HORRY GEORGETOWN
TECHNICAL COLLEGE

Addendum No. 1

February 3rd 2025

Project Number: H59-N275-CB

Project Name: HGTC-Grand Strand Campus BLDG 100 Parking Lot

1. Bid Form - SE-330, Lump Sum Bid Form:
   A. 6.3-Unit Prices
   Contractor to include a unit price for an 8″ watermain obstruction bypass. This will be deducted from the contract sum if it is decided that an obstruction bypass is not needed at the watermain storm drainage crossing.

   B. 9a-Contract Time.
   Time to perform work has been changed to 120 calendar days.

2. Drawings:

   No changes

3. Specifications:

   No changes

4. General Clarifications
   A. A campus geotechnical report has been included.

   B. The contractor will be responsible for providing the design and installation of a drip irrigation system. To be connected to the irrigation meter shown on the plans. Irrigation to be provided by a standard city single service with ¾″ meter.

   C. Base material shall conform to the requirements of SCDOT Section 305.

End of Addendum No. 1

Attachment 1

Report of Geotechnical Exploration
HGTC Grand Strand Campus Renovations
Myrtle Beach, South Carolina
S&ME Project No. 1463-19-054

PREPARED FOR:

Horry Georgetown Technical College
2050 Highway 501 E
Conway, South Carolina 29526

PREPARED BY:

S&ME, Inc.
1330 Highway 501 Business
Conway, SC 29526

December 19, 2019

December 19, 2019

Horry Georgetown Technical College
2050 Highway 501 E
Conway, South Carolina 29526

Attention: Ms. Dianna Cecala

Reference: **Report of Geotechnical Exploration**
HGTC Grand Strand Campus Renovations
Conway, South Carolina
S&ME Project No. 1463-19-054

Dear Ms. Cecala:

We are pleased to submit our Report of Geotechnical Exploration for the referenced project. These services were performed pursuant to the Statewide Term Contract Number 4400009788, between the State of South Carolina Materials Management Office and S&ME, effective December 16, 2014, and our proposal 14-1900729 dated October 29, 2019. The purpose of this exploration was to evaluate subsurface conditions within the construction footprints as they relate to site preparation, earthwork, and structural foundation support. This report presents our understanding of the proposed construction, the site and subsurface conditions encountered, and our geotechnical conclusions and recommendations.

♦ Project Information

Project information was provided during a telephone conversation and follow-up email correspondence between Ernie Olds (Becker Morgan Group) and Worth King (S&ME) on October 24, 2019. The email included a site plan dated September 26, 2019 and drawn by Becker Morgan Group.

The site is located at the existing Horry Georgetown Technical College campus in the area surrounded by Pampas Drive, Swallow Avenue, Cactus Street, and Hemlock Avenue in Myrtle Beach, South Carolina. We understand that development will include renovations to the entrances of four existing buildings (Building 100, Building 200 A, Building 200 C, and Building 300), the excavation of five new ponds, and the addition of approximately 215 new asphalt parking spaces and drive areas. We anticipate that the construction will consist of metal stud framing and cast-in-place, soil-supported, concrete slabs-on-grade or walkways.

Structural load information was not provided to us. Based on our previous experience with similar projects, we anticipate that the building wall loads will not exceed 4 kips per linear foot, and the building column loads will not exceed 50 kips per column. We assume that future site grade elevations will likely remain near existing elevations with cut or fill thicknesses of about 1 foot or less in most areas.

Methods of Exploration

Field Exploration

Our exploration included a site reconnaissance by a geotechnical engineer and the performance of one seismic cone penetration test (SCPT) sounding within the approximate future building footprint, labeled SCPT-1, which was advanced to a depth of 50 feet, where refusal[1] occurred. Although we proposed to advance sounding SCPT-1 to a depth of 40 feet, it was extended to a depth of 50 feet due to the soil conditions encountered. Three additional cone penetration test (CPT) soundings without seismic testing, labeled C-2 through C-4, were advanced to a depth of approximately 20 feet each within the approximate future building footprint. Each test sounding was performed in general accordance with ASTM D 5778 procedures. We also advanced a hand auger boring without penetration testing at each of the CPT/SCPT sounding locations to a depth of 4 feet each.

We advanced hand auger borings (HA-1 through HA-3) at three locations within the proposed pavement areas to a depth of 4 feet each, to explore the near-surface soils. Within each of these hand auger borings, dynamic cone penetrometer (DCP) testing was performed at approximate one-foot depth intervals in general accordance with ASTM STP 399, "Dynamic Cone for Shallow In-Situ Penetration Testing" procedures, to provide us with an index for estimating soil strength parameters and relative consistency of the near-surface soils encountered.

We also excavated five test pits (TP-1 through TP-5) within the future pond areas to depths ranging from 6.5 to 8 feet below the existing ground surface, using a track-mounted hoe.

Test locations were established in the field by S&ME personnel utilizing landmark features of the site and existing structures, after public utilities were marked by SC 811. These approximate test locations are shown on the Test Location Sketch (Figure 1) attached in the appendix. A more detailed description of our field-testing procedures, the CPT/SCPT sounding logs, and the hand auger boring logs are also included in the appendix.

Laboratory Testing

We transported the soil samples to our laboratory, and selected samples recovered from the hand auger borings and test pits were subjected to the following laboratory tests:

- Natural Moisture Content (ASTM D 2216)
- Fines Content percent passing the No. 200 sieve by weight (ASTM D 1140)
- Modified Proctor Moisture-Density Relationship (ASTM D 1557)
- California Bearing Ratio (CBR) (ASTM D 1883)

A summary of the laboratory procedures used to perform these tests is presented in the appendix. The individual test results are also included.

[1] "Refusal" is defined as the depth beyond which the cone penetrometer can no longer be advanced under the maximum downcrowd pressure applied by the drill rig and tooling.

Site and Subsurface Conditions

Site Conditions

At the time of our exploration, the existing campus included buildings, pavements, and some unpaved areas. Asphalt thickness in the existing pavement areas was not observed. Our test locations were performed in the unpaved areas. The majority of the unpaved areas were clear of trees; however, some sparse trees measuring up to about 50 feet in height were present across the site. Topsoil thickness ranged from 4 to 10 inches at our test locations. Topsoil thickness may be greater in unexplored areas of the site.

Site-specific topographic information was not provided to us; however, based on visual observation, the site appeared to be relatively level with less than about 2 feet of elevation change. Standing water was not observed on the site surface at the time of our exploration.

Subsurface Conditions

The generalized subsurface conditions at the site are described below. For more detailed descriptions and stratifications at test locations, the respective sounding logs should be reviewed in the appendix.

Details of the subsurface conditions encountered by the soundings, test pits, and hand auger borings are shown on the logs attached in the appendix. These logs represent our interpretation of the subsurface conditions based upon the field data. Stratification lines on the logs represent approximate boundaries between soil behavior types[2]; however, the actual transition may be gradual.

The soils encountered in the soundings and hand auger borings were grouped into several general strata based on estimated physical properties derived from subsurface data and the recovered soil samples. The strata encountered are labeled I through III to allow their properties to be systematically described. The general subsurface conditions and their pertinent characteristics are discussed in the following paragraphs.

Undocumented Fill

Previously placed undocumented fill material was observed in hand auger borings C-1, C-2, and C-4, and in test pit TP-2. The fill material extended to a depth of about 1 ½ feet in C-1, and to about 1 foot in C-4. Hand auger boring C-2 encountered refusal to further advancement at a depth of 1 foot on an unknown subsurface obstruction. In test pit TP-2, the fill appeared to be less than 1 foot thick. The fill materials generally consisted of silty sands (USCS Classification "SM"), or poorly-graded sands with silt (SP-SM), and in some cases were identified as fill due to particles of debris such as small chunks of concrete. We also note that the soils recovered from a depth of about 1 ½ feet in hand auger boring C-1 had a slight petroleum odor.

[2] Soil Behavior Type in the cone penetration test (CPT) soundings is calculated based on empirical correlations with tip resistance, sleeve friction, and pore pressure. A CPT may define a soil based on its behavior as one type while its grain size and plasticity, the traditional basis for soil classification, may define it as a different type.

Stratum I: Upper Sands with Clay Seams

Beneath the topsoil and fill, an upper layer consisting primarily of sands and sand mixtures was observed to a depth of approximately 37 feet in sounding SCPT-1 and to the termination depth of 20 feet in each of the other soundings. These soils exhibited tip resistances ranging from about 50 tons per square foot (tsf) to about 200 tsf, and typically ranged from about 50 tsf to 100 tsf, indicating a typically medium dense relative density with some dense layers. "Hardpan" conditions, where soils are organically-cemented together and exhibit tip stresses greater than about 175 tsf, were observed in sounding C-3 near a depth of about 8 feet.

Soils within our hand auger borings and test pits classified primarily as poorly graded sands with silt (USCS Classification "SP-SM"), poorly graded sands with clay (SP-SC), clayey sands (SC), and silty sands (SM). While most of the soils encountered in this stratum were sandy, some zones of sandy lean clays (CL) were also observed. Near-surface clay seams were observed in all four soundings between depths of about 2 to 4 feet, and in hand auger borings C-3 and HA-1, and in test pits TP-2 and TP-3.

Soils of this stratum were typically brown, tan, and gray in color, and were moist to wet where located above the subsurface water level and saturated where located below. Each hand auger boring was terminated within this stratum at a depth of 4 feet, and each test pit was terminated within this stratum between depths of 6.5 and 8 feet. Soundings C-2 through C-4 were terminated within this stratum at a depth of approximately 20 feet. Previously-placed fill material was observed within the upper 1 foot at test locations SCPT-1 and C-4.

Three samples collected from Stratum I were subjected to laboratory testing, indicating natural moisture contents ranging from 12.2 percent to 30.9 percent and fines contents of percent by weight passing the No. 200 sieve ranging from 8.4 percent to 69.1 percent. Modified Proctor moisture-density relationship testing of a bulk sample collected from test pit TP-4 at a depth of 1.0 to 2.5 feet indicated a maximum dry density of 122.9 pounds per cubic foot (pcf) at an optimum moisture content of 9.9 percent. The CBR value for this soil when a sample was remolded to 95 percent compaction near its optimum moisture content measured about 14 percent. A sample obtained from test pit TP-5 at a depth of 3.75 feet to 6.0 feet indicated a maximum dry density of 103.2 pcf at an optimum moisture content of 11.1 percent.

Stratum II: Intermediate Clays and Silt Mixtures

Beneath Stratum I and beginning at a depth of 37 feet, an intermediate stratum of clays and silt mixtures was encountered to a depth of about 48 feet in sounding SCPT-1. Soils of this stratum exhibited tip resistances ranging from about 10 tsf to 40 tsf, and typically ranging from about 10 to 20 tsf, indicating typically soft to stiff consistency.

Stratum III: Lower Cemented Marine Sands

Beneath Stratum II, beginning at a depth of about 48 feet and extending to refusal in sounding SCPT-1 at a depth of about 50 feet, a lower stratum of marine sands was encountered. Tip resistance measurements ranged from about 200 tsf to 600 tsf, indicating a very dense relative density with possible cementation. The sounding likely refused on a cemented lens of limestone, which are known geologically to be present in this area.

Subsurface Water

Subsurface water was interpreted based on pore pressure readings within the CPT soundings at a depth of approximately 7 below the ground surface. Subsurface water was encountered at depths ranging from about 3 to 7.5 feet beneath the ground surface within the hand auger borings and test pits, where encountered. Subsurface water levels at the site will likely fluctuate during the year due to factors such as seasonal and climatic variations, and construction activity in the area. The near-surface clay seams observed at several of our test locations indicates favorable conditions for the development of a shallow perched water table.

♦ Conclusions and Recommendations

The exploration indicates the site is adaptable for the proposed construction. The primary geotechnical considerations will be site preparation and drainage, near-surface soil stabilization, controlled fill placement and compaction, and shallow foundation and pavement construction.

The following presents our geotechnical recommendations. When reviewing these recommendations, it must be recognized that unexpected subsurface conditions may be encountered between test locations. Unexpected conditions can normally be addressed during construction by on-site engineering evaluation.

Demolition of Existing Structures

The following general recommendations are provided for demolition of previous construction:

1. Remove or plug existing utilities that are to be permanently abandoned, including but not limited to the storm sewer system that is present on the site. If not removed or plugged, pipes may serve as conduits for subsurface erosion resulting in formation of voids below foundations or grade slabs.

   A. Where existing utilities are left in place and plugged in the structural footprint, it may be necessary to undercut poorly compacted backfill to provide adequate support for foundations or slabs.
   B. Backfill all excavations created to remove these old utilities in accordance with the "Controlled Fill" section of this report.

