GEOTECHNICAL BASE LINE REPORT

US 1 over Interstate 20 Interchange Improvement
Lexington County, South Carolina

PREPARED FOR

STV, Inc.
2430 Mall Drive, Suite 315
North Charleston, South Carolina 29406

PREPARED BY

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3112 Devine Street
Columbia, South Carolina 29205

SCDOT Project ID: P030711
F&ME Project #: G6018.00

JULY 18, 2019

July 18, 2019

Mr. Chris Carlsten, P.E.
STV, Inc.
2430 Mall Drive, Suite 315
North Charleston, South Carolina 29406

Re.: Geotechnical Base Line Report
US 1 over I-20 Interchange Improvement
Lexington County, South Carolina
SCDOT Project ID P030711
F&ME File No. G6018.00

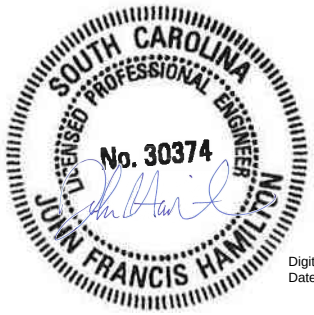
Mr. Carlsten:

Submitted herein is the geotechnical base line report for the above referenced project. Included is a summary of the subsurface data, the subsurface findings, the soil laboratory test results, and our preliminary evaluation for the conceptual bridge foundation systems and bridge/roadway embankments.

Please notify us if there are any questions or if we can be of further assistance.

Respectfully Submitted,

F&ME CONSULTANTS



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John F. Hamilton, P.E.
Geotechnical Design Manager

Attachments

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APPENDIX

1. PROJECT DESCRIPTION

The project is located east of the Town of Lexington, South Carolina at the intersection of US Highway 1 and Interstate 20. A site location plan is presented in Section 1 of the Appendix.

The intersection improvement project will consist of replacing the existing US 1 bridge over I-20 with a new bridge structure and improvements to the traffic flow through the interchange. Based on preliminary concepts, the proposed bridge and roadway construction could likely be constructed on a new alignment. Potential embankment construction may require fill placement on the order of ten (10) to fifteen (15) feet relative to the top of the existing embankments to meet the proposed grade. At the embankment side slope locations, fill heights on the order of twenty-five (25) feet are estimated.

The geotechnical field investigation was performed by F&ME in general accordance with the SCDOT Geotechnical Design Manual and the Subcontract for Professional Services, dated February 26, 2019.

2. SUBSURFACE INVESTIGATION

From March 6 to April 1, 2019, three (3) bridge soil test borings (designated as B-1 through B-3), eight (8) roadway and ramp soil test borings (designated as R-1 through R-8), two (2) auger borings (designated as B-1U and B-3U), and one (1) multi-channel analysis of surface waves (MASW) test were performed in the vicinity of the project. The boring locations were selected prior to the development of the preliminary design-build concepts, and the intent of the subsurface investigation was to provide a broad indication of the subsurface conditions at the site.

The soil test borings were advanced utilizing a trailer-mounted CME 45B drill rig. The borings utilized rotary wash drilling techniques to maintain a stable borehole. Standard Penetration Tests (SPT) were continuously obtained in the top ten (10) feet of each test boring. Following the continuous sampling, SPT samples were obtained at regular, five (5) foot intervals throughout the remaining depths of the borings. SPT samples were performed in general accordance with ASTM D-1586 to determine the relative densities and consistencies of the subsurface soils and to collect subsurface soil samples. An automatic hammer was used to perform the SPTs. The measured energy ratio for the CME 45B hammer is 84%.

The bridge borings were advanced to tri-cone roller bit drilling refusal and subsequently advanced into rock using NQ-sized rock coring equipment. The roadway embankment borings were advanced to a target depth and were subsequently terminated.

The auger borings were performed for the primary purpose of collecting intact, Shelby Tube samples. Boring B-1U was advanced to a depth of approximately fourteen (14) feet before encountering a restriction to Shelby tube advancement. Boring B-3U was advanced to a target depth of approximately thirty-five (35) feet.

Bulk soil samples were collected for laboratory testing to provide soil strength parameters for the existing embankment soils or potential pavement subgrade soils. The bulk soil samples were collected and composited from an approximate depth of five (5) to ten (10) feet below the existing ground surface.

The locations, depths, and elevations of the borings performed for the subsurface investigation are provided in the following table.

Subsurface Investigation Summary Table					
Boring I.D.	Test Hole Locale	Station (US 1)	Offset from CL (ft)	Boring Elevation (ft-MSL)	Test Depth (ft)
B-1	Bridge	323+59	107'-LT	374.1	102.6
B-2	Bridge	322+12	132' - LT	352.4	79.2
B-3	Bridge	320+54	61'-LT	375.1	101.0
R-1	Road	324+65	57'-LT	373.0	40.0
R-2	Road	319+67	110'-LT	374.8	40.0
R-3	Road	327+63	91'-RT	359.3	20.0
R-4	Road	323+06	495'-RT	355.9	20.0
R-5	Road	316+38	242'-LT	371.4	40.0
R-6	Road	322+67	626'-LT	361.6	20.0
R-7	Road	325+85	952'-LT	360.8	20.0
R-8	Road	327+65	353'-LT	362.0	40.0
B-1U	Bridge/Road	323+62	107'-LT	374.1	14.3
B-3U	Bridge/Road	320+51	60'-LT	375.1	35.3
BS-1	Road	323+71	40'-LT	374.3	10.0
BS-2	Road	320+61	117'-LT	375.7	10.0
BS-3	Road	327+59	94'-RT	359.7	5.0
BS-4	Road	321+52	649'-LT	362.8	5.0

The collected soil samples were examined and logged in the field by F&ME personnel, sealed in plastic bags, and transported to our laboratory for further examination and analyses. The soils were visually classified in the field based upon the Unified Soil Classification System.

Rock cores collected from the test borings were also transported to our laboratory for visual inspection and determinations of rock recovery ratios, rock-quality designation, Rock Mass Ratings (RMRs), Geologic Strength Indices (GSIs), and unconfined compressive (UC) rock strength testing. We have provided photos of the recovered rock core specimens in Section 7 of the Appendix.

We have provided a boring location plan in Section 3 of the Appendix displaying the locations of the borings performed during the subsurface investigation.

3. LABORATORY TESTING PROGRAM

Select soil samples from the borings were tested in F&ME's AASHTO certified laboratory to determine physical and engineering soil properties. These tests were used to identify the strength and behavioral characteristics of the soils as well as to verify the field classifications by the AASHTO classification system and the Unified Soil Classification System (USCS). The laboratory testing program is summarized in the following table.

Laboratory Testing Table	
Test Type	Quantity
Moisture Content	41
Grain Size w/ Wash #200	8
Wash #200	34
Atterberg Limits	42
CU Triaxial	4
Unconfined Compression - Rock	9
Standard Proctor	4
Electro-Chemical Series	2
California Bearing Ratio	2

All soil testing was conducted in general accordance with applicable ASTM/AASHTO standards. Data sheets presenting the results of the laboratory test program are provided in Section 10 of the Appendix.

4. GENERAL SITE GEOLOGY

The project site is located in the Fall Line zone within the Upper Coastal Plain Physiographic Provence of South Carolina. In descending order, the site subsurface conditions generally consist of existing embankment fill, cretaceous-aged coastal plain soils, residual soils, partially weathered rock (PWR), and bedrock. Being so close to the Fall Line, the degree of weathering of the bedrock can be variable. Based on the performed soil borings, the depth to bedrock appears relatively consistent at this site.

The Upper Coastal Plain deposits consist of either Black Creek Formation or Middendorf Formation soils. Both the Black Creek Formation and the Middendorf Formation are cretaceous-aged, marine deposits. The soil composition in these cretaceous-aged soils is highly variable with material ranging from non-plastic, clean sands to low plasticity silts and clays. Typically, the distinguishing characteristic of these deposits is a notable increase in relative densities encountered during drilling. Kaolinic clay-like material is often encountered within the Middendorf Formation or below the Black Creek Formation. The kaolinic material consists of silty/clayey sands and low plasticity silts and clays and is easily identified by its distinct white color. Within the cretaceous-aged soils, N-values were most commonly in excess of twenty (20) bpf. The blow counts from this formation generally suggest medium dense to dense sands and very stiff to hard silts and clays. The thickness of the Coastal Plain soils varies from thirty (30) feet to fifty (50) feet.

Underlying the Coastal Plain soils at the site are Piedmont residual soils. The encountered residuum generally consists of varying amounts of sand, silt, and clay. The thickness of the residual soils generally varies from ten (10) feet to twenty (20) feet. In general, SPT N-values suggest medium dense to very dense sands and very stiff to hard silts.

Below the residual soils, partially weathered rock (PWR) was encountered. PWR is an intermediate geo-material (IGM) that is experiencing a transition from the parent bedrock to weathered in-place, residuum. By definition, PWR is a soil exhibiting SPT N-values in excess of one hundred (100) blows per foot (bpf). The PWR thickness generally varies from five (5) to ten (10) feet.

Below the PWR, bedrock was encountered. The rock type encountered at this site is Granite.

5. SUBSURFACE CONDITIONS

The below soil descriptions, strata depths, and consistencies are generalized and were interpreted by F&ME based on the subsurface conditions as encountered in the test borings. We have included the soil test boring logs in the Appendix for detailed descriptions of the encountered soil conditions. As with any geologic formation, the depth and thickness of the soil strata will vary across the site. Although the test borings designate strata changes at specific depths in the description of the soil stratigraphy on the soil test boring logs, transitions between soil strata are generally gradual. The borings performed for this preliminary report were located along the existing roadway alignment, and strata changes and depths will vary from those performed along the conceptual roadway alignment. Therefore, the outlined subsurface profile shown on the soil test boring logs should only be considered general, on-site soil conditions and should not be utilized as an absolute indicator.

5.1 Soil Stratigraphy

The following table summarizes the soil stratification along the proposed new roadway alignment.

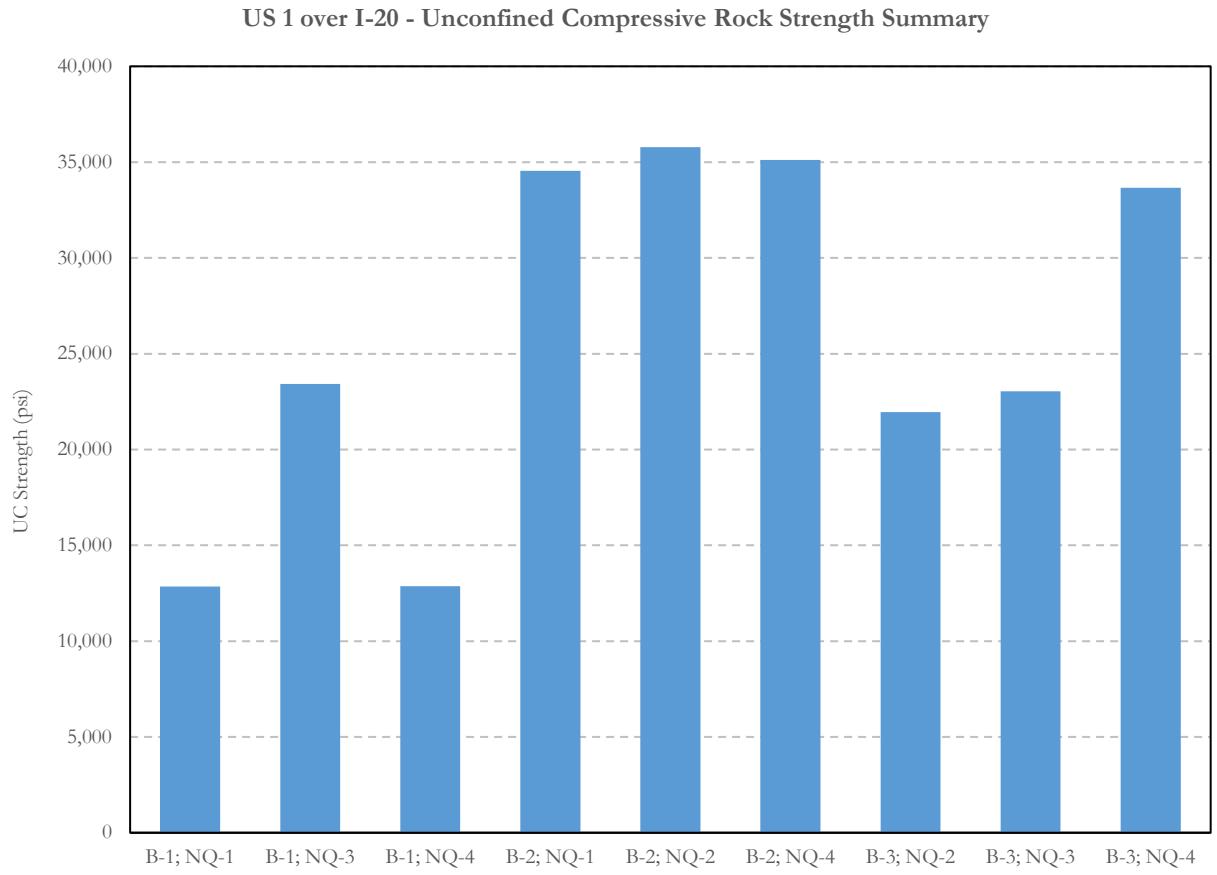
Soil Stratification Table					
Geologic Formation	Elevation of Top of Layer (ft-MSL)	Depth to Top of Layer (ft)	USCS Soil Type	Avg. SPT N-Value (bpf)	Comments
Existing Embankment Fill	+375	0	SM/SC	15	Existing Fill
Cretaceous	+365	10	SM/SC/ML/ SP-SM/SP/ SC-SM/CL/ SP-SC	20	Coastal Plain
Residuum	+320	55	SC/ML/ SP-SC	35	
PWR	+305	70	SM/SC	100+	
Bedrock	+294	81	N/A	N/A	See Section 5.2

5.2 Rock Conditions

Following auger refusal conditions encountered in the test borings, rock coring operations were conducted. The core lengths were generally twenty (20) feet. F&ME utilized diamond NQ rock coring techniques to recover the rock core samples in general accordance with ASTM D2113.

The rock type at this site is classified as a coarse-grained granite. The rock strength is classified as strong to extremely strong (ie. > 35,000 psi unconfined compressive strengths). The rock weathering is described as highly weathered to fresh. The in-situ rock has numerous, tight joints. The core recovery (REC) ranges from forty percent (40%) to one hundred percent (100%), and the rock-quality designation (RQD) for the lengths recovered ranges from twenty-two percent (22%) to ninety-nine percent (99%). Unconfined Compressive (UC) strengths of the intact fine-grained rock samples generally ranged from 12,000 to 35,000 pounds per square inch (psi). The rock recovered from soil boring B-2 consistently exhibited unconfined compressive strengths on the order of 35,000 psi.

The laboratory data sheets from the rock core compressive strength testing are provided in Section 10 of the Appendix. A graphical summary of the rock strength testing performed is provided in the chart below.



5.3 Subsurface Shear Wave Velocity

Geophysical testing consisting of a multi-channel analysis of surface waves (MASW) test was performed from the I-20 ground elevation at the northwestern quadrant of the interchange. The MASW location is provided on the Boring Location Plan in Section 3 of the Appendix. From the geophysical testing, a subsurface shear wave velocity profile was developed. Based on the shear wave velocity profile, the depth at which the shear wave velocity exceeds 2,500 ft/sec is approximately eighty-five (85) feet. The graphical shear wave velocity profile is provided in Section 6 of the Appendix.

The shear wave velocity information was submitted to SCDOT for development of the project seismic design data.

5.4 Groundwater Conditions

Groundwater table measurements were recorded immediately following completion of the borings and/or 24-hours following completion of the borings. The depth to the groundwater table ranged from approximately five (5) to thirty (30) feet. These depths correspond to a groundwater elevation ranging from approximately 350 ft-MSL to 355 ft-MSL. Groundwater elevations along this project will fluctuate with climactic events. During and following periods of rainfall, the water table may be encountered at higher elevations than identified on the field testing logs. In addition, the site is conducive to perched groundwater conditions. We would expect that water from recent rainfall would slowly drain through the dense, Cretaceous soils and fine-grained residuum. Perched groundwater is not indicative of the true, static groundwater table. The Design-Build team should evaluate the groundwater conditions at the site and exercise engineering judgement to assign an appropriate groundwater table for design purposes.

6. CONCEPTUAL GEOTECHNICAL ASSESSMENT

The conclusions and recommendations presented in this report are preliminary. The recommendations are based upon the general soil conditions indicated by the preliminary soil test borings, our analyses of the site and subsurface conditions, and our experience on similar projects. The recommendations do not reflect variations in subsurface conditions or the presence of undiscovered obstructions that could exist intermediate of the soil test boring locations or in unexplored areas of the site. Once bridge plans are finalized, a final geotechnical investigation will be performed, and a final geotechnical report presenting foundation analyses and recommendations will be developed.

6.1. Site Preparation

Based on the subsurface conditions as encountered in the preliminary field investigation, the soil subgrade below the planned bridge approach embankment areas is anticipated to be adequate for construction of the bridge and roadway embankments. Extensive undercutting or other ground modifications are not expected for acceptable embankment performance. Any areas not explored during the investigation, presented herein, should be carefully evaluated for geotechnical performance relative to the design-build team's selected concept.

Temporary and permanent site drainage should be established as soon as possible to promote drainage away from the proposed embankment subgrade locations. Establishing good site drainage prior to construction and maintaining it thereafter can minimize the effects of surface run-off and shallow and/or fluctuating groundwater. Permanent site drainage should be established to prevent soils at and below the roadway subgrade and the foundation elements from becoming saturated and to minimize fluctuations in moisture contents. The shear strength of soils typically decreases with increasing moisture content and saturation. Therefore, site drainage is the single most critical factor impacting construction and the long-term performance of the roadway.

Site preparation should be performed in accordance with Section 201 of the 2007 SCDOT Standard Specifications for Highway Construction, supplemental specifications, and/or special provisions. Where existing ground surface approximates final grade or where final roadway embankment fill heights will not exceed five (5) feet above existing grade, the ground surface below the embankment footprint should by stripped of any organic materials and topsoil to depths as required, and grubbing of tree root systems will be required. Stump holes and other holes resulting from obstruction removal shall be backfilled with suitable material and properly compacted. In planned roadway embankment areas where fill heights will exceed five (5) feet, stumps may be left in place as long as stumps do not extend more than eight (8) inches above ground line.

6.2. Geotechnical Seismic Hazard Potential

Geotechnical seismic hazards consist of a loss in a soil's shear strength through cyclic ground motions induced by earthquakes. In sand-like soils, this phenomenon is typically referred to as soil liquefaction. Cyclic-softening is the typical terminology for fine grained soils. Liquefaction of sand-like soils is considered the most devastating seismically induced geotechnical hazard.

Liquefaction is the loss of a soil's shear strength due to a rapid increase in pore water pressure resulting from soil particle dilation induced by seismic vibrations. Soils most susceptible to liquefaction generally consist of saturated, loose, "clean" (i.e., Plasticity Indexes less than 7), fine (10% particle size ranging from 0.07 millimeters to 0.25 millimeters) sands. Soil softening occurs in moderate to high plasticity silts and clays.

Based on a qualitative review of the collected subsurface information, extensive seismic Soil Strength Loss (SSL) is not expected at the site.

6.3. Static Settlement

In general, the proposed bridge and roadway embankment subgrade soils consist of moderate density/consistency sand and silt above the static, groundwater table. Fill placement along the project will result in deformation of the subgrade soils. We anticipate that any problematic soils near the ground surface, would be removed and replaced prior to fill placement, since these soils would be difficult to stabilize prior to embankment construction. We anticipate that a majority of the settlement across the project would occur rapidly with fill placement. The potential for extensive, long-term consolidation settlements appears to be low at the site.

6.4. Embankment Slope Stability

Static and seismic embankment slope stability analyses are required at the bridge embankments. Only static stability analyses are required at the roadway embankment locations as defined in the GDM. From reviewing the boring logs, we anticipate that most of the static and seismic slope stability analyses will yield resistance factors that meet the GDM criteria without ground improvement. In certain locations, soil reinforcement may be necessary to achieve the desired resistance factor.

6.5. Pile Corrosion and Deterioration Potential

Per AASHTO LRFD Bridge Design Specifications, the following soil or site conditions are considered indicative of a potential for steel and/or concrete pile deterioration or corrosion.

1. Resistivity less than 2,000 ohm-cm;
2. pH less than 5.5;
3. pH between 5.5 and 8.5 in soils with high organic content;
4. Sulfate concentrations greater than 1,000 ppm;
5. Landfills and cinder fills;
6. Soils subject to mine or industrial discharge; and,
7. Areas with a mixture of high resistivity soils and low resistivity high alkaline soils.

Electrochemical testing was performed on select soils within soil boring B-1 and bulk sample BS-2. The results from the electro-chemical laboratory testing are provided in Section 10 of the Appendix. Based on the results from the corrosion series testing, the potential for subsurface steel corrosion exists in the general vicinity of soil boring B-1. At this location, the measured pH does not conform to the acceptable AASHTO limits. Based on the collected data, steel corrosion is not expected within the surficial soils near and in similar composition to BS-2. Sulfate levels were less than the allowable limits, and the potential for subsurface concrete degradation is not expected at the site. Following additional subsurface testing, the D-B team should carefully evaluate the geotechnical conditions relative to corrosion and degradation and provide mitigation measures, as necessary.

6.6. Pile Foundations

Pile foundations are anticipated for support of the bridge end bents and may be used for support of bridge interior bents depending on the site geometry. Pile foundations may also be used to support other various structural components of the project such as retaining walls, sound walls, and overhead signs. Driven pile installations would be preferred, and we anticipate that most locations can utilize driven pile techniques. The potential for predrilling at this site is low. In general, pile foundations are considered preferable for the anticipated construction. Specific pile foundation design issues are discussed in the following sections.

6.6.1. Axial Resistance

The Strength limit state axial loading conditions will likely to govern the geotechnical pile foundation design.

Non-displacement, driven piles will develop a majority of the required driving resistance through skin friction in the Coastal Plain and residual soils and end bearing on PWR or bedrock. We expect that medium-sized pile hammers will be required to advance the piles through the denser Coastal Plain and residuum material and mobilize the required driving resistance. Depending on the loading conditions, the pile driving termination criteria may consist of driving the piles to a refusal condition. The Contractor should exercise care to not over-drive, over-stress, or damage piles on an impenetrable bearing stratum.

Based on the subsurface conditions, displacement piles are suitable at the site. If displacement piles are utilized, we anticipate a composite pile section would be preferred. The composite pile would consist of a larger top of pile section that would develop a majority of the axial resistance and smaller, shorter bottom of pile section that would improve drivability. We expect that medium to large sized pile hammers will be required to advance the piles through the denser Coastal Plain and residuum material beyond the minimum pile tip elevation required for lateral stability.

If the pile tip elevations are placed above a location where a pile driving practical refusal condition exists, then the D-B Contractor may elect to perform Pile Dynamic Analyses (PDA) testing with CAPWAP measurements to monitor pile driving stresses during driving and to verify the in-place, driven pile resistance. If the required driving resistance is not attained during initial drive, then a wait period may be implemented to allow for pile freeze. Following the wait period, pile driving re-strikes should be performed. Continuous PDA testing should be considered during both the initial drive and the re-strikes, as necessary. The number of required PDA tests shall be in accordance with the GDM.

6.6.2. Lateral Resistance

For the Strength limit state, Service limit state, and the Extreme Event limit state, we anticipate that the driven piles will develop the required lateral stability in the existing embankment fill and the coastal plain soils. SSL should be evaluated to determine if foundations should be extended below the depths needed to satisfy the Strength and Service limit states. At the end bents, the seismic bridge abutment backwall passive pressure shall be calculated in accordance with Chapter 14 of the GDM for the existing embankment fill material or the selected embankment fill material.

6.6.3. Drivability

Driven piles will likely use a diesel pile hammer. We anticipate that non-displacement piles (ie. steel H-piles or steel open-ended pipe piles) will be utilized at the end bents and may be utilized at interior bents depending on the site geometry. Pre-stressed concrete (PSC) piles or closed-end steel pipe piles are also deemed suitable at the site.

Based on the anticipated pile lengths, we expect that most steel pile foundations will require a pile splice and will be driven in two (2) sequences. When pile driving in the denser coastal plain soils and when pile tip elevations are above the minimum tip elevations, the Contractor should be careful to minimize the time between driving sequences to avoid substantial pile freeze such that the piles cannot be further advanced to the minimum tip elevation requirement. We anticipate that a medium/large-sized pile hammer will be required. We expect that most piles will be driven to a practical refusal condition on PWR or bedrock. The Contractor should exercise care to not over-drive, over-stress, or damage piles on an impenetrable bearing stratum after encountering a practical refusal condition. Assuming that pile installations will terminate on a practical refusal condition and due to the proximity of commercial and residential structures relative to the proposed construction, the Contractor should develop a strategy to manage and limit the generated earth-borne vibrations from pile installations.

For a properly selected driving system, we do not anticipate unusual pile driving issues for successful installation of the driven piles. The selected driving system shall address driving compressive and tensile stresses to conform to the SCDOT criteria.

6.7. Drilled Shaft Foundations

We anticipate that drilled shaft foundations would be an option at the bridge interior bents. Drilled shafts may also be used to support other various structural components of the project such as retaining walls, sounds walls, and overhead signs. We anticipate that drilled shaft sizes could range from 36 inch to 60 inch diameter shafts. Specific drilled shaft design issues are discussed in the following sections.

6.7.1. Axial Resistance

The Strength limit state axial loading conditions are expected to govern the geotechnical design of drilled shafts.

Depending on the approach taken by the Design-Build team, we expect that a majority of the drilled shafts will develop the required axial resistance through skin friction in the Coastal Plain, residuum, IGM and bedrock and/or through end bearing on bedrock. Since drilled shafts mobilize shaft resistance and end resistance at different displacements, it is difficult to predict the load transfer from skin resistance to tip resistance. The Design-Build Team should exercise caution when using a drilled shaft design including both skin friction and end bearing in rock.

Construction casing will be required to facilitate drilled shaft construction. It is anticipated that the casing would be advanced a short distance from the ground surface, and the drilling slurry would provide stability for the excavation. The drilled shaft design methodology does not allow for resistance development in the cased portion of the drilled shaft. As such, the drilled shaft design will generate the required resistance in the uncased portion below the casing tip elevation.

6.7.2. Lateral Resistance

For the Strength limit state and Extreme Event I limit state, the drilled shafts will develop most of the required lateral stability in the Coastal Plain soils and the residuals soils. At this site, we expect the axial loading condition will govern the geotechnical drilled shaft design.

6.7.3. Constructability

Drilled shaft construction will likely require excavation of hard soil (SPT N-values in excess of 100 bpf) or rock. In general, the measured rock strengths along the project suggest strong to extremely strong rock conditions. The extremely strong rock conditions are generally confined to the proposed interior bent locations where drilled shafts are a potential foundation option. Rock strengths at this location were consistently on the order of 35,000 psi. Drilling in this type of rock will likely be slow. The Contractor should be prepared to deal with extremely hard rock in their drilled shaft installation plan. Specialized drilling equipment may be required to excavate through the hard bedrock.

6.8. Shallow Foundations

Shallow foundations are not typically utilized on SCDOT bridges due to the difficulty with balancing both settlement and bearing capacity requirements as well as constructability issues. At this site, shallow foundations are not deemed suitable as a bridge substructure element. Shallow foundations may be desired for support of retaining walls, sound walls, overhead signs, or other structural components not listed herein if the subsurface conditions are conducive. Specific shallow foundation design issues are discussed in the following sections.

6.8.1. Bearing Capacity and Settlement

Where axial loads are low, the groundwater table is deep, and the soils are sand-like, shallow foundations may be an appropriate foundation option for non-bridge foundations. If SSL and/or soft soils are present below the proposed bottom of footing elevation and if shallow groundwater is present above the proposed bottom of footing elevation, then shallow foundations should not be considered. The Structural Engineer and Geotechnical Engineer should coordinate their designs such that all performance criteria are met.

6.8.2. Constructability

The ability to utilize shallow foundations may be limited by the site geometry. Depending on the construction sequencing and maintenance of traffic concept, temporary shoring may be implemented to facilitate the excavation requirements for shallow foundation construction. The shallow foundation subgrade soils may be moisture sensitive, and surface water should be directed away from any excavation to avoid undercutting.

Given the appropriate site and soil conditions, we see no unusual constructability conditions that would inhibit the use of non-bridge shallow foundations for this project.

7. EXISTING PAVEMENTS AND SUBGRADE SOIL CONDITIONS

Four (4) asphalt pavement cores were collected from the borings performed along US 1, and one (1) asphalt pavement core was collected from the existing Brickyard Road cul-de-sac. Photos of the asphalt cores are provided in Section 8 of the Appendix. From observations of the extracted cores, the existing US 1 mainline asphalt thickness varied from three (3) to six (6) inches and is underlain by a Graded Aggregate Base Course (GABC). The thickness of the GABC is approximately six (6) inches.

From the soil test borings performed along the existing US 1 alignment and the CBR testing performed at the existing interstate ramps, we note that the quality of the subgrade material near and below the existing pavements is "moderate". A majority of the near surface soil material yielded an AASHTO soil classification of A-1 to A-4. At bulk sample BS-3 location (offset to soil boring R-3), a CBR value of approximately five (5) was recorded. At bulk sample BS-4 location (offset to soil boring R-6), a CBR value of approximately eleven (11) was recorded.

8. LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to the referenced project. The conclusions and recommendations contained herein are based upon the provided test borings and testing result data, contained within, and applicable standards in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

APPENDIX

APPENDIX

SECTION 1 SITE LOCATION PLAN

TN
MN (7.3°W)

Scale 1 : 50,000

1" = 4,166.7 ft Data Zoom 12-0

F&ME CONSULTANTS, INC.
COLUMBIA, SC

REV.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. _____ DATE _____
DWG. CTC DATE 4.5.19 GROUP ____ – ____
R/W _____ DATE _____

US1 REPLACEMENT BRIDGE OVER I-20
LEXINGTON COUNTY, SOUTH CAROLINA

SITE LOCATION PLAN

F&ME JOB NO. G6018.000

SCALE = AS NOTED | FIGURE 1

APPENDIX

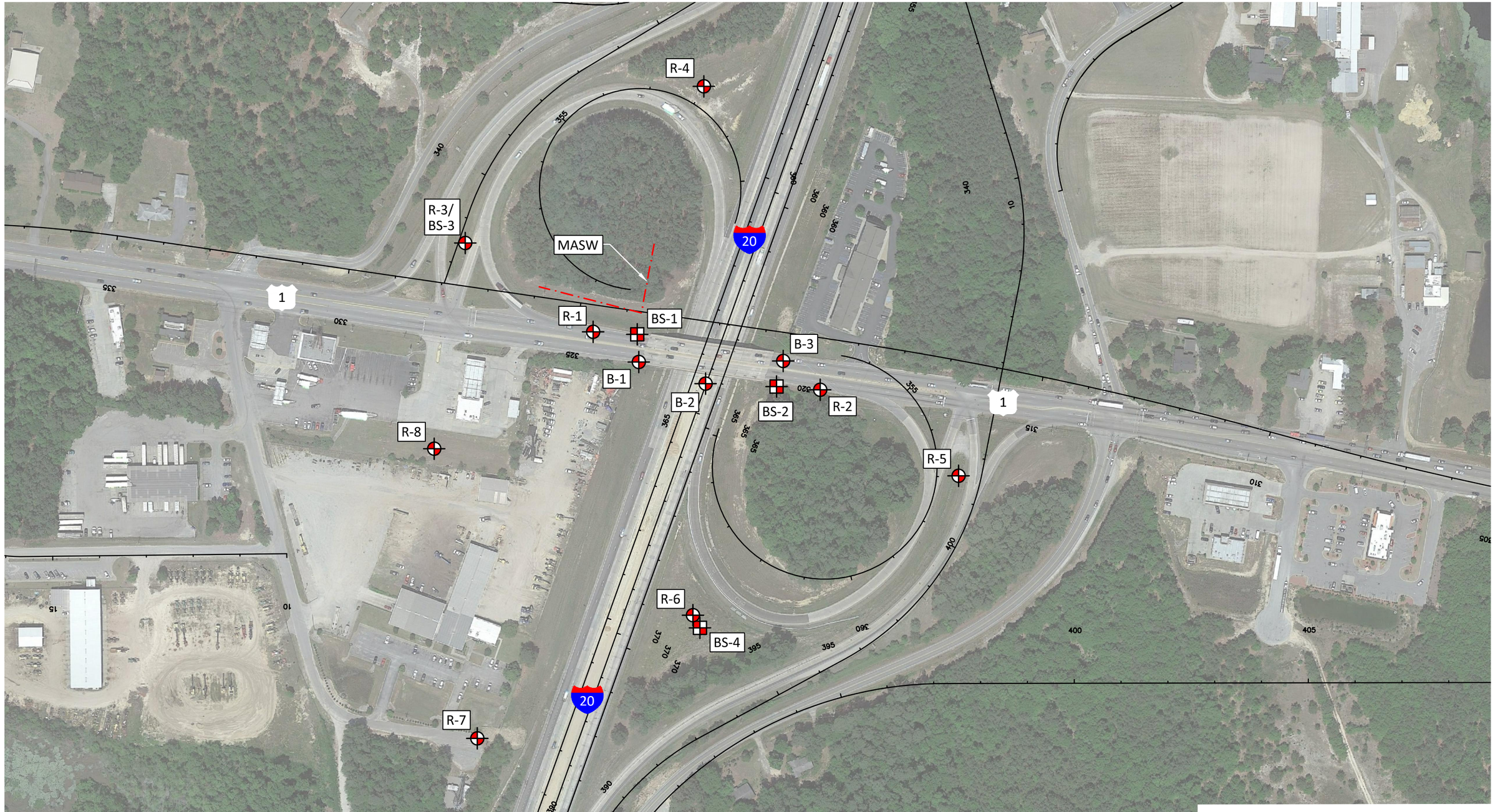
SECTION 2 GEOTECHNICAL INVESTIGATION SUMMARY

Field Investigation Summary

Boring ID	Test Hole Locale	Alignment	Station	Offset from CL	Northing	Easting	Latitude	Longitude	Elevation	Depth
B-1	Bridge	US-1	323+59	107'-LT	780455.811	1940741.605	33.9782769	-81.1954978	374.1	102.6
B-2	Bridge	US-1	322+12	132' - LT	780410.335	1940884.035	33.9781521	-81.1950257	352.4	79.2
B-3	Bridge	US-1	320+54	61'-LT	780458.714	1941049.873	33.9782867	-81.1944784	375.1	101.0
R-1	Road	US-1	324+65	57'-LT	780521.160	1940643.453	33.978455	-81.1958182	373.0	40.0
R-2	Road	US-1	319+67	110'-LT	780396.966	1941128.457	33.9781167	-81.1942174	374.8	40.0
R-3	Road	US-1	327+63	91'-RT	780710.636	1940370.751	33.9789951	-81.1967069	359.3	20.0
R-4	Road	US-1	323+06	495'-RT	781045.220	1940880.409	33.9798937	-81.1950198	355.9	20.0
R-5	Road	US-1	316+38	242'-LT	780213.418	1941424.390	33.9776032	-81.1932464	371.4	40.0
R-6	Road	US-1	322+67	626'-LT	779915.632	1940857.088	33.9768115	-81.1951183	361.6	20.0
R-7	Road	US-1	325+85	952'-LT	779652.646	1940396.473	33.976076	-81.1966263	360.8	20.0
R-8	Road	US-1	327+65	353'-LT	780271.239	1940304.482	33.9777615	-81.19694	362.0	40.0
B-1U	Bridge/Road	US-1	323+62	107'-LT	780456.499	1940738.685	33.9782782	-81.1955055	374.1	14.3
B-3U	Bridge/Road	US-1	320+51	60'-LT	780458.714	1941052.873	33.978286	-81.194469	375.1	35.3
BS-1	Road	US-1	323+71	40'-LT	780514.196	1940738.138	33.978439	-81.1955081	374.3	10.0
BS-2	Road	US-1	320+61	117'-LT	780403.386	1941035.337	33.9781382	-81.1945243	375.7	10.0
BS-3	Road	US-1	327+59	94'-RT	780713.053	1940374.463	33.9789815	-81.1967086	359.7	5.0
BS-4	Road	US-1	321+52	649'-LT	779890.943	1940868.504	33.9767245	-81.1950737	362.8	5.0

APPENDIX

SECTION 3 BORING LOCATION PLAN



LEGEND:

- B-X — BRIDGE SOIL TEST BORING LOCATION
- R-X — ROAD/EMBANKMENT SOIL TEST BORING LOCATION
- BULK SAMPLE LOCATION

REV.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. ____ DATE ____
DWG. CTC DATE 4.26.19 GROUP ____ – ____
R/W ____ DATE ____

F&ME CONSULTANTS, INC.
COLUMBIA, SC

US1 REPLACEMENT BRIDGE OVER I-20
LEXINGTON COUNTY, SOUTH CAROLINA

BORING PLAN

F&ME JOB NO. G6018.000

SCALE: NTS | FIGURE 2

APPENDIX

SECTION 4 GENERALIZED SUBSURFACE PROFILE

KEY TO SYMBOLS

PROJECT NAME US 1 Bridge over I-20

PROJECT COUNTY Lexington

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


ASPHALT


PWR: Partially Weathered Rock


BEDROCK: Bedrock


Topsoil


CL: USCS Low Plasticity Clay


SC: USCS Clayey Sand


SP: USCS Poorly Graded Sand


SP-SM: USCS Poorly Graded Sand with Silt


SP-SC: USCS Poorly Graded Sand with Clay


GP: USCS Poorly-graded Gravel


SM: USCS Silty Sand


ML: USCS Silt


MLS: USCS Sandy Silt


SC-SM: USCS Silty, Clayey Sand

SOIL TEST ID'S

B-#	BRIDGE SOIL TEST BORING
R-#	ROADWAY SOIL TEST BORING
B-#U	AUGER BORING
BS-#	BULK SAMPLE
MASW-#	MULTI-CHANNEL ANALYSIS OF SURFACE WAVES TEST

ABBREVIATIONS

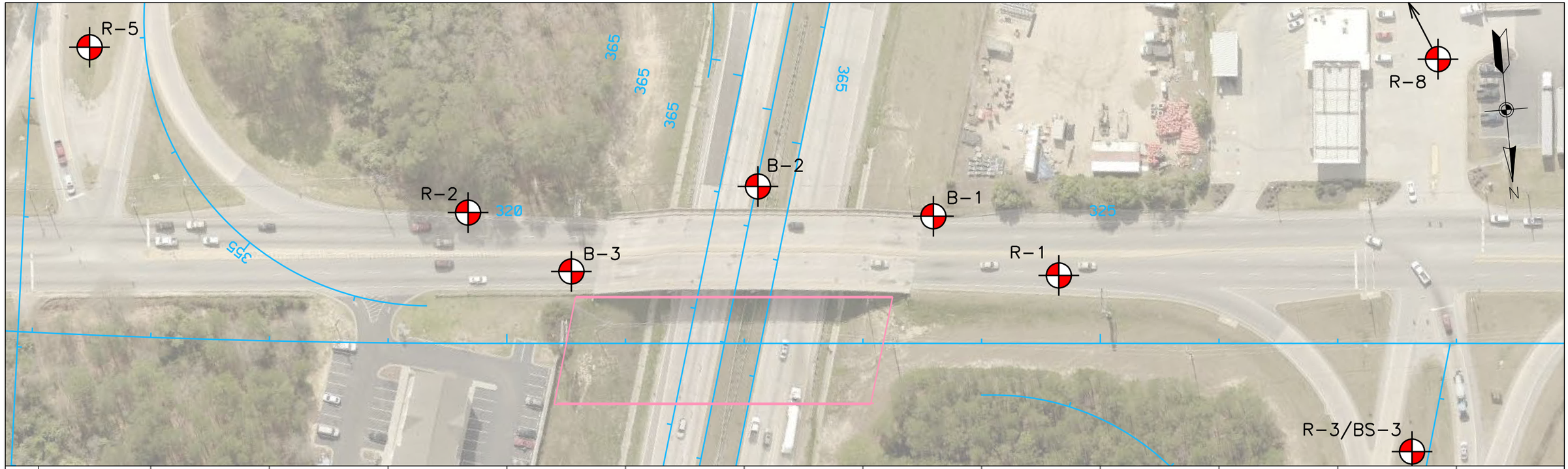
LL	- LIQUID LIMIT (%)
PL	- PLASTIC LIMIT (%)
PI	- PLASTIC INDEX (%)
NMC	- MOISTURE CONTENT (%)
NP	- NON PLASTIC
%#200	- PERCENT PASSING NO. 200 SIEVE

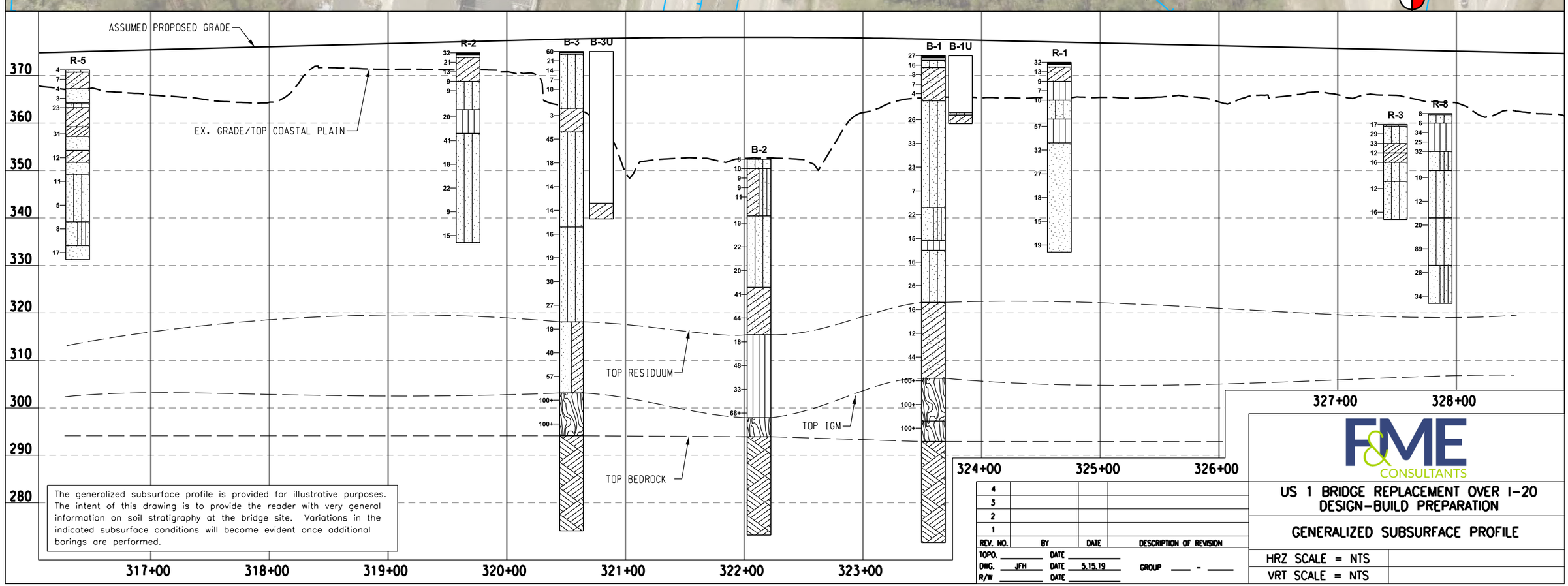

Water Level at Time Drilling, or as Shown


Water Level at End of Drilling, or as Shown

NOTES

1. THE GENERALIZED SUBSURFACE PROFILES ARE PROVIDED ONLY FOR ILLUSTRATIVE PURPOSES. THE INTENT OF THESE DRAWINGS IS TO PROVIDE THE READER WITH VERY GENERAL INFORMATION ON SOILS, CUTS, AND FILLS. VARIATIONS IN THE INDICATED SUBSURFACE CONDITIONS WILL BECOME EVIDENT ONCE ADDITIONAL BORINGS ARE PERFORMED.





The generalized subsurface profile is provided for illustrative purposes. The intent of this drawing is to provide the reader with very general information on soil stratigraphy at the bridge site. Variations in the indicated subsurface conditions will become evident once additional borings are performed.

REV. NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. ____ DATE ____
DWG. JFH DATE 5.15.19 GROUP ___ - ___
R/W ____ DATE ____

F&ME CONSULTANTS

US 1 BRIDGE REPLACEMENT OVER I-20
DESIGN-BUILD PREPARATION

GENERALIZED SUBSURFACE PROFILE

HRZ SCALE = NTS
VRT SCALE = NTS

APPENDIX

SECTION 5 BORING LOGS

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-1		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+59	**Offset:**	107' - L	**Alignment:**	Mainline
Elev.:	374.2 ft	**Latitude:**	33.9782769	**Longitude:**	-81.1954978	**Date Started:**	3/6/2019
Total Depth:	102.6 ft	**Soil Depth:**	81.3 ft	**Core Depth:**	21.3 ft	**Date Completed:**	3/7/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 25 ft	**24HR**	26.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Asphalt								
	0.5	**ASPHALT (5.5 in)**		0.0	SS-1	X	13	13	14	27
	1.0	**GABC (6.0 in)**								
	2.5	**FILL** Medium Dense, Moist, Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell=10YR 5/3		2.0	SS-2	9	8	8	6	16
369.2				4.0	SS-3	3	3	5	5	8
		Loose to Medium Dense, Moist, White/Red, Low to Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=2.5YR 5/6 & 10YR 8/1		6.0	SS-4	3	3	4	5	7
				8.0	SS-5	1	1	3	3	4
	9.5	@SS-5: Very Loose								
364.2		**COASTAL PLAIN** Medium Dense to Dense, Moist, Red/Gray, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=2.5YR 5/8 & 7.5YR 6/1		13.5	SS-6	7	11	15		26
359.2				18.5	SS-7	11	15	18		33
354.2		@ SS-7: Red/Yellow, Munsell=2.5YR 5/8 & 7.5YR 7/8		23.5	SS-8	5	10	13		23
349.2		@ SS-8: Yellow/White, Munsell=10YR 8/8 & 10YR 8/1		28.5	SS-9	3	3	4		7
344.2		@ SS-9: Loose, Wet, Yellow/Pink, Munsell=10YR 8/8 & 2.5YR 8/3 LL=NP, PL=NP, PI=NP, NMC=10.8%, %#200=4.0		33.5	SS-10	5	11	11		22
	32.0	Medium Dense, Wet, Yellow/White, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=10YR 8/8 & 10YR 8/1								
339.2										

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-1		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+59	**Offset:**	107' - L	**Alignment:**	Mainline
Elev.:	374.2 ft	**Latitude:**	33.9782769	**Longitude:**	-81.1954978	**Date Started:**	3/6/2019
Total Depth:	102.6 ft	**Soil Depth:**	81.3 ft	**Core Depth:**	21.3 ft	**Date Completed:**	3/7/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 25 ft	**24HR**	26.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	39.0	Stiff, Wet, White, Medium to High Plasticity, Fine to Medium Sandy SILT (ML/A-6), Munsell=7.5YR 8/1	38.5	SS-11	7	7	8		15
334.2	41.0	@SS-11: LL=43, PL=27, PI=16, NMC=27.8%, %200=64.4							
		Medium Dense, Wet, White, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4), Munsell=7.5YR 8/1	43.5	SS-12	5	6	10		16
329.2		@SS-12: LL=NP, PL=NP, PI=NP, NMC=12.5%, %200=18.2							
			48.5	SS-13	6	13	13		26
324.2	52.0	**RESIDUUM**							
		Medium Dense, Wet, Yellow/White, Medium to High Plasticity, Clayey Fine to Coarse SAND (SC/A-2-6), Munsell=10YR 8/8 & 10YR 8/1	53.5	SS-14	9	8	8		16
319.2		@SS-14: LL=47, PL=24, PI=23, NMC=24.3%, %200=18.5							
			58.5	SS-15	3	5	7		12
314.2		@SS-15: LL=38, PL=24, PI=14, NMC=29.1%, %200=40.0							
			63.5	SS-16	10	19	25		44
309.2		@ SS-16: Dense, White, Munsell=10YR 8/1							
	68.0	**PARTIALLY WEATHERED ROCK**	68.5	SS-17	50/6"				100+
304.2		Very Dense, Moist, Yellow/White, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4) with Gravel, Munsell=10YR 8/8 & 10YR 8/1	73.5	SS-18	50/4"				100+

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-1		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+59	**Offset:**	107' - L	**Alignment:**	Mainline
Elev.:	374.2 ft	**Latitude:**	33.9782769	**Longitude:**	-81.1954978	**Date Started:**	3/6/2019
Total Depth:	102.6 ft	**Soil Depth:**	81.3 ft	**Core Depth:**	21.3 ft	**Date Completed:**	3/7/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 25 ft	**24HR**	26.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
299.2		@ SS-18: Brown/White, Munsell=7.5YR 5/8 & 7.5YR 8/1				
	77.0	Very Dense, Moist, Yellow/Brown, Non-Plastic, Fine to Coarse SAND (SP-SM/A-3) with Silt, Munsell=10YR 5/4	78.5	SS-19	50/1"	100+
294.2	81.3	**GRANITE** Igneous, Pink/White/Green/Gray, Quartz/Feldspar/Hornblade, Moderately/Highly Weathered, Joints Dipping from 20 degrees to 85 degrees, Weak, J, VC, N/T, Wa/St, SR/R,Su/Pa	81.3	NQ-1		
289.2		@NQ-1: %REC=77, RQD=40, GSI=35-40, RMR=37, 8 min/ft, qu=12,843 psi	86.1	NQ-2		
284.2		@NQ-2: Highly Weathered, %REC=40, RQD=22, GSI=20-25, RMR=27, 5 min/ft,	91.1	NQ-3		
279.2		@NQ-3: Slightly/Moderately Weathered, %REC=90, RQD=30, GSI=35-40, RMR=37, 8 min/ft, qu=23,425 psi	96.1	NQ-4		
274.2		@NQ-4: Slightly Weathered to Fresh, %REC=96, RQD=67, GSI=40-45, RMR=50, 2 min/ft, qu=12,866 psi	100.6	NQ-5		
	102.6	@NQ-5: %REC=96, RQD=50, GSI=40-45, RMR=48, 2 min/ft				
269.2		Boring Terminated at 102.6 ft.				
264.2						

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	B-1U
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+62	**Offset:**	107' - L	**Alignment:**	Mainline
Elev.:	374.2 ft	**Latitude:**	33.9782782	**Longitude:**	-81.1955055	**Date Started:**	4/1/2019
Total Depth:	14.3 ft	**Soil Depth:**	14.3 ft	**Core Depth:**	0 ft	**Date Completed:**	4/1/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** NE	**24HR**	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Asphalt								
		DRILL TO 12.0 FT.								
369.2										
364.2										
	12.0			12.0						
	12.5	**COASTAL PLAIN**		12.5	ST-1A					
		Brown/Yellow/Black/White, Non-Plastic, Silty Fine to Medium SAND (SM/A-1-b), Munsell=5YR 5/6, 5YR 2.5/1, & 5YR 8/1		13.0	ST-1B					
		LL=NP, PL=NP, PI=NP, %#200=18.3		13.5	ST-1C					
	14.3			14.0	ST-1D					
359.2		Brown/Yellow/Black/Red, Low Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=5YR 5/6, 5YR 2.5/1, & 5YR 5/8			ST-2					
		@ST-1B: LL=25, PL=16, PI=9, NMC=19.7%, %#200=21.9								
		@ST-1C: LL=39, PL=22, PI=17, NMC=13.1%, %#200=29.2								
		Boring Terminated at 14.3 ft on Shelby Tube Advancement Refusal.								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-2		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	322+12	**Offset:**	132' - L	**Alignment:**	Mainline
Elev.:	352.4 ft	**Latitude:**	33.9781521	**Longitude:**	-81.1950257	**Date Started:**	3/14/2019
Total Depth:	79.2 ft	**Soil Depth:**	58.5 ft	**Core Depth:**	20.7 ft	**Date Completed:**	3/15/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 5 ft	**24HR**	NM

