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ROADWAY SOIL SURVEY

For the

ROADWAY IMPROVEMENTS
17TH STREET EAST FROM
U.S. HIGHWAY 41 TO CANAL ROAD
MANATEE COUNTY, FLORIDA

Prepared for

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1.0 PROJECT DESCRIPTION

This geotechnical study is to support the design of the proposed improvements to 17th Street East in Manatee County, Florida. The project includes improvements to 17th Street East from U.S. Highway 41 to Canal Road, in Manatee County, Florida. The length of the project is approximately 3,900 feet from U.S. 41 to Canal Road. The scope of the project includes the design of a four lane divided roadway with median ditch, bike lanes, sidewalks, drainage facilities, traffic signals and roadway lighting.

A 6± acre stormwater facility to the east of the Sylvan Oaks subdivision will be designed and permitted to alleviate flooding in the subdivision. This stormwater facility will also be designed to accept roadway runoff. Three (3) additional ponds are currently anticipated to be constructed.

This report presents the results of the subsurface exploration for the proposed roadway improvements and comments on roadway subgrade preparation procedures and pavement design considerations based on the encountered subgrade soils and measured groundwater conditions. In addition, this report presents the results of the subsurface exploration for the four (4) proposed ponds along with pond design considerations based on the encountered soil and groundwater conditions.

2.0 SCOPE OF SERVICES

The purpose of this study was to obtain information on the general subsurface conditions at the locations of the roadway and pond improvements. Subsurface materials encountered were then evaluated with respect to available project characteristics. In this regard, engineering assessments for the following items have been formulated:

1. Suitability of the existing shallow soils and groundwater conditions for roadway support. Anticipated site preparation recommendations for support of the new pavement.

2. Suitability of materials along the alignment for use as engineered fill, pavement subgrade fill and general backfill. Engineering criteria for placement and compaction of approved fill materials.

3. General location and description of potentially deleterious materials encountered in the borings that may interfere with construction progress or roadway performance, including existing fills or surficial organics.

4. Assessment of the existing soil subgrade and groundwater conditions at the subject site for suitability in pond design.

The scope of work for this project included the following:

1. Performed a general visual reconnaissance of the site and coordinated utility locate services.

2. Executed a program of subsurface exploration consisting of subsurface sampling and field testing. A total of thirty-nine (39) auger borings were completed within the planned roadway improvement areas. Thirty-two (32) of the auger borings were advanced by hand to depths of 1.5 to 5 feet below the existing grade. Many of the hand auger borings terminated shallower than the proposed termination depth of 5 feet below existing grades due to the presence of very hard soil and/or rock. Three (3) power auger borings were advanced by a hydraulic drill rig to depths of approximately 15 feet below the existing grade. Four (4) power auger borings (PA-3, PA-4, PA-5 and PA-7) were not performed due to limited access and/or utility conflicts. Therefore, hand auger borings were performed at these locations. In addition, three (3) Standard Penetration Test (SPT) borings were performed within the limits of the proposed pond located between Station 34+00 and Station 36+00 on the north side of 17th Street East and two (2) SPT borings were performed within the limits of the proposed pond located south of 17th Street East between Station 44+20 and Station 49+00. Three (3) SPT borings were performed in each of the two ponds located on either side of the existing creek between stations 52+00 and 55+50. The SPT borings were extended to depths of 20 feet below existing grades. Samples were obtained and SPT "N" values measured virtually continuously for the upper 10 feet and then on 5 feet intervals thereafter.

3. Visually classified the samples in the laboratory using the American Association of State Highway and Transportation Officials (AASHTO) Soil Classification System in general accordance with the American Society of Testing and Materials (ASTM) test designation D-3282, titled "Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes".

4. Performed limited laboratory testing including sieve analysis, moisture content, organic content, Atterberg limits and Limerock Bearing Ratio (LBR) tests.

5. Measured groundwater levels in the borings and estimated the seasonal high groundwater levels.

6. Prepared this engineering report summarizing the field studies and the subsurface soil and groundwater conditions encountered.

3.0 SUBSURFACE EXPLORATION AND CONDITIONS

To identify shallow subsurface conditions within the roadway improvement/expansion areas, a series of thirty-nine (39) auger borings was performed to depths of 1.5 to 15 feet below the existing grade. In each boring, samples were collected virtually continuously from the ground surface to the depths of termination. These soil samples were classified in the field and placed in airtight jars for transportation to our laboratory in Tampa. For safety, after performing the borings, the boreholes were backfilled with available existing materials.

3.1 Boring Locations

Boring locations were determined by PSI engineers based on the plans provided by Wade-Trim, Inc. The borings were staked and performed in the field by PSI technicians and drill crews.

The boring locations are presented on Sheets 2 to 5 in the Appendix.

3.2 Soil Boring Conditions

The results of the roadway and pond borings are presented on Sheets 6 through 8 in the Appendix in the form of soil profiles, along with the profile legend and other pertinent information such as measured groundwater levels and laboratory test results. Soil stratification is based on an examination of the recovered soil samples and the laboratory testing and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types of significantly different engineering properties. The actual transition may be gradual. In some cases, small variations in properties, not considered pertinent to our engineering evaluation, may have been abbreviated for clarity. The profiles represent the conditions at the boring locations only and variations may occur between the borings and beyond the depths explored. In general, the borings performed along the roadway alignment and within the proposed pond encountered the following strata.

SOIL STRATUM DESCRIPTIONS AND AASHTO CLASSIFICATIONS		
Stratum	Soil Description	AASHTO Soil Classification
1	Fine Sand	A-3
2	Clayey Sand to Sandy Clay	A-2-6/A-6
3	Slightly Silty to Slightly Clayey	A-2-4
4	Limestone	---

3.3 GROUNDWATER TABLE

The groundwater table was measured at each of the boring locations. The depths to the groundwater table, when encountered ranged from 3.5 to greater than 15 feet below the existing ground surface. The groundwater table depths measured at each boring location during our field survey are presented graphically on the Soil Boring Profiles on Sheets 6 through 8 in the Appendix.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as existing swales, drainage ponds and underdrains. The estimated seasonal high groundwater tables (SHGWT) for the proposed roadway alignment range from approximately 2 to greater than 5 feet below existing grades. However, due to the near-surface presence of clayey soils, a perched condition may occur where water levels are observed at or near the ground surface during prolonged rainy periods.

4.0 LABORATORY TESTING

4.1 SOIL CLASSIFICATION

Representative samples collected from the borings were visually examined in the laboratory by a geotechnical engineer to verify the field classifications. The samples were classified in general accordance with the AASHTO Classification System as based on visual examinations. Laboratory testing included natural moisture content, organic content, grain-size distribution and LBR testing on selected samples. This testing was utilized to confirm the visual classifications. The laboratory test results are summarized on the attached Table 3. LBR test results are presented on Table 4.

4.2 SIEVE ANALYSIS TEST (FULL AND –200)

The sieve analysis test measures the percentage by weight of a dry soil sample passing a series of U.S. standard sieves, including the percent passing the No. 200 sieve. In this manner, the grain size distribution of the soil is measured. The percentage by weight passing the No. 200 sieve is the silt and clay content. The soil gradation , including the percentage by weight of silt and clay in a soil affects its engineering properties, including permeability, suitability as roadway subgrade and suitability as general fill material. Sieve analysis tests were conducted in accordance with the FDOT FM 1-T207, (American Standard for Testing Materials (ASTM) D-1587). Some of the

samples were only washed through the No. 200 sieve providing the percent passing the No. 200 sieve (percent fines).

4.3 Moisture and Organic Content Tests

Laboratory moisture and organic content tests consist of the percentage of moisture and organic contents in selected samples in general accordance with FM 1-T265 and 1-T267 (ASTM D-2216) and D-2974). Briefly, the natural moisture content was determined by weighing a sample of the selected material and then drying it in an oven. Care was taken to use a gentle heat so as not to destroy the organics. The sample was removed from the oven and reweighed. The difference between the two (2) weights was the amount of moisture removed from the sample. The weights of the moisture divided by the weight of the dry soil sample is the percentage by weight of the moisture in the sample.

The dried soil samples were then heated in a small muffle furnace to 550 to 660 degrees Centigrade for six (6) hours, thereby driving off all organic-type material, leaving only the soil minerals. The difference in weight prior to and after the burning is the weight of organics. The weight of the organics divided by the weight of the dried soil is the percentage of organics within a sample. Soils which have organic contents in excess of five percent (5)% are classified as "muck".

4.4 Atterberg Limits

The liquid limit and the plastic limit test ("Atterberg limits") were conducted in general accordance with the FDOT test designation FM 1-T 089 and 1-T 090, respectively (ASTM test designation D 4318). Atterberg plastic limit and liquid limit tests measure the moisture content at which a fine-grained soil changes from a semi-solid to plastic state and from a plastic to a liquid state, respectively. The plasticity index is the difference between the liquid and plastic limits. The plasticity index is a rough indication of the tendency of a soil to absorb water on the particle surfaces. Some clays have a strong affinity for water, and tend to swell when wetted and shrink when dried. The larger the plasticity index, the greater the shrink-swell tendency.

5.0 GENERAL SITE GEOLOGY, USDA SCS AND USGS CONDITIONS

5.1 Regional Geology

Surface and near surface sediments in Manatee County consist of quartz sand, consolidated and unconsolidated shell beds, clays, limestone and dolomite. The sediments range in age from Oligocene to Holocene which are described below in ascending order.

The Oligocene Series consists of Suwannee Limestone. This is generally broken down into two (2) units. The upper unit of the Suwannee Limestone is a creamy white to light yellowish gray limestone containing darker dolomitized zones. The undolomitized

portions are variable packstone to wahcestone, poorly to well indurated and variably recrystallized. The upper unit is highly fossiliferous, containing abundant poorly preserved foraminiferous, mollusks, echinoids and corals.

The lower unit of the Suwannee Limestone is generally a pale gray to light yellow calculitic limestone. The lower unit is typically softer, more calculitic and less porous and fossiliferous than the upper unit and may contain finely divided pyrite. The top of the Suwanee Limestone is encountered at approximately 360 feet below mean sea level in the southeastern-most part of the country; the top of the Suwannee Limestone is encountered at depths of approximately 150 feet to over 360 feet.

The Arcadia Formation is present throughout Manatee County in the subsurface. The top of the Arcadia Formation is encountered at approximately mean sea level in southeastern Manatee County to just over 100 feet below mean sea level in the southern part of the county. The Arcadia Formation dips gently to the south-southeast. The thickness of this formation ranges from approximately 300 to over 490 feet. The Arcadia Formation in Manatee County consists of, in ascending order, the Tampa Member and an unnamed upper member. The Tampa Member is a white to tan-colored, quartz sandy limestone with a carbonate mud matrix. Varying amounts of clay are usually disseminated throughout the rock. Some beds within the Tampa Member contain more than 50% quartz sand. Dolomite is relatively uncommon within the Tampa Member. The Tampa Member is recognizable through most of southern Manatee County. The upper unnamed member consists of white to yellowish-gray quartz sand, phosphatic, sometimes clayey dolomites and limestones. Occasional beds of carbonate rich quartz sand and thin clay beds are present.

The Peace River Formation consists of sediments of yellowish-gray to light olive green interbedded phosphatic sands, clayey sand, clays and dolomite stringers. The top of this formation is found at or near mean sea level. However, in southeastern Manatee County, this formation is encountered at approximately 50 feet above mean sea level. The thickness of the formation ranges from 0 to 110 feet thick.

5.2 MANATEE COUNTY SOIL SURVEY

The "Soil Survey of Manatee County, Florida" published by the USDA Soil Conservation Service (SCS) indicated the primary mapping units in the vicinity of the proposed roadway improvements for 17th Street East as Bradenton Fine Sand, Limestone Substratum (5), Chobee Loamy Fine Sand (13), Chobee Variant Sandy Clay Loam (14), Eau Gallie Fine Sand (20),and Wabasso Fine Sand (48). The SCS map of the vicinity is shown on Sheet 1 in the Appendix. A summary of the USDA Soil Survey information is presented in Table 1 in the Appendix.

5.3 USGS Quadrangle Map

A review of the "Palmetto, Florida" Quadrangle map published by the United States Geological Service indicates that existing site grade elevations are at approximately 10 to 15 feet based on the 1929 National Geodetic Vertical Datum. The USGS map of the vicinity is shown on Sheet 1 in the Appendix.

6.0 GENERAL ROADWAY CONSTRUCTION RECOMMENDATIONS

6.1 Subgrade Preparation

Site preparation and roadway construction should be in accordance with Manatee County Specifications or the latest FDOT Standard Specifications for Road and Bridge Construction and Roadway and Traffic Design Standards.

Groundwater levels along the roadway improvement areas ranged from 3.5 to greater than 15 feet below the existing grade. Seasonal high groundwater levels are expected to be within 2 to greater than 5 feet of the existing ground surface. However, due to the presence of near-surface clayey soils, perched conditions where groundwater is at or near the ground surface may occur during prolonged rainy periods. The shallow clayey soils may be excavated during construction and replaced with clean sandy fill (less than 12 percent passing the No. 200 seive) in accordance with Indexes 500 and 505. This procedure may lower the expected perched water condition along the alignment. Depending upon groundwater levels at the time of construction, some form of dewatering may be required.

6.2 Temporary Side Slopes

All excavations should be performed in accordance with Manatee County Specifications or FDOT Standard Index 500 and the latest Standard Specifications for Road and Bridge Construction and in accordance with OSHA Standards.

6.3 Groundwater Control

Depending upon groundwater levels at the time of construction, some form of dewatering may be required for utility construction. Groundwater can normally be controlled in shallow excavations with pumps and sumps. During subgrade soil preparation any plastic soils below design grade could become disturbed by construction activities. If this becomes the case, the contractor may be directed to remove the disturbed or pumping soils to a depth of at least 12 to 18 inches below design grade and backfill the area with structural fill. In such situations, FDOT Indexes 500 and 505 should be followed closely.

6.4 On-Site Soil Suitability

In general, the sands (A-3, Stratum 1) can be moved and used for grading purposes, site leveling, general engineering fill, structural fill and backfill in other areas, provided the fill is free of highly organic materials, clay, debris or any other material deemed unsuitable for construction. Soils from Stratum 2 consist of plastic to highly plastic materials (A-2-6/A-6) and should be removed from beneath the proposed roadway to a depth of 24 inches below the bottom of the planned base course per Index 500. These soils should not be placed in an embankment section within 4 feet (measured vertically) from the bottom of the planned base course, per Index 505. Highly plastic materials should not be placed anywhere beneath the proposed roadway within the 1:2 control line and may only be placed above the water table to within 4 feet of the bottom of the proposed base course elevation outside of the 1:2 control line, per the Index 505. Stratum 3 consists of slightly silty to slightly clayey sands (A-2-4) and appears to be satisfactory for use in the embankment, when utilized in accordance with Index 505. However, this material is likely to retain excess moisture and may be difficult to dry and compact. This material should be used in the embankment above the water level at the time of construction.