2. Reroute existing utilities that will remain in use around the proposed new structural footprints.

3. Demolish existing asphalt pavements to be abandoned and remove from the site. Do not use pavement millings as backfill without first consulting with S&ME, since this type of fill is not appropriate in all areas.

Site Preparation

Site preparation over most of the site will include stripping of topsoil and removal of asphalt. Site preparation will also include implementation and maintenance of site drainage. The following recommendations are provided regarding site preparation and earthwork.

1. We recommend that site drainage be implemented prior to site construction. Perimeter drainage ditches should be excavated at the site to drain water away from the construction area prior to grading. Water

levels should be maintained at least 2 feet beneath any working surface, to reduce the potential for deterioration under construction equipment and compactive efforts due to the effects of subsurface water.

2. Strip surface vegetation and topsoil, debris-laden fill, and any other organic or unsuitable materials, where encountered, and dispose of outside the future pavement and building pad footprints. Organic soils containing more than about 5 percent organics should be removed from the proposed construction areas. Do not locate debris piles within the construction areas.

   A. Any soft, unsuitable soils that are encountered should be removed to their full lateral extent.
   B. Any previously-placed fill materials that are encountered during construction should be evaluated by the Geotechnical Engineer or his designated representative.
   C. Backfill all sections excavated to remove debris-laden or unsuitable fill in accordance with the "Controlled Fill" section of this report.

3. After stripping, the existing subgrade surface should be densified in place with a heavy vibratory roller prior to placement of any new fill.

   A. The exposed surface should be densified to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) to a depth of at least 8 inches below the surface, in order to recompact the existing loose, sandy surface.
   B. Under favorable moisture conditions and with the proper equipment, this may be able to be accomplished by densifying the soil from the working surface. However, under less favorable conditions, it may be necessary for the contractor to re-work (or remove, condition, and replace) the material, using moistening or drying techniques, in order to achieve the desired level of compaction. The densification of these soils should be performed under the observation of an S&ME representative.

4. After surface densification but prior to placement of any new fill, a representative of the Geotechnical Engineer should observe the prepared surface for stability. This may consist of a visual observation, probing with a small diameter rod, and/or observing the contractor perform a proofroll using a heavy vehicle (in those areas which are accessible to heavy equipment). Areas of unstable soil may require stabilization prior to fill placement as recommended by the Geotechnical Engineer at the time of construction.

Excavation

Subsurface water was encountered at depths of about 3 to 7 feet below the existing ground surface at the time of our exploration. If subsurface water is encountered during excavation, the water level should be maintained at least 2 feet below excavations to help maintain bottom stability. Water can probably be controlled at the site by pumping from sumps located within the excavation. The effects of dewatering on nearby structures should be evaluated and are the responsibility of the designer of any dewatering system.

All excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards for Type C soils. The contractor is solely responsible for site safety. This information is provided only as a service, and under no circumstances should S&ME be assumed to be responsible for construction site or excavation safety.

Controlled Fill

Controlled fill material should be cohesionless, non-plastic sandy soil containing no more than 15 percent fines (material passing the No. 200 sieve) by weight and having a maximum dry density of at least 105 pounds per cubic foot (pcf) as determined by a laboratory modified Proctor moisture density relationship test (ASTM D1557). The soil should be relatively free of organics or other deleterious matter. All fill should be placed in uniform lifts of 10 in. or less (loose measure) and compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557). Based upon our visual-manual soil classifications and laboratory test results, some but not all of the on site near-surface soils may be suitable for re-use as compacted fill on site. Where more silty and clayey soils are encountered, these soils are unlikely to be suitable for re-use as compacted backfill; therefore, the contractor should anticipate the possible need to import fill material.

- Soils excavated from the ponds at test pit locations TP-2 and TP-3 appear to be mostly unsuitable for re-use as fill due to excessive clay content. Some of the sandier soils observed in test pits TP-1, TP-4 and TP-5 may be of suitable soil type but will likely be wet and therefore likely require drying before use.
- The contractor should anticipate that when installing subsurface utilities which penetrate the more silty and clayey soils of either Stratum I or Stratum II, the excavated materials may not be suitable for re-use as compacted backfill in the utility trenches due to excessive clay content and moisture, requiring sandy soil to be imported for this purpose.

Fill placement should be observed by a qualified Materials Technician working under the direction of the Geotechnical Engineer. In addition to this visual evaluation, the Technician should perform a sufficient number of in-place field density tests to confirm that the required degree of compaction is being attained. At least one density test per each 5,000 square feet per lift of fill should be performed for large area fills.

Seismic Design Considerations

As of July 1, 2016, the 2015 edition of the International Building Code (IBC) has been adopted for use in South Carolina. We classified the site as one of the Site Classes listed in IBC Section 1613.3, using the procedures described in Chapter 20 of ASCE 7-10.

- **Code Change Note:** A Building Code change is scheduled to take place on January 1, 2020 in South Carolina. The new code, which is the South Carolina adaptation of the International Building Code (IBC) 2018 edition, includes references to revised seismic maps based upon ASCE 7-16. It is expected that permits for new construction which are filed on or after January 1, 2020, will fall under the 2018 IBC, rather than the 2015 IBC. In the case of this site, this Code change results in a change to the Seismic Design Category. See Table 1 below for more information.

The initial step in site class definition is to check for the four conditions described for Site Class F, which would require a site-specific evaluation to determine site coefficients F_A and F_V. Soils vulnerable to potential failure include the following: 1) quick and highly sensitive clays or collapsible weakly cemented soils, 2) peats and highly organic clays, 3) very high plasticity clays, and 4) very thick soft/medium stiff clays. These soils were not evident in the soundings.

One other determining characteristic, liquefaction potential under seismic conditions, was assessed. Soils were assessed qualitatively for liquefaction susceptibility based on their age, stratum, mode of deposition, degree of cementation, and size composition. This assessment considered observed liquefaction behavior in various soils in areas of previous seismic activity. Our analysis, which is more fully described below, indicates that liquefaction of subsoils appears unlikely to occur on a widespread basis at this site in the event of the design magnitude earthquake; therefore, Site Class F does not apply.

Based on shear wave velocities measured during our exploration, we determined that site response factors F_A and F_V corresponding to Site Class D would be applicable to determine spectral values for design. This recommendation is provided based on the average weighted shear wave velocities measured to a depth of 50 feet and extrapolated to a depth of 100 feet. The average weighted shear wave velocity measured to a depth of 50 feet was estimated to be 615 feet per second, which is greater than the 600 feet per second that is required for consideration of Site Class D design parameters. Please see the appendix for the Shear Wave Velocity Calculations worksheet.

Liquefaction Analysis

We performed our liquefaction analysis based on the design earthquakes prescribed by both the 2015 and 2018 editions of the International Building Code (IBC). An age correction factor, which increases the liquefaction resistance of older sand deposits of the type that were encountered at this site, was applied.

To help evaluate the consequences of liquefaction, we have computed the Liquefaction Potential Index (LPI), which is an empirical tool used to evaluate the potential for liquefaction to cause damage. The LPI considers the factor of safety against liquefaction, the depth to the liquefiable soils, and the thickness of the liquefiable soils to compute an index that ranges from 0 to 100. An LPI of 0 means there is no risk of liquefaction; an LPI of 100 means the entire profile is expected to liquefy. The level of risk is generally defined as:

- **LPI < 5** – surface manifestation and liquefaction-induced damage not expected.
- **5 ≤ LPI ≤ 15** – moderate liquefaction with some surface manifestation possible.
- **LPI > 15** – severe liquefaction and foundation damage is likely.

Using the 2015 Code parameters, the LPI for this site averaged less than 1, indicating the liquefaction risks are low, and liquefaction-induced damage is not expected. Therefore, Site Class F does not apply to this site. Under the 2018 version of the Code, the LPI would be even further reduced, and liquefaction even less likely to occur.

Seismic Spectral Design Values

Using site class D parameters, the spectral response accelerations and site coefficients for the site are given below in Table 1.

Table 1: Seismic Design Coefficients

Criteria	Site Class	S_S	S_1	S_{DS}	S_{D1}	PGA_M	Seismic Design Category
2015 IBC	D	0.51	0.18	0.47	0.25	0.34	D
2018 IBC	D	0.32	0.12	0.33	0.18	0.25	C

Seismic Design Category

For a structure having a Risk Category classification of I, II, or III, the S_{DS} and S_{D1} values obtained are consistent with “Seismic Design Category D” as defined in section 1613.3.5 of the 2015 version of the IBC.

For a structure having a Risk Category classification of I, II, or III, the S_{DS} and S_{D1} values obtained are consistent with “Seismic Design Category C” as defined in section 1613.3.5 of the 2018 version of the IBC.

Shallow Foundations

Based on the provided structural loads and our analysis, we recommend that the proposed structures be supported with conventional shallow foundations bearing in suitable natural soils or well-compacted fill, provided that our site preparation and fill placement and compaction recommendations are followed.

A maximum allowable bearing pressure of 2,000 pounds per square foot (psf) may be used for sizing footings.

Building footings should bear a minimum depth of 12 in. below finished exterior grades to develop the design bearing pressure. Wall and column footings should be a minimum of 18 and 30 in. wide, respectively. This recommendation is made to help prevent a "localized" or "punching" shear failure condition, which could exist with very narrow footings.

All foundation excavation bottoms must be evaluated by a representative of the Geotechnical Engineer prior to reinforcing steel and concrete placement. This evaluation should include probing, hand-auger borings, and dynamic cone penetrometer (DCP) testing. This evaluation will help determine if individual footings are directly underlain by suitable bearing material. Loose material should be properly compacted or undercut and replaced with well-compacted controlled fill or clean, coarse, crushed aggregate such as SCDOT No. 57 or No. 67 stone. If practical, concrete placement should be completed the same day as the footing excavation.

- Based on an 50-kip column load and a uniform applied area load of 250 psf to represent the weight of the new fill, the floor slab, and the load on the slab, and considering a 2,000 psf applied bearing pressure for the shallow foundations, we estimate about 1 inch or less of static settlement potential.

- Based on a 4 kip per linear foot wall strip load and a uniform applied area load of 250 psf to represent the weight of the new fill, the floor slab, and the load on the slab, and considering a 2,000 psf applied bearing pressure for the shallow foundations, we estimate about 1 inch or less of static settlement potential.

- Differential settlement is typically assumed to be about half of the total post-construction settlement, or in this case, ½ in. or less.

If actual structural loads exceed those assumed in this report or if more than about 2 feet of new fill will be required to achieve design grade elevations in the building pad, we should be provided with this information so that we can reevaluate static settlement. This is important because higher structural loads or additional fill may cause additional settlement.

Lateral capacity of foundations includes a soil lateral pressure and coefficient of friction as described in IBC Section 1806. Assuming that the footings will bear within either compacted sandy fill or the native sands, the foundations will be embedded in material similar to those described as Class 4 in Table 1806.2. Where footings are cast neat against the sides of excavations in natural soils, an allowable bearing pressure of 150 psf per foot depth below natural grade may be used in computations. An allowable coefficient of friction of 0.36, multiplied by the dead load, may be used for computation of sliding resistance. An increase of one-third in the allowable lateral capacity may be considered for load combinations, including wind and earthquake, as permitted by IBC Section 1605.3.2, unless otherwise restricted by design code provisions.

Soil-Supported Grade Slabs

A modulus of subgrade reaction (k) of 175 lbs/in^3 (pci) is recommended for use in reinforcing design of thin, soil-supported grade slabs.

We recommend placement of a layer of at least 4 inches of compacted granular materials below the reinforced slabs. The granular layer may consist of clean sand having a USCS Classification of SP or SW according to ASTM D 2487, with less than 5 percent by weight passing the No. 200 sieve as measured by ASTM D 1140. Alternatively, the granular layer may consist of a crushed, well-graded gravel blend such as SCDOT Graded Aggregate Base Course (GABC), or an open-graded, manufactured, washed gravel such as SCDOT No. 57 or No. 67 stone. If sand or washed gravel is used as the underslab layer, then the contractor should plan on using a pump truck to place the floor slab concrete since these materials are cohesionless and are difficult to drive vehicles on. If GABC is used, then either a pump truck or direct discharge from concrete batch trucks may be appropriate depending upon the circumstances. If either GABC or sand is used, the underslab layer should be compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557), and tested for density by a representative of S&ME. Have the geotechnical engineer observe a proofroll of all slab subgrades (where accessible) prior to reinforcing wire, vapor barrier, or concrete placement. Softened soils may need to be undercut or stabilized before slab construction.

