MARCH 12, 2018
BOARD OF COUNTY COMMISSIONERS
ORANGE COUNTY, FLORIDA
Y18-743-RM / ADDENDUM NO. 1
PUBLIC WORKS BITHLO VEHICLE MAINTENANCE BUILDING

THE OPENING DATE IS MARCH 20, 2018

This addendum is hereby incorporated into the bid documents of the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to, and shall take precedence over, the original documents. Underlining indicates additions, deletions are indicated by ~~strikethrough~~.

A. The Bid opening date remains March 20, 2018 at 2:00 p.m.

B. Questions and Answers:

1. **QUESTION:** Is there a geotechnical report?

   ANSWER: Yes, please see "Exhibit A" attached to this addendum

2. **QUESTION**: Who pays for the permits?

   ANSWER: The Owner pays for the permits.

3. **QUESTION**: Building site security must be provided by G4S security systems? Please confirm.

   ANSWER: G4S security is not required on this project.

4. **QUESTION**: Section 01010 – 1.07 background checks. Each sub will need to do a background check on each employee that is on site? Please confirm.

   ANSWER: Employee background checks are not required for this project.

5. **QUESTION**: Note 5 page E-101 states contractor shall provide services from Orange County approved fuel system contractor to terminate all cables at island. Can you provide a list of orange county approved contractors? Or where I can find the list

   ANSWER: The approved Orange County fuel system contractor is EJ Ward, Inc. The local rep's contact info: Everette Atkinson, eatkinson@ejward.com, business phone (210) 824-7383

6. **QUESTION**: Page S201A, there is no foundation labeled anywhere. I assume the dotted line represents the F5.0 foundation, as it is shown on page S.201B

   ANSWER: Correct – the F5.0 foundation continues all the way around the slab.

7. **QUESTION**: Can you confirm where detail 1/S300 is shown on the plans? On page S.201B there are three greyed out pilasters, and I want to know if those are the ones. How many pilasters are there?

   ANSWER: Detail applies at all column locations. Should be 22 locations.

8. **QUESTION**: Can you confirm where detail 2/S300 is? The slab turn down. I did not see that called out anywhere on the plans.

   ANSWER: Detail 2/S300 does not apply to the project.

9. **QUESTION**: The compressed air requires grooved fittings. Is another method acceptable?

   ANSWER: Compressed air fittings can also be butt welded fittings.

10. **QUESTION**: It was mentioned that the small building was to be demoed at a later date, how much later? One week or couple months?

    ANSWER: Please reference Key Note #5 on drawing sheet A00.50A

C. All other terms and conditions of the IFB remain the same.

The Bidder/Proposer shall acknowledge receipt of this addendum by completing the applicable section in the solicitation or by completion of the acknowledgement information on the addendum. Either form of acknowledgement must be completed and returned not later than the date and time for receipt of the bid or proposal.

Receipt acknowledged by:

______________________________ ________________________

Authorized Signature **Date Signed**

____

Title

____

Name of Firm

EXHIBIT A

Geotechnical Engineering Report

Bithlo Vehicle Maintenance Building
18758 Old Cheney Highway
Bithlo, Orange County, Florida

March 16, 2017
Terracon Project No. H1175023

Prepared for:
Orange County Capital Projects Division
Orlando, Florida

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

March 16, 2017

Orange County Capital Projects Division
400 E. South Street
Orlando, Florida 32801

Attn: Mr. Scott Reekie, LEED AP
P: [407] 836 0044

Re: Geotechnical Engineering Report
Bithlo Vehicle Maintenance Building
18758 Old Cheney Highway
Bithlo, Orange County, Florida
Terracon Project Number: H1175023

Dear Mr. Reekie:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with our proposal number PH1175023 dated January 26, 2017.

This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.
Certificate of Authorization Number 8830

Shenna McMaster, P.E.
Senior Geotechnical Engineer
Florida PE #57537

Jay W. Casper, P.E.
Principal

This report has been electronically signed and sealed by Shenna McMaster, P.E. on 3/16/17 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Geotechnical exploration has been performed for the proposed maintenance building at 18758 Old Cheney Highway in Bithlo, Orange County, Florida. Three (3) borings, designated as B-1 through B-3, have been performed to a depth of 15 feet below the existing ground surface in the proposed building area.

Based on the information obtained from our geotechnical exploration, it appears that the site can be developed for the proposed project. The following geotechnical considerations were identified:

- Soil conditions observed consisted of mostly sands with varying amounts of silt to the boring termination depth, with the exception of boring B-1 which encountered a clayey sand layer at a depth of about 5 to 6.5 feet below the ground surface.

- Groundwater was observed in the borings at a depth of about 6 to 11 feet below existing grade. Normal seasonal high groundwater levels are anticipated to be about 2 to 3 feet below existing grade.

