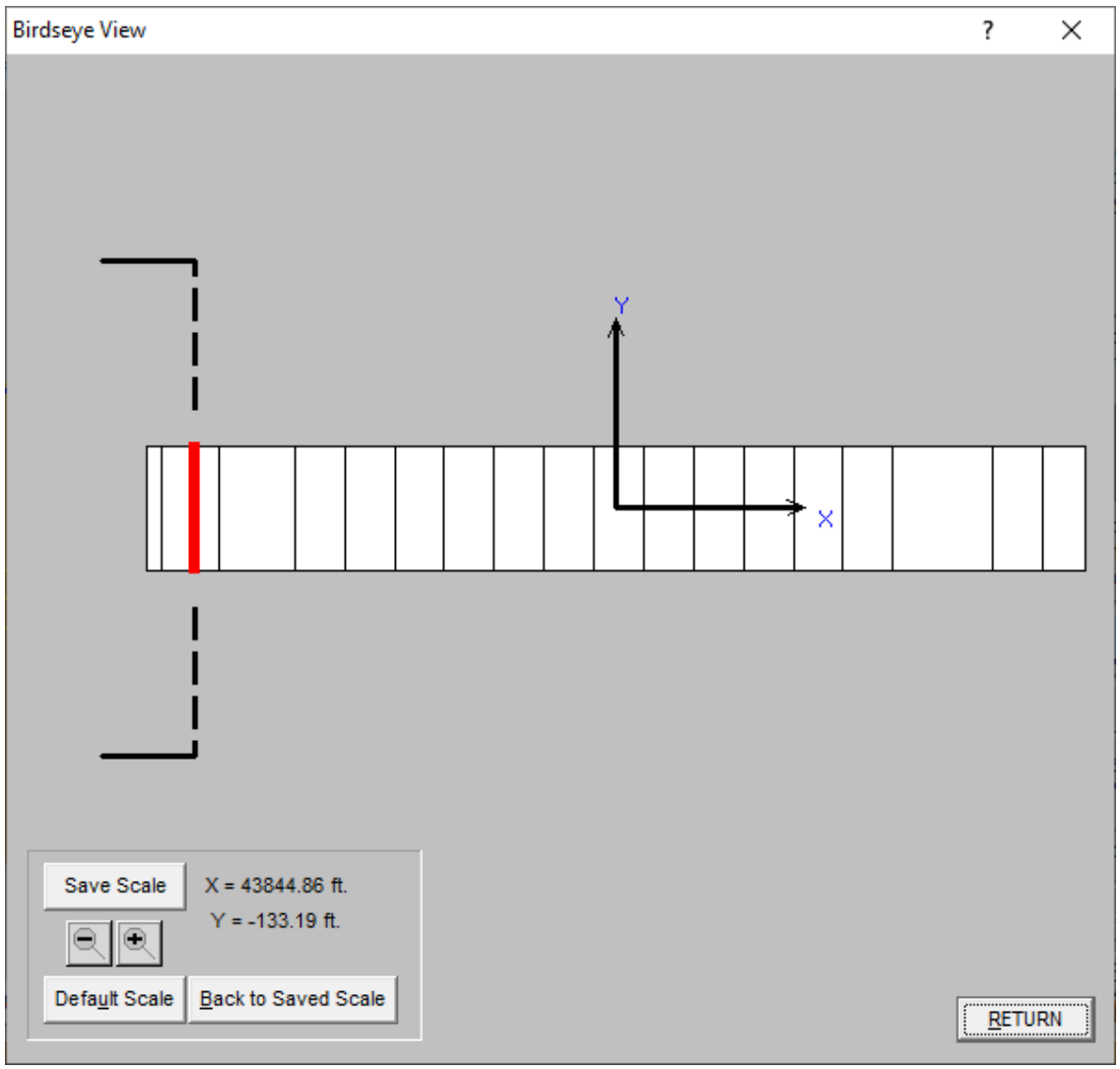
*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
13	43650.00	30.00	1	224000	0.2000	0.1498	3.50	3.29	0.21
			2	183000	0.2000	0.0235			
			3	272000	0.2000	0.0151			
			4	424000	0.2500	0.0208			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.



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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	43626.00	3.50	Loose Sand
	2	43861.00	3.50	
	3	44096.00	3.50	
2	1	0.00	-29.50	Very Loose Sand to Silty Sand
3	1	0.00	-34.50	Loose Silty Sand
4	1	0.00	-39.50	Medium Dense Silty Sand

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 43626.00 [ft]	1	43626.00	24.66	New Embankment
	X2 = 44096.00 [ft]	2	43633.00	24.31	
		3	43662.00	22.88	
		4	43700.00	20.96	
		5	43725.00	19.71	
		6	43750.00	18.46	
		7	43775.00	17.21	
		8	43800.00	15.96	
		9	43825.00	14.71	
		10	43850.00	13.47	
		11	43875.00	12.31	
		12	43900.00	11.26	
		13	43925.00	10.25	
		14	43950.00	9.35	
		15	43975.00	8.65	
		16	44000.00	8.14	
		17	44050.00	7.53	
		18	44075.00	7.13	
		19	44096.00	6.86	

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CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title: CR 865 over Big Carlos Pass
Project Number: 6511-16-051 -
Client: KCA
Designer: Tierra, Inc. - TM
Station Number: 413+73 to 414+41

Description:
Settlement Analysis for Temporary Sidewalk MSE Walls using boring WB-413R.

Company's information:

Name: Tierra, Inc.
Street: 7351 Temple Terrace Highway
Tampa, FL 33637
Telephone #:
Fax #:
E-Mail:

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\FoSSA_MSEW sidewalk_WB-413R.2ST
Original date and time of creating this file: 10/21/2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 5 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.20	Loose Sand
2	110.00	0.25	Medium Dense Sand
3	105.00	0.20	Loose Sand
4	125.00	0.45	Very Dense Silty Sand
5	115.00	0.23	Weathered Limestone/Caprock

INPUT DATA – EMBANKMENT LAYERS – 1 layers

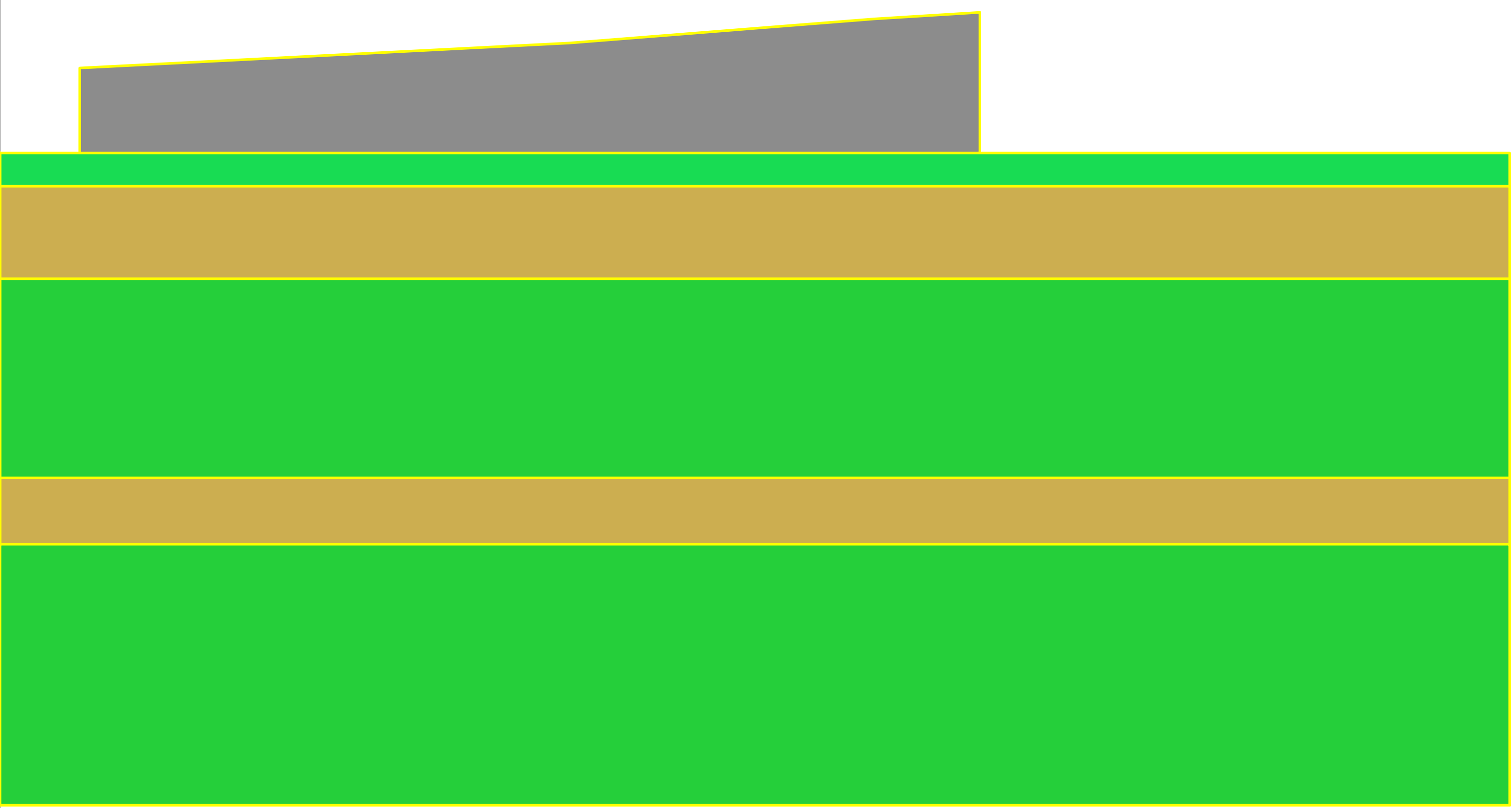
	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	115.00	New Embankment

