Geotechnical Base Line Report (GBLR)
I-85 Widening MM80-96
Spartanburg and Cherokee Counties, SC
SCDOT Project ID P027114
S&ME Project No. 1426-14-161

Prepared for:

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Attention: Mr. Thomas F. Kicklighter, III, PE

Reference: **Geotechnical Base Line Report (GBLR)**
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SCDOT Project ID P027114
WBS No. 88P027114E1.SLB.1
S&ME Project No. 1426-14-161

Dear Mr. Kicklighter:

S&ME, Inc. (S&ME) submits this Geotechnical Base Line Report (GBLR) to provide geotechnical information and preliminary geotechnical recommendations to Infrastructure Consulting & Engineering (ICE) and the South Carolina Department of Transportation (SCDOT) for the referenced project. Our geotechnical services were performed in general accordance with the Subconsultant Agreement for Professional Services between S&ME and ICE dated January 23, 2015.

The enclosed report includes (1) a description of observed site conditions, (2) methods and results of field tests and sampling, (3) laboratory tests of recovered samples, and (4) design and construction considerations for informational purposes only. The first edition of this report was submitted on December 31, 2015, and the second edition was submitted on March 8, 2016. This updated report reflects review comments from SCDOT's Design/Build Group (dated February 11, 2016 and March 15, 2016), and supersedes all previous report submittals.

S&ME appreciates this opportunity to work with Infrastructure Consulting & Engineering and SCDOT as your geotechnical consultant on this project. If you have any questions or need any further information with regard to this report, please do not hesitate to contact us at 864-574-2360.

Sincerely,

S&ME, Inc.

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1.0 Project Information

The proposed construction for this project includes improvements and widening of the approximately 18-mile section of I-85 from approximately Mile Marker 80 (MM80) to near Mile Marker 97.6 (MM97.6), as the northern extent of the project was increased during the early scoping phase. The widening will consist of increasing the total number of lanes from four to six lanes, by adding a travel lane in each direction (primarily widening to the inside within the currently grassed median, where feasible). The project will include interchange improvements at the following interchanges: SC-110/Battleground Road (Exit 83), S-11-39/Macedonia/Green River Road (Exit 87), S-105/Hyatt Street (Exit 90), S-11-82/Pleasant School Road (Exit 95), and SC-18/Shelby Highway (Exit 96); as well as replacement of the overpass bridge at County Road S-11-131/Sunny Slope Drive (MM84.6). Other highway structures, including culvert extensions and retaining walls are planned.

We have reviewed preliminary plans of the current roadway conditions and proposed realignments (including profiles and cross-sections), with project stationing, provided by ICE in August 2015. Due to the length of the project, the preliminary plans were prepared in three segments, labeled Segments A, B and C, each by a different member of the Design Team. The plans for Segment A (approximate MM80-MM86, Station 843+44 to Station 1185+00) were prepared by ICE, and dated August 7, 2015. The plans for Segment B (approximate MM86-MM90, Station 1185+00 to Station 1485+00) were prepared by Mead & Hunt, and dated August 14, 2015. The plans for Segment C (approximate MM90-MM97.6, Station 1485+00 to Station 1806+15) were prepared by STV, Inc., and dated August 13, 2015.

Our proposed exploration scope was outlined in the document titled *Attachment A – Scope of Services and Schedule, I-85 Widening Project MM80-MM96*, dated September 10, 2014, updated on September 23, 2014 following the Formal Scoping Meeting with SCDOT on September 22, 2014 and modified based on review comments by Mr. Brad Reynolds with SCDOT on February 20, 2015. Our services were performed in general conformance with Chapter 21.2.2 of the "2010 SCDOT Geotechnical Design Manual" (GDM) as modified by Bridge Design Memorandum 0510 dated October 22, 2010, and the referenced modified/ approved scope.

The objective of this exploration was to explore subsurface conditions along the Interstate 85 alignment, associated realigned roadways, replacement bridge end bents, and retaining wall locations as they pertain to the proposed roadway and structure improvements. The field and laboratory testing of this exploration provides geotechnical base line data to be utilized for preliminary design and estimating as part of a future design-build letting process.

This report presents a general discussion of preliminary design and construction issues anticipated for the proposed construction. While this report presents our field and laboratory testing data as well some design considerations, as requested by the SCDOT, we do not provide a level of exploration or recommendations in sufficient detail to support final design recommendations.

2.0 Exploration Procedures and Site Conditions

2.1 Field Exploration

Because of the project schedule and public meetings required to help determine the final location of some bridge structures/roadway alignments, the geotechnical scope of work was submitted to SCDOT in three phases: 1) I-85 median, 2) replacement bridges, and 3) roadway realignments (generally outside the I-85 mainline pavement limits), retaining walls and culverts. Phase 1 field/laboratory work was performed beginning in April 2015, while Phases 2 and 3 were performed beginning in September 2015. Prior to initiating each Phase of exploration, we submitted a *Subsurface Investigation Plan* (SIP) to ICE and SCDOT for review and approval. A total of two hundred four (204) soil test borings and eight hundred ninety-nine (899) laboratory tests were performed. The following sections describe each Phase of work.

2.1.1 Phase 1 – I-85 Median

The geotechnical scope of work performed during April 2015 included a total of one hundred twenty-eight (128) borings, as shown on Summary Tables 1 and 2 in Appendix I, and Boring Location Plans (Figures 1 through 17) in Appendix II. Borings labeled NB-1 through NB-65 were performed along the northbound portion of the median (generally south/east of the existing cable barrier), and borings SB-1 through SB-63 were performed along the southbound portion of the median (generally north/west of the existing cable barrier). The median boring layout was determined using the information provided by SCDOT for lane closure distance, time restrictions, and requested reduced spacing. The work began near Sta. 875+00 in the NB median (boring NB-1) and continued north to near Sta. 1804+50 (NB-65). Traffic control was reversed, and borings were performed in the SB median from SB-63 to SB-1. By staggering the borings between NB and SB lanes, the average spacing was approximately 740 feet between borings, as measured along the centerline. The median borings were extended to depths of 5 or 15 feet, depending on anticipated median barrier wall height.

The borings indicated above for this initial phase of exploration were conducted within the current SCDOT Right-of-Way. Traffic control (lane closure) was required to perform the field work. S&ME subcontracted the traffic control operations to StayAlert Safety Services, and installed temporary traffic control devices in general accordance with SCDOT requirements for lane closures along Interstate highways. We also complied with SCDOT's work operation time restrictions for lane closures along Interstate highways. For each phase of the field work, we coordinated with SCDOT Cherokee County Maintenance/Construction Department personnel prior to, and during, our field operations to maintain satisfactory traffic control provisions. Drilling was delayed a total of nine (9) nights throughout the exploration because of weather.

The borings were performed using a CME 55 truck-mounted drill rig, and continuously sampled (through Standard Penetration Testing, SPT) using two 1.5-foot split-spoons followed by one 2-foot split spoon for the 5 foot deep borings. The 15-foot deep borings were sampled every 2 feet in the first ten (10) feet, and every five (5) feet thereafter until boring termination. In addition to the split-spoon samples, sixteen (16) bulk soil samples were collected from various borings. As anticipated, and based on our experience with similar roadway projects in Spartanburg and Cherokee Counties, the borings encountered both residual soils and fill soils associated with past highway construction. Two borings (NB-58 and SB-51) encountered partially weathered rock (PWR) at depths of 6 and 3.5 feet, respectively. However, based on the highly variable geology within the Upstate of South Carolina, shallower PWR and/or refusal conditions could be encountered intermediate of all explored locations.

Subsurface water was not encountered in the median borings at the time of boring (TOB). Due to their locations near the active Interstate, these borings were immediately backfilled upon completion. It should be noted the subsurface water levels will fluctuate during the year (due to such things as seasonal variations, precipitation, and construction activity in the area), and future water levels will vary.

Following completion of the borings, laboratory tests were conducted on selected split-spoon samples and bulk samples (as further described later in this report), as assigned by the S&ME project engineers.

2.1.2 Phase 2 – Replacement Bridges

The geotechnical scope of work performed during September 2015 for the replacement bridges included a total of ten (10) borings (labeled BR-1 though BR-10), as shown on Summary Table 3 in Appendix I and MASW/MAM Location Plans (Figures 18 through 22) in Appendix II. The bridge boring layout was determined using the information provided by ICE and established in the field within current SCDOT Right-of-Way. The planned replacement bridges over Interstate 85 (and their associated exploratory borings) for this project include:

- SC-110 / Battleground Road (Exit 83), Borings BR-1 and BR-2;
- S-11-131 / Sunny Slope Drive (MM84.6), Borings BR-3 and BR-4;
- S-11-39 / Macedonia/Green River Road (Exit 87), Borings BR-5 and BR-6;
- S-11-82 / Pleasant School Road (Exit 95), Borings BR-7 and BR-8; and
- SC-18 / Shelby Highway (Exit 96), Borings BR-9 and BR-10.

Traffic control (lane closure and ramp re-channeling) was required to perform the field work for bridge borings BR-7 and BR-8. The remaining borings were performed behind existing guardrail or outside the distance required by SCDOT for traffic control. S&ME subcontracted the traffic control operations to Area Wide Protective, Inc. (AWP), and installed temporary traffic control devices in general accordance with SCDOT requirements. Drilling was delayed approximately three (3) working days because of weather.

The bridge borings were extended to refusal, which varied from 21.2 to 71.8 feet below the ground surface using a truck-mounted CME 55 and ATV-mounted CME 550 drill rigs. The borings were continuously sampled (through Standard Penetration Testing, SPT) using a 2-foot split spoon for the upper 10 feet, and every 5 feet thereafter using a 1.5-foot split spoon until auger refusal. After encountering auger refusal, each boring was extended into rock 19.6 to 23.5 feet using NQ coring procedures. Upon completion of coring, the rock core samples were placed in standard core boxes and transported to our laboratory, where the cores were visually and manually classified by a Professional Geologist. Total boring/coring depths ranged from 43 to 94.3 feet. In addition, thirteen (13) undisturbed Shelby tube samples were pushed in offset borings, within roughly 5 feet of the referenced BR-# locations.

The bridge borings generally encountered existing/possible fill and residuum, underlain by PWR and refusal material. Depth to PWR varied from 23 to 63 feet below the ground surface in all but two of the borings (BR-8 and BR-9, which encountered refusal material directly below residuum). Rock coring recovery (REC) varied from 33 to 100 percent; the Rock Quality Designation (RQD) varied from 0 to 100 percent; and the Rock Mass Rating (RMR) varied from 11 to 76 per GDM Table 6-29; indicating highly variable rock quality conditions along the project corridor. Unconfined compressive strength tests were performed on rock core samples chosen based on visual observations to help limit test specimens with fracturing. However, due to limited rock quality (specimen length/strength) test specimens suitable for compressive strength testing were not present in boring BR-10. The core testing from borings BR-1

through BR-9 resulted in unconfined compressive strengths ranging from 2,140 psi to 18,550 psi. Rock quality and compressive strength will vary significantly with depth and bridge location (apparent from the test data), and the test results may or may not be representative of rock across the entire project site.

Subsurface water was encountered in each boring at depths ranging from 18 to 30 feet at the time of boring (TOB) or after a period of approximately 24 hours. Four of the borings were immediately backfilled upon completion, due to their locations within/near active roadways. As previously noted, the subsurface water levels will fluctuate during the year, and future water levels will vary.

2.1.3 Phase 3 – Roadways, Retaining Walls & Culverts

The geotechnical scope of work performed during September/October 2015 for roadways, retaining walls and culverts included a total of sixty-six (66) borings (denoted as "R-#" for roadways, "RW-#" for roadway retaining walls, and "C-#" for culverts), as shown on Summary Table 4 in Appendix I and Boring Location Plans (Figures 1 through 17) in Appendix II. The roadway/retaining wall/culvert boring layout was determined using the information provided by ICE and established in the field within current SCDOT right-of-way. Traffic control, consisting of lane/shoulder closure or ramp re-channeling, was required to perform the field work for 26 of the 66 borings. The remaining borings were performed behind existing guardrail or outside the distance required by SCDOT for traffic control. S&ME subcontracted the traffic control operations to Area Wide Protective, Inc. (AWP), and installed temporary traffic control devices in general accordance with SCDOT requirements for lane/shoulder closures.

The Phase 3 borings were extended to depths of 5 to 50 feet below the ground surface using truck-mounted CME 45/55 and ATV-mounted CME 550 drill rigs. The borings were continuously sampled (through Standard Penetration Testing, SPT) using a 2-foot split spoon for the upper 10 feet, and every 5 feet thereafter using a 1.5-foot split spoon until either assigned boring termination depths were obtained or auger refusal, whichever occurred first. In addition to the split spoon samples, two (2) undisturbed Shelby tube samples were pushed, and eleven (11) bulk samples were collected.

The roadway/retaining wall/culvert boring generally encountered existing/possible fill and residuum. Water-deposited alluvial/possible alluvial soils were present in seven (7) borings (C-1, C-4, C-7, C-9, C-10, RW-4, RW-50, and RW-54) at depths as shallow as 8 feet below the ground surface and as deep as 37 feet. The deeper alluvial deposits were encountered below thick fills apparently placed during past roadway embankment construction. Fourteen (14) borings penetrated PWR in lens/mass form as shallow as 2 feet below the ground surface and as deep as 47 feet. Refusal to auger advancement was encountered in thirteen (13) borings at depths of 5 to 43 feet below the ground surface. Subsurface water was measured in twenty-six (26) of the 66 borings at depths of 5 to 28 feet at TOB or a period of approximately 24 hours after TOB.

2.1.4 Surface Wave Geophysics

Shear wave velocities of the subsurface materials in the upper 100+ feet were measured using surface wave methods. Specifically, we performed testing using a combination of MASW (Multi-Channel Analysis of Surface Waves) and Microtremor Array Measurements (MAM, i.e., ReMi™) near one end bent of each proposed replacement bridge. The test locations and configurations are labeled "SW-#" on the MASW/MAM Location Plans (Figures 18 through 22) in Appendix II. MASW is a seismic method for near-surface characterization of shear wave velocity (Vs). MASW utilizes the Rayleigh-type surface waves

("ground roll") recorded by multiple receivers (geophones) deployed on an even spacing and connected to a common recording seismograph.

The testing was conducted using a 16-channel GeoMetrics ES-3000 seismograph and the test data reduced using the OYO Corporation SeisImager software. Surface waves recorded as they propagate along the receiver line are analyzed through powerful and diverse multichannel processing techniques similar to a pattern-recognition approach. A combination of active and passive sources are used to develop the wave frequencies required to obtain velocities to a depth of 100 feet. The results of the active and passive sources were combined to produce a single Shear Wave Velocity Profile at each bridge location, and these Profiles are contained in Appendix VI.

2.1.5 Scope Exclusions

As outlined in the referenced *Scoping* and/or *SIP* documents, several items were determined to be excluded from our defined scope of services for this project. These designated "out-of-scope" items included: interstate pavement coring/borings and pavement thickness design (to be performed by SCDOT, based on their review and comments of the *Phase 1 SIP*); borings near several river/creek crossings (including the Pacolet River, Thicketty Creek, and Cherokee Creek); borings for several bridges over I-85, including SC-105 (Hyatt Street, Exit 90), SC-11 (Chesnee Highway, Exit 92) and SC-150 (Providence Road), which we understand were considered satisfactory to remain in-place; borings for the CSX Railroad Bridge near the Auriga Plant (near MM80); and borings for structures located outside of the current SCDOT Right-of-Way (applicable to multiple roads, ramps, and culverts).

2.2 Boring Locations and Elevations

The boring locations were initially established in the field using a handheld GPS unit (generally accurate to within about 3 feet). Some boring locations were influenced by the presence of overhead power lines, underground utilities, and/or current Right-of-Way limits, and several borings were relocated to avoid these conflicts/constraints or for safety reasons. The "as-drilled" locations were recorded with our GPS after completion of drilling. The approximate boring locations are shown on the Boring Location Plans (Figures 1 through 17) and MASW/MAM Plans (Figures 18 through 22) in Appendix II. Ground surface elevations at the boring locations were provided by ICE based on the "as-drilled" GPS coordinates provided by S&ME. Both surface elevations and location coordinates are approximate. A summary of soil test boring locations (stations, offset distances, and coordinates), boring depths, and boring elevations are tabulated in Appendix I. The GPS coordinates for the boring locations are tabulated in both northing/easting and latitude/longitude decimal degrees.

Soil sampling and penetration testing were performed in general accordance with ASTM D 1586 "Standard Test Method for Penetration Test and Split Barrel Sampling of Soils". The borings were performed using truck- and ATV-mounted drill rigs with automatic SPT hammers, using both hollow stem augers and rotary wash boring methods. Split-spoon samples were generally obtained continuously to a depth of 10 feet, and then at 5-foot intervals below that depth. Upon encountering auger refusal in the bridge borings, rock coring was then performed using an NQ-2 core barrel and wireline retrieval system. After completion of drilling, subsurface water level and/or hole cave depth measurements were attempted and recorded. Some borings were located in/near high traffic areas and were backfilled at the time of drilling for safety precautions. The boreholes were backfilled with soil cuttings, and those performed

through pavements were patched with asphalt cold patch. In addition, several roadway shoulder locations were repaired and covered with grass seed/straw.

SPT hammer energy measurements were performed with a Pile Driving Analyzer (PDA) on the drill rigs used to perform the borings on this project. The N-values indicated on the logs are field values and were not corrected for overburden stress, rod length, borehole diameter, or hammer efficiency. Hammer energy ratios are provided on the individual Soil Test Logs, along with the SPT Hammer Efficiency Reports, both in Appendix III.

2.3 Classification of Recovered Samples

Recovered split-spoon samples, bulk soil samples, and UD/Shelby tube samples were classified in general accordance with ASTM D 2487 and D 2488, as well as the AASHTO classification system, per the SCDOT Geotechnical Design Manual (GDM). Rock core descriptions generally follow those described in the SCDOT GDM. Interpreted subsurface conditions encountered by the SPT borings are shown on the Soil Test Logs in Appendix III. These logs represent our interpretation of the subsurface conditions based on the test data. Stratification lines on the boring logs represent approximate boundaries between soil types; however, the actual transition may be gradual, and the thicknesses of the strata will vary across the site. Photographs of the UD/Shelby tube samples are included in Appendix IV, and photographs of rock core samples are included in Appendix V.

2.4 Laboratory Physical Tests

Index property testing consisting of Atterberg limits, particle-size distribution, natural moisture content, and ignition loss tests were performed on multiple split-spoon, bulk, and UD samples to assist in classifying the soils. Moisture-density (standard Proctor) testing was performed on twenty-five (25) bulk soil samples collected along the median and roadway realignment areas, with sixteen (16) California Bearing Ratio tests performed on bulk samples collected from the median borings. Five (5) one-dimensional consolidation, four (4) consolidated undrained (CU) triaxial shear, and one (1) unconsolidated undrained (UU) triaxial shear tests were performed from UD samples obtained from the bridge borings. Electrochemical (resistivity, pH, sulfate content, chloride content) tests were performed on five (5) composite bulk soil samples (1 per bridge) at the proposed bridge structure locations. Unconfined compressive strength testing was performed on eighteen (18) intact rock core samples obtained from the bridge borings.

Testing was performed in general accordance with ASTM or AASHTO test procedures. The samples were classified in accordance with the Unified Soil Classification System (USCS) and AASHTO classification system. Results of index property and physical tests performed on split-spoon, UD, and bulk samples are provided on the Summary of Laboratory Test Data tables, along with the individual test data sheets, in Appendix IV. Unconfined compressive strength test results for the rock core specimens are provided in Appendix V, along with photographs of the rock core samples. The following is a quantity summary of laboratory tests performed:

Test Type	Quantity
Natural Moisture Content	263
Atterberg Limits	275
Grain Size Analysis	283
Loss on Ignition (Organic Content)	4
Standard Proctor Compaction	25
California Bearing Ratio (CBR)	16
CU Triaxial Shear, with PP measurements	4
UU Triaxial Shear	1
One-Dimensional Consolidation	5
Electrochemical / Corrosion Series[1]	5
Unconfined Compression – Rock[2]	18

[1]Electrochemical / corrosion series consisted of pH, electrical resistivity, sulfate and chloride testing.
[2]Additional unconfined compression tests were anticipated; however, suitable test samples from BR-10 were not available.

2.5 Local Physiographic Conditions and Geology

The project site is in the Piedmont Physiographic Province of South Carolina. The Piedmont Physiographic Province is a relatively broad strip extending from central Alabama across Georgia and the Carolinas into Virginia. Rocks of the Piedmont occur in belts that are some of the oldest formations in the United States. The rock types are primarily metamorphic gneiss and schist with some granite intrusions.

The major portion of the bedrock in the Piedmont is covered with a varying thickness of residual soil which has been derived by chemical decomposition and physical weathering of the underlying rock. Residual soils developed during the weathering of this bedrock consist predominately of micaceous sandy silts and silty sands which grade to clayey silts and silty clays with nearness to the ground surface. The thickness of the residual soils can vary from only a few feet to in excess of 100 feet.

The boundary between the residual soil and the underlying bedrock is not sharply defined. Generally, a transition zone consisting of very hard soil to soft rock, appropriately classified as "partially weathered rock" is found. Within the transition zone, large boulders or lenses of relatively "fresh" rock which are generally much harder than the surrounding material often exist. The irregular bedrock surface is basically a consequence of differential weathering of the various minerals and joint patterns of the rock mass.

In areas disturbed in the past by human activities, existing fill materials can be present. These materials potentially include soil, rock pieces, vegetation, or waste products such as construction debris. The compaction of soil and rock pieces (rock fragments, cobbles, and/or crushed stone) greatly affects their strength and support qualities, and the amount of vegetation and waste products typically reduces these qualities. Alluvial soils, which are deposited by flowing water, can be expected in low lying areas and areas near bodies of water.

2.6 Interpreted Stratification of Soils and Rock

The exploratory borings encountered up to five general strata or horizons (fill, alluvium, residuum, partially weathered rock, and mass rock) based on interpreted physical properties, visual appearance, and apparent geologic origin. General descriptions of the samples recovered from each strata are presented below for each proposed replacement bridge location and one culvert location. Profile Figures 23 through 28 in Appendix II also illustrate the general subsurface conditions at these locations.

2.6.1 SC-110 (Battleground Road), Exit 83 RBO I-85

Borings BR-1 and BR-2 were performed near the proposed northwest and southeast end bents of this replacement bridge near I-85 Station 1031+50. As the replacement bridge is offset approximately 50 feet southwest of the existing bridge, new embankments will be constructed at each abutment (and the existing bridge will be removed). Preliminary grading information shown on the plans indicate the new embankments will raise site grades at the bridge approaches approximately 25 to 30 feet above current grade elevation. Based on the preliminary cross-section plans, we anticipate the northwest embankment will have a 2H:1V spill-through slope, and the southeast embankment will be constructed with a Mechanically Stabilized Earth (MSE) wall in front of the abutment.

Boring BR-2 encountered possible fill soil to a depth of approximately 6 feet below the current ground surface. The fill was classified as elastic silt with sand, and exhibited a generally high plasticity. Fill consistency as gauged by SPT penetration data was very stiff to hard. SPT N-values obtained in the fill ranged from 16 to 46 blows per foot (bpf). Below a thin surficial layer of topsoil in BR-1, and below the fill in BR-2, the borings penetrated Piedmont residual soils to depths of approximately 48 feet and 60 feet, respectively. The residuum was generally variable in classification, and consisted of interbedded layers of silty sand, sandy silt, clay, and elastic silt. SPT N-values obtained in the residual silts and clays ranged from 6 to 40 bpf, indicating a firm to hard consistency. SPT N-values obtained in the residual sands ranged from 6 to 33 bpf, indicating a loose to dense consistency.

As illustrated on the generalized subsurface profile Figure 23 in Appendix II, the PWR and rock levels appear to vary moderately between the two end bents. Borings BR-1 and BR-2 encountered partially weathered rock (PWR) at depths of approximately 48 feet and 52 feet (near elevations 831 feet and 825 feet), respectively. The PWR generally consisted of very dense silty sand and very hard sandy silt with rock fragments. SPT N-values obtained in the PWR exceeded 100 bpf. The borings penetrated PWR to auger refusal at depths of approximately 54 feet and 67 feet (near elevations 825 feet and 810 feet), respectively. NQ-2 wireline coring continued below the refusal levels and penetrated primarily biotite gneiss of variable quality. Based on percent recovery, RQD, and Rock Mass Rating (RMR) values, rock quality descriptions ranged from very poor to good. Unconfined compressive strength of four selected core specimens ranged from 6,330 psi to 18,550 psi. We assessed RMR values of the recovered cores to range from 11 to 76, and generally increased with depth.

Groundwater was measured in Borings BR-1 and BR-2 at depths of approximately 30 feet and 29 feet (near elevations 849 feet and 848 feet), respectively, after a period of at least 24 hours following completion of drilling. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – SC 110 (Battleground Road) RBO I-85

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values (bpf)	Unconfined Compressive Strength (ksi)	Comments
Possible Fill	877 (BR-2)	0 (BR-2)	MH	16 - 46	n/a	
Residuum	879 (BR-1) 871 (BR-2)	0 (BR-1) 6 (BR-2)	CL, ML, MH, SM	6 - 40 (BR-1) 6 - 33 (BR-2)	n/a	Groundwater near El. 849 ft
PWR	831 (BR-1) 825 (BR-2)	48 (BR-1) 52 (BR-2)	SM, ML	100+	n/a	
Refusal / Rock	825 (BR-1) 810 (BR-2)	54 (BR-1) 67 (BR-2)	n/a	n/a	10-12 ksi (BR-1) 6 ksi (BR-2)	RMR values 11-76

2.6.2 S-11-131 (Sunny Slope Drive), MM 84.6 RBO I-85

Borings BR-3 and BR-4 were performed near the proposed northwest and southeast end bents of this replacement bridge near I-85 Station 1128+50. As the replacement bridge is offset approximately 50 feet southwest of the existing bridge, new embankments will be constructed at each abutment (and the existing bridge will be removed). Preliminary grading information shown on the plans indicate the new embankments will raise site grades at the bridge approaches approximately 25 to 28 feet above current grade elevation. Based on the preliminary cross-section plans, we anticipate both embankments will have 2H:1V spill-through slopes.

Below a surficial layer of topsoil, borings BR-3 and BR-4 encountered fill soil to a depth of approximately 2 feet below the current ground surface. The fill in BR-3 was classified as very stiff sandy clay with an SPT N-value of 23 bpf, and the fill in BR-4 was classified as loose silty/clayey sand with an SPT N-value of 5 bpf.

Below the upper fill, both borings penetrated Piedmont residual soils to depths of approximately 63 feet and 42 feet, respectively. The residuum was generally variable in classification, and consisted of interbedded layers of silty sand, sandy silt, silty/clayey sand, and elastic silt. SPT N-values obtained in the residual silts and clays ranged from 4 to 44 bpf, indicating a soft to hard consistency. SPT N-values obtained in the residual sands ranged from 8 to 31 bpf, indicating a loose to dense consistency.

As illustrated on the generalized subsurface profile Figure 24 in Appendix II, the PWR and rock levels appear to vary significantly between the two end bents. Borings BR-3 and BR-4 encountered PWR at depths of approximately 63 feet and 42 feet (near elevations 838 feet and 857 feet), respectively. The PWR generally consisted of very hard sandy silt with rock fragments. SPT N-values obtained in the PWR exceeded 100 bpf. The borings penetrated PWR to auger refusal at depths of approximately 72 feet and 45 feet (near elevations 830 feet and 854 feet), respectively. NQ-2 wireline coring continued below the refusal levels and penetrated primarily biotite gneiss of variable quality. Based on percent recovery, RQD, and Rock Mass Rating (RMR) values, rock quality descriptions ranged from very poor to good. Unconfined compressive strength of four selected core specimens ranged from 3020 psi to 12,650 psi. We assessed RMR values of the recovered cores to range from 18 to 73, and generally increased with depth.

Groundwater was measured in Borings BR-3 and BR-4 at depths of approximately 25 feet and 28 feet (near elevations 876 feet and 871 feet), respectively, after a period of at least 24 hours following completion of drilling. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – S-11-131 (Sunny Slope Drive) RBO I-85

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values (bpf)	Unconfined Compressive Strength (ksi)	Comments
Fill	901 (BR-3) 899 (BR-4)	0 (BR-3) 0 (BR-4)	CL, SC-SM	4 (BR-3) 23 (BR-4)	n/a	
Residuum	899 (BR-3) 897 (BR-4)	2 (BR-3) 2 (BR-4)	SM, ML, MH, SC-SM	8 - 44 (BR-3) 4 - 31 (BR-4)	n/a	Groundwater near El. 874 ft (avg.)
PWR	838 (BR-3) 857 (BR-4)	63 (BR-3) 42 (BR-4)	ML	100+	n/a	
Refusal / Rock	830 (BR-3) 854 (BR-4)	72 (BR-3) 45 (BR-4)	n/a	n/a	10-12 ksi (BR-3) 3-12.6 ksi (BR-4)	RMR values 18-73

2.6.3 S-11-39 (Macedonia Road), Exit 87 RBO I-85

Borings BR-5 and BR-6 were performed near the proposed northwest and southeast end bents of this replacement bridge near I-85 Station 1229+00. As the replacement bridge is offset approximately 150 feet southwest of the existing bridge, new embankments will be constructed at each abutment (and the existing bridge will be removed). Preliminary grading information shown on the plans indicate the new embankments will raise site grades at the bridge approaches approximately 30 to 35 feet above current grade elevation. Based on the preliminary cross-section plans, we anticipate each embankment will be constructed with an MSE wall in front of the abutment.

Below a surficial layer of topsoil, borings BR-5 and BR-6 penetrated Piedmont residual soils to depths of approximately 37 feet and 42 feet, respectively, below the current ground surface. The residuum was generally consistent in classification, typically characterized by an upper layer of sandy clay (BR-5) or elastic silt (BR-6) underlain by sandy silt. SPT N-values obtained in the residual silts and clays ranged from 3 to 27 bpf, indicating a soft to very stiff consistency. However, most SPT N-values ranged from 6 to 11 bpf, indicating a firm to stiff consistency.

As illustrated on the generalized subsurface profile Figure 25 in Appendix II, the PWR and rock levels appear to vary moderately between the two end bents. Borings BR-5 and BR-6 encountered PWR at depths of approximately 37 feet and 27 feet (near elevations 840 feet and 846 feet), respectively. The PWR generally consisted of very dense silty sand with rock fragments. SPT N-values obtained in the PWR exceeded 100 bpf. The borings penetrated a relatively thin layer of PWR (approximately 2 to 4 feet thick), and encountered auger refusal at depths of approximately 41 feet and 29 feet (near elevations 836 feet and 844 feet), respectively. NQ-2 wireline coring continued below the refusal levels and penetrated primarily granitoid gneiss and biotite gneiss of variable quality. Based on percent recovery, RQD, and Rock Mass Rating (RMR) values, rock quality descriptions ranged from poor to good. Unconfined compressive strength of four selected core specimens ranged from 11,270 psi to 15,740 psi. We assessed RMR values of the recovered cores to range from 26 to 76.

Groundwater was measured in Borings BR-5 and BR-6 at depths of approximately 17 feet and 14 feet (near elevations 860 feet and 859 feet), respectively, after a period of at least 24 hours following completion of drilling. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – S-11-39 (Macedonia Road) RBO I-85

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values	Unconfined Compressive Strength (ksi)	Comments
Residuum	877 (BR-5) 872.5 (BR-6)	0 (BR-5) 0 (BR-6)	ML, MH, CL	4 - 16 (BR-5) 3 - 27 (BR-6)	n/a	Groundwater near El. 860 ft
PWR	840 (BR-5) 845.5 (BR-6)	37 (BR-5) 27 (BR-6)	SM	100+	n/a	
Refusal / Rock	836 (BR-5) 844 (BR-6)	41 (BR-5) 29 (BR-6)	n/a	n/a	12-16 ksi (BR-5) 11-14 ksi (BR-6)	RMR values 26-76

2.6.4 S-11-82 (Pleasant School Road), Exit 95 RBO I-85

Borings BR-7 and BR-8 were performed near the proposed south and north end bents of this replacement bridge near I-85 Station 1656+75. As the replacement bridge is offset approximately 500 feet west of the existing bridge, new embankments will be constructed at each abutment (and the existing bridge will be removed). Preliminary grading information shown on the plans indicate the new embankments will raise site grades at the bridge approaches approximately 28 to 30 feet above current grade elevation. Based on the preliminary cross-section plans, we anticipate each embankment will be constructed with an MSE wall in front of the abutment.

Below surficial layers of asphaltic pavement and stone base, borings BR-7 and BR-8 encountered fill soil to depths of approximately 10 feet and 6 feet, respectively, below the current ground surface. The composition of the fill was highly variable, consisting at BR-7 of stiff to firm sandy clay/silt, interbedded with layers of loose sand and silty sand. At BR-8, stiff sandy fat clay with 6.5 percent organic material was underlain by loose clayey sand. SPT N-values obtained in most of the fill silts and clays ranged from 5 to 14 bpf, indicating a firm to stiff consistency (an N-value of 29 bpf was also measured, but this value was likely amplified by gravel in the fill, and thus not representative of the soil consistency). SPT N-values obtained in the fill sands ranged from 9 to 14 bpf, indicating a loose to medium dense consistency.

Below the upper fill, borings BR-7 and BR-8 penetrated Piedmont residual soils to depths of approximately 23 feet and 21 feet, respectively. The residuum was generally variable in classification, and consisted of interbedded layers of silty sand, sandy silt, silty/clayey sand, and sandy elastic silt. Two SPT N-values obtained in the residual silts were 10 and 12 bpf, indicating a stiff consistency. SPT N-values obtained in the residual sands ranged from 6 to 22 bpf, indicating a loose to medium dense consistency.

As illustrated on the generalized subsurface profile Figure 26 in Appendix II, the PWR and rock levels appear to vary moderately between the two end bents. Boring B-7 encountered PWR at a depth of approximately 23 feet (near elevation 667 feet). The PWR generally consisted of very dense silty sand with rock fragments, with SPT N-values exceeding 100 bpf. Boring BR-7 penetrated PWR to auger refusal at a depth of approximately 29 feet (near elevation 661 feet). Boring BR-8 did not encounter PWR; rather, it encountered auger refusal below the residuum at a depth of approximately 21 feet (near elevation 672 feet). NQ-2 wireline coring continued below the refusal levels and penetrated primarily biotite gneiss and granite gneiss of variable quality. Based on percent recovery, RQD, and Rock Mass Rating (RMR) values, rock quality descriptions ranged from very poor to good. Unconfined compressive strength of four selected core specimens ranged from 2,140 psi to 11,070 psi. We assessed RMR values of the recovered

cores from BR-7 to range from 18 to 41, and generally increased with depth. However, at BR-8, below an upper 7-foot thick layer of good quality rock (RMR 71), the underlying rock was assessed to be of very poor quality (RMR 19).

Groundwater was measured in Borings BR-7 and BR-8 at depths of approximately 20 feet and 18 feet (near elevations 670 feet and 675 feet), respectively, after completion of drilling. Because these borings were located very close to active roadways, they were backfilled upon completion. Since 24-hour water levels could not be measured, the time-of-boring water levels should be considered very approximate. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – S-11-82 (Pleasant School Road) RBO I-85

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values (bpf)	Unconfined Compressive Strength (ksi)	Comments
Fill	690 (BR-7) 693 (BR-8)	0 (BR-7) 0 (BR-8)	CL, SP, SM, ML, CH, SC	5 - 29 (BR-7) 9 - 14 (BR-8)	n/a	6.5% organics in BR-8 (2'-3')
Residuum	680 (BR-7) 687 (BR-8)	10 (BR-7) 6 (BR-8)	SM, ML, MH, SC-SM	6 - 13 (BR-7) 10 - 22 (BR-8)	n/a	Groundwater near El. 673 ft (avg.)
PWR	667 (BR-7)	23 (BR-7)	SM	100+	n/a	
Refusal / Rock	661 (BR-7) 672 (BR-8)	29 (BR-7) 21 (BR-8)	n/a	n/a	2-4.6 ksi (BR-7) 7.3-11 ksi (BR-8)	RMR values 18-71

2.6.5 SC-18 (Shelby Highway), Exit 96 RBO I-85

Borings BR-9 and BR-10 were performed near the proposed south and north end bents of this replacement bridge near I-85 Station 1734+20. As the replacement bridge is offset approximately 130 feet east of the existing bridge, new embankments will be constructed at each abutment (and the existing bridge will be removed). Preliminary grading information shown on the plans indicate the new embankments will raise site grades at the bridge approaches approximately 30 to 37 feet above current grade elevation. Based on the preliminary cross-section plans, we anticipate each embankment will be constructed with an MSE wall in front of the abutment.

Below a surficial layer of topsoil, borings BR-9 and BR-10 encountered fill soil to depths of approximately 6 feet and 4 feet, respectively, below the current ground surface. The composition of the fill was highly variable, consisting at BR-9 of firm sandy silt underlain by loose clayey sand. At BR-10, stiff sandy elastic silt was underlain by very stiff sandy silt. SPT N-values obtained in the fill silts ranged from 5 to 19 bpf, indicating a firm to very stiff consistency. Two SPT N-values obtained in the fill sands were 4 and 6 bpf, indicating a loose consistency.

Below the upper fill, borings BR-9 and BR-10 penetrated Piedmont residual soils to a depth of approximately 46 feet. The residuum at BR-9 was highly variable in classification, and consisted of interbedded layers of silty sand, sandy silt, clayey sand, and elastic silt. The residuum at BR-10 was less variable in classification, and consisted primarily of medium dense silty sand. Most SPT N-values obtained in the residual silts ranged from 10 to 11 bpf, indicating a stiff consistency (with one N-value of 66 bpf in a deeper zone indicating a very hard consistency). SPT N-values obtained in the residual sands ranged from 10 to 30 bpf, indicating a loose to medium dense consistency.

As illustrated on the generalized subsurface profile Figure 27 in Appendix II, the PWR and rock levels appear to vary slightly between the two end bents. Boring B-10 encountered PWR at a depth of approximately 46 feet (near elevation 667 feet). The PWR generally consisted of very hard sandy silt, with an SPT N-value exceeding 100 bpf. Boring BR-10 penetrated PWR to auger refusal at a depth of approximately 50 feet (near elevation 663 feet). Boring BR-9 did not encounter PWR; rather, it encountered auger refusal below the residuum at a depth of approximately 46 feet (near elevation 661 feet). NQ-2 wireline coring continued below the refusal levels and penetrated primarily biotite gneiss interlayered with granitoid gneiss. Based on percent recovery, RQD, and Rock Mass Rating (RMR) values, rock quality descriptions ranged from very poor to poor. Unconfined compressive strength of two selected core specimens from BR-9 were 2,550 psi and 7,580 psi (no core specimens from BR-10 were tested due to insufficient length and/or very poor quality of the samples). We assessed RMR values of the recovered cores to range from 13 to 35.

