

Subject: Evaluation of South Tampa Stormwater Project
Tampa, Florida

August 1, 2026

Prepared by: Martin E. Millburg, P.E.
2414 West Watrous Avenue
Tampa, Florida 33629

ENGINEERING REVIEW OF SOUTH HOWARD STORMWATER PROJECT

Executive Summary – This project is designed to relieve flooding in the Parkland Estates and Palma Ceia Pines neighborhoods a few blocks north and south of Swann Avenue, and a few blocks west of Howard Avenue. The City of Tampa (COT) design includes a gravity drain system that extends about 6,300 feet from the AMI Pond to its discharge at Bayshore. The main feature of this system includes a 10 feet square Box Culvert (BC) installed at a depth ranging from about 13 to 20 feet below the ground surface, through the center of Howard Avenue. Howard Avenue is an essential transportation and commercial artery. Construction will effectively shut this artery down for 2 to 3 years. There is strong community opposition to this destruction of Howard Avenue.

The COT has stated its preference for a gravity system. The possibility of using a Horizontal Directional Drill to install a stormwater drain pipe under Howard was discussed with the Design-Build team as early as February 2025 during community meetings. No evidence that the COT has considered this option has been presented.

The planned gravity BC design has significant shortcomings as listed below:

1. Established design procedure by FDOT includes considering community input and providing documentation that comments have been heard and addressed. This has not been done.
2. The cost of this system is estimated by the COT to be at least \$100 million or more. Detailed cost estimate information for the 10' square BC option has not been provided by the COT.
3. In spite of the unprecedented size of this project for the City of Tampa, no independent review of their design has been performed. FDOT Community Engagement procedures include a Technical Advisory Team (TAT) to review all technical work.
4. In return for the destruction of Howard Avenue for 2 to 3 years and spending in excess of \$100 million dollars, the project will reduce flooding from 5.5 to 4.0 feet during a Milton level event. When considering whether to go forward with this project, the benefit of a 1.5 feet reduction in flood levels needs to be considered relative to spending more than \$100 million.
5. The COT design documents appear to misrepresent features of a Parkview pumping station and Horizontal Direction Drill installation when they discuss the disadvantages of that system.
6. FDOT design procedures require a geotechnical study to have been completed by the 30 to 60% design phase. No significant geotechnical study has been completed by the COT.
7. There is available geotechnical data from the Selmon Expressway expansion currently underway. That data shows that conventional measures for shoring the anticipated 20 feet excavation will be

significantly hindered by rock about 20 feet deep. Sheet piles are typically used to support the vertical walls of excavations, but they will not be able to be driven into rock. An unforeseen cost associated with shoring this excavation may develop during construction.

8. Significant dewatering will be required to facilitate the excavations as deep as 20 feet. This degree of dewatering can induce settlement of structures, pavement and sidewalks in areas where dewatering is performed. Howard Avenue has been developed for decades, including former gasoline stations and other possible sources of groundwater contamination. Dewatering poses a risk that some degree of groundwater contamination could be discharged into Tampa Bay.
9. During a major storm event when effective drainage is most needed, the effectiveness of the gravity drainage system will be dramatically reduced. A 6,000 feet long gravity based drainage system depends on significant differential head between along the system. Using the 20.5' flood elevation shown for a Hurricane Milton event, a FEMA defined storm event that raises the tailwater elevation as high as +16' reduces flowrates by about 2/3 as the tailwater elevation rises from +8' to +16'.

More detailed discussion of these issues is presented in subsequent pages of this report.

The purpose of this evaluation is to have a flood relief system with the most effective design, in order to promote public safety and well being.

More detailed discussion of each of the issues in the Executive Summary of this report is presented below:

- 1) Community Input has not Been Considered** – The South Howard Avenue community has been vocal and adamant in their opposition to South Howard Avenue being destroyed over a 2 to 3 year period. Those concerns have not been addressed. One of the FDOT Community Engagement Plans (CEP) Guiding Principles (see attached) is “It should make a record of input to let the public and partners know their comments and concerns have been heard. Documentation shows that a process was used in evaluating comments and addressing them as appropriate.” The concerns of the South Howard community have been ignored and shut out of this process. The COT may assert that they have engaged the community but those community engagements have been one sided and choreographed to exclude meaningful community input. Project input has been attempted for more than one year. During a meeting around February 2025, the Project Manager for the contractor Kimmins was asked about using Horizontal Directional Drilling (HDD) for this project. The response was that the COT preferred a gravity system. Written engineering input was provided to the COT within a few weeks after that meeting, including more detail regarding HDD and geotechnical engineering concerns. In June 2025, a community meeting was held at the Bayshore Garden Center. After an unruly audience member was quieted, the City went on to discuss how they were going to landscape Howard Avenue after they destroyed it. Audience members, including myself, were somewhat stunned at the tone deaf nature of the presentation that treated the destruction of Howard Avenue as a foregone conclusion. The COT was apparently soliciting public input regarding post destruction landscaping and repaving. There was opportunity for input to COT staff was during one-on-one meetings after the presentation was completed, and that was utilized to some degree, to no apparent effect. At no time has the COT demonstrated a record of the public concerns and that their concerns have been appropriately addressed, as required by the FDOT CEP.
- 2) Excessive Cost of This Project** – The COT has not shared current detailed cost estimate information. Our understanding, based on a City Council meeting in late January 2026 is that a current project cost of about \$100 million is projected. The April 2022 JMT report included costs for a pump station, estimated to cost \$21 million, including a 25% contingency (see attached). A preliminary cost estimate for installation of a 3 feet diameter pipe for 2,600 feet from Morrison Avenue to West Palm Drive of \$6,000,000 has been provided. (see attached email from Huxted Trenchless).

The segment of this project along Howard Avenue extends from Station (STA) 12+00 to 55+00 (4,300 linear feet - LF). COT hydraulic gradient maps show the box culvert extending a total of 6,200 LF, including portions not on Howard Avenue. Because the Howard Avenue segment represents the deepest and most extensive excavation of this project, the cost of that segment in all likelihood represents 50% or more of the total project cost. Additional costs associated with the Howard Avenue segment of this project include the installation of a 300 feet long segment of 5 feet diameter storm drain to supplement the capacity for the segment extending from north of the CSX railroad to

south of Watrous Avenue. A significant potential additional cost not currently accounted for by the COT is the cost of shoring up the 13 to 20 feet deep Howard Avenue excavation. This will be addressed in more detail later in this report. Conservatively assuming that Howard Avenue consumes at least 50% of the current \$100 million budget, and that the cost of a Parkview pump station and HDD under Howard Avenue will cost about \$30 million, a minimum \$20 million cost savings will be realized as a result of the HDD option. This reduced cost option does not destroy the Howard Avenue community and will provide reliable drainage, even during major storm events. If the COT were to share their cost estimate, a more accurate estimate of the cost of the Howard Avenue segment could be determined.

- 3) Independent Technical Review** - Another feature of the FDOT CEP is a Technical Advisory Team (TAT) responsible for reviewing all technical work in support of resilience related planning, projects, and other activities including recommendations, prioritization, and review of draft products. The TAT includes technical staff from Central and District program offices for the FDOT model. With the many engineering features of this project that are considered highly questionable by the affected community, a TAT could help support a good design effort, or may expose that other, less expensive and less disruptive approaches are available.
- 4) \$100 Million gets a 1.5' Reduction in Flood Levels** - In return for the destruction of Howard Avenue for 2 to 3 years and spending in excess of \$100 million dollars, the project will reduce flooding from 5.5 to 4.0 feet during a Milton level event. See attached COT diagram.
- 5) COT Misrepresents Design Features of the Parkland Pump Station Option** - On page 20 of the April 2026 Preliminary Engineering Report prepared by AtkinsRealis, the option of a pump station in Parkland Estates is disparaged. The report asserts that a 10 feet diameter force main pipe would be required. That is not accurate, as even a single 3 feet diameter force main will deliver flood relief during the FEMA storm event, compared to the significant flow reduction for the proposed 10 feet square BC. This report also states the discharge pipe from the pump station would have similar construction impacts along South Howard – Not True. The discharge pipe from a pump station can be installed under South Howard or any other ROW way using Horizontal Directional Drill (HDD) techniques. This would reduce the impact to Howard Avenue by 90% or more. They also state a pumping station has permanent noise impacts – not true. The electric pumps that would be used are relatively quiet. They also state a pumping station has a high risk of loss of power – not true. The pumping station would be within a few blocks from HCA Florida, South Tampa Hospital. This hospital has redundant power feeds to maintain reliable power during storm events. A power line could be extended from the Hospital to the Parkland Pump Station. In addition, standby generators can be provided. In the event of the power failing and the standby generators tripping on, a majority of houses in the neighborhood will have their generators on, so the noise from the pump station generators would not be noticed. The residents of that neighborhood have requested relief from flooding for many years, and are not likely to notice or complain if some noise from backup

generators is associated with flood relief to their neighborhood. The report points out that the pump systems would require maintenance. The City already maintains 225 sanitary pump stations and this would add one more pump station to that number.

- 6) No Geotechnical Study Done by COT** – On page 50 of the 4/2026 report, COT asserts they have done a geotechnical study. The City states in the 4/2/26 draft report summarizes their geotechnical explorations as consisting of some hand auger borings to 6 to 7 feet deep to look for buried concrete in Parkland Estates, and jetting down to 14 feet deep at 9 locations to verify the existing of a box culvert at Watrous Avenue. This effort did not include the production of soil boring profiles. To consider these probes as a geotechnical study is not only wholly inaccurate, it puts this project, the COT, the Howard Avenue community and taxpayers at significant risk for substantial cost overruns.

FDOT requires a preliminary geotechnical study in the Project Development and Environmental (PD&E) phase. A full geotechnical study is required for the 30 and 60% submittals. The 4/2026 COT report is equivalent to a 30 to 60% design effort, as the next stage is the final report. Current plans are to install about 5,200 feet of new box culvert within excavations supported using temporary soil retaining walls. FDOT standards require soil borings for every 150 feet of permanent or temporary retaining walls, and that the soil borings extend at least 15 feet below the bottom of the box culvert. The bottom of the box culvert averages about 15 feet deep, so at this stage of this project the COT should have done 35 soil borings averaging 30 feet deep along the proposed box culvert ROW. To date, the COT has effectively done none.

- 7) Existing Geotechnical Data** - There is existing soils data in the area of this project that was performed for the planned Selmon Expressway widening (see attached). These typically show groundwater about 3 feet deep, sands and clays in the upper 20 feet, underlain by weathered limestone. The ramifications to this project could be severe. At Southview, the bottom of the BC is at least 18 feet deep. The excavation will need to be maintained by temporary retaining walls. If rock is present at 20 feet, the retaining walls may not be able to advanced deep enough to support the excavation. Tiebacks, possibly extending 50 feet or more back onto private property along Howard Avenue, may be the only possible cost effective means of supporting the retaining walls. The process of getting permission from these private property owners, many of whom staunchly oppose this project, could take months or more, or may not be able to be obtained. Another option that may be required to support the excavation walls would be installation of a combi-retaining wall. This wall is a combination of a retaining wall with drilled shafts embedded into rock to support the wall. This process would result in significant delays and be relatively costly. There is no evidence that this issue has been addressed, suggesting a low level of design expertise and/or experience. If this issue is present, as suggested by existing soils data, discovery during construction could result in significant delays to the project while alternatives for supporting the excavation are evaluated. Significant additional cost will be incurred by the COT, with no recourse other than to agree to whatever measures may be proposed to get the project moving again.

Available geotechnical data shows about 30 to 50% of the soils to be excavated to will consist of clayey soils. Clayey soils are not well suited for backfilling, so imported sandy soils will be required to backfill the box culvert excavation. This soil will need to be brought back in and backfilled, with about 30 to 50% of the material needing to be purchased select backfill. This issue could have a significant negative impact on project costs, and needs to be thoroughly evaluated in the current design phase.

- 8) Dewatering** - A major negative feature of the planned South Howard excavation is the extensive dewatering effort that will be required. Groundwater will need to be pumped down as much as 20 feet in some areas to provide a dry excavation to work in. When groundwater is pumped down to that degree, the adjacent soil loses its buoyancy. The resulting increase in effective stress within the soil is equal to placing a 10 feet tall fill pile along the excavation. Sensitive structures and utilities can be damaged. At least two former gasoline stations were sited along Howard. Those sites along with other industrial processes over the years may result in polluted groundwater being pumped to Tampa Bay. Another risk posed by dewatering and the shallow limestone is that relatively high volumes of water may enter the excavation from the underlying limestone formation. Limestone can provide a highly productive aquifer. Excavating to a depth at or near the top of the limestone can result in major volumes of water entering the excavation from the limestone, effectively resulting in an excavation nearly impossible to dewater. This risk must be evaluated during this project planning stage.
- 9) Gravity System Failure During a Storm Event** – For the proposed Milton storm event, the hydraulic grade shows the headwater as high as +20.5' with a tailwater elevation of about +8'. This provides about 12.5 feet of driving head. If the FEMA storm elevation of +16' is present at the tailwater, the resulting driving head is reduced to 4.5 feet. Stormwater flow through the gravity system would be reduced by about 2/3 during the time at which it is most needed.

Community Input has not Been Considered

COMMUNITY ENGAGEMENT PLAN FOR FDOT OPP RESILIENCE ACTIVITIES

INTRODUCTION

This Community Engagement Plan (CEP) describes community engagement activities to be conducted for the development of resilience-related plans, projects, and other activities. The purpose of community engagement is to provide early and continuous opportunities for community input into statewide transportation resilience needs, opportunities, and decision-making processes.

GOALS OF THE CEP

The overall goal of this CEP is to use an efficient process that actively involves partners, stakeholders, and members of the public in the development of resilience-related planning, projects, and other activities. This goal is supported by three objectives:

- **Statewide partner engagement** – Strengthen coordination with key statewide partner organizations.
- **Regional and local partner engagement** – Encourage input, feedback, and support from regional and local partners.
- **Public engagement** – Promote multiple and convenient opportunities for interested members of the public to offer input and feedback.

FDOT GUIDING PRINCIPLES FOR COMMUNITY ENGAGEMENT

Community engagement is two-way communication aimed at incorporating the views, concerns, and issues of the community into the decision-making process. FDOT's Public Engagement Resource Guides identifies four guiding principles for community engagement including:

- It should be continuous through all phases of a project, allowing the public to hear and be heard through the project life cycle.
- It should be inclusive of all decisionmakers, those who will be affected and those with an interest in the project.
- It should use the most appropriate technique for each audience. Knowing the community helps determine the most appropriate outreach techniques and establish the measure to evaluate those techniques.
- It should make a record of input to let the public and partners know their comments and concerns have been heard. Documentation shows that a process was used in evaluating comments and addressing them as appropriate.

Excessive Cost of This Project



Project: Parkland Estates
Subject: Construction Cost Est.
Computed By: RAM Date: 3/03/20

Job No. 19-03630-001
Sheet No. 1 of 2
Checked By: MPL Date: 3/04/21

Parkland Estates Stormwater Pumping Station Opinion of Probable Cost					
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ITEM PRICE
1	General Requirements (Management and Coordination, Documentation, Third Party Testing and Inspection Services, Temporary Controls and Barriers, Storage and Staging, and Field Engineering.	1	LS	\$ 386,750.00	\$ 386,750.00
2	Mobilization, includes Insurance, Bond, and Erosion and Sediment Control	1	LS	\$1,260,000.00	\$ 1,260,000.00
3	Electrical Equipment; includes 2-enclosed Circuit breakers (one for each service), automatic transfer switch, Distribution Switchboard, VFDs with Soft Start Bypasses for each pump and miscellaneous Controls Building equipment (HVAC).	1	LS	\$ 800,000.00	\$ 800,000.00
4	20-inch Non-Clog Submersible Pumps with 215 HP Motor including 3-inch S.S. Guide Rail Quick Connect System, Base Elbow, and Pump Controls (HOA, Transducer, Stilling Wells, and Backup Floats and Telemetry)	3	LS	\$ 475,000.00	\$ 1,425,000.00
5	32' x 50' Pump Sump and Valve Vault Substructure Cast in Place Reinforced Concrete including Excavation, Dewatering, Structural Shoring and Sheeting, Vibration Monitoring, Helical Piles, Special Inspections, Testing, Appurtenances, Startup and Commissioning, O&M Manuals, Demonstrations, and Warranties	1	LS	\$3,750,000.00	\$ 3,750,000.00
6	Brick Controls Building Superstructure and Foundation, 30' x 16'	1	LS	\$ 85,000.00	\$ 85,000.00
7	36" Diameter Flanged Ductile Iron Station Piping with Interior Cement Lining and Exterior Epoxy Coating.	90	LF	\$ 850.00	\$ 76,500.00
8	36" Diameter Flanged Ductile Iron Station Fittings with Interior Cement Lining and Exterior Fusion Bonded Epoxy Coating.	9	EA	\$ 1,000.00	\$ 9,000.00
9	42" Diameter Ductile Iron Header Mechanical Joint Piping with Interior Cement Lining and Exterior Fusion Bonded Epoxy Coating	40	LF	\$ 1,500.00	\$ 60,000.00

Parkland Estates_Construction Cost Estimate.xlsx



Project: Parkland Estates
Subject: Construction Cost Est.
Computed By: RAM Date: 3/03/20

Job No. 19-03630-001
Sheet No. 2 of 2
Checked By: MPL Date: 3/04/21

Parkland Estates Stormwater Pumping Station Opinion of Probable Cost					
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ITEM PRICE
10	Station Automatic Combination Air Vents including S.S. Ball Valve and S.S. Piping	3	EA	\$ 6,000.00	\$ 18,000.00
11	36" Check Valve with Fusion Bonded Epoxy Coating	3	EA	\$ 58,750.00	\$ 176,250.00
12	36" 100% Port Plug Valve with Fusion Bonded Epoxy Coating, Worm Gear and Handwheel.	3	EA	\$ 63,850.00	\$ 191,550.00
13	Substructure Single Leaf Angle Frame Hatches, Access Ladders and Removeable Grating, Pipe Supports, and S.S. Hardware	1	LS	\$ 80,000.00	\$ 80,000.00
14	Pump Station Site Work; includes grading, concrete access drive, Stormwater BMP, and Landscaping.	1	LS	\$ 70,000.00	\$ 70,000.00
15	42" Diameter PVC C905 Force Main including pipe fittings (Zinc Coated D.I. with Restrained Followers) excavation, bedding, select backfill, compaction, pavement/Curb and Gutter/Conc.Walk/ Landscaping Restoration, dewatering, Inspection and Testing, and Test Holes	7,000	LF	\$ 900.00	\$ 6,300,000.00
16	3" Combination Air Vent Manhole including excavation, bedding, select backfill, compaction, dewatering, Inspection and Testing	6	EA	\$ 12,000.00	\$ 72,000.00
17	42" Diameter Force Main Discharge including Energy Dissipation, Coastline Restoration, Backflow Prevention	1	EA	\$ 100,000.00	\$ 100,000.00
18	Underground Reinforced Concrete Detention Facility (10,000 Sq.Ft x 4-ft Depth for Storage)	1	LS	\$1,500,000.00	\$ 1,500,000.00
				Subtotal	\$ 16,360,050.00
				Engineering Design and Construction Phase Services @ 2.5%	\$ 409,001.25
				Design Contingency @ 25%	\$ 4,090,012.50
				TOTAL	\$20,859,063.75

Parkland Estates_Construction Cost Estimate.xlsx

From: Dustin Brasher <dbrasher@huxtedtrenchless.com>

Sent: Thursday, April 24, 2025 11:46 AM

To: mmillburg@hotmail.com <mmillburg@hotmail.com>

Cc: Alfred Domingo <adomingo@huxtedtrenchless.com>

Subject: Huxted Trenchless - Potential Horizontal Drill Project - South Tampa Drainage

Mr. Millburg,

Alfred forwarded me your email indicating that you were looking for a ROM for 2,600 LF of 36-inch pipe. You did indicate something about gravity, which leads me to believe that they are looking to have an online and on grade installation for natural flow of the water. This is typically a challenge for HDD's, though not impossible, but making the required geometry to reach something like this is not conducive for a 75ft depth installation.

Installing the HDD from grade level and reaching a 75 ft depth within 2,600 LF is standard practice, but you would more than likely need to have a pumping system to move the water through the line.

HDD Rough Order of Magnitude

- | | | |
|--|----|--------------|
| • Mobilization/Demobilization = | \$ | 300,000.00 |
| • Drill/Ream/Pull (2,600 LF) = | \$ | 3,900,000.00 |
| • Product Pipe/Fuse/Test = | \$ | 1,400,000.00 |
| • Additional Items (Based on Specs/City Code) | | |
| ○ Noise Mitigation =
(Assumed 45 Days) | \$ | 250,000.00 |
| ○ Traffic Control (Varies on requirements) =
\$250,000.00 (Assumed 45 days) | \$ | 150,000.00- |

Total Base = \$ 5,600,000.00

Total Base + Extras = \$ 6,000,000.00

This is of course a rough order, factors such as geology, specifications, local ordinances, etc. can all impact the price. Note, that this is based on site setup, utilities locate, surveying, engineering, any restoration, connections, burial, final testing, etc. being excluded from our price.

We also perform microtunneling, which is another option. This would require a large launching and receiving shaft on either side of the line, which can run anywhere from \$1M-\$3M, depending on a number of factors. The cost per LF for the tunnel including product can range widely, but for ROM purposes let's say \$3,000/LF. Going with \$2M on average for

the shafts and \$3,000/LF would bring you to \$9,800,000.00 not including any of the extras. This scenario though would provide a better gravity line option through as MT would launch at a specific angle and carry that until completion.

Hopefully this helps you in regards to the project. Who is the owner, and any thoughts on what stage they are in for engineering, construction, and feasibility?

Regards,

Dustin Brasher

General Manager / Lead Estimator

Office: (941) 722 - 6613

Direct: (848) 240 - 8234

Cell: (832) 689 - 5166

huxtedtrenchless.com

Mailing Address: 1306 North FM 3083 Road East, Conroe TX 77303

Billing Address: 1333 Campus Parkway, Wall Township, NJ 07753



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Independent Technical Review

ROLES AND RESPONSIBILITIES

This section documents the roles and responsibilities for implementing the CEP for FDOT staff.