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	1.50
2	41375.00	1.50

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	41350.00	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0002			
			3	336000	0.2000	0.0003			
			4	2792000	0.4500	-0.0000			
			5	4155000	0.2300	0.0001			
2	41355.42	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0003			
			3	336000	0.2000	0.0011			
			4	2792000	0.4500	0.0000			
			5	4155000	0.2300	0.0002			
3	41360.83	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0003			
			3	336000	0.2000	0.0027			
			4	2792000	0.4500	0.0001			
			5	4155000	0.2300	0.0002			
4	41366.25	0.00	1	381000	0.2000	-0.0001	1.50	1.49	0.01
			2	544000	0.2500	-0.0001			
			3	336000	0.2000	0.0062			
			4	2792000	0.4500	0.0002			
			5	4155000	0.2300	0.0004			
5	41371.67	0.00	1	381000	0.2000	0.0001	1.50	1.48	0.02
			2	544000	0.2500	0.0020			
			3	336000	0.2000	0.0125			
			4	2792000	0.4500	0.0004			
			5	4155000	0.2300	0.0005			
6	41377.08	0.00	1	381000	0.2000	0.0040	1.50	1.47	0.03
			2	544000	0.2500	0.0066			
			3	336000	0.2000	0.0198			
			4	2792000	0.4500	0.0006			
			5	4155000	0.2300	0.0006			
7	41382.50	0.00	1	381000	0.2000	0.0041	1.50	1.46	0.04
			2	544000	0.2500	0.0076			
			3	336000	0.2000	0.0253			
			4	2792000	0.4500	0.0007			
			5	4155000	0.2300	0.0008			
8	41387.92	0.00	1	381000	0.2000	0.0043	1.50	1.46	0.04
			2	544000	0.2500	0.0079			
			3	336000	0.2000	0.0287			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0009			
9	41393.33	0.00	1	381000	0.2000	0.0045	1.50	1.45	0.05
			2	544000	0.2500	0.0082			
			3	336000	0.2000	0.0309			
			4	2792000	0.4500	0.0009			
			5	4155000	0.2300	0.0010			
10	41398.75	0.00	1	381000	0.2000	0.0046	1.50	1.45	0.05
			2	544000	0.2500	0.0085			
			3	336000	0.2000	0.0326			
			4	2792000	0.4500	0.0010			
			5	4155000	0.2300	0.0010			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
11	41404.17	0.00	1	381000	0.2000	0.0048	1.50	1.45	0.05
			2	544000	0.2500	0.0088			
			3	336000	0.2000	0.0341			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0011			
12	41409.58	0.00	1	381000	0.2000	0.0049	1.50	1.45	0.05
			2	544000	0.2500	0.0091			
			3	336000	0.2000	0.0354			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0011			
13	41415.00	0.00	1	381000	0.2000	0.0052	1.50	1.45	0.05
			2	544000	0.2500	0.0096			
			3	336000	0.2000	0.0366			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0011			
14	41420.42	0.00	1	381000	0.2000	0.0054	1.50	1.44	0.06
			2	544000	0.2500	0.0101			
			3	336000	0.2000	0.0375			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0011			
15	41425.83	0.00	1	381000	0.2000	0.0057	1.50	1.44	0.06
			2	544000	0.2500	0.0107			
			3	336000	0.2000	0.0374			
			4	2792000	0.4500	0.0011			
			5	4155000	0.2300	0.0011			
16	41431.25	0.00	1	381000	0.2000	0.0060	1.50	1.45	0.05
			2	544000	0.2500	0.0112			
			3	336000	0.2000	0.0352			
			4	2792000	0.4500	0.0010			
			5	4155000	0.2300	0.0010			
17	41436.67	0.00	1	381000	0.2000	0.0063	1.50	1.45	0.05
			2	544000	0.2500	0.0106			
			3	336000	0.2000	0.0292			
			4	2792000	0.4500	0.0008			
			5	4155000	0.2300	0.0008			
18	41442.08	0.00	1	381000	0.2000	0.0003	1.50	1.48	0.02
			2	544000	0.2500	0.0038			
			3	336000	0.2000	0.0192			
			4	2792000	0.4500	0.0006			
			5	4155000	0.2300	0.0007			
19	41447.50	0.00	1	381000	0.2000	-0.0001	1.50	1.49	0.01
			2	544000	0.2500	-0.0000			
			3	336000	0.2000	0.0099			
			4	2792000	0.4500	0.0004			
			5	4155000	0.2300	0.0005			
20	41452.92	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0004			
			3	336000	0.2000	0.0045			
			4	2792000	0.4500	0.0002			
			5	4155000	0.2300	0.0004			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
21	41458.33	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0003			
			3	336000	0.2000	0.0019			
			4	2792000	0.4500	0.0001			
			5	4155000	0.2300	0.0002			
22	41463.75	0.00	1	381000	0.2000	-0.0000	1.50	1.50	0.00
			2	544000	0.2500	-0.0002			
			3	336000	0.2000	0.0006			
			4	2792000	0.4500	0.0000			
			5	4155000	0.2300	0.0002			
23	41469.17	0.00	1	381000	0.2000	-0.0000	1.50	1.50	-0.00
			2	544000	0.2500	-0.0002			
			3	336000	0.2000	0.0001			
			4	2792000	0.4500	-0.0000			
			5	4155000	0.2300	0.0001			
24	41474.58	0.00	1	381000	0.2000	-0.0000	1.50	1.50	-0.00
			2	544000	0.2500	-0.0001			
			3	336000	0.2000	-0.0001			
			4	2792000	0.4500	-0.0000			
			5	4155000	0.2300	0.0001			
25	41480.00	0.00	1	381000	0.2000	-0.0000	1.50	1.50	-0.00
			2	544000	0.2500	-0.0001			
			3	336000	0.2000	-0.0002			
			4	2792000	0.4500	-0.0000			
			5	4155000	0.2300	0.0000			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	41225.00	1.50	Loose Sand
	2	41424.00	1.50	
	3	41441.00	1.50	
2	1	0.00	-1.00	Medium Dense Sand
3	1	0.00	-8.00	Loose Sand
4	1	0.00	-23.00	Very Dense Silty Sand
5	1	0.00	-28.00	Weathered Limestone/Caprock

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 41373.00 [ft]	1	41373.00	7.90	New Embankment
	X2 = 41441.00 [ft]	2	41410.00	9.80	
		3	41433.00	11.60	
		4	41441.00	12.10	

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DOWNDRAG EVALUATION

Big Carlos Pass Bridge Replacement
Estero Blvd. (CR 865) Over Big Carlos Pass
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

END BENT 1

Soil Settlement
(From FoSSA Embankment Settlement Analysis Output File)

Immediate Settlement:	0.03	ft
Ultimate Settlement:	0.00	ft
Total Soil Settlement:	**0.03**	**ft**
	0.39	**in**

Pile Settlement
(From Pile Group Settlement Calculations)

Pile Settlement: 0 in

Elastic Compression of Pile Under Max Service Axial Load

SPT Boring Analyzed:	BB-414	
Max Service Axial Load Per Pile, Q =		kips
Elastic Modulus, E =	4,000	ksi
Pile Cutoff Elevation =	33	ft
Elevation where Ultimate Side Friction resists Service Load (FB Deep) =		ft

Dimensions of Pile

Pile Type:	PPSC	
Pile Size:	24-in	
Area, A =	576.0	in^2
Pile Length, L =	396	in

Elastic Compression of Pile, $\Delta_E = (QL)/(EA)$

Δ_E = 0.00 in

Relative Settlement
Relative Settlement = Total Soil Settlement - Pile Settlement - Δ_E

Relative Settlement = 0.392 in

Negative Shaft Resistance (Downdrag) Mobilized? **NO** (Relative Settlement > 0.5 inches)

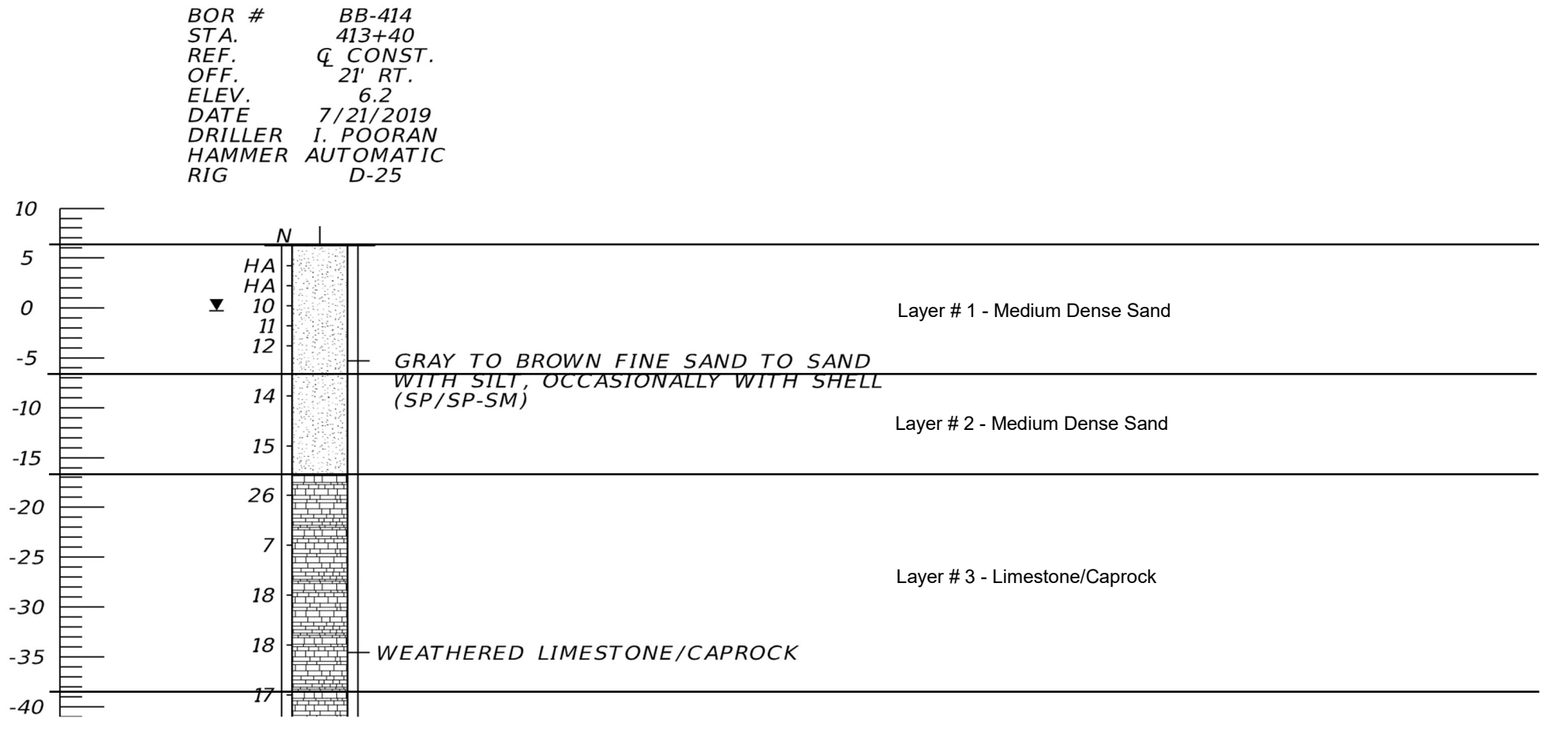
DOWNDRAG EVALUATION

Big Carlos Pass Bridge Replacement
Estero Blvd. (CR 865) Over Big Carlos Pass
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

