



**GEOTECHNICAL ENGINEERING SERVICES
PROPOSED DAVIS ISLAND TRAIL
SOUTH DAVIS BOULEVARD
TAMPA, FLORIDA**

September 25, 2008

City of Tampa
Parks & Recreation Department
730 W. Emma Street
Tampa, Florida 33603

Attention: Ms. Laurie Potier-Brown
Project Manager

Re: Geotechnical Engineering Services
Proposed Davis Island Trail
South Davis Boulevard
Tampa, Florida
PSI Project No. 787-85076
Purchase Order No. POPR08100384

Dear Ms. Potier-Brown:

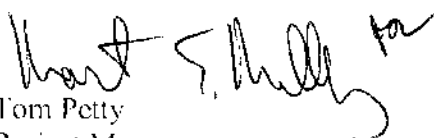
Thank you for choosing Professional Service Industries, Inc. (PSI) as your consultant for the above-referenced project. PSI has completed a geotechnical study for the referenced project. The results of the study are discussed in the accompanying report, three (3) copies of which are enclosed.

Authorization to proceed with this project was provided by Mr. Gregory Spearman, Purchasing Director of City of Tampa, through Purchase Order No. POPR08100384. This study was conducted in accordance with our proposal for these services dated December 18, 2007. PSI Proposal No. 787-7G0360.

Should there be any questions, please do not hesitate to contact our office at (813) 886-1075. PSI would be pleased to continue providing geotechnical services throughout the implementation of the project, and we look forward to working with you and your organization on this and future projects.

Sincerely,

Professional Service Industries, Inc.
Engineering Business No. 3684


Tom Petty
Project Manager



Martin E. Millburg, P.E.
Senior Geotechnical Engineer
Florida License No. 36584
10/14/08

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1.0 INTRODUCTION

1.1 PROJECT INFORMATION

The project, as we understand it, includes construction of the proposed Davis Island Trail located in Tampa, Florida. The trail is planned to travel southwest along South Davis Boulevard and then continue to the east along Severn Avenue. We understand the proposed trail will be constructed over a distance of approximately 1½ miles long, and will be constructed within one foot of current grade.

If any of this information is incorrect or if project plans change significantly please contact PSI so that we may determine if alternate changes in the recommendations are required.

1.2 SITE DESCRIPTION

The site is located along South Davis Boulevard on Davis Island in Tampa, Florida. The project site is located within Section 31 & 36, Township 29 South, Range 18 & 19 East in Hillsborough County, Florida. The elevation of the proposed project site is approximately +5 feet NGVD. Davis Island was constructed from dredged fill in the 1920's.

2.0 SCOPE OF SERVICES

The purpose of this study was to provide a geotechnical study for the primary purpose of developing geotechnical design criteria for support of planned pavement trail design and construction. In this regard, the following services have been performed:

1. General assessment of the area geology based on our past experience and study of available geological literature.
2. Soil stratigraphy at the boring locations. Development of the soil profile along the proposed trail and the anticipated soil conditions within the depth of influence.
3. General location and description of potential deleterious materials encountered in the borings which may interfere with construction progress or pavement performance, including existing fills or surficial organics.
4. Discuss site preparation requirements and engineering criteria for placement and compaction of in-situ soils and approved fill materials.



5. Identification of critical design and/or construction considerations based on the soil and groundwater conditions encountered in the borings.
6. Measure the groundwater levels in the borings and estimate the normal seasonal high groundwater levels.

