EXECUTIVE SUMMARY

- It is understood the subject project is located at 10400-10492 Park Boulevard North in Seminole, Pinellas County, Florida and is currently known as Seminole Waterfront Park Restroom and Storage Building. The property is understood to encompass less than one acre. This property was observed to consist of a generally level grass-surfaced area.

- This property is expected to be developed with a one-story restroom and storage building structure. It is anticipated the primary support of the structure is to be provided by load-bearing walls. The floor of the building is anticipated to be constructed as concrete slab-on-grade. The finished grades of the facility area are expected to generally coincide with the existing grade levels. The maximum loadings associated with the proposed structure are expected to be as follows:

Wall Load:	2 kips/linear ft
Floor Load:	100 lbs/sq ft

- The borings indicate the subsurface soils were generally arranged in four soil layers. The initial soil layer encountered generally consisted of approximately two feet of grayish brown fine SAND (SP) with traces of debris and asphalt fragments. It is believed that this initial soil layer primarily consists of EARTHFILL. The second soil layer encountered extended to a depth of six feet, generally consisted of a medium dense, dark gray, fine SAND (SP). The third soil layer encountered extended to a depth of nine feet generally consisted of a medium dense to dense, reddish brown, partially cemented slightly silty SAND (SP-SM). The final soil layer extended to the maximum boring termination depths of 20 feet below the existing ground surface elevations. This soil appeared to consist of loose, brown, slightly silty SAND (SP-SM).

- As recorded immediately after drilling during the time of our subsurface exploration, measurable groundwater was encountered at an approximate depth of 4.5 feet below the existing ground surface elevations. The normal seasonal high groundwater (NSHGW) is expected to be tidally influenced and be located at least three feet below the existing ground surface elevations.

- Based upon our evaluation and analyses, the soils encountered within the proposed building area are capable of supporting the building loads considered on conventional shallow foundations with proper subgrade preparation. Based upon the anticipated construction and recommended site preparation, shallow foundations may be designed for a net maximum allowable bearing pressure which does not exceed 2,500 pounds per square foot (psf). Subgrade preparation should include moisture conditioning and heavy vibratory compaction. Foundation bearing surfaces should be compacted to at least one foot below the bearing surfaces to at least 95 percent of the Modified Proctor maximum dry density value. The building grades should be selected such that the bottom foundations are located at least one foot above the NSHGW. **Due to the EARTHFILL, undercut and backfill extending to an approximate maximum depth of three feet below the existing ground surface within the proposed building foundation areas should be expected.**

- The near surface soil strata are expected to consist of fine SAND that tends to be moderately moisture sensitive. In this regard, the near-surface soils are expected to be generally SUITABLE for use as structural fill.

GULF COAST TESTING LABORATORY INC.
5671 70th AVENUE NORTH
PINELLAS PARK, FL 33781
CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED
CERTIFICATE of AUTHORIZATION # 00002370
PHONE*: (727) 544-4080 *FAX*: (727) 544-753*2
Email: info@gctlfl.com

GULF COAST TESTING LABORATORY INC.

PINELLAS PARK, FL 33781

CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED

February 8, 2018

Mr. Christopher Chin, PE
Deuel & Associates
565 South Hercules Avenue
Clearwater, FL 33764

Subject: **Geotechnical Exploration**
Seminole Waterfront Park Restroom and Storage Building
Pinellas County, FL
GCTL Project No. 24078

Dear Mr. Chin:

In response to your request, **Gulf Coast Testing Laboratory, Inc. (GCTL)** has conducted a subsurface exploration at the subject site. Enclosed are copies of the subsurface exploration report.

GCTL appreciates the opportunity to provide Geotechnical Engineering services for this important project. Should you need additional services on this or any other project, **GCTL** offers the expertise of a selected collection of highly experienced, and motivated, Professional Engineers providing Geotechnical Engineering, Environmental Assessment services, as well as Construction Materials Engineering and Testing services.

Please do not hesitate to call should there be any questions about the subsurface exploration. We look forward to the opportunity to work for your organization on this and future projects.

Sincerely,

GULF COAST TESTING LABORATORY, INC.

Don R. Stites

Don R. Stites, P.E.
Principal Geotechnical Engineer
Florida Registration No. 42290

Rick Davis

Rick Davis
President

5671 70th AVENUE NORTH
PINELLAS PARK, FL 33781
CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED
CERTIFICATE of AUTHORIZATION # 00002370
***PHONE*: (727) 544-4080 *FAX*: (727) 544-7532**
Email: info@gctlfl.com

REPORT OF
GEOTECHNICAL EXPLORATION
FOR
SEMINOLE WATERFRONT PARK
RESTROOM AND STORAGE BUILDING
PINELLAS COUNTY, FLORIDA

Prepared for:

Since 1954
DEUEL & ASSOCIATES
CIVIL ENGINEERS - LAND SURVEYORS

Prepared by:

Gulf Coast Testing Laboratory, Inc.

GCTL Project No. 24078

February 8, 2018

State of Florida Certificate of Authorization Number 00002370

GULF COAST TESTING LABORATORY INC.

PINELLAS PARK, FL 33781

CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED

February 8, 2018

Mr. Christopher Chin, PE
Deuel & Associates
565 South Hercules Avenue
Clearwater, FL 33764

Subject: Geotechnical Exploration
Seminole Waterfront Park Restroom and Storage Building
Pinellas County, FL
GCTL Project No. 24078

Dear Mr. Chin:

Gulf Coast Testing Laboratory, Inc. (GCTL) has completed the requested geotechnical exploration for the above-referenced project. The results of the subsurface exploration have been evaluated and are presented in this Report of Geotechnical Exploration.

This report presents a review of the project information provided to us, a description of the site and subsurface conditions encountered as well as our foundation and earthwork recommendations. The Appendices to the report contain site and boring location figures, boring logs, and site photographs.

5671 70th AVENUE NORTH
PINELLAS PARK, FL 33781
CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED
CERTIFICATE of AUTHORIZATION # 00002370
***PHONE*: (727) 544-4080 *FAX*: (727) 544-7532**
Email: info@gctlfl.com

We appreciate this opportunity to provide our services to you and we look forward to serving as your geotechnical consultant throughout this project. Should you have any questions in regard to the information presented in this report, please do not hesitate to contact us at your earliest convenience.

Sincerely,

GULF COAST TESTING LABORATORY, INC.

Digitally signed by Don R Stites
Date: 2018.02.10 15:24:57 -05'00'

Rick Davis

Don R. Stites, P.E.
Principal Geotechnical Engineer
Florida Registration No. 42290

Rick Davis
President

TABLE OF CONTENTS

APPENDIX

- **Figure 1 – General Site Vicinity Map**
- **Figure 2 – Local Site Vicinity Map**
- **Figure 3 – 2017 Aerial Photograph**
- **Figure 4 – 2014 Aerial Photograph**
- **Figure 5 – 2013 Aerial Photograph**
- **Figure 6 – 2006 Aerial Photograph**
- **Figure 7 – 2002 Aerial Photograph**
- **Figure 8 – 1995 Aerial Photograph**
- **Figure 9 – Field Exploration Plan**
- **Figure 10 – Aerial Field Exploration Plan**
- **Figure 11 – USDA Soil Map**
- **Soil Boring Logs**
- **Site Photographs**

1.0 EXECUTIVE SUMMARY

- It is understood the subject project is located at 10400-10492 Park Boulevard North in Seminole, Pinellas County, Florida and is currently known as Seminole Waterfront Park Restroom and Storage Building. The property is understood to encompass less than one acre. This property was observed to consist of a generally level grass-surfaced area.