END BENT 1

From FoSSA

X	Y	Layer	Young's Modulus, E (psf)	Poisson's Ratio, μ	Layer Immediate Settlement (ft)	Top of Layer Elevation, Z (ft)	Layer Ultimate Settlement, S_c (ft)
-40.00	-94.50	1	593000	0.25	0.0218	6.20	0.0000
		2	667000	0.30	0.0088	-6.80	0.0000
		3	4363000	0.23	0.0020	-16.80	0.0000
		4					
		5					
		6					
		7					



Soil Settlement:

Immediate:	0.0327	ft
Ultimate:	0.0000	ft
Total:	**0.3921**	**in**
Pile Settlement:	0.0000	in
Relative Settlement prior to Elastic Compression:	**0.3921**	**in**
Pile Compression:	0.0000	in
Relative Settlement at existing ground surface:	**0.3921**	**in**

Interpolate in Layer #
Neutral Axis Elevation **#N/A** **ft**

Evaluation of Soil Settlement Relative to Pile in Each Soil Layer:

Layer # 1		
Bottom of Layer Elevation:	-6.80	ft
Layer Thickness:	13.00	ft
Length of Pile in Compression within layer:	13.00	ft
Immediate Settlement in Layer:	0.2621	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.1301**	**in**
Layer # 2		
Bottom of Layer Elevation:	-16.80	ft
Layer Thickness:	10.00	ft
Length of Pile in Compression within layer:	10.00	ft
Immediate Settlement in Layer:	0.1058	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0242**	**in**
Layer # 3		
Bottom of Layer Elevation:	0.00	ft
Layer Thickness:	-16.80	ft
Length of Pile in Compression within layer:	-16.80	ft
Immediate Settlement in Layer:	0.0242	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0000**	**in**
Layer # 4		
Bottom of Layer Elevation:	0.00	ft
Layer Thickness:	0.00	ft
Length of Pile in Compression within layer:	0.00	ft
Immediate Settlement in Layer:	0.0000	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0000**	**in**
Layer # 5		
Bottom of Layer Elevation:	0.00	ft
Layer Thickness:	0.00	ft
Length of Pile in Compression within layer:	0.00	ft
Immediate Settlement in Layer:	0.0000	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0000**	**in**
Layer # 6		
Bottom of Layer Elevation:	0.00	ft
Layer Thickness:	0.00	ft
Length of Pile in Compression within layer:	0.00	ft
Immediate Settlement in Layer:	0.0000	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0000**	**in**
Layer # 7		
Bottom of Layer Elevation:	-59.00	ft
Layer Thickness:	59.00	ft
Length of Pile in Compression within layer:	0.00	ft
Immediate Settlement in Layer:	0.0000	in
Ultimate Settlement in Layer:	0.0000	in
Relative Settlement at Bottom of Layer:	**0.0000**	**in**

CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	410+55 to 413+72

Description:

Settlement Analysis for downdrag evaluation at End Bent 1 using boring BB-414.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... 16-051 Big Carlos Pass\FoSSA\FoSSA_EB-1_BB-414.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 3 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	110.00	0.25	Medium Dense Sand
2	112.00	0.30	Medium Dense Sand
3	115.00	0.23	Loose Sand

INPUT DATA – EMBANKMENT LAYERS – 1 layers

	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

INPUT DATA OF WATER

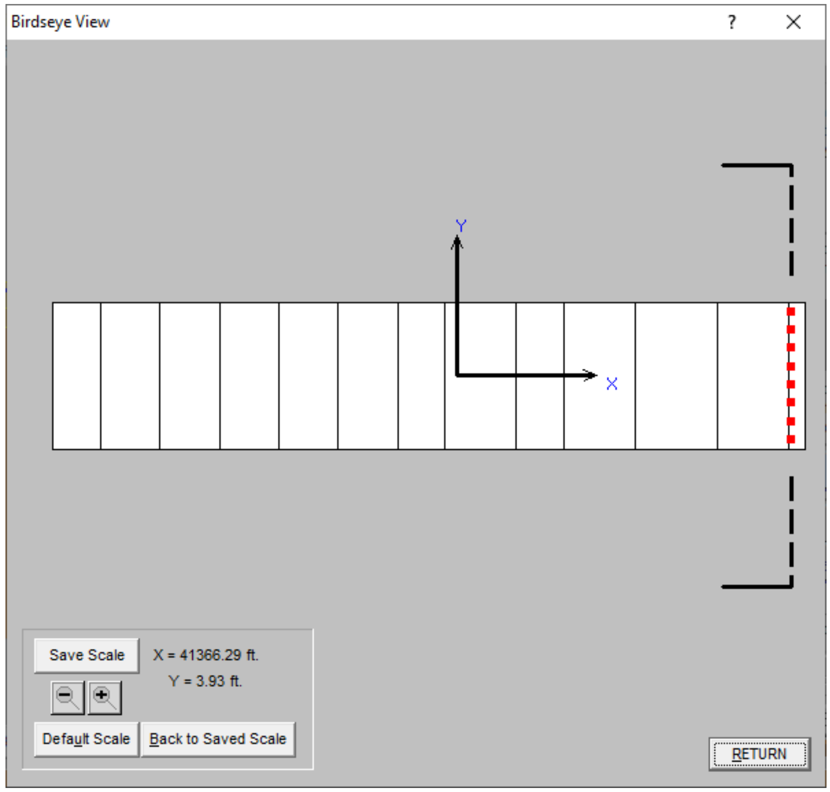
Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

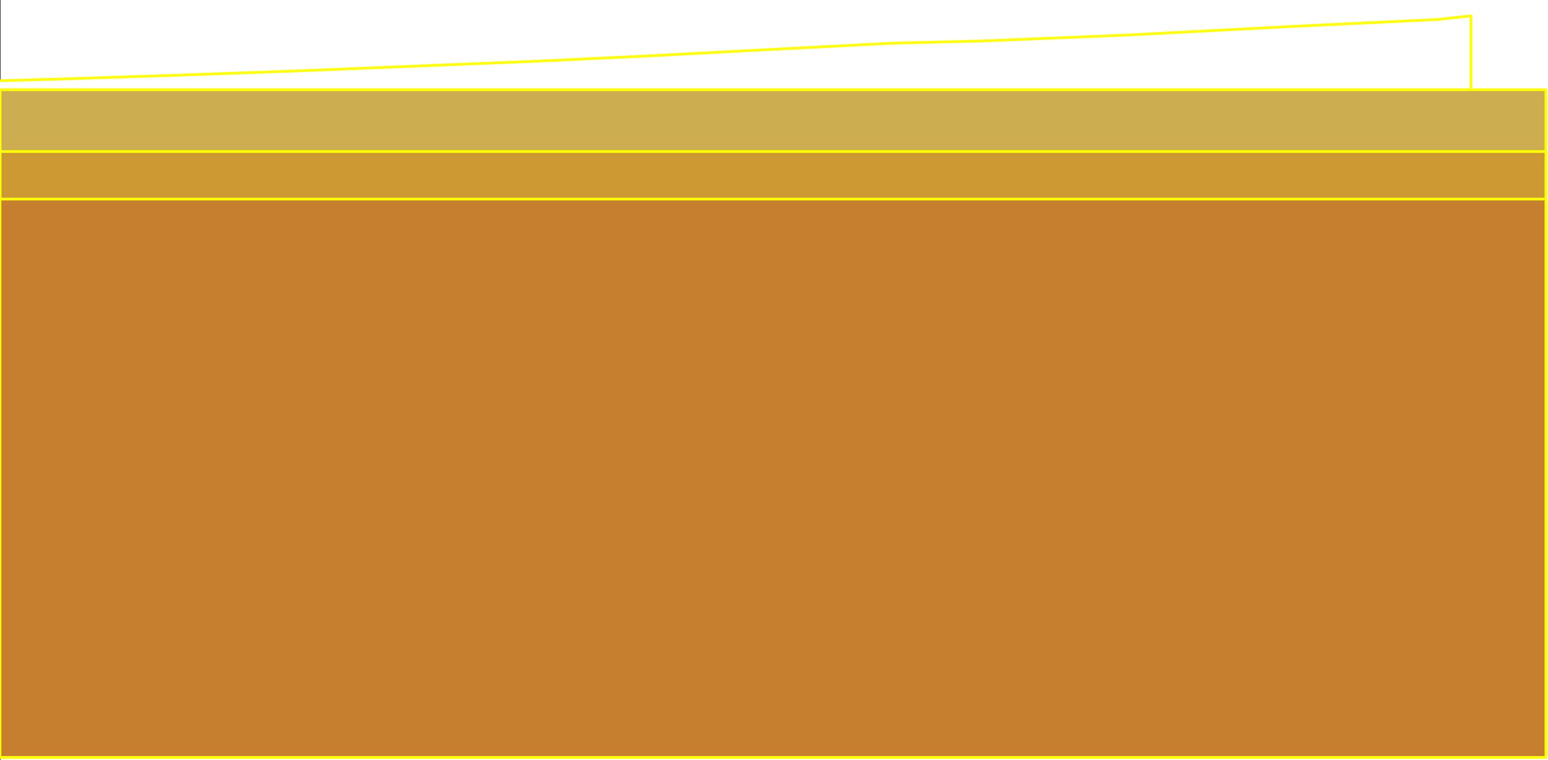
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DRAWING OF SPECIFIED GEOMETRY