Pavement Section Design and Construction

We assume that new pavement subgrades will be constructed atop compacted structural fill soils compacted to at least 95 percent of the modified Proctor maximum dry density. We have performed our evaluations assuming that a CBR value of at least 10 percent will be available from subgrade soils compacted to 95 percent. If soils exhibiting a CBR value of less than 10 percent at 95 percent compaction are to be used on this project, these recommendations may require revision.

Traffic volumes for the proposed development were not provided to us in preparation for our exploration and pavement section analysis; therefore, we have performed our calculations based on typical pavement section thicknesses and assumed traffic demand volumes. The recommended pavement section components are provided in Table 2 below for both normal-duty and heavy-duty pavements.

For flexible pavements, the pavement thickness computations were made using the AASHTO method, assuming an initial serviceability of 4.2 and a terminal serviceability index of 2.0, and a reliability factor of 95 percent. Assuming that only SCDOT approved source materials will be used in flexible pavement section construction, we used a structural layer coefficient of 0.44 for the HMA layers and a coefficient of 0.18 for the graded aggregate base course (GABC).

Rigid pavement design assumes an initial serviceability of 4.5 and a terminal serviceability index of 2.5, and a reliability factor of 90 percent. Assuming that the concrete would not be continuously reinforced, we used an average load transfer coefficient of 3.8. We also assumed a minimum 28-day design compressive strength of at least 4,000 psi for the PCC. A sub-base drainage factor of 1.0 was assigned, based upon the assumption that the sub-base soils will consist of granular SP-SM soils.

Table 2: Recommended Minimum Pavement Sections[(a)]

Pavement Area	Theoretical Allowable Traffic Load (ESALs)	HMA Surface Course Type C (inches)	HMA Intermediate Course Type C (inches)	4,000 psi Concrete Pavement (inches)	Compacted SCDOT Graded Aggregate Base Course [GABC] (inches)
Normal Duty Flexible (Asphalt) - *No Trucks*	178,000	1.5	1.5	---	6.0
Heavy Duty Flexible (Asphalt) –*With Trucks*	436,000	1.5	1.5	---	8.0
Normal Duty Rigid (Concrete) -*No Trucks*	208,000	---	---	6.0	6.0
Heavy Duty Rigid (Concrete) –*With Trucks*	451,000	---	---	7.0	6.0

(a) Single-stage construction is assumed; S&ME, Inc. must observe subgrade preparation and pavement installation.

Permanent Underdrains

We recommend that in order to provide permanent stabilization for pavements, a system of underdrains should be designed for the pavement area subgrades (parking lots and roadways) to promote drainage. The presence of shallow clayey soils can allow for the creation of a shallow perched water table. Perched shallow groundwater can cause premature deterioration of pavements, particularly asphalt pavements, and underdrains can be a cost-effective way to mitigate this risk and increase the service life of pavements that are constructed in this geology.

1. In order to provide permanent stabilization for pavements, comprehensive underdrain systems are recommended to be designed for the pavement area subgrades (parking lots and roadways).

2. The site civil engineer should be consulted regarding the type and location of the underdrains. Our experience is that two types of underdrain systems are commonly used in this locality, depending upon the traffic application and the preferences of the civil engineer. One commonly used system is a gravel-filled, fabric-wrapped trench containing an embedded perforated plastic HDPE pipe. Another type of system that we see used is an edge drain product such as AdvanEdge by ADS, Inc. This is a fabric-wrapped, perforated HDPE slot style drain. Some engineers have used a combination of these two systems. Typically, the underdrains are tied into the storm water system to maintain positive gravity flow.
3. Do not fill any landscaped islands in the parking lot with clayey or silty (impermeable) spoils that may impede the movement of water into the underdrains.
4. Minimize irrigation of the landscaped areas surrounding the pavements, and of islands within the parking lot, if any.

General Pavement Construction Recommendations

The following recommendations are provided regarding pavement construction:

1. Fill placed in pavement areas should be compacted as recommended previously in this report. Prior to pavement section installation, all exposed pavement area subgrades should be methodically proofrolled at final soil subgrade (FSG) elevation under the observation of S&ME, Inc., and any identified unstable areas should be repaired as directed.
2. Pavement underdrainage and/or ditches should be designed and constructed, as previously discussed. The pavement underdrainage should be designed by the civil engineer to assist in long-term drainage.
3. The stone base course underlying pavements should consist of a graded aggregate base course (GABC) as specified by the SCDOT 2007 Standard Specifications for Highway Construction, Section 305. Proposed materials for use should be provided by a SCDOT-approved source.

   - Do not substitute Coquina type base course (SCDOT Section 304) for the recommended GABC as defined in SCDOT Section 305.

4. As stated in the SCDOT Section 305 specification, we recommend that all new base course should be compacted to at least 100 percent of the modified Proctor maximum dry density (SC T-140). Heavy compaction equipment is likely to be required in order to achieve the required base course compaction, and the moisture content of the material will likely need to be maintained very near the optimum moisture content in order to facilitate proper compaction. S&ME, Inc. should be contacted to perform field density and thickness testing of the base course prior to paving.
5. After placement of base course stone, the surface should be methodically proofrolled at final base grade elevation by the contractor under the observation of the Geotechnical Engineer (S&ME), and any identified unstable areas should be repaired. Base courses should not exhibit pumping or rutting under equipment traffic. Rutting or pumping areas shall be undercut and replaced and/or stabilized as directed by the engineer.
6. Construct the HMA surface course in accordance with the specifications of Section 403 of the South Carolina Department of Transportation Standard Specifications for Highway Construction (2007 edition). Construct HMA intermediate courses in accordance with the specifications of Section 402 of this same specification.

7. It is important that the asphaltic concrete be properly compacted, as specified in Section 401.4 of the SCDOT specification. Asphaltic concrete that is insufficiently compacted will show wear much more rapidly than if it were properly compacted. Sufficient testing should be performed during flexible pavement installation to confirm that the required thickness, density, and quality requirements of the pavement specifications are followed.
8. Experience indicates that a thin surface overlay of asphalt pavement may be required in about 7 to 10 years due to normal wear and weathering of the surface. Such wear is typically visible in several forms of pavement distress, such as aggregate exposure and polishing, aggregate stripping, asphalt bleeding, and various types of cracking. There are means to methodically estimate the remaining pavement life based on a systematic statistical evaluation of pavement distress density and mode of failure. We recommend the pavement be evaluated in about 7 years to assess the pavement condition and remaining life.
9. For rigid pavements, we recommend air-entrained ASTM C 94 Portland cement concrete that will achieve a minimum compressive strength of at least 4,000 psi at 28 days after placement, as determined by ASTM C 39. We also recommend that the pavement concrete be constructed in a manner which at least meets the minimum standards recommended by the American Concrete Institute (ACI).
10. We recommend that at least 1 set of 5 cylinder specimens be cast by S&ME per every 50 cubic yards of concrete placed or at least once per placement event in order to measure achievement of the design compressive strength. We also recommend that S&ME be present on site to observe concrete placement.

♦ Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations in this report are based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of variations of the soils at the site to those encountered at our boring and sounding locations may not become evident until construction. If variations appear evident, then we should be provided the opportunity to re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structure are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing by the submitting engineers.

Assessment of site environmental conditions; sampling of soils, ground water or other materials for environmental contaminants; identification of jurisdictional wetlands, rare or endangered species, geological hazards or potential air quality and noise impacts were beyond the scope of this geotechnical exploration. Information regarding auxiliary construction items including but not limited to retaining walls, trash dumpster storage pads, curbing, street lights, signage, utilities, fountains, flagpoles, etc. was not provided by the client and therefore has not been addressed as part of the scope of this report. If additional foundation design or construction recommendations are needed with regard to any of these items, please contact us.

Closure

S&ME, Inc. appreciates the opportunity to be of service to you on this project. Please call if you have questions concerning this report or any of our services.

Sincerely,

S&ME, Inc.

W. Worth King, P.E.
Project Engineer
Registration No. 29491

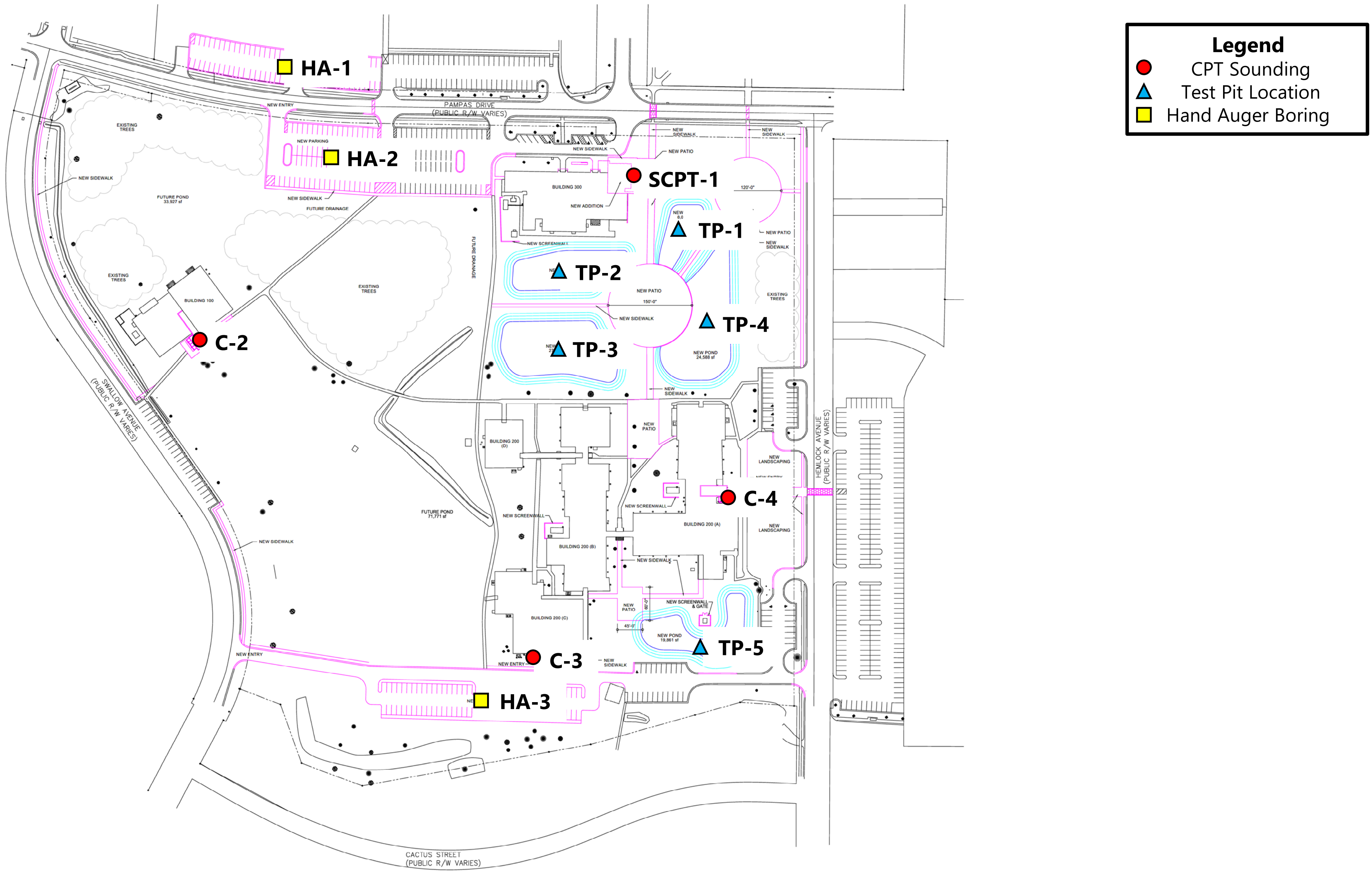
SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 29491 W. WORTH KING 12/19/19

Ronald P. Forest, Jr., P.E.
Senior Engineer
Registration No. 21248

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION S&ME, INC. No. C00473

Attachments: Appendix

Appendix



Test Location Sketch

HGTC Grand Strand Campus Renovations
Myrtle Beach, South Carolina

SCALE: AS SHOWN

DATE: 11-7-19

PROJECT NUMBER 1463-19-054

FIGURE NO. 1

♦ Summary of Exploration Procedures

The American Society for Testing and Materials (ASTM) publishes standard methods to explore soil, rock and ground water conditions in Practice D-420-18, "*Standard Guide for Site Characterization for Engineering Design and Construction Purposes.*" The boring and sampling plan must consider the geologic or topographic setting. It must consider the proposed construction. It must also allow for the background, training, and experience of the geotechnical engineer. While the scope and extent of the exploration may vary with the objectives of the client, each exploration includes the following key tasks:

- Reconnaissance of the Project Area
- Preparation of Exploration Plan
- Layout and Access to Field Sampling Locations
- Field Sampling and Testing of Earth Materials
- Laboratory Evaluation of Recovered Field Samples
- Evaluation of Subsurface Conditions

The standard methods do not apply to all conditions or to every site. Nor do they replace education and experience, which together make up engineering judgment. Finally, ASTM D 420 does not apply to environmental investigations.