Groundwater was measured in Borings BR-9 and BR-10 at a depth of approximately 18 feet (near elevations 689 feet and 695 feet, respectively) after completion of drilling. Because these borings were located close to active roadways, they were backfilled upon completion. Since 24-hour water levels could not be measured, the time-of-boring water levels should be considered very approximate. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – SC-18 (Shelby Highway) RBO I-85

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values (bpf)	Unconfined Compressive Strength (ksi)	Comments
Fill	707 (BR-9) 713 (BR-10)	0 (BR-9) 0 (BR-10)	ML, MH, SC	4 - 6 (BR-9) 14 - 19 (BR-10)	n/a	
Residuum	701 (BR-9) 709 (BR-10)	6 (BR-9) 4 (BR-10)	SM, ML, MH, SC	10 - 66 (BR-9) 11 - 30 (BR-10)	n/a	Groundwater near El. 692 ft (avg.)
PWR	667 (BR-10)	46 (BR-10)	ML	100+	n/a	
Refusal / Rock	661 (BR-9) 663 (BR-10)	46 (BR-9) 50 (BR-10)	n/a	n/a	2.6 - 7.6 ksi (BR-9 only)	RMR values 13-35

2.6.6 S-11-82 (Pleasant School Road), Culvert at Providence Branch

Borings C-9 and C-10 were performed on opposite sides of existing double 10-foot by 10-foot box culverts near Station 184+80 of Road S-11-82 (Pleasant School Road). We understand this culvert, which accommodates streamflow of Providence Branch below the roadway embankment, will likely remain in place. Preliminary grading information shown on the plans indicate the vertical re-alignment for this portion of S-11-82 will raise site grades at the culvert approximately 6 feet above current grade elevation. Rather than extending the culverts and widening the existing fill embankment, we understand retaining walls are planned along both sides of the roadway in this area to limit potential impact to the stream and associated wetlands. Based on the preliminary cross-section plans, we anticipate both retaining walls will be over 16 feet tall. The plans show the bottom of wall bearing approximately 1 foot higher than the top of the culvert (near elevation 630 feet), and the average culvert invert elevation near 619 feet.

Below surficial layers of asphaltic pavement and stone base, borings C-9 and C-10 encountered fill soil to depths of approximately 18 feet and 22 feet, respectively, below the current ground surface. The composition of the fill was highly variable, consisting at C-9 of interbedded layers of sandy elastic silt,

clayey sand, and sandy silt of mostly low consistency. At C-10, stiff to very soft sandy clay and sandy elastic silt was underlain by very loose silty sand. SPT N-values obtained in most of the fill silts and clays ranged from 2 to 7 bpf, indicating a very soft to firm consistency (N-values of 10, 15, and 17 bpf were also measured, but these values were likely amplified by gravel in the fill, and thus not representative of the soil consistency). SPT N-values obtained in the fill sands ranged from 1 to 5 bpf, indicating a very loose to loose consistency.

Below the fill, boring C-9 penetrated a layer of alluvial soil (likely associated with former bed/banks of the stream channel) to a depth of approximately 23 feet. The alluvium at C-9 consisted of loose silty sand, with an SPT N-value of 5 bpf.

As illustrated on the generalized subsurface profile Figure 28 in Appendix II, the PWR and rock levels appear to vary slightly between these two borings. Boring C-9 encountered PWR below the alluvium at a depth of approximately 23 feet (near elevation 617 feet). The PWR generally consisted of very dense silty sand, with an SPT N-value exceeding 100 bpf. Boring C-9 penetrated a relatively thin layer of PWR, and encountered auger refusal at a depth of approximately 26 feet (near elevation 614 feet). Boring C-10 did not encounter PWR; rather, it encountered auger refusal below the fill at a depth of approximately 22 feet (near elevation 618 feet). Coring of the refusal materials was not performed.

Groundwater was measured in Borings C-9 and C-10 at a depth of approximately 18 feet (near elevations 622 feet) after completion of drilling. This elevation appeared to be near (slightly higher than) the stream level at the time of the exploration. Because these borings were located within an active roadway, they were backfilled upon completion. Since 24-hour water levels could not be measured, the time-of-boring water levels should be considered very approximate. The following tabulation summarizes the preceding description:

Subsurface Stratification Table – S-11-82 (Pleasant School Road) Culvert at Providence Branch

Geologic Stratum	Elevation of Top of Layer (ft-msl)	Depth to Top of Layer (ft)	USCS Soil Type(s)	SPT-N Values (bpf)	Comments
Fill	640 (C-9) 640 (C-10)	0 (C-9) 0 (C-10)	MH, SC, ML, CL	3 - 17 (C-9) 1 - 15 (C-10)	Many N-values likely amplified by gravel in fill
Alluvium	622 (C-9)	18 (C-9)	SM	5	Groundwater near El. 622 ft
PWR	617 (C-9)	23 (C-9)	SM	100+	
Rock	614 (C-9) 618 (C-10)	26 (C-9) 22 (C-10)	n/a	n/a	Average Culvert Invert elevation near 619 ft

3.0 Earthquake Design Considerations

Seismic induced ground shaking at the foundation is the effect taken into account by "2008 SCDOT Seismic Design Specifications for Highway Bridges." Other effects, including landslides or soil liquefaction, are not addressed in the specifications but must also be considered for certain performance category structures.

Bridge structures on the state highway system have been classified as Operational I, II, or III structures as defined in the Seismic Design Specifications. We anticipate the bridges for this project are Operational Classification II structures as defined by Section 3.2 of the SCDOT – Seismic Design Specifications. Operational Classification II structures require an evaluation for the Safety Evaluation Earthquake (SEE)

and Functional Evaluation Earthquake (FEE). The Roadway Operational Classification is also II within 150 feet of the bridge abutment and will be ROC IV beyond 150 feet.

3.1 Ground Motion

The "2008 SCDOT Seismic Design Specifications for Highway Bridges" use two different earthquake motions. The Functional Evaluation Earthquake (FEE) is defined as an earthquake with a 15 percent probability of exceedance in 75 years. The Safety Evaluation Earthquake (SEE) is an earthquake with a 3 percent probability of exceedance in 75 years. Performance criteria required subsequent to each earthquake are tabulated in terms of service levels and damage levels in Section 3.2.3 of the SCDOT – Seismic Design Specifications.

For this preliminary geotechnical analysis, we did not request the Acceleration Design Response Spectrum (ADRS) for each bridge from the SCDOT Geotechnical Design Section. The Design-phase geotechnical engineer should request the ADRS curves from SCDOT for inclusion in the subsequent Bridge Geotechnical Engineering Report (BGER). The Seismic Design Category (SDC), and values of S_{DS}, S_{D1}, and PGA for each structure can be determined at that time from the ADRS output for the FEE and SEE earthquakes.

3.2 Site Class Effects

We classified each bridge site as one of the Site Classes defined in Section 12.4.1 (Table 12-22) of the GDM. Site conditions were initially compared to the three conditions described for Site Class E. These are soft soils vulnerable to large strains under seismic motion. Borings did not include at least 10 feet having 1) plasticity index greater than 20, 2) moisture content greater than 40 percent, and 3) undrained shear strength less than 500 psf.

The next step in site class definition is a check for the four conditions described for Site Class F, which would require a site specific evaluation to determine site coefficients F_A and F_V. The three conditions, 1) peats and highly organic clays; 2) very high plasticity clays; and 3) very thick soft/medium stiff clays, were not evident in the borings performed.

The GDM requires classification of a site using shear wave velocity values. Shear wave velocities were obtained in the five (5) different soil profiles. Our MASW/MAM arrays were conducted to a depth of approximately 100 to 130+ feet, beyond which no shear wave velocity signal could be detected. This is typical for geologies where a hard rock profile is encountered.

Five (5) MASW/MAM arrays (5 using active sources and 5 using passive sources) were performed at the replacement bridge locations indicated on Table 3 in Appendix I. The results from the active MASW arrays were combined with the passive MAM arrays to develop shear wave velocity profiles SW-1 through SW-5.

The shear wave velocity measurements by MASW/MAM for Array SW-4 (harmonic average of 1678 feet per second to a depth of 100 feet) exceeded 1200 feet per second. Based on this harmonic average and the subsurface data, the soils for the S-11-82 (Pleasant School Road) Bridge site classify as Seismic Site Class C in accordance with Table 4-2 of the 2008 SCDOT Seismic Design Specifications for Highway Bridges (Version 2.0). The shear wave velocity measurements for the other bridge sites (Arrays SW-1, SW-2, SW-3, and SW-5) exhibited harmonic averages ranging from 991 to 1069 feet per second. Because their harmonic averages are less than the 1200 feet per second threshold, these four other bridge sites (SC-110, S-11-131, S-11-39, and SC-18) classify as Seismic Site Class D in accordance with Table 4-2 of the

same specifications. While the subsurface profiles vary across the proposed replacement bridge limits, the respective Site Classes appear suitable for the entire bridge area at each site. The shear wave velocity profile generally corresponds to the subsurface profile (PWR/rock elevations) characterized by the findings of the borings.

3.3 Liquefaction Potential

The general potential for liquefaction of sands below explored roadway embankments and bridge abutments for this project was qualitatively assessed to be low, due to the depth, relative density and fines contents of the soils. Based on our experience with multiple other projects in Spartanburg and Cherokee Counties, the typical magnitudes of Peak Ground Acceleration (PGA) within the project corridor site are relatively low. Liquefiable soils were not evident beneath the approach embankment areas at the proposed bridge abutments. Also, no known published references exist which document sand boil features associated with historic or prehistoric earthquake activity in the South Carolina Piedmont.

4.0 Design and Construction Considerations

As defined in Section 21 of the GDM (as modified in Bridge Design Memorandum 0510 dated October 22, 2010) the scope of geotechnical interpretation and discussion to be included in a GBLR is limited to "very preliminary engineering recommendations." Issues specifically called out in Section 21.2.2 of the GDM are general recommendations concerning foundations and/or ground improvement requirements.

4.1 SC-110 (Battleground Road), RBO I-85

A generalized subsurface profile of the borings conducted at this structure (facing northeast) is shown as Figure 23 in Appendix II to help illustrate the following preliminary recommendations for bridge foundation support. Assuming a 220-foot total bridge length with two 110-foot long spans, this arrangement would likely result in heavy column loads for the interior bent. The use of shallow foundations does not appear feasible for this bridge, as the significant thickness and moderate to low consistency of the residual soils below the end abutments and interior bent foundation would likely induce intolerable consolidation settlements. Therefore, installation of deep foundations will be required to support this bridge. Additional exploration, especially for the interior bent, will be required during the project design phase to complete the evaluation and recommendations for the bridge foundations.

Acceptable driven pile types include steel H-piles, steel pipe piles, prestressed concrete piles, or composite piles of shapes and dimensions typically used by the SCDOT and listed in Table 16-2 of the GDM. Because these types would bear in very dense/hard PWR, group settlements would be very small. Each of these pile types appear technically feasible for use at either end bents or interior bents; however, the use of prestressed concrete piles can be problematic and are not typically used in the Piedmont due to the variable PWR/rock surface and potential for encountering PWR/rock lenses in the residual soil zone.

H-piles driven to bear in very dense/hard PWR below about elevation 820-830 feet would begin to develop substantial capacity in end bearing. Pipe piles driven either open- or close-ended will develop very high axial resistance at similar elevation. Precast concrete piles may require a driving shoe or stinger if driven below about elevation 830 feet. Drilled piles described in Section 16.5 of the GDM do not appear necessary at this location.

We anticipate the spill-through embankment for the northwest bridge approach will be graded prior pile installation for the northwest end bent. Placement of 25+ feet of fill for the approach embankment will induce consolidation settlement of the underlying residual subgrade soils. To prevent "downdrag" (negative skin friction) loading on these piles, subgrade settlements should be monitored and pile installation delayed until subgrade settlement has completed to within tolerable limits. Otherwise, if this waiting period is not feasible, the pile loading demand will need to include the additional downdrag load. Regardless of the decision to wait for pile installation, construction of roadway pavements should be delayed until monitored subgrade settlement has completed to within tolerable limits. Also, the design-phase geotechnical evaluation should include a detailed slope stability analysis for this end bent slope (particularly for the 20-foot thick zone of low-consistency silt encountered in boring BR-1 between approximate elevations 851-871 feet).

We anticipate the widened interstate lane configuration will require the southeast approach embankment and end bent to be contained by a Mechanically Stabilized Earth (MSE) retaining wall. Based on planned final grades, we expect the MSE wall height will be at least 25 feet. Foundation piles for the southeast end bent will be located within the reinforced zone of this abutment MSE wall. Per SCDOT Supplemental Technical Specification SC-M-713 (May 2014) for MSE wall construction, piles should be installed prior to installation of the MSE wall at the end bent abutment, following excavation of the wall area to near its plan wall foundation subgrade elevation. Following initial pile installation (and prior to MSE wall construction), the piles should be sleeved/encased for protection during placement and compaction of the wall backfill. Similar to the opposite bridge approach, placement of 25+ feet of fill for the southeast approach embankment will induce consolidation settlement of the underlying subgrade soils. However, because the piles will have been installed prior to fill placement, they will be subject to downdrag loading caused by the subgrade settlement. Therefore, the pile loading demand for the southeast abutment piles will need to include the additional downdrag load.

Evaluation of subgrade settlement magnitude was not included in the GBLR scope; however, based on the height of the southeast approach embankment (25+ feet) and thickness of the compressible soil subgrade zone below the wall (40+ feet), we anticipate subgrade consolidation settlement could exceed several inches. Depending on performance criteria for the MSE wall and approach slab/embankment, some ground improvement could be required prior to MSE wall construction. Typical ground improvement methods for reducing settlement (when undercutting is not practical) include: soil mixing, injection grouting, fortifying the subgrade with stone columns or controlled-modulus columns, and installation of a deep foundation system (micropiles, continuous flight auger piles, driven timber piles).

Drilled shafts may be preferable for support of interior bent foundations since their use would preclude requirement for excavation of a pile cap. Rock strata is relatively deep (>60 feet), so drilled shafts would derive axial resistance primarily as side friction in PWR below approximate elevation 825-830 feet, end bearing on/in rock, and to a lesser extent from side friction in the residual soils above. Depending on the axial and lateral load demands, installation of rock sockets could provide additional resistance. Construction casing will be required in the upper portions of the shafts and, depending on shaft length and arrangement of reinforcing steel, some portion of the casing may need to be permanent. Based on the significant depth to PWR/rock to seal the casing from groundwater intrusion below elevation 849 feet, installation of full-depth casing will likely not be practical. Therefore, considering the modest N-values of the soils below groundwater elevation, use of drilling slurry will be required for shaft excavation using the "wet construction method".

4.2 S-11-131 (Sunny Slope Drive), RBO I-85

A generalized subsurface profile of the borings conducted at this structure (facing northeast) is shown as Figure 24 in Appendix II to help illustrate the following preliminary recommendations for bridge foundation support. Assuming a 210-foot total bridge length with two 105-foot long spans, this arrangement would likely result in heavy column loads for the interior bent. The use of shallow foundations does not appear feasible for this bridge, as the significant thickness and moderate to low consistency of the residual soils below the end abutments and interior bent foundation would likely induce intolerable consolidation settlements. Therefore, installation of deep foundations will be required to support this bridge. Additional exploration, especially for the interior bent, will be required during the project design phase to complete the evaluation and recommendations for the bridge foundations.

Acceptable driven pile types include steel H-piles, steel pipe piles, prestressed concrete piles, or composite piles of shapes and dimensions typically used by the SCDOT and listed in Table 16-2 of the GDM. Because these types would bear in very dense/hard PWR, group settlements would be very small. Each of these pile types appear technically feasible for use at either end bents or interior bents; however, the use of prestressed concrete piles can be problematic and not typically used in the Piedmont due to the variable PWR/rock surface and potential for encountering PWR/rock lenses in the residual soil zone.

As previously noted in Section 2.6.2 above, the PWR and rock levels appear to vary significantly between the two end bents at this bridge site. H-piles driven to bear in very hard PWR below about elevation 835 feet (northwest end bent) and below about elevation 855 feet (southeast end bent) would begin to develop substantial capacity in end bearing. Pipe piles driven either open- or close-ended will develop very high axial resistance at similar elevations. Precast concrete piles may require a driving shoe or stinger if driven near these elevations. Drilled piles described in Section 16.5 of the GDM do not appear necessary at this location.

We anticipate the spill-through embankments for both bridge approaches will be graded prior to pile installation. Placement of 25+ feet of fill for the approach embankments will induce consolidation settlement of the underlying residual subgrade soils. To reduce or negate “downdrag” (negative skin friction) loading on these piles, subgrade settlements should be monitored and pile installation delayed until subgrade settlement has completed to within tolerable limits. Otherwise, if this waiting period is not feasible, the pile loading demand will need to include the additional downdrag load.

Regardless of the decision to wait for pile installation, construction of roadway pavements should be delayed until monitored subgrade settlement has completed to within tolerable limits. This recommendation is especially applicable to this site, considering the thickness of the compressible soil subgrade zone below the northwest approach (50+ feet) and the of low-consistency compressible soils underlying the southeast approach. Also, the design-phase geotechnical evaluation should include a detailed slope stability analysis for the end bent slopes (particularly for the 20-foot thick zone of low-consistency silt encountered in boring BR-4 between approximate elevations 867-887 feet).

Drilled shafts may be preferable for support of interior bent foundations since their use would preclude requirement for excavation of a pile cap. Rock strata is relatively deep, and potentially as deep as 70 feet if using the results of boring BR-3 for a more conservative estimate of PWR/rock depth. Thus, drilled shafts would derive axial resistance primarily as side friction in PWR below approximate elevation 840-845 feet, end bearing on/in rock, and to a lesser extent from side friction in the residual soils above.

Depending on the axial and lateral load demands, installation of rock sockets could provide additional resistance. Construction casing will be required in the upper portions of the shafts and, depending on shaft length and arrangement of reinforcing steel, some portion of the casing may need to be permanent. Based on the significant depth to PWR/rock to seal the casing from groundwater intrusion below approximate elevation 874 feet, installation of full-depth casing will likely not be practical. Therefore, use of the "wet construction method" will be required for shaft excavation below the groundwater level.

4.3 S-11-39 (Macedonia Road), RBO I-85

A generalized subsurface profile of the borings conducted at this structure (facing northeast) is shown as Figure 25 in Appendix II to help illustrate the following preliminary recommendations for bridge foundation support. Assuming a 180-foot total bridge length with two 90-foot long spans, this arrangement would likely result in relatively heavy column loads for the interior bent. The use of shallow foundations does not appear feasible for this bridge, as the significant thickness and moderate to low consistency of the residual soils below the end abutments and interior bent foundation would likely induce intolerable consolidation settlements. Therefore, installation of deep foundations will be required to support this bridge. Additional exploration, especially for the interior bent, will be required during the project design phase to complete the evaluation and recommendations for the bridge foundations.

Acceptable driven pile types include steel H-piles, steel pipe piles, prestressed concrete piles, or composite piles of shapes and dimensions typically used by the SCDOT and listed in Table 16-2 of the GDM. Because these types would bear in very dense/hard PWR, group settlements would be very small. Each of these pile types appear technically feasible for use at either end bents or interior bents; however, the use of prestressed concrete piles can be problematic and are typically not used in the Piedmont due to the variable PWR/rock surface and potential for encountering PWR/rock lenses in the residual soil zone.

H-piles driven to bear in very dense PWR below about elevation 840-845 feet would begin to develop substantial capacity in end bearing. Pipe piles driven either open- or close-ended will develop very high axial resistance at similar elevation. Precast concrete piles may require a driving shoe or stinger if driven near these elevations. Drilled piles described in Section 16.5 of the GDM do not appear necessary at this location.

We anticipate the widened interstate lane configuration will require the both approach embankments and end bents to be contained by Mechanically Stabilized Earth (MSE) retaining walls. Based on planned final grades, we expect the MSE wall height will be at least 25 feet. Foundation piles for both end bents will be located within the reinforced zone of the abutment MSE walls. Per SCDOT Supplemental Technical Specification SC-M-713 (May 2014) for MSE wall construction, piles should be installed prior to installation of the MSE wall at the end bent abutment, following excavation of the wall area to near its plan wall foundation subgrade elevation. Following initial pile installation (and prior to MSE wall construction), the piles should be sleeved/encased for protection during placement and compaction of the wall backfill. Placement of 25 to 30+ feet of fill for the approach embankments will induce consolidation settlement of the underlying subgrade soils. However, because the piles will have been installed prior to fill placement, they will be subject to downdrag loading caused by the subgrade settlement. Therefore, the pile loading demand for the abutment piles will need to include the additional downdrag load.

Evaluation of subgrade settlement magnitude was not included in the GBLR scope; however, based on the height of the approach embankments (25 to 30+ feet) and thickness of the compressible soil subgrade

zone below the wall (approximately 25 to 35 feet), we anticipate subgrade consolidation settlement could exceed several inches. Depending on performance criteria for the MSE wall and approach slab/ embankment, some ground improvement could be required prior to MSE wall construction. Typical ground improvement methods for reducing settlement (when undercutting is not practical) include: soil mixing, injection grouting, fortifying the subgrade with stone columns or controlled-modulus columns, and installation of a deep foundation system (micropiles, continuous flight auger piles, driven timber piles). Also, the design-phase geotechnical evaluation should include detailed external stability analyses for the end bent walls (particularly global stability through the low-consistency silts encountered in boring BR-5 between approximate elevations 850-870 feet).

Drilled shafts may be preferable for support of interior bent foundations since their use would preclude requirement for excavation of a pile cap. Rock strata is moderately deep (approximately 30 to 40 feet), so drilled shafts would derive axial resistance primarily as side friction in PWR below approximate elevation 840-845 feet, end bearing on/in rock, and to a lesser extent from side friction in the residual soils above. Depending on the axial and lateral load demands, installation of rock sockets could provide additional resistance. Construction casing will be required in the upper portions of the shafts and, depending on shaft length and arrangement of reinforcing steel, some portion of the casing may need to be permanent. Based on the significant depth to PWR/rock to seal the casing from groundwater intrusion below elevation 860 feet, installation of full-depth casing might not be deemed practical. Therefore, considering the generally low N values of the soils below groundwater elevation, use of drilling slurry will be required for shaft excavation using the "wet construction method".

4.4 S-11-82 (Pleasant School Road), RBO I-85

A generalized subsurface profile of the borings conducted at this structure (facing west) is shown as Figure 26 in Appendix II to help illustrate the following preliminary recommendations for bridge foundation support. Assuming a 157-foot total bridge length with two 78.5-foot long spans, this arrangement would likely result in moderately heavy column loads for the interior bent. The use of shallow foundations does not appear feasible for this bridge, as the conditions described in Section 5.1 of the GDM (presence of fill), which preclude use of shallow foundations, appear to be present. Therefore, installation of deep foundations will be required to support this bridge. Additional exploration, especially for the interior bent, will be required during the project design phase to complete the evaluation and recommendations for the bridge foundations.

Acceptable driven pile types include steel H-piles, steel pipe piles, prestressed concrete piles, or composite piles of shapes and dimensions typically used by the SCDOT and listed in Table 16-2 of the GDM. Because these types would bear in very dense/hard PWR, group settlements would be very small. Each of these pile types appear technically feasible for use at either end bents or interior bents; however, the use of prestressed concrete piles can be problematic and not typically used in the Piedmont due to the variable PWR/rock surface and potential for encountering PWR/rock lenses in the residual soil zone.

H-piles driven to bear in very dense PWR below about elevation 665 feet (south end bent) or mass rock below about elevation 672 feet (north end bent) would begin to develop substantial capacity in end bearing. Pipe piles driven either open- or close-ended will develop very high axial resistance at similar elevation. Precast concrete piles may require a driving shoe or stinger if driven near these elevations. Drilled piles described in Section 16.5 of the GDM do not appear necessary at this location.

We anticipate the widened interstate lane configuration will require the both approach embankments and end bents to be contained by Mechanically Stabilized Earth (MSE) retaining walls. Based on planned final grades, we expect the MSE wall height will be at least 24 feet. Foundation piles for both end bents will be located within the reinforced zone of the abutment MSE walls. Per SCDOT Supplemental Technical Specification SC-M-713 (May 2014) for MSE wall construction, piles should be installed prior to installation of the MSE wall at the end bent abutment, following excavation of the wall area to near its plan wall foundation subgrade elevation. Following initial pile installation (and prior to MSE wall construction), the piles should be sleeved/encased for protection during placement and compaction of the wall backfill. Placement of 25 to 30 feet of fill for the approach embankments will induce consolidation settlement of the underlying subgrade soils. However, because the piles will have been installed prior to fill placement, they will be subject to downdrag loading caused by the subgrade settlement. Therefore, the pile loading demand for the abutment piles will need to include the additional downdrag load.

Evaluation of subgrade settlement magnitude was not included in the GBLR scope; however, based on the height of the approach embankments (25 to 30 feet) and thickness of the compressible soil subgrade zone below the wall (approximately 20 to 25 feet), we anticipate subgrade consolidation settlement could be on the order of a few inches. Depending on performance criteria for the MSE wall and approach slab/ embankment, some ground improvement could be required prior to MSE wall construction. Typical ground improvement methods for reducing settlement (when undercutting is not practical) include: soil mixing, injection grouting, fortifying the subgrade with stone columns or controlled-modulus columns, and installation of a deep foundation system (micropiles, continuous flight auger piles, driven timber piles). Also, the design-phase geotechnical evaluation should include detailed external stability analyses for the end bent walls (particularly global stability through the low-consistency fill encountered in boring BR-7 between approximate elevations 680-690 feet).

Drilled shafts may be preferable for support of interior bent foundations since their use would preclude requirement for excavation of a pile cap. Rock strata is moderately shallow (approximately 20 to 30 feet), so drilled shafts would derive axial resistance primarily as side friction in PWR below approximate elevation 667 feet, end bearing on/in rock, and to a lesser extent from side friction in the residual soils above. Based on the shorter shaft length, installation of rock sockets would provide additional axial resistance, and will likely be required to help resist lateral loads. Construction casing will be required in the upper portions of the shafts and, depending on shaft length and arrangement of reinforcing steel, some portion of the casing may need to be permanent. Based on the relatively shallow depth to PWR/rock to seal the casing from groundwater intrusion below approximate elevation 674 feet, installation of full-depth casing could be feasible. Groundwater intrusion can be controlled to tolerable levels using casing sealed into PWR/rock, assisted by pumps if needed.

4.5 SC-18 (Shelby Highway), RBO I-85

A generalized subsurface profile of the borings conducted at this structure (facing west) is shown as Figure 27 in Appendix II to help illustrate the following preliminary recommendations for bridge foundation support. Assuming a 156-foot total bridge length with two 78-foot long spans, this arrangement would likely result in moderately heavy column loads for the interior bent. The use of shallow foundations does not appear feasible for this bridge, as the conditions described in Section 5.1 of the GDM (presence of fill), which preclude use of shallow foundations, appear to be present. Therefore, installation of deep foundations will be required to support this bridge. Additional exploration, especially

for the interior bent, will be required during the project design phase to complete the evaluation and recommendations for the bridge foundations.

Acceptable driven pile types include steel H-piles, steel pipe piles, prestressed concrete piles, or composite piles of shapes and dimensions typically used by the SCDOT and listed in Table 16-2 of the GDM. Because these types would bear in very dense/hard PWR, group settlements would be very small. Each of these pile types appear technically feasible for use at either end bents or interior bents; however, the use of prestressed concrete piles can be problematic and are not generally used in the Piedmont due to the variable PWR/rock surface and potential for encountering PWR/rock lenses in the residual soil zone.

H-piles driven to bear in very hard PWR below about elevation 665 feet (north end bent) or mass rock below about elevation 660 feet (south end bent) would begin to develop substantial capacity in end bearing. Pipe piles driven either open- or close-ended will develop very high axial resistance at similar elevation. Precast concrete piles may require a driving shoe or stinger if driven near these elevations. Drilled piles described in Section 16.5 of the GDM do not appear necessary at this location.

We anticipate the widened interstate lane configuration will require the both approach embankments and end bents to be contained by Mechanically Stabilized Earth (MSE) retaining walls. Based on planned final grades, we expect the MSE wall height will be approximately 30 feet. Foundation piles for both end bents will be located within the reinforced zone of the abutment MSE walls. Per SCDOT Supplemental Technical Specification SC-M-713 (May 2014) for MSE wall construction, piles should be installed prior to installation of the MSE wall at the end bent abutment, following excavation of the wall area to near its plan wall foundation subgrade elevation. Following initial pile installation (and prior to MSE wall construction), the piles should be sleeved/encased for protection during placement and compaction of the wall backfill. Placement of 25 to 30 feet of fill for the approach embankments will induce consolidation settlement of the underlying subgrade soils. However, because the piles will have been installed prior to fill placement, they will be subject to downdrag loading caused by the subgrade settlement. Therefore, the pile loading demand for the abutment piles will need to include the additional downdrag load.

Evaluation of subgrade settlement magnitude was not included in the GBLR scope; however, based on the height of the approach embankments (25 to 30 feet) and thickness/consistency of the compressible soil subgrade zone below the wall (approximately 40 feet), we anticipate subgrade consolidation settlement could be on the order of a few inches. Depending on performance criteria for the MSE wall and approach slab/embankment, some ground improvement could be required prior to MSE wall construction. Typical ground improvement methods for reducing settlement (when undercutting is not practical) include: soil mixing, injection grouting, fortifying the subgrade with stone columns or controlled-modulus columns, and installation of a deep foundation system (micropiles, continuous flight auger piles, driven timber piles). Also, the design-phase geotechnical evaluation should include detailed external stability analyses for the end bent walls (particularly global stability through the low-consistency fill and underlying modest consistency residuum encountered in boring BR-9 between approximate elevations 690-707 feet).

Drilled shafts may be preferable for support of interior bent foundations since their use would preclude requirement for excavation of a pile cap. Rock strata is moderately deep (approximately 50 feet), so drilled shafts would derive axial resistance primarily as side friction in PWR below approximate elevation 662 feet, end bearing on/in rock, and to a lesser extent from side friction in the residual soils above. Depending on the axial and lateral load demands, installation of rock sockets could provide additional resistance. Construction casing will be required in the upper portions of the shafts and, depending on

shaft length and arrangement of reinforcing steel, some portion of the casing may need to be permanent. Based on the significant depth to PWR/rock to seal the casing from groundwater intrusion below elevation 692 feet, installation of full-depth casing might not be deemed practical. Therefore, use of the "wet construction method" will be required for shaft excavation below the groundwater level.

4.6 S-11-82 (Pleasant School Road), Culvert at Providence Branch

A generalized subsurface profile of the borings conducted at this structure (facing north) is shown as Figure 28 in Appendix II to help illustrate the following preliminary recommendations for support of the proposed retaining walls. The results of borings C-9 and C-10 indicate the existing double box culverts are backfilled on the top and sides with low to very low consistency fill soil. As often typical for slope fill, we anticipate the consistency of the fill along the slopes (where the walls are planned) is likely less suitable than the conditions encountered by the borings performed within the roadway limits. Also, boring C-9 penetrated loose alluvium near the bottom exterior of the culvert, suggesting the culvert was constructed in the bottom of a drainage feature. The existing fill and alluvium appear to be unsatisfactory for support of the proposed retaining walls. Favorably, it appears the culvert bottom is supported, in part, by relatively shallow PWR and/or rock.

To provide a stable base for the wall foundation, we recommend undercutting the very loose old fill and alluvium from the proposed retaining wall limits (including the width of the reinforced zone for an MSE wall). Undercutting should extend to a depth of PWR/rock or stable residual soil, although the culvert foundation should not be undermined during excavation. The undercut limits should extend laterally at least 10 feet beyond the front of each wall. Anticipating soft, wet conditions near the bottom of excavation, the undercut subgrade could require stabilization using geotextile fabric with crushed stone. Depending on the undercut depth and groundwater elevation at the time of construction, some temporary dewatering and groundwater control could be needed during subgrade stabilization and initial backfilling. Following stabilization, the backfilling can continue up to the wall foundation elevation, provided the foreslope in front of the wall foundation is adequate for its global stability. If the area is constrained to prevent grading of an adequate foreslope in front of the wall, the wall foundation will need to be lowered or embedded deeper.

If the walls bear near the top of the culvert, a "cushion" layer of crushed stone should be placed to separate the structures. Also, the existing culvert should be structurally evaluated to check that it can support the toe stresses applied by the retaining wall foundations.

4.7 Corrosivity

4.7.1 Electrical Resistivity

Section 10.7.5 of the AASHTO LRFD Specifications describes soil conditions that are considered as indicative of potential pile/structure deterioration or a corrosive environment, including a lower bound threshold for soil resistivity of 2,000 ohm-centimeters (ohm-cm). Also referenced in LRFD Section 10.7.5 is FHWA Publication No. FHWA-RD-89-186 (by V. Elias, December 1990). This publication indicates soils with a resistivity greater than 10,000 ohm-cm are considered generally "non-corrosive", and soils with resistivity within the range of 5,000 to 10,000 ohm-cm are generally considered to be "mildly corrosive".

Electrical resistivity of five representative samples of soils from the proposed bridge locations are listed in the Electrochemical / Corrosion Series Testing table in Appendix IV. The soil resistivity values for two composite samples obtained from BR-3/4 (2 to 6 feet) and BR-8 (3 to 20 feet) were 9,200 ohm-cm and 6,100 ohm-cm, respectively, indicating mildly corrosive conditions. Composite samples from the other three locations tested had resistivity values ranging from 13,500 to 18,000 ohm-cm, which would be considered relatively non-corrosive.

4.7.2 Soil pH

Section 10.7.5 of the AASHTO LRFD Specifications describes soil conditions that are considered as indicative of potential pile/structure deterioration or a corrosive environment, including a lower bound threshold for soil pH at 5.5. Also referenced in LRFD Section 10.7.5 is FHWA Publication No. FHWA-RD-89-186 (by V. Elias, December 1990). From our review, this publication concluded that corrosion potential is a function of the combination of both pH and soil resistivity (with resistivity generally having more effect upon the total corrosivity of the environment).

Two of the five tested pH levels from BR-5 (13.5 to 35 feet) and BR-10 (13.5 to 35 feet) were 5.1 and 4.8, respectively, were both below the 5.5 pH threshold; however, the measured soil resistivity values of these samples were 18,000 and 13,500 ohm-cm, respectively. Both of these resistivity values were significantly higher than the 3,000 ohm-cm minimum threshold, and greater than the 10,000 ohm-cm threshold to be considered "non-corrosive". Thus, in our opinion, the combination of pH and resistivity for the tested samples indicates a resultant lower corrosion potential. The pH of the other three samples were 5.7, 6.2, and 6.6, all within the generally acceptable range limits. We recommend additional pH testing be performed during the design phase (particularly for the bridges represented by BR-5 and BR-10) to further assess the corrosion potential due to low pH and help determine whether corrosion prevention/ mitigation measures will be required.

4.7.3 Chloride Ion Content

Chloride ion contents of five representative samples of soils from the proposed bridge locations are listed in the Electrochemical / Corrosion Series Testing table in Appendix IV. Referenced above, the FHWA Publication No. FHWA-RD-89-186 (by V. Elias, December 1990) indicates that up to 100 parts per million (ppm, or mg/kg) chloride ion content by weight in soil is considered negligible for corrosion potential. The chloride content obtained from the laboratory analyses on the soils tested ranged from <13 to 54 ppm, below the threshold that would be considered susceptible for corrosion potential.

4.7.4 Sulfate Ion Content

Section 10.7.5 of the AASHTO LRFD Specifications describes soil conditions that are considered as indicative of potential pile/structure deterioration or a corrosive environment, including an upper bound threshold for soil sulfate concentration of 1000 parts per million (ppm, or mg/kg). Other published sources, such as the FHWA Publication No. FHWA-RD-89-186 (by V. Elias, December 1990), and the American Concrete Institute (ACI) "Manual of Concrete Practice", indicate that up to 200 ppm sulfate by weight in soil is considered negligible as far as corrosion potential to concrete.

Sulfate ion contents of five representative samples of soils from the proposed bridge locations are listed in the Electrochemical / Corrosion Series Testing table in Appendix IV. The measured sulfate content in the five soil samples ranged from <12 to 150 ppm, below the threshold(s) that would be considered susceptible for corrosion potential.

4.8 Retaining Walls

Retaining walls are planned for numerous areas of the site to accommodate grade changes and right-of-way constraints. Both cast-in-place concrete walls and Mechanically Stabilized Earth (MSE) walls are anticipated. Multiple borings (labeled as "RW-#") were performed to evaluate the subsurface conditions within the vicinity and/or foundation zone of several retaining walls. The design phase geotechnical explorations will need to explore some of these wall locations if further detail, and will need to explore other wall locations. External stability analyses will be required to evaluate global stability, overturning, sliding, bearing, and potential settlement of the retaining walls. Although the scope of our exploration does not include a thorough analysis of the external stability conditions, several borings encountered problematic conditions associated with wall design and/or construction.

We have highlighted two of these areas with profile Figures in Appendix II which illustrate the potential problematic conditions:

- Figure 29: I-85 Exit 87 (Ramp A), Station 1233+20, Boring RW-29
- Figure 30: I-85 Exit 96 (Ramp C), Station 1729+00, Boring RW-54

At both locations, retaining walls are planned to accommodate fill embankments within constrained areas, resulting in tall embankments/walls with heights of 20 to 30 feet. At these locations, the borings encountered thick zones of low-consistency, compressible soils (fill, alluvium, and residuum) below the bottom of wall subgrade. These materials can consolidate under the heavy surcharge load of the wall backfill, and can be unstable when evaluated for global stability.
As noted previously for the retaining walls at bridge abutments, some ground improvement could be required prior to retaining wall construction (depending on performance criteria for the wall and retained roadway/embankment). If the depth of unsuitable soil is relatively shallow, undercutting and replacement is often the first option for subgrade improvement. Other typical ground improvement methods for reducing settlement and/or improving global stability (when undercutting is not practical) include: soil mixing, injection grouting, fortifying the subgrade with stone columns or controlled-modulus columns, and installation of a deep foundation system (micropiles, continuous flight auger piles, driven timber piles).

Although profile Figures were not prepared for the following wall areas, we wanted to mention them as other potentially problematic areas that will need additional exploration, and possibly ground improvement measures:

- I-85 Mainline Station 978+00, Boring RW-4
- I-85 Mainline Station 1070+60, Boring RW-17
- I-85 Mainline Station 1484+00, Boring RW-36
- I-85 Mainline Station 1678+40, Boring RW-49
- I-85 Mainline Station 1703+00, Boring RW-50

4.9 Difficult Excavation

Excavation depths of up to 20 to 25 feet are planned in multiple "cut" areas of the site. Sixteen (16) borings penetrated PWR in lens/mass form as shallow as 2 feet below the ground surface and as deep as 47 feet. Refusal to auger advancement was encountered in fourteen (14) borings at depths of 5 to 43 feet below the ground surface. For several of the borings, the PWR or refusal level is below the planned excavation depth as shown on the provided cross-section drawings. However, several borings encountered PWR or refusal at depths above the plan subgrade elevation. Therefore, difficult excavation conditions due to PWR (and possibly rock in boulder, pinnacle, or mass form) should be expected during grading and slope excavation in these areas. Please keep in mind that the depth and consistency of PWR and rock vary significantly in this geologic region, and PWR/rock could be encountered at shallower depths intermediate of the boring locations.

We have highlighted a few of these areas with profile Figures in Appendix II which illustrate the potential difficult excavation conditions:

- Figure 31: I-85 Mainline Station 1073+07, Boring RW-19
- Figure 32: I-85 Mainline Station 1347+10, Boring RW-33
- Figure 33: I-85 Mainline Station 1777+50, Boring RW-61

The dense residual soils and most of the PWR can likely be excavated by pre-loosening these materials with a single-tooth ripper drawn with a large bulldozer (such as a CAT D8K). PWR in trenches and isolated areas can typically be removed with a large tracked excavator (such as a CAT 330), with a bucket equipped with hardened rock teeth. Although auger refusal was not encountered by the roadway borings (excluding the wall/culvert borings), it is our experience that PWR with N-values greater than roughly 50 over 2 inches could require rock excavation methods, such as blasting or the use of pneumatic equipment.

Prospective bidding Contractors should review the boring information carefully, anticipate the potential for difficult excavation conditions due to PWR (and possibly rock), and prepare their grading estimates accordingly.

4.10 Vibration Monitoring

Construction activities such as demolition, clearing, grading, compaction, and pile driving generate vibrations. Our experience indicates the perception of neighboring property owners can be more significant than the actual potential for damage. Vibrations, when coupled with noise from activities such as pile driving, are readily perceptible by people. The human perception threshold is actually much smaller than the threshold for damage to structures. When neighbors perceive vibrations, which may be well below damaging magnitudes, they can become more attuned to potential property damage, often noticing old problems such as cracks in walls and driveways previously overlooked.