6.5 Pavement Design Considerations

Three (3) LBR tests were performed at the locations indicated on Table 4 in the Appendix. Testing on the samples yielded LBR values of 52, 68 and 73 percent. Unless additional LBR tests are performed on the existing subgrade, a design LBR value of 50 percent is recommended for the existing project soils for use in pavement design. The results of the LBR tests are presented in Table 4 in the Appendix.

When encountered, groundwater levels varied from 3.5 feet to greater than 15 feet below the existing grades along the alignment and are presented on the soil profiles on Sheets 6 through 8 and Table 2 in the Appendix along with seasonal high water levels. The minimum separation between the bottom of the base and the estimated seasonal high groundwater table (SHGWT) levels shall be designed in accordance with the FDOT Drainage Manual and other related FDOT and FHWA guidelines. Based on preliminary information provided by Wade-Trim, Inc., the proposed roadway improvements will generally be at or near the existing grades of the existing roadway. Due to the shallow clayey soils and perched groundwater conditions a moisture tolerant base should be specified to protect the integrity of the roadway base. Coquina shell base materials are more resistant to wet conditions than limerock and the separation can be somewhat reduced. Crushed concrete is also less sensitive to moisture than limerock, but should be treated in the same fashion. An asphaltic concrete base may also be used in areas of high groundwater.

7.0 POND DESIGN CONSIDERATIONS

7.1 GENERAL

The soils encountered in the three (3) SPT borings performed within the proposed Pond No. 1 to be located between Station 34+00 and 36+00 along the north side of 17th Street East generally consisted of fine sand (A-3) to slightly silty to slightly clayey sand (A-2-4) from the ground surface to a depth of approximately 6 feet. Underlying these soils is clayey sand to sandy clay (A-2-6/A-6) to the depth of termination at 20 feet below existing grades. Groundwater was encountered in the borings at depths of approximately 6 to greater than 10 feet below existing grades. The estimated seasonal high groundwater table for the referenced pond is estimated at an approximate depth of 4 to 5 feet below existing grades.

The soils encountered in the two (2) SPT borings performed within the proposed Pond No. 2 to be located south of 17th Street East between Station 44+20 and Station 49+00 generally consisted of fine sands (A-3) and slightly silty to slightly clayey sand (A-2-4) from the ground surface to a depth of approximately 2 feet below the ground surface. Underlying these soils is very hard limestone to very hard clayey sand to sandy clay (A-2-6/A-6) to the depth of termination at 20 feet below existing grades. Groundwater was not measured in the upper 10 feet in either of the two (2) borings performed within the limits of Pond No. 2 due to the clayey soils, the drilling mud and the length of time the borehole was open. The seasonal high groundwater table for Pond No. 2 is believed to be perched and is estimated to be at a depth of 0.5 to 2 feet below existing grades due to the shallow limestone encountered in our borings. We anticipate the seasonal high water level within Pond No. 2 will be a function of the depth to the shallow limestone material or the clayey materials beneath them, depending on the depth of the proposed excavations. According to plans submitted by Wade-Trim for the proposed Pond No. 2, we understand that the proposed pond is to be excavated to an elevation of 5.5 feet NGVD, or to a depth of approximately 7.5 feet below the existing ground surface. Excavating to this depth may effectively lower the seasonal high groundwater level since the shallow conditions causing a perched condition will be lowered in the excavated area. Based on the anticipated depth of the excavation at the location of proposed Pond No. 2, the seasonal high groundwater may be approximately 6 to 7 feet below existing grades or between elevations 7 and 6 feet NGVD. Additional borings will be needed to confirm that the shallow perched condition can be lowered when the ponds are excavated.

The soils encountered in the SPT borings performed within the proposed limits of the two ponds located on either side of the existing creek located between Stations 52+00 and 55+50 consisted of clayey sand to sandy clay (A-2-6/A-6) in the upper 3 to 10 feet below existing grades. Underlying this stratum, the borings encountered alternating strata of limestone, slightly silty to silty sand (A-2-4) and clayey sand to sandy clay (A-2-6/A-6) to the depth of termination at 20 feet below the existing ground surface. Groundwater was encountered in the borings performed in Pond No. 3 at depths of approximately 10 feet below existing grades. The seasonal high groundwater table for Pond No. 3 is estimated to be at a depth of approximately 0.5 feet below existing grades due to perching on the

shallow clays and limestone. Groundwater was encountered in the borings performed in Pond No. 4 at depths of approximately 4 feet below existing grades. The seasonal high groundwater table for Pond No. 4 is estimated to be at a depth of approximately 0.5 feet below existing grades due to perching on the shallow clays and limestone. We anticipate the seasonal high water level within Pond Nos. 3 and 4 will be functions of the depth to the shallow limestone or clayey materials encountered in our borings, depending on the depth of the proposed excavations. According to plans submitted by Wade-Trim for the proposed Pond Nos. 3 and 4, we understand that the proposed ponds are to be excavated to an elevation of 4.0 feet NGVD, or to a depth of approximately 5.5 to 6 feet below the existing ground surface. Excavating to this depth may effectively lower the seasonal high groundwater level since the shallow conditions causing a perched condition will be lowered in the excavated area. Based on the anticipated depth of the excavation at the location of proposed Pond No. 3, the seasonal high groundwater may be approximately 4 to 5 feet below existing grades or between elevations 5 and 4 feet NGVD. Based on the anticipated depth of the excavation at the location of proposed Pond No. 4, the seasonal high groundwater may be approximately 3 to 3.5 feet below existing grades or between elevations 6.5 and 5.5 feet NGVD. Additional borings will be needed to confirm that the shallow perched condition can be lowered when the ponds are excavated.

The seasonal high groundwater level estimations presented above are considered approximate and are based on the results of our borings and the preliminary plans submitted by Wade-Trim. We understand that the locations for the proposed ponds are limited for access for additional studies due to private ownership. However, it is our opinion that if a more precise estimate of the seasonal high groundwater levels is desired, then temporary piezometers should be constructed within the proposed pond areas so that groundwater levels can be recorded for a period of time during the normal rainy season. This will allow for a more reliable prediction of the effect the proposed pond excavations will have on the seasonal high water level at each pond location.

7.2 General Construction Recommendations

Site preparation and construction should be done in accordance with the latest Manatee County Specifications and the FDOT Standard Specifications for Road and Bridge Construction and Roadway and Traffic Design Standards. Temporary excavation side slopes should be shored in accordance with OSHA requirements.

7.3 Groundwater Control

Depending upon groundwater levels at the time of construction, some form of dewatering may be required to achieve the required excavations. Groundwater can normally be controlled in shallow excavations with pumps and sumps.

7.4 On-Site Soil Suitability

In general, the majority of the fine sands (A-3, Stratum 1) can be moved and used for embankment fill, site leveling, general engineering fill, structural fill and backfill in other areas, provided the fill is free of organic materials, clay, debris or any other material deemed unsuitable for construction. All fill should be placed in accordance with the recommendations provided in this report.

The materials from Stratum 2 are plastic materials (A-2-6/A-6) and shall be removed in accordance with Index 500. These soils may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. They should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for shorter distances. Highly plastic materials should not be placed anywhere beneath the proposed roadway within the 1:2 control line and may only be placed above the water table to within 4 feet of the bottom of the proposed base course elevation outside of the 1:2 control line, per the Index 505.

Stratum 3 consists of slightly clayey and slightly silty sands (A-2-4) and appears to be satisfactory for use in the embankment, when utilized in accordance with Index 505. However, this material is likely to retain excess moisture and may be more difficult to dry and compact. This material should be used in the embankment above the water level existing at the time of construction.

The material from Stratum 4 consists of shallow limestone. This material may be difficult to excavate for pavement construction and the installation of utility and drainage structures. This material shall be removed and utilized in accordance with Section 120-7 of the FDOT Standard Specifications for Road and Bridge Construction.

8.0 REPORT LIMITATIONS

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 on this data.

The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction and the data obtained from the soil borings performed at the locations indicated and does not reflect any variations which may occur among these borings. If any variations become evident during the course of construction, 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. When final design plans and specifications are available, a general review by our office should be completed to check that the assumptions made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

APPENDIX

TABLES

TABLE 1
SUMMARY OF USDA SOIL SURVEY
17TH STREET EAST FROM U.S. 41 TO CANAL ROAD
MANATEE COUNTY, FLORIDA
PSI PROJECT NO. 775-15504

USDA MAP SYMBOL AND SOIL NAME	SOIL CLASSIFICATION			SEASONAL HIGH WATER TABLE			RISK OF CORROSION	
	DEPTH (in)	AASHTO GROUP	PERMEABILITY (in/hr)	DEPTH (feet)	KIND	MONTH	UNCOATED STEEL	CONCRETE
Bradenton Fine Sand, Limestone Substratum (5)	0 - 6 6 - 13 13 - 47 47 - 77 77 - 80	A-3, A-2-4 A-3, A-2-4 A-2-4, A-2-6 BEDROCK A-3, A-2-4, A-2-6, A-6	6.0 - 20 6.0 - 20 0.6 - 2.0 --- 0.6 - 6.0	0 - 1.0	Apparent	Jun - Dec	High	Low
Chobee Loamy Fine Sand (13)	0 - 8 8 - 51 51 - 80	A-2-4 A-2-6, A-2-7, A-6, A-7 A-2-4, A-2-6, A-6, A-7	2.0 - 6.0 <0.2 0.2 - 6.0	0 - 1.0	Apparent	Jun - Feb	Moderate	Low
Chobee Variant Sandy Clay Loam (14)	0 - 20 20 - 35 35 - 40 40 - 80	A-6, A-7 A-6, A-7 A-2-4, A-2-6, A-6, A-7 A-3, A-2-4	0.06 - 0.2 0.06 - 0.2 0.06 - 0.6 6.0 - 20	+2 - 1.0	Apparent	Jul - Dec	High	Low
Eau Gallie Fine Sand (20)	0 - 28 28 - 42 42 - 50 50 - 65	A-3 A-3, A-2-4 A-2-4, A-2-6 A-3, A-2-4	6.0 - 20 0.6 - 6.0 0.6 - 6.0 2.0 - 6.0	0.5 - 1.5	Apparent	Jun - Oct	High	Moderate
Wabasso Fine Sand (48)	0 - 21 21 - 31 31 - 37 37 - 65 65 - 80	A-3 A-3, A-2-4 A-3 A-2-4, A-2-6 A-3, A-2-4	6.0- 20 0.6 - 2.0 6.0 - 20 <0.2 6.0 - 20	0 - 1.0	Apparent	Jun - Oct	Moderate	High

TABLE 2
AUGER BORING LOCATIONS AND GROUNDWATER TABLE
17TH STREET EAST FROM U.S. 41 TO CANAL ROAD
MANATEE COUNTY, FLORIDA
PSI PROJECT NO. 775-15504

BORING NUMBER	BORING LOCATION		BORING ELEVATION [1] (feet, NGVD)	MEASURED GROUNDWATER TABLE [2]		SEASONAL HIGH GROUNDWATER ELEVATION (feet, NGVD)	BORING DEPTH (feet)	BORING TYPE
	STATION (feet)	OFFSET (feet)		DEPTH (feet)	ELEVATION (feet, NGVD)			
PB - 1	34 + 47	240 LT	12.6	>10[3]	---	7.6	20.0	SPT
PB - 2	35 + 11	355 LT	12.6	NOT PERFORMED DUE TO LIMITED ACCESS				
PB - 3	35 + 70	240 LT	12.4	6.0	6.6	7.4	20.0	SPT
PB - 4	35 + 08	90 LT	12.4	>10[3]	---	7.4	20.0	SPT
PB - 5	45 + 50	100 RT	13.0	>10[3]	---	7.0[5]	20.0	SPT
PB - 6	48 + 00	140 RT	13.0	>10[3]	---	6.0[5]	20.0	SPT
PB - 7	53 + 10	569 RT	9.2	10.0	-0.8	4.0[5]	20.0	SPT
PB - 8	52 + 75	541 RT	10.1	10.0	0.1	5.0[5]	20.0	SPT
PB - 9	52 + 47	518 RT	9.7	10.0	-0.3	4.5[5]	20.0	SPT
PB - 10	53 + 05	706 RT	9.6	4.0	5.6	6.5[5]	20.0	SPT
PB - 11	55 + 26	711 RT	9.4	4.0	5.4	6.5[5]	20.0	SPT
PB - 12	55 + 10	535 RT	8.9	4.0	4.9	5.5[5]	20.0	SPT
AB - 1	31 + 00	25 LT	13.1	3.5	9.6	10.6	5.0	HAND AUGER
AB - 2	32 + 00	28 RT	12.4	3.5	8.9	9.9	5.0	HAND AUGER
AB - 3	33 + 00	25 LT	13.0	GNE[3]	---	---	5.0	HAND AUGER
AB - 4	34 + 00	25 RT	11.8	GNE[3]	---	---	4.0	HAND AUGER
PA - 1	35 + 00	25 LT	12.8	7.0	5.8	7.8	15.0	POWER AUGER
AB - 5	36 + 00	20 RT	8.0	GNE[3]	---	---	5.0	HAND AUGER
AB - 6	37 + 00	30 LT	12.4	GNE[3]	---	---	2.5	HAND AUGER
AB - 7	38 + 00	20 RT	12.3	GNE[3]	---	---	5.0	HAND AUGER
AB - 8	39 + 00	30 LT	12.7	GNE[3]	---	---	4.0	HAND AUGER
PA - 2	40 + 00	24 RT	12.5	7.0	5.5	6.5	15.0	POWER AUGER
AB - 9	41 + 00	30 LT	12.5	GNE[3]	---	---	4.5	HAND AUGER
AB - 10	42 + 00	22 RT	12.4	GNE[3]	---	---	4.5	HAND AUGER
AB - 11	43 + 00	27 LT	12.6	GNE[3]	---	---	3.5	HAND AUGER
AB - 12	44 + 00	20 RT	12.0	GNE[3]	---	---	2.5	HAND AUGER
PA - 3	45 + 00	25 LT	13.0	GNE[3]	---	---	3.0	HAND AUGER[4]
AB - 13	46 + 00	25 RT	12.6	GNE[3]	---	---	2.5	HAND AUGER
AB - 14	47 + 00	23 LT	12.8	GNE[3]	---	---	4.0	HAND AUGER
AB - 15	48 + 00	26 RT	12.8	GNE[3]	---	---	4.0	HAND AUGER
AB - 16	49 + 00	30 LT	13.0	GNE[3]	---	---	4.0	HAND AUGER
PA - 4	50 + 00	20 RT	11.8	GNE[3]	---	---	1.0	HAND AUGER[4]
AB - 17	51 + 00	28 LT	12.6	GNE[3]	---	---	3.5	HAND AUGER
AB - 18	52 + 00	20 RT	11.5	GNE[3]	---	---	5.0	HAND AUGER
AB - 19	53 + 00	20 LT	11.8	GNE[3]	---	---	2.0	HAND AUGER
AB - 20	54 + 00	22 RT	11.0	GNE[3]	---	---	3.0	HAND AUGER
PA - 5	55 + 00	20 LT	11.2	GNE[3]	---	---	3.0	HAND AUGER[4]
AB - 21	56 + 00	32 RT	11.8	GNE[3]	---	---	2.5	HAND AUGER
AB - 22	57 + 00	18 LT	12.4	GNE[3]	---	---	3.5	HAND AUGER
AB - 23	58 + 00	20 LT	12.5	GNE[3]	---	---	4.0	HAND AUGER
PA - 6	59 + 00	30 RT	12.2	GNE[3]	---	---	15.0	POWER AUGER
AB - 24	60 + 00	35 LT	12.7	GNE[3]	---	---	3.0	HAND AUGER
AB - 25	61 + 00	30 RT	11.4	0.0	11.4	---	4.0	HAND AUGER
AB - 26	62 + 00	20 LT	11.4	GNE[3]	---	---	3.0	HAND AUGER
AB - 27	63 + 00	32 RT	11.9	GNE[3]	---	---	2.0	HAND AUGER
AB - 28	64 + 00	20 LT	12.0	GNE[3]	---	---	2.0	HAND AUGER
PA - 7	65 + 00	30 RT	11.5	GNE[3]	---	---	3.0	HAND AUGER[4]
AB - 29	66 + 00	22 LT	11.7	GNE[3]	---	---	2.0	HAND AUGER
AB - 30	67 + 00	22 RT	10.9	GNE[3]	---	---	5.0	HAND AUGER
AB - 31	68 + 00	25 LT	11.8	GNE[3]	---	---	1.5	HAND AUGER
AB - 32	69 + 00	25 RT	13.0	GNE[3]	---	---	5.0	HAND AUGER