- This property is expected to be developed with a one-story restroom and storage building structure. It is anticipated the primary support of the structure is to be provided by load-bearing walls. The floor of the building is anticipated to be constructed as concrete slab-on-grade. The finished grades of the facility area are expected to generally coincide with the existing grade levels. The maximum loadings associated with the proposed structure are expected to be as follows:

Wall Load:	2 kips/linear ft
Floor Load:	100 lbs/sq ft

- The borings indicate the subsurface soils were generally arranged in four soil layers. The initial soil layer encountered generally consisted of approximately two feet of grayish brown fine SAND (SP) with traces of debris and asphalt fragments. It is believed that this initial soil layer primarily consists of EARTHFILL. The second soil layer encountered extended to a depth of six feet, generally consisted of a medium dense, dark gray, fine SAND (SP). The third soil layer encountered extended to a depth of nine feet generally consisted of a medium dense to dense, reddish brown, partially cemented slightly silty SAND (SP-SM). The final soil layer extended to the maximum boring termination depths of 20 feet below the existing ground surface elevations. This soil appeared to consist of loose, brown, slightly silty SAND (SP-SM).

- As recorded immediately after drilling during the time of our subsurface exploration, measurable groundwater was encountered at an approximate depth of 4.5 feet below the existing ground surface elevations. The normal seasonal high groundwater (NSHGW) is expected to be tidally influenced and be located at least three feet below the existing ground surface elevations.

- Based upon our evaluation and analyses, the soils encountered within the proposed building area are capable of supporting the building loads considered on conventional shallow foundations with proper subgrade preparation. Based upon the anticipated construction and recommended site preparation, shallow foundations may be designed for a net maximum allowable bearing pressure which does not exceed 2,500 pounds per square foot (psf). Subgrade preparation should include moisture conditioning and heavy vibratory compaction. Foundation bearing surfaces should be compacted to at least one foot below the bearing surfaces to at least 95 percent of the Modified Proctor maximum dry density value. The building grades should be selected such that the bottom foundations are located at least one foot above the NSHGW. **Due to the EARTHFILL, undercut and backfill extending to an approximate maximum depth of three feet below the existing ground surface within the proposed building foundation areas should be expected.**

- The near surface soil strata are expected to consist of fine SAND that tends to be moderately moisture sensitive. In this regard, the near-surface soils are expected to be generally SUITABLE for use as structural fill.

2.0 INTRODUCTION

2.1 PROJECT CHARACTERISTICS

This property is expected to be developed with a one-story restroom and storage building structure. The subject project is understood to encompass less than 3,000 square feet. It is anticipated the primary support of the structure is to be provided by load-bearing walls. The floor of the building is anticipated to be constructed as concrete slab-on-grade. The finished grades of the facility area are expected to generally coincide with the existing grade levels.

The structure loading conditions were not available during the time of this report. Based on our experience with similar structures, the maximum loadings are expected to be as follows:

Wall Load:	2 kips/linear ft
Floor Load:	100 lbs/sq ft

2.2 SITE DESCRIPTION

It is understood the subject project is located at 10400-10492 Park Boulevard North in Seminole, Pinellas County, Florida and is currently known as Seminole Waterfront Park Restroom and Storage Building. This property was observed to consist of a generally level grass-surfaced area. An existing asphaltic concrete surface roadway with parking areas was observed nearby the subject property.

The approximate site location is illustrated on Figures in the Appendix of this report. Photographs of the subject property have been included in the Appendix of this report.

2.3 PURPOSE AND SCOPE

The purpose of this study was to obtain information on the general subsurface conditions at the proposed project site. The subsurface materials encountered were then evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

- General location and description of potentially deleterious materials encountered in the borings, which may interfere with construction progress or structure performance, including existing fills or surficial/subsurface organics.

- Identification of the existing groundwater levels and estimated normal seasonal high groundwater fluctuations.

- Evaluate active raveling ("sinkhole-type") activity, if any, in the borings performed.

- Evaluation of a shallow foundation system to be used for support of the proposed structure, with a slab-on-grade floor member. Identification of recommended shallow foundation design parameters, including allowable bearing pressures, foundation levels and expected total and differential settlements.

- Recommended soil subgrade preparation operations, including stripping, grubbing and compaction. Recommended engineering criteria for placement and compaction of approved structural fill materials.

- Evaluation of the suitability and availability of materials on-site that may be moved during site grading for use as structural fill in the building area, as pavement subgrade fill, and as general backfill.

- Presentation of construction recommendations, including expected ground water control measures, temporary slope stability recommendations, and unsuitable soil removal guidelines.

The following services were provided in order to achieve the preceding objectives:

- Reviewed readily-available published geologic information. This included information from available soil survey information published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS).

- Reviewed readily-available aerial photographs of the subject property.

- Coordinate underground utility location services through Sunshine State One Call of Florida, Inc.

- Executed a program of subsurface exploration consisting of subsurface sampling and field testing.

    - Performed one SPT borings within the designated building area. The SPT borings extended to an approximate depth of 20 feet below the existing ground surface elevations.

    - Performed one auger boring within the designated building area. The auger boring extended to an approximate depth of five feet below the existing ground surface elevations.

- Visually classified and stratified representative soil samples in the laboratory using the Unified Soil Classification System (USCS). Identified soil conditions at each boring location and formed an opinion of the site soil stratigraphy.

- Collected groundwater level measurements and estimated normal wet seasonal high groundwater levels.

- The results of the field exploration and laboratory tests were used in the engineering analyses and in the formulation of the recommendations. The results of the subsurface exploration, including the recommendations and the data upon which they are based, are presented in this formal written report prepared by an experienced Professional Engineer.

The scope of our services does not include a thorough 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.

3.0 FIELD EXPLORATION

The general foundation soil types and associated design parameters were developed by drilling one soil test boring and one auger boring within the proposed development area. The boring locations were determined in the field from existing ground surface features. The ground surface elevations at the boring locations were neither furnished nor determined. The boring locations illustrated in the Appendix should be considered accurate only to the degree implied by the method used. If more precise locations are desired, we suggest that you contact a Registered Surveyor. The approximate locations of the borings are illustrated in the Appendix of this report.

The soil test boring was advanced with a trailer-mounted drill rig using "Mud" Rotary drilling procedures to an approximate maximum depth of 20 feet below the existing ground surface elevations. The soil sampling was performed in general accordance with ASTM Test Designation D-1586, entitled "Penetration Test and Split-Barrel Sampling of Soils." Samples were obtained at intervals of two feet to a depth of ten feet, and at intervals of five feet thereafter. Representative portions of these soil samples were sealed in "air-tight" containers, labeled and transferred to our laboratory for classification and testing.