SCDOT should require contractors to perform pre- and post-construction surveys on applicable structures within at least 150 feet of the site boundaries to document their condition before and after vibration generating construction activities. This survey should include video and photographic records and the installation of crack monitors throughout the area. Vibration monitoring should be performed during initial construction activity such as driving of sheet piles or light blasting. Depending on the levels recorded, vibration monitoring might also be continued throughout major construction activities to maintain a record of vibrations and to confirm that established thresholds are not exceeded.

4.11 Pavement Support

Borings NB-1 through NB-65, and SB-1 through SB-63, were performed along the roadway median and, coupled with 10 abutment borings performed at bridges and 66 borings for other roadways and structures, represent a spacing of about one boring per 450 to 500 feet of alignment. Classification of samples in the laboratory and visual classification of recovered samples was performed using AASHTO M-145 terminology and soil types accumulated by thickness boring-by-boring to determine a weighted average of available subgrade soil classifications along the alignment. Based upon the classification and physical tests performed on representative samples, only about 16 percent of materials in the upper five feet of the subgrade consist of soils classified favorably as A-2 or better. Conversely, 64 percent of soils along the alignment consist of soils classified adversely as A-6 or poorer.

California Bearing Ratio tests performed on sixteen (16) bulk samples obtained from median/roadway borings are summarized in Appendix IV. The test specimens were remolded at 95 percent of Standard Proctor maximum dry density. Of the sixteen (16) total samples, five (5) samples were classified as AASHTO A-4 (USCS classifications SM, SC, and SC-SM, per the index test results), and eleven (11) samples were classified as AASHTO A-6 (USCS classifications CL and SC, per the index test results).

Of the A-4 soils, the average CBR value was 9.0 percent, with a range of 4.8 percent to 13.7 percent. Of the A-6 soils, the average CBR value was 5.8 percent, with a range of 2.0 percent to 9.0 percent. Because the CBR of 2.0 appeared to be an outlier, it might be considered punitive/over-conservative to design the pavements based on this apparent lower-bound value. The next two lowest CBR values were 3.6 and 3.7 percent (both CL soils, similar to the first). If the low CBR value was discarded/discounted, statistically approximately 94 percent of the CBR values (15 out of 16 total) were at least 3.6 percent or higher.

5.0 Closing

Environmental assessments of soils, water, wetland, and endangered species were not included in our geotechnical scope of services for this project. Environmental-related documents (asbestos and lead-based paint surveys of several existing bridges) for this project are provided under separate cover.

This Geotechnical Base Line Report has been prepared in general accordance with SCDOT GDM Chapter 21 (as modified in SCDOT Bridge Design Memorandum 0510, dated October 22, 2010) and with generally accepted geotechnical engineering practice for specific application to this project. The preliminary recommendations and conclusions in this report are based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made. The Geotechnical Engineer of Record for the project must review the data submitted in this report and develop their own interpretation of the testing results as they apply to design.

The nature and extent of variations between the borings will not become evident until construction. If variations appear evident, then we will need to re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing by the submitting engineers.

APPENDICES

<u>Appendix I – Summary Tables of Boring Locations</u>

Table 1 – Summary of Northbound Median Boring Locations
Table 2 – Summary of Southbound Median Boring Locations
Table 3 – Summary of Test Locations for Replacement Bridges
Table 4 – Summary of Roadway Boring Locations

<u>Appendix II – Plans and Figures</u>

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<u>Appendix III – Soil Test Logs</u>

SCDOT gINT Soil/Rock Symbol Legend
Soil Test Logs for Northbound Median Borings (65)
Soil Test Logs for Southbound Median Borings (63)
Soil Test Logs for Bridge Borings (10)
Soil Test Logs for Roadway and Culvert Borings (66)
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<u>Appendix IV – Laboratory Test Data</u>

Summary of Laboratory Test Data – Northbound Median Borings
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<u>Appendix V – Rock Cores</u>

Table of Compressive Strength of Intact Rock Cores
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<u>Appendix VI – Shear Wave Velocity Test Data</u>

Summary of MASW / MAM Shear Wave Velocity Test Data
MASW / MAM Shear Wave Velocity Profiles (5)

APPENDIX I

SUMMARY TABLES OF BORING LOCATIONS

Table 1 – Summary of Northbound Median Boring Locations

Table 2 – Summary of Southbound Median Boring Locations

Table 3 – Summary of Test Locations for Replacement Bridges

Table 4 – Summary of Roadway Boring Locations

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

TABLE 1 - SUMMARY OF NORTHBOUND MEDIAN BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Depth (ft)	Surface Elevation (ft)	I-85 Mainline Station	Offset (ft)	GPS Coordinates			
					Latitude	Longitude	Northing	Easting
NB-1	5	803.2	875+00	5 RT	35.02902	-81.86591	1163866.7	1740729.1
NB-2	5	772.6	890+00	4.5 RT	35.03020	-81.86113	1164284.8	1742165.9
NB-3	5	729.1	904+50	4 RT	35.03134	-81.85646	1164688.5	1743565.9
NB-4	5	702.5	919+25	6 RT	35.03249	-81.85174	1165094.5	1744983.6
NB-5	5	701.4	934+00	9.5 RT	35.03364	-81.84702	1165502.2	1746399.2
NB-6	15	746.3	648+85	5 RT	35.03478	-81.84226	1165905.9	1747828.9
NB-7	15	815.1	963+50	10 RT	35.03593	-81.83756	1166312.9	1749237.7
NB-8	5	812.5	978+25	10 RT	35.03733	-81.83293	1166809.3	1750629.0
NB-9	5	844.5	993+00	17.5 RT	35.03911	-81.82848	1167448.2	1751964.9
NB-10	5	844.7	1007+90	19 RT	35.04092	-81.82405	1168095.2	1753296.2
NB-11	5	853.3	1022+60	19 RT	35.04271	-81.81965	1168736.7	1754619.9
NB-12	5	887.4	1037+25	16 RT	35.04452	-81.81524	1169385.1	1755945.5
NB-13	5	868.6	1052+00	16 RT	35.04633	-81.81084	1170032.6	1757267.0
NB-14	5	823.9	1066+75	17 RT	35.04813	-81.80643	1170679.2	1758592.1
NB-15	5	837.8	1081+50	16 RT	35.04993	-81.80202	1171323.1	1759918.1
NB-16	5	866.0	1096+25	18 RT	35.05174	-81.79761	1171971.2	1761243.4
NB-17	5	885.1	1111+00	15.5 RT	35.05352	-81.79320	1172610.8	1762568.0
NB-18	5	899.9	1125+75	6 RT	35.05532	-81.78877	1173257.2	1763900.1
NB-19	5	911.8	1140+50	15.5 RT	35.05734	-81.78451	1173982.5	1765181.2
NB-20	5	892.5	1155+20	12 RT	35.05973	-81.78053	1174840.2	1766378.1
NB-21	5	869.5	1170+05	14 RT	35.06213	-81.77651	1175705.7	1767587.7
NB-22	5	897.3	1184+65	15.5 RT	35.06450	-81.77259	1176559.0	1768768.2
NB-23	5	901.0	1199+60	16 RT	35.06692	-81.76856	1177430.9	1769980.5
NB-24	5	937.4	1214+00	15 RT	35.06924	-81.76465	1178266.8	1771155.7
NB-25	5	876.2	1229+00	10 RT	35.07160	-81.76056	1179119.4	1772388.2
NB-26	5	873.1	1243+80	9 RT	35.07297	-81.75599	1179606.6	1773758.9
NB-27	5	849.6	1258+50	8 RT	35.07361	-81.75112	1179830.9	1775218.2
NB-28	5	841.2	1273+10	8 RT	35.07427	-81.74632	1180058.6	1776655.8
NB-29	5	812.2	1288+00	8 RT	35.07490	-81.74139	1180279.2	1778131.5
NB-30	5	779.7	1302+95	8 RT	35.07556	-81.73647	1180508.1	1779605.5
NB-31	5	741.1	1317+50	7 RT	35.07621	-81.73165	1180734.9	1781049.0
NB-32	5	723.7	1332+25	11 RT	35.07687	-81.72680	1180963.5	1782503.6
NB-33	5	716.1	1347+00	11 RT	35.07794	-81.72169	1181344.3	1784034.7

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TABLE 1 - SUMMARY OF NORTHBOUND MEDIAN BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Depth (ft)	Surface Elevation (ft)	I-85 Mainline Station	Offset (ft)	GPS Coordinates			
					Latitude	Longitude	Northing	Easting
NB-34	5	763.6	1362+00	17 RT	35.07903	-81.71719	1181730.0	1785384.0
NB-35	5	809.6	1376+50	15 RT	35.08016	-81.71255	1182130.2	1786774.9
NB-36	5	814.3	1391+05	6 RT	35.08157	-81.70801	1182636.5	1788136.6
NB-37	5	792.3	1406+10	6 RT	35.08374	-81.70373	1183415.8	1789424.7
NB-38	5	750.8	1420+75	7 RT	35.08599	-81.69965	1184228.6	1790650.4
NB-39	5	806.9	1435+60	9 RT	35.08830	-81.69557	1185060.1	1791876.6
NB-40	5	847.1	1450+00	10 RT	35.09054	-81.69159	1185866.0	1793073.1
NB-41	5	824.7	1465+00	7 RT	35.09284	-81.68744	1186696.2	1794320.8
NB-42	5	816.6	1479+60	8 RT	35.09508	-81.68341	1187503.4	1795532.7
NB-43	5	790.6	1494+50	9 RT	35.09671	-81.67887	1188089.5	1796893.3
NB-44	5	816.8	1509+20	16 RT	35.09734	-81.67405	1188306.4	1798336.5
NB-45	5	809.6	1524+00	14 RT	35.09710	-81.66913	1188209.7	1799808.9
NB-46	5	810.5	1538+20	25.5 RT	35.09676	-81.66441	1188077.0	1801219.7
NB-47	5	785.6	1553+50	16 RT	35.09643	-81.65930	1187946.6	1802747.4
NB-48	5	788.4	1568+25	17 RT	35.09717	-81.65445	1188207.3	1804199.6
NB-49	5	778.8	1583+00	17 RT	35.09897	-81.65005	1188856.5	1805521.9
NB-50	5	756.5	1597+80	9 RT	35.10083	-81.64564	1189522.7	1806845.1
NB-51	5	726.2	1612+50	8 RT	35.10214	-81.64105	1189992.6	1808219.7
NB-52	5	716.0	1627+30	10 RT	35.10237	-81.63612	1190066.3	1809695.2
NB-53	5	705.7	1642+00	9 RT	35.10254	-81.63121	1190120.0	1811165.3
NB-54	5	693.7	1656+85	9 RT	35.10271	-81.62625	1190171.1	1812648.0
NB-55	5	682.6	1671+50	165 RT	35.10319	-81.62129	1190340.1	1814133.2
NB-56	5	669.6	1684+80	82 RT	35.10485	-81.61725	1190936.3	1815347.6
NB-57	5	627.0	1698+10	15 RT	35.10644	-81.61331	1191507.4	1816528.5
NB-58	15	657.9	1711+40	9 RT	35.10787	-81.60919	1192019.3	1817764.1
NB-59	15	703.2	1724+70	9 RT	35.10928	-81.60510	1192528.4	1818989.9
NB-60	5	723.2	1738+00	10 RT	35.11001	-81.60081	1192786.2	1820274.2
NB-61	5	706.9	1751+25	16.5 RT	35.11018	-81.59638	1192838.3	1821600.4
NB-62	5	670.5	1764+60	17 RT	35.11033	-81.59194	1192886.2	1822930.1
NB-63	5	632.9	1777+90	18 RT	35.11057	-81.58750	1192965.5	1824256.4
NB-64	5	593.8	1791+15	17 RT	35.11205	-81.58345	1193498.1	1825470.7
NB-65	5	580.2	1804+50	9 RT	35.11457	-81.58023	1194410.9	1826441.4

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TABLE 2 - SUMMARY OF SOUTHBOUND MEDIAN BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Depth (ft)	Surface Elevation (ft)	I-85 Mainline Station	Offset (ft)	GPS Coordinates			
					Latitude	Longitude	Northing	Easting
SB-1	5	731.0	897+00	2 LT	35.03089	-81.85892	1164531.4	1742829.2
SB-2	5	731.2	911+70	5 LT	35.03201	-81.85420	1164927.5	1744243.9
SB-3	5	689.1	926+50	10.5 LT	35.03325	-81.84905	1165366.3	1745793.2
SB-4	5	715.4	941+30	9.5 LT	35.03431	-81.84471	1165739.0	1747093.6
SB-5	15	780.4	956+00	10.5 LT	35.03546	-81.84002	1166146.9	1748500.0
SB-6	15	824.7	971+00	9 LT	35.03666	-81.83523	1166574.1	1749939.2
SB-7	5	826.8	985+45	9 LT	35.03831	-81.83083	1167161.3	1751260.1
SB-8	5	851.4	1000+40	9.5 LT	35.04012	-81.82633	1167812.4	1752612.7
SB-9	5	836.5	1015+00	9 LT	35.04191	-81.82200	1168450.3	1753914.0
SB-10	5	876.1	1030+00	16.5 LT	35.04373	-81.81750	1169102.2	1755265.6
SB-11	5	887.5	1044+50	9.5 LT	35.04551	-81.81315	1169741.4	1756572.6
SB-12	5	841.5	1059+40	9 LT	35.04733	-81.80868	1170393.4	1757916.0
SB-13	5	830.5	1074+00	9 LT	35.04912	-81.80434	1171035.9	1759220.7
SB-14	5	848.8	1088+90	10 LT	35.05095	-81.79988	1171691.3	1760561.4
SB-15	5	878.0	1103+60	9.5 LT	35.05272	-81.79550	1172325.9	1761877.9
SB-16	5	892.4	1118+20	9 LT	35.05452	-81.79110	1172968.6	1763198.9
SB-17	5	907.1	1133+00	9.5 LT	35.05632	-81.78669	1173616.5	1764524.7
SB-18	5	906.5	1148+00	9 LT	35.05866	-81.78258	1174458.0	1765760.5
SB-19	5	877.5	1162+50	9 LT	35.06101	-81.77864	1175304.4	1766946.4
SB-20	15	879.6	1177+30	9.5 LT	35.06340	-81.77465	1176164.0	1768146.8
SB-21	5	894.3	1192+00	10 LT	35.06577	-81.77067	1177020.2	1769344.0
SB-22	5	932.0	1206+50	9 LT	35.06811	-81.76676	1177863.0	1770520.7
SB-23	5	910.7	1221+60	9 LT	35.07051	-81.76270	1178725.9	1771744.4
SB-24	5	866.6	1236+40	16.5 LT	35.07258	-81.75839	1179468.5	1773037.6
SB-25	5	872.0	1251+00	18 LT	35.07340	-81.75363	1179758.8	1774466.6
SB-26	5	840.7	1265+85	17 LT	35.07405	-81.74872	1179982.4	1775937.2
SB-27	5	825.8	1280+60	16.5 LT	35.07468	-81.74385	1180204.4	1777396.5
SB-28	5	796.9	1295+40	16 LT	35.07535	-81.73897	1180435.4	1778856.5
SB-29	5	759.3	1310+00	16.5 LT	35.07599	-81.73415	1180658.6	1780300.7
SB-30	5	735.2	1325+00	10.5 LT	35.07663	-81.72921	1180882.8	1781781.1
SB-31	5	663.9	1340+00	11 LT	35.07742	-81.72430	1181157.0	1783251.6
SB-32	5	737.6	1354+30	10 LT	35.07850	-81.71970	1181541.7	1784632.4
SB-33	5	787.4	1370+00	10.5 LT	35.07966	-81.71500	1181954.3	1786041.2

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TABLE 2 - SUMMARY OF SOUTHBOUND MEDIAN BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Depth (ft)	Surface Elevation (ft)	I-85 Mainline Station	Offset (ft)	GPS Coordinates			
					Latitude	Longitude	Northing	Easting
SB-34	5	815.7	1384+00	10 LT	35.08089	-81.71022	1182394.4	1787474.6
SB-35	5	811.2	1398+60	5 LT	35.08266	-81.70584	1183028.8	1788788.9
SB-36	5	766.5	1413+35	17 LT	35.08495	-81.70177	1183854.7	1790013.5
SB-37	5	776.6	1428+15	17 LT	35.08723	-81.69769	1184674.2	1791240.1
SB-38	5	833.3	1443+00	18 LT	35.08954	-81.69360	1185505.7	1792470.5
SB-39	5	835.9	1457+50	16.5 LT	35.09177	-81.68959	1186312.0	1793673.1
SB-40	5	833.9	1472+50	17 LT	35.09410	-81.68546	1187150.8	1794916.2
SB-41	5	787.7	1487+00	5 LT	35.09613	-81.68128	1187882.3	1796170.4
SB-42	5	817.9	1502+00	8 LT	35.09727	-81.67647	1188285.7	1797612.1
SB-43	5	810.0	1516+50	17 LT	35.09735	-81.67161	1188306.4	1799065.5
SB-44	5	813.1	1531+40	10 LT	35.09698	-81.66665	1188161.4	1800549.7
SB-45	5	790.8	1546+00	9 LT	35.09664	-81.66180	1188029.9	1802001.6
SB-46	5	786.2	1561+00	9 LT	35.09667	-81.65681	1188029.8	1803494.0
SB-47	5	785.4	1575+60	13 LT	35.09809	-81.65227	1188540.2	1804854.9
SB-48	5	770.8	1590+45	17 LT	35.09996	-81.64786	1189213.2	1806177.0
SB-49	5	740.7	1605+00	17.5 LT	35.10171	-81.64349	1189841.0	1807488.3
SB-50	5	720.5	1620+00	18 LT	35.10235	-81.63856	1190063.0	1808966.9
SB-51	5	711.4	1634+50	16 LT	35.10251	-81.63372	1190114.4	1810415.3
SB-52	5	700.4	1649+00	6 LT	35.10272	-81.62887	1190180.8	1811864.4
SB-53	5	689.0	1664+00	9 LT	35.10299	-81.62389	1190271.2	1813357.1
SB-54	5	672.5	1678+38	5 LT	35.10439	-81.61941	1190771.2	1814698.7
SB-55	5	647.2	1692+20	10.5 LT	35.10587	-81.61515	1191304.0	1815977.7
SB-56	5	631.3	1705+00	15.5 LT	35.10723	-81.61120	1191792.7	1817160.6
SB-57	15	694.4	1718+50	7 LT	35.10867	-81.60705	1192307.2	1818404.9
SB-58	15	710.7	1731+50	7 LT	35.10990	-81.60298	1192750.2	1819626.9
SB-59	5	724.3	1744+45	6 LT	35.11017	-81.59867	1192838.3	1820916.7
SB-60	5	687.7	1758+35	9 LT	35.11033	-81.59401	1192888.3	1822308.8
SB-61	5	650.2	1771+80	9 LT	35.11048	-81.58952	1192936.2	1823653.1
SB-62	5	612.8	1784+95	9 LT	35.11123	-81.58529	1193202.0	1824921.0
SB-63	5	580.6	1798+30	8.5 LT	35.11344	-81.58178	1194002.2	1825974.9

301 Zima Park Drive
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TABLE 3 - SUMMARY OF TEST LOCATIONS FOR REPLACEMENT BRIDGES
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring / Test Number	Total Depth (ft)	Surface Elev. (ft)	I-85 Mainline Station	Offset (ft)	GPS Coordinates				For Replacement Bridge Over I-85:
					Latitude	Longitude	Northing	Easting	
BR-1	76.0	878.9	1031+24	105 LT	35.044138	-81.817290	1169251.7	1755330.8	Battleground Road (SC-110); NW end
BR-2	90.2	876.9	1031+15	90 RT	35.043645	-81.817014	1169071.4	1755412.0	Battleground Road (SC-110); SE end
SW-1* (MASW/MAM)	110	881 (average)	1031+40	85 LT	35.044107	-81.817181	--	--	Battleground Road (SC-110); NW end
BR-3	94.3	901.4	1128+40	90 LT	35.055947	-81.788185	1173482.2	1764076.1	Sunny Slope Drive (S-11-131); NW end
BR-4	65.0	899.0	1128+36	67 RT	35.055527	-81.787930	1173329.0	1764151.3	Sunny Slope Drive (S-11-131); SE end
SW-2* (MASW/MAM)	100	896 (average)	1126+90	70 RT	35.055374	-81.788387	--	--	Sunny Slope Drive (S-11-131); SE end
BR-5	61.0	877.2	1229+00	90 LT	35.071866	-81.760759	1179215.6	1772327.8	Macedonia Road (S-11-39); NW end
BR-6	50.5	872.5	1228+80	90 RT	35.071418	-81.760533	1179051.8	1772394.3	Macedonia Road (S-11-39); SE end
SW-3* (MASW/MAM)	120+	878 (average)	1229+40	90 LT	35.071931	-81.760654	--	--	Macedonia Road (S-11-39); NW end
BR-7	51.0	690.0	1656+80	90 RT	35.102498	-81.626261	1190095.9	1812645.3	Pleasant School Rd. (S-11-82); S end
BR-8	43.0	693.4	1656+75	80 LT	35.102955	-81.626310	1190262.3	1812631.8	Pleasant School Rd. (S-11-82); N end
SW-4* (MASW/MAM)	130+	690 (average)	1656+30	100 RT	35.102463	-81.626406	--	--	Pleasant School Rd. (S-11-82); S end
BR-9	69.2	706.8	1734+10	90 RT	35.109739	-81.602079	1192688.8	1819895.0	Shelby Highway (SC-18); South end
BR-10	71.8	712.7	1734+05	75 LT	35.110185	-81.602162	1192851.1	1819871.0	Shelby Highway (SC-18); North end
SW-5* (MASW/MAM)	130	715 (average)	1735+00	110 LT	35.110322	-81.601848	--	--	Shelby Highway (SC-18); North end

Note: For the Shear Wave Velocity Tests (MASW/MAM), SW-1 through SW-5, array is centered at the approximate Station/Offset and Lat./Long. coordinates indicated, and the ground surface elevation is the average along the array.

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TABLE 4 - SUMMARY OF ROADWAY BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring No.	Depth (ft)	Surface Elev. (ft)	Station	Offset (ft)	Route	Alignm't	GPS Coordinates			
							Latitude	Longitude	Northing	Easting
RW-1	25	821.1	1506+80	100 LT	I-85	Mainline	35.097638	-81.674894	1188418.2	1798085.1
RW-2	30	720.6	901+20	70 RT	I-85	Mainline	35.030977	-81.857483	1164558.5	1743259.0
RW-3	30	800.0	957+00	97 LT	I-85	Mainline	35.035768	-81.839806	1166259.0	1748565.8
RW-4	25	797.3	978+00	96 LT	I-85	Mainline	35.037594	-81.833199	1166907.6	1750548.9
RW-5	30	837.5	989+80	70 RT	I-85	Mainline	35.038637	-81.829401	1167278.1	1751689.3
R-6	25	856.8	1002+00	80 LT	I-85	Mainline	35.040489	-81.825993	1167943.9	1752714.8
RW-7	28.8	832.8	1016+60	76 LT	I-85	Mainline	35.042265	-81.821610	1168580.1	1754032.0
R-8	20	865.9	1025+70	86 LT	I-85	Mainline	35.043403	-81.818912	1168988.0	1754843.1
R-9	15	859.8	1024+70	95 RT	I-85	Mainline	35.042834	-81.818946	1168781.0	1754831.2
R-10	15	877.8	25+20	15 RT	SC-110	Reloc. CL	35.045683	-81.817830	1169815.1	1755173.5
R-11	50	860.8	38+35	18 RT	SC-110	Reloc. CL	35.042386	-81.816180	1168611.0	1755658.0
R-12	15	865.3	68+90	60 RT	S-1009/2005	Reloc. CL	35.045659	-81.821565	1169815.2	1754055.4
R-13	20	892.1	83+00	10 LT	Phillips Dr.	Reloc. CL	35.047065	-81.817204	1170316.7	1755364.8
R-14	20	883.9	1035+50	85 LT	I-85	Mainline	35.044597	-81.815984	1169415.5	1755722.9
R-15	15	887.3	1037+60	55 RT	I-85 Exit 83	A 83 RD	35.044108	-81.814452	1169233.9	1756180.1
RW-16	43	826.6	1063+75	80 LT	I-85	Mainline	35.048035	-81.807495	1170647.0	1758274.0
RW-17	32	823.7	1070+60	75 LT	I-85	Mainline	35.048871	-81.805475	1170946.5	1758880.9
RW-18	18.4	826.3	1064+25	74 RT	I-85	Mainline	35.047721	-81.807136	1170531.9	1758380.4
RW-19	31.6	842.6	1073+07	96 RT	I-85	Mainline	35.048750	-81.804442	1170900.1	1759190.0
R-20	15	897.2	1116+50	23 RT	S-665	Reloc. CL	35.055255	-81.791971	1173239.3	1762941.0
R-21	20	905.2	1141+15	82 LT	I-85	Mainline	35.057698	-81.784553	1174111.3	1765168.2
R-22	20	902.5	20+85	10 LT	S-11-131	Reloc. CL	35.054226	-81.786975	1172853.0	1764433.6
RW-23	50	953.2	1213+00	96 LT	I-85	Mainline	35.069349	-81.765172	1178309.0	1771000.4
R-24	15	907.0	302+00	8 LT	Cann. Camp.	Exist. CL	35.067745	-81.764353	1177723.2	1771241.4
R-25	35	881.9	1225+50	15 RT	I-85 Exit 87	Ramp C	35.070414	-81.761194	1178687.8	1772193.9
R-26	20	891.9	1226+45	50 RT	I-85 Exit 87	Ramp B	35.071638	-81.761678	1179134.4	1772052.2
R-27	20	876.8	116+50	20 LT	S-11-39	Reloc. CL	35.074049	-81.761650	1180012.1	1772067.2
R-28	15	869.1	142+55	40 LT	S-11-39	Reloc. CL	35.067442	-81.758330	1177599.8	1773043.1
RW-29	50	868.1	1233+20	30 LT	I-85 Exit 87	Ramp A	35.072799	-81.759518	1179552.4	1772701.9
R-30	20	865.3	1238+80	25 RT	I-85 Exit 87	Ramp D	35.072386	-81.757465	1179397.4	1773315.0
RW-31	35	881.5	1250+40	120 RT	I-85	Mainline	35.073010	-81.753712	1179616.3	1774439.7
RW-32	30	778.9	1302+10	110 LT	I-85	Mainline	35.075898	-81.736830	1180631.1	1779499.3
RW-33	26.8	738.4	1347+10	120 RT	I-85	Mainline	35.077614	-81.721863	1181224.4	1783982.4

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

TABLE 4 - SUMMARY OF ROADWAY BORING LOCATIONS
I-85 WIDENING MM 80-96
Spartanburg/Cherokee Counties, South Carolina
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring No.	Depth (ft)	Surface Elev. (ft)	Station	Offset (ft)	Route	Alignm't	GPS Coordinates			
							Latitude	Longitude	Northing	Easting
R-34	5	782.0	1428+00	85 LT	I-85	Mainline	35.087379	-81.697883	1184729.4	1791182.2
R-35	15	837.8	1473+00	95 LT	I-85	Mainline	35.094347	-81.685511	1187241.1	1794901.0
RW-36	30	791.3	1484+00	95 LT	I-85	Mainline	35.095937	-81.682304	1187813.8	1795864.1
RW-37	20	784.0	1563+50	70 RT	I-85	Mainline	35.096598	-81.655923	1188003.1	1803758.3
RW-38	20	745.8	1601+00	75 LT	I-85	Mainline	35.101452	-81.644829	1189749.2	1807088.3
RW-39	20	714.3	1621+00	76 RT	I-85	Mainline	35.102123	-81.638270	1189981.1	1809052.0
RW-40	20	701.3	1637+00	83 RT	I-85	Mainline	35.102296	-81.632857	1190034.3	1810671.7
R-41	25	700.7	1649+60	35 RT	I-85 Exit 95	Ramp B	35.102864	-81.628668	1190233.5	1811926.2
R-42	20	668.9	1651+00	32 LT	S-614	Reloc. CL	35.100561	-81.628306	1189394.3	1812029.3
R-43	17.4	667.7	192+75	20 LT	S-11-82	Reloc. CL	35.100891	-81.626977	1189512.1	1812427.5
R-44	30	707.3	212+40	15 RT	S-11-82	Reloc. CL	35.105794	-81.625189	1191293.7	1812973.2
R-45	25	699.3	1661+80	150 RT	S-668	Reloc. CL	35.104334	-81.624984	1190761.9	1813031.4
R-46	25	700.2	1663+00	2 LT	I-85 Exit 95	Ramp A	35.103366	-81.624362	1190408.3	1813215.4
R-47	20	703.2	1665+00	60 RT	I-85 Exit 95	Ramp D	35.102149	-81.623259	1189963.4	1813542.8
R-48	20	685.4	127+40	5 LT	SC-18	Reloc. CL	35.103221	-81.619967	1190347.8	1814529.7
RW-49	30	663.7	1678+40	100 LT	I-85	Mainline	35.104582	-81.619530	1190842.2	1814663.5
RW-50	25	620.3	1703+00	90 LT	I-85	Mainline	35.107198	-81.611960	1191781.1	1816933.6
R-51	20	710.0	1723+00	94 LT	I-85	Mainline	35.109353	-81.605773	1192554.7	1818789.0
R-52	35	719.6	1732+60	45 RT	I-85 Exit 96	Ramp B	35.110515	-81.602991	1192972.8	1819623.7
R-53	15	711.5	1733+10	10 RT	S-668	Reloc. CL	35.111752	-81.604004	1193424.8	1819323.4
RW-54	50	701.0	1729+00	20 LT	I-85 Exit 96	Ramp C	35.109315	-81.603581	1192537.0	1819444.6
R-55	35	691.2	183+85	40 LT	SC-329	Reloc. CL	35.106078	-81.599868	1191352.0	1820548.5
R-56	15	723.0	193+20	2 LT	SC-329	Reloc. CL	35.108174	-81.601568	1192117.9	1820044.5
R-57	20	708.2	211+40	20 RT	SC-329	Reloc. CL	35.113042	-81.601398	1193889.8	1820105.7
R-58	30	719.8	1735+80	30 LT	I-85 Exit 96	Ramp D	35.109595	-81.601531	1192635.3	1820058.5
R-59	40	738.4	1744+00	10 LT	I-85 Exit 96	Ramp A	35.110502	-81.598793	1192960.5	1820879.3
R-60	25	710.3	1750+00	15 LT	S-668	Reloc. CL	35.110581	-81.596800	1192985.8	1821475.7
RW-61	50	658.6	1777+50	115 RT	I-85	Mainline	35.110262	-81.587575	1192854.1	1824234.4
C-1	35.5	820.5	1016+70	125 RT	I-85	Mainline	35.041779	-81.821248	1168402.3	1754138.9
C-4	50	736.1	1420+00	118 RT	I-85	Mainline	35.085619	-81.699665	1184102.4	1790635.9
C-7	24.7	779.9	1489+40	105 RT	I-85	Mainline	35.096081	-81.680388	1187862.1	1796437.7
C-9	25.6	640.2	185+00	7 RT	S-11-82	Reloc. CL	35.099105	-81.628339	1188864.5	1812016.3
C-10	22	640.4	184+65	20 LT	S-11-82	Reloc. CL	35.099046	-81.628505	1188843.1	1811966.4

APPENDIX II

PLANS AND FIGURES

Boring Location Plans (17) – Figures 1-17

MASW / MAM Location Plans (5) – Figures 18-22

Generalized Subsurface Profiles (11) – Figures 23-33

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SCALE: As Shown	PROJECT NO: 1426-14-161	

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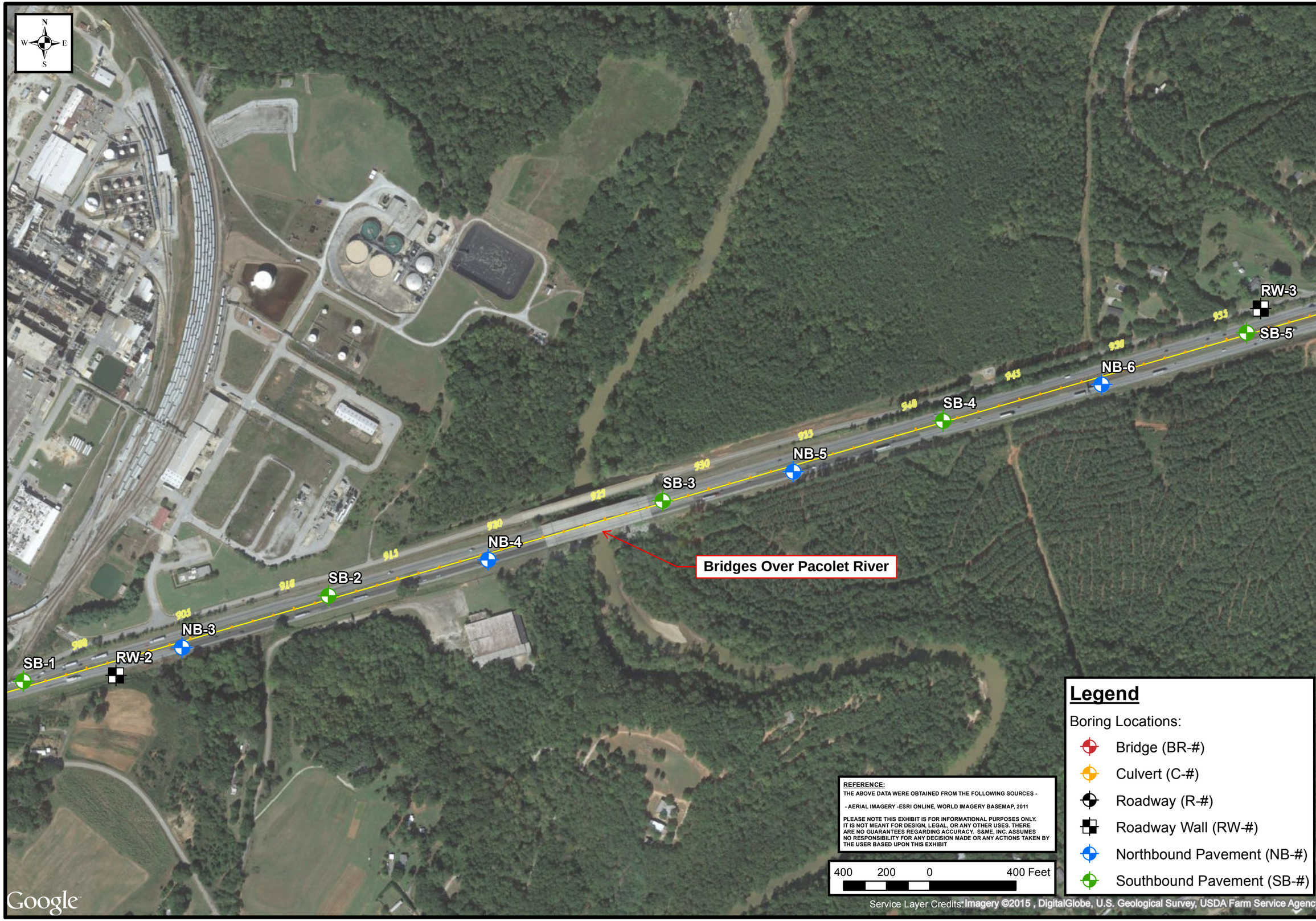
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

1



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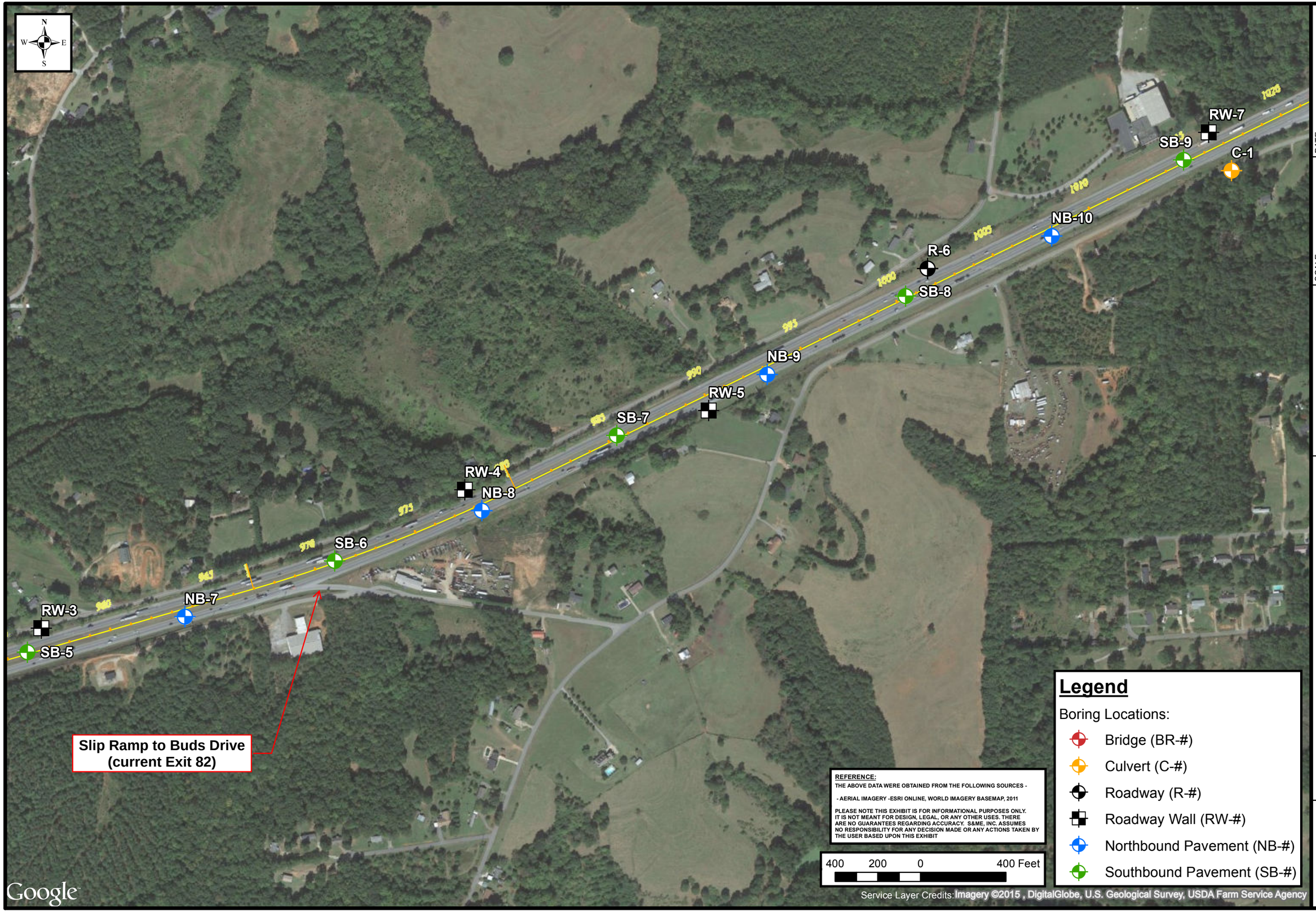
I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