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Interstate Median								
		FILL		0.0						
	2.0	Loose, Moist, Brown/White/Yellow, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4) and Gravel, Munsell: 7.5YR 5/2, 2.5 Y 8/1, & 2.5 Y 8/6		2.0	SS-1	2	4	4	6	8
				4.0	SS-2	4	5	5	4	10
347.4		▽**COASTAL PLAIN**			SS-3	5	5	4	7	9
		Loose to Medium Dense, Moist, Brown/White/Yellow, Non-Plastic to Low Plasticity, Silty, Clayey, Fine to Medium SAND (SC-SM/A-1-b), Munsell: 7.5YR 5/2, 2.5 Y 8/1, & 2.5 Y 8/6		6.0	SS-4	4	5	4	7	9
		@SS-3: Brown/Yellow, Munsell: 2.5YR 8/1		8.0	SS-5	3	5	6	7	11
342.4		@SS-4: Wet, LL=26, PL=21, PI=5, NMC=19.5%, %200=14.7								
	12.0	@SS-5: White/Pink, Munsell: 2.5YR 8/1 & 2.5YR 8/2		13.5	SS-6	3	7	11		18
		Medium Dense, Moist, Brown/White/Yellow, Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4)								
337.4		@SS-6: LL=31, PL=28, PI=3, NMC=22.4%, %200=16.9		18.5	SS-7	7	11	11		22
		@SS-7: White Munsell: 10YR 8/1								
332.4				23.5	SS-8	8	9	11		20
		@SS-8: Fine to Coarse Sand, LL=35, PL=29, PI=6, NMC=18%, %200=16.2								
327.4				28.5	SS-9	7	19	22		41
	27.0	Dense, Wet, Brown, Low/Medium Plasticity, Clayey Fine to Coarse SAND (SC/A-2-6), with Gravel, Munsell: 7.5YR 5/6								
322.4				33.5	SS-10	17	22	22		44
		@SS-10: White/Yellow, Munsell: 10YR 8/1 & 10YR 8/6								
317.4										

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

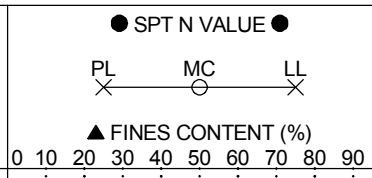
Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-2		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	322+12	**Offset:**	132' - L	**Alignment:**	Mainline
Elev.:	352.4 ft	**Latitude:**	33.9781521	**Longitude:**	-81.1950257	**Date Started:**	3/14/2019
Total Depth:	79.2 ft	**Soil Depth:**	58.5 ft	**Core Depth:**	20.7 ft	**Date Completed:**	3/15/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 5 ft	**24HR**	NM

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	37.0	**RESIDIUUM** Very Stiff to Hard, Moist, White/Yellow, Low to Medium Plasticity, Fine to Medium Sandy SILT (ML/A-6), Munsell: 10YR 8/1 & 10YR 8/6 @SS-11: LL=39, PL=27, PI=12, NMC=26.2%, %200=40	38.5	SS-11	4	6	12		18
312.4			43.5	SS-12	10	19	29		48
307.4			48.5	SS-13	8	13	20		33
302.4			53.5	SS-14	11	18	50/5"		68+
	54.5	**PARTIALLY WEATHERED ROCK** Very Dense, Moist, White/Gray, Clayey Fine to Medium SAND (SC/A-2-6), Munsell: 10YR 8/1 & 10YR 6/1							
297.4	58.5	**GRANITE** Igneous, Pink/White/Green/Gray, Quartz/Feldspar/Hornblade/Biotite, Slightly/Moderately Weathered, Joints Dipping from 20 degrees to 45 degrees, Weak, J, VC, VN/T, Ir, R/VR,Su @NQ-1: %REC=97, RQD=72, GSI=40-45, RMR=68, 2 min/ft, qu=34,541 psi @NQ-2: Slightly Weathered to Fresh, %REC=98, RQD=76, GSI=40-45, RMR=72, 4 min/ft, qu=35,777 psi @NQ-3: Slightly Weathered to Fresh, %REC=100, RQD=95, GSI=45-50, RMR=80, 10 min/ft	58.5	NQ-1					
292.4			61.2	NQ-2					
287.4			66.2	NQ-3					
282.4			71.2						



Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	B-2
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	322+12	**Offset:**	132' - L	**Alignment:**	Mainline
Elev.:	352.4 ft	**Latitude:**	33.9781521	**Longitude:**	-81.1950257	**Date Started:**	3/14/2019
Total Depth:	79.2 ft	**Soil Depth:**	58.5 ft	**Core Depth:**	20.7 ft	**Date Completed:**	3/15/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 5 ft	**24HR**	NM

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
277.4		@NQ-4: Slightly Weathered to Fresh, Pa, %REC=77, RQD=58, GSI=35-40, RMR=68, 12 min/ft, qu=35,106 psi		75.2	NQ-4			
		@NQ-5: Fresh, Pa/Fi, %REC=100, RQD=83, GSI=45-50, RMR=72, 7 min/ft			NQ-5			
	79.2							
272.4		Boring Terminated at 79.2 ft.						
267.4								
262.4								
257.4								
252.4								
247.4								

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	B-3
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	320+54	**Offset:**	61' - L	**Alignment:**	Mainline
Elev.:	375.1 ft	**Latitude:**	33.9782867	**Longitude:**	-81.1944784	**Date Started:**	3/11/2019
Total Depth:	101 ft	**Soil Depth:**	81 ft	**Core Depth:**	20 ft	**Date Completed:**	3/13/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 28 ft	**24HR**	27 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Asphalt								
	0.3	**ASPHALT (3 in)**		0.0	SS-1	8	39	21	15	60
	0.6	**GABC (7.0 in)**								
		FILL Loose to Medium Dense, Moist, Red/Yellow, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5 YR 7/6		2.0	SS-2	9	10	11	10	21
370.1				4.0	SS-3	7	7	7	7	14
		@SS-3: Red/Yellow, Munsell: 5YR 7/8		6.0	SS-4	2	4	3	3	7
				8.0	SS-5	5	5	5	6	10
365.1										
	12.0	**COASTAL PLAIN** Very Loose, Red/Brown, Low to Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=2.5YR 5/8 & 7.5 YR 5/6		13.5	SS-6	1	2	2		3
360.1										
	17.0	Medium Dense to Dense, Moist, Red/Yellow, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5 YR 8/6		18.5	SS-7	12	20	25		45
355.1										
				23.5	SS-8	6	8	10		18
350.1		@SS-8: Brown/White, Munsell: 7.5YR 5/8 & White 8/1								
		▼		28.5	SS-9	4	6	8		14
		▽								
345.1		@SS-9: Wet, Yellow, Munsell=10YR 7/8, LL=NP, PL=NP, PI=NP, NMC=20.9%, %200=17.6								
				33.5	SS-10	3	6	8		14
340.1		@SS-10: White/Yellow, Munsell=10YR 8/1 & 10YR 7/8 LL=NP, PL=NP, PI=NP, NMC=22.3%, %200=26.3								
	37.0									

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	B-3		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	320+54	**Offset:**	61' - L	**Alignment:**	Mainline
Elev.:	375.1 ft	**Latitude:**	33.9782867	**Longitude:**	-81.1944784	**Date Started:**	3/11/2019
Total Depth:	101 ft	**Soil Depth:**	81 ft	**Core Depth:**	20 ft	**Date Completed:**	3/13/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 28 ft	**24HR**	27 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
335.1		Medium Dense, Wet, White/Yellow, Silty Fine to Coarse SAND (SM/A-2-4), Munsell=10YR 8/1 & 10YR 7/8	38.5	SS-11	5	6	10		16
			43.5	SS-12	5	7	12		19
330.1		@SS-12: LL=NP, PL=NP, PI=NP, NMC=19.9%, %200=13.1							
			48.5	SS-13	10	14	16		30
325.1									
			53.5	SS-14	5	11	16		27
320.1									
	57.0	**RESIDUUM**							
		Medium Dense, Wet, Yellow, Non-Plastic, Fine to Coarse SAND (SP-SC/A-1-b) with Clay, Munsell=10YR 8/8	58.5	SS-15	5	7	12		19
315.1									
			63.5	SS-17	8	15	25		40
		@SS-17: Dense to Very Dense							
310.1									
			68.5	SS-18	16	24	33		57
305.1									
	72.0	**PARTIALLY WEATHERED ROCK**							
		Very Dense, Moist Brown, Silty Fine to Coarse SAND (SM/A-2-4), Munsell=10YR 8/2	73.5	SS-19	37	50/3"			100+
300.1									

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	B-3
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	320+54	**Offset:**	61' - L	**Alignment:**	Mainline
Elev.:	375.1 ft	**Latitude:**	33.9782867	**Longitude:**	-81.1944784	**Date Started:**	3/11/2019
Total Depth:	101 ft	**Soil Depth:**	81 ft	**Core Depth:**	20 ft	**Date Completed:**	3/13/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW/RC	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	NQ	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 28 ft	**24HR**	27 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
				78.5				
295.1		@ SS-20: Red/White, Munsell=10YR 8/1 & 7.5YR 6/4			SS-20	50/3"	100+	>>
	81.0	**GRANITE**		81.0				
		Igneous, Pink/Brown/Gray, Quartz/Feldspar/Hornblade, Highly Weathered, Joints Dipping from 10 degrees to 70 degrees, Weak, J, VC, MW/VN, Pl/St/Ir, S/R,Su			NQ-1			
290.1		@NQ-1: %REC=80, RQD=27, GSI=20-25, RMR=29, 4 min/ft		86.0				
		@NQ-2: Slightly/Moderately Weathered, SR/R, Su/Sp/Fi, %REC=95, RQD=50, GSI=30-35, RMR=55, 6 min/ft, qu=21,957 psi			NQ-2			
285.1		@NQ-3: Slightly Weathered to Fresh, N/T, Pl/Ir, Su/Pa/Fi, %REC=100, RQD=99, GSI=40-45, RMR=72, 4 min/ft, qu=23,043 psi		91.0				
					NQ-3			
280.1		@NQ-4: MW/VN, Sp/Fi %REC=95, RQD=90, GSI=40-45, RMR=80, 4 min/ft, qu=33,660 psi		96.0				
					NQ-4			
275.1	101.0	Boring Terminated at 101 ft.						
270.1								
265.1								

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/16/19

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	B-3U
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	320+51	**Offset:**	60' - L	**Alignment:**	Mainline
Elev.:	375.1 ft	**Latitude:**	33.978286	**Longitude:**	-81.194469	**Date Started:**	4/1/2019
Total Depth:	35.3 ft	**Soil Depth:**	35.3 ft	**Core Depth:**	0 ft	**Date Completed:**	4/1/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** NM	**24HR**	NM

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Asphalt						
		DRILL TO 32.0 FT.						
370.1								
365.1								
360.1								
355.1								
350.1								
345.1								
	32.0	**COASTAL PLAIN**		32.0	ST-1A			
		Brown/Yellow/Pink/White, Low to Medium Plasticity, Clayey Fine to Medium SAND (SC/A-4(1)), Munsell=5YR 7/4, 10YR 6/8, & 10YR 8/1		32.2	ST-1B			
				32.7	ST-1C			
				33.2	ST-1D			
340.1	35.3	@ST-2B => NMC=18.5%		33.7	ST-1E			
		@ST-2C => LL=28, PL=18, PI=10, NMC=15.5%, %#200=39.6		34.0	ST-2			
335.1		@ST-2D => NMC=15.4%						
		Boring Terminated at 35.3 ft.						

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-1		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	324+65	**Offset:**	57' - L	**Alignment:**	Mainline
Elev.:	372.8 ft	**Latitude:**	33.978455	**Longitude:**	-81.1958182	**Date Started:**	3/12/2019
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft	**Date Completed:**	3/12/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 25 ft	**24HR**	NM

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Asphalt								
	0.5	**ASPHALT (6 in)**		0.0	SS-1	X	17	15	9	32
	1.0	**GABC (6.0 in)**		2.0	SS-2	5	7	6	5	13
	4.0	**FILL** Medium Dense, Moist, Red, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=2.5YR 5/8		4.0	SS-3	4	4	5	4	9
367.8		@SS-1 & SS-2: LL=41, PL=24, PI=17, NMC=12.7%, %200=29.9		6.0	SS-4	1	2	5	9	7
	8.0			8.0	SS-5	3	4	6	7	10
362.8		Firm to Stiff, Moist, Red, Non-Plastic to Low Plasticity, Sandy SILT (ML/A-4), Munsell=2.5YR 5/8 & 2.5YR 7/8								
	12.0	@SS-4: Brown, Munsell=7.5YR 6/3		13.5	SS-6	15	24	33		57
		COASTAL PLAIN								
357.8		Loose, Moist, Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5YR 6/3 & 7.5YR 5/2								
	17.0	Hard, Moist, Red/Brown, Non-Plastic to Low Plasticity, Sandy SILT (ML/A-4), Munsell=7.5YR 4/6 & 7.5YR 5/6		18.5	SS-7	12	14	18		32
352.8		Dense to Medium Dense, Moist, Yellow/Red, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=5YR 6/6								
		@SS-8: Yellow, Munsell=10YR 7/8,		23.5	SS-8	11	14	13		27
347.8	27.0									
		Medium Dense, Wet, Pink/Yellow, Low Plasticity, Silty, Clayey Fine to Medium SAND (SC-SM/A-2-4), Munsell=10YR 8/3 & 10YR 8/8,		28.5	SS-9	5	8	10		18
342.8		@SS-9: LL=25, PL=21, PI=4, NMC=19.4%, %200=21.3								
	32.0			33.5	SS-10	5	5	10		15
		Medium Dense, Wet, White, Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=10YR 8/1								
337.8		@SS-10: LL=24, PL=21, PI=3, NMC=21.6%, %200=14.8		38.5	SS-11	9	10	9		19
		@SS-11: White/Yellow, Munsell=10YR 8/1 & 10YR 8/8,								
332.8	40.0	LL=34, PL=27, PI=7, NMC=18.0%, %200=23.6								
		Boring Terminated at 40 ft.,								

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 6/4/19

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	R-2
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	319+67	**Offset:**	110' - L	**Alignment:**	Mainline
Elev.:	374.8 ft	**Latitude:**	33.9781167	**Longitude:**	-81.1942174	**Date Started:**	3/8/2019
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft	**Date Completed:**	3/8/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 23 ft	**24HR**	25 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Asphalt								
	0.5	**ASPHALT (5 in)**		0.0	SS-1	X	21	17	15	32
	1.0	**GABC (6.0 in)**		2.0	SS-2	10	10	11	11	21
		FILL		4.0						
369.8	6.0	Dense to Medium Dense, Moist, Brown, Low to Medium Plasticity, Clayey SAND (SC/A-2-6), Munsell=7.5YR 5/6			SS-3	8	7	6	6	13
		@SS-1 & SS-2: LL=30, PL=21, PI=9, NCM=10.1%, %200=23.9		6.0	SS-4	3	4	5	7	9
		@SS-3: Red/Pink, Munsell=2.5YR 5/8 & 2.5YR 8/3		8.0	SS-5	4	5	4	5	9
364.8	12.0	Loose, Moist, Brown, Non-Plastic to Medium Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5YR 5/6		13.5	SS-6	4	8	12		20
		@SS-4: LL=47, PL=30, PI=17, NMC=14.3%, %200=29.6								
359.8	17.0	**COASTAL PLAIN**		18.5	SS-7	10	17	24		41
		Very Stiff, Moist, Brown/Gray, Medium Plasticity, SILT (ML/A-4), Munsell=7.5 YR 4/1 & 7.5YR 5/2								
354.8		Dense to Medium Dense, Moist, Brown/White/Red, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5YR 5/6, 7.5YR 8/1, & 2.5YR 5/8		23.5	SS-8	5	8	10		18
		@SS-8: Yellow/White, Munsell=10YR 7/6 & 10YR 8/1, LL=NP, PL=NP, PI=NP, NMC=16.2%, %200=18.3		28.5	SS-9	8	10	12		22
349.8		@SS-9: Wet, LL=24, PL=21, PI=3, NMC=19.9%, %200=14.0		33.5	SS-10	3	3	6		9
344.8		@SS-10: Loose, White/Yellow, Munsell=10YR 8/1 & 10YR 7/6								
339.8	37.0	LL=31, PL=25, PI=6, NMC=26.1%, %200=22.4		38.5	SS-11	5	9	6		15
		Medium Dense, Moist, White/Yellow, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=10YR 8/1 & 10YR 7/6								
334.8	40.0	@SS-11: LL=37, PL=22, PI=15, NMC=18.6%, %200=18.1								
		Boring Terminated at 40 ft.								

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

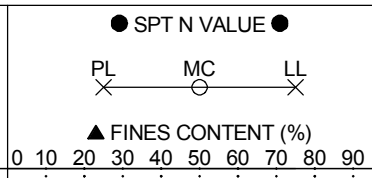
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 6/4/19

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	R-3
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	327+63	**Offset:**	91' - R	**Alignment:**	Mainline
Elev.:	359.7 ft	**Latitude:**	33.9789951	**Longitude:**	-81.1967069	**Date Started:**	3/18/2019
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	3/18/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 10 ft	**24HR**	12 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Grass								
	0.3	**TOPSOIL**		0.0	SS-1	1	6	11	14	17
		COASTAL PLAIN								
		Medium Dense, Moist, Red/White, Medium Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=2.5YR 5/8 & 2.5YR 8/1		2.0	SS-2	13	14	15	16	29
		@SS-1: LL=48, PL=29, PI=19, NMC=13.3%, %200=31.7								
	4.0	@SS-2: Brown, Munsell=2.5YR 5/8		4.0	SS-3	14	15	18	16	33
354.7		Hard, Moist, White/Pink, Medium to High Plasticity, CLAY (CL/A-6), Munsell=2.5YR 8/1 & 2.5YR 8/4								
	6.0	Stiff, Moist, White/Pink/Red, Low Plasticity to Medium Plasticity, Sandy CLAY (CL/A-6), Munsell=2.5YR 5/8		6.0	SS-4	3	4	8	9	12
	8.0	Medium Dense, Moist, White/Red, Non-Plastic, Fine to Medium Silty SAND (SM/A-2-4), Munsell=2.5YR 5/8		8.0	SS-5	5	6	10	10	16
349.7		▽								
	12.0	Medium Dense, Wet, White/Brown, Silty Fine to Medium SAND (SM/A-2-4), Munsell: 2.5YR 8/1 & 2.5YR 7/4		13.5	SS-6	5	6	6		12
		@ SS-6: White/Reddish Brown, Munsell=2.5YR 8/1 & 2.5 YR 7/4								
344.7		LL=NP, PL=NP, PI=NP, NMC=18.1%, %200=16.3								
		@ SS-7: White/Pink, 2.5YR 8/1 & 2.5 YR 8/4		18.5	SS-7	4	7	9		16
339.7	20.0	Boring Terminated at 20 ft.								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-4		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+06	**Offset:**	495' - R	**Alignment:**	Mainline
Elev.:	356.0 ft	**Latitude:**	33.9798937	**Longitude:**	-81.1950198	**Date Started:**	3/18/2019
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	3/18/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 7.5 ft	**24HR**	10 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Grass								
	0.3	**TOPSOIL**		0.0	SS-1	1	2	4	5	6
		FILL								
	2.0	Loose, Moist, Red/Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell=5YR 5/4		2.0	SS-2	3	5	8	10	13
		@SS-1: LL=NP, PL=NP, PI=NP, NMC=16.1%, %200=32.8		4.0						
351.0		**COASTAL PLAIN**			SS-3	9	10	15	11	25
	6.0	Medium Dense, Moist, Red, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=2.5YR 6/8		6.0	SS-4	3	6	9	10	15
		@ SS-3: Red/Yellow, Munsell=5YR 6/8								
	8.0	Medium Dense, Moist, Red/Yellow, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5YR 7/8		8.0	SS-5	4	6	7	8	13
346.0		Medium Dense, Wet, White/Pink, Non-Plastic, Fine to Medium SAND (SP/A-3), Munsell=7.5YR 8/1 & 7.5YR 8/4								
	12.0	Medium Dense, Wet, Pink/White, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=Pink/White, 7.5YR 8/2		13.5	SS-6	4	10	14		24
		@SS-6: LL=46, PL=27, PI=19, NMC=15.3%, %200=28.2								
341.0										
	17.0	Medium Dense, Wet, Gray, Non-Plastic, Fine to Medium SAND (SP/A-3), Munsell=10YR 7/2		18.5	SS-7	8	8	10		18
336.0	20.0	Boring Terminated at 20 ft.								

SPT N VALUE ●

PL ✕ MC ○ LL ✕

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-5		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	316+38	**Offset:**	242' - L	**Alignment:**	Mainline
Elev.:	371.2 ft	**Latitude:**	33.9776032	**Longitude:**	-81.1932464	**Date Started:**	3/18/2019
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft	**Date Completed:**	3/18/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 17 ft	**24HR**	22 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Grass								
	0.5	**TOPSOIL**		0.0						
		FILL			SS-1	1	1	3	3	4
		Very Loose to Loose, Moist, Red/Brown, Low Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=5YR 5/4		2.0						
		@SS-1: LL=25, PL=17, PI=8, NMC=14%, %200=34.1			SS-2	2	3	4	3	7
	4.0	@SS-2: Yellow/Red, Munsell=5YR 5/8		4.0						
366.2		**COASTAL PLAIN**			SS-3	2	2	2	1	4
		Very Loose, Moist, Yellow/Brown, Non-Plastic, Fine SAND (SP/A-3), Munsell=10YR 5/4		6.0						
	7.0				SS-4	1	1	2	4	3
		Very Loose, Moist, Yellow/Brown/Red, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell=10YR 5/4 & 2.5YR 5/8		8.0						
	8.0	Medium Dense, Moist, Yellow/Brown/Red, Low to Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=10YR 5/4 & 2.5YR 5/8			SS-5	6	9	14	18	23
361.2										
	12.0	Hard, Wet, White/Red, Medium to High Plasticity, CLAY (CL/A-6), Munsell=10YR 8/1 & 10YR 7/8		13.5						
	14.0				SS-6	9	12	19		31
356.2		Dense, Moist to Wet, White/Red, Non-Plastic, Fine to Medium SAND (SP/A-3), Munsell=10YR 7/8								
	17.0 ▽	Medium Dense, Moist to Wet, White/Red, Medium to High Plasticity, Clayey SAND (SC/A-2-6), Munsell=7.5 YR 5/6, 7.5YR 8/1 & 2.5YR 5/8		18.5						
	19.5				SS-7	5	5	7		12
351.2		Medium Dense, Wet, Red, Non-Plastic, Fine to Medium SAND (SP/A-3), Munsell=10YR 4/8								

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

Continued Next Page

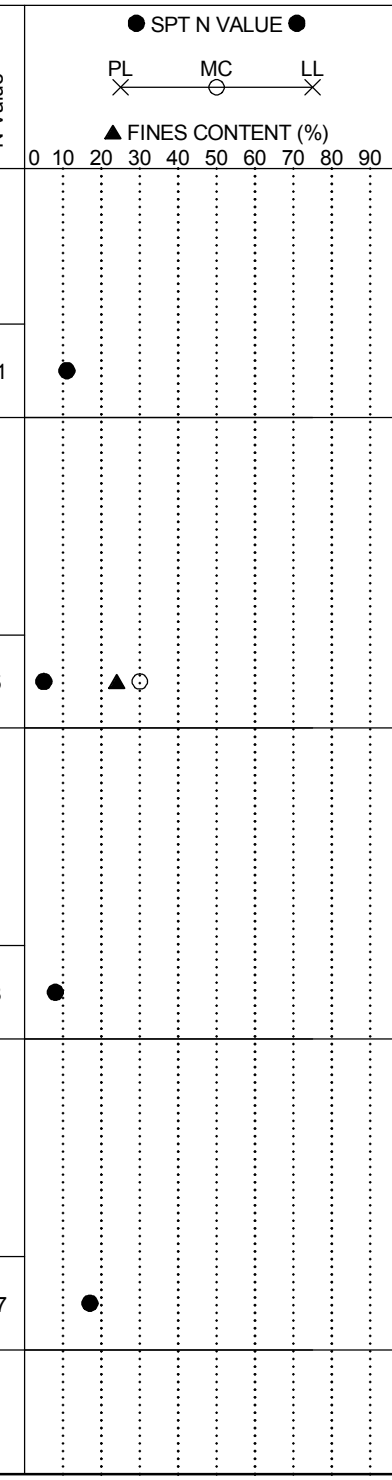
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-5		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	316+38	**Offset:**	242' - L	**Alignment:**	Mainline
Elev.:	371.2 ft	**Latitude:**	33.9776032	**Longitude:**	-81.1932464	**Date Started:**	3/18/2019
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft	**Date Completed:**	3/18/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 17 ft	**24HR**	22 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	22.0	Loose to Medium Dense, Wet, Brown/Yellow, Non-Plastic to Low Plasticity, Fine to Medium Silty SAND (SM/A-2-4), Munsell=10YR 6/8	23.5	SS-8	5	6	5		11
346.2			28.5	SS-9	2	1	4		5
341.2		@SS-9: Yellow/Pink, Munsell=10YR 8/6 & 7.5YR 8/3, LL=NP, PL=NP, PI=NP, NMC=30%, %200=24.1							
	32.0	Loose, Wet, White, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=7.5YR 9/1	33.5	SS-10	2	3	5		8
336.2									
	37.0	Medium Dense, Moist, Gray/Brown, Non-Plastic, Fine to Medium SAND (SP/A-3) with Gravel, Munsell=7.5YR 7/1 & 7.5YR 5/8	38.5	SS-11	4	7	10		17
331.2	40.0	Boring Terminated at 40 ft.							



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-6		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	322+67	**Offset:**	626' - L	**Alignment:**	Mainline
Elev.:	361.4 ft	**Latitude:**	33.9768115	**Longitude:**	-81.1951183	**Date Started:**	3/18/2019
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	3/18/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 6.5 ft	**24HR**	12 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Grass								
	0.3	**TOPSOIL**		0.0	SS-1	4	6	7	6	13
		COASTAL PLAIN		2.0	SS-2	5	7	9	10	16
		Medium Dense, Brown, Low to Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), Munsell=10YR 5/3		4.0	SS-3	5	8	12	12	20
356.4		@SS-1: LL=32, PL=17, PI=15, NMC=10.2%, %200=28.1		6.0	SS-4	5	12	15	19	27
		▽ @SS-4: Gray, Munsell=10YR 7/2, LL=43, PL=24, PI=19, NMC=15.2%, %200=32.0		8.0	SS-5	6	8	11	12	19
351.4										
	12.0	Loose, Brown, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=10YR 7/4 & 10YR 7/8		13.5	SS-6	1	2	3		5
346.4										
				18.5	SS-7	2	3	4		7
341.4	20.0	Boring Terminated at 20 ft.								

SPT N VALUE ●

PL ✕ MC ○ LL ✕

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	R-7		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	325+85	**Offset:**	952' - L	**Alignment:**	Mainline
Elev.:	360.5 ft	**Latitude:**	33.976076	**Longitude:**	-81.1966263	**Date Started:**	3/19/2019
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	3/19/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 5.5 ft	**24HR**	5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Soil								
	0.2	**ASPHALT**		0.0						
		FILL			SS-1	3	5	5	5	10
		Loose to Medium Dense, Yellow/Red, Low to Medium Plasticity, Clayey SAND (SC/A-2-6), Munsell=5YR 5/8		2.0						
		@SS-1: LL=31, PL=16, PI=15, NMC=12.9%, %200=29			SS-2	3	5	5	5	10
				4.0						
355.5	5.0	**COASTAL PLAIN**			SS-3	5	13	16	25	29
	6.0	Medium Dense, Red/Yellow-Brown, Non-Plastic to Low Plasticity, Fine to Medium SAND (SP-SM/A-1-b) with Silt, Munsell=7.5YR 4/2 & 7.5YR 4/1		6.0	SS-4	6	5	7	11	12
	8.0	Stiff, Red/Yellow, Non-Plastic to Low Plasticity, Sandy SILT (ML/A-4), Munsell=2.5YR 5/8 & 10YR 5/4		8.0	SS-5	6	13	16	17	29
350.5		Medium Dense, Red/Yellow, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Munsell=2.5YR 5/8 & 10YR 5/4								
	12.0	Very Stiff, White/Red, Medium to High Plasticity, CLAY (CL/A-6), Munsell=2.5YR 5/1 & 2.5YR 5/8		13.5	SS-6	3	7	9		16
345.5										
	17.0	Medium Dense, Brown/Red, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell=10YR 8/4 & 10YR 5/8		18.5						
		@SS-7: LL=NP, PL=NP, PI=NP, NMC=23.3%, %200=18.7			SS-7	1	4	8		12
340.5	20.0	Boring Terminated at 20 ft.								

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	R-8
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	327+65	**Offset:**	353' - L	**Alignment:**	Mainline
Elev.:	362.0 ft	**Latitude:**	33.9777615	**Longitude:**	-81.19694	**Date Started:**	3/19/2019
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft	**Date Completed:**	3/19/2019
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	84%
Core Size:	N/A	**Driller:**	L. Guempel	**Groundwater:**	**TOB** 3.5 ft	**24HR**	14 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	Grass								
	0.3	**TOPSOIL**		0.0	SS-1	3	4	4	3	8
	2.0	**COASTAL PLAIN**		2.0	SS-2	1	2	4	6	6
357.0		Loose, Brown, Silty Fine to Medium SAND (SM/A-2-4), Munsell=7.5YR 5/3 @SS-1: LL=NP, PL=NP, PI=NP, NMC=7.2%, %200=13.9		4.0	SS-3	13	16	18	20	34
	8.0	Firm, Brown/Red, Low to Medium Plasticity, Sandy SILT (ML/A-4), Munsell=7.5YR 5/3 & 10YR 5/8		6.0	SS-4	8	11	14	23	25
352.0		@ SS-3: Hard to Very Stiff, Red/White/Brown, Munsell=10YR 5/8, 10YR 8/1 & 7.5YR 5/8		8.0	SS-5	10	15	17	19	32
	12.0	Dense, Red/White/Brown, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=10YR 5/8, 10YR 8/1 & 7.5YR 5/8		13.5	SS-6	3	4	6		10
347.0		Loose to Medium Dense, Pink/White, Silty Fine to Medium SAND (SM/A-2-4), Munsell=10YR 8/3 & 7.5YR 9/1 @SS-6: LL=NP, PL=NP, PI=NP, NMC=21.3%, %200=16		18.5	SS-7	5	6	6		12
342.0	22.0	@19.5 ft => 2" Kaolin		23.5	SS-8	5	10	10		20
337.0		Medium Dense, White/Yellow, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4) with Gravel, Munsell=10YR 8/1 & 10YR 7/6		28.5	SS-9	26	39	50		89
332.0		@SS-9: Very Dense, Pink, Munsell=10YR 8/3								
	32.0	Medium Dense to Dense, White, Non-Plastic, Fine to Medium SAND (SP-SM/A-3) with Silt, Munsell=7.5YR 9/1		33.5	SS-10	6	13	15		28
327.0										
322.0	40.0	@SS-11: White/Yellow, Munsell=10YR 8/1 & 10YR 7/6		38.5	SS-11	7	11	23		34
		Boring Terminated at 40 ft.								

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	BS-1
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	323+71	**Offset:**	40' - L	**Alignment:**	Mainline
Elev.:	374.3 ft	**Latitude:**	33.978439	**Longitude:**	-81.1955081	**Date Started:**	3/6/2019
Total Depth:	10 ft	**Soil Depth:**	10 ft	**Core Depth:**	0 ft	**Date Completed:**	3/6/2019
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y N	**Liner Used:**	Y N
Drill Machine:		**Drill Method:**	Hand Auger	**Hammer Type:**		**Energy Ratio:**	
Core Size:	N/A	**Driller:**	R. Wessinger	**Groundwater:**	**TOB** NE	**24HR**	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Grass						
		FILL Moist, Gray/Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Munsell: 10YR 5/2 LL=NP, PL=NP, PI=NP, NMC=2.1%, %200=22.1		0.0				
369.3					DS-1			
364.3	10.0	Boring Terminated at 10.0 ft						

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	BS-2
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	320+61	**Offset:**	117' - L	**Alignment:**	Mainline
Elev.:	375.7 ft	**Latitude:**	33.9781382	**Longitude:**	-81.1945243	**Date Started:**	3/6/2019
Total Depth:	10 ft	**Soil Depth:**	10 ft	**Core Depth:**	0 ft	**Date Completed:**	3/6/2019
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y N	**Liner Used:**	Y N
Drill Machine:		**Drill Method:**	Hand Auger	**Hammer Type:**		**Energy Ratio:**	
Core Size:	N/A	**Driller:**	R. Wessinger	**Groundwater:**	**TOB** NE	**24HR**	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Grass						
		FILL Moist, Gray/Brown, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-), Munsell: 10YR 5/2 LL=32, PL=19, PI=13, NMC=15.2%, %200=34.3		0.0				
370.7					DS-1			
365.7	10.0	Boring Terminated at 10.0 ft						

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 5/15/19

SCDOT Soil Test Log

Project ID:	P030711	**County:**	Lexington	**Boring No.:**	BS-3		
Site Description:	US 1 over I-20 Design Build Interchange			**Route:**	US 1		
Eng./Geo.:	R. Wessinger	**Boring Location:**	327+59	**Offset:**	94' - R	**Alignment:**	Mainline
Elev.:	359.7 ft	**Latitude:**	33.9789815	**Longitude:**	-81.1967086	**Date Started:**	4/1/2019
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/1/2019
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y N	**Liner Used:**	Y N
Drill Machine:		**Drill Method:**	Hand Auger	**Hammer Type:**		**Energy Ratio:**	
Core Size:	N/A	**Driller:**	R. Wessinger	**Groundwater:**	**TOB** NE	**24HR**	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Grass						
		FILL Moist, Gray/Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-1-b), Munsell: 10YR 5/2 LL=NP, PL=NP, PI=NP, %200=24.1		0.0	DS-1			
354.7	5.0	Boring Terminated at 5.0 ft						

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P030711			**County:**	Lexington	**Boring No.:**	BS-4
Site Description:	US 1 over I-20 Design Build Interchange					**Route:**	US 1
Eng./Geo.:	R. Wessinger	**Boring Location:**	321+52	**Offset:**	649' - L	**Alignment:**	Mainline
Elev.:	362.8 ft	**Latitude:**	33.9767245	**Longitude:**	-81.1950737	**Date Started:**	4/1/2019
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/1/2019
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y N	**Liner Used:**	Y N
Drill Machine:		**Drill Method:**	Hand Auger	**Hammer Type:**		**Energy Ratio:**	
Core Size:	N/A	**Driller:**	R. Wessinger	**Groundwater:**	**TOB** NE	**24HR**	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Grass						
		COASTAL PLAIN Moist, Gray/Brown, Low Plasticity, Silty Fine to Medium SAND (SM/A-4(1)), Munsell: 10YR 5/2 LL=36, PL=32, PI=4, %200=49.3		0.0	DS-1			
357.8	5.0	Boring Terminated at 5.0 ft						

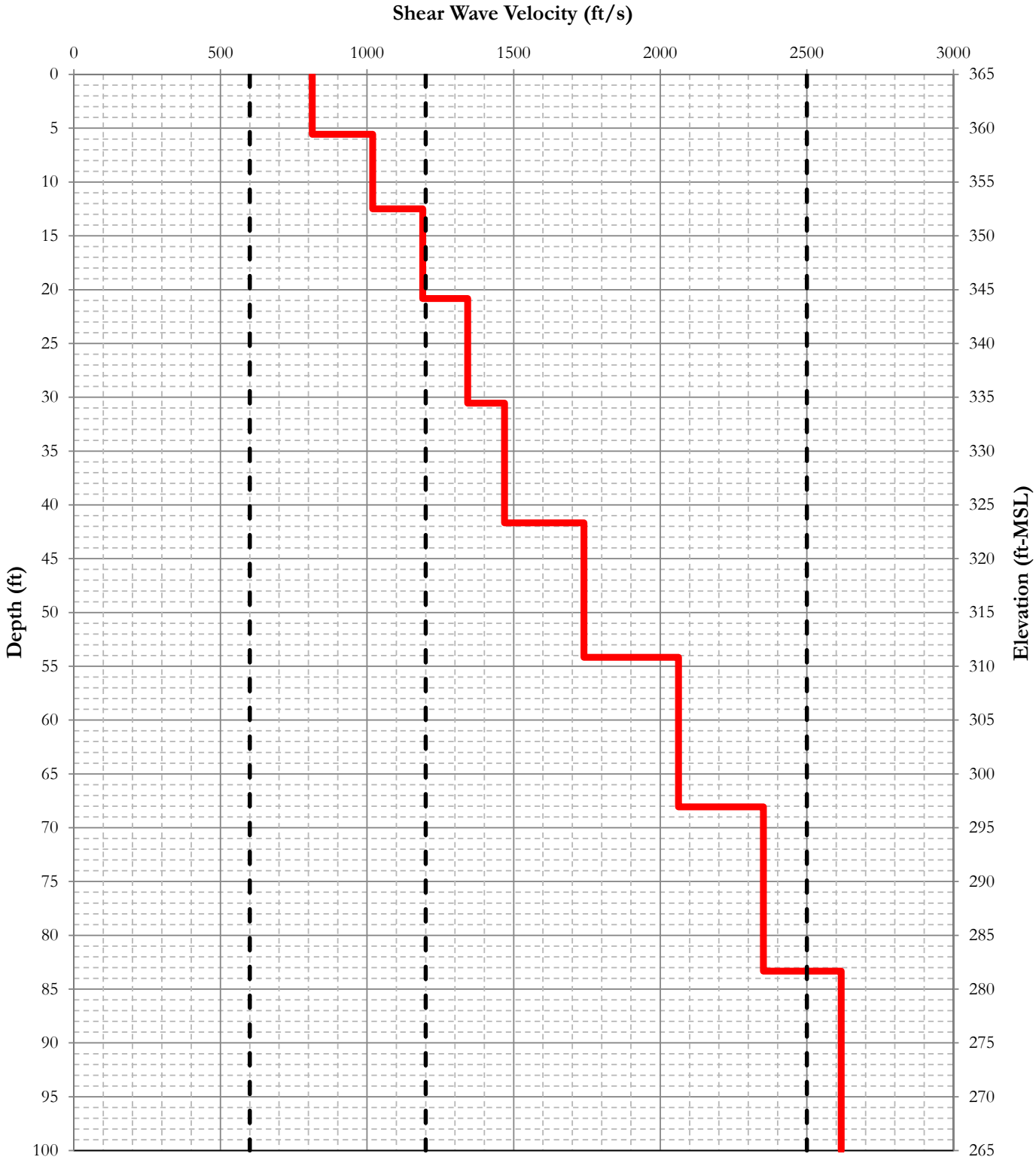
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

APPENDIX

SECTION 6 GEOPHYSICAL TEST RESULTS

Project: US 1 over I-20 DB - **MASW Vs Profile**
Location : NW Quadrant of project
Date: 3/22/2019



APPENDIX

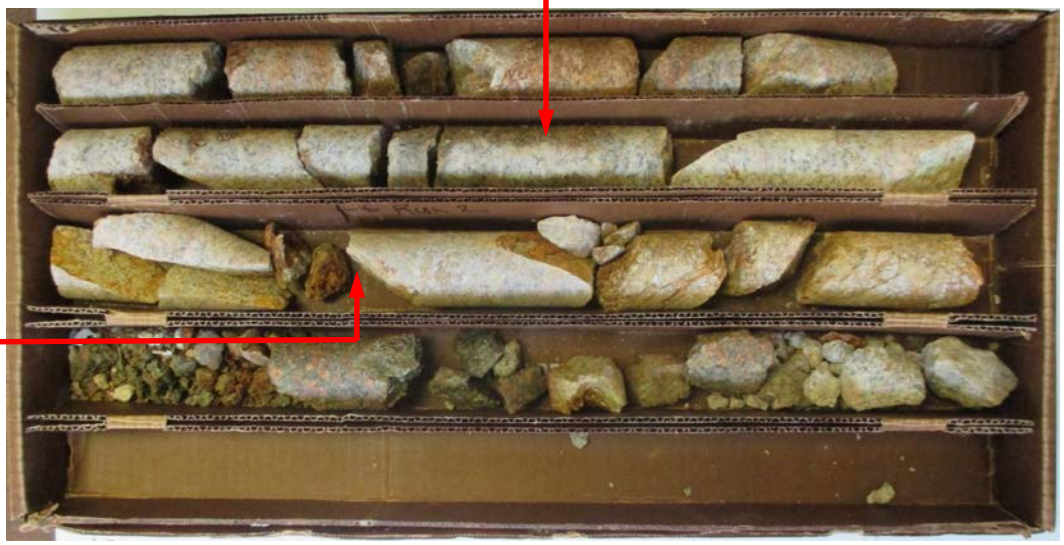
SECTION 7 ROCK CORE PHOTOS

US 1 Bridge over I-20

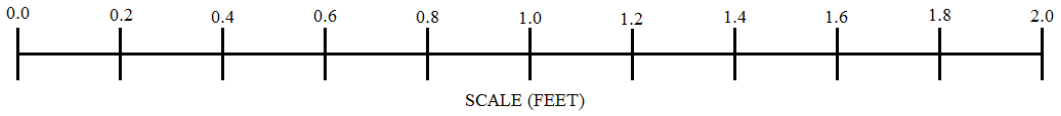
Boring B-1: US 1 Station 323+59; 107.0 ft Left of CL

UC Rock Strength = 12,843 psi

Begin Run 1
(81.3-86.1 ft)

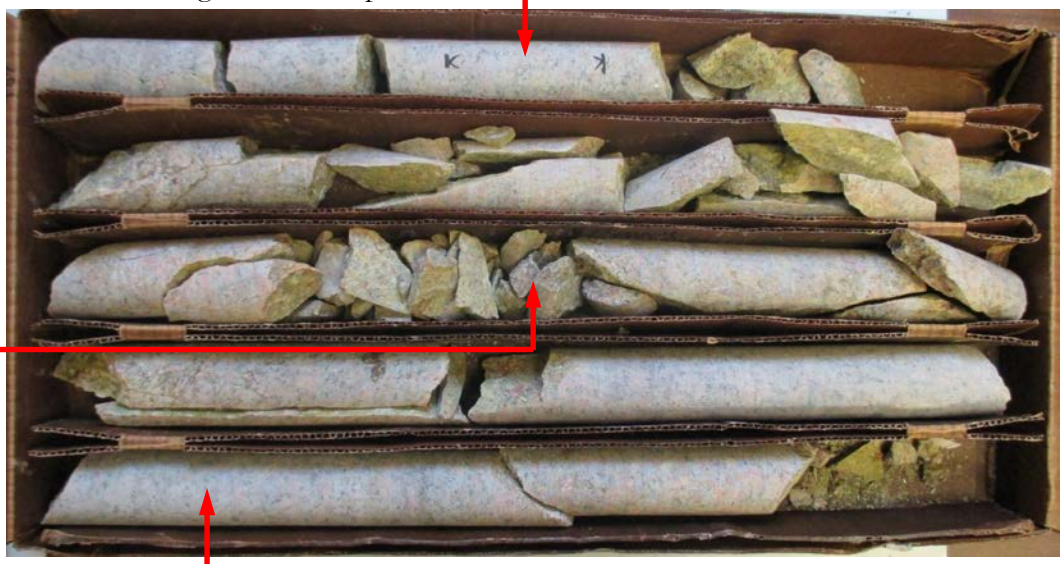


Begin Run 2
(86.1-91.1 ft)

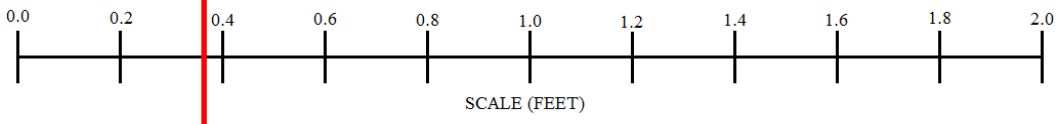


UC Rock Strength = 23,425 psi

Begin Run 3
(91.1-96.1 ft)



Begin Run 4
(96.1-100.6 ft)

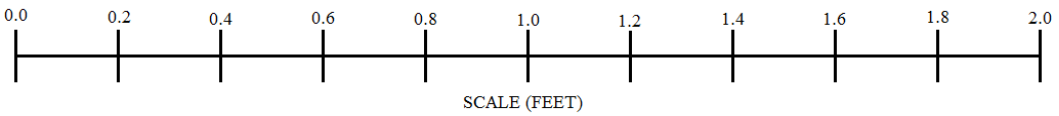


UC Rock Strength = 12,866 psi

US 1 Bridge over I-20

Boring B-1: US 1 Station 323+59; 107.0 ft Left of CL

Begin Run 5
(100.6-102.6 ft)



US 1 Bridge over I-20

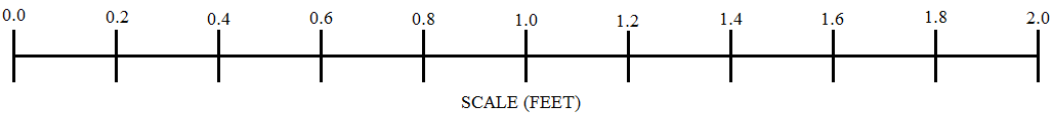
Boring B-2: US 1 Station 364+29; 1.4 ft Right of CL

UC Rock Strength = 34,541 psi

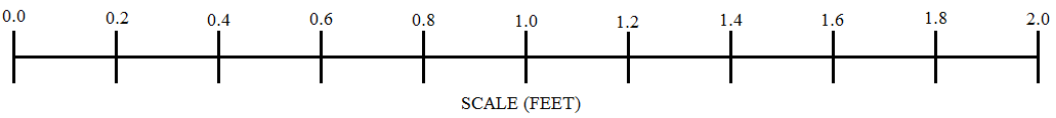
UC Rock Strength = 35,777 psi

Begin Run 1
(58.5-61.2 ft)

Begin Run 2
(61.2-66.2 ft)



Begin Run 3
(66.2-71.2 ft)



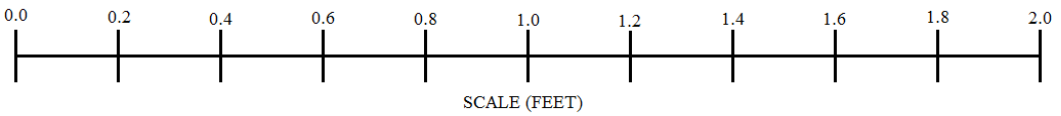
US 1 Bridge over I-20

Boring B-2: US 1 Station 364+29; 1.4 ft Right of CL

UC Rock Strength = 35,106 psi

Begin Run 4
(71.2-75.2 ft)

Begin Run 5
(75.2-79.2 ft)

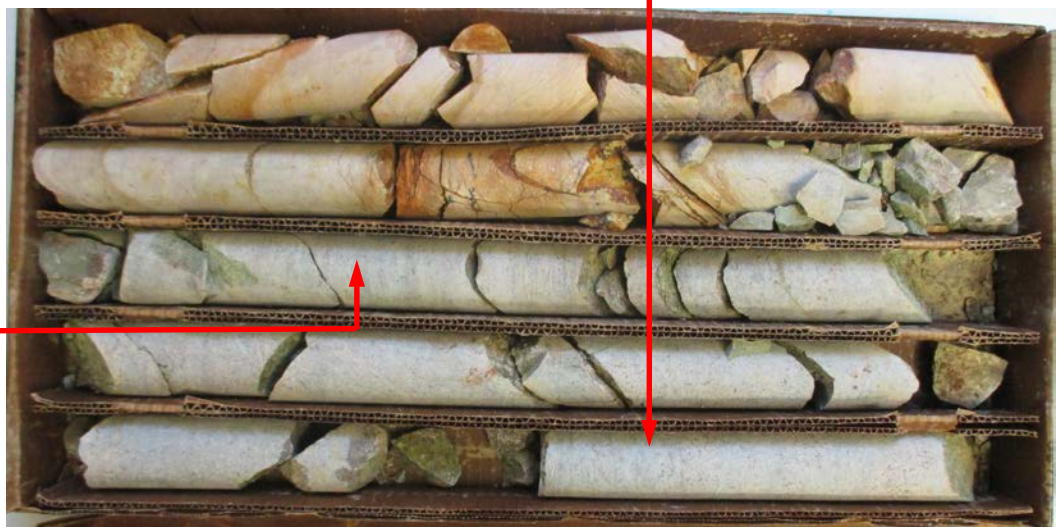


US 1 Bridge over I-20

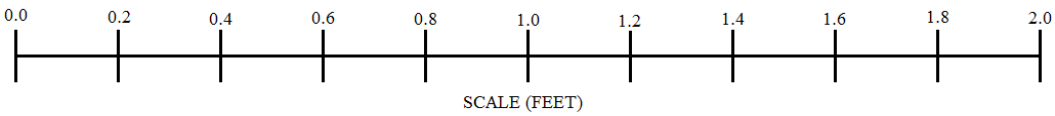
Boring B-3: US 1 Station 320+54; 61.0 ft Left of CL

UC Rock Strength = 21,957 psi

Begin Run 1
(81.0-86.0 ft)

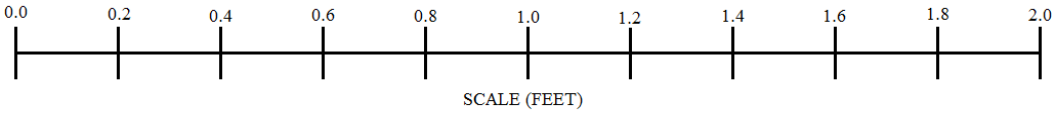


Begin Run 2
(86.0-91.0 ft)



UC Rock Strength = 23,043 psi

Begin Run 3
(91.0-96.0 ft)

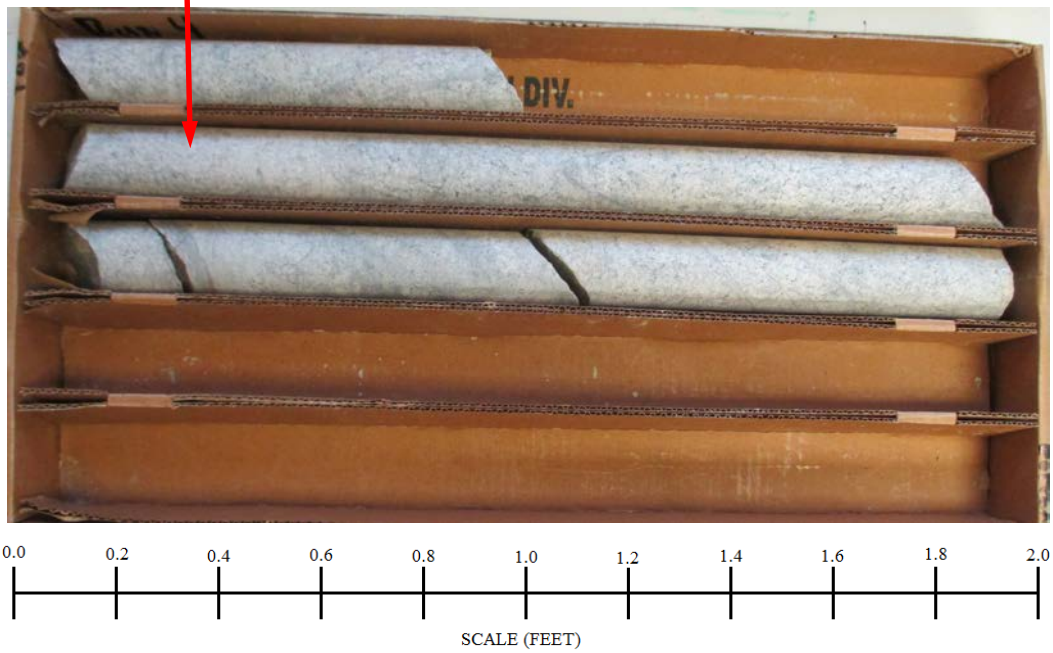


US 1 Bridge over I-20

Boring B-3: US 1 Station 320+54; 61.0 ft Left of CL

UC Rock Strength = 33,660 psi

Begin Run 4
(96.0-101.0 ft)