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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	41366.00	-27.00	1	593000	0.2500	0.0218	6.20	6.17	0.03
			2	667000	0.3000	0.0088			
			3	4363000	0.2300	0.0020			
2	41366.00	-19.29	1	593000	0.2500	0.0246	6.20	6.16	0.04
			2	667000	0.3000	0.0121			
			3	4363000	0.2300	0.0026			
3	41366.00	-11.57	1	593000	0.2500	0.0248	6.20	6.16	0.04
			2	667000	0.3000	0.0133			
			3	4363000	0.2300	0.0030			
4	41366.00	-3.86	1	593000	0.2500	0.0247	6.20	6.16	0.04
			2	667000	0.3000	0.0136			
			3	4363000	0.2300	0.0031			
5	41366.00	3.86	1	593000	0.2500	0.0247	6.20	6.16	0.04
			2	667000	0.3000	0.0136			
			3	4363000	0.2300	0.0032			
6	41366.00	11.57	1	593000	0.2500	0.0248	6.20	6.16	0.04
			2	667000	0.3000	0.0133			
			3	4363000	0.2300	0.0030			
7	41366.00	19.29	1	593000	0.2500	0.0247	6.20	6.16	0.04
			2	667000	0.3000	0.0122			
			3	4363000	0.2300	0.0026			
8	41366.00	27.00	1	593000	0.2500	0.0220	6.20	6.17	0.03
			2	667000	0.3000	0.0091			
			3	4363000	0.2300	0.0021			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	41055.00	6.20	Medium Dense Sand
	2	41225.00	6.20	
	3	41375.00	6.20	
2	1	0.00	-6.80	Medium Dense Sand
3	1	0.00	-16.80	Loose Sand

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 41055.00 [ft]	1	41055.00	7.86	New Embankment
	X2 = 41372.00 [ft]	2	41075.00	8.43	
		3	41100.00	9.24	
		4	41125.00	10.14	
		5	41150.00	11.15	
		6	41175.00	12.16	
		7	41200.00	13.35	
		8	41220.00	14.40	
		9	41250.00	15.95	
		10	41270.00	16.45	
		11	41300.00	17.70	
		12	41335.00	19.52	
		13	41365.00	20.95	
		14	41372.00	21.71	

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DOWNDRAG EVALUATION

Big Carlos Pass Bridge Replacement
Estero Blvd. (CR 865) Over Big Carlos Pass
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

END BENT 15

Soil Settlement
(From FoSSA Embankment Settlement Analysis Output File)

Immediate Settlement:	0.11	ft
Ultimate Settlement:	0.00	ft
Total Soil Settlement:	**0.11**	**ft**
	1.35	**in**

Pile Settlement
(From Pile Group Settlement Calculations)

Pile Settlement: 0.30 in

Elastic Compression of Pile Under Max Service Axial Load

SPT Boring Analyzed:	BB-436	
Max Service Axial Load Per Pile, Q =	332.2	kips
Elastic Modulus, E =	4,000	ksi
Pile Cutoff Elevation =	14.2	ft
Elevation where Ultimate Side Friction resists Service Load (FB Deep) =	-97.6	ft

Dimensions of Pile

Pile Type:	PPSC	
Pile Size:	24-in	
Area, A =	576.0	in^2
Pile Length, L =	1341.6	in

Elastic Compression of Pile, $\Delta_E = (QL)/(EA)$

Δ_E = 0.19 in

Relative Settlement
Relative Settlement = Total Soil Settlement - Pile Settlement - Δ_E

Relative Settlement = 0.852 in

Negative Shaft Resistance (Downdrag) Mobilized? **YES** (Relative Settlement > 0.5 inches)

DOWNDRAG EVALUATION

Big Carlos Pass Bridge Replacement
Estero Blvd. (CR 865) Over Big Carlos Pass
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

END BENT 15

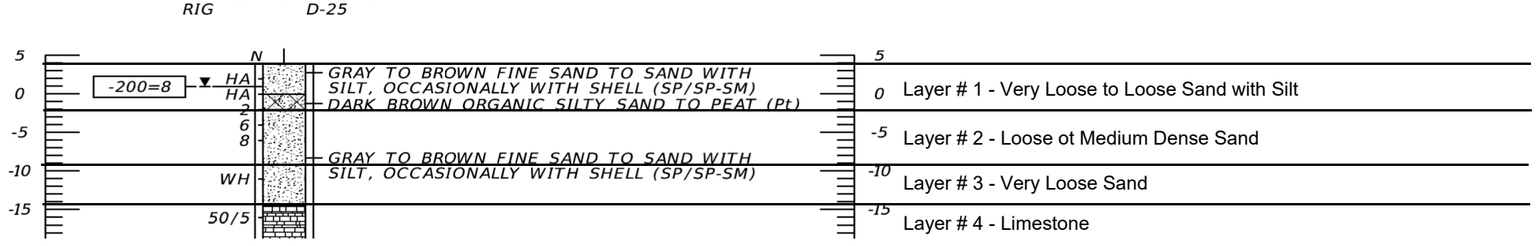
From FoSSA

X	Y	Layer	Young's Modulus, E (psf)	Poisson's Ratio, μ	Layer Immediate Settlement (ft)	Top of Layer Elevation, Z (ft)	Layer Ultimate Settlement, S_c (ft)
436+36	3.86	1	251000	0.25	0.0389	3.90	0.0000
		2	446000	0.25	0.0242	-2.10	0.0000
		3	150000	0.20	0.0487	-9.10	0.0000
		4	20000000	0.23	0.0003	-14.10	0.0000
		5				-19.10	
		6					
		7					

Soil Settlement:

Immediate:	0.1121 ft
Ultimate:	0.0000 ft
Total:	**1.3454 in**
Pile Settlement:	0.3000 in
Relative Settlement prior to Elastic Compression:	**1.0454 in**
Pile Compression:	0.1934 in
Relative Settlement at existing ground surface:	**0.8698 in**

BOR # BB-436*
STA. 436+19
REF. ℄ CONST.
OFF. 48' RT.
ELEV. 3.9
DATE 12/10/2019
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



Interpolate in Layer # 1
Neutral Axis Elevation **-1.0** **ft**

Evaluation of Soil Settlement Relative to Pile in Each Soil Layer:

Layer # 1

Bottom of Layer Elevation:	-2.10 ft
Layer Thickness:	6.00 ft
Length of Pile in Compression within layer:	6.00 ft
Immediate Settlement in Layer:	0.4673 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**0.4129 in**

Layer # 2

Bottom of Layer Elevation:	-9.10 ft
Layer Thickness:	7.00 ft
Length of Pile in Compression within layer:	7.00 ft
Immediate Settlement in Layer:	0.2903 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**0.1347 in**

Layer # 3

Bottom of Layer Elevation:	-14.10 ft
Layer Thickness:	5.00 ft
Length of Pile in Compression within layer:	5.00 ft
Immediate Settlement in Layer:	0.5842 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**-0.4408 in**

Layer # 4

Bottom of Layer Elevation:	-19.10 ft
Layer Thickness:	5.00 ft
Length of Pile in Compression within layer:	5.00 ft
Immediate Settlement in Layer:	0.0037 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**-0.4358 in**

Layer # 5

Bottom of Layer Elevation:	0.00 ft
Layer Thickness:	-19.10 ft
Length of Pile in Compression within layer:	-19.10 ft
Immediate Settlement in Layer:	0.0000 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**-0.4689 in**

Layer # 6

Bottom of Layer Elevation:	0.00 ft
Layer Thickness:	0.00 ft
Length of Pile in Compression within layer:	0.00 ft
Immediate Settlement in Layer:	0.0000 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**-0.4689 in**

Layer # 7

Bottom of Layer Elevation:	#N/A ft
Layer Thickness:	#N/A ft
Length of Pile in Compression within layer:	0.00 ft
Immediate Settlement in Layer:	0.0000 in
Ultimate Settlement in Layer:	0.0000 in
Relative Settlement at Bottom of Layer:	**-0.4689 in**

DOWNDRAG EVALUATION

Big Carlos Pass Bridge Replacement
Estero Blvd. (CR 865) Over Big Carlos Pass
Lee County, Florida
CN-160002
Tierra Project No.: 6511-16-051

Pier/Bent		EB-15
SPT Boring Analyzed		BB-436
Ground Elevation (ft.)		3.9
Cutoff Elevation (ft.)		14.2
Pile type/size	PPSC	24-in
SPT Hammer Type		Automatic
SPT Hammer Efficiency Factor		1.24

24-in PPSC Pile Dimensions	
Pile base/depth/diameter (in.)	24-in
Pile width (in.)	24-in
Flange & Web Thickness (in.)	-
Inside Flange Length (in.)	-
Inside Web Length (in.)	-
Perimeter/Circumference (in.)	96.00