2



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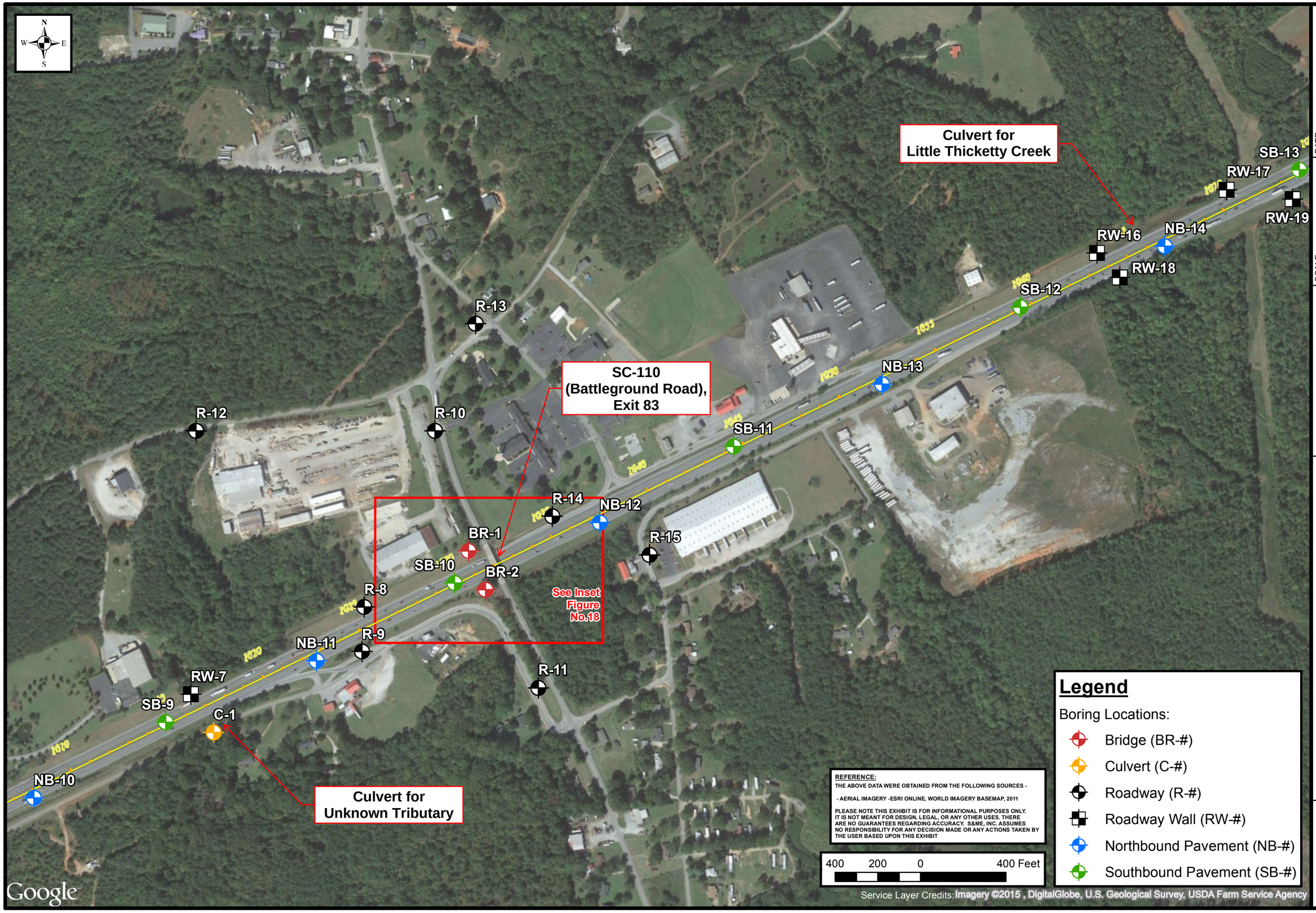
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

3



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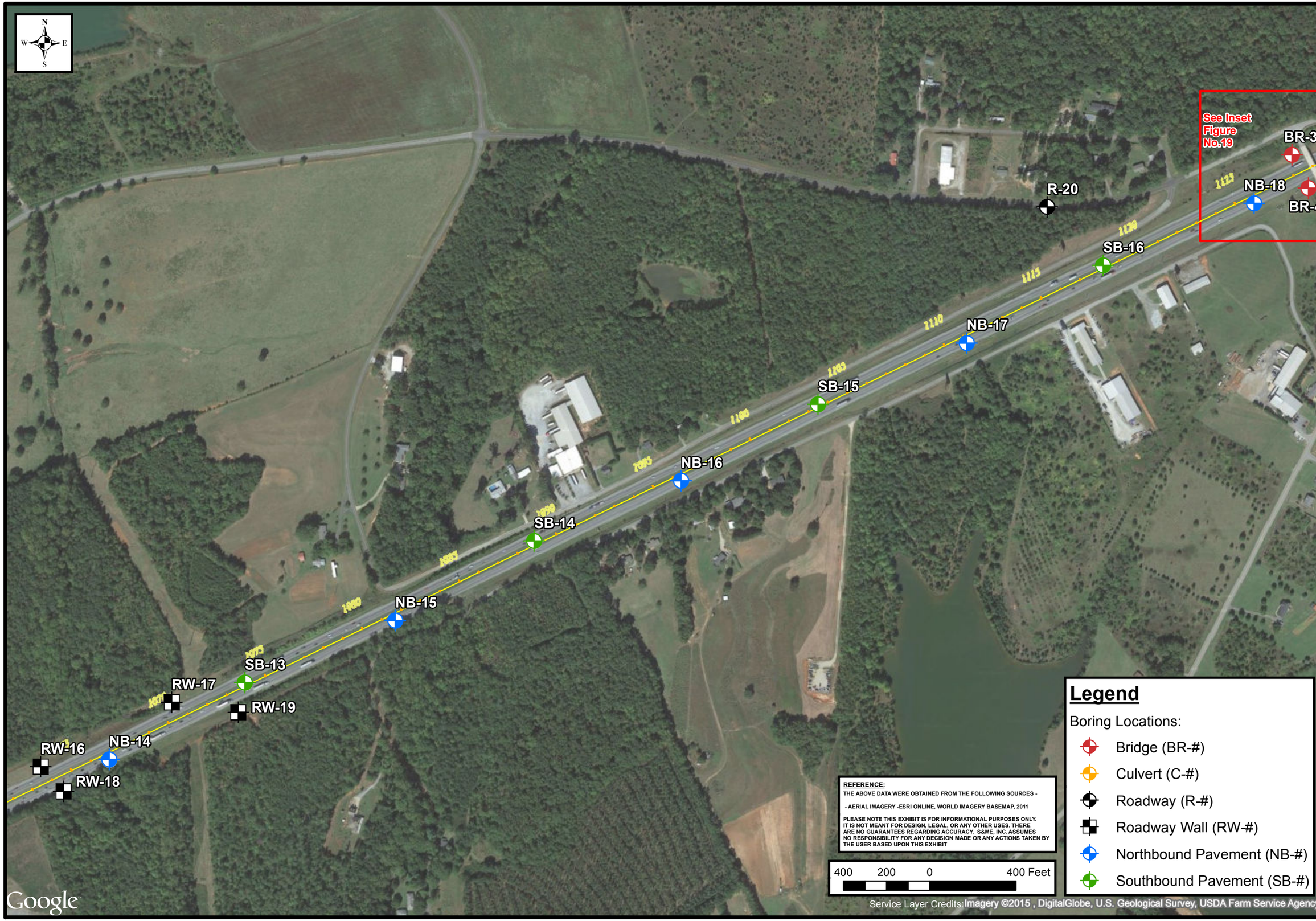
I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

4



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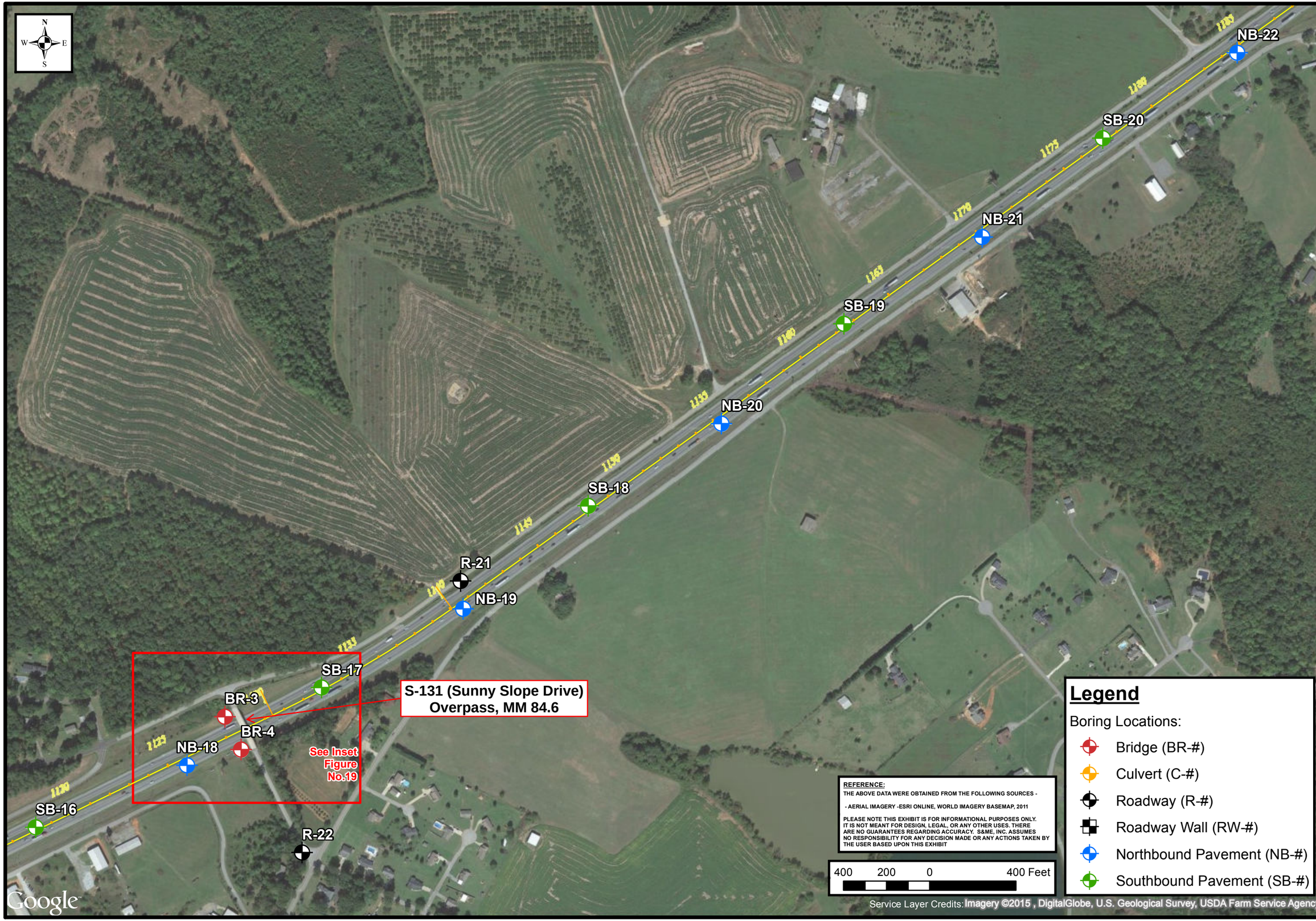
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

5



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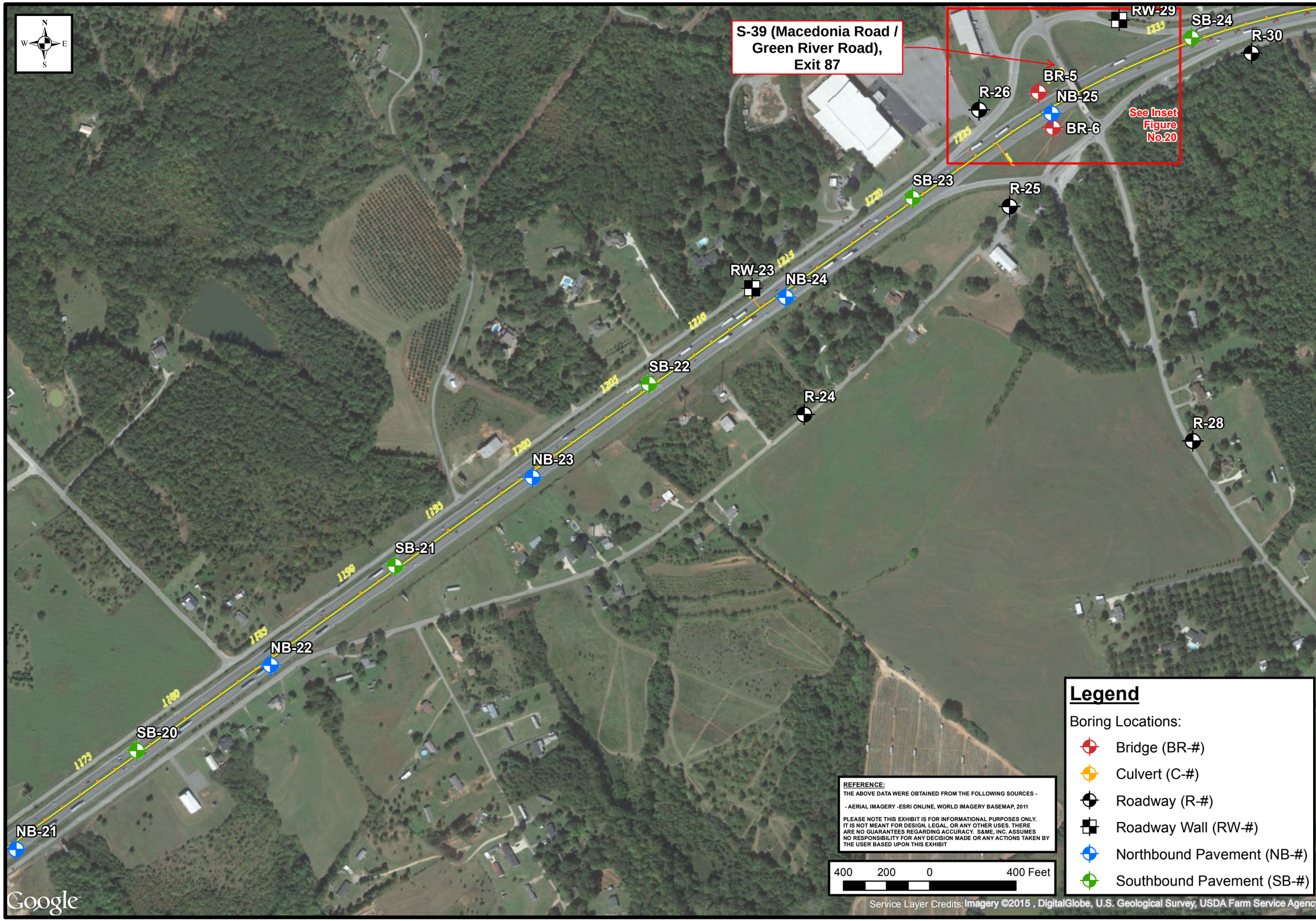
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

6



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Boring Location Plan

I-85 Widening MM80 - MM96
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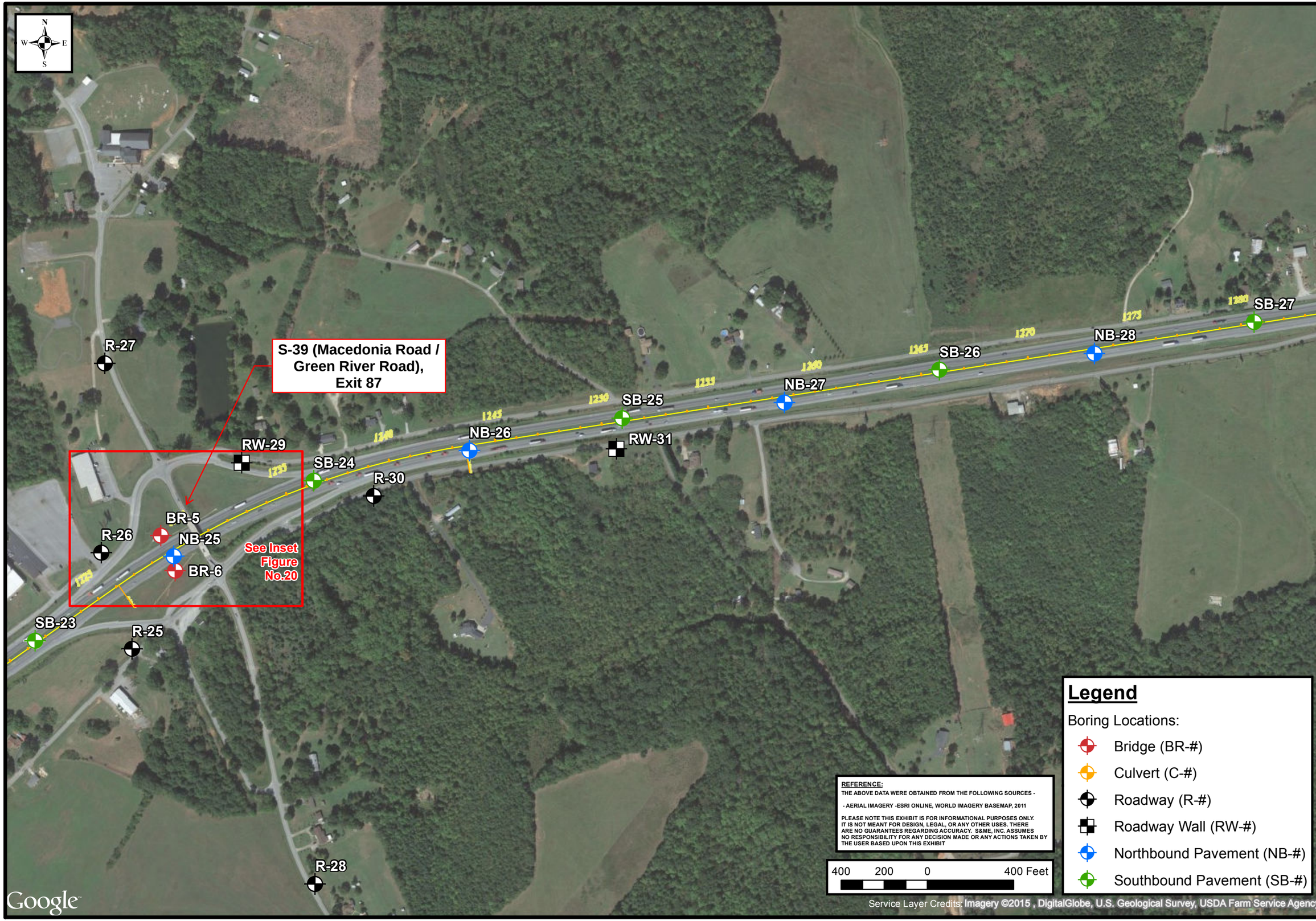
Figure No.

7



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Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

8

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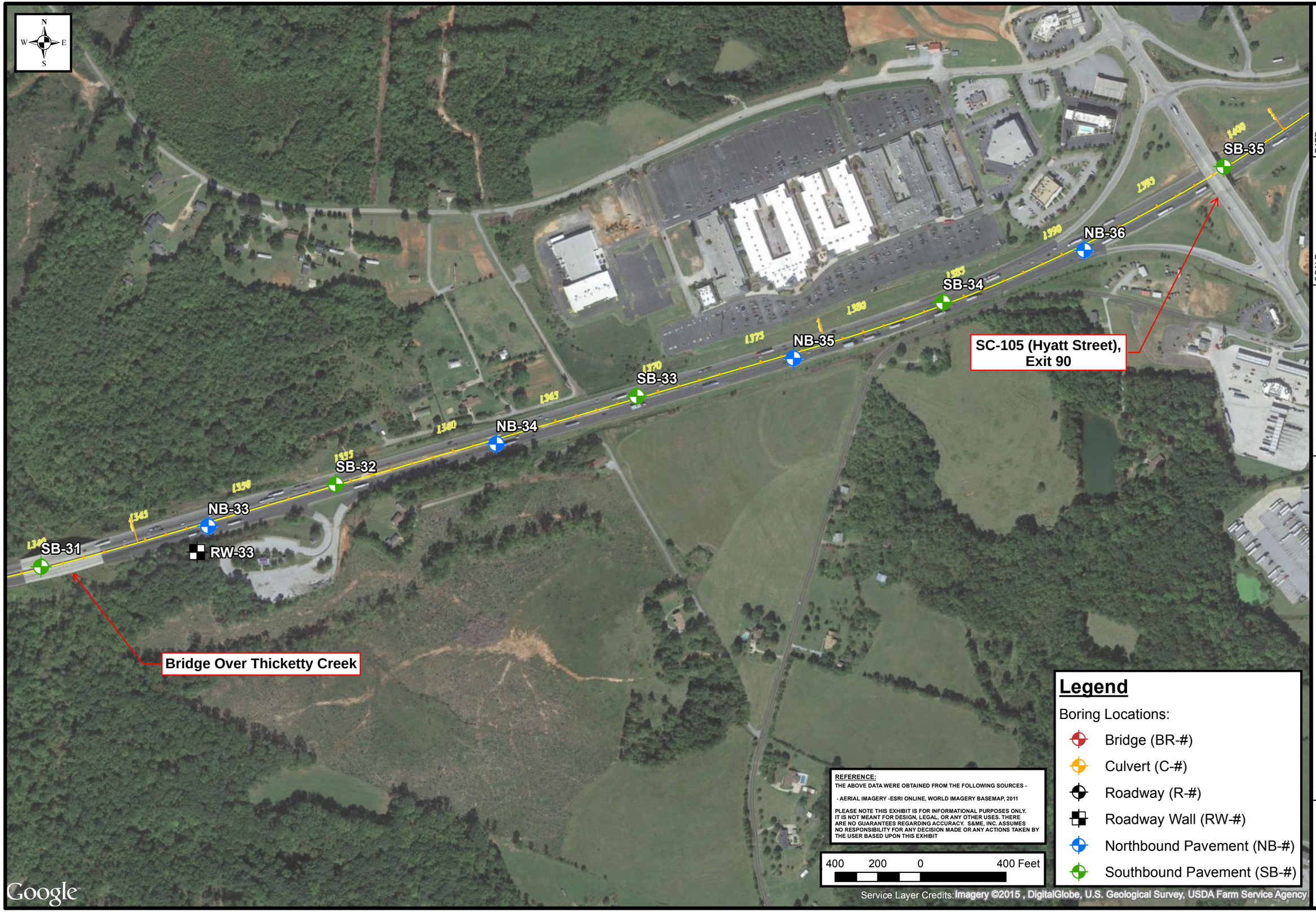
I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

9



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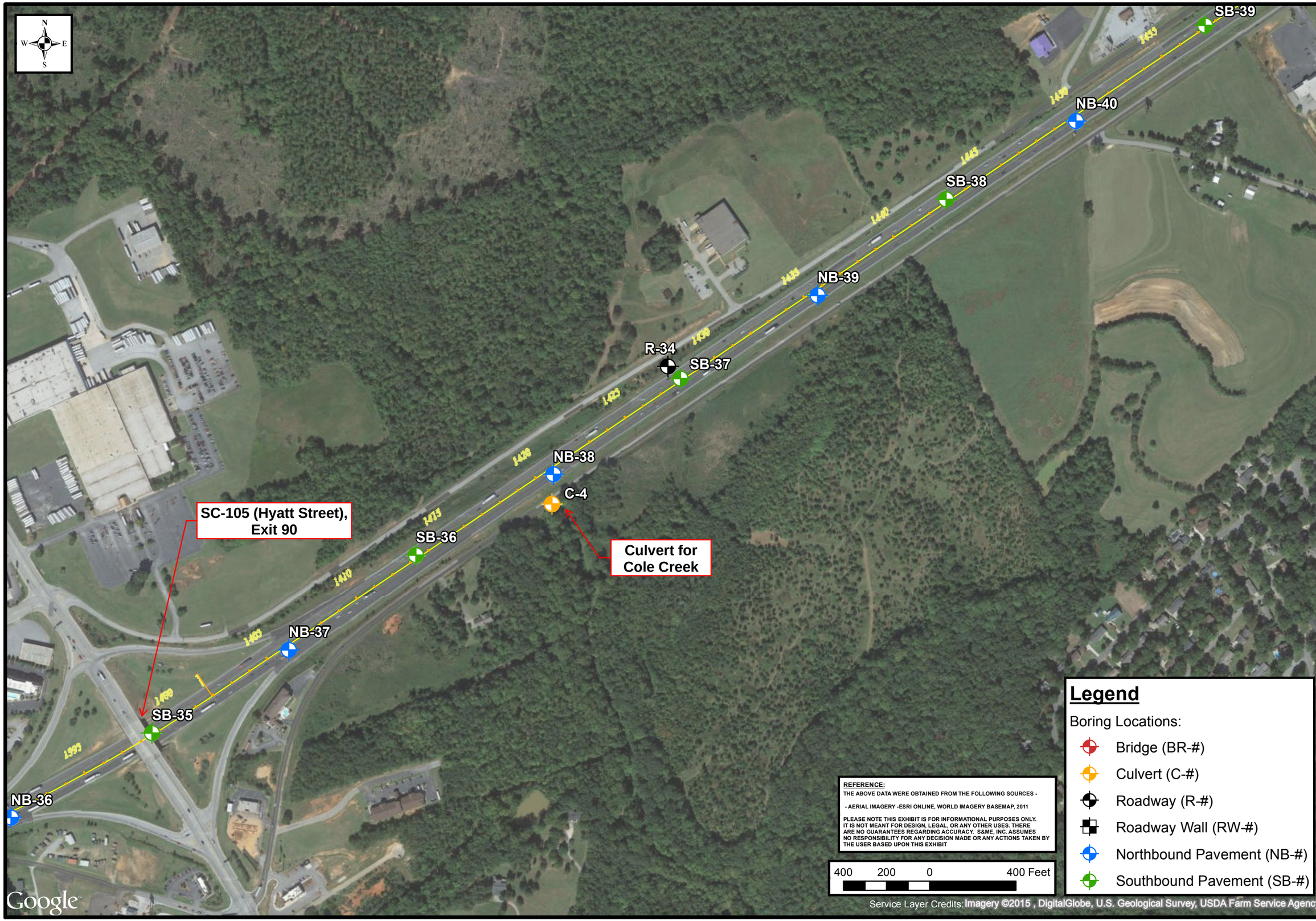
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.
10



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I-85 Widening MM80 - MM96
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Figure No.

11

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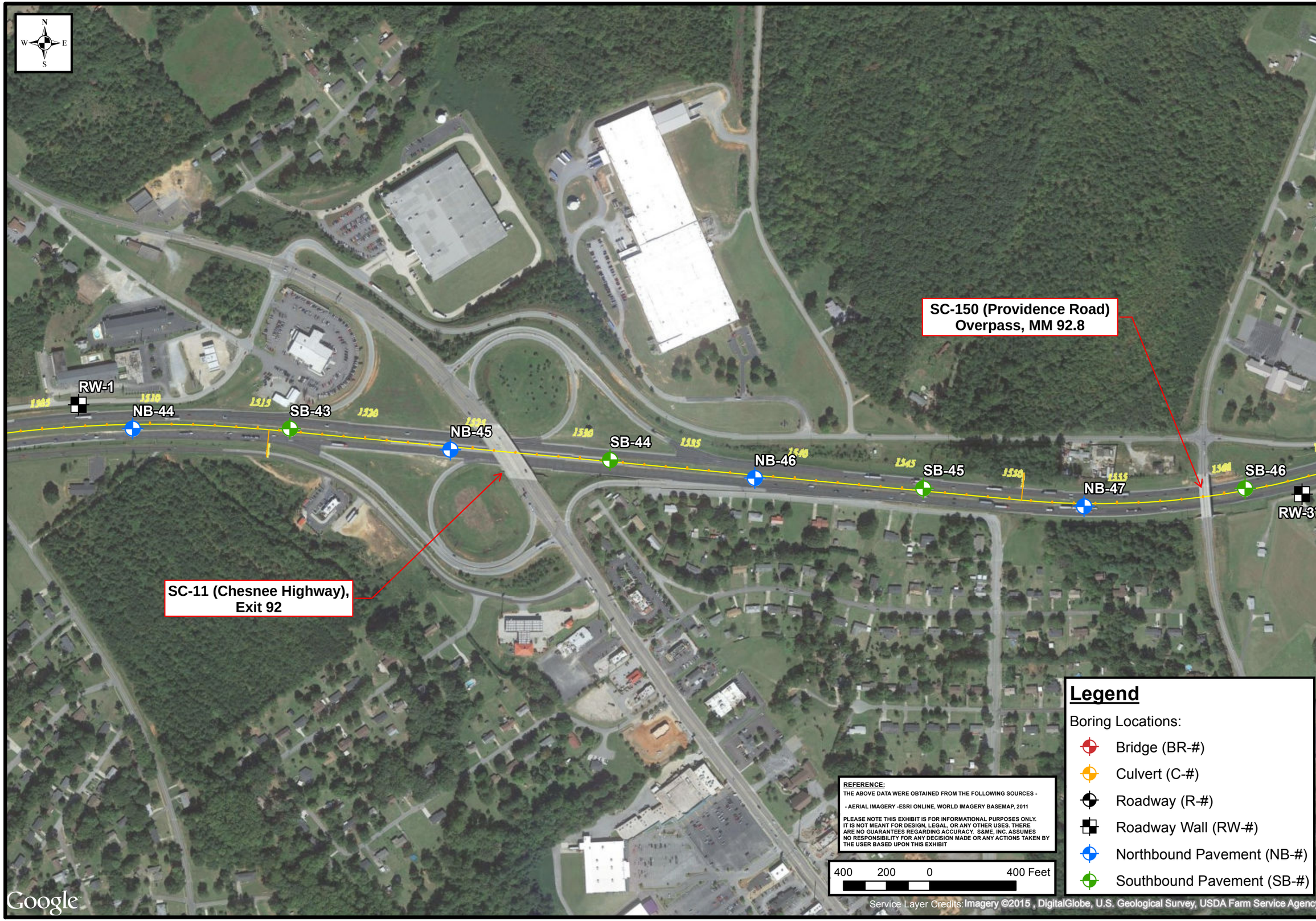
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.
12



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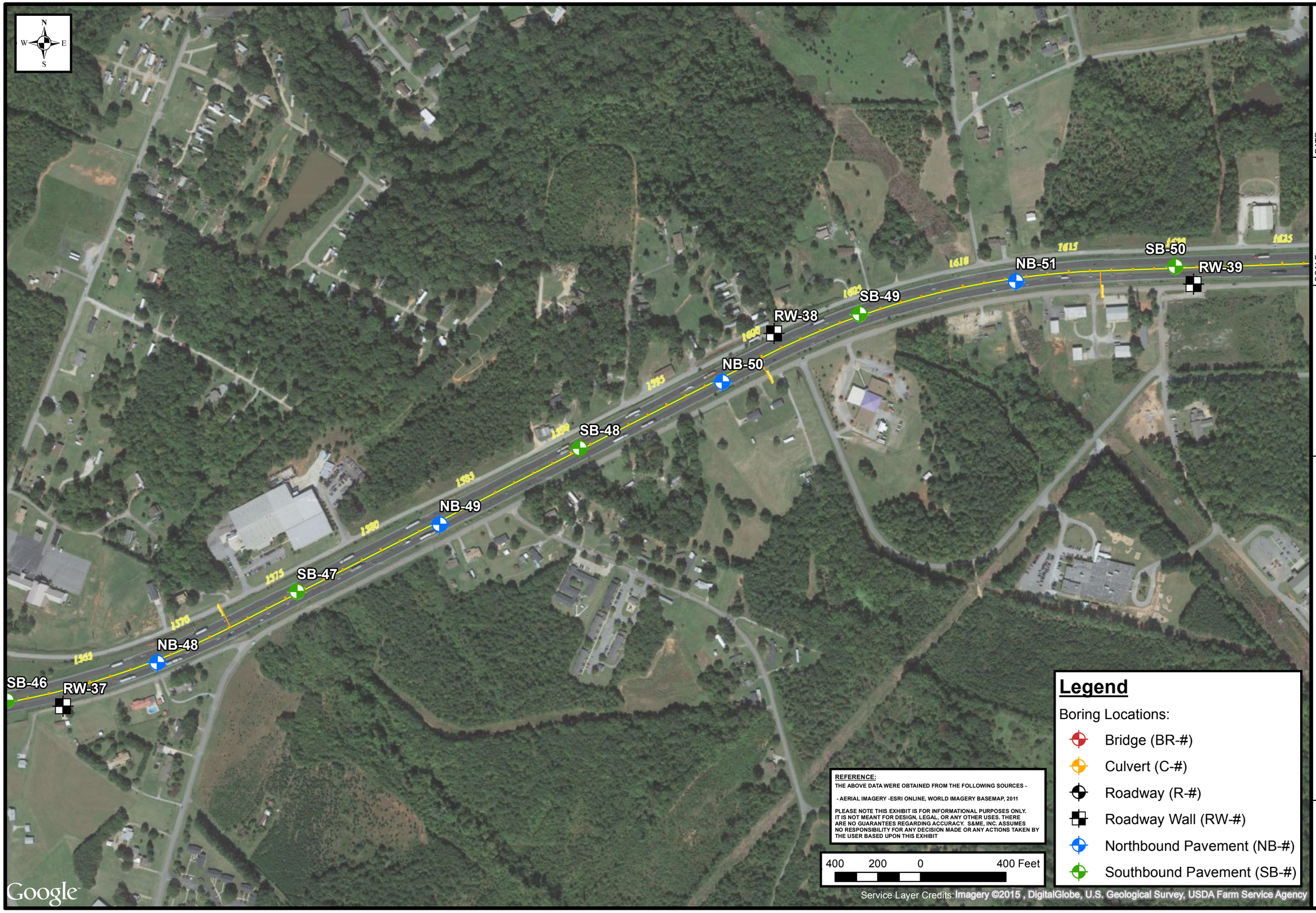
I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

13



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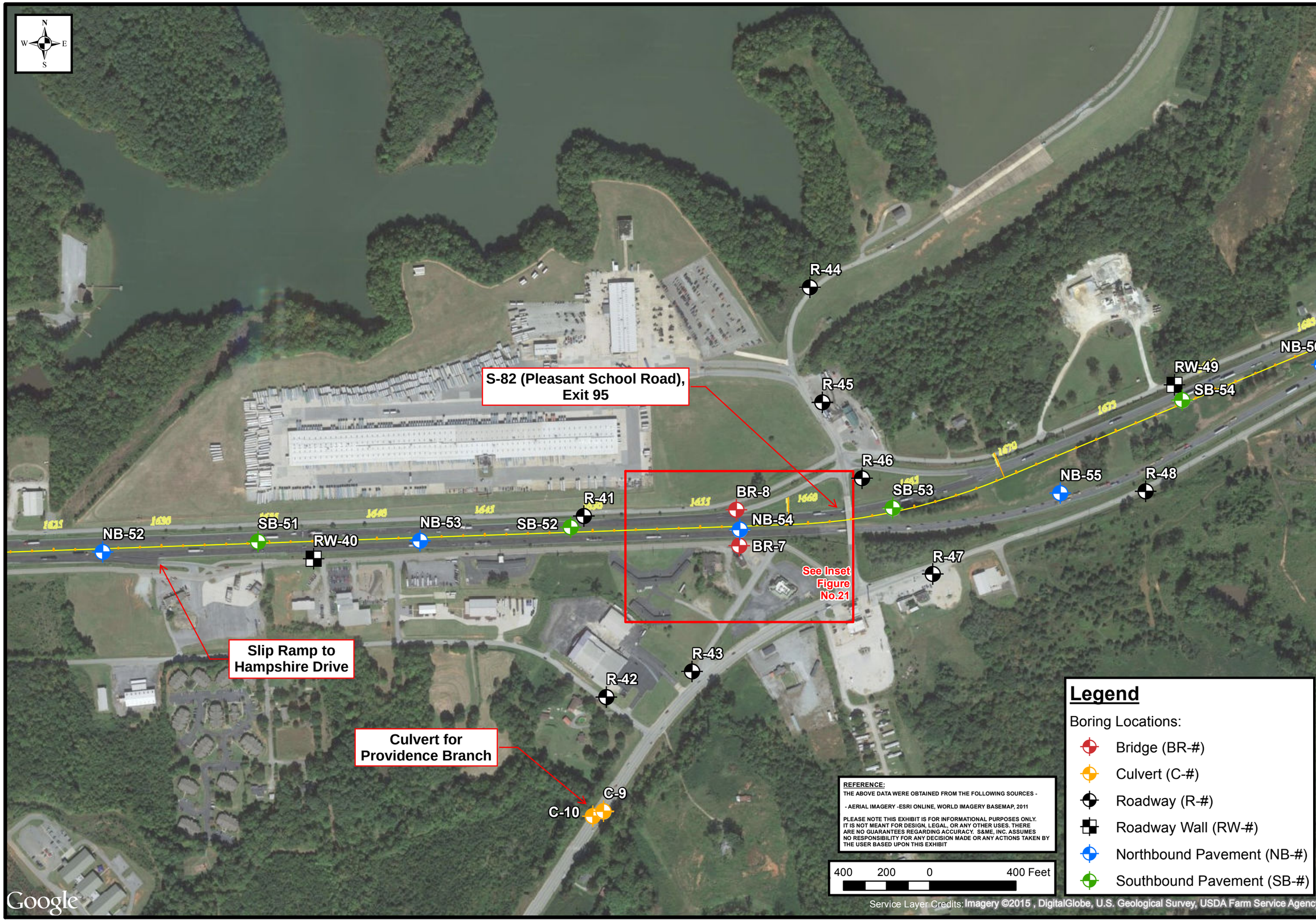
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

14



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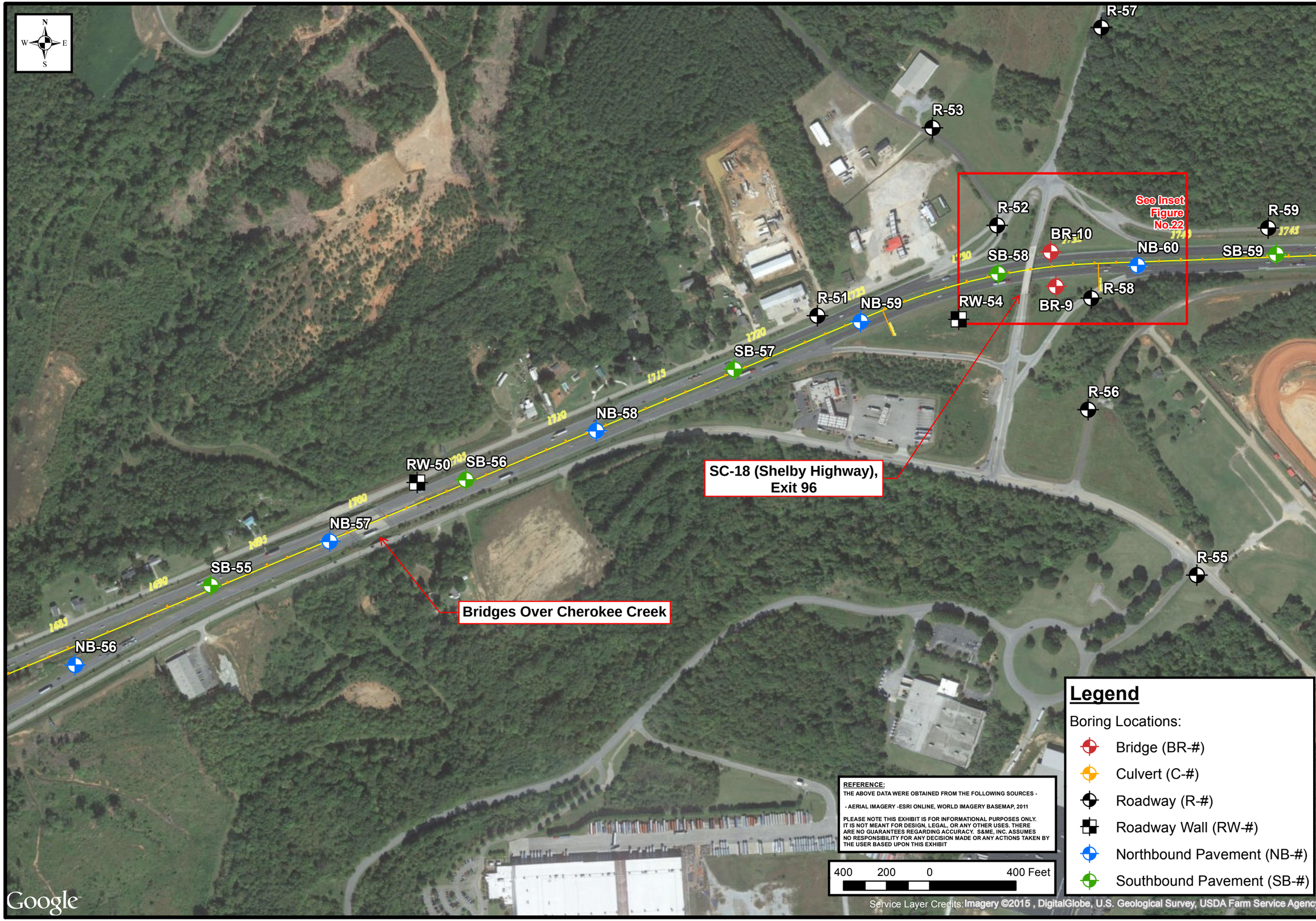
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