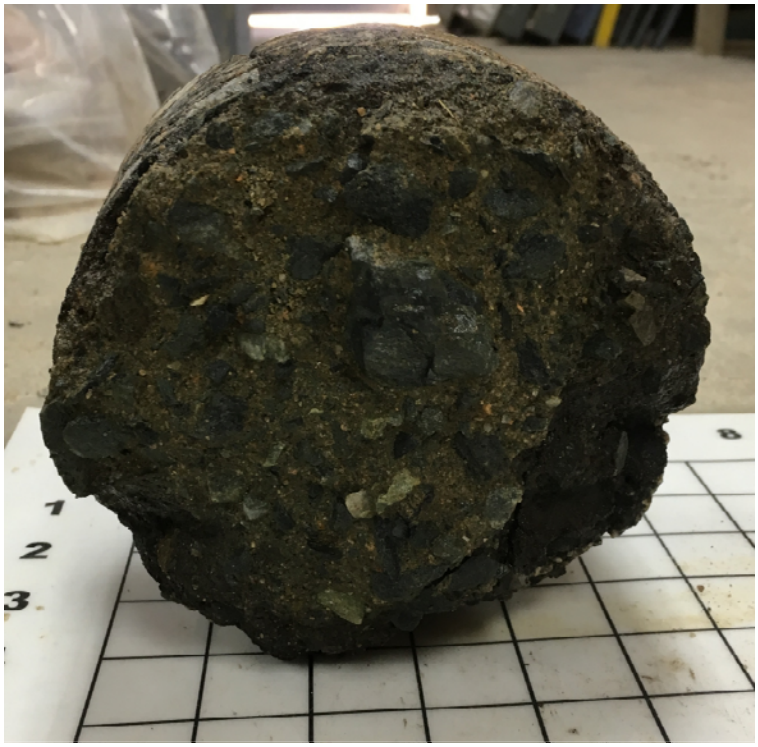
APPENDIX

SECTION 8 ASPHALT CORE PHOTOS

US 1 Bridge over I-20

Boring B-1: US 1 Station 323+59; 107.0 ft Left of CL

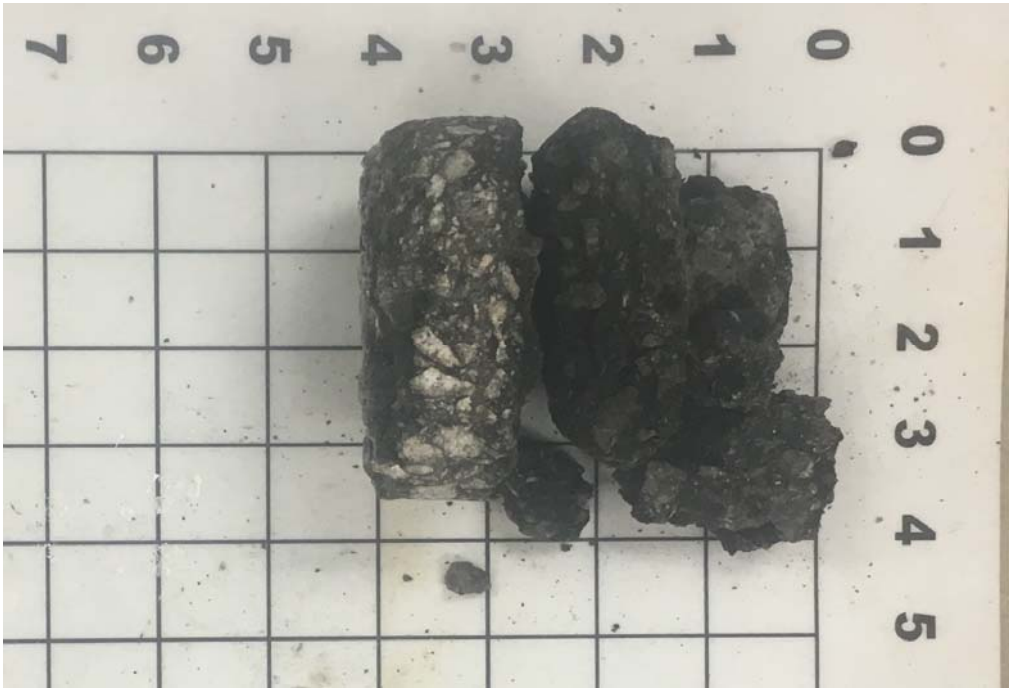
Eastbound Outside Travel Lane



US 1 Bridge over I-20

Boring B-3: US 1 Station 320+54; 61.0 ft Left of CL

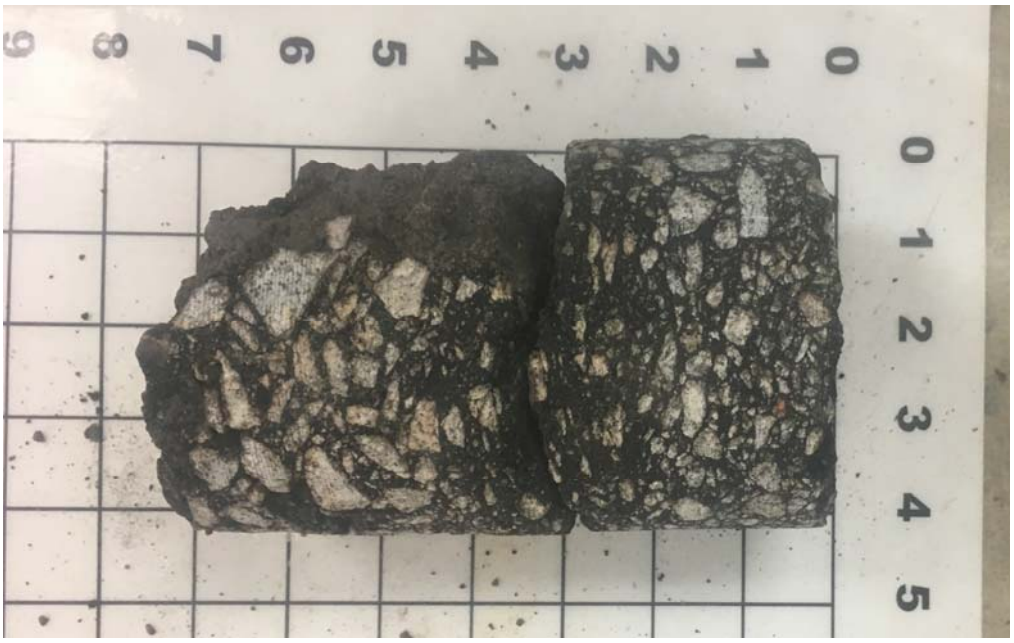
Westbound Outside Travel Lane



US 1 Bridge over I-20

Boring R-1: US 1 Station 324+65; 57.0 ft Left of CL

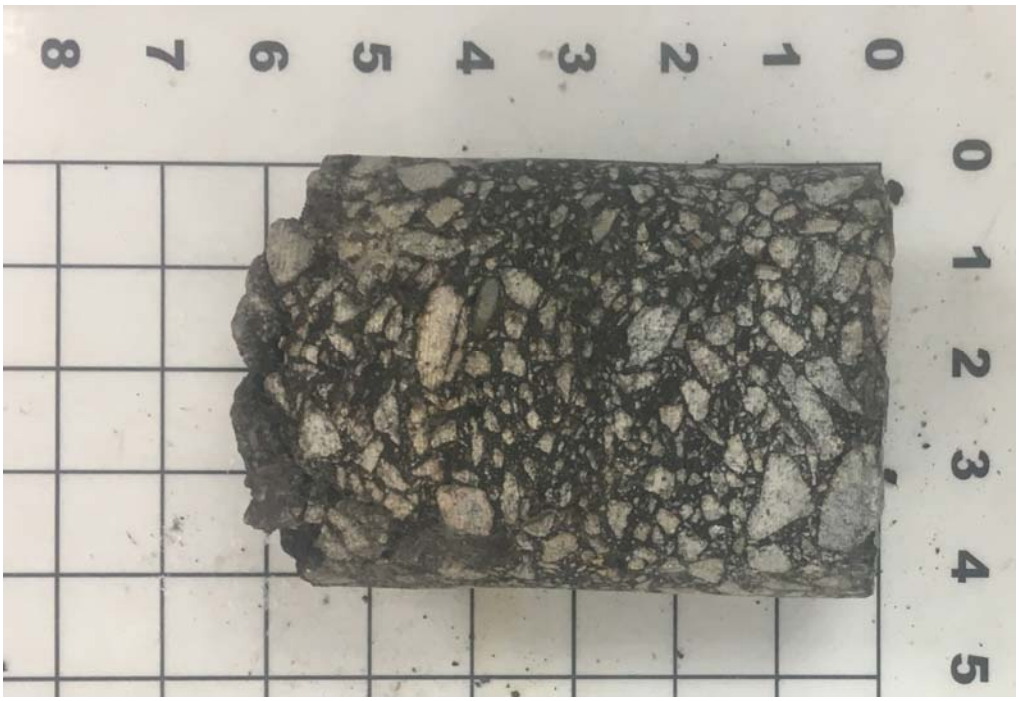
Westbound Outside Travel Lane



US 1 Bridge over I-20

Boring R-2: US 1 Station 319+67; 110.0 ft Left of CL

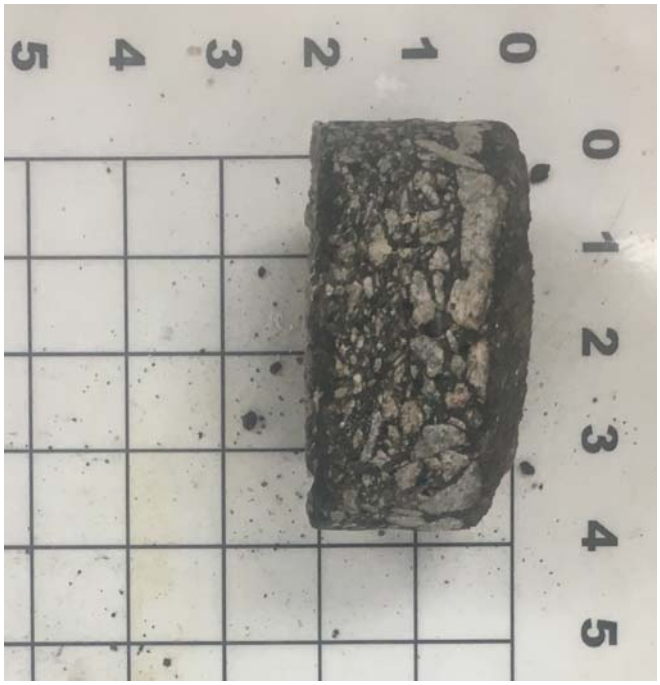
Eastbound Outside Travel Lane



US 1 Bridge over I-20

Boring R-7: US 1 Station 373+07; 205.0 ft Left of CL

Brickyard Rd. Cul-de-sac

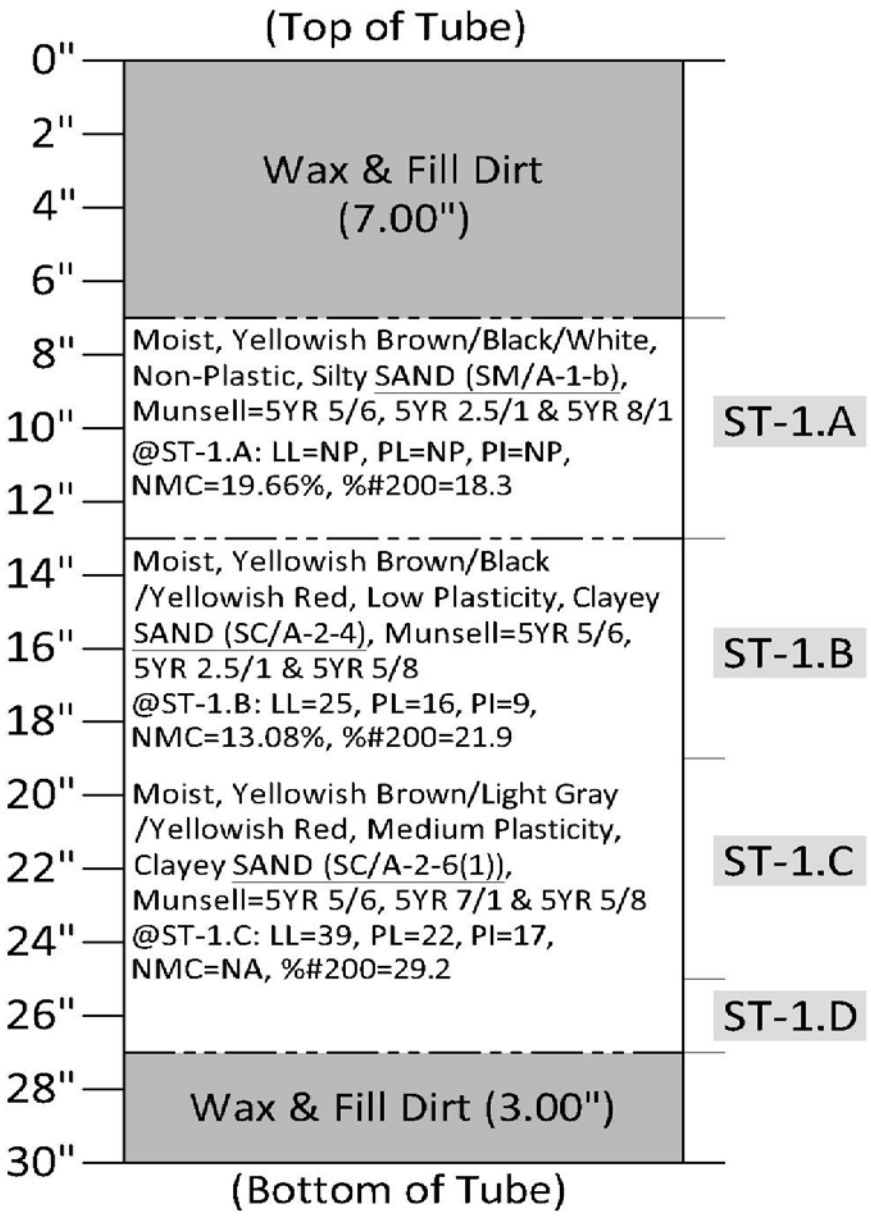


APPENDIX

SECTION 9 UD PREPARATION LOGS

SCDOT Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-1
Project Descrip.:	RBO I-20		Route:	US-1	
UD Sample No.:	ST-1	Depth (ft.):	12.0' - 13.7'		
Date Sampled:	4/1/2019	Date Extracted:	4/29/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	



Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-1
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	12.0' - 13.7'		
Date Sampled:	4/1/2019	Date Extracted:	4/29/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	

Specimen No. ST-1.A Photo 1

Specimen No. ST-1.A Photo 2 (Collapse)

Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-1
Project Descrip.:	RBO I-20		Route:	US-1	
UD Sample No.:	ST-1	Depth (ft.):	12.0' - 13.7'		
Date Sampled:	4/1/2019	Date Extracted:	4/29/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	

Specimen No. ST-1.A Photo 3 (Split)

Specimen No. ST-1.B Photo 1

Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-1
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	12.0' - 13.7'		
Date Sampled:	4/1/2019	Date Extracted:	4/29/2019		
Extracted By:	W. Pitts		Eng. Firm:		F&ME Consultants, Inc.

Specimen No. ST-1.C Photo 1

Specimen No. ST-1.D Photo 1

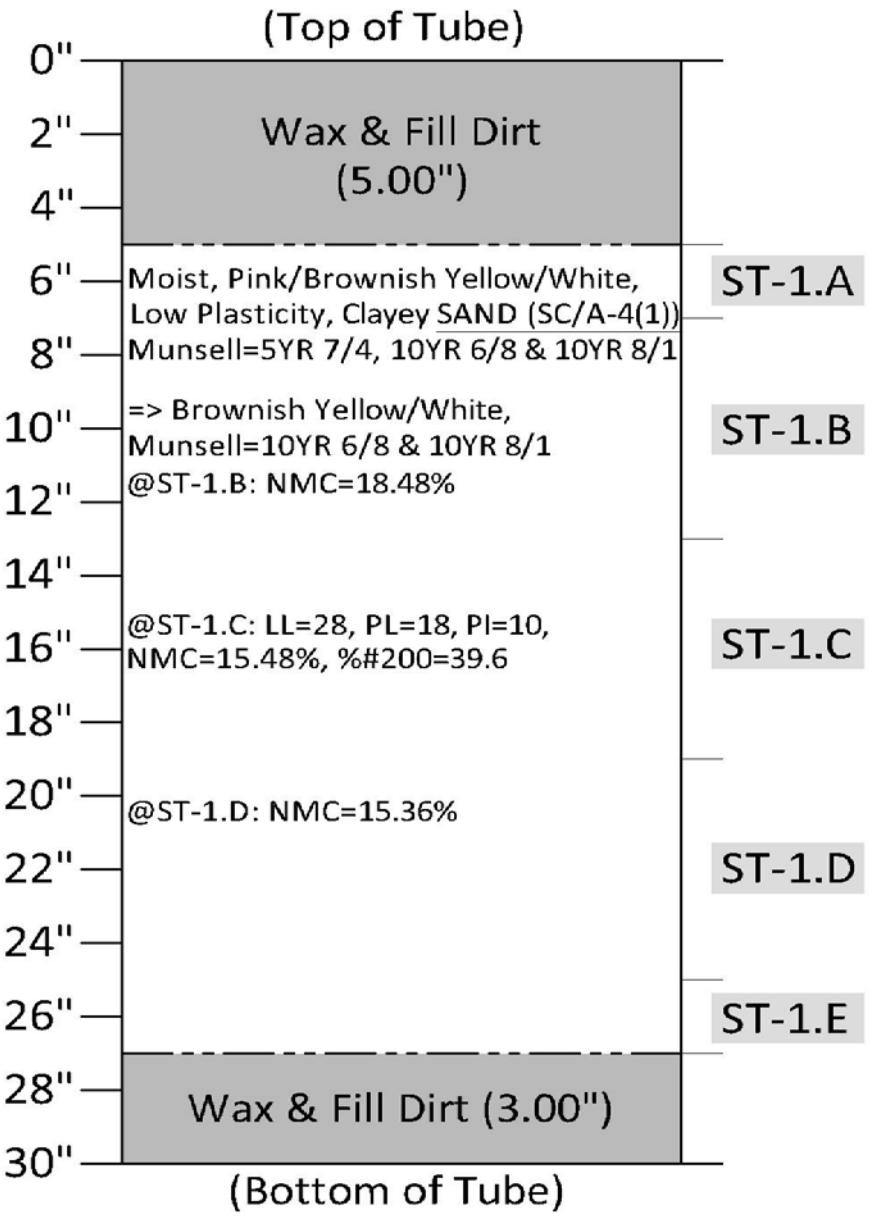
Shelby Tube Log

Project ID:	P030711	**County:**	32 - Lexington	**Boring No:**	AP @ B-1
Project Descrip.:	RBO I-20			**Route:**	US-1
UD Sample No.:	ST-1	**Depth (ft.):**	12.0' - 13.7'		
Date Sampled:	4/1/2019	**Date Extracted:**	4/29/2019		
Extracted By:	W. Pitts		**Eng. Firm:**	F&ME Consultants, Inc.	

Specimen No. ST-1.D Photo 1 (Split)

SCDOT Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20		Route:	US-1	
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	



Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts	Eng. Firm:	F&ME Consultants, Inc.		

Specimen No. ST-1.A Photo 1

Specimen No. ST-1.A Photo 2 (Split)

Shelby Tube Log

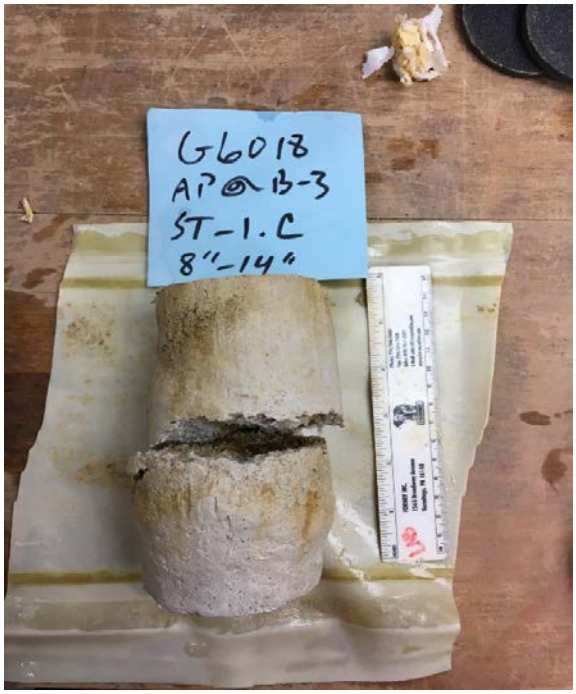
Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts	Eng. Firm:	F&ME Consultants, Inc.		

Specimen No. ST-1.B Photo 1

Specimen No. ST-1.B Photo 2 (After CU Testing)

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	

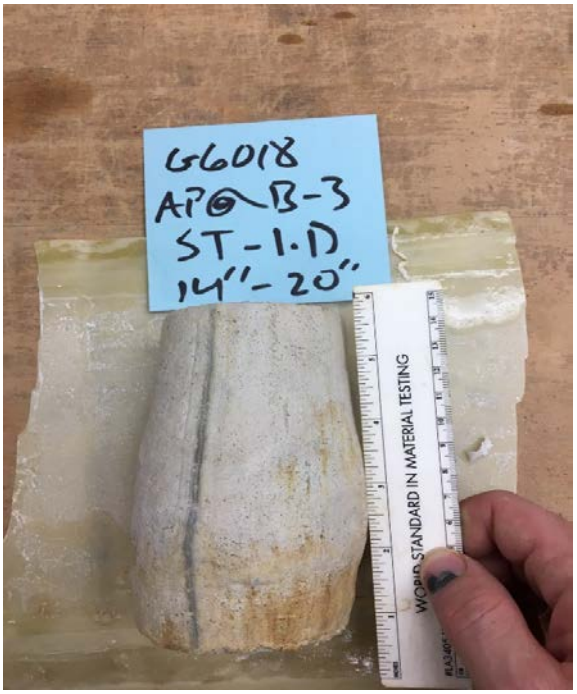
Specimen No. ST-1.C Photo 1



Specimen No. ST-1.C Photo 2 (After CU Testing)

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	

Specimen No. ST-1.D Photo 1



Specimen No. ST-1.D Photo 2 (After CU Testing)

Shelby Tube Log

Project ID:	P030711	County:	32 - Lexington	Boring No:	AP @ B-3
Project Descrip.:	RBO I-20			Route:	US-1
UD Sample No.:	ST-1	Depth (ft.):	32.0' - 34.0'		
Date Sampled:	4/1/2019	Date Extracted:	5/7/2019		
Extracted By:	W. Pitts		Eng. Firm:	F&ME Consultants, Inc.	

Specimen No. ST-1.E Photo 1

Specimen No. ST-1.E Photo 2 (Split)

APPENDIX

SECTION 10 LABORATORY TEST RESULTS

US 1 BRIDGE OVER I-20
LEXINGTON COUNTY, SOUTH CAROLINA
F&ME PROJECT NO.: G6018.00; SCDOT PROJECT NO.: P030711

SPLIT SPOON SAMPLE LABORATORY RESULTS SUMMARY

Boring Number	Sample Number	Sample Depth (ft)	Index									Electro-Chemical			
			% Gravel	% Sand	% Fines (Silt/Clay)	LL	PL	PI	Moisture Content	USCS	AASHTO Class	pH	Resistivity (Ohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)
B-1	SS-7 & SS-8	18.5'-20.0' & 23.5'-25.0'	N/A	N/A	--	--	--	--	--	--	N/A	4.6	6,400	<30	50
B-1	SS-9	28.5'-30'	N/A	N/A	31.8	30	28	2	27.5	SM	N/A	--	--	--	--
B-1	SS-11	38.5'-40'	N/A	N/A	64.4	43	27	16	27.8	ML	N/A	--	--	--	--
B-1	SS-12	43.5'-45'	N/A	N/A	18.2	NP	NP	NP	12.5	SM	N/A	--	--	--	--
B-1	SS-14	53.5'-55'	N/A	N/A	18.5	47	24	23	24.3	SC	N/A	--	--	--	--
B-1	SS-15	58.5'-60'	N/A	N/A	40.0	38	24	14	29.1	SC	N/A	--	--	--	--
B-2	SS-5	6'-8'	N/A	N/A	14.7	26	21	5	19.5	SC-SM	N/A	--	--	--	--
B-2	SS-6	13.5'-15'	N/A	N/A	16.9	31	28	3	22.4	SM	N/A	--	--	--	--
B-2	SS-8	23.5'-25'	N/A	N/A	16.2	35	29	6	18.0	SM	N/A	--	--	--	--
B-2	SS-11	38.5'-40'	N/A	N/A	50.5	39	27	12	26.2	ML	N/A	--	--	--	--
B-3	SS-9	28.5-30'	N/A	N/A	17.6	NP	NP	NP	20.9	SM	N/A	--	--	--	--
B-3	SS-10	33.5'-35'	N/A	N/A	26.3	NP	NP	NP	22.3	SM	N/A	--	--	--	--
B-3	SS-12	43.5'-45'	N/A	N/A	13.1	NP	NP	NP	19.9	SM	N/A	--	--	--	--
R-1	SS-1 & SS-2	0'-4'	N/A	N/A	29.9	41	24	17	12.7	SC	N/A	--	--	--	--
R-1	SS-9	28.5'-30.0'	N/A	N/A	21.3	25	21	4	19.4	SC-SM	N/A	--	--	--	--
R-1	SS-10	33.5'-35.0'	N/A	N/A	14.8	24	21	3	21.6	SM	N/A	--	--	--	--
R-1	SS-11	38.5'-40.0'	N/A	N/A	23.6	34	27	7	18.0	SM	N/A	--	--	--	--
R-2	SS-1 & SS-2	0'-4'	N/A	N/A	23.9	30	21	9	10.1	SC	N/A	--	--	--	--
R-2	SS-5	6'-8'	N/A	N/A	29.6	47	30	17	14.3	SM	N/A	--	--	--	--
R-2	SS-8	23.5'-25.0'	N/A	N/A	18.3	NP	NP	NP	16.2	SM	N/A	--	--	--	--
R-2	SS-9	28.5'-30.0'	N/A	N/A	14.0	24	21	3	19.9	SM	N/A	--	--	--	--
R-2	SS-10	33.5'-35.0'	N/A	N/A	22.4	31	25	6	26.1	SM	N/A	--	--	--	--
R-2	SS-11	38.5'-40.0'	N/A	N/A	18.1	37	22	15	18.6	SC	N/A	--	--	--	--
R-3	SS-1	0'-2'	N/A	N/A	31.7	48	29	19	13.3	SM	N/A	--	--	--	--
R-3	SS-6	13.5'-15'	N/A	N/A	16.3	NP	NP	NP	18.1	SM	N/A	--	--	--	--
R-4	SS-1	0'-2'	N/A	N/A	32.8	NP	NP	NP	16.1	SM	N/A	--	--	--	--
R-4	SS-6	13.5'-15'	N/A	N/A	28.2	46	27	19	15.3	SC	N/A	--	--	--	--
R-5	SS-1	0'-2'	N/A	N/A	34.1	25	17	8	14.0	SC	N/A	--	--	--	--
R-5	SS-9	28.5'-30'	N/A	N/A	24.1	NP	NP	NP	30.0	SM	N/A	--	--	--	--
R-6	SS-1	0'-2'	N/A	N/A	28.1	32	17	15	10.2	SC	N/A	--	--	--	--
R-6	SS-4	6'-8'	N/A	N/A	32	43	24	19	15.2	SC	N/A	--	--	--	--
R-7	SS-1	0'-2'	N/A	N/A	29	31	16	15	12.9	SC	N/A	--	--	--	--
R-7	SS-7	18.5'-20'	N/A	N/A	18.7	NP	NP	NP	23.3	SM	N/A	--	--	--	--
R-8	SS-1	0'-2'	N/A	N/A	13.9	NP	NP	NP	7.2	SM	N/A	--	--	--	--
R-8	SS-6	13.5'-15'	N/A	N/A	16	NP	NP	NP	21.3	SM	N/A	--	--	--	--

US 1 BRIDGE OVER I-20
LEXINGTON COUNTY, SOUTH CAROLINA
F&ME PROJECT NO.: G6018.00; SCDOT PROJECT NO.: P030711

BULK & UD SAMPLE LABORATORY RESULTS SUMMARY

Boring Number	Sample Depth (ft)	Index									Standard Proctor		CU Triaxial Shear				CBR		Electro-Chemical			
		% Gravel	% Sand	% Fines (Silt/Clay)	LL	PL	PI	Moisture Content	USCS	AASHTO Class	Optimum Moisture Content (%)	Maximum Dry Density (pcf)	φ (degrees)	C (psi)	φ' (degrees)	C' (psi)	0.1" Pen.	0.2" Pen.	pH	Resistivity (Ohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)
B-1U	12.0'-12.5'	0.0	81.7	18.3	NP	NP	NP	--	SM	A-1-b	--	--					--	--	--	--	--	--
B-1U	12.5'-13.0'	0.7	77.4	21.9	25	16	9	19.7	SC	A-2-4	--	--	0.0	4.50	0.0	4.50	--	--	--	--	--	--
B-1U	13.0'-13.5'	0.3	70.6	29.2	39	22	17	13.1	SC	A-2-6(1)	--	--					--	--	--	--	--	--
B-3U	33.2'-32.7'	--	--	--	--	--	--	18.8	--	--	--	--					--	--	--	--	--	--
B-3U	32.7'-33.2'	0.1	60.3	39.6	28	18	10	15.5	SC	A-4(1)	--	--	21.0	1.66	40.0	0.00	--	--	--	--	--	--
B-3U	33.2'-33.7'	--	--	--	--	--	--	15.4	--	--	--	--					--	--	--	--	--	--
BS-1	0.0'-10.0'	0.0	77.9	22.1	NP	NP	NP	2.1	SM	A-2-4	9.5	126.6	43.3	1.50	35.7	1.50	--	--	--	--	--	--
BS-2	0.0'-10.0'	0.0	65.7	34.3	32	19	13	15.2	SC	A-2-6(1)	10.2	124.6	24.7	2.90	33.8	1.00	--	--	6.6	2,400	<30	97
BS-3	0.0'-5.0'	7.5	68.3	24.1	NP	NP	NP	--	SM	A-1-b	15.2	113.0	--	--	--	--	5.1%	5.3%	--	--	--	--
BS-4	0.0'-5.0'	0	50.7	49.3	36	32	4	--	SM	A-4(1)	12.7	117.7	--	--	--	--	11.7%	10.6%	--	--	--	--

US 1 BRIDGE OVER I-20
LEXINGTON COUNTY, SOUTH CAROLINA
F&ME PROJECT NO.: G6018.00; SCDOT PROJECT NO.: P030711

ROCK CORE LABORATORY RESULTS SUMMARY

Boring Number	Sample Number	Sample Depth (ft)	Rock Type	Unit Weight (lb / ft^3)	UC Strength (psi)
B-1	RC-1	84.0'-84.3'	Granite	161.0	12843
B-1	RC-2	92.0'-92.3'	Granite	163.0	23425
B-1	RC-3	98.5'-98.8'	Granite	163.0	12866
B-2	RC-4	60.0'-60.3'	Granite	163.0	34541
B-2	RC-5	63.3'-63.6'	Granite	164.0	35777
B-2	RC-6.2	71.8'-72.1'	Granite	164.0	35106
B-3	RC-7	89.6'-89.9'	Granite	164.0	21957
B-3	RC-8	94.8'-95.1'	Granite	163.0	23043
B-3	RC-9	97.0'-97.3'	Granite	163.0	33660

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1004	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019

BORING NO.	B-1	B-1	B-1	B-1	B-1
SAMPLE NO.	SS-9	SS-11	SS-12	SS-14	SS-15
SAMPLE DEPTH	28.5'-30'	38.5'-40'	43.5'-45'	53.5'-55	58.5'-60'
WATER CONTENT, W%	27.5	27.8	12.5	24.3	29.1

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

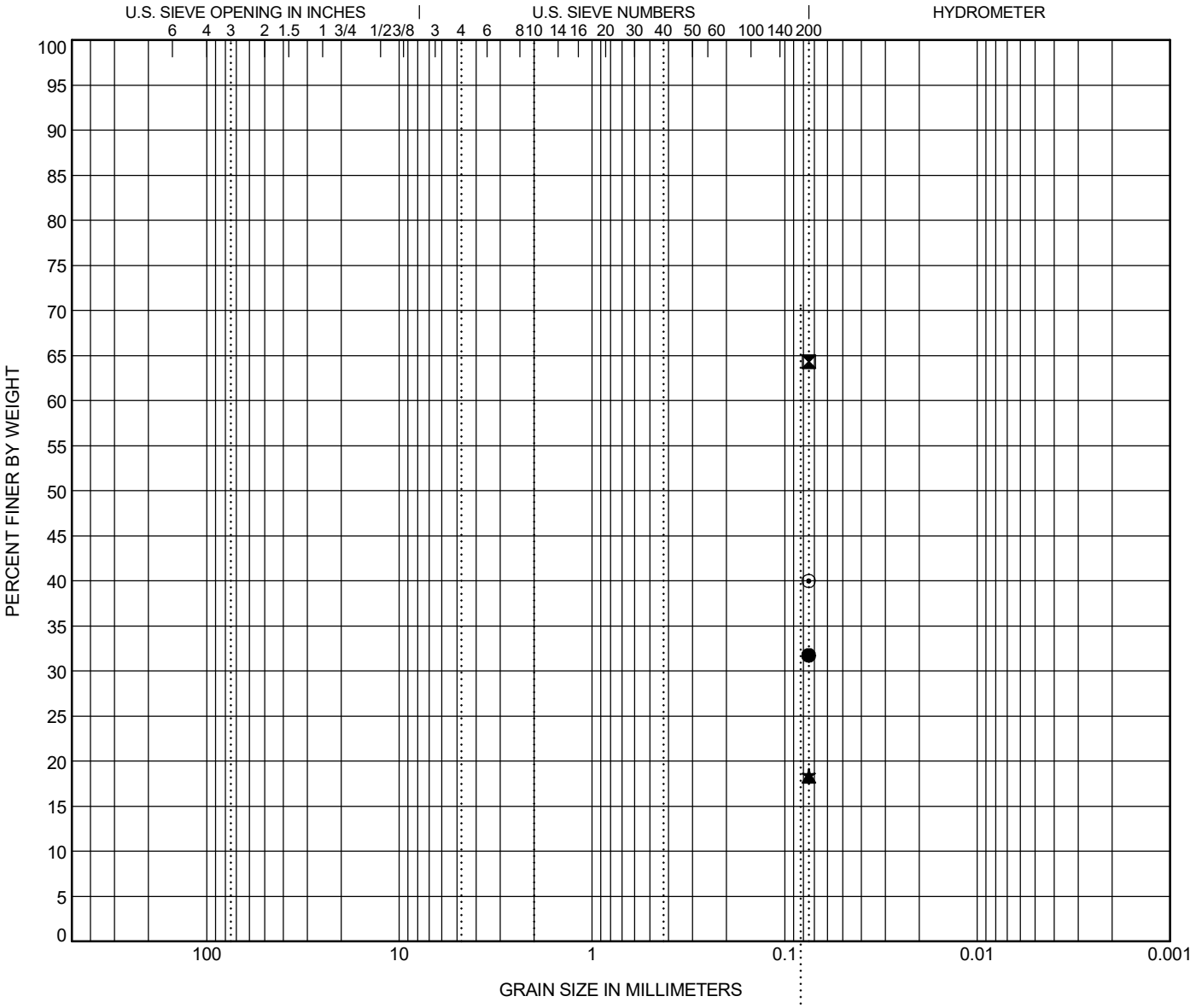
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**30.0**	**SILTY SAND(SM)**	**30**	**28**	**2**		
⊠	**B-1**	**40.0**	**SANDY SILT(ML)**	**43**	**27**	**16**		
▲	**B-1**	**45.0**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
★	**B-1**	**55.0**	**CLAYEY SAND(SC)**	**47**	**24**	**23**		
⊙	**B-1**	**60.0**	**CLAYEY SAND(SC)**	**38**	**24**	**14**		

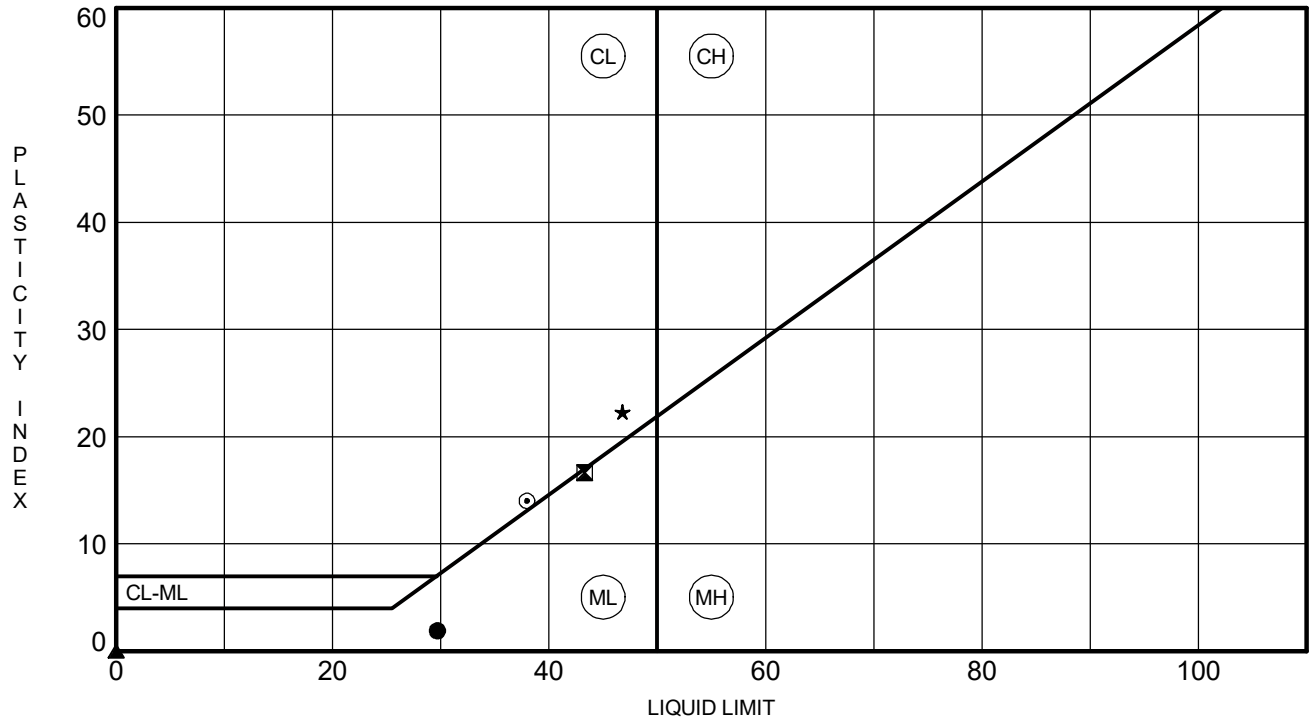
	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**30.0**	**0.075**						**31.8**	
⊠	**B-1**	**40.0**	**0.075**						**64.4**	
▲	**B-1**	**45.0**	**0.075**						**18.2**	
★	**B-1**	**55.0**	**0.075**						**18.5**	
⊙	**B-1**	**60.0**	**0.075**						**40.0**	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1**	**30.0**	**30**	**28**	**2**	**32**	**SILTY SAND(SM)**
⊠	**B-1**	**40.0**	**43**	**27**	**16**	**64**	**SANDY SILT(ML)**
▲	**B-1**	**45.0**	**NP**	**NP**	**NP**	**18**	**SILTY SAND(SM)**
★	**B-1**	**55.0**	**47**	**24**	**23**	**18**	**CLAYEY SAND(SC)**
⊙	**B-1**	**60.0**	**38**	**24**	**14**	**40**	**CLAYEY SAND(SC)**

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-1
Client Project	SCDOT US-1 over I-20	Depth	84.0' - 84.3'
Project Number	41705	Sample	RC-1
		Lab ID number	41705003
Description:	Brown Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
2.60E-03	-3.07E-04	6397
1.43E-03	-9.27E-05	3183

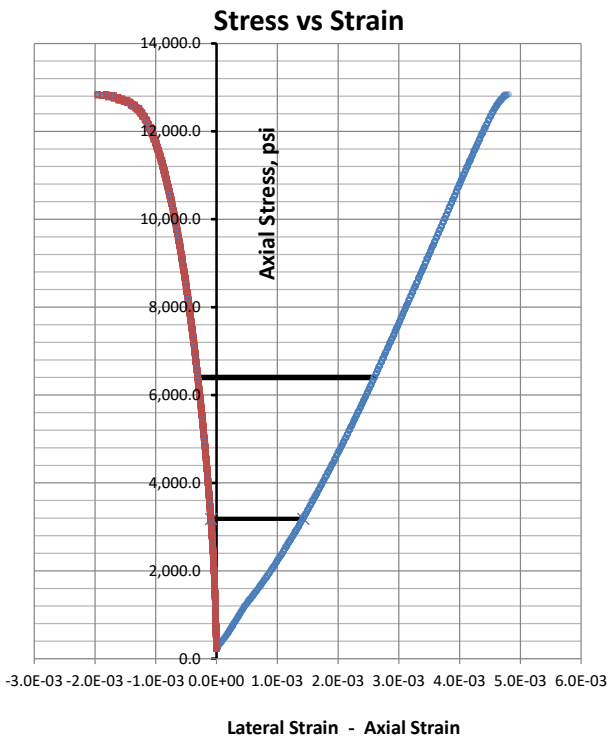
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.068
Mid Height Diameter #1, in	1.86
Mid Height Diameter #2, in	1.863
Average Mid. Height Diameter, in.	1.86
Sample Area, in^2	2.72
L/D Ratio (2.0-2.5)	**2.19**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	467.31
Sample Volume, cc	181
Wet Density, pcf	161

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	34953
Unconfined Compressive Strength, psi	**12,843**
Youngs Modulus, E psi	**2.7 E+06**
Slope of Lateral Curve, psi	**-15.0 E+06**
Poisson's Ratio	**0.18**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo

SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	14	16	13	14
-0.75	12	14	10	11
-0.625	8	12	7	10
-0.5	6	8	5	9
-0.375	5	5	3	5
-0.25	3	3	2	4
-0.125	1	2	1	3
0	0	0	0	0
0.125	-2	-4	-3	-2
0.25	-4	-6	-4	-5
0.375	-7	-8	-4	-7
0.5	-8	-11	-5	-9
0.625	-10	-13	-8	-11
0.75	-13	-14	-10	-15
0.875	-14	-16	-11	-16
1	-16	-18	-14	-19
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.02	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.01	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.0015	0.003
Angle, *	0.02	0.04
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-1
Client Project	SCDOT US-1 over I-20	Depth	92.0' - 92.3'
Project Number	41705	Sample	RC-2
		Lab ID number	41705004
Description:	Pink and Gray Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.26E-03	-3.47E-04	11634
5.71E-04	-1.72E-04	5903

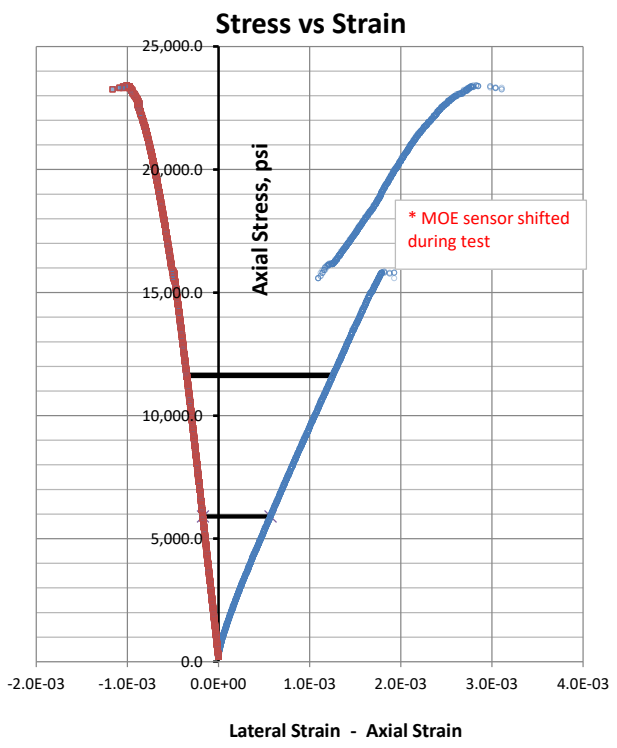
ASTM D 4543; Section 4.2 & 5.6	
Length, in	3.76
Mid Height Diameter #1, in	1.863
Mid Height Diameter #2, in	1.864
Average Mid. Height Diameter, in.	1.86
Sample Area, in^2	2.73
L/D Ratio (2.0-2.5)	**2.02**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	440.27
Sample Volume, cc	168
Wet Density, pcf	163

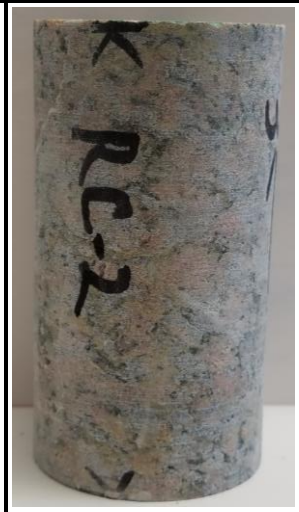
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	63889
Unconfined Compressive Strength, psi	**23,425**
Youngs Modulus, E psi	**8.3 E+06**
Slope of Lateral Curve, psi	**-32.7 E+06**
Poisson's Ratio	**0.25**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	11	10	11	11
-0.75	9	9	10	10
-0.625	7	8	10	7
-0.5	6	8	7	7
-0.375	6	6	5	6
-0.25	4	4	3	3
-0.125	1	2	2	1
0	0	0	0	0
0.125	-1	-1	-1	-2
0.25	-2	-2	-3	-3
0.375	-3	-3	-4	-4
0.5	-3	-6	-5	-5
0.625	-5	-7	-6	-7
0.75	-5	-9	-8	-9
0.875	-7	-10	-10	-10
1	-10	-13	-10	-12
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.01	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.00	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.002	0.003
Angle, *	0.03	0.05
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-1
Client Project	SCDOT US-1 over I-20	Depth	98.5' - 98.8'
Project Number	41705	Sample	RC-3
		Lab ID number	41705005
Description:	Pink and Gray Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
5.80E-04	-1.71E-04	6469
2.31E-04	-7.47E-05	3217

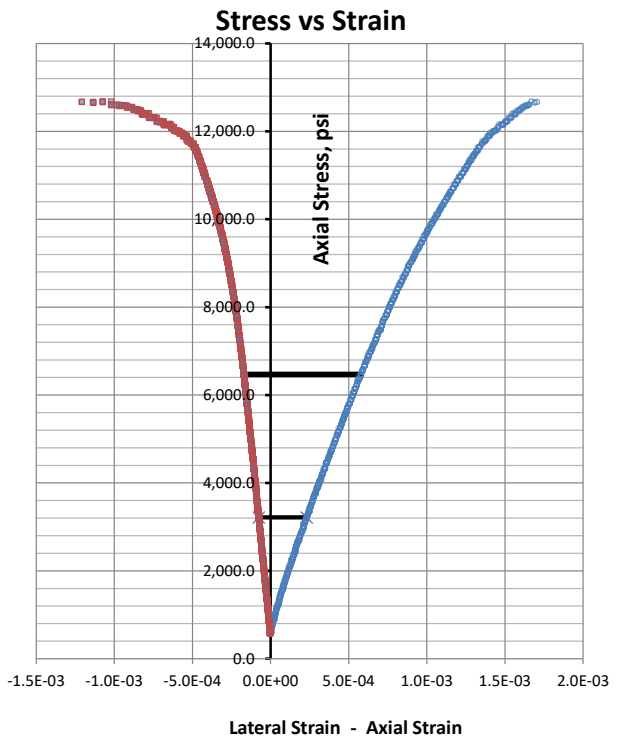
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.247
Mid Height Diameter #1, in	1.867
Mid Height Diameter #2, in	1.866
Average Mid. Height Diameter, in.	1.87
Sample Area, in^2	2.74
L/D Ratio (2.0-2.5)	**2.28**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	498.2
Sample Volume, cc	190
Wet Density, pcf	163

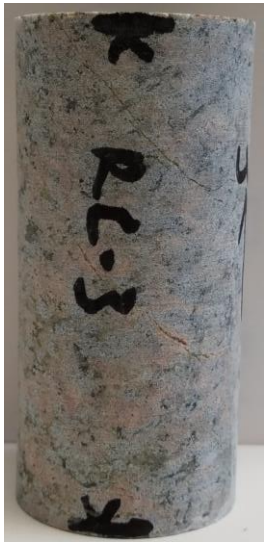
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	35204
Unconfined Compressive Strength, psi	**12,866**
Youngs Modulus, E psi	**9.3 E+06**
Slope of Lateral Curve, psi	**-33.7 E+06**
Poisson's Ratio	**0.28**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	3	32	1	30
-0.75	3	26	1	28
-0.625	3	22	1	22
-0.5	2	16	3	18
-0.375	2	11	1	12
-0.25	2	8	2	8
-0.125	1	3	2	4
0	0	0	0	0
0.125	0	-3	0	-2
0.25	0	-7	0	-6
0.375	-1	-12	-1	-11
0.5	-1	-16	0	-16
0.625	-1	-21	0	-20
0.75	0	-26	0	-24
0.875	-1	-30	-1	-28
1	-2	-35	-1	-31
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.01	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.01	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.004	0.003
Angle, *	0.05	0.04
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1189	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	WAP	**DATE OF TESTING:**	4/29/2019
WEIGHED BY:	WAP	**DATE OF WEIGHING:**	4/30/2019

BORING NO.	B-1U	B-1U			
SAMPLE NO.	ST-1.B	ST-1.C			
SAMPLE DEPTH	12.5' - 13.0'	13.0' - 13.5'			
WATER CONTENT, W%	19.7	13.1			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

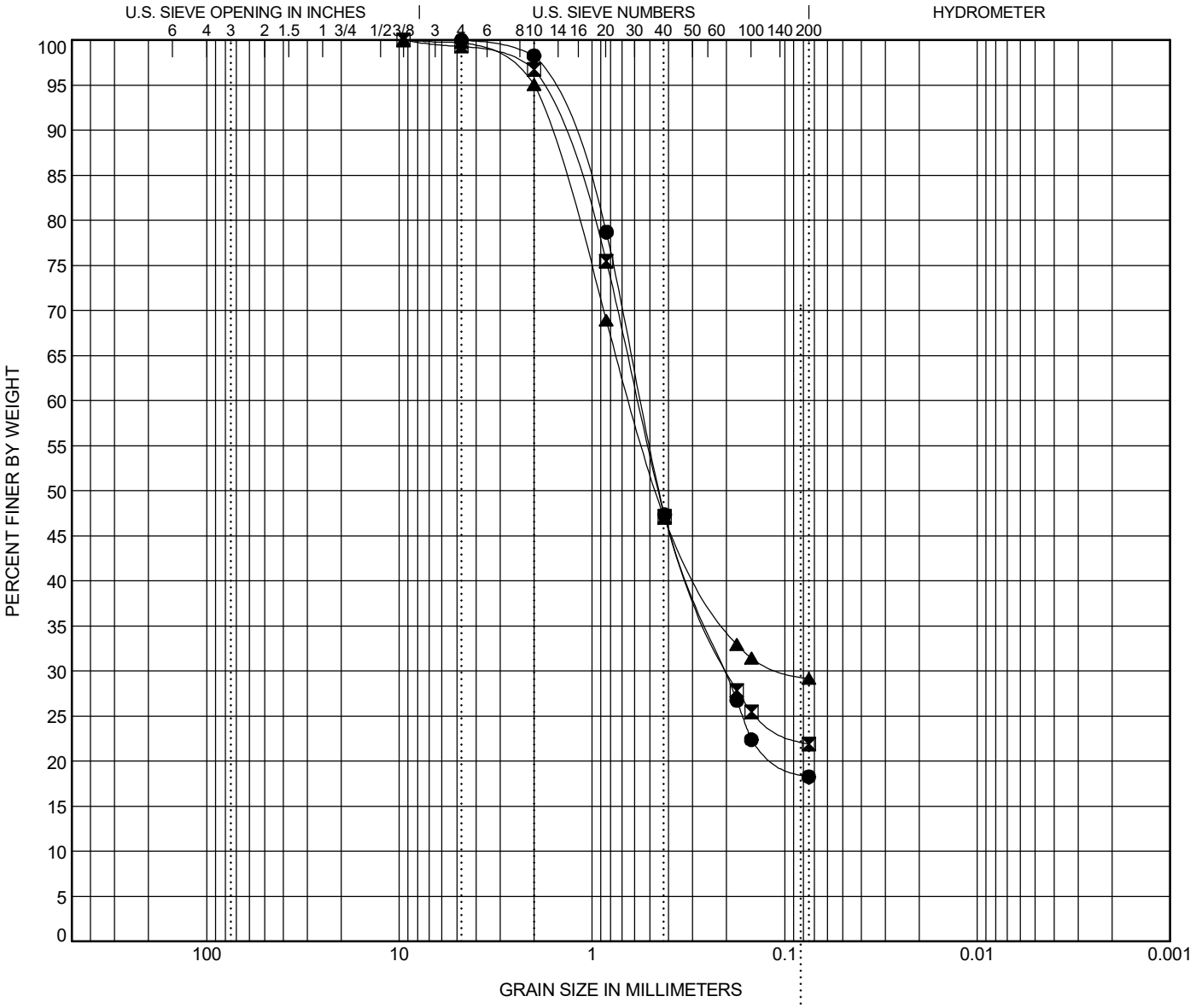
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