Depth Below Ground Elevation (ft.)	SPT N-Value	FB-Deep Soil Number	Soil Type	Elevation (ft. NAVD)	Corrected SPT N-Value (N_{60})	Layer Thickness (ft.)	Unit Skin Friction (tsf)	Unit Side Shear Resistance (tons)	Total Side Shear Resistance, R_{dd} (tons)	Unit Driving Resistance of Soil (tons)	Total Driving Resistance of Soil (tons)	Downdrag Value (tons)	Notes
0.0	8	6	PRE-DRILL	3.9	9	0.0	0.17	0.0	0.0	0.0	0.0	**0.0**	
2.0	8	6	PRE-DRILL	1.9	9	2.0	0.17	2.7	2.7	0.0	0.0	**2.7**	
4.0	8	6	PRE-DRILL	-0.1	9	2.0	0.17	2.7	5.5	0.0	0.0	**5.5**	
4.9	8	6	PRE-DRILL	-1.0	9	0.9	0.17	1.2	6.7	0.0	0.0	**6.7**	**Downdrag Load = 7 tons**
6.0	8	6	PRE-DRILL	-2.1	9	1.1	0.17	1.5	8.2	0.0	0.0	**8.2**	
8.0	8	6	PRE-DRILL	-4.1	9	2.0	0.17	2.7	10.9	0.0	0.0	**10.9**	
10.0	8	6	PRE-DRILL	-6.1	9	2.0	0.17	2.7	13.7	0.0	0.0	**13.7**	
15.0	8	6	PRE-DRILL	-11.1	9	5.0	0.17	6.8	20.5	0.0	0.0	**20.5**	
20.0	8	6	PRE-DRILL	-16.1	9	5.0	0.17	6.8	27.4	0.0	0.0	**27.4**	
25.0	8	6	PRE-DRILL	-21.1	9	5.0	0.17	6.8	34.2	0.0	0.0	**34.2**	
30.0	8	6	PRE-DRILL	-26.1	9	5.0	0.17	6.8	41.0	0.0	0.0	**41.0**	
35.0	8	6	PRE-DRILL	-31.1	9	5.0	0.17	6.8	47.9	0.0	0.0	**47.9**	Approx. Pile Driving Grade
38.9	8	6	PRE-DRILL	-35.0	9	3.9	0.17	5.3	53.2	0.0	0.0	**53.2**	
40.0	4	3	SAND	-36.1	4	1.1	0.08	0.7	53.9	0.7	0.7	**54.6**	
45.0	10	3	SAND	-41.1	12	5.0	0.23	9.1	63.0	9.1	9.8	**72.8**	
50.0	4	3	SAND	-46.1	4	5.0	0.08	3.0	66.0	3.0	12.8	**78.9**	
55.0	5	3	SAND	-51.1	6	5.0	0.11	4.6	70.6	4.6	17.4	**88.0**	
60.0	7	3	SAND	-56.1	8	5.0	0.15	6.1	76.7	6.1	23.5	**100.2**	
65.0	5	2	CLAY-SILT-SAND	-61.1	6	5.0	0.27	10.9	87.6	8.2	31.6	**119.2**	
70.0	7	2	CLAY-SILT-SAND	-66.1	8	5.0	0.36	14.2	101.8	10.7	42.3	**144.1**	
75.0	11	2	CLAY-SILT-SAND	-71.1	13	5.0	0.55	22.0	123.8	16.5	58.8	**182.7**	
80.0	4	2	CLAY-SILT-SAND	-76.1	4	5.0	0.19	7.4	131.2	5.6	64.4	**195.6**	
85.0	8	2	CLAY-SILT-SAND	-81.1	9	5.0	0.40	15.9	147.1	11.9	76.3	**223.4**	
90.0	7	2	CLAY-SILT-SAND	-86.1	8	5.0	0.36	14.2	161.3	10.7	87.0	**248.3**	
95.0	6	2	CLAY-SILT-SAND	-91.1	7	5.0	0.31	12.6	173.9	9.4	96.4	**270.3**	
100.0	5	2	CLAY-SILT-SAND	-96.1	6	5.0	0.27	10.9	184.8	8.2	104.6	**289.4**	
105.0	5	2	CLAY-SILT-SAND	-101.1	6	5.0	0.27	10.9	195.7	8.2	112.7	**308.4**	
110.0	5	2	CLAY-SILT-SAND	-106.1	6	5.0	0.27	10.9	206.6	8.2	120.9	**327.5**	
115.0	7	2	CLAY-SILT-SAND	-111.1	8	5.0	0.36	14.2	220.8	10.7	131.6	**352.4**	
120.0	6	2	CLAY-SILT-SAND	-116.1	7	5.0	0.31	12.6	233.4	9.4	141.0	**374.5**	
125.0	5	2	CLAY-SILT-SAND	-121.1	6	5.0	0.27	10.9	244.3	8.2	149.2	**393.5**	
130.0	4	2	CLAY-SILT-SAND	-126.1	4	5.0	0.19	7.4	251.7	5.6	154.7	**406.5**	
135.0	3	2	CLAY-SILT-SAND	-131.1	3	5.0	0.14	5.6	257.3	4.2	158.9	**416.3**	
140.0	4	2	CLAY-SILT-SAND	-136.1	4	5.0	0.19	7.4	264.7	5.6	164.5	**429.2**	
145.0	4	2	CLAY-SILT-SAND	-141.1	4	5.0	0.19	7.4	272.1	5.6	170.0	**442.2**	
150.0	5	2	CLAY-SILT-SAND	-146.1	6	5.0	0.27	10.9	283.0	8.2	178.2	**461.2**	
155.0	8	3	SAND	-151.1	9	5.0	0.17	6.8	289.9	6.8	185.1	**474.9**	
160.0	20	3	SAND	-156.1	24	5.0	0.46	18.2	308.1	18.2	203.3	**511.4**	
165.0	50	3	SAND	-161.1	62	5.0	0.00	0.0	308.1	0.0	203.3	**511.4**	
170.0	60	3	SAND	-166.1	74	5.0	0.00	0.0	308.1	0.0	203.3	**511.4**	
175.0	45	3	SAND	-171.1	55	5.0	1.05	41.8	349.9	41.8	245.1	**595.0**	
180.0	68	3	SAND	-176.1	84	5.0	0.00	0.0	349.9	0.0	245.1	**595.0**	
185.0	54	2	CLAY-SILT-SAND	-181.1	66	5.0	0.00	0.0	349.9	0.0	245.1	**595.0**	
190.0	34	2	CLAY-SILT-SAND	-186.1	42	5.0	1.25	49.9	399.7	37.4	282.5	**682.2**	

CR 865 over Big Carlos Pass

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PROJECT IDENTIFICATION

Title:	CR 865 over Big Carlos Pass
Project Number:	6511-16-051 -
Client:	KCA
Designer:	Tierra, Inc. - DAB
Station Number:	436+26 to 440+96

Description:

Settlement Analysis for downdrag evaluation at End Bent 15 using boring BB-436.

Company's information:

Name:	Tierra, Inc.
Street:	591 Susan B. Britt Court Winter Garden, FL 34787
Telephone #:	(407) 877-1354
Fax #:	(407) 654-7347
E-Mail:	dbarber@tierraeng.com

Original file path and name: J:\6511\20 ..... Carlos Pass\FoSSA\Downdrag\FoSSA_EB-15_BB-436.2ST
Original date and time of creating this file: Thu May 20 15:27:37 2021

GEOMETRY: Analysis of a 3D-Approximate geometry

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INPUT DATA – FOUNDATION LAYERS – 4 layers

	Wet Unit Weight, γ [lb/ft³]	Poisson's Ratio μ	Description of Soil
1	105.00	0.25	Loose Sand
2	110.00	0.25	Medium Dense Sand
3	100.00	0.20	Very loose Sand
4	135.00	0.23	Limestone

INPUT DATA – EMBANKMENT LAYERS – 1 layers

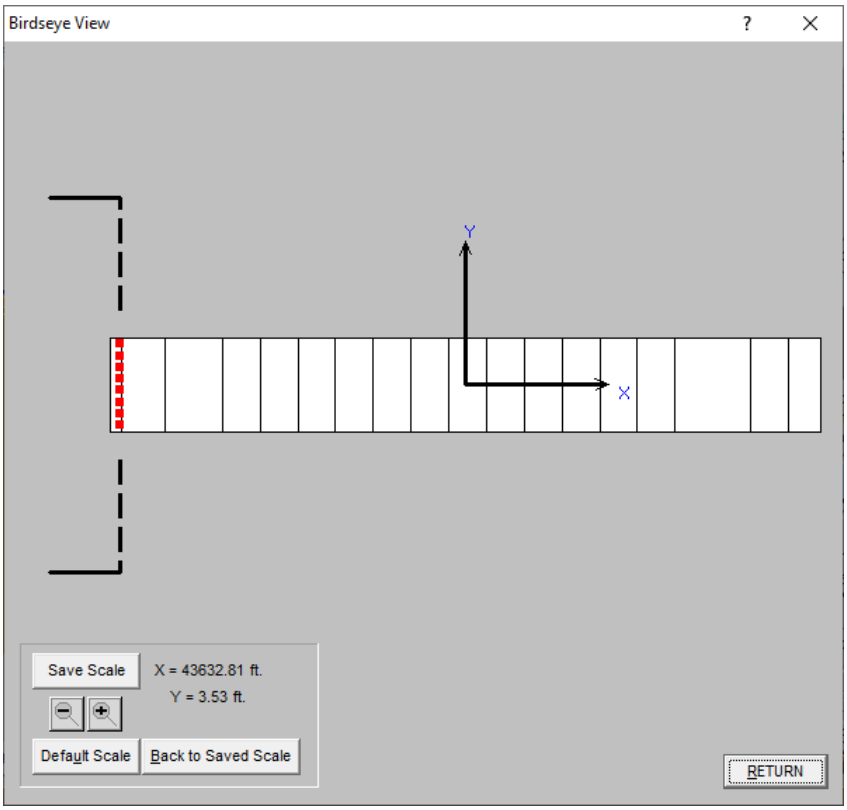
	Wet Unit Weight, γ [lb/ft³]	Description of Soil
1	110.00	New Embankment

INPUT DATA OF WATER

Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]
1	41050.00	2.00
2	41375.00	2.00

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DRAWING OF SPECIFIED GEOMETRY





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IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer (k)	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Settlement of each layer, Si(k) [ft.]	Initial Z [ft.]	Final Z * [ft.]	Total Settlement Sum of Si(k), [ft.]
1	43632.00	-27.00	1	251000	0.2500	0.0388	3.90	3.81	0.09
			2	446000	0.2500	0.0189			
			3	150000	0.2000	0.0325			
			4	20000000	0.2300	0.0002			
2	43632.00	-19.29	1	251000	0.2500	0.0395	3.90	3.79	0.11
			2	446000	0.2500	0.0237			
			3	150000	0.2000	0.0439			
			4	20000000	0.2300	0.0003			
3	43632.00	-11.57	1	251000	0.2500	0.0391	3.90	3.79	0.11
			2	446000	0.2500	0.0242			
			3	150000	0.2000	0.0477			
			4	20000000	0.2300	0.0003			
4	43632.00	-3.86	1	251000	0.2500	0.0389	3.90	3.79	0.11
			2	446000	0.2500	0.0242			
			3	150000	0.2000	0.0487			
			4	20000000	0.2300	0.0003			
5	43632.00	3.86	1	251000	0.2500	0.0389	3.90	3.79	0.11
			2	446000	0.2500	0.0242			
			3	150000	0.2000	0.0487			
			4	20000000	0.2300	0.0003			
6	43632.00	11.57	1	251000	0.2500	0.0391	3.90	3.79	0.11
			2	446000	0.2500	0.0242			
			3	150000	0.2000	0.0478			
			4	20000000	0.2300	0.0003			
7	43632.00	19.29	1	251000	0.2500	0.0395	3.90	3.79	0.11
			2	446000	0.2500	0.0238			
			3	150000	0.2000	0.0443			
			4	20000000	0.2300	0.0003			
8	43632.00	27.00	1	251000	0.2500	0.0389	3.90	3.81	0.09
			2	446000	0.2500	0.0192			
			3	150000	0.2000	0.0333			
			4	20000000	0.2300	0.0002			

*Note: Final Z is calculated assuming only 'Immediate Settlement' exists.