♦ Reconnaissance of the Project Area

We walked over the site to note land use, topography, ground cover, and surface drainage. We observed general access to proposed sampling points and noted any existing structures.

Checks for Hazardous Conditions - State law requires that we notify the South Carolina 811 (SC-811) before we drill or excavate at any site. SC-811 is operated by the major water, sewer, electrical, telephone, CATV, and natural gas suppliers of South Carolina. SC-811 forwarded our location request to the participating utilities. Location crews then marked buried lines with colored flags within 72 hours. They did not mark utility lines beyond junction boxes or meters. We checked proposed sampling points for conflicts with marked utilities, overhead power lines, tree limbs, or man-made structures during the site walkover.

♦ Boring and Sampling

Electronic Cone Penetrometer (CPT) Soundings

CPT soundings consist of a conical pointed penetrometer which is hydraulically pushed into the soil at a slow, measured rate. Procedures for measurement of the tip resistance and side friction resistance to push generally follow those described by ASTM D-5778, "*Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils*."

A penetrometer with a conical tip having a 60 degree apex angle and a cone base area of 10 cm^2 was advanced into the soil at a constant rate of 20 mm/s. The force on the conical point required to penetrate the soil was measured electronically every 50 mm penetration to obtain the *cone resistance* q_c. A friction sleeve is present on the penetrometer immediately behind the cone tip. The force exerted on the sleeve was measured electronically at a minimum of every 50 mm penetration and divided by the surface area of the sleeve to obtain the *friction sleeve resistance value* f_s A pore pressure element mounted immediately behind the cone tip was used to measure the pore pressure induced during advancement of the cone into the soil.

CPT Soil Stratification

Using ASTM D-5778 soil samples are not obtained. Soil classification was made on the basis of comparison of the tip resistance, sleeve resistance and pore pressure values to values measured at other locations in known soil types, using experience with similar soils and exercising engineering judgment.

Plots of normalized tip resistance versus friction ratio and normalized tip resistance versus penetration pore pressure were used to determine soil classification (Soil Behavior Type, SBT) as a function of depth using empirical charts developed by P.K. Robertson (1990). The friction ratio soil classification is determined from the chart in the appendix using the normalized corrected tip stress and the normalized corrected tip stress and the normalized friction ratio.

At some depths, the CPT data fell outside of the range of the classification chart. When this occurred, no data was plotted and a break was shown in the classification profile. This occasionally occurred at the top of a penetration as the effective vertical stress is very small and commonly produced normalized tip resistances greater than 1000.

To provide a simplified soil stratigraphy for general interpretation and for comparison to standard boring logs, a statistical layering and classification system was applied the field classification values. Layer thicknesses were determined based on the variability of the soil classification profile, based upon changes in the standard deviation of the SBT classification number with depth. The average SBT number was determined for each successive 6-inch layer, beginning at the surface. Whenever an additional 6-inch increment deviated from the previous increment, a new layer was started, otherwise, this material was added to the layer above and the next 6-inch section evaluated. The soil behavior type for the layer was determined by the mean value for the complete layer.

Refusal to CPT Push

Refusal to the cone penetrometer equipment occurred when the reaction weight of the CPT rig was exceeded by the thrust required to push the conical tip further into the ground. At that point the rig tended to lift off the ground. Refusal may have resulted from encountering hard cemented or indurated soils, soft weathered rock, coarse gravel, cobbles or boulders, thin rock seams, or the upper surface of sound continuous rock. Where fills are present, refusal to the CPT rig may also have resulted from encountering buried debris, building materials, or objects.

Hand Auger Borings

Auger borings were advanced using hand operated augers. The soils encountered were identified in the field by cuttings brought to the surface.   Representative samples of the cuttings were placed in glass jars or plastic bags and later transported to the laboratory. Soil consistency was qualitatively estimated by the relative difficulty of advancing the augers. In some of the hand auger borings, at selected intervals, the augers were withdrawn and soil consistency measured with a dynamic cone penetrometer. The conical point of the penetrometer was first seated 1-3/4 inches to penetrate any loose cuttings in the boring, then driven two additional 1-3/4 inch increments by a 15 pound hammer falling 20 inches. The number of hammer blows required to achieve this penetration was recorded. When properly evaluated by qualified professional staff, the blow count is an index to the soil strength and ability to support foundations.

Water Level Measurement

Subsurface water levels in the boreholes were measured during the onsite exploration and after a period of about 24 hours by measuring depths from the existing grade to the current water level using a tape.

Backfilling of Borings

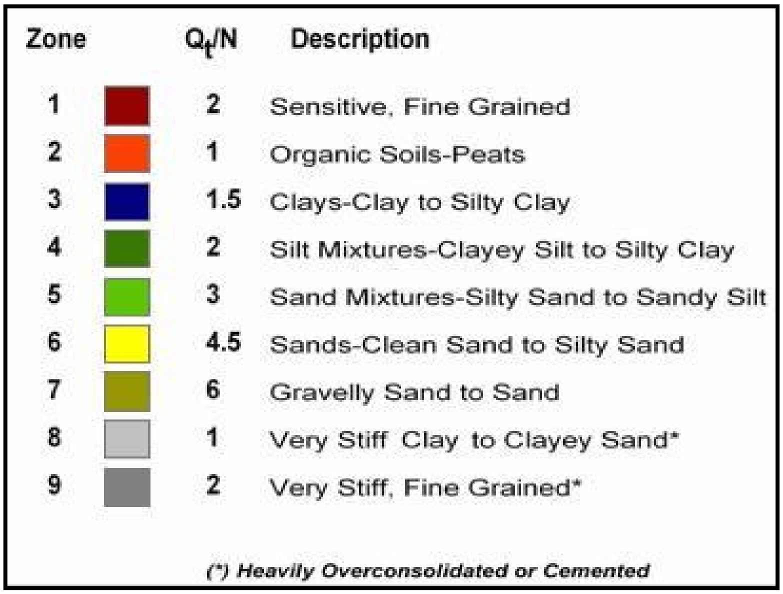
Once subsurface water levels were obtained, boring spoils were backfilled into the open bore holes. Hand auger bore holes were backfilled to the existing ground surface with soil cuttings. CPT sounding holes were not backfilled, since these holes are only 2 inches in diameter.

Excavated Test Pits

Test pits were excavated to obtain information about shallow soil conditions.   Test pits allow closer observation of the soil composition with depth and give an indication of excavation difficulty with a specific type of equipment during construction.

A field engineer was present to observe the soil strata exposed in each pit, estimate the relative ease of excavation, the amount of subsurface water entering the pits, and the maximum depth the pits were excavated. After completion of excavation, the pits were immediately backfilled with the spoil material; however, since the pits were narrow, deep excavations, very limited compactive effort could be applied to the backfill. Backfill was bucket-tamped during placement. The backfill was heaped up slightly above the level of the ground surface, but the client should recognize that some ground settlements may occur at the surface in the vicinity of the test pits.

CPT Soil Classification Legend



Zone	Q_t/N	Description
1	2	Sensitive, Fine Grained
2	1	Organic Soils-Peats
3	1.5	Clays-Clay to Silty Clay
4	2	Silt Mixtures-Clayey Silt to Silty Clay
5	3	Sand Mixtures-Silty Sand to Sandy Silt
6	4.5	Sands-Clean Sand to Silty Sand
7	6	Gravelly Sand to Sand
8	1	Very Stiff Clay to Clayey Sand*
9	2	Very Stiff, Fine Grained*

(*) Heavily Overconsolidated or Cemented

Robertson's Soil Behavior Type (SBT), 1990			
Group #	**Description**	**Ic**	
		Min	**Max**
1	Sensitive, fine grained	N/A	
2	Organic soils - peats	3.60	N/A
3	Clays - silty clay to clay	2.95	3.60
4	Silt mixtures - clayey silt to silty clay	2.60	2.95
5	Sand mixtures - silty sand to sandy silt	2.05	2.60
6	Sands - clean sand to silty sand	1.31	2.05
7	Gravelly sand to dense sand	N/A	1.31
8	Very stiff sand to clayey sand (High OCR or cemented)	N/A	
9	Very stiff, fine grained (High OCR or cemented)	N/A	

Soil behavior type is based on empirical data and may not be representative of soil classification based on plasticity and grain size distribution.

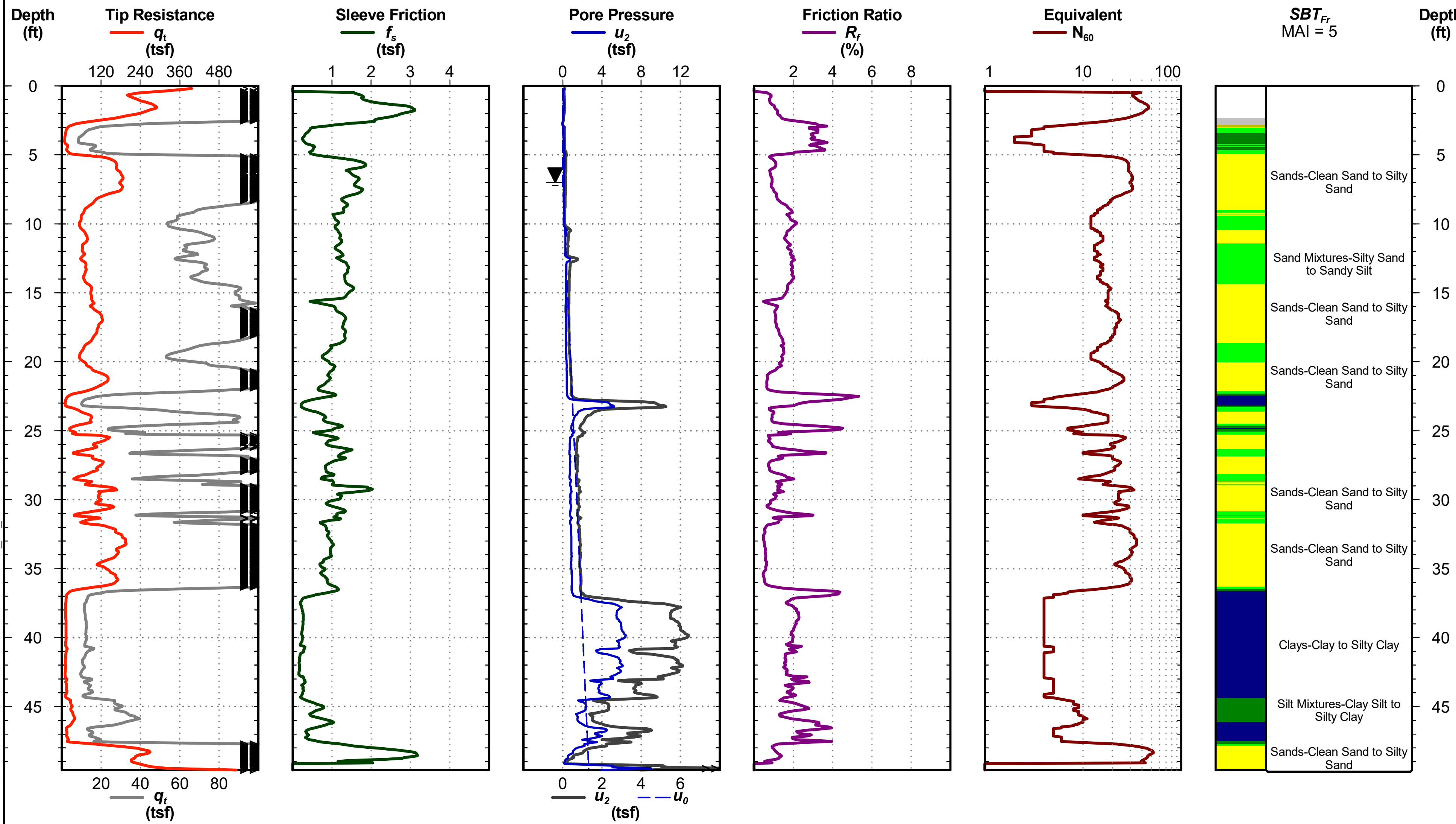
Relative Density and Consistency Table			
SANDS		SILTS and CLAYS	
Cone Tip Stress, qt (tsf)	Relative Density	Cone Tip Stress, qt (tsf)	Consistency
Less than 20	Very Loose	Less than 5	Very Soft
20 - 40	Loose	5 - 15	Soft to Firm
40 - 120	Medium Dense	15 - 30	Stiff
120 - 200	Dense	30 - 60	Very Stiff
Greater than 200	Very Dense	Greater than 60	Hard