OFFICE OF POLICY PLANNING (OPP)

OPP leads many of the policy-driven resilience-related initiatives. Their responsibilities related to community engagement for these policy plans include:

- Leading coordination activities with all statewide partner groups.
- Leading planning and preparation for statewide briefings.
- Periodically updating the FDOT Executive Board as well as Central Office and District Directors and Managers.
- Coordinating review and approval of the drafts and final products.

OFFICE OF ENVIRONMENTAL MANAGEMENT (OEM)

OEM leads many resilience-related and other environmental initiatives. Their responsibilities related to community engagement for policy plans include:

- Assisting OPP with coordination activities with all statewide partner groups
- Assisting OPP with planning and preparing for statewide briefings.
- Providing subject matter expertise to and review of draft and final products

TECHNICAL ADVISORY TEAM

A Technical Advisory Team (TAT) is responsible for reviewing all technical work in support of resilience-related planning, projects, and other activities including recommendations, prioritization, and review of draft products. The TAT includes technical staff from Central and District program offices.

OPP will lead and provide staff support for the TAT. The TAT will meet regularly via Teams virtual conference.

OTHER FDOT OFFICES

Central and District Office responsibilities related to community engagement for resilience-related policy plans include:

- Collecting, documenting, and responding to input received from District staff and offices regarding resilience-related plans, projects, or other activities and sharing this information with OPP.
- Assisting with regional and local coordination activities regarding community engagement, as needed
- Assisting with briefings and updates related to resilience initiatives.

FDOT's Executive Board, Directors, and Intermodal Systems Development (ISD) Managers will receive regular updates and have opportunities for input throughout the development of resilience plans, projects, and other activities. These internal groups will review and provide feedback on the draft resilience-related products developed by OPP.

\$100 Million gets a 1.5' Reduction in Flood Levels

6.3.5 Hurricane Milton Simulation

To quantify the expected reduction in flooding if a storm of similar magnitude to Hurricane Milton were to make landfall again after the full project is complete, the simulation of Hurricane Milton was applied to the PCM, and results were compared to show the significant benefit this project could provide for the community during another historic rainfall event. The comparison shows a similar reduction in peak flood stage between Phase I and the future phase improvements, with the future phase collection systems providing a slight additional benefit.

Figure 6-13 and Figure 6-14 below show a significant reduction in both peak flood stage (and therefore the number of homes and vehicles damaged) and flood duration (and therefore the amount of time streets are inaccessible to emergency vehicles). The Phase I hydrographs were plotted in gray for reference. The predicted peak stage reduction is between 16 and 18 inches throughout Parkland Estates and Palma Ceia Pines. **Model results predict that the future phase collection systems would have protected an additional 10 homes and businesses – now 235 of the 333 ground floor homes and businesses that flooded during Hurricane Milton if they had been in place prior to the 2024 hurricane season.**

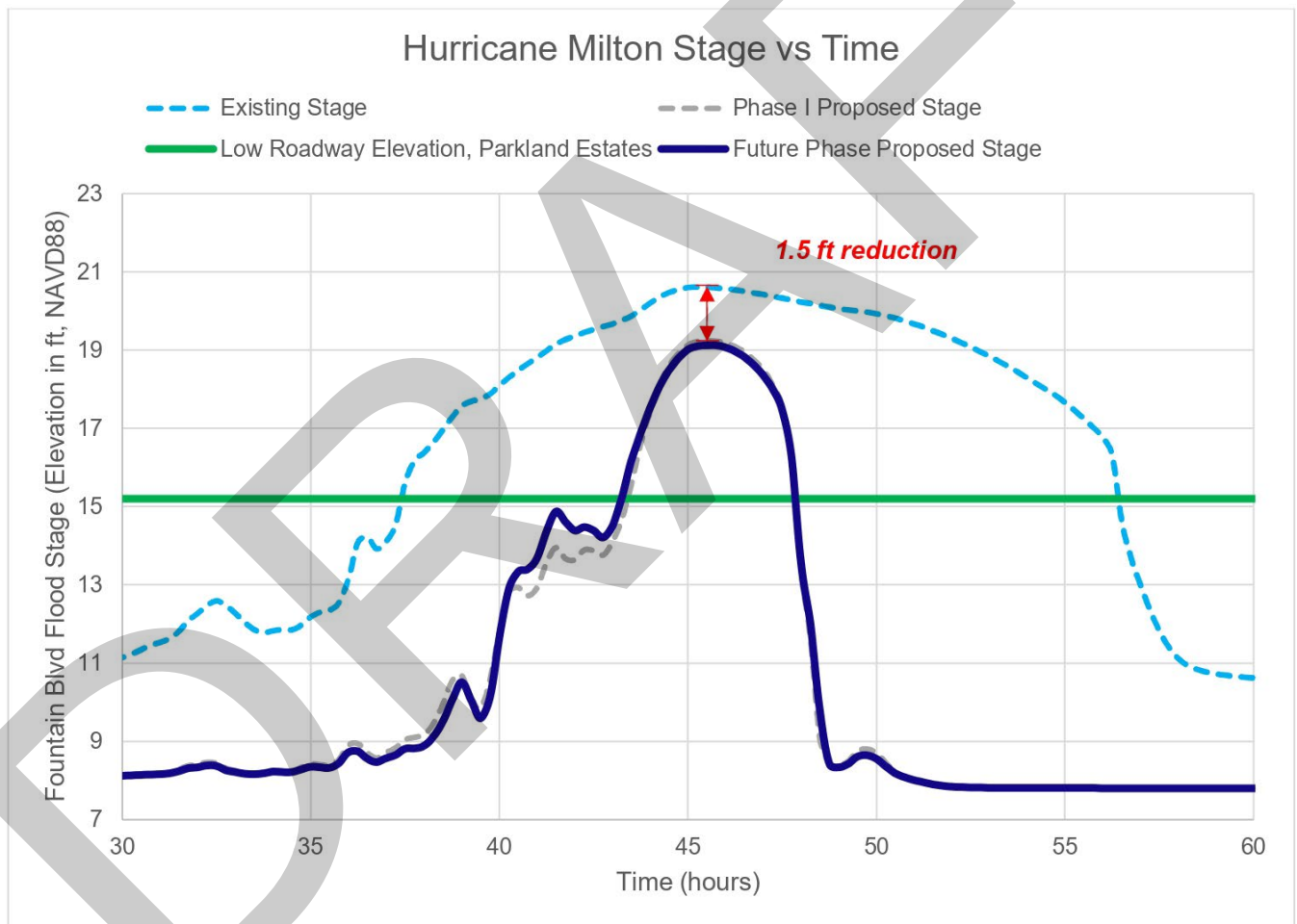


Figure 6-13 – Proposed Hurricane Milton Flood Reduction, Parkland Estates (Future Phase)

No Geotechnical Study Done by COT

Chapter 1: Introduction

The purpose of this handbook is to provide Geotechnical Engineers with established procedures for performing geotechnical activities for the Florida Department of Transportation. Specifically, this handbook defines the tasks involved in performing a subsurface investigation and the geotechnical aspects of the design and construction of roadways and roadway structures.

As each project presents unique considerations and requires engineering judgment based on a thorough knowledge of the individual situation, the scope of services in the contract for each project supersedes the minimum scope of work outlined in this handbook. The scope of services dictates the specific practices which are to be used on a particular project. Additionally, the scope defines the required interaction between the Department's Geotechnical Engineer and those performing the geotechnical work.

The design and construction of a roadway and related structures is a complex operation involving the participation of many department units and outside agencies. The key to the successful completion of the project is communication. It is essential that good communication, coordination and interaction exist between the Geotechnical Engineer and these other units and agencies. This interaction should continue throughout all project phases to ensure a reliable and cost-effective design and minimize construction problems.

This handbook is designed to present information in the same sequence, as it would occur during project development for a design-bid-construct project. A general outline of the tasks, which should be performed by a Geotechnical Engineer during a project, is shown in Sections 1.1.1 through 1.1.4. The details of these tasks are discussed and amplified in subsequent chapters. Chapter 11 discusses the process for a design-build project. A general outline of the tasks, which should be performed by a Geotechnical Engineer for a design-build project, is shown in Sections 11.1 through 11.3.

Finally, it should be noted that this is not intended as an all-encompassing or comprehensive procedural handbook. Methods of subsurface investigation and of analyzing data and solving problems are not discussed in detail. The lists of references at the end of each chapter are but a few of the many sources of information that will provide the engineer with greater insight into investigation procedures and analysis and problem solving techniques. Clarification regarding the content of this Handbook is available from the District Geotechnical Engineer, the State Geotechnical Materials Engineer in Gainesville, and the State Geotechnical Engineer in Tallahassee.

1.1 Geotechnical Tasks in Typical Highway Projects

1.1.1 Planning, Development, and Engineering Phase

- Prepare geotechnical scope of services for consultant projects.
- Assist in corridor and route selection.
- Review existing information.
- Review the [Public Soil Boring Viewer \(fdot.gov\)](http://fdot.gov/public-soil-boring-viewer) for previous borings in the area.
- Perform field reconnaissance of site and existing structures.
- Plan and supervise field investigation program, field and laboratory testing.

- Analyze all data available.
- Prepare preliminary geotechnical report summarizing available data and providing recommendations.
- Identify potential needs for the design investigation to address construction requirements and anticipate problems (high groundwater issues, preforming requirements, vibration and noise impacts).

1.1.2 Project Design Phase

- Perform additional field investigations and provide additional or revised recommendations if called for in geotechnical report or if project has substantially changed since earlier investigations.
- Assist the roadway and structural engineers in interpreting and applying geotechnical recommendations to design and special provisions and/or supplemental specifications.
- Design and if applicable perform load test programs or special instrumentation monitoring as deemed necessary.
- Review plans, special provisions and/or supplemental specifications.
- Identify construction activities and techniques to minimize potential construction requirements and problems (preforming requirements, vibration and noise impacts).

1.1.3 Construction Phase

- Establish construction criteria for geotechnical portions of project.
- Inspect construction procedures to assure compliance with design and specifications.
- Design, install, perform, monitor, and evaluate load test programs and/or instrumentation systems.
- Solve unforeseen foundation and/or roadway soils problems.

1.1.4 Post-Construction Phase

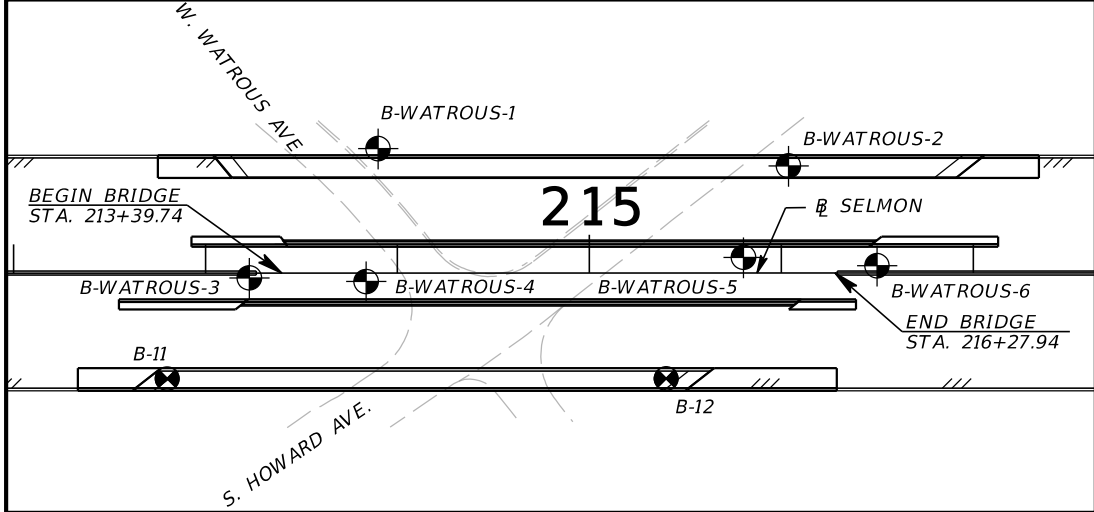
- Assess and provide solutions to roadway and structure maintenance problems, which are related to the geotechnical characteristics of the site.
- Summarize construction procedures and/or problems and any changes in design made during construction.
- Provide information to State Geotechnical files for reference during the design of future projects.

Existing Geotechnical Data

APPENDIX F

Report of Core Borings Sheets – SR 618 over Howard Ave./Watrous Ave.

Existing Geotechnical Data – Borings Performed by Others



BORING LOCATION PLAN

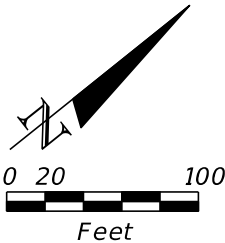
ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUPERSTRUCTURE EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:
RESISTIVITY 14,000 OHM-CM
CHLORIDES 15 TO 30 PPM
SULFATES <5 TO 27 PPM
pH 7.2 TO 7.5

WATER TEST RESULTS: (TAMPA BAY)
RESISTIVITY 260 OHM-CM
CHLORIDES 20,000 PPM
SULFATES 3,700 PPM
pH 7.5

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND
SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.

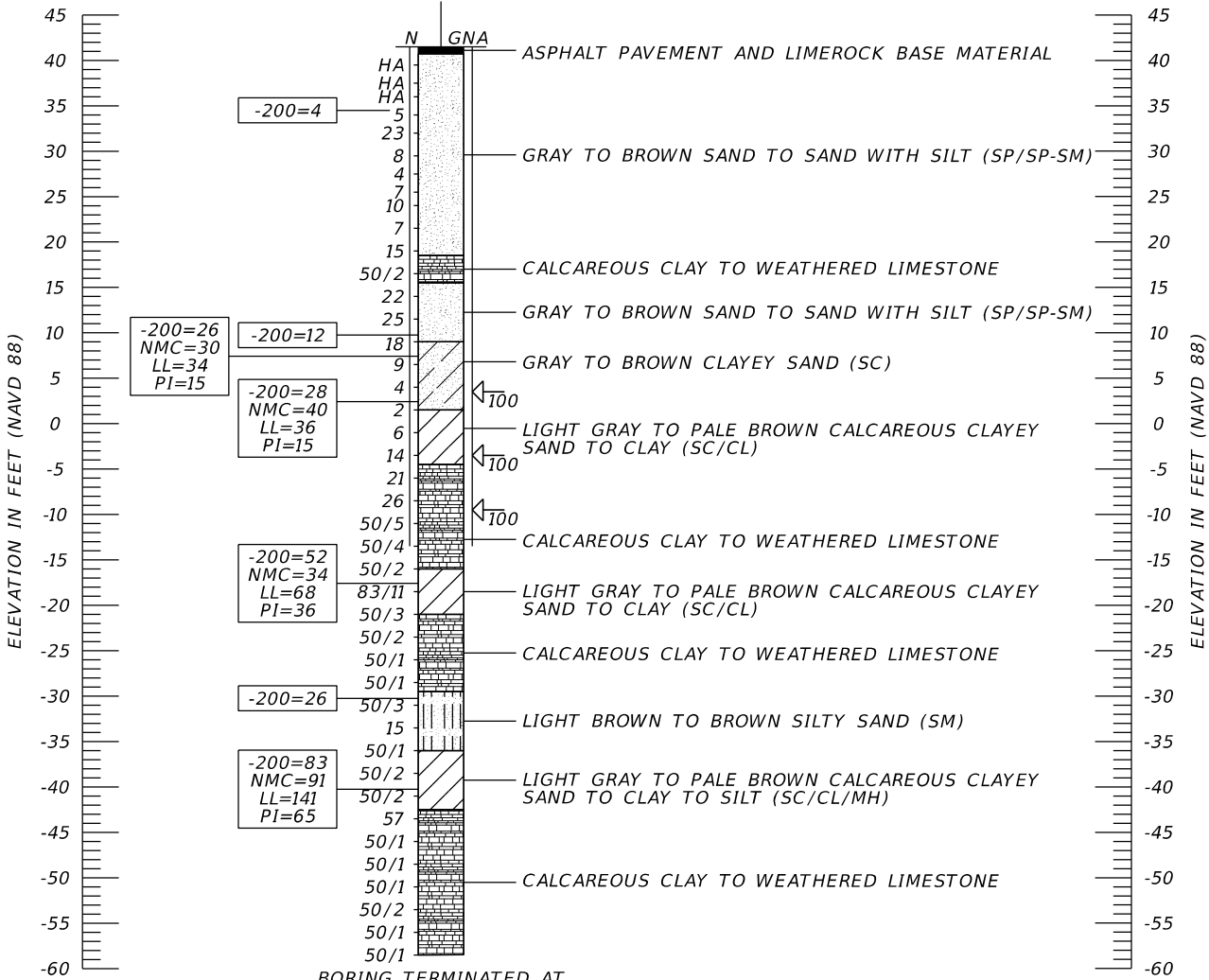
LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- LIGHT GRAY TO PALE BROWN CALCAREOUS CLAYEY SAND TO CLAY TO SILT (SC/CL/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE

- 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 (%)

- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING

SELMON BASELINE SURVEY OF SELMON EXPRESSWAY



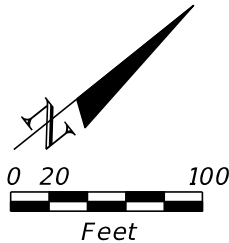
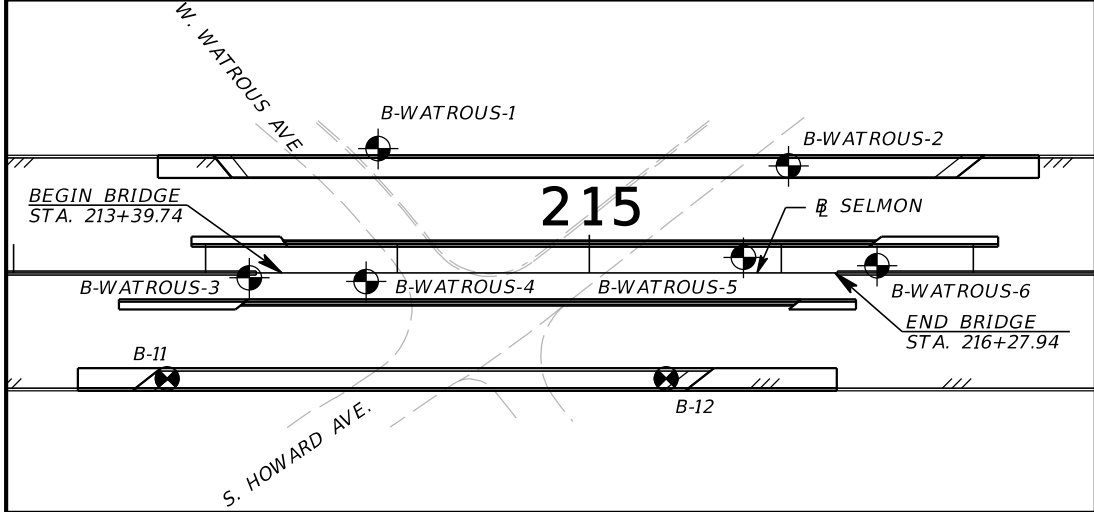
BORING TERMINATED AT
ELEVATION -58.5 FT (NAVD 88)
LATITUDE: N 27.93179
LONGITUDE: W 82.48336

	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 NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (1) W. WATROUS AVENUE/S. HOWARD AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

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



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
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LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- LIGHT GRAY TO PALE BROWN CALCAREOUS CLAYEY SAND TO CLAY TO SILT (SC/CL/MH)
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- 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 (%)

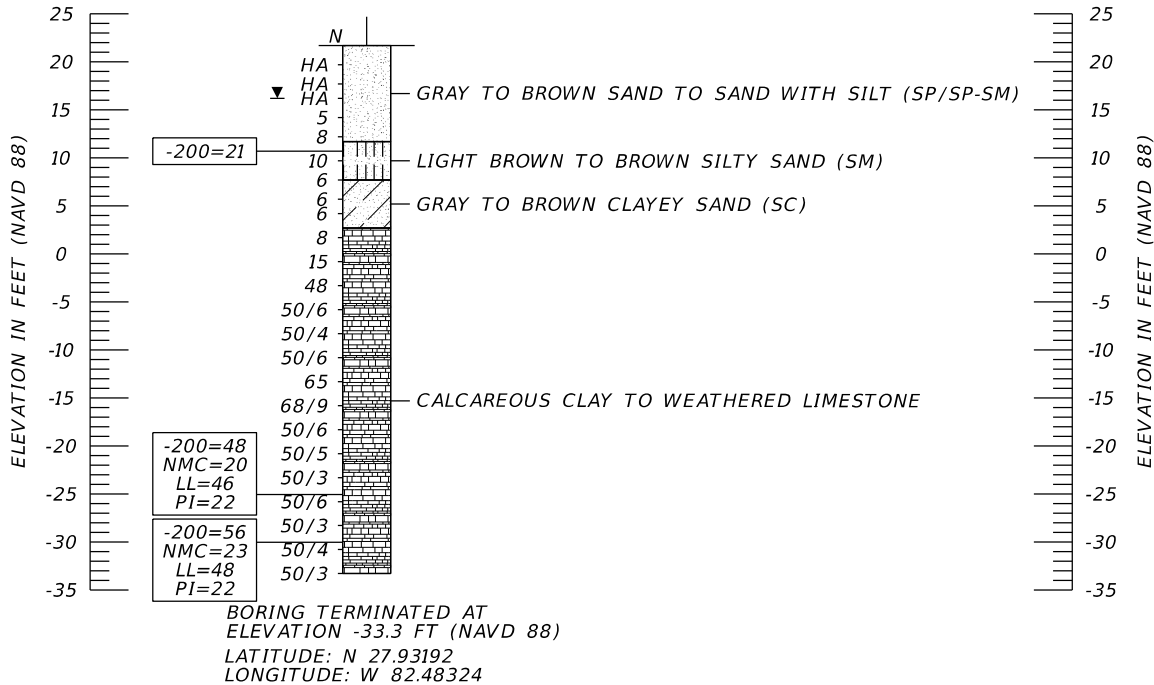
NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988

- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING

SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

BOR # B-WATROUS-4
STA. 213+84
REF. SELMON
OFF. 4' RT.
ELEV. 21.7
DATE 1/20/2024
DRILLER C. VIRGEN
HAMMER AUTOMATIC
RIG D-25

- ENVIRONMENTAL CLASSIFICATION:
- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SOIL TEST RESULTS:
- RESISTIVITY 14,000 OHM-CM
 - CHLORIDES 15 TO 30 PPM
 - SULFATES <5 TO 27 PPM
 - pH 7.2 TO 7.5
- WATER TEST RESULTS: (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
 - CHLORIDES 20,000 PPM
 - SULFATES 3,700 PPM
 - pH 7.5
- CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
- d CORE BARREL DIAMETER (INCHES)
 - t ROCK CORE TIME (MINUTES)
 - PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
 - REC PERCENT RECOVERY (%)
 - RQD ROCK QUALITY DESIGNATION (%)
 - γ_d DRY UNIT WEIGHT (PCF)
 - q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
 - q_{st} SPLITTING TENSILE STRENGTH (PSI)

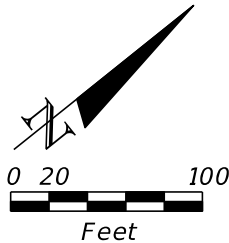
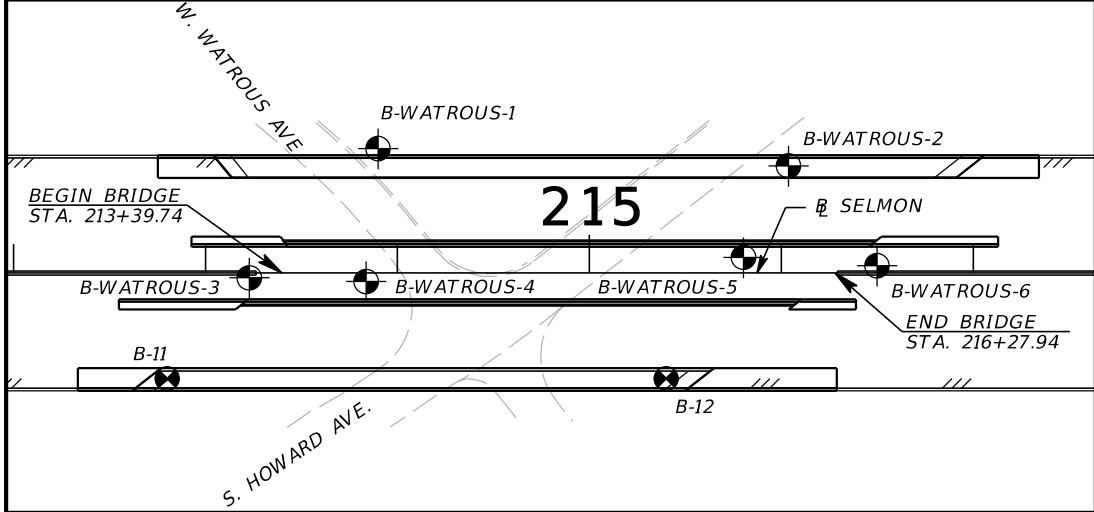


	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
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SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	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 NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (2) W. WATROUS AVENUE/S. HOWARD AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

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LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- LIGHT GRAY TO PALE BROWN CALCAREOUS CLAYEY SAND TO CLAY TO SILT (SC/CL/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE

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- 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 (%)

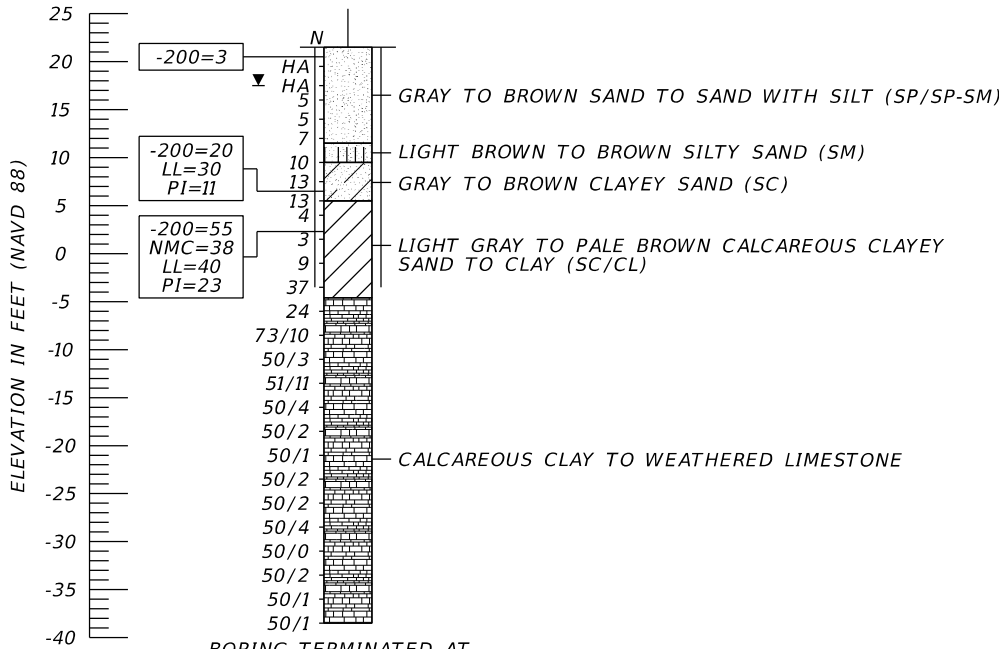
NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988

- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING

SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

BOR # B-WATROUS-1
STA. 213+90
REF. SELMON
OFF. 65' LT.
ELEV. 21.5'
DATE 4/7/2022
DRILLER R. SCRUGGS
HAMMER AUTOMATIC
RIG D-25

- ENVIRONMENTAL CLASSIFICATION:
- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SOIL TEST RESULTS:
- RESISTIVITY 14,000 OHM-CM
 - CHLORIDES 15 TO 30 PPM
 - SULFATES <5 TO 27 PPM
 - pH 7.2 TO 7.5
- WATER TEST RESULTS: (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
 - CHLORIDES 20,000 PPM
 - SULFATES 3,700 PPM
 - pH 7.5
- CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
- d CORE BARREL DIAMETER (INCHES)
 - t ROCK CORE TIME (MINUTES)
 - PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
 - REC PERCENT RECOVERY (%)
 - RQD ROCK QUALITY DESIGNATION (%)
 - γ_d DRY UNIT WEIGHT (PCF)
 - q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
 - q_{st} SPLITTING TENSILE STRENGTH (PSI)



BORING TERMINATED AT ELEVATION -38.5 FT (NAVD 88)
LATITUDE: N 27.93205
LONGITUDE: W 82.48340

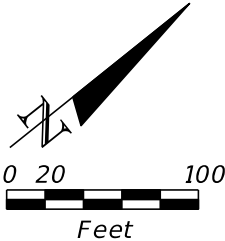
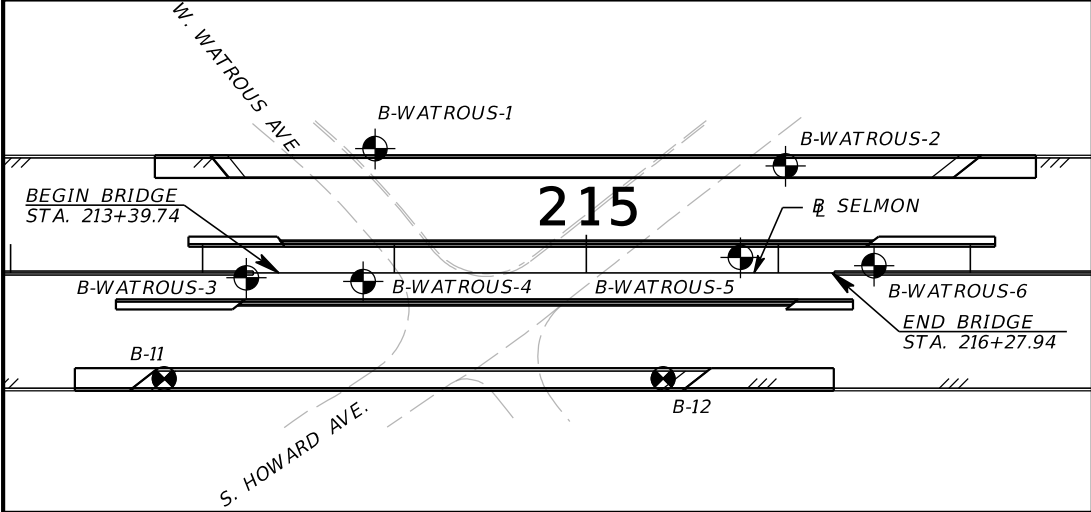


	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
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VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS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

BRIDGE NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (3) W. WATROUS AVENUE/S. HOWARD AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

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LEGEND

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- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- LIGHT GRAY TO PALE BROWN CALCAREOUS CLAYEY SAND TO CLAY TO SILT (SC/CL/MH)
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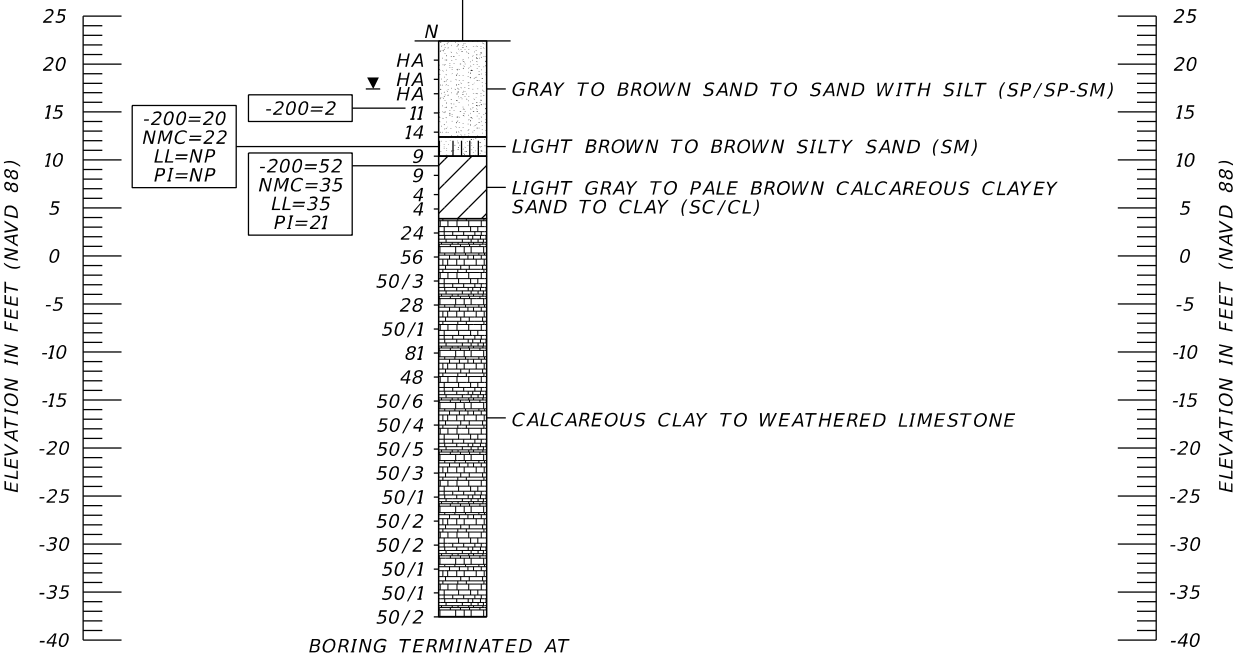
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- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)

- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
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- CASING

SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

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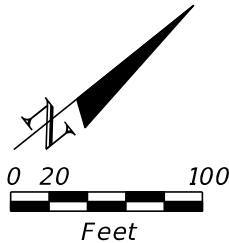
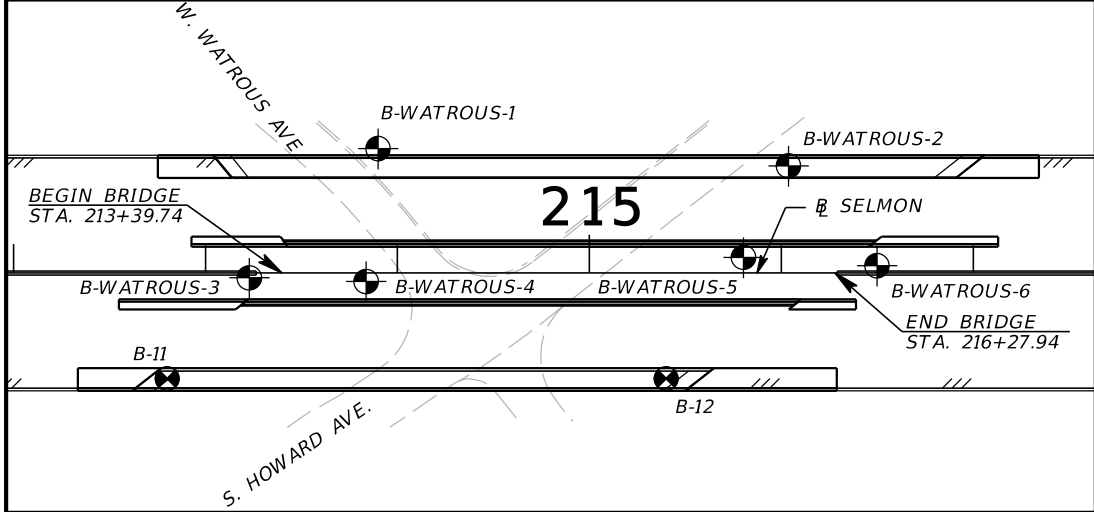
BOR # B-WATROUS-5
STA. 215+80
REF. SELMON
OFF. 8' LT.
ELEV. 22.4
DATE 1/25/2024
DRILLER C. VIRGEN
HAMMER AUTOMATIC
RIG D-25



	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
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STIFF	8 to 15	6 to 12
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HARD	GREATER THAN 30	GREATER THAN 24

BRIDGE NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:	REPORT OF CORE BORINGS (4) W. WATROUS AVENUE/S. HOWARD AVENUE	REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				ROAD NO.		COUNTY
							DESIGNED BY: BJS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		
							CHECKED BY: KHS						



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LEGEND

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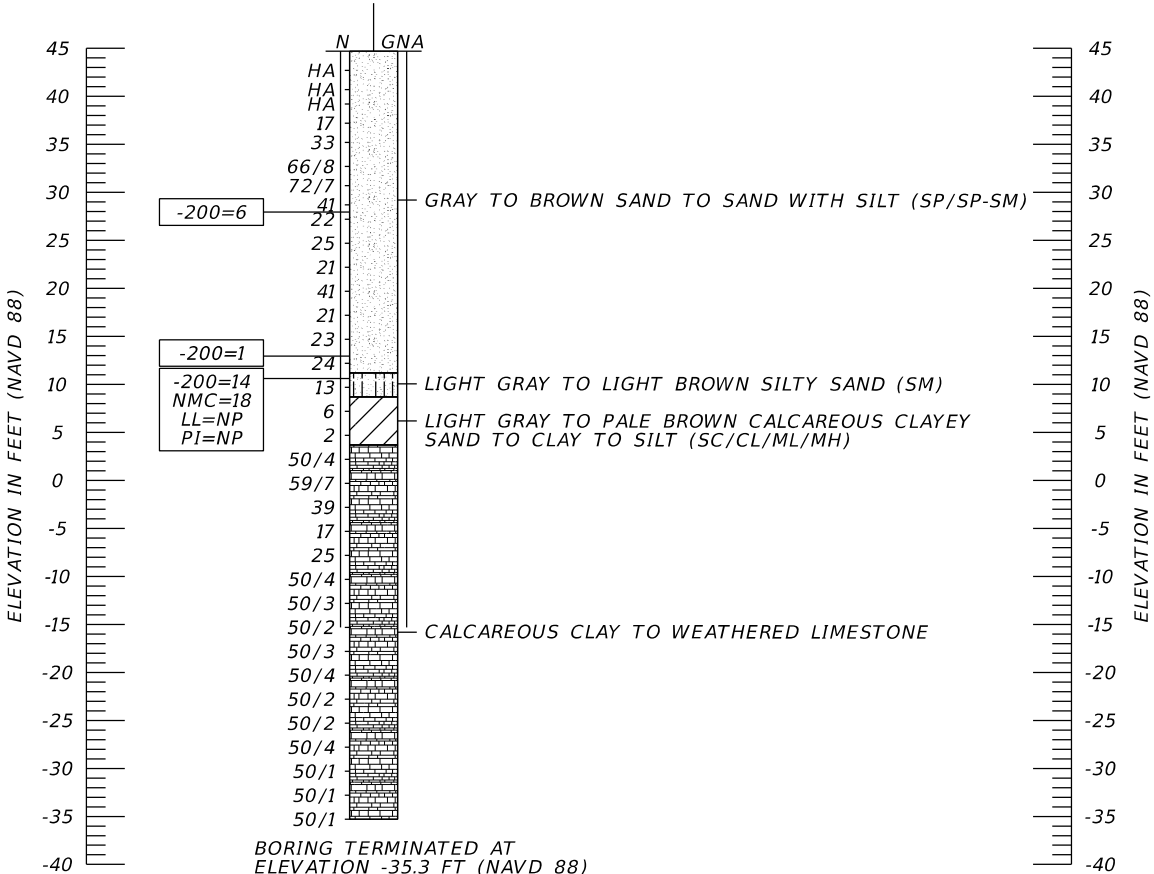
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SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

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

- ENVIRONMENTAL CLASSIFICATION:
- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
 - SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SOIL TEST RESULTS:
- RESISTIVITY 14,000 OHM-CM
 - CHLORIDES 15 TO 30 PPM
 - SULFATES <5 TO 27 PPM
 - pH 7.2 TO 7.5
- WATER TEST RESULTS: (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
 - CHLORIDES 20,000 PPM
 - SULFATES 3,700 PPM
 - pH 7.5
- CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
- d CORE BARREL DIAMETER (INCHES)
 - t ROCK CORE TIME (MINUTES)
 - PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
 - REC PERCENT RECOVERY (%)
 - RQD ROCK QUALITY DESIGNATION (%)
 - γ_d DRY UNIT WEIGHT (PCF)
 - q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
 - q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-WATROUS-6
STA. 216+50
REF. SELMON
OFF. 4' LT.
ELEV. 44.7
DATE 2/29/2024
DRILLER A. JACKSON
HAMMER AUTOMATIC
RIG D-25

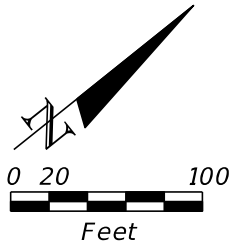
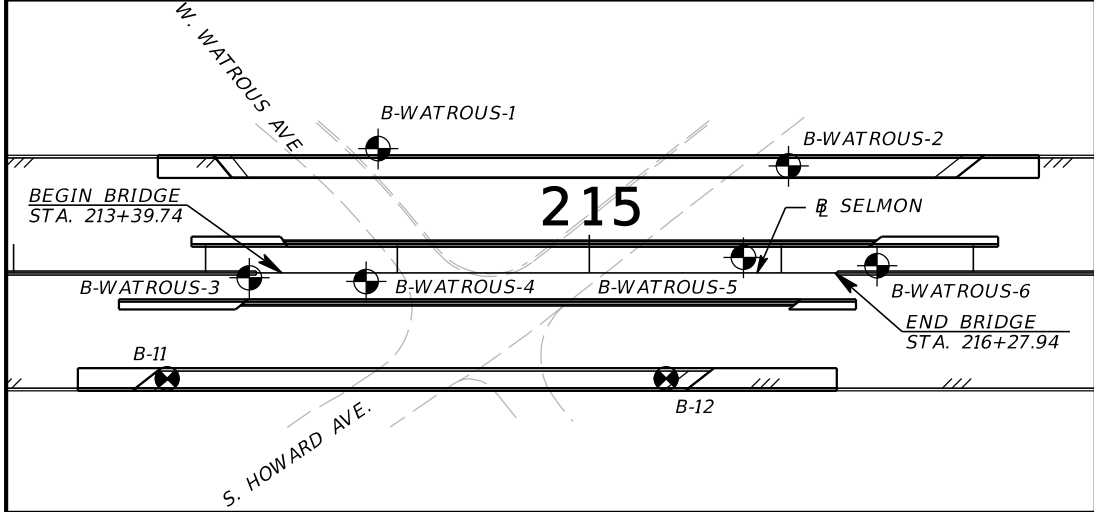


BORING TERMINATED AT
ELEVATION -35.3 FT (NAVD 88)
LATITUDE: N 27.93250
LONGITUDE: W 82.48275

BRIDGE NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS CHECKED BY: SS DESIGNED BY: BJS CHECKED BY: KHS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (5) W. WATROUS AVENUE/S. HOWARD AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET	SHEET NO.
								SR 618	HILLSBOROUGH	H1-0012			

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



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
 - ROCK CORES OBTAINED BY WASH DRILLING ADJACENT TO SPT BORING LOCATION TO DEPTHS NOTED THEN PERFORMING CORE RUN.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- LIGHT GRAY TO PALE BROWN CALCAREOUS CLAYEY SAND TO CLAY TO SILT (SC/CL/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE

- 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 (%)

NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988

- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING

BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:

- RESISTIVITY 14,000 OHM-CM
- CHLORIDES 15 TO 30 PPM
- SULFATES <5 TO 27 PPM
- pH 7.2 TO 7.5

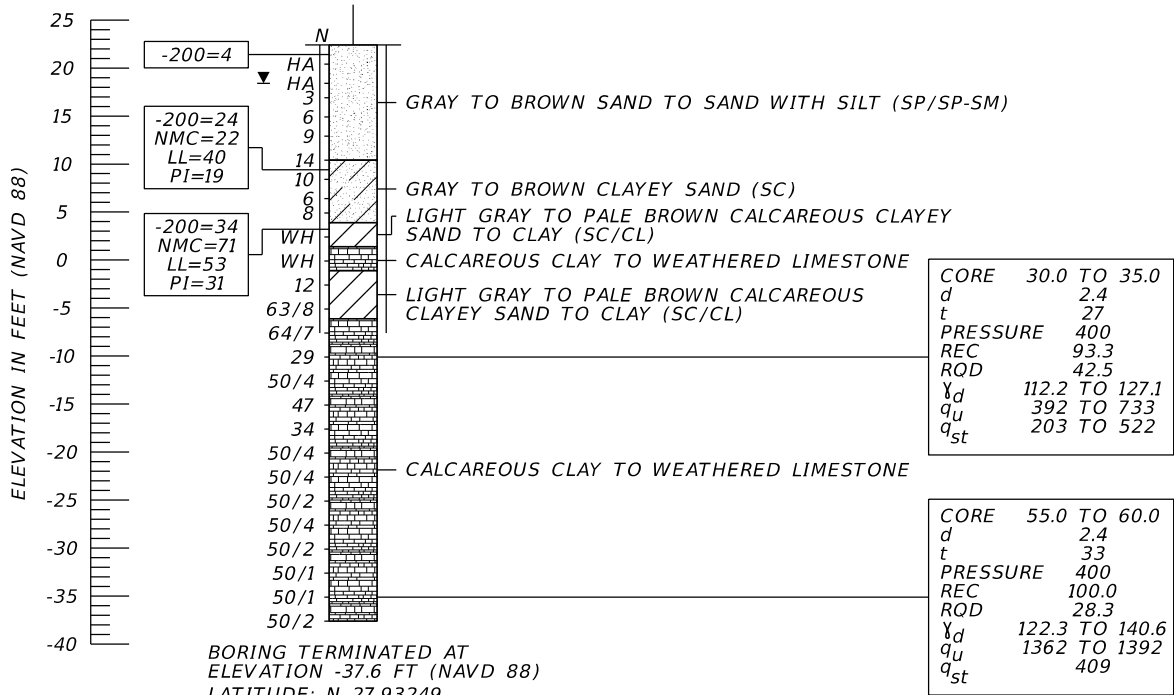
WATER TEST RESULTS:

- (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
- CHLORIDES 20,000 PPM
- SULFATES 3,700 PPM
- pH 7.5

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION

- d CORE BARREL DIAMETER (INCHES)
- t ROCK CORE TIME (MINUTES)
- PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
- REC PERCENT RECOVERY (%)
- RQD ROCK QUALITY DESIGNATION (%)
- γ_d DRY UNIT WEIGHT (PCF)
- q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
- q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-WATROUS-2
STA. 216+04
REF. SELMON
OFF. 56' LT.
ELEV. 22.4'
DATE 3/14/2022
DRILLER A. JACKSON
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -37.6 FT (NAVD 88)
LATITUDE: N 27.93249
LONGITUDE: W 82.48296

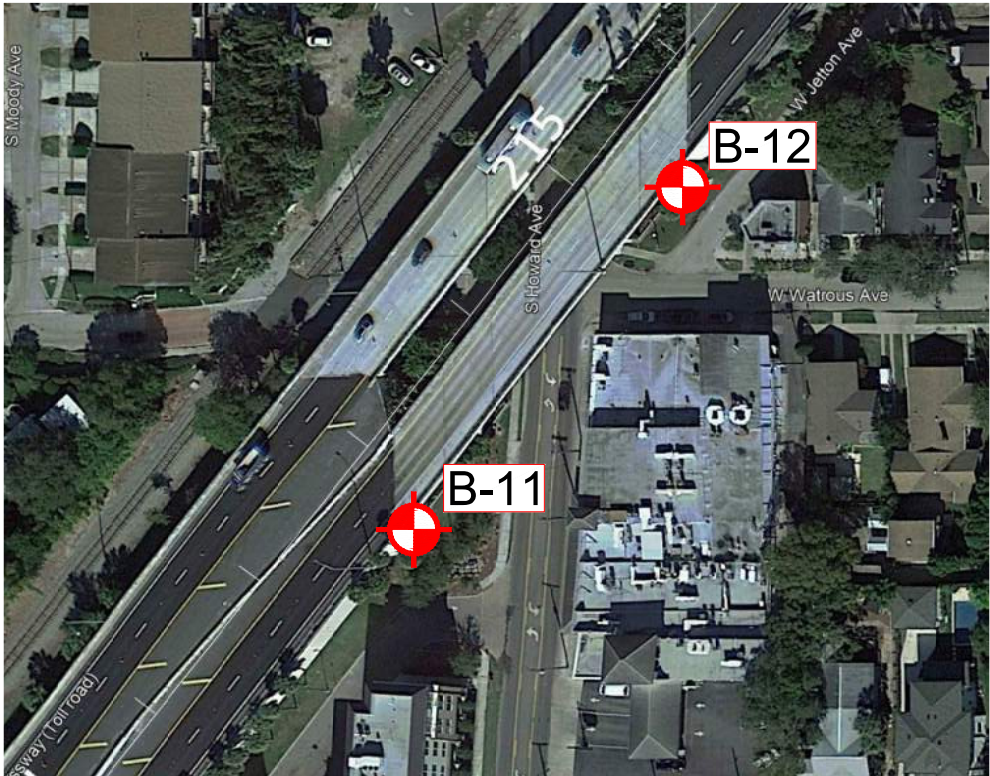
SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

	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 NOS. 100318 & 100319

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				PROJECT NAME:		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	REPORT OF CORE BORINGS (6) W. WATROUS AVENUE/S. HOWARD AVENUE		
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		SHEET NO.

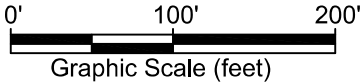
THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



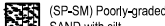
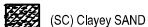
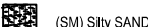
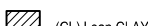
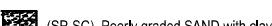
Source: Google Earth
Image Date: 12/17/2019

LEGEND:

 Approximate SPT Boring Location



LEGEND

- | | |
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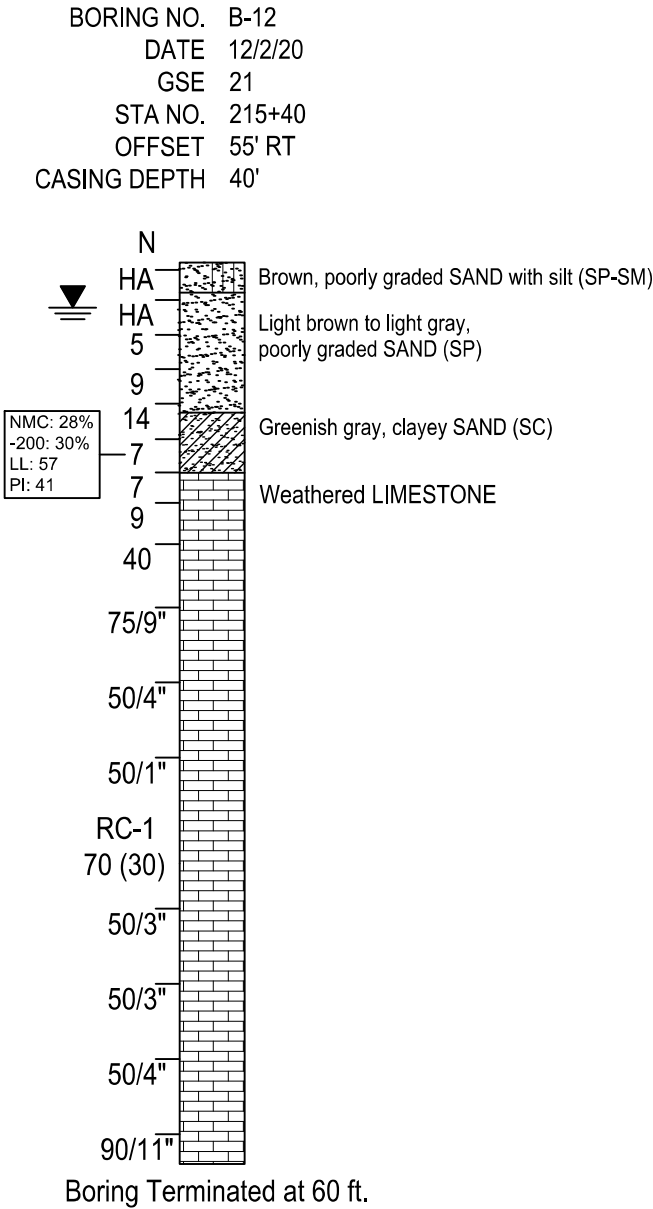
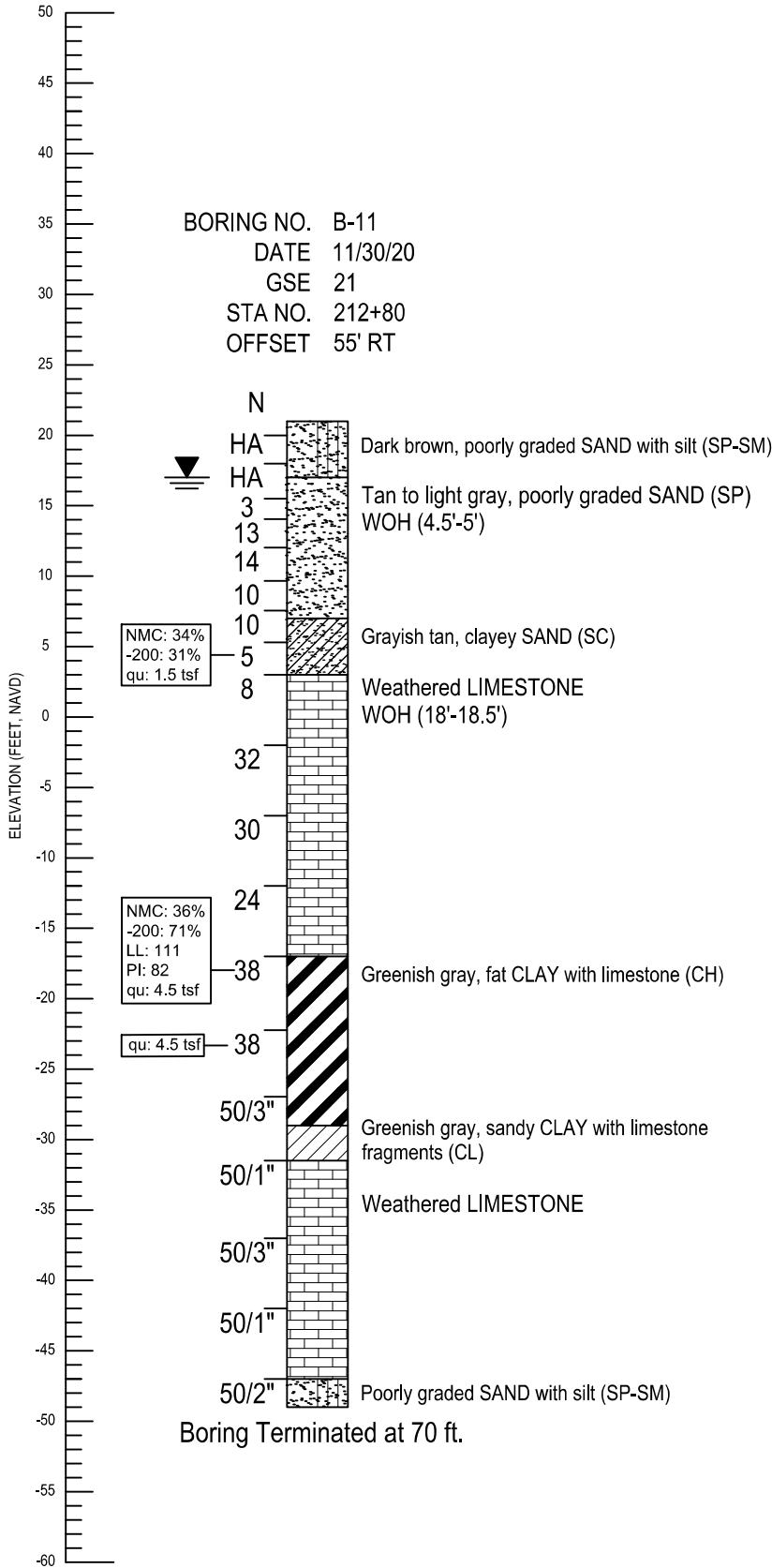
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (Chlorides = 9,500 ppm in Hillsborough Bay)
SUPERSTRUCTURE: EXTREMELY AGGRESSIVE (Chlorides = 9,500 ppm in Hillsborough Bay)

ENGINEERING CLASSIFICATION

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

-  WATER TABLE EXISTING AT TIME OF BORING
 ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
N SPT N-VALUE
HA HAND AUGER
NMC NATURAL MOISTURE CONTENT (%)
-200 FINES PASSING A NO. 200 SIEVE (%)
GNA GROUNDWATER NOT APPARENT
GSE APPROXIMATE GROUND SURFACE ELEVATION (FEET, NAVD)
OC ORGANIC CONTENT
LL LIQUID LIMIT
PI PLASTICITY INDEX
LOC LOSS OF CIRCULATION
ROC REGAIN OF CIRCULATION
WOH WEIGHT OF HAMMER
WOR WEIGHT OF ROD
SP UNIFIED SOIL CLASSIFICATION SYSTEM
qu UNCONFINED COMPRESSIVE STRENGTH FROM POCKET PENETROMETER
50/3" 50 BLOWS FOR 3-INCHES PENETRATION INTO SOIL
RC-1 70 (42) ROCK CORE WITH 70% RECOVERY AND RQD OF 42%

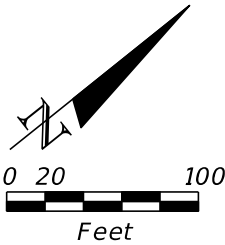
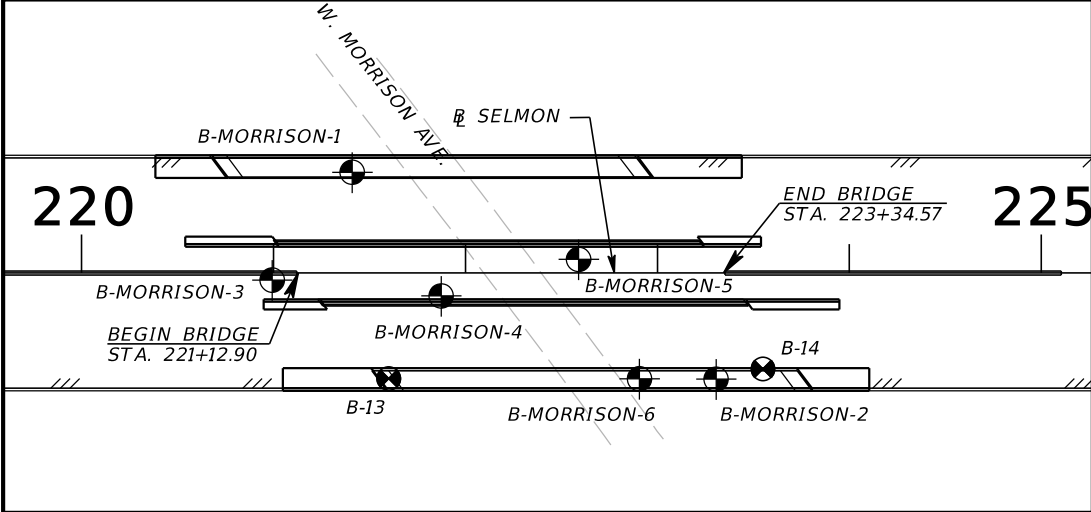


REVISIONS				ETHAN H. DREW, P.E. P.E. NO. 88622 MC SQUARED, INC. 5808-A BRECKENRIDGE PARKWAY, TAMPA, FL 33610	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			REPORT OF CORE BORINGS WATROUS AVE/HOWARD AVE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 618	HILLSBOROUGH		8	

APPENDIX G

Report of Core Borings Sheets – SR 618 over Morrison Ave.

Existing Geotechnical Data – Borings Performed by Others



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO GREEN-GRAY CLAYEY SAND (SC)
- DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- 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
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

ENVIRONMENTAL CLASSIFICATION:

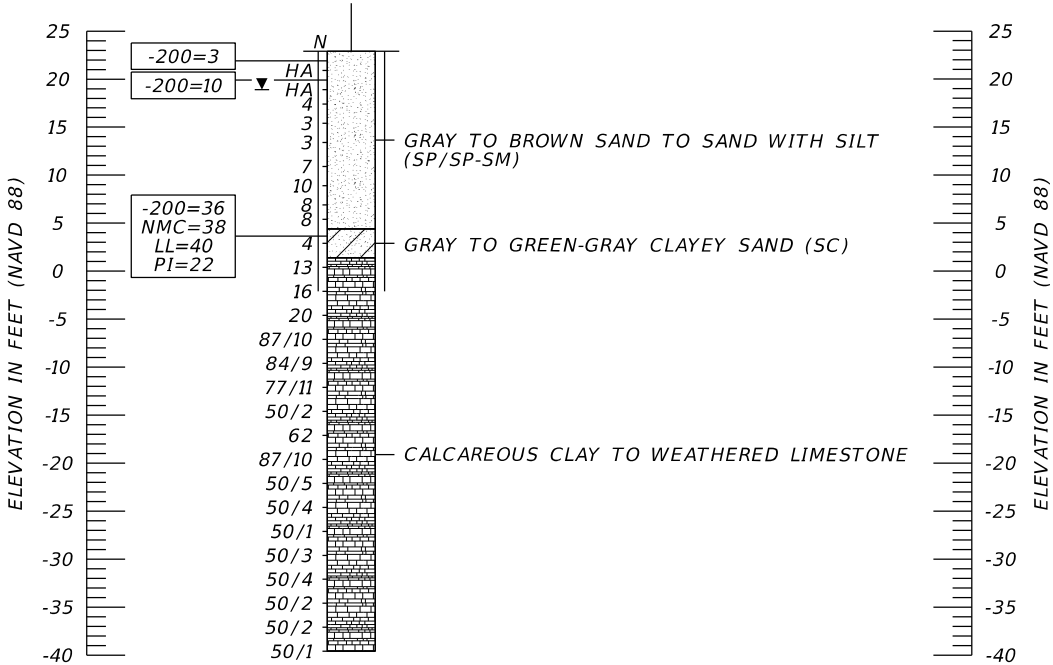
- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)

- SOIL TEST RESULTS:
- RESISTIVITY 10,000 TO 14,000 OHM-CM
 - CHLORIDES 15 TO 30 PPM
 - SULFATES <5 TO 12 PPM
 - pH 6.9 TO 8.2

- WATER TEST RESULTS: (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
 - CHLORIDES 20,000 PPM
 - SULFATES 3,700 PPM
 - pH 7.5

- CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
- d CORE BARREL DIAMETER (INCHES)
 - t ROCK CORE TIME (MINUTES)
 - PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
 - REC PERCENT RECOVERY (%)
 - ROD ROCK QUALITY DESIGNATION (%)
 - Y_d DRY UNIT WEIGHT (PCF)
 - q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
 - q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-MORRISON-1
STA. 221+41
REF. SELMON
OFF. 52' LT.
ELEV. 22.9'
DATE 3/23/2022
DRILLER K. CAUDILL
HAMMER AUTOMATIC
RIG D-25

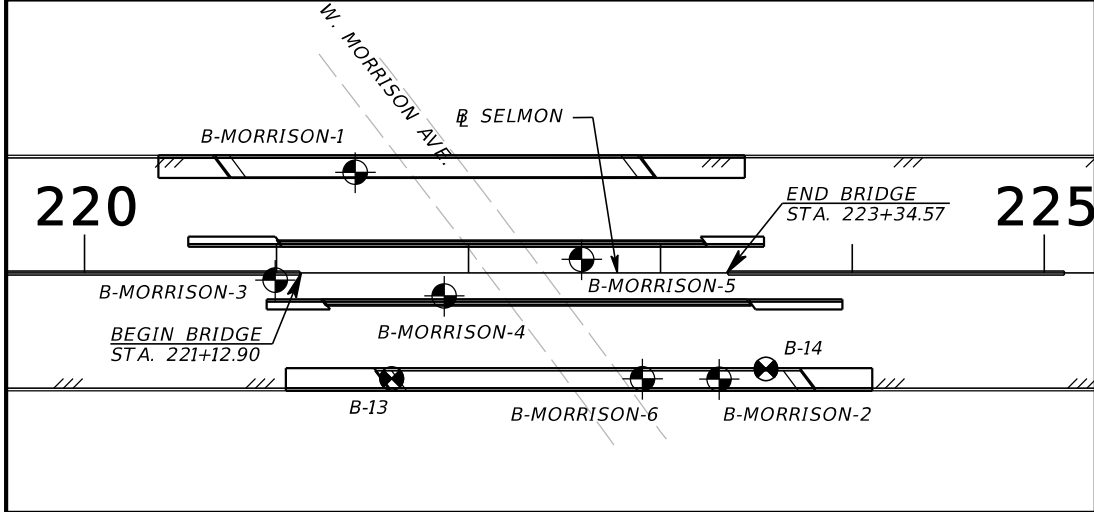


BORING TERMINATED AT
ELEVATION -39.6 FT (NAVD 88)
LATITUDE: N 27.93364
LONGITUDE: W 82.48192

	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 NOS. 100320 & 100321

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS CHECKED BY: SS DESIGNED BY: BJS CHECKED BY: KHS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (I) MORRISON AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME: SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET	SHEET NO.	
								SR 618	HILLSBOROUGH	H1-0012			



BORING LOCATION PLAN

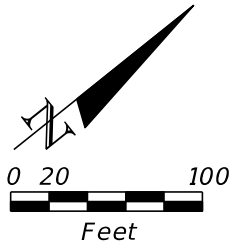
ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUPERSTRUCTURE EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:
RESISTIVITY 10,000 TO 14,000 OHM-CM
CHLORIDES 15 TO 30 PPM
SULFATES <5 TO 12 PPM
pH 6.9 TO 8.2