The scope of services for the geotechnical testing program associated with the proposed trail to achieve the project requirements included the following:

1. Reviewed readily available published topographic and soils information. This published information was obtained from a topographic map published by the United States Geological Survey (USGS) and the "Soil Survey of Hillsborough County, Florida" published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS).
2. Executed a program of subsurface exploration consisting of subsurface sampling. We performed a total of thirty-four (34) hand auger borings to a depth of 5 feet below the ground surface along the proposed trail. Samples were retrieved at regular intervals to allow for classification of the soil samples.
3. Visually classified representative soil samples in the laboratory using the AASHTO classification system. Performed a limited laboratory testing program. Identified soil conditions and formed an opinion of soil stratigraphy at each boring location.
4. Measured the groundwater levels in the borings. Estimated the normal seasonal high groundwater levels at the boring locations.
5. The results of the field exploration have been used in an engineering analysis and in the formulation of the recommendations. The results of the subsurface exploration, including the recommendations and the data on which they are based, are presented in this report written by a Professional Engineer.

3.0 SUBSURFACE EXPLORATION

3.1 BORING LOCATIONS

Boring locations were established by PSI personnel in the field through measuring distances from existing site features. Accordingly, the locations are considered approximate.



3.2 ROADWAY SOIL BORINGS

The subsurface conditions were explored using thirty-four (34) hand auger borings performed to a depth of 5 feet below the ground surface. The approximate locations are presented on **Sheet 2** in **Appendix A**.

The hand auger borings were advanced by manually rotating a bucket auger into the soil. The bucket auger consisted of a bucket and two (2) curved cutting blades which retains the soil as the auger is advanced. At regular intervals, the auger was withdrawn and representative samples were collected from each apparent soil layer. The samples were then placed in sealed containers and transported to our Tampa office for further evaluation by a project engineer.

4.0 LABORATORY TESTING

4.1 SOIL CLASSIFICATION TESTING

Representative soil samples collected from the hand auger borings were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classification. The roadway samples were classified in general accordance with the AASHTO Classification System. Classification was based on visual observations with the aid of the laboratory test results performed on selected representative samples. Laboratory classification tests consisted of grain-size analysis and atterberg limits tests. The laboratory test results are presented adjacent to the corresponding soil boring profiles on **Sheet 3** of **Appendix A**.

5.0 GENERALIZED SUBSURFACE SOIL CONDITIONS

5.1 HILLSBOROUGH COUNTY USDA SOIL SURVEY

The "Soil Survey of Hillsborough County, Florida" published by the USDA, SCS, was reviewed for general near surface soil information. This information indicated that the primary soil unit at the project location is St. Augustine-Urban land complex (Mapping unit: 45).

The St. Augustine-Urban land complex consists of soil that is nearly level and somewhat poorly drained and of areas of Urban land. This complex is on flats and slight ridges bordering Tampa Bay. These soils are subject to flooding for very brief periods during the hurricane season. The slope is 0 to 2 percent. The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.



In most areas, the soils in this map unit are artificially drained by sewer systems, gutters, tile drains, and surface ditches. The undrained areas have a seasonal high water table at a depth of about 20 to 30 inches for 2 to 6 months. The high water table recedes to a depth of 50 inches during prolonged dry periods. The permeability St. Augustine soil is moderately rapid or rapid. The available water capacity is low.

5.2 USGS TOPOGRAPHICAL SURVEY

According to the review of a United States Geological Survey (USGS) topographic map, the ground surface of the site is generally flat and occurs at an elevation of approximately +5 feet, based on the National Geodetic Vertical Datum (NGVD) of 1929.

5.3 SOIL BORING RESULTS

Based upon the exploratory borings and results of the laboratory testing, the near surface soils in the areas explored have been grouped into four (4) categories/strata.

In general the borings encountered clean to slightly silty fine sands (A-3) with shell fragments to the termination depth of 5 feet in the borings. Throughout many of the borings across the site, we encountered interbedded layers of silty sands (A-2-4), silty clays (A-6), and sandy clays to clays (A-7). The variability of the soils encountered is consistent with dredged fill material due to dredging of the adjacent channels in Tampa Bay.