The auger boring was manually performed with the use of a 3-inch nominal diameter bucket auger. The soil sampling was performed in general accordance with ASTM Test Designation D-1452, titled "Soil Investigation and Sampling by Auger Borings." These samples were taken "continuously" from the ground surface to an approximate depth of five feet below the existing ground surface elevations. Representative portions of these soil samples were sealed in "air-tight" containers, labeled and transferred to our laboratory for classification and testing.

4.0 LABORATORY TESTING

The soil samples were transported to our laboratory and were classified by the Geotechnical Engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM Test Designation D-2488. Based on the subsurface materials encountered with respect to the proposed project, refined laboratory testing was not deemed necessary.

It should be noted that all soil samples will be properly disposed of 30 days following the submittal of the **GCTL** subsurface exploration report.

5.0 GENERALIZED SUBSURFACE CONDITIONS

5.1 AERIAL PHOTOGRAPH

The Aerial Photographs dated 2017, 2014, 2013, 2006, 2002, and 1995 were reviewed for the subject property. Based on review of the aerial photograph dated 2017, the subject property appeared to be similar to the conditions observed during the time of our field services. Based on review of the aerial photographs dated 2014, 2013, 2006, 2002, and 1995, the subject property appeared to be previously developed with aboveground structures and vehicle parking area. Copies of the aerial photographs have been included in the Appendix of this report.

5.2 COUNTY SOIL SURVEY

The "Soil Survey of Pinellas County, Florida", published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general vicinity of the subject project. This information indicates that there is one primary soil mapping unit within the proposed project area. The soil map unit characteristics are tabulated below:

SOIL SERIES	DEPTH (INCHES)	UNIFIED SOIL CLASS	PERMEABILITY RATING (INCHES/HOUR)	USDA SEASONAL HIGH GROUNDWATER TABLE	
				DEPTH (FEET)	MONTHS
Matlacha and St. Augustine Soils and Urban Land (16)	0 – 42	SP, SP-SM	2.0 – 6.0	2.0 – 3.0	June-October
	42 – 80	SP, SP-SM	6.0 – 20.0	1.5 – 3.0	
	0 – 22		6.0 – 20.0		
	22 – 33		2.0 – 20.0		
	33 – 48	SP, SP-SM	6.0 – 20.0		
	48 – 63	SM, SP-SM	2.0 – 20.0		
	63 - 80		6.0 – 20.0		

Urban Land is reported to consist of land areas which have "undergone extensive urban development. The soils have been modified by cutting, grading, filling, and shaping or otherwise generally altered. Urban facilities including paved parking areas, streets, industrial buildings, houses and other structures, and underground utilities have been constructed on 75 percent or more of this association. Places not covered by urban facilities remain as altered soils or soil material." Based on the altered state of the soil material, published soil and groundwater characteristics are not considered reliable.

A copy of the soil survey map has been included in the Appendix of this report.

5.3 SEISMIC SITE CLASSIFICATION

Based on our review of the International Building Code, dated 2006, and our knowledge of the general subsurface conditions at the site, we believe the site should be considered to be a Site Class D. It should be noted that this classification is based on the subsurface exploration results and our experience in the area. A soil test boring extending to a depth of at least 100 feet may be performed to verify this site classification.

5.4 SUBSURFACE CONDITIONS

Soil stratification was based on visual observation of the recovered soil samples, laboratory testing and interpretation of the field boring logs by an experienced **GCTL** Engineering Technician. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles present the conditions at the particular boring location and variations do occur among the borings and between soil samples.

The borings indicate the subsurface soils were generally arranged in four soil layers. The initial soil layer encountered generally consisted of approximately two feet of grayish brown fine SAND (SP). It is believed that this initial soil layer primarily consists of EARTHFILL. Standard Penetration Test (SPT) methods were not performed in this initial soil stratum in order to avoid potential underground utility interference.

The second soil layer encountered generally consisted of a medium dense, dark gray, fine SAND (SP). This soil layer extended to an approximate depth of six feet below the existing ground surface. SPT results within this soil stratum were measured to be 12 blows per foot (bpf).

The third soil layer encountered generally consisted of a medium dense to dense, reddish brown, partially cemented slightly silty SAND (SP-SM). This soil layer extended to an approximate depth of nine feet below the existing ground surface. SPT results within this soil stratum were measured to range from 18 to 39 bpf.

The final soil layer extended to the maximum boring termination depths of 20 feet below the existing ground surface elevations. This soil appeared to consist of loose, brown, slightly silty SAND (SP-SM). SPT results within this soil stratum were measured to range from 4 to 11 blows per foot (bpf).

No "raveled" conditions indicative of active sinkhole type activity were encountered.

5.5 GROUNDWATER CONDITIONS

As recorded immediately after drilling during the time of our subsurface exploration, measurable groundwater was encountered at an approximate depth of 4.5 feet below the existing ground surface elevations.

Groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and may be affected by man-made influences. In addition, a seasonal effect may also occur during which higher groundwater levels are normally recorded in rainy seasons. Based on our review of the site location, subsurface conditions, including the soil coloring characteristics, available published information, the groundwater levels are expected to be tidally influenced with the normal seasonal high groundwater levels encountered at least three feet below the existing ground surface elevations.

If the ground water level is critical to design or construction, ground water observation wells should be installed on-site to monitor ground water fluctuations over a period of time and to permit more accurate determinations of wet season and dry season levels.

6.0 DESIGN RECOMMENDATIONS

The following design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered during this exploration. The test boring data was evaluated utilizing correlations between the measured standard penetration test resistances and the engineering performance characteristics of similar subsurface conditions. Once the final building characteristics have been identified, including project building locations on the site, and structural loading conditions, a review must be made by **GCTL** to determine if any modifications to the recommendations will be required.

6.1 GENERAL

Based on our extensive experience with similar subsurface conditions, we believe that the proposed structure may be satisfactorily supported with the use of conventional shallow foundation systems. The aerial photograph review indicated that the subject property was previoiusly developed and appeared to have been subjected to associated earthmoving operations. **Due to the existing EARTHFILL, undercut and backfill extending to an approximate maximum depth of three feet below the existing ground surface should be expected within the proposed foundation excavations.**

The subject property should be cleared and graded, including the removal of both aboveground and underground structures (including asphaltic concrete pavement and foundations). Following the approval of the Geotechnical Engineer, the exposed ground surface should be proofrolled and compacted with a vibratory drum roller (having a static drum weight on the order of eight tons) under the direction of an experienced Professional Engineer in order to confirm the ability of the soils to properly support the expected development. It is recommended that twelve passes of the roller be performed, with successive passes aligned perpendicular to the proceeding pass.

Areas which are evaluated to be unstable, if any, should be remediated in accordance with the recommendations of the Geotechnical Engineer. Care should be used in areas in which the vibratory roller is within 50 feet of existing structures in order to prevent vibrations which could be detrimental to existing structures.