[1] Boring elevations were obtained from cross sections and profiles provided by Wade-Trim, Inc.

[2] Measured at the time of drilling.

[3] Groundwater table not encountered within the depth of the boring at the time of field activities.

[4] Performed Hand Auger due to limited access and/or utility conflicts

[5] Estimated based on excavating the materials which result in a perched condition. Additional borings are needed to confirm that the perched condition will effectivley be lowered by excavating these materials.

TABLE 3
SUMMARY OF LABORATORY TEST RESULTS
17TH STREET EAST FROM U.S HIGHWAY 41 TO CANAL ROAD
MANATEE COUNTY, FLORIDA
PSI PROJECT NO. 775-15504

BORING NUMBER	BORING LOCATION		SAMPLE DEPTH (ft)	ORGANIC CONTENT (%)	MOISTURE CONTENT (%)	SIEVE ANALYSES (%)					ATTERBERG LIMITS (%)		AASHTO GROUP	STRATUM NUMBER
	STATION (ft)	OFFSET (ft)				#10	#40	#60	#100	#200	LL	PI		
AB - 1	31 + 00	25 LT	0.5 - 1	-	-	97	92	83	59	18	-	-	A-2-4	3
AB - 2	32 + 00	28 RT	1.5 - 2	-	-	100	98	87	55	3	-	-	A-3	1
AB - 2	32 + 00	28 RT	2.5 - 3	1	17	-	-	-	-	3	-	-	A-3	1
AB - 4	34 + 00	25 RT	0 - 0.5	7	19	-	-	-	-	15	-	-	A-2-4	3
AB - 5	36 + 00	20 RT	3.5 - 4.0	-	-	100	95	87	62	23	-	-	A-2-4	3
AB - 9	41 + 00	30 LT	2 - 2.5	-	-	97	93	81	47	2	-	-	A-3	1
AB - 10	42 + 00	22 RT	3.5 - 4.0	-	-	100	91	82	54	18	-	-	A-2-4	3
AB - 11	43 + 00	27 LT	1.5 - 2.0	-	-	100	93	86	58	22	-	-	A-2-4	3
AB - 11	43 + 00	27 LT	2.5 - 3.0	-	21	-	-	-	-	34	35	13	A-2-6	2
AB - 12	44 + 00	20 RT	0 - 0.5	-	-	100	73	64	45	23	-	-	A-2-4	3
AB - 13	46 + 00	25 RT	2 - 2.5	-	23	-	-	-	-	35	38	18	A-2-6	2
AB - 14	47 + 00	23 LT	2 - 2.5	-	15	-	-	-	-	43	40	19	A-6	2
AB - 15	48 + 00	26 RT	0.5 - 1.0	-	-	100	95	83	50	9	-	-	A-3	1
AB - 16	49 + 00	30 LT	0 - 0.5	-	-	100	94	85	51	13	-	-	A-2-4	3
PB - 7	52 + 75	569 RT	0 - 5.0	-	39	-	-	-	-	90	-	-	A-6	2
PB - 12	55 + 10	535 RT	0 - 5.0	5	19	-	-	-	-	27	35	14	A-2-6	2
AB - 24	60 + 00	35 LT	0 - 0.5	-	-	100	87	73	45	20	-	-	A-2-4	3
AB - 28	64 + 00	20 LT	0 - 0.5	3	15	-	-	-	-	19	-	-	A-2-4	3
AB - 28	64 + 00	20 LT	0.5 - 1.0	-	-	100	77	68	47	19	-	-	A-2-4	3
AB - 29	66 + 00	22 LT	0.5 - 1.0	-	-	100	68	63	52	38	-	-	A-2-6	2

TABLE 4
SUMMARY OF LIMEROCK BEARING RATIO TEST RESULTS
17TH STREET EAST FROM U.S. HIGHWAY 41 TO CANAL ROAD
MANATEE COUNTY, FLORIDA
PSI PROJECT NO. 775-15504

SAMPLE NUMBER	SAMPLE LOCATION[1]		DEPTH (ft)	AASHTO GROUP	STRATUM NUMBER	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)	LBR VALUE (%)
	STATION (ft)	OFFSET (ft)						
LBR - 1 [1]	44 + 00	20 RT	0.0 - 1.0	A-2-4	3	122.0	10.5	73
LBR - 2 [2]	53 + 00	20 LT	0.0 - 1.0	A-3	1	115.0	11.0	52
LBR - 3 [3]	63 + 00	32 RT	0.0 - 1.0	A-2-6	2	122.0	10.0	68

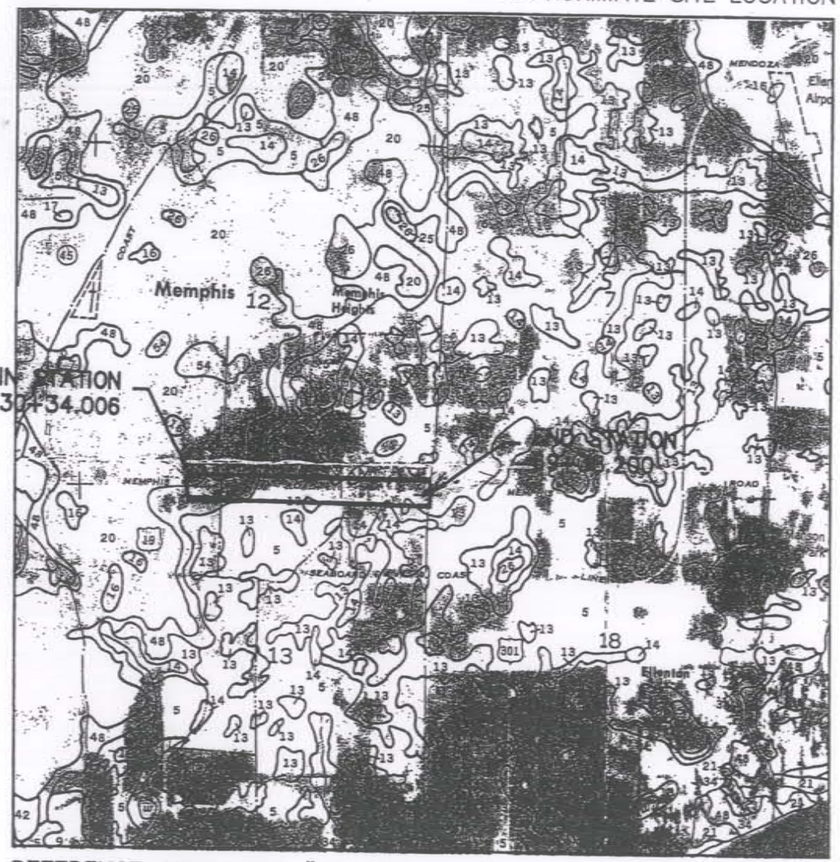
[1] Sample obtained at location of boring AB-12 at a depth of 0-1 ft.

[2] Sample obtained at location of boring AB-19 at a depth of 0-1 ft.

[3] Sample obtained at location of boring AB-27 at a depth of 0-1 ft.

SHEETS

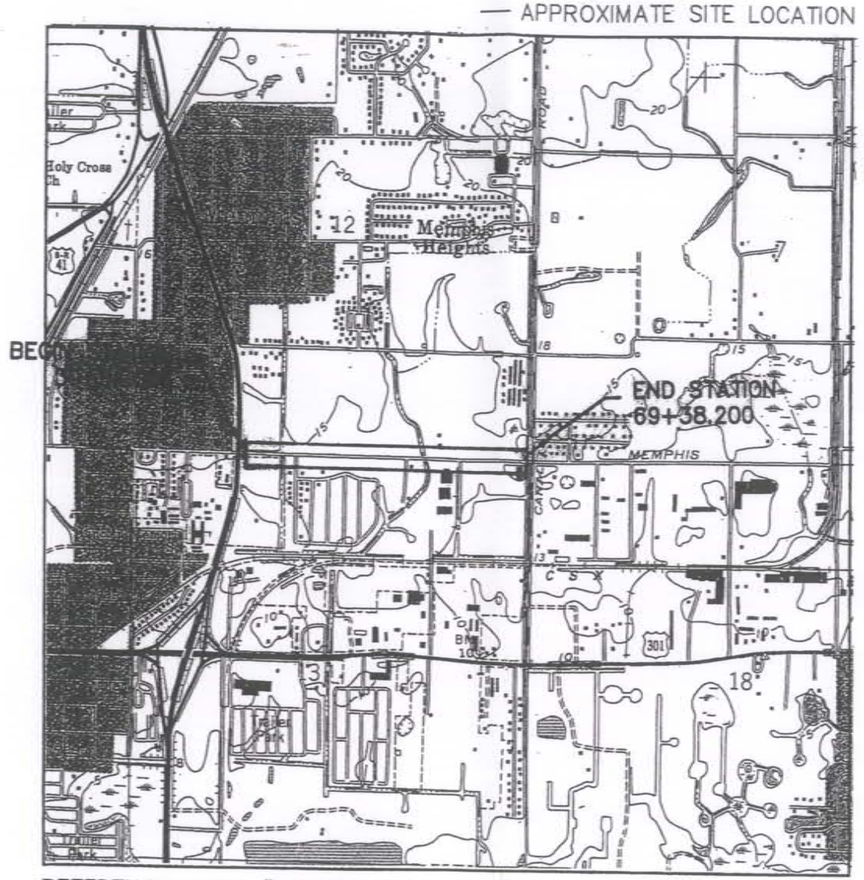
— APPROXIMATE SITE LOCATION



REFERENCE: USDA SCS, "SOIL SURVEY OF MANATEE COUNTY, FLORIDA"
TOWNSHIP: 34 SOUTH
RANGE: 17 EAST
SECTION: 12
ISSUED: 1983
PHOTO: –
SCALE: 1" = 2000'

USDA VICINITY MAP

— APPROXIMATE SITE LOCATION



REFERENCE: USGS "PALMETTO, FLORIDA" QUADRANGLE MAP
TOWNSHIP: 34 SOUTH
RANGE: 17 EAST
SECTION: 12
ISSUED: 1964
PHOTOREVISED: 1987
SCALE: 1" = 2000'

USGS VICINITY MAP

DRAWN	NJH
CHECKED	KS
APPROVED	CRN
SCALE	NOTED

USDA & USGS VICINITY MAPS
17th STREET EAST
PALMETTO, FLORIDA

psi Information To Build On
Engineering • Consulting • Testing

DATE	PROJ. NO.	SHEET
AUG. 02	775–15504	SHEET 1

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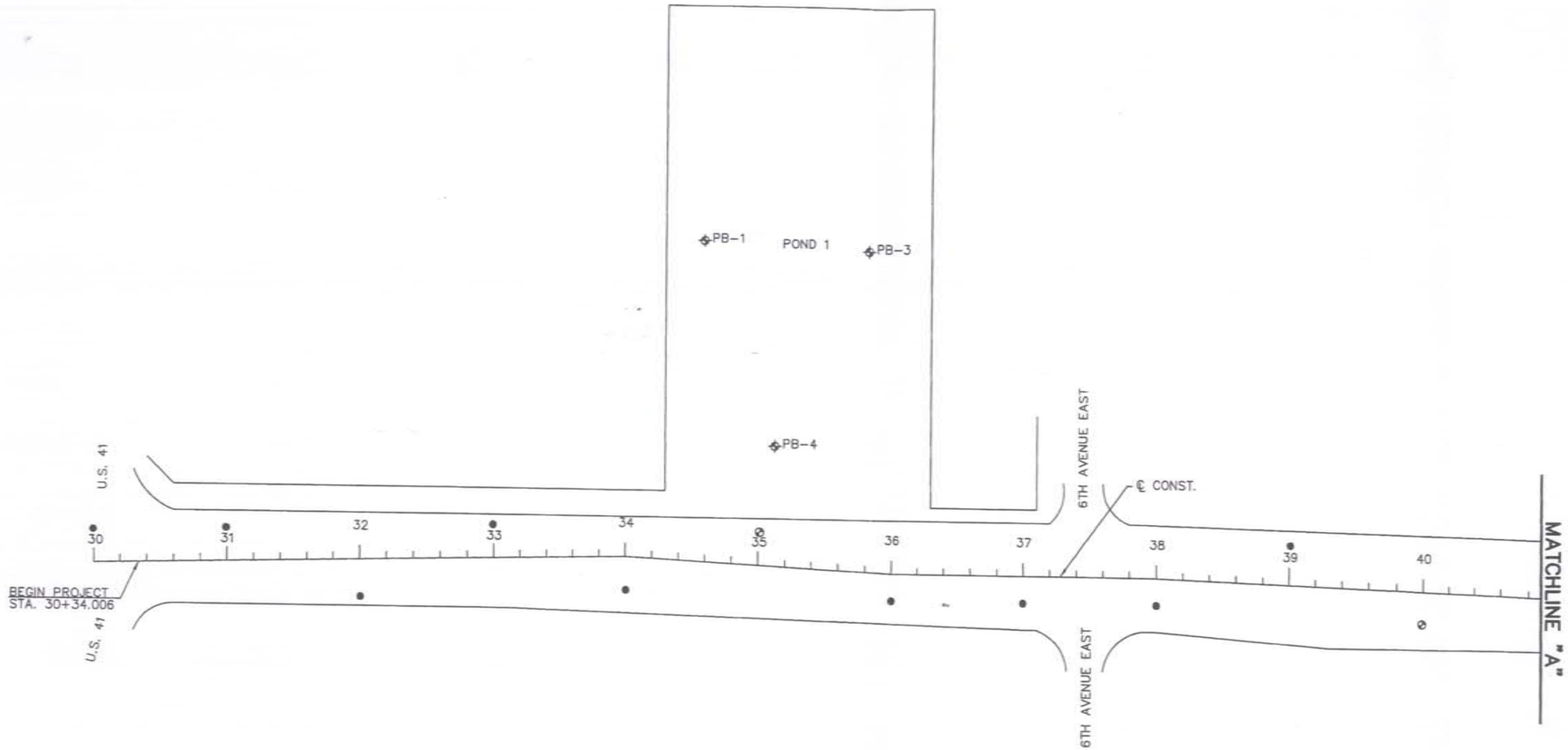
MANATEE CO. PROJECT NO.	SHEET NO.
60352660	