The soil boring profiles are presented on **Sheet 3** in the **Appendix** of this report, along with the profile legend and other pertinent information such as measured groundwater levels. Soil stratification is based on an examination of the recovered soil samples, the laboratory testing, and interpretation of field boring logs by a geotechnical engineer. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The profiles represent the conditions at the boring locations only and variations may occur among the borings.

In general, the auger borings performed encountered the following strata.

STRATUM	SOIL DESCRIPTION	AASHTO SOIL CLASSIFICATION
1	Clean to Slightly Silty Fine SAND	A-3
2	Silty CLAY	A-6
3	Sandy Clay to CLAY	A-7
4	Silty SAND	A-2-4



5.4 GROUNDWATER

At the time of our field exploration, groundwater was measured in the borings at depths ranging from 3 feet to greater than 5 feet below the ground surface. It should be noted that groundwater conditions tend to fluctuate with environmental changes and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as swales, drainage ponds, etc. Based on a review of the SCS data, the borings performed for our evaluation, and our experience in the project area, we estimate the seasonal high groundwater table (SHGWT) to be at a depth of approximately 1½ feet above those encountered in our soil borings. For borings where groundwater was not encountered, we estimate the depth to the SHGWT is at least 3½ feet deep.

In general, the estimated seasonal high groundwater level is not intended to define a limit or ensure that future seasonal fluctuations in groundwater levels will not exceed the estimated levels. Groundwater levels could exceed the estimated seasonal high groundwater levels as a result of a series of rainfall events, changed conditions at the site that alter surface water drainage characteristics, and/or variations in duration, intensity, or total volume of rainfall.

We recommend that the Contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on the construction procedure.

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

6.1 PAVEMENT DESIGN CONSIDERATIONS

In accordance with FDOT guidelines, grades for this type of roadway should be ideally set to provide a minimum separation of 3 feet between the bottom of the base and the estimated seasonal high groundwater levels. For non FDOT projects, this separation could be reduced to 18 inches, if desired. Correspondingly, the base should remain a minimum of 18 inches above sustained water levels in roadside ditches, making positive drainage of the ditches important. The choice of base material would depend upon the relationship of final roadway improvement grades and the bottom of the base to the design high groundwater table levels. Soil cement or coquina shell base materials are more resistant to wet conditions than limerock and the separation can be somewhat reduced. Crushed concrete is also less sensitive to moisture than limerock, but should be treated in the same fashion.



6.2 GROUNDWATER CONTROL

Depending upon groundwater levels at the time of construction, some form of dewatering may be required for deeper excavation such as trenches for utility installation. Groundwater can normally be controlled in shallow excavations with pumps and sumps. During subgrade soil preparation any plastic soils below design grade could become disturbed by construction activities. If this becomes the case, the contractor may be directed by the engineer to remove the disturbed or pumping soils to a depth of 1 to 2 feet below design grade and backfill the area with structural fill. In such situations, FDOT Indices 500 and 505 should be followed closely.

6.3 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS

The overall site preparation and mechanical densification work for the construction of the roadway, should be in accordance with the FDOT Standard Specifications for Road and Bridge Construction and Standard Index requirements.

7.0 LIMITATIONS

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

The scope of the exploration was intended to evaluate shallow soil conditions and does not include an evaluation of the potential of sinkhole development for the project site. The analysis and recommendations submitted in this report are based upon data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway improvement areas.