6.2 SHALLOW FOOTINGS

Due to the apparent EARTHFILL, it is considered essential that all foundation excavations be observed by the Geotechnical Engineer. It should be expected that some limited undercut and backfill of the foundation excavations may be required. Foundation bearing soils approved by the Geotechnical Engineer should be compacted to a minimum of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) for a minimum depth of one foot below the foundation bearing levels. The building grades should be selected such that the bottom foundations are located at least one foot above the normal seasonal high groundwater level.

Based upon the anticipated construction and recommended site preparation, shallow foundation bearing soils approved by the Geotechnical Engineer are currently expected to be satisfactory to support a net maximum allowable bearing pressure which does not exceed 2,500 pounds per square foot (psf).

It is recommended that all exterior footing be embedded such that the bottoms of the foundations are a minimum of 12 inches below the adjacent compacted grades. This embedment depth will tend to provide foundation confinement; interior foundations, if any, may be located at nominal depths below the floor slab areas. Strip or wall footings should be a minimum of 18 inches wide and pad or column footings should be a minimum of 36 inches wide. The minimum footing sizes should be used regardless of whether or not the foundation loads and allowable bearing pressures dictate a smaller size. These minimum footing sizes tend to provide adequate load bearing area to develop overall bearing capacity and account for minor variations in the bearing materials. It is important that the structural elements be centered on the footings such so that loads are transferred evenly, unless the footings are adequately proportioned for eccentric loads.

6.3 SETTLEMENT

The settlement of shallow foundations supported on the sandy-type soils generally occur immediately following load application. Provided that the recommended subgrade preparation operations are properly performed, the total settlements of isolated columns and wall footings should not exceed one inch, with differential settlements on the order of 50 percent of the total settlements. Differential settlements of these magnitudes are usually considered tolerable for the anticipated construction; the tolerance of the proposed structure to the predicted total and differential settlements should be confirmed by the Structural Engineer.

6.4 MODULUS OF SUBGRADE REACTION

Based on the soil conditions encountered at the proposed site and the recommended site preparation operations presented in the Construction Considerations section of this report, the unit modulus of vertical subgrade reaction (k_1) for the soil is expected to be on the order of 280 pounds per square inch per inch of vertical deflection (pci) for a unit footing dimension of one foot by one foot. For larger foundations, the k-value should be reduced in accordance with the following equation:

$$K = K_1 \left(\frac{B+1}{2B} \right)^2$$

Where B is the foundation width in feet.

It should be noted that this value is based on typical values in published literature; a plate load test may be performed to more accurately assess the actual modulus of vertical subgrade reaction.

7.0 FLOOR SLAB

It is expected that the floor slab may be safely supported as a slab-on-grade member provided that any undesirable materials are removed and replaced with controlled structural fill. It is also recommended that the floor slab bearing soils be covered by a lapped polyethylene sheeting of in order to reduce the potential for floor dampness which can affect the performance of glued tile and carpet, if any are used.

This membrane should consist of a 10-mil single layer of non-corroding, non-deteriorating polyethylene sheeting material placed so as to minimize seams and to cover all of the soil below the building floor slab. This membrane should be cut in a "cross shape" to allow for pipes or other penetrations and the membrane should extend to within ½ inch of all such pipes or penetrations. All seams of the membrane should be lapped at least 12 inches. Punctures or tears in the membrane should be repaired with the same or comparable material and sealed in a waterproof manner.

The performance of concrete floor slabs is also affected by the concrete mix that is used. A relatively high water-cement ratio of the mix can cause aesthetic disruptions, such as unsightly slab "curling" and shrinkage cracking. Also, an additional waiting period may be required prior to installing moisture-sensitive floor covering because of the moisture loss from the concrete floor slabs.

8.0 CONSTRUCTION CONSIDERATIONS

8.1 FILL PLACEMENT AND SUBGRADE PREPARATION

The following are our recommendations for overall site preparation and mechanical densification work for construction of the proposed development, based on the anticipated construction and our boring results. These recommendations should be used as a guideline for the project general specifications prepared by the Design Engineer.

1. The location of any existing underground utility lines within the construction area should be established. Provision should then be made to relocate any interfering utility lines from the construction area to appropriate locations. In this regard, it should be noted that if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion which subsequently may result in excessive settlements.

2. Following clearing and grading, the exposed ground surface should be proofrolled and compacted with a vibratory drum roller (having a static drum weight on the order of eight tons) under the direction of an experienced Professional Engineer in order to confirm the ability of the soils to properly support the expected development on shallow foundations.

3. It is recommended that the natural ground be compacted to a dry density of at least 95 percent of the Modified Proctor Test maximum dry density (ASTM D-1557) to a minimum depth of one foot below the stripped grade within the building floor slab area.

4. Following satisfactory completion of the proofrolling and compaction operations, the proposed structure area may be brought up to finished subgrade levels, if required. It is recommended that off-site fill consist of soils having less than 12 percent passing the No. 200 sieve, and be free of rubble, organics, clay, debris and other unsuitable material. Fill should be tested and approved by **GCTL** prior to acquisition. Approved sand fill should be placed in loose lifts not exceeding twelve inches in thickness. The fill soils should be compacted to a dry density of at least 95 percent of the Modified Proctor Test maximum dry density within the building areas.

5. Soil moisture content may need to be controlled in order to facilitate proper compaction. If additional moisture is necessary to achieve the compaction objectives of imported fill, then water should be applied in such a way that will not cause erosion or removal of the subgrade soils. A moisture content within two percentage points of the optimum indicated by the Modified Proctor Test (ASTM D-1557) is recommended prior to compaction of the natural ground and fill.

6. It is considered essential that all foundation excavations be observed by the Geotechnical Engineer. Foundation bearing soils approved by the Geotechnical Engineer as load bearing materials should be compacted to develop a minimum density requirement of 95 percent of the maximum Modified Proctor dry density with ASTM D-1557, for a minimum depth of one foot below the bottom of the footing depths. Soils placed adjacent to footings or walls should be carefully compacted with a light rubber-tired roller or vibratory plate compactor to avoid damaging the footings or walls.

7. A representative from **GCTL** should be retained to provide on-site observation of earthwork and ground modification activities. It is important that **GCTL** be retained to observe that the subsurface conditions are as we have discussed and reported herein, and that foundation construction, ground modification and fill placement are in accordance with our recommendations.

8.2 GROUNDWATER CONTROL

Measurable groundwater was encountered at an approximate depth 4.5 feet below the existing ground surface elevations. Groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and may be affected by man-made influences. The normal seasonal high groundwater (NSHGW) is expected to be tidally influenced and located at least three feet below the existing ground surface elevations. Groundwater, if encountered, is expected to be satisfactorily controlled by pumping from excavated sump areas.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in conditions, such as physical disturbance or rain water. Surface runoff water should be drained away from the excavations and not be allowed to pond. If possible, all foundation concrete should be placed the same day that the excavations are made. If this is not possible, the foundation excavations should be adequately protected in the interim.