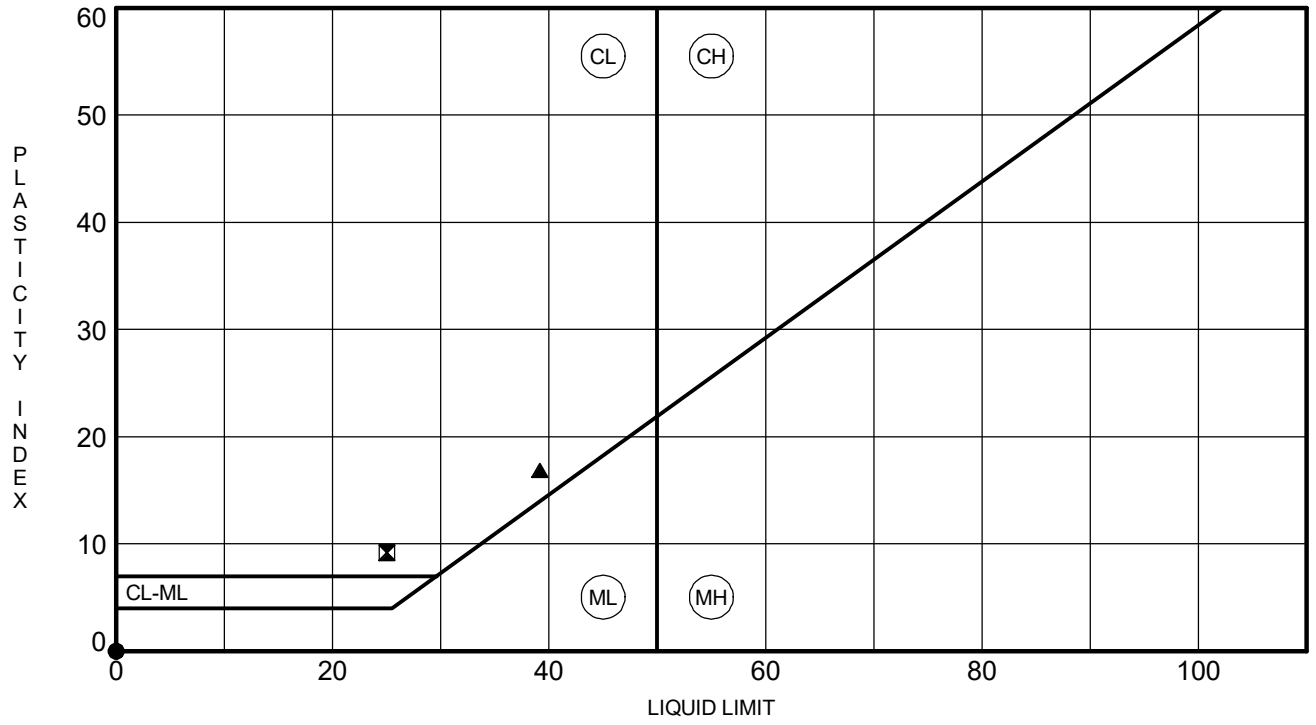
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-1U**	**12.5**	**Silty SAND (SM/A-1-b)**	**NP**	**NP**	**NP**		
⊠	**B-1U**	**13.0**	**Clayey SAND (SC/A-2-4)**	**25**	**16**	**9**		
▲	**B-1U**	**13.5**	**Clayey SAND (SC/A-2-6(1))**	**39**	**22**	**17**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1U**	**12.5**	**4.76**	**1.729**	**0.445**		**0.0**	**81.7**	**18.3**	
⊠	**B-1U**	**13.0**	**9.51**	**1.861**	**0.45**		**0.7**	**77.4**	**21.9**	
▲	**B-1U**	**13.5**	**9.51**	**1.993**	**0.463**		**0.3**	**70.6**	**29.2**	

ATTERBERG LIMITS' RESULTS

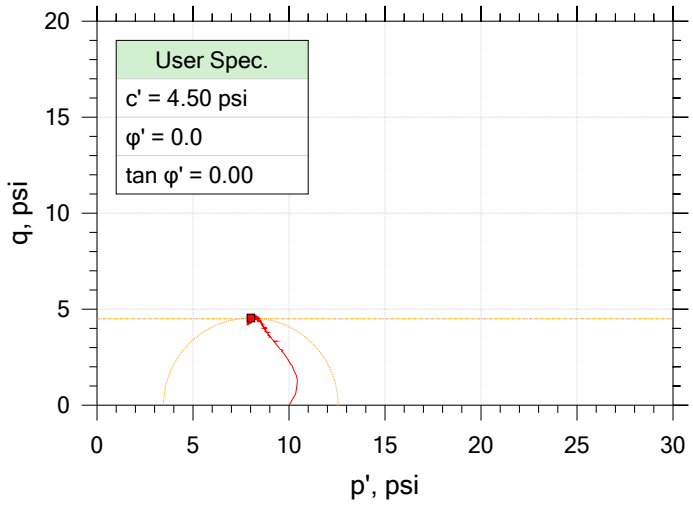
PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

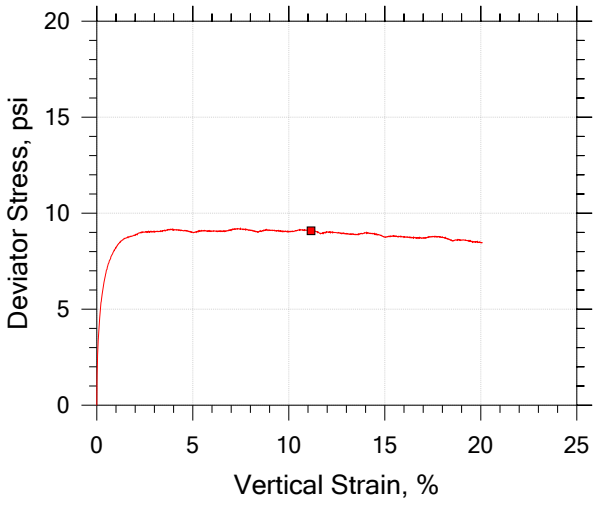
PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1U**	**12.5**	**NP**	**NP**	**NP**	**18**	**Silty SAND (SM/A-1-b)**
⊠	**B-1U**	**13.0**	**25**	**16**	**9**	**22**	**Clayey SAND (SC/A-2-4)**
▲	**B-1U**	**13.5**	**39**	**22**	**17**	**29**	**Clayey SAND (SC/A-2-6(1))**

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297





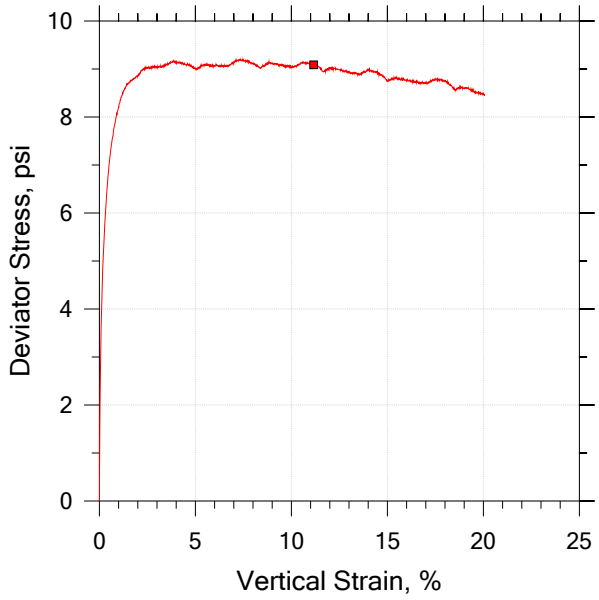
Symbol		
Sample ID		ST-1.B
Depth, ft		12.0 - 13.7
Test Number		A
Initial	Height, in	6.012
	Diameter, in	2.843
	Moisture Content (from Cuttings), %	19.7
	Dry Density, pcf	95.1
	Saturation (Wet Method), %	69.5
	Void Ratio	0.759
Final	Moisture Content, %	26.8
	Dry Density, pcf	97.3
	Cross-Sectional Area (Method A), in²	6.232
	Saturation, %	100.0
	Void Ratio	0.719
	Back Pressure, %	62.00
Vertical Effective Consolidation Stress, psi		9.974
Horizontal Effective Consolidation Stress, psi		10.00
Vertical Strain after Consolidation, %		0.3572
Volumetric Strain after Consolidation, %		1.991
Time to 50% Consolidation, min		0.0000
Shear Strength, psi		4.543
Strain at Failure, %		11.2
Strain Rate, %/min		0.07500
Deviator Stress at Failure, psi		9.087
Effective Minor Principal Stress at Failure, psi		3.469
Effective Major Principal Stress at Failure, psi		12.56
B-Value		0.95

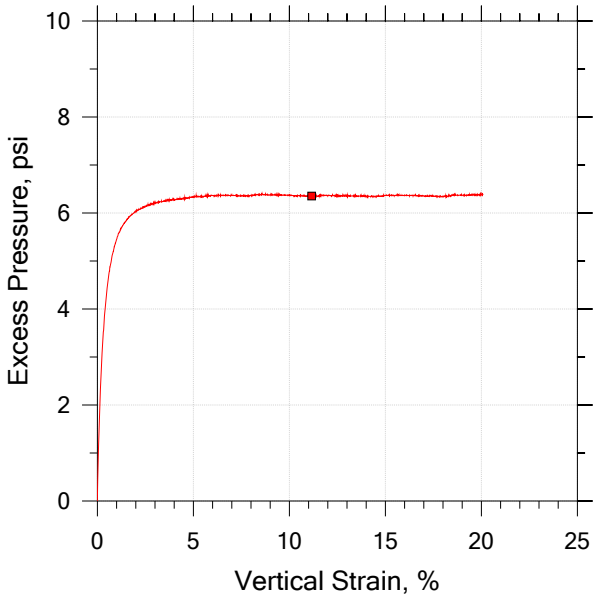
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

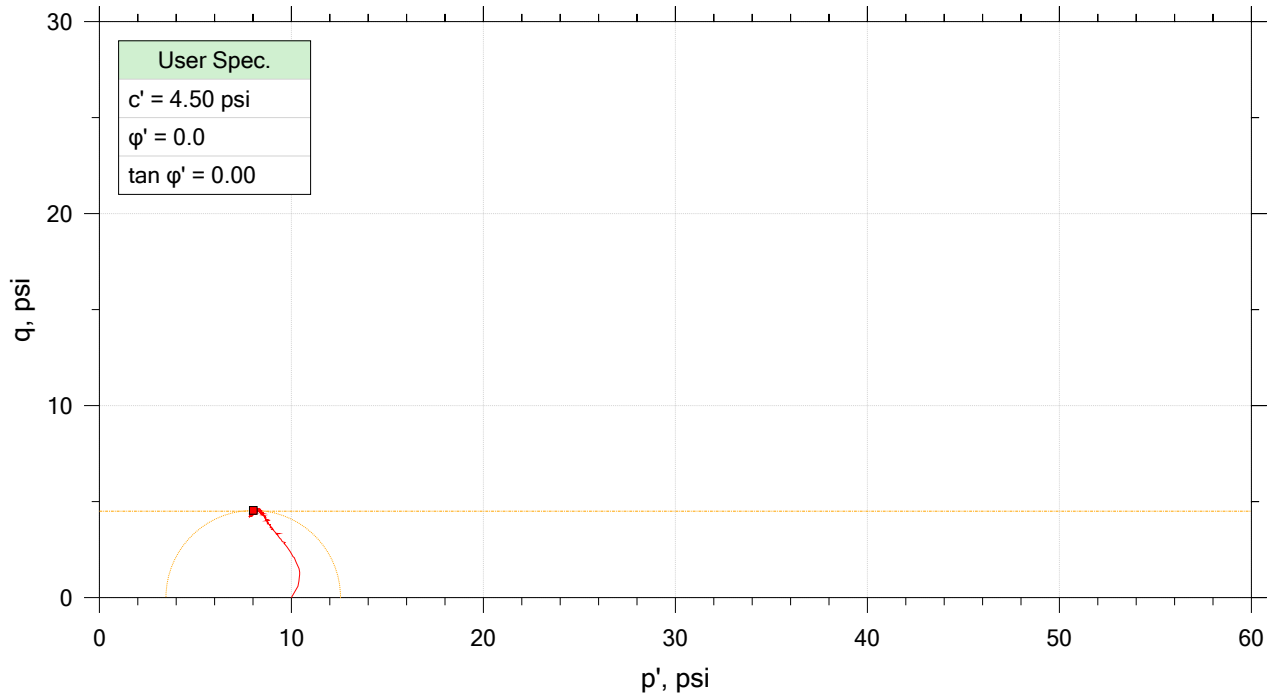
F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
Test No.: A	Sample Type: Undisturbed	Elevation:
Description:		
Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
to run any additional tests.		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



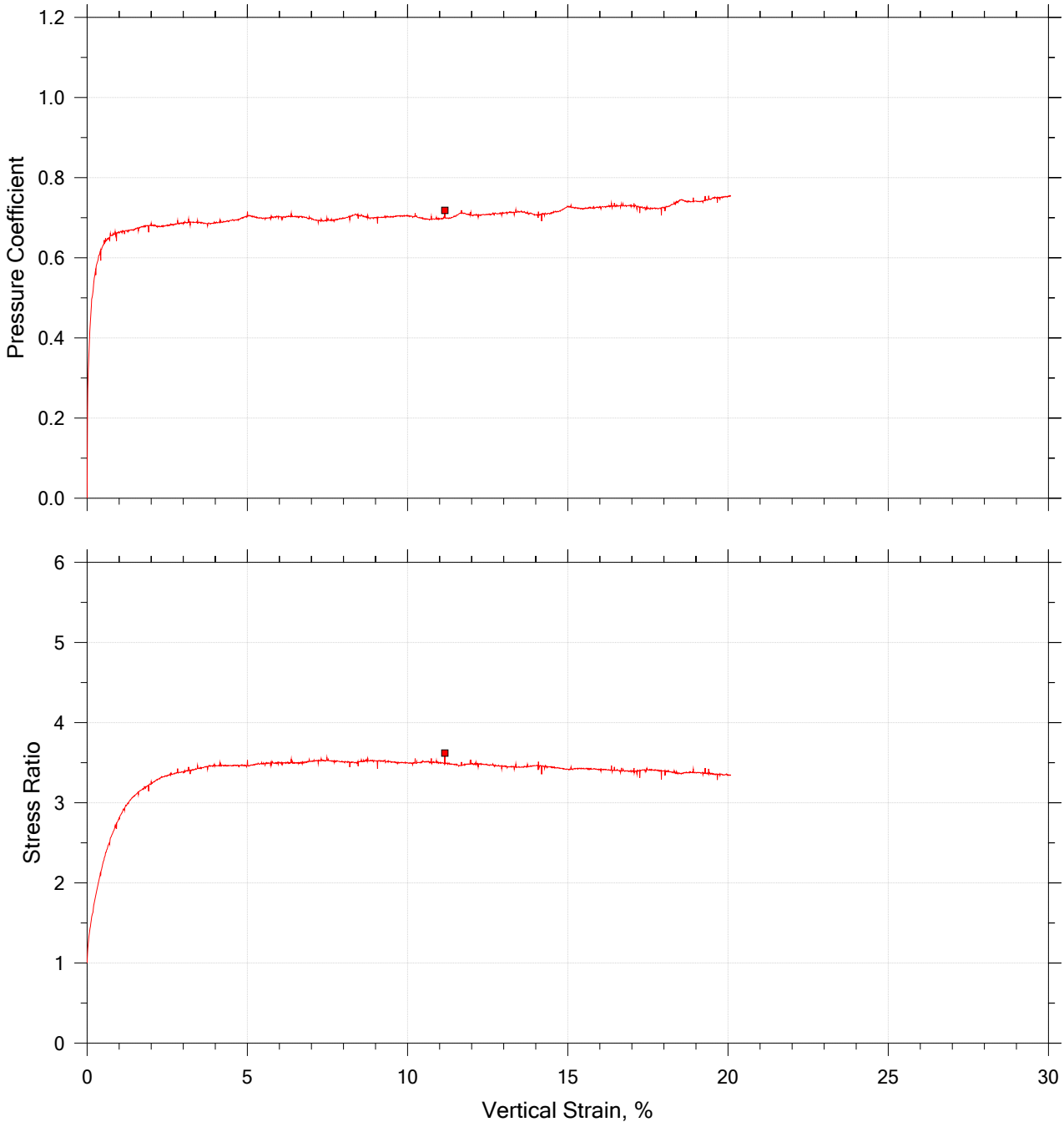




	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	12.0 - 13.7	WAP	4/29/2019	JFH/WAP		19-1189 - AP@B-1_ST-1_test A.dat

F&ME CONSULTANTS	Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
	Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
	Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
	Test No.: A	Sample Type: Undisturbed	Elevation:
	Description:		
	Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
	to run any additional tests.		

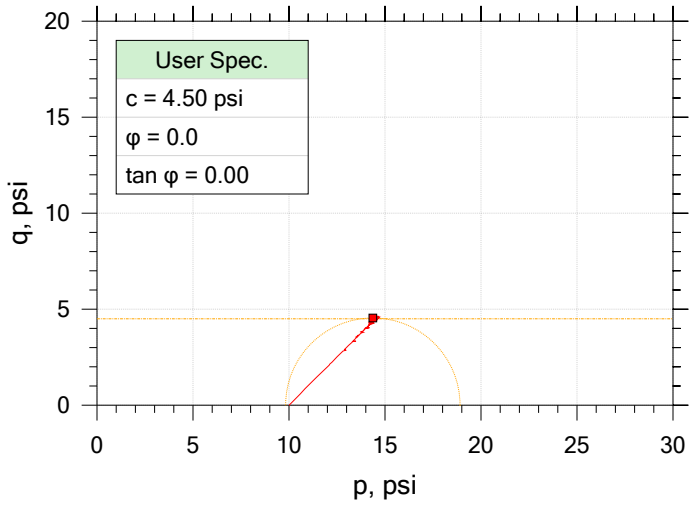
CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

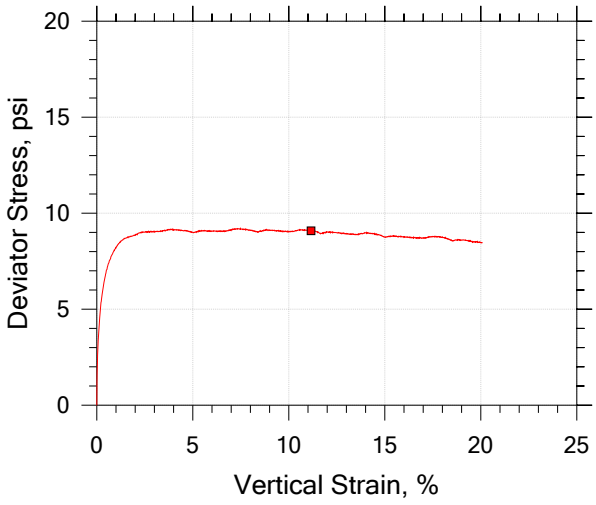


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	12.0 - 13.7	WAP	4/29/2019	JFH/WAP		19-1189 - AP@B-1_ST-1_test A.dat

	Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
	Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
	Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
	Test No.: A	Sample Type: Undisturbed	Elevation:
	Description:		
	Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
	to run any additional tests.		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297





Symbol		
Sample ID		ST-1.B
Depth, ft		12.0 - 13.7
Test Number		A
Initial	Height, in	6.012
	Diameter, in	2.843
	Moisture Content (from Cuttings), %	19.7
	Dry Density, pcf	95.1
	Saturation (Wet Method), %	69.5
	Void Ratio	0.759
Final	Moisture Content, %	26.8
	Dry Density, pcf	97.3
	Cross-Sectional Area (Method A), in²	6.232
	Saturation, %	100.0
	Void Ratio	0.719
	Back Pressure, %	62.00
Vertical Effective Consolidation Stress, psi		9.974
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Vertical Strain after Consolidation, %		0.3572
Volumetric Strain after Consolidation, %		1.991
Time to 50% Consolidation, min		0.0000
Shear Strength, psi		4.543
Strain at Failure, %		11.2
Strain Rate, %/min		0.07500
Deviator Stress at Failure, psi		9.087
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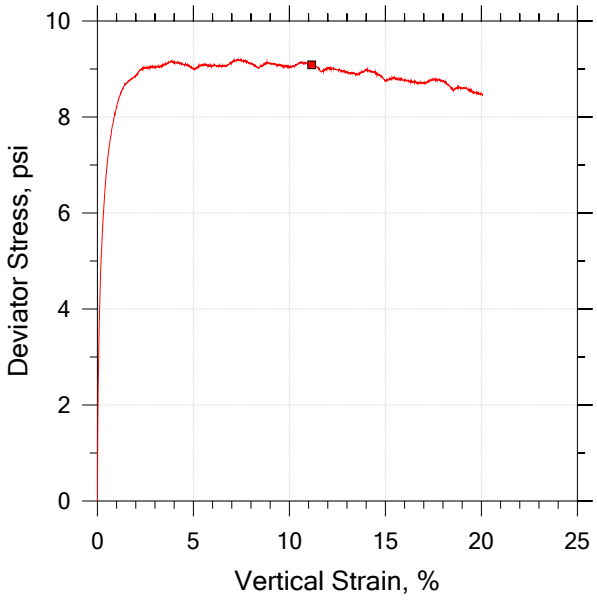
B-Value		0.95

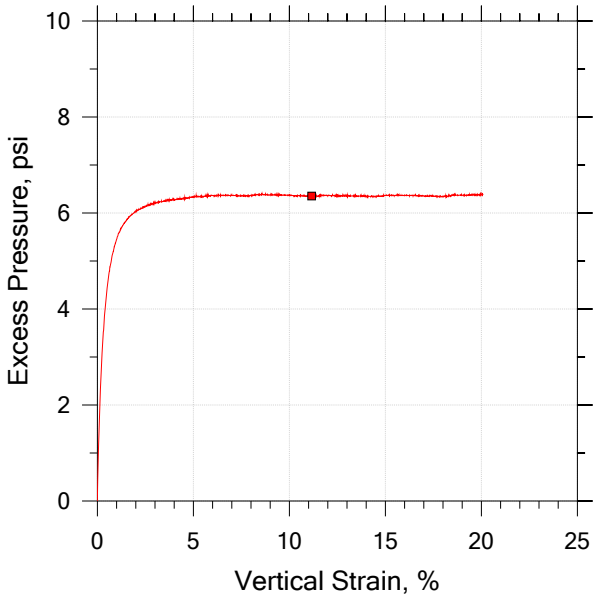
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

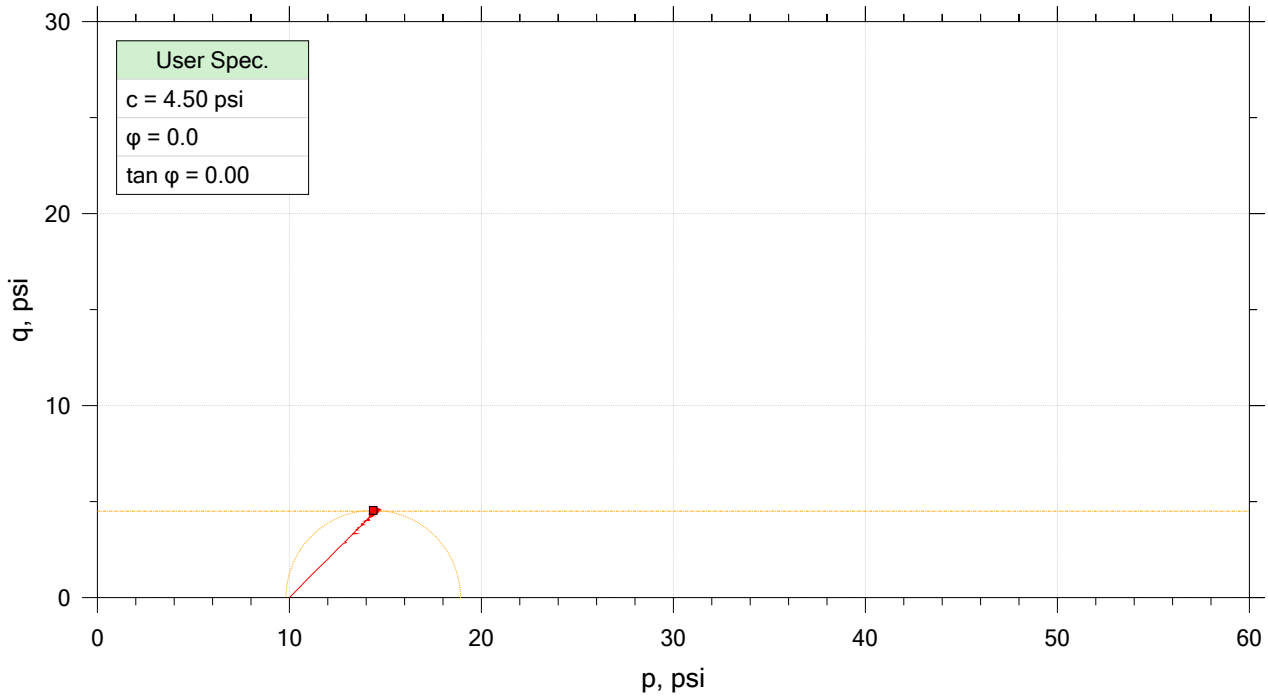
F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
Test No.: A	Sample Type: Undisturbed	Elevation:
Description:		
Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
to run any additional tests.		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



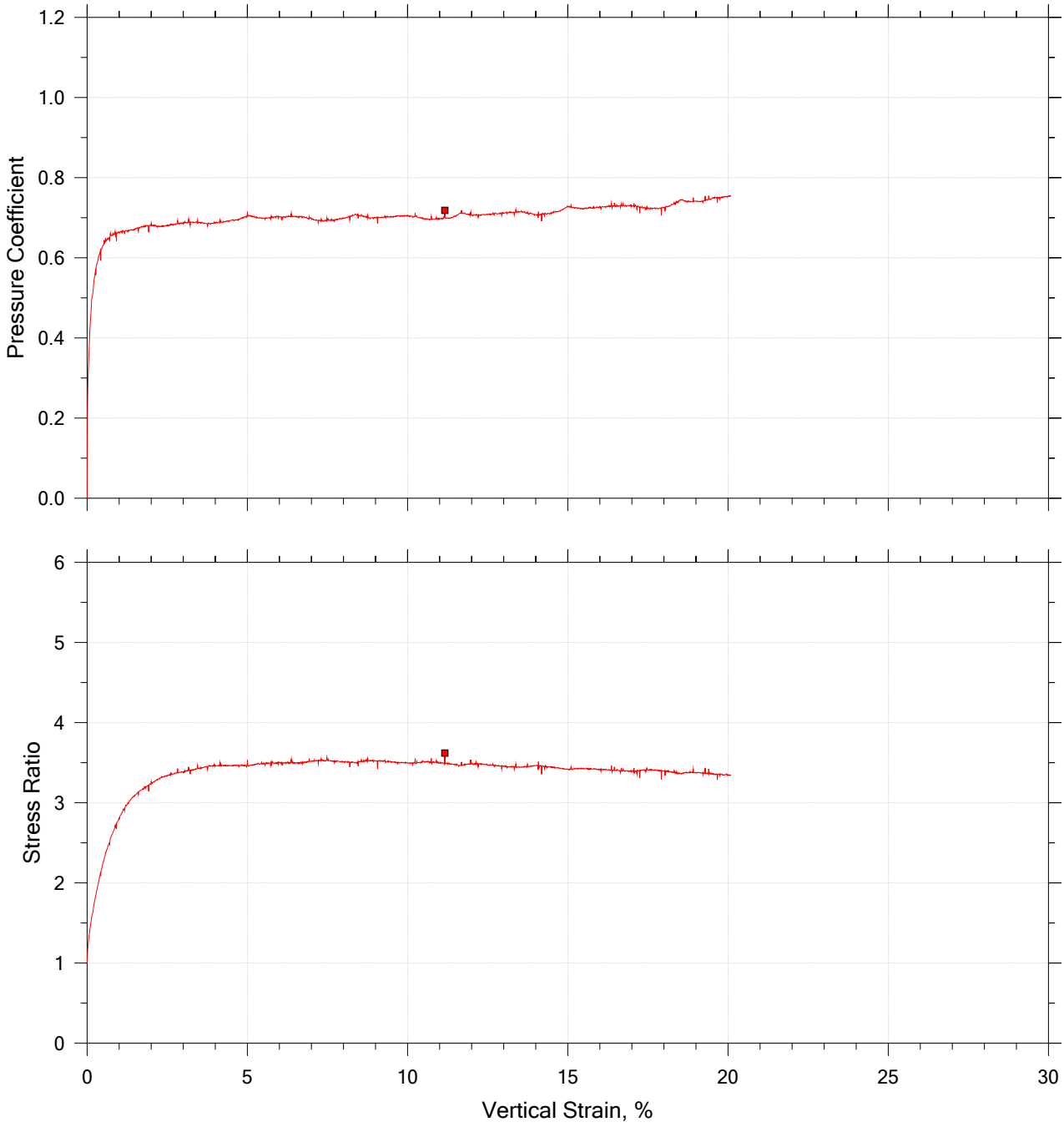




	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	12.0 - 13.7	WAP	4/29/2019	JFH/WAP		19-1189 - AP@B-1_ST-1_test A.dat

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
Test No.: A	Sample Type: Undisturbed	Elevation:
Description:		
Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
to run any additional tests.		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	12.0 - 13.7	WAP	4/29/2019	JFH/WAP		19-1189 - AP@B-1_ST-1_test A.dat

	Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
	Boring No.: AP @ B-1_ST-1	Tested By: WAP	Checked By: JFH/WAP
	Sample No.: 19-1189	Test Date: 4/29/2019	Depth: 12.0 - 13.7
	Test No.: A	Sample Type: Undisturbed	Elevation:
	Description:		
	Remarks: Sample ST-1.A Collapsed during extraction. Unclear data was obtained from ST-1.C. Not enough material after ST-1.C		
	to run any additional tests.		

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1039	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019

BORING NO.	B-2	B-2	B-2	B-2	
SAMPLE NO.	SS-5	SS-6	SS-8	SS-11	
SAMPLE DEPTH	6'-8'	13.5'-15'	23.5'-25	38.5'-40'	
WATER CONTENT, W%	19.5	22.4	18.0	26.2	

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

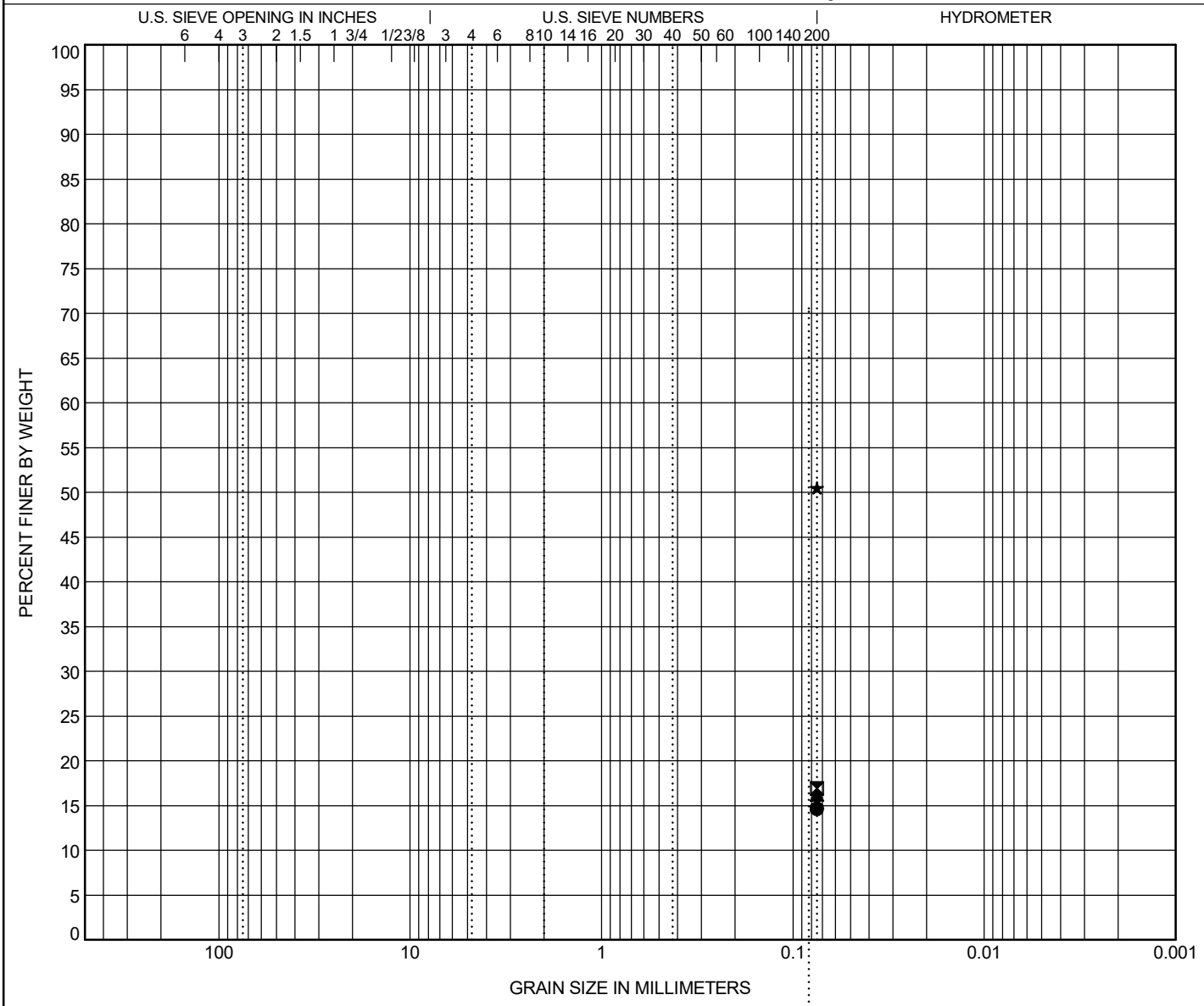
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-2	8.0	SILTY, CLAYEY SAND(SC-SM)	26	21	5		
⊠	B-2	15.0	SILTY SAND(SM)	31	28	3		
▲	B-2	25.0	SILTY SAND(SM)	35	29	6		
★	B-2	40.0	SANDY SILT(ML)	39	27	12		

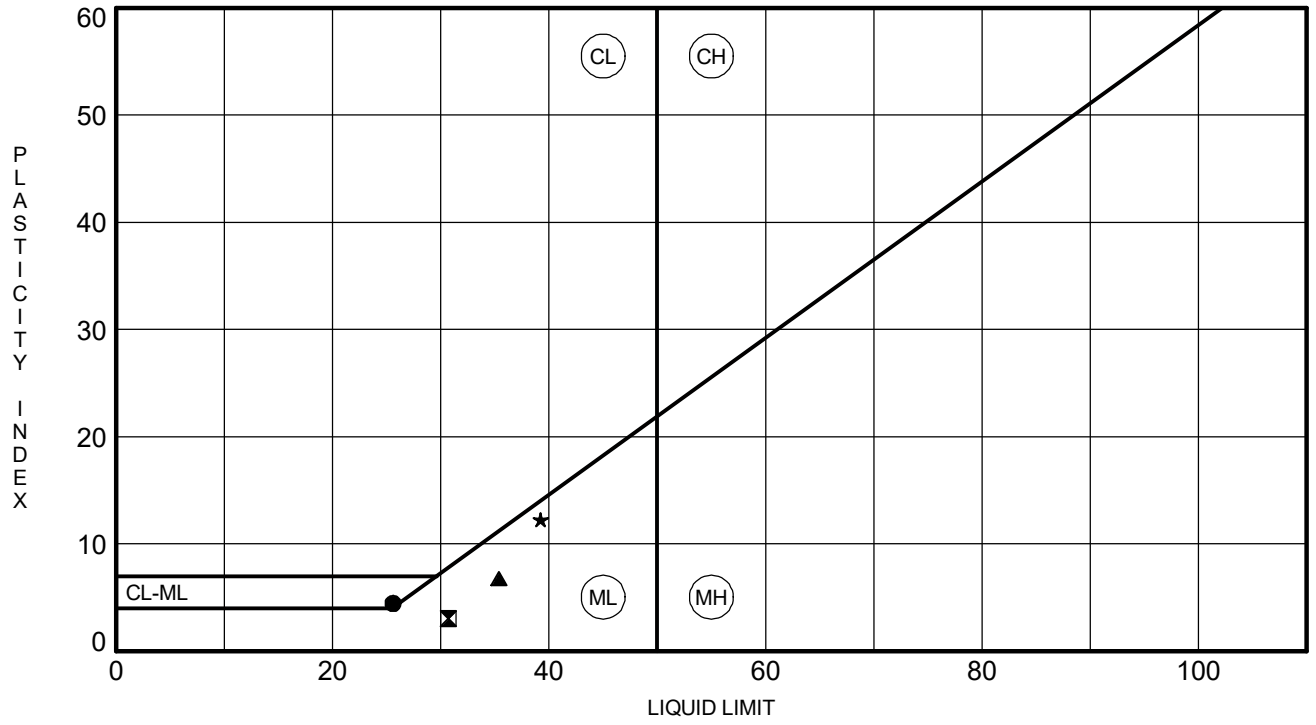
BOREHOLE		DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	8.0	0.075						14.7	
⊠	B-2	15.0	0.075						16.9	
▲	B-2	25.0	0.075						16.2	
★	B-2	40.0	0.075						50.5	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-2**	**8.0**	**26**	**21**	**5**	**15**	**SILTY, CLAYEY SAND(SC-SM)**
⊠	**B-2**	**15.0**	**31**	**28**	**3**	**17**	**SILTY SAND(SM)**
▲	**B-2**	**25.0**	**35**	**29**	**6**	**16**	**SILTY SAND(SM)**
★	**B-2**	**40.0**	**39**	**27**	**12**	**51**	**SANDY SILT(ML)**

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-2
Client Project	SCDOT US-1 over I-20	Depth	60.0' - 60.3'
Project Number	41705	Sample	RC-4
		Lab ID number	41705006
Description:	Gray and Green Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.62E-03	-4.14E-04	17145
7.88E-04	-1.96E-04	8896

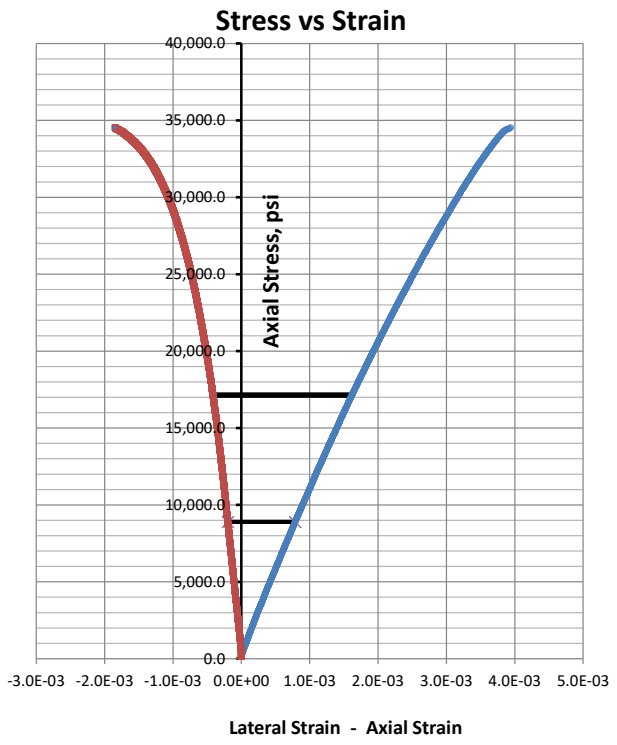
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.09
Mid Height Diameter #1, in	1.874
Mid Height Diameter #2, in	1.876
Average Mid. Height Diameter, in.	1.88
Sample Area, in^2	2.76
L/D Ratio (2.0-2.5)	**2.18**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	483.08
Sample Volume, cc	185
Wet Density, pcf	163

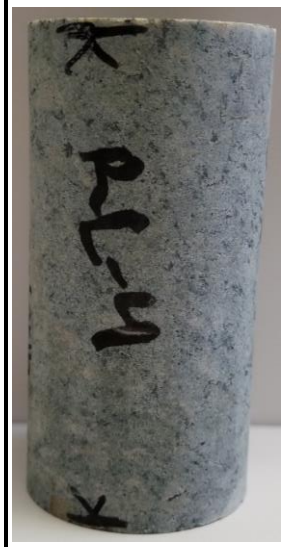
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	95373
Unconfined Compressive Strength, psi	**34,541**
Youngs Modulus, E psi	**9.9 E+06**
Slope of Lateral Curve, psi	**-37.9 E+06**
Poisson's Ratio	**0.26**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	29	25	26	24
-0.75	23	20	21	19
-0.625	19	15	17	15
-0.5	16	12	13	11
-0.375	10	9	10	8
-0.25	6	6	7	6
-0.125	3	3	4	3
0	0	0	0	0
0.125	-5	-3	-5	-4
0.25	-9	-6	-8	-8
0.375	-13	-9	-12	-12
0.5	-17	-12	-16	-14
0.625	-21	-15	-21	-18
0.75	-26	-18	-25	-19
0.875	-30	-20	-30	-22
1	-33	-23	-32	-23
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles		
Angular difference between End 1 and End 2 - D1	0.01	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.00	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length		
Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)	Top	Bottom
Maximum Gap, in	0.0025	0.003
Angle, *	0.04	0.04
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-2
Client Project	SCDOT US-1 over I-20	Depth	63.3' - 63.6'
Project Number	41705	Sample	RC-5
		Lab ID number	41705007
Description:	Black and Green Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.60E-03	-4.95E-04	17912
7.40E-04	-2.32E-04	8982

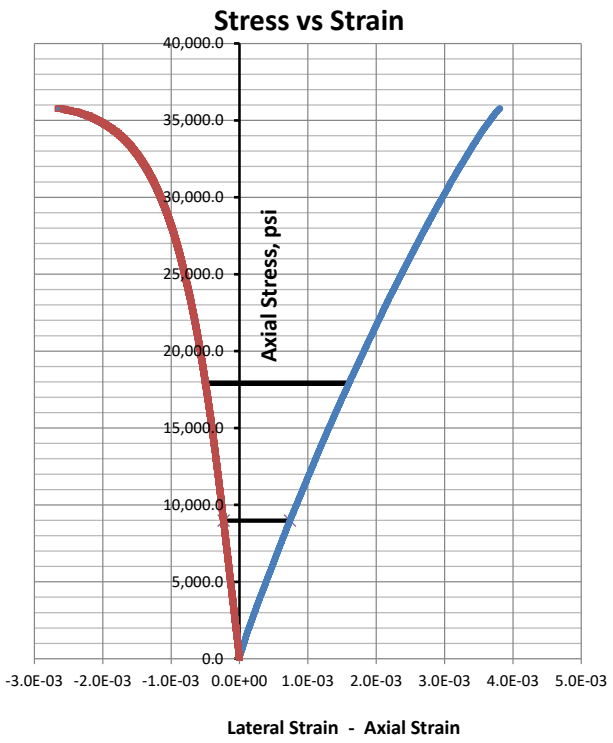
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.183
Mid Height Diameter #1, in	1.869
Mid Height Diameter #2, in	1.872
Average Mid. Height Diameter, in.	1.87
Sample Area, in^2	2.75
L/D Ratio (2.0-2.5)	**2.24**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	495.41
Sample Volume, cc	188
Wet Density, pcf	164

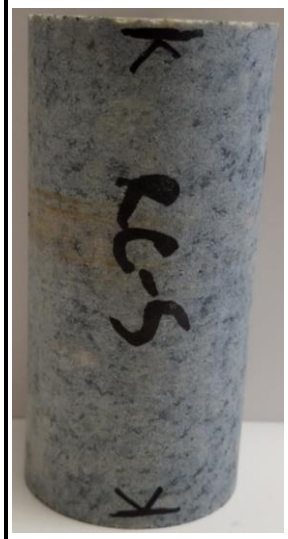
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	98313
Unconfined Compressive Strength, psi	**35,777**
Youngs Modulus, E psi	**10.4 E+06**
Slope of Lateral Curve, psi	**-33.9 E+06**
Poisson's Ratio	**0.31**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	15	15	14	16
-0.75	12	12	13	12
-0.625	11	10	11	10
-0.5	8	7	10	9
-0.375	6	5	9	8
-0.25	3	3	6	5
-0.125	2	1	3	1
0	0	0	0	0
0.125	-3	-3	-2	-2
0.25	-5	-5	-4	-5
0.375	-6	-7	-5	-7
0.5	-9	-8	-9	-10
0.625	-10	-11	-11	-13
0.75	-11	-12	-12	-14
0.875	-13	-15	-13	-17
1	-15	-16	-14	-17
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles		
Angular difference between End 1 and End 2 - D1	0.00	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.01	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length		
Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)	Top	Bottom
Maximum Gap, in	0.003	0.005
Angle, *	0.04	0.07
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-2
Client Project	SCDOT US-1 over I-20	Depth	71.8' - 72.1'
Project Number	41705	Sample	RC-6.2
		Lab ID number	41705008
Description:	Black and Green Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.47E-03	-4.80E-04	17262
6.98E-04	-2.50E-04	8942

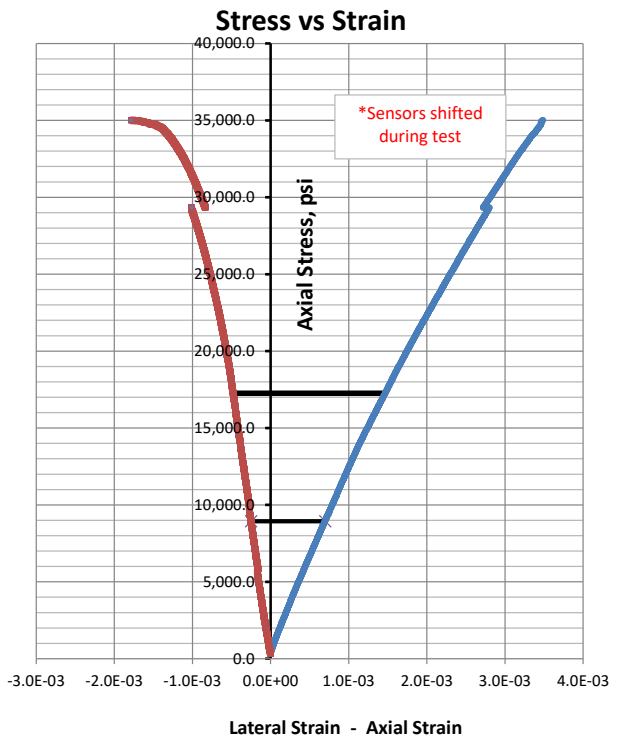
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.376
Mid Height Diameter #1, in	1.863
Mid Height Diameter #2, in	1.864
Average Mid. Height Diameter, in.	1.86
Sample Area, in^2	2.73
L/D Ratio (2.0-2.5)	**2.35**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	515.25
Sample Volume, cc	196
Wet Density, pcf	164

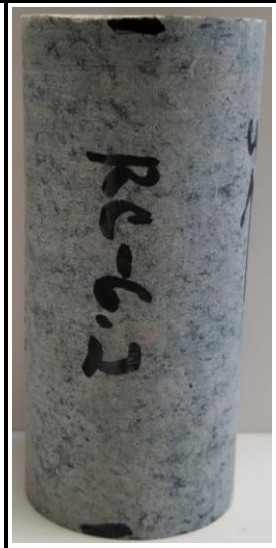
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	95749
Unconfined Compressive Strength, psi	**35,106**
Youngs Modulus, E psi	**10.8 E+06**
Slope of Lateral Curve, psi	**-36.1 E+06**
Poisson's Ratio	**0.30**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	1	27	2	25
-0.75	1	23	2	22
-0.625	1	17	1	19
-0.5	1	14	1	15
-0.375	0	11	1	10
-0.25	0	8	0	7
-0.125	0	4	0	3
0	0	0	0	0
0.125	0	-3	0	-5
0.25	-1	-5	0	-8
0.375	-1	-9	-1	-10
0.5	-1	-11	-1	-12
0.625	-2	-15	0	-17
0.75	-3	-20	-1	-22
0.875	-3	-23	-1	-24
1	-2	-28	-2	-28
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.00	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.00	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.005	0.0025
Angle, *	0.07	0.03
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1005	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	Silty SAND (SM)		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019

BORING NO.	B-3	B-3	B-3		
SAMPLE NO.	SS-9	SS-10	SS-12		
SAMPLE DEPTH	28.5'-30'	33.5'-35'	43.5'-45'		
WATER CONTENT, W%	20.9	22.3	19.9		

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

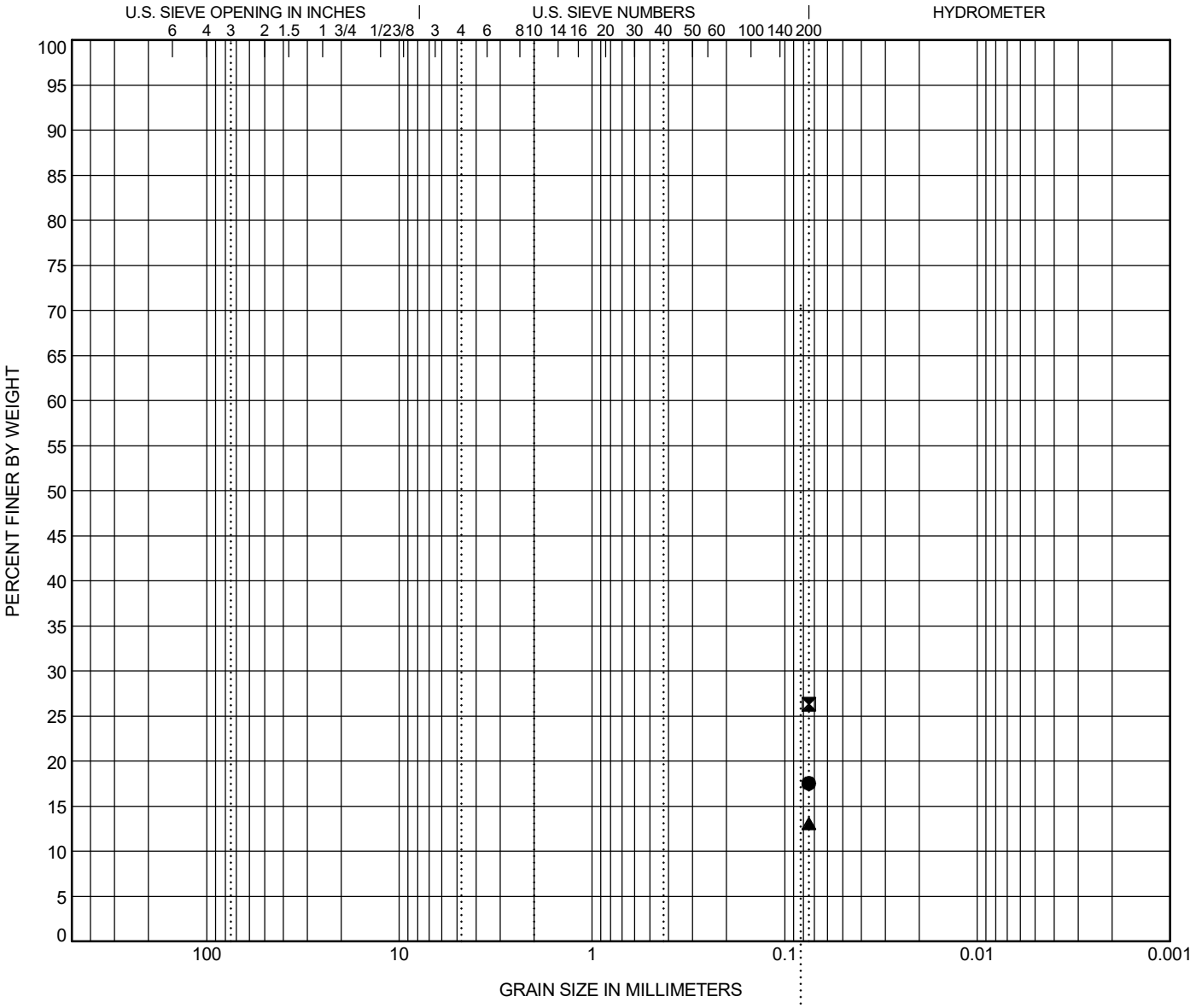
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-3	30.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠ B-3	35.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
▲ B-3	45.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