- The proposed structure may be supported on shallow footings bearing on the existing site soil or on newly placed engineered fill.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
WEST ORANGE MAINTENANCE BUILDING
18758 OLD CHENEY HIGHWAY
BITHLO, FLORIDA

Terracon Project No. H1175023
March 16, 2017

1.0 INTRODUCTION

This geotechnical engineering report has been prepared for the proposed maintenance building at 18758 Old Cheney Highway in Bithlo, Orange County, Florida as shown on the Topographic Vicinity Map included as Exhibit A-1 in Appendix A. Three (3) soil borings, designated as B-1 through B-3, were performed to a depth 15 feet below the existing ground surface within the location of the proposed building. Logs of the borings along with a Boring Location Plan (Exhibit A-4) are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- earthwork
- foundation design and construction
- floor slab design and construction

2.0 PROJECT INFORMATION

1.1. Site Location

ITEM	DESCRIPTION
Location	18758 Old Cheney Highway; Bithlo, Florida
Current Ground Cover	Asphalt pavement, metal tool shed, grass area.
Existing Topography	The USGS Quadrangle Map, "Bithlo, Florida" indicates the project area is generally flat with ground surface elevations near +65 feet.

1.2 Project Description

ITEM	DESCRIPTION
Structure	The project involves the construction of a single story maintenance building about 192 by 26 feet in footprint. A smaller structure present at the location of the proposed building will be demolished as part of the construction of the new building.
Building Construction	Reinforced concrete slab with metal walls.
Finished Floor Elevation (FFE)	Near existing grades.

The project scope does not include pavements or stormwater management facilities.

3.0 SUBSURFACE CONDITIONS

3.1 Soil Survey

The Soil Survey of Orange County, Florida as prepared by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS; later renamed the Natural Resource Conservation Service - NRCS), identifies the soil types at the subject site as primarily *Smyrna fine sand (44),* possibly encroaching slightly into *Sanibel muck (42)*. It should be noted that the Soil Survey is not intended as a substitute for site-specific geotechnical exploration; rather it is a useful tool in planning a project scope in that it provides information on soil types likely to be encountered. Boundaries between adjacent soil types on the Soil Survey maps are approximate (included in Appendix as Exhibit A-2). A description of the mapped soil units are included in Appendix A as Exhibit A-3.

3.2 Typical Profile

Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/ Density
0 to 15 feet (to boring termination)	Mostly fine sand (SP), sand with silt (SP-SM) and silty sand (SM)[1]	Loose to Medium dense

1. Boring B-1 encountered a layer of clayey sand (SC) at a depth of about 5 to 6.5 feet below the surface.

Conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types. The in-situ transition between materials may be gradual. Details for each of the borings can be found on the boring logs in Appendix A of this report. Descriptions of our field exploration are included as Exhibit A-5 in Appendix A. General notes for SPT borings can be found in Exhibit C-1. A more detailed description of the Unified Soil Classification System (USCS) is included as Exhibit C-2 in Appendix C.

3.3 Groundwater

The boreholes were observed during drilling for the presence and level of groundwater. Groundwater was observed in the borings at a depth of about 6 to 11 feet below existing grade at the time of drilling. The deeper groundwater level observed may be due to silty sands masking the apparent groundwater table. It should be recognized that fluctuations of the groundwater table will occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the boring was performed. In addition, perched water can develop within higher permeability soils overlying less permeable soils. Therefore, groundwater levels during construction or at other times in the future may be higher or lower than the levels indicated on the boring logs.

We estimate that during the normal wet season with rainfall and recharge at a maximum, groundwater levels will be about 2 to 3 feet below the existing grade. Our estimates of the seasonal groundwater conditions are based on the USDA Soil Survey, the encountered soil types, recent weather conditions, and the encountered water levels. These seasonal water table estimates do not represent the temporary rise in water table that occurs immediately following a storm event, including adjacent to other stormwater management facilities. This is different from static groundwater levels in wet ponds and/or drainage canals which can affect the design water levels of new, nearby ponds. The seasonal high water table may vary from normal when affected by extreme weather changes, localized or regional flooding, karst activity, future grading, drainage improvements, or other construction that may occur on our around the site following the date of this report.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Borings encountered surficial fine sand to fine sand with silt and silty sand. These materials are generally suitable for construction of the proposed foundations and floor slabs following the recommended Earthwork portions of this report.

Spread footings bearing on natural sands or engineered fill are recommended for support of the proposed building. The engineered fill should be placed as outlined in Section 4.2, Earthwork, of this report.

We recommend that the exposed subgrade be thoroughly evaluated after the existing structure is demolished and stripping of any pavement, topsoil and creation of all cut areas, but prior to the start of structural fill operations (if any). We recommend that Terracon be retained to evaluate the satisfactory preparation of the bearing material for the foundations and floor slab subgrade soils. Subsurface conditions, as identified by the field testing programs, have been reviewed and evaluated with respect to the proposed building plans known to us at this time.

Design and construction recommendations for foundation systems and other earth connected phases of the project are outlined below.

4.2 Earthwork

4.2.1 Site Preparation

Prior to placing any fill, existing pavements and structures, vegetation, topsoil, and any otherwise unsuitable material should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and re-compacted. After stripping and grubbing and achieving cut grades, the exposed surface should be proofrolled where possible to aid in locating loose or soft areas. Proof-rolling can be performed with appropriate heavy equipment to obtain a minimum compaction as defined in Section 4.2.3. Unstable soil (pumping) should be removed or moisture conditioned and compacted in place prior to placing fill.

Where fill is placed on existing slopes, we recommend that fill slopes be over filled and then cut back to develop an adequately compacted slope face. Slopes should be provided with appropriate erosion protection.