15



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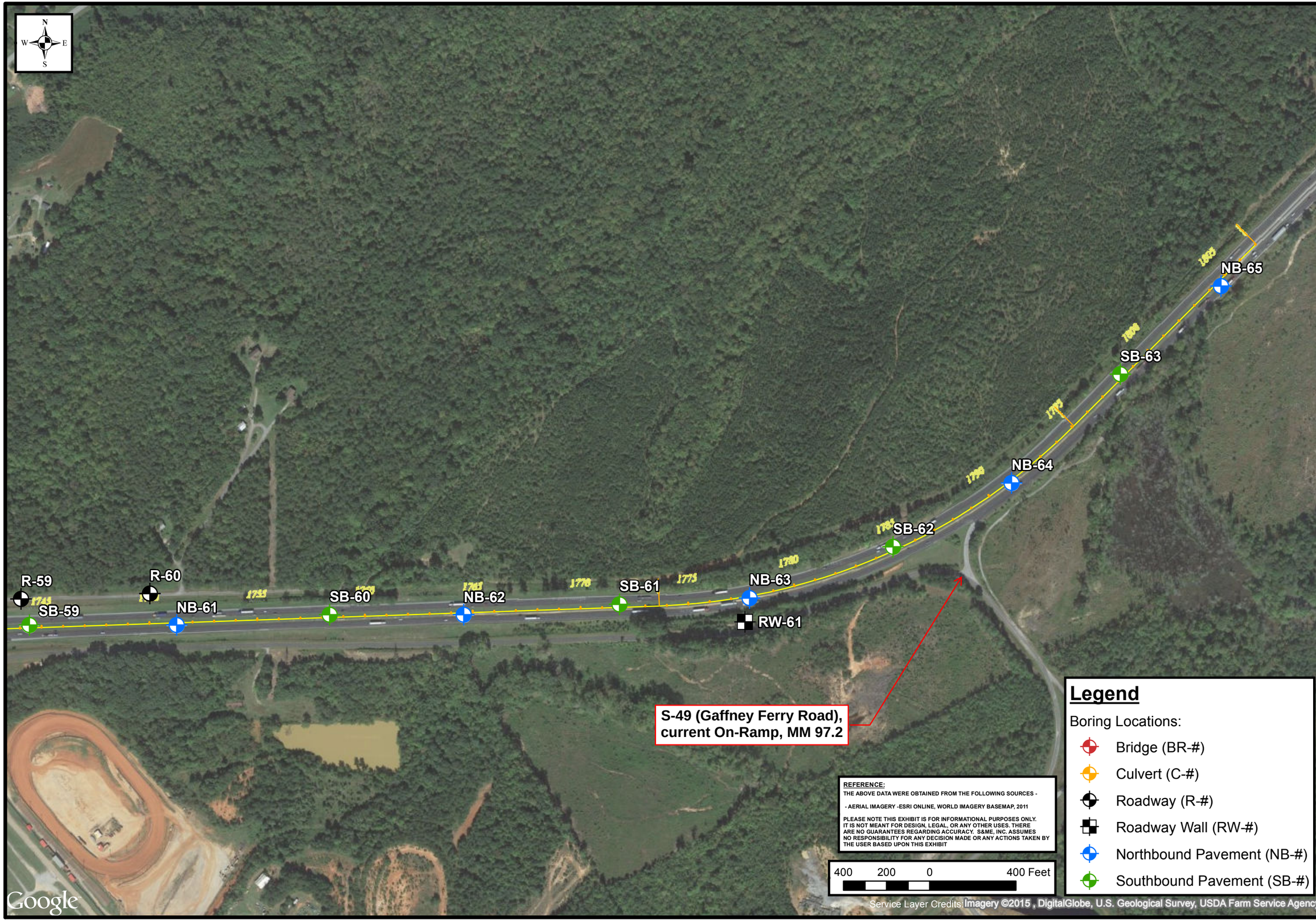
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

16



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Legend

Boring Locations:

- Bridge (BR-#)
- Culvert (C-#)
- Roadway (R-#)
- Roadway Wall (RW-#)
- Northbound Pavement (NB-#)
- Southbound Pavement (SB-#)

SCALE:	As Shown
PROJECT NO:	1426-14-161
DATE:	12-17-2015
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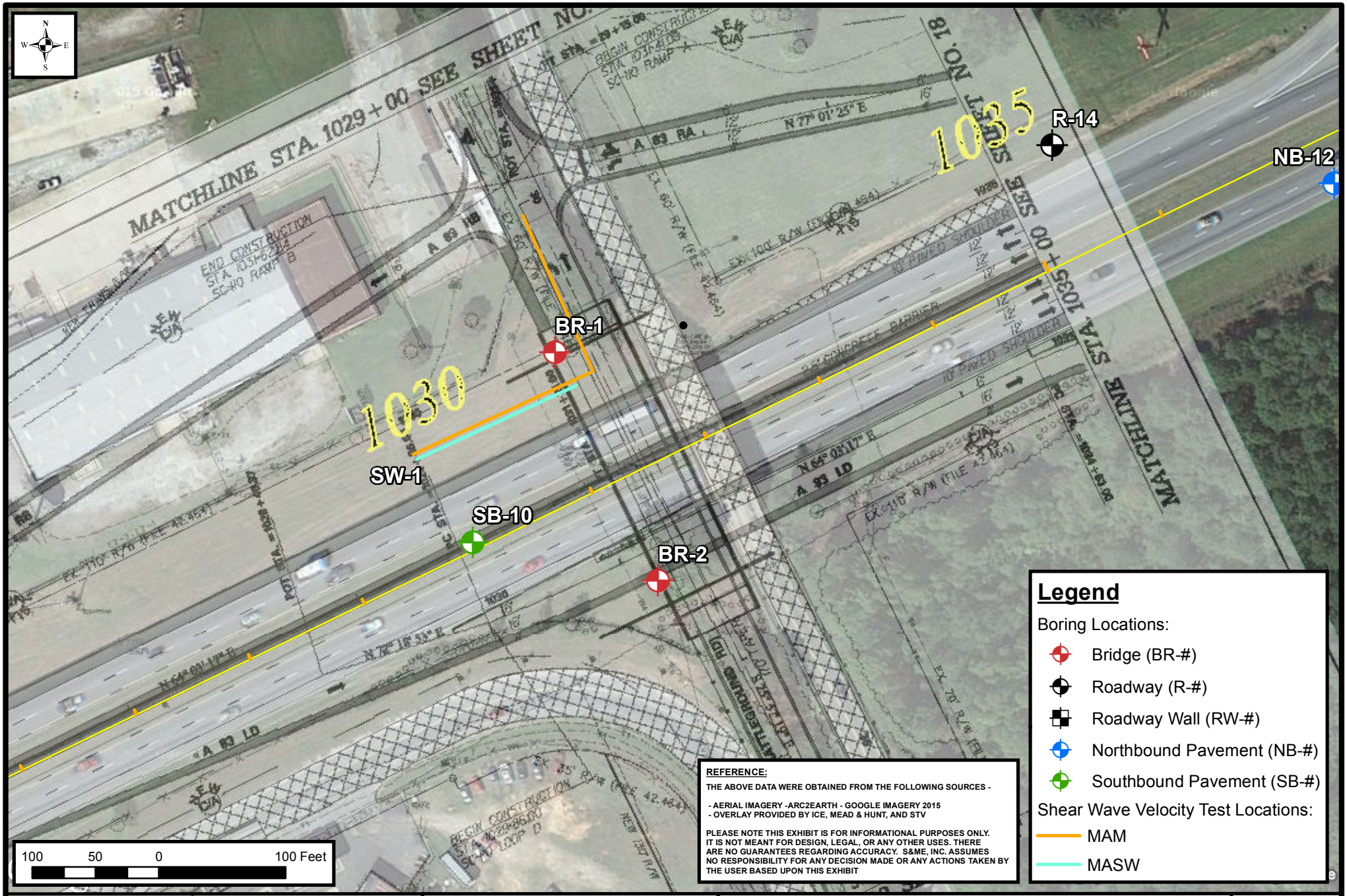
Boring Location Plan

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina

Figure No.

17



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MASW/MAM Location Plan

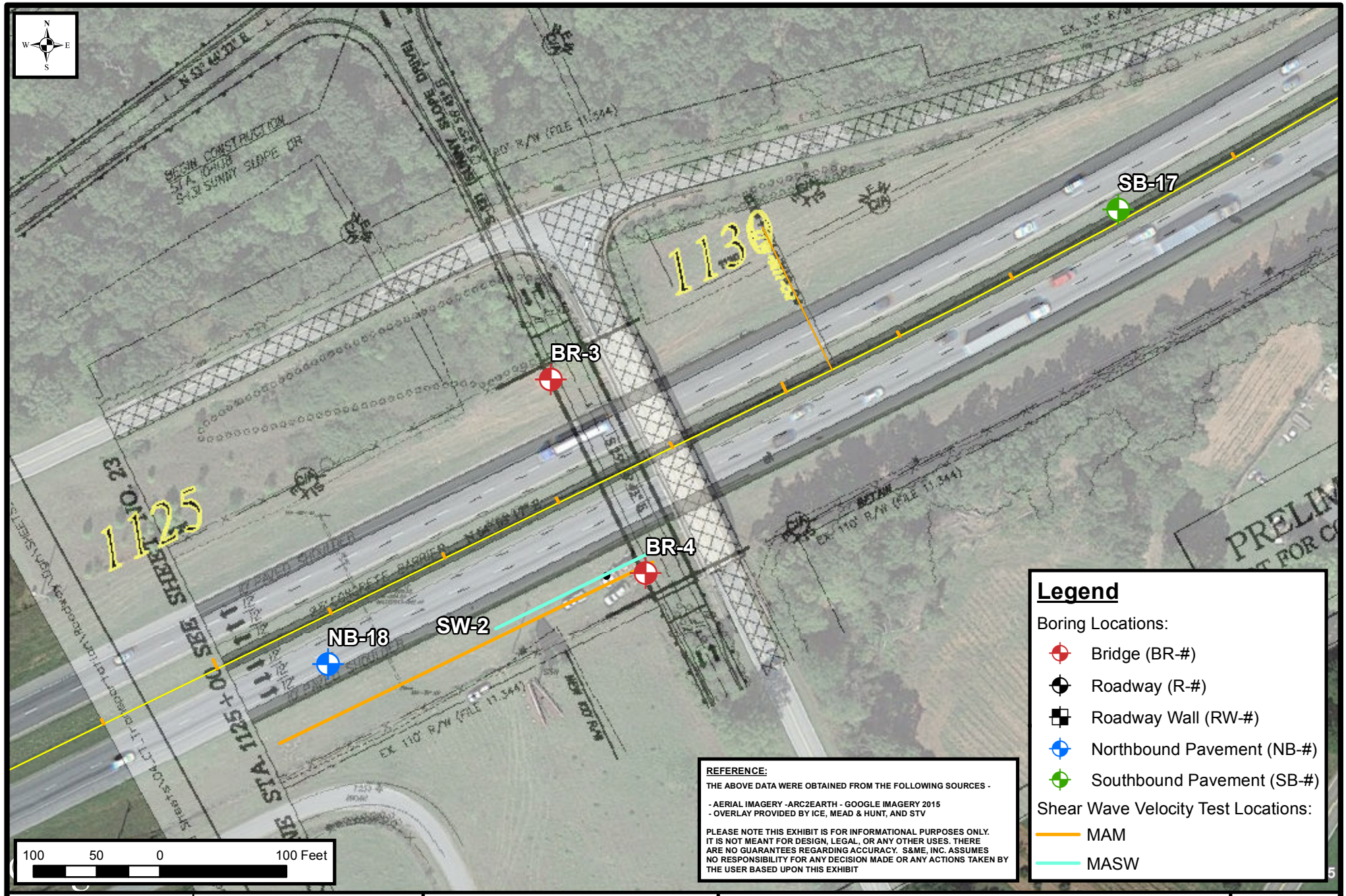
SC-110 (Battleground Road) RBO I-85

I-85 Widening MM80-MM96

Spartanburg & Cherokee Counties, South Carolina

FIGURE NO.

18



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As Shown	12/21/2015		
PROJECT NO:	DRAWN BY:	CHECKED BY:	
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MASW/MAM Location Plan

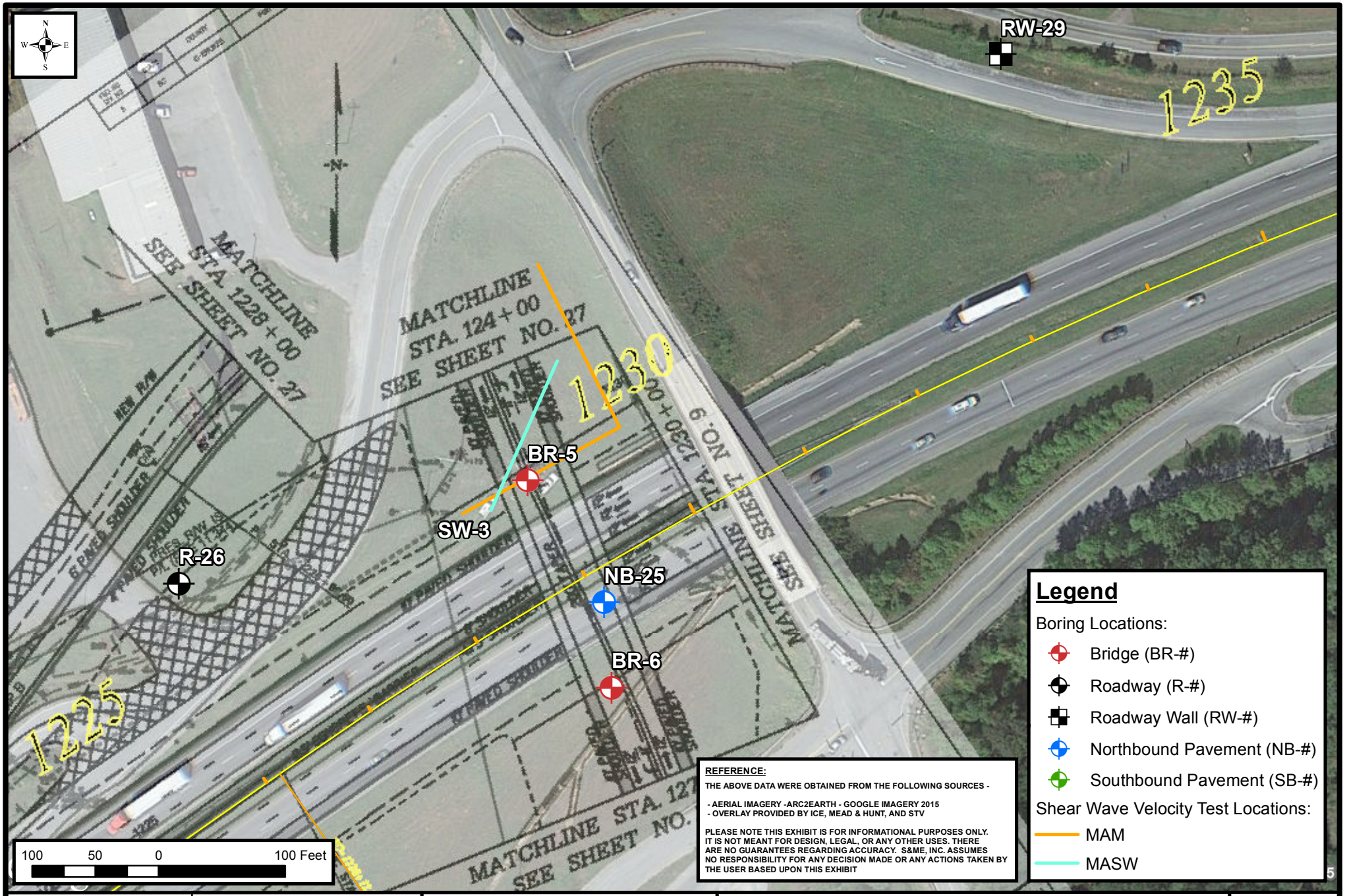
S-11-131 (Sunny Slope Drive) RBO I-85

I-85 Widening MM80-MM96

Spartanburg & Cherokee Counties, South Carolina

FIGURE NO.

19



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MASW/MAM Location Plan

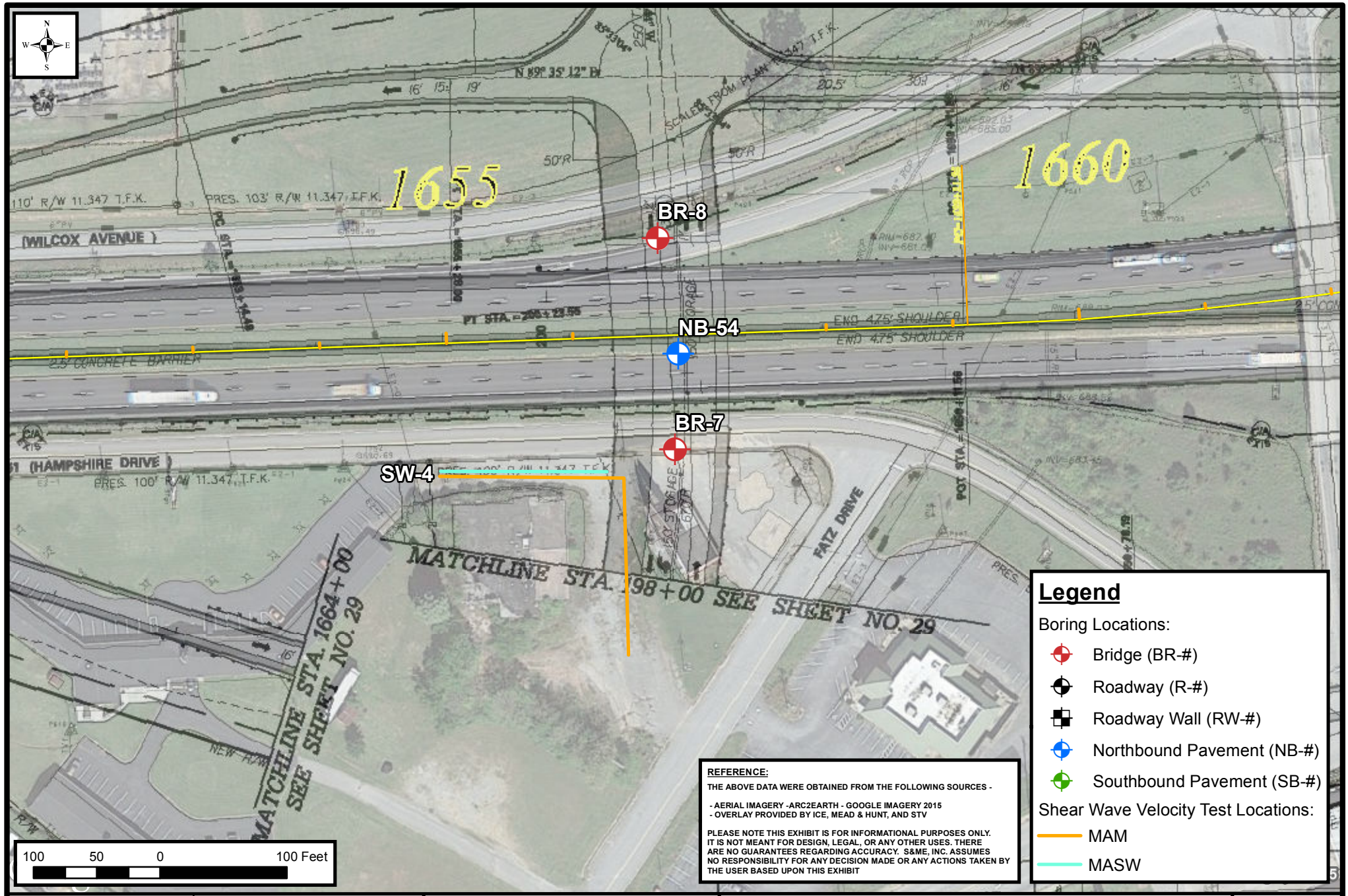
S-11-39 (Macedonia Road) RBO I-85

I-85 Widening MM80-MM96

Spartanburg & Cherokee Counties, South Carolina

FIGURE NO.

20



REFERENCE:

THE ABOVE DATA WERE OBTAINED FROM THE FOLLOWING SOURCES -

- AERIAL IMAGERY -ARC2EARTH - GOOGLE IMAGERY 2015
- OVERLAY PROVIDED BY ICE, MEAD & HUNT, AND STV

PLEASE NOTE THIS EXHIBIT IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES REGARDING ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS EXHIBIT

SCALE:	DATE:		
As Shown	12/21/2015		
PROJECT NO:	DRAWN BY:	CHECKED BY:	
1426-14-161	J.Foose	G.Taylor	

S&ME
WWW.SMEINC.COM

MASW/MAM Location Plan

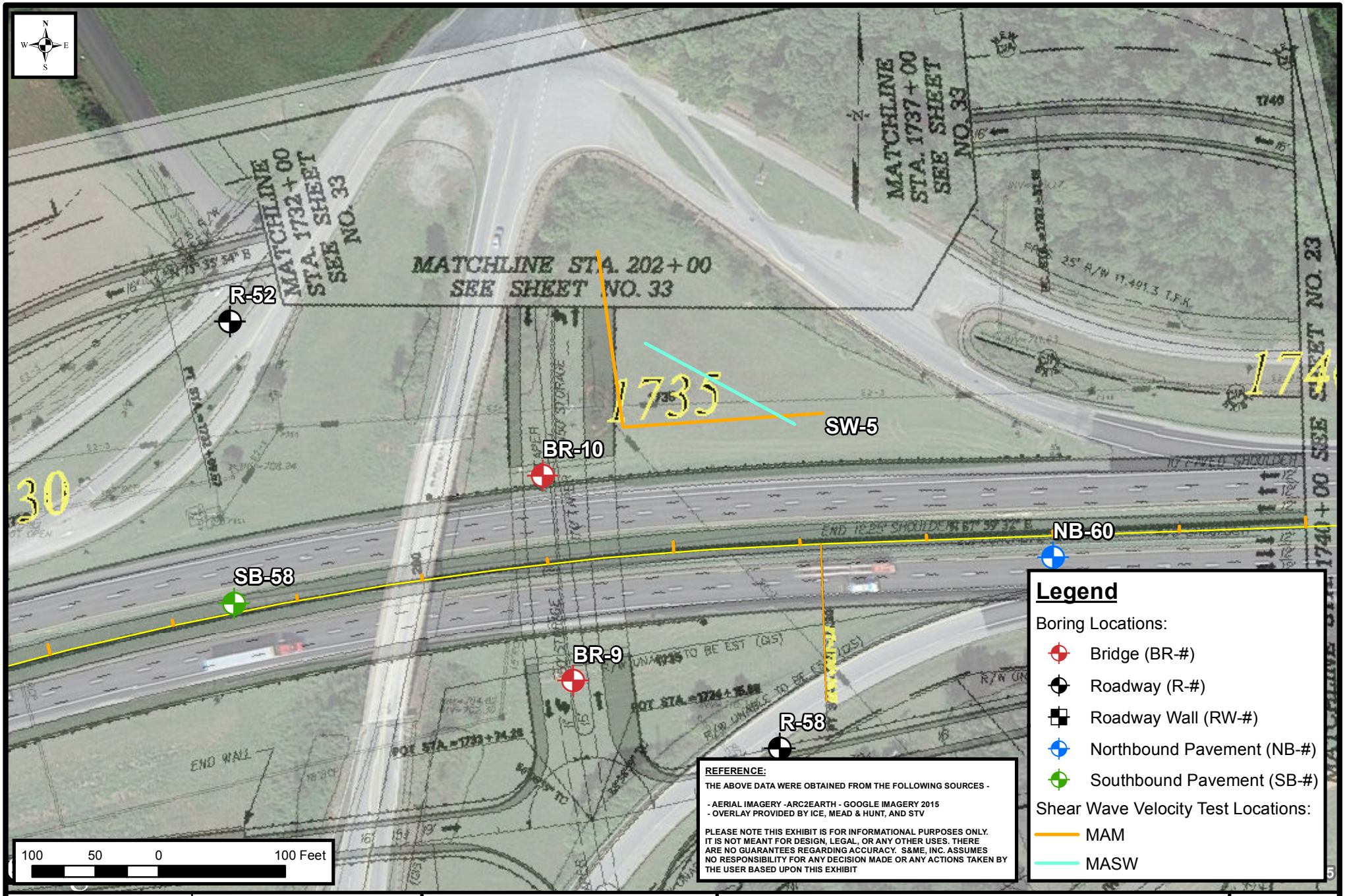
S-11-82 (Pleasant School Road) RBO I-85

I-85 Widening MM80-MM96

Spartanburg & Cherokee Counties, South Carolina

FIGURE NO.

21



SCALE:	DATE:		
As Shown	12/21/2015		
PROJECT NO:	DRAWN BY:	CHECKED BY:	
1426-14-161	J.Foose	G.Taylor	

S&ME
WWW.SMEINC.COM

MASW/MAM Location Plan

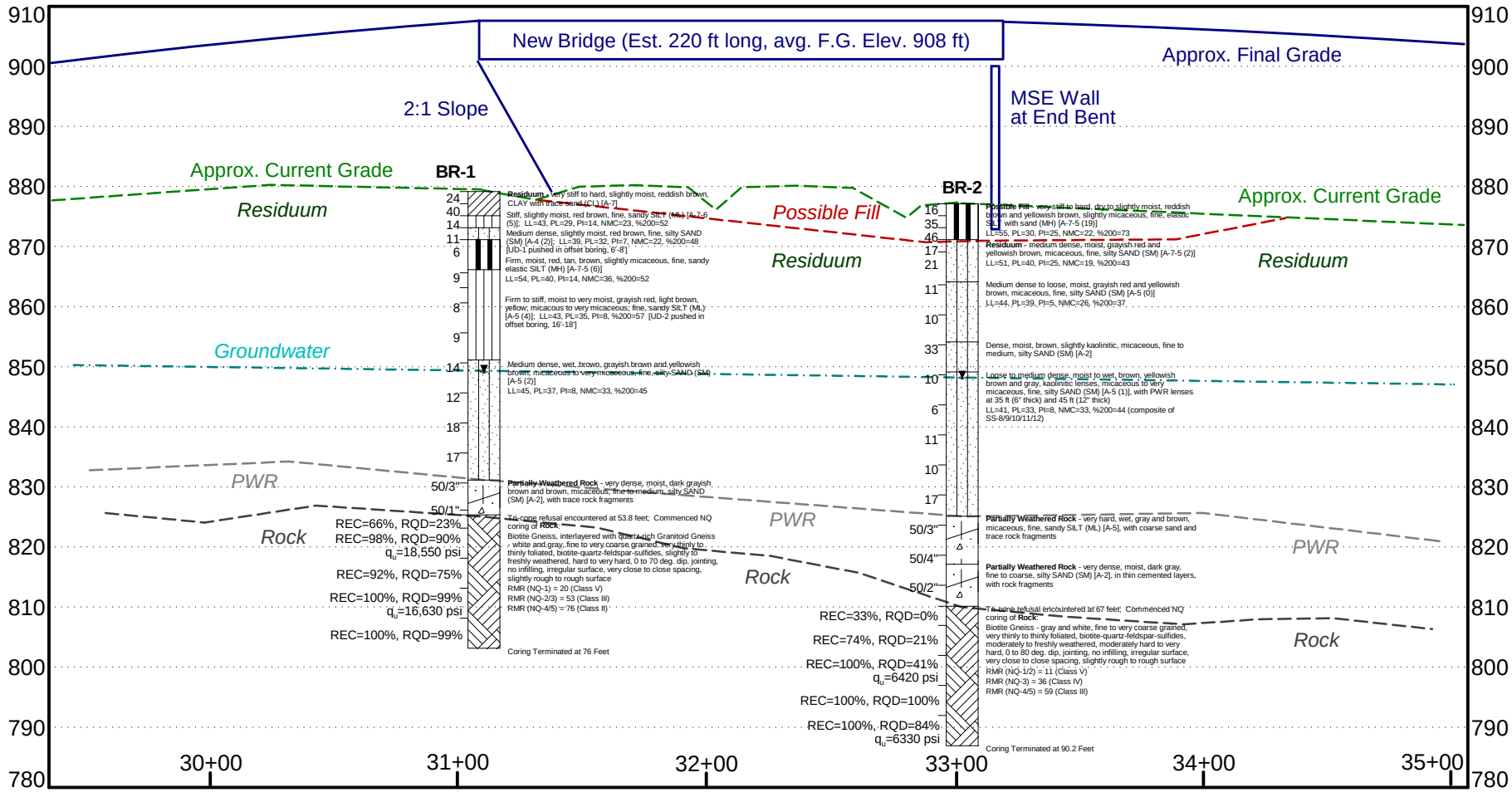
SC-18 (Shelby Highway) RBO I-85

I-85 Widening MM80-MM96

Spartanburg & Cherokee Counties, South Carolina

FIGURE NO.

22



The depicted stratigraphy is shown for illustrative purposes only and is not warranted. Separations between different strata may be gradual and likely vary considerably from those shown. Profiles between nearby borings have been estimated using reasonable engineering care and judgment. The actual subsurface conditions will vary between boring locations.

Boring	Elev.	Sta. No.	Offset
BR-1	878.9	1031+24	105 LT
BR-2	876.9	1031+15	90 RT

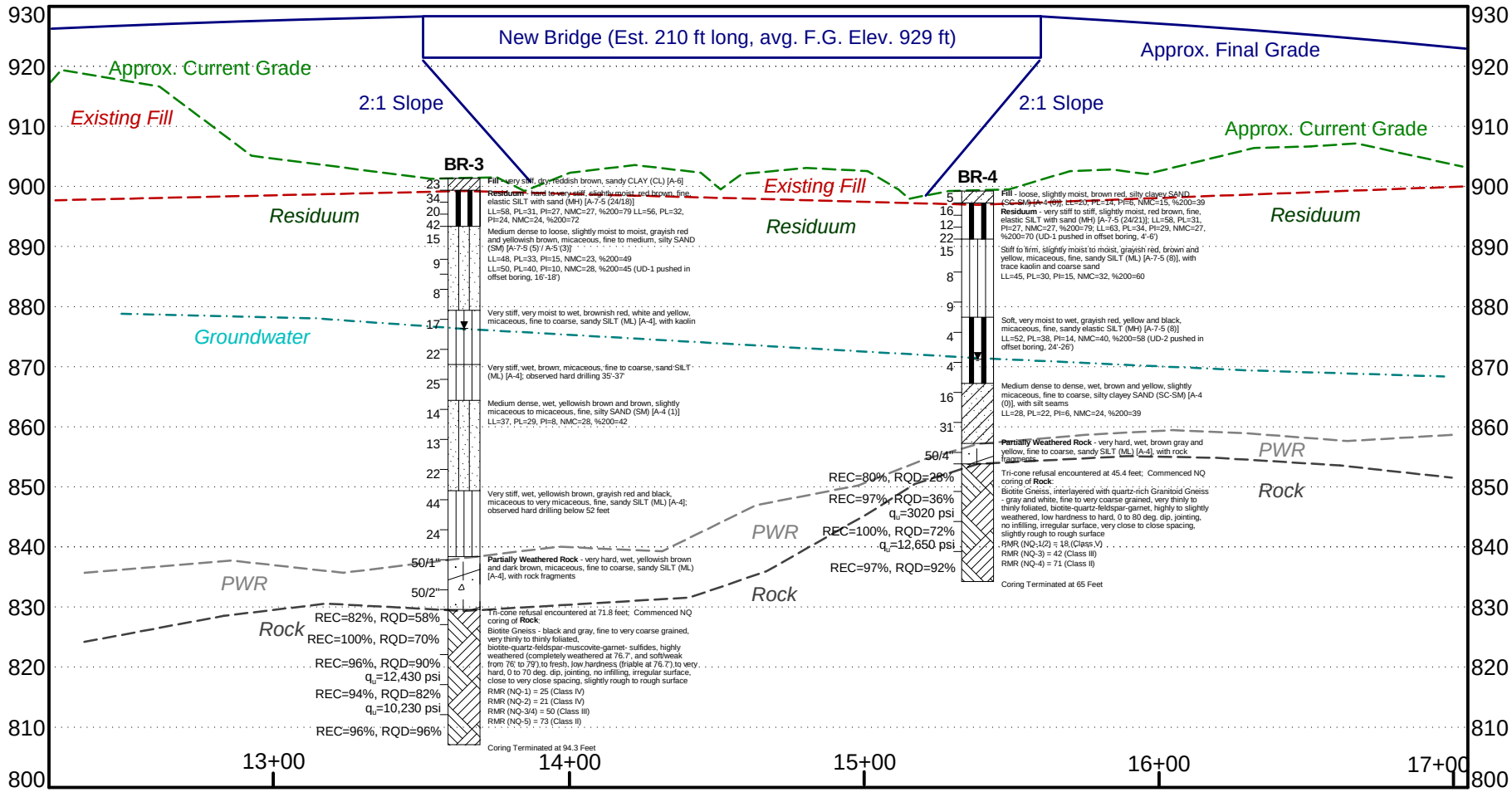
SCDOT

GENERALIZED SUBSURFACE PROFILE
SC-110 (BATTLEGROUND ROAD) RBO I-85
I-85 STATION 1031+50 (APPROX.)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 24 / 2016	23

SPROETOE 1426-14-161 BRIDGE BORINGS.GPJ SC_DOT.GDT 2/24/16



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(S-11-131 Stationing)

Boring	Elev.	Sta. No.	Offset
BR-3	901.4	1128+40	90 LT
BR-4	899.0	1128+36	67 RT

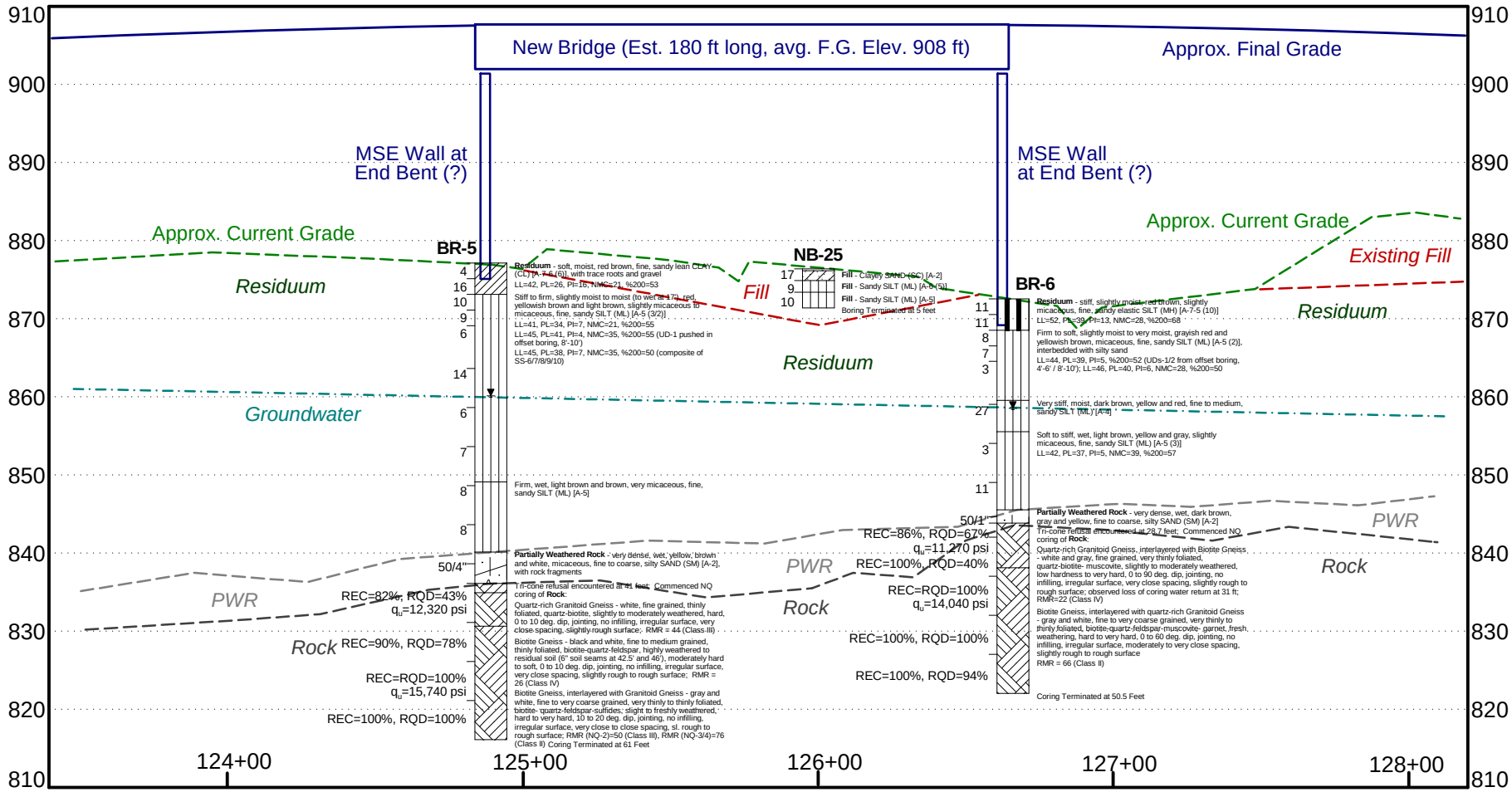
SCDOT

GENERALIZED SUBSURFACE PROFILE
S-11-131 (SUNNY SLOPE DRIVE) RBO I-85
I-85 STATION 1128+50 (APPROX.)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 24 / 2016	24

SPROETOE 1426-14-161 BRIDGE BORINGS.GPJ SC_DOT.GDT 2/25/16



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(S-11-39 Stationing)

Boring	Elev.	Sta. No.	Offset
BR-5	877.2	1229+00	90 LT
BR-6	872.5	1228+80	90 RT
NB-25	876.2	1229+00	10 RT