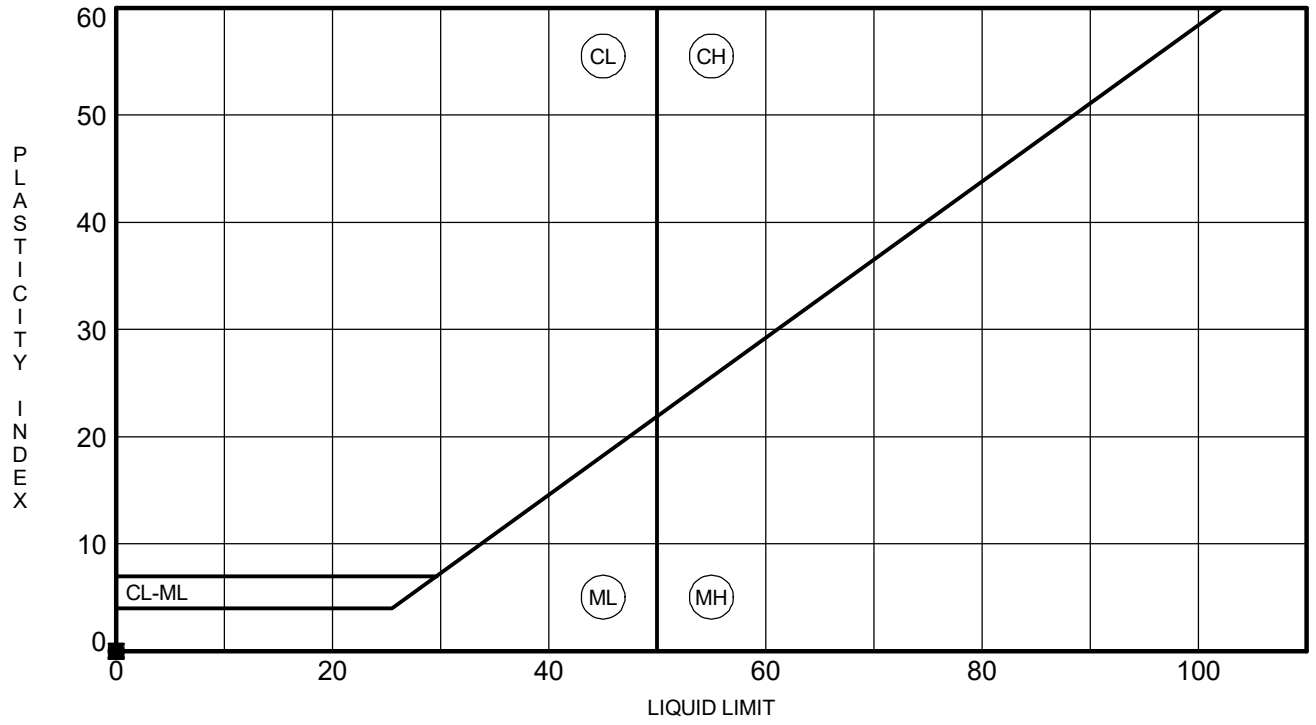
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-3	30.0	**0.075**						**17.6**	
⊠ B-3	35.0	**0.075**						**26.3**	
▲ B-3	45.0	**0.075**						**13.1**	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-3**	**30.0**	**NP**	**NP**	**NP**	**18**	**SILTY SAND(SM)**
⊠	**B-3**	**35.0**	**NP**	**NP**	**NP**	**26**	**SILTY SAND(SM)**
▲	**B-3**	**45.0**	**NP**	**NP**	**NP**	**13**	**SILTY SAND(SM)**

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-3
Client Project	SCDOT US-1 over I-20	Depth	89.6' - 89.9'
Project Number	41705	Sample	RC-7
		Lab ID number	41705009
Description:	Pink and Gray Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.22E-03	-3.65E-04	10909
5.69E-04	-1.76E-04	5476

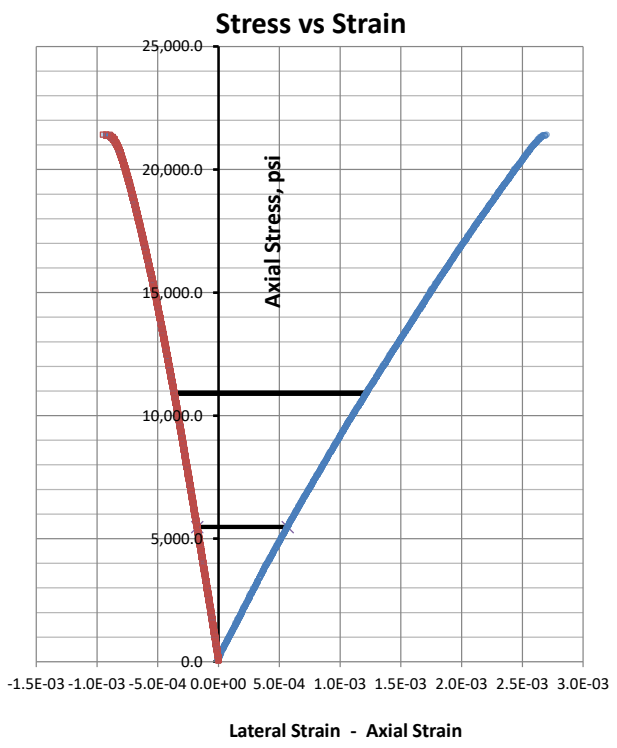
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.137
Mid Height Diameter #1, in	1.868
Mid Height Diameter #2, in	1.868
Average Mid. Height Diameter, in.	1.87
Sample Area, in^2	2.74
L/D Ratio (2.0-2.5)	**2.21**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	487.18
Sample Volume, cc	186
Wet Density, pcf	164

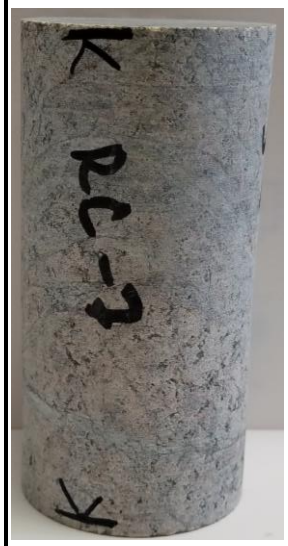
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	60175
Unconfined Compressive Strength, psi	**21,957**
Youngs Modulus, E psi	**8.3 E+06**
Slope of Lateral Curve, psi	**-28.7 E+06**
Poisson's Ratio	**0.29**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	11	50	6	53
-0.75	9	47	4	49
-0.625	7	39	3	41
-0.5	5	34	3	34
-0.375	4	25	3	28
-0.25	3	18	2	19
-0.125	1	10	1	12
0	0	0	0	0
0.125	-1	-6	-1	-9
0.25	-3	-13	-1	-16
0.375	-3	-21	-2	-24
0.5	-5	-28	-3	-29
0.625	-7	-36	-3	-35
0.75	-8	-42	-4	-42
0.875	-10	-49	-5	-47
1	-12	-53	-6	-52
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.03	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.01	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.01	0.008
Angle, *	0.14	0.11
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-3
Client Project	SCDOT US-1 over I-20	Depth	94.8' - 95.1'
Project Number	41705	Sample	RC-8
		Lab ID number	41705010
Description:	Gray Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.67E-03	-5.28E-04	11548
8.21E-04	-2.36E-04	5814

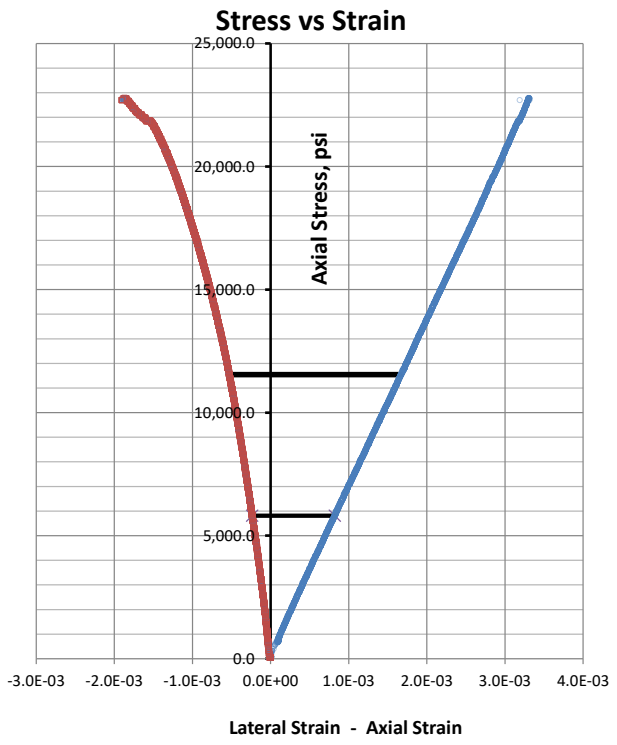
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.159
Mid Height Diameter #1, in	1.869
Mid Height Diameter #2, in	1.869
Average Mid. Height Diameter, in.	1.87
Sample Area, in^2	2.74
L/D Ratio (2.0-2.5)	**2.23**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	489.25
Sample Volume, cc	187
Wet Density, pcf	163

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	63219
Unconfined Compressive Strength, psi	**23,043**
Youngs Modulus, E psi	**6.8 E+06**
Slope of Lateral Curve, psi	**-19.6 E+06**
Poisson's Ratio	**0.34**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo

SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	7	2	6	2
-0.75	5	2	5	2
-0.625	5	2	4	2
-0.5	4	1	3	1
-0.375	3	1	2	1
-0.25	3	0	1	1
-0.125	1	0	1	1
0	0	0	0	0
0.125	0	0	-1	0
0.25	-2	-2	-2	-1
0.375	-2	-2	-3	-2
0.5	-3	-2	-4	-2
0.625	-3	-2	-5	-2
0.75	-4	-2	-6	-2
0.875	-5	-3	-8	-3
1	-6	-3	-8	-5
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.00	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.00	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.004	0.0025
Angle, *	0.06	0.03
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client	F&ME Consultants	Boring	B-3
Client Project	SCDOT US-1 over I-20	Depth	97.0' - 97.3'
Project Number	41705	Sample	RC-9
		Lab ID number	41705011
Description:	Black and White Granite		
As-Received Condition:	Useable L/D > 2		
Sample Preparation:	Diamond saw blade cut, surface ground flat		

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
2.17E-03	-7.07E-04	17020
1.06E-03	-3.28E-04	8370

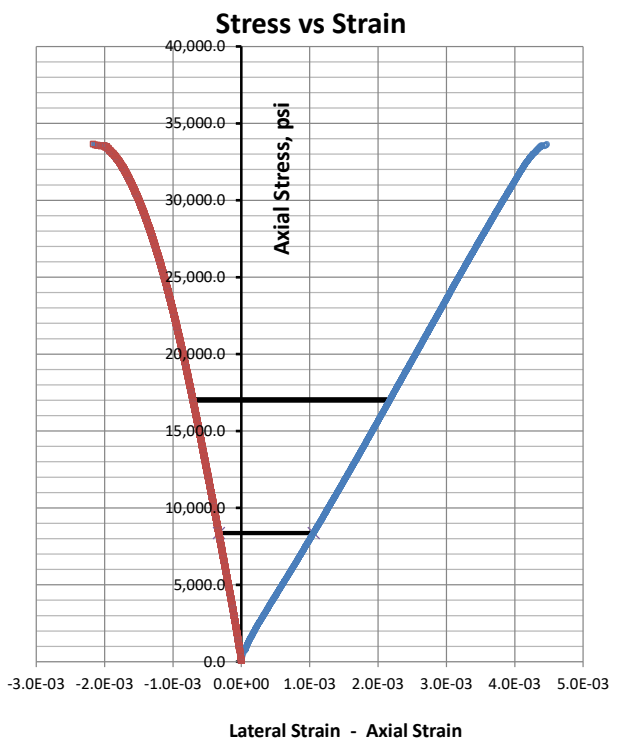
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.029
Mid Height Diameter #1, in	1.868
Mid Height Diameter #2, in	1.87
Average Mid. Height Diameter, in.	1.87
Sample Area, in^2	2.74
L/D Ratio (2.0-2.5)	**2.16**

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	472.81
Sample Volume, cc	181
Wet Density, pcf	163

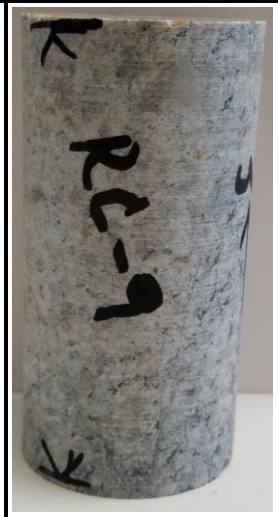
Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	92347
Unconfined Compressive Strength, psi	**33,660**
Youngs Modulus, E psi	**7.8 E+06**
Slope of Lateral Curve, psi	**-22.8 E+06**
Poisson's Ratio	**0.34**

Load Application in Relation to Lithology: *Unable to Determine*

Stress vs Strain



Sample Photo



SPECIMEN PREPARATION: ASTM D 4543; Section 9.2.1 FP-2 (Flatness and Parallelism)

~Distance along Diameter	Reading, 0.0001" End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	4	15	5	15
-0.75	3	13	4	12
-0.625	3	9	4	10
-0.5	2	6	4	8
-0.375	1	4	4	8
-0.25	1	3	3	6
-0.125	0	1	3	4
0	0	0	0	0
0.125	-1	-3	0	-2
0.25	-2	-5	-1	-4
0.375	-2	-6	-2	-5
0.5	-3	-7	-2	-8
0.625	-3	-9	-3	-10
0.75	-4	-12	-4	-12
0.875	-5	-15	-5	-13
1	-5	-18	-5	-15
Flatness Pass/Fail	Pass	Pass	Pass	Pass

End Parallelism Angles

Angular difference between End 1 and End 2 - D1	0.01	<0.25* Pass
Angular difference between End 1 and End 2 - D2	0.00	<0.25* Pass

ASTM D 4543; Section 9.1.1 S1 - Straightness of Specimen Length

Maximum Gap, in	< 0.02	*Tolerance (<0.02 in)*

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)

	Top	Bottom
Maximum Gap, in	0.003	0.003
Angle, *	0.04	0.04
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass

Preparation Equipment: Bench Comparator, Feeler Gauge, Square

Performed By: MAK Input Validation: MAK Reviewed By: ALO Date Tested: 4/29/2019

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1190	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	Clayey SAND (SC/A-4(1))		
TESTED BY:	WAP	**DATE OF TESTING:**	5/8/2019
WEIGHED BY:	WAP	**DATE OF WEIGHING:**	5/11/2019

BORING NO.	B-3U	B-3U	B-3U		
SAMPLE NO.	ST-1.B	ST-1.C	ST-1.D		
SAMPLE DEPTH	32.2' - 32.7'	32.7' - 33.2'	33.2' - 33.7'		
WATER CONTENT, W%	18.8	15.5	15.4		

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

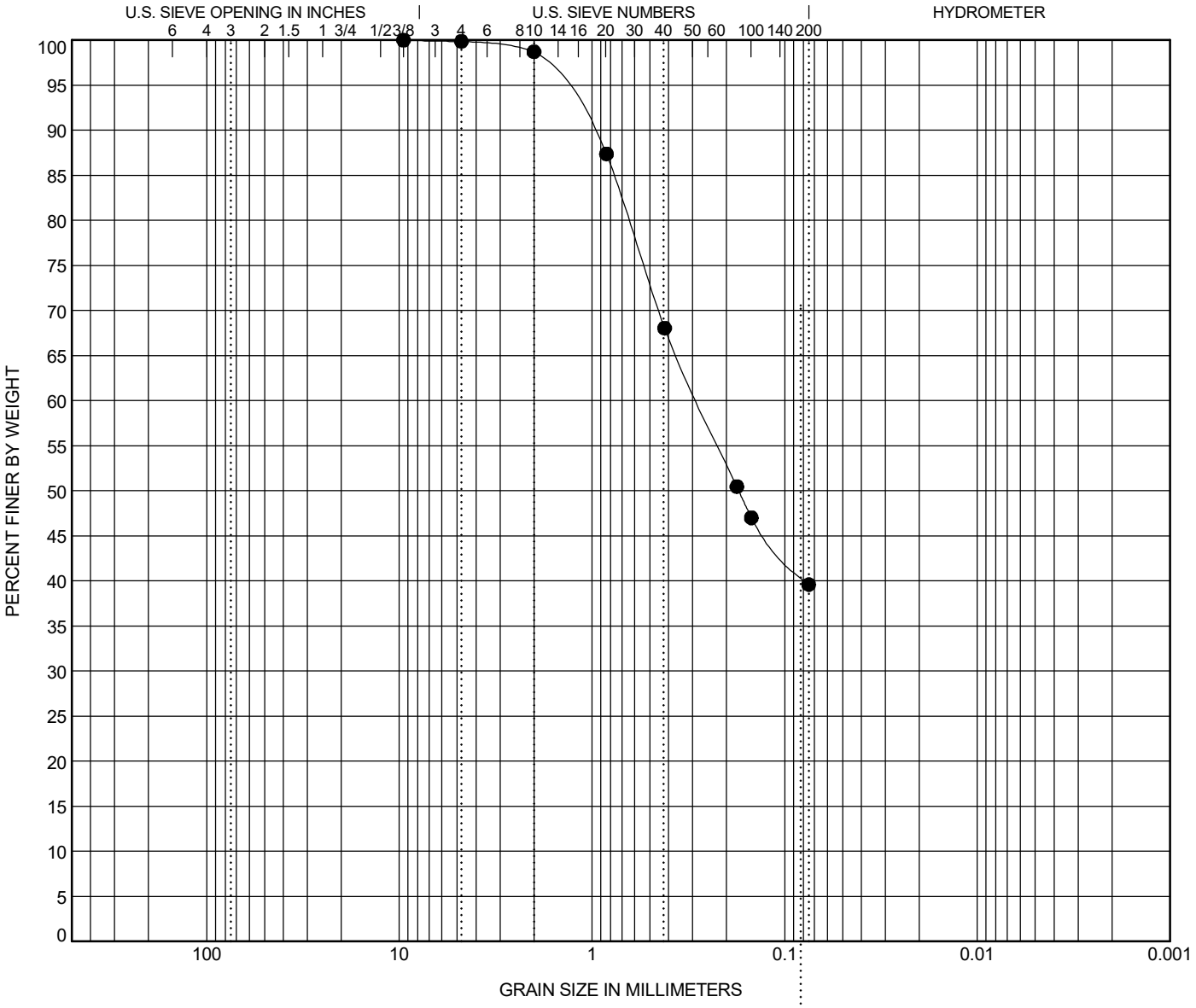
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

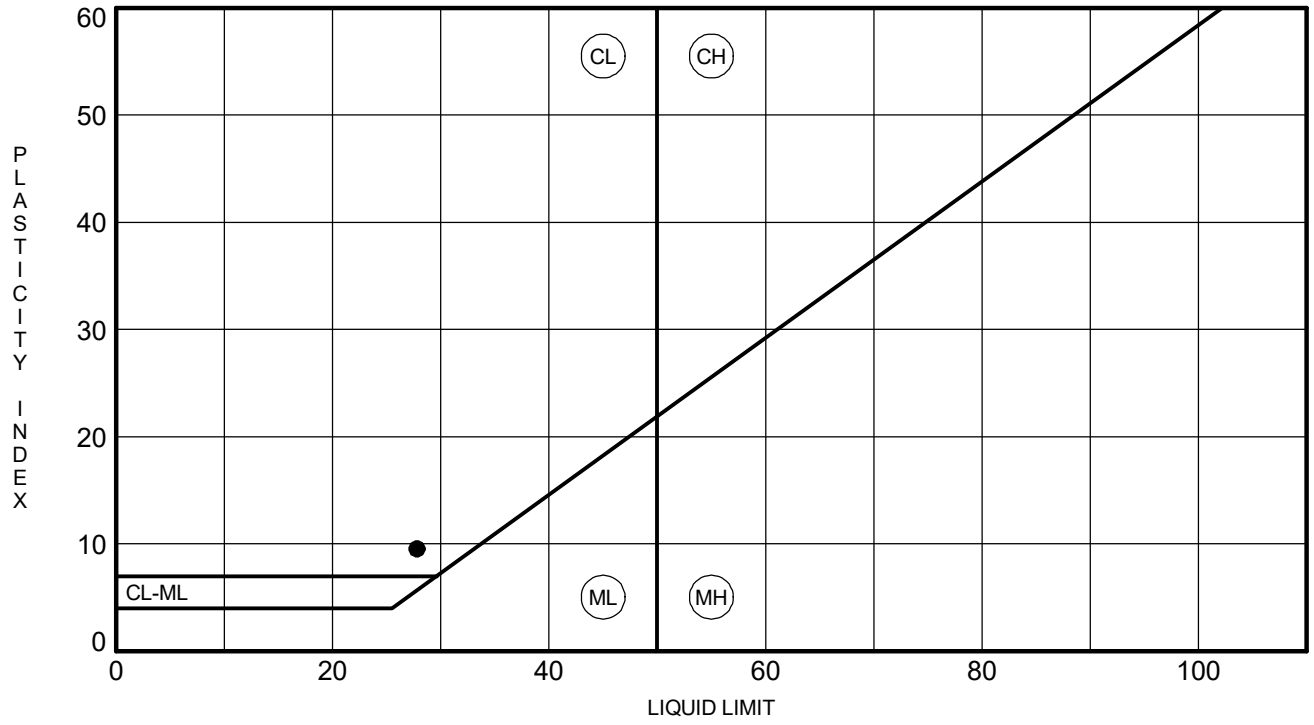
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-3U**	**33.2**	**Clayey SAND (SC/A-4(1))**	**28**	**18**	**10**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-3U**	**33.2**	**9.51**	**1.505**	**0.173**		**0.1**	**60.3**	**39.6**	

ATTERBERG LIMITS' RESULTS

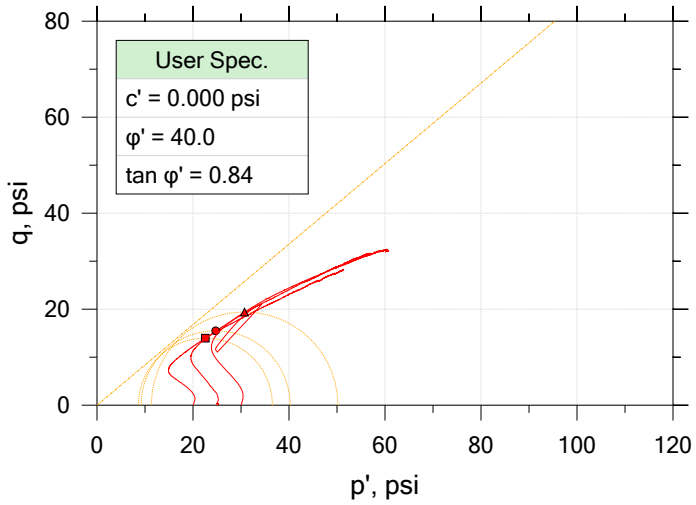
PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

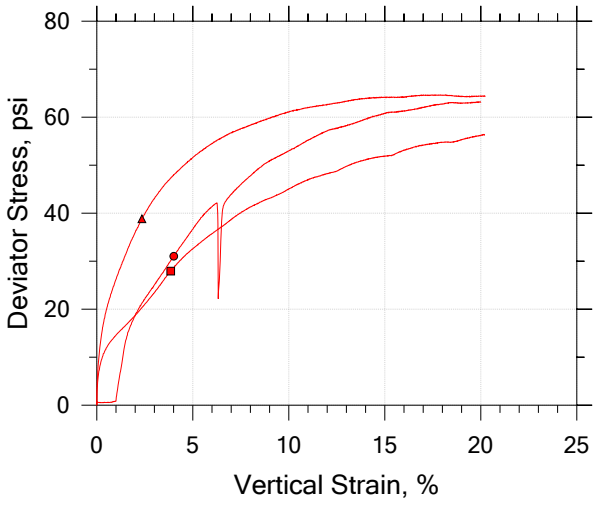
PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-3U**	**33.2**	**28**	**18**	**10**	**40**	**Clayey SAND (SC/A-4(1))**

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297





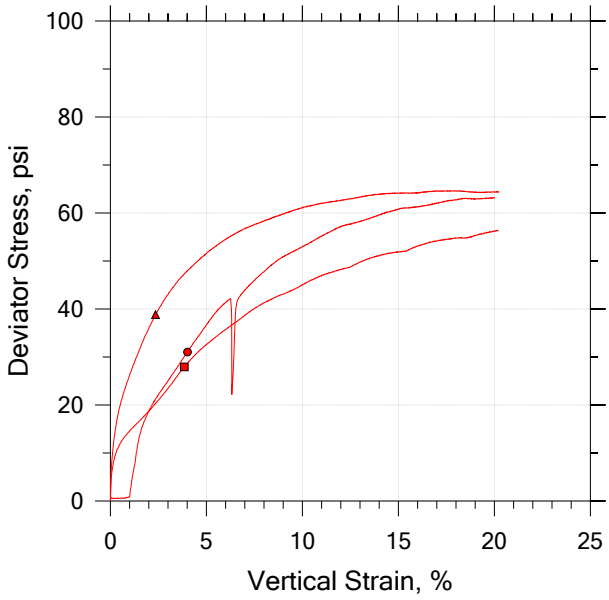
Symbol		■	●	▲	
Sample ID		ST-1.B	ST-1.C	ST-1.D	
Depth, ft		32.0 - 34.0	32.0 - 34.0	32.0 - 34.0	
Test Number		A	B	C	
Initial	Height, in	6.012	6.040	6.105	
	Diameter, in	2.843	2.858	2.866	
	Moisture Content (from Cuttings), %	18.5	15.5	15.4	
	Dry Density, pcf	96.1	114.	115.	
	Saturation (Wet Method), %	66.8	88.0	91.4	
	Void Ratio	0.741	0.471	0.450	
Final	Moisture Content, %	25.8	16.0	15.1	
	Dry Density, pcf	98.9	117.	119.	
	Cross-Sectional Area (Method A), in²	6.234	6.235	6.328	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.693	0.429	0.405	
	Back Pressure, %	61.99	76.99	82.95	
Vertical Effective Consolidation Stress, psi		19.96	25.00	29.96	
Horizontal Effective Consolidation Stress, psi		20.01	25.00	30.03	
Vertical Strain after Consolidation, %		0.8556	-0.04610	0.9891	
Volumetric Strain after Consolidation, %		2.311	2.554	2.423	
Time to 50% Consolidation, min		0.0000	0.0000	0.0000	
Shear Strength, psi		13.96	15.52	19.42	
Strain at Failure, %		3.85	4.01	2.35	
Strain Rate, %/min		0.07500	0.07500	0.07500	
Deviator Stress at Failure, psi		27.93	31.04	38.84	
Effective Minor Principal Stress at Failure, psi		8.610	9.200	11.31	
Effective Major Principal Stress at Failure, psi		36.54	40.24	50.15	
B-Value		0.95	0.95	0.95	

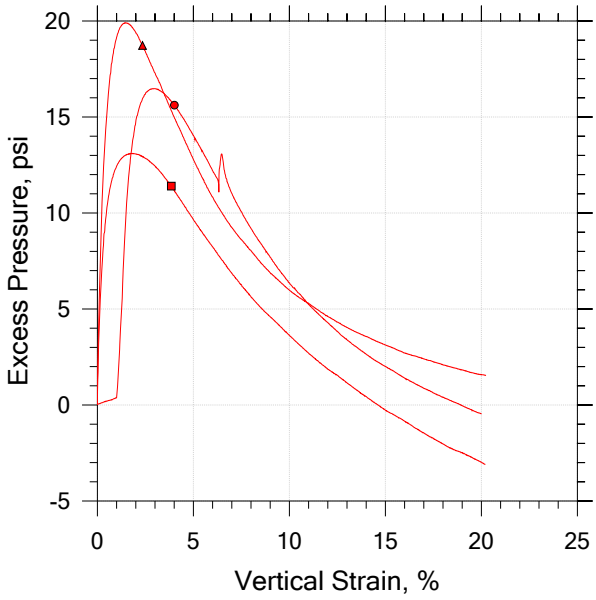
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

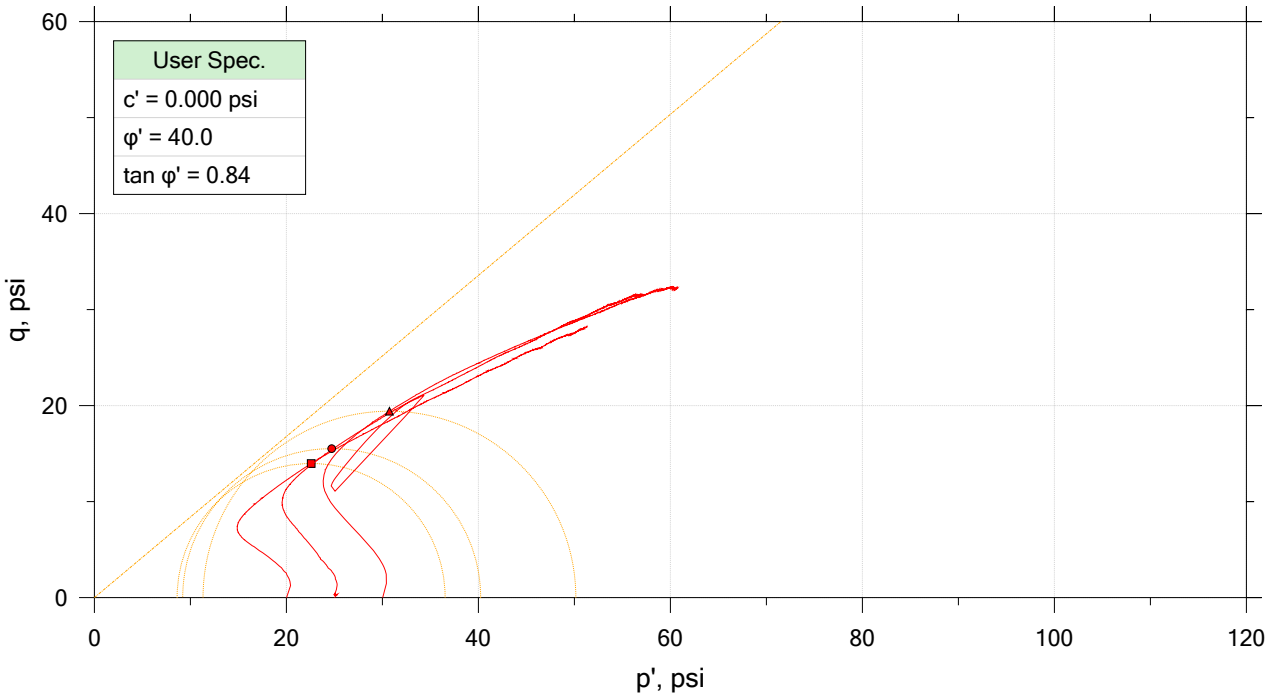
F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
Test No.: ABC	Sample Type: Undisturbed	Elevation:
Description:		
Remarks:		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



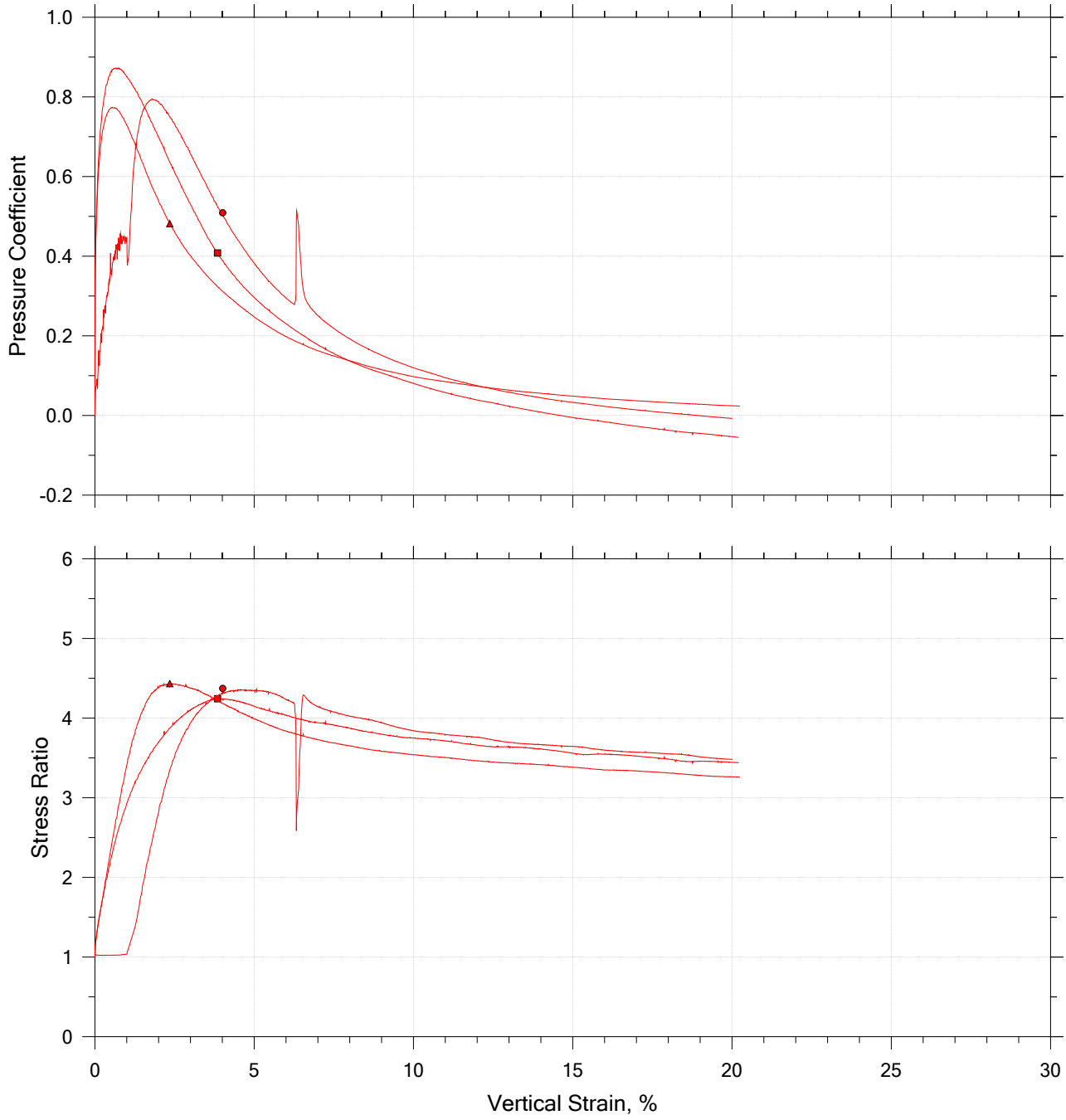




	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	32.0 - 34.0	WAP	5/8/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test A.dat
●	ST-1.C	B	32.0 - 34.0	WAP/AMC	5/9/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test B.dat
▲	ST-1.D	C	32.0 - 34.0	WAP/AMC	5/10/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test C.dat

F&ME CONSULTANTS	Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
	Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
	Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
	Test No.: ABC	Sample Type: Undisturbed	Elevation:
	Description:		
	Remarks:		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

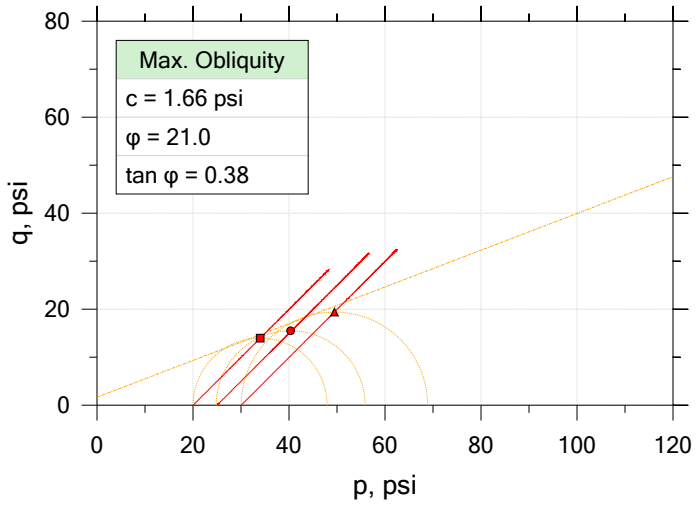


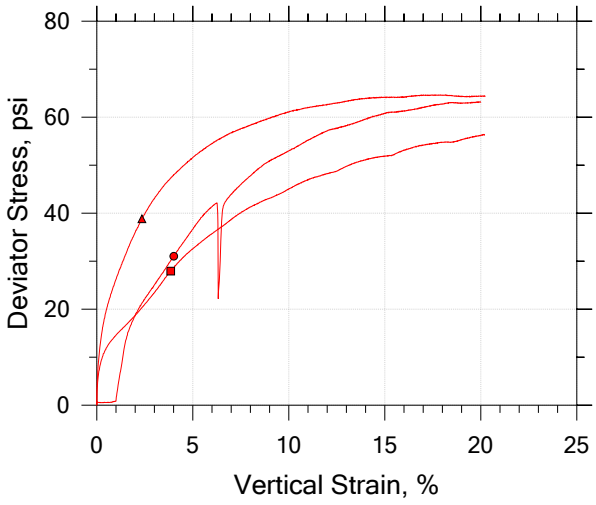
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	32.0 - 34.0	WAP	5/8/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test A.dat
●	ST-1.C	B	32.0 - 34.0	WAP/AMC	5/9/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test B.dat
▲	ST-1.D	C	32.0 - 34.0	WAP/AMC	5/10/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test C.dat

F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
Test No.: ABC	Sample Type: Undisturbed	Elevation:
Description:		
Remarks:		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297





Symbol		■	●	▲	
Sample ID		ST-1.B	ST-1.C	ST-1.D	
Depth, ft		32.0 - 34.0	32.0 - 34.0	32.0 - 34.0	
Test Number		A	B	C	
Initial	Height, in	6.012	6.040	6.105	
	Diameter, in	2.843	2.858	2.866	
	Moisture Content (from Cuttings), %	18.5	15.5	15.4	
	Dry Density, pcf	96.1	114.	115.	
	Saturation (Wet Method), %	66.8	88.0	91.4	
	Void Ratio	0.741	0.471	0.450	
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	Saturation, %	100.0	100.0	100.0	
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	Back Pressure, %	61.99	76.99	82.95	
Vertical Effective Consolidation Stress, psi		19.96	25.00	29.96	
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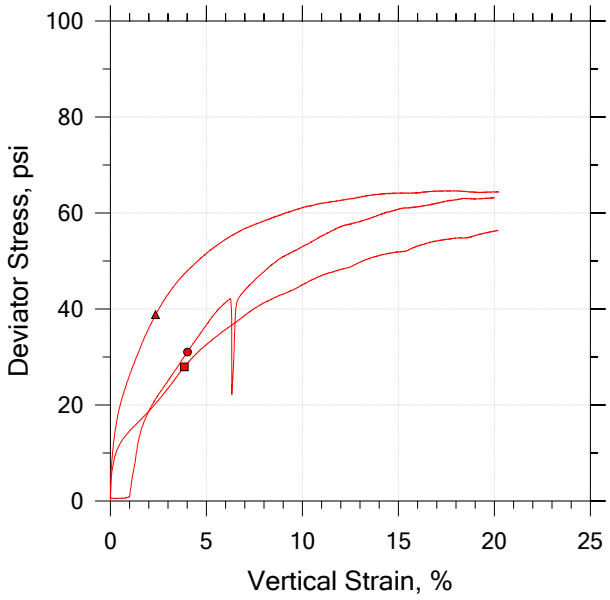
Strain Rate, %/min		0.07500	0.07500	0.07500	
Deviator Stress at Failure, psi		27.93	31.04	38.84	
Effective Minor Principal Stress at Failure, psi		8.610	9.200	11.31	
Effective Major Principal Stress at Failure, psi		36.54	40.24	50.15	
B-Value		0.95	0.95	0.95	

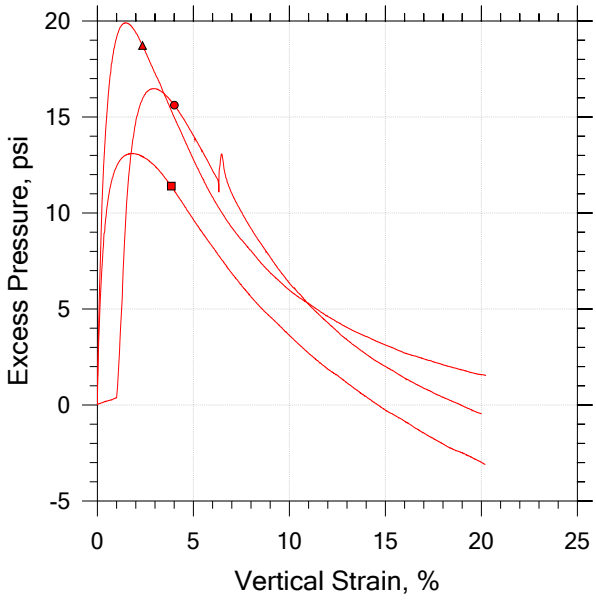
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

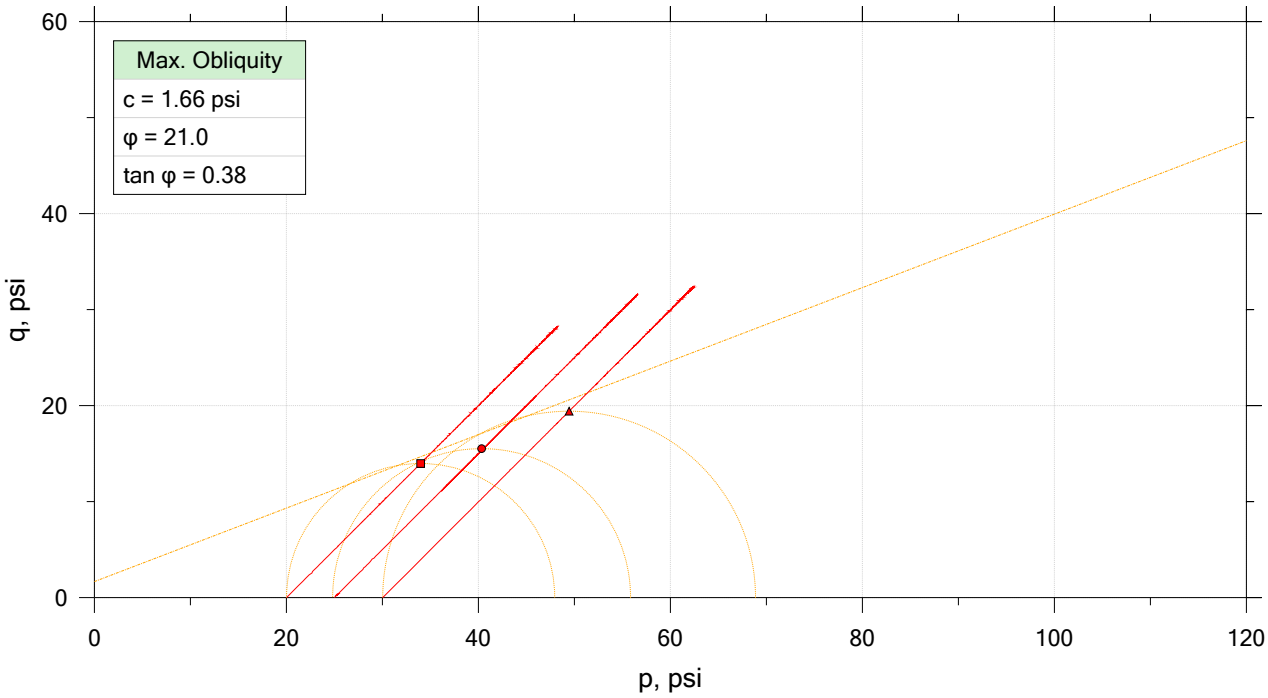
F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
Test No.: ABC	Sample Type: Undisturbed	Elevation:
Description:		
Remarks:		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



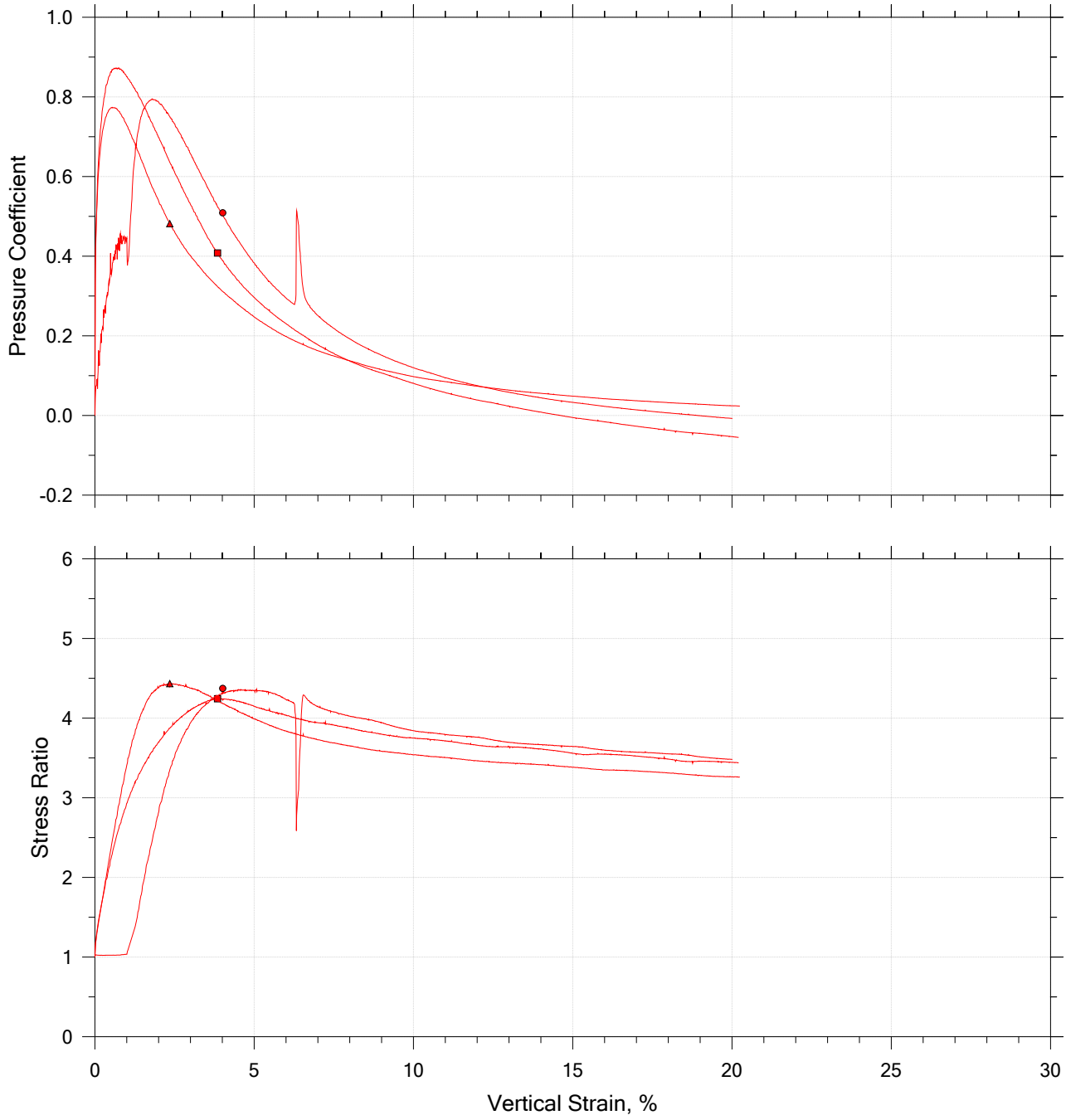




	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	32.0 - 34.0	WAP	5/8/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test A.dat
●	ST-1.C	B	32.0 - 34.0	WAP/AMC	5/9/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test B.dat
▲	ST-1.D	C	32.0 - 34.0	WAP/AMC	5/10/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test C.dat

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
Test No.: ABC	Sample Type: Undisturbed	Elevation:
Description:		
Remarks:		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1.B	A	32.0 - 34.0	WAP	5/8/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test A.dat
●	ST-1.C	B	32.0 - 34.0	WAP/AMC	5/9/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test B.dat
▲	ST-1.D	C	32.0 - 34.0	WAP/AMC	5/10/2019	JFH/WAP		19-1190 - AP@B-3_ST-1_test C.dat

F&ME CONSULTANTS

Project: US-1 RBO I-20	Location: Columbia, SC	Project No.: G6018
Boring No.: AP @ B-3_ST-1	Tested By: WAP	Checked By: JFH/WAP
Sample No.: 19-1190	Test Date: 5/8/2019 - 5/10/2019	Depth: 32.0 - 34.0
Test No.: ABC	Sample Type: Undisturbed	Elevation:
Description:		
Remarks:		

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1037	**DATE SAMPLE RECEIVED:**	3/22/2019
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	JH	**DATE OF WEIGHING:**	4/23/2019

BORING NO.	BS-1				
SAMPLE NO.					
SAMPLE DEPTH	0'-10'				
WATER CONTENT, W%	2.1				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

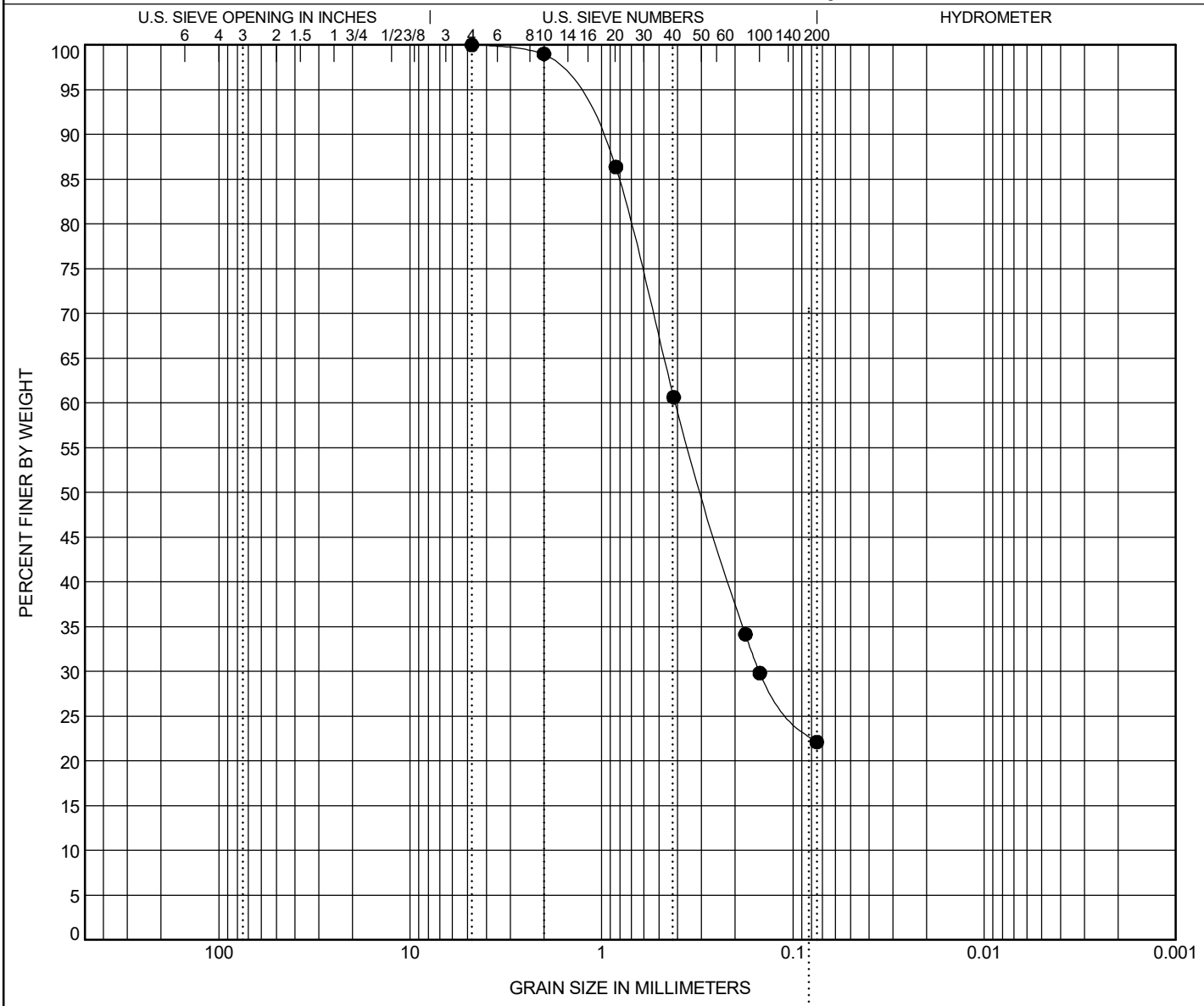
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