BORING LOCATION PLAN

0 50'
PLAN SCALE

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE POWER AUGER BORING LOCATION
- APPROXIMATE HAND AUGER BORING LOCATION

P:\geo\fdot\J-4\775155O4\RoadWay\1550402

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

PROFESSIONAL SERVICE INDUSTRIES, INC.
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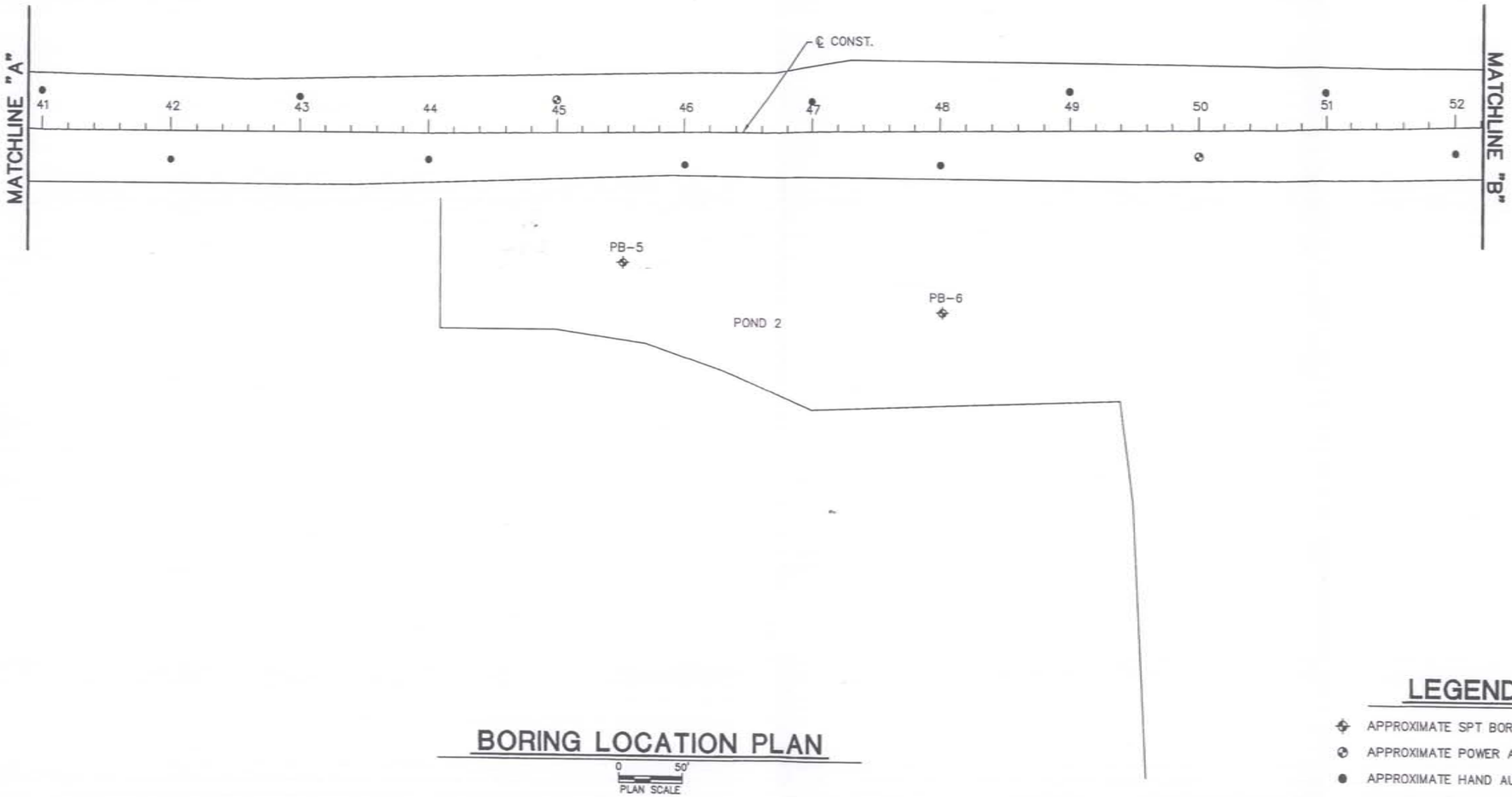
(813)-886-1076
FLORIDA ENGINEERING CERTIFICATE
OF AUTHORIZATION No. 3684

MANATEE COUNTY

17th STREET EAST

PSI PROJECT No. 775-15504
SHEET 2

MANATEE CO. PROJECT NO.	SHEET NO.
60352660	



BORING LOCATION PLAN

0 50'
PLAN SCALE

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE POWER AUGER BORING LOCATION
- APPROXIMATE HAND AUGER BORING LOCATION

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REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

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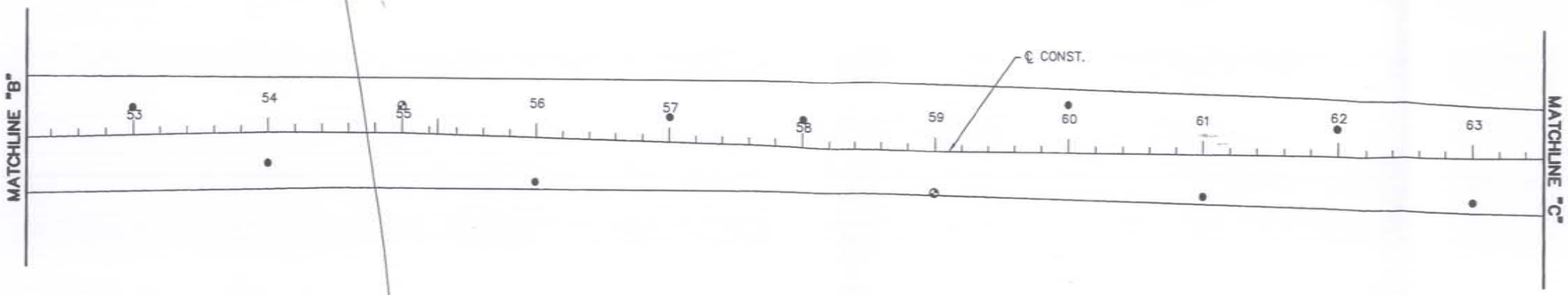
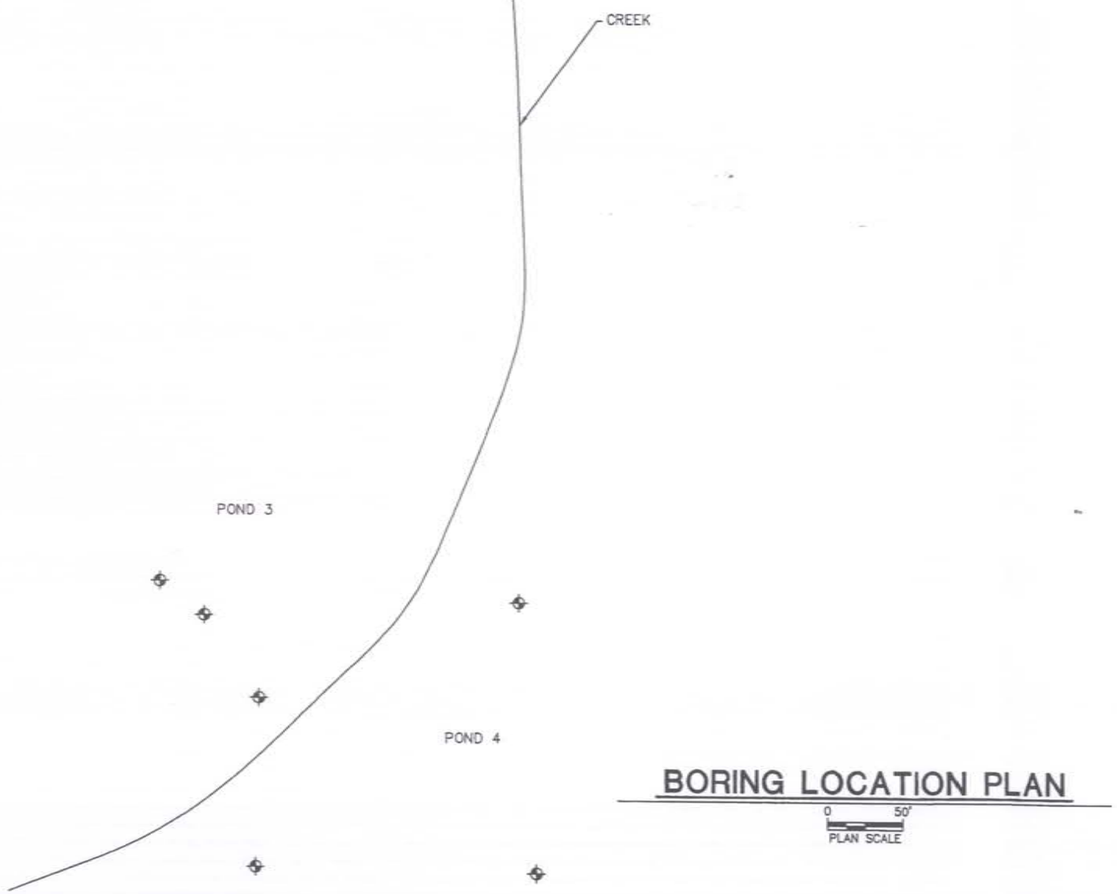
MANATEE COUNTY

17th STREET EAST

PSI PROJECT No. 775-15504
SHEET 3

MANATEE CO. PROJECT NO.	SHEET NO.
60352660	





BORING LOCATION PLAN

0 50'
PLAN SCALE

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE POWER AUGER BORING LOCATION
- APPROXIMATE HAND AUGER BORING LOCATION

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REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

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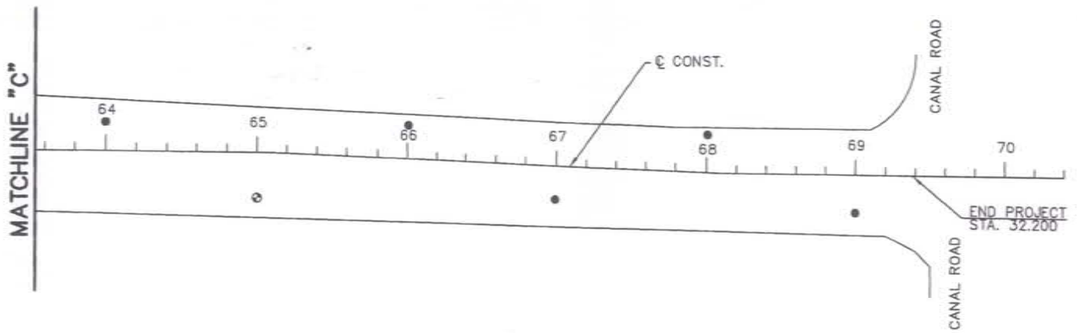
MANATEE COUNTY

17th STREET EAST

PSI PROJECT No. 775-15504
SHEET 4

MANATEE CO. PROJECT NO.	SHEET NO.
60352660	



BORING LOCATION PLAN

0 50'
PLAN SCALE

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE POWER AUGER BORING LOCATION
- APPROXIMATE HAND AUGER BORING LOCATION

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REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	ORN	11/02
Approved by	C. REES NICKERSON, P.E.	