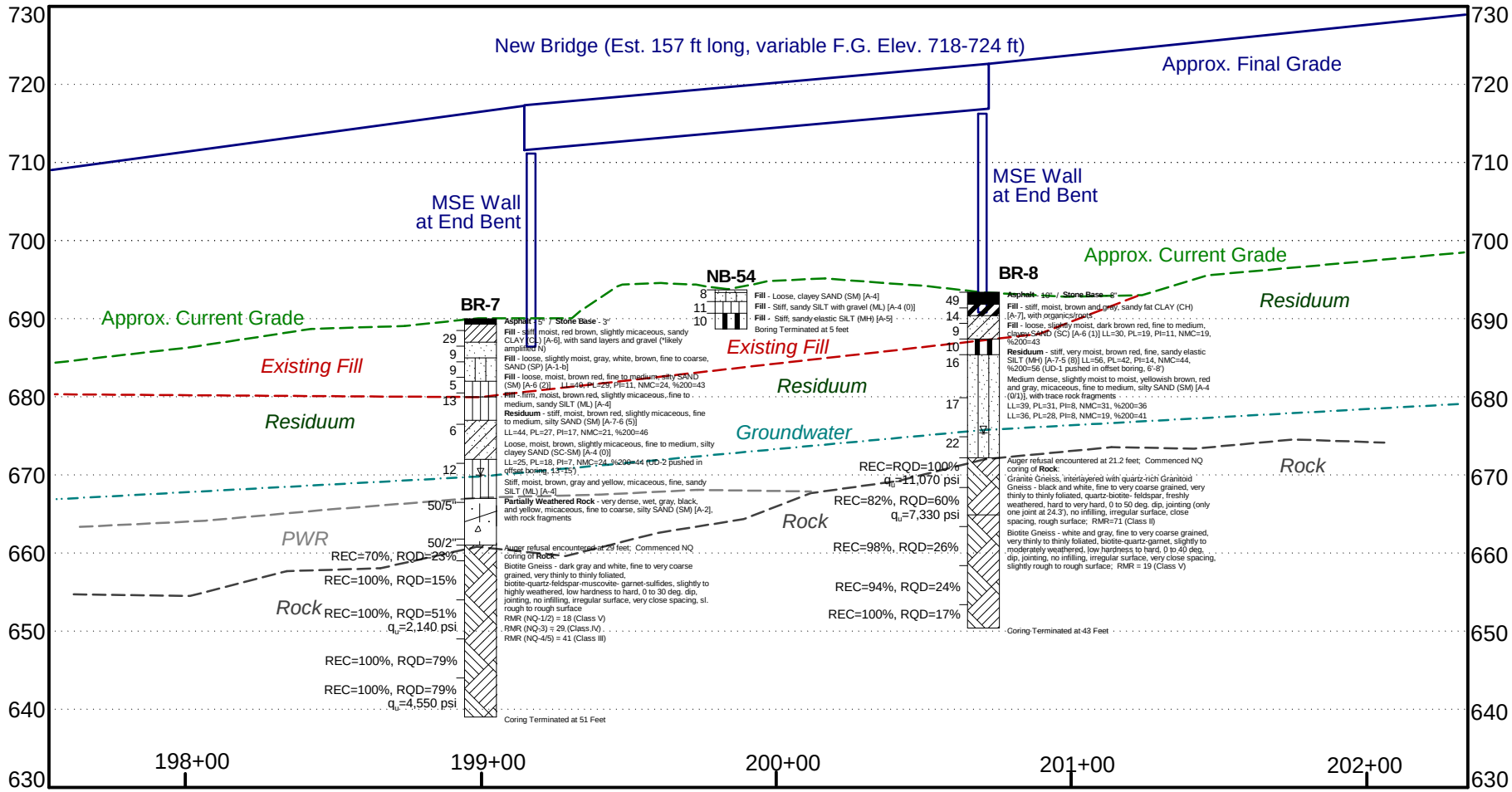
SCDOT

GENERALIZED SUBSURFACE PROFILE
S-11-39 (MACEDONIA ROAD) RBO I-85
I-85 STATION 1229+00 (APPROX.)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 24 / 2016	25

SPROETOE 1426-14-161 BRIDGE BORINGS.GPJ SC_DOT.GDT 2/25/16



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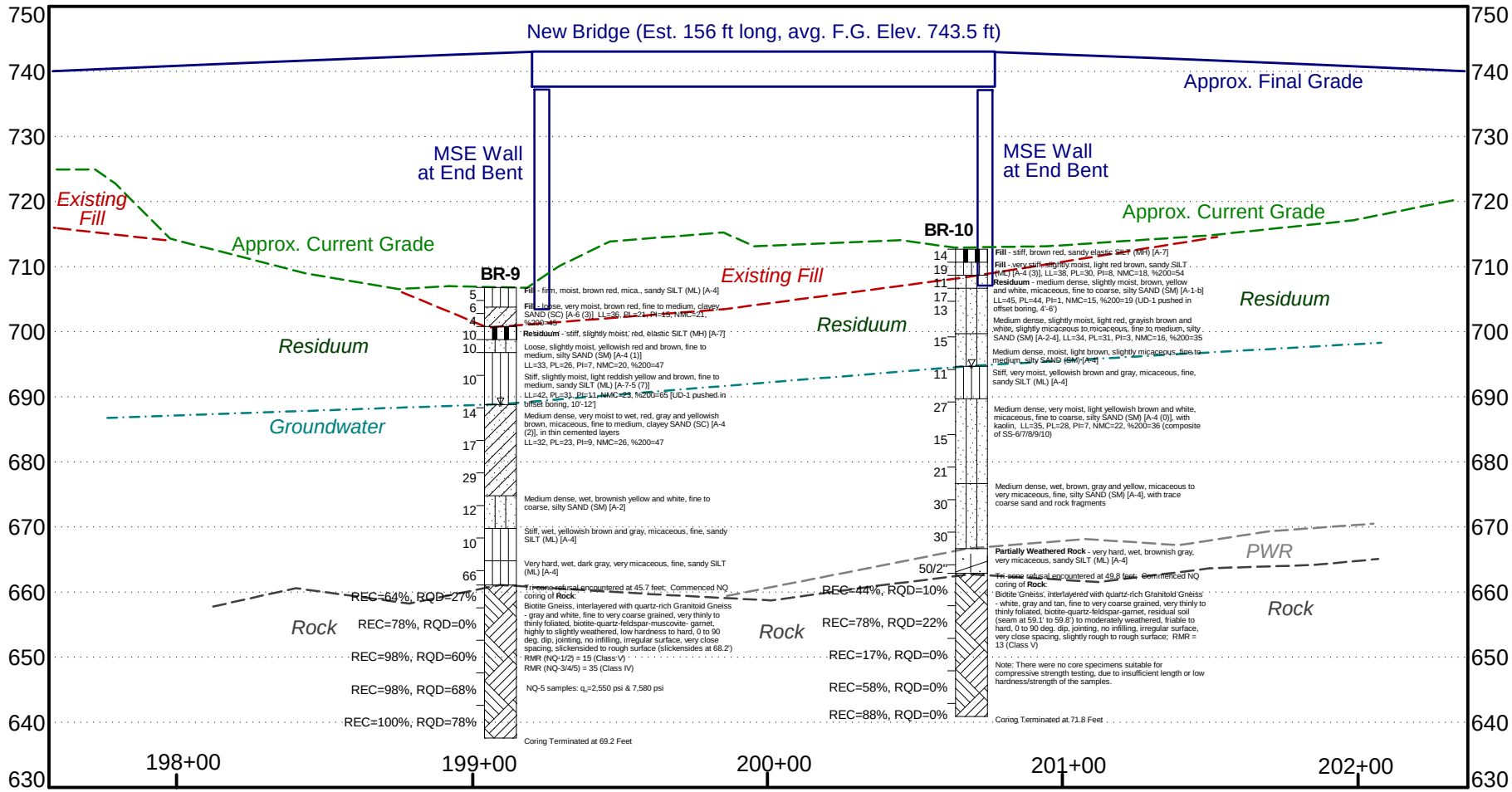
Boring	Elev.	Sta. No.	Offset
BR-7	690.0	1656+80	90 RT
BR-8	693.4	1656+75	80 LT
NB-54	693.7	1656+85	9 RT

GENERALIZED SUBSURFACE PROFILE
S-11-82 (PLEASANT SCHOOL ROAD) RBO I-85
I-85 STATION 1656+75 (APPROX.)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 24 / 2016	26

SPROETOE 1426-14-161 BRIDGE BORINGS.GPJ SC_DOT.GDT 2/25/16



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Boring	Elev.	Sta. No.	Offset
BR-10	712.7	1734+05	75 LT
BR-9	706.8	1734+10	90 RT

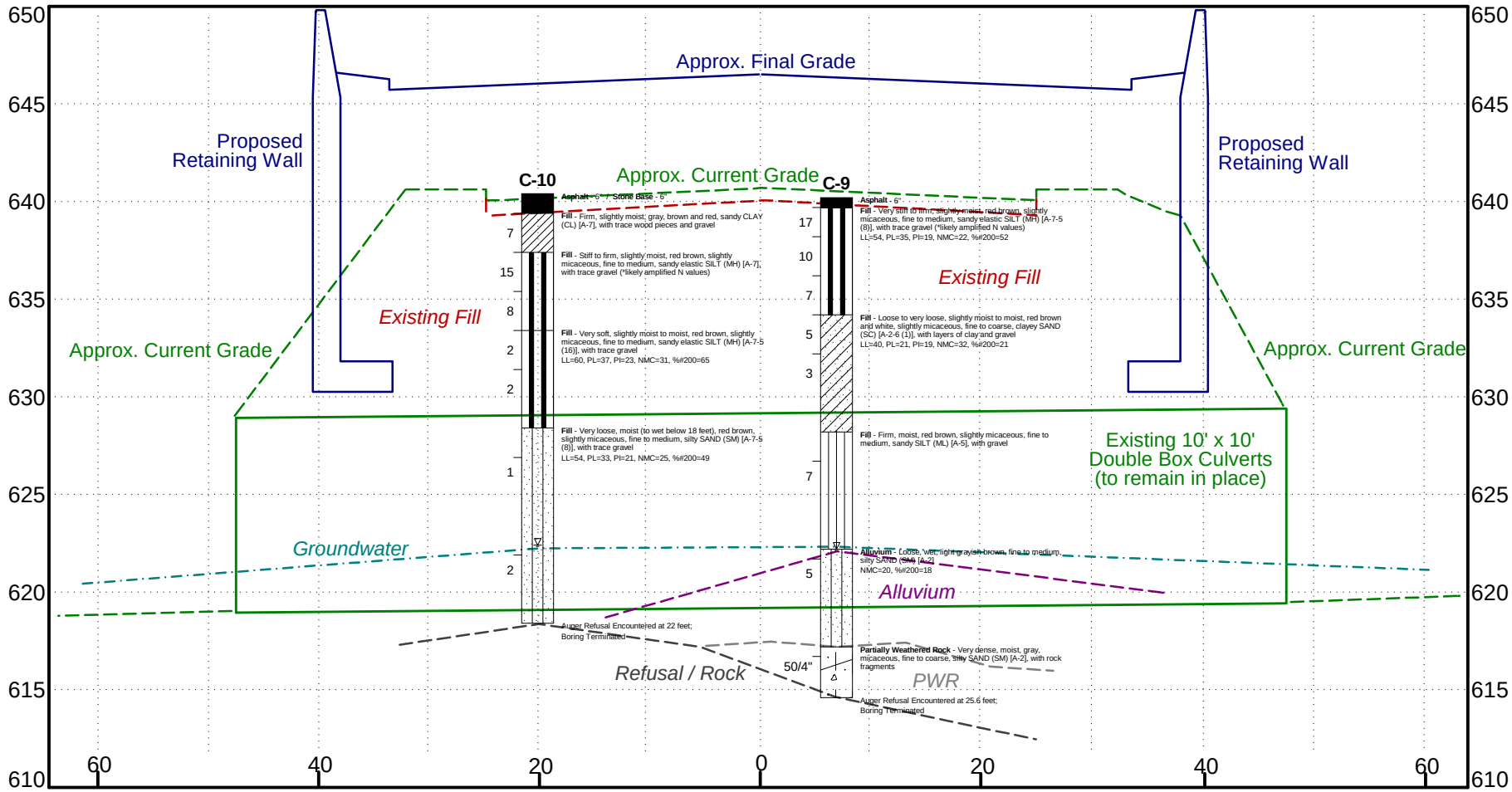
SCDOT

GENERALIZED SUBSURFACE PROFILE
SC-18 (SHELBY HIGHWAY) RBO I-85
I-85 STATION 1734+20 (APPROX.)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 25 / 2016	27

SPROETOE 1426-14-161 BRIDGE BORINGS.GPJ SC_DOT.GDT 2/29/16



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Boring	Elev.	Sta. No.	Offset
C-10	640.4	184+65	20 LT
C-9	640.2	185+00	7 RT

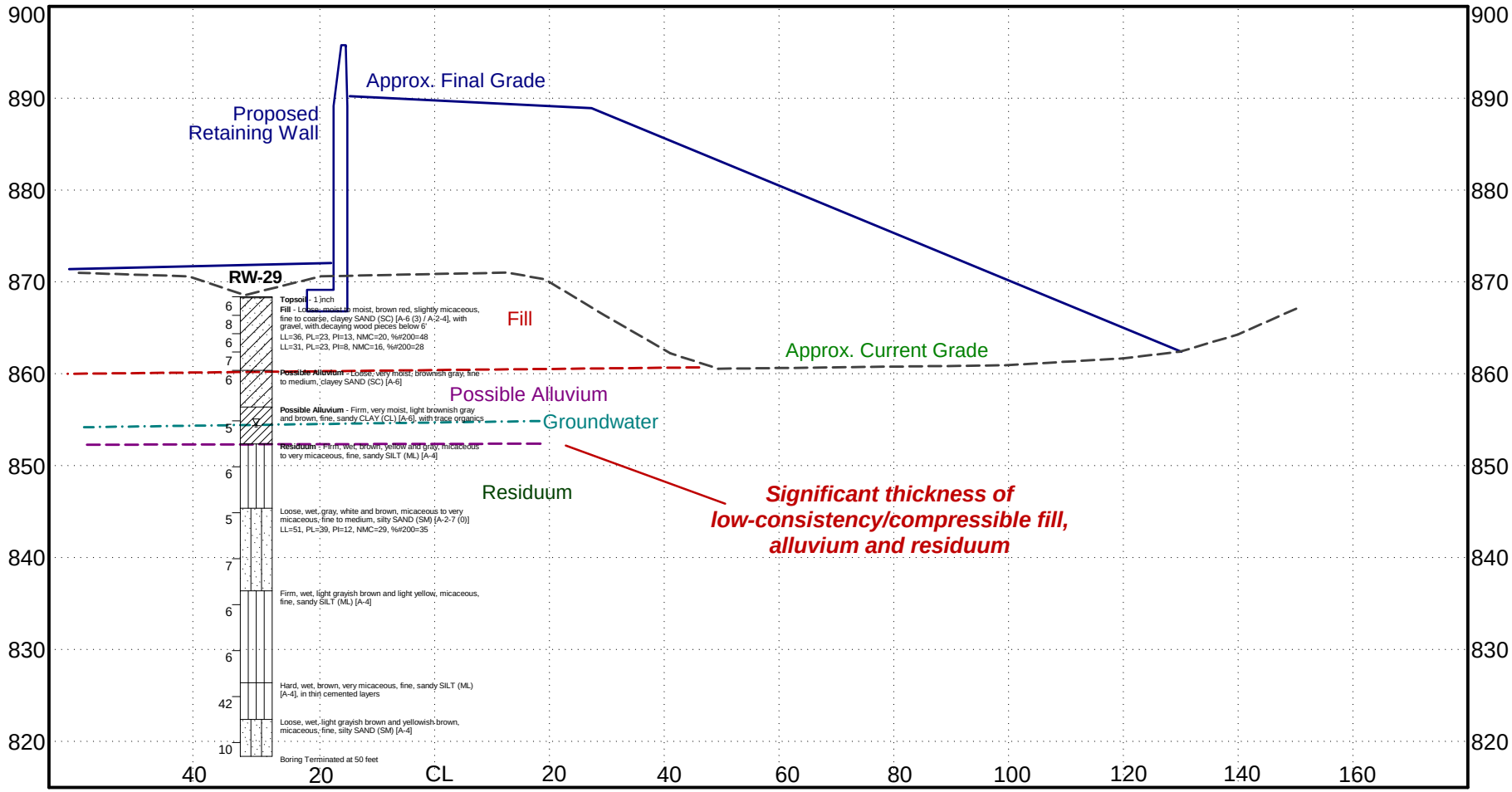
SCDOT

GENERALIZED SUBSURFACE PROFILE
S-11-82 (PLEASANT SCHOOL ROAD) CULVERT
AT PROVIDENCE BRANCH (STA. 184+80)

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	2 / 25 / 2016	28

SPROETOE 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/1/16



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Boring	Elev.	Sta. No.	Offset
RW-29	868.1	1233+20	30 LT

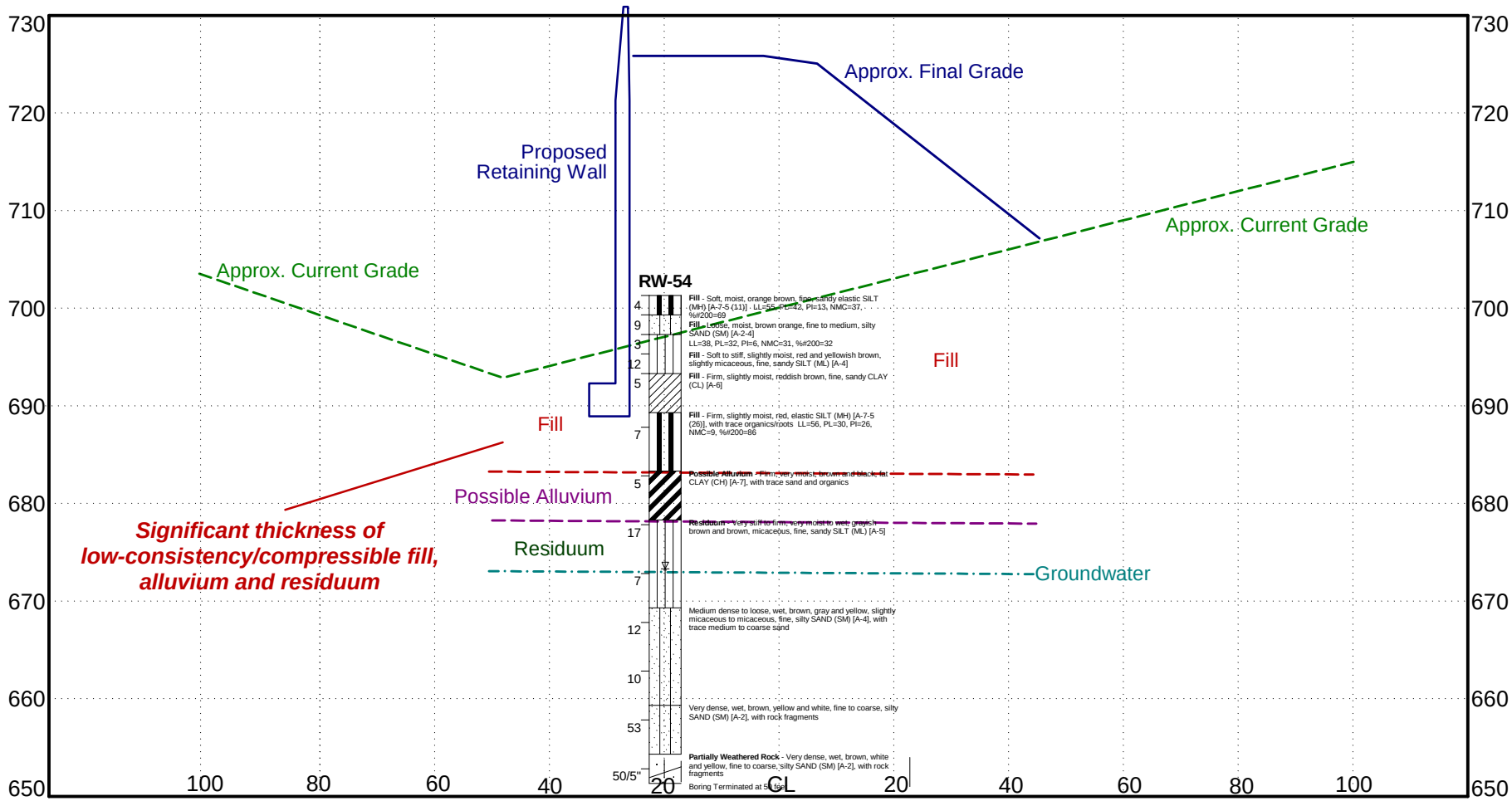
Reference: Preliminary X-Section Plans by ICE, STV, or Mead & Hunt (dated August 2015)

GENERALIZED SUBSURFACE PROFILE
I-85, EXIT 87 (RAMP A), APPROX. STA. 1233+20
BORING RW-29

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	03 / 04 / 2016	29

SPROETOE P027114 I-85 MM80-96 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/4/16



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Boring	Elev.	Sta. No.	Offset
RW-54	701.0	1729+00	20 LT

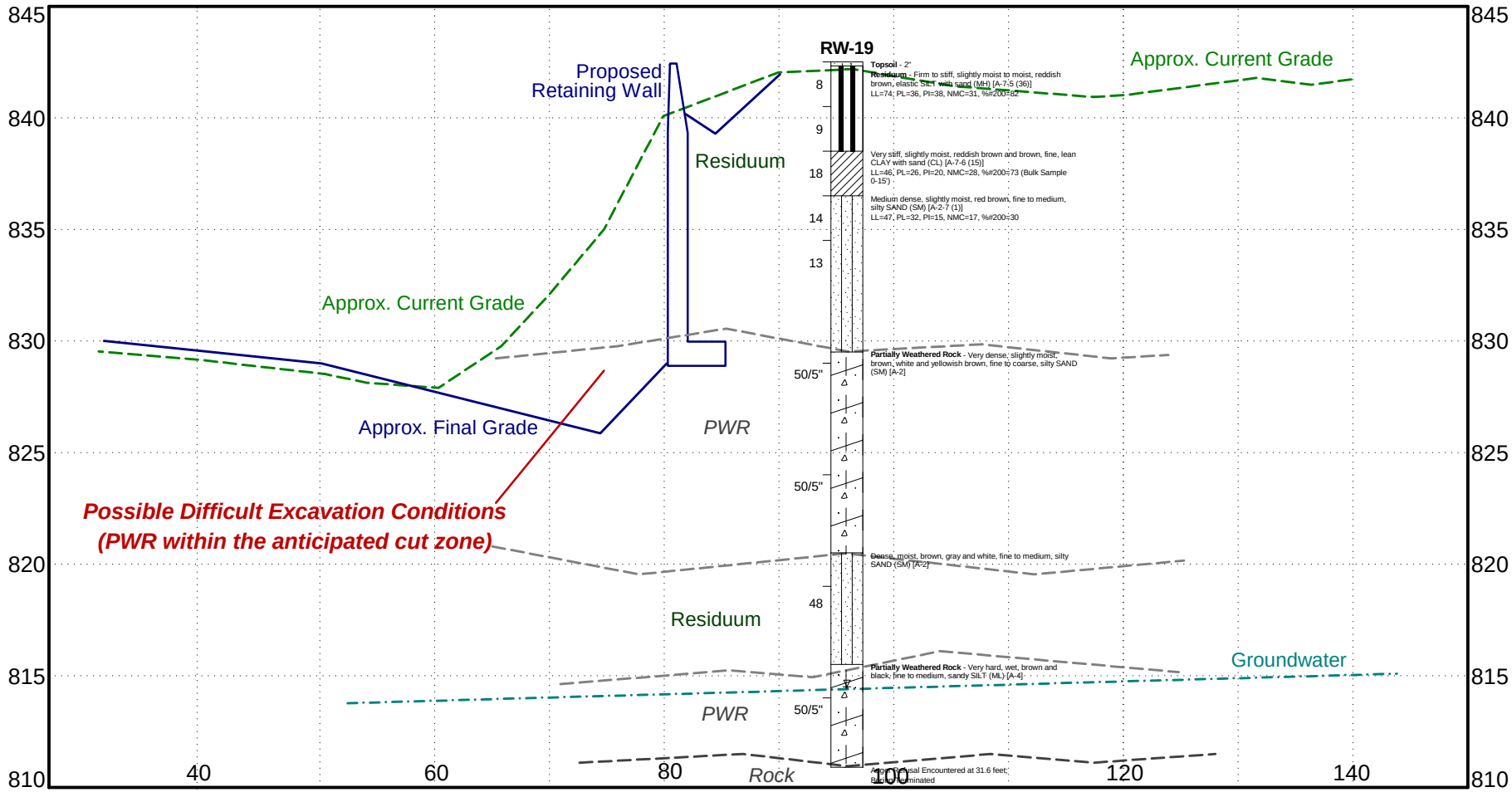
Reference: Preliminary X-Section Plans by ICE, STV, or Mead & Hunt (dated August 2015)

GENERALIZED SUBSURFACE PROFILE
I-85, EXIT 96 (RAMP C), APPROX. STA. 1729+00
BORING RW-54

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	03 / 04 / 2016	30

SPROETOE P027114 I-85 MM80-96 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/4/16



(Cross-Section Offsets from CL)

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Boring	Elev.	Sta. No.	Offset
RW-19	842.6	1073+07	96 RT

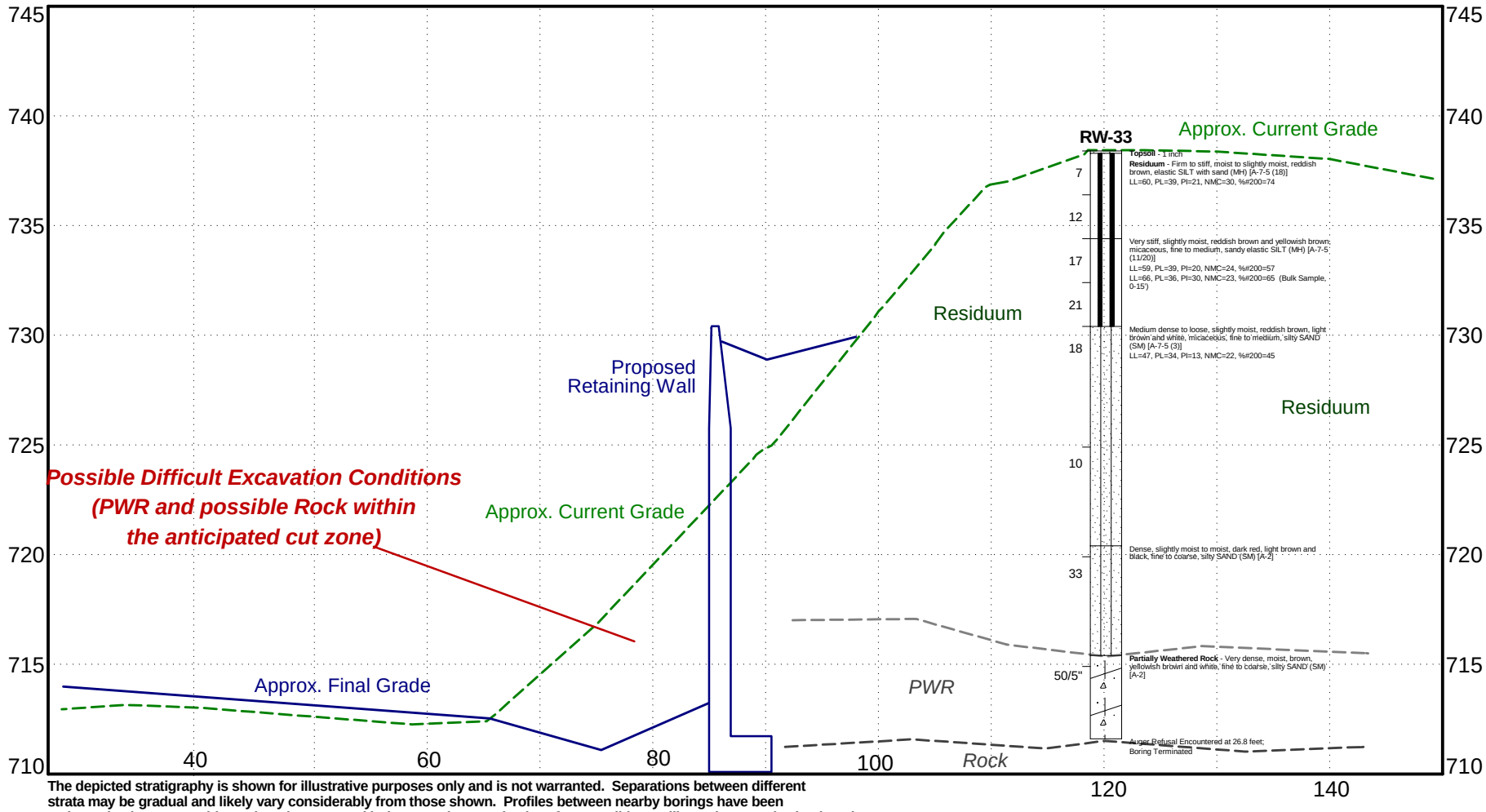
Reference: Preliminary X-Section Plans by ICE, STV, or Mead & Hunt (dated August 2015)

GENERALIZED SUBSURFACE PROFILE
I-85 MAINLINE, APPROX. STATION 1073+07
BORING RW-19

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	03 / 04 / 2016	31

SPROETOE P027114 I-85 MM80-96 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/4/16



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(Cross-Section Offsets from CL)

Boring	Elev.	Sta. No.	Offset
RW-33	738.4	1347+10	120 RT

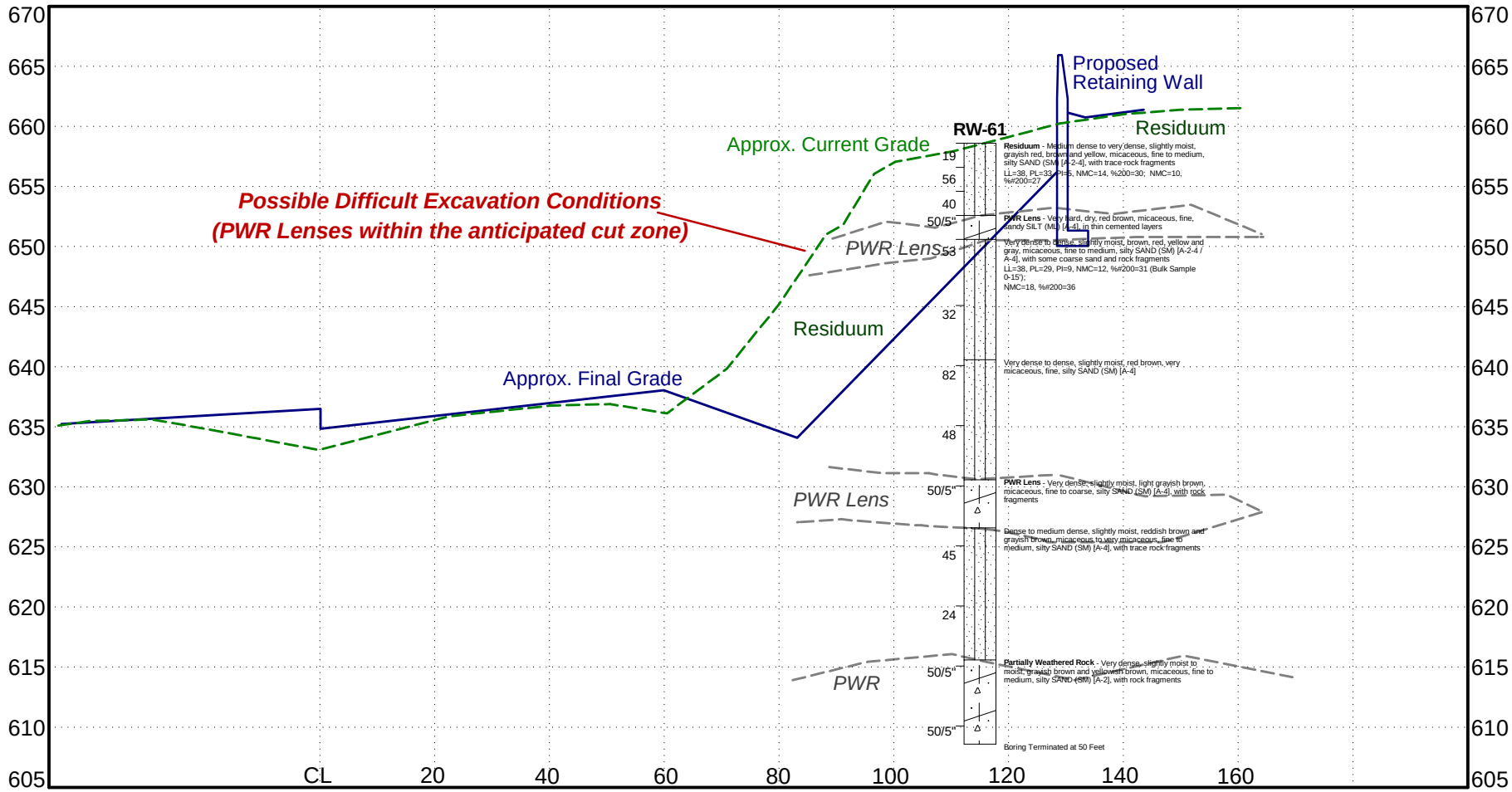
Reference: Preliminary X-Section Plans by ICE, STV, or Mead & Hunt (dated August 2015)

GENERALIZED SUBSURFACE PROFILE
I-85 MAINLINE, APPROX. STATION 1347+10
BORING RW-33

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	03 / 04 / 2016	32

SPROETOE P027114 I-85 MM80-96 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/4/16



(Cross-Section Offsets from CL)

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Boring	Elev.	Sta. No.	Offset
RW-61	658.6	1777+50	115 RT

Reference: Preliminary X-Section Plans by ICE, STV, or Mead & Hunt (dated August 2015)

GENERALIZED SUBSURFACE PROFILE
I-85 MAINLINE, APPROX. STATION 1777+50
BORING RW-61

I-85 Widening MM80-MM96
Spartanburg & Cherokee Counties, South Carolina
WBS No. 88P027114E1.SLB.1
S&ME Project #1426-14-161

PROJECT ID	DATE	FIGURE
P027114	03 / 04 / 2016	33

SPROETOE P027114 I-85 MM80-96 ROADWAY AND CULVERT BORINGS.GPJ SC_DOT.GDT 3/4/16

APPENDIX III

SOIL TEST LOGS

SCDOT gINT Soil/Rock Symbol Legend

Soil Test Logs for Northbound Median Borings (65)

Soil Test Logs for Southbound Median Borings (63)

Soil Test Logs for Bridge Borings (10)

Soil Test Logs for Roadway and Culvert Borings (66)

SPT Hammer Efficiency Reports (4)

Field Test Procedures

SCDOT

SYMBOL	gINT CODE*	TYPICAL DESCRIPTION
	SCCT	*CONCRETE*
	SCAT	*ASPHALT*
	SCTS	*TOPSOIL/PEAT*
	SCSAND	*SAND*
	SCSTSAND	*SILTY SAND/SANDY SILT*
	SCCLSAND	*CLAYEY SAND/SANDY CLAY*
	SCCLAY	*CLAY*
	SCSILT	*SILT*
	SCSTCLAY	*SILTY CLAY/CLAYEY SILT*
	SCSAP	*SAPROLITE*
	SCLS	*LIMESTONE*
	SCBR	*GRANITE (BEDROCK)*
	SCMARL	*MARL*

**These codes are not the classification for the material. These are the Graphic codes to be used in the Lithology table.*

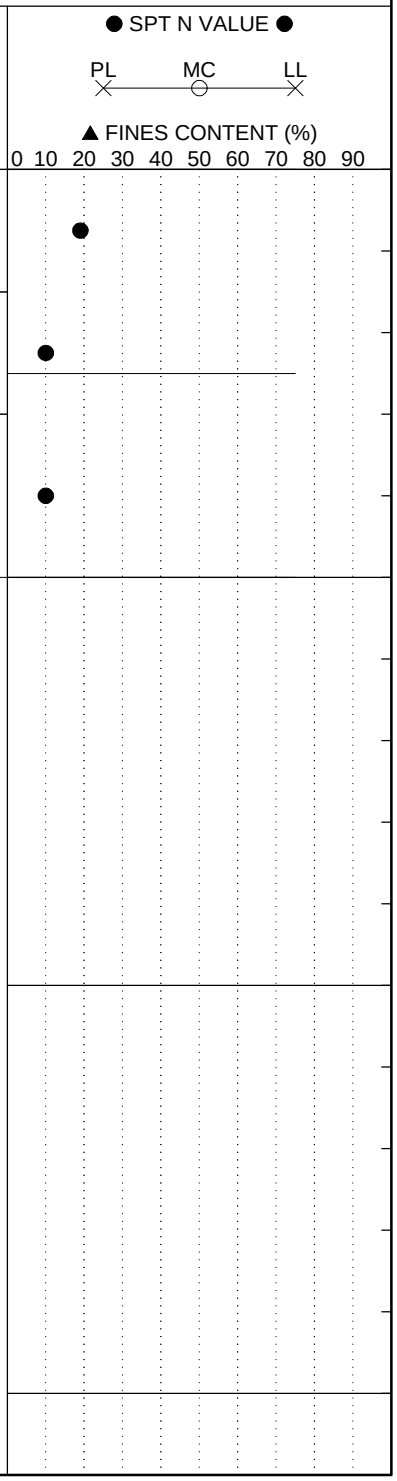
SC_DOT_LEGEND 1/98

gINT SOIL/ROCK SYMBOL LEGEND

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-1
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	875+00	**Offset:**	5 RT	**Alignment:**	NB
Elev.:	803.2 ft	**Latitude:**	35.02902	**Longitude:**	-81.86591	**Date Started:**	4/12/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/12/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Medium dense, brown black, fine to coarse, poorly graded SAND (SP) [A-1-b], trace asphalt fragments, trace clay		0.0	SS-1	8	9	10	19
	1.5	**Fill** - Loose, red olive black, medium to fine, clayey SAND (SC) [A-2], trace asphalt fragments, trace mica		1.5	SS-2	3	4	6	10
	3.0	**Fill** - Stiff, brown red, fat CLAY (CH) [A-7-6]		3.0	SS-3	3	4	6	10
798.2	5.0	Boring Terminated at 5 feet							
793.2									
788.2									



LEGEND

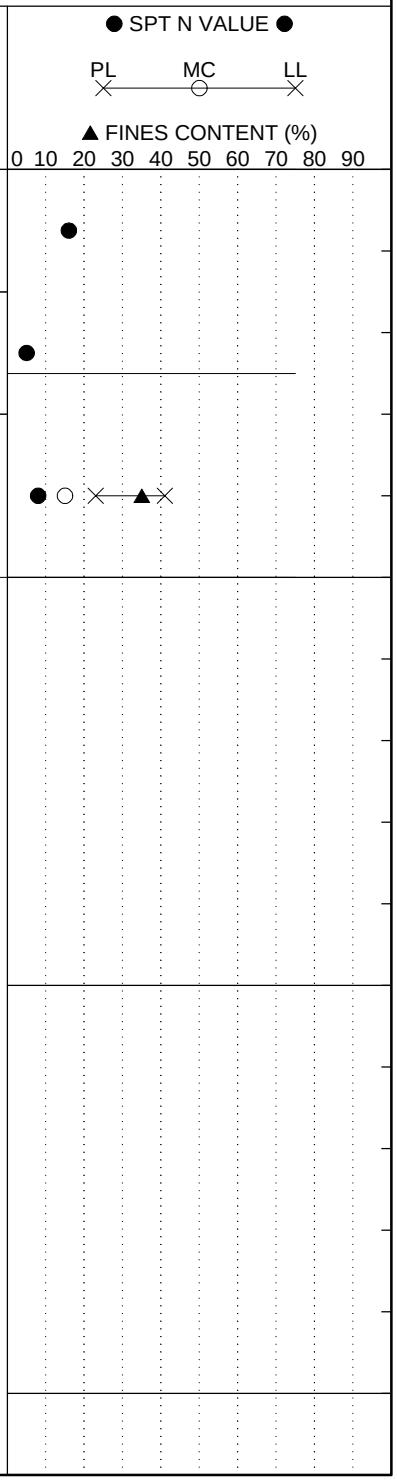
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-2
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	890+00	**Offset:**	4.5 RT
Alignment:	NB				
Elev.:	772.6 ft	**Latitude:**	35.0302	**Longitude:**	-81.86113
Date Started:	4/12/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Topsoil - 12 inches of topsoil with asphalt fragments		0.0	SS-1	4	12	4	16
	1.0	**Fill** - Firm, brown olive red, coarse to medium, sandy lean CLAY (CL) [A-6], trace crushed stone		1.5	SS-2	3	3	2	5
	3.5	**Fill** - Loose, red orange brown, fine, clayey SAND with gravel (SC) [A-2-7 (2)] LL=41, PL=23, PI=18, NMC=15, %200=35		3.0	SS-3	3	3	5	8
767.6	5.0	Boring Terminated at 5 feet							
762.6									
757.6									