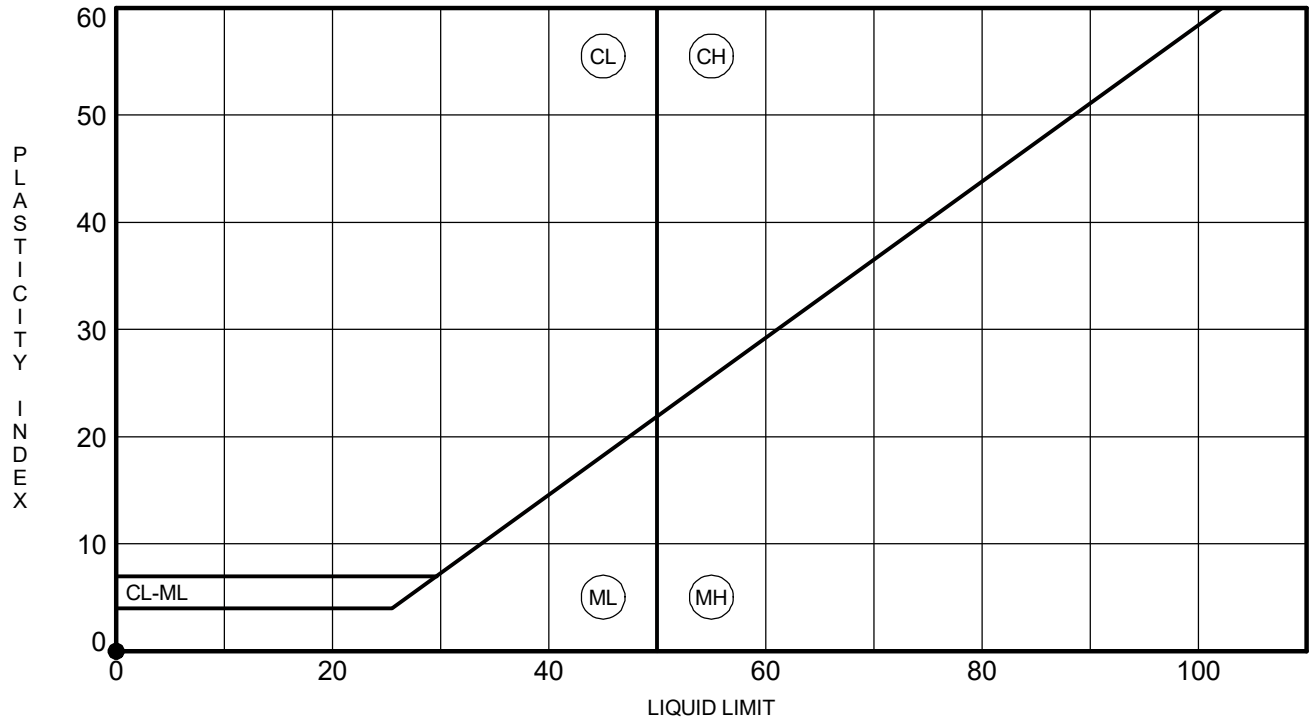
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-1**	**10.0**	**Silty SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-1**	**10.0**	**4.76**	**1.519**	**0.297**		**0.0**	**77.9**	**22.1**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-1**	**10.0**	**NP**	**NP**	**NP**	**22**	**Silty SAND (SM/A-2-4)**

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	F&ME Consultants	Boring	BS-1
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1037
		Lab Sample No.	41705001
Visual Description:	Brown Clayey Sand		

WET DENSITY					
Mold ID	F	F	F	F	
Compaction Point #	1	2	3	4	
Wt. Mold & WS, gm.	6050	6205	6267	6175	
Wt. Mold, gm.	4171	4171	4171	4171	
Wt. WS, gm.	1879	2034	2096	2004	
Mold Volume, cc	940	940	940	940	
Wet Density, gm./cc	2.00	2.16	2.23	2.13	
Wet Density, pcf	124.8	135.1	139.2	133.1	

TEST PARAMETERS	
Test Method	ASTM D698
Compaction Energy	Standard
Test Procedure	B
Mold Diameter, in	4
Compacted Layers	3
Blows Per Layer	25
Rammer Weight / Fall	5.5 lbs / 12 in.
Size of Material Used	-3/8" Sieve
Use: <5% Retained on 3/8"	

WATER CONTENT					
Tare Number	604	561	901	509	
Wt. Tare & WS, gm.	897.4	869.5	852.4	974.2	
Wt. Tare & DS, gm.	857.8	819.9	782.4	875.6	
Wt. Tare, gm.	149.5	196.5	98.8	102.6	
Water Content, %	5.6	8.0	10.2	12.8	

OVERSIZE PARTICLE CORRECTION
No Corrections Needed
Percent of Oversize Rock (+3/8" Sieve) = <5%
(Based on As-received Screening & Soaking)
W.C. of Finer Material, % (-3/8" Sieve) = NA

DRY DENSITY vs. WATER CONTENT

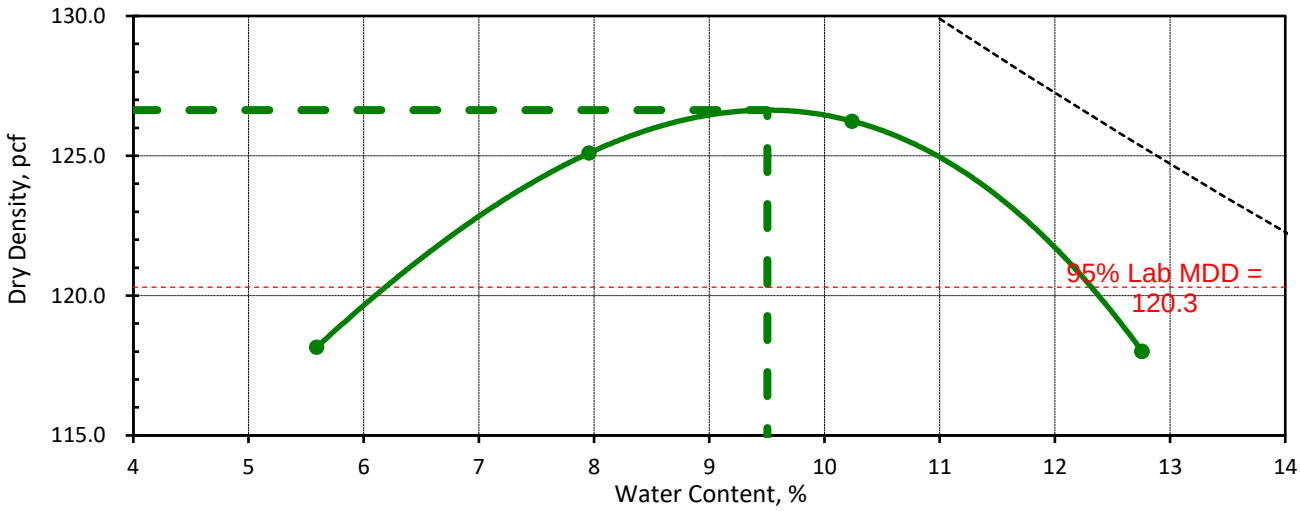
SAMPLE SUMMARY

LABORATORY TEST VALUES

Water Content, %	5.6	8.0	10.2	12.8	
Dry Density, pcf	118.2	125.1	126.2	118.0	

SAMPLE SUMMARY	
Lab Optimum Water Content, %	***9.5***
Lab Maximum Dry Density, pcf	***126.6***

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



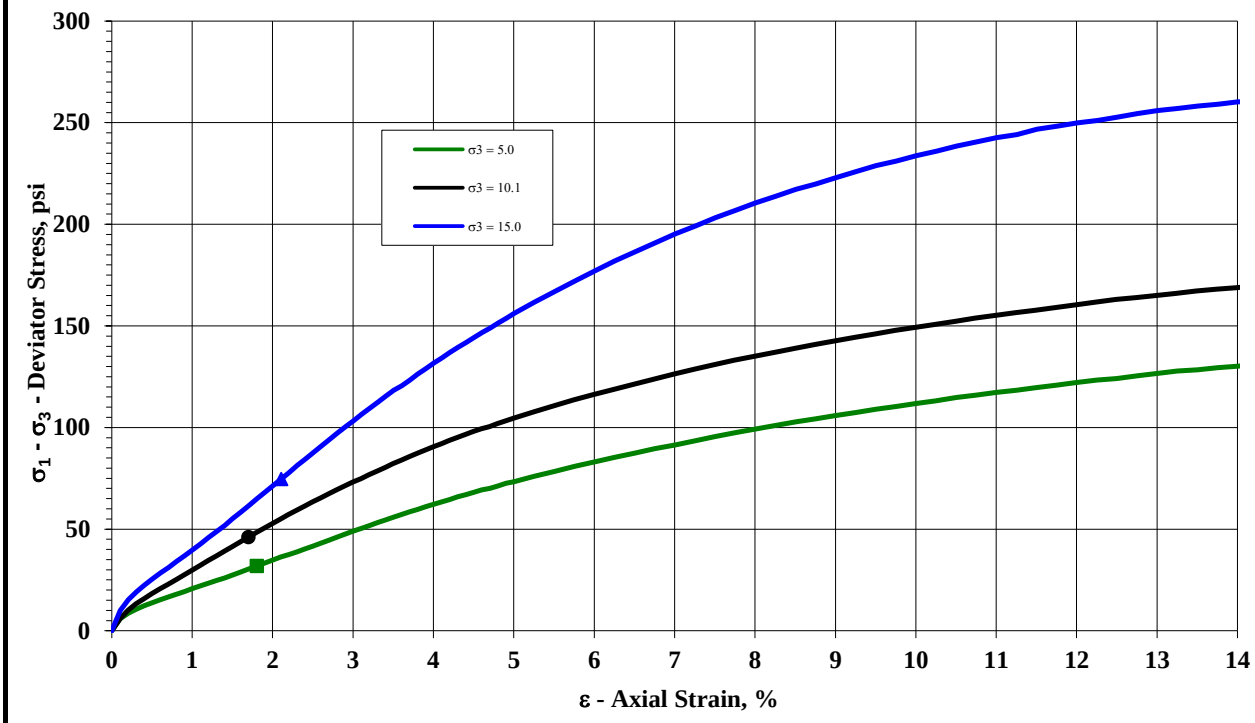
Note: Compacted using manual hammer.

Input Validation: BLS Reviewed By: ALO Date Tested: 04/30/19

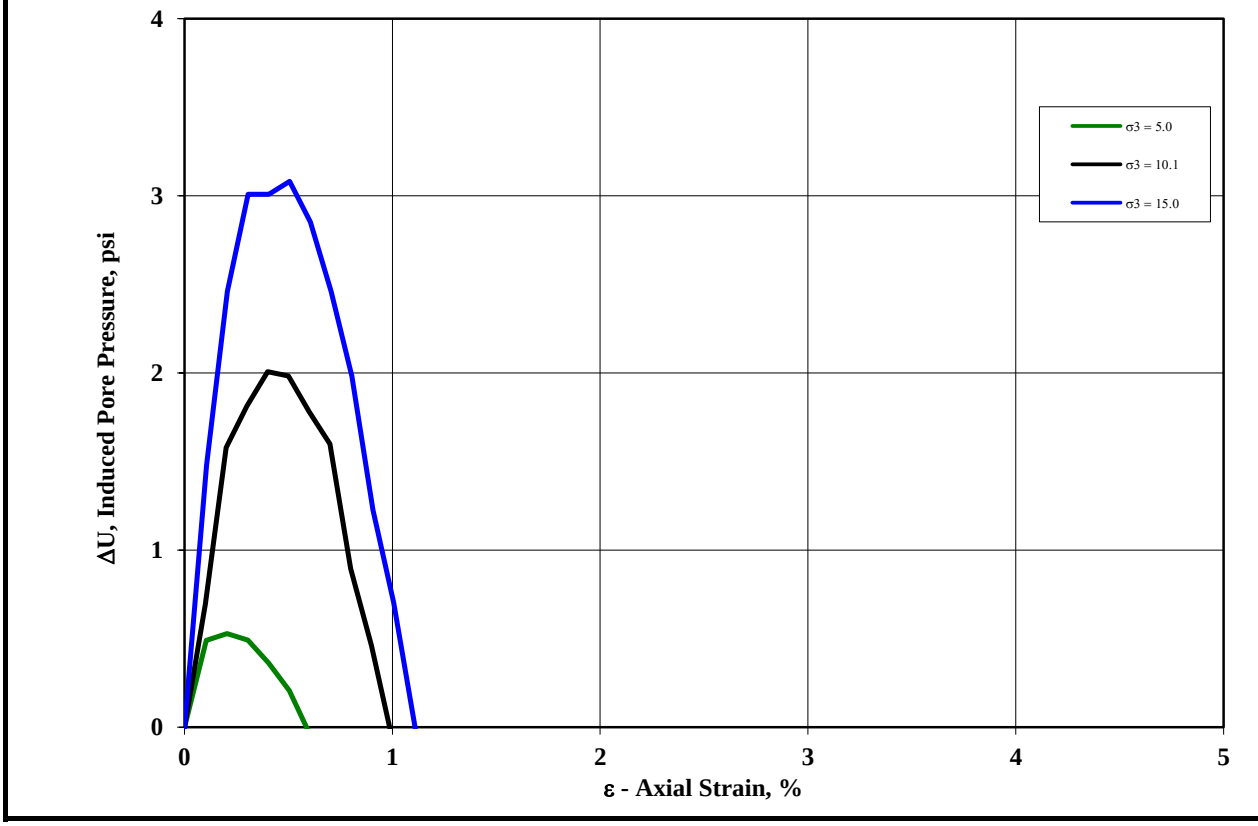
CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-1
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1037
Test Conditions:	Remolded - Side And Double Drained	Lab Sample No.	41705001
USCS Description:	Brown Silty Sand		

AXIAL STRAIN vs. DEVIATOR STRESS



AXIAL STRAIN vs. INDUCED PORE-WATER PRESSURE



CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-1
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1037
		Lab Sample No.	41705001
USCS Description:	Brown Silty Sand		
Test Conditions:	Remolded - Side And Double Drained		

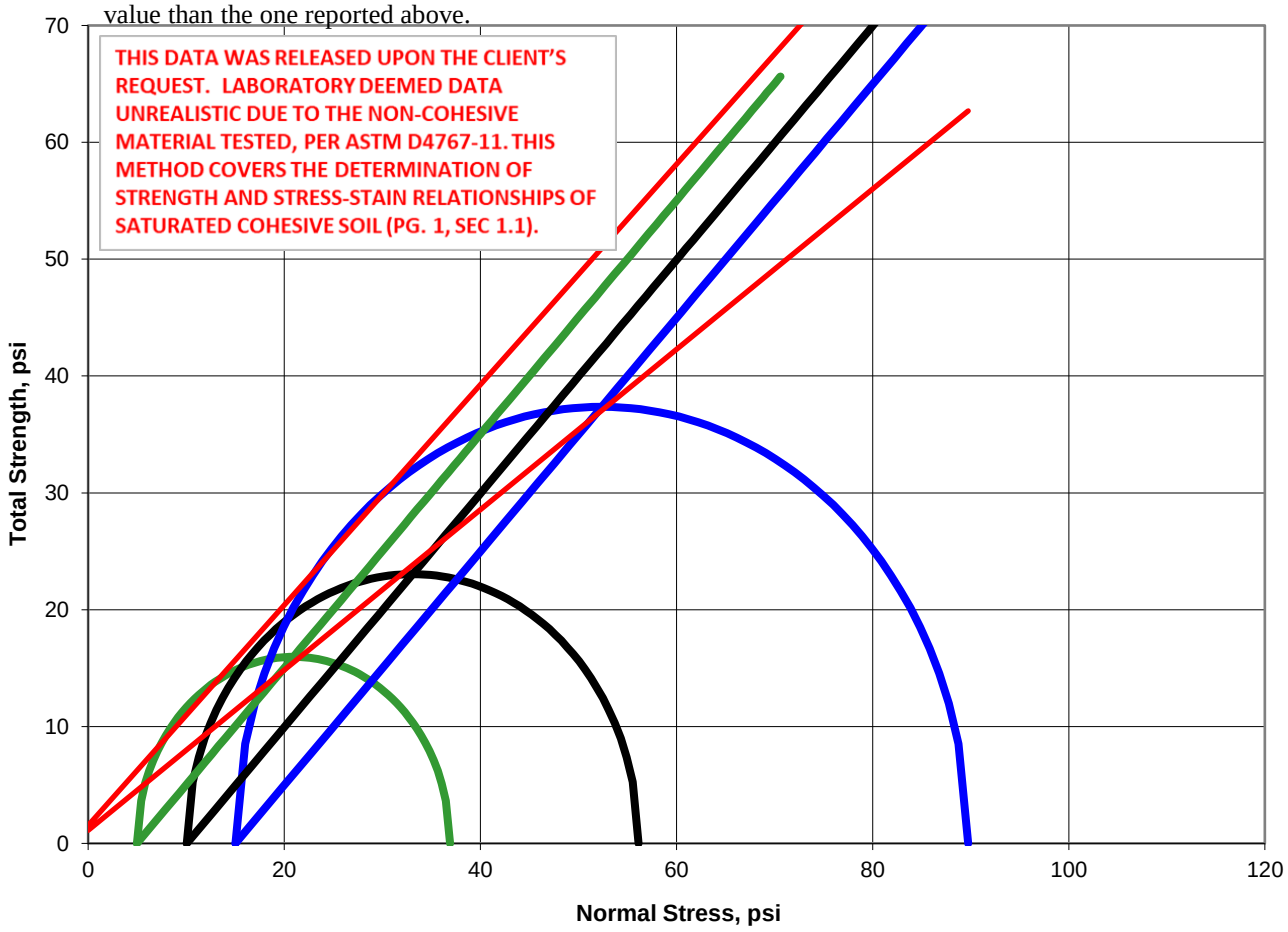
TOTAL STRESS

FAILURE CONDITION: MAX. EFFECTIVE PRINCIPAL STRESS RATIO

Test No.	Deviator Stress	Major Principal Stress	Minor Principal Stress	Strain at Failure	Mohr's Circle Stress Path		Failure Angle	
	$\sigma1-\sigma3$	$\sigma1$	$\sigma3$	ε	$(\sigma1+\sigma3)/2$	$(\sigma1-\sigma3)/2$		
	psi	psi	psi	%	psi	psi	α, deg	34.5
Test 1	31.93	36.91	4.98	1.80	20.94	15.97	a, psi	1.1
Test 2	46.07	56.13	10.06	1.70	33.09	23.04	Φ, deg	43.3
Test 3	74.72	89.75	15.02	2.11	52.39	37.36	C, psi	1.5

Calculations based on: Test 1 Test 2 Test 3

Note: The Friction Angle and Cohesion using other combinations of test points may yield a higher or lower value than the one reported above.



CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-1
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1037
		Lab Sample No.	41705001
USCS Description:	Brown Silty Sand		
Test Conditions:	Remolded - Side And Double Drained		

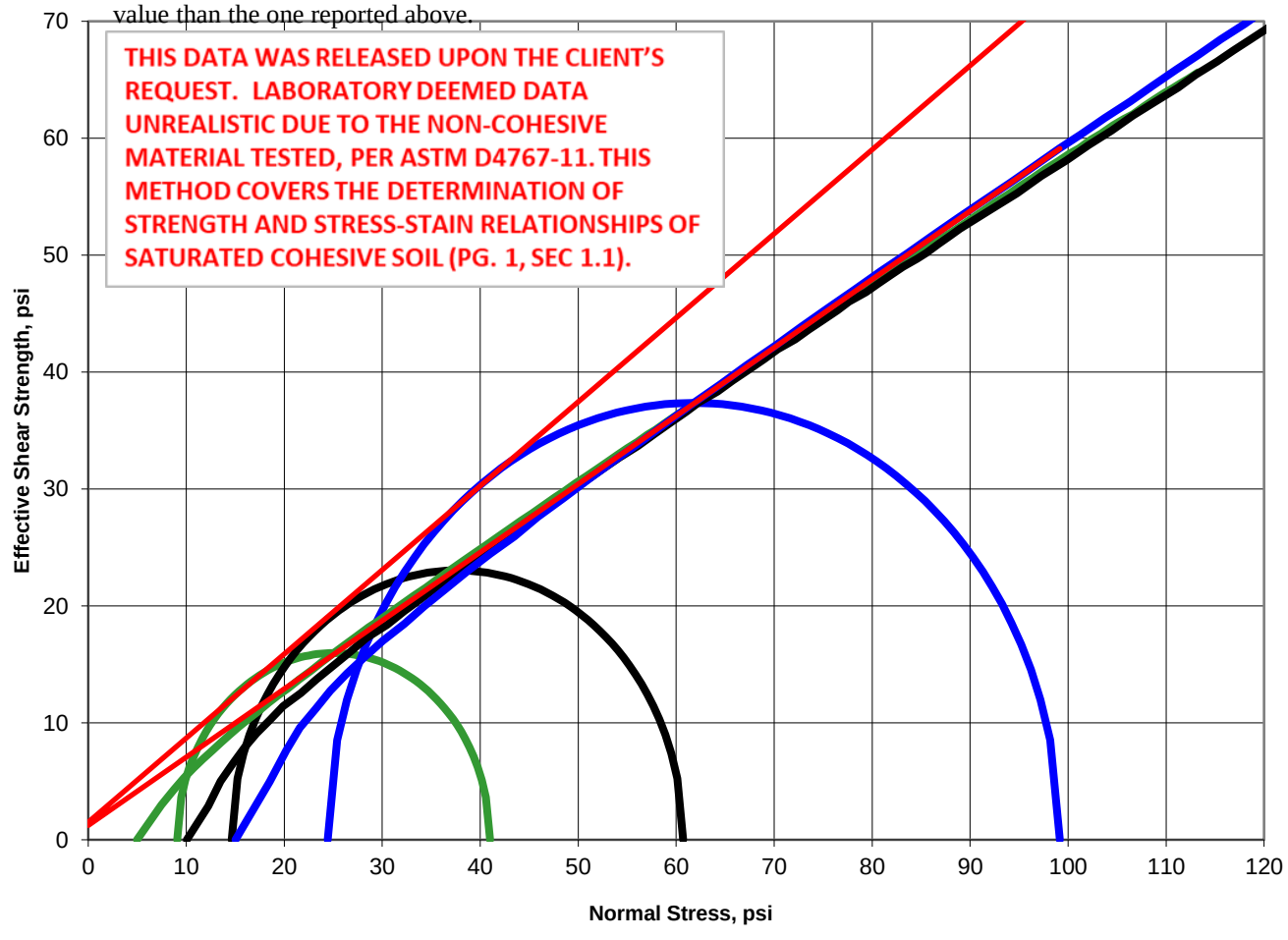
EFFECTIVE STRESS

FAILURE CONDITION: MAX. EFFECTIVE PRINCIPAL STRESS RATIO

Test No.	Deviator Stress	Major Principal Stress	Minor Principal Stress	Strain at Failure	Mohr's Circle Stress Path		Failure Angle	
	$\sigma 1-\sigma 3$	$\sigma' 1$	$\sigma' 3$	ε	p'	q		
	psi	psi	psi	%	psi	psi	α', deg	30.3
Test 1	31.93	41.01	9.08	1.80	25.04	15.97	a', psi	1.2
Test 2	46.07	60.72	14.64	1.70	37.68	23.04	Φ', deg	35.7
Test 3	74.72	99.16	24.44	2.11	61.80	37.36	C', psi	1.5

Calculations based on: Test 1 Test 2 Test 3

Note: The Friction Angle and Cohesion using other combinations of test points may yield a higher or lower value than the one reported above.



AFTER TEST PHOTOS

Client	F&ME Consultants	Boring	BS-1
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1037
		Lab No.	41705001
Visual Description	Brown Silty Sand		
Sample Condition	Remolded - Side And Double Drained		

TEST 1 **TEST 2** **TEST 3**

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1008	**DATE SAMPLE RECEIVED:**	3/22/2019
DESCRIPTION OF SOIL:	Clayey SAND (SC/A-2-6(1))		
TESTED BY:	WAP	**DATE OF TESTING:**	4/25/2019
WEIGHED BY:	WAP	**DATE OF WEIGHING:**	4/26/2019

BORING NO.	BS-2				
SAMPLE NO.					
SAMPLE DEPTH	0'-10'				
WATER CONTENT, W%	15.2				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

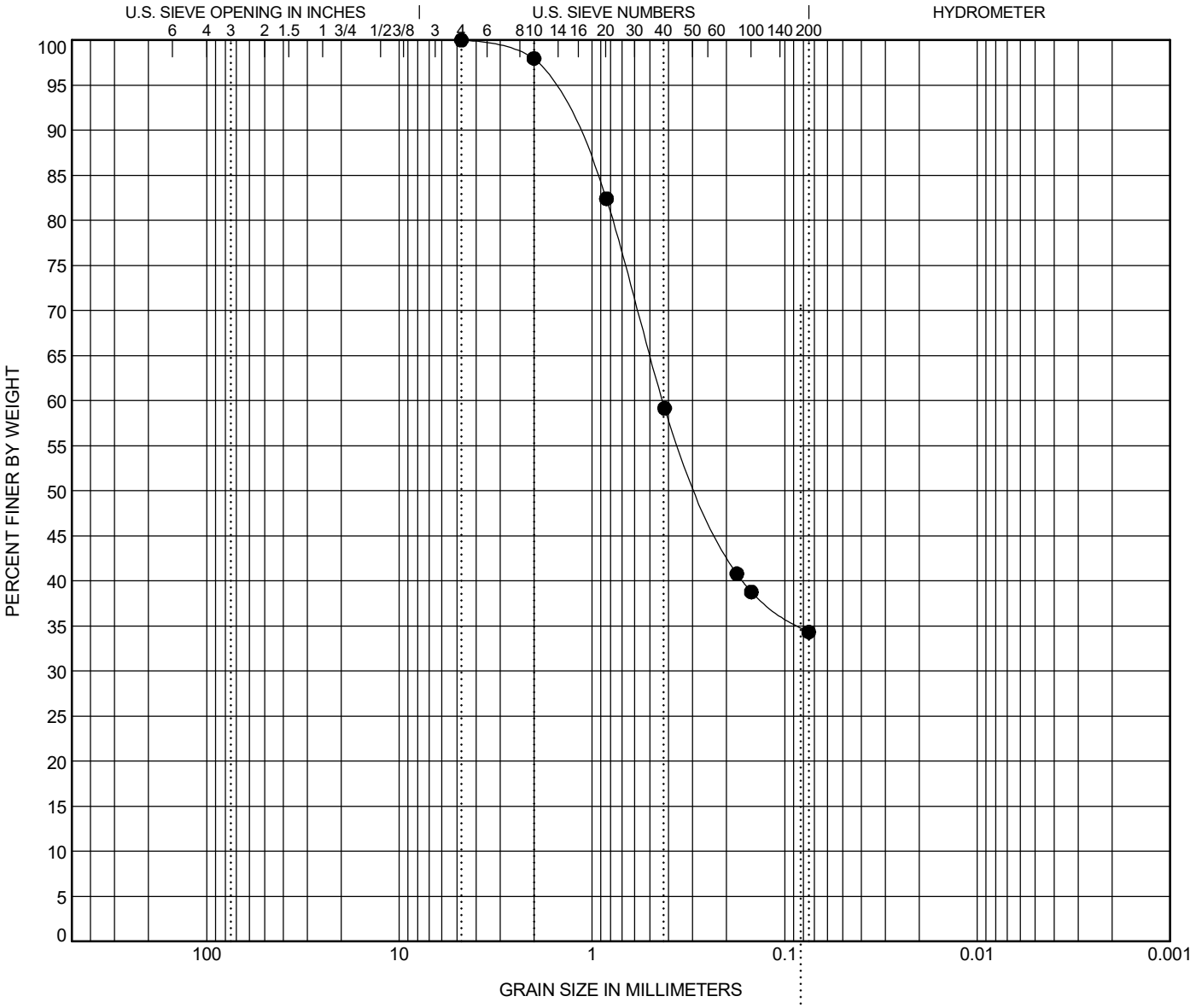
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



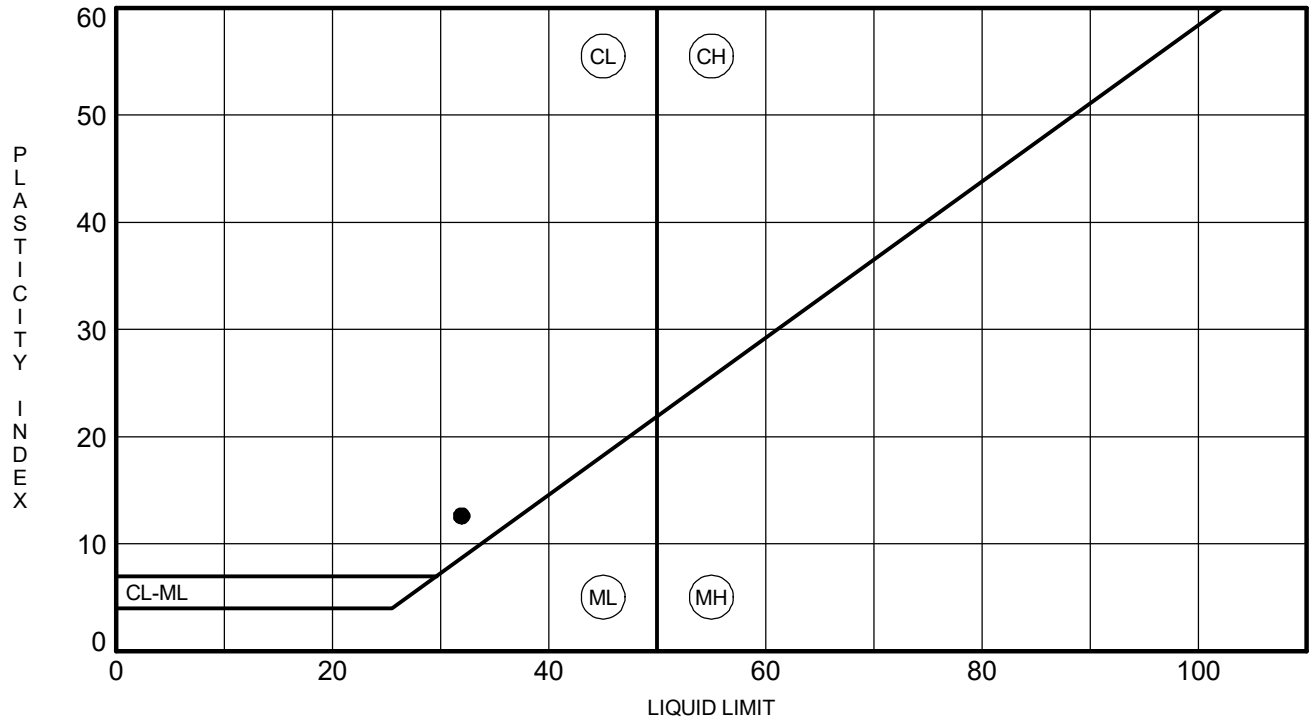
BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **BS-2**	**10.0**	**Clayey SAND (SC/A-2-6(1))**	**32**	**19**	**13**		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● **BS-2**	**10.0**	**4.76**	**1.694**	**0.273**		**0.0**	**65.7**	**34.3**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-2**	**10.0**	**32**	**19**	**13**	**34**	**Clayey SAND (SC/A-2-6(1))**

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
		Lab Sample No.	41705002

Visual Description: Brown Clayey Sand

WET DENSITY					
Mold ID	F	F	F	F	
Compaction Point #	1	2	3	4	
Wt. Mold & WS, gm.	6075	6228	6221	6163	
Wt. Mold, gm.	4171	4171	4171	4171	
Wt. WS, gm.	1904	2057	2050	1992	
Mold Volume, cc	940	940	940	940	
Wet Density, gm./cc	2.03	2.19	2.18	2.12	
Wet Density, pcf	126.4	136.6	136.1	132.3	

TEST PARAMETERS	
Test Method	ASTM D698
Compaction Energy	Standard
Test Procedure	B
Mold Diameter, in	4
Compacted Layers	3
Blows Per Layer	25
Rammer Weight / Fall	5.5 lbs / 12 in.
Size of Material Used	-3/8" Sieve
Use: <5% Retained on 3/8"	

WATER CONTENT					
Tare Number	453	B11	18	800	
Wt. Tare & WS, gm.	697.7	741	827	971.9	
Wt. Tare & DS, gm.	655	682.8	742.9	859.3	
Wt. Tare, gm.	85.5	84	81.9	102.4	
Water Content, %	7.5	9.7	12.7	14.9	

OVERSIZE PARTICLE CORRECTION

No Corrections Needed

Percent of Oversize Rock (+3/8" Sieve) = <5%
(Based on As-received Screening & Soaking)

W.C. of Finer Material, % (-3/8" Sieve) = NA

DRY DENSITY vs. WATER CONTENT

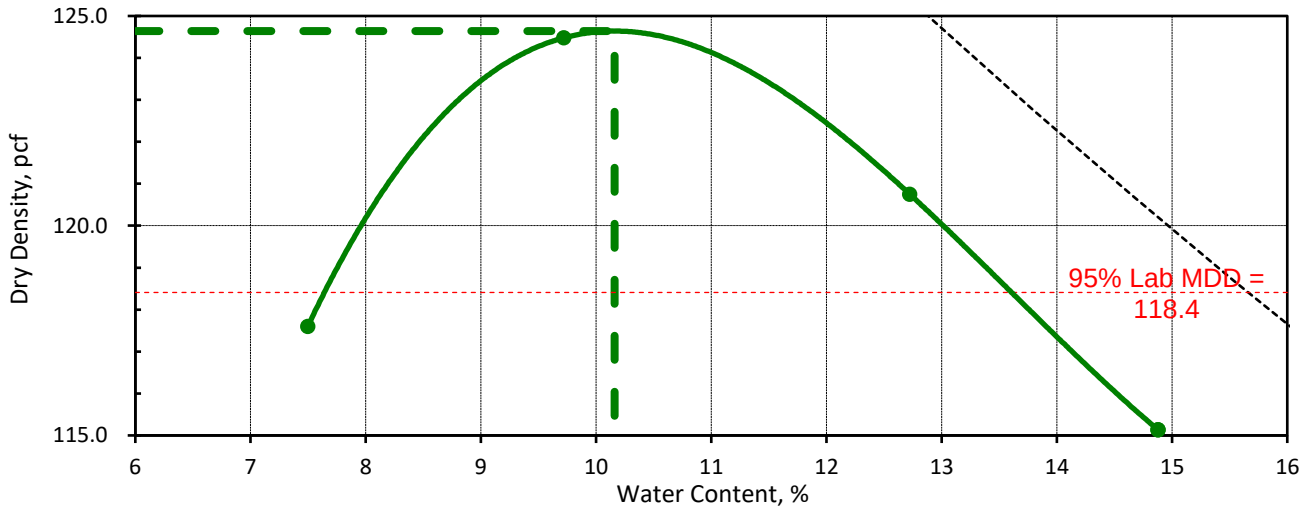
SAMPLE SUMMARY

LABORATORY TEST VALUES

Water Content, %	7.5	9.7	12.7	14.9	
Dry Density, pcf	117.6	124.5	120.8	115.1	

Lab Optimum Water Content, %	***10.2***
Lab Maximum Dry Density, pcf	***124.6***

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



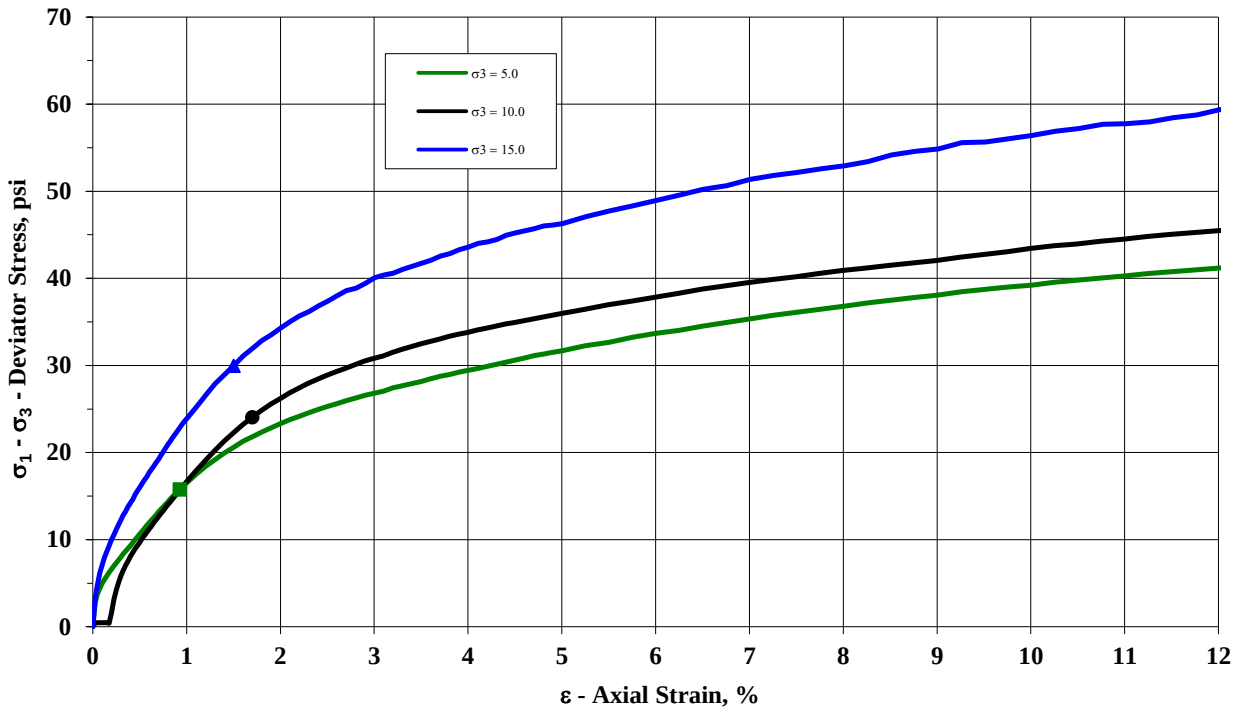
Note: Compacted using manual hammer.

Input Validation: BLS Reviewed By: ALO Date Tested: 04/30/19

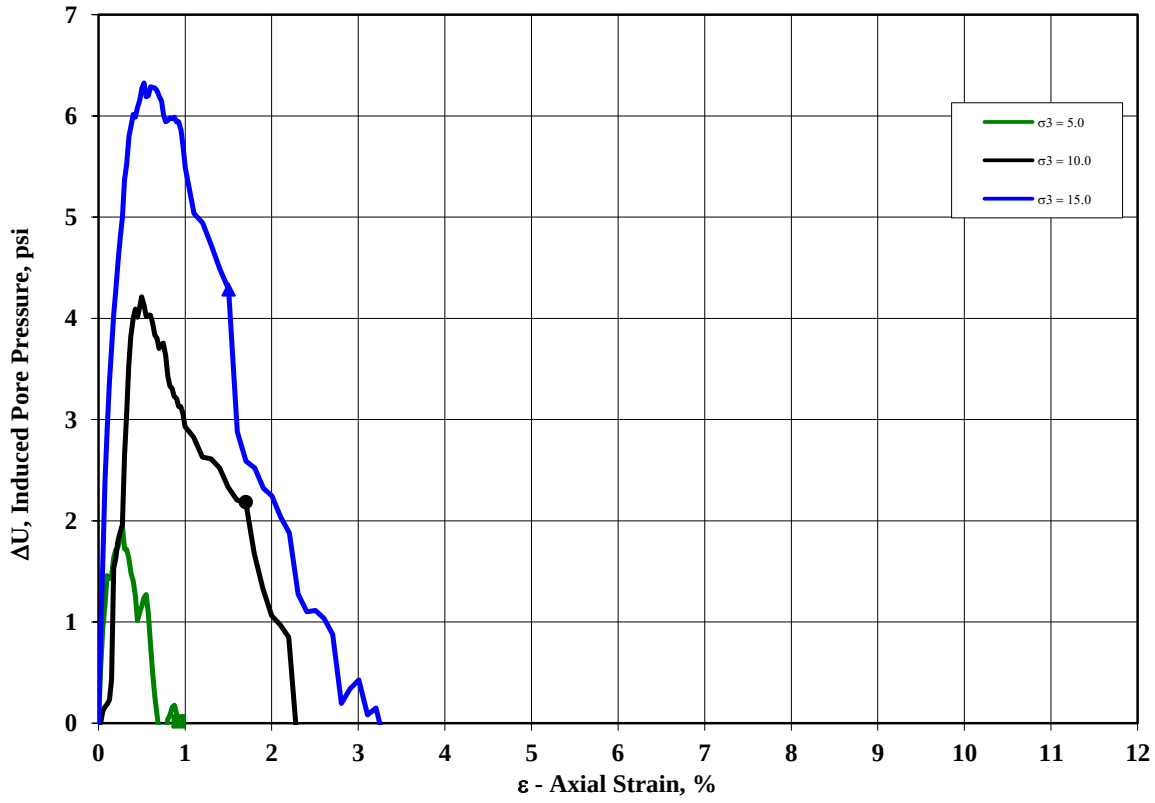
CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
Test Conditions:	Remolded - Side And Double Drained	Lab Sample No.	41705002
USCS Description:	Brown Clayey Sand		

AXIAL STRAIN vs. DEVIATOR STRESS



AXIAL STRAIN vs. INDUCED PORE-WATER PRESSURE



CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
		Lab Sample No.	41705002
USCS Description:	Brown Clayey Sand		
Test Conditions:	Remolded - Side And Double Drained		

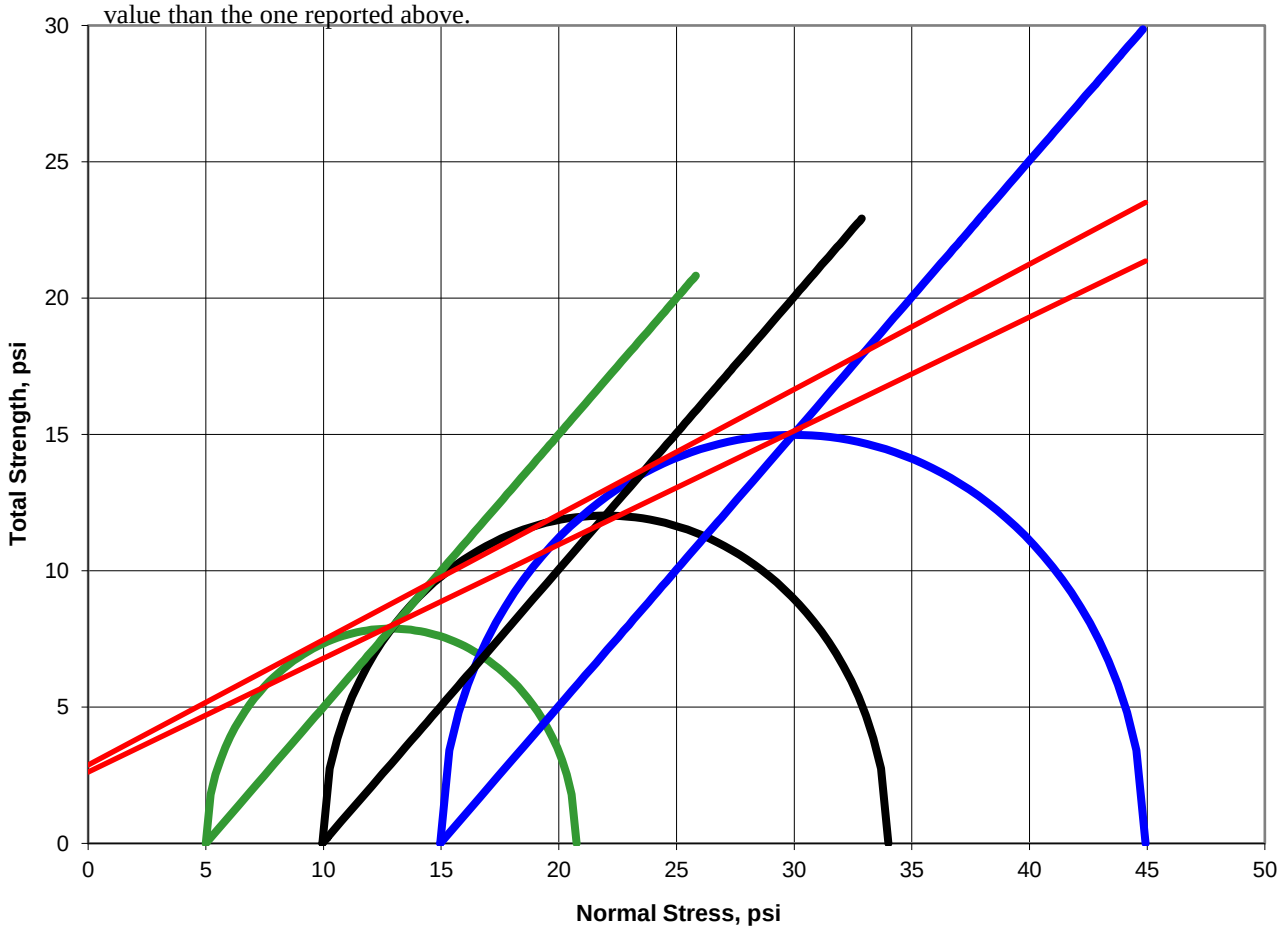
TOTAL STRESS

FAILURE CONDITION: MAX. EFFECTIVE PRINCIPAL STRESS RATIO

Test No.	Deviator Stress	Major Principal Stress	Minor Principal Stress	Strain at Failure	Mohr's Circle Stress Path		Failure Angle	
	$\sigma1-\sigma3$	$\sigma1$	$\sigma3$	ε	$(\sigma1+\sigma3)/2$	$(\sigma1-\sigma3)/2$		
	psi	psi	psi	%	psi	psi	α, deg	22.7
Test 1	15.76	20.76	5.00	0.93	12.88	7.88	a, psi	2.6
Test 2	24.05	34.00	9.95	1.70	21.98	12.03	Φ, deg	24.7
Test 3	29.97	44.93	14.96	1.50	29.95	14.99	C, psi	2.9

Calculations based on: Test 1 Test 2 Test 3

Note: The Friction Angle and Cohesion using other combinations of test points may yield a higher or lower value than the one reported above.



CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS AASHTO T297-94(2016)

Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
		Lab Sample No.	41705002
USCS Description:	Brown Clayey Sand		
Test Conditions:	Remolded - Side And Double Drained		

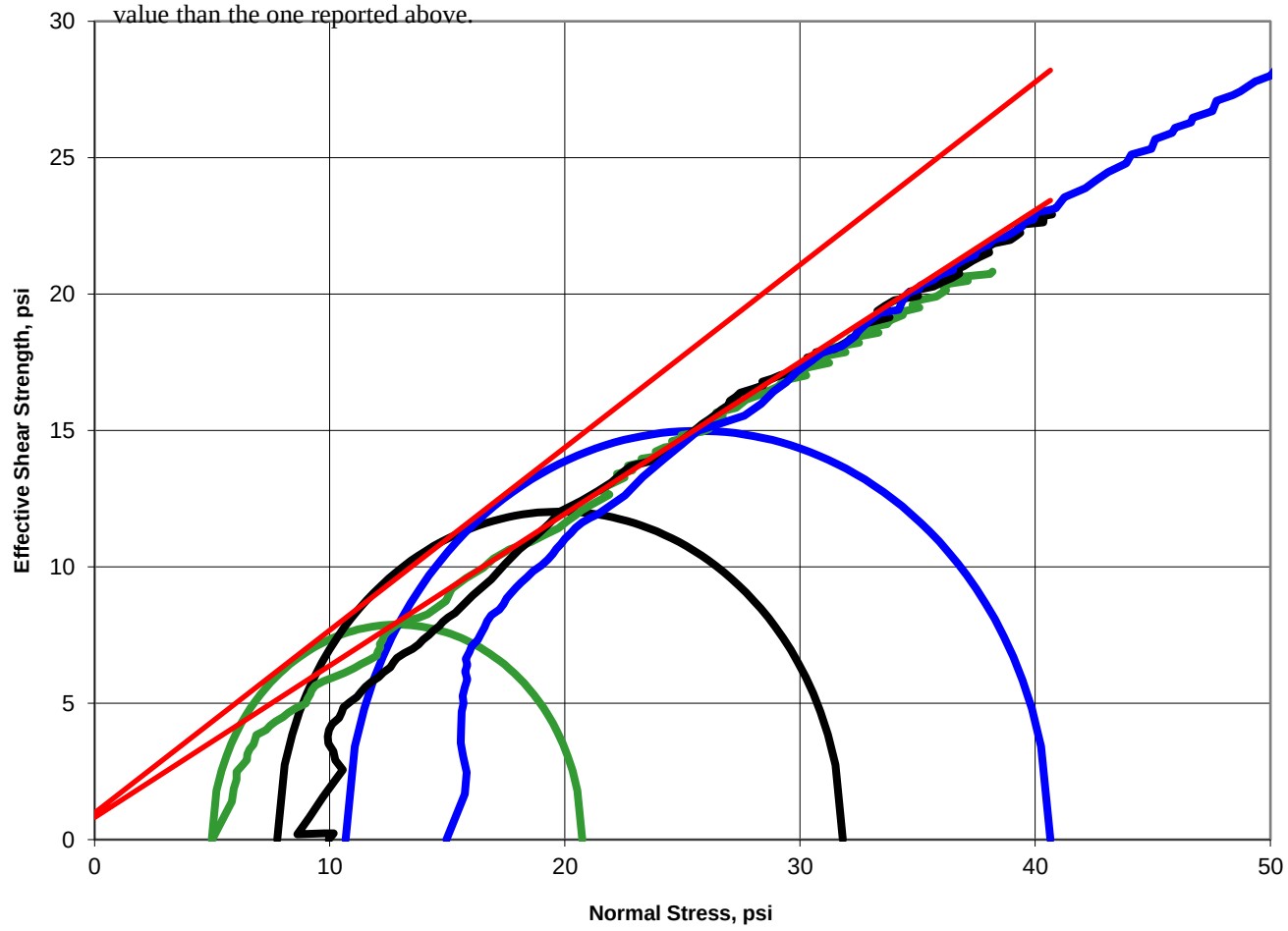
EFFECTIVE STRESS

FAILURE CONDITION: MAX. EFFECTIVE PRINCIPAL STRESS RATIO

Test No.	Deviator Stress	Major Principal Stress	Minor Principal Stress	Strain at Failure	Mohr's Circle Stress Path		Failure Angle	
	$\sigma 1-\sigma 3$	$\sigma' 1$	$\sigma' 3$	ε	p'	q		
	psi	psi	psi	%	psi	psi	α', deg	29.1
Test 1	15.76	20.74	4.98	0.93	12.86	7.88	a', psi	0.8
Test 2	24.05	31.82	7.77	1.70	19.79	12.03	Φ', deg	33.8
Test 3	29.97	40.64	10.67	1.50	25.66	14.99	C', psi	1.0

Calculations based on: Test 1 Test 2 Test 3

Note: The Friction Angle and Cohesion using other combinations of test points may yield a higher or lower value than the one reported above.