HGTC Grand Strand Campus Renovations
Myrtle Beach, SC
S&ME Project No: 1463-19-054

Sounding ID: SCPT-1

Date: Nov. 25, 2019
Estimated Water Depth: 7 ft
Rig/Operator: Truck / T. Chew

Total Depth: 49.6 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



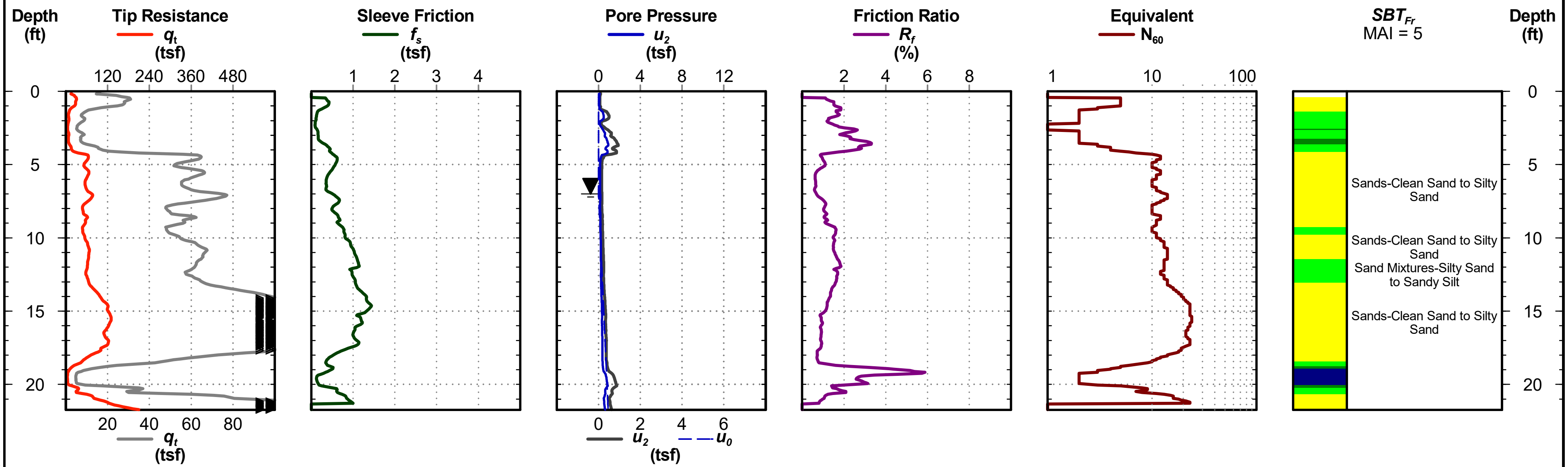
Cone Penetration Test

Electronic Filename: SCPT-1(004)_PD.DAT

HGTC Grand Strand Campus Renovations
Myrtle Beach, SC
S&ME Project No: 1463-19-054

Sounding ID: C-2

Date:	Nov. 25, 2019	**Total Depth:**	21.7 ft
Estimated Water Depth:	7 ft	**Termination Criteria:**	Target Depth
Rig/Operator:	Truck / T. Chew	**Cone Size:**	1.75



Cone Penetration Test

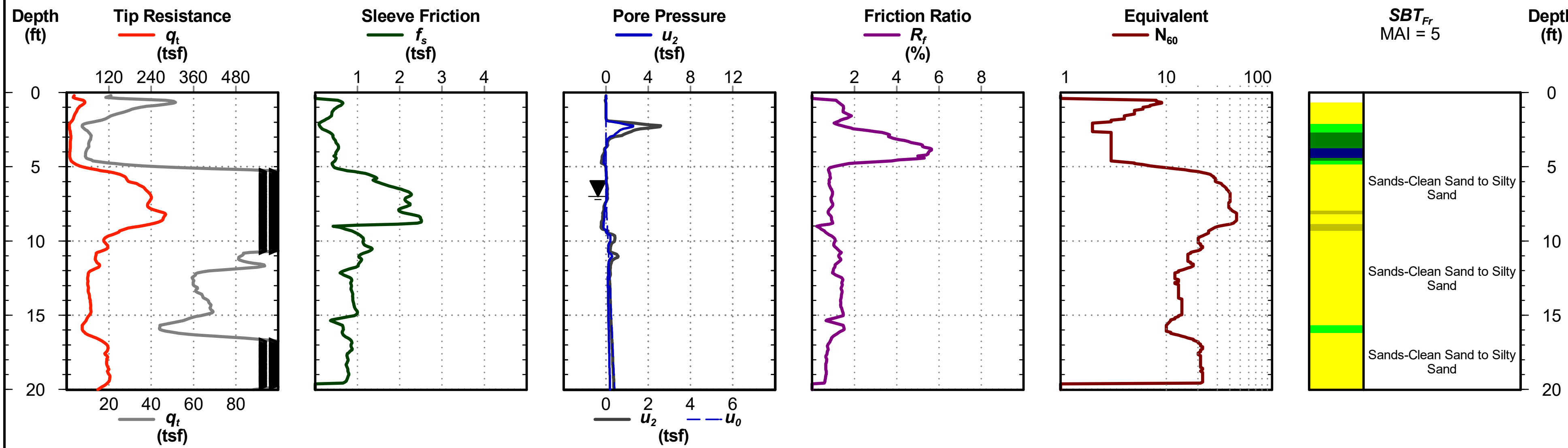
Electronic Filename: C-2(006)_PD.DAT

Sounding ID: C-3

HGTC Grand Strand Campus Renovations
Myrtle Beach, SC
S&ME Project No: 1463-19-054

Date: Nov. 25, 2019
Estimated Water Depth: 7 ft
Rig/Operator: Truck / T. Chew

Total Depth: 20.0 ft
Termination Criteria: Target Depth
Cone Size: 1.75



Cone Penetration Test

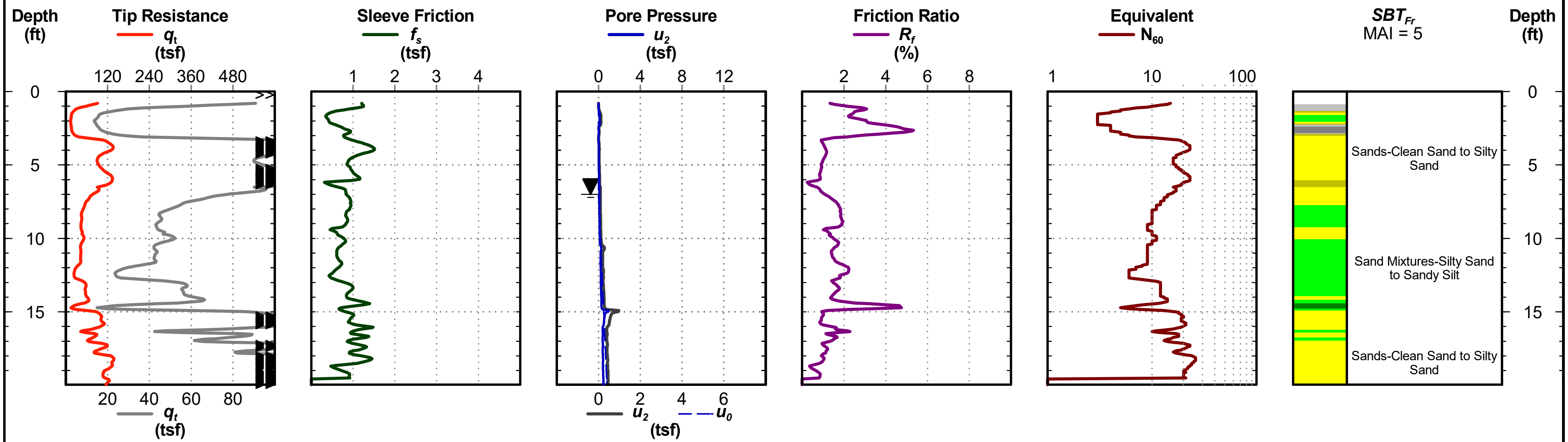
Electronic Filename: C-3(002)_PD.DAT

Sounding ID: C-4

HGTC Grand Strand Campus Renovations
Myrtle Beach, SC
S&ME Project No: 1463-19-054

Date: Nov. 25, 2019
Estimated Water Depth: 7 ft
Rig/Operator: Truck / T. Chew

Total Depth: 20.0 ft
Termination Criteria: Target Depth
Cone Size: 1.75



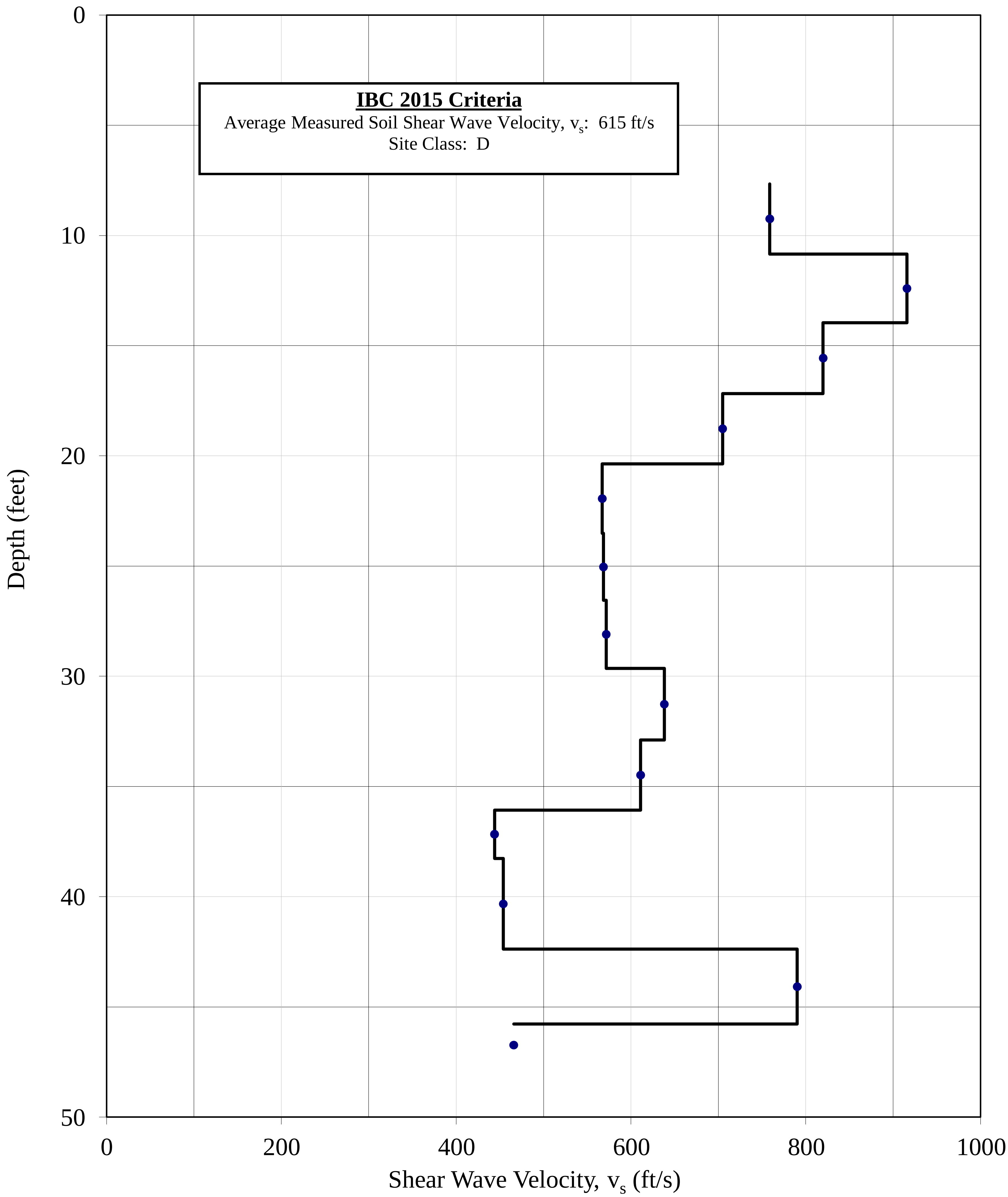
Cone Penetration Test

Electronic Filename: C-4(003)_PD.DAT

Shear Wave Velocity Calculations

HGTC Grand Strand Campus Renovations
Myrtle Beach, SC

Sounding ID: **SCPT-1** Project Number: **1463-19-054**
Date: 11/25/19



* Site Class based on 2015 International Building Code - *Table 1613.5.2* - *SITE CLASS DEFINITIONS*

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

Fill

Asphalt

Concrete

Topsoil

Gravel

Sand

Silt

Clay

Organic

Silty Sand

Clayey Sand

Sandy Silt

Clayey Silt

Sandy Clay

Silty Clay

Partially Weathered Rock

Cored Rock

WATER LEVELS

(Shown in Water Level Column)

▽ = Water Level At Termination of Boring
▼ = Water Level Taken After 24 Hours
◄ = Loss of Drilling Water
HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

SAMPLER TYPES

(Shown in Samples Column)

Shelby Tube

Split Spoon

Rock Core

No Recovery

TERMS

Standard Penetration Resistance - The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586.