LEGEND

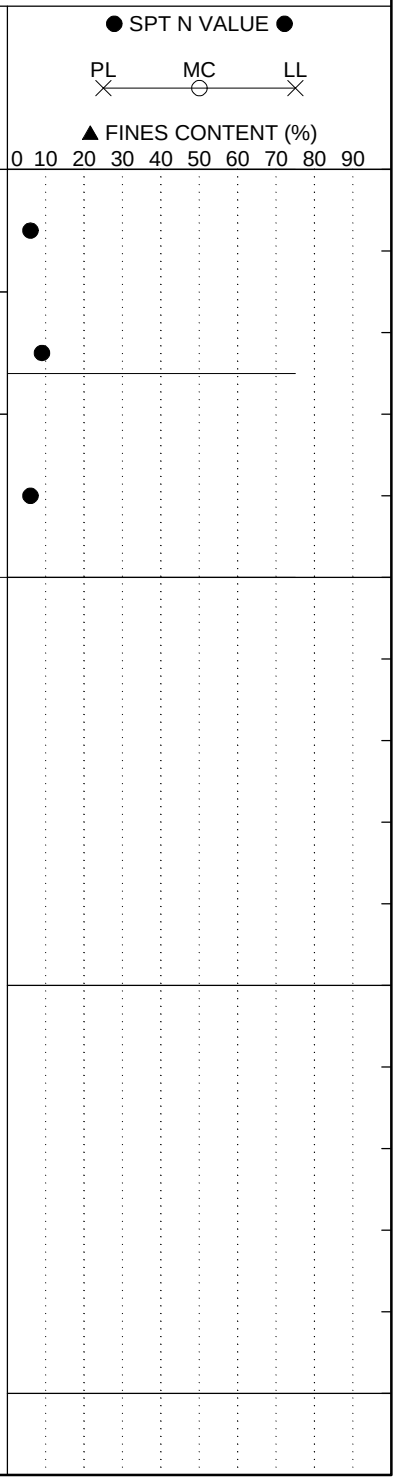
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-3
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	904+50	**Offset:**	4 RT	**Alignment:**	NB
Elev.:	729.1 ft	**Latitude:**	35.03134	**Longitude:**	-81.85646	**Date Started:**	4/12/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/12/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
	1.5	**Fill** - Firm, brown black, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-6], trace roots, trace asphalt fragments		1.5	SS-1	2	3	3	6
		Fill - Stiff to firm, brown olive red, very micaceous, fine, sandy SILT (ML) [A-4], trace crushed stone, trace clay, trace roots (1.5'-3')		3.0	SS-2	3	4	5	9
					SS-3	2	3	3	6
724.1	5.0	Boring Terminated at 5 feet							
719.1									
714.1									



LEGEND

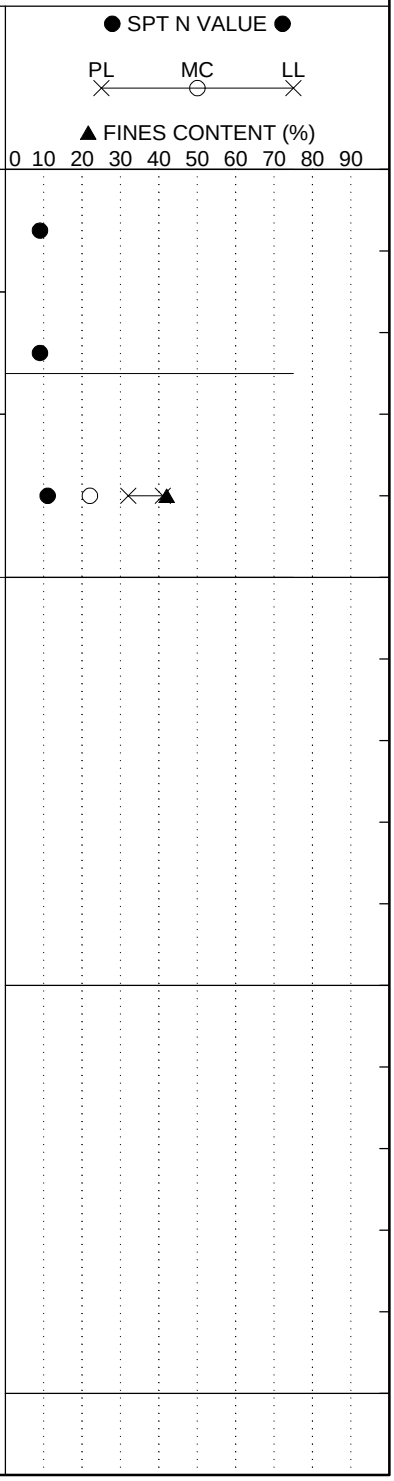
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-4
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	919+25	**Offset:**	6 RT
Alignment:	NB				
Elev.:	763.6 ft	**Latitude:**	35.03249	**Longitude:**	-81.85174
Date Started:	4/12/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Stiff, brown red, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-6], trace sand		1.5	SS-1	4	5	4	9
	2.5	**Residuum** - Loose to medium dense, light brown, fine, silty SAND (SM) [A-5 (1)], trace mica		3.0	SS-2	2	4	5	9
		LL=41, PL=32, PI=9, NMC=22, %200=42			SS-3	2	5	6	11
758.6	5.0	Boring Terminated at 5 feet							
753.6									
748.6									



LEGEND

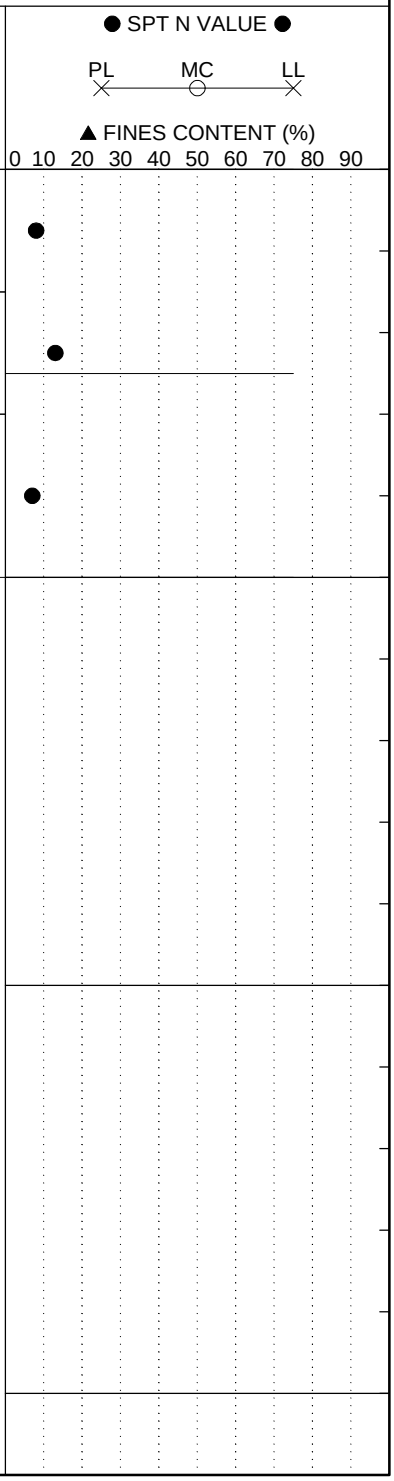
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-5
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	934+00	**Offset:**	9.5 RT
Alignment:	NB				
Elev.:	809.6 ft	**Latitude:**	35.03364	**Longitude:**	-81.84702
Date Started:	4/12/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Firm to stiff, brown olive red, fine to medium, sandy lean CLAY (CL) [A-6], trace roots, trace mica			SS-1	3	4	4	8
				1.5	SS-2	3	6	7	13
	3.0	**Possible Fill** - Loose, gray brown, fine to medium, silty SAND (SM) [A-4], trace mica		3.0	SS-3	4	3	4	7
804.6	5.0	Boring Terminated at 5 feet							
799.6									
794.6									



LEGEND

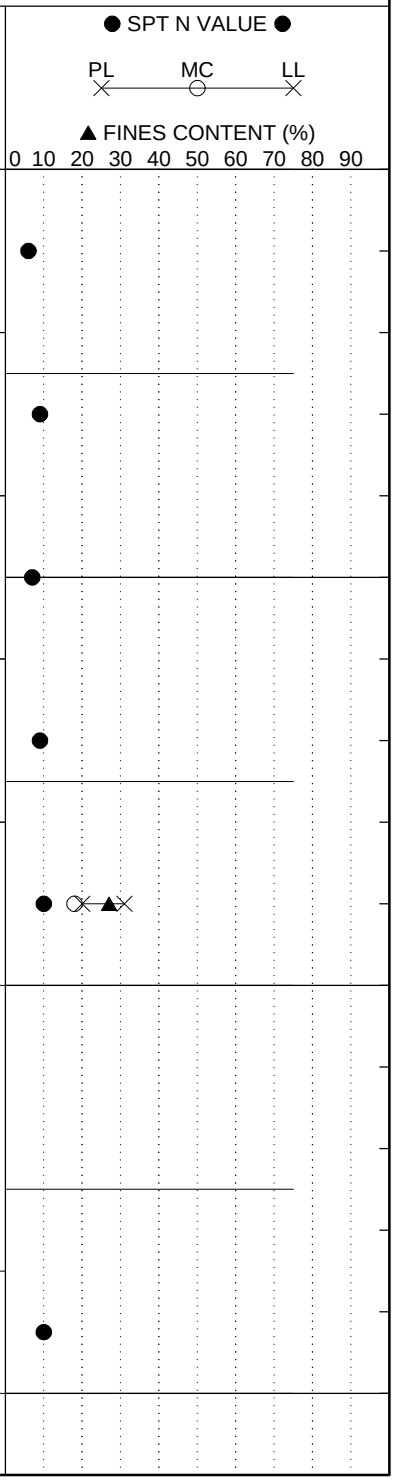
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-6
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	648+85	**Offset:**	5 RT
Alignment:	NB				
Elev.:	746.3 ft	**Latitude:**	35.03478	**Longitude:**	-81.84226
Date Started:	4/12/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown black, fine to medium, clayey SAND (SC) [A-2], trace gravel, trace roots			SS-1	2	2	4	6
	2.0	**Fill** - Stiff, brown olive, fine to medium, sandy lean CLAY (CL) [A-6]		2.0	SS-2	3	3	6	9
	4.0	**Fill** - Firm to stiff, red brown olive, coarse to medium, sandy lean CLAY (CL) [A-6], trace crushed stone		4.0	SS-3	2	3	4	7
741.3				6.0	SS-4	2	4	5	9
	8.0	**Fill** - Loose, red tan brown, medium to fine, clayey SAND with gravel (SC) [A-2-6 (0)] LL=31, PL=20, PI=11, NMC=18, %200=27		8.0	SS-5	11	6	4	10
736.3				13.5	SS-6	2	4	6	10
731.3	15.0	Boring Terminated at 15 feet							



LEGEND

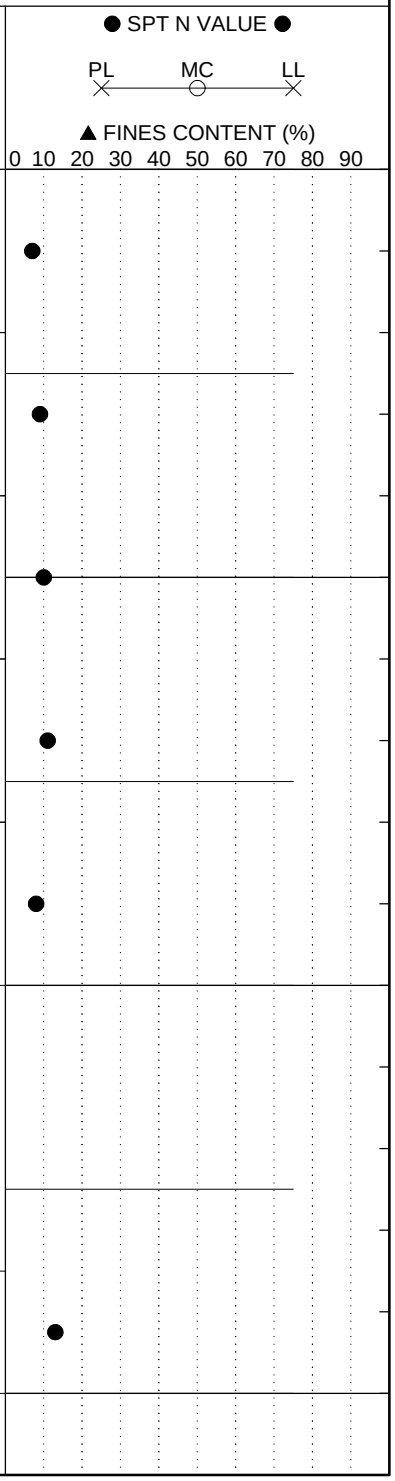
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-7
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	963+50	**Offset:**	10 RT
Alignment:	NB				
Elev.:	815.1 ft	**Latitude:**	35.03593	**Longitude:**	-81.83756
Date Started:	4/12/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.5	**Topsoil** - 6 inches	0.0					
		Fill - Loose, dark brown, fine to coarse, clayey SAND (SC) [A-2], trace roots		SS-1	4	4	3	7
	2.0	**Fill** - Stiff, red brown olive, silty CLAY (CL) [A-6]	2.0	SS-2	3	4	5	9
	4.0	**Residuum** - Stiff to firm, olive gray pink, fine, sandy SILT (ML) [A-4], trace mica	4.0	SS-3	3	4	6	10
810.1			6.0	SS-4	2	4	7	11
			8.0	SS-5	3	3	5	8
805.1								
			13.5	SS-6	9	5	8	13
800.1	15.0	Boring Terminated at 15 feet						



LEGEND

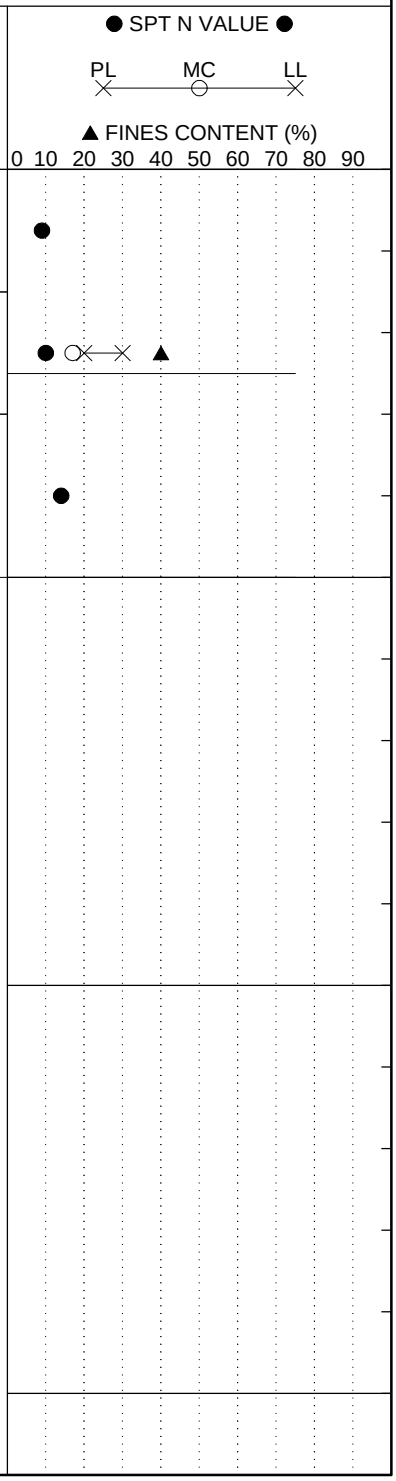
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-8
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	978+25	**Offset:**	10 RT
Alignment:	NB				
Elev.:	812.5 ft	**Latitude:**	35.03733	**Longitude:**	-81.83293
Date Started:	4/12/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/12/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.5	**Topsoil** - 6 inches		0.0					
		Fill - Loose, brown, fine to medium, clayey SAND (SC) [A-2], trace roots			SS-1	3	4	5	9
	1.5	**Fill** - Loose to medium dense, brown red, medium dense to fine, clayey SAND (SC) [A-4 (1)] LL=30, PL=20, PI=10, NMC=17, %200=40		1.5	SS-2	2	4	6	10
				3.0	SS-3	3	6	8	14
807.5	5.0	Boring Terminated at 5 feet							
802.5									
797.5									



LEGEND

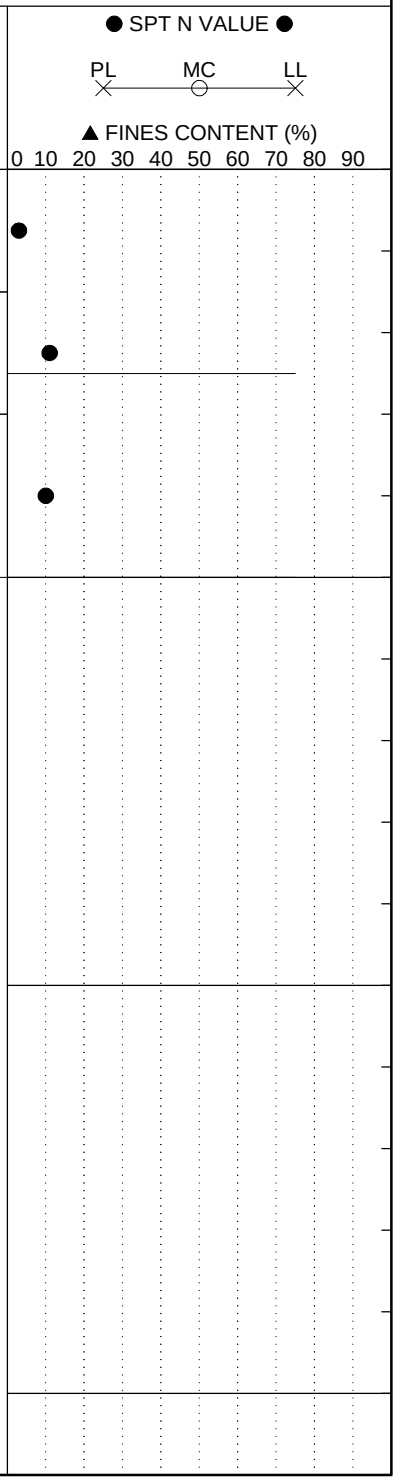
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-9		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	P. Chesney	**Boring Location:**	993+00	**Offset:**	17.5 RT	**Alignment:**	NB
Elev.:	844.5 ft	**Latitude:**	35.03911	**Longitude:**	-81.82848	**Date Started:**	4/20/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/20/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Very loose to medium dense, brown, medium to fine, clayey SAND (SC) [A-6], trace roots, trace gravel		0.0	SS-1	1	1	2	3
				1.5	SS-2	4	5	6	11
	2.5	**Fill** - Loose, brown red orange, medium to fine, silty SAND (SM) [A-2] trace clay, trace gravel, trace mica		3.0	SS-3	3	3	7	10
839.5	5.0	Boring Terminated at 5 feet							
834.5									
829.5									



LEGEND

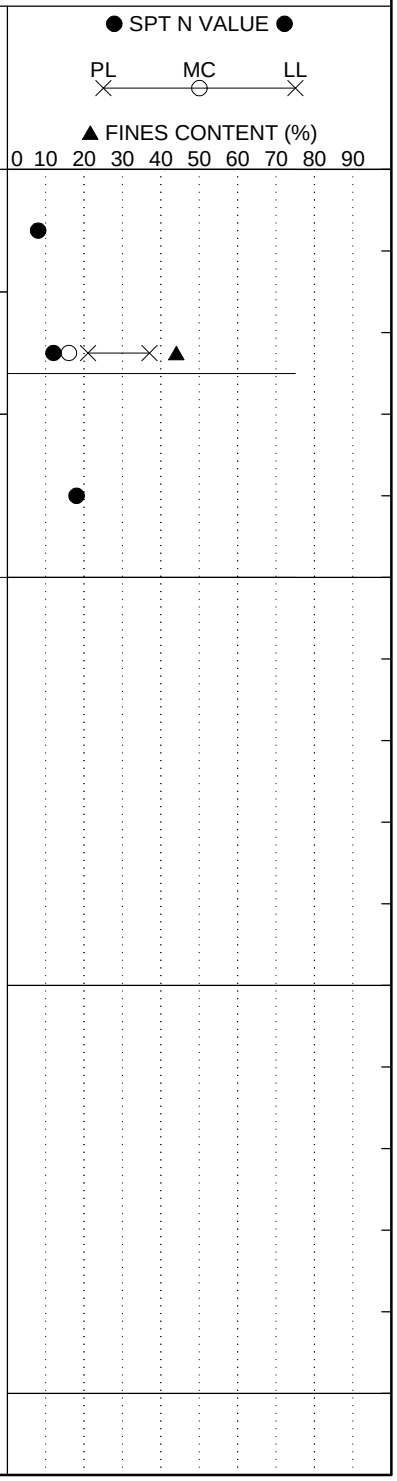
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-10
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1007+90	**Offset:**	19 RT
Alignment:	NB				
Elev.:	844.7 ft	**Latitude:**	35.04092	**Longitude:**	-81.82405
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Loose, olive brown, medium to fine, clayey SAND (SC) [A-2], trace roots, trace gravel		SS-1	2	4	4	8
	1.5	**Fill** - Medium dense, red brown, fine, clayey SAND (SC) [A-6 (3)], trace gravel LL=37, PL=21, PI=16, NMC=16, %200=44	1.5	SS-2	2	4	8	12
	3.0	**Fill** - Very stiff, red olive, sandy SILT (ML) [A-4], trace clay, trace mica	3.0	SS-3	6	8	10	18
839.7	5.0	Boring Terminated at 5 feet						
834.7								
829.7								



LEGEND

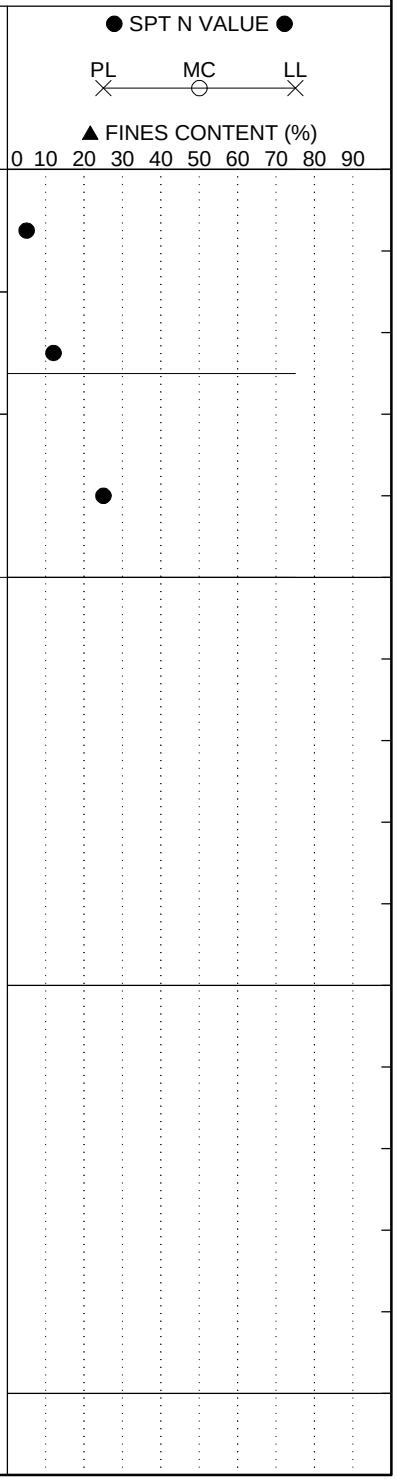
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-11
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1022+60	**Offset:**	19 RT
Alignment:	NB				
Elev.:	853.3 ft	**Latitude:**	35.04271	**Longitude:**	-81.81965
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.5	**Topsoil** - 6 inches		0.0					
		Fill - Loose, brown red gray, medium to fine, clayey SAND (SC) [A-2], trace organics		1.5	SS-1	2	2	3	5
	2.0	**Residuum** - Medium dense, olive white brown, fine to medium, clayey SAND (SC) [A-2]		3.0	SS-2	2	6	6	12
					SS-3	3	10	15	25
848.3	5.0	Boring Terminated at 5 feet							
843.3									
838.3									



LEGEND

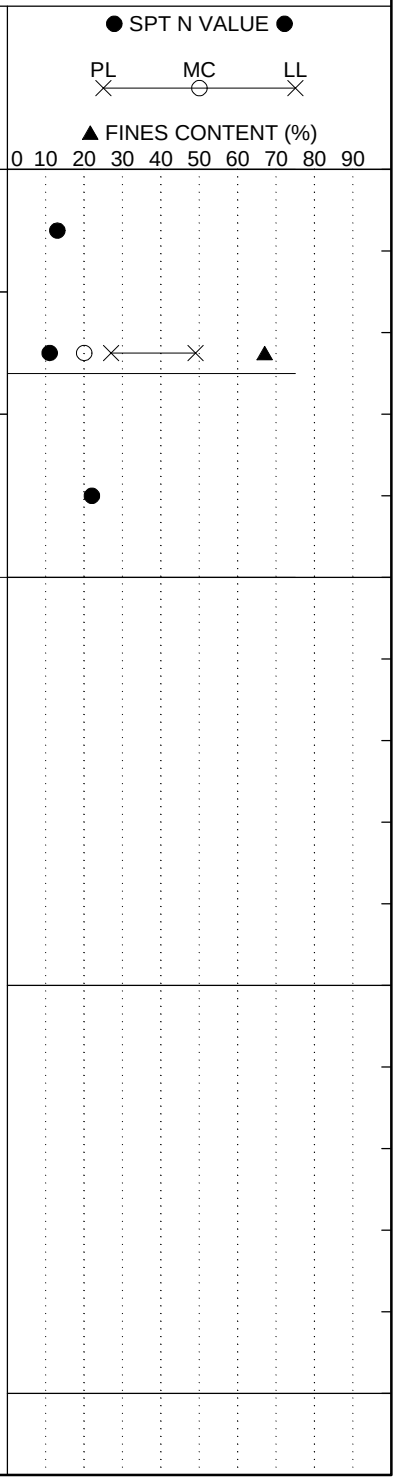
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-12
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1037+25	**Offset:**	16 RT
Alignment:	NB				
Elev.:	887.4 ft	**Latitude:**	35.04452	**Longitude:**	-81.81524
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Medium dense, gray black, medium to fine, clayey SAND (SC) [A-2], trace organics, trace rock fragments			SS-1	2	6	7	13
	1.5	**Fill** - Stiff, red brown, fine, sandy lean CLAY (CL) [A-7-6 (14)] LL=49, PL=27, PI=22, NMC=20, %200=67		1.5	SS-2	2	5	6	11
	3.0	**Fill** - Very stiff, olive, lean CLAY (CL) [A-7]		3.0	SS-3	9	10	12	22
882.4	5.0	Boring Terminated at 5 feet							
877.4									
872.4									



LEGEND

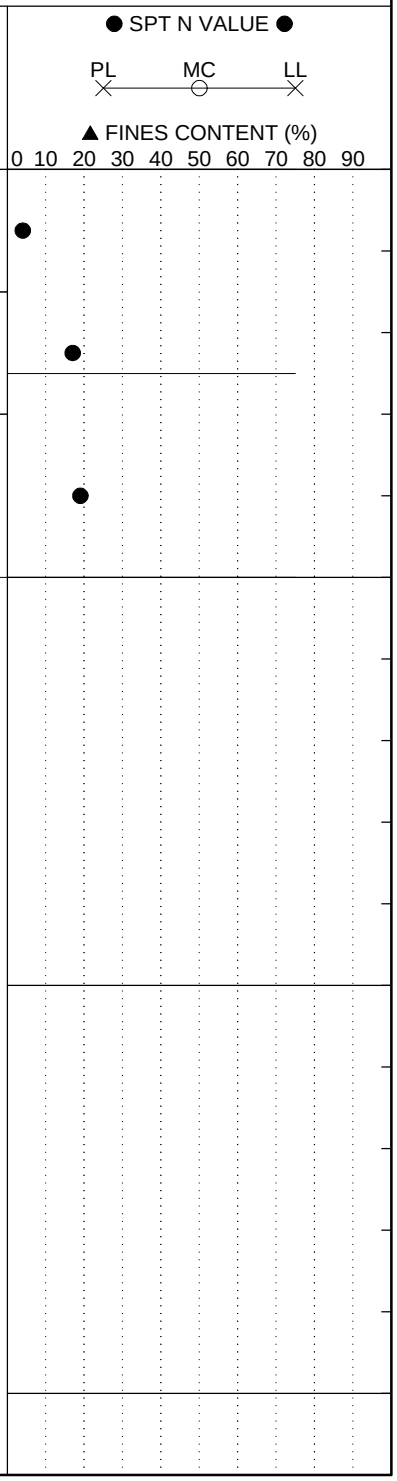
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-13
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1052+00	**Offset:**	16 RT
Alignment:	NB				
Elev.:	868.6 ft	**Latitude:**	35.04633	**Longitude:**	-81.81084
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Very loose, olive brown, medium to fine, clayey SAND (SC) [A-6], trace organics		1.5	SS-1	2	2	2	4
	2.0	**Residuum**- Very stiff, red brown, lean CLAY (CL) [A-6], trace silt		3.0	SS-2	3	6	11	17
					SS-3	3	9	10	19
863.6	5.0	Boring Terminated at 5 feet							
858.6									
853.6									



LEGEND

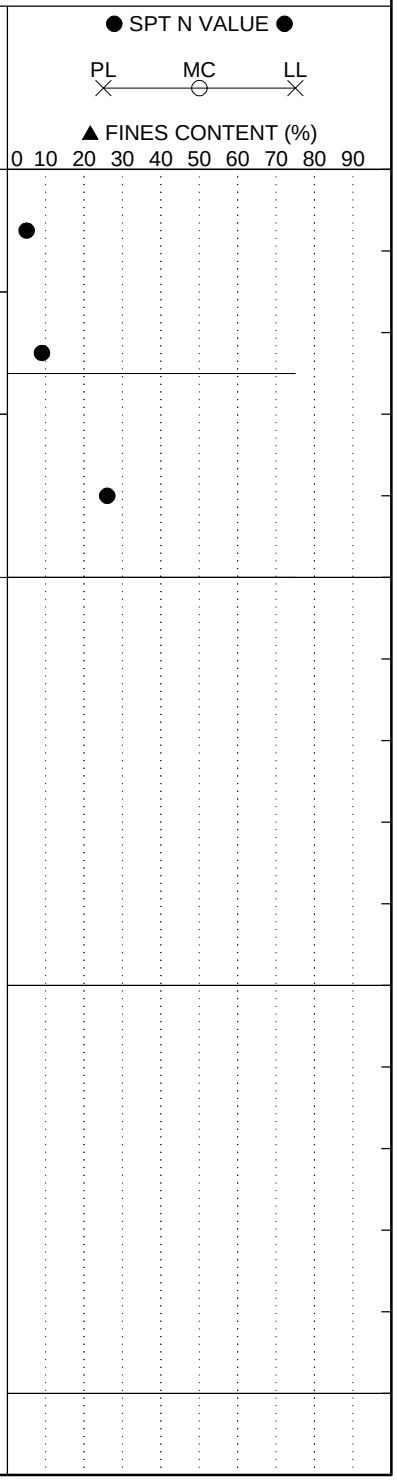
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-14
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1066+75	**Offset:**	17 RT
Alignment:	NB				
Elev.:	823.9 ft	**Latitude:**	35.04813	**Longitude:**	-81.80643
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown olive, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	1	2	3	5
	1.5	**Fill** - Stiff, red orange brown, elastic SILT (MH) [A-5], trace gravel, trace mica		1.5	SS-2	2	5	4	9
	3.0	**Fill** - Very stiff, red brown gray, medium to fine, lean CLAY with sand (CL) [A-6]		3.0	SS-3	2	13	13	26
818.9	5.0	Boring Terminated at 5 feet							
813.9									
808.9									



LEGEND

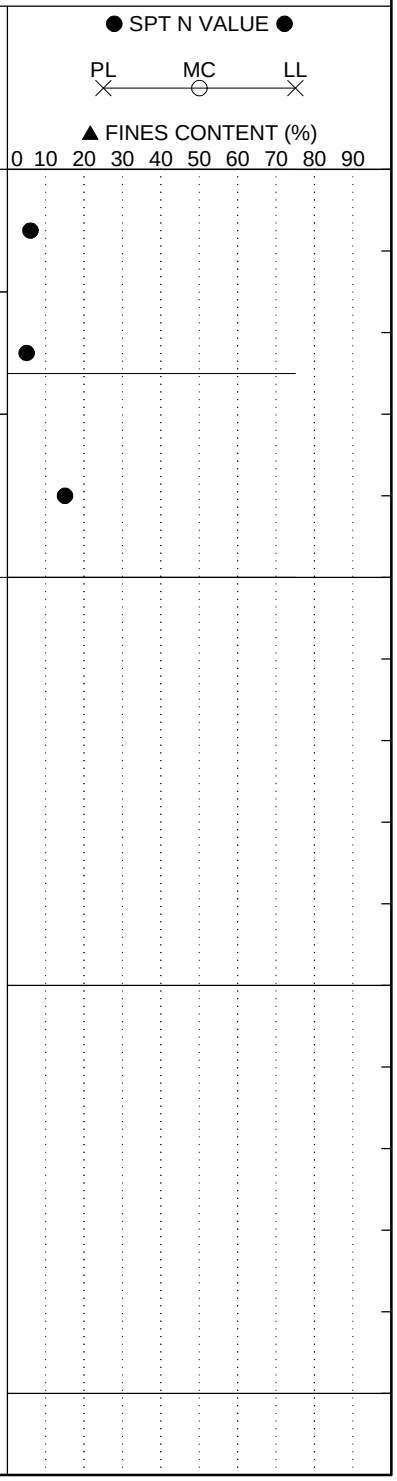
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-15
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1081+50	**Offset:**	16 RT
Alignment:	NB				
Elev.:	837.8 ft	**Latitude:**	35.04993	**Longitude:**	-81.80202
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, brown gray olive, medium to fine, clayey SAND (SC) [A-2], trace roots, trace organics			SS-1	2	2	4	6
	1.5	**Fill** - Firm, brown olive, clayey SILT with sand (ML) [A-5]		1.5	SS-2	2	3	2	5
	3.0	**Fill** - Medium dense, olive gray, red, fine to medium, silty SAND (SM) [A-2/6] trace mica		3.0	SS-3	3	5	10	15
832.8	5.0	Boring Terminated at 5 feet							
827.8									
822.8									



LEGEND

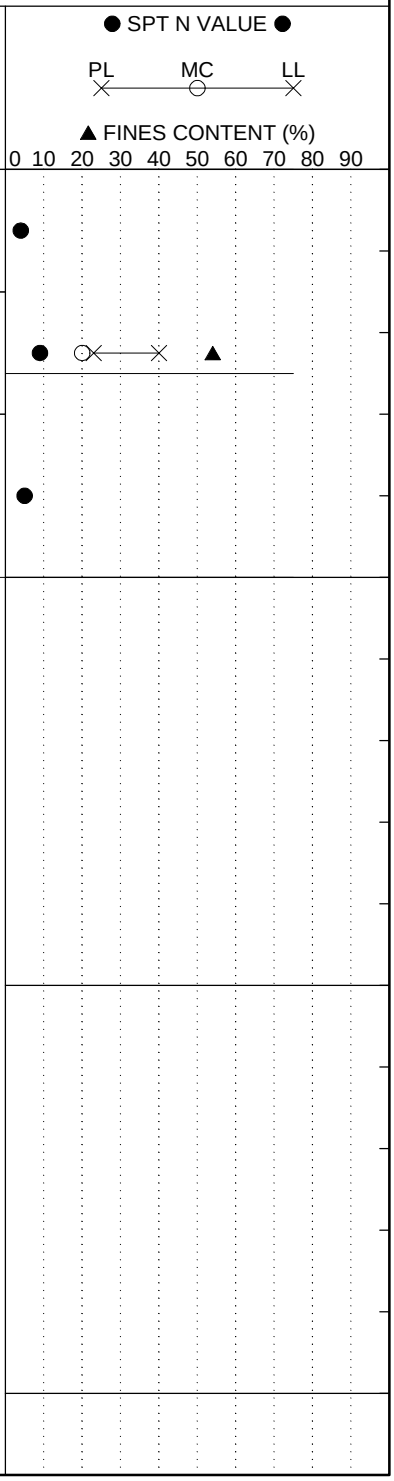
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-16
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1096+25	**Offset:**	18 RT
Alignment:	NB				
Elev.:	866.0 ft	**Latitude:**	35.05174	**Longitude:**	-81.79761
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Very loose, slightly moist, brown olive, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	2	2	2	4
	1.5	**Residuum** - Stiff, tan brown orange, fine to medium, sandy lean CLAY (CL) [A-6 (7)] LL=40, PL=23, PI=17, NMC=20, %200=54		1.5	SS-2	4	4	5	9
	3.0	Firm, moist, olive brown red, fine to medium, sandy SILT (ML) [A-4]		3.0	SS-3	2	2	3	5
861.0	5.0	Boring Terminated at 5 feet							
856.0									
851.0									



LEGEND

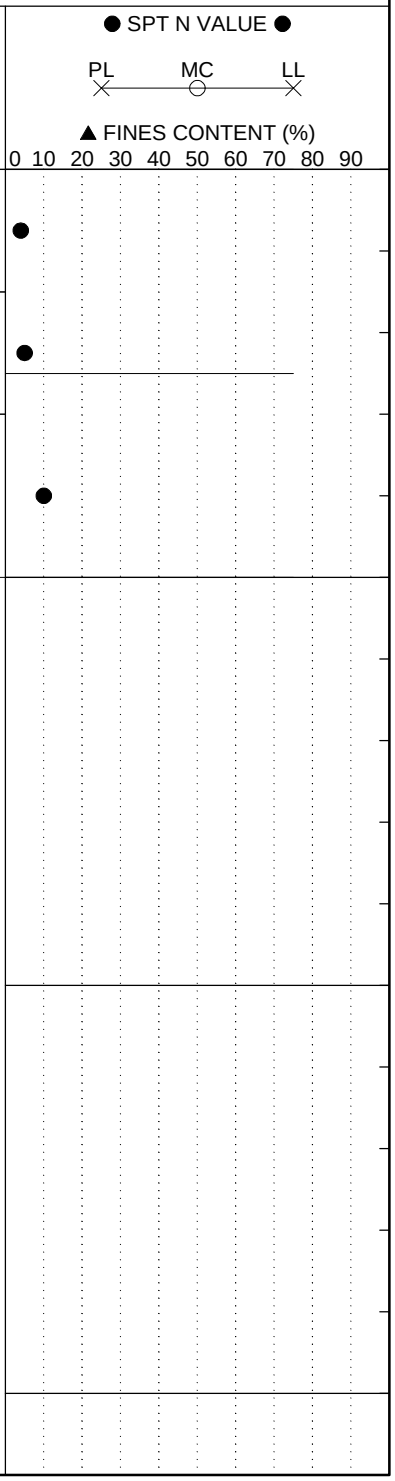
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-17
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1111+00	**Offset:**	15.5 RT
Alignment:	NB				
Elev.:	885.1 ft	**Latitude:**	35.05352	**Longitude:**	-81.7932
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Very loose, olive brown, medium to fine, clayey SAND (SC) [A-2]			SS-1	1	2	2	4
	1.5	**Fill** - Firm, brown, red gray, lean CLAY (CL) [A-6], trace sand		1.5	SS-2	1	2	3	5
	3.0	**Fill** - Stiff, red brown, lean CLAY (CL) [A-7]		3.0	SS-3	3	4	6	10
880.1	5.0	Boring Terminated at 5 feet							
875.1									
870.1									