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TABULATED GEOMETRY: INPUT OF FOUNDATION SOILS

Found. Soil #	Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	1	43626.00	3.90	Loose Sand
	2	43861.00	3.90	
	3	44096.00	3.90	
2	1	0.00	-2.10	Medium Dense Sand
3	1	0.00	-9.10	Very loose Sand
4	1	0.00	-14.10	Limestone

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TABULATED GEOMETRY: INPUT OF EMBANKMENT SOILS

Embank. Soil #		Point #	Coordinates (X, Z) : (X) [ft.]	(Z) [ft.]	DESCRIPTION
1	X1 = 43626.00 [ft]	1	43626.00	24.66	New Embankment
	X2 = 44096.00 [ft]	2	43633.00	24.31	
		3	43662.00	22.88	
		4	43700.00	20.96	
		5	43725.00	19.71	
		6	43750.00	18.46	
		7	43775.00	17.21	
		8	43800.00	15.96	
		9	43825.00	14.71	
		10	43850.00	13.47	
		11	43875.00	12.31	
		12	43900.00	11.26	
		13	43925.00	10.25	
		14	43950.00	9.35	
		15	43975.00	8.65	
		16	44000.00	8.14	
		17	44050.00	7.53	
		18	44075.00	7.13	
		19	44096.00	6.86	

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Pile Analysis

Pier/Bent	EB-15
SPT Boring Analyzed	BB-436
Ground Elevation (ft.)	3.9
Groundwater Elevation (ft.)	2.0
Cutoff Elevation (ft.)	14.2
SPT Hammer Type	Automatic
SPT Hammer Efficiency Factor	1.24

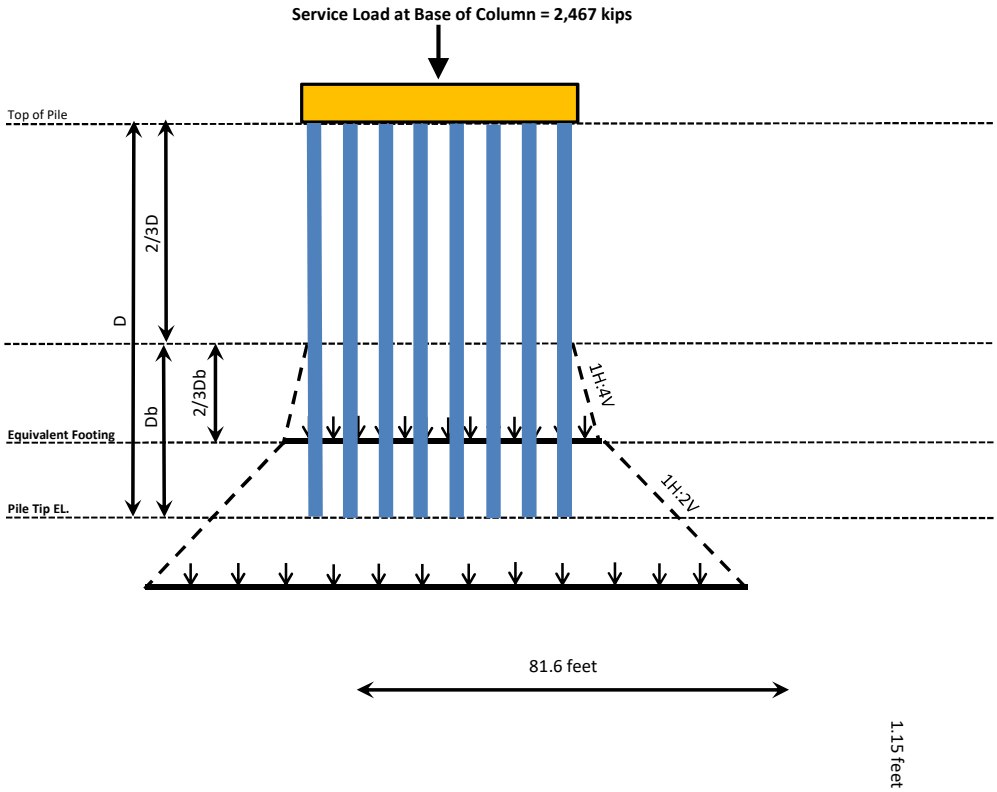
Depth Below Ground Elevation (ft.)	Soil Type	SPT N-Value	Elevation (ft. NAVD)	Corrected SPT N-Value (N_{60})	Unit Weight (pcf)	Effective Unit Weight (pcf)	Effective Stress Friction Angle (Φ)	Depth to Mid-Point of Soil Layer Analyzed (ft.)	Effective Vertical Stress at Mid-Point of Layer σ'_v (ksf)
0.0	SAND	4	3.9	4	100	100	29	0	0.000
2.0	SAND	4	1.9	4	100	37.6	29	1.0	0.038
4.0	SAND	12	-0.1	14	110	47.6	30	3.0	0.123
6.0	SAND	2	-2.1	2	100	37.6	28	5.0	0.208
8.0	SAND	6	-4.1	7	105	42.6	29	7.0	0.288
10.0	SAND	8	-6.1	9	105	42.6	29	9.0	0.373
15.0	SAND	1	-11.1	1	100	37.6	28	12.5	0.510
20.0	LIMESTONE	100	-16.1	100	135	72.6	0	17.5	0.786
25.0	SAND	3	-21.1	3	100	37.6	28	22.5	1.061
30.0	SAND	2	-26.1	2	100	37.6	28	27.5	1.249
35.0	SAND	3	-31.1	3	100	37.6	28	32.5	1.437
40.0	SAND	4	-36.1	4	100	37.6	29	37.5	1.625
45.0	SAND	10	-41.1	12	105	42.6	30	42.5	1.826
50.0	SAND	4	-46.1	4	100	37.6	29	47.5	2.026
55.0	SAND	5	-51.1	6	105	42.6	29	52.5	2.227
60.0	SAND	7	-56.1	8	105	42.6	29	57.5	2.440
65.0	CLAY	5	-61.1	6	115	52.6	0	62.5	2.678
70.0	CLAY	7	-66.1	8	115	52.6	0	67.5	2.941
75.0	CLAY	11	-71.1	13	120	57.6	0	72.5	3.216
80.0	SAND	4	-76.1	4	100	37.6	29	77.5	3.454
85.0	SAND	8	-81.1	9	105	42.6	29	82.5	3.655
90.0	SAND	7	-86.1	8	105	42.6	29	87.5	3.868
95.0	SAND	6	-91.1	7	105	42.6	29	92.5	4.081
100.0	SAND	5	-96.1	6	105	42.6	29	97.5	4.294
105.0	CLAY	5	-101.1	6	115	52.6	0	102.5	4.532
110.0	CLAY	5	-106.1	6	115	52.6	0	107.5	4.795
115.0	CLAY	7	-111.1	8	115	52.6	0	112.5	5.058
120.0	CLAY	6	-116.1	7	115	52.6	0	117.5	5.321
125.0	CLAY	5	-121.1	6	115	52.6	0	122.5	5.584
130.0	CLAY	4	-126.1	4	110	47.6	0	127.5	5.834
135.0	CLAY	3	-131.1	3	110	47.6	0	132.5	6.072
140.0	CLAY	4	-136.1	4	110	47.6	0	137.5	6.310
145.0	CLAY	4	-141.1	4	110	47.6	0	142.5	6.548
150.0	SAND	5	-146.1	6	105	42.6	29	147.5	6.774
155.0	SAND	8	-151.1	9	105	42.6	29	152.5	6.987
160.0	SAND	20	-156.1	24	110	47.6	31	157.5	7.212
165.0	SAND	50	-161.1	62	125	62.6	36	162.5	7.488
170.0	SAND	60	-166.1	74	125	62.6	37	167.5	7.801
175.0	SAND	45	-171.1	55	125	62.6	35	172.5	8.114
180.0	SAND	68	-176.1	84	125	62.6	38	177.5	8.427
185.0	CLAY	54	-181.1	66	125	62.6	0	182.5	8.740
190.0	CLAY	34	-186.1	42	125	62.6	0	187.5	9.053

Pile Settlement Analysis

SPT Boring Analyzed	**BB-436**
Service Load (kips)	**2,467**
Ground EL. (ft.)	**3.9**
Estimated Cutoff EL. (ft.)	**14.2**
Estimated Pile Tip EL. (ft.)	**-160.0**

The following is an evaluation of the stress distribution of the pile group utilizing the estimated tip elevation. The geotechnical parameters were estimated based on SPT Boring: BB-34. AASHTO Figure 10.7.2.3.1-1 Example C (See Attachment) was used to determine equivalent square footings and stress distributions. The following illustration is not to scale.

Compute the stresses distribution



Equivalent Footing EL. =	***-140.64***	***Dimensions***	
Plan Width (B) =	***2.00***	***D =***	***174.2***
Plan Length (L) =	***56.00***	***2/3D =***	***116.1***
Width of Eq. Footing (B_1) =	***21.36***	***Db =***	***58.1***
Length of Eq. Footing (L_1) =	***75.36***	***2/3Db =***	***38.7***

Pressure Distribution Table						
Elevation (ft., NAVD88)	Width (ft.)	Length (ft.)	Area ($ft.^2$)	Applied Pressure ΔP (ksf)	Overburden Pressure P'_o (ksf)	$\Delta P/P'_o$ (%)
-136.1	21.36	75.36	1609.3	1.53	6.31	24.3%
-141.1	26.36	80.36	2117.8	1.16	6.55	17.8%
-146.1	31.36	85.36	2676.4	0.92	6.77	13.6%
-151.1	36.36	90.36	3284.9	0.75	6.99	10.7%
-156.1	41.36	95.36	3943.5	0.63	7.21	8.7%
-161.1	46.36	100.36	4652.0	0.53	7.49	7.1%
-166.1	51.36	105.36	5410.6	0.46	7.80	5.8%
-171.1	56.36	110.36	6219.1	0.40	8.11	4.9%
-176.1	61.36	115.36	7077.7	0.35	8.43	4.1%
-181.1	66.36	120.36	7986.3	0.31	8.74	3.5%
-186.1	71.36	125.36	8944.8	0.28	9.05	3.0%
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Settlement Computations

Compute settlement of Layer 1 (Firm Silt)