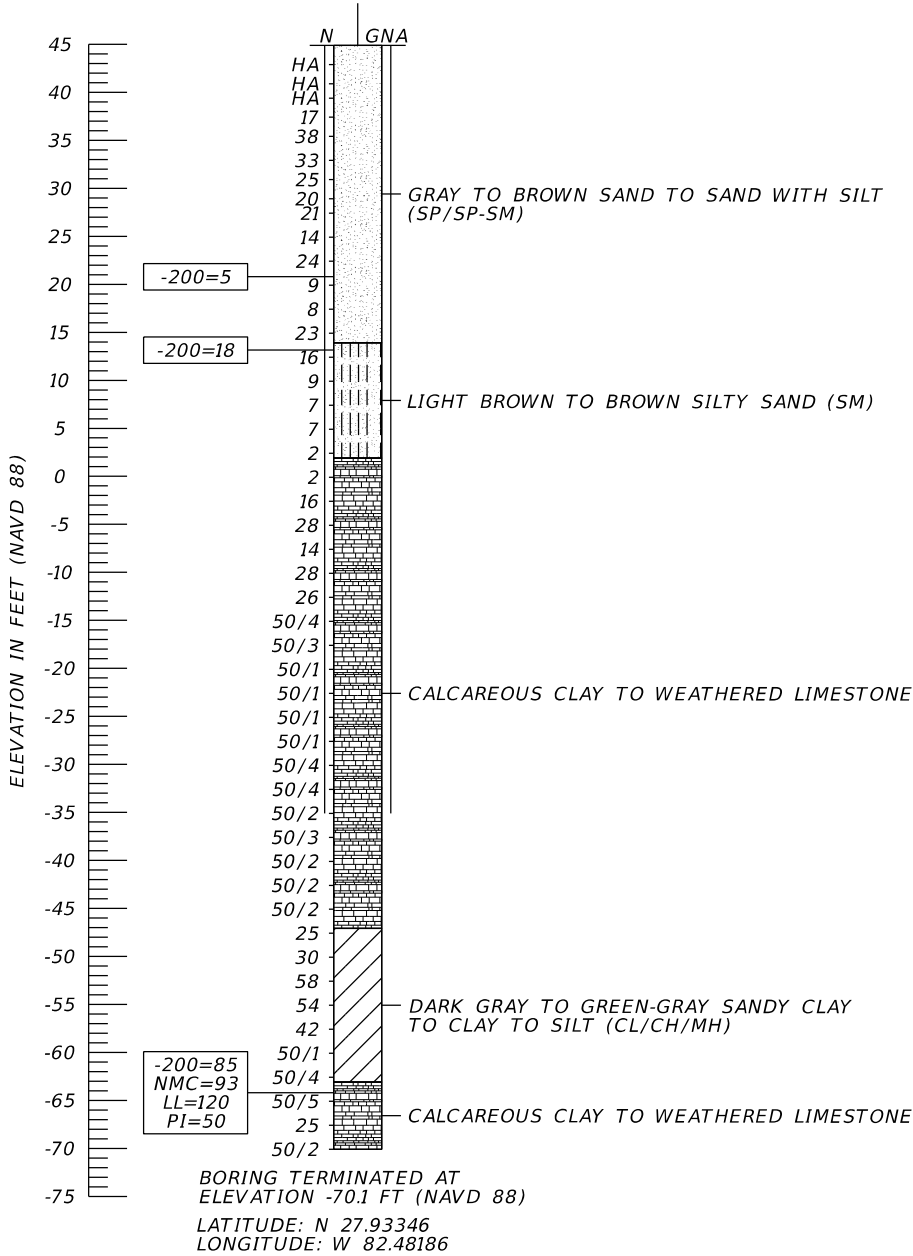
WATER TEST RESULTS: (TAMPA BAY)
RESISTIVITY 260 OHM-CM
CHLORIDES 20,000 PPM
SULFATES 3,700 PPM
pH 7.5

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND
SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.

BOR # B-MORRISON-3
STA. 220+99
REF. SELMON
OFF. 4' RT.
ELEV. 44.9
DATE 4/20/2024
DRILLER A. JACKSON
HAMMER AUTOMATIC
RIG D-25



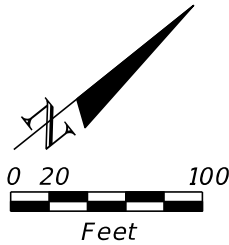
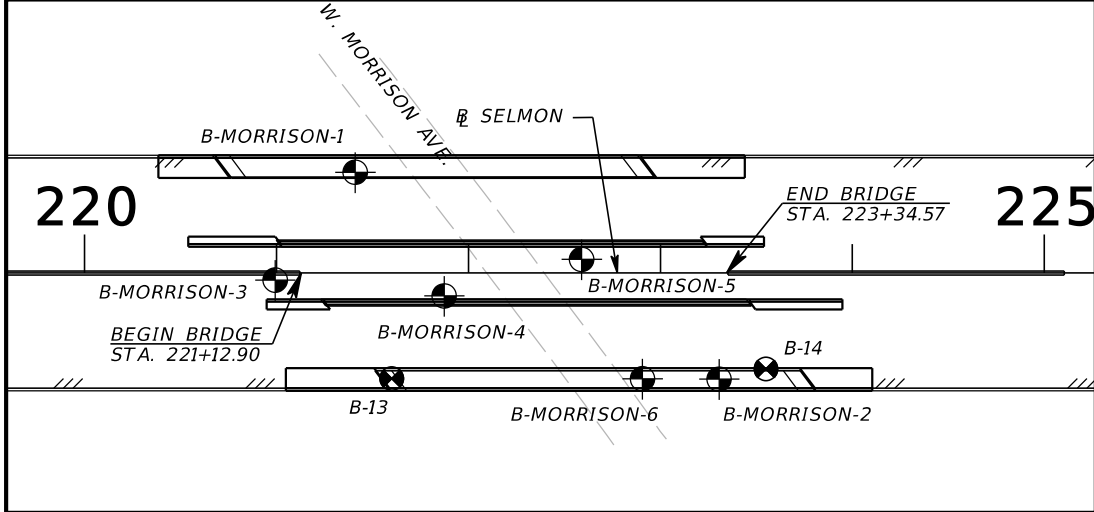
- LEGEND**
- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
 - LIGHT BROWN TO BROWN SILTY SAND (SM)
 - GRAY TO GREEN-GRAY CLAYEY SAND (SC)
 - DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
 - CALCAREOUS CLAY TO WEATHERED LIMESTONE
 - UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP 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
 - 200 PERCENT PASSING #200 SIEVE
 - NMC NATURAL MOISTURE CONTENT (%)
 - LL LIQUID LIMIT (%)
 - PI PLASTICITY INDEX (%)
 - NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
 - APPROXIMATE SPT BORING LOCATION BY OTHERS
 - APPROXIMATE SPT BORING LOCATION
 - GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
 - CASING
 - SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

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

BRIDGE NOS. 100320 & 100321

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (2) MORRISON AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				PROJECT NAME: SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		SHEET NO.
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.			
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012			

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



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
 - ROCK CORES OBTAINED BY WASH DRILLING ADJACENT TO SPT BORING LOCATION TO DEPTHS NOTED THEN PERFORMING CORE RUN.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO GREEN-GRAY CLAYEY SAND (SC)
- DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- 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
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

ENVIRONMENTAL CLASSIFICATION:

- SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)
- SUPERSTRUCTURE EXTREMELY AGGRESSIVE (WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:

- RESISTIVITY 10,000 TO 14,000 OHM-CM
- CHLORIDES 15 TO 30 PPM
- SULFATES <5 TO 12 PPM
- pH 6.9 TO 8.2

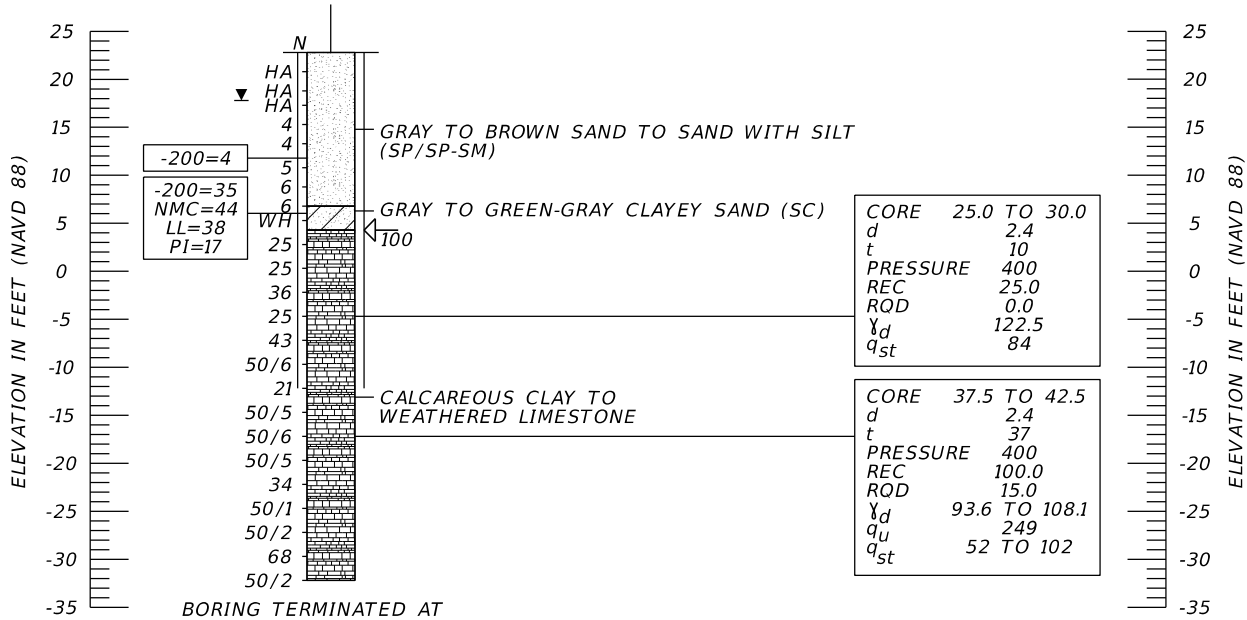
WATER TEST RESULTS:

- (TAMPA BAY)
- RESISTIVITY 260 OHM-CM
- CHLORIDES 20,000 PPM
- SULFATES 3,700 PPM
- pH 7.5

CORE

- CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
- d CORE BARREL DIAMETER (INCHES)
- t ROCK CORE TIME (MINUTES)
- PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
- REC PERCENT RECOVERY (%)
- ROD ROCK QUALITY DESIGNATION (%)
- Y_d DRY UNIT WEIGHT (PCF)
- q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
- q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-MORRISON-4
STA. 221+87
REF. SELMON
OFF. 12' RT.
ELEV. 22.8
DATE 1/15/2024
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -32.2 FT (NAVD 88)
LATITUDE: N 27.93363
LONGITUDE: W 82.48167

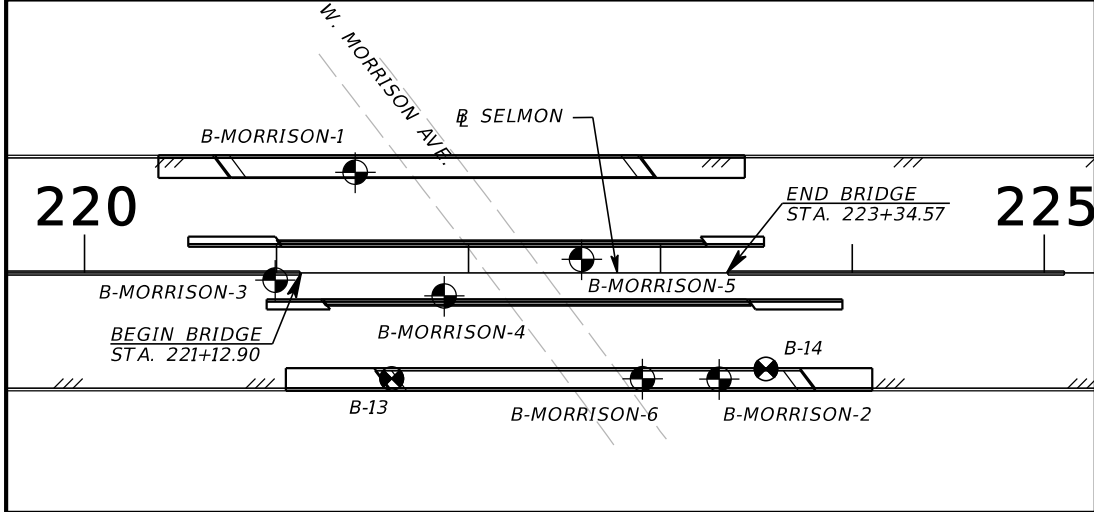
BRIDGE NOS. 100320 & 100321

REVISIONS						DRAWN BY: BJS			SHEET TITLE: REPORT OF CORE BORINGS (3) MORRISON AVENUE			REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	CHECKED BY: SS	DESIGNED BY: BJS	CHECKED BY: KHS	ROAD NO.	COUNTY	THEA PROJECT NO.	
									SR 618	HILLSBOROUGH	H1-0012	SHEET NO.

KEVIN H. SCOTT, P.E.
P.E. LICENSE NUMBER 65514
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY

SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET



BORING LOCATION PLAN

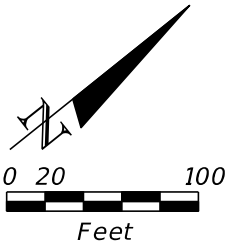
ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUPERSTRUCTURE EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:
RESISTIVITY 10,000 TO 14,000 OHM-CM
CHLORIDES 15 TO 30 PPM
SULFATES <5 TO 12 PPM
pH 6.9 TO 8.2

WATER TEST RESULTS: (TAMPA BAY)
RESISTIVITY 260 OHM-CM
CHLORIDES 20,000 PPM
SULFATES 3,700 PPM
pH 7.5

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND
SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)

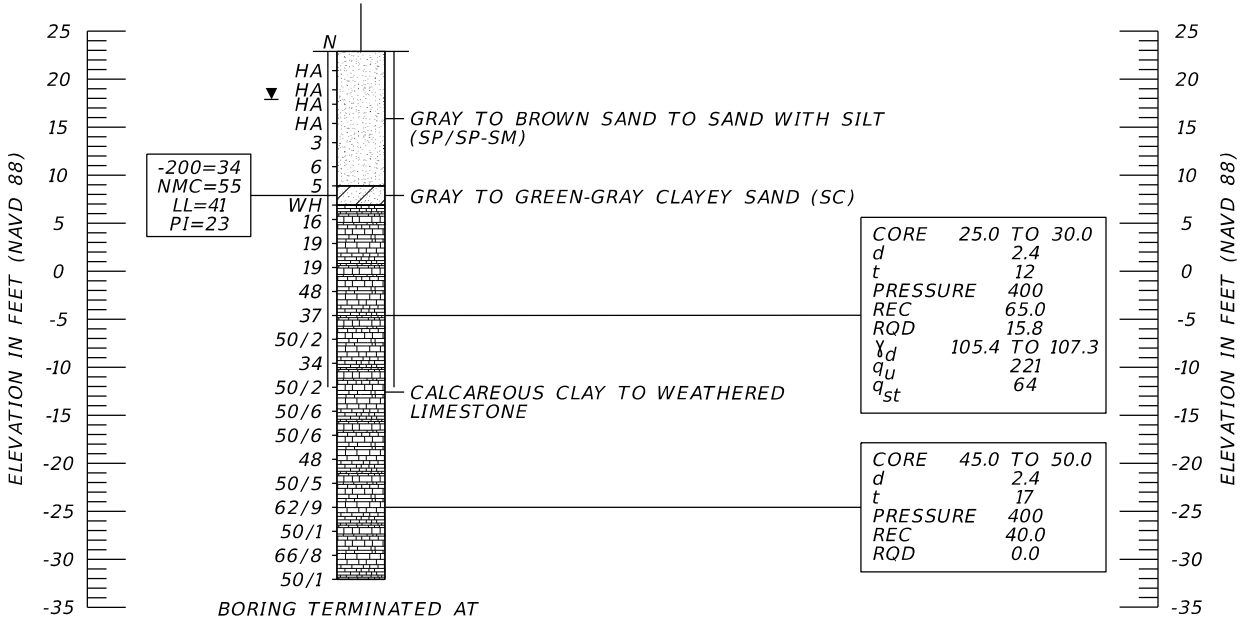


- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
 - ROCK CORES OBTAINED BY WASH DRILLING ADJACENT TO SPT BORING LOCATION TO DEPTHS NOTED THEN PERFORMING CORE RUN.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO GREEN-GRAY CLAYEY SAND (SC)
- DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- 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
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

BOR # B-MORRISON-5
STA. 222+59
REF. SELMON
OFF. 7' LT.
ELEV. 22.9
DATE 1/11/2024
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25

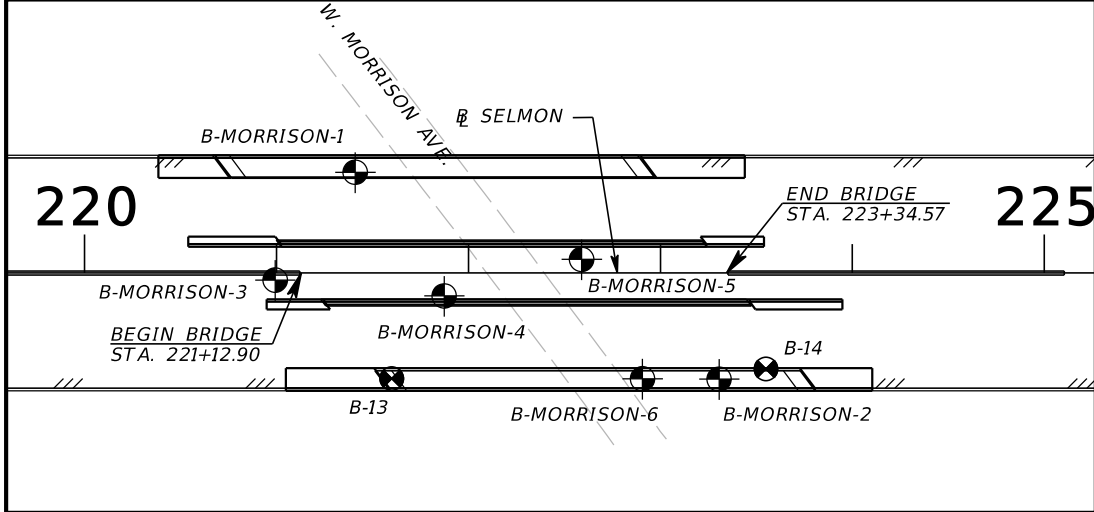


BORING TERMINATED AT ELEVATION -32.1 FT (NAVD 88)
LATITUDE: N 27.93382
LONGITUDE: W 82.48158

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

BRIDGE NOS. 100320 & 100321

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS CHECKED BY: SS DESIGNED BY: BJS CHECKED BY: KHS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (4) MORRISON AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME: SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET	SHEET NO.	
								SR 618	HILLSBOROUGH	H1-0012			



BORING LOCATION PLAN

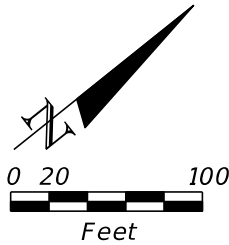
ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUPERSTRUCTURE EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:
RESISTIVITY 10,000 TO 14,000 OHM-CM
CHLORIDES 15 TO 30 PPM
SULFATES <5 TO 12 PPM
pH 6.9 TO 8.2

WATER TEST RESULTS: (TAMPA BAY)
RESISTIVITY 260 OHM-CM
CHLORIDES 20,000 PPM
SULFATES 3,700 PPM
pH 7.5

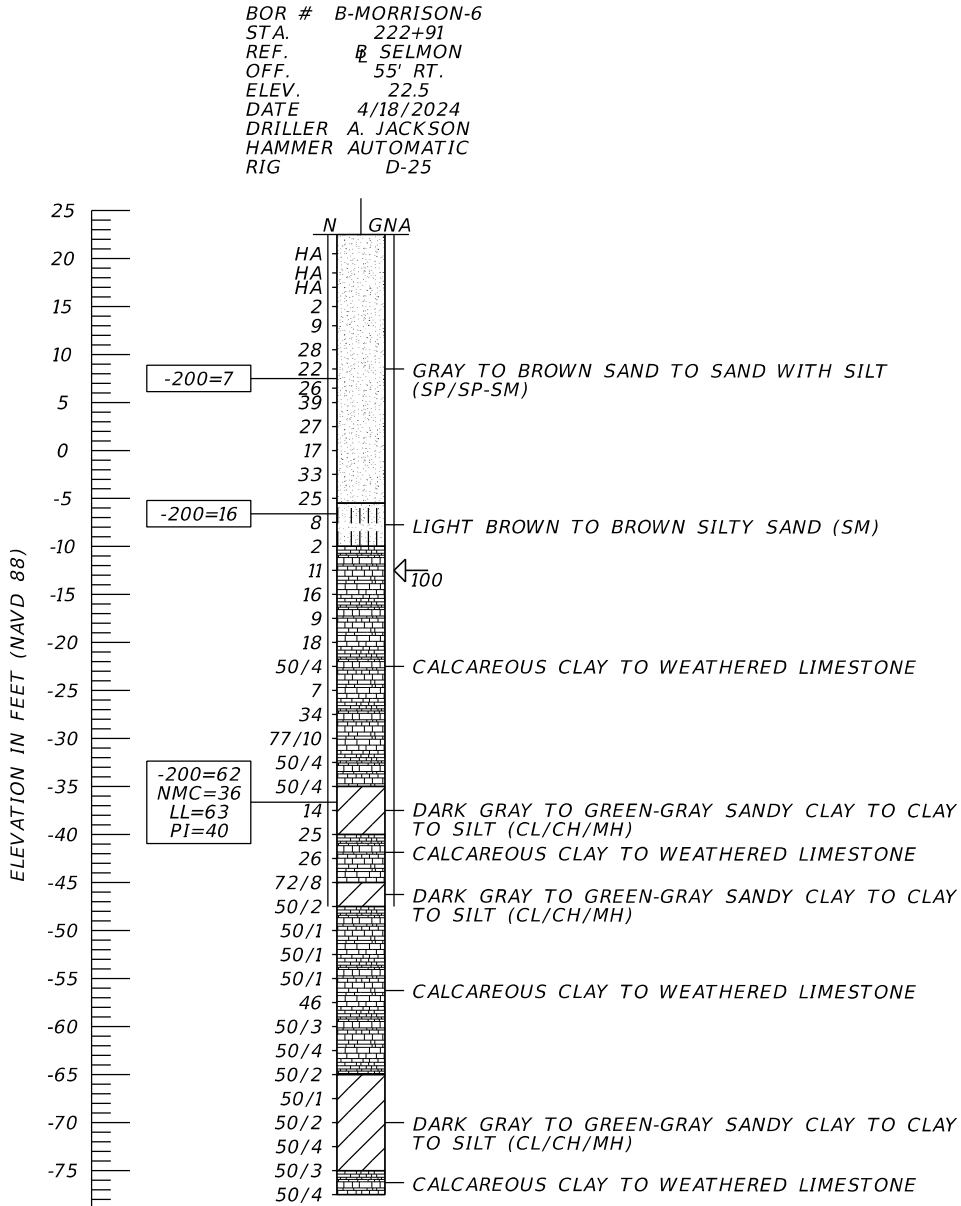
CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND
SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO GREEN-GRAY CLAYEY SAND (SC)
- DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- 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
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY



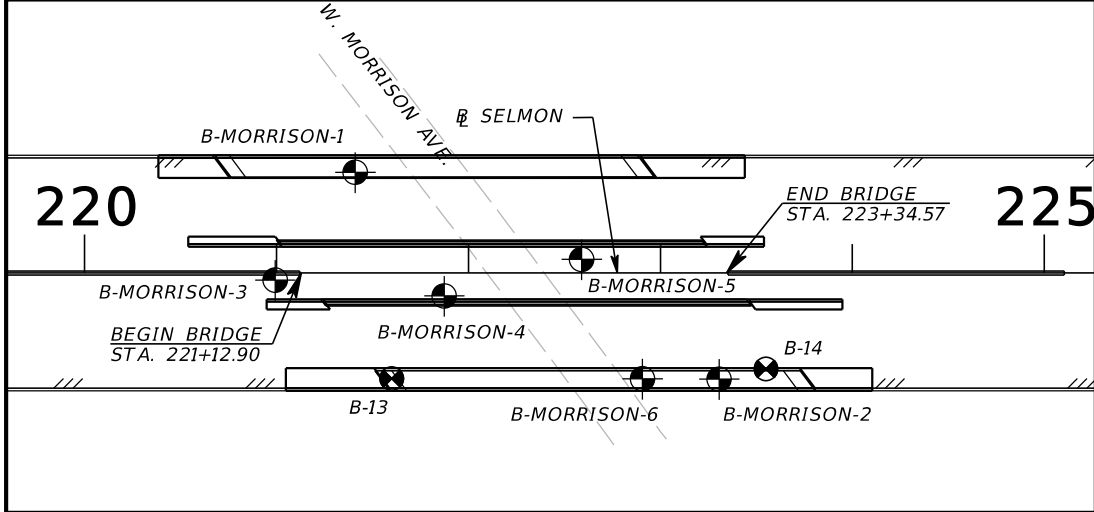
BORING TERMINATED AT
ELEVATION -77.5 FT (NAVD 88)
LATITUDE: N 27.93378
LONGITUDE: W 82.48137

	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 NOS. 100320 & 100321

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				PROJECT NAME:		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012			

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



BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

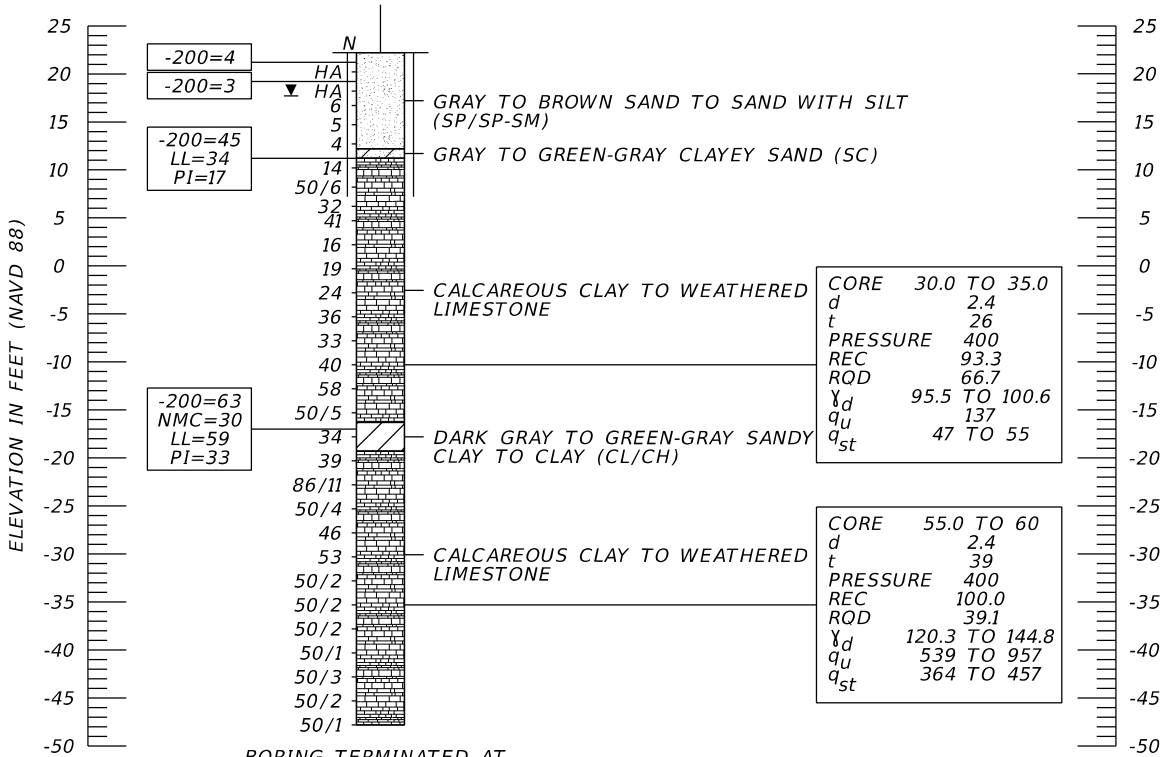
SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)
SUPERSTRUCTURE EXTREMELY AGGRESSIVE
(WATER - CHLORIDES = 20,000 PPM)

SOIL TEST RESULTS:
RESISTIVITY 10,000 TO 14,000 OHM-CM
CHLORIDES 15 TO 30 PPM
SULFATES <5 TO 12 PPM
pH 6.9 TO 8.2

WATER TEST RESULTS: (TAMPA BAY)
RESISTIVITY 260 OHM-CM
CHLORIDES 20,000 PPM
SULFATES 3,700 PPM
pH 7.5

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND
SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-MORRISON-2
STA. 223+31
REF. SELMON
OFF. 55' RT.
ELEV. 22.2'
DATE 3/22/2022
DRILLER K. CAUDILL
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -47.8 FT (NAVD 88)
LATITUDE: N 27.93387
LONGITUDE: W 82.48129

- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
 - ROCK CORES OBTAINED BY WASH DRILLING ADJACENT TO SPT BORING LOCATION TO DEPTHS NOTED THEN PERFORMING CORE RUN.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- LIGHT BROWN TO BROWN SILTY SAND (SM)
- GRAY TO GREEN-GRAY CLAYEY SAND (SC)
- DARK GRAY TO GREEN-GRAY SANDY CLAY TO CLAY TO SILT (CL/CH/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- 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
- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- CASING

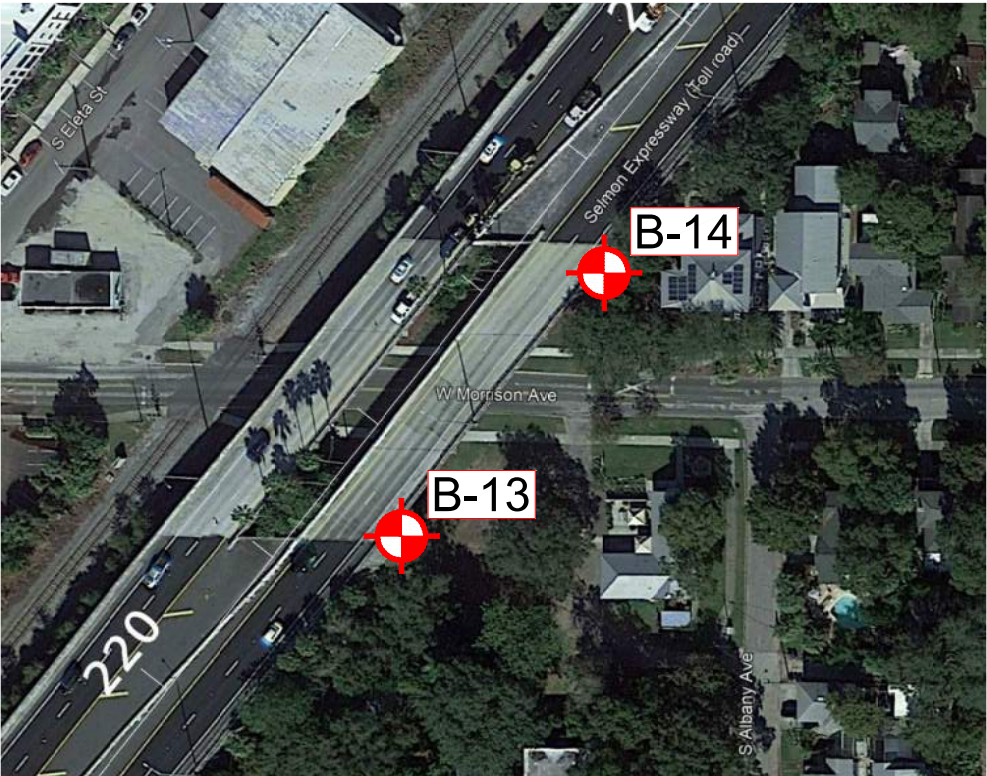
SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

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

BRIDGE NOS. 100320 & 100321

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (6) MORRISON AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

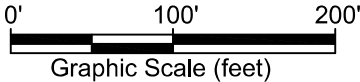
THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



Source: Google Earth
Image Date: 12/17/2019

LEGEND:

Approximate SPT Boring Location



LEGEND

- (SP-SM) Poorly-graded SAND with silt
- (SC) Clayey SAND
- (CL) Lean CLAY
- (CH) Fat CLAY
- Limestone
- Weathered LIMESTONE
- (SM) Silty SAND
- (SP-SC) Poorly graded SAND with clay
- (SC-SM) Silty clayey SAND
- (SP) Poorly-graded SAND

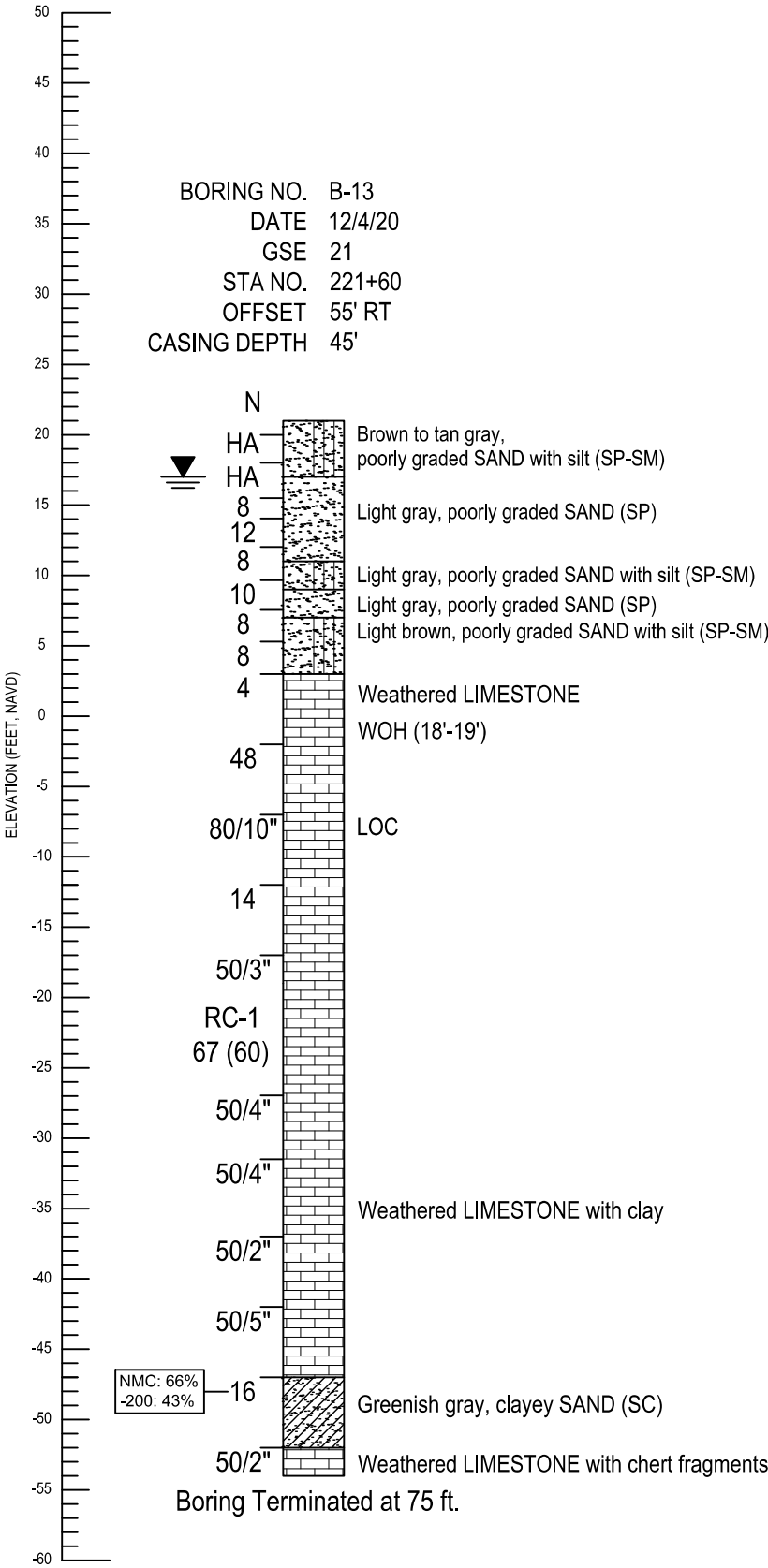
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (Chlorides = 9,500 ppm in Hillsborough Bay)
SUPERSTRUCTURE: EXTREMELY AGGRESSIVE (Chlorides = 9,500 ppm in Hillsborough Bay)

ENGINEERING CLASSIFICATION

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

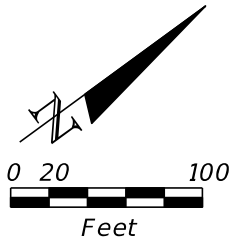
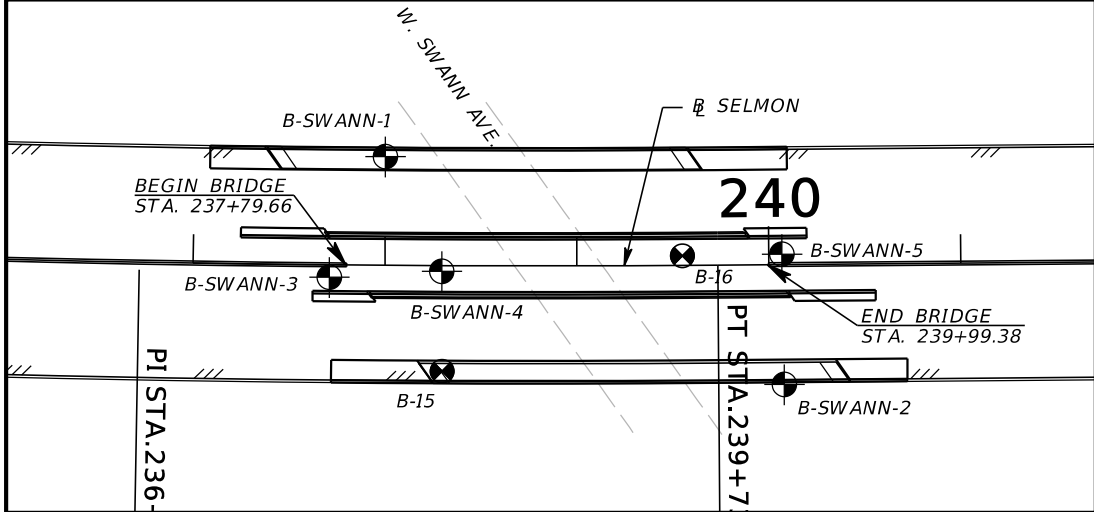
-
- WATER TABLE EXISTING AT TIME OF BORING
-
- ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
- N
- SPT N-VALUE
- HA
- HAND AUGER
- NMC
- NATURAL MOISTURE CONTENT (%)
- 200
- FINES PASSING A NO. 200 SIEVE (%)
- GNA
- GROUNDWATER NOT APPARENT
- GSE
- APPROXIMATE GROUND SURFACE ELEVATION (FEET, NAVD)
- OC
- ORGANIC CONTENT
- LL
- LIQUID LIMIT
- PI
- PLASTICITY INDEX
- LOC
- LOSS OF CIRCULATION
- ROC
- REGAIN OF CIRCULATION
- WOH
- WEIGHT OF HAMMER
- WOR
- WEIGHT OF ROD
- SP
- UNIFIED SOIL CLASSIFICATION SYSTEM
- qu
- UNCONFINED COMPRESSIVE STRENGTH FROM POCKET PENETROMETER
- 50/3"
- 50 BLOWS FOR 3-INCHES PENETRATION INTO SOIL
- RC-1
- 70 (42)
- ROCK CORE WITH 70% RECOVERY AND RQD OF 42%



APPENDIX H

Report of Core Borings Sheets – SR 618 over Swann Ave.

Existing Geotechnical Data – Borings Performed by Others



- NOTES:
- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
 - BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.

LEGEND

- GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM)
- GRAY SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- GRAY TO BROWN SILTY CLAY TO CLAY (CL-ML/CL/CH)
- BROWN SILT (ML/MH)
- CALCAREOUS CLAY TO WEATHERED LIMESTONE
- ASPHALT PAVEMENT AND LIMEROCK BASE MATERIAL
- 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 (%)
- NP NON-PLASTIC
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- LOSS OF CIRCULATION OF DRILLING FLUID (%)
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

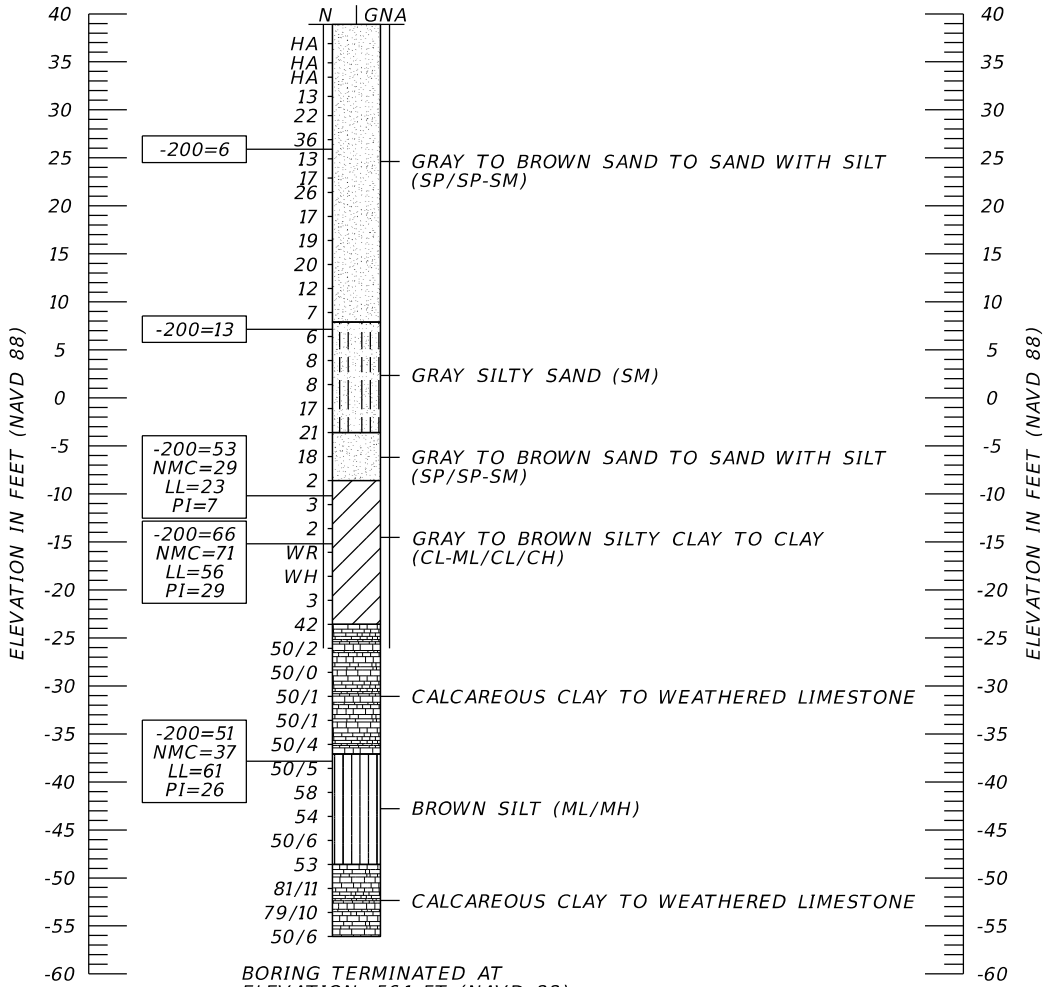
SUBSTRUCTURE CONCRETE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE (RESISTIVITY = 4,800 OHM-CM)
SUPERSTRUCTURE SLIGHTLY AGGRESSIVE

SOIL TEST RESULTS:

RESISTIVITY 4,800 TO 28,000 OHM-CM
CHLORIDES 45 TO 90 PPM
SULFATES <5 TO 171 PPM
pH 6.8 TO 7.1

BOR # B-SWANN-3
STA. 237+71
REF. SELMON
OFF. 6' RT.
ELEV. 38.9
DATE 5/1/2024
DRILLER C.VIRGEN
HAMMER AUTOMATIC
RIG D-25

CORE CORE DEPTH IS REFERENCED TO FEET BELOW THE GROUND SURFACE (MUDLINE) AT THE TIME OF BORING COMPLETION
d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Yd DRY UNIT WEIGHT (PCF)
qu MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
st SPLITTING TENSILE STRENGTH (PSI)

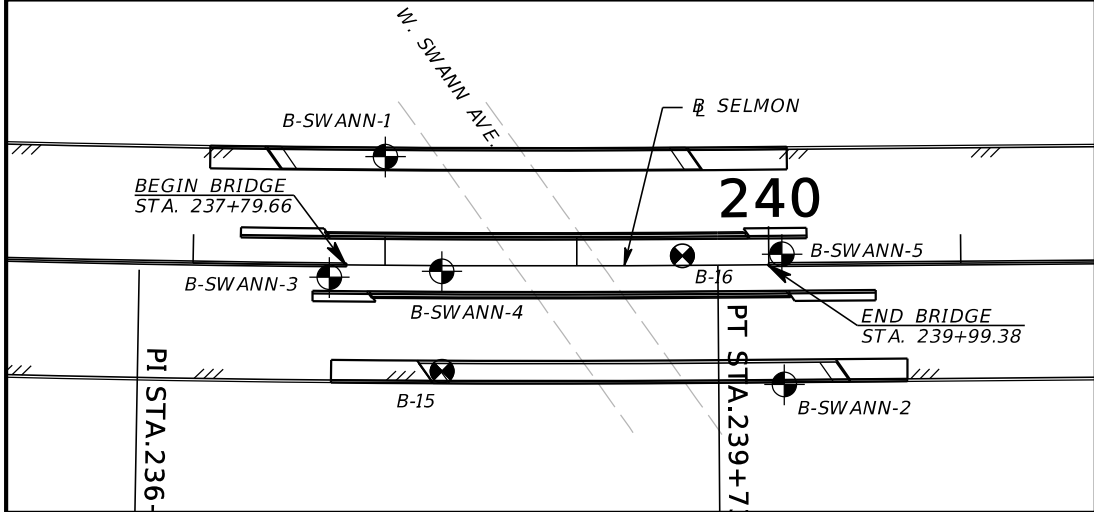


BORING TERMINATED AT ELEVATION -56.1 FT (NAVD 88)
LATITUDE: N 27.93707
LONGITUDE: W 82.47865

	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 NOS. 100322 & 100323

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (1) SWANN AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		



BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

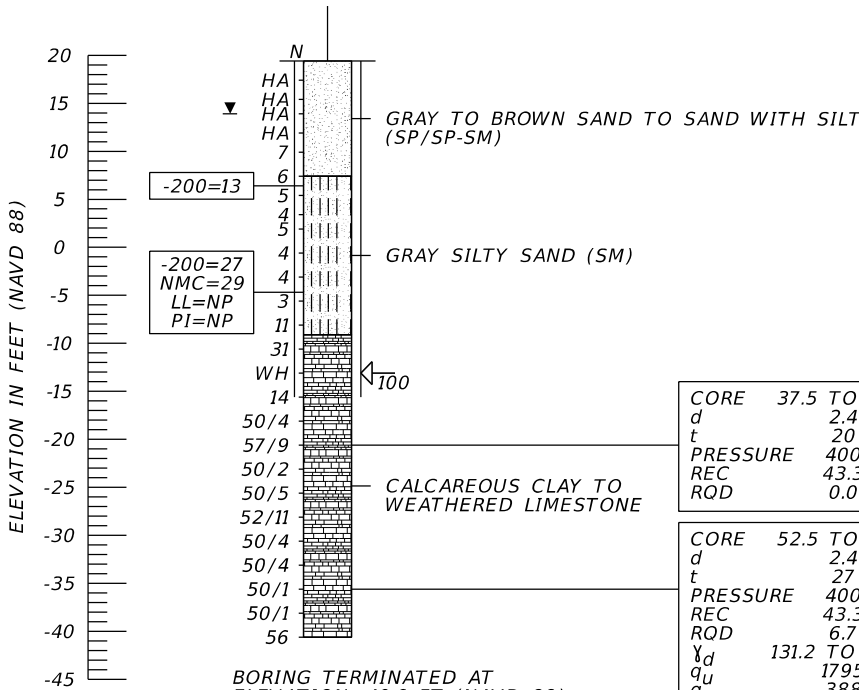
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SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE
(RESISTIVITY = 4,800 OHM-CM)
SUPERSTRUCTURE SLIGHTLY AGGRESSIVE

SOIL TEST RESULTS:

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CHLORIDES 45 TO 90 PPM
SULFATES <5 TO 171 PPM
pH 6.8 TO 7.1

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d CORE BARREL DIAMETER (INCHES)
t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
RQD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)

BOR # B-SWANN-4
STA. 238+30
REF. SELMON
OFF. 3' RT.
ELEV. 19.4
DATE 1/16/2024
DRILLER D. STAKELIN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT
ELEVATION -40.6 FT (NAVD 88)

LATITUDE: N 27.93720
LONGITUDE: W 82.47855

NOTES:

- BORING LOCATIONS AND ELEVATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.
- BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
- ROCK CORES OBTAINED BY WASH DRILLING ADJACENT TO SPT BORING LOCATION TO DEPTHS NOTED THEN PERFORMING CORE RUN.

LEGEND

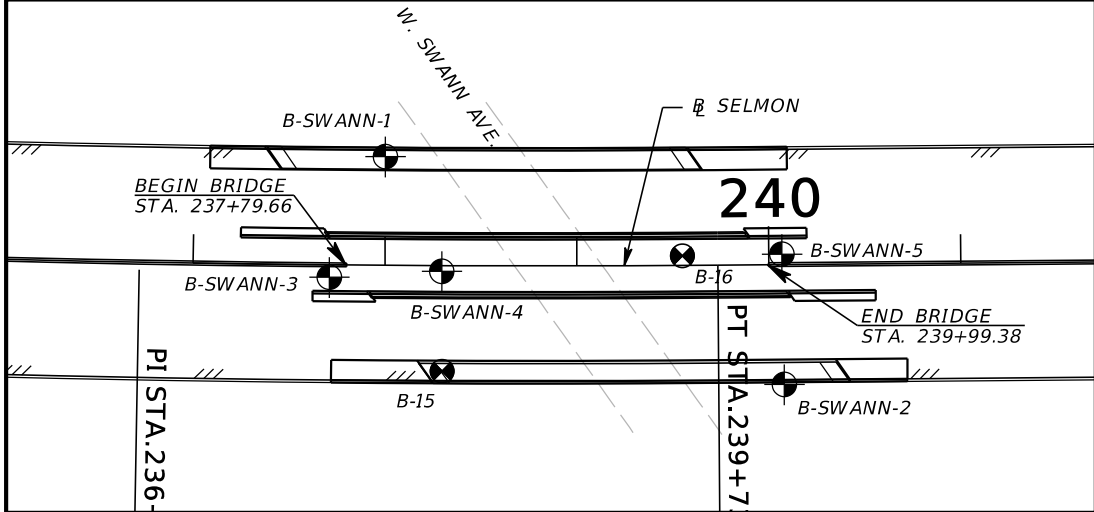
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- GRAY SILTY SAND (SM)
- GRAY TO BROWN CLAYEY SAND (SC)
- GRAY TO BROWN SILTY CLAY TO CLAY (CL-ML/CL/CH)
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- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCE
- 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 (%)
- NP NON-PLASTIC
- NAVD 88 NORTH AMERICAN VERTICAL DATUM OF 1988
- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
- GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- LOSS OF CIRCULATION OF DRILLING FLUID (%)
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
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LOOSE	4 to 10	3 to 8
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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 NOS. 100322 & 100323

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE:		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS				REPORT OF CORE BORINGS (2) SWANN AVENUE		
							DESIGNED BY: BJS	ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
							CHECKED BY: KHS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

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



BORING LOCATION PLAN

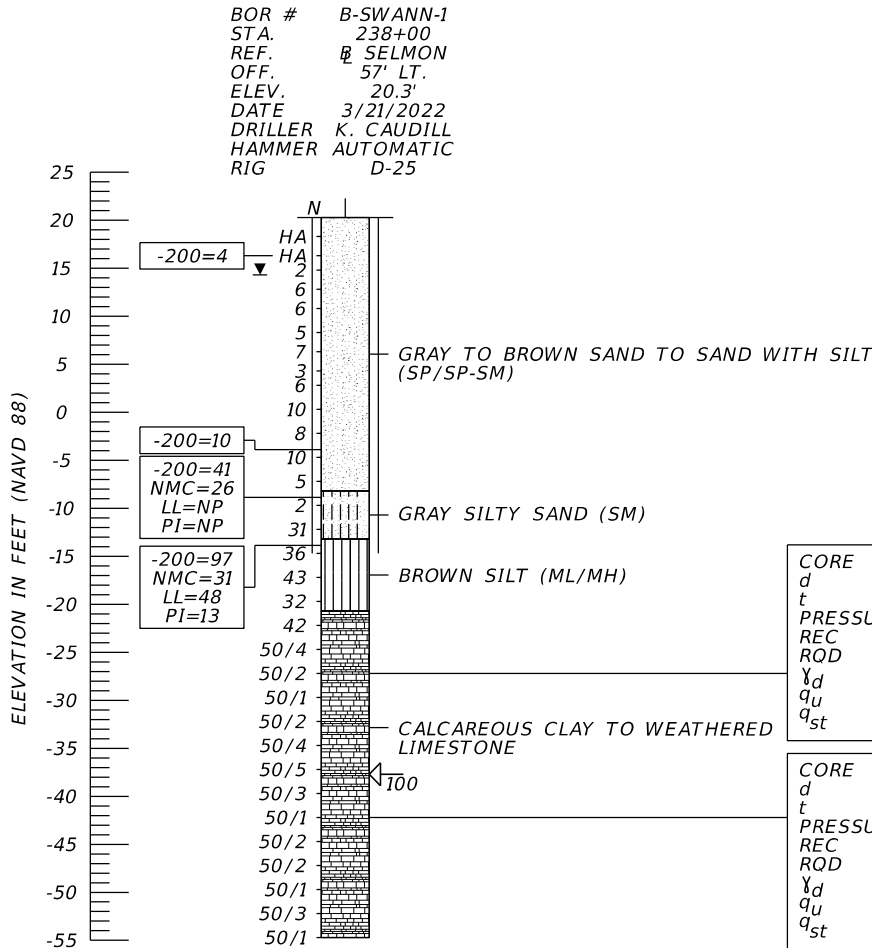
ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE
(RESISTIVITY = 4,800 OHM-CM)
SUPERSTRUCTURE SLIGHTLY AGGRESSIVE

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pH 6.8 TO 7.1

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t ROCK CORE TIME (MINUTES)
PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
ROD ROCK QUALITY DESIGNATION (%)
Y_d DRY UNIT WEIGHT (PCF)
q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)



BORING TERMINATED AT
ELEVATION -54.7 FT (NAVD 88)
LATITUDE: N 27.93723
LONGITUDE: W 82.47875

NOTES:

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- BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION AT THE BRIDGE SITE IS REPORTED UP TO APPROXIMATELY +15 FEET, NGVD 29.
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LEGEND

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- GRAY TO BROWN SILTY CLAY TO CLAY (CL-ML/CL/CH)
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- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- NP NON-PLASTIC

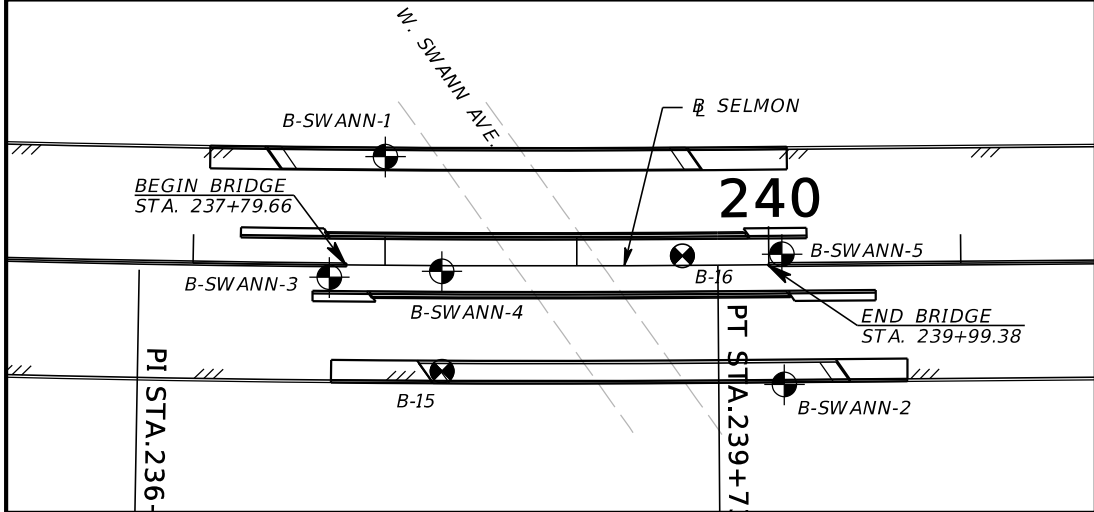
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- APPROXIMATE SPT BORING LOCATION BY OTHERS
- APPROXIMATE SPT BORING LOCATION
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- LOSS OF CIRCULATION OF DRILLING FLUID (%)
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY

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GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
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BRIDGE NOS. 100322 & 100323

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS CHECKED BY: SS DESIGNED BY: BJS CHECKED BY: KHS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (3) SWANN AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SHEET NO.	
								SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET		

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



BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

SUBSTRUCTURE CONCRETE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE
(RESISTIVITY = 4,800 OHM-CM)
SUPERSTRUCTURE SLIGHTLY AGGRESSIVE

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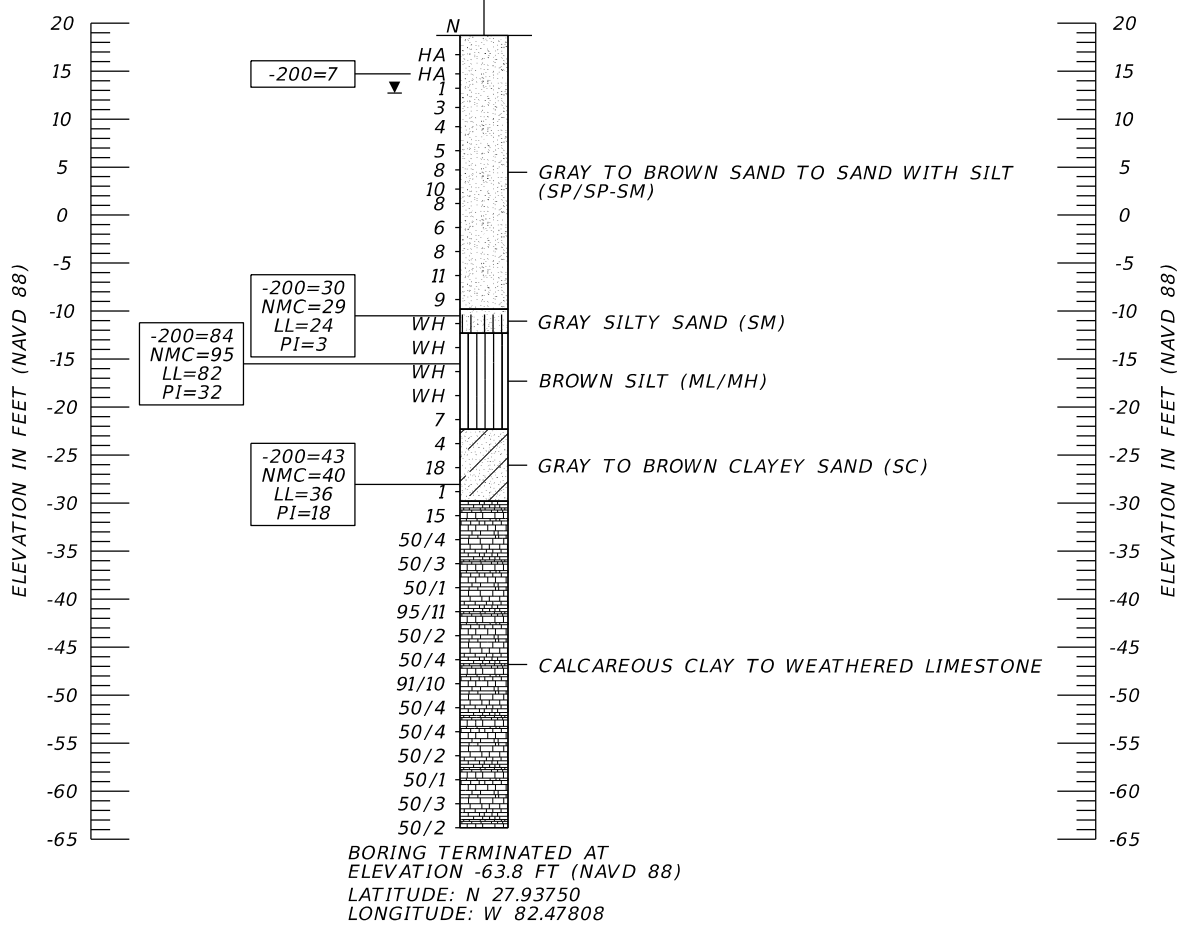
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PRESSURE DOWN PRESSURE APPLIED DURING CORE RUN (PSI)
REC PERCENT RECOVERY (%)
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q_u MAXIMUM UNCONFINED COMPRESSION STRENGTH (PSI)
q_{st} SPLITTING TENSILE STRENGTH (PSI)

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LEGEND

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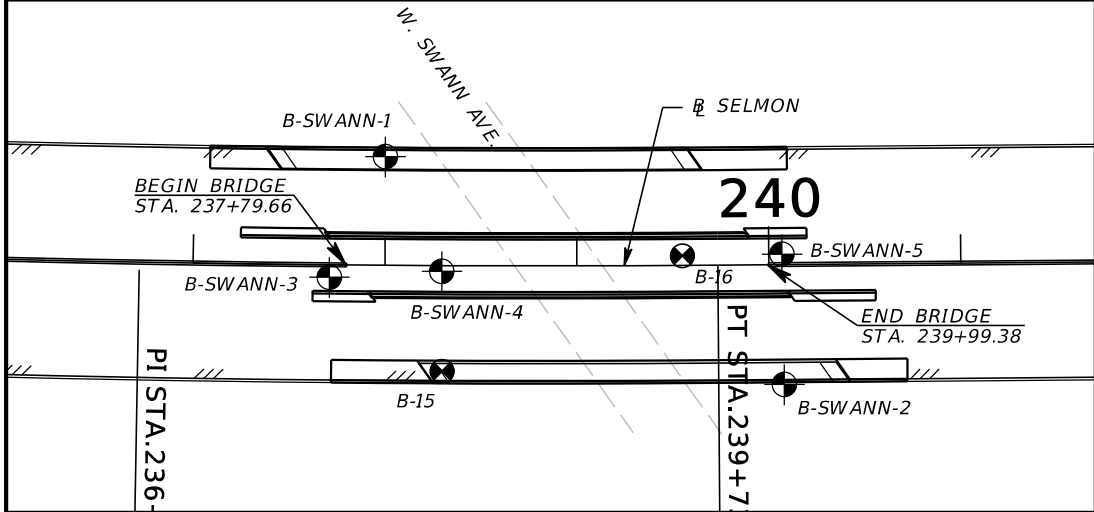


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BRIDGE NOS. 100322 & 100323

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS CHECKED BY: SS DESIGNED BY: BJS CHECKED BY: KHS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (4) SWANN AVENUE		REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	THEA PROJECT NO.	PROJECT NAME:	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET	SHEET NO.
								SR 618	HILLSBOROUGH	H1-0012			

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BORING LOCATION PLAN

ENVIRONMENTAL CLASSIFICATION:

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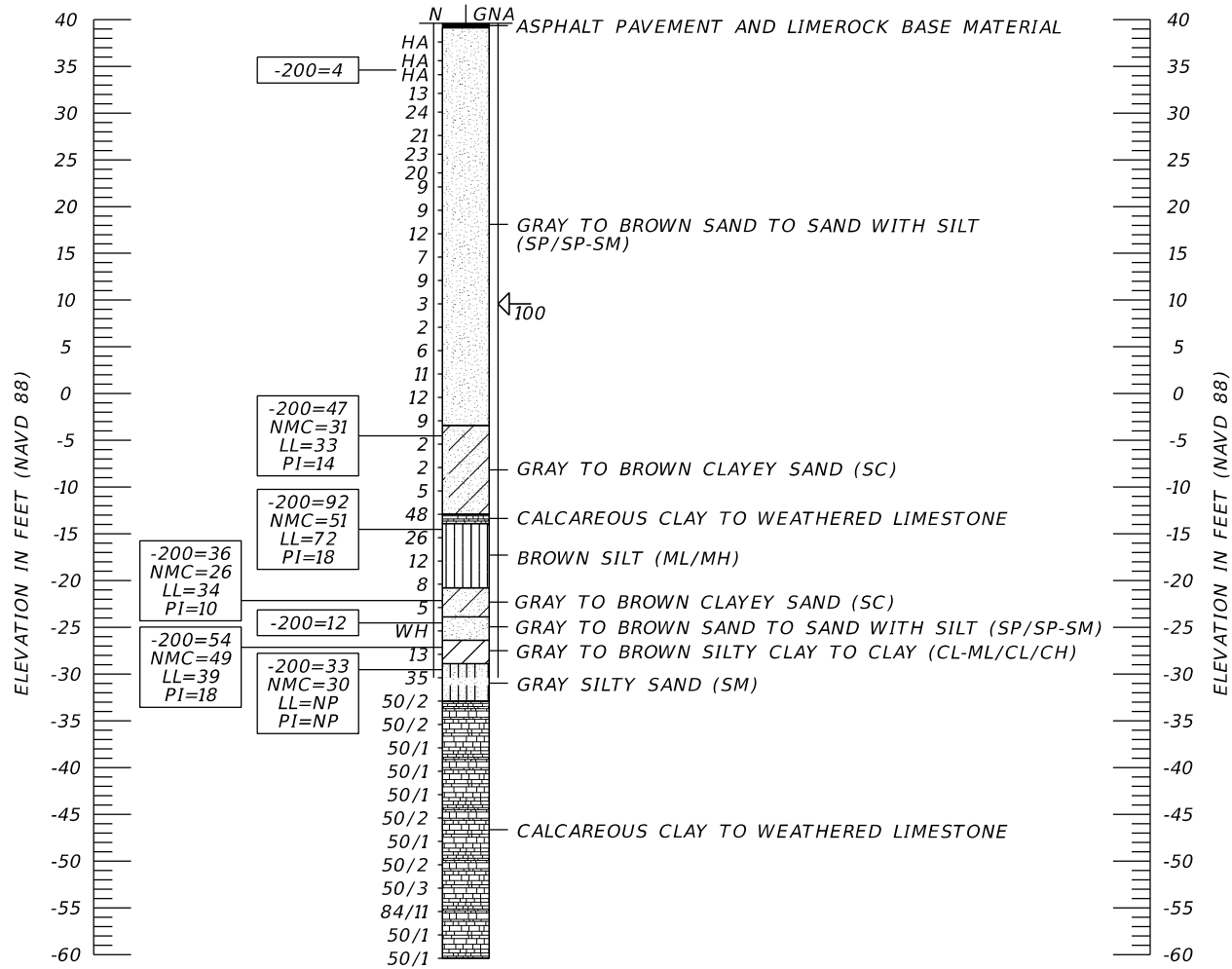
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LEGEND