8.3 TEMPORARY SIDE SLOPES

The side slopes for temporary excavations are expected to remain stable at two horizontal to one vertical (2H:1V) to a maximum excavation depth of four feet. Where restrictions do not permit slopes to be constructed as recommended above, the excavation should be shored and braced in accordance with current OSHA requirements. Excavated materials should not be stockpiled at the top of any slope within a horizontal distance equal to the excavation depth.

8.4 ON-SITE SOIL SUITABILITY

All materials to be used for backfill or compacted fill construction should be evaluated and, if necessary, tested by **GCTL** prior to placement to determine if they are suitable for the intended use. In general, the near surface soil strata are expected to consist of fine SAND that tends to be moderately moisture sensitive. In this regard, the near-surface soils are expected to be generally SUITABLE for use as structural fill.

It is recommended that off-site structural fill materials consist of soils having less than 12 percent passing the No. 200 sieve, and be free of rubble, organics, clay, debris and other unsuitable material. Any off-site materials used as fill should be approved by an experienced Professional Engineer prior to acquisition.

9.0 BASIS FOR RECOMMENDATIONS

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

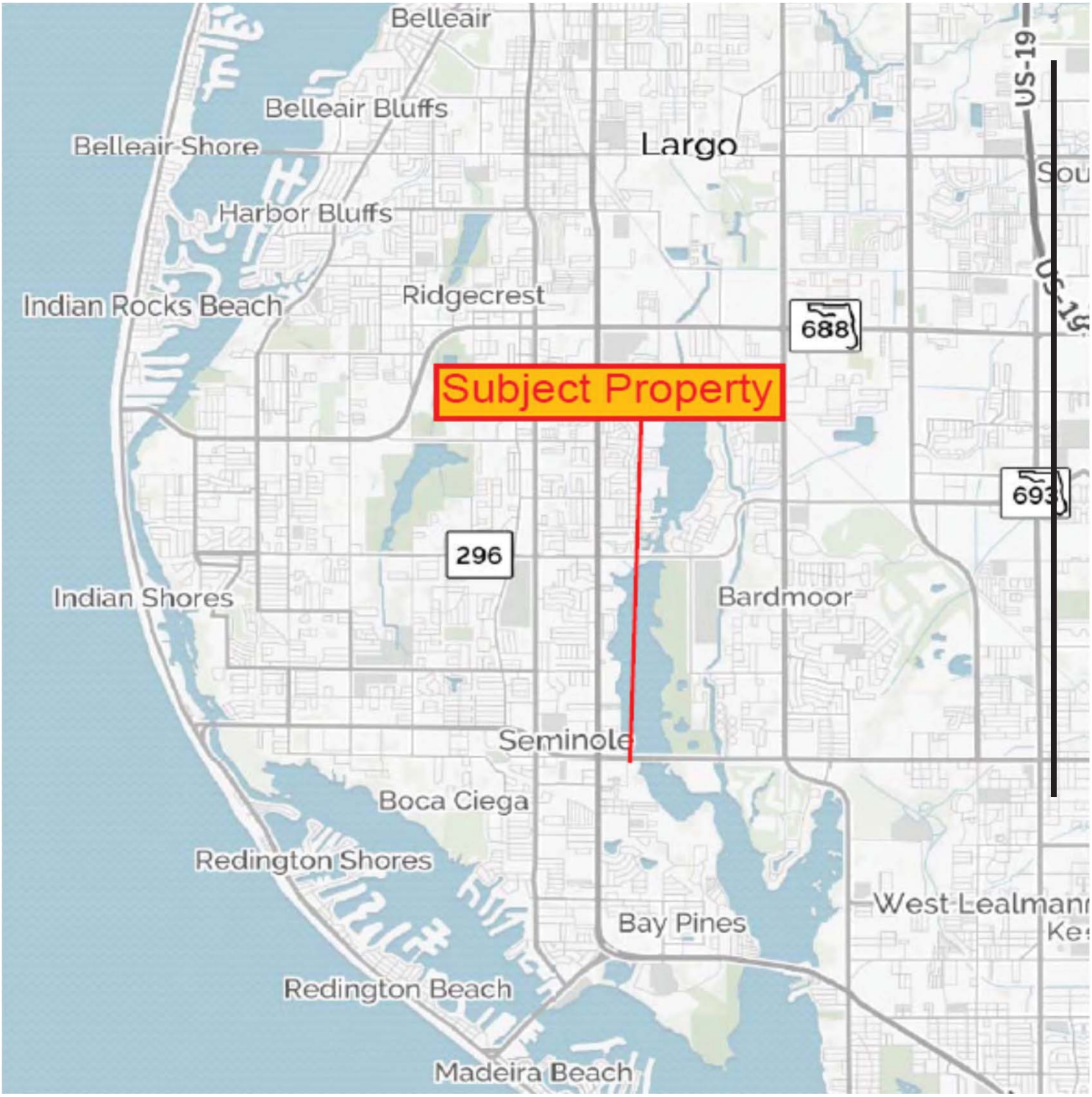
The scope of the exploration was intended to evaluate soil conditions within the primary influence of the considered structure and does not include an evaluation of potential deep soil conditions, such as sinkholes. The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process itself may alter soil conditions.

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 this report should also be reviewed in the event that significant changes occur in the design, nature or location of the proposed construction.