REC - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

S&ME

PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	HAND AUGER BORING LOG: C-1

DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD: **Hand Auger**	PERFORMED BY: **S&ME/J. Prevatte**	
WATER LEVEL: **3.5' ATD**		

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 6 inches.		
		FILL **POORLY GRADED SAND WITH SILT (SP-SM)** - Tan, mostly fine to medium sand, few low plasticity to non-plastic fines, moist.		
1		**FILL** **SILTY SAND (SM)** - Greenish gray, mostly fine to medium sand, some low plasticity to non-plastic fines, marine shell fragments, moist.		
		SILTY SAND (SM) - Dark brown and black, mostly fine sand, some low plasticity to non-plastic fines, slight petroleum odor, moist.		
2				
3				▽ (3.5)
4		Boring terminated at 4 ft Target Depth		

DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	HAND AUGER BORING LOG: C-2

DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD: **Hand Auger**	PERFORMED BY: **S&ME/J. Prevatte**	
WATER LEVEL: **Not Encountered**		

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 8 inches.		
		<u>**FILL**</u> **SILTY SAND (SM)** - Dark brown, mostly fine sand, some low plasticity to non-plastic fines, moist.		
1		Boring terminated at 1 ft Auger Refusal		

DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	HAND AUGER BORING LOG: C-3

DATE STARTED:	**11/13/19**	DATE FINISHED:	**11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD:	**Hand Auger**	PERFORMED BY:	**S&ME/J. Prevatte**	
WATER LEVEL:	**3' ATD**			

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 8 inches.		
1		**CLAYEY SAND (SC)** - Dark brown and orange, mostly fine to medium sand, some low to medium plasticity fines, moist.		
2		**SANDY LEAN CLAY (CL)** - Dark brown and gray, mostly low to medium plasticity fines, some fine to medium sand, moist.		
3				▽
		CLAYEY SAND (SC) - Dark brown and gray, mostly fine to medium sand, some low to medium plasticity fines, wet.		
4		Boring terminated at 4 ft Target Depth		

DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	**HAND AUGER BORING LOG: C-4**

DATE STARTED:	**11/13/19**	DATE FINISHED:	**11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD:	**Hand Auger**	PERFORMED BY:	**S&ME/J. Prevatte**	
WATER LEVEL:	**Not Encountered**			

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 6 inches.		
		FILL **POORLY GRADED SAND WITH SILT (SP-SM)** - Tan, mostly fine to medium sand, few low plasticity to non-plastic fines, moist.		
1		**SILTY SAND (SM)** - Tan and dark brown, mostly fine to medium sand, some low plasticity to non-plastic fines, moist.		
2				
3				
4		Boring terminated at 4 ft Target Depth		

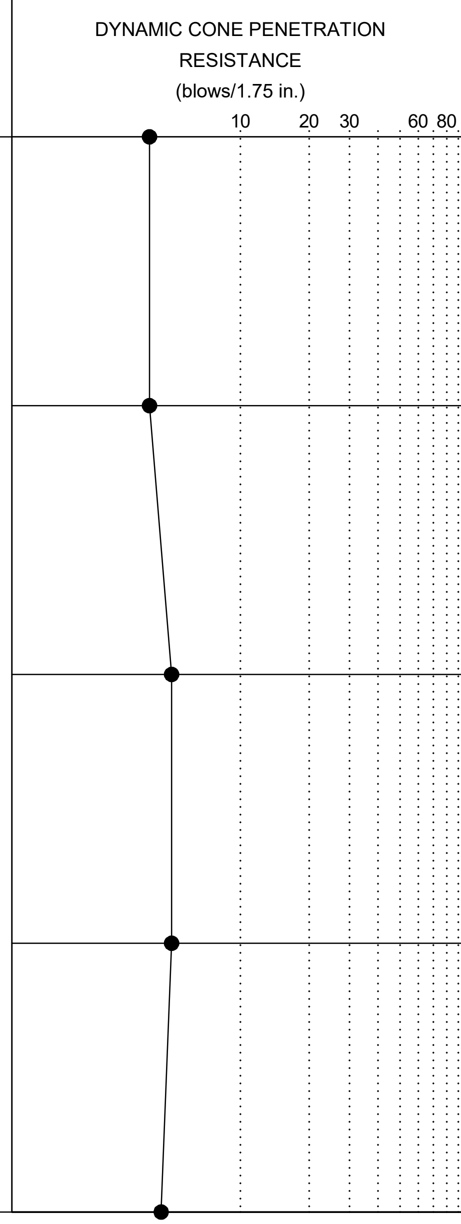
DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	**HAND AUGER BORING LOG: HA-1**

DATE STARTED:	**11/13/19**	DATE FINISHED:	**11/13/19**
SAMPLING METHOD:	**Hand Auger**	PERFORMED BY:	**S&ME/J. Prevatte**
WATER LEVEL:	**3' ATD**		

NOTES:
Elevation Unknown

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL	DCP VALUE
0		**TOPSOIL** - 10 inches.			4
1		**LEAN CLAY WITH SAND (CL)** - Soft to firm, dark brown, mostly low to medium plasticity fines, few fine sand, moist.			4
2					5
3				∇	5
4		Boring terminated at 4 ft Target Depth			5



DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

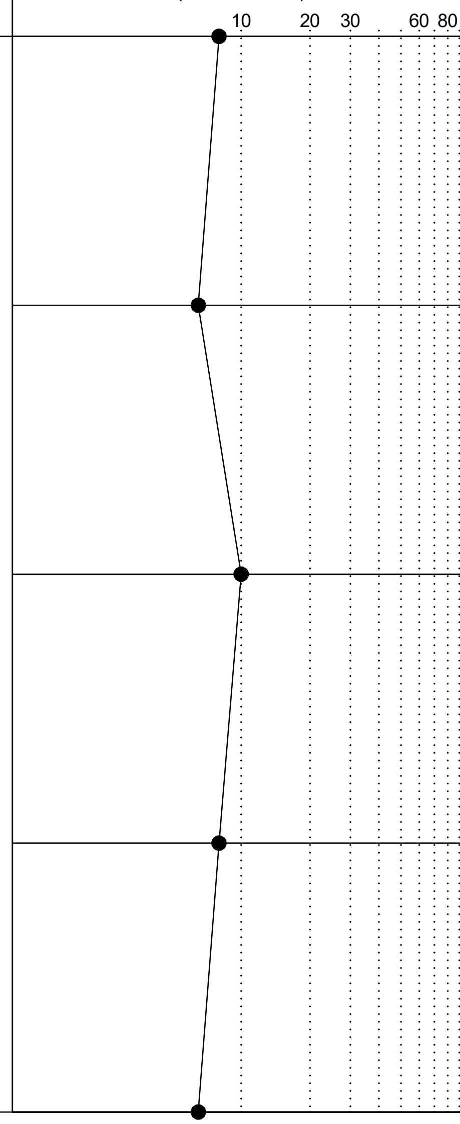
HAND AUGER BORING LOG: HA-2

PROJECT:	**HGTC Grand Strand Campus Renovations** **Myrtle Beach, South Carolina** **1463-19-054**
DATE STARTED:	**11/13/19**
DATE FINISHED:	**11/13/19**
SAMPLING METHOD:	**Hand Auger**
PERFORMED BY:	**S&ME/J. Prevatte**
WATER LEVEL:	**Not Encountered**

NOTES:
Elevation Unknown

Depth (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL	DCP VALUE
0	**TOPSOIL** - 4 inches.			8
	SILTY SAND (SM) - Loose, dark brown, mostly fine to medium sand, some low plasticity to non-plastic fines, moist to wet.			
1				7
2	**CLAYEY SAND (SC)** - Loose, orange and gray, mostly fine to medium sand, some low to medium plasticity fines, moist to wet.			10
3				8
4	Boring terminated at 4 ft Target Depth			7

DYNAMIC CONE PENETRATION RESISTANCE (blows/1.75 in.)



DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

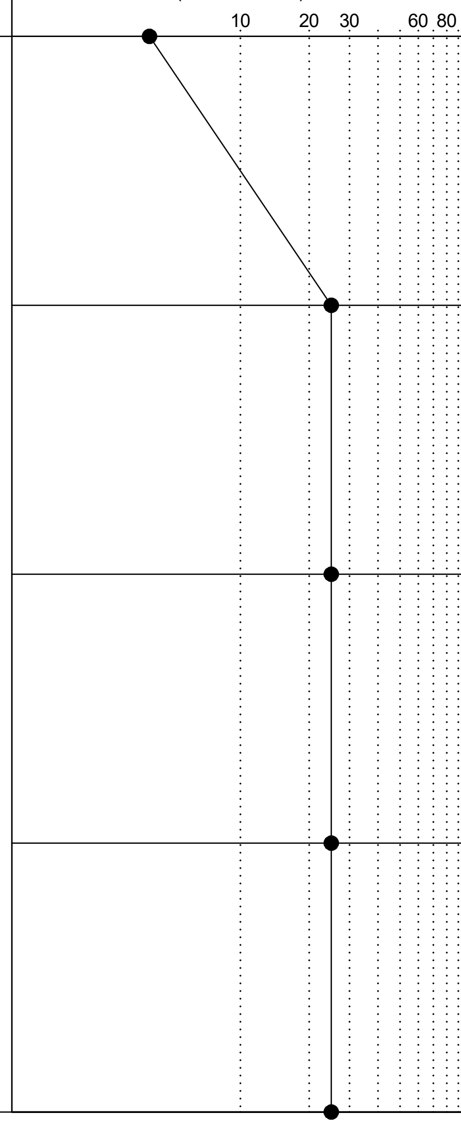
PROJECT:	HGTC Grand Strand Campus Renovations Myrtle Beach, South Carolina 1463-19-054	**HAND AUGER BORING LOG: HA-3**

DATE STARTED:	**11/13/19**	DATE FINISHED:	**11/13/19**
SAMPLING METHOD:	**Hand Auger**	PERFORMED BY:	**S&ME/J. Prevatte**
WATER LEVEL:	**Not Encountered**		

NOTES:
Elevation Unknown

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL	DCP VALUE
0		**TOPSOIL** - 6 inches.			4
0.5		**CLAYEY SAND (SC)** - Loose to medium dense, orange and gray, mostly fine to medium sand, some low to medium plasticity fines, moist.			
1					20+
1.5		**SILTY SAND (SM)** - Medium dense, brown, mostly fine to medium sand, some low plasticity to non-plastic fines, moist to wet.			
2					20+
3					20+
4		Boring terminated at 4 ft Target Depth			20+

DYNAMIC CONE PENETRATION RESISTANCE (blows/1.75 in.)



DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJECT:	**HGTC Grand Strand Campus Rennovations** **Myrtle Beach, South Carolina** **1463-19-054**	**TEST PIT LOG: TP-1**

DATE STARTED:	**11/13/19**	DATE FINISHED:	**11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD:	**Excavator**	PERFORMED BY:	**S&ME/J. Prevatte**	
WATER LEVEL:	**Not Encountered**			

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 4 inches.		
		CLAYEY SAND (SC) - Orange and brown, mostly fine to medium sand, some low to medium plasticity fines, moist.		
1		**SILTY SAND (SM)** - Dark brown and black, mostly fine to medium sand, some low plasticity to non-plastic fines, moist.		
2				
3		- - - White, mostly fine sand, moist to wet.		
4				
5		- - - Orange and white, wet.		
6		- - - Dark brown and gray.		