4.2.2 Material Requirements

Compacted structural fill should meet the following material property requirements:

Fill Type [1]	USCS Classification	Acceptable Location for Placement	Maximum Lift Thickness (in.)
General [1]	SP (fines content < 5%)	All locations and elevations	12[3]
	SP-SM (fines content between 5 and 12%)[2]	All locations and elevations, except strict moisture control will be required during placement, particularly during the rainy season.	8 to 12[3]

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris.
2. If fines contents are greater than 12 percent, special design and construction procedures may be necessary.
3. Loose thickness when heavy compaction equipment is used in vibratory mode. Lift thickness should be decreased if static compaction is being used, typically to no more than 8 inches, and the required compaction must still be achieved. Use 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is required.

4.2.3 Compaction Requirements-Building Pad Area

Item	Description
Minimum Compaction Requirements [1]	95 percent of the material's maximum modified Proctor dry density (ASTM D 1557).
Moisture Content[2]	Within ±2 percent of optimum moisture content as determined by the Modified Proctor test, at the time of placement and compaction.
Minimum Testing Frequency	Two field density tests within the building area following proofrolling and per 1-foot lift of fill placed.

Item	Description

1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
2. Specifically, moisture levels should be maintained low enough to allow for satisfactory compaction to be achieved without the cohesionless fill material pumping when proofrolled.

4.2.4 Utility Trench Backfill

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the building should be backfilled with in-situ soils to avoid creating a preferred flow path through the trenches.

4.2.5 Grading and Drainage

Final surrounding grades should be sloped away from the structure on all sides to prevent ponding of water. Gutters, downspouts, or other appropriate methods that direct water a minimum of 10 feet beyond the footprint of the proposed structures are recommended, unless the area outside the foundations will be completely covered by pavement. Site grades should be set considering the estimated seasonal high groundwater presented in Section 3.3.

4.2.6 Earthwork Construction Considerations

After initial proofrolling and compaction, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and re-compacted prior to floor slab and pavement construction.

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to the structure.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will probably be required during grading operations. The Grading Contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations into the completed subgrade, and just prior to construction of building floor slabs.

4.3 Foundations

In our opinion, the proposed maintenance building can be supported by a shallow foundation system bearing on existing fill soils or newly placed fill extending to native soil. Design recommendations for shallow foundations for the proposed structure are presented in the following sections.

4.3.1 Foundation Design Recommendations

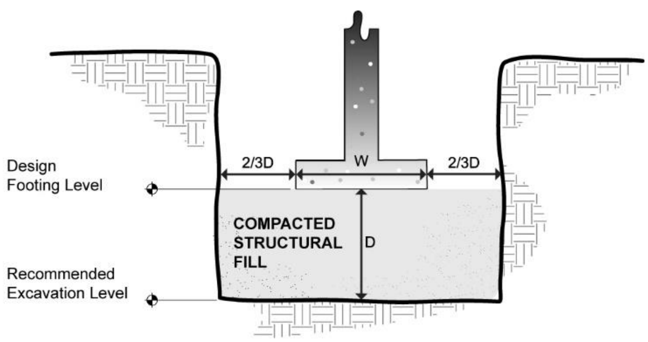
Description	Column Footing	Wall Footing	Monolithic Slab Foundation [4]
Net Allowable Bearing Pressure [1]	2,500 psf	2,500 psf	2,500 psf
Minimum Width	30 inches	18 inches	12 inches
Minimum Embedment Below Finished Grade [2]	18 inches	18 inches	12 inches
Compaction Requirements	95 percent of the materials maximum Modified Proctor dry density for a depth of 12 inches below footing.		
Minimum Testing Frequency	One field density test per footing for a minimum depth of 1 foot below the footing subgrade.	One field density test per 50 linear feet for a minimum depth of 1 foot below the footing subgrade.	One field density test per 50 linear feet for a minimum depth of 1 foot below the footing subgrade.
Approximate Total Settlement [3]	<1 inch	<1 inch	<1 inch
Estimated Differential Settlement [3]	<¾ inch between columns	<¾ inch over 40 feet	<¾ inch over 40 feet

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable fill or soft soils, if encountered, will be undercut and replaced with engineered fill.
2. For erosion protection and to reduce effects of seasonal moisture variations in subgrade soils.
3. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. The above settlement estimates have assumed that the maximum footing width is 5 feet for column footings and 2 feet for continuous footings.
4. Turned-down portion of slab. For slab requirements see Section 4.4.1.

4.3.2 Foundation Construction Considerations

The base of all foundation excavations should be free of water and loose soil and debris prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, the affected soil should be removed or moisture conditioned and re-compacted prior to placing concrete. Consider placing a lean concrete mud-mat over the bearing soils if the excavations must remain open over night or for an extended period of time. It is recommended that Terracon be retained to observe and test the soil foundation bearing materials.

If unsuitable bearing soils are encountered in footing excavations, the excavations should be extended deeper to suitable soils and the footings could bear directly on these soils at the lower level. The footings could also bear on properly compacted backfill extending down to the suitable soils. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with granular material placed in lifts of 6 inches or less in loose thickness and compacted to at least 95 percent of the material's modified effort maximum dry density (ASTM D-1557). The overexcavation and backfill procedures are described in the figures below. Compaction tests should be performed at a frequency of 1 test per footing per 1-foot lift for square footings, and 1 test per 50 linear feet per 1-foot lift for wall or continuous footings.