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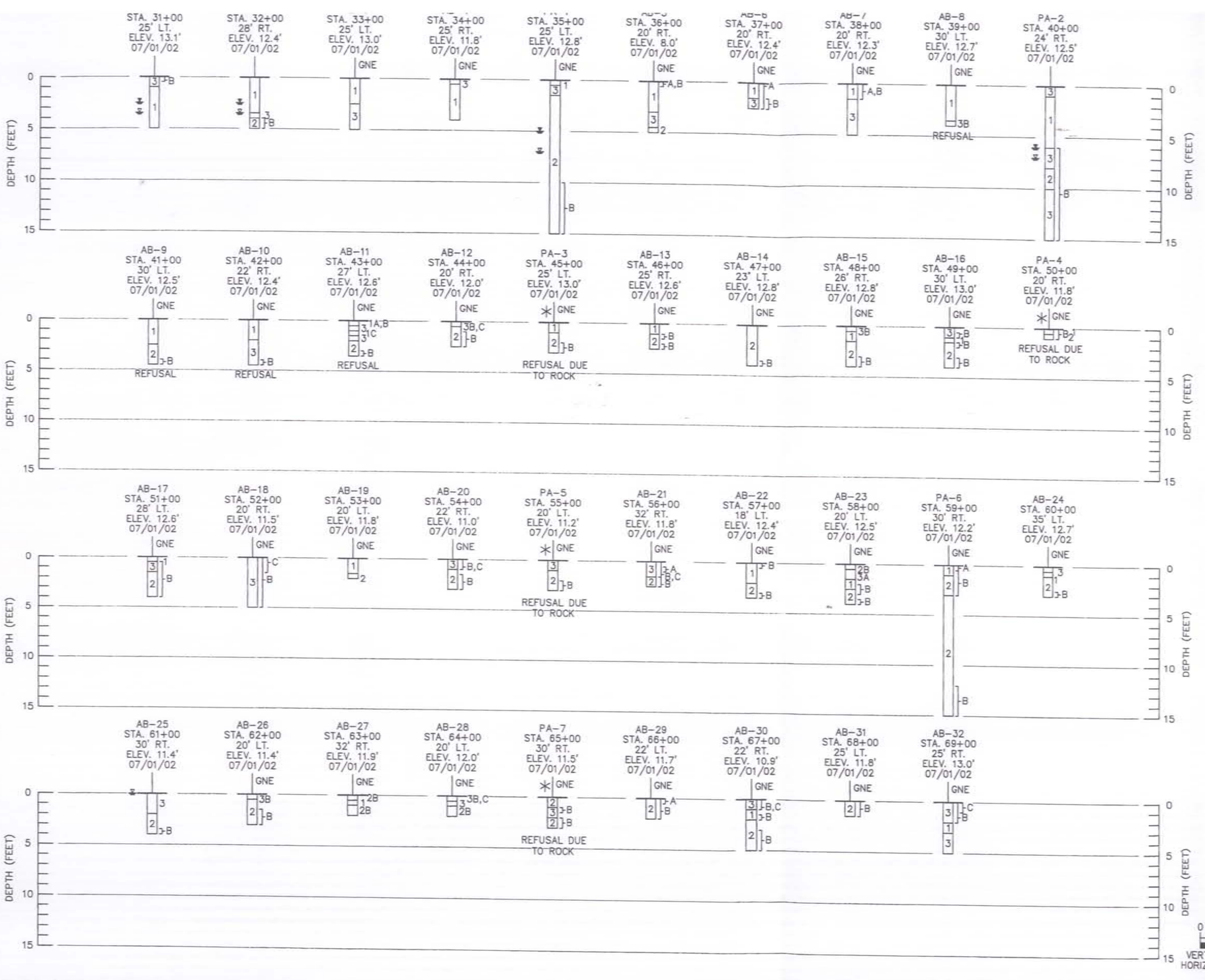
MANATEE COUNTY

17th STREET EAST

PSI PROJECT No. 775-15504
SHEET 5

MANATEE CO. PROJECT NO.	SHEET NO.
60352660	



LEGEND

1. BROWN FINE SAND (A-3)
2. BROWN TO LIGHT BROWN, GRAY TO GREENISH-GRAY CLAYEY SAND TO SANDY CLAY (A-2-6/A-6)
3. BROWN TO DARK GRAY SLIGHTLY SILTY TO SLIGHTLY CLAYEY SAND (A-2-4)
4. LIMESTONE

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL, DATE

SEASONAL HIGH GROUND WATER

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

A WITH SHELL FRAGMENTS

B WITH ROCK/ LIMESTONE FRAGMENTS

C FILL WITH CLAY LENSES

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)

50/6" FIFTY BLOWS FOR SIX INCHES

← LOSS OF CIRCULATION (%)

* PERFORMED HAND AUGER DUE TO UTILITY CONFLICTS/LIMITED ACCESS

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

SOIL PROFILES

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

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MANATEE COUNTY

17th STREET EAST

PSI PROJECT No. 775-15504
SHEET 6

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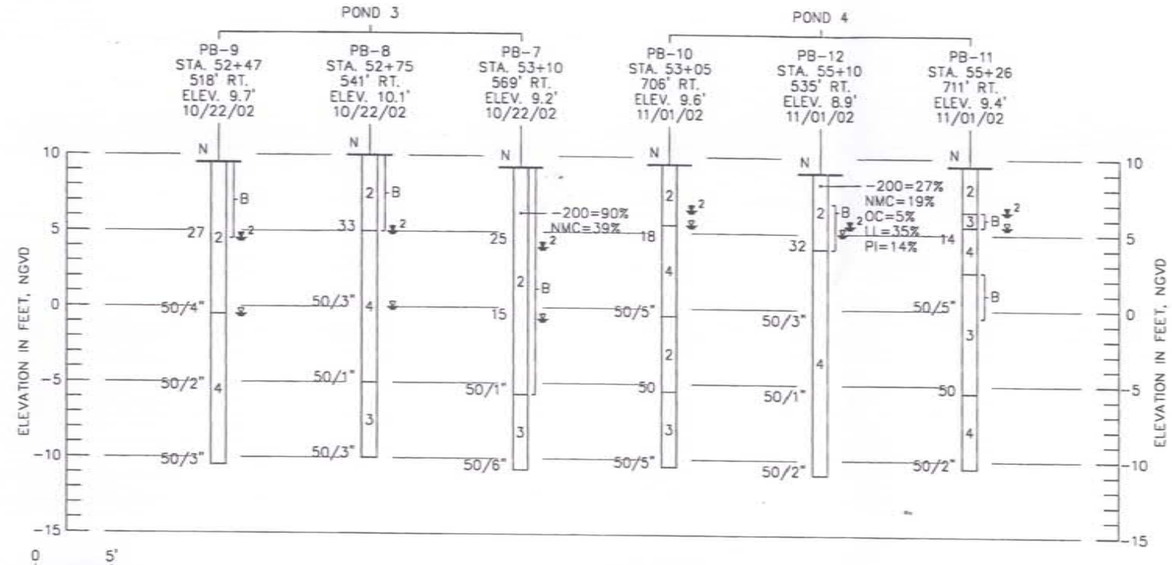
MANATEE CO. PROJECT NO.	SHEET NO.
60352660	



SOIL PROFILES

LEGEND

1. BROWN FINE SAND (A-3)
2. BROWN TO LIGHT BROWN, GRAY TO GREENISH-GRAY CLAYEY SAND TO SANDY CLAY (A-2-6/A-6)
3. BROWN TO DARK GRAY SLIGHTLY SILTY TO SLIGHTLY CLAYEY SAND (A-2-4)
4. LIMESTONE

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW

GROUNDWATER LEVEL, DATE

SEASONAL HIGH GROUND WATER

Ψ^1 ESTIMATED SEASONAL HIGH GROUND WATER ONCE POND IS EXCAVATED TO ELEVATION 5.5 FEET NGVD

Ψ^2 ESTIMATED SEASONAL HIGH GROUND WATER ONCE POND IS EXCAVATED TO ELEVATION 4.0 FEET NGVD

GNE GROUNDWATER LEVEL NOT ENCOUNTERED

Φ GROUNDWATER LEVEL NOT MEASURED

A WITH SHELL FRAGMENTS

B WITH ROCK/ LIMESTONE FRAGMENTS

C FILL WITH CLAY LENSES

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)

50/6" FIFTY BLOWS FOR SIX INCHES

⇐ LOSS OF CIRCULATION (%)

\# NOT PERFORMED DUE TO UTILITY CONFLICTS/LIMITED ACCESS

-200 FINES PASSING NO. 200 SIEVE (%)

NMC NATURAL MOISTURE CONTENT (%)

OC ORGANIC CONTENT (%)

LL LIQUID LIMIT (%)

PI PLASTICITY INDEX (%)

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REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

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MANATEE COUNTY

17th STREET EAST

MANATEE CO. PROJECT NO.	SHEET NO.
60352660	

MANATEE COUNTY, FLORIDA

DATE OF SURVEY: JULY – NOVEMBER 2002
SURVEY MADE BY: PSI
SUBMITTED BY: C. REES NICKERSON, P.E.

COUNTY PROJECT No. 6035260

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. 30+34.006 SURVEY ENDS STA. 69+38.200

		ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)				
STRATUM NO.	LBR VALUE (%)	No. OF TESTS	% ORGANIC	No. OF TESTS	MOISTURE CONTENT	No. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION
1	-----	1	1	1	17	4	97–100	93–98	81–87	47–55	2–9	0	-----	-----	A–3	BROWN FINE SAND
2	-----	1	5	5	15–39	6	100	68	63	52	27–43	4	35–40	13–19	A–2–6/ A–6	BROWN TO LIGHT BROWN, GRAY TO GREENISH GRAY CLAYEY SAND TO SANDY CLAY
3	-----	2	3–7	2	15–19	10	97–100	73–95	64–87	45–62	15–23	0	-----	-----	A–2–4	BROWN TO DARK GRAY SLIGHTLY SILTY TO SILTY TO SLIGHTLY CLAYEY SAND
4	-----	--	-----	--	-----	--	-----	-----	-----	-----	-----	--	-----	-----	–	LIMESTONE

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY.

- ▼ GROUNDWATER TABLE ENCOUNTERED
- ▼ SEASONAL HIGH GROUND WATER
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- A INDICATES WITH SHELL FRAGMENTS.
- B INDICATES WITH ROCK/LIMESTONE FRAGMENTS
- C INDICATES FILL WITH CLAY LENSES

NOTES:

1. THE MATERIAL FROM STRATUM NUMBER 1 (A–3) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505.
2. THE MATERIAL FROM STRATUM NUMBER 2 IS PLASTIC A–2–6/A–6 MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. IT MAY BE PLACED ABOVE THE EXISTING WATER LEVEL (AT THE TIME OF CONSTRUCTION) TO WITHIN 4 FEET OF THE PROPOSED BASE. IT SHOULD BE PLACED UNIFORMLY IN THE LOWER PORTION OF THE EMBANKMENT FOR SOME DISTANCE ALONG THE PROJECT RATHER THAN FULL DEPTH FOR SHORTER DISTANCES.
3. THE MATERIAL FROM STRATUM NUMBER 3 APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505. HOWEVER, THIS MATERIAL IS LIKELY TO RETAIN EXCESS MOISTURE AND BE DIFFICULT TO DRY AND COMPACT. IT SHOULD BE USED IN THE EMBANKMENT ABOVE THE WATER LEVEL EXISTING AT THE TIME OF CONSTRUCTION.
4. THE MATERIAL FROM STRATUM NUMBER 4 CONSISTS OF SHALLOW LIMESTONE. THIS MATERIAL MAY BE DIFFICULT TO EXCAVATE FOR PAVEMENT CONSTRUCTION AND THE INSTALLATION OF UTILITY AND DRAINAGE STRUCTURES. THIS MATERIAL SHALL BE REMOVED AND UTILIZED IN ACCORDANCE WITH SECTION 120–7 OF THE FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

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REVISIONS									
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	Name	Date
Drawn by	DJG	11/02
Checked by	CRN	11/02
Approved by	C. REES NICKERSON, P.E.	

PROFESSIONAL SERVICE INDUSTRIES, INC.
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TAMPA, FL. 33634
(813)–886–1076
FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 3684

MANATEE COUNTY

17th STREET EAST

GRADATION CURVES

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

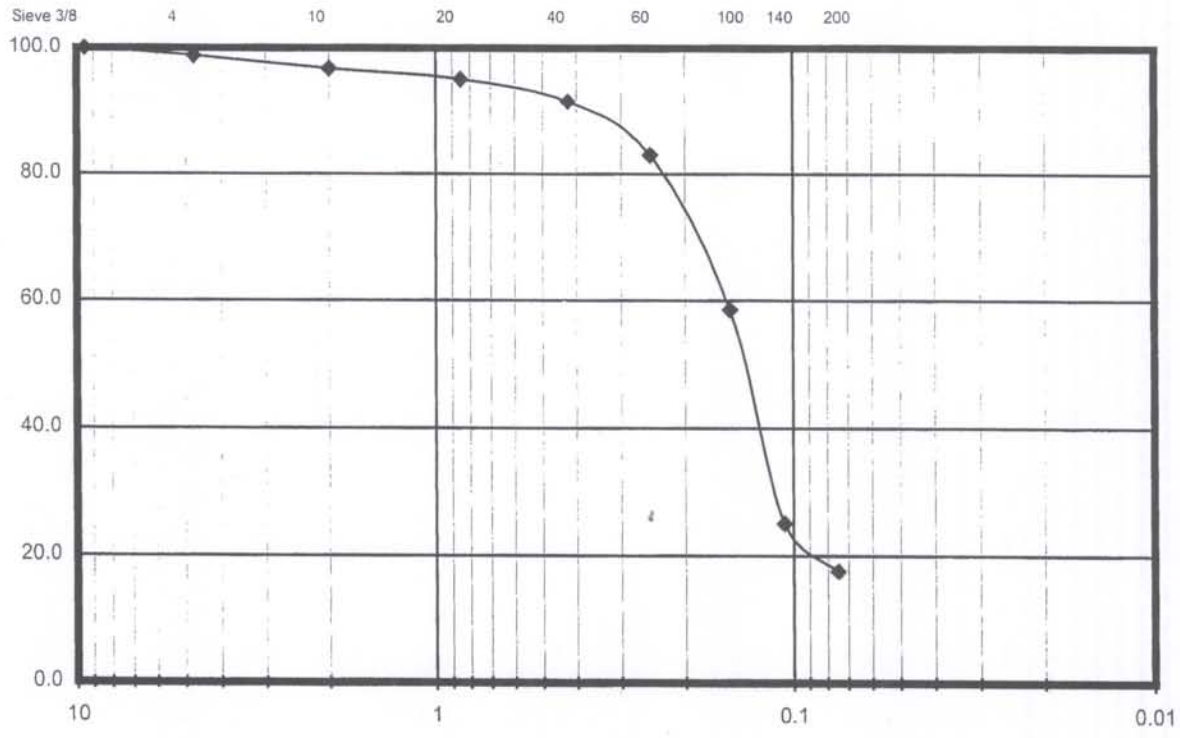
Project: 17 Th Street

Sample Location: AB 1 @.5-1'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
1.3	81.2	17.6