Boring terminated at 6.5 ft
Target Depth

PROJECT:	**HGTC Grand Strand Campus Rennovations** **Myrtle Beach, South Carolina** **1463-19-054**	**TEST PIT LOG: TP-2**

DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD: **Excavator**	PERFORMED BY: **S&ME/J. Prevatte**	
WATER LEVEL: **Not Encountered**		

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 6 inches.		
1		<u>**FILL**</u> **SILTY SAND (SM)** - Tan, mostly fine to medium sand, some low plasticity to non-plastic fines, some marine shell fragments and concrete debris, moist. **SILTY SAND (SM)** - Dark brown and gray, mostly fine to medium sand, some low plasticity to non-plastic fines, wet.		
2		**POORLY GRADED SAND WITH SILT (SP-SM)** - Tan and brown, mostly fine to medium sand, few low plasticity to non-plastic fines, some marine shell fragments, wet.		
3		**SANDY LEAN CLAY (CL)** Orange and gray, mostly low to medium plasticity fines, some fine sand, wet.		
4				
5				
6				
7		Boring terminated at 7 ft Target Depth		

PROJECT:	HGTC Grand Strand Campus Rennovations Myrtle Beach, South Carolina 1463-19-054	**TEST PIT LOG: TP-3**
DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD: **Excavator**	PERFORMED BY: **S&ME/J. Prevatte**	
WATER LEVEL: **7' ATD**		

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 8 inches.		
1 – 2		**SILTY SAND (SM)** - Dark brown and gray, mostly fine sand, some low plasticity to non-plastic fines, moist to wet.		
2		**POORLY GRADED SAND WITH SILT (SP-SM)** - Tan and brown, mostly fine to medium sand, few low plasticity to non-plastic fines, some marine shell fragments, wet.		
3 – 7		**SANDY LEAN CLAY (CL)** Orange and gray, mostly low to medium plasticity fines, some fine sand, wet.		▽ (7)

Boring terminated at 7.5 ft
Target Depth

PROJECT: HGTC Grand Strand Campus Rennovations Myrtle Beach, South Carolina 1463-19-054		TEST PIT LOG: TP-4
DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown
SAMPLING METHOD: **Excavator**	PERFORMED BY: **S&ME/J. Prevatte**	
WATER LEVEL: **7' ATD**		

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
		TOPSOIL - 4 inches.		
1 2 3		**CLAYEY SAND (SC)** - Dark brown and gray, mostly fine sand, some low to medium plasticity fines, moist.		
4 5 6 7		**SILTY SAND (SM)** - White, mostly fine sand, some low plasticity to non-plastic fines, moist to wet. - - - Brown, wet.		▽ (7)

Boring terminated at 7.5 ft
Target Depth

PROJECT: HGTC Grand Strand Campus Rennovations Myrtle Beach, South Carolina 1463-19-054		TEST PIT LOG: TP-5	
DATE STARTED: **11/13/19**	DATE FINISHED: **11/13/19**	NOTES: Elevation Unknown	
SAMPLING METHOD: **Excavator**	PERFORMED BY: **S&ME/J. Prevatte**		
WATER LEVEL: 7.5' ATD			

Depth (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION (feet)	WATER LEVEL
0 – 0.67		**TOPSOIL** - 8 inches.		
0.67 – 1.5		**SILTY SAND (SM)** - Dark brown, mostly fine sand, some low plasticity to non-plastic fines, moist.		
1.5 – 3.5		**CLAYEY SAND (SC)** - Orange and brown, mostly fine to medium sand, some low to medium plasticity fines, moist.		
3.5 – 8		**POORLY GRADED SAND WITH CLAY (SP-SC)** - White and gray, mostly fine to medium sand, few low plasticity to non-plastic fines, moist. - - - Brown, wet.		∇ (7.5)

Boring terminated at 8 ft
Target Depth

♦ Summary of Laboratory Procedures

Examination of Recovered Soil Samples

Soil and field records were reviewed in the laboratory by the geotechnical professional. Soils were classified in general accordance with the visual-manual method described in ASTM D 2488, "*Standard Practice for Description and Identification of Soils (Visual-Manual Method)*". Representative soil samples were selected for classification testing to provide grain size and plasticity data to allow classification of the samples in general accordance with the Unified Soil Classification System method described in ASTM D 2487, "*Standard Practice for Classification of Soils for Engineering Purposes*". The geotechnical professional also prepared the final boring and sounding records enclosed with this report.

Moisture Content Testing of Soil Samples by Oven Drying

Moisture content was determined in general conformance with the methods outlined in ASTM D 2216, "*Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil or Rock by Mass*." This method is limited in scope to Group B, C, or D samples of earth materials which do not contain appreciable amounts of organic material, soluble solids such as salt or reactive solids such as cement. This method is also limited to samples which do not contain contamination.

A representative portion of the soil was divided from the sample using one of the methods described in Section 9 of ASTM D 2216. The split portion was then placed in a drying oven and heated to approximately 110 degrees C overnight or until a constant mass was achieved after repetitive weighing. The moisture content of the soil was then computed as the mass of water removed from the sample by drying, divided by the mass of the sample dry, times 100 percent. No attempt was made to exclude any particular particle size from the portion split from the sample.

Percent Fines Determination of Samples

A selected specimen of soils was washed over a No. 200 sieve after being thoroughly mixed and dried. This test was conducted in general accordance with ASTM D 1140, "*Standard Test Method for Amount of Material Finer Than the No. 200 Sieve*." Method A, using water to wash the sample through the sieve without soaking the sample for a prescribed period of time, was used and the percentage by weight of material washing through the sieve was deemed the "percent fines" or percent clay and silt fraction.

Compaction Tests of Soils Using Modified Effort

Soil placed as engineering fill is compacted to a dense state to obtain satisfactory engineering properties. Laboratory compaction tests provide the basis for determining the percent compaction and water content needed to achieve the required engineering properties, and for controlling construction to assure the required compaction and water contents are achieved. Test procedures generally followed those described by ASTM D 1557,"*Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lbf/ft^3).*"

The relationship between water content and the dry unit weight is determined for soils compacted in either 4 or 6 inch diameter molds with a 10 lbf rammer dropped from a height of 18 inches, producing a compactive effort of 56,000 lbf/ft^3. ASTM D 1557 provides three alternative procedures depending on material gradation:

Method A

All material passes No. 4 sieve size
4 inch diameter mold
Shall be used if 20 percent or less by weight is retained on No. 4 sieve
Soil in 5 layers with 25 blows per layer

Method B

All material passes 3/8 inch sieve
4 inch diameter mold
Shall be used if 20 percent by weight is retained on the No. 4 sieve and 20 percent or less by weight is retained on the 3/8 Inch sieve.
Soil in 5 layers with 25 blows per layer

Method C

All material passes ¾ inch sieve
6-inch diameter mold
Shall be used if more than 20 percent by weight is retained on the 3/8 inch sieve and less than 30 percent is retained on the ¾inch sieve.
Soil in 5 layers with 56 blows per layer

Soil was compacted in the mold in five layers of approximately equal thickness, each compacted with either 25 or 56 blows of the rammer. After compaction of the sample in the mold, the resulting dry density and moisture content was determined and the procedure repeated. Separate soils were used for each sample point, adjusting the moisture content of the soil as described in Section 10.2 (Moist Preparation Method). The procedure was repeated for a sufficient number of water content values to allow the dry density vs. water content values to be plotted and the *maximum dry density* and *optimum moisture content* to be determined from the resulting curvilinear relationship.

Laboratory California Bearing Ratio Tests of Compacted Samples

This method is used to evaluate the potential strength of subgrade, subbase, and base course material, including recycled materials, for use in road and airfield pavements. Laboratory CBR tests were run in general accordance with the procedures laid out in ASTM D 1883, "*Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils*." Specimens were prepared in standard molds using two different levels of compactive effort within plus or minus 0.5 percent of the optimum moisture content value. While embedded in the compaction mold, each sample was inundated for a minimum period of 96 hours to achieve saturation. During inundation the specimen was surcharged by a weight approximating the anticipated weight of the pavement and base course layers. After removing the sample from the soaking bath, the soil was then sheared by jacking a piston having a cross sectional area of 3 square inches into the end surface of the specimen. The piston was jacked 0.5 inches into the specimen at a constant rate of 0.05 inches per minute.

The CBR is defined as the load required to penetrate a material to a predetermined depth, compared to the load required to penetrate a standard sample of crushed stone to the same depth. The CBR value was usually based on the load ratio for a penetration of 0.10 inches, after correcting the load-deflection curves for surface irregularities or upward concavity. However, where the calculated CBR for a penetration of 0.20 inches was greater than the result obtained for a penetration of 0.10 inches, the test was repeated by reversing the specimen and shearing the opposite end surface. Where the second test indicated a greater CBR at 0.20 inches penetration, the CBR for 0.20 inches penetration was used.

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

ASTM D 2216 ☑ *AASHTO T 265* ☐

S&ME, Inc. - Myrtle Beach: 1330 Highway 501 Business, Conway, SC 29526

Project #:	1463-19-054	Report Date:	11/27/2019
Project Name:	HGTC Grand Strand Renovations	Test Date(s):	11/22/2019
Client Name:	Horry-Georgetown Technical College		
Client Address:	2050 Highway 501 E; Conway, SC 29526		
Sample by:	J. Prevatte	Sample Date(s):	11/13/2019

Method: **A (1%)** ☐ **B (0.1%)** ☑

Balance ID.	19608	Calibration Date:	2/28/19
Oven ID.	17745	Calibration Date:	4/8/19

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft. or m.		grams	grams	grams	grams	%	
TP-4	Bulk-2	1'-2.5'	Green	83.90	223.40	205.70	17.70	14.5%	
TP-5	Bulk-1	3.75'-6'	HHH	84.20	204.60	191.50	13.10	12.2%	
C-3	S-1	2'-3.5'	Bob	82.10	123.20	113.50	9.70	30.9%	

Notes / Deviations / References

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

W. King, P.E.	WK	Project Engineer	12/2/19
Technical Responsibility	*Signature*	*Position*	*Date*

Form No: TR-D1140-1
Revision No. 1
Revision Date: 8/2/17

MATERIAL FINER THAN THE #200 SIEVE

ASTM D1140

S&ME, Inc. - Myrtle Beach: 1330 Highway 501 Business, Conway, SC 29526

Project #:	1463-19-054	Report Date:	11/27/2019
Project Name:	HGTC Grand Strand Renovations	Test Date(s):	11/22/2019
Client Name:	Horry-Georgetown Technical College		
Client Address:	2050 Highway 501 E; Conway, SC 29526		
Sample by:	J. Prevatte	**LAB#**	10
		Sample Dates:	11/13/2019

Method; A ☐ B ☑ Soaked ☑ Soak Time 2 Hrs

Boring #	Sample #	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Tare Wt. + Dry Wt. after Wash	% Passing #200
		ft. or m.		grams	grams	grams	grams	%
TP-4	Bulk-2	1'-2.5'	Green	83.90	223.40	205.70	159.00	**38.3%**
TP-5	Bulk-1	3.75'-6'	HHH	84.20	204.60	191.50	182.50	**8.4%**
C-3	S-1	2'-3.5'	BBB	82.10	123.20	113.50	91.80	**69.1%**

Balance ID. *19608* *Calibration Date:* *2/28/19* *#200 Sieve* *18775* *Calibration Date:* *2/28/20*

Notes / Deviations / References: ASTM D1140: Amount of Material in Soil Finer Than the No. 200 (75-um)) Sieve