Overexcavation / Backfill

NOTE: Excavation in sketch shown vertical for convenience. Excavations should be sloped as necessary for safety.

4.4 Floor Slabs

4.4.1 Floor Slab Design Recommendations

Item	Description
Floor Slab Support	Free draining granular material meeting the general fill specification. [1]
Modulus of Subgrade Reaction	100 pounds per square inch per inch (psi/in) for point loading conditions.
Compaction Requirements	95 percent of the materials maximum Modified Proctor dry density.

Minimum Testing Frequency	One field density test per 2,500 square feet or fraction thereof for a depth of 12 inches. [2]

1. We recommend subgrades be maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become desiccated prior to construction of floor slabs, the affected material should be removed or the materials scarified, moistened, and recompacted. Upon completion of grading operations in the building areas, care should be taken to maintain the recommended subgrade moisture content and density prior to construction of the building floor slabs.
2. Density should be re-checked after utility construction.

Where appropriate, saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual.

The use of a vapor retarder should be considered beneath concrete slabs-on-grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI and Florida Building Code (FBC) regarding moisture and radon for procedures and cautions regarding the use and placement of a vapor retarder. We note that FBC requires a minimum of 6-mil polyethylene, which is typically used in Florida. However, local requirements that might affect what moisture barrier may use should also be consulted.

4.4.2 Floor Slab Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. We recommend the area underlying the floor slab be rough graded and then thoroughly proofrolled prior to final grading. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of concrete and corrective action will be required.

Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of concrete.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

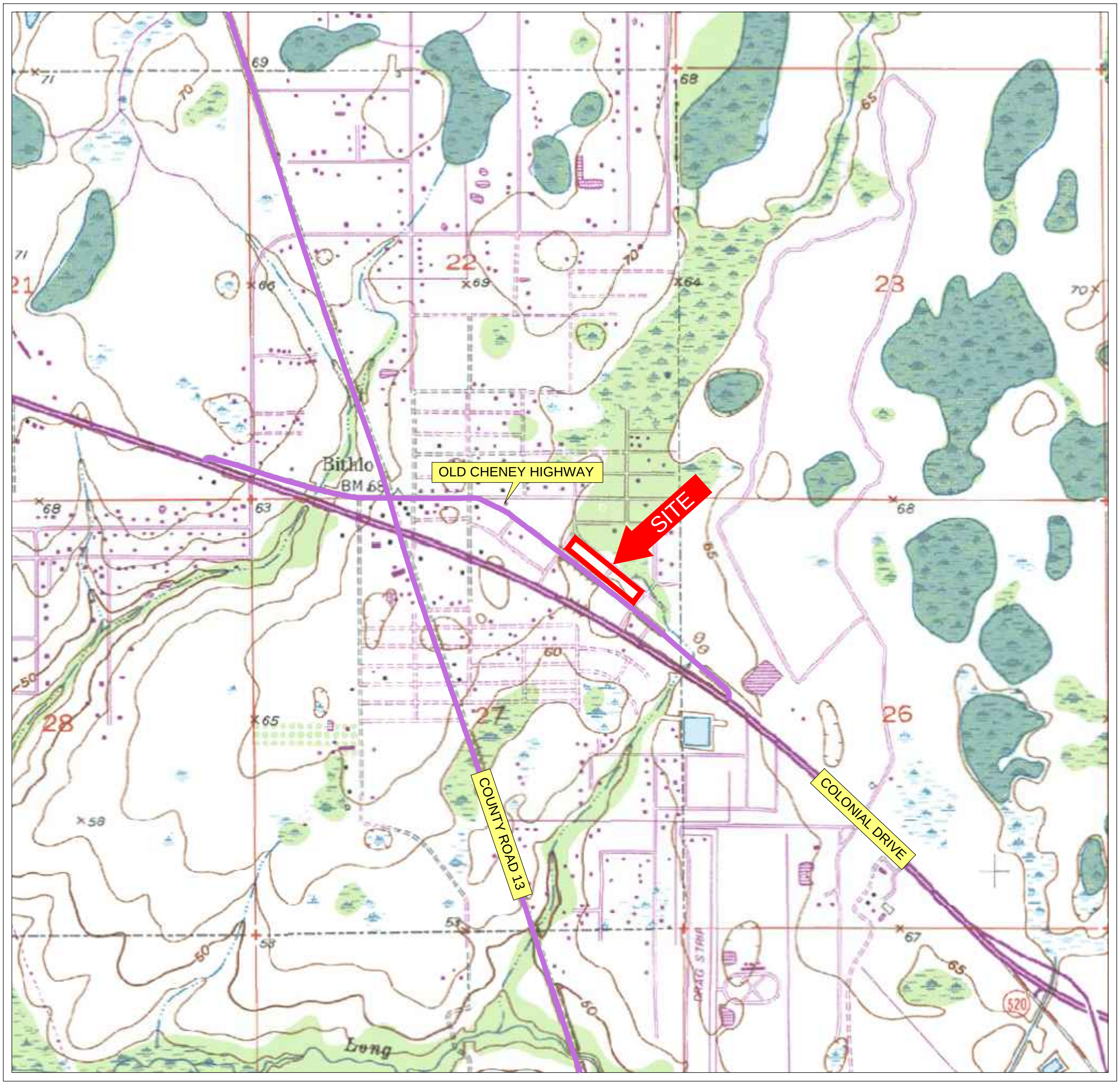
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION

UNITED STATES — DEPARTMENT OF THE INTERIOR — GEOLOGICAL SURVEY



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MILES 1 .5 0 1

FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 5 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

SECTION: 27
TOWNSHIP: 22 SOUTH
RANGE: 32 EAST

BITHLO, FLORIDA
1953; PHOTOREVISED 1980
7.5 MINUTE SERIES (QUADRANGLE)

N

Project Mngr: JWC	Project No. H1175023	Terracon Consulting Engineers and Scientists	TOPOGRAPHIC VICINITY MAP	EXHIBIT
Drawn By: AS	Scale: AS SHOWN		GEOTECHNICAL ENGINEERING REPORT BITHLO VEHICLE MAINTENANCE BUILDING	A-1
Checked By: SM	File No. H1175023	1675 LEE ROAD WINTER PARK, FLORIDA 32789	18758 OLD CHENEY HIGHWAY	
Approved By: JWC	Date: 2-7-17	PH. (407) 740-6110 FAX. (407) 740-6112	BITHLO, ORANGE COUNTY, FLORIDA	

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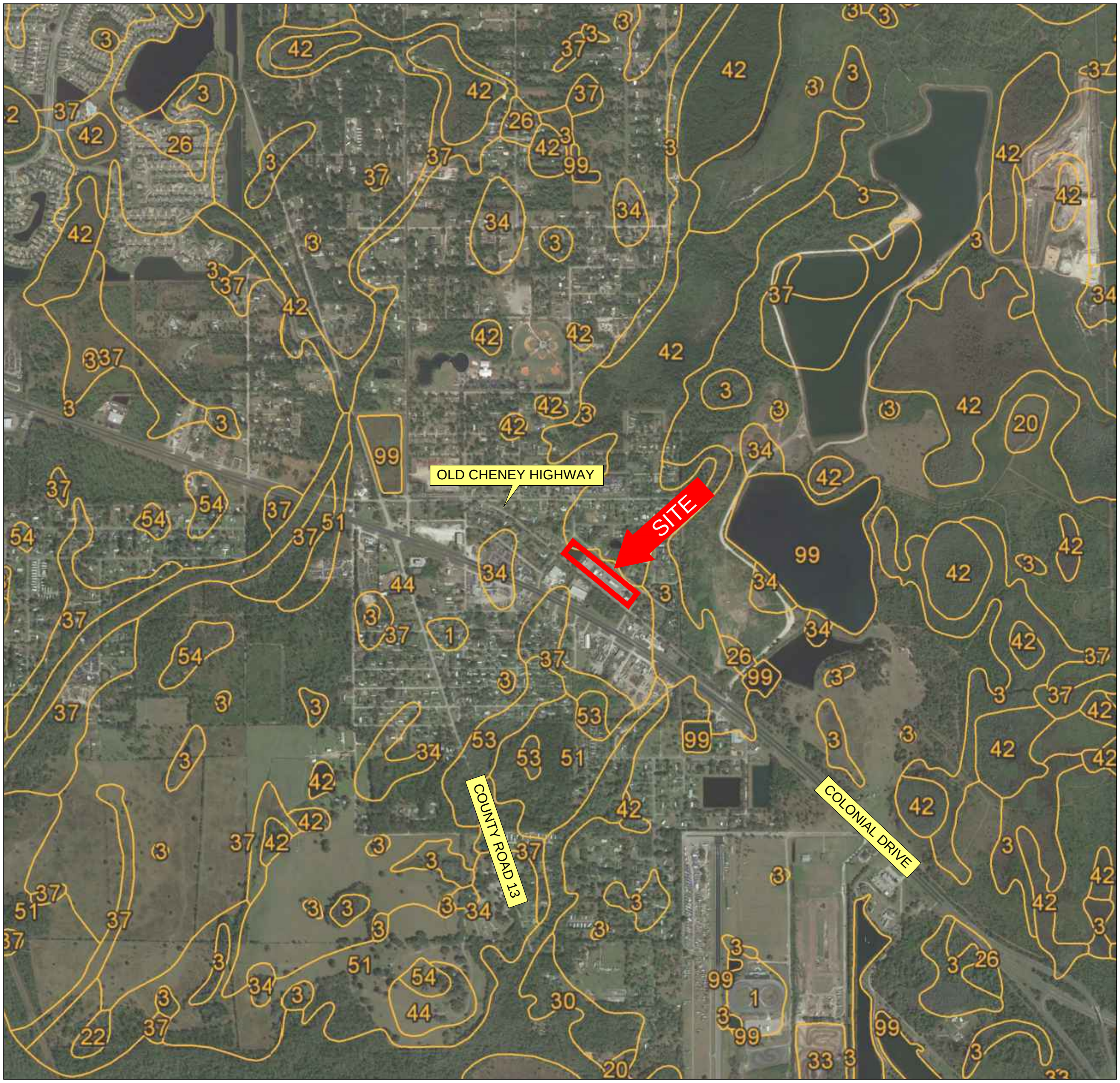

SCALE 1" = 2000'

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

U.S.D.A. SOIL SURVEY FOR ORANGE COUNTY, FLORIDA

N

SECTION: 27
TOWNSHIP: 22 SOUTH
RANGE: 32 EAST

SOIL LEGEND

42	SANIBEL MUCK
44	SMYRNA-SMYRNA, WET, FINE SAND, 0 TO 2 PERCENT SLOPES

Project Mngr: JWC	Project No. H1175023		
Drawn By: AS	Scale: AS SHOWN		
Checked By: SM	File No. H1175023		
Approved By: JWC	Date: 2-7-17		

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

SOILS MAP
GEOTECHNICAL ENGINEERING REPORT
BITHLO VEHICLE MAINTENANCE BUILDING
18758 OLD CHENEY HIGHWAY
BITHLO, ORANGE COUNTY, FLORIDA

EXHIBIT
A-2

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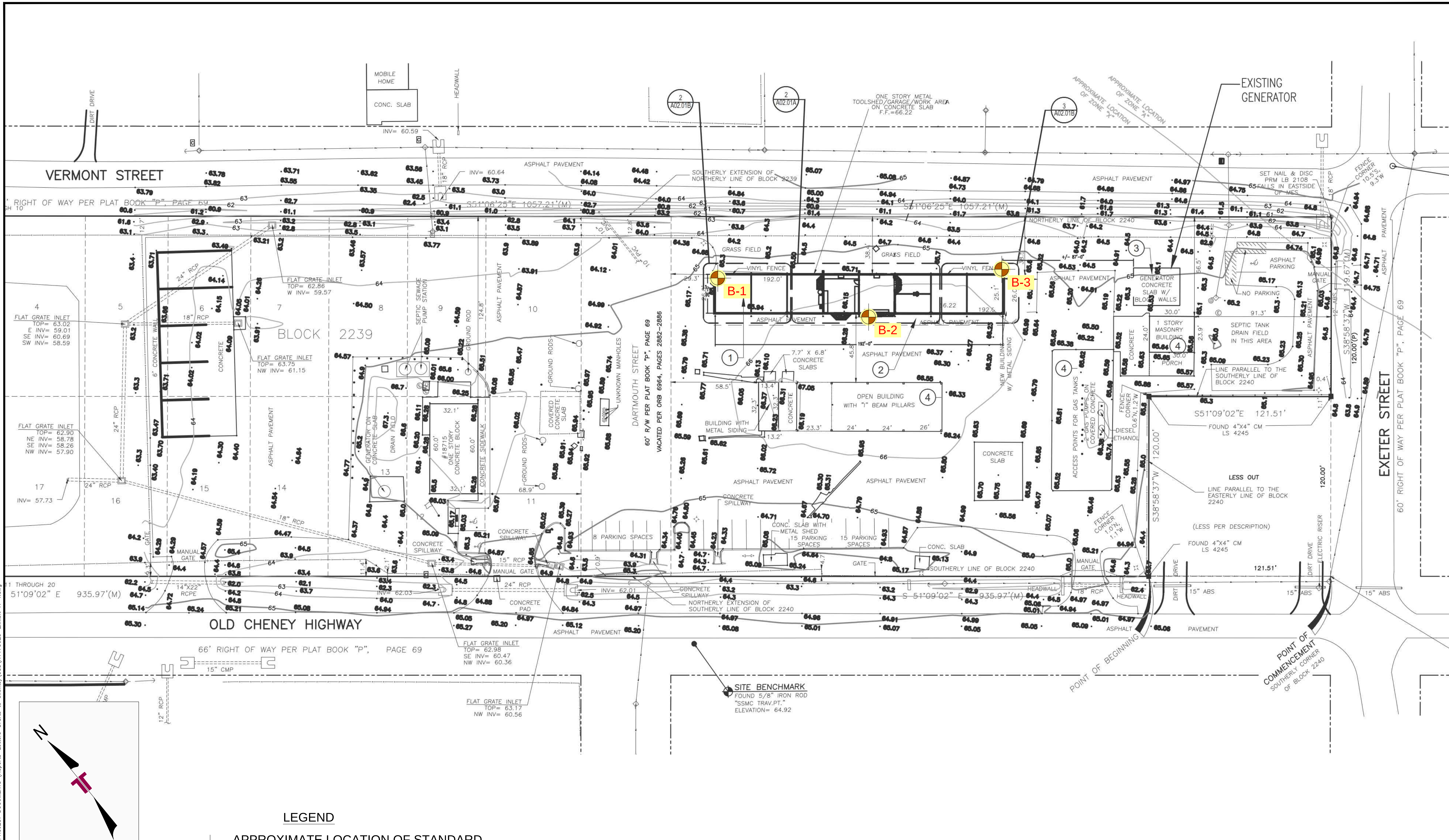
Soil Survey Description

42 –Sanibel muck. This soil type is nearly level and very poorly drained. It is typically found in depressions, freshwater swamps and marshes, and poorly defined drainageways. In its natural state, groundwater is ponded atop this soil type for 6 to 9 months of years with normal rainfall; the groundwater table fluctuates between the surface and a depth of 10 inches (0.8 feet) for 2 to 6 months. A surficial organic layer is normally associated with this soil type, approximately 11 inches (0.9 feet) thick. Typical organic contents of the organic layer range from 20 to 50 percent. Beneath the surficial organic layer, Sanibel soils are predominantly sandy to the maximum defined depth of 80 inches (6.7 feet).

44 – Smyrna fine sand. This soil type is nearly level and poorly drained. It is typically found on broad flatwoods. In its natural state and during years of normal rainfall, this soil type has a seasonal high water table within 10 inches (0.8 feet) of the surface, receding to a depth of 10 to 40 inches (0.8 to 3.3 feet) for more than six months.



LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

Project Mngr: JWC	Project No. H1175320		
Drawn By: AS	Scale: AS SHOWN		
Checked By: SM	File No. H1175320		
Approved By: JWC	Date: 2-7-17		

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

BORING LOCATION PLAN
GEOTECHNICAL ENGINEERING REPORT
BITHLO VEHICLE MAINTENANCE BUILDING
18758 OLD CHENEY HIGHWAY
BITHLO, ORANGE COUNTY, FLORIDA

EXHIBIT
A-4

Field Exploration Description

The boring locations were laid out at the project site by Terracon personnel. Borings were located in the field using a hand-held GPS unit with coordinates obtained from Google Earth imagery. The locations indicated on the attached diagram are approximate and should be considered accurate only to the degree implied by the means and methods used to define them.

The SPT soil borings were drilled with an ATV-mounted, rotary drilling rig equipped with an automatic hammer. The boreholes were advanced with a cutting head and stabilized with the use of bentonite (drillers' mud). Soil samples were obtained by the split spoon sampling procedure in general accordance with the Standard Penetration Test (SPT) procedure. In the split spoon sampling procedure, the number of blows required to advance the sampling spoon the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration by means of a 140-pound hammer with a free fall of 30 inches, is the standard penetration resistance value (N). This value is used to estimate the in-situ relative density of cohesionless soils and the consistency of cohesive soils. The sampling depths and penetration distance, plus the standard penetration resistance values, are shown on the boring logs.

Due to potential buried utilities at the boring locations, the upper 6 feet of the borings were hand augered. A penetrometer was used within the hand augered portion of the borings. The penetrometer used during the hand auger procedure is a hand operated device which obtains the relative resistance to penetration of a standard size cone shaped tip into the soil. As the cone is pushed into the soil the maximum pressure is indicated on a hydraulic gauge or proving ring. These pressure readings are shown on the attached boring profiles at the tested locations and depths. Although the penetrometer readings do not directly correlate to the SPT N-values, comparison of penetrometer reading within and between boring locations can provide a basis for evaluation of relative looseness and compaction of soils.

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

Portions of the samples from the borings were sealed in glass jars to reduce moisture loss, and then the jars were taken to our laboratory for further observation and classification. Upon completion, the boreholes were backfilled with the site soil. Field logs of each boring were prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. The boring logs included with this report represent an interpretation of the field logs and include modifications based on laboratory observation of the samples.

BORING LOG NO. B-1

PROJECT: Bithlo Vehicle Maintenance Building

CLIENT: Orange County Capital Projects Division

SITE: 18758 Old Cheney Highway, Bithlo, Orange County, Florida

LOCATION See Exhibit A-4

Latitude: 28.552173° Longitude: -81.097911°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
	SAND WITH SILT (SP-SM), trace gravel, gray-brown				21 (HP)		
					15 (HP)		
					10 (HP)		
					10 (HP)		
5.0					10 (HP)		
	CLAYEY SAND (SC), orange-brown	5			7 (HP)	28	44
6.5	**SAND (SP)**, light brown		▽		3-2-3-3 N=5		
					3-2-4-4 N=6		
		10					
15.0					4-3-4 N=7		
	Boring Terminated at 15 Feet	15					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary Wash Boring

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exhibit A-5 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Water Initially Observed at 6.1'*

Terracon
1675 Lee Rd
Winter Park, FL

Boring Started: 3/6/2017	Boring Completed: 3/6/2017
Drill Rig: DR-989	Driller:
Project No.: H1175023	Exhibit: A-6

BORING LOG NO. B-2

PROJECT: Bithlo Vehicle Maintenance Building

CLIENT: Orange County Capital Projects Division

SITE: 18758 Old Cheney Highway
Bithlo, Orange County, Florida

LOCATION See Exhibit A-4

Latitude: 28.551926° Longitude: -81.097713°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
0.5	**ASPHALT CONCRETE**						
3.5	**SAND WITH SILT (SP-SM)**, with shell and gravel stabilization, orange-brown to gray-brown				18 (HP)		
					40 (HP)		
					16 (HP)		
5.0	**SAND (SP)**, light gray				16 (HP)		
					19 (HP)		
8.5	**SAND WITH SILT (SP-SM)**, dark brown to reddish-brown, root @ 7.5'	5			20 (HP)	21	9
					8-8-9-9 N=17		
15.0	**SILTY SAND (SM)**, with cemented lenses (Harpdan), brown to dark-reddish-brown				10-11-11-9 N=22		
		10	▽ (11.1')				
		15			8-10-10 N=20		
	Boring Terminated at 15 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary Wash Boring

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exhibit A-5 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Water Initially Observed at 11.1'*

Terracon
1675 Lee Rd
Winter Park, FL

Boring Started: 3/6/2017	Boring Completed: 3/6/2017
Drill Rig: DR-989	Driller:
Project No.: H1175023	Exhibit: A-7

BORING LOG NO. B-3

PROJECT: Bithlo Vehicle Maintenance Building

CLIENT: Orange County Capital Projects Division

SITE: 18758 Old Cheney Highway, Bithlo, Orange County, Florida

LOCATION See Exhibit A-4

Latitude: 28.551859° Longitude: -81.097426°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
	SAND WITH SILT (SP-SM), with gravel stabilization, gray-brown				21 (HP)		
1.5					19 (HP)	16	4
	SAND (SP), light gray				19 (HP)		
3.5					15 (HP)		
	SAND WITH SILT (SP-SM), dark reddish-brown				17 (HP)		
		5	▽		17 (HP)		
6.5					9-11-9-9 N=20		
	SAND (SP), gray-brown				8-8-8-8 N=16		
9.5							
	SAND WITH SILT (SP-SM), dark brown	10					
15.0		15			10-8-11 N=19		
	Boring Terminated at 15 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary Wash Boring

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exhibit A-5 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Water Initially Observed at 5.9'*

Terracon
1675 Lee Rd
Winter Park, FL

Boring Started: 3/6/2017	Boring Completed: 3/6/2017
Drill Rig: DR-989	Driller:
Project No.: H1175023	Exhibit: A-8

APPENDIX B
SUPPORTING INFORMATION

Laboratory Testing

During the field exploration, a portion of each recovered sample was sealed in a glass jar and transported to our laboratory for further visual observation and laboratory testing. Selected samples retrieved from the borings were tested for moisture (water) content and fines content (soil passing a US standard #200 sieve). Those results are included in this report and on the respective boring logs. The visual-manual classifications were modified as appropriate based upon the laboratory testing results.

The soil samples were classified in general accordance with the appended General Notes and the Unified Soil Classification System based on the material's texture and plasticity. The estimated group symbol for the Unified Soil Classification System is shown on the boring logs and a brief description of the Unified Soil Classification System is included in Appendix C.

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING		WATER LEVEL		FIELD TESTS	
	Auger Cuttings		Water Initially Encountered	(HP)	Hand Penetrometer
	Rock Core		Water Level After a Specified Period of Time	(T)	Torvane
	Grab Sample		Water Level After a Specified Period of Time	(DCP)	Dynamic Cone Penetrometer
	No Recovery		Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	(PID)	Photo-Ionization Detector
	Shelby Tube			(OVA)	Organic Vapor Analyzer
	Standard Penetration Test				

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Automatic Hammer SPT N-Value (Blows/Ft.)**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (psf)**	**Automatic Hammer SPT N-Value (Blows/Ft.)**
Very Loose	< 3	Very Soft	less than 500	< 1
Loose	3 - 8	Soft	500 to 1,000	1 - 3
Medium Dense	8 - 24	Medium Stiff	1,000 to 2,000	3 - 6
Dense	24 - 40	Stiff	2,000 to 4,000	6 - 12
Very Dense	> 40	Very Stiff	4,000 to 8,000	12 - 24
		Hard	> 8,000	> 24

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K,L,M,N]
					Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K,L,M,P]
					Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10} \qquad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains $\geq$ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains $\geq$ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains $\geq$ 30% plus No. 200 predominantly sand, add "sandy" to group name.

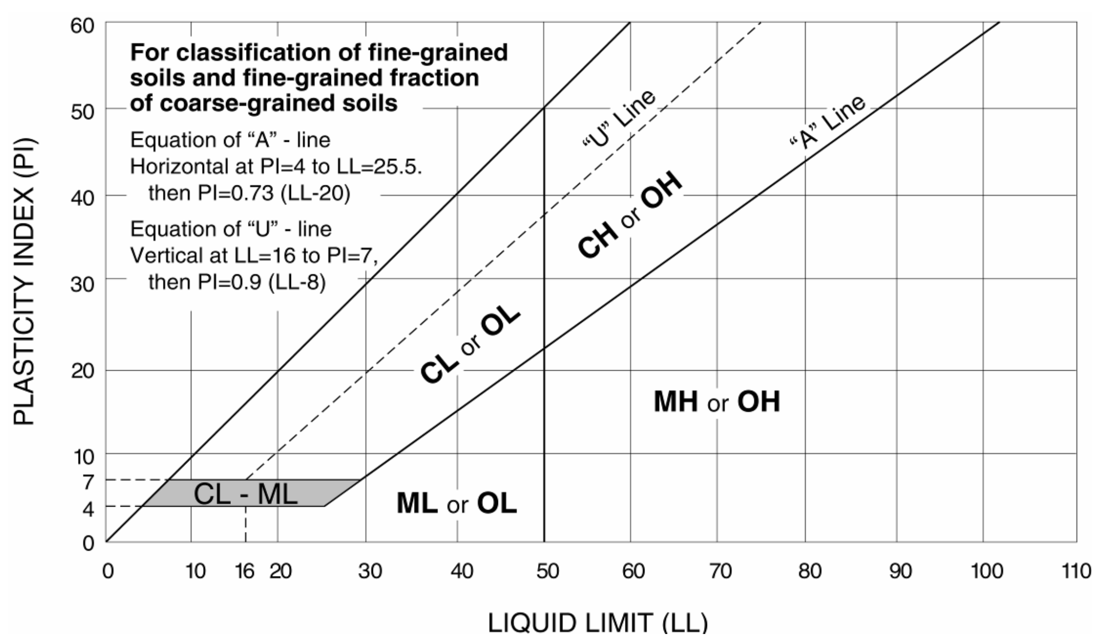
[M] If soil contains $\geq$ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI $\geq$ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Terracon