AFTER TEST PHOTOS

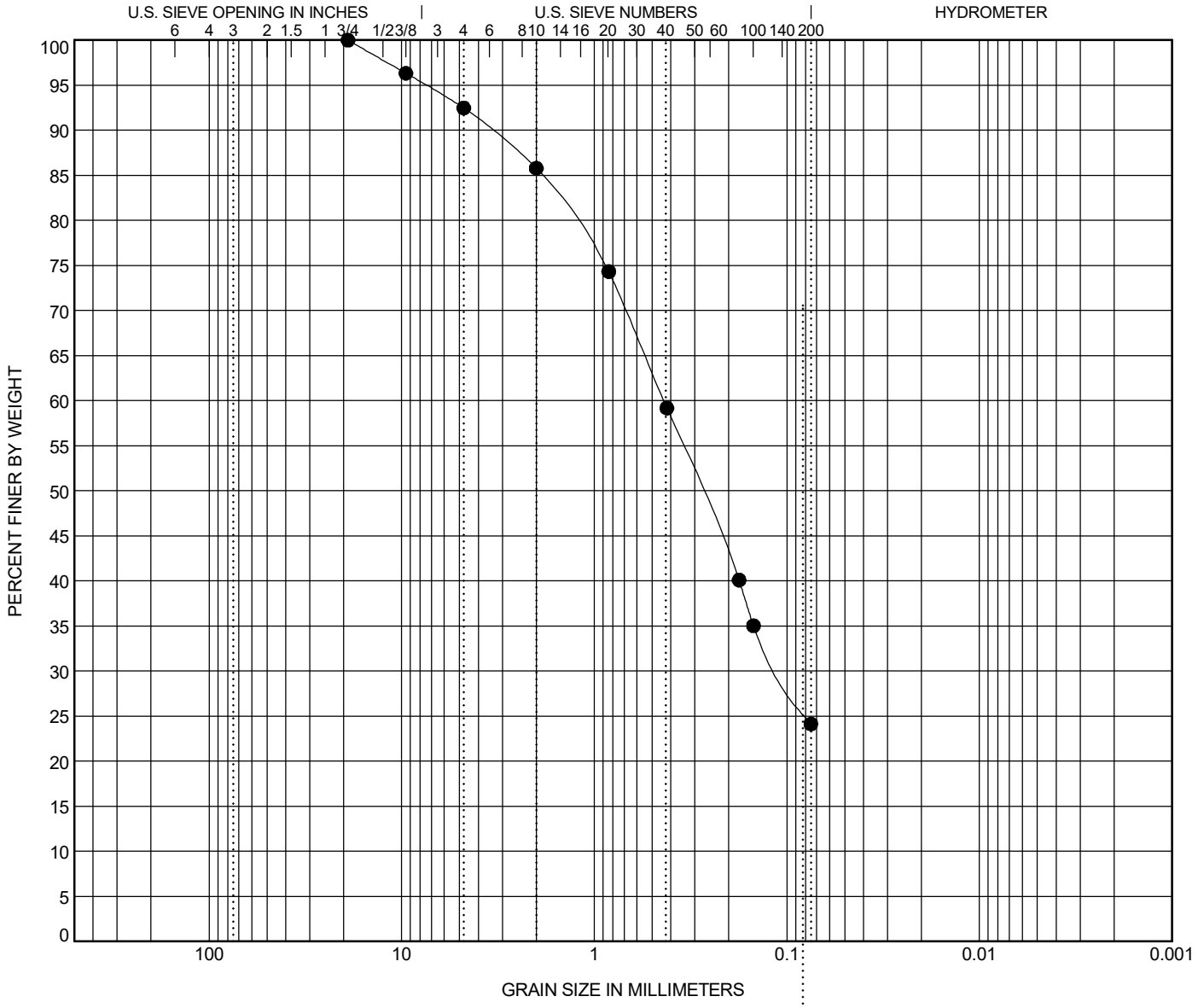
Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
		Lab No.	41705002
Visual Description	Brown Clayey Sand		
Sample Condition	Remolded - Side And Double Drained		

TEST 1 **TEST 2** **TEST 3**

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

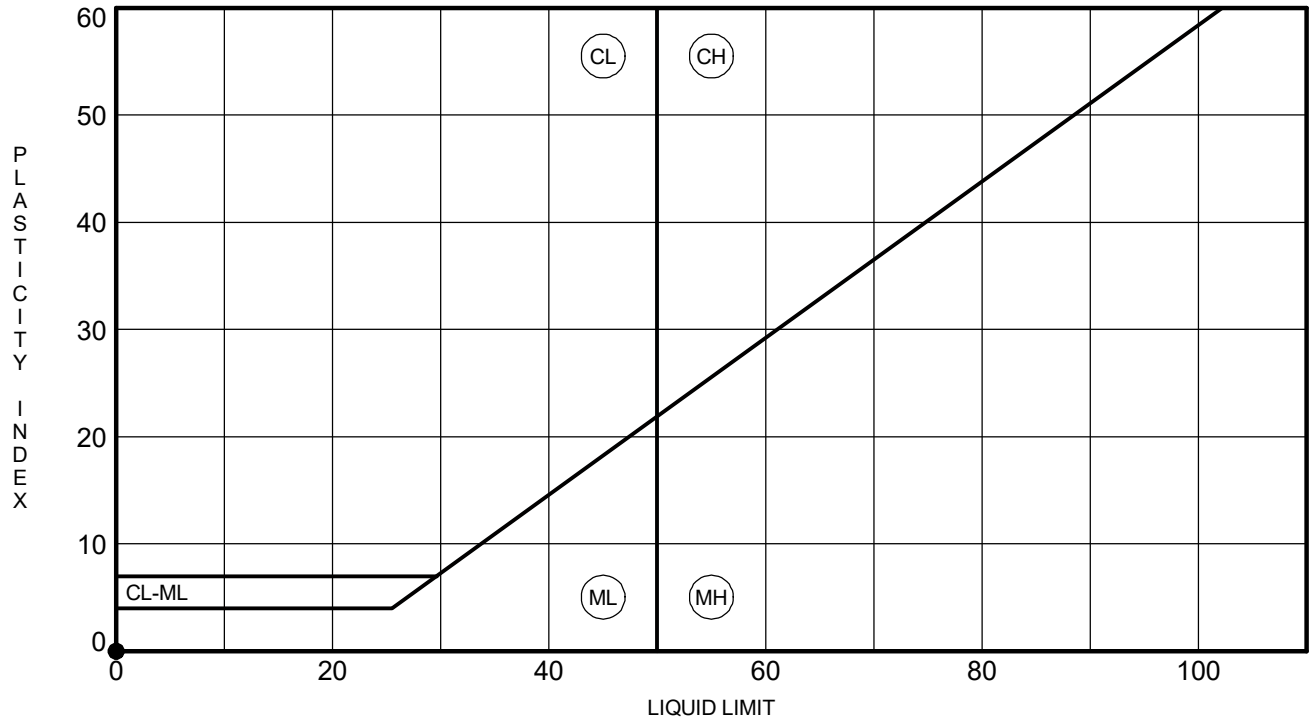
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-3**	**5.0**	**Silty SAND (SM/A-1-b)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-3**	**5.0**	**19**	**7.484**	**0.277**		**7.5**	**68.3**	**24.1**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington

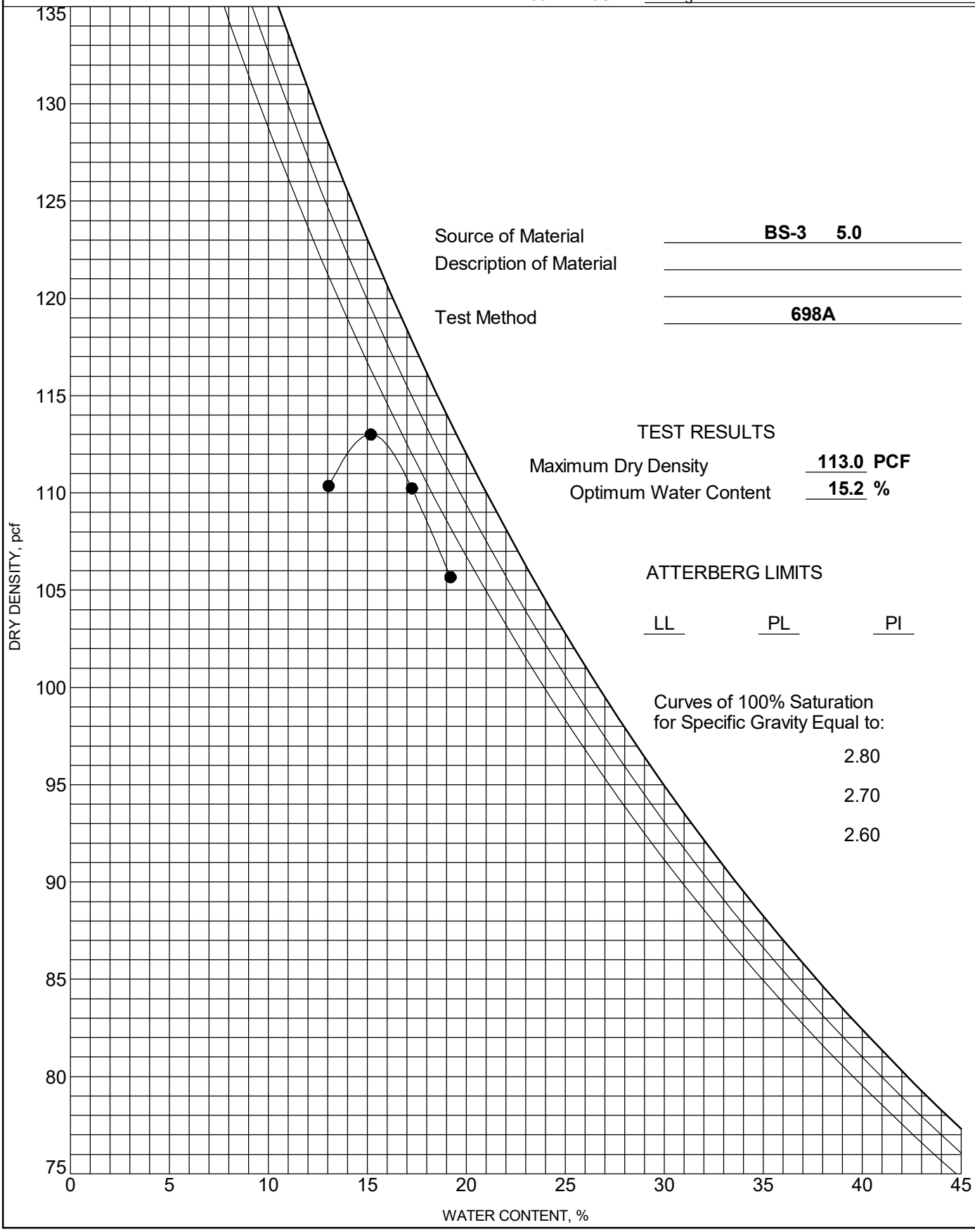


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-3**	**5.0**	**NP**	**NP**	**NP**	**24**	**Silty SAND (SM/A-1-b)**

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



Source of Material **BS-3 5.0**

Description of Material

Test Method **698A**

TEST RESULTS

Maximum Dry Density **113.0** **PCF**

Optimum Water Content **15.2** **%**

ATTERBERG LIMITS

LL PL PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

CALIFORNIA BEARING RATIO TEST

AASHTO T193

PROJECT:	US-1 over I-20	PROJECT NO.:	P030711
SAMPLE LOCATION:	BS-3	SAMPLE/BORING NUMBER:	19-1187
SAMPLE ELEVATION/DEPTH:	0' - 5'	SAMPLED BY:	
SOIL DESCRIPTION:	Silty **SAND (SM/A-1-b)**	DATE SAMPLED:	
		DATE RECEIVED:	
DATE TEST BEGAN:	4/26/19	DATE TEST COMPLETED:	4/30/19

PROCTOR TEST VALUES

MAXIMUM DRY DENSITY (PCF):	113.0
OPTIMUM MOISTURE (%):	15.2
METHOD:	

SOAKED CBR TEST VALUES (ASTM D-1883)

MOLDED DRY DENSITY (PCF):	107.3
% MAXIMUM DRY DENSITY:	95.0
MOLDED MOISTURE CONTENT (%):	15.29
SOAKING PERIOD (HRS):	96
SURCHARGE (LBS):	10
% ± SHRINK/SWELL:	0.81
CBR @ 0.1" PENETRATION:	5.1%
CBR @ 0.2" PENETRATION:	5.3%
PENETRATION RATE (mm/min):	1.7

REMARKS:

TECHNICIAN SIGNATURE: WAP

BORING NO.: BS-3 MOLD NO.: U

TESTED BY: WAP

Method Used for Preparation and Compaction of Specimen:

Maximum Dry Density: 113.0 Optimum Moisture Content: 15.2

[A]

MOISTURE CONTENT DETERMINATION	Before Compaction	After Compaction	Top 1-in. Layer after Soaking	Average Moisture Content after Soaking
Can No.	M222	LOOP	397	487
Weight of wet soil + can (g)	161.64	184.58	240.32	241.98
Weight of dry soil + can (g)	141.56	160.91	202.48	206.17
Weight of can (g)	8.29	8.29	8.43	8.31
Weight of water (g)	20.08	23.67	37.84	35.81
Weight of dry soil (g)	133.27	152.62	194.05	197.86
Moisture Content (%)	15.1	15.5	19.5	18.1

Average moisture content before soaking: 15.3 %

Average moisture content after soaking: 18.8 %

[B] DENSITY DETERMINATION

		Before Soaking	After Soaking
(1)	Weight of mold + compacted soil specimen (p)	25	25.18
(2)	Weight of mold (p)	15.56	15.56
(3)	Weight of compacted soil specimen (p) [(3) = (1) - (2)]	9.44	9.62
(4)	Diameter of mold (in.)	5.998	5.998
(5)	Area of soil specimen ($in.^2$)	28.26	28.25546
(6)	Height of soil specimen (in.)	4.667	4.705
(7)	Volume of soil specimen ($in.^3$) [(7) = (5) x (6)]	131.9	132.942
(8)	Wet Density (lb/ft^3) [(8) = (3) x 1728 ÷ (7)]	123.7	125.0422
(9)	Moisture content (%) (from part [A])	15.3	18.8
(10)	Dry density (lb/ft^3) [(10) = (8) ÷ (1+(9)/100)]	107.3	105.3
	% Compaction	94.95%	93.15%

[C] SWELL DATA

			Final Swell Measurement
(1)	Surcharge weight (lb)	10	10
(2)	Date	4/26/2019	4/30/2019
(2a)	Time	2:08 PM	2:08 PM
(3)	Elapsed time (h)	0	96
(4)	Dial reading	0.100	0.138
(5)	Initial height of soil specimen (in.) [from part [B], (6)]	4.667	4.705
(6)	Swell (% of initial height) [(6) = (4) ÷ (5) x 100]	0.0%	0.8%

[D] BEARING RATIO DATA

(1)	X	Soaked		Unsoaked [check one]
(2)	Wieght of surcharge	10	lb	
(3)	Proving ring calibration	19097	lb/in.	

Penetration (in.)	Proving Ring Dial Reading (in.)	Piston Load (lb)	Area of Piston (in.^{2})	Unit Load on Piston (psi)
(1)	(2)	(3) = (2) x provign ring calibration	(4)	(5) = (3) ÷ (4)
0	0	0	3	0
25	8	31.2	3	10
50	13	99.5	3	33
75	16	122.5	3	41
100	20	153.1	3	51
125	24	183.7	3	61
150	26	199	3	66
175	29	221.95	3	74
200	31	237.25	3	79
300	39	298.55	3	100
400	45	344.45	3	115
500	52	397	3	132

CBR at 0.10-in. penetration = (corrected unit load on piston for 0.10-in. penetration (from unit load versus penetration curve)) ÷ 1000 x 100 = 5.1%

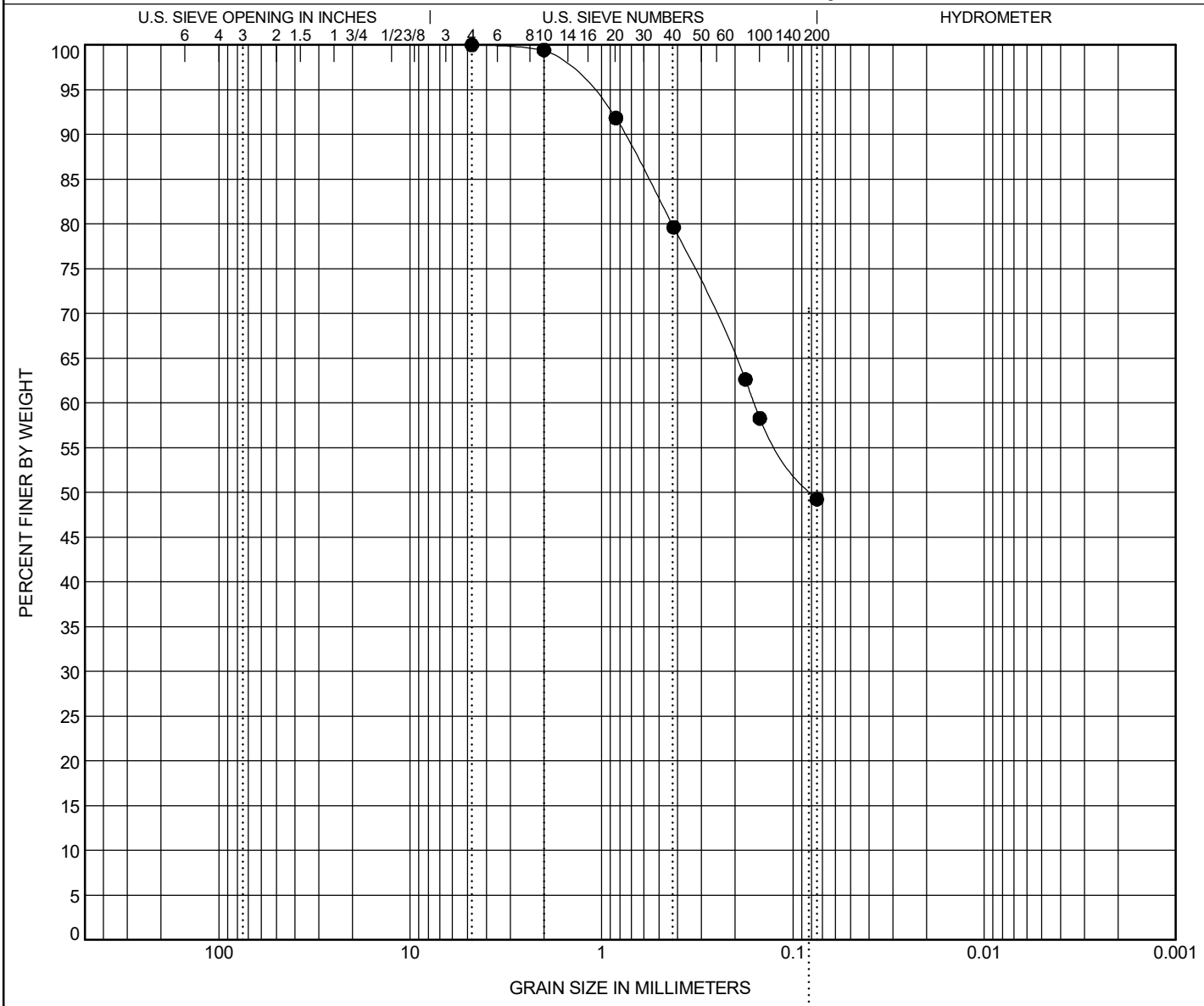
CBR at 0.20-in. penetration = (corrected unit load on piston for 0.20-in. penetration (from unit load versus penetration curve)) ÷ 1500 x 100 = 5.3%

Design CBR = _____

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

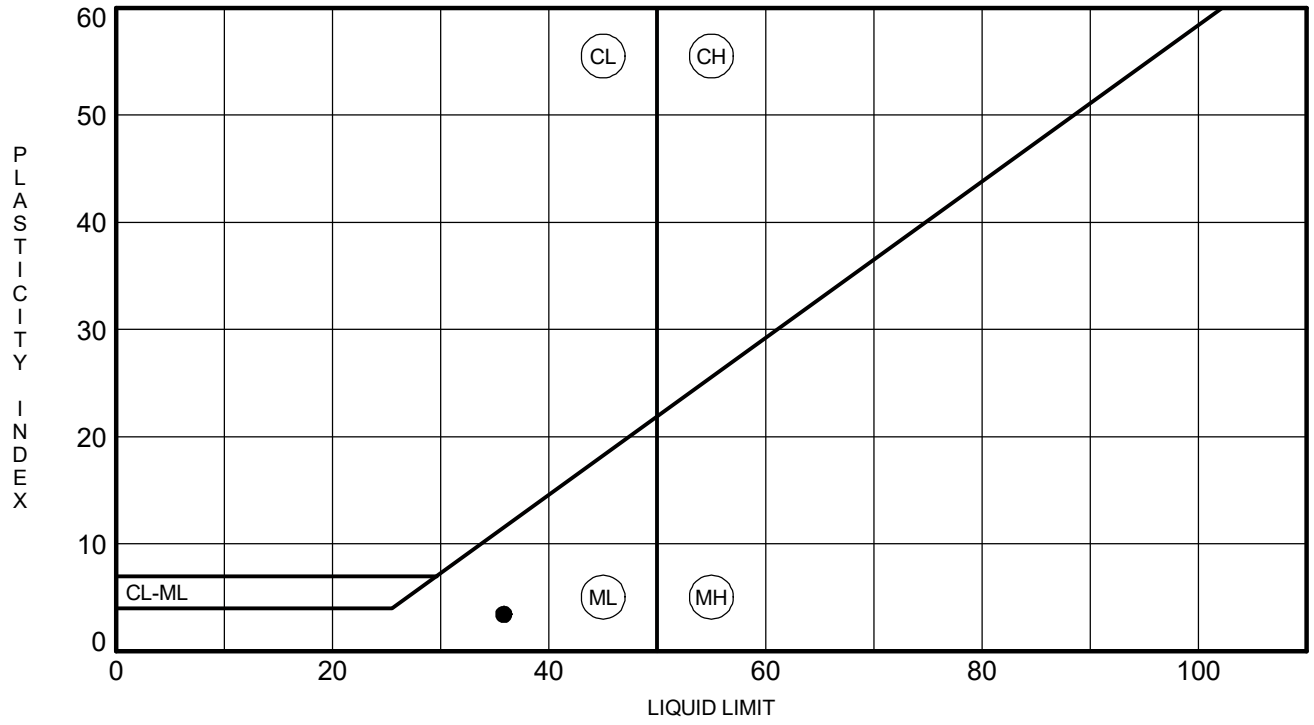
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-4**	**5.0**	**Silty SAND (SM/A-4(1))**	**36**	**32**	**4**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-4**	**5.0**	**4.76**	**1.206**	**0.079**		**0.0**	**50.7**	**49.3**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington

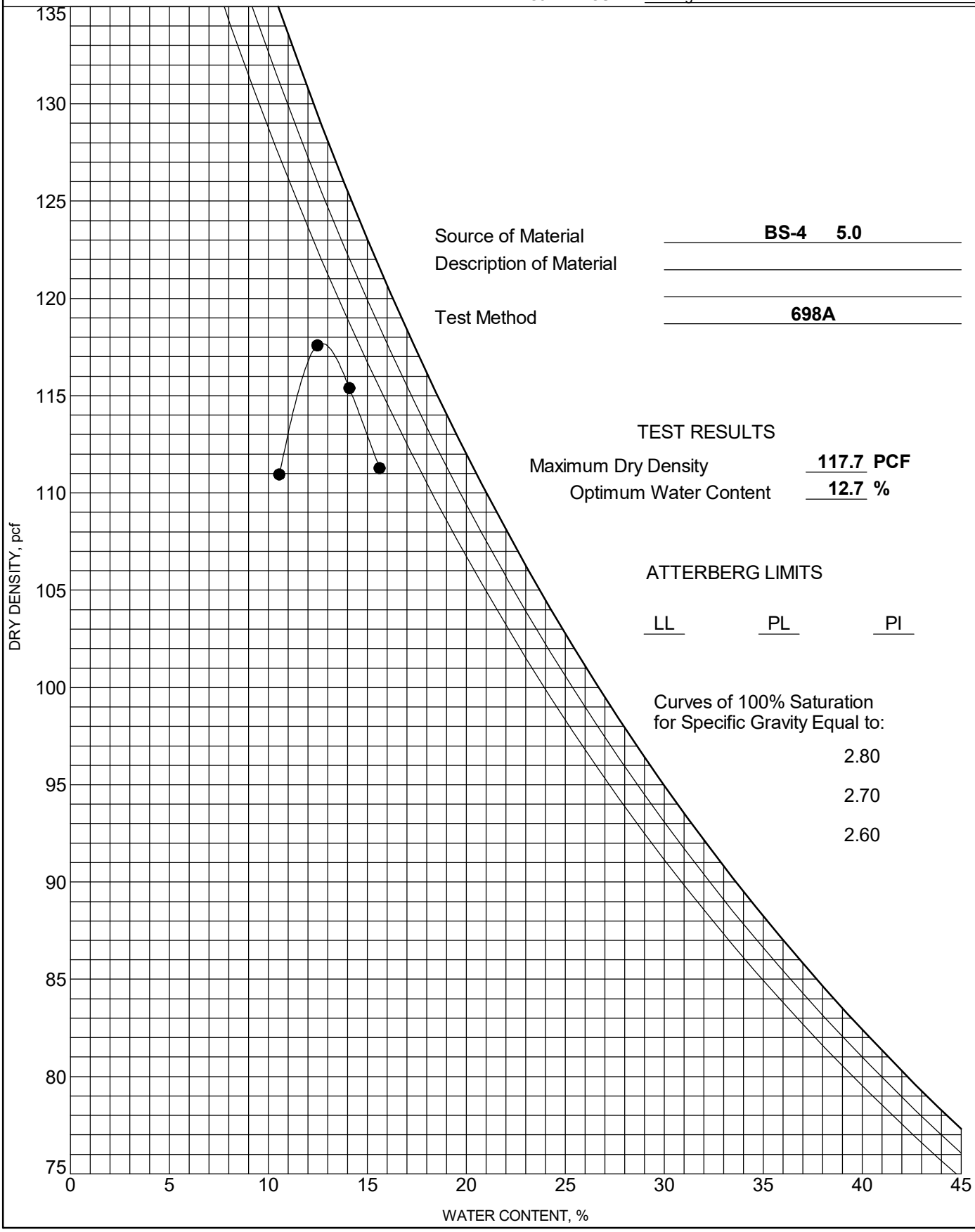


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-4**	**5.0**	**36**	**32**	**4**	**49**	**Silty SAND (SM/A-4(1))**

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



Source of Material **BS-4 5.0**

Description of Material

Test Method **698A**

TEST RESULTS

Maximum Dry Density **117.7** **PCF**

Optimum Water Content **12.7** **%**

ATTERBERG LIMITS

LL PL PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

CALIFORNIA BEARING RATIO TEST

AASHTO T193

PROJECT:	US-1 over I-20	PROJECT NO.:	P030711
SAMPLE LOCATION:	BS-4	SAMPLE/BORING NUMBER:	19-1188
SAMPLE ELEVATION/DEPTH:	0' - 5'	SAMPLED BY:	
SOIL DESCRIPTION:	Silty **SAND (SM/A-4(1))**	DATE SAMPLED:	
		DATE RECEIVED:	
DATE TEST BEGAN:	4/26/19	DATE TEST COMPLETED:	4/30/19

PROCTOR TEST VALUES

MAXIMUM DRY DENSITY (PCF):	117.7
OPTIMUM MOISTURE (%):	12.7
METHOD:	

SOAKED CBR TEST VALUES (ASTM D-1883)

MOLDED DRY DENSITY (PCF):	112.1
% MAXIMUM DRY DENSITY:	95.2
MOLDED MOISTURE CONTENT (%):	12.32
SOAKING PERIOD (HRS):	96
SURCHARGE (LBS):	10
% ± SHRINK/SWELL:	-0.07
CBR @ 0.1" PENETRATION:	11.7%
CBR @ 0.2" PENETRATION:	10.6%
PENETRATION RATE (mm/min):	1.7

REMARKS:

TECHNICIAN SIGNATURE: WAP

BORING NO.: BS-4 MOLD NO.: V

TESTED BY: WAP

Method Used for Preparation and Compaction of Specimen:

Maximum Dry Density: 117.7 Optimum Moisture Content: 12.7

[A]

MOISTURE CONTENT DETERMINATION	Before Compaction	After Compaction	Top 1-in. Layer after Soaking	Average Moisture Content after Soaking
Can No.	5080	2021	358	3029
Weight of wet soil + can (g)	146.8	174.79	173.9	169.77
Weight of dry soil + can (g)	131.78	156.17	151.87	147.99
Weight of can (g)	8.5	6.71	8.39	8.18
Weight of water (g)	15.02	18.62	22.03	21.78
Weight of dry soil (g)	123.28	149.46	143.48	139.81
Moisture Content (%)	12.2	12.5	15.4	15.6

Average moisture content before soaking: 12.3 %

Average moisture content after soaking: 15.5 %

[B] DENSITY DETERMINATION

		Before Soaking	After Soaking
(1)	Weight of mold + compacted soil specimen (p)	24.83	24.99
(2)	Weight of mold (p)	15.36	15.36
(3)	Weight of compacted soil specimen (p) [(3) = (1) - (2)]	9.47	9.63
(4)	Diameter of mold (in.)	6.001	6.001
(5)	Area of soil specimen ($in.^2$)	28.28	28.28374
(6)	Height of soil specimen (in.)	4.595	4.592
(7)	Volume of soil specimen ($in.^3$) [(7) = (5) x (6)]	130.0	129.8789
(8)	Wet Density (lb/ft^3) [(8) = (3) x 1728 ÷ (7)]	125.9	128.1243
(9)	Moisture content (%) (from part [A])	12.3	15.5
(10)	Dry density (lb/ft^3) [(10) = (8) ÷ (1+(9)/100)]	112.1	111.0
	% Compaction	95.24%	94.28%

[C] SWELL DATA

			Final Swell Measurement
(1)	Surcharge weight (lb)	10	10
(2)	Date	4/26/2019	4/30/2019
(2a)	Time	2:28 PM	2:28 PM
(3)	Elapsed time (h)	0	96
(4)	Dial reading	0.100	0.097
(5)	Initial height of soil specimen (in.) [from part [B], (6)]	4.595	4.592
(6)	Swell (% of initial height) [(6) = (4) ÷ (5) x 100]	0.0%	-0.1%

[D] BEARING RATIO DATA

(1)	X	Soaked		Unsoaked [check one]
(2)	Wieght of surcharge	10	lb	
(3)	Proving ring calibration	19097	lb/in.	

Penetration (in.)	Proving Ring Dial Reading (in.)	Piston Load (lb)	Area of Piston (in.^{2})	Unit Load on Piston (psi)
(1)	(2)	(3) = (2) x provign ring calibration	(4)	(5) = (3) ÷ (4)
0	0	0	3	0
25	25	191.35	3	64
50	34	260.2	3	87
75	41	313.85	3	105
100	46	352.1	3	117
125	51	389.85	3	130
150	55	418.45	3	139
175	60	454.2	3	151
200	63	475.7	3	159
300	74	554.4	3	185
400	84	625.9	3	209
500	94	697.5	3	233

CBR at 0.10-in. penetration = (corrected unit load on piston for 0.10-in. penetration (from unit load versus penetration curve)) ÷ 1000 x 100 = 11.7%

CBR at 0.20-in. penetration = (corrected unit load on piston for 0.20-in. penetration (from unit load versus penetration curve)) ÷ 1500 x 100 = 10.6%

Design CBR = _____

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1006	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019 & 5/18/19
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019 & 5/20/19

BORING NO.	R-1	R-1	R-1	R-1	
SAMPLE NO.	SS-1 & SS-2	SS-9	SS-10	SS-11	
SAMPLE DEPTH	0'-4'	28.5'-30.0'	33.5'-35.0'	38.5'-40.0'	
WATER CONTENT, W%	12.7	19.4	21.6	18.0	

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

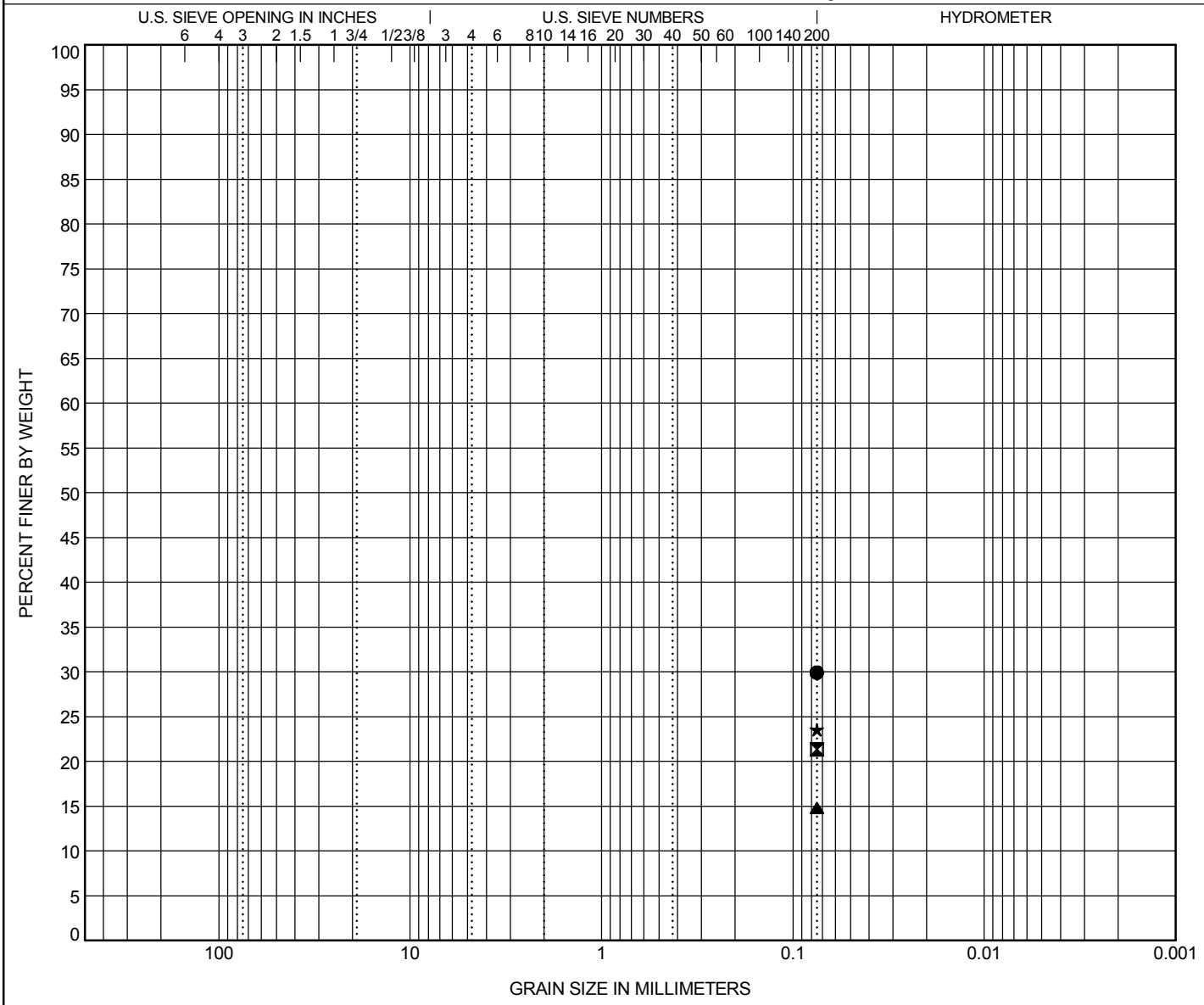
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

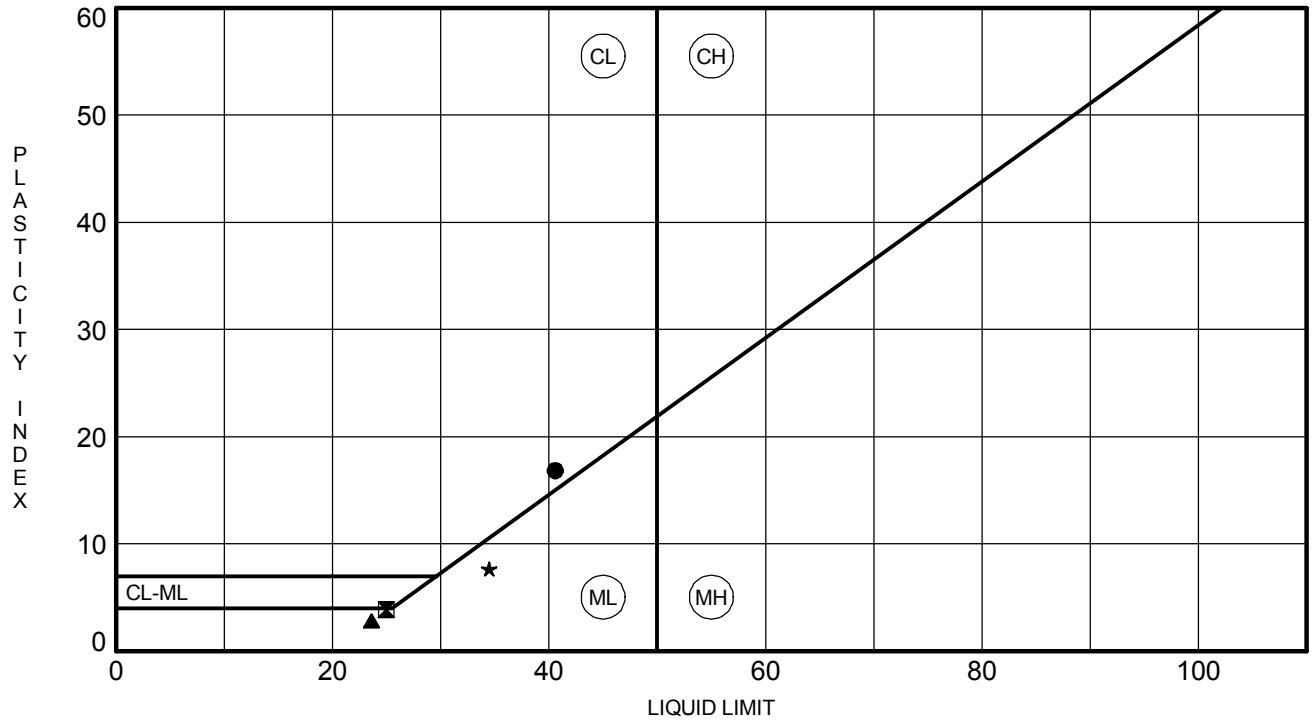
	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**R-1**	**4.0**	**CLAYEY SAND(SC)**	**41**	**24**	**17**		
⊠	**R-1**	**30.0**	**SILTY, CLAYEY SAND(SC-SM)**	**25**	**21**	**4**		
▲	**R-1**	**35.0**	**SILTY SAND(SM)**	**24**	**21**	**3**		
★	**R-1**	**40.0**	**SILTY SAND(SM)**	**34**	**27**	**7**		

	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	**R-1**	**4.0**	**0.075**						**29.9**	
⊠	**R-1**	**30.0**	**0.075**						**21.3**	
▲	**R-1**	**35.0**	**0.075**						**14.8**	
★	**R-1**	**40.0**	**0.075**						**23.6**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-1**	**4.0**	**41**	**24**	**17**	**30**	**CLAYEY SAND(SC)**
⊠	**R-1**	**30.0**	**25**	**21**	**4**	**21**	**SILTY, CLAYEY SAND(SC-SM)**
▲	**R-1**	**35.0**	**24**	**21**	**3**	**15**	**SILTY SAND(SM)**
★	**R-1**	**40.0**	**34**	**27**	**7**	**24**	**SILTY SAND(SM)**

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3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1007	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019 & 5/18/19
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019 & 5/20/19

BORING NO.	R-2	R-2	R-2	R-2	R-2
SAMPLE NO.	SS-1 & SS-2	SS-5	SS-8	SS-9	SS-10
SAMPLE DEPTH	0'-4'	6'-8'	23.5'-25.0'	28.5'-30.0'	33.5'-35.0
WATER CONTENT, W%	10.1	14.3	16.2	19.9	26.1

BORING NO.	R-2				
SAMPLE NO.	SS-11				
SAMPLE DEPTH	38.5'-40.0'				
WATER CONTENT, W%	18.6				

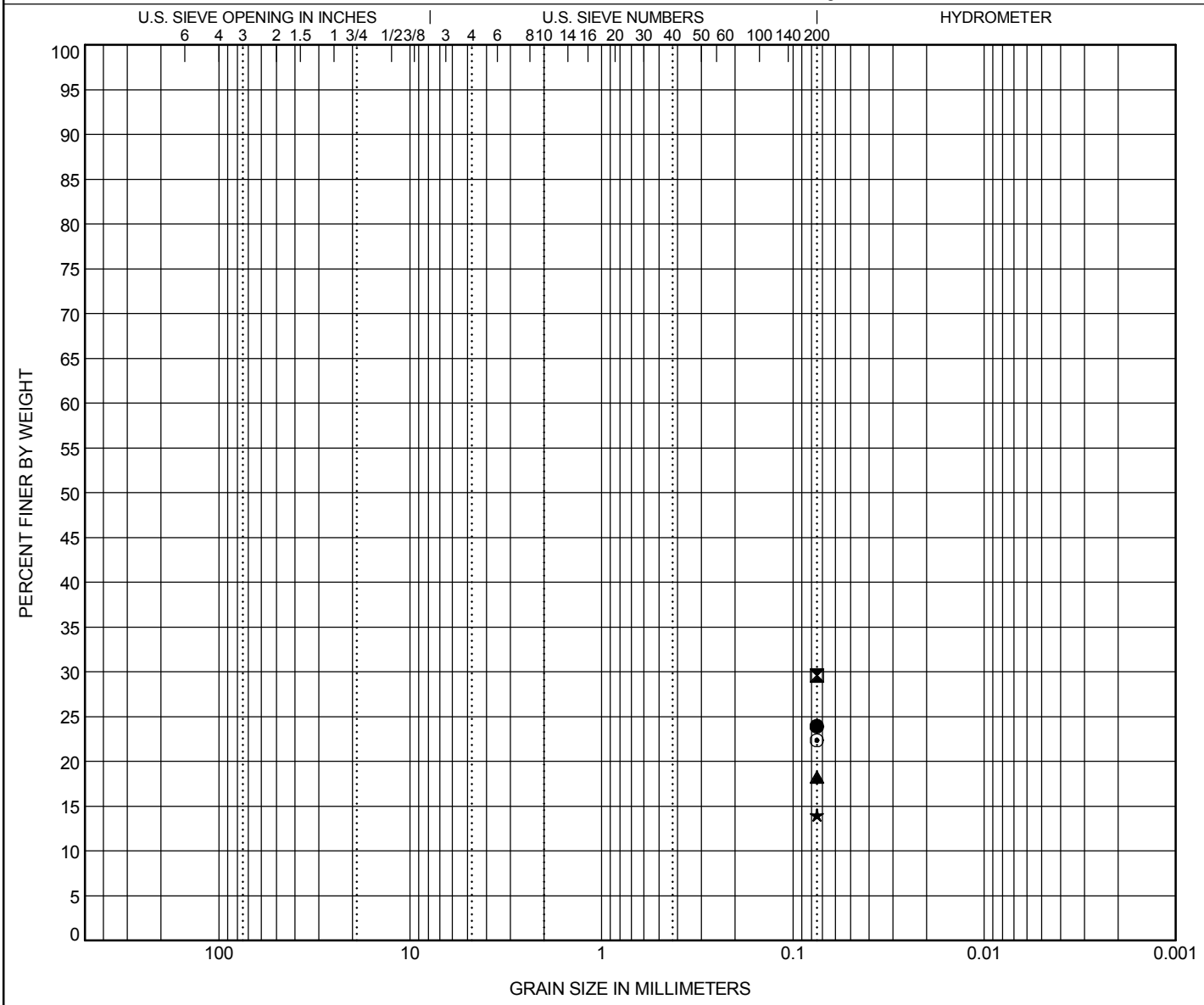
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	R-2	4.0	CLAYEY SAND(SC)	30	21	9		
⊠	R-2	8.0	SILTY SAND(SM)	47	30	17		
▲	R-2	25.0	SILTY SAND(SM)	NP	NP	NP		
★	R-2	30.0	SILTY SAND(SM)	24	21	3		
⊙	R-2	35.0	SILTY SAND(SM)	31	25	6		

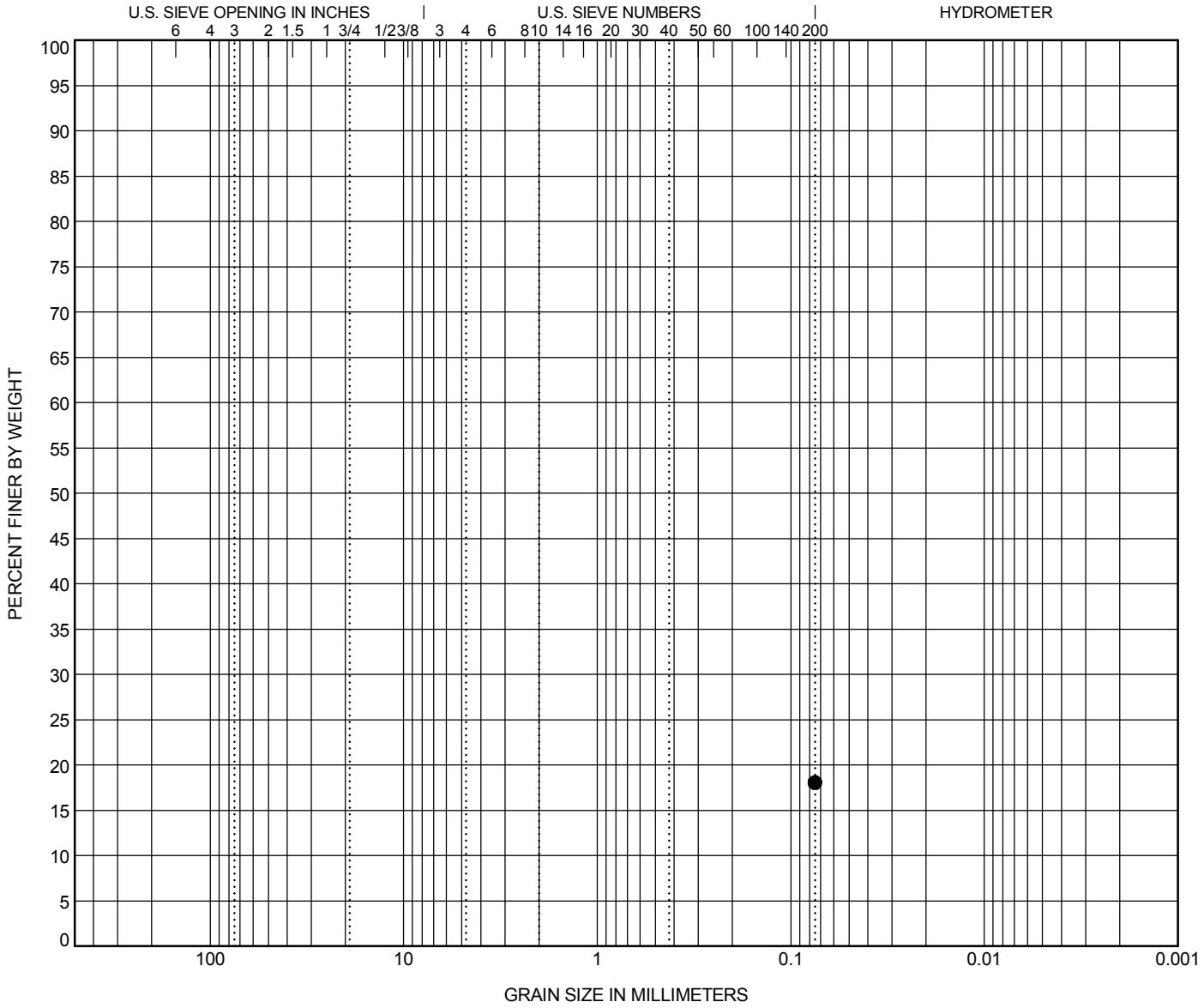
	BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	R-2	4.0	0.075						23.9	
⊠	R-2	8.0	0.075						29.6	
▲	R-2	25.0	0.075						18.3	
★	R-2	30.0	0.075						14.0	
⊙	R-2	35.0	0.075						22.4	

GRAIN SIZE G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 6/4/19

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **R-2**	**40.0**	**CLAYEY SAND(SC)**	**37**	**22**	**15**		

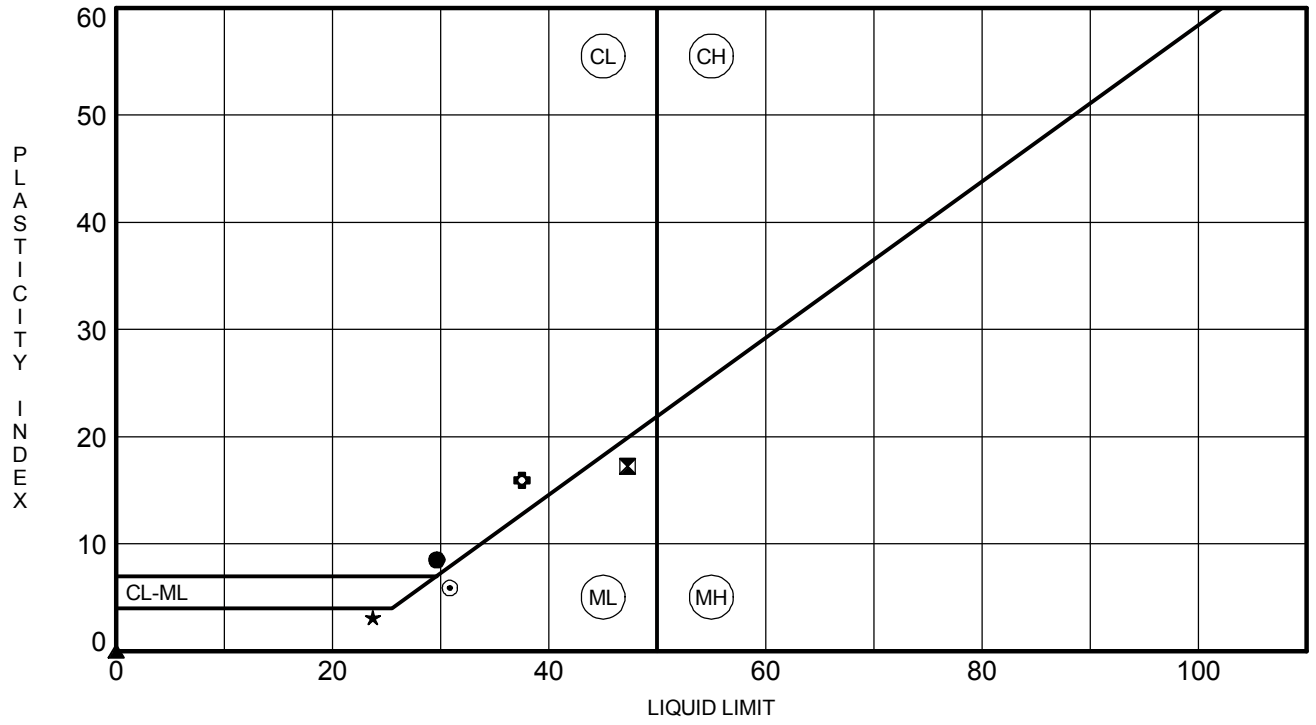
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● **R-2**	**40.0**	**0.075**						**18.1**	

GRAIN SIZE G6018.00 - US 1 OVER I-20 DBP.GPJ FME2017.GDT 6/4/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20 Design Build Interchange

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-2**	**4.0**	**30**	**21**	**9**	**24**	**CLAYEY SAND(SC)**
⊠	**R-2**	**8.0**	**47**	**30**	**17**	**30**	**SILTY SAND(SM)**
▲	**R-2**	**25.0**	**NP**	**NP**	**NP**	**18**	**SILTY SAND(SM)**
★	**R-2**	**30.0**	**24**	**21**	**3**	**14**	**SILTY SAND(SM)**
⊙	**R-2**	**35.0**	**31**	**25**	**6**	**22**	**SILTY SAND(SM)**
✿	**R-2**	**40.0**	**37**	**22**	**15**	**18**	**CLAYEY SAND(SC)**

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MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1075	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	Silty SAND (SM)		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019

BORING NO.	R-3	R-3			
SAMPLE NO.	SS-1	SS-6			
SAMPLE DEPTH	0'-2'	13.5'-15'			
WATER CONTENT, W%	13.3	18.1			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