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- GRAY TO BROWN SILTY CLAY TO CLAY (CL-ML/CL/CH)
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- APPROXIMATE SPT BORING LOCATION BY OTHERS
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- LOSS OF CIRCULATION OF DRILLING FLUID (%)
- CASING
- SELMON BASELINE SURVEY OF SELMON EXPRESSWAY



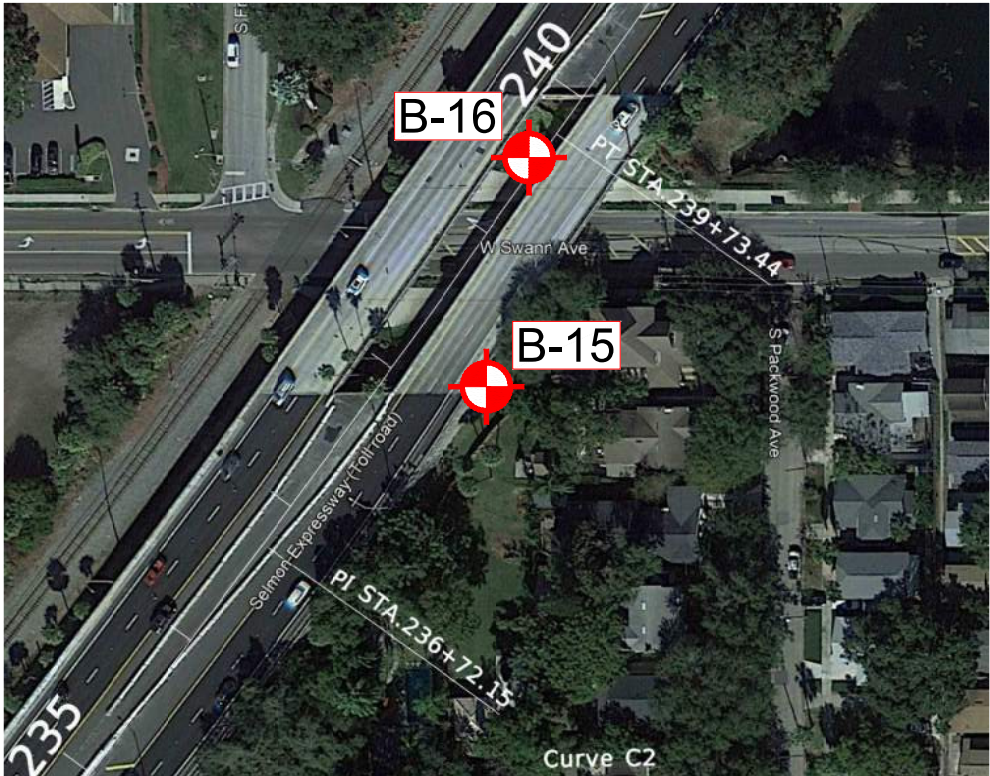
BORING TERMINATED AT
ELEVATION -60.4 FT (NAVD 88)
LATITUDE: N 27.93761
LONGITUDE: W 82.47825

	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 NOS. 100322 & 100323

REVISIONS						KEVIN H. SCOTT, P.E. P.E. LICENSE NUMBER 65514 TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637	DRAWN BY: BJS	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			SHEET TITLE: REPORT OF CORE BORINGS (5) SWANN AVENUE			REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		CHECKED BY: SS							ROAD NO.
							DESIGNED BY: BJS	SR 618	HILLSBOROUGH	H1-0012	SOUTH SELMON EXPRESSWAY IMPROVEMENTS FROM HIMES AVENUE TO WHITING STREET			
							CHECKED BY: KHS							

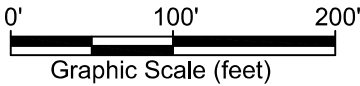
THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



Source: Google Earth
Image Date: 12/17/2019

LEGEND:

Approximate SPT Boring Location



LEGEND

- (SP-SM) Poorly-graded SAND with silt
(SC) Clayey SAND
(CL) Lean CLAY
(CH) Fat CLAY
Limestone
(SP) Poorly-graded SAND
Weathered LIMESTONE
(SM) Silty SAND
(SP-SC) Poorly graded SAND with clay
(SC-SM) Silty clayey SAND

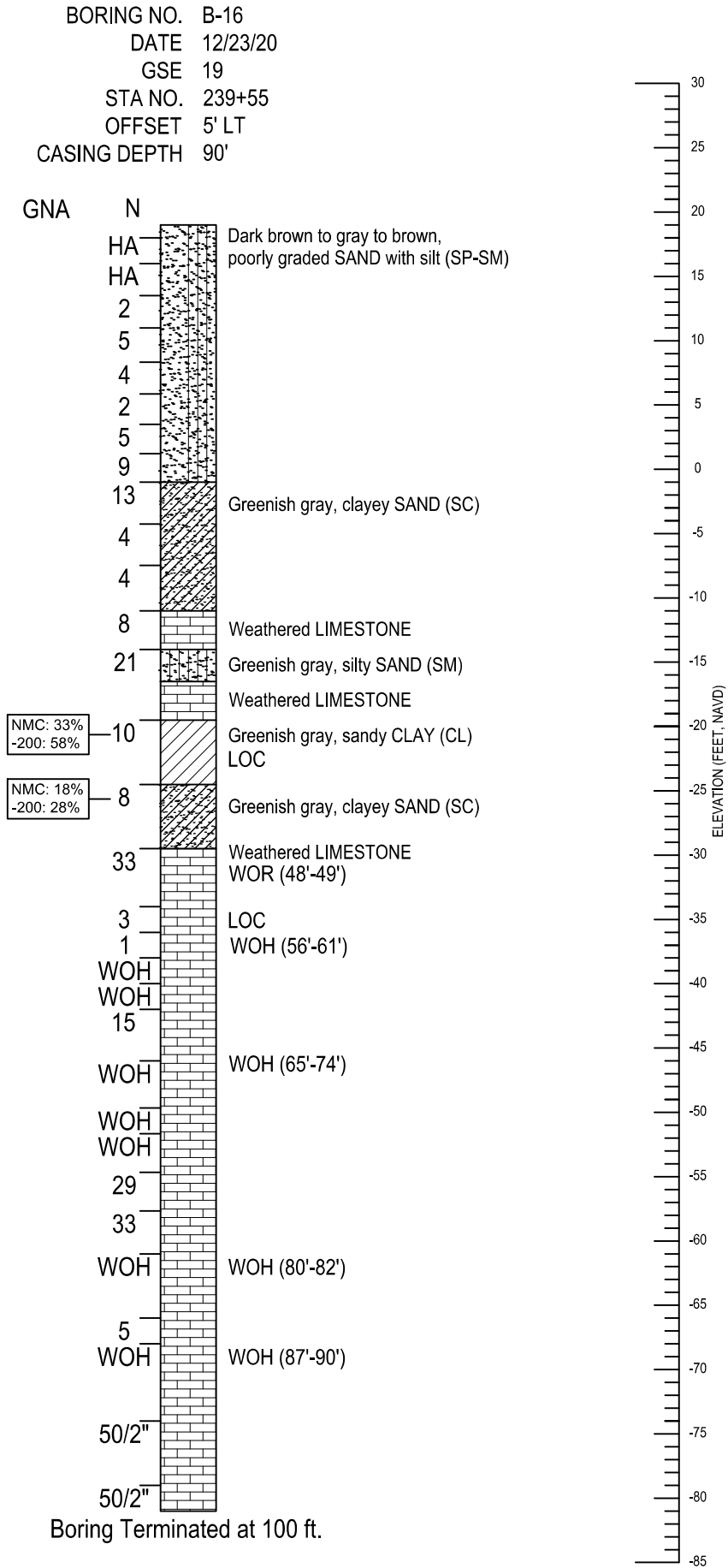
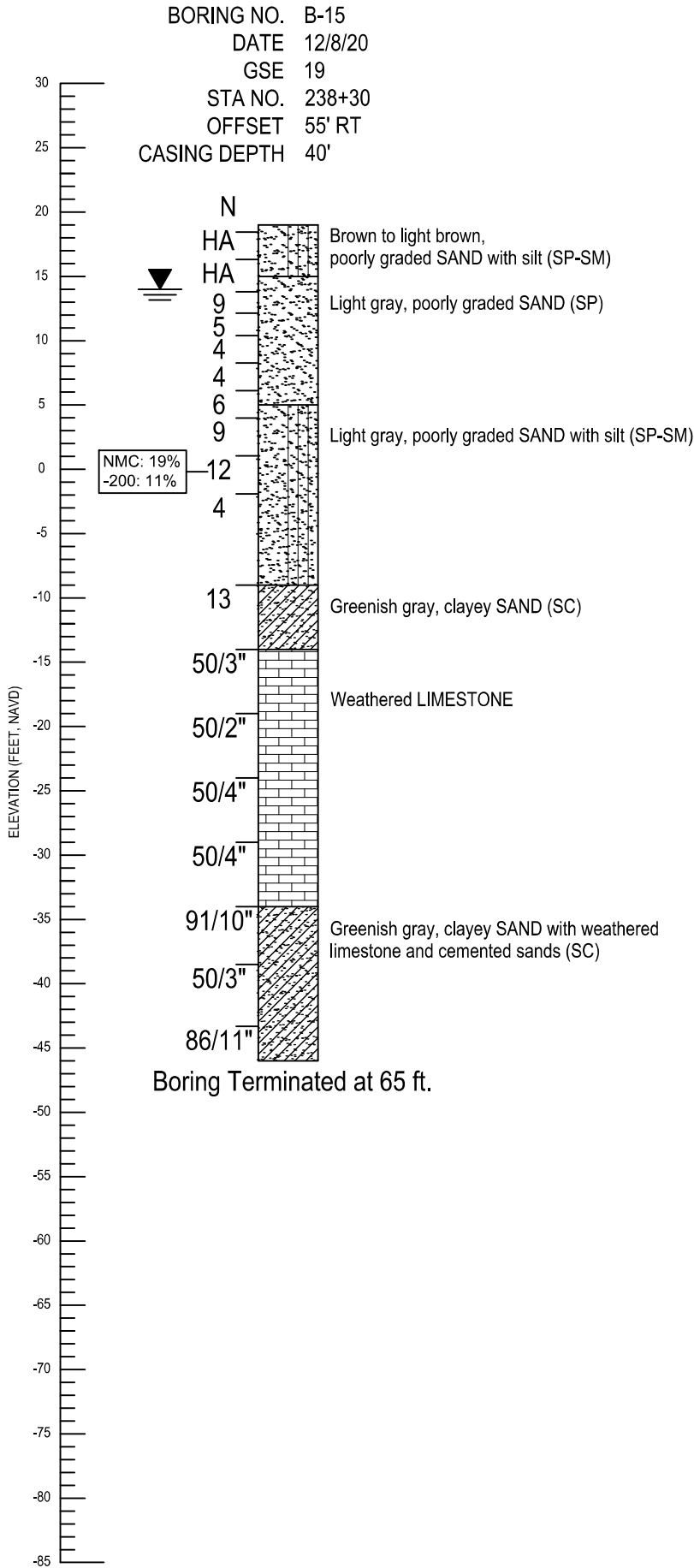
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE:
CONCRETE: MODERATELY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE

ENGINEERING CLASSIFICATION

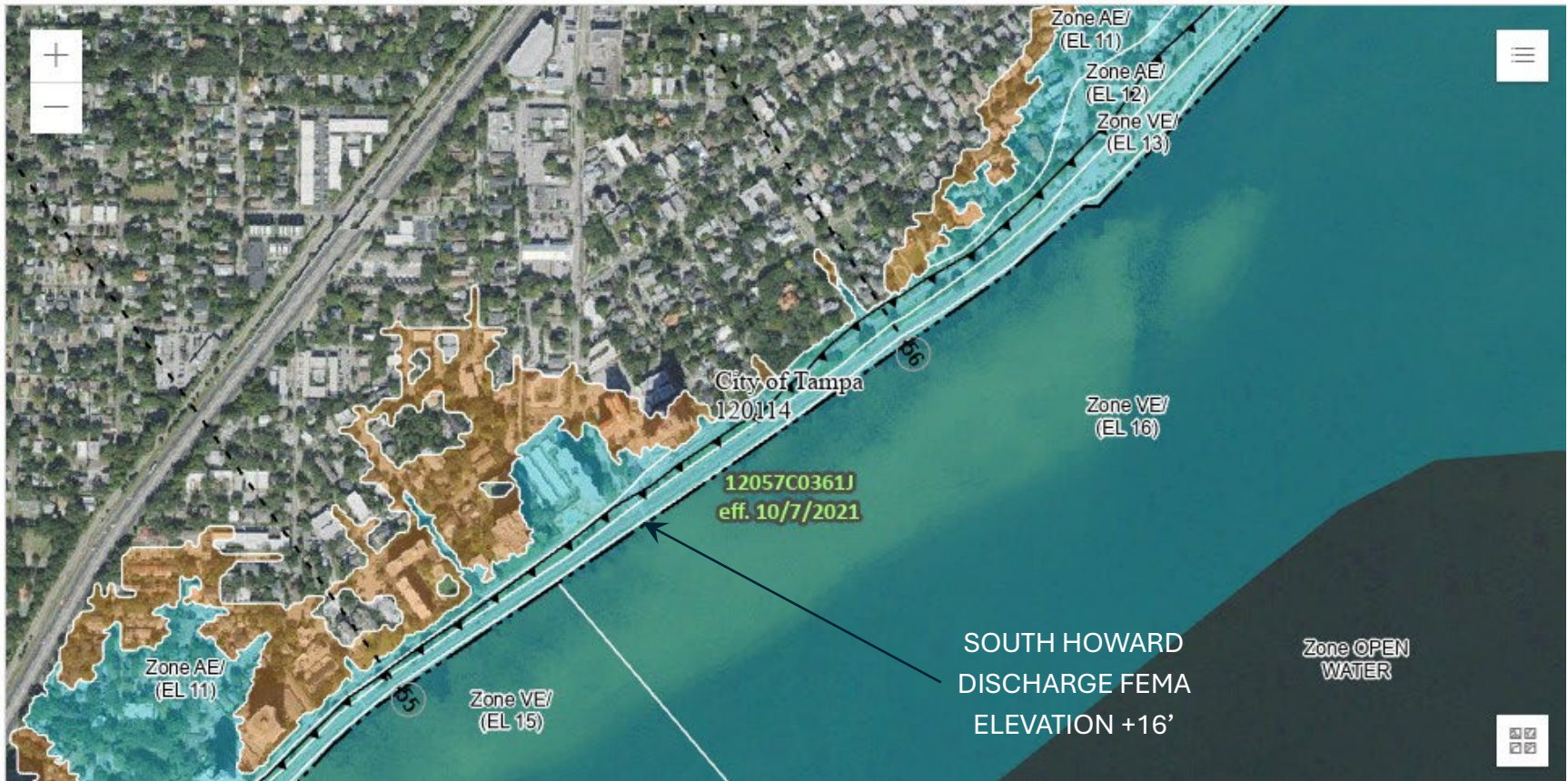
GRANULAR MATERIALS- RELATIVE DENSITY	SAFETY HAMMER SPT N-VALUE (BLOWS/FT)	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT)
VERY LOOSE	≤ 4	≤ 3
LOOSE	4-10	3-8
MEDIUM DENSE	10-30	8-24
DENSE	30-50	24-40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SAFETY HAMMER SPT N-VALUE (BLOWS/FT)	AUTOMATIC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

- WATER TABLE EXISTING AT TIME OF BORING
ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
N SPT N-VALUE
HA HAND AUGER
NMC NATURAL MOISTURE CONTENT (%)
-200 FINES PASSING A NO. 200 SIEVE (%)
GNA GROUNDWATER NOT APPARENT
GSE APPROXIMATE GROUND SURFACE ELEVATION (FEET, NAVD)
OC ORGANIC CONTENT
LL LIQUID LIMIT
PI PLASTICITY INDEX
LOC LOSS OF CIRCULATION
ROC REGAIN OF CIRCULATION
WOH WEIGHT OF HAMMER
WOR WEIGHT OF ROD
SP UNIFIED SOIL CLASSIFICATION SYSTEM
qu UNCONFINED COMPRESSIVE STRENGTH FROM POCKET PENETROMETER
50/3" 50 BLOWS FOR 3-INCHES PENETRATION INTO SOIL
RC-1 70 (42) ROCK CORE WITH 70% RECOVERY AND RQD OF 42%



REVISIONS				ETHAN H. DREW, P.E. P.E. NO. 88622 MC SQUARED, INC. 5808-A BRECKENRIDGE PARKWAY, TAMPA, FL 33610	TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY			REPORT OF CORE BORINGS SWANN AVE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		10
					SR 618	HILLSBOROUGH			

Gravity System Failure During a Storm Event



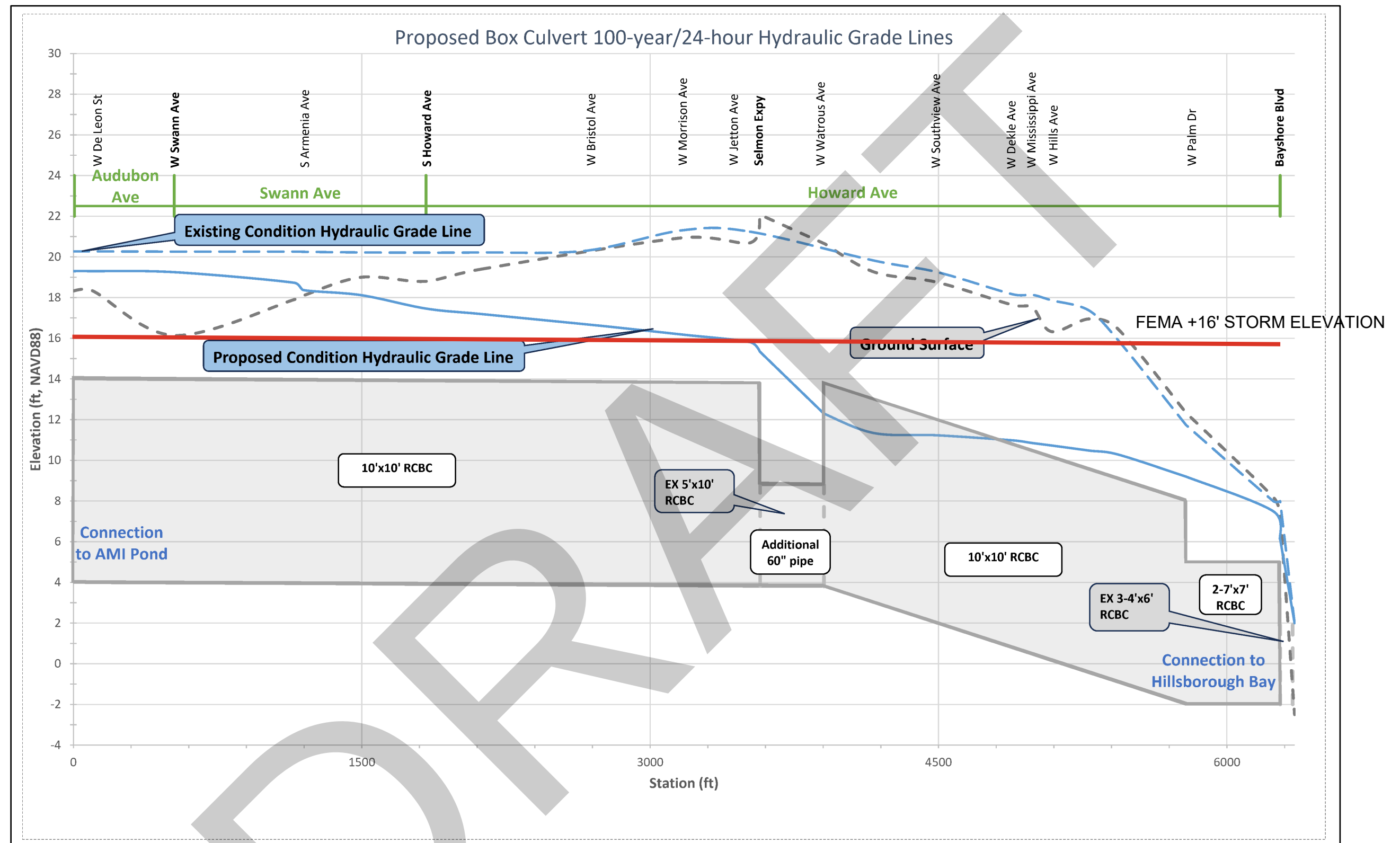


Figure 6-3 – Recommended Alternative Profile View and 100-year/24-hour HGL Comparison