Top of Layer EL. = ***-140.6***
Bottom of Layer EL. = ***-144.6***
Height of Layer = ***4.0***
Midpoint Layer EL. = ***-142.622***
P'_o *at Midpoint* = ***6.617***
ΔP *at Midpoint* = ***1.09***

$$C_N = \left[0.77 log\left(\frac{40}{P'_o}\right)\right] = \textbf{0.6}$$

SPT Navg. = ***4***
$N' = C_N N_{60}$ = ***2***
Bearing Capacity Index (C') = ***20*** **(ASSHTO Figure 10.6.2.4.2-1)**

$$S = H\frac{1}{C'} log\left(\frac{P'_o + \Delta P}{P'_o}\right) = \textbf{0.16 inch}$$

Compute settlement of Layer 2 (Silty Sand)

Top of Layer EL. = ***-144.6***
Bottom of Layer EL. = ***-152.9***
Height of Layer = ***8.3***
Midpoint Layer EL. = ***-148.750***
P'_o *at Midpoint* = ***6.886***
ΔP *at Midpoint* = ***0.83***

$$C_N = \left[0.77 log\left(\frac{40}{P'_o}\right)\right] = \textbf{0.6}$$

SPT Navg. = ***8***
$N' = C_N N_{60}$ = ***4***
Bearing Capacity Index (C') = ***34*** **(ASSHTO Figure 10.6.2.4.2-1)**

$$S = H\frac{1}{C'} log\left(\frac{P'_o + \Delta P}{P'_o}\right) = \textbf{0.14 inch}$$

TOTAL SETTLEMENT = ***0.30 inch***

Example Unit Skin Friction Calculation

PPSC Pile in Sand: N_{60}=9

From FB-Deep: Unit Skin friction = 0.019 x N_{60} tsf = 0.019 x 9 = 0.171tsf

24-in PPSC circumference = 24in x 4 = 96in; Area = 8ft^2/ft

Neutral Axis 4.9ft below existing ground elevation:

Ultimate Side Friction = 0.171tsf x 8ft^2/ft x 4.9ft = **6.7032 tons**

APPENDIX E

FHWA Checklist

GTR REVIEW CHECKLIST (SITE INVESTIGATION)

A. Site Investigation Information

Since the most important step in the geotechnical design process is the conduct of an adequate site investigation, presentation of the subsurface information in the geotechnical report and on the plans deserves careful attention.

Geotechnical Report Text (Introduction) (Pages 322-325)	YES	NO	UNKNOWN OR N/A
1. Is the general location of the investigation described and/or a vicinity map included?	☒	☐	☐
2. Is scope and purpose of the investigation summarized?	☒	☐	☐
3. Is concise description given of geologic setting and topography of area?	☒	☐	☐
4. Are the field explorations and laboratory tests on which the report is based listed?	☒	☐	☐
5. Is general description of subsurface soil, rock, and groundwater conditions given?	☒	☐	☐
*6. Is the following information included with the geotechnical report (typically included in report appendices): a. Test hole logs? (Pages 25-33) b. Field test data? c. Laboratory test data? (Pages 74 - 75) d. Photographs (if pertinent)?	☒	☐	☐
Plan and Subsurface Profile (Pages 24, 47-49, 335)			
*7. Is a plan and subsurface profile of the investigation site provided?	☒	☐	☐
8. Are the field explorations located on the plan view?	☒	☐	☐
*9. Does the conducted site investigation meet minimum criteria outlined in Table 2?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SITE INVESTIGATION)			
Plan and Subsurface Profile (Pages 24, 47-49, 335) Continued	YES	NO	UNKNOWN OR N/A
10. Are the explorations plotted and correctly numbered on the profile at their true elevation and location?	☒	☐	☐
11. Does the subsurface profile contain a word description and/or graphic depiction of soil and rock types?	☒	☐	☐
12. Are groundwater levels and date measured shown on the subsurface profile?	☒	☐	☐
Subsurface Profile or Field Boring Log (Pages 16-17, 25-29)			
13. Are sample types and depths noted?	☒	☐	☐
*14 Are SPT blow counts, percent core recovery, and RQD values shown?	☒	☐	☐
15. If cone penetration tests were made, are plots of cone resistance and friction ratio shown with depth?	☐	☐	☒
Laboratory Test Data (Pages 60, 74-75)			
*16 Were lab soil classification tests such as natural moisture content, gradation, Atterberg limits, performed on selected representative samples to verify field visual soil identifications?	☒	☐	☐
17. Are laboratory test results such as shear strength (Page 62), consolidation (Page 68), etc., included and/or summarized?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)			
B. Centerline Cuts and Embankments (Pages 6-9) In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?			
Are station to station descriptions included for:	YES	NO	UNKNOWN OR N/A
1. Existing surface and subsurface drainage?	☐	☐	☒
2. Evidence of springs and excessively wet areas?	☐	☐	☒
3. Slides, slumps, and faults noted along the alignment?	☐	☐	☒
Are station to station recommendations included for:			
General Soil Cut or Fill			
4. Specific surface/subsurface drainage recommendations?	☐	☐	☒
5. Excavation limits of unsuitable materials?	☐	☐	☒
*6. Erosion protection measures for backslopes, side slopes, and ditches, including riprap recommendations or special slope treatments?	☐	☐	☒
Soil Cuts (Pages 101-102)			
*7. Recommended cut slope design?	☐	☐	☒
8. Are clay cut slopes designed for minimum F.S. = 1.50?	☐	☐	☒
9. Special usage of excavated soils?	☐	☐	☒
10. Estimated shrink-swell factors for excavated materials?	☐	☐	☒
11. If answer to 3 is YES, are recommendations provided for design treatments?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)			
Fills (Pages 77-79)	YES	NO	UNKNOWN OR N/A
11. Recommended fill slope design?	☐	☐	☒
12. Will fill slope design provide minimum F.S. = 1.25?	☐	☐	☒
Rock Slopes			
*13 Are recommended slope designs and blasting specifications provided?	☐	☐	☒
*14 Is the need for special rock slope stabilization measures, e.g., rockfall catch ditch, wire mesh slope protection, shotcrete, rock bolts, addressed?	☐	☐	☒
15. Has the use of "template" designs been avoided (such as designing all rock slopes on 1/4 to 1 rather than designing based on orientation of major rock jointing)?	☐	☐	☒
*16 Have effects of blast induced vibrations on adjacent structures been evaluated?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)

C. Embankments over Soft Ground

Where embankments must be built over soft ground (such as soft clays, organic silts, or peat), stability and settlement of the fill should be carefully evaluated. In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?

Embankment Stability (Pages 77-79, 95-97)	YES	NO	UNKNOWN OR N/A
*1 Has the stability of the embankment been evaluated for minimum safety factors of 1.25 for side slope stability and 1.30 for end slope stability of bridge approach embankments?	☐	☐	☒
*2. Has the shear strength of the foundation soil been determined from lab testing and/or field vane shear or static cone penetrometer tests?	☐	☐	☒
*3. If the proposed embankment does not provide minimum factors of safety given above, are recommendations given for feasible treatment alternates which will increase factor of safety to minimum acceptable (such as change alignment, lower grade, use stabilizing counterberms, excavate and replace weak subsoil, fill stage construction, lightweight fill, geotextile fabric reinforcement, etc.)?	☐	☐	☒
*4. Are cost comparisons of treatment alternates given and a specific alternate recommended?	☐	☐	☒
Settlement of Subsoil (Pages 146-160)			
5. Have consolidation properties of fine grained soils been determined from laboratory consolidation tests?	☐	☐	☒
*6. Have settlement amount and settlement time been estimated?	☐	☐	☒
7. For bridge approach embankments, are recommendations made to get the settlement out before the bridge abutment is constructed (waiting period, surcharge, or wick drains)?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)			
Settlement of Subsoil (Pages 146-160)	YES	NO	UNKNOWN OR N/A
8. If geotechnical instrumentation is proposed to monitor fill stability and settlement, are detailed recommendations provided on the number, type, and specific locations of the proposed instruments?	☐	☐	☒
9. Construction Considerations (Pages 183, 331-334)			
a. If excavation and replacement of unsuitable shallow surface deposits (peat, muck, top soil) is recommended - are vertical and lateral limits of recommended excavation provided?	☐	☐	☒
b. Where a surcharge treatment is recommended, are plan and cross-section of surcharge treatment provided in geotechnical report for benefit of the roadway designer?	☐	☐	☒
c. Are instructions or specifications provided concerning instrumentation, fill placement rates and estimated delay times for the contractor?	☐	☐	☒
d. Are recommendations provided for disposal of surcharge material after the settlement period is complete?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)			
D. Landslide Corrections (Pages 77-80, 103-105) In addition to the basic information listed in Section A, is the following information provided in the landslide study geotechnical report? (Refer to Table 4 for guidance on the necessary technical support data for correction of slope instabilities.)			
	YES	NO	UNKNOWN OR N/A
*1. Is a site plan and scaled cross-section provided showing ground surface conditions both before and after failure?	☐	☐	☒
*2. Is the past history of the slide area summarized - including movement history, summary of maintenance work and costs, and previous corrective measures taken (if any?)	☐	☐	☒
*3. Is a summary given of results of site investigation, field and lab testing, and stability analysis, including cause(s) of the slide?	☐	☐	☒
Plan 4. Are detailed slide features - including location of ground surface cracks, head scarp, and toe bulge - shown on the site plan?	☐	☐	☒
Cross Section *5. Are the cross sections used for stability analysis included with the soil profile, water table, soil unit weights, soil shear strengths, and failure plane shown as it exists?	☐	☐	☒
*6. Is slide failure plane location determined from slope indicators?	☐	☐	☒
*7. For an active slide, was soil strength along the slide failure plane backfigured using a safety factor equal to 1.0 at the time of failure?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)			
Landslide Corrections (Continued) Text	YES	NO	UNKNOWN OR N/A
*8. Is the following information presented for each proposed correction alternate: (typical correction methods include buttress, shear key, rebuild slope, surface drainage, subsurface drainage-interceptor, drain trenches or horizontal drains and retaining structures)? a. Cross-section of proposed alternate? b. Estimated safety factor? c. Estimated cost? d. Advantages and disadvantages?	☐	☐	☒
9. Is a recommended correction alternate(s) given which provide a minimum F.S. = 1.25?	☐	☐	☒
10. If horizontal drains are proposed as part of slide correction, has subsurface investigation located definite water bearing strata that can be tapped with horizontal drains?	☐	☐	☒
11. If a toe counterberm is proposed to stabilize an active slide, has field investigation confirmed that the toe of the existing slide does not extend beyond the toe of the proposed counterberm?	☐	☐	☒
12. Construction Considerations:			
a. Where proposed correction will require excavation into the toe of an active slide (such as for buttress or shear key), has the "during construction backslope F.S." with open excavation been determined?	☐	☐	☒
b. If open excavation F.S. is near 1.0, has excavation stage construction been proposed?	☐	☐	☒
c. Has seasonal fluctuation of groundwater table been considered?	☐	☐	☒
d. Are special construction features, techniques and materials described and specified?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (RETAINING WALLS)			
E. Retaining Walls (See Section 5 of "Geotechnical Engineering Notebook") In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?			
	YES	NO	UNKNOWN OR N/A
*1. Does the geotechnical report include recommended soil strength parameters and groundwater elevation for use in computing wall design lateral earth pressures and factor of safety for overturning, sliding, and external slope stability?	☒	☐	☐
2. Is it proposed to bid alternate wall designs?	☐	☐	☒
*3. Are acceptable reasons given for the choice and/or exclusion of certain wall types (gravity, reinforced soil, tieback, cantilever, etc.)?	☐	☐	☒
*4. Is an analysis of the wall stability included with minimum acceptable factors of safety against overturning (F.S. = 2.0), sliding (F.S. = 1.5), and external slope stability (F.S. = 1.5)?	☒	☐	☐
5. If wall will be placed on compressible foundation soils, is estimated total settlement, differential settlement, and time rate of settlement given?	☒	☐	☐
6. Will wall types selected for compressible foundation soils allow differential movement without distress?	☒	☐	☐
7. Are wall drainage details including materials and compaction provided?	☐	☐	☒
8. Construction Considerations			
a. Are excavation requirements covered - safe slopes for open excavations, need for sheeting or shoring?	☒	☐	☐
b. Fluctuation of groundwater table?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SPREAD FOOTINGS)