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

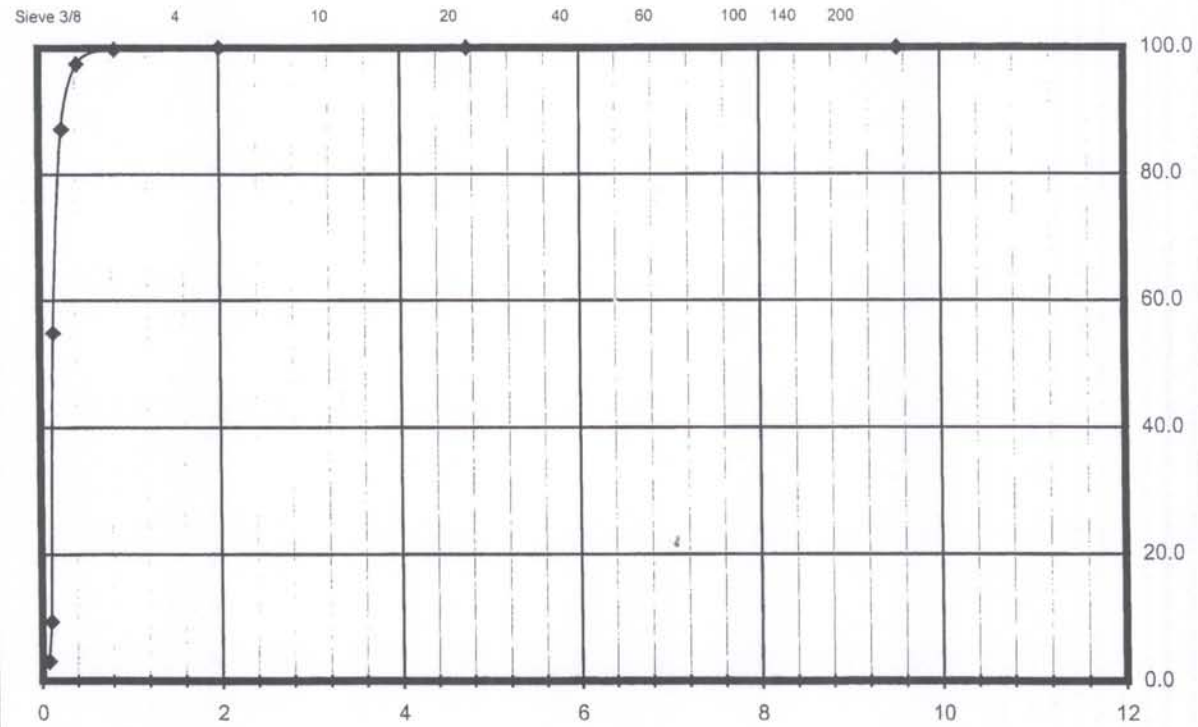
Project: 17 Th Street

Sample Location: AB 2 @1.5-2'

Soil Description: Fine Sand

Soil Classification: A-3 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	96.9	3.1

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

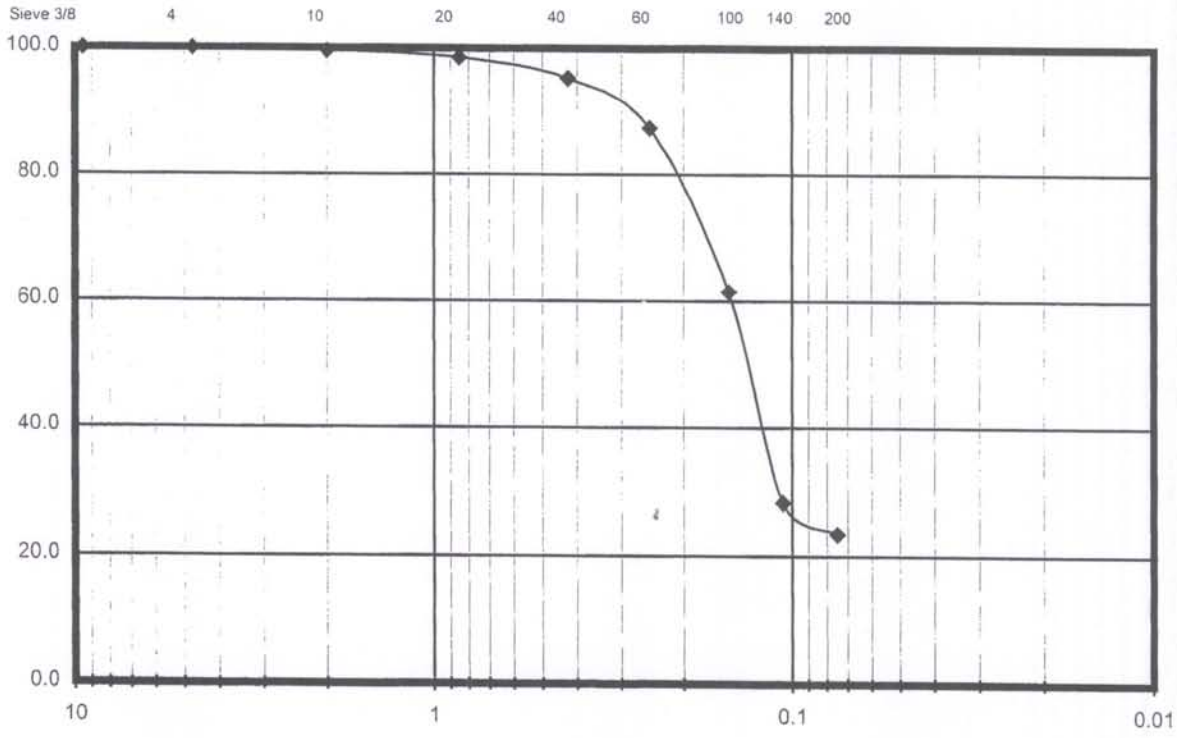
Project: 17 Th Street

Sample Location: AB 5 @3.5-4'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	76.6	23.4

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

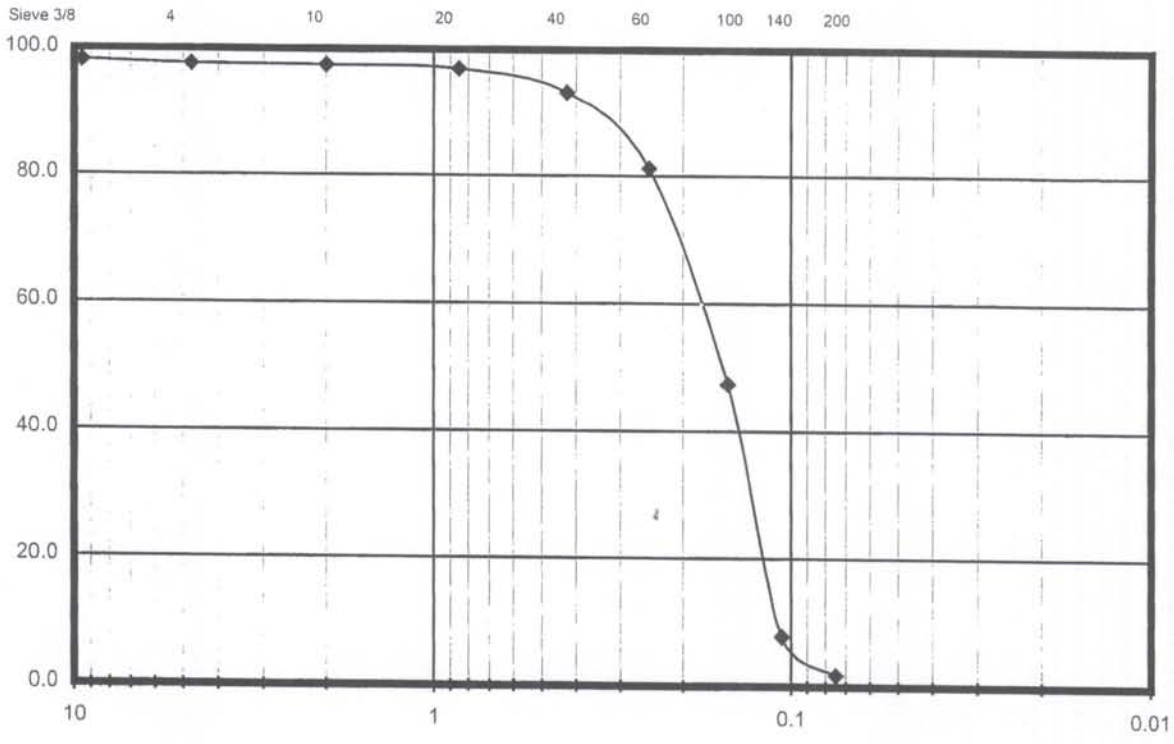
Project: 17 Th Street

Sample Location: AB 9 @2'-2.5'

Soil Description: Fine Sand

Soil Classification: A-3 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
2.4		95.8		1.8
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

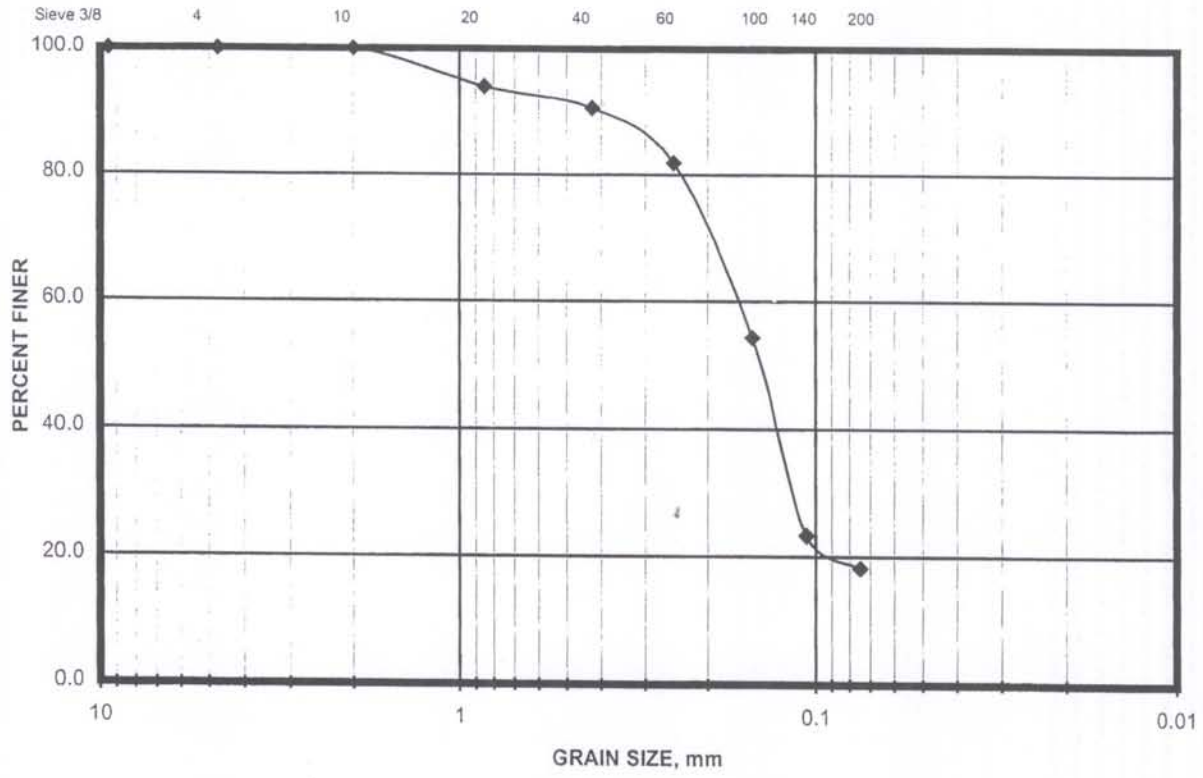
Project: 17 Th Street

Sample Location: AB 10 @3.5-4'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		81.8		18.2
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

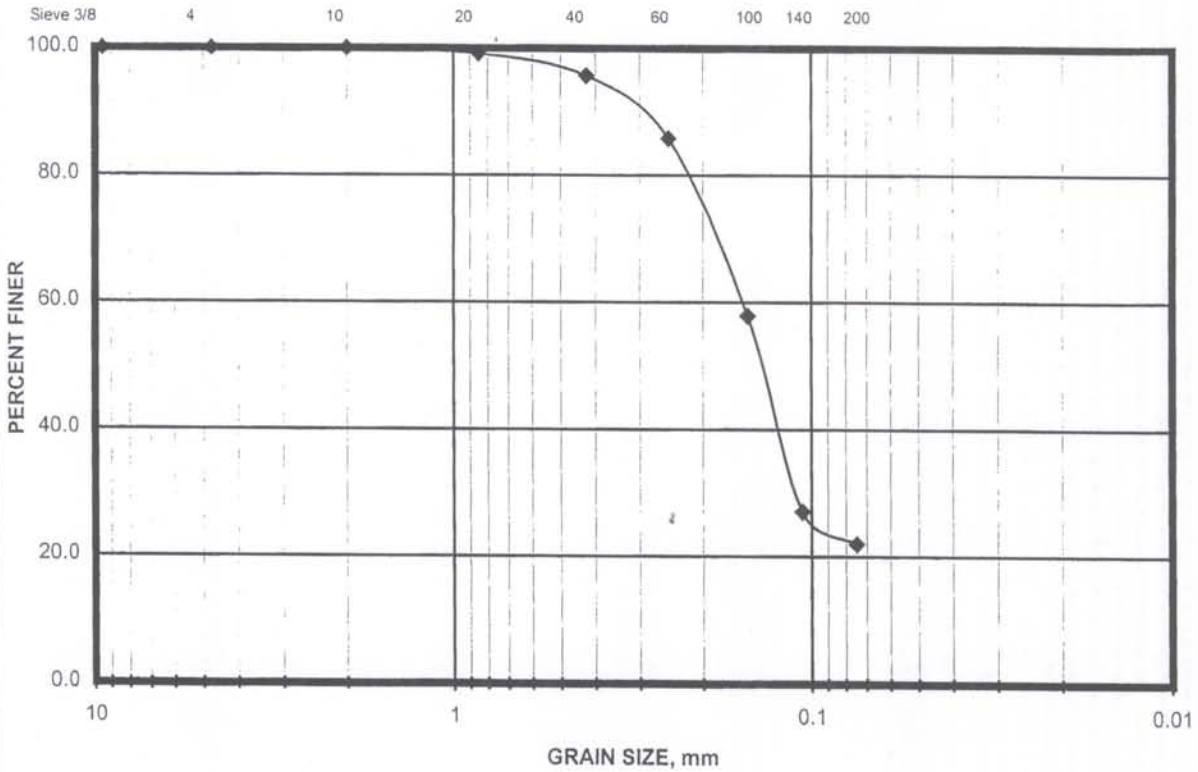
Project: 17 Th Street

Sample Location: AB 11 @1.5'-2'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		78.0		22.0
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