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



APPENDIX A

APPROXIMATE SITE LOCATION

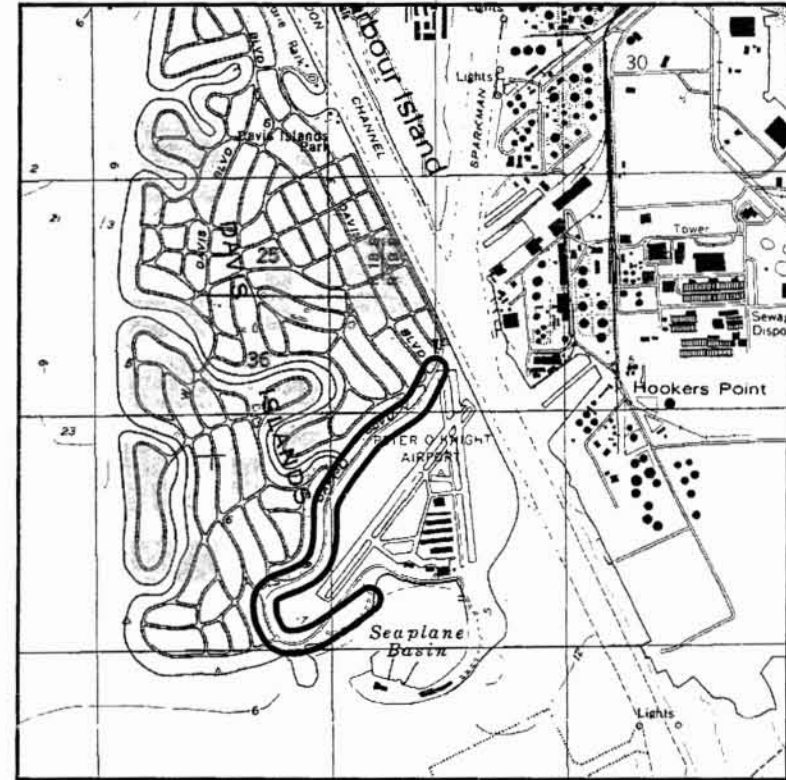


REFERENCE: USDA SCS. "SOIL SURVEY OF HILLSBOROUGH COUNTY, FLORIDA"
 TOWNSHIP: 29 SOUTH 29 SOUTH ISSUED: 1989
 RANGE: 18 EAST 19 EAST PHOTO: 1982
 SECTION: 36 31 SCALE: 1" = 2000'