F. Structure Foundations - Spread Footings
(Pages 191-205)

In addition to the basic information listed in Section A, is the following information provided in the project foundation report?

	YES	NO	UNKNOWN OR N/A
*1. Are spread footings recommended for foundation support? If not, are reasons for not using them discussed?	☐	☐	☒
If spread footing supports are recommended, are conclusions/recommendations given for the following:			
*2. Is recommended bottom of footing elevation and reason for recommendation (e.g., based on frost depth, estimated scour depth, or depth to competent bearing material) given?	☐	☐	☒
*3. Is recommended allowable soil or rock bearing pressure given?	☐	☐	☒
*4. Is estimated footing settlement and time given?	☐	☐	☒
5. Where spread footings are recommended to support abutments placed in the bridge end fills, are special gradation and compaction requirements provided for select end fill and backwall drainage material? (Pages 137-141)	☐	☐	☒
6. Construction Considerations:			
a. Have the materials been adequately described on which the footing is to be placed so the project inspector can verify that material is as expected?	☐	☐	☒
b. Have excavation requirements been included for safe slopes in open excavations, need for sheeting or shoring, etc?	☐	☐	☒
c. Has fluctuation of the groundwater table been addressed?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)

G. Structure Foundations - Piles
(Pages 224-311)

In addition to the basic information listed in Section A, if pile support is recommended or given as an alternate, conclusions/recommendations should be provided in the project geotechnical report for the following:

	YES	NO	UNKNOWN OR N/A
*1. Is the recommended pile type given (displacement, nondisplacement, pipe pile, concrete pile, H-pile, etc.) with valid reasons given for choice and/or exclusions? (Pages 224-226)	☒	☐	☐
2. Do you consider the recommended pile type(s) to be the most suitable and economical?	☒	☐	☐
*3. Are estimated pile lengths and estimated tip elevations given for the recommended allowable pile design loads?	☒	☐	☐
4. Do you consider the recommended design loads to be reasonable?	☒	☐	☐
5. Has pile group settlement been estimated (only of practical significance for friction pile groups ending in cohesive soil)? (Pages 245-247)	☐	☐	☒
6. If a specified or minimum pile tip elevation is recommended, is a clear reason given for the required tip elevation, such as underlying soft layers, scour, downdrag, piles uneconomically long, etc.?	☒	☐	☐
*7. Has design analysis (wave equation analysis) verified that the recommended pile section can be driven to the estimated or specified tip elevation without damage (especially applicable where dense gravel-cobble-boulder layers or other obstructions have to be penetrated?	☐	☐	☒
8. Where scour piles are required, have pile design and driving criteria been established based on mobilizing the full pile design capacity below the scour zone?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)			
G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
9. Where lateral load capacity of large diameter piles is an important design consideration, are P-Y curves (load vs. deflection) or soil parameters given in the geotechnical report to allow the structural engineer to evaluate lateral load capacity of all piles?	☒	☐	☐
*10. For pile supported bridge abutments over soft ground:			
a. Has the abutment pile downdrag load been estimated and solutions such as bitumen coating considered in design? Not generally required if surcharging of the fill is being performed (Pages 248-251)	☒	☐	☐
b. Is bridge approach slab recommended to moderate differentials settlement between bridge ends and fill?	☒	☐	☐
c. If the majority of subsoil settlement will not be removed prior to abutment construction (by surcharging), has estimate been made of the amount of abutment rotation that can occur due to lateral squeeze of soft subsoil? (Pages 114-115)	☐	☐	☒
d. Does the geotechnical report specifically alert the structural designer to the estimated horizontal abutment movement?	☐	☐	☒
11. If bridge project is large, has pile load test program been recommended? (Pages 299-302)	☒	☐	☐
12. For a major structure in high seismic risk area, has assessment been made of liquefaction potential of foundation soil during design earthquake (note: only loose saturated sands and silts are "susceptible" to liquefaction)?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)			
G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
13. Construction Considerations: (Pages 279-311)			
Have the following important construction considerations been adequately addressed?	☒	☐	☐
a. Pile driving details such as: boulders or obstructions which may be encountered during driving - need for preaugering, jetting, spudding, need for pile tip reinforcement, driving shoes, etc.?	☒	☐	☐
b. Excavation requirements - safe slope for open excavations, need for sheeting or shoring? Fluctuation of groundwater table?	☒	☐	☐
c. Have effects of pile driving operation on adjacent structures been evaluated - such as protection against damage caused by footing excavations or pile driving vibrations?	☒	☐	☐
d. Is preconstruction condition survey to be made of adjacent structures to prevent unwarranted damage claims?	☒	☐	☐
e. On large pile driving projects, have other methods of pile driving control been considered such as dynamic testing or wave equation analysis?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (DRILLED SHAFTS)

H. Structure Foundations - Drilled Shafts
(Pages 252-260)

In addition to the basic information listed in Section A, if drilled shaft support is recommended or given as an alternate, are conclusions/recommendations provided in the project foundation report for the following:

	YES	NO	UNKNOWN OR N/A
*1. Are recommended shaft diameter(s) and length(s) for allowable design loads based on an analysis using soil parameters for side friction and end bearing?	☐	☐	☒
*2. Settlement estimated for recommended design load?	☐	☐	☒
*3. Where lateral load capacity of shaft is an important design consideration, are P-Y (load vs. deflection) curves or soils data provided in geotechnical report which will allow structural engineer to evaluate lateral load capacity of shaft?	☐	☐	☒
4. Is static load test (to plunging failure) recommended?	☐	☐	☒
5. Construction Considerations:			
a. Have construction methods been evaluated, (i.e., can less expensive dry method or slurry method be used or will casing be required)?	☐	☐	☒
b. If casing will be required, can casing be pulled as shaft is concreted (this can result in significant cost savings on very large diameter shafts)?	☐	☐	☒
c. If artesian water was encountered in explorations, have design provisions been included to handle it (such as by requiring casing and tremie seal)?	☐	☐	☒
d. Will boulders be encountered? (Note: If boulders will be encountered, then the use of shafts should be seriously questioned due to construction installation difficulties and resultant higher costs the boulders can cause.)	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)			
I. Material Sites In addition to the basic information listed in Section A, is the following information provided in the project Material Site Report?			
	YES	NO	UNKNOWN OR N/A
1. Material site location, including description of existing or proposed access routes and bridge load limits (if any)?	☐	☐	☒
*2. Have soil samples representative of all materials encountered during the pit investigation been submitted and tested?	☐	☐	☒
*3. Are laboratory quality test results included in the report?	☐	☐	☒
4. For aggregate sources, do the laboratory quality test results (such as L.A. abrasion, sodium sulfate, degradation, absorption, reactive aggregate, etc.) indicate if specification materials can be obtained from the deposit using normal processing methods?	☐	☐	☒
5. If the lab quality test results indicate that specification material cannot be obtained from the pit materials as they exist naturally - has the source been rejected or are detailed recommendations provided for processing or controlling production so as to ensure a satisfactory product?	☐	☐	☒
*6. For soil borrow sources, have possible difficulties been noted - such as above optimum moisture content clay-silt soils, waste due to high PI, boulders, etc?	☐	☐	☒
*7. Where high moisture content clay-silt soils must be used, are recommendations provided on the need for aeration to allow the materials to dry out sufficiently to meet compaction requirements?	☐	☐	☒
8. Are estimated shrink-swell factors provided?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)			
I. Material Site - Continued	YES	NO	UNKNOWN OR N/A
*9. Do the proven material site quantities satisfy the estimated project quantity needs?	☐	☐	☒
10. Where materials will be excavated from below the water table, has seasonal fluctuation of the water table been determined?	☐	☐	☒
11. Are special permits requirement covered?	☐	☐	☒
12. Have pit reclamation requirements been covered adequately?	☐	☐	☒
13. Has a material site sketch (plan and profile) been provided for inclusion in the plans, which contains:	☐	☐	☒
* Material site number?			
* North arrow and legal subdivision?	☐	☐	☒
* Test hole or test pit logs, locations, number and date?	☐	☐	☒
* Water table elevation and date?	☐	☐	☒
* Depth of unsuitable overburden which will have to be stripped?	☐	☐	☒
* Suggested overburden disposal area?	☐	☐	☒
* Proposed mining area and previously mined areas?	☐	☐	☒
* Existing stockpile locations?	☐	☐	☒
* Existing or suggested access roads?	☐	☐	☒
* Bridge load limits?	☐	☐	☒
* Reclamation details?	☐	☐	☒
14. Are recommended special provisions provided?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.