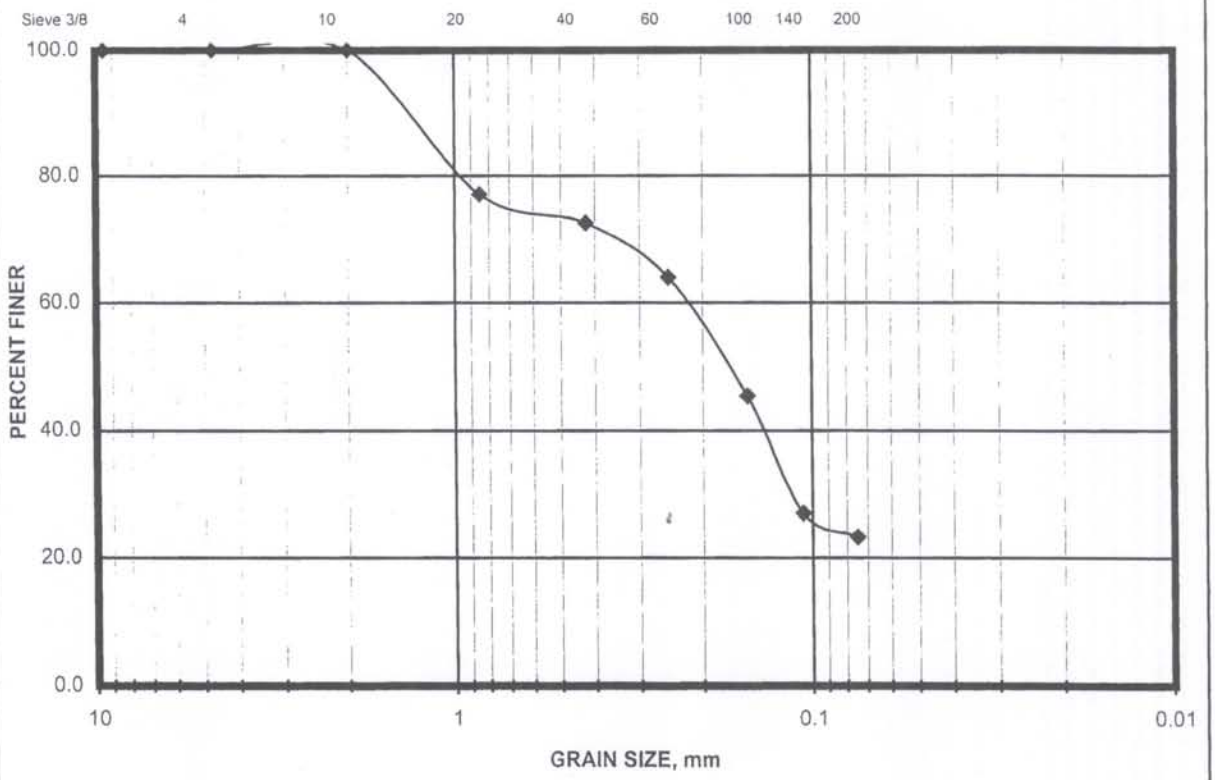
Project: 17 Th Street

Sample Location: AB 12 @0-.5'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		76.8		23.2
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

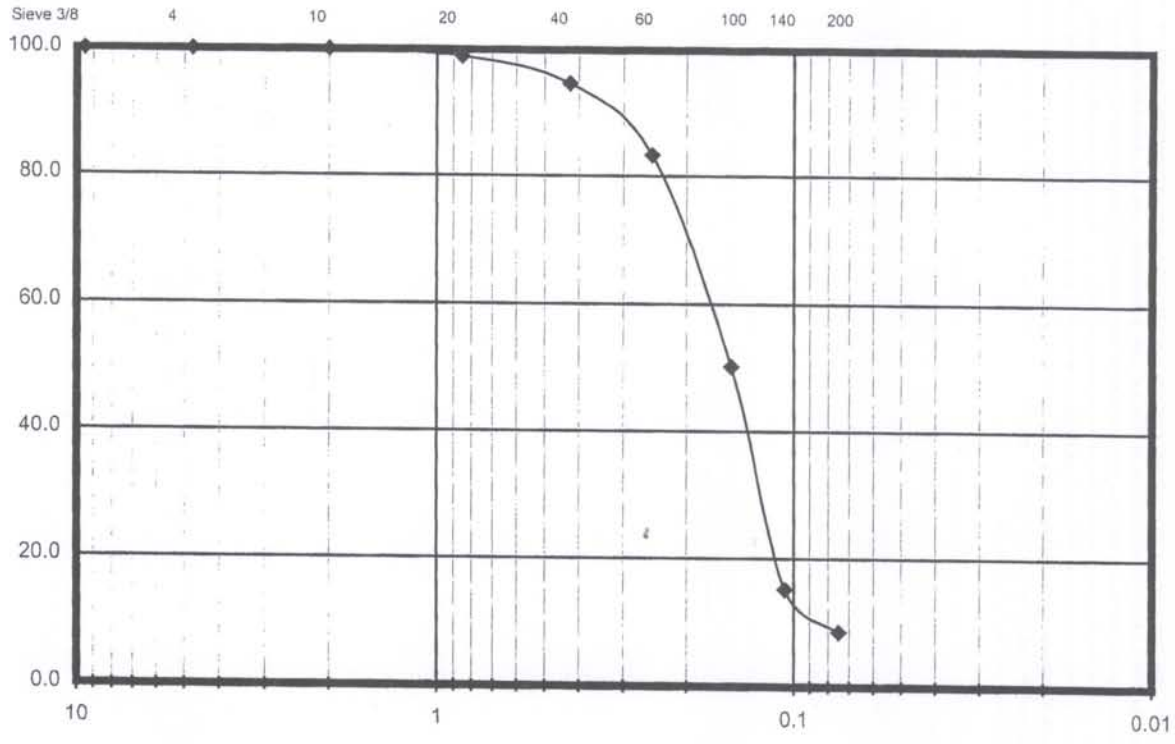
Project: 17 Th Street

Sample Location: AB 15 @.5-1'

Soil Description: Slightly Silty Sand

Soil Classification: A-3 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	91.4	8.6

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

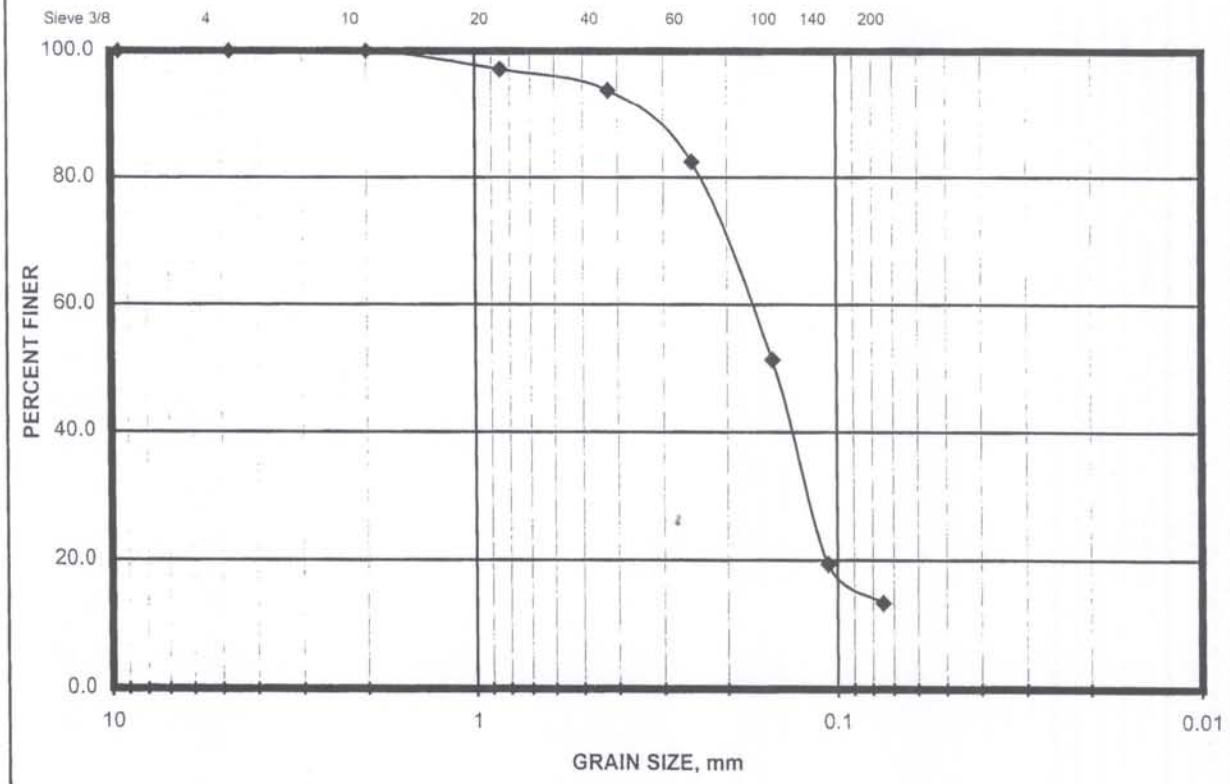
Project: 17 Th Street

Sample Location: AB 16 @0-.5'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		86.6		13.4
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

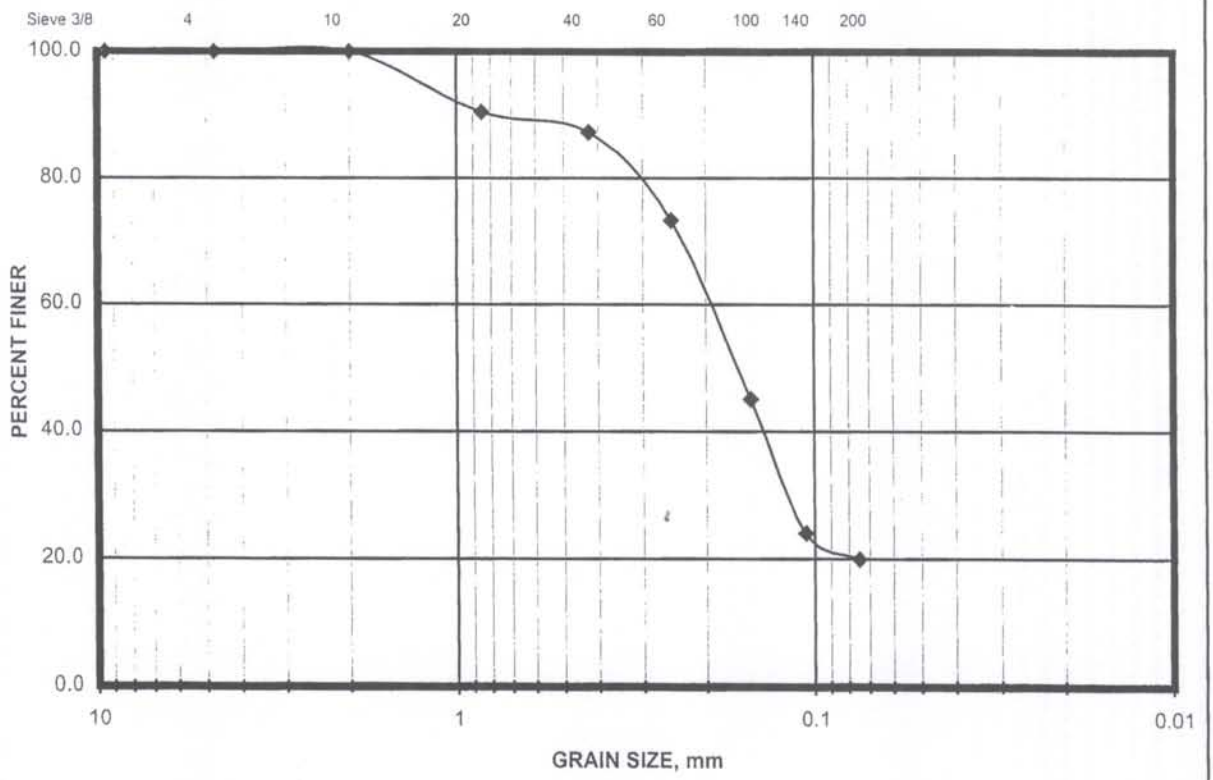
Project: 17 Th Street

Sample Location: AB 24 @0-.5'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		80.0		20.0
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

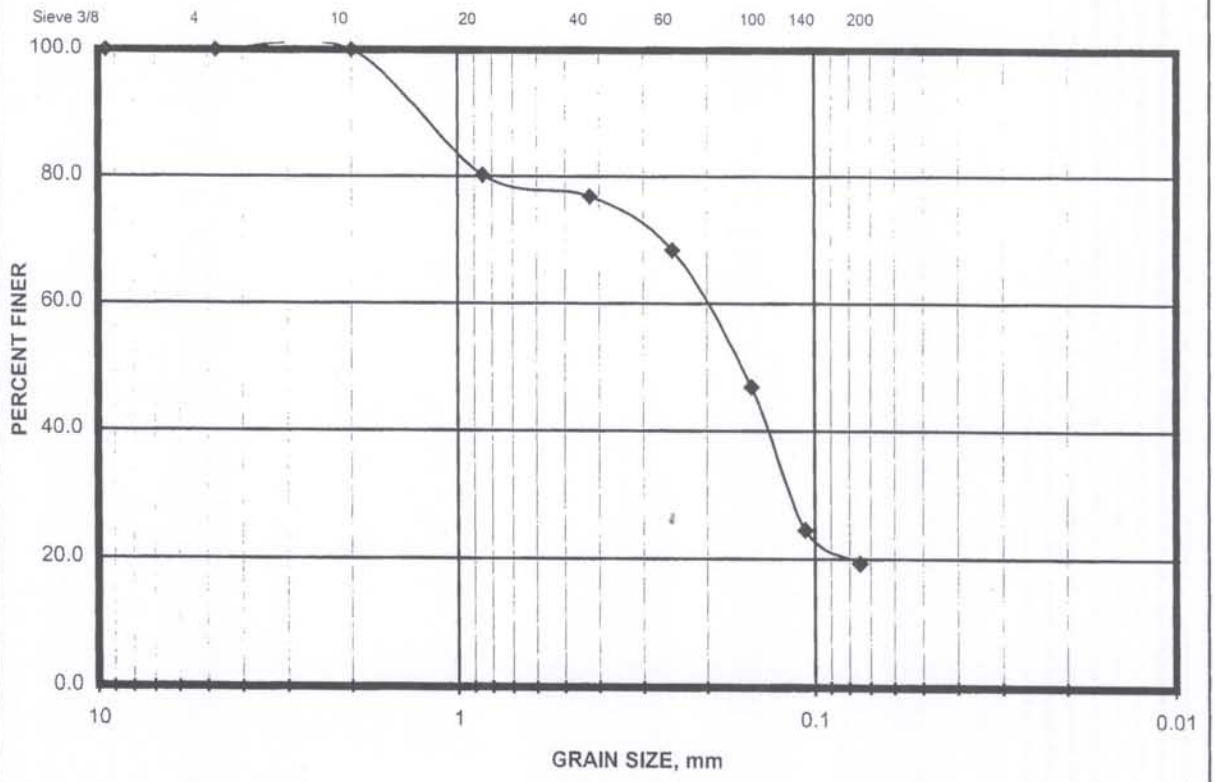
Project: 17 Th Street

Sample Location: AB 28 @.5-1'

Soil Description: Silty Sand

Soil Classification: A-2-4 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		80.6		19.4
D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

PROFESSIONAL SERVICE INDUSTRIES, INC.

Project No. 775-15504 Date: 8/1/02

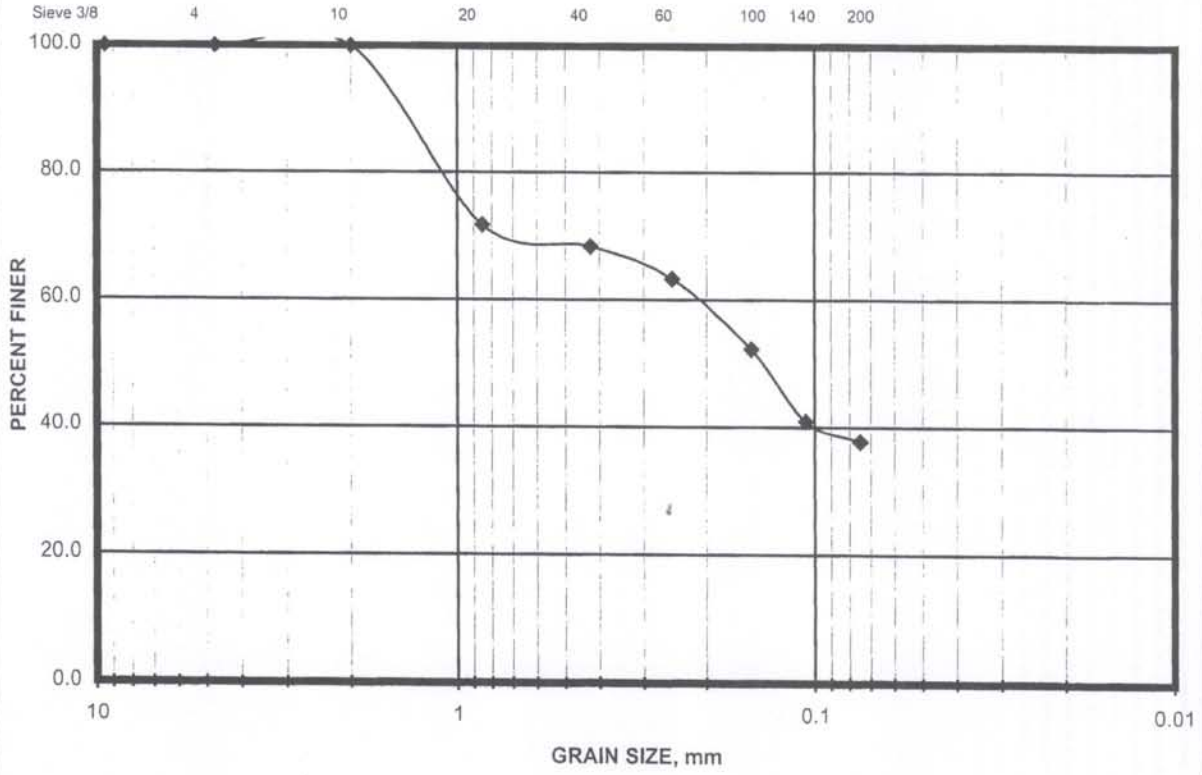
Project: 17 Th Street

Sample Location: AB 29 @.5-1'

Soil Description: Clayey Sand

Soil Classification: A-2-6 LL _____ PI _____

GRAIN SIZE DISTRIBUTION



% Gravel		% Sand		%-200
0.0		62.3		37.7
D60	D30	D10	CC	CU

LBR AND PROCTOR CURVES

RESULTS OF LABORATORY TESTING

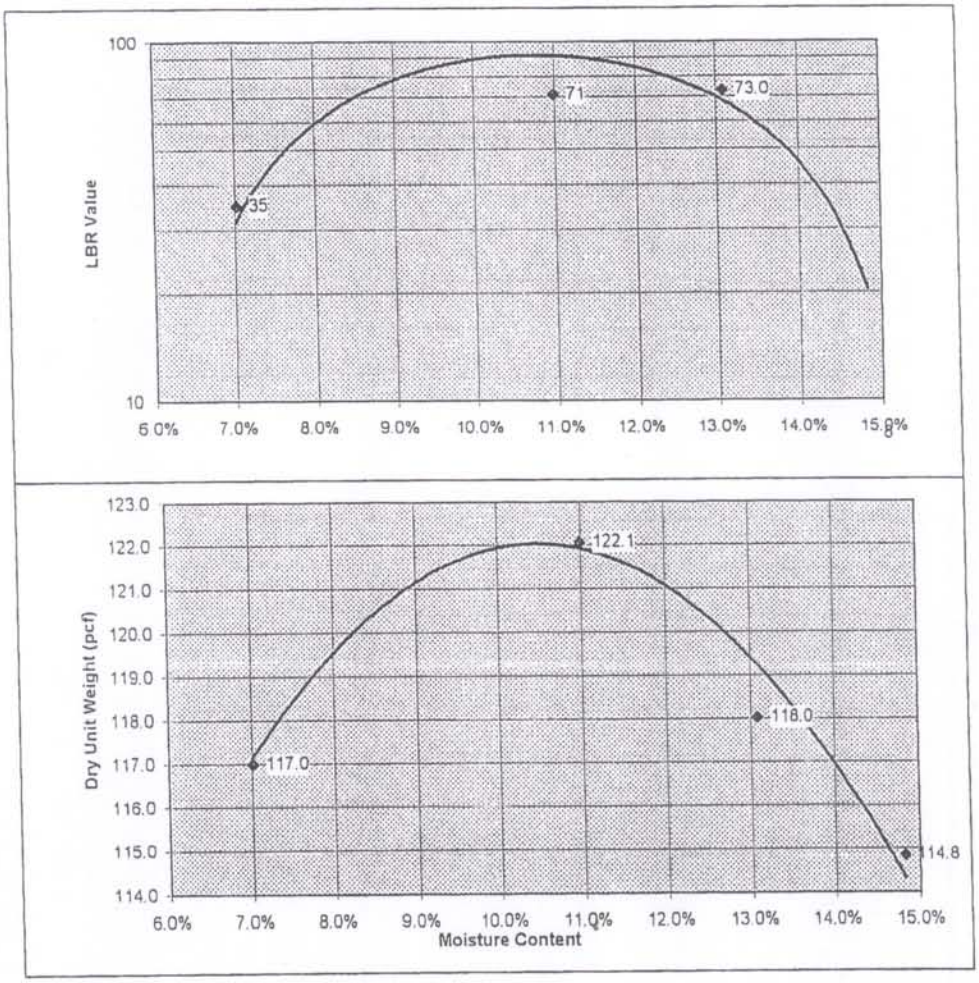
Tested For: 0
0
0
0
0

Project: 17 St. East Sta. 44+ 0
0
0

Project No. 775-15504
Report No. 0

Date: 1/0/00

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	73 %
Maximum Density	122.0 pcf
Optimum Moisture	10.5 %
Test Method:	FSTM FM 5-515
Sampled by:	PSI

Description: Brown Fine Sand With Rock + Clay

Sample Location: Sta. 44+0
0

cc:

Respectfully Submitted,
Professional Service Industries, Inc.

Name
Project Engineer

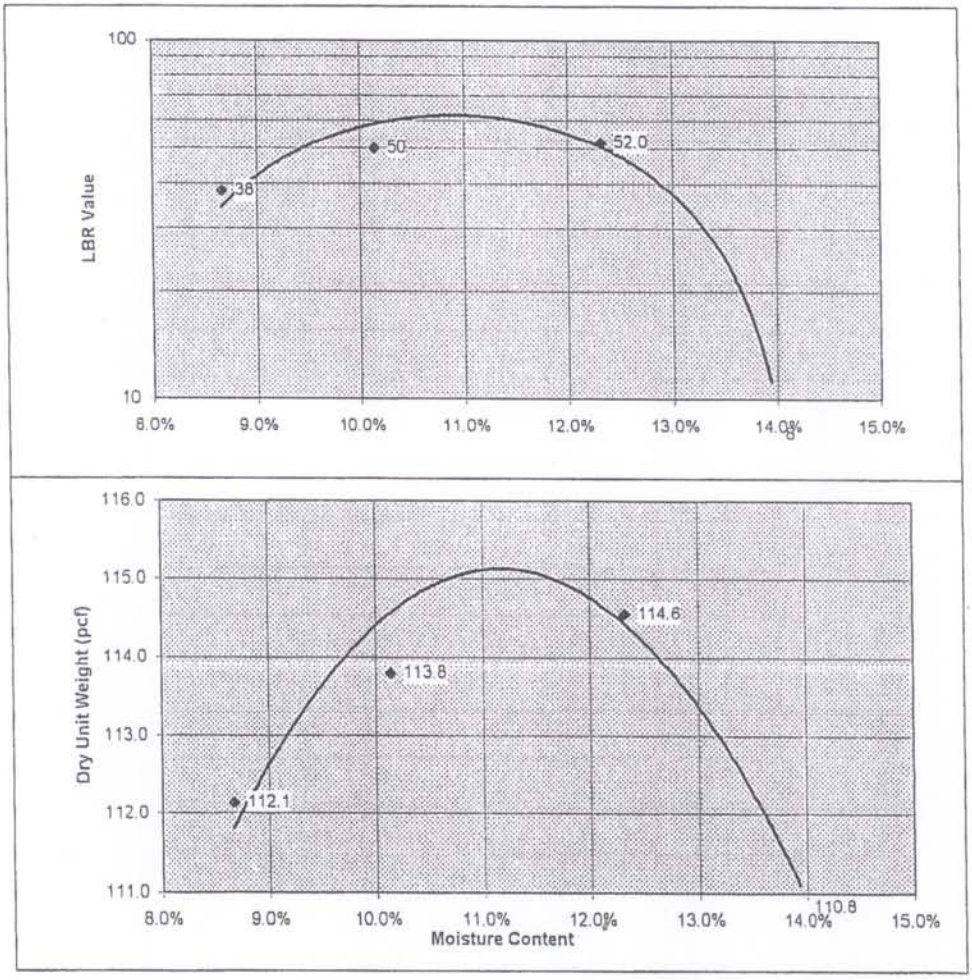
RESULTS OF LABORATORY TESTING

Tested For: 0
0
0
0
0

Project: 17 St. East
0
0

Project No. 775-15504
Date: 1/0/00 Report No. 0

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	52 %		
Maximum Density	115.0 pcf	Description:	Brown Fine Sand
Optimum Moisture	11.0 %		0
Test Method:	FSTM FM 5-515		
Sampled by:	PSI	Sample Location:	Sta53+0
			37460

cc:

Respectfully Submitted,
Professional Service Industries, Inc.

Name
Project Engineer

RESULTS OF LABORATORY TESTING

Tested For: 0
0
0
0
0

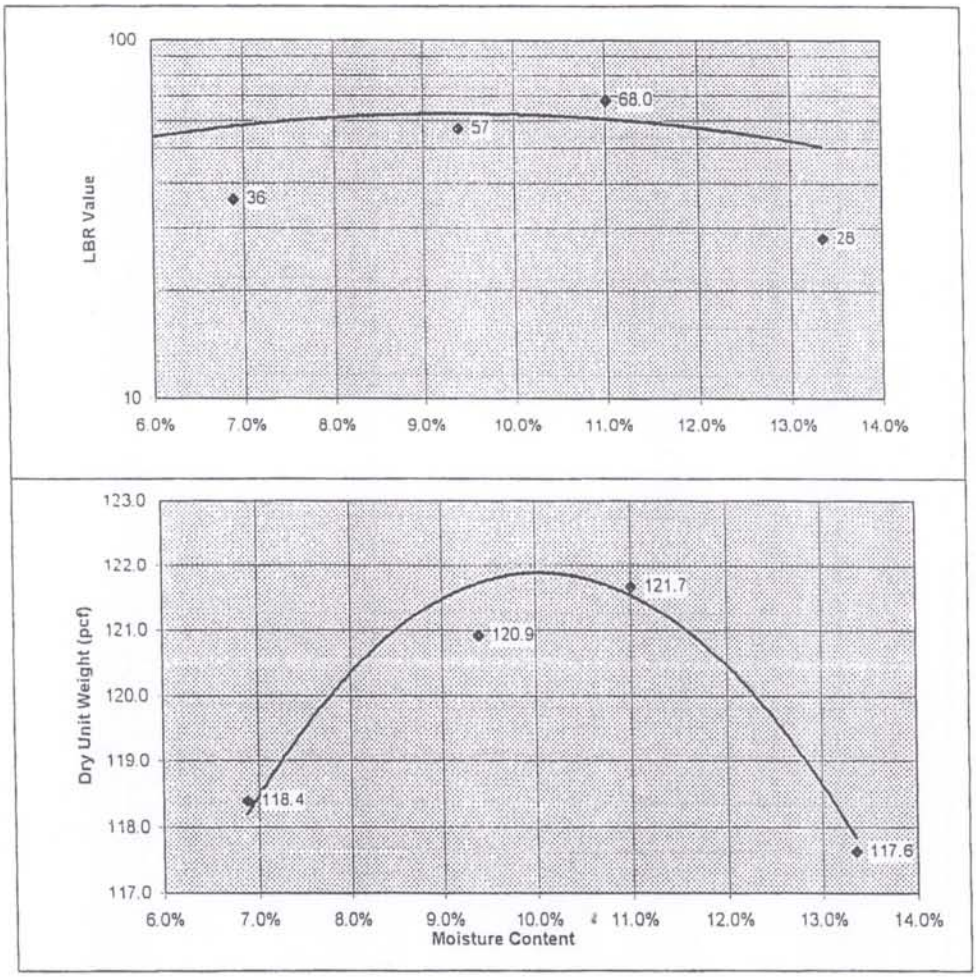
Project: 17 th St. East
0
0

Project No. 775-15504

Date: 1/0/00

Report No. 0

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	68 %		
Maximum Density	122.0 pcf	Description:	Brown Fine Sand With Clay And Rocks
Optimum Moisture	10.0 %		
Test Method:	FSTM FM 5-515		
Sampled by:	PSI	Sample Location:	STA 63+00 R 37460

cc:

Respectfully Submitted,

Professional Service Industries, Inc.

Name
Project Engineer