LEGEND

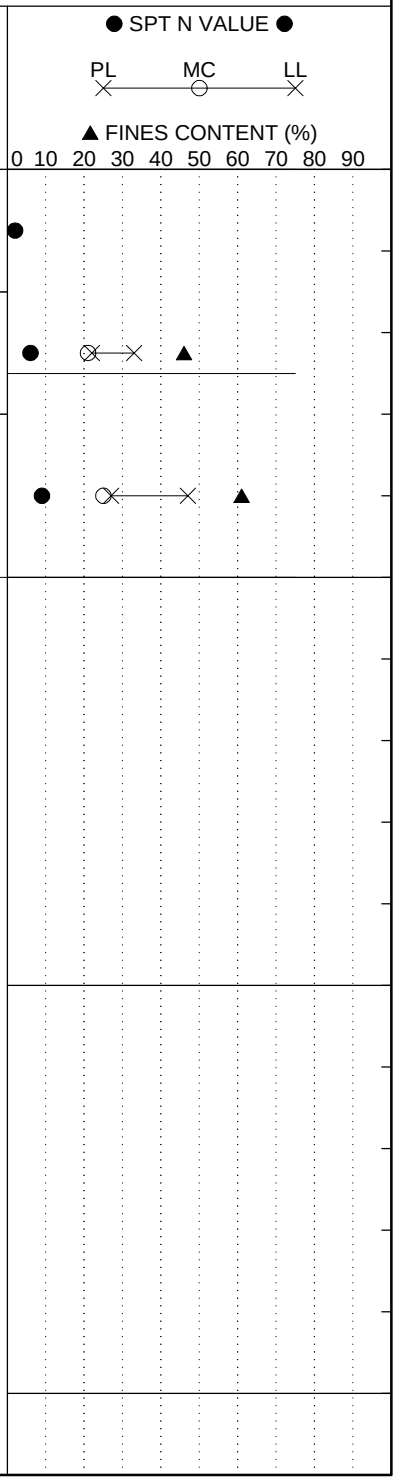
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-18		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	P. Chesney	**Boring Location:**	1125+75	**Offset:**	6 RT	**Alignment:**	NB
Elev.:	899.9 ft	**Latitude:**	35.05532	**Longitude:**	-81.78877	**Date Started:**	4/20/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/20/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Very loose, brown olive, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	1	1	1	2
	1.5	**Fill** - Loose, brown red, fine to medium, clayey SAND (SC) [A-6 (2)], trace silt, trace roots LL=33, PL=22, PI=11, NMC=21, %200=46		1.5	SS-2	2	3	3	6
	3.0	**Fill** - Stiff, tan red brown, fine, sandy lean CLAY (CL) [A-7-6 (11)], trace silt LL=47, PL=27, PI=20, NMC=25, %200=61		3.0	SS-3	2	4	5	9
894.9	5.0	Boring Terminated at 5 feet							
889.9									
884.9									



LEGEND

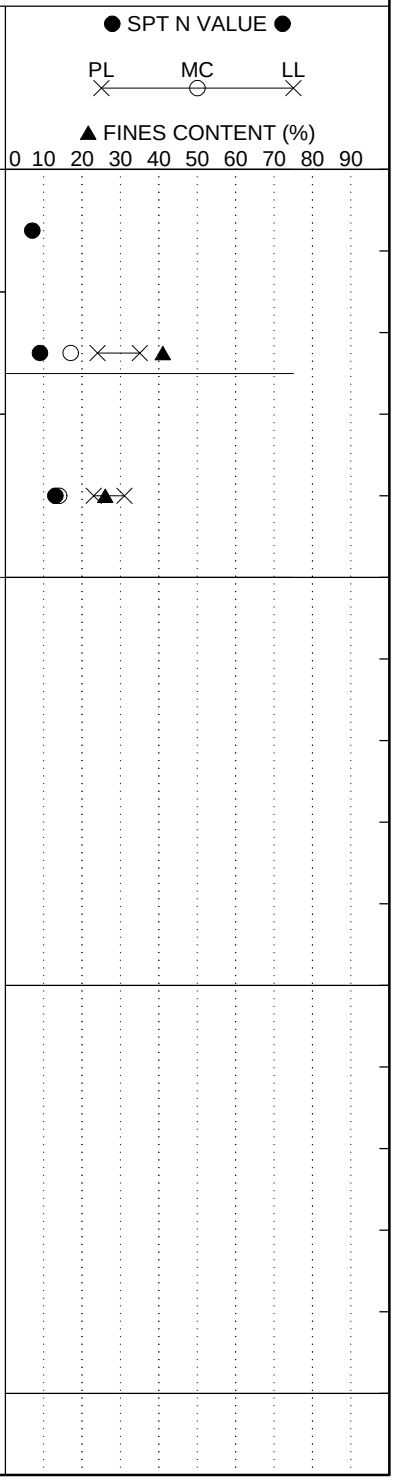
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-19
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1140+50	**Offset:**	15.5 RT	**Alignment:**	NB
Elev.:	911.8 ft	**Latitude:**	35.05734	**Longitude:**	-81.78451	**Date Started:**	4/20/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/20/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	1	3	4	7
	1.5			1.5					
		Fill - Loose, tan red brown, fine to medium, clayey SAND with gravel (SC) [A-6 (1)], trace rock fragments LL=35, PL=24, PI=11, NMC=17, %200=41			SS-2	4	4	5	9
	3.0			3.0					
		Fill - Medium dense, tan red brown, fine to medium, clayey SAND with gravel (SC) [A-2-4] LL=31, PL=23, PI=8, NMC=14, %200=26			SS-3	3	4	9	13
906.8	5.0	Boring Terminated at 5 feet							
901.8									
896.8									



LEGEND

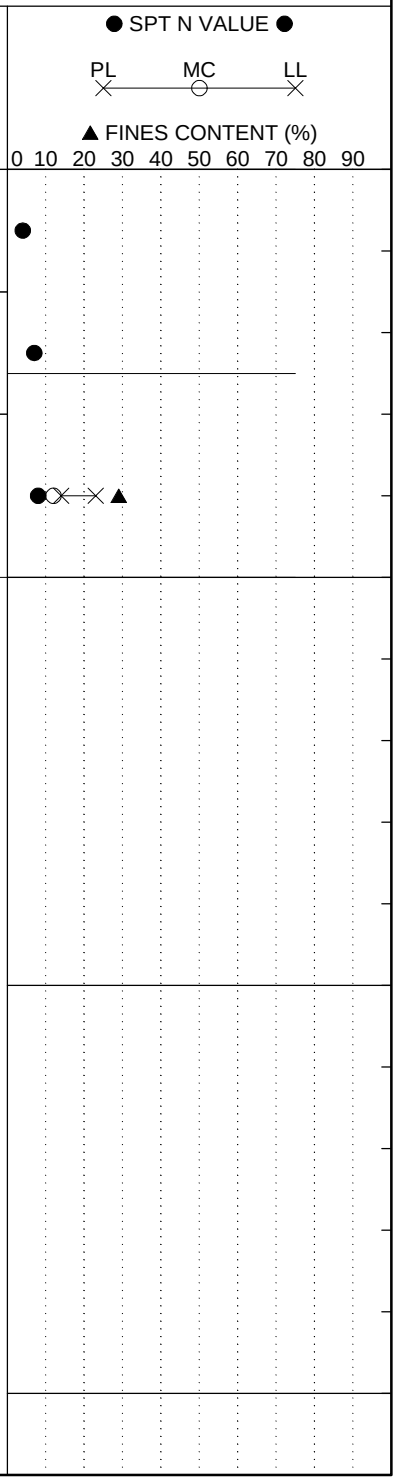
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-20
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1155+20	**Offset:**	12 RT
Alignment:	NB				
Elev.:	892.5 ft	**Latitude:**	35.05973	**Longitude:**	-81.78053
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Very loose, brown, fine to medium, clayey SAND (SC) [A-2], trace roots			SS-1	1	2	2	4
	1.5	**Fill** - Firm, brown, fine medium, sandy lean CLAY (CL) [A-6], trace roots		1.5	SS-2	3	3	4	7
	3.0	**Fill** - Loose, red brown, fine, clayey SAND with gravel (SC) [A-2-4] LL=23, PL=14, PI=9, NMC=12, %200=29		3.0	SS-3	2	3	5	8
887.5	5.0	Boring Terminated at 5 feet							
882.5									
877.5									



LEGEND

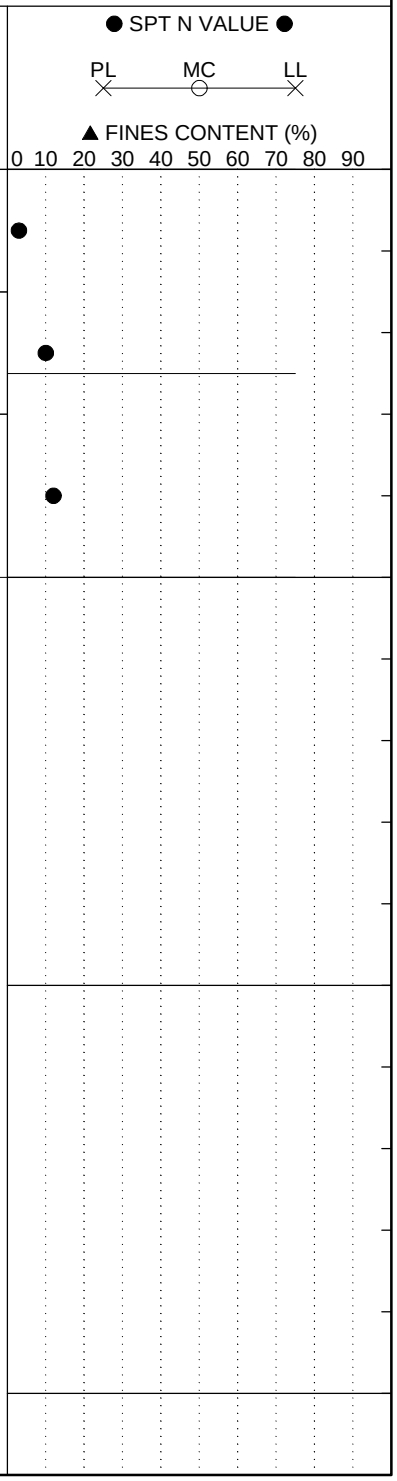
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-21
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1170+05	**Offset:**	14 RT
Alignment:	NB				
Elev.:	869.5 ft	**Latitude:**	35.06213	**Longitude:**	-81.77651
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Very loose, moist, brown, fine to medium, clayey SAND (SC) [A-2] trace roots			SS-1	1	1	2	3
	1.5	**Fill** - Stiff, olive red brown, fine to medium, sandy CLAY (CL) [A-6] trace silt		1.5	SS-2	1	3	7	10
	3.0	**Residuum** - Stiff, orange black, fine, sandy SILT (ML) [A-2-4] trace mica		3.0	SS-3	3	6	6	12
864.5	5.0	Boring Terminated at 5 feet							
859.5									
854.5									



LEGEND

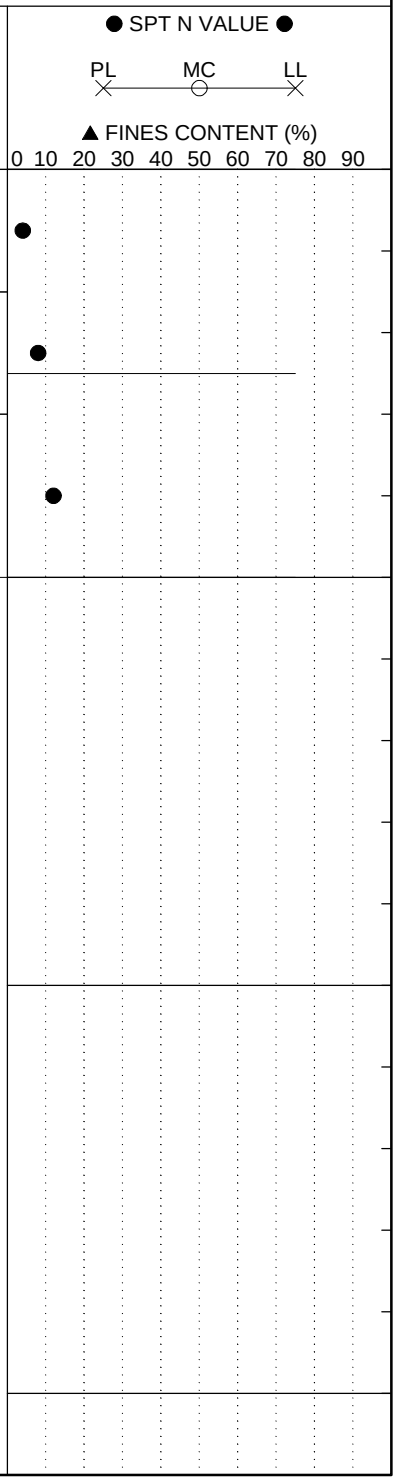
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-22
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1184+65	**Offset:**	15.5 RT
Alignment:	NB				
Elev.:	897.3 ft	**Latitude:**	35.0645	**Longitude:**	-81.77259
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Very loose, brown, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	1	1	3	4
	1.5	**Fill** - Loose, olive red, medium to fine, clayey SAND (SC) [A-6]		1.5	SS-2	2	4	4	8
				3.0	SS-3	3	6	6	12
	4.0	**Residuum** - Stiff, red brown, lean CLAY (CL) [A-6]							
892.3	5.0	Boring Terminated at 5 feet							
887.3									
882.3									



LEGEND

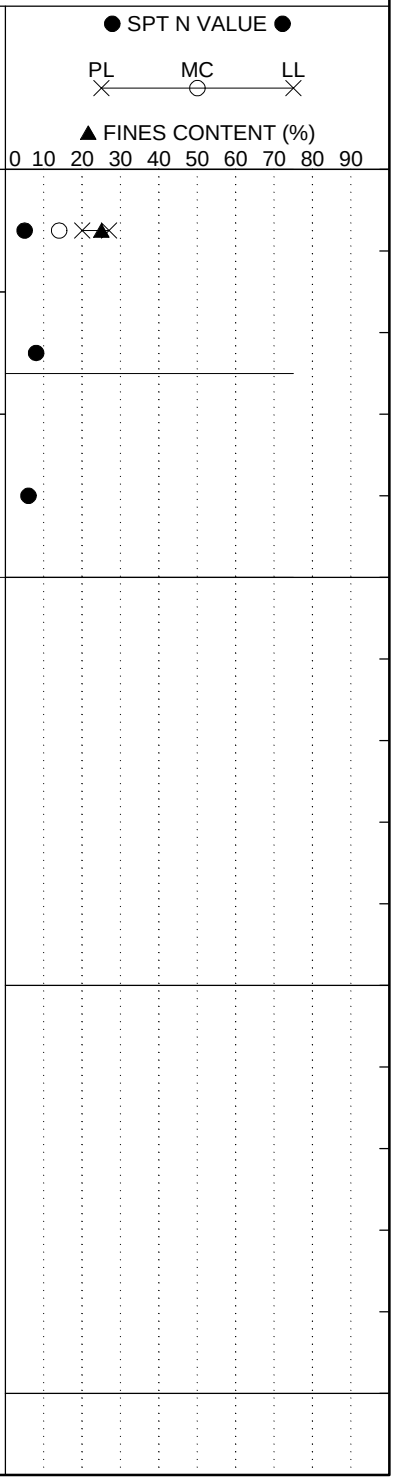
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-23
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1199+60	**Offset:**	16 RT
Alignment:	NB				
Elev.:	901.0 ft	**Latitude:**	35.06692	**Longitude:**	-81.76856
Date Started:	4/20/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/20/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, moist, dark brown red, fine, silty clayey SAND with gravel (SC-SM) [A-2-4]			SS-1	1	2	3	5
	1.5	LL=27, PL=20, PI=7, NMC=14, %200=25		1.5					
		Residuum - Firm, brown red, lean CLAY (CL) [A-6]			SS-2	2	4	4	8
				3.0					
					SS-3	2	2	4	6
896.0	5.0	Boring Terminated at 5 feet							
891.0									
886.0									



LEGEND

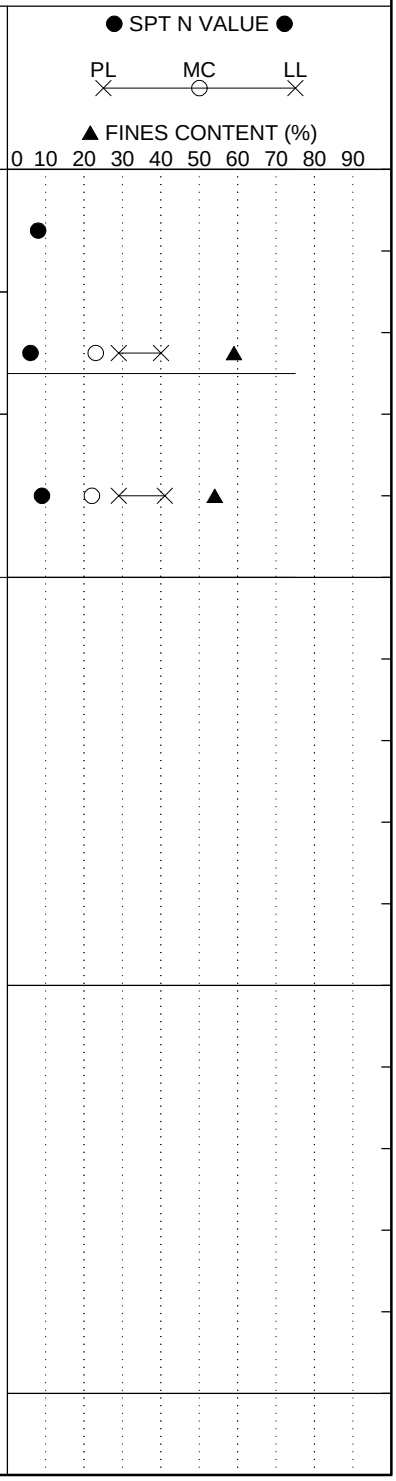
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-24		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	P. Chesney	**Boring Location:**	1214+00	**Offset:**	15 RT	**Alignment:**	NB
Elev.:	937.4 ft	**Latitude:**	35.06924	**Longitude:**	-81.76465	**Date Started:**	4/20/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/20/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, moist, dark brown, fine to coarse, clayey SAND (SC) [A-2], trace roots, trace rock fragments			SS-1	1	3	5	8
	1.5	**Residuum** - Firm, orange red tan, fine, sandy SILT (ML) [A-6 (5)], trace mica LL=40, PL=29, PI=11, NMC=23, %200=59		1.5	SS-2	2	3	3	6
	3.0	Stiff, orange red tan, fine, sandy SILT (ML) [A-7-6 (5)], trace mica LL=41, PL=29, PI=12, NMC=22, %200=54		3.0	SS-3	2	4	5	9
932.4	5.0	Boring Terminated at 5 feet							
927.4									
922.4									



LEGEND

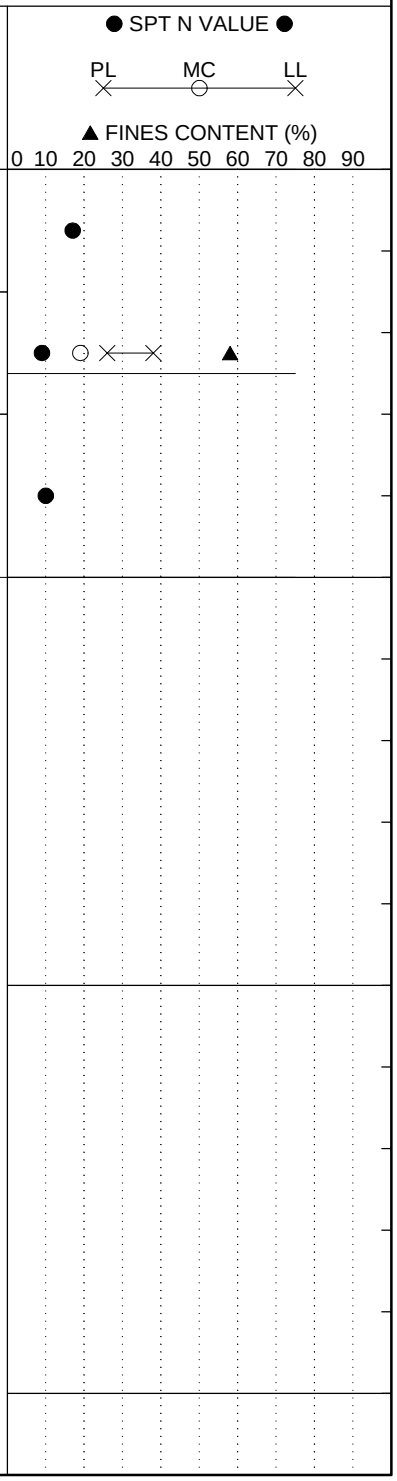
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-25
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1229+00	**Offset:**	10 RT
Alignment:	NB				
Elev.:	876.2 ft	**Latitude:**	35.0716	**Longitude:**	-81.76056
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Medium dense, dark brown olive, fine to coarse, clayey SAND (SC) [A-2], trace roots, trace gravel			SS-1	2	11	6	17
	1.5	**Fill** - Stiff, red tan, fine, sandy SILT (ML) [A-6 (5)], trace mica LL=38, PL=26, PI=12, NMC=19, %200=58		1.5	SS-2	4	3	6	9
	3.0	**Fill** - Stiff, orange green gray, fine to medium, sandy SILT (ML) [A-5]		3.0	SS-3	2	4	6	10
871.2	5.0	Boring Terminated at 5 feet							
866.2									
861.2									



LEGEND

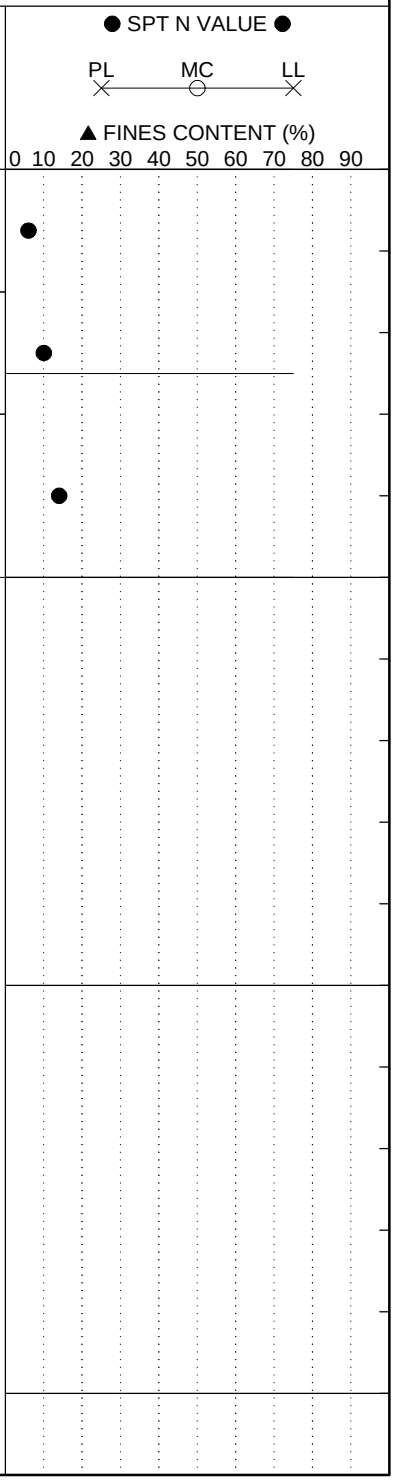
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-26
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1243+80	**Offset:**	9 RT
Alignment:	NB				
Elev.:	873.1 ft	**Latitude:**	35.07297	**Longitude:**	-81.75599
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, moist, dark brown, fine to coarse, clayey SAND (SM) [A-2], trace roots (4"-1.5')			SS-1	1	3	3	6
				1.5	SS-2	4	5	5	10
	3.0	**Fill** - Medium dense, olive red, fine to medium, silty SAND (SM) [A-4], trace mica		3.0	SS-3	4	7	7	14
868.1	5.0	Boring Terminated at 5 feet							
863.1									
858.1									



LEGEND

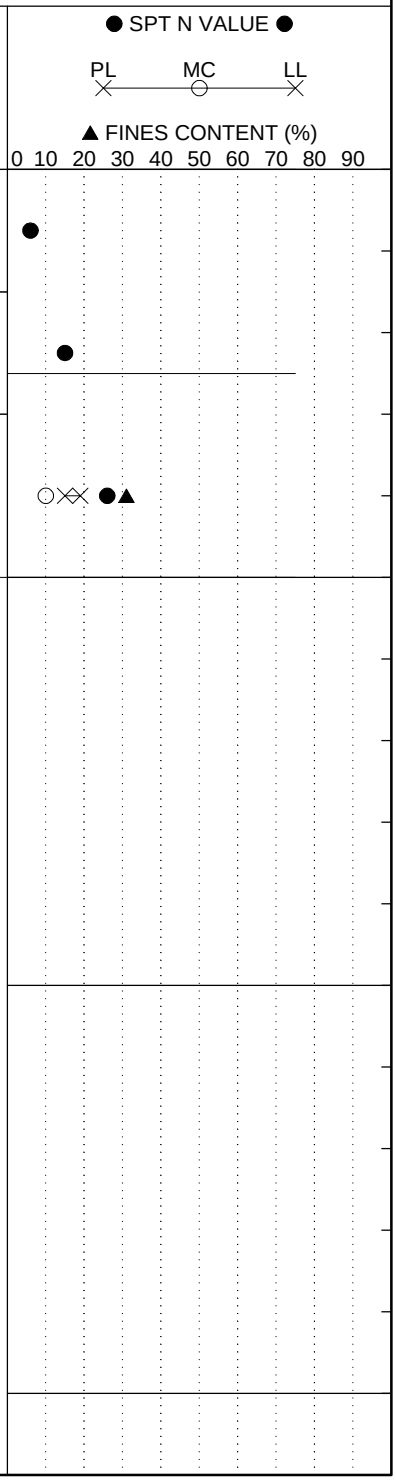
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-27
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1258+50	**Offset:**	8 RT
Alignment:	NB				
Elev.:	849.6 ft	**Latitude:**	35.07361	**Longitude:**	-81.75112
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.4	**Topsoil** - 5 inches	0.0					
	1.5	**Fill** - Loose, dark brown, medium to fine, clayey SAND (SC) [A-2], trace roots, trace asphalt pieces	1.5	SS-1	3	3	3	6
	3.0	**Fill** - Medium dense, red gray, fine to medium, clayey SAND (SC) [A-2]	3.0	SS-2	4	7	8	15
844.6	5.0	**Residuum** - Medium dense, moist, dark red brown, fine to medium, silty clayey SAND (SC-SM) [A-2-4] LL=19, PL=15, PI=4, NMC=10, %200=31		SS-3	4	12	14	26
		Boring Terminated at 5 feet						
839.6								
834.6								



LEGEND

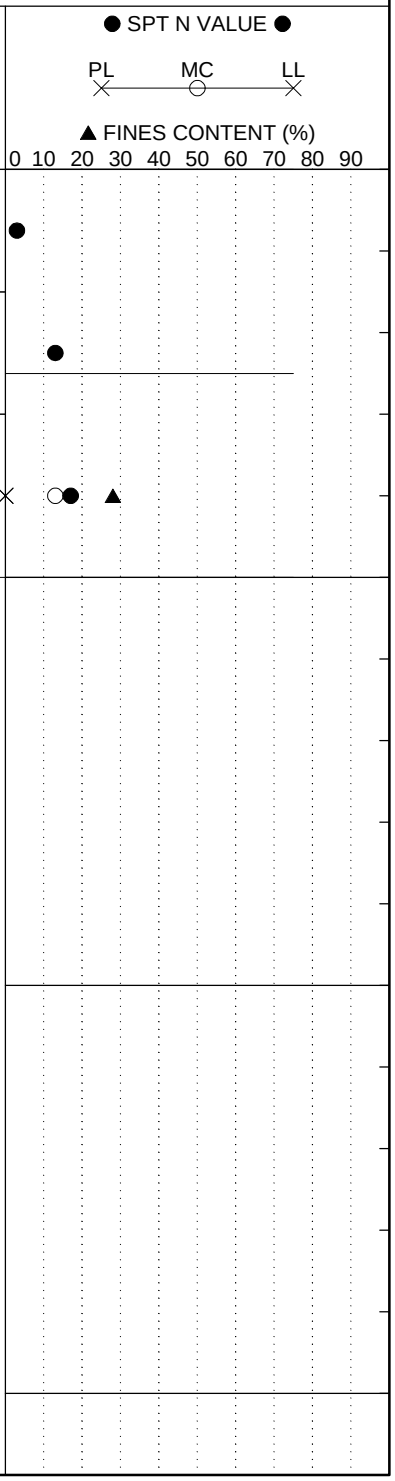
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-28
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1273+10	**Offset:**	8 RT
Alignment:	NB				
Elev.:	841.2 ft	**Latitude:**	35.07427	**Longitude:**	-81.74632
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Very loose, dark brown, clayey medium to fine SAND (SC) [A-2] trace roots		SS-1	1	2	1	3
	1.5	**Residuum** - Medium dense, olive red, silty SAND (SM) [A-2], trace clay, trace rock fragments (1/4")	1.5	SS-2	1	3	10	13
	3.0	Medium dense, yellow orange, medium to fine, silty SAND (SM) [A-2-4] LL/PL/PI="NP", NMC=13, %200=28	3.0	SS-3	9	9	8	17
836.2	5.0	Boring Terminated at 5 feet						
831.2								
826.2								



LEGEND

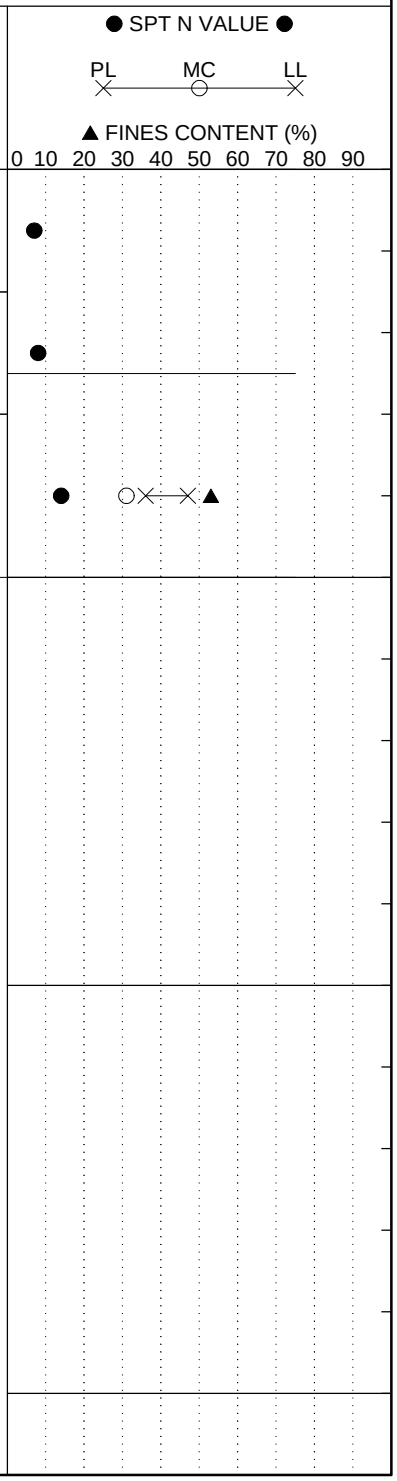
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-29
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1288+00	**Offset:**	8 RT
Alignment:	NB				
Elev.:	812.2 ft	**Latitude:**	35.0749	**Longitude:**	-81.74139
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, slightly moist, dark brown, medium to coarse, clayey SAND (SC) [A-2], trace roots, trace rubber fragments			SS-1	1	3	4	7
	1.5	Firm to stiff, red orange, medium to fine, sandy SILT (ML) [A-7-5 (5)] LL=47, PL=36, PI=11, NMC=31, %200=53		1.5	SS-2	4	4	4	8
				3.0	SS-3	5	6	8	14
807.2	5.0	Boring Terminated at 5 feet							
802.2									
797.2									



LEGEND

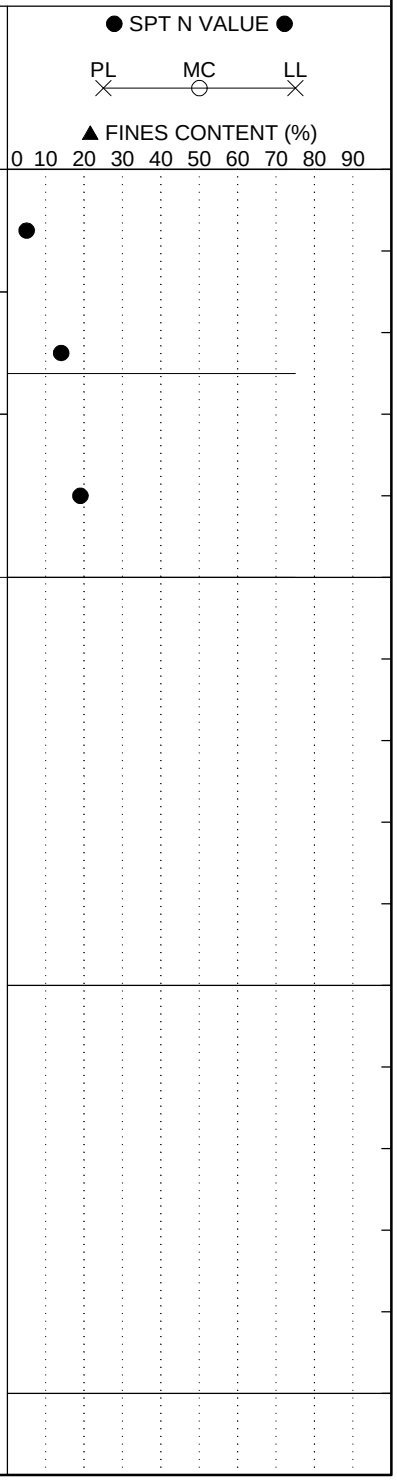
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-30
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1302+95	**Offset:**	8 RT
Alignment:	NB				
Elev.:	779.7 ft	**Latitude:**	35.07556	**Longitude:**	-81.73647
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, slightly moist, dark brown, medium to fine, clayey SAND (SC) [A-2], trace roots			SS-1	1	2	3	5
	1.5	**Fill** - Stiff to very stiff, red brown, elastic SILT (MH) [A-7], trace organics, trace organic staining		1.5	SS-2	3	4	10	14
				3.0	SS-3	5	8	11	19
774.7	5.0	Boring Terminated at 5 feet							
769.7									
764.7									



LEGEND

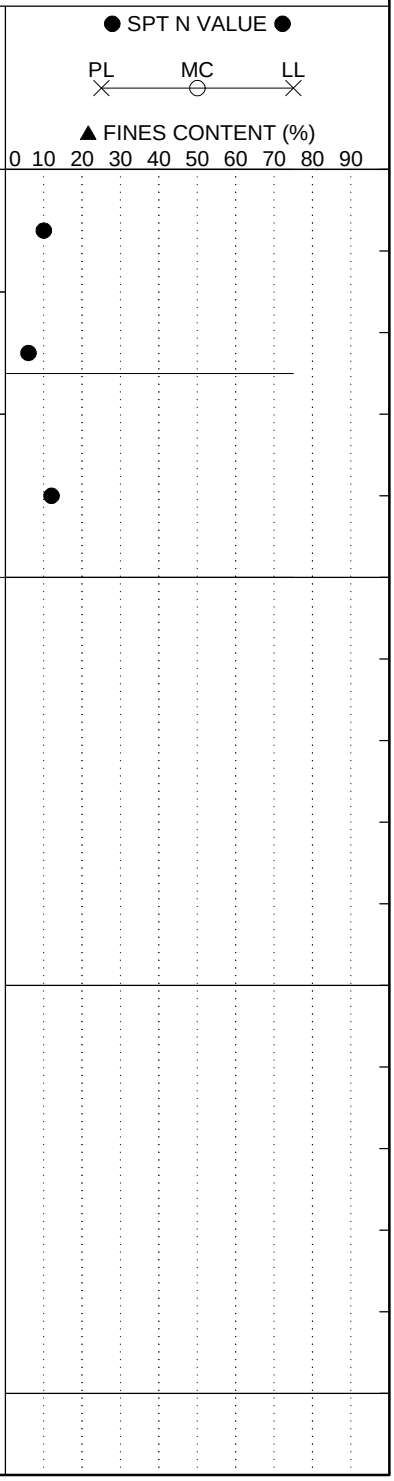
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-31
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1317+50	**Offset:**	7 RT
Alignment:	NB				
Elev.:	741.1 ft	**Latitude:**	35.07621	**Longitude:**	-81.73165
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Stiff, dark brown black, fine to medium, sandy lean CLAY (CL) [A-6], trace roots, trace asphalt fragments, trace silt			SS-1	1	4	6	10
	1.5	**Fill** - Loose, tan red, medium to fine, clayey SAND (SC) [A-6], trace roots		1.5	SS-2	3	3	3	6
	3.0	**Fill** - Medium dense, moist, brown, medium to fine, silty SAND (SC) [A-4], trace mica		3.0	SS-3	3	6	6	12
736.1	5.0	Boring Terminated at 5 feet							
731.1									
726.1									



LEGEND

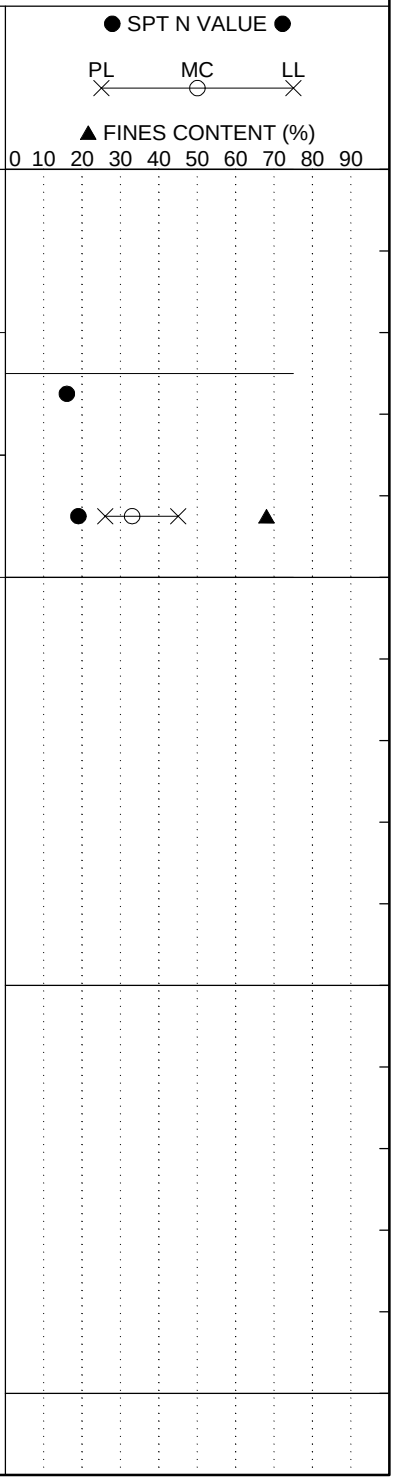
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-32
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1332+25	**Offset:**	11 RT
Alignment:	NB				
Elev.:	723.7 ft	**Latitude:**	35.07687	**Longitude:**	-81.7268
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 2 feet							
	2.0			2.0					
		Fill - Very stiff, moist, red orange, fine, sandy lean CLAY (CL) [A-7-6 (12)], trace sand LL=45, PL=