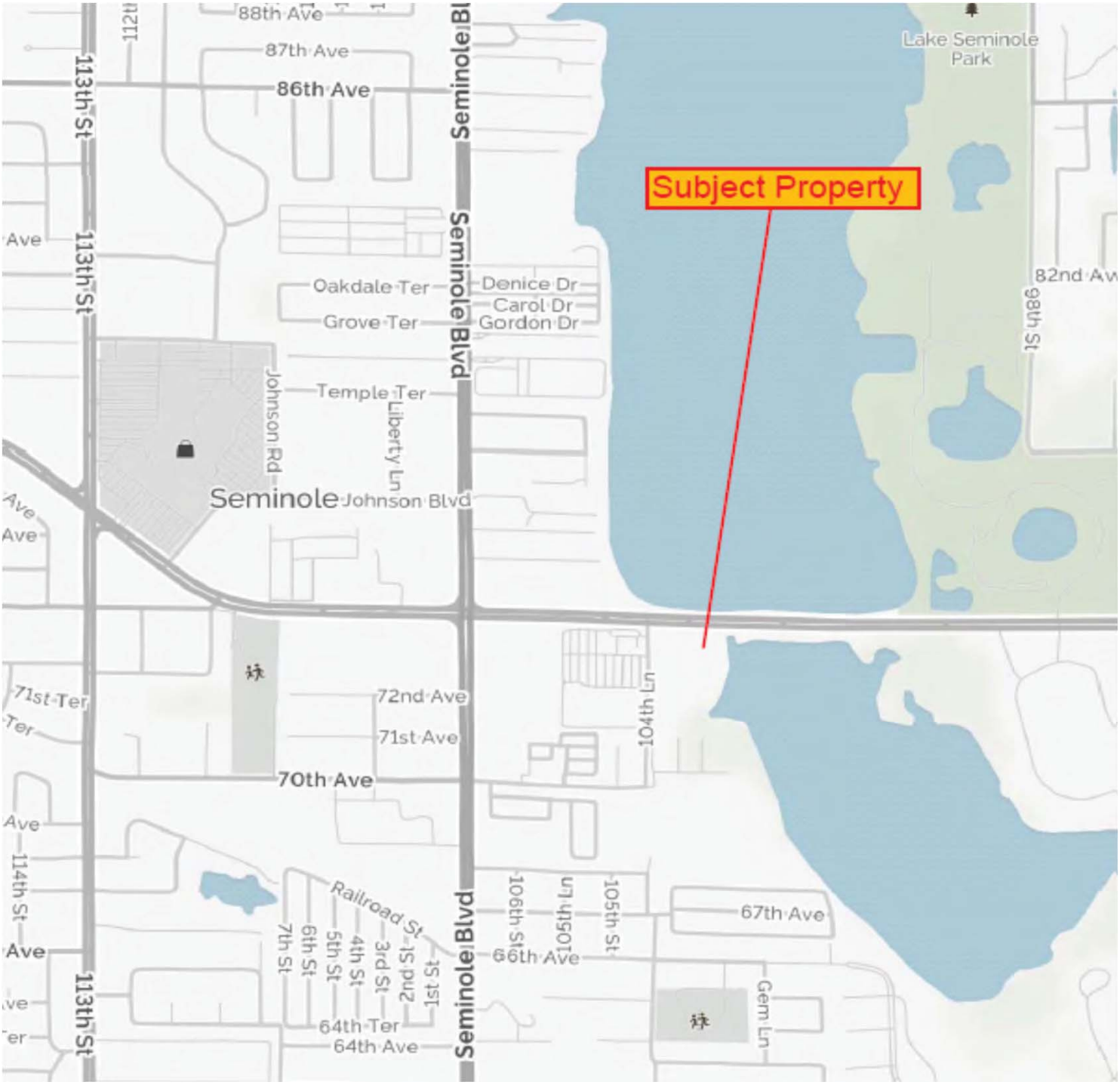
The recommendations provided herein are based in part upon project information provided to us and they apply only to the specific project and site discussed in this report. Once complete project information is available, the proposed facility structure characteristics should be conveyed to us for review. Our recommendations may then be modified, if necessary. Experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team. We recommend that the owner retain **GCTL** to provide these services based upon our familiarity with the project, the subsurface conditions, and the intent of the recommendations and design criteria.

APPENDIX

FIGURES



General Site Vicinity Map Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 1	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532



Local Site Vicinity Map Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 2	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

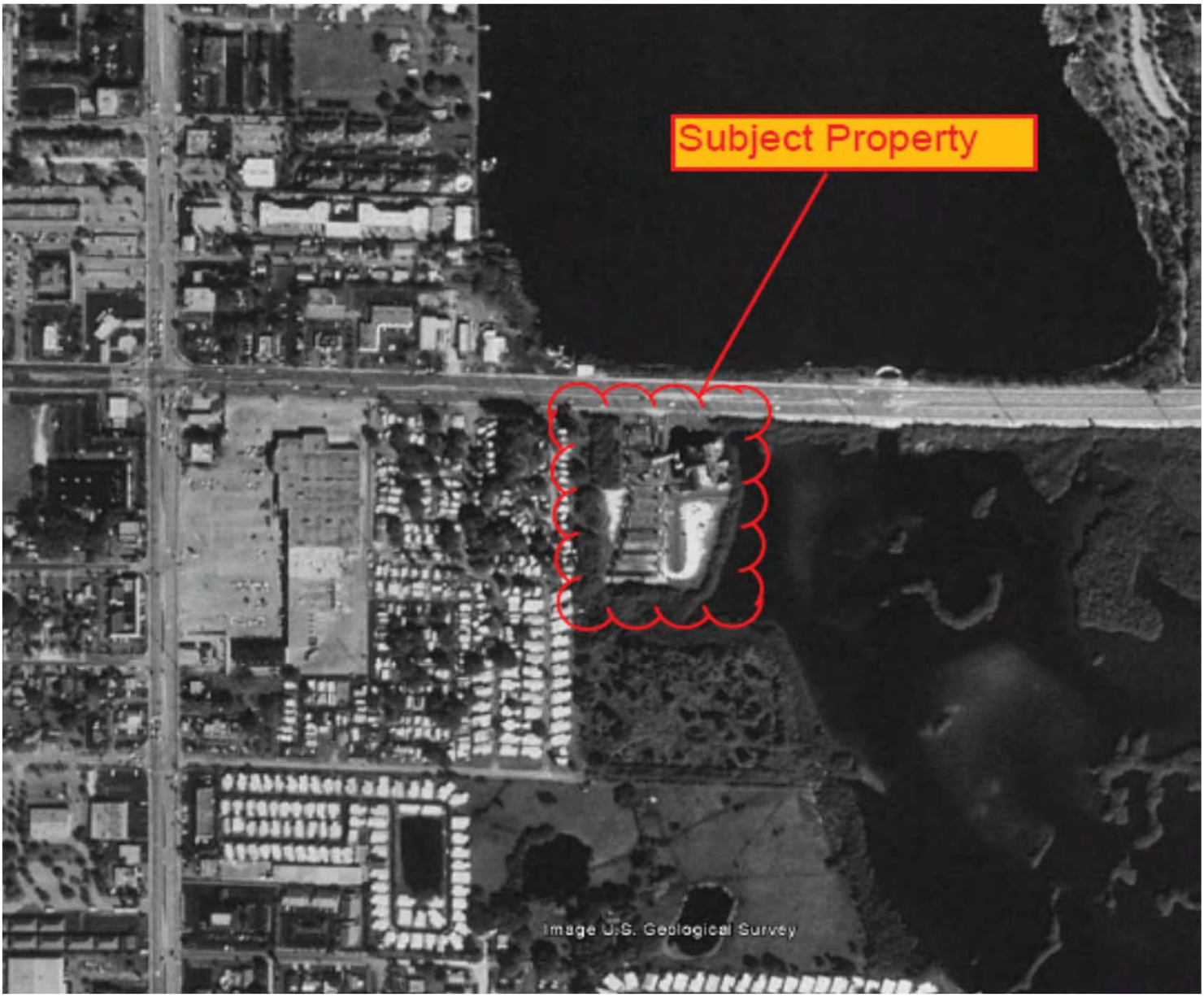
2017 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 3	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

2014 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 4	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