USDA VICINITY MAP



APPROXIMATE SITE LOCATION



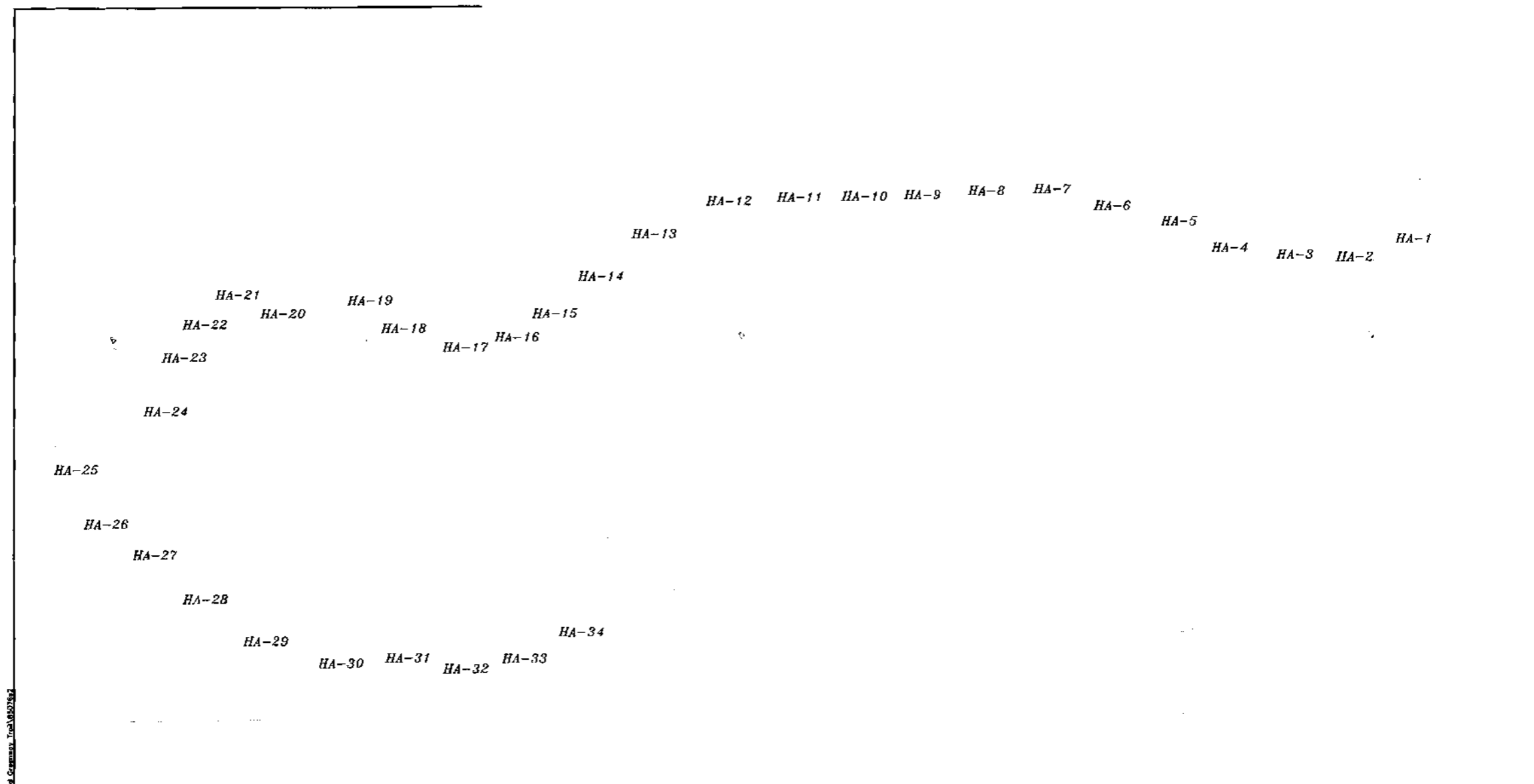
REFERENCE: USGS "TAMPA, FLORIDA" QUADRANGLE MAP
 TOWNSHIP: 29 SOUTH 29 SOUTH ISSUED: 2002
 RANGE: 18 EAST 19 EAST PHOTOREVISED: -
 SECTION: 36 31 SCALE: 1" = 2000'

USGS VICINITY MAP

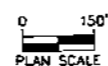


DRAWN	DJC
CHECKED	TP
APPROVED	MEM
SCALE	NOTED

USDA & USGS VICINITY MAPS		
DAVIS ISLANDS TRAIL		
TAMPA, FLORIDA		
Information To Build On		
Engineering • Consulting • Testing		
DATE	SEPT 08	PROJ. NO. 787-85076
		SHEET 1