W. King, P.E. — *Technical Responsibility*

WK — *Signature*

Project Engineer — *Position*

12/2/19 — *Date*

Form No. TR-D698-2
Revision No. : 1
Revision Date: 07/25/17

MOISTURE - DENSITY REPORT

Quality Assurance

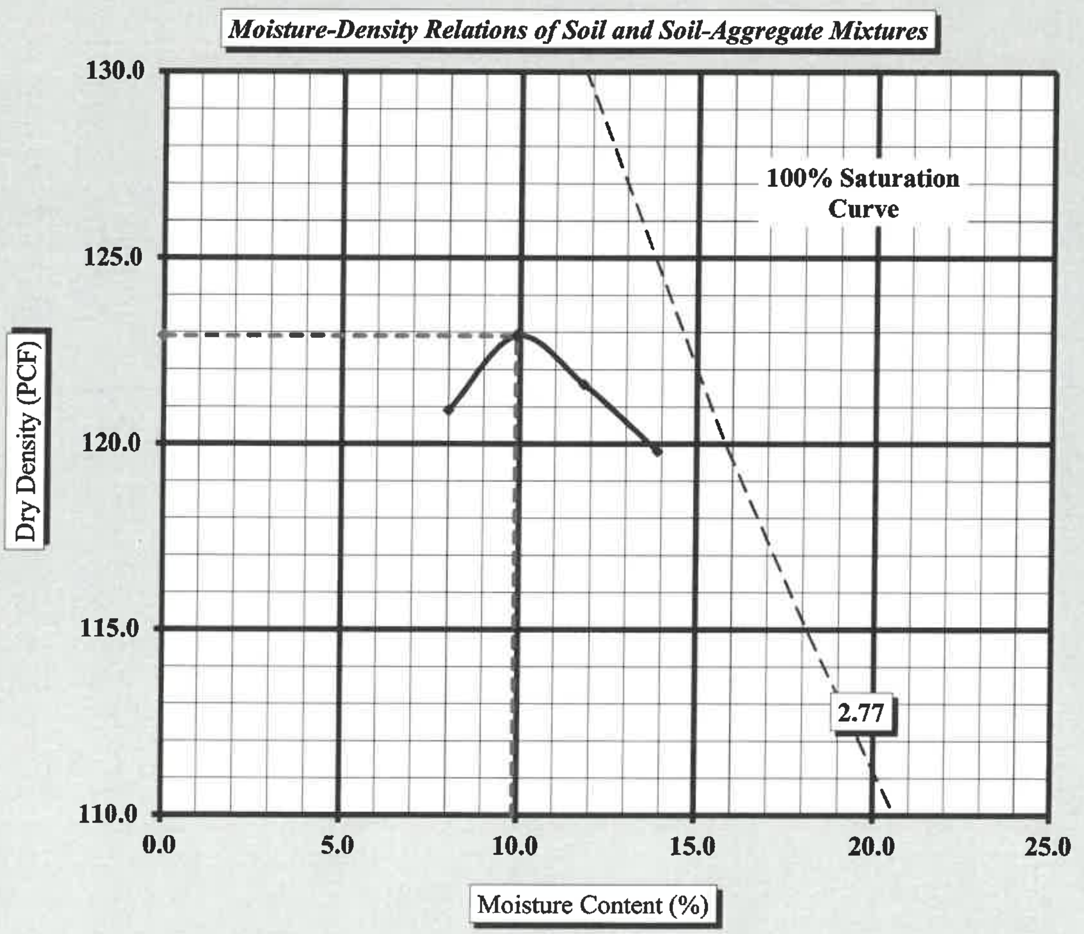
S&ME, Inc. - Myrtle Beach: 1330 Highway 501 Business, Conway, SC 29526

S&ME Project #:	1463-19-054	Report Date:	11/27/2019
Project Name:	HGTC Grand Strand Renovations	Test Date(s):	11/19/2019
Client Name:	Horry-Georgetown Technical College		
Client Address:	2050 Highway 501 E; Conway, SC 29526		

Boring #:	TP-4	Sample #:	Bulk-2	Sample Date:	11/13/2019
Location:	Test Pits And Borings	Lab #:	10	Depth:	1'-2.5'
Sample Description:	Brown Clayey Sand (SC)				

Maximum Dry Density 122.9 PCF. **Optimum Moisture Content 9.9%**

ASTM D1557 - - Method A



Soil Properties

Natural Moisture Content	14.5%
Specific Gravity of Soil	--
Liquid Limit	--
Plastic Limit	--
Plastic Index	--

% Passing	
3/4"	--
3/8"	--
#4	--
#10	--
#40	--
#60	--
#200	38.3%

Oversize Fraction	
Bulk Gravity	--
% Moisture	--
% Oversize	--
MDD	--
Opt. MC	--

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐
Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

W. King, P.E.	WK	Project Engineer	12/2/19
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D1883-T193-3
Revision No. 2
Revision Date: 08/11/17

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

ASTM D 1883

S&ME, Inc. - Myrtle Beach: 1330 Highway 501 Business, Conway, SC 29526

Project #:	1463-19-054	Report Date:	11/27/2019
Project Name:	HGTC Grand Strand Renovations	Test Date(s)	11/22/2019
Client Name:	Horry-Georgetown Technical College	Amended Report	
Client Address:	2050 Highway 501 E; Conway, SC 29526	Original Report 2/31/07	

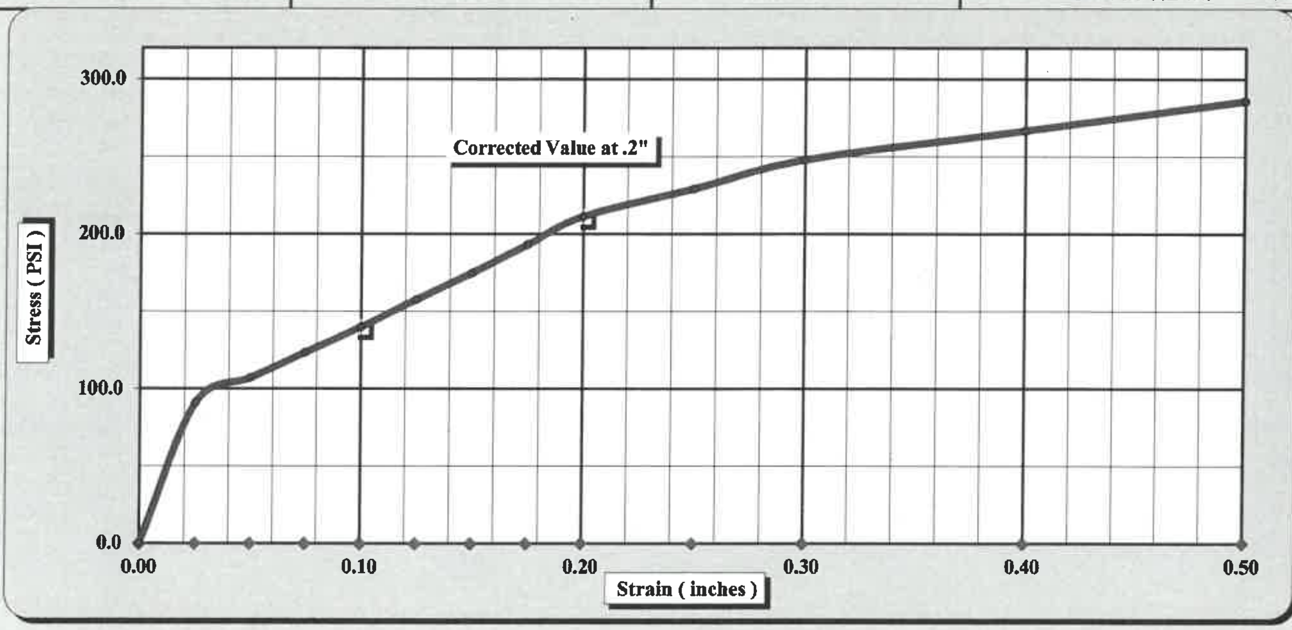
Boring #:	TP-4	Sample #:	Bulk-2	Sample Date:	11/13/2019
Location:	Test Pits and Borings	LAB #:	10	Depth:	1'-2.5'

Sample Description: Brown Clayey Sand (SC)

ASTM D1557 *Method A* Maximum Dry Density: 122.9 PCF Optimum Moisture Content: 9.9%

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: 1.0%

Uncorrected CBR Values				**Corrected CBR Values**			
CBR at 0.1 in.	14.0	CBR at 0.2 in.	14.1	CBR at 0.1 in.	14.0	CBR at 0.2 in.	14.1



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 6.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25		
Initial Dry Density (PCF)	116.7	Final Dry Density (PCF)	116.3
Moisture Content of the Compacted Specimen	10.8%	Moisture Content (top 1" after soaking)	12.8%
Percent Compaction	95.0%	Percent Swell	0.4%

Soak Time:	96 hrs.	Surcharge Weight	20.0	Surcharge Wt. per sq. Ft.	101.8
Liquid Limit	--	Plastic Index	--	Apparent Relative Density	--

Notes/Deviations/References: Liquid Limit: ASTM D 4318, Specific Gravity: ASTM D 854, Classification: ASTM D 2487

W. King, P.E.	WK	Project Engineer	12/2/19
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D698-2
Revision No. : 1
Revision Date: 07/25/17

MOISTURE - DENSITY REPORT

Quality Assurance

S&ME, Inc. - Myrtle Beach: 1330 Highway 501 Business, Conway, SC 29526

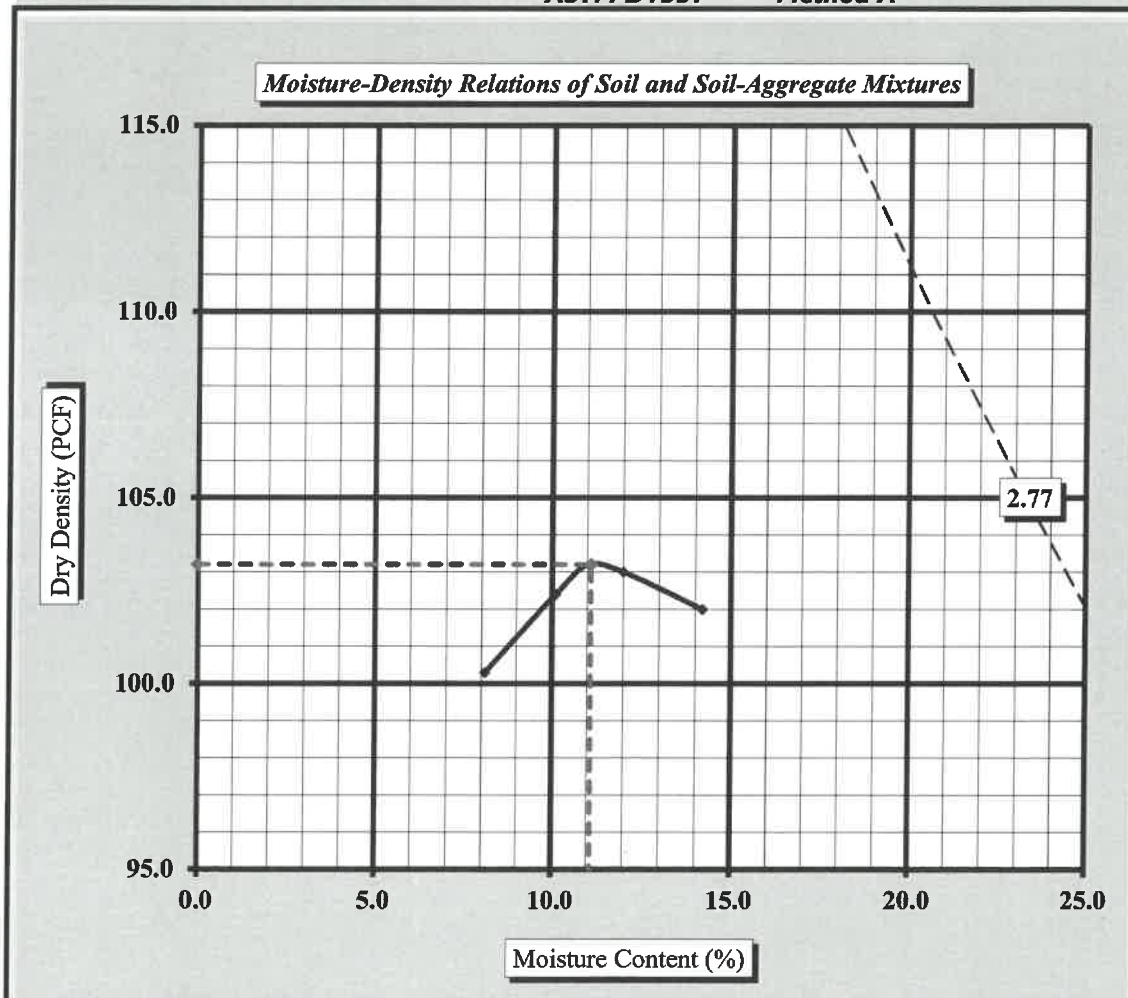
S&ME Project #:	1463-19-054	Report Date:	11/27/2019
Project Name:	HGTC Grand Strand Renovations	Test Date(s):	11/22/2019
Client Name:	Horry-Georgetown Technical College		
Client Address:	2050 Highway 501 E; Conway, SC 29526		

Boring #:	TP-5	Sample #:	Bulk-1	Sample Date:	11/13/2019
Location:	Test Pits And Borings	Lab #:	10	Depth:	3.75-6'

Sample Description: Brown Poorly Graded Sand with Clay (SP-SC)

Maximum Dry Density **103.2** **PCF.** **Optimum Moisture Content** **11.1%**

ASTM D1557 - - Method A



Soil Properties	
Natural Moisture Content	--
Specific Gravity of Soil	--
Liquid Limit	--
Plastic Limit	--
Plastic Index	--
% Passing	
3/4"	--
3/8"	--
#4	--
#10	--
#40	--
#60	--
#200	--
Oversize Fraction	
Bulk Gravity	--
% Moisture	--
% Oversize	--
MDD	--
Opt. MC	--

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐
Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:
ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

W. King, P.E.	WK	Project Engineer	12/2/19
Technical Responsibility	*Signature*	*Position*	*Date*