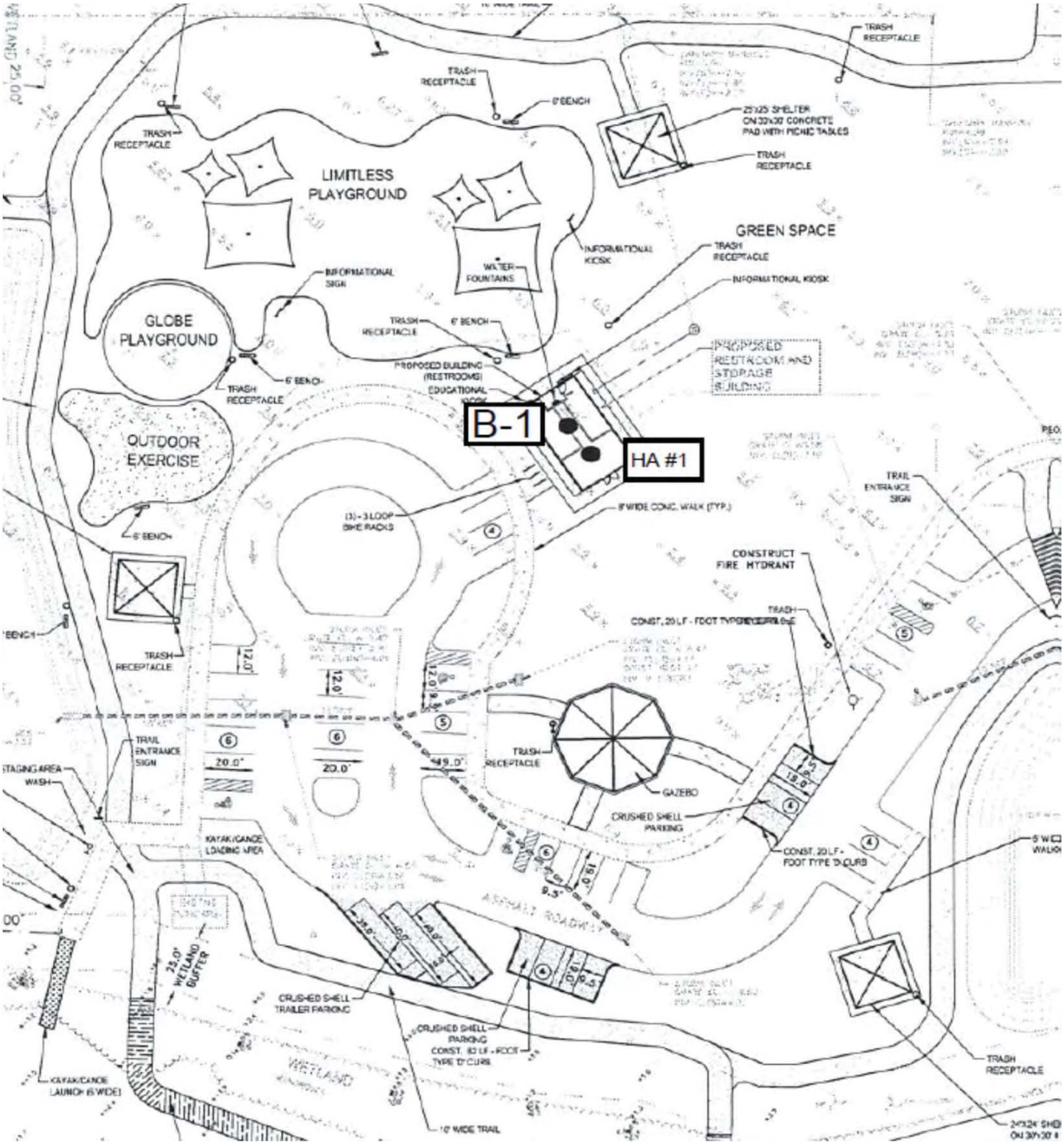
2013 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 5	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

2006 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 6	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

2002 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 7	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

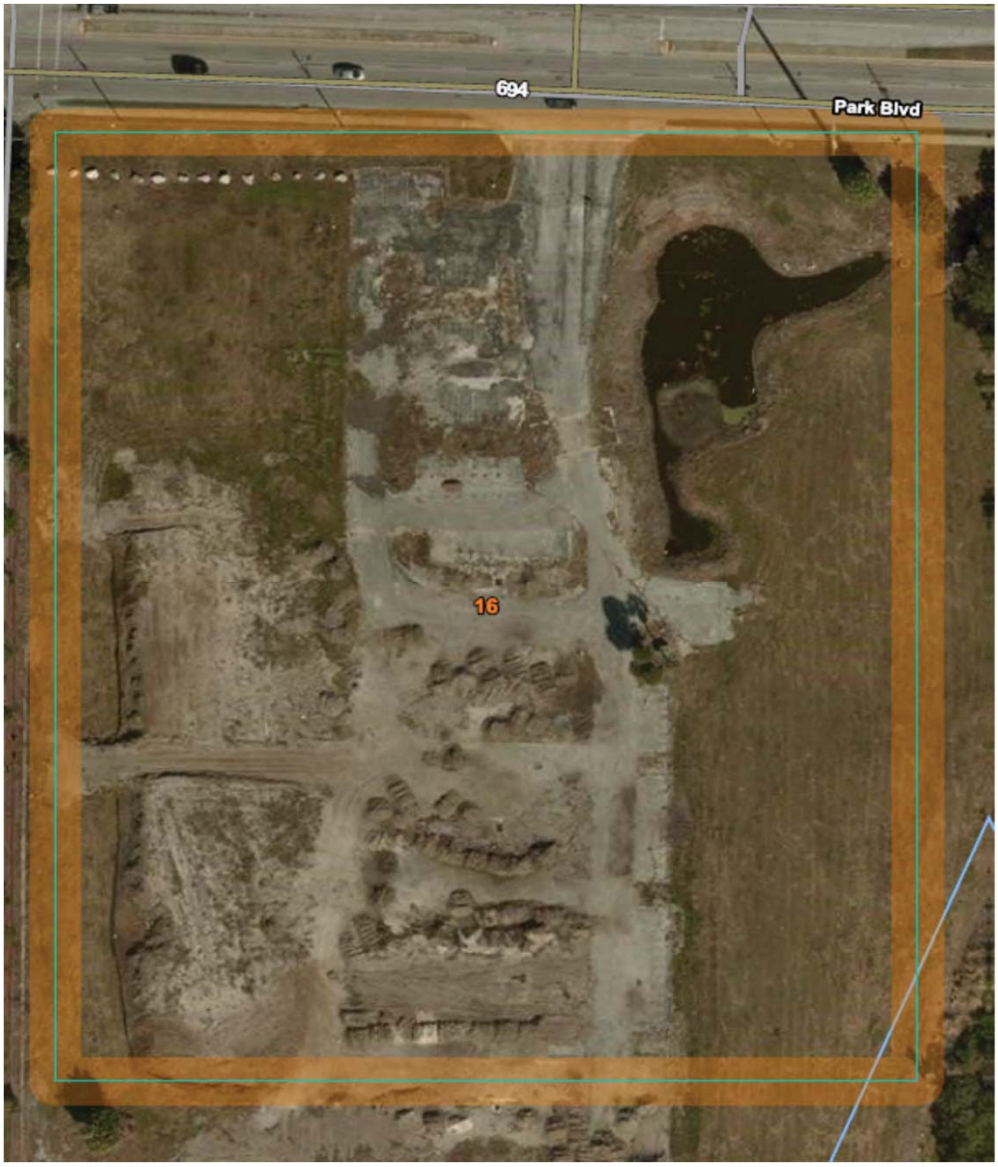


1995 Aerial Photograph Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 8	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532



Field Exploration Plan Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 9	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

Aerial Field Exploration Plan Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 10	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
16	Matlacha and St. Augustine soils and Urban land	5.0	100.0%
Totals for Area of Interest		**5.0**	**100.0%**

USDA Soil Map Subject Property Pinellas County, Florida	Project No.: 24078 Scale: As Shown Figure No.: 11	Gulf Coast Testing Laboratory, Inc. 5671 70th Avenue North Pinellas Park, Florida PH: (727)-544-4080 FX: (727)-544-7532

SOIL BORING LOGS

GULF COAST TESTING LABORATORY INC.