BORING LOCATION PLAN



LOCATION	
TOWNSHIP:	29 S 29 S
RANGE:	18 E 19 E
SECTION:	36 31

LEGEND

APPROXIMATE HAND AUGER BORING LOCATION

P:\1787_04s_Comp\04s\1000\050718_Soap_Dome_Bldg_Corridor_Trial\050718.dwg

REVISIONS			
Date	By	Description	



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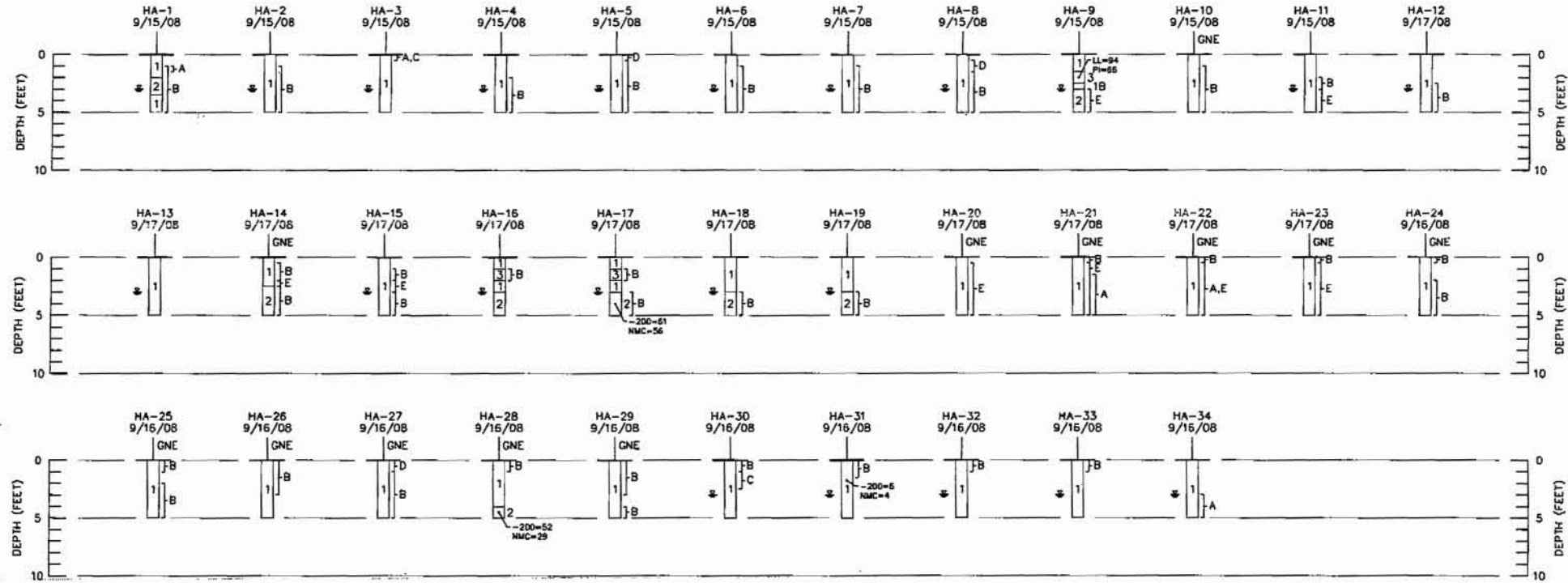
MARTIN E. HILBURG, P.E.
 FLORIDA LICENSE No. 36284

FLORIDA ENGINEERING CERTIFICATE
 OF AUTHORIZATION No. 3684

CITY OF TAMPA		
ROAD NO.	COUNTY	PROJECT NO.
-	HILLSBOROUGH	-

ROADWAY SOILS SURVEY
DAVIS ISLANDS TRAIL

SHEET NO.
2



LEGEND

1. PALE BROWN TO DARK GRAY FINE SAND TO SLIGHTLY SILTY FINE SAND (A-3)
 2. DARK GRAY SILTY CLAY (A-6)
 3. DARK BROWN TO GRAY SANDY CLAY TO CLAY (A-7)
- A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW
- ♣ GROUNDWATER LEVEL, DATE OBSERVED
- GNE GROUNDWATER LEVEL NOT ENCOUNTERED
- A LENSES OF SANDY CLAY
- B TRACE SHELL FRAGMENTS
- C WITH LIMESTONE
- D TRACE LIMESTONE
- E ABUNDANT SHELL FRAGMENTS
- 200 FINES PASSING NO. 200 SIEVE (%)
- NMC NATURAL MOISTURE CONTENT (%)
- PI PLASTICITY INDEX (%)
- LL LIQUID LIMIT (%)

0 5' 10'
VERTICAL SCALE
HORIZONTAL N.T.S.

SOIL PROFILES

REVISIONS					
Date	By	Description	Date	By	Description



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CITY OF TAMPA
ROAD NO. COUNTY PROJECT NO.
HILLSBOROUGH

ROADWAY SOILS SURVEY
DAVIS ISLANDS TRAIL

SHEET NO.