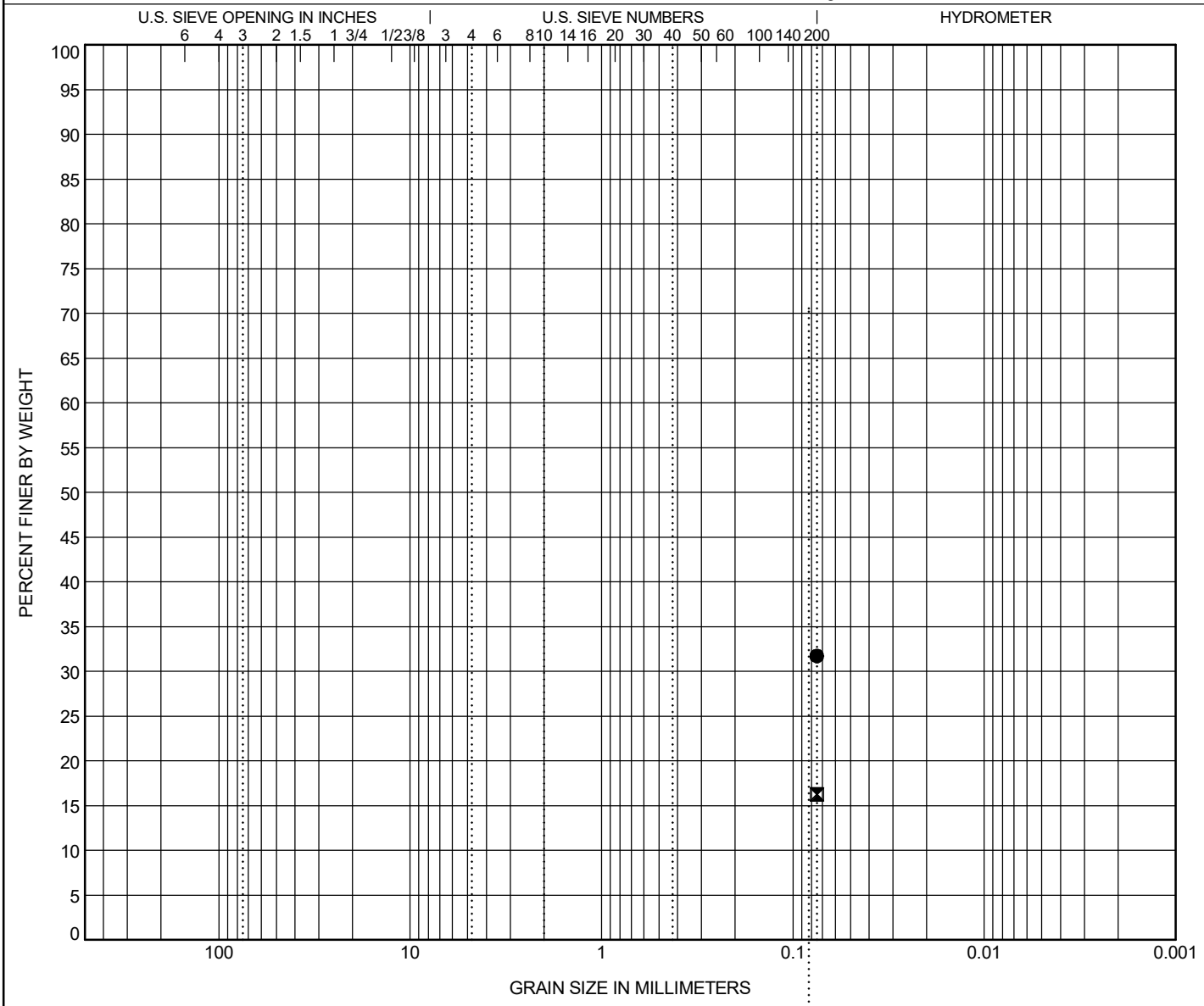
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-3	2.0	**SILTY SAND(SM)**	**48**	**29**	**19**		
⊠ R-3	15.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

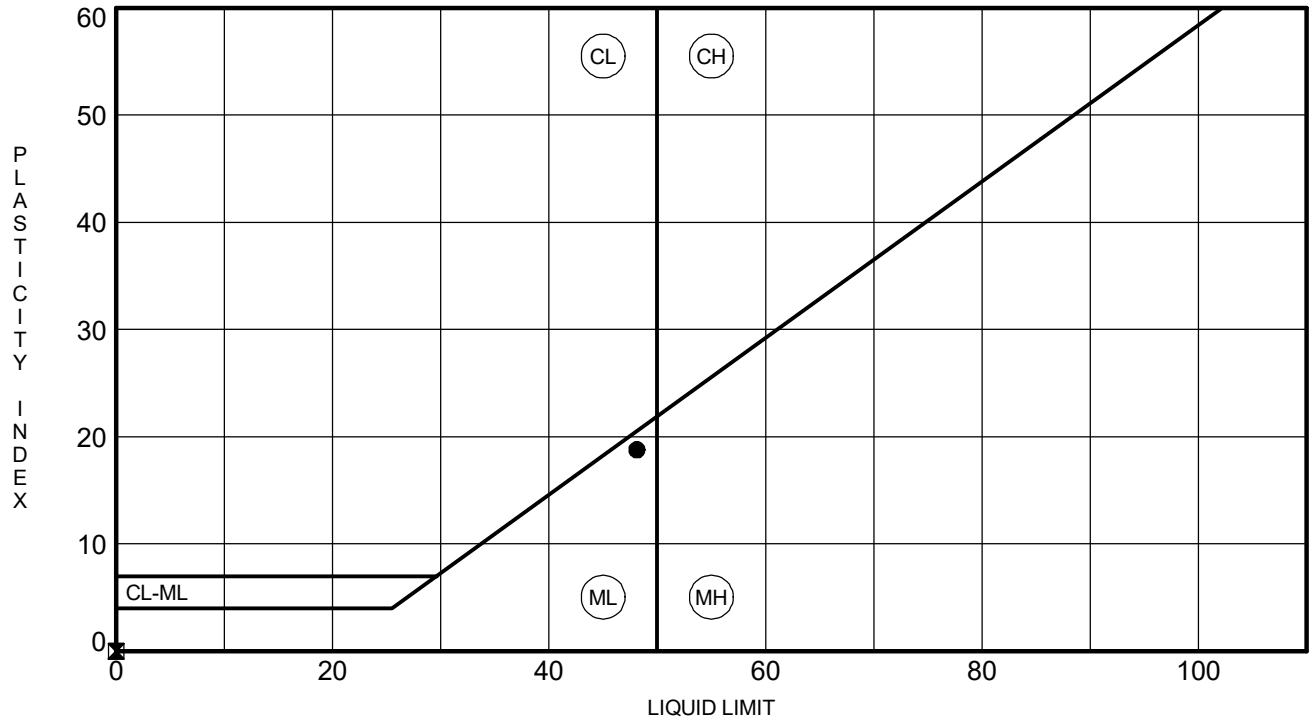
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-3	2.0	**0.075**						**31.7**	
⊠ R-3	15.0	**0.075**						**16.3**	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-3**	**2.0**	**48**	**29**	**19**	**32**	**SILTY SAND(SM)**
⊠	**R-3**	**15.0**	**NP**	**NP**	**NP**	**16**	**SILTY SAND(SM)**

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Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1075	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	AMC	**DATE OF WEIGHING:**	4/22/2019

BORING NO.	R-4	R-4			
SAMPLE NO.	SS-1	SS-6			
SAMPLE DEPTH	0'-2'	13.5'-15'			
WATER CONTENT, W%	16.1	15.3			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

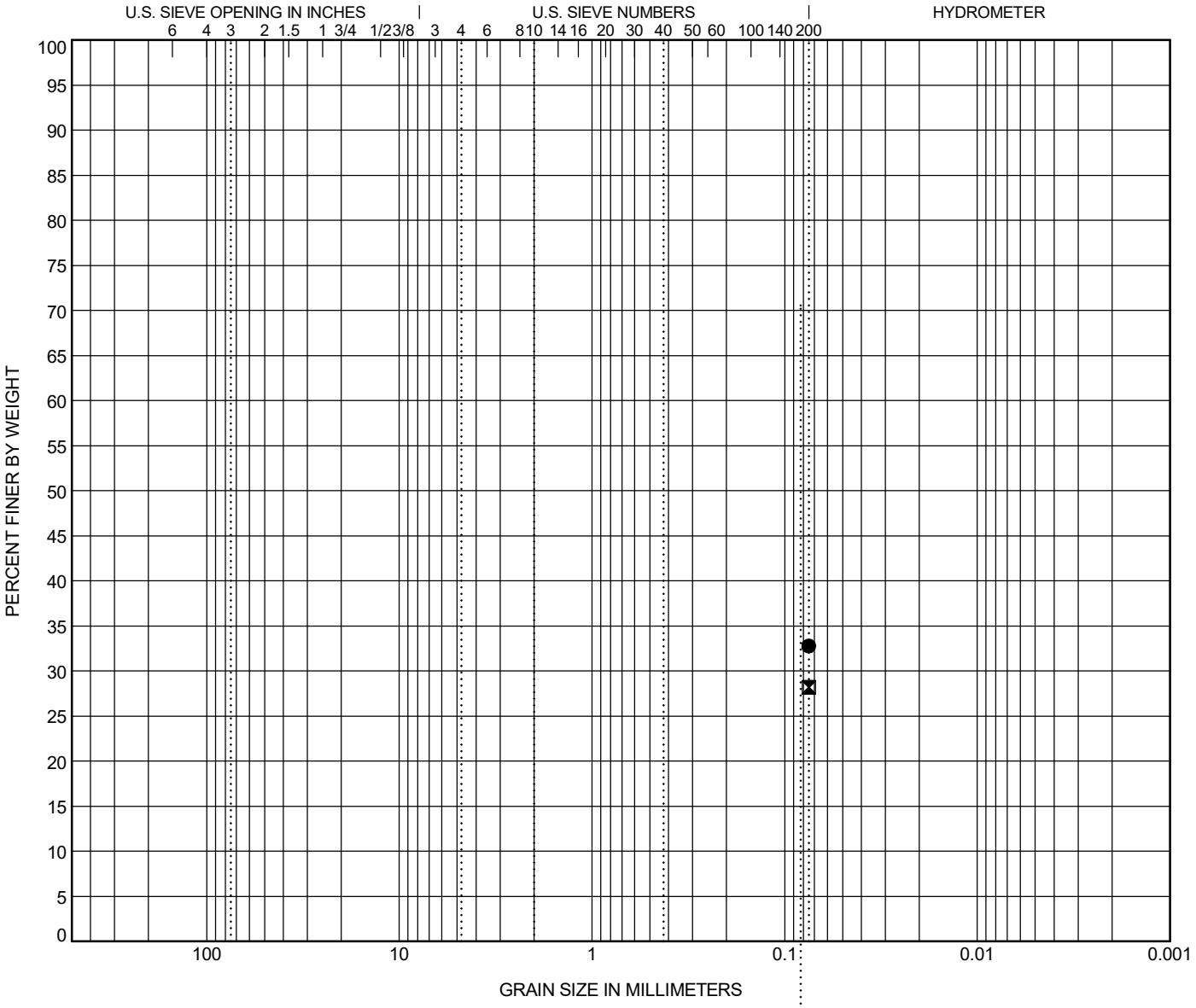
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-4	2.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠ R-4	15.0	**CLAYEY SAND(SC)**	**46**	**27**	**19**		

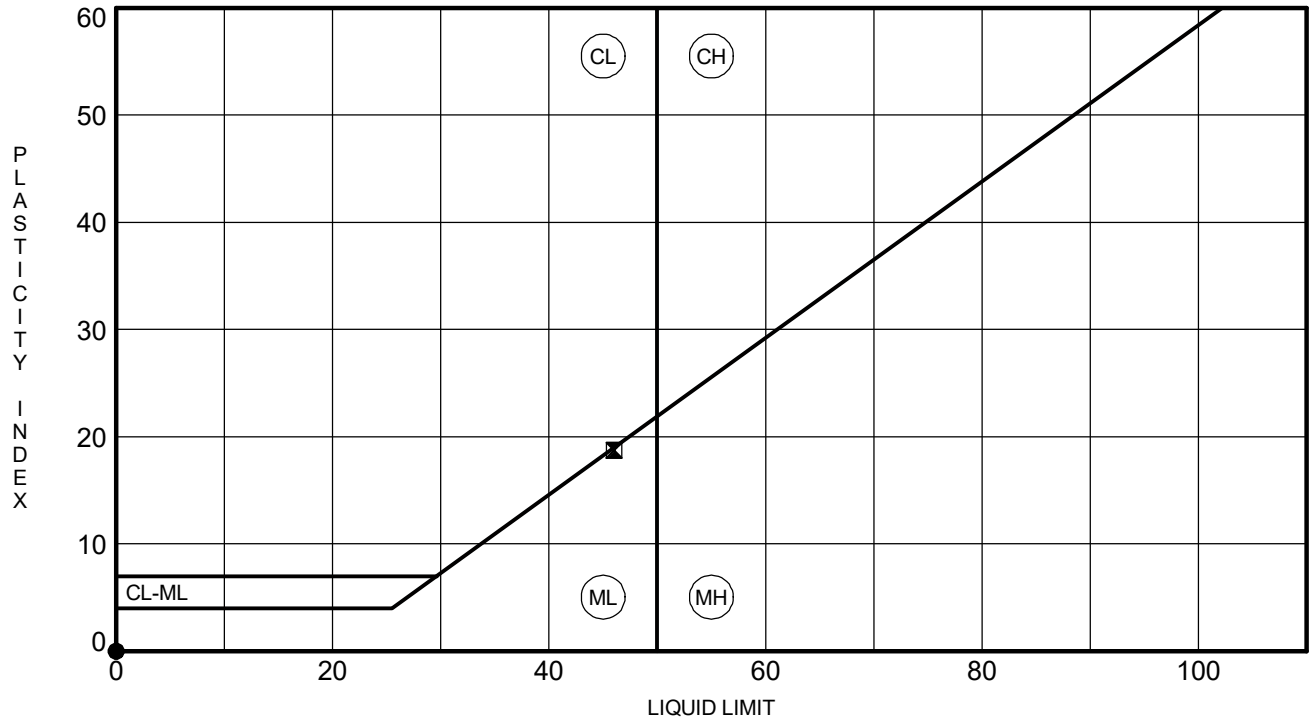
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-4	2.0	**0.075**						**32.8**	
⊠ R-4	15.0	**0.075**						**28.2**	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-4**	**2.0**	**NP**	**NP**	**NP**	**33**	**SILTY SAND(SM)**
⊠	**R-4**	**15.0**	**46**	**27**	**19**	**28**	**CLAYEY SAND(SC)**

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Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1077	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	JH	**DATE OF WEIGHING:**	4/23/2019

BORING NO.	R-5	R-5			
SAMPLE NO.	SS-1	SS-9			
SAMPLE DEPTH	0'-2'	28.5'-30'			
WATER CONTENT, W%	14.0	30.0			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

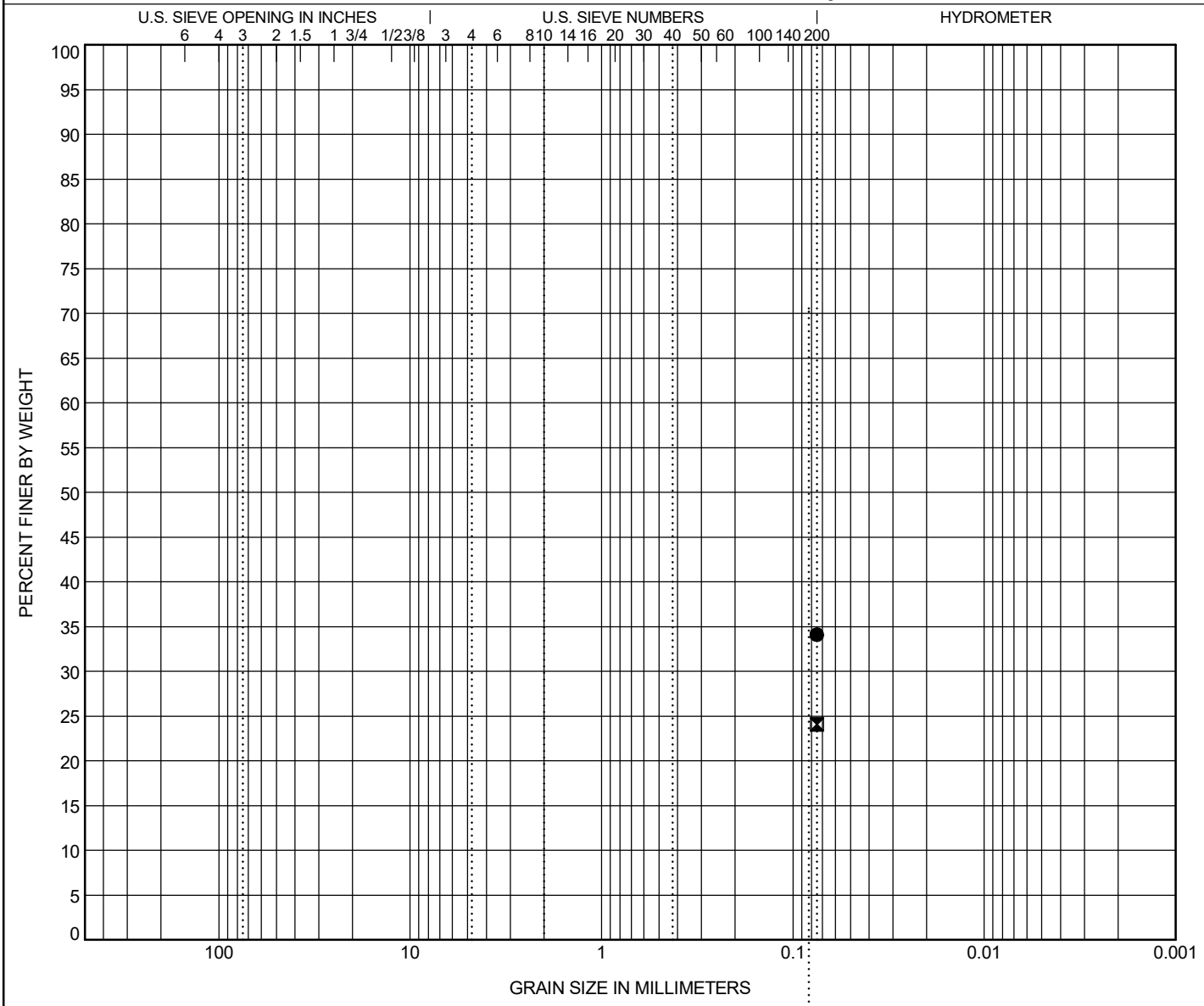
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



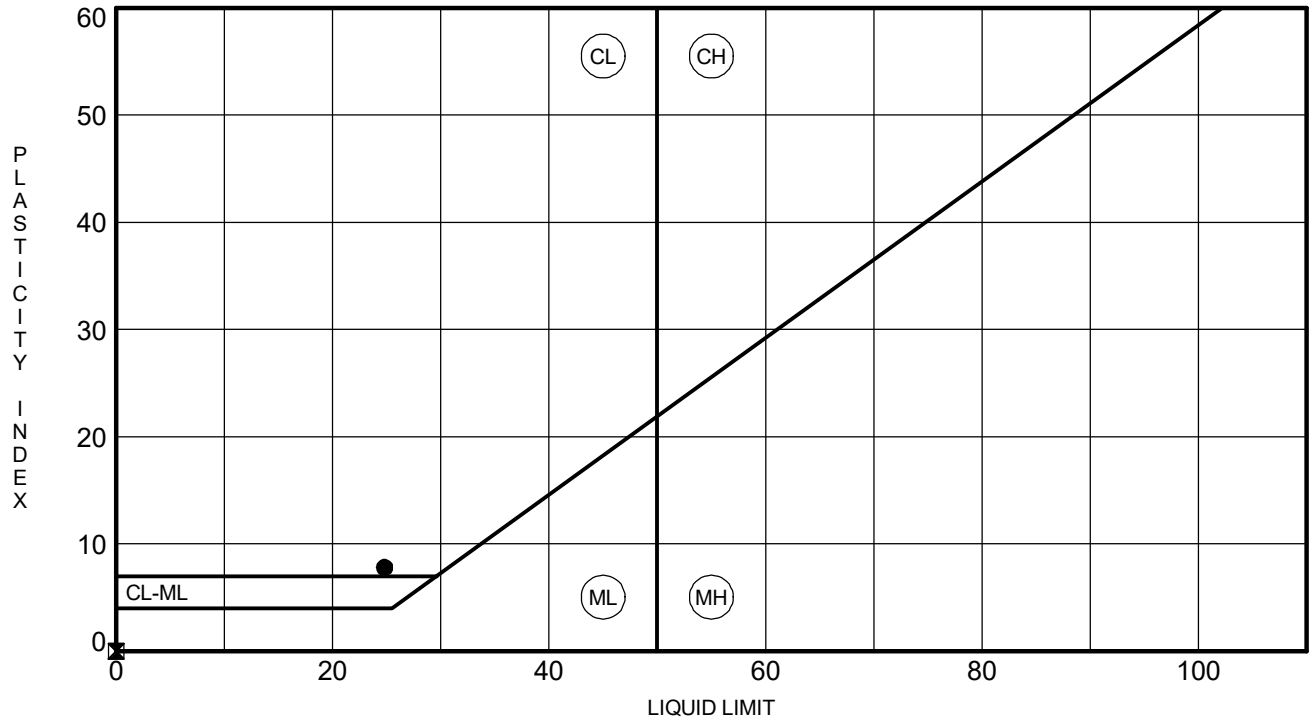
BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-5	2.0	**CLAYEY SAND(SC)**	**25**	**17**	**8**		
⊠ R-5	30.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-5	2.0	**0.075**						**34.1**	
⊠ R-5	30.0	**0.075**						**24.1**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-5**	**2.0**	**25**	**17**	**8**	**34**	**CLAYEY SAND(SC)**
⊠	**R-5**	**30.0**	**NP**	**NP**	**NP**	**24**	**SILTY SAND(SM)**

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Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1078	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	Clayey SAND (SC)		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	JH	**DATE OF WEIGHING:**	4/23/2019

BORING NO.	R-6	R-6			
SAMPLE NO.	SS-1	SS-4			
SAMPLE DEPTH	0'-2'	6'-8'			
WATER CONTENT, W%	10.2	15.2			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

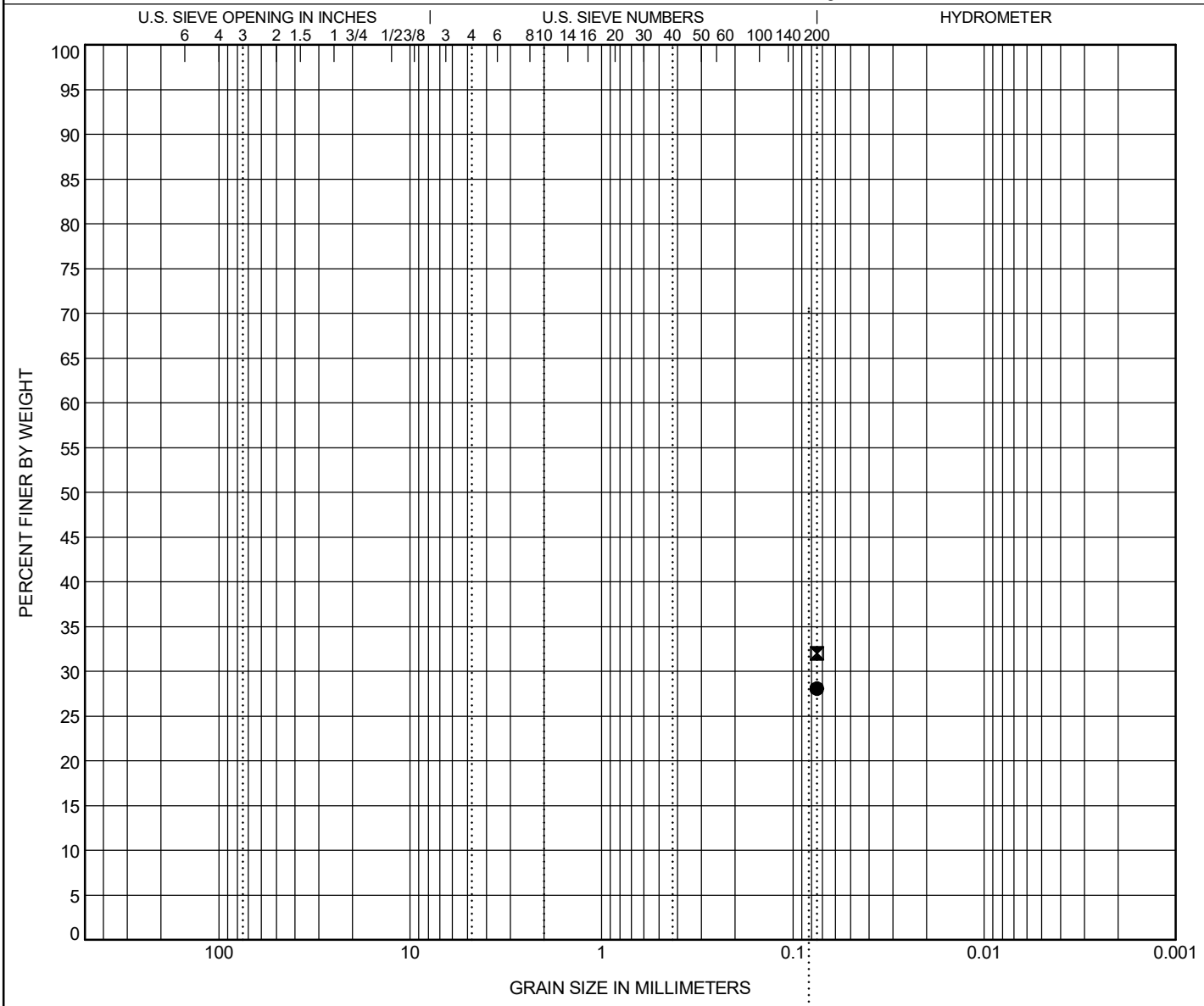
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-6	2.0	**CLAYEY SAND(SC)**	32	17	15		
⊠ R-6	8.0	**CLAYEY SAND(SC)**	43	24	19		

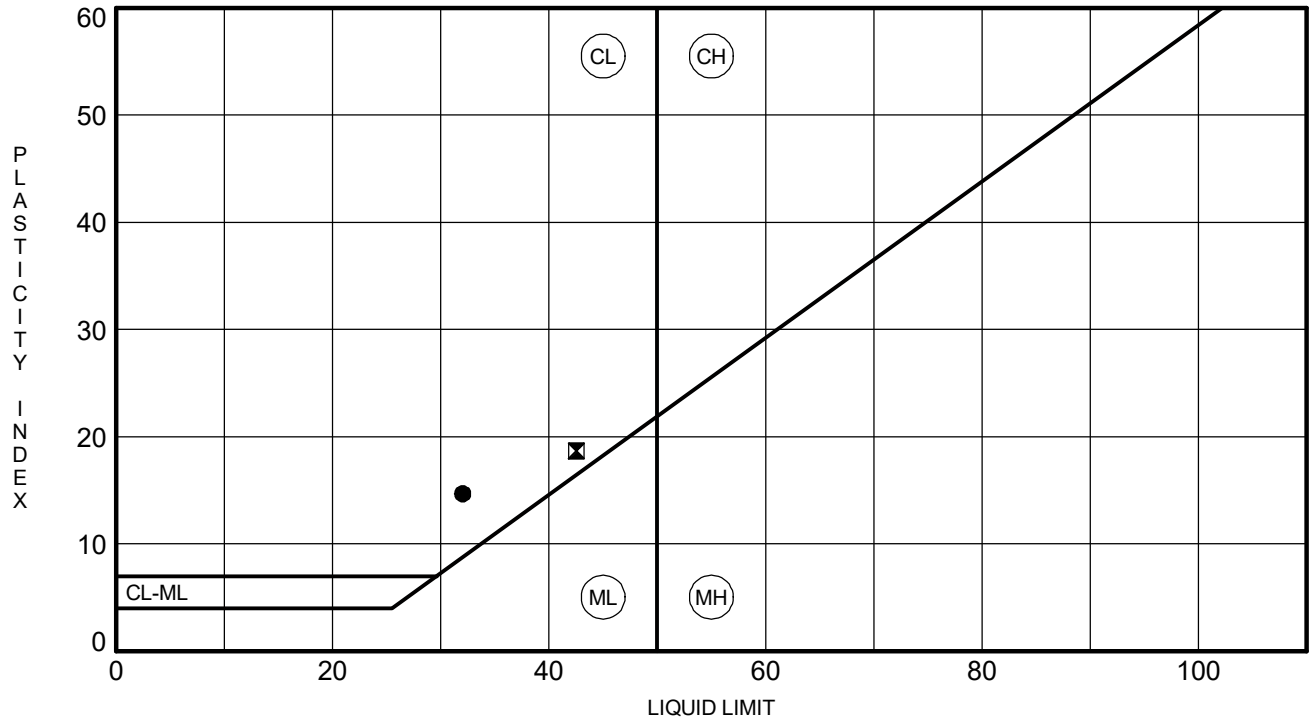
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-6	2.0	0.075						28.1	
⊠ R-6	8.0	0.075						32.0	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-6**	**2.0**	**32**	**17**	**15**	**28**	**CLAYEY SAND(SC)**
⊠	**R-6**	**8.0**	**43**	**24**	**19**	**32**	**CLAYEY SAND(SC)**

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3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1079	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	VARIOUS		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	JH	**DATE OF WEIGHING:**	4/23/2019

BORING NO.	R-7	R-7			
SAMPLE NO.	SS-1	SS-7			
SAMPLE DEPTH	0'-2'	18.5'-20'			
WATER CONTENT, W%	12.9	23.3			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

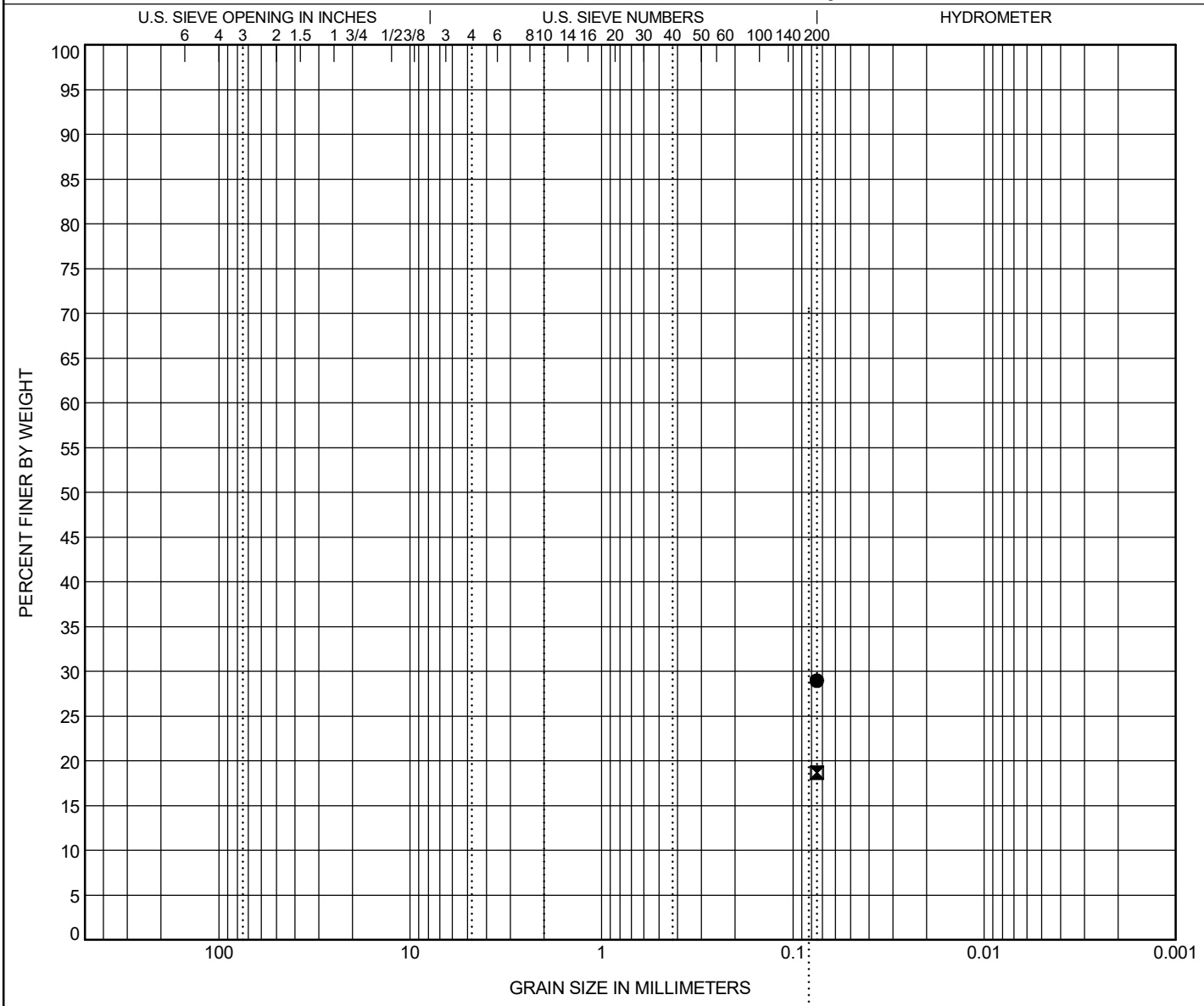
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



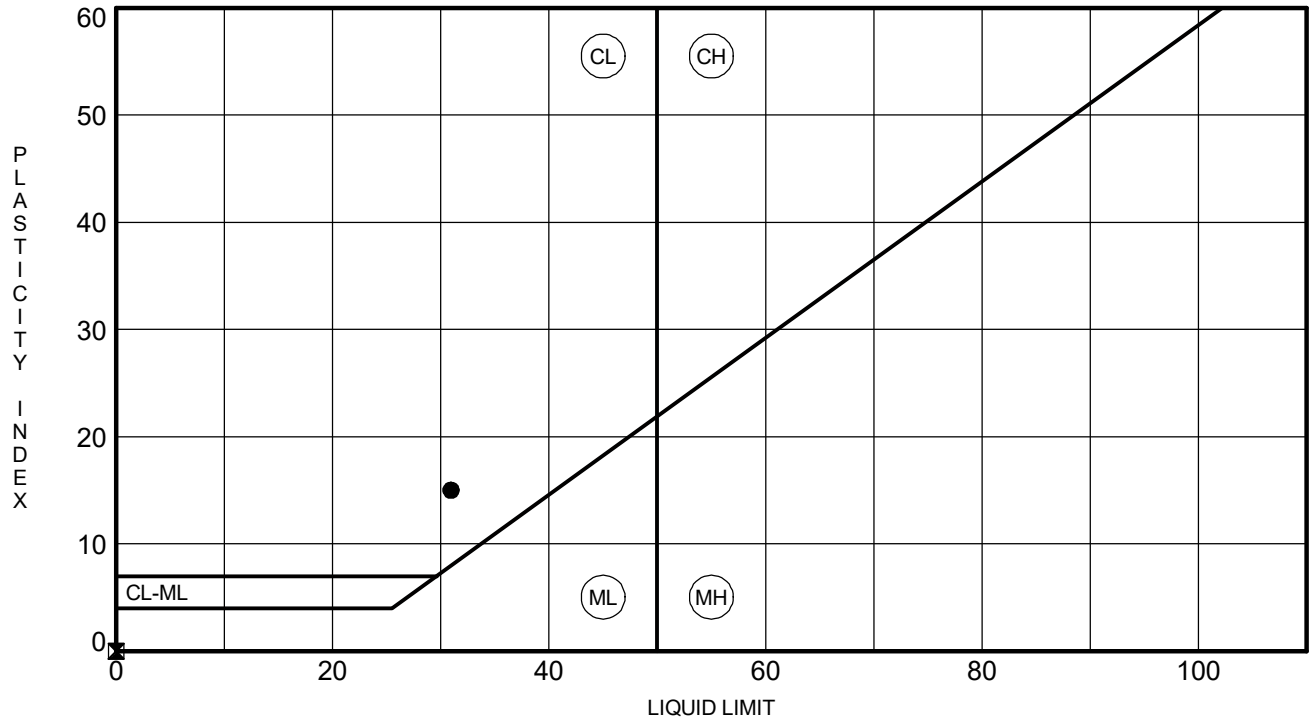
BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-7	2.0	**CLAYEY SAND(SC)**	**31**	**16**	**15**		
⊠ R-7	20.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-7	2.0	**0.075**						**29.0**	
⊠ R-7	20.0	**0.075**						**18.7**	

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-7**	**2.0**	**31**	**16**	**15**	**29**	**CLAYEY SAND(SC)**
⊠	**R-7**	**20.0**	**NP**	**NP**	**NP**	**19**	**SILTY SAND(SM)**

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US-1 over I-20	**PROJECT NO.:**	P030711
SAMPLE NUMBER:	19-1080	**DATE SAMPLE RECEIVED:**	4/18/2019
DESCRIPTION OF SOIL:	Silty SAND (SM)		
TESTED BY:	AMC	**DATE OF TESTING:**	4/19/2019
WEIGHED BY:	JH	**DATE OF WEIGHING:**	4/23/2019

BORING NO.	R-8	R-8			
SAMPLE NO.	SS-1	SS-6			
SAMPLE DEPTH	0'-2'	13.5'-15'			
WATER CONTENT, W%	7.2	21.3			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

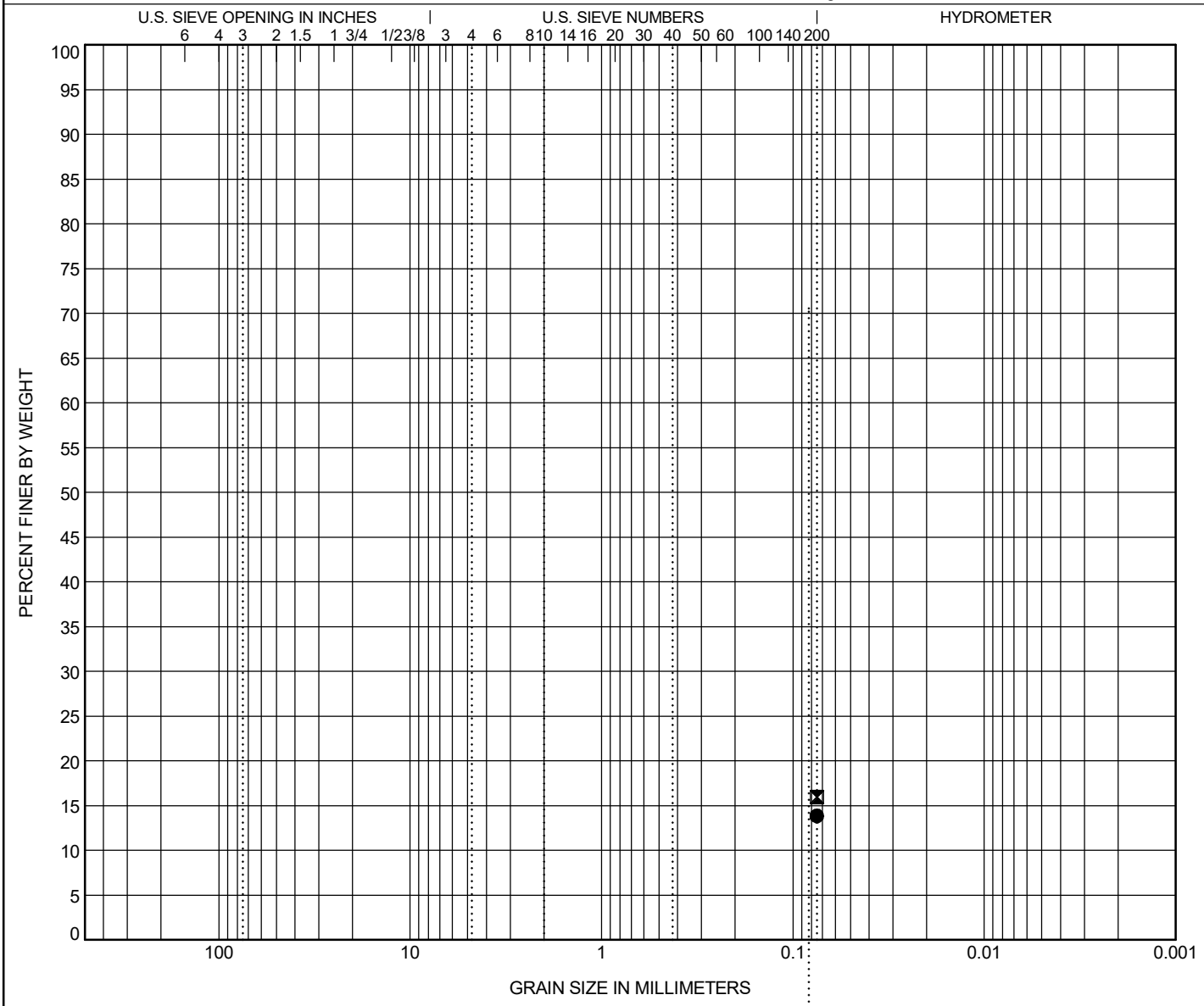
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

GRAIN SIZE DISTRIBUTION

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● R-8	2.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠ R-8	15.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

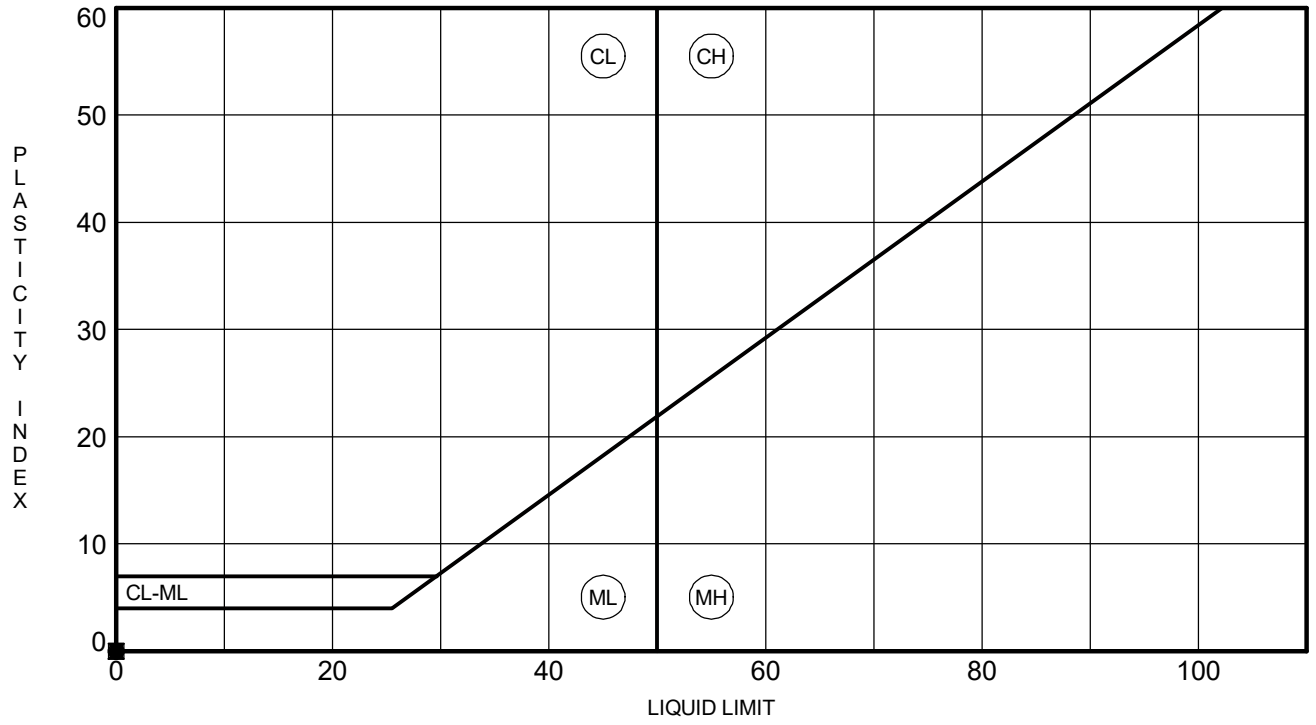
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● R-8	2.0	**0.075**						**13.9**	
⊠ R-8	15.0	**0.075**						**16.0**	

GRAIN SIZE - SCDOT G6018 - US 1 OVER I-20 DB PREP.1.GPJ FME2017.GDT 5/7/19

ATTERBERG LIMITS' RESULTS

PROJECT ID P030711 **PROJECT NAME** US 1 over I-20

PROJECT COUNTY Lexington



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-8**	**2.0**	**NP**	**NP**	**NP**	**14**	**SILTY SAND(SM)**
⧓	**R-8**	**15.0**	**NP**	**NP**	**NP**	**16**	**SILTY SAND(SM)**

Corrosivity Testing

Client F&ME Consultants
Client Project SCDOT US-1 over I-20
Project No. 41705

Lab Sample ID	Boring	Depth	Sample	Matrix	pH AASHTO T289			Chloride AASHTO T291 (Method B)			Sulfate AASHTO T290 (Method B)			Min. Soil Resistivity AASHTO T288		
					Result	Date Tested	Tested By	**Result mg/kg (ppm)**	Date Tested	Tested By	**Result mg/kg (ppm)**	Date Tested	Tested By	**Result, Ohm-cm**	Date Tested	Tested By
41705012	B-1	18.5' - 20.0' & 23.5' - 25.0'	19-1004	Soil	4.6	4/25/2019	MC	50	4/29/2019	MC	<30	4/29/2019	MC	6,400	4/30/2019	MC
41705013	BS-2	0.0' - 10.0'	19-1008	Soil	6.6	4/25/2019	MC	97	4/29/2019	MC	<30	4/29/2019	MC	2,400	4/30/2019	MC

Input Validation: MC Reviewed By: ALO

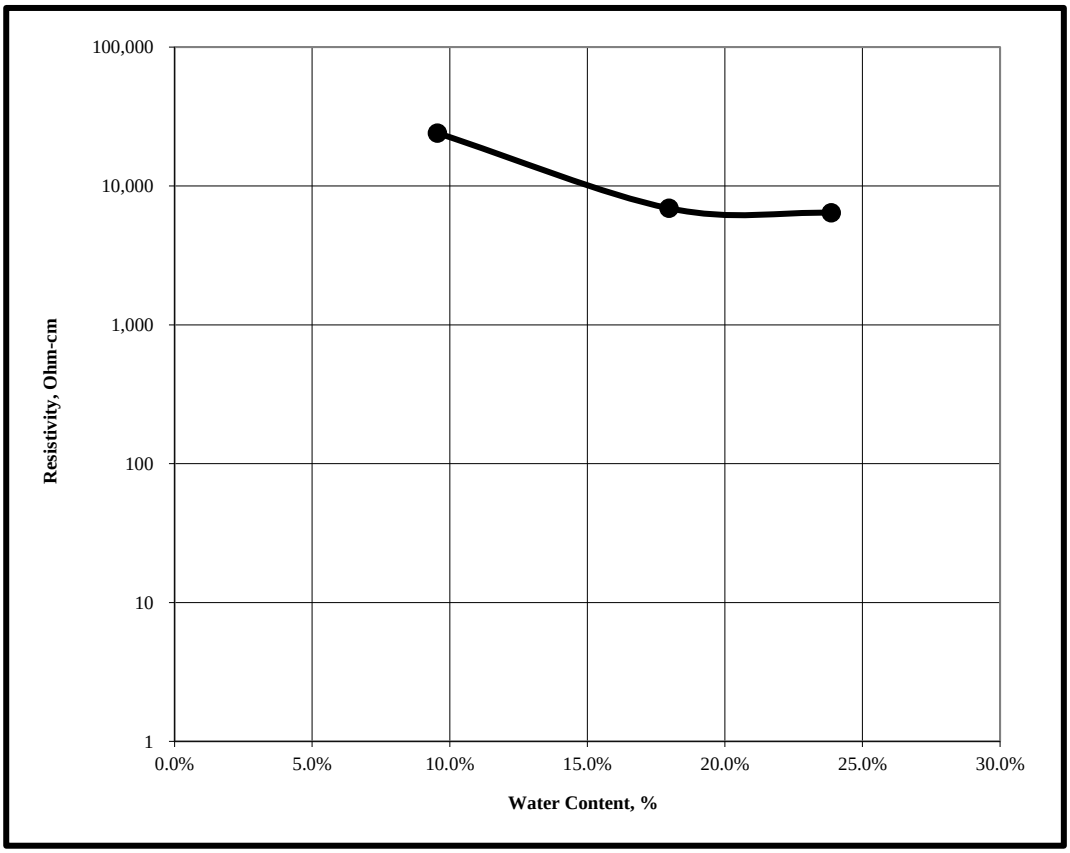
Minimum Laboratory Soil Resistivity
AASHTO - T288 Mod (4 electrode method)

Client	F&ME Consultants	Boring	B-1
Client Project	SCDOT US-1 over I-20	Depth	18.5' - 20.0' & 23.5' - 25.0'
Project No.	41705	Sample	19-1004
		Lab Sample No.	41705012

SOIL BOX PARAMETERS	
Soil Box Length, cm	11.15
Soil Box Area, cm^2	7.20
Electrode Spacing, cm	7.20
Soil Box Factor, cm (Area/Spacing)	1
Soil Box Volume, cc	80

MINIMUM RESISTIVITY TESTED	
WC at Min. Resistivity Tested, %	23.9%
Min. Resistivity Tested, Ohm-cm	6,400

Water Content					Resistivity Ohm-cm	% Change
Tare #	Tare+WS grams	Tare+DS grams	Tare wt. grams	Water Content %		
229	45.79	43.19	15.99	9.6%	24,000	NA
614	61.99	54.94	15.72	18.0%	6,900	71%
623	66.70	56.96	16.16	23.9%	6,400	7%



Performed By: MC Input Validation: MC Reviewed By: ALO Date Tested: 4/30/2019

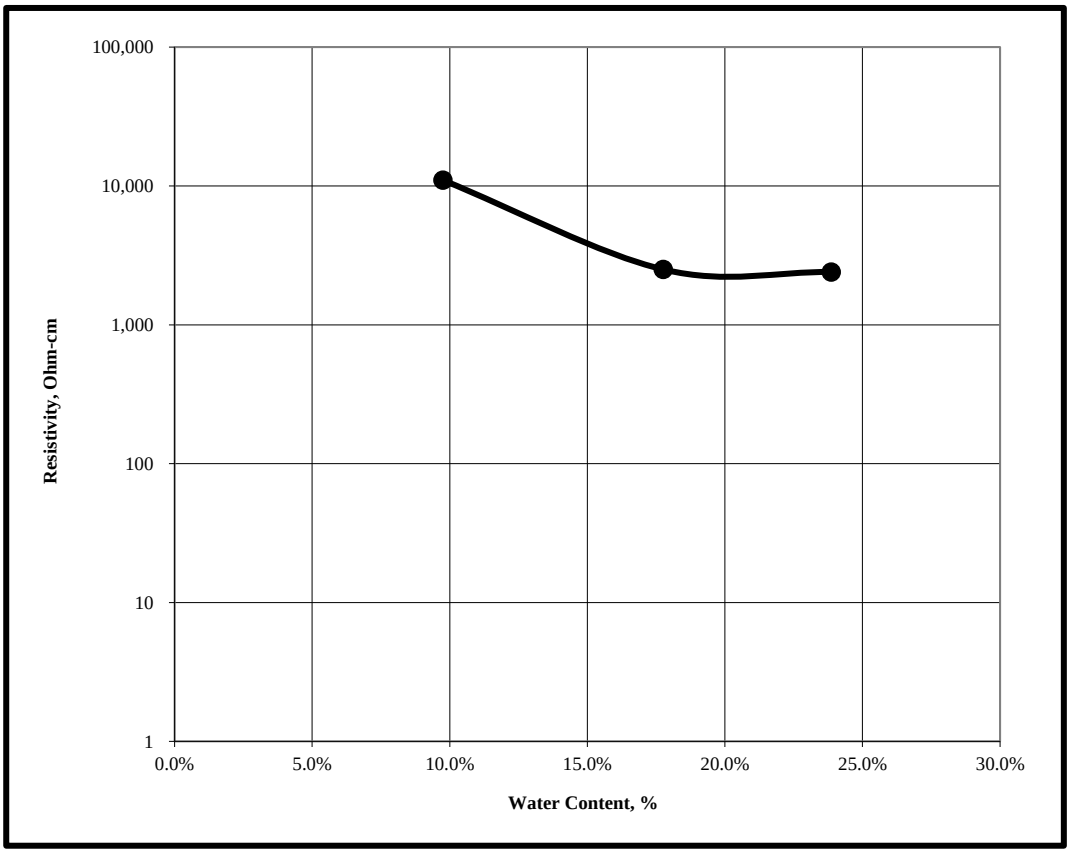
Minimum Laboratory Soil Resistivity
AASHTO - T288 Mod (4 electrode method)

Client	F&ME Consultants	Boring	BS-2
Client Project	SCDOT US-1 over I-20	Depth	0.0' - 10.0'
Project No.	41705	Sample	19-1008
		Lab Sample No.	41705013

SOIL BOX PARAMETERS	
Soil Box Length, cm	11.15
Soil Box Area, cm^2	7.20
Electrode Spacing, cm	7.20
Soil Box Factor, cm (Area/Spacing)	1
Soil Box Volume, cc	80

MINIMUM RESISTIVITY TESTED	
WC at Min. Resistivity Tested, %	23.9%
Min. Resistivity Tested, Ohm-cm	2,400

Water Content					Resistivity Ohm-cm	% Change
Tare #	Tare+WS grams	Tare+DS grams	Tare wt. grams	Water Content %		
624	47.61	44.81	16.11	9.8%	11,000	NA
230	54.98	49.07	15.81	17.8%	2,500	77%
620	64.73	55.34	16.01	23.9%	2,400	4%



Performed By: MC Input Validation: MC Reviewed By: ALO Date Tested: 4/30/2019