5671 70th Avenue North
Pinellas Park, FL 33781

Soil Boring Log

GCTL Project No. :	24078	Project Name:	Waterfront Park	Boring Number:	B-1
		Site Location:	Pinellas County	Start Date:	02/07/18
		Drilling Method:	MR	Completion Date:	02/07/18

FEET (BLS)	SAMPLE TYPE	SAMPLE INTERVAL (BLS)	BLOW COUNT	N-Value	MATERIAL DESCRIPTION	COMMENTS
0	HA	0 - 1.0	NA	NA	**Grayish Brown Fine SAND (SP)**	
	HA	1.0 - 2.0	NA	NA		
	HA	2.0 - 3.0	NA	NA		
	HA	3.0 - 4.0	NA	NA	**Dark Gray Fine SAND (SP)**	
5	SS	4.0 - 5.0	6-6	12		**Groundwater Encountered 4.5 Feet BLS**
	SS	5.0 - 6.0	7-5	12		
	SS	6.0 - 7.0	7-20	27	**Reddish Brown Partially Cemented Slightly Silty SAND (SP-SM)**	
	SS	7.0 - 8.0	19-20	39		
	SS	8.0 - 9.0	9-9	18		
10	SS	9.0 -10.0	6-5	11	**Brown Slightly Silty SAND (SP-SM)**	
15	SS	13.5 - 15.0	5-5-4	9		
20	SS	18.5 - 20.0	3-3-1	4	**EOB 20 Feet BLS** **Boring Backfilled**	

(HA) = HAND AUGER
(MR) = MUD ROTARY
(SS) = SPLIT SPOON
(WR) = WEIGHT OF ROD
(WH) = WEIGHT OF HAMMER

(BLS) = BELOW LAND SURFACE
(EOB) = END OF BORING
(NR) = NOT RECORDED
(NA) = NOT APPLICABLE

GULF COAST TESTING LABORATORY INC.

P.O. BOX 6

PINELLAS PARK, FL 33780

CONSTRUCTION MATERIALS ENGINEERING COUNCIL CERTIFIED

CERTIFICATE of AUTHORIZATION # 00002370

PHONE*: (727)544-4080 *FAX*: (727) 544-753*2

PROJECT: Seminole Waterfront Park Restroom and Storage Building

LOCATION: 10400-10492 Park Blvd., Seminole, Pinellas County, Florida

See Site Plan

LAB NO.: 24078 DATE REPORTED: 2/8/18

DATE TESTED: 2/7/18 TESTED BY: CR

Hand Auger HA #1

DEPTH		CLASSIFICATION
FT.	IN.	
	3	Dark Grayish Brown SAND w/ some Debris
	6	
	9	
1	12	
	15	Pale Brown SAND and Shell
	18	
	21	
2	24	
	27	Dark Gray SAND w/ Asphalt Debris
	30	
	33	
3	36	
	39	Brown SAND w/ some Roots
	42	
	45	
4	48	
	51	Very Dark Gray SAND
	54	
	57	
5	60	
	63	Hole Terminated @ 5’ 0” Water Table @ 4’ 6”
	66	
	69	
6	72	
	75	
	78	
	81	
7	84	
	87	
	90	
	93	
8	96	
	99	
	102	
	105	
9	108	
	111	
	114	
	117	
10	120	

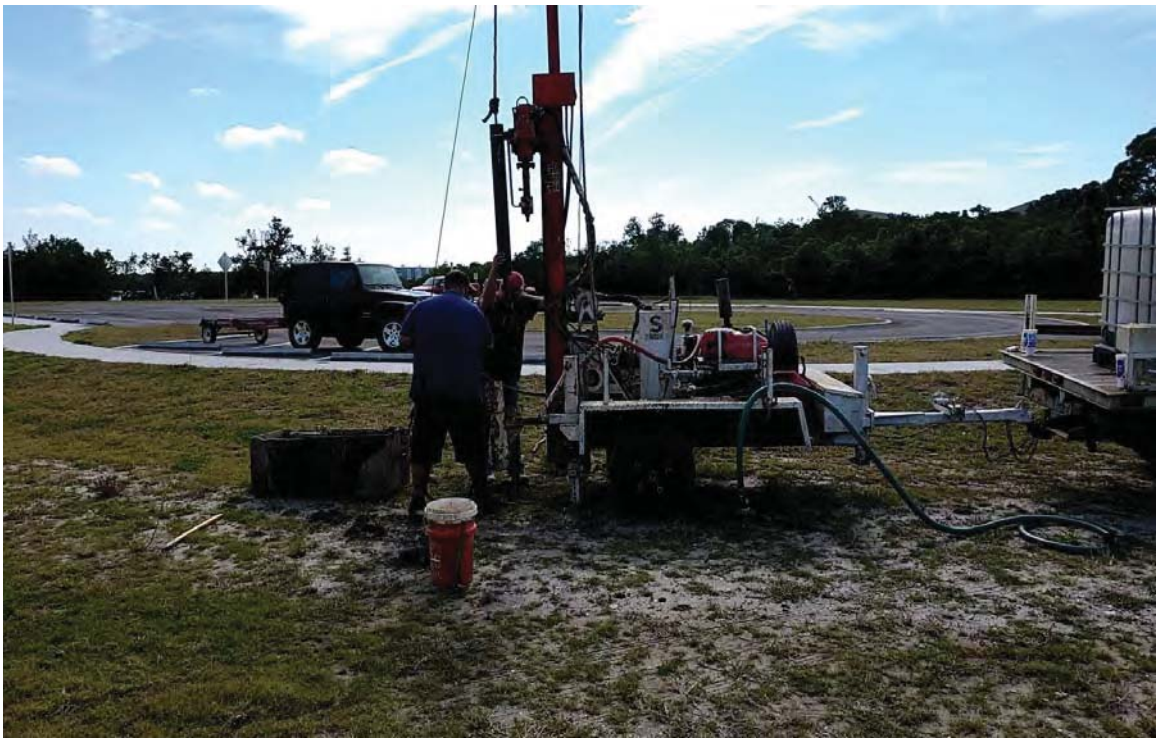
SITE PHOTOGRAPHS

Photograph No. 1: View of subject property.

Photograph No. 2: View of subject property.

Photograph No. 3: View of subject property.

Photograph No. 4: View of subject property.



Photograph No. 5: View of soil boring drilling operation.

Photograph No. 6: View of soil boring drilling operations.