



REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING SERVICES

Hampton Aquatics Center

Hampton, Virginia

GET Project No: WM19-192G

January 30, 2020

PREPARED FOR:

City of Hampton
Engineering and Architectural Services
22 Lincoln Street
Hampton, Virginia 23669



January 30, 2020

TO: **City of Hampton**
Engineering and Architectural Services
22 Lincoln Street
Hampton, Virginia 23669

Attn: Mr. Ron Sterling, P.E.

RE: Report of Subsurface Exploration and Geotechnical Engineering Services
Hampton Aquatics Center
Hampton, Virginia
G E T Project No: WM19-192G

Dear Mr. Sterling:

In compliance with your instructions, we have completed our Subsurface Exploration and Geotechnical Engineering Services for the above referenced project. The results of this study, together with our recommendations, are presented in this report.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **G E T Solutions, Inc.** would be pleased to continue its role as Geotechnical Engineer during the project implementation.

Thank you for the opportunity to work with you on this project. We trust that the information contained herein meets your immediate need, and should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,
G E T Solutions, Inc.

James R. Wheeler, P.G.
Senior Project Geologist

Bruce R. Spiro, P.E.
Principal Engineer
Virginia Lic. No. 015791



Copies: (1) Client

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1.0 PROJECT INFORMATION	1
1.1 Project Authorization.....	1
1.2 Project Site Location and Description	1
1.3 Project Construction Description.....	2
1.4 Purpose and Scope of Services.....	2
2.0 FIELD AND LABORATORY PROCEDURES	3
2.1 Field Exploration	3
2.2 Laboratory Testing.....	4
2.2.1 <i>Soil Classification and Index Testing</i>	4
2.2.2 <i>Bulk Soil Sample Testing</i>	5
3.0 SITE AND SUBSURFACE CONDITIONS.....	5
3.1 Site Geology	5
3.2 Previously Reclaimed Land	5
3.3 Existing Pavement Conditions	6
3.4 Subsurface Soil Conditions.....	6
3.5 Groundwater Information	7
3.6 Shrink-Swell Soils Discussion	8
4.0 EVALUATION AND RECOMMENDATIONS.....	9
4.1 Clearing and Grading.....	9
4.2 Subgrade Preparation.....	10
4.3 Structural Fill and Placement	11
4.4 Suitability of On-site Soils	11
4.5 Shallow Foundation Design Recommendations.....	11
4.6 Settlements.....	12
4.7 Foundation Excavations.....	12
4.8 Slab-on-Grade Design Recommendations.....	13
4.9 Below-Grade Walls (Pool Walls)	13
4.10 Pavement Design Recommendations.....	15
4.11 Seismic Evaluation	17
5.0 CONSTRUCTION CONSIDERATIONS.....	18
5.1 Anticipated Excavation Characteristics	18
5.2 Excavation Stability.....	18
5.3 Dewatering	19
5.4 Site Utility Installation.....	20
6.0 REPORT LIMITATIONS.....	20
APPENDIX I	BORING LOCATION PLAN
APPENDIX II	CLASSIFICATION SYSTEM FOR SOIL EXPLORATION
APPENDIX III	SUMMARY OF LABORATORY CLASSIFICATION RESULTS
APPENDIX IV	BORING LOGS
APPENDIX V	GENERALIZED SOIL PROFILE
APPENDIX VI	CBR TESTING RESULTS
APPENDIX VII	PAVEMENT SECTION COMPOSITION AND DESCRIPTION

EXECUTIVE SUMMARY

The proposed development will consist of constructing an aquatic center on a vacant 6-acre site located on the northeast corner of Coliseum Drive and Pine Chapel Road in Hampton, Virginia. The proposed aquatic center will include a structure about 52,134 ft² in plan area. The aquatic center structure will include a lobby, multipurpose room, offices, locker rooms, restrooms, mechanical and storage rooms, concession area, competition in-ground pool, program in-ground pool, whirlpool, and a 2nd floor mezzanine that will provide spectator seating for both pools below. As reported by the Structural Engineer, the maximum column and wall foundation loads for the aquatic center structure are not expected to exceed 75 kips and 6 kips linear foot, respectively. Finish floor elevation will be at 13 feet; therefore, fills required to achieve finish grades within the building footprint should be limited to about 2 feet or less. The proposed development will also include the construction of a splash park, paved parking areas that will provide about 238 parking spaces, sidewalks, landscaping, and associated infrastructure components. The splash park is expected to include shallow water depth pools, spray elements, water slides, and a 1-story mechanical building.

Our field exploration program included fourteen (14) 10- to 60-foot deep Standard Penetration Test (SPT) borings located within the footprint of the proposed aquatic center structure, splash park, and pavement areas. The initial groundwater level was measured to occur at depths ranging from 5 to 7 feet below existing site grades. These depths correspond to approximate elevations ranging from 5 to 7 feet MSL per elevations obtained from the topographic survey provided by the client. Boreholes were backfilled upon completion for safety considerations. As such, the reported groundwater levels may not be indicative of the static groundwater level. A summary of the subsurface conditions encountered at the SPT soil test borings is presented in Section 3 of this report.

The following evaluations and recommendations were developed based on our field exploration and laboratory-testing program as well as a review of the feasibility study report previously completed by **G E T Solutions, Inc.** (G E T Project No. WM18-110G, dated April 19, 2018).

- § A field testing program during construction is recommended, which should include subgrade proofrolling, test pits, compaction testing and foundation excavation observations for bearing capacity verification.
- § **Uncontrolled FILL materials were encountered at this site that extended to depths ranging from 2 to 5.3 feet below existing grades at our boring locations. These Uncontrolled FILL materials are required to be undercut and removed from beneath all shallow foundations (where applicable) but may be suitable for slab and pavement support pending a further investigation at the time of construction.**
- § Some of the subsurface Silty SAND (SM) soils encountered at the boring locations appear to meet the criteria recommended in this report for reuse as structural fill. However, significant moisture manipulation will be required when reusing these soils as they are generally located below the groundwater table.
- § The project's budget should include an allowance for subgrade improvements (undercut and backfill with structural fill and/or additional aggregate base material).

Hampton Aquatics Center

Hampton, Virginia

GET Project No: WM19-192G

- § The proposed aquatic center structure and mechanical building for the splash park can be supported by means of shallow spread footings designed using an allowable bearing capacity of 2,000 pounds per square foot (psf) (with a minimum 30-inch embedment and a minimum 24-inch width). Isolated square pier footings are recommended to be a minimum of 3 feet by 3 feet in area for bearing capacity consideration. Estimated post-construction total and differential settlements may range up to 1-inch and ½-inch, respectively.
- § Provided the recommended earthwork activities and evaluations are carried out properly, the ground floor slabs may be constructed as on-grade members.
- § It is expected that the below grade pool walls will consist of earth-retaining structures. Wall footings can be designed using a net allowable soil pressure of 2,000 psf (maximum allowable toe pressures should not exceed 2,500 psf).
- § Based on California Bearing Ratio (CBR) testing, a design CBR value of 8.4 was used in evaluating the pavement sections. Detailed pavement design recommendations are presented in Section 4.10.
- § Based on our experience in the vicinity of the project site and the composition of the soils recovered within the upper 75 feet (maximum explored depth during feasibility study) at the boring locations, it is our opinion that the site characteristics are indicative of a Site Class “D” in accordance with Table 20.3-1 of ASCE 7-10 as referenced by the 2015 International Building Code (IBC);

This summary briefly discusses some of the major topics mentioned in the attached report. Accordingly, this report should be read in its entirety to thoroughly evaluate the contents.

1.0 PROJECT INFORMATION

1.1 Project Authorization

GET Solutions, Inc. has completed our Subsurface Exploration and Geotechnical Engineering Services for the proposed Hampton Aquatics Center project located in Hampton, Virginia. The geotechnical engineering services were conducted in general accordance with **GET** Proposal No. PWM19-372G dated December 24, 2019. Authorization to proceed with our services was received from the client in an email dated December 26, 2019.

1.2 Project Site Location and Description

The project site is located on a vacant 6-acre site at 1908 and 1914 Coliseum Drive in Hampton, Virginia. The project site is bordered to the north by Best Western Hampton Coliseum Inn and Coliseum Gardens apartments, to the east by Coliseum Gardens apartments, to the south by Pine Chapel Road, and to the west by Coliseum Drive.

The project site currently consists of an old, fatigued asphalt parking lot. The asphalt was noted to be in poor condition, with evidence of severe weathering, alligator cracking, potholes, etc. Evidence of an underground storm sewer system was also observed at this site. Sidewalks and minor landscaping are located along the shoulders of the roads that border this property. Based on the topographic survey provided by the client the existing site elevations generally range from about 11 to 13 feet MSL. Photographic documentation of the site is provided in Figure 1.



Figure 1 – Project Site Facing North

Based on a review of Hampton GIS aerial imagery (from the city GIS web viewer) dating from 1973 to 2002, the site previously contained a large structure and asphalt parking lot. It is our understanding the large structure was a retail store called Best Products. Sometime between February 2004 and January 2004 (per Google Earth historical aerial imagery) the retail structure was demolished and by September 2005 (per Google Earth historical aerial imagery) the footprint of the demolished retail structure was paved.

1.3 Project Construction Description

The proposed development will consist of constructing an aquatic center that will include a structure about 52,134 ft² in plan area. The aquatic center structure will include a lobby, multipurpose room, offices, locker rooms, restrooms, mechanical and storage rooms, concession area, competition in-ground pool, program in-ground pool, whirlpool, and a 2nd floor mezzanine that will provide spectator seating for both pools below. As reported by the Structural Engineer, the maximum column and wall foundation loads are not expected to exceed 75 kips and 6 kips linear foot, respectively. Finish floor elevation will be at 13 feet; therefore, fills required to achieve finish grades within the building footprint should be limited to about 2 feet or less.

The proposed development will also include the construction of a splash park, paved parking areas that will provide about 238 parking spaces, sidewalks, landscaping, and associated infrastructure components. The splash park will likely be constructed in a future phase and not part of the initial phase of development of the aquatic center. The splash park is expected to include shallow water depth pools, spray elements, water slides, and a small 1-story mechanical building. Cuts and fills required to establish finish grades for this development are expected to be limited to about 2 feet or less except for the excavations required for the in-ground pools where more significant cuts would be required.

If any of the noted information is incorrect or has changed, G E T Solutions, Inc. shall be informed so that we may amend the recommendations presented in this report, if appropriate.

1.4 Purpose and Scope of Services

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

1. General assessment of the soils revealed by the borings performed at the proposed project site.
2. General location and description of potentially deleterious material encountered in the borings that may interfere with construction progress or structure and pavement performance, including existing fills or surficial/subsurface organics.
3. Construction considerations for soil subgrade preparation (stripping, grading and compaction). Engineering criteria for placement and compaction of approved structural fill material.
4. Evaluation of the on-site soils for re-use as structural fill.

5. Feasibility of utilizing a shallow foundation system for support of the proposed structures. Design parameters required for the foundation system, including foundation sizes, allowable bearing pressures, foundation levels, and expected total and differential settlements.
6. Feasibility of constructing ground floors as slab-on-grade members.
7. Assessment of the shallow subsurface soils' expansive properties.
8. Estimated below grade soil parameters and construction considerations for the proposed below grade walls for the pools.
9. Pavement design recommendations based on field exploration activities, California Bearing Ratio (CBR) tests, and our experience with similar soil conditions.
10. Seismic Site Class definition in accordance with the International Building Code (IBC) 2015 requirements, available soil data, and our local experience.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic material in the soil, bedrock, surface water, groundwater or air, on or below or around this site.

2.0 FIELD AND LABORATORY PROCEDURES

2.1 Field Exploration

In order to explore the general subsurface soil types and to aid in developing associated design parameters and recommendations, the following exploration program was performed:

- § In order to advance the soil borings, 4-inch diameter cores were initially drilled through the asphalt pavement prior to advancing the soil borings.
- § Six (6) 25- to 60-foot deep Standard Penetration Test (SPT) borings (designated as AB-1 through AB-6) were drilled within the approximate footprint of the proposed aquatic center structure.
- § Two (2) 15-foot deep Standard Penetration Test (SPT) borings (designated as AB-7 and AB-8) were drilled within the approximate footprint of the proposed splash park.
- § Six (6) 10-foot deep SPT boring (designated as CBR-1 through CBR-6) were drilled within proposed pavement areas.
- § Two (2) temporary groundwater monitoring wells were installed at boring locations CBR-1 and CBR-5 to determine the stabilized groundwater levels.
- § A bulk subgrade sample was collected at each of the borings (designated as CBR-1 through CBR-6) performed within the proposed pavement areas. The bulk subgrade samples were collected from approximately 0.4 to 3 feet below existing grades. The bulk soil samples were returned to our AASHTO re:source (formerly ARML) and US Army Corps of Engineers certified laboratory and subjected to CBR testing in accordance with ASTM standards.

The SPT borings were performed with the use of hollow stem auger and rotary wash “mud” drilling procedures in general accordance with ASTM D 1586. The tests were performed continuously from the existing ground surface to depths of 10 to 12 feet and at 5 foot intervals starting at a depth of 13 feet. The soil samples were obtained with a standard 1.4-inch inner diameter, 2-inch outer diameter, 30-inch long split-spoon sampler. The sampler was driven with blows of a 140 lb. automatic hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value (uncorrected for automatic hammer and overburden pressure). A representative portion of each disturbed split-spoon sample was collected with each SPT, placed in a glass jar, sealed, labeled, and returned to our laboratory for review.

In addition to the field exploration, a review of the preliminary geotechnical engineering report (feasibility study) prepared by **G E T Solutions, Inc.** (**G E T** Project No. WM18-110G, dated April 19, 2018) for this site was also completed. The subsurface information obtained during this feasibility study was used to supplement and assist in developing our evaluations and recommendations presented in this report.

The boring locations were established by **G E T Solutions, Inc.** and staked/marked in the field by measuring distances from identifiable landmarks. Upon completion of the soil borings, the holes were backfilled with the soil clippings and the asphalt core hole replaced with cold patch asphalt. Approximate soil boring locations are shown on the attached “Boring Location Plan” (Appendix I) which was developed using the proposed site layout drawing provided by the client.

2.2 Laboratory Testing

Soil testing provided by **G E T Solutions, Inc.** was performed in accordance with American Society for Testing and Materials (ASTM) standards. All soils and materials tests were performed in our AASHTO re:source (formally AMRL) and US Army Corps of Engineers certified Williamsburg laboratory.

2.2.1 Soil Classification and Index Testing

Representative portions of all soil samples collected during drilling operations were sealed in glass jars, labeled and transferred to our laboratory in accordance with ASTM D 4220 for classification and analysis. Soil descriptions on the boring logs are provided using visual-manual methods in general accordance with ASTM D 2488 using the Unified Soil Classification System (USCS). Soil samples that were selected for index testing were classified in general accordance with ASTM D 2487. It should be noted that some variation can be expected between samples classified using the visual-manual procedure (ASTM D 2488) and the USCS (ASTM D 2487). A summary of the soil classification system is provided in Appendix II.

Representative split-spoon soil samples were selected and subjected to natural moisture, #200 sieve wash, and Atterberg Limits testing in order to corroborate the visual classification. These test results are presented in Appendix III and on the soil test boring logs provided in Appendix IV. A generalized subsurface soil profile is provided in Appendix V.

2.2.2 Bulk Soil Sample Testing

The six (6) bulk soil samples were returned to our AASHTO re:source and US Army Corps of Engineers certified Williamsburg laboratory and subjected to Standard Proctor and CBR testing in accordance with ASTM procedures. A summary of the CBR test results is presented in Table I below; Proctor curves, CBR curves, and Particle Size Distribution curves are provided in Appendix VI.

Table I - CBR Test Results

CBR / Boring No.	Depth (feet) ⁽¹⁾	USCS Type	Natural Moisture (%)	% Passing #200 Sieve	Atterberg Limits (LL/PL/PI)	Max. Dry Density (pcf)	Optimum Moisture (%)	CBR Value	Swell (%)
CBR-1	0.4 - 2	SC "FILL"	10	30.7	24/13/11	126.5	9.6	9.7	0.1
CBR-2	0.7 - 3	SM "FILL"	9	33.7	Non-Plastic	125.5	9.7	14.5	0.1
CBR-3	0.7 - 2	SC "FILL"	12	39.4	40/19/21	117.5	13.5	9.9	0.1
CBR-4	0.4 - 2	SM "FILL"	11	25.6	Non-Plastic	125.0	10.0	16.1	0.1
CBR-5	0.4 - 2	SC "FILL"	11	25.4	24/14/10	124.6	10.0	9.7	0.1
CBR-6	0.5 - 3	SM "FILL"	11	33.7	Non-Plastic	125.1	9.1	15.9	0.1

Note: (1) Depth below existing site grades

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Geology

The project site is located within the Atlantic Coastal Plain physiographic province. Bedrock of the Late Mesozoic age is present at depths of greater than 2,000 ft, and is overlain by Lower and Upper Cretaceous, Tertiary, Pleistocene and Recent Sediments.

Across the outer Coastal Plain, the Pliocene age Yorktown Formation of the Tertiary Period is widespread, occurring from Maryland to North Carolina. Its age is estimated between 4.8 million and 2.8 million years and is estimated to have been deposited during three transgressive episodes. The depositional environment was shallow marine in nature, consisting of inner shelf, barrier-island, estuarine and lagoonal patterns. The Yorktown Formation is a glauconitic, fossiliferous, Silty to Clayey greenish-gray fine Sand. This material has been pre-consolidated by an increased effective overburden pressure generated due to a drop in the sea level at the end of the Tertiary Period, and by previously overlying sediments, which eroded away as the sea level subsequently lowered.

As sea levels rose during the Pleistocene Epoch of the Quaternary Period, areas within the project limits were filled and overlain by soils of the Lynnhaven Member of the Tabb Formation, which is composed of fluvial and estuarine deposits. The geologic stratigraphy encountered in our subsurface explorations generally consisted of marine deposited Sands and Clays of this formation.

3.2 Previously Reclaimed Land

Based on a review of historical United States Geological Survey (USGS) topographic maps of the Newport News North Quadrangle, produced between the years of 1907 and 1986, the project site does not appear to be located within a previously reclaimed land area.

3.3 Existing Pavement Conditions

The project site currently consists of an old, fatigued asphalt parking lot. The asphalt was noted to be in poor condition, with evidence of severe weathering, alligator cracking, potholes, etc. at the time our site reconnaissance. A summary of the coring investigation program is presented in Table II below.

Table II – Existing Pavement Conditions

Core/Boring Location	Asphalt Thickness (in)	Aggregate Base Thickness (in)	Subgrade USCS Classification
AB-1	2.5	3.0	CL "FILL"
AB-2	5.5	-	SC "FILL"
AB-3	6.5	2.0	SC "FILL"
AB-4	1.7	1.5	SM "FILL"
AB-5	2.5	4.0	SM "FILL"
AB-6	2.2	1.5	SM "FILL"
AB-7	5.3	4.0	SM "FILL"
AB-8	4.2	3.5	SM "FILL"
CBR-1	2.0	4.5	SC "FILL"
CBR-2	3.0	5.0	SM "FILL"
CBR-3	4.0	4.3	SC "FILL"
CBR-4	2.3	2.0	SM "FILL"
CBR-5	2.5	2.3	SC "FILL"
CBR-6	2.1	4.0	SM "FILL"

A detailed account of our coring exploration program is included in the "Pavement Section Composition and Description" sheets (Appendix VII).

3.4 Subsurface Soil Conditions

A summary of the subsurface soil conditions encountered at the SPT boring locations is presented in Table III on the following page.

Table III – Subsurface Soil Conditions

Average Depth ⁽¹⁾ (ft)	Stratum	Description	Ranges of SPT ⁽²⁾ N-Values
0 to 0.3 - 0.8	Pavement	Ø Refer to Section 3.3; Table II	-
0.3 - 0.8 to 2 - 5.3	FILL	Ø Predominantly SAND (SM and SC) with varying amounts of Gravel, Silt, and/or Clay Ø Lesser amounts of Sandy Lean CLAY (CL) with varying amounts of Gravel	<u>SAND</u> 5 - 20 <u>CLAY</u> 7 - 11
2 - 5.3 to 4 - 5.8	I	Ø SAND (SM and SC) with varying amounts of Gravel, Silt, and/or Clay <i>This stratum was not present at boring locations AB-2, AB-3, AB-7, CBR-2, CBR-3, CBR-4, and CBR-6.</i>	5 - 13
2 - 5.8 to 5.8 - 8	II	Ø Lean and Fat CLAY (CL and CH) with varying amounts of Gravel and/or Sand <i>This stratum was not present at boring locations CBR-3 and CBR-5.</i>	4 - 11
5.8 - 8 to 3.8 - 11.3	III	Ø SAND (SM and SC) with varying amounts of Gravel, Silt, Clay, and/or marine shell fragments <i>Borings CBR-1, CBR-5, and CBR-6 were terminated within this stratum.</i>	3 - 6
8.3 - 11.3 to 10 - 60	IV	Ø Yorktown Formation classified as Silty SAND (SM) with varying amounts of marine shell fragments	3 - 9
Notes: (1) Depth below existing grades (2) SPT=Standard Penetration Test, N-Values in Blows-per-foot (uncorrected)			

The subsurface descriptions are of a generalized nature provided to highlight the major soil strata encountered. The records of the subsurface exploration are included in Appendix IV (Boring Log sheets) and in Appendix V (Generalized Soil Profiles) which should be reviewed for specific information as to the individual borings. The stratifications shown on the records of the subsurface exploration represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

3.5 Groundwater Information

The groundwater level was recorded at the boring locations during drilling and as observed through the relative wetness of the recovered soil samples during the drilling operations. The initial groundwater table was generally determined to occur at depths ranging from 5 to 7 feet below existing site grades. These depths correspond to approximate elevations ranging from 5 to 7 feet MSL per elevations obtained from the topographic survey provided by the client.

During drilling operations, fluid (water-clay slurry) is introduced into the bore holes generally impairing the ability to accurately determine groundwater levels. In addition, as subsurface soils begin to dry, moisture moves upwards through the soil profile by means of capillary action. Based on the subsurface soil composition (soils containing more than 30% of fines by weight), the initial groundwater level reading (based on the relative wetness of the soils) could be in part attributed to the capillary action of the soils. As such, the reported initial groundwater level may not be indicative of the static groundwater level. The boreholes were backfilled upon completion for safety considerations.

Groundwater levels were measured at the temporary groundwater monitoring wells located at borings CBR-1 and CBR-5. The groundwater information associated with these wells is presented in Table IV.

Table IV – Temporary Well Readings

Boring Location	Initial Groundwater Reading (ft) ⁽¹⁾	24-hour Groundwater Reading (ft) ⁽¹⁾	Estimated 24-hour Groundwater Reading Elevation (ft) ⁽²⁾
CBR-1	5.8	5	6
CBR-2	7	7.5	5.5

Notes: (1) Depth below existing site grades.

(2) Elevation is estimated based on topographic survey provided by the client.

In the project's area, seasonal groundwater fluctuations of ± 3 feet are common; however, greater fluctuations have been documented. We recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on the construction procedures, if necessary.

3.6 Shrink-Swell Soils Discussion

The soils recovered during our field investigation were tested and evaluated for their potential to expand or contract with moisture changes (typically termed shrink-swell). Shallow foundations and other on-grade features constructed on expansive soils at certain depths may be subjected to detrimental uplift or horizontal forces caused by the swelling of these soils as a result of an increase in the moisture content. Conversely, as these Clays lose moisture they may shrink, adversely affecting the foundations. The depth to which soils are normally affected by moisture changes extends from the ground surface to approximately 30 inches below existing grades in this area, depending on site topography and drainage characteristics.

The predominant soils within the project site are mapped by the Soil Survey of Hampton, Virginia as the 8-Chickahominy-Urban Land and 27-Urban Land Soil Series. The Urban Land designation indicates that "man-placed" fill materials are likely present at this site. Our soil borings revealed Uncontrolled FILL materials at all of the boring locations that extended to depths ranging from 2 to 5.3 feet below existing grades. The naturally occurring soils encountered beneath the Uncontrolled FILL materials in the borings appear to be consistent with the Chickahominy Soil Series. These soils are described by the Soil Survey as possessing moderate to high expansive (shrink-swell) potential.

Based on the laboratory classification test results (including these test results from the feasibility study), the shallow (upper 10 feet) CLAY (CL and CH) soils possess Liquid Limits (LL) ranging from 32% to 65% and Plasticity Indices (PI) ranging from 16 to 33 generally indicative of possessing moderate to high shrink-swell potential and in agreement with the soil survey. As such, foundation adjustments (by increasing foundation embedment) appear necessary for shrink-swell considerations at this site.

4.0 EVALUATION AND RECOMMENDATIONS

Our recommendations are based on the previously discussed project information, our interpretation of the soil test borings and laboratory data, and our observations during our site reconnaissance. If the proposed construction should vary from what was described, we request the opportunity to review our recommendations and make any necessary changes.

4.1 Clearing and Grading

The proposed construction area should be cleared by means of removing the existing asphalt, abandoned utilities, slabs, or foundations, and any other unsuitable materials. It is estimated that a cut of up to 6.5 inches in depth will be required to remove asphalt. This cut is expected to extend deeper in isolated areas to remove thicker asphalt pavement or unsuitable soils, which become evident during the grading operations. It is recommended that the clearing operations extend laterally at least 5 feet beyond the perimeter of the proposed construction areas.

Uncontrolled FILL materials were observed as deep as 5.3 feet below existing site grades at the boring locations and may occur deeper elsewhere on the site within unexplored locations. Some of this Uncontrolled FILL material may potentially remain in place under pavement and slabs if approved by the Geotechnical Engineer (to be determined following the completion of test pits, proofroll, and compaction testing). However, all Uncontrolled FILL materials must be removed from below the base of all foundation excavations. Uncontrolled FILL materials are often considered unreliable due to the variable content and uncertainty regarding means of placement. As such, Uncontrolled FILL material left in place can be susceptible to settlement as a result of internal compression of the soils contained within. With regard to pavement, these settlements would be minimal (about 1 inch or less) and have minimal impact on performance, if any.

To reduce the potential for subgrade improvements (undercutting due to saturated soils in conjunction with heavy construction traffic), it is recommended that the grading operations be performed during the drier months of the year (historically April through November as indicated by the NCDC *Climate Atlas of the United States*). This should minimize these potential problems, although they may not be eliminated. If grading is attempted during the winter months, stabilization of wet soils should be anticipated. Methods to address wet soils may include excavation-substitution (undercutting and backfilling with structural fill) or the introduction of chemical additives (cement, lime, etc.). However, during the drier months of the year, wet soils could be dried by discing or implementing other drying procedures (stockpiling or spreading in thin lifts) to achieve moisture contents necessary to achieve adequate degrees of compaction. The project's budget should include an allowance for subgrade improvements as described above.

The site should be graded to enhance surface water runoff to reduce the ponding of water. Ponding of water often results in softening of the near-surface soils. In the event of heavy rainfall within areas to receive fill, we recommend that the grading operations cease until the site has had a chance to dry. If the subgrade becomes deteriorated due to the above-mentioned or other reasons, difficulty maneuvering construction equipment and machinery is likely.

The undercut and backfill should be performed under the observation of a representative of **G E T Solutions, Inc.** who will evaluate the composition of the recovered soils. Recommendations concerning the subgrade improvements (as necessary) will be provided in the field following the testing procedures.

4.2 Subgrade Preparation

Following the clearing operation, the newly exposed subgrade soils should be densified with a large static drum roller. After the subgrade soils have been densified, they should be evaluated by a qualified geotechnical inspector for stability. Accordingly, the subgrade soils should be proofrolled to check for pockets of loose material hidden beneath a crust of better soil. Several passes should be made by a large rubber-tired roller or loaded dump truck over the construction areas. The number of passes will be determined in the field by the Geotechnical Engineer depending on the soils conditions. Any pumping and unstable areas observed during proofrolling (beyond the initial cut) should be undercut and/or stabilized at the directions of the Geotechnical Engineer.

In addition to the proofroll, several 3 to 6-foot deep test pits should be excavated within the proposed construction areas. The test pits are considered necessary to determine the thickness and composition of the Uncontrolled FILL materials and thus the suitability for it to remain in-place (beneath the slabs and pavements). The test pits should be performed under the observation of a representative **G E T Solutions, Inc.**, who will evaluate the composition of the recovered soils. In addition to the test pits, several compaction tests should be performed on the Uncontrolled FILL materials within the proposed construction areas to further substantiate the suitability of the existing Uncontrolled FILL material to remain beneath the ground supported slabs and pavements. It is possible that some subgrade improvements will be required to provide suitable soils for slab and pavement support. **Regardless, all Uncontrolled FILL materials must be removed from the base of all footing excavations.**

The extent of the subgrade improvements will be evaluated in the field during construction based on the outcome of the field testing procedures (field assessments of subgrade stability). In this regard, and in order to reduce the potential for subgrade improvements, care should be exercised during the grading and construction operations at the site. The project's budget should include an allowance for subgrade improvements (undercut and backfill with structural fill or additional aggregate base material).

4.3 Structural Fill and Placement

Following the approval of the natural subgrade soils by the Geotechnical Engineer, the placement of the fill required to establish the design grades may begin. Any material to be used for structural fill should be evaluated and tested by an independent testing laboratory prior to placement to determine if they are suitable for the intended use. Suitable structural fill material should consist of sand or gravel containing less than 25% by weight of fines (SP, SM, SW, GP, GW - with dimensions not to exceed 2 inches in diameter), having a liquid limit less than 25 and plastic limit less than 6, and should be free of rubble, organics, clay, debris and other unsuitable material.

All structural fill should be compacted to a dry density of at least 98% of the Standard Proctor maximum dry density, in accordance with ASTM Specification D 698. The moisture content of the structural fill should be within ± 2 percentage points of the optimum moisture content at the time of placement. In general, the compaction should be accomplished by placing the fill in maximum 8 to 10-inch loose lifts and mechanically compacting each lift to at least the specified minimum dry density. A qualified inspector should perform field density tests on each lift as necessary to assure that adequate compaction is achieved.

Backfill material in utility trenches within the construction areas should consist of structural fill (as previously described), and should be compacted to at least 98% of ASTM Specification D 698. This fill should be placed in 4 to 6 inch loose lifts when hand compaction equipment is used.

If applicable, care should be used when operating heavy compacting equipment near existing structures to avoid transmission of the vibrations that could cause settlement damage or disturb occupants. In this regard, it is recommended that the vibratory roller remain at least 25 feet away from existing structures; these areas should be compacted with small, hand-operated compaction equipment.

4.4 Suitability of On-site Soils

Based on the laboratory testing program, some of the soils classified as Silty SAND (SM) appear to be suitable for reuse as structural fill material in accordance with Section 4.3 of this report. However, significant moisture manipulation will be required as these soils are located below the groundwater table. This manipulation will likely require stockpiling of wet soils and/or placing the material in thin layers. Further classification testing (natural moisture content, gradation analysis, and Proctor testing) should be performed in the field during construction to evaluate/confirm the suitability of excavated soils for reuse as fill. **The project's budget should include an allowance for imported structural fill.**

4.5 Shallow Foundation Design Recommendations

Provided that the construction procedures contained herein are properly performed, the proposed aquatics center building and maintenance building for the splash park can be supported by shallow foundations bearing upon firm natural soil or well-compacted structural fill material. **Uncontrolled FILL materials are not considered suitable for foundation support and must be removed from below all footings.** Uncontrolled FILL materials were encountered to a depth of 5.3 feet below existing grades at the boring locations. The Uncontrolled FILL material thicknesses may vary at other unexplored locations across the project site.

The foundations can be designed using a net allowable soil pressure of 2,000 pounds per square foot (psf). In using net pressures, the weight of the foundations and backfill over the foundations, including the weight of the floor slab, need not be considered. Hence, only loads applied at or above the finished floor need to be used for dimensioning the foundations.

In order to develop the recommended bearing capacity of 2,000 psf and to accommodate for moderate to high expansive (shrink-swell) potential soils, the base of the footings should have a minimum embedment of 30 inches beneath finished grades and should have a minimum width of 24 inches. In addition, isolated square column footings (if deemed necessary) are recommended to be a minimum of 3 feet by 3 feet in area for bearing capacity consideration. The recommended 30-inch footing embedment is considered sufficient to provide adequate cover against frost penetration to the bearing soils.

4.6 Settlements

It is estimated that, with proper site preparation, the maximum resulting post-construction total settlement of the proposed building foundations should be up to 1 inch. The maximum differential settlement magnitude is expected to be less than ½ -inch between adjacent footings (wall footings and column footings of widely varying loading conditions). The settlements were estimated on the basis of the results of the field penetration tests and laboratory testing. Careful field control will contribute substantially towards minimizing the settlements.

4.7 Foundation Excavations

In preparation for shallow foundation support, the footing excavations should extend into firm natural soil or well-compacted structural fill. **Again, Uncontrolled FILL materials are not considered suitable for foundation support and must be removed from below all footings.** Uncontrolled FILL materials were encountered to a depth of 5.3 feet below existing grades at the boring locations and may extend deeper at other unexplored locations across the project site (greater thicknesses may be encountered at the filled-in, previously existing pool). The foundation bearing capacities should be verified in the field during construction by means of performing a footing inspection for each foundation structure. At that time, the Geotechnical Engineer should also explore the extent of excessively loose, soft, or otherwise unsuitable material within the exposed excavations. Also, at the time of footing observations, the Geotechnical Engineer should advance hand auger borings or use a hand penetration device in the bases of the foundation excavations to verify that the recovered soils are consistent with those documented in this report. The necessary depth of penetration will be established during the subgrade observations.

If pockets of unsuitable soils requiring undercut are encountered in the footing excavations, the proposed footing elevation should be re-established by means of backfilling with “flowable fill” or a suitable structural fill material compacted to a dry density of at least 98% of the Standard Proctor maximum dry density (ASTM D 698), as described in Section 4.3 of this report, prior to concrete placement. This construction procedure will provide for a net allowable bearing capacity of 2,000 psf.

Immediately prior to reinforcing steel placement, it is suggested that the bearing surfaces of all footing and floor slab areas be compacted using hand operated mechanical tampers, to a dry density of at least 98% of the Standard Proctor maximum dry density (ASTM D 698) as tested to a depth of 12 inches, for bearing capacity considerations. In this manner, any localized areas, which have been loosened by excavation operations, should be adequately re-compacted. The compaction testing in the base of the footings may be waived by the Geotechnical Engineer, where firm bearing soils are observed during the footing inspections.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition such as from physical disturbance, rain or frost. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

4.8 Slab-on-Grade Design Recommendations

Floor slabs may be constructed as slab-on-grade members provided the previously recommended earthwork activities and evaluations are carried out properly. It is recommended that all ground floor slabs be directly supported by at least a 4-inch layer of relatively clean, compacted, poorly graded sand (SP) or gravel (GP) with less than 5% passing the No. 200 Sieve (0.074 mm). The purpose of the 4-inch layer is to act as a capillary barrier and equalize moisture conditions beneath the slab. A subgrade modulus of 125 pounds per square inch per inch (psi/in) should be used when analyzing the slabs under this construction procedure. Alternately, the concrete slabs may be directly supported by a 6 to 8-inch layer of well-compacted aggregate base stone (VDOT 21A or 21B); a subgrade modulus of 125 pounds per square inch per inch (psi/in) should be used when analyzing the slabs under this alternate construction procedure.

It is also recommended that the floor slab bearing soils be covered by a vapor barrier or retarder in order to minimize the potential for floor dampness, which can affect the performance of glued tile and carpet. Generally, use a vapor retarder for minimal vapor resistance protection below the slab on grade. When floor finishes, site conditions, or other considerations require greater vapor resistance protection; consideration should be given to using a vapor barrier. Selection of a vapor retarder or barrier should be made by the architect based on project requirements.

4.9 Below-Grade Walls (Pool Walls)

It is expected that the below grade pool walls will consist of earth-retaining structures. The footings can be designed using a net allowable soil pressure of 2,000 psf. Maximum allowable toe pressures should not exceed 2,500 psf. It is noted that in order to promote excavation stability and facilitate mat foundation construction, a bedding layer of 12 inches of VDOT No. 57 stone is recommended to be placed in the base of the excavation.

In order to reduce the magnitude of lateral loads being applied to the below grade walls and promote positive water drainage, it is recommended that a granular backfill be placed directly behind the walls and extend laterally back from the wall a minimum distance of four feet. These granular soils should be a relatively clean, free draining granular material (sand) classified as SP-SM or better, containing less than 12 percent passing the No. 200 sieve (0.074 mm). The compaction behind these walls should be in the range of 95 to 97 percent of the Standard Proctor maximum dry density (ASTM D698). The soils in this zone should not be over-compacted. In order to minimize the potential for wall damage due to excessive compaction, hand operated mechanical tampers should be used to compact the granular materials. Heavy compaction equipment should not be allowed within five feet of the retaining walls.

Below grade walls (pool walls) should be designed to withstand the lateral earth pressures exerted upon them. For rigid walls restrained from rotation, we recommend that the "At Rest" soil condition be used in the wall design and evaluation. In the design of the below-grade wall type structures, the estimated soil parameters in the following table (Table V) can be utilized. These parameters assume granular soils (Structural Fill) will comprise the near wall backfill.

Table V - Below Grade Estimated Soil Parameters

Soil Type	SAND (SP, SM, SP-SM, SC)
Stratum	I, II and Structural Fill
Estimated Moist Unit Weight (pcf)	115
Estimated Saturated Unit Weight (pcf)	120
Estimated Submerged Unit Weight (pcf)	58
Friction Angle, ϕ (degrees)	30
Cohesion, c (psf)	0
Active Soil Pressure Coefficient, K_a	0.33
At-Rest Soil Pressure Coefficient, K_0	0.5
Passive Soil Pressure Coefficient, K_p	3.0
Coefficient of Friction	0.38

These soil parameters are considered appropriate for materials satisfying the requirements for Structural Fill. It is noted that increased lateral pressures generated by surcharge loads should be considered in the design.

The initial groundwater table was generally determined to occur at depths ranging from 5 to 7.5 feet below existing site grades. Additionally, the groundwater level may rise another 3 feet or more during wet periods (seasonal high). **In this respect, and absent a permanent groundwater depression system (underdrains), the pool should be designed to resist uplift pressures (buoyancy), as well as including hydrostatic equalizer valves for a “dry” pool condition. At your request, G E T Solutions, Inc. can provide deep foundation recommendations with allowable tension capacities if needed by the pool designer for the pools to resist uplift pressures (buoyancy) due to shallow groundwater conditions at this site. Also, the pool walls should be sized with considerations given to hydrostatic pressures; these pressures should assume the water level to occur near the ground surface.**

4.10 Pavement Design Recommendations

It is not known at this time if the existing pavements that coincide with future pavement areas will be milled and overlaid or if these areas will undergo complete pavement reconstruction. We have provided recommendations for both scenarios.

New Pavement

Based on the results of the laboratory test program, the collected bulk soil samples have an average soaked CBR value of 12.6. The average soaked CBR value was multiplied by a factor of two-thirds to determine a design CBR value. The two-thirds factor provides the necessary safety margins to compensate for the specified time of soaking not capturing the minimum CBR strength of some soils, for any non-uniformity of the soil, and for any low test results not considered when computing the average. As such, a design CBR value of 8.4 should be used for designing pavement sections. The comprehensive test results are provided in Appendix VI. A modulus of subgrade reaction (k) value of 125 pounds per square inch per inch (psi/in) can be used in structurally designing rigid pavement sections.

Table VI on the following page includes typical minimum pavement design recommendations for pavement areas that may be included with this project.

Table VI - Typical New Pavement Sections

Section	Hot Mix Asphalt		Concrete ⁽¹⁾	Aggregate Base ⁽²⁾	Subgrade ⁽³⁾
	Surface	Base			
Light Duty Flexible (Parking Bays)	2"	-	-	8"	Stable and Compacted
Heavy Duty Flexible (Access Road/Drive Isles)	2"	3"	-	8"	Stable and Compacted
Heavy Duty (Dumpster Pads)	-	-	6"	8"	Stable and Compacted

Notes: (1) Minimum flexural strength of 650 psi at 28 days.

(2) VDOT No. 21A or 21B stone compacted to a dry density of at least 100% of the Standard Proctor maximum dry density (ASTM D 698).

(3) Compacted to a dry density of at least 100% of the Standard Proctor maximum dry density (ASTM D 698)

Actual pavement section thicknesses should be provided by the design Civil Engineer based on traffic loads, volume, and the owners design life requirements. The above sections correspond to thickness representative of typical local construction practices and as such periodic maintenance should be anticipated. All pavement material and construction procedures should conform to VDOT requirements.

Following pavement rough grading operations, the exposed subgrade should be observed under proofrolling. This proofrolling should be accomplished with a fully loaded dump truck or 7 to 10 ton drum roller to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with a well-compacted material. The inspection of these phases should be performed by the Geotechnical Engineer or his representative. The subgrade soils are likely to be unstable at the time of construction and some ground improvements are likely. As such, the project's budget should include a contingency to accommodate the potential ground improvements.

Where excessively unstable subgrade soils are observed during proofrolling and/or fill placement, it is expected that these weak areas can be stabilized by means of thickening the base course layer by 4 to 6 inches, adding 12 inches of Structural Fill subbase, or lining the exposed subgrade with geotextile fabric (Mirafi HP270 or equivalent). These alternatives are to be addressed by the Geotechnical Engineer during construction, if necessary, who will recommend the most economical approach at the time.

Pavement Overlay

The existing pavement section thicknesses ranged from 1.6 to 6.5 inches of asphalt underlain by 0 to 6 inches of aggregate base material at our boring locations (including feasibility study). Based on the results of our field explorations the pavement section thicknesses are highly variable across this project site and for those reasons it is difficult to recommend an appropriate mill and overlay depth that would suffice uniformly across all pavement areas. At a minimum, it is recommended to mill a ½-inch depth and overlay the remaining pavement with 2 inches of surface course asphalt. However, this approach could be inadequate in certain areas across the site, particularly in locations where a heavy-duty pavement section is needed, and the existing pavement section is already relatively thin. In addition, the existing asphalt is old, fatigued, and in poor condition. For these reasons, it may be advantageous to not pursue the mill/overlay approach and consider complete pavement reconstruction. Nevertheless, if the mill and overlay approach is pursued further exploratory into existing pavement section thicknesses is highly recommended to ensure an adequate pavement section is present for the intended use when completed. Adjustments can be made to the overlay thicknesses based on these further findings.

All pavements planned for mill and overlay should be evaluated and properly addressed prior to proceeding with milling operations, as further discussed below.

A survey of the condition of the existing pavements should be performed by the Geotechnical Engineer immediately prior to paving.

The pavements should be proofrolled with a loaded tandem axle dump truck, or other pneumatic-tire vehicle of similar size and weight. The purpose of the proofrolling is to locate any unstable pavement areas. If any localized instabilities are observed, a full-depth asphalt patch should be applied. A full-depth asphalt patch should meet or exceed the structural competency of the design pavement section at that location. Depending on the condition of the exposed subgrade, additional subgrade undercutting and backfilling with compacted Aggregate Base Material Type 21-A or 21-B may be recommended.

Any cracks larger than ¼-inch wide should be filled with an asphalt emulsion crack sealant prior to application of the tack coat. Depending on crack width, the Geotechnical Engineer may recommend the application of pavement fabric strips after the crack has been sealed.

A tack coat should be applied to the surface of all existing pavements which are to remain immediately prior to re-surfacing.

4.11 Seismic Evaluation

Based on our experience in the vicinity of the project site and the composition of the soils recovered within the upper 75 feet (maximum explored depth during feasibility study) at the boring locations, it is our opinion that the site characteristics are indicative of a Site Class “D” in accordance with Table 20.3-1 of ASCE 7-10 as referenced by the 2015 International Building Code (IBC); however, the seismic evaluation requires soils information associated with the upper 100 feet. If the site classification is critical to the structural design, it will be necessary to perform a 100-foot deep Cone Penetration Test (SCPTu) boring with shear wave velocity testing to substantiate this site classification.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Anticipated Excavation Characteristics

Based on the results of this exploration, varying soil conditions and compositions are expected to be encountered throughout the project limits. Open-cut excavations will extend through natural soils that are considered to be relatively “clean” (i.e. soil that is relatively free of deleterious debris that may hinder excavation or installation). Debris typically considered unsuitable consist of wood, glass, organics, plastics, coal, brick or any other material larger than 2 inches in diameter. Based on these characteristics it is anticipated that some of the shallow subsurface materials encountered within the project alignment may be reusable as backfill. Soils containing appreciable amounts of deleterious debris should be discarded; however, an effort should be made during excavation to segregate potentially suitable in-situ soils for reuse. Information pertaining to backfill criteria was provided previously in Section 4.3.

5.2 Excavation Stability

The shallow subsurface within the project limits is comprised of clayey and granular soils; however, the Contractor should anticipate these soils to have relatively little cohesion and have a high potential for caving. Additionally, water seepage at varying elevations should be expected within the side walls of the open cut areas, increasing the potential for caving. Based on these mentioned characteristics, it is recommended that all subsurface soils be considered Type C in accordance with Occupational Safety and Health Administration (OSHA) criteria.

Temporary Slopes

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its “Construction Standards for Excavations, 29 CFR, part 1926, Subpart P”. This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations, or footing excavations, be constructed in accordance with the new (OSHA) guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the Contractor could be liable for substantial penalties.

Temporary slopes may not be a feasible option. The Contractor is solely 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. The Contractor’s responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the Contractor’s safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

Where temporary slopes are not feasible, shoring by means of sheeting and/or trench shields may be appropriate. Where the stability of adjoining structures, pavements, or other improvements is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability. Shoring, bracing, or underpinning required for this project (if required) should be designed by a Professional Engineer.

Shoring

Shoring design and installation should be the responsibility of the Contractor. Shoring systems required for this project should be designed by a Professional Engineer. Shoring systems should be designed to provide positive restraint of trench walls in an effort to protect against lateral deformation that may result in ground cracks, settlement, and/or other ground movements that may affect adjacent underground utilities and pavements as well as surface improvements. The Contractor should be made aware of this potential condition in order that preventative measures can be implemented or repair measures provided for.

Depending on the shoring system used, the removal process may create voids along the walls of the excavations. If these voids are left in place and are significant, backfill and/or the retained soil may shift laterally resulting in settlement of overlying structures/pavements. As such, care should be taken to remove the shoring systems and backfill the trenches in a manner as to not create these voids.

In all cases, the Contractor should select an excavation and/or shoring scheme that will protect adjacent and overlying improvements, including below grade utilities.

We are providing this information solely as a service to our client. **G E T Solutions, Inc.** is not assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

5.3 Dewatering

It is expected that dewatering will be required for excavations that extend near or below the existing groundwater table (approximate depth of 5 to 7.5 feet or shallower). Dewatering above the groundwater level could probably be accomplished by pumping from sumps. Dewatering at depths below the groundwater level will require well pointing and possibly shoring. Since temporary dewatering will impact construction and be dependent on construction methods and scheduling, we recommend the Contractor be solely responsible for the design, installation, maintenance, and performance of all temporary dewatering systems. Where shoring is employed, the dewatering system should be compatible with the type of shoring to be used. We recommend the Contractor verify groundwater conditions and evaluate dewatering requirements prior to construction.

Lowering the groundwater table during dewatering activities will result in an increase in effective stresses and may induce settlements of the soils underlying adjacent structures/pavements. Additionally, hydraulic compaction of predominately granular soils (e.g. SM soils) should be anticipated as a result of lowering the groundwater table. We recommend that the dewatering be performed such that the groundwater level is lowered no more than approximately 5 feet below the proposed excavation depth. It may be advantageous to install settlement monuments in areas where dewatering by means of well pointing is required.

It would be advantageous to construct all fills early in the construction. If this is not accomplished, disturbance of the existing site drainage could result in collection of surface water in some areas, thus rendering these areas wet and very loose. Temporary drainage ditches should be employed by the contractor to accentuate drainage during construction. If water collects in foundation excavations, it will be necessary to remove the water from the excavation, remove the saturated soils, and re-test the adequacy of the bearing surface soils to support the design bearing pressure prior to concrete placement.

Establishing a system of drainage ditches to carry surface and shallow groundwater away from the construction areas should reduce grading costs. No permanent subsurface drainage systems are needed for this project.

5.4 Site Utility Installation

The base of the utility trenches should be observed by a qualified inspector prior to the pipe placement to verify the suitability of the bearing soils. It is expected that the utilities will be located above or near the groundwater level (at the time of this reporting 5 to 7.5 feet below the existing site grades), bearing in moist to wet cohesive and granular soils. In these instances, the bearing soils may require some stabilization to provide suitable bedding. This stabilization is commonly accomplished by adding 12 inches or more of bedding stone (Type VDOT No. 57). The resulting excavations should be backfilled with structural fill, as described in Section 4.3 of this report. As mentioned previously, some of the shallow subsurface materials encountered within the project site may be suitable for reuse as backfill. Soils containing appreciable amounts of fines or deleterious debris should be discarded. Imported fill should be included in the construction budget for backfilling the utility excavations within the construction areas.

6.0 REPORT LIMITATIONS

The recommendations submitted in this report are based on the available soil information obtained by **GET Solutions, Inc.** and the information supplied by the client and their consultants for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, **GET Solutions, Inc.** should be notified immediately to determine if changes in our recommendations are required. If **GET Solutions, Inc.** is not retained to perform these functions, **GET Solutions, Inc.** can not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

As the plans and specifications are completed, the Geotechnical Engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents in order that the earthwork recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of City of Hampton and their consultants for the specific application to the proposed Hampton Aquatics Center project in Hampton, Virginia.

APPENDICES

- I. BORING LOCATION PLAN
- II. CLASSIFICATION SYSTEM FOR SOIL EXPLORATION
- III. SUMMARY OF LABORATORY CLASSIFICATION RESULTS
- IV. BORING LOGS
- V. GENERALIZED SOIL PROFILE
- VI. CBR TESTING RESULTS
- VII. PAVEMENT SECTION COMPOSITION AND DESCRIPTION

APPENDIX I

BORING LOCATION PLAN

Locations are approximate



- ⊕ = Borings and CBR Locations
- ⊕ = Borings Completed During Feasibility Study (G E T Project No. WM18-110G)

Boring Location Plan

Project: Hampton Aquatics Center
 Hampton, Virginia
 Project No: WM19-192G
 Client: City of Hampton

Scale: Not to Scale
 Date: 1/30/2020
 Plot By: JW

APPENDIX II

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

Standard Penetration Test (SPT), N-value

Standard Penetration Tests (SPT) were performed in the field in general accordance with ASTM D 1586. The soil samples were obtained with a standard 1.4" I.D., 2" O.D., 30" long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment (4 increments for each soil sample) of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value.

NON COHESIVE SOILS

(SILT, SAND, GRAVEL and Combinations)

Relative Density

Very Loose	4 blows/ft. or less
Loose	5 to 10 blows/ft.
Medium Dense	11 to 30 blows/ft.
Dense	31 to 50 blows/ft.
Very Dense	51 blows/ft. or more

Particle Size Identification

Boulders	8 inch diameter or more
Cobbles	3 to 8 inch diameter
Gravel	Coarse 1 to 3 inch diameter
	Medium $\frac{1}{2}$ to 1 inch diameter
	Fine $\frac{1}{4}$ to $\frac{1}{2}$ inch diameter
Sand	Coarse 2.00 mm to $\frac{1}{4}$ inch (diameter of pencil lead)
	Medium 0.42 to 2.00 mm (diameter of broom straw)
	Fine 0.074 to 0.42 mm (diameter of human hair)
Silt	0.002 to 0.074 mm (cannot see particles)

CLASSIFICATION SYMBOLS (ASTM D 2487 and D 2488)

Coarse Grained Soils

More than 50% retained on No. 200 sieve

GW - Well-graded Gravel
GP - Poorly graded Gravel
GW-GM - Well-graded Gravel w/Silt
GW-GC - Well-graded Gravel w/Clay
GP-GM - Poorly graded Gravel w/Silt
GP-GC - Poorly graded Gravel w/Clay
GM - Silty Gravel
GC - Clayey Gravel
GC-GM - Silty, Clayey Gravel
SW - Well-graded Sand
SP - Poorly graded Sand
SW-SM - Well-graded Sand w/Silt
SW-SC - Well-graded Sand w/Clay
SP-SM - Poorly graded Sand w/Silt
SP-SC - Poorly graded Sand w/Clay
SM - Silty Sand
SC - Clayey Sand
SC-SM - Silty, Clayey Sand

Fine-Grained Soils

50% or more passes the No. 200 sieve

CL - Lean Clay
CL-ML - Silty Clay
ML - Silt
OL - Organic Clay/Silt
 Liquid Limit 50% or greater
CH - Fat Clay
MH - Elastic Silt
OH - Organic Clay/Silt

Highly Organic Soils

PT - Peat

COHESIVE SOILS

(CLAY, SILT and Combinations)

Consistency

Very Soft	2 blows/ft. or less
Soft	3 to 4 blows/ft.
Medium Stiff	5 to 8 blows/ft.
Stiff	9 to 15 blows/ft.
Very Stiff	16 to 30 blows/ft.
Hard	31 blows/ft. or more

Relative Proportions

<u>Descriptive Term</u>	<u>Percent</u>
Trace	0-5
Few	5-10
Little	15-25
Some	30-45
Mostly	50-100

Strata Changes

In the column "Description" on the boring log, the horizontal lines represent approximate strata changes.

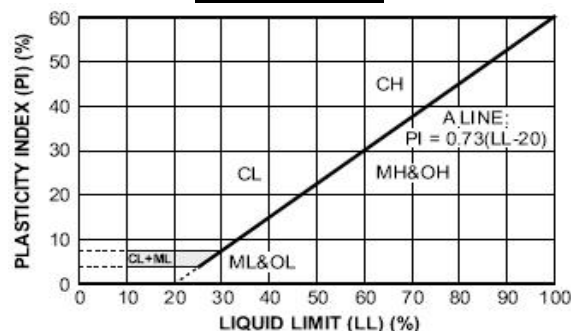
Groundwater Readings

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as tidal influences and man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc.).

Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent	GW, GP, SW, SP
More than 12 percent	GM, GC, SM, SC
5 to 12 percent	Borderline cases requiring dual symbols

Plasticity Chart



APPENDIX III

SUMMARY OF LABORATORY CLASSIFICATION RESULTS



GET Solutions, Inc.

SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

CLIENT City of Hampton

PROJECT NAME Hampton Aquatics Center

PROJECT NUMBER WM19-192G

PROJECT LOCATION Hampton, Virginia

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	% <#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
AB-1	7.0	48	22	26	0.075	68	CL	48.0			
AB-1	9.0				0.075	27		39.0			
AB-1	24.0				0.075	47		32.0			
AB-2	3.0	32	15	17	0.075	84	CL	23.0			
AB-2	5.0	51	25	26	0.075	63	CH	49.0			
AB-3	5.5	55	25	30	0.075	63	CH	43.0			
AB-3	7.0				0.075	42		54.0			
AB-4	7.0	42	20	22	0.075	49	SC	42.0			
AB-4	9.0				0.075	29		36.0			
AB-5	7.0	37	19	18	0.075	39	SC	30.0			
AB-6	19.0				0.075	28		38.0			
AB-8	3.8	24	15	9	0.075	42	SC	15.0			
AB-8	7.0	31	22	9	0.075	31	SC	29.0			

APPENDIX IV

BORING LOGS





RECORD OF SUBSURFACE EXPLORATION

Virginia Beach Williamsburg Elizabeth City Jacksonville
5465 Greenwich Road 701 Alexander Lee Parkway 106 Capital Trace Unit E 415-A Western Blvd
Virginia Beach, VA 23642 Williamsburg, VA 23185 Elizabeth City, NC 27909 Jacksonville, NC 28546
757-518-1703 757-564-6452 252-335-9765 910-478-9915

BORING ID
AB-1

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/3/2020
DATE COMPLETED: 1/3/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
									Plastic Limit	X	—	X	Liquid Limit	Water Content	-	●	Penetration	-																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
									10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
-25		Dark gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation" (layer continued from previous page)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



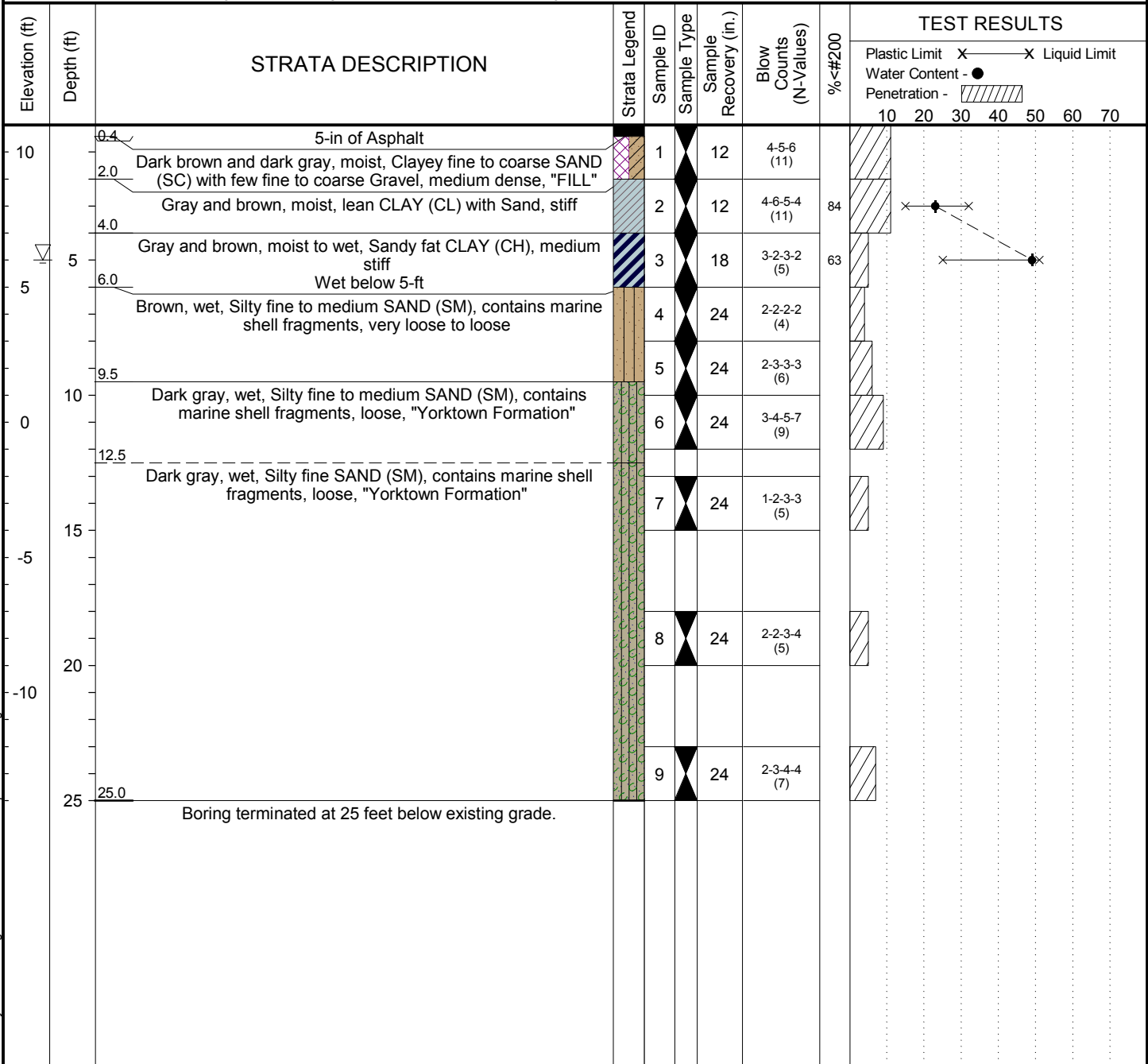
RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

**BORING ID
AB-2**

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 5 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/3/2020
DATE COMPLETED: 1/3/2020
DRILLER: GET Solutions, Inc.



Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.



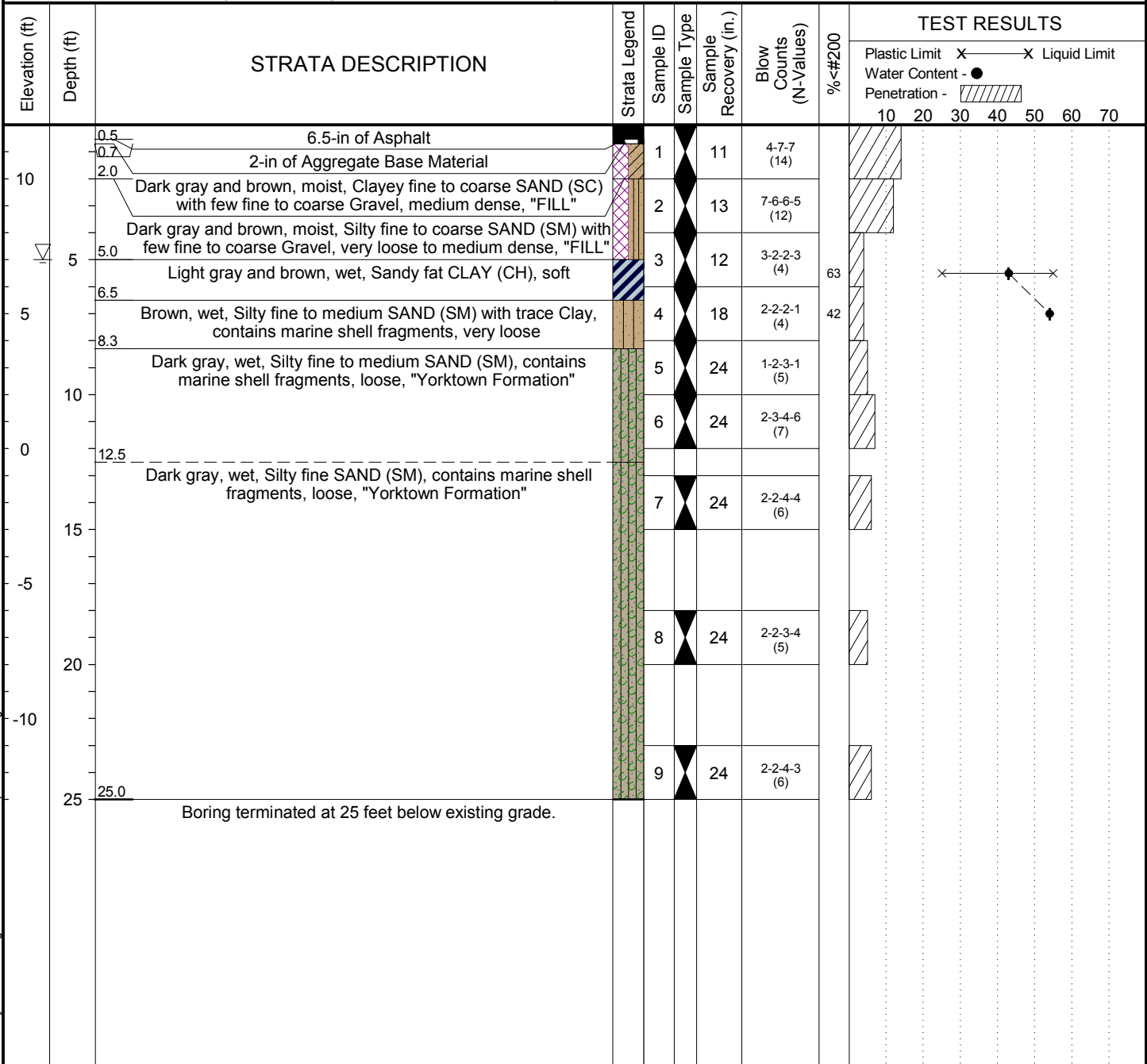
RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
AB-3

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 5 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.



Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
AB-4

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/3/2020
DATE COMPLETED: 1/3/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS			
									Plastic Limit	X	X	Liquid Limit
									Water Content	-	●	
									Penetration	-		
									10	20	30	40 50 60 70
10	0.3	1.7-in of Asphalt		1		12	4-6-5-4 (11)					
	2.0	1.5-in of Aggregate Base Material		2		10	4-4-5-6 (9)					
	4.0	Dark brown, moist, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay, medium dense, "FILL"		3		18	3-4-3-3 (7)					
5	6.0	Dark gray, moist, Clayey fine to coarse SAND (SC) with trace fine to coarse Gravel, loose		4		18	3-3-3-2 (6)	49				
	8.0	Orange-brown and gray, moist, lean CLAY (CL) with Sand, medium stiff		5		24	2-1-2-2 (3)	29				
	11.3	Brown, wet, Clayey fine SAND (SC), loose		6		24	2-3-3-4 (6)					
		Brown, wet, Silty fine to medium SAND (SM), contains marine shell fragments, very loose		7		24	2-2-3-5 (5)					
		Dark gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"		8		24	2-2-3-4 (5)					
				9		24	2-3-4-5 (7)					
25	25.0	Boring terminated at 25 feet below existing grade.										

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
AB-5

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 7 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 13
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS			
									Plastic Limit	X	X	Liquid Limit
									Water Content	-	●	
									Penetration	-		
									10	20	30	40 50 60 70
		2.5-in of Asphalt		1		10	4-4-6-6 (10)					
		4-in of Aggregate Base Material		2		12	9-7-7-9 (14)					
10	3.3	Dark gray, moist, Silty fine to coarse SAND (SM) with trace fine to coarse Gravel and Clay, loose, "FILL"										
5	5.0	Gray and brown, moist, Silty fine to coarse SAND (SM) with trace fine Gravel and Clay, loose		3		12	6-5-3-3 (8)					
	5.8	Gray and brown, moist, lean CLAY (CL) with Sand, medium stiff										
		Orange-brown and gray, moist to wet, Clayey fine SAND (SC), very loose		4		24	1-1-2-4 (3)	39		X	●	X
5	8.3	Wet below 7-ft										
		Dark gray, wet, Silty fine to medium SAND (SM), contains marine shell fragments, very loose, "Yorktown Formation"		5		24	2-1-2-2 (3)					
10	10.0	Dark gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"		6		24	3-2-3-6 (5)					
0				7		24	2-3-3-4 (6)					
15												
				8		24	2-2-4-5 (6)					
-5												
20												
-10												
25	25.0	Boring terminated at 25 feet below existing grade.		9		24	2-3-3-4 (6)					
Sample Type(s):		Notes: Boring elevation is estimated from topographic survey provided by the client.										
SPT - Standard Penetration Test												

This information pertains only to this boring and should not be interpreted as being indicative of the site.










































RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

**BORING ID
AB-6**

PROJECT NAME: **Hampton Aquatics Center**
CLIENT: **City of Hampton**
PROJECT LOCATION: **Hampton, Virginia**
BORING LOCATION: **See Attached Boring Location Plan**
DRILLING METHOD(S): **Rotary wash "mud"**
GROUNDWATER*: INITIAL (ft) ∇ : **6** AFTER _____ HOURS (ft) ∇ : _____ CAVE-IN (ft) \odot : _____
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: **WM19-192G**
SURFACE ELEVATION (MSL) (ft): **11**
LOGGED BY: **T. Vaughn**
DATE STARTED: **1/3/2020**
DATE COMPLETED: **1/3/2020**
DRILLER: **GET Solutions, Inc.**

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS												
									Plastic Limit	X	Liquid Limit	Water Content	Penetration	10	20	30	40	50	60	70	
10	0.2	2.2-in of Asphalt		1		12	2-2-5 (7)														
	0.3	1.5-in of Aggregate Base Material		2		18	4-4-4-4 (8)														
	2.0	Gray and orange-brown, moist, Silty fine to coarse SAND (SM) with trace fine Gravel and Clay, loose, "FILL"		3		24	4-4-7-6 (11)														
	4.5	Light gray and dark gray, moist, Clayey fine to coarse SAND (SC) with trace fine Gravel, loose		4		22	6-5-5-4 (10)														
5		Light gray and brown, moist to wet, Sandy lean CLAY (CL), stiff		5		24	4-3-3-1 (6)														
	8.0	Wet below 6-ft		6		24	2-3-3-1 (6)														
	10.0	Brown to gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose		7		24	3-3-4-5 (7)														
0		Gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"		8		24	2-3-5-5 (8)	28													
	12.5	Dark gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"		9		24	2-3-5-5 (8)														
-5				10		24	2-3-3-5 (6)														
	20			11		24	2-3-4-5 (7)														
-10																					
	25																				
-15																					
	30																				
-20																					
	35																				

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

**BORING ID
AB-6**

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/3/2020
DATE COMPLETED: 1/3/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
									Plastic Limit	X	Liquid Limit	Water Content	-	Penetration	-	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
-25		Dark gray, wet, Silty fine SAND (SM), contains marine shell fragments, loose, "Yorktown Formation" (layer continued from previous page)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.






RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
AB-7

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
									Plastic Limit	X	Liquid Limit	Water Content -	Penetration -	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
10 5 5 10 0	0.4	5.3-in of Asphalt		1		8	1-5-3-3 (8)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
AB-8

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS	
									Plastic Limit X	Liquid Limit X
									Water Content - ●	
									Penetration -	
									10 20 30 40 50 60 70	
		4.2-in of Asphalt		1		13	2-4-3-2 (7)			
		3.5-in of Aggregate Base Material		2		11	5-5-5-7 (10)			
		Light gray, moist, Silty fine to medium SAND (SM) with few fine to coarse Gravel, loose, "FILL"		3		12	9-5-5-4 (10)	42		
		Light gray and brown, moist, Clayey fine to medium SAND (SC), loose		4		10	4-2-2-2 (4)	31		
		Light gray and brown, moist, Sandy lean CLAY (CL), stiff		5		21	2-2-2-2 (4)			
		Dark gray, wet, Clayey fine to coarse SAND (SC) with trace fine Gravel, very loose		6		21	3-3-4-7 (7)			
		Brown, wet, Silty fine to medium SAND (SM), contains marine shell fragments, very loose		7		23	3-4-5-7 (9)			
		Dark gray, wet, Silty fine to medium SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"								
		Boring terminated at 15 feet below existing grade.								

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.





RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
CBR-1

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 5.8 AFTER 24 HOURS (ft) ∇ : 5 CAVE-IN (ft) \odot :

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
									Plastic Limit	X	Liquid Limit	Water Content	-	Penetration	-	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
10	0.2	2-in of Asphalt																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
CBR-2

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS				
									Plastic Limit	X	Liquid Limit	Water Content	Penetration
	0.3	3-in of Asphalt											
	0.7	5-in of Aggregate Base Material											
10		Dark gray, moist, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay, medium dense, "FILL"		1		9	2-8-12-5 (20)						
				2		10	6-4-9-5 (13)						
5	4.0	Brown, moist, Sandy lean CLAY (CL), soft		3		8	2-2-2-2 (4)						
	6.0	Brown, wet, Silty fine to medium SAND (SM) with trace Clay, contains marine shell fragments, very loose to loose		4		23	2-2-1-2 (3)						
5				5		24	2-2-3-5 (5)						
10	9.8 10.0	Dark gray, wet, Silty fine to medium SAND (SM), contains marine shell fragments, loose, "Yorktown Formation"											
		Boring terminated at 10 feet below existing grade.											

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID
CBR-3

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 5 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
									Plastic Limit	X	Liquid Limit	Water Content	-	Penetration	-	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10	0.3	4-in of Asphalt																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.




RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd 910-478-9915

BORING ID
CBR-4

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 12
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									Plastic Limit	X	Liquid Limit	Water Content	-	Penetration	-	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	0.2	2.3-in of Asphalt																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.



RECORD OF SUBSURFACE EXPLORATION



Virginia Beach Williamsburg Elizabeth City Jacksonville
5465 Greenwich Road 701 Alexander Lee Parkway 106 Capital Trace Unit E 415-A Western Blvd
Virginia Beach, VA 23642 Williamsburg, VA 23185 Elizabeth City, NC 27909 Jacksonville, NC 28546
757-518-1703 757-564-6452 252-335-9765 910-478-9915

BORING ID
CBR-5

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 7 AFTER 24 HOURS (ft) ∇ : 7.5 CAVE-IN (ft) \odot :

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 13
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

The initial groundwater readings are not intended to indicate the static groundwater level.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
									Plastic Limit - X	Liquid Limit - X	Water Content - ●	Penetration - 	10	20	30	40	50	60	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	0.2	2.5-in of Asphalt																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
Williamsburg 701 Alexander Lee Parkway 757-564-6452
Elizabeth City 106 Capital Trace Unit E 252-335-9765
Jacksonville 415-A Western Blvd 910-478-9915

BORING ID
CBR-6

PROJECT NAME: Hampton Aquatics Center
CLIENT: City of Hampton
PROJECT LOCATION: Hampton, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLING METHOD(S): Rotary wash "mud"
GROUNDWATER*: INITIAL (ft) ∇ : 6 AFTER HOURS (ft) ∇ : CAVE-IN (ft) \odot :
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: WM19-192G
SURFACE ELEVATION (MSL) (ft): 11
LOGGED BY: T. Vaughn
DATE STARTED: 1/6/2020
DATE COMPLETED: 1/6/2020
DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	%<#200	TEST RESULTS				
									Plastic Limit	X	X	Liquid Limit	
									Water Content	-	●		
									Penetration	-			
									10	20	30	40	50 60 70
10	0.2 0.5	2.1-in of Asphalt 4-in of Aggregate Base Material Dark gray and dark brown, moist, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay, loose to medium dense, "FILL"		1		8	5-4-4-3 (8)						
				2		9	5-5-6-6 (11)						
5	5.3	Light gray and orange-brown, moist to wet, lean CLAY (CL), medium stiff Wet below 6-ft		3		20	4-3-3-4 (6)						
5				4		24	4-4-4-3 (8)						
	7.8	Brown, wet, Silty fine to medium SAND (SM) with trace Clay, contains marine shell fragments, very loose to loose		5		24	1-2-1-2 (3)						
10	10.0	Boring terminated at 10 feet below existing grade.											

Sample Type(s):

SPT - Standard Penetration Test

Notes: Boring elevation is estimated from topographic survey provided by the client.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

APPENDIX V

GENERALIZED SOIL PROFILE



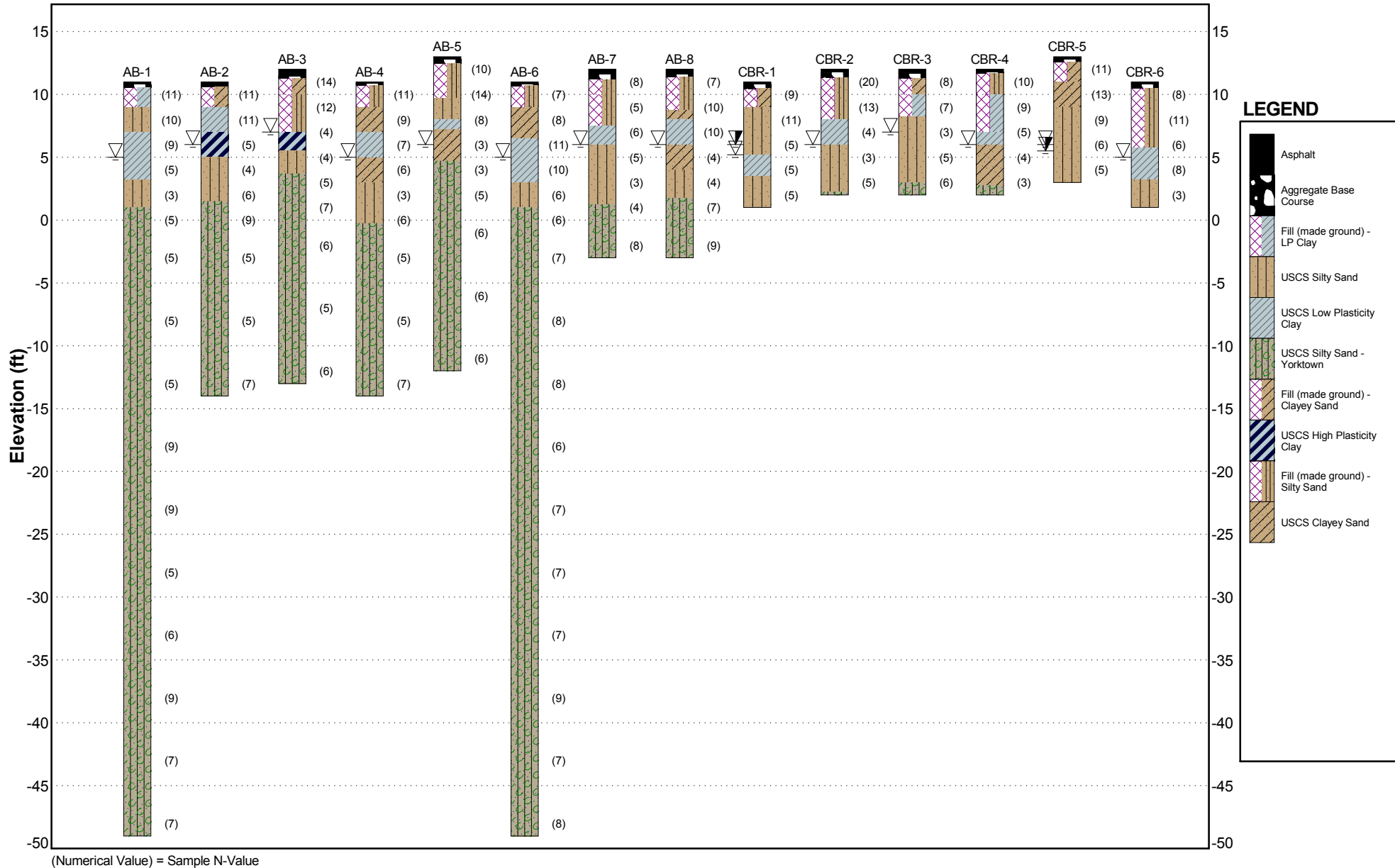
GENERALIZED SOIL PROFILE

PROJECT NAME: Hampton Aquatics Center

PROJECT NUMBER: WM19-192G

PROJECT LOCATION: Hampton, Virginia

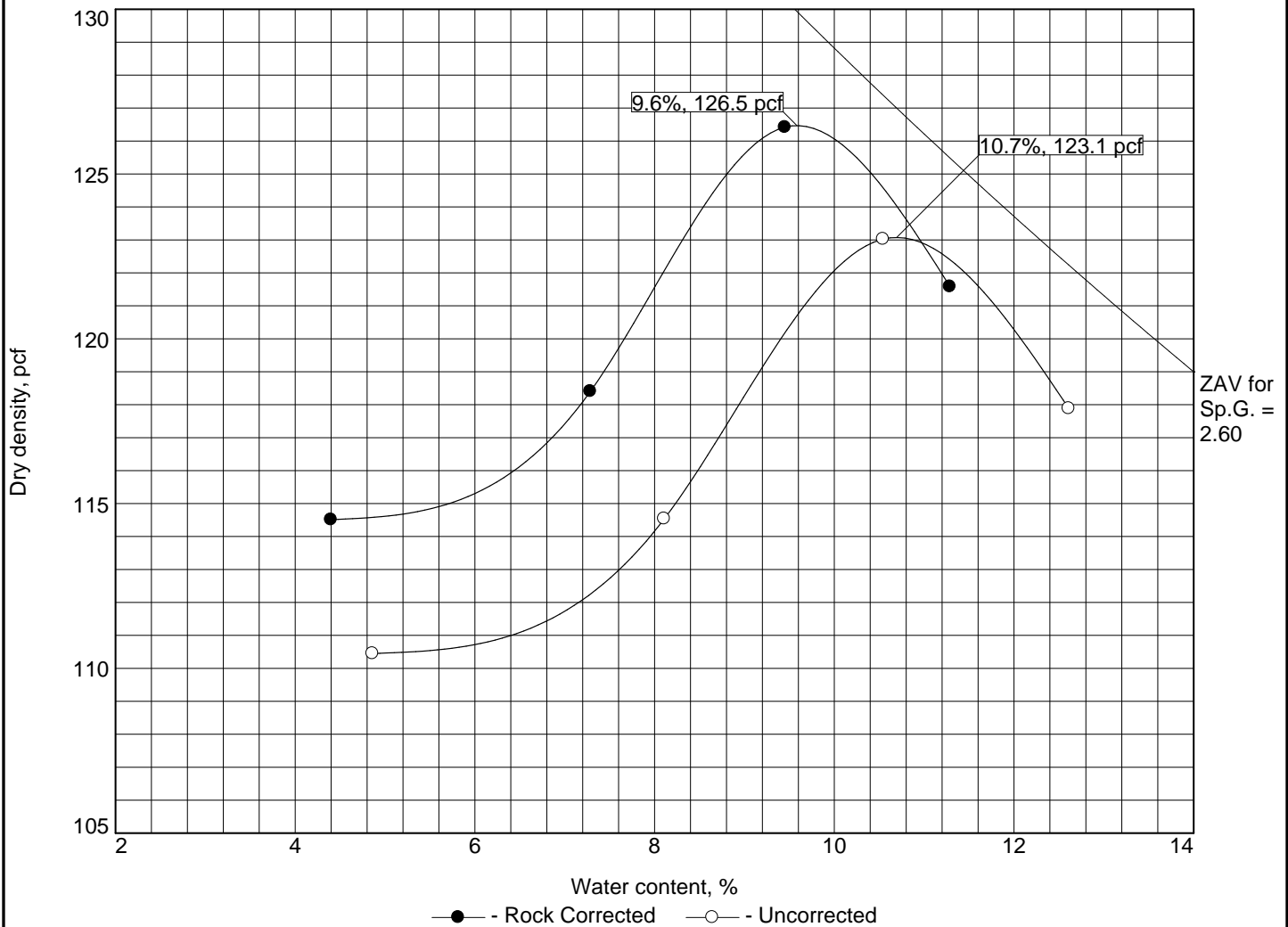
CLIENT: City of Hampton



APPENDIX VI

CBR TESTING RESULTS

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.6-2 ft	SC	A-2-6(0)	10	Estimated 2.6	24	11	11.1	30.7

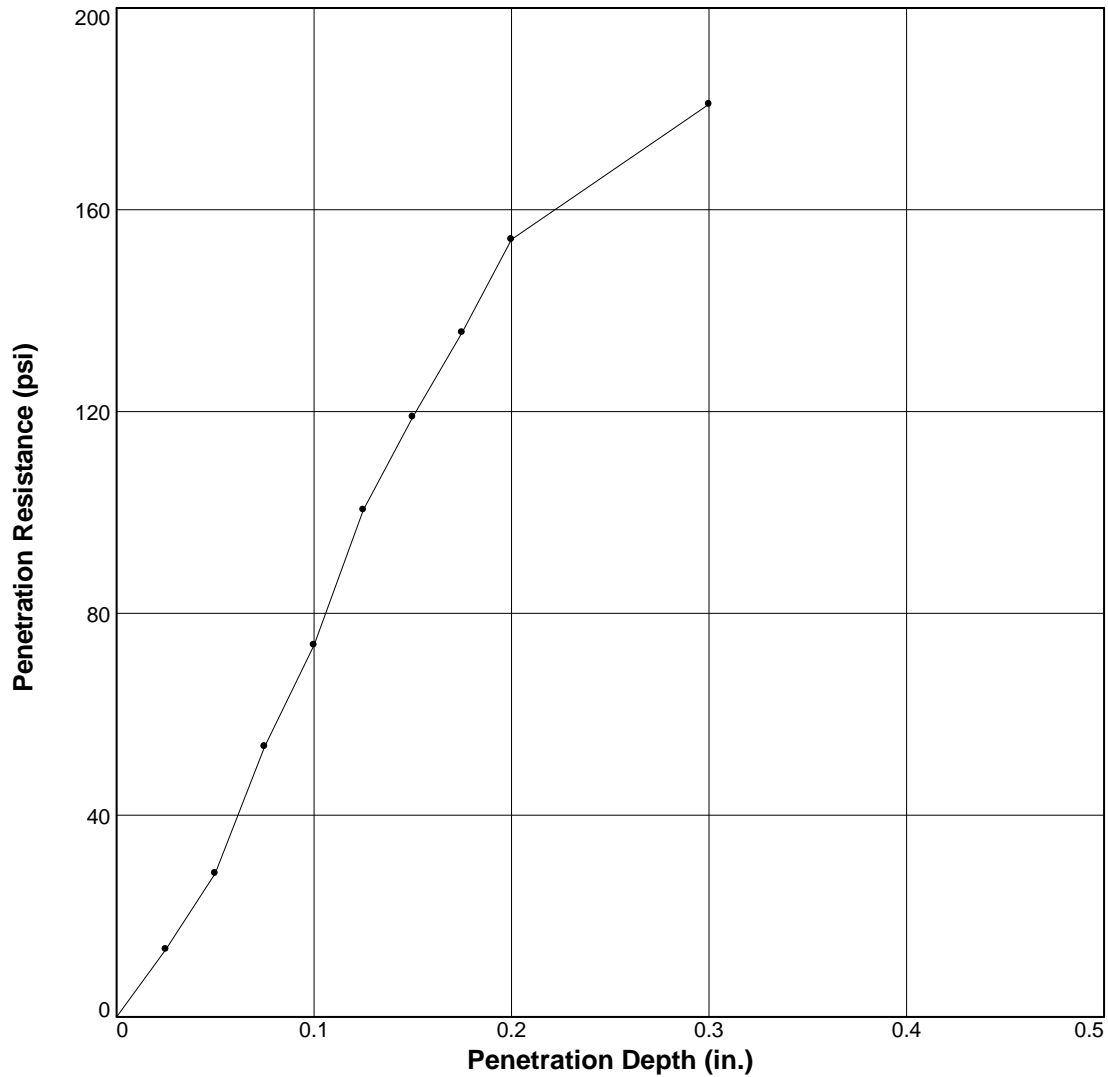
ROCK CORRECTED TEST RESULTS		UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 126.5 pcf		123.1 pcf	Dark gray, Clayey fine to coarse SAND (SC) with fine Gravel
Optimum moisture = 9.6 %		10.7 %	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #1			Remarks: CBR #1 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020
GET Solutions, Inc. Williamsburg, VA			

Figure 1

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	126.5	100	9.1	126.3	99.9	12.9	9.7	10.7	0.022	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray, Clayey fine to coarse SAND (SC) with fine Gravel							SC	126.5	9.6	24	11

Project No: WM19-192G

Project: Hampton Aquatics Center

Location: See Attached Boring Location Plan

Sample Number: CBR #1 **Depth:** 0.6-2 ft

Date: 1/3/2020

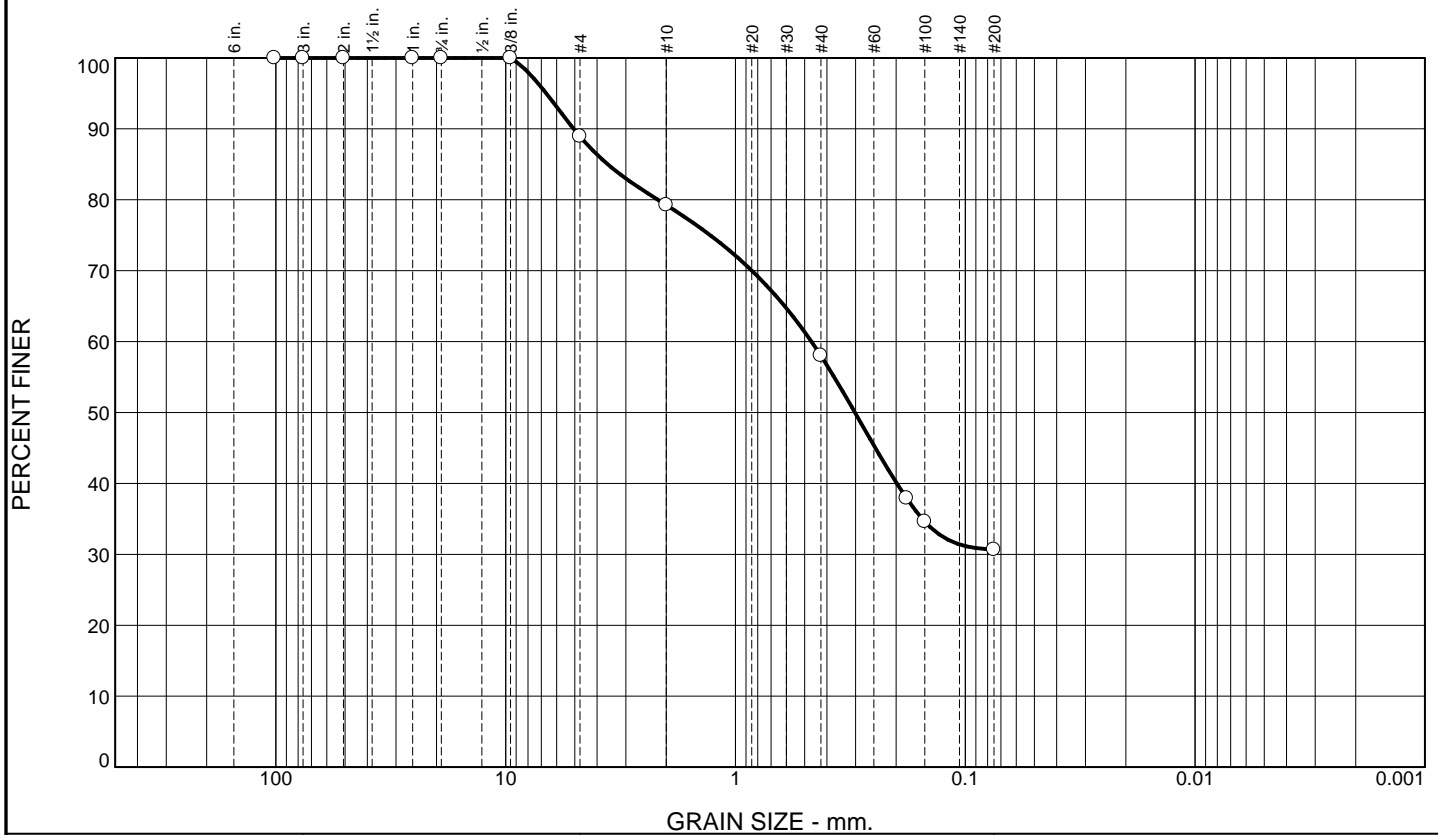
Test Description/Remarks:

CBR #1
Sample Obtained: 1/3/2020
Sample Tested: 1/8/2020
Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 1a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.1	9.6	21.3	27.3	30.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	100.0		
#4	88.9		
#10	79.3		
#40	58.0		
#80	37.9		
#100	34.6		
#200	30.7		

* (no specification provided)

Soil Description

Dark gray, Clayey fine to coarse SAND (SC) with fine Gravel

Atterberg Limits

PL= 13 LL= 24 PI= 11

Coefficients

D₉₀= 5.0605 D₈₅= 3.5954 D₆₀= 0.4671
D₅₀= 0.3021 D₃₀= C_u= D₁₅=
D₁₀= C_c=

Classification

USCS= SC AASHTO= A-2-6(0)

Remarks

CBR #1
Sample Obtained: 1/3/2020
Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #1 Depth: 0.6-2 ft

Date: 1/8/2020

GET Solutions, Inc.

Williamsburg, VA

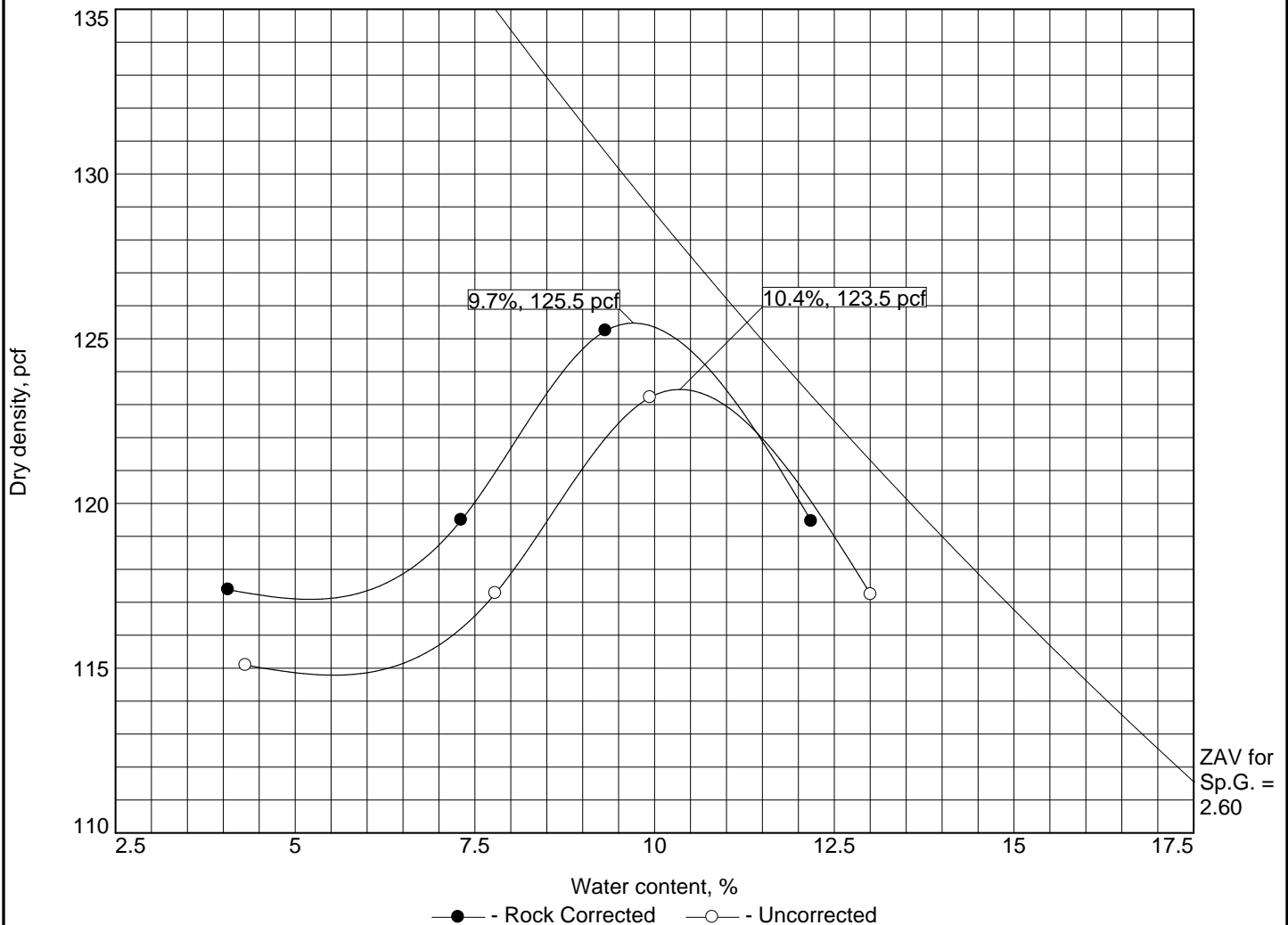
Client: City of Hampton
Project: Hampton Aquatics Center

Project No: WM19-192G

Figure 1b

Tested By: A. Kotyk Checked By: J. Wheeler

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.7-3 ft	SM	A-2-4(0)	9	Estimated 2.6	NV	NP	6.7	33.7

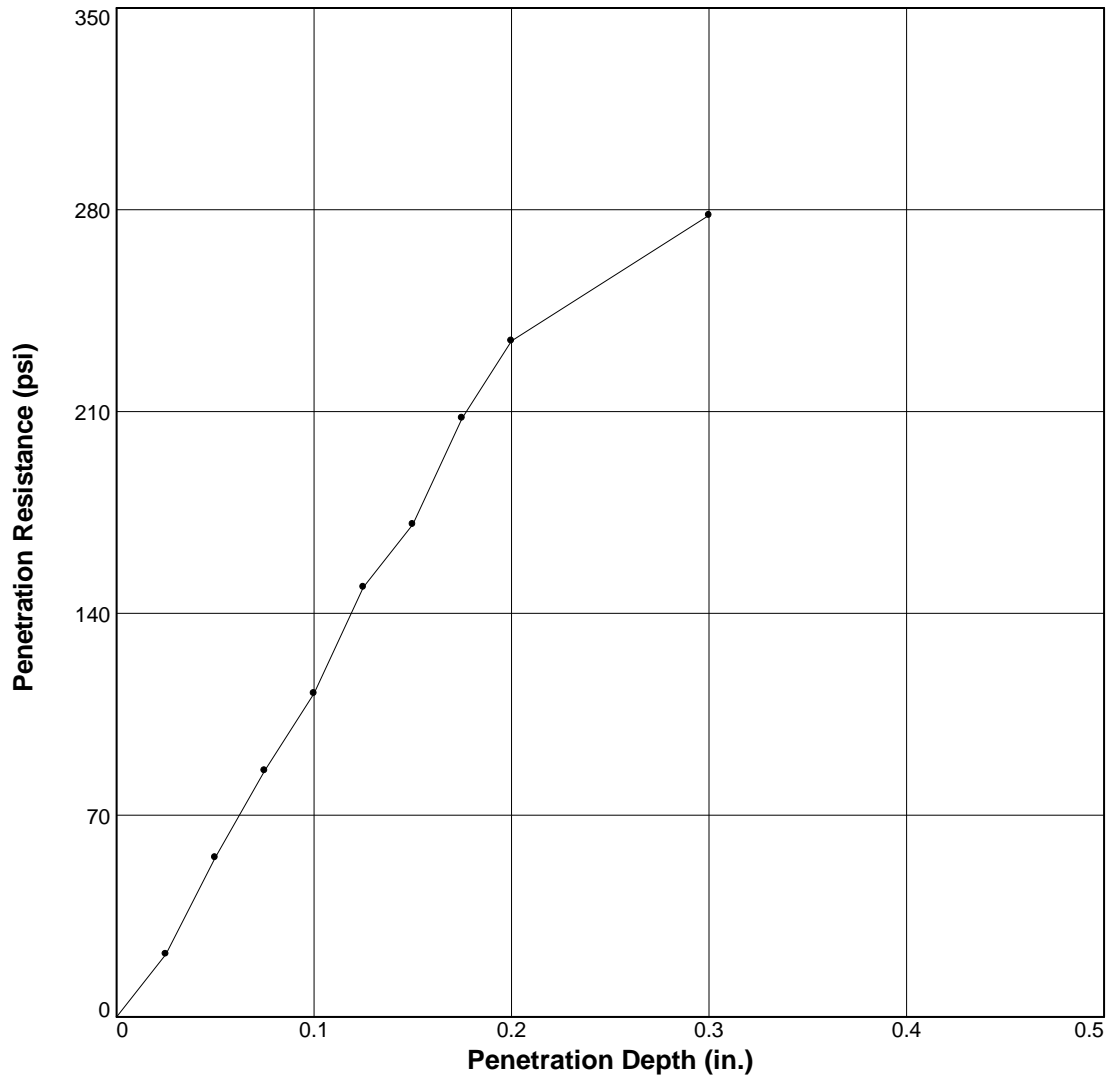
ROCK CORRECTED TEST RESULTS		UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 125.5 pcf		123.5 pcf	Dark gray, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay
Optimum moisture = 9.7 %		10.4 %	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #2			Remarks: CBR #2 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020
GET Solutions, Inc. Williamsburg, VA			
			Figure 2

Figure 2

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	125.5	100	9.2	125.3	99.9	12.3	14.5	16.3	0.022	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay							SM	125.5	9.7	NV	NP

Project No: WM19-192G

Project: Hampton Aquatics Center

Location: See Attached Boring Location Plan

Sample Number: CBR #2 **Depth:** 0.7-3 ft

Date: 1/3/2020

Test Description/Remarks:

CBR #2

Sample Obtained: 1/3/2020

Sample Tested: 1/8/2020

Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 2a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.7	11.9	22.6	25.1	33.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	100.0		
#4	93.3		
#10	81.4		
#40	58.8		
#80	41.3		
#100	37.9		
#200	33.7		

* (no specification provided)

Soil Description

Dark gray, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 3.7047

D₈₅= 2.5897

D₆₀= 0.4546

D₅₀= 0.2739

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-2-4(0)

Remarks

CBR #2

Sample Obtained: 1/3/2020

Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #2 Depth: 0.7-3 ft

Date: 1/3/2020

GET Solutions, Inc.

Williamsburg, VA

Client: City of Hampton
Project: Hampton Aquatics Center

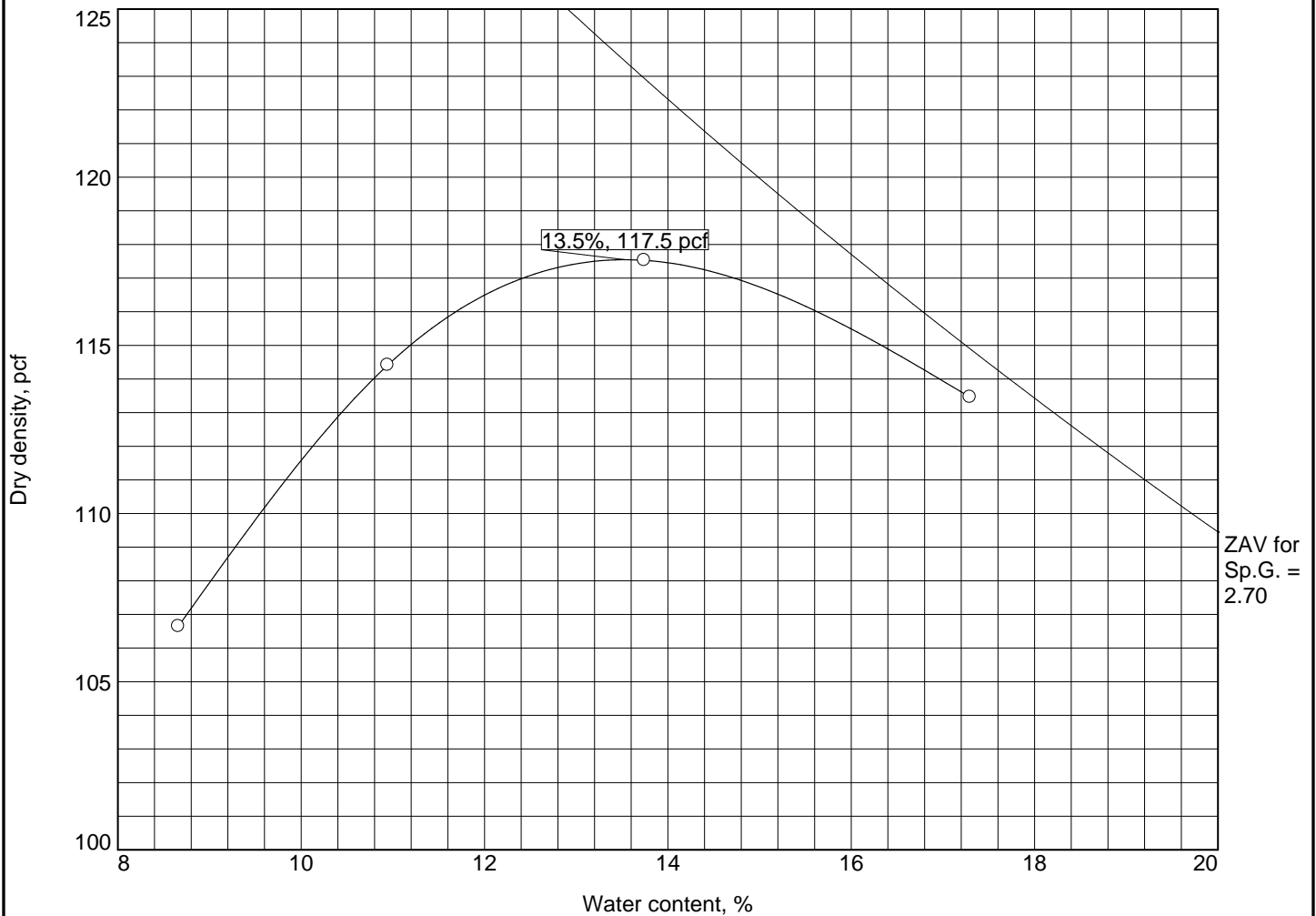
Project No: WM19-192G

Figure 2b

Tested By: A. Kotyk

Checked By: J. Wheeler

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.7-2 ft	SC	A-6(3)	12	Estimated 2.6	40	21	5.6	39.4

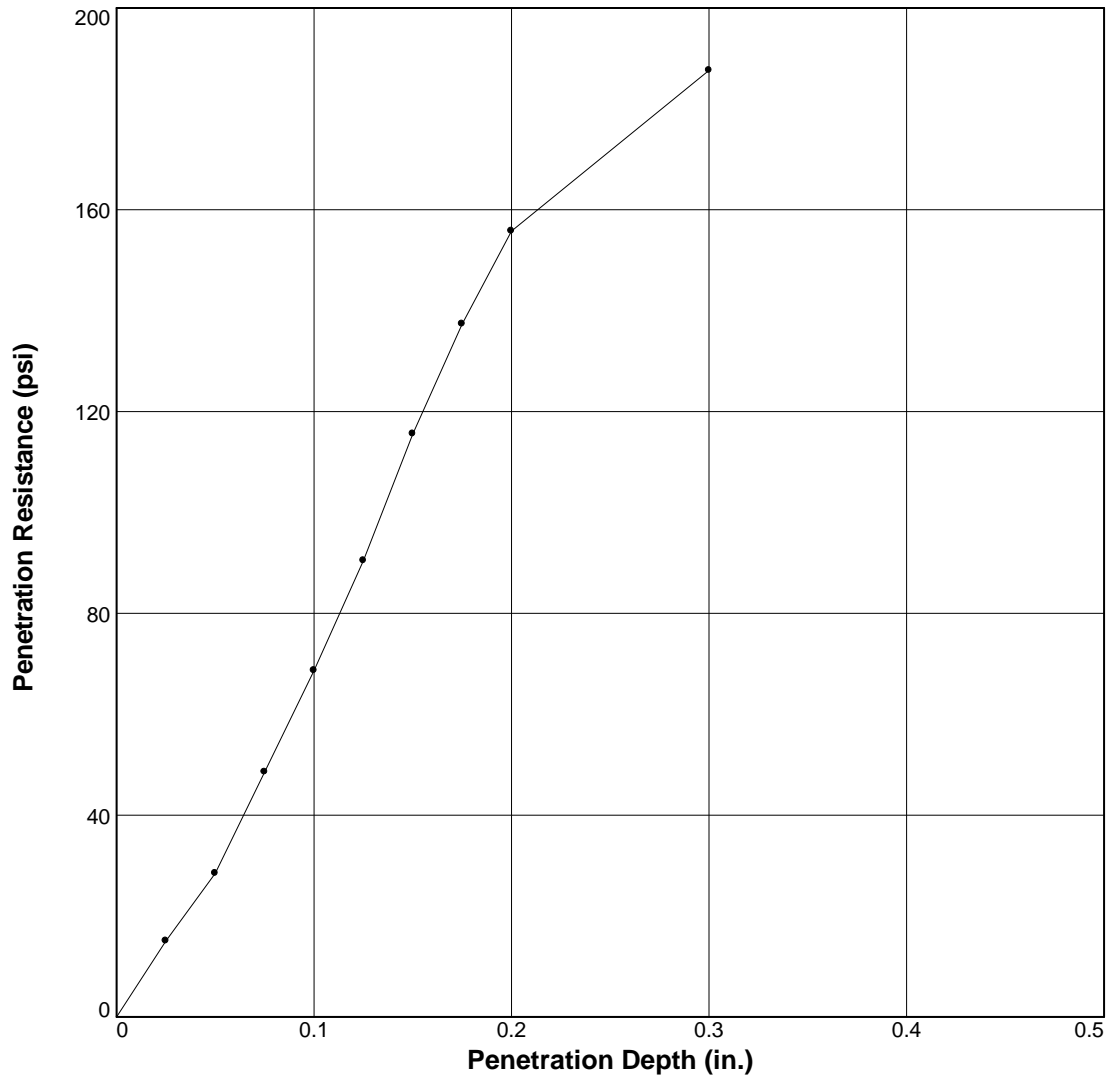
TEST RESULTS		MATERIAL DESCRIPTION	
Maximum dry density = 117.5 pcf Optimum moisture = 13.5 %		Dark gray, Clayey fine to coarse SAND (SC) with trace fine Gravel	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #3		Remarks: CBR #3 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020	
GET Solutions, Inc. Williamsburg, VA			

Figure 3

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	117.5	100	13.0	117.4	99.9	16.6	9.9	11.1	0.034	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray, Clayey fine to coarse SAND (SC) with trace fine Gravel							SC	117.5	13.5	40	21

Project No: WM19-192G
Project: Hampton Aquatics Center
Location: See Attached Boring Location Plan
Sample Number: CBR #3 **Depth:** 0.7-2 ft
Date: 1/3/2020

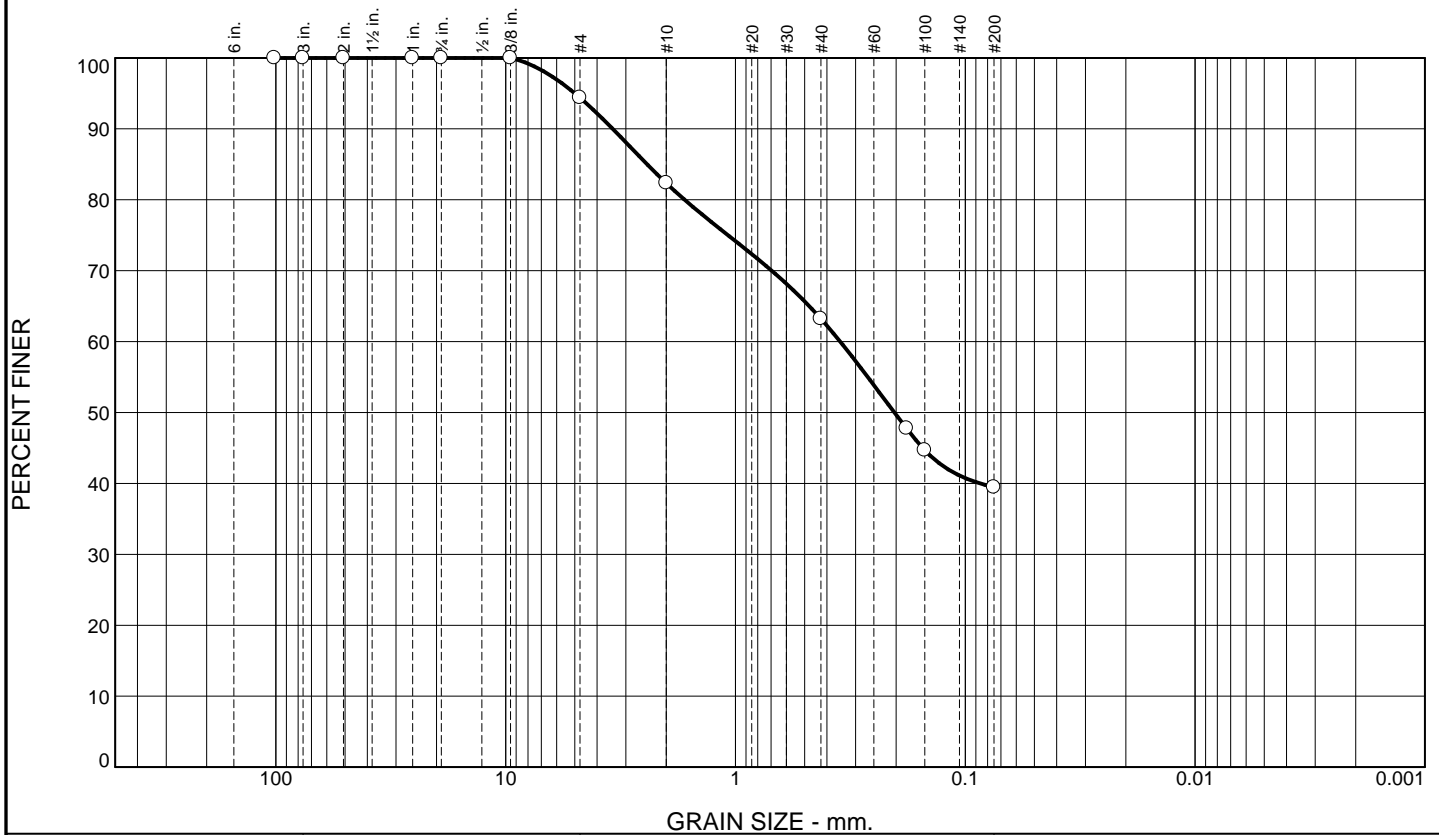
Test Description/Remarks:

CBR #3
 Sample Obtained: 1/3/2020
 Sample Tested: 1/8/2020
 Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 3a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.6	12.1	19.1	23.8	39.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	100.0		
#4	94.4		
#10	82.3		
#40	63.2		
#80	47.8		
#100	44.7		
#200	39.4		

* (no specification provided)

Soil Description

Dark gray, Clayey fine to coarse SAND (SC) with trace fine Gravel

Atterberg Limits

PL= 19 LL= 40 PI= 21

Coefficients

D₉₀= 3.4232 D₈₅= 2.4234 D₆₀= 0.3501
D₅₀= 0.2034 D₃₀= C_u= D₁₅= C_c=

Classification

USCS= SC AASHTO= A-6(3)

Remarks

CBR #3
Sample Obtained: 1/3/2020
Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #3 Depth: 0.7-2 ft

Date: 1/3/2020

GET Solutions, Inc.

Williamsburg, VA

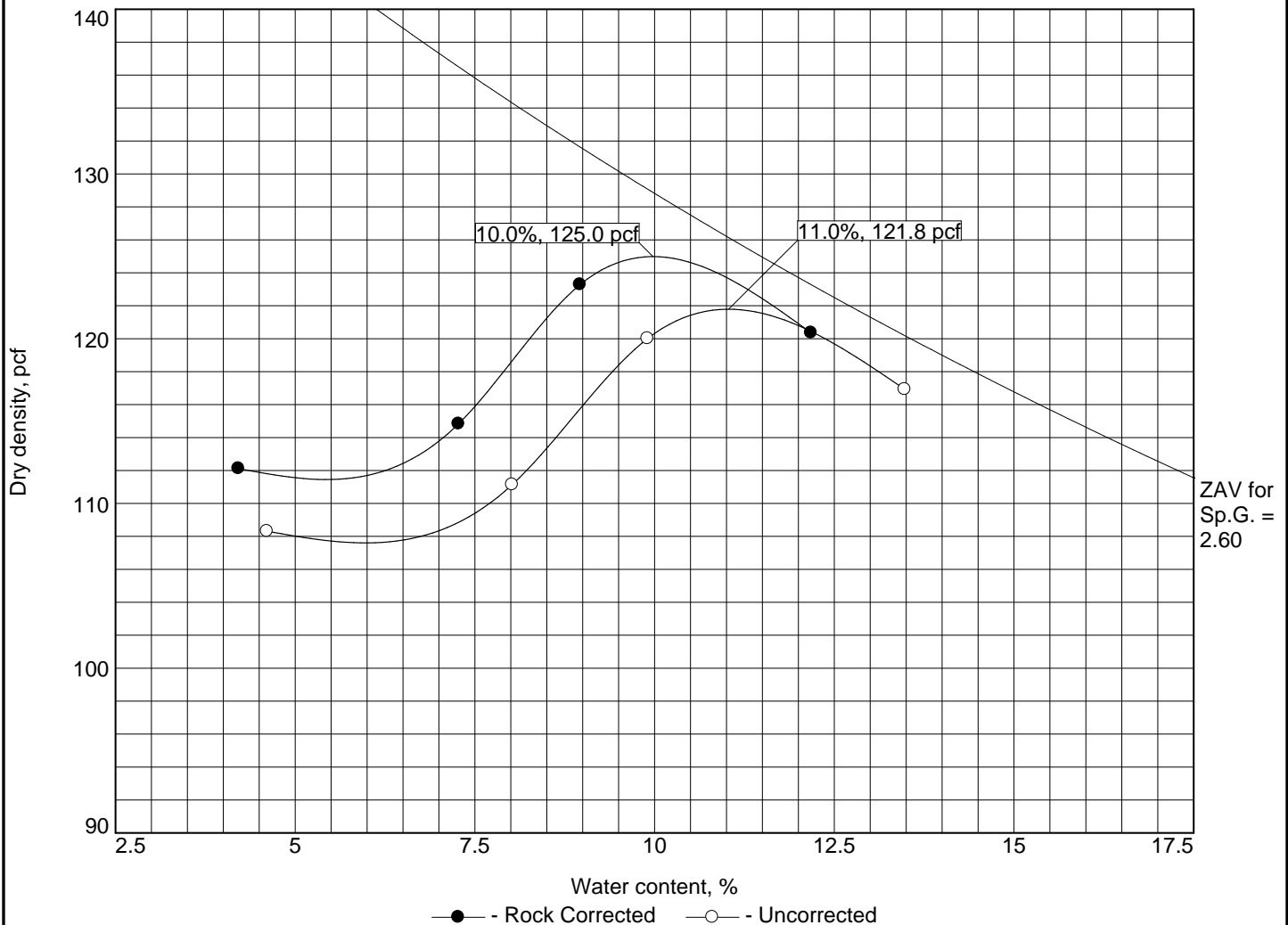
Client: City of Hampton
Project: Hampton Aquatics Center

Project No: WM19-192G

Figure 3b

Tested By: A. Kotyk Checked By: J. Wheeler

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.4-2 ft	SM	A-2-4(0)	11	Estimated 2.6	NV	NP	10.2	25.6

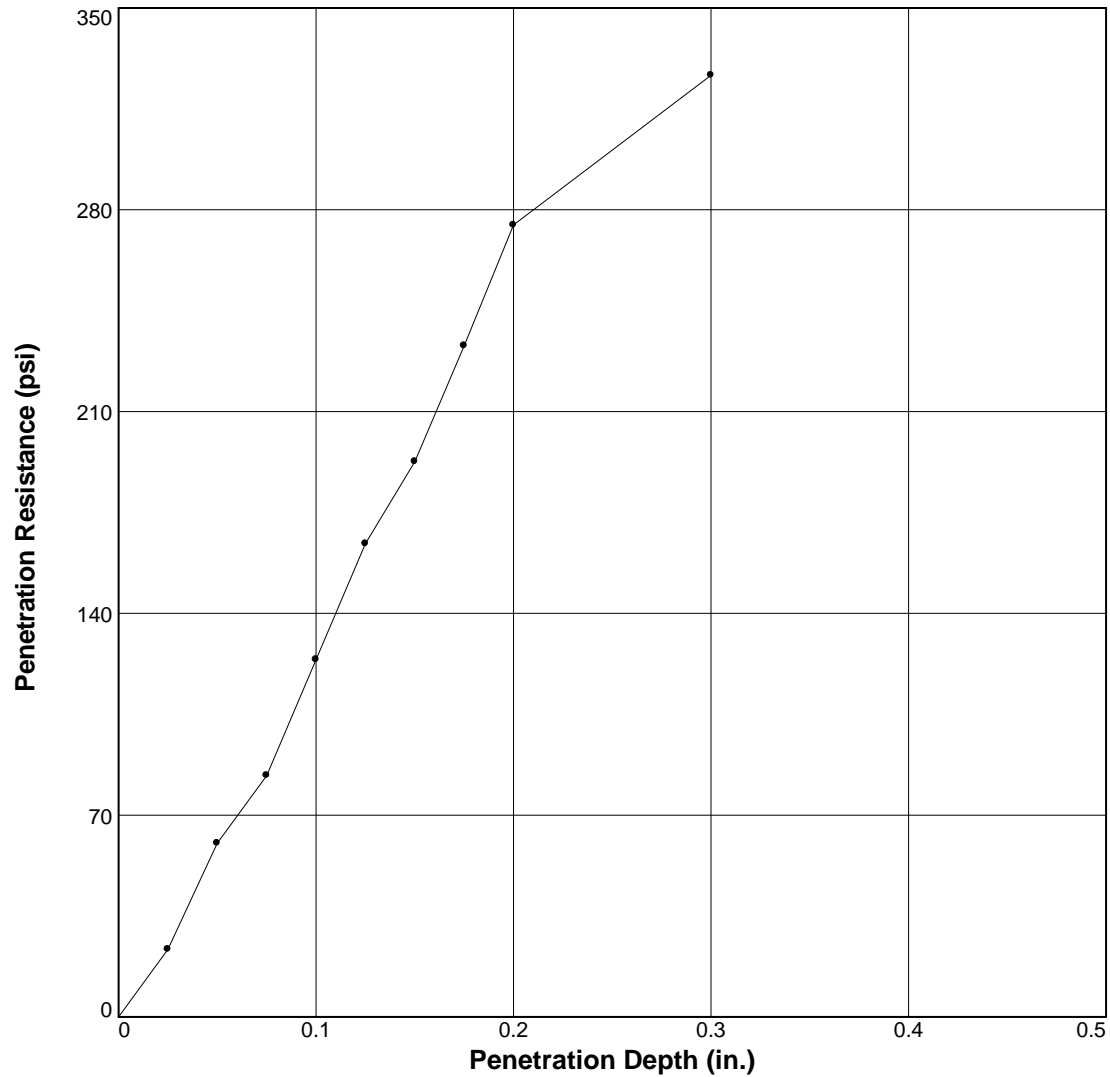
ROCK CORRECTED TEST RESULTS		UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 125.0 pcf		121.8 pcf	Dark gray and brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay
Optimum moisture = 10.0 %		11.0 %	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #4			Remarks: CBR #4 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020
GET Solutions, Inc. Williamsburg, VA			

Figure 4

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	125.0	100	9.5	124.9	99.9	13.6	16.1	19.1	0.023	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray and brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay							SM	125.0	10.0	NV	NP

Project No: WM19-192G
Project: Hampton Aquatics Center
Location: See Attached Boring Location Plan
Sample Number: CBR #4 **Depth:** 0.4-2 ft
Date: 1/3/2020

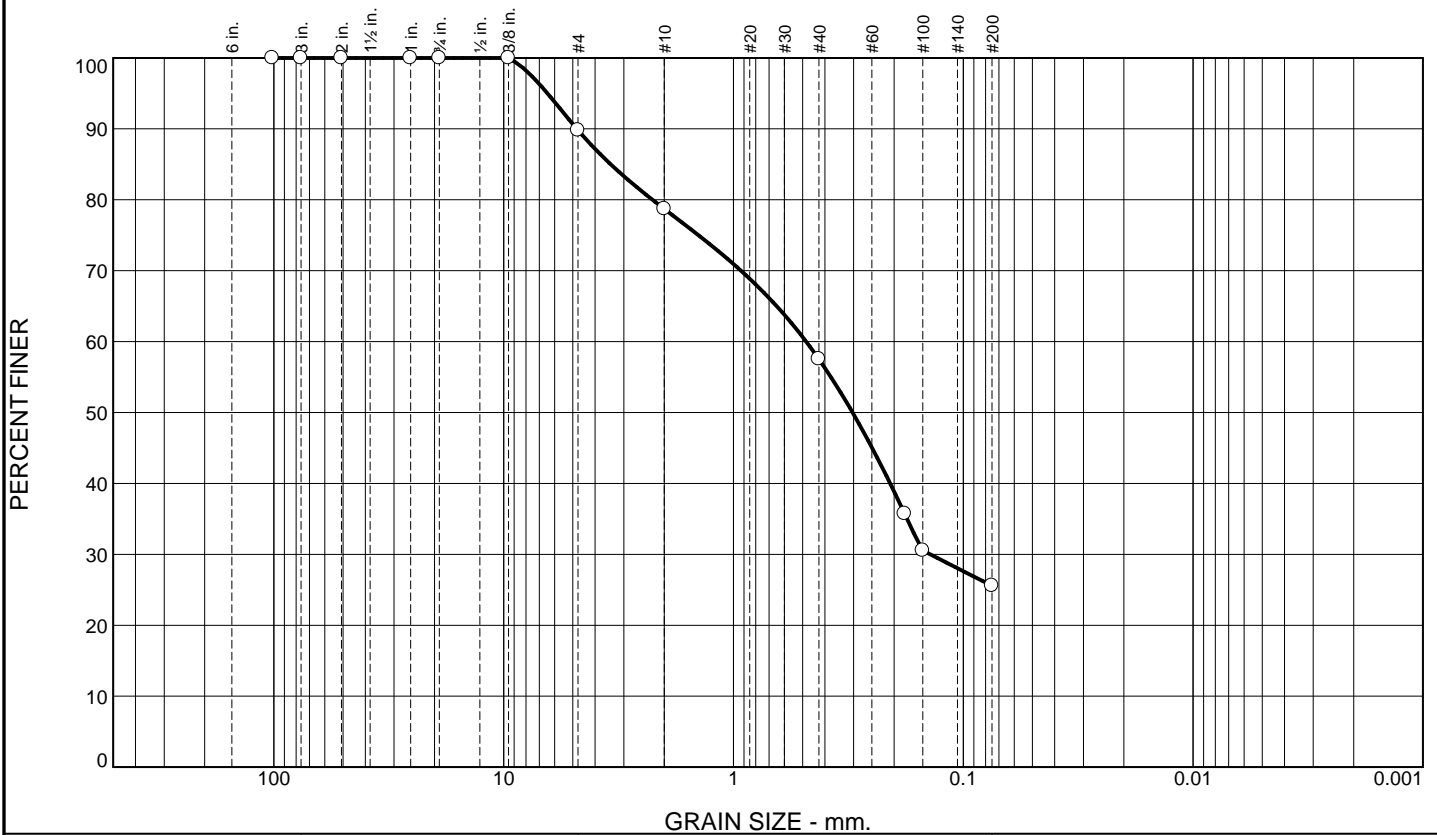
Test Description/Remarks:

CBR #4
 Sample Obtained: 1/3/2020
 Sample Tested: 1/8/2020
 Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 4a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.2	11.1	21.2	31.9	25.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	100.0		
#4	89.8		
#10	78.7		
#40	57.5		
#80	35.7		
#100	30.5		
#200	25.6		

* (no specification provided)

Soil Description

Dark gray and brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 4.8072

D₈₅= 3.4223

D₆₀= 0.4829

D₅₀= 0.3033

D₃₀= 0.1393

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-2-4(0)

Remarks

CBR #4

Sample Obtained: 1/3/2020

Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #4 Depth: 0.4-2 ft

Date: 1/3/2020

GET Solutions, Inc.

Williamsburg, VA

Client: City of Hampton
Project: Hampton Aquatics Center

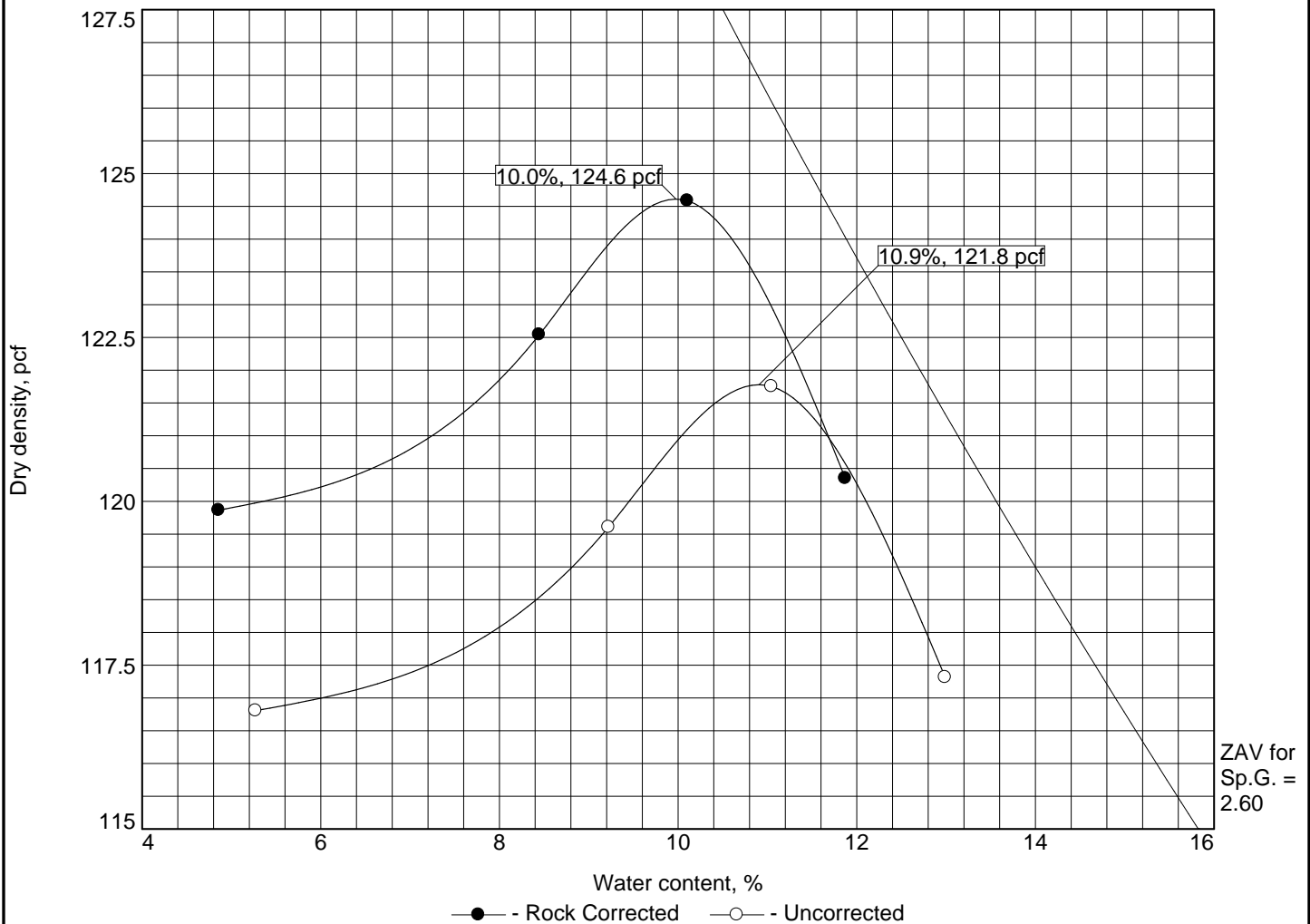
Project No: WM19-192G

Figure 4b

Tested By: A. Kotyk

Checked By: J. Wheeler

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.4-2 ft	SC	A-2-4(0)	11	Estimated 2.6.	24	10	9.1	25.4

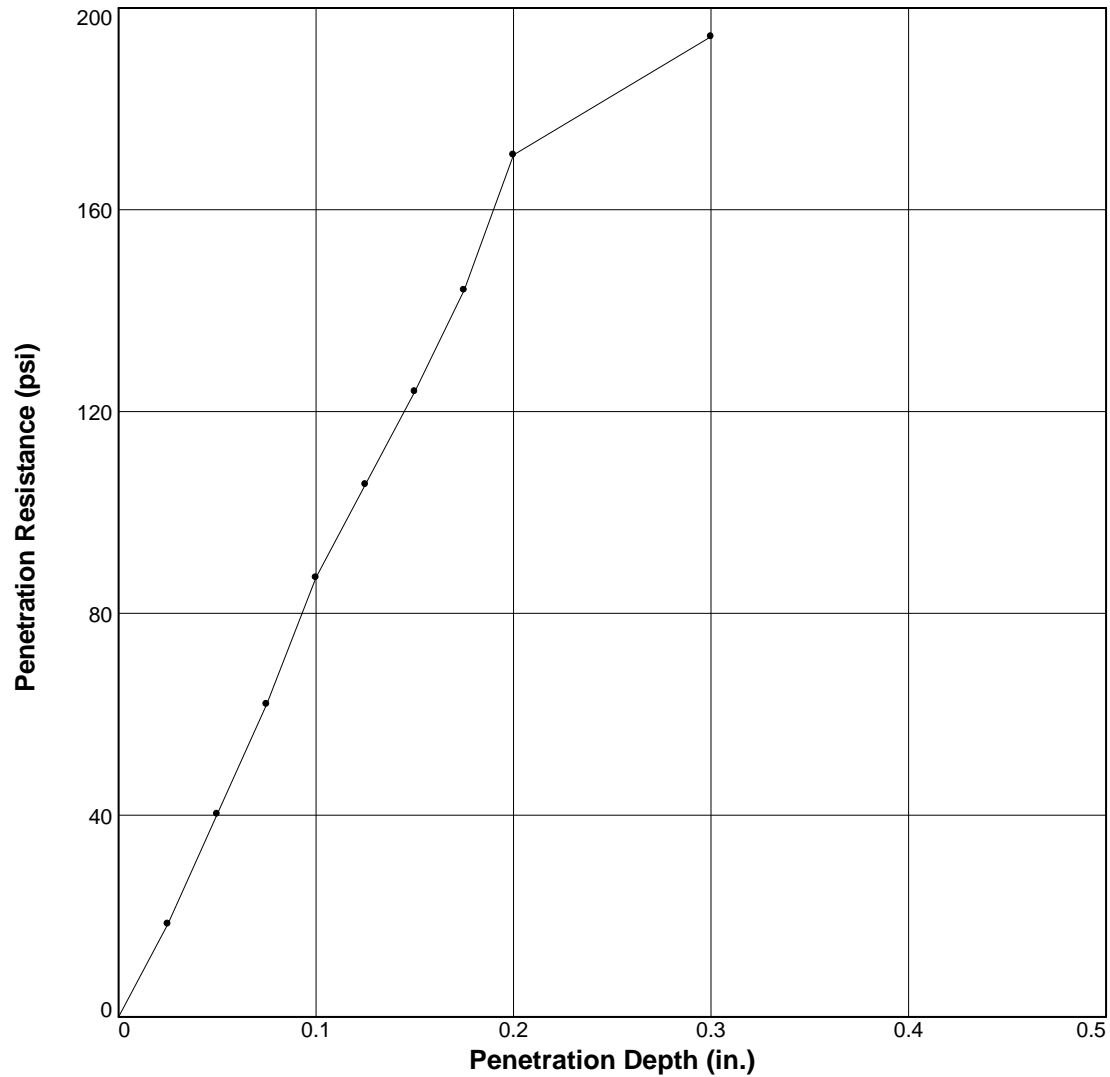
ROCK CORRECTED TEST RESULTS		UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 124.6 pcf		121.8 pcf	Dark gray and brown, Clayey fine to coarse SAND (SC) with few fine Gravel
Optimum moisture = 10.0 %		10.9 %	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #5			Remarks: CBR #5 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020
GET Solutions, Inc. Williamsburg, VA			

Figure 5

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	124.6	100	9.5	124.4	99.8	12.9	9.7	11.6	0.014	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray and brown, Clayey fine to coarse SAND (SC) with few fine Gravel							SC	124.6	10.0	24	10

Project No: WM19-192G
Project: Hampton Aquatics Center
Location: See Attached Boring Location Plan
Sample Number: CBR #5 **Depth:** 0.4-2 ft
Date: 1/3/2020

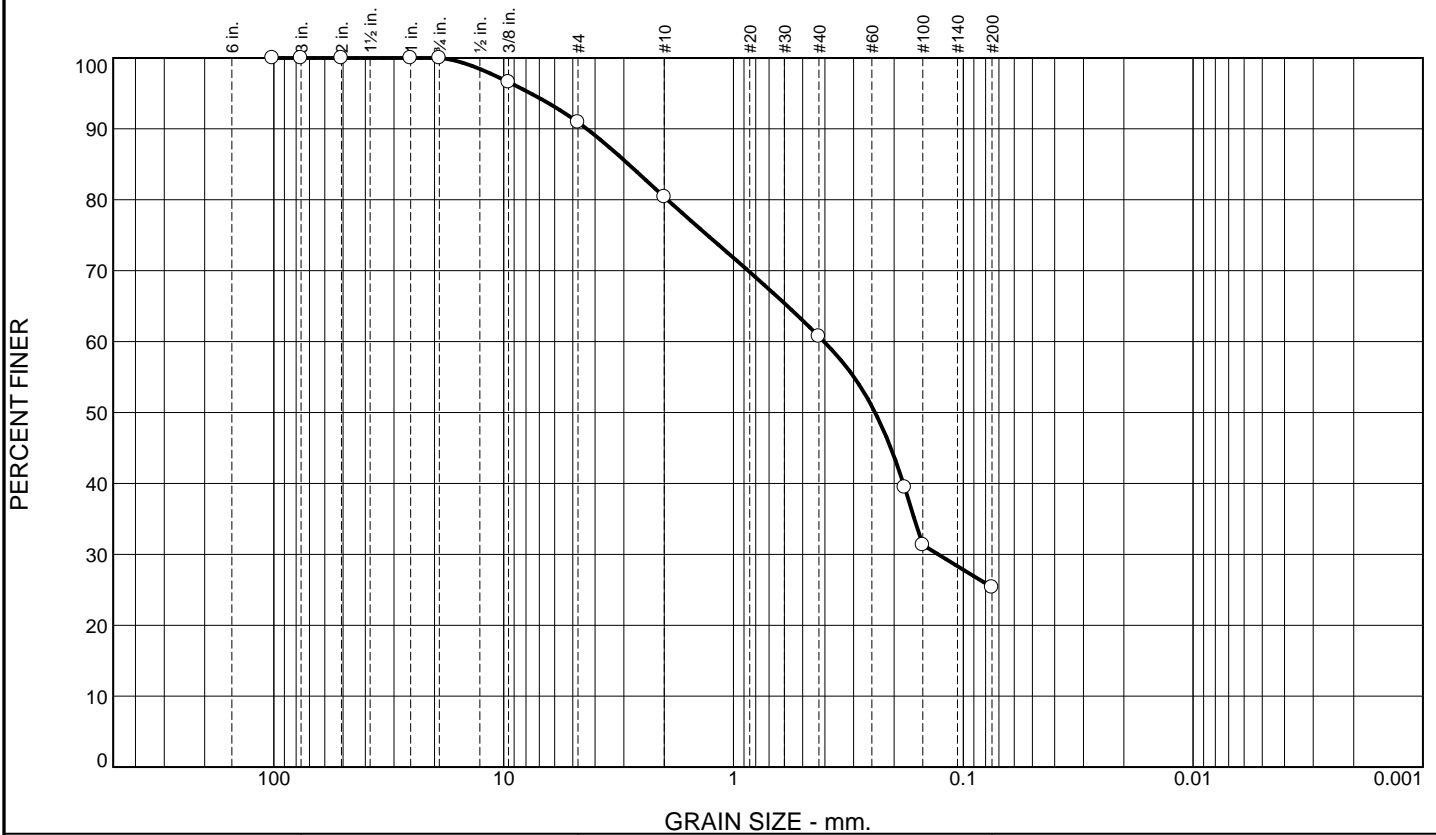
Test Description/Remarks:

CBR #5
 Sample Obtained: 1/3/2020
 Sample Tested: 1/8/2020
 Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 5a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.1	10.5	19.7	35.3	25.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	96.6		
#4	90.9		
#10	80.4		
#40	60.7		
#80	39.5		
#100	31.3		
#200	25.4		

* (no specification provided)

Soil Description

Dark gray and brown, Clayey fine to coarse SAND (SC) with few fine Gravel

Atterberg Limits

PL= 14 LL= 24 PI= 10

Coefficients

D₉₀= 4.3479 D₈₅= 2.8610 D₆₀= 0.4038
D₅₀= 0.2420 D₃₀= 0.1285 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

CBR #5
Sample Obtained: 1/3/2020
Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #5 Depth: 0.4-2 ft

Date: 1/3/2020

GET Solutions, Inc.

Williamsburg, VA

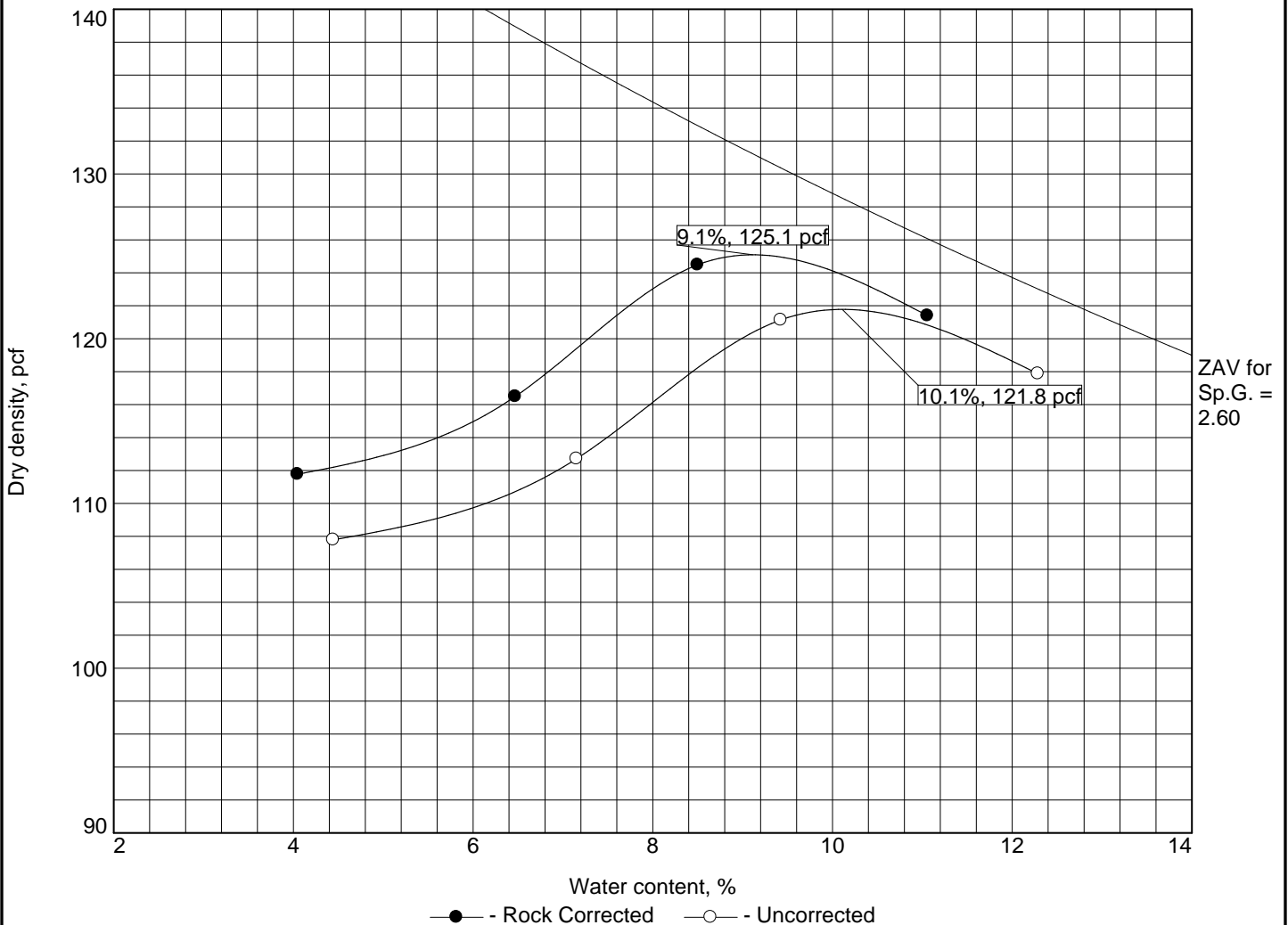
Client: City of Hampton
Project: Hampton Aquatics Center

Project No: WM19-192G

Figure 5b

Tested By: A. Kotyk Checked By: J. Wheeler

MOISTURE DENSITY TEST REPORT (PROCTOR CURVE)



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.5-3 ft	SM	A-2-4(0)	11	Estimated 2.6	NV	NP	10.6	33.7

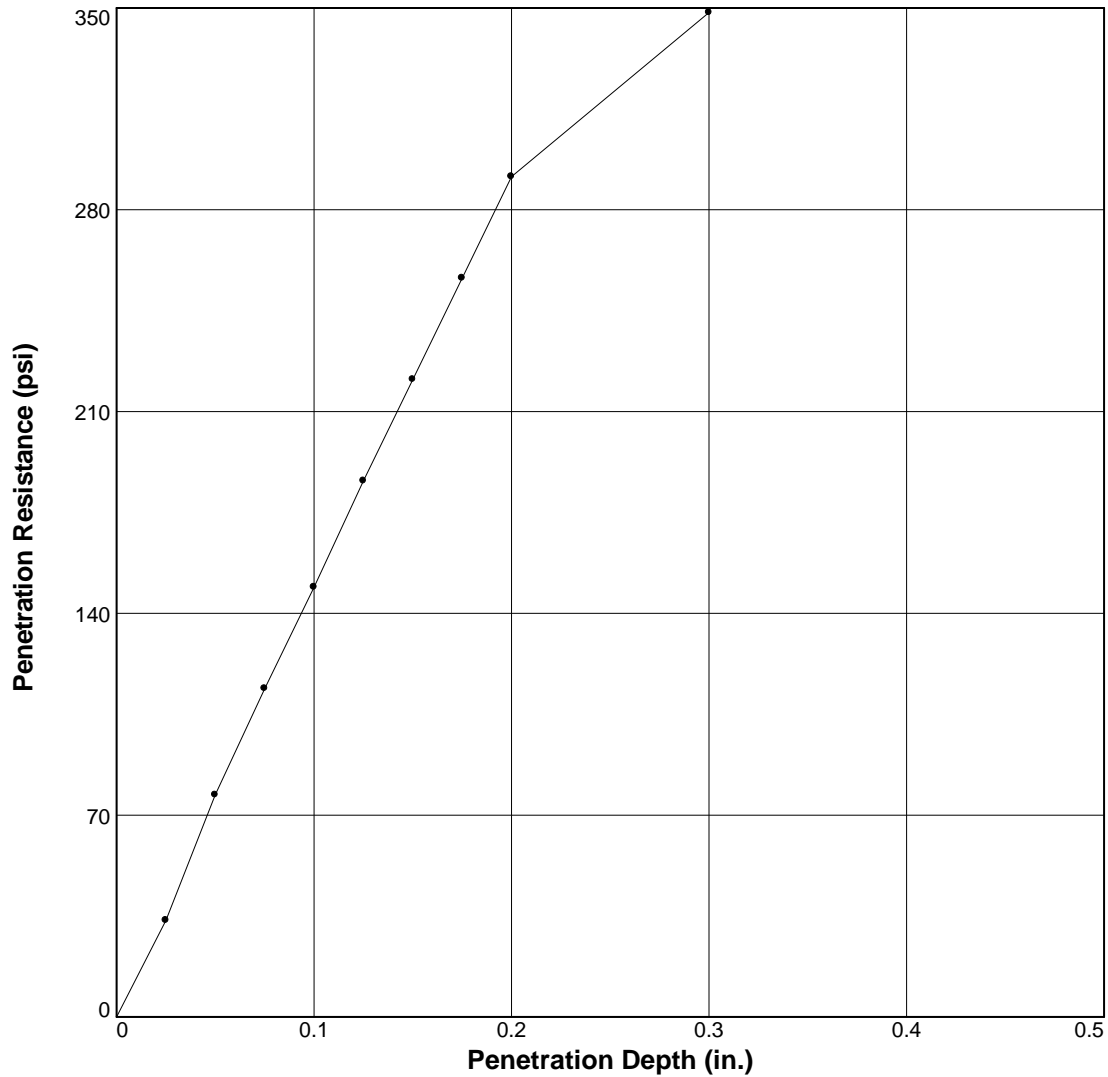
ROCK CORRECTED TEST RESULTS		UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 125.1 pcf		121.8 pcf	Dark gray and dark brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay
Optimum moisture = 9.1 %		10.1 %	
Project No. WM19-192G Client: City of Hampton Project: Hampton Aquatics Center ○ Location: See Attached Boring Location Plan Sample Number: CBR #6			Remarks: CBR #6 Sample Obtained: 1/3/2020 Sample Tested: 1/8/2020
GET Solutions, Inc. Williamsburg, VA			

Figure 6

Tested By: A. Kotyk Checked By: J. Wheeler

BEARING RATIO TEST REPORT

ASTM D1883-16



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	125.1	100	8.6	124.9	99.8	13.3	15.9	19.7	0.007	10	0.1
2 △											
3 □											
Material Description							USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark gray and dark brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay							SM	125.1	9.1	NV	NP

Project No: WM19-192G

Project: Hampton Aquatics Center

Location: See Attached Boring Location Plan

Sample Number: CBR #6 **Depth:** 0.5-3 ft

Date: 1/3/2020

Test Description/Remarks:

CBR #6

Sample Obtained: 1/3/2020

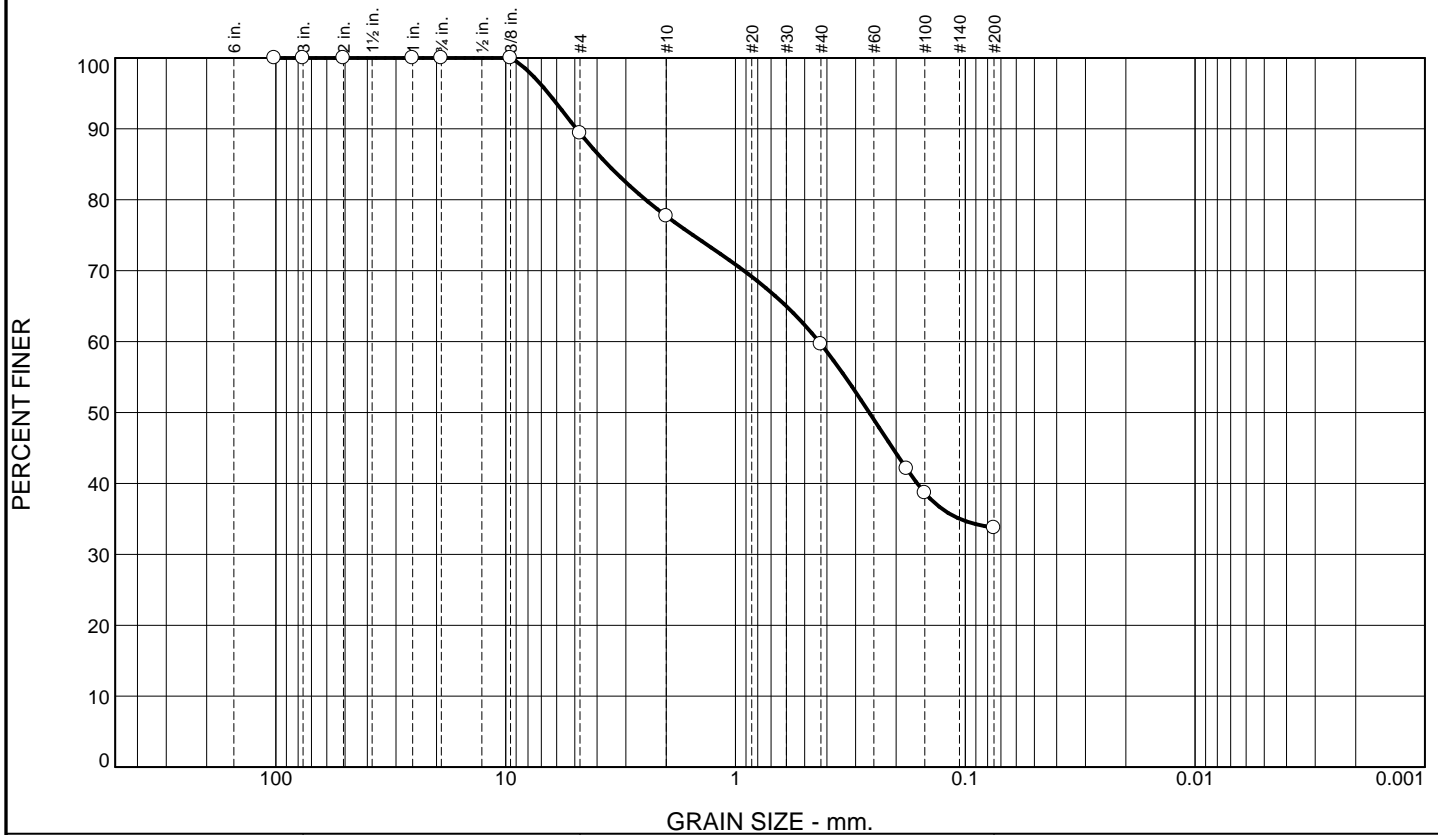
Sample Tested: 1/8/2020

Resiliency Factor = 3.0

BEARING RATIO TEST REPORT
GET Solutions, Inc.

Figure 6a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.6	11.7	18.0	26.0	33.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1"	100.0		
0.75"	100.0		
0.375"	100.0		
#4	89.4		
#10	77.7		
#40	59.7		
#80	42.1		
#100	38.7		
#200	33.7		

* (no specification provided)

Soil Description

Dark gray and dark brown, Silty fine to coarse SAND (SM) with few fine Gravel and trace Clay

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 4.9196

D₈₅= 3.6050

D₆₀= 0.4334

D₅₀= 0.2618

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-2-4(0)

Remarks

CBR #6

Sample Obtained: 1/3/2020

Sample Tested: 1/8/2020

Location: See Attached Boring Location Plan
Sample Number: CBR #6 Depth: 0.5-3 ft

Date: 1/3/2020

GET Solutions, Inc.

Williamsburg, VA

Client: City of Hampton
Project: Hampton Aquatics Center

Project No: WM19-192G

Figure 6b

Tested By: A. Kotyk

Checked By: J. Wheeler

APPENDIX VII

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 3-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-1

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.5</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>3.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

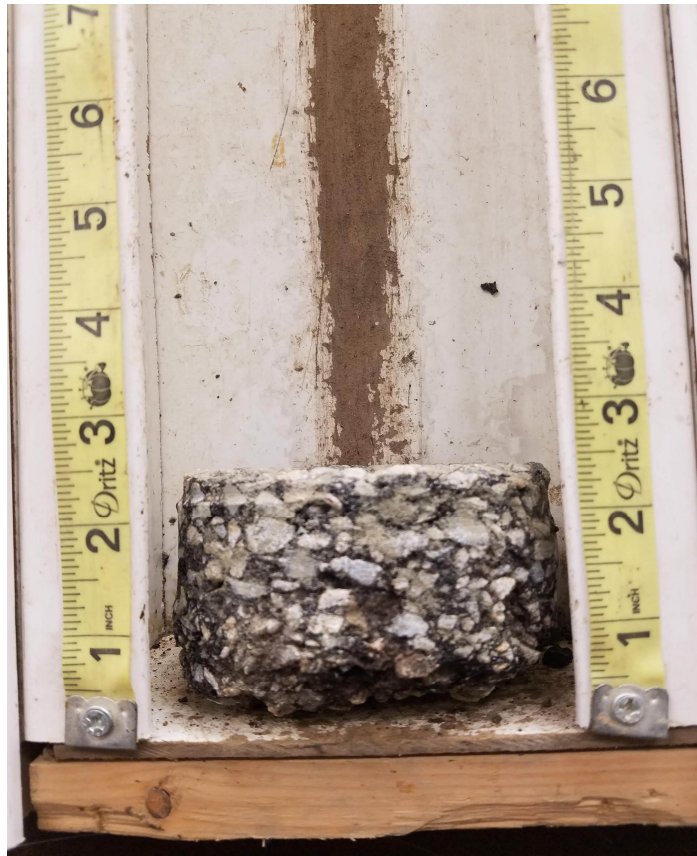
Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 3-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-2

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>5.0</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>0.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-3

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>6.5</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>2.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 3-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-4

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>1.7</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>1.5</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
Project Location: Hampton, VA

Boring/Core Identification:

AB-5

Boring/Core GPS Coordinates:

Latitude: -
Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.5</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>4.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

The lower portion of the asphalt core fell apart during coring and retrieval, so the photograph below does not represent the entire asphalt pavement section.

Top of Core

Bottom of Core



701 Alexander Lee Parkway
Williamsburg, Virginia 23185
Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 3-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-6

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.2</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>1.5</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-7

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>5.3</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>4.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

AB-8

Latitude: -
Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>4.2</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>3.5</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks: The lower portion of the asphalt core fell apart during coring and retrieval, so the photograph below does not represent the entire asphalt pavement section.

Top of Core

Bottom of Core



701 Alexander Lee Parkway
Williamsburg, Virginia 23185
Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-2

Latitude: -

Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.0</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>4.5</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar: No (WWF/Rebar/Both)

Embedment Depths from Top of Core: N/A in. Rebar

N/A in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric: No (yes/no)

Description of Vapor Barrier or Geotextile: N/A

General Core Notes and Remarks: Core fell apart during coring and retrieval and no photo of core available.



701 Alexander Lee Parkway
Williamsburg, Virginia 23185
Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-2

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>3.0</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>5.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks: The lower portion of the asphalt core fell apart during coring and retrieval, so the photograph below does not represent the entire asphalt pavement section.

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-3

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>4.0</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>4.3</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-4

Latitude: -
Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.3</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>2.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric: No (yes/no)

Description of Vapor Barrier or Geotextile: N/A

General Core Notes and Remarks:

The lower portion of the asphalt core fell apart during coring and retrieval, so the photograph below does not represent the entire asphalt pavement section.

Top of Core

Bottom of Core



701 Alexander Lee Parkway
Williamsburg, Virginia 23185
Tel: 757-564-6452 Fax: 757-564-6453

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-5

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.5</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>2.3</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name: Hampton Aquatics Center
 Project Number: WM19-192G

Date of Extraction: 6-Jan-2020
 Project Location: Hampton, VA

Boring/Core Identification:

Boring/Core GPS Coordinates:

CBR-6

Latitude: -
 Longitude: -

General Core Location: Refer to Boring Location Plan

Pavement Section	Asphalt	<u>2.1</u>	in.	Void Underlying Pavement:	<u>No</u>	(yes/no)
Composition:	Aggregate Base	<u>4.0</u>	in.	Void Depth Below Pavement:	<u>N/A</u>	in.

Welded Wire Fabric (WWF) or Rebar:	<u>No</u>	(WWF/Rebar/Both)
Embedment Depths from Top of Core:	<u>N/A</u>	in. Rebar
	<u>N/A</u>	in. Welded Wire Fabric

Vapor Barrier or Geotextile Fabric:	<u>No</u>	(yes/no)
Description of Vapor Barrier or Geotextile:	<u>N/A</u>	

General Core Notes and Remarks:

Top of Core

Bottom of Core



701 Alexander Lee Parkway
 Williamsburg, Virginia 23185
 Tel: 757-564-6452 Fax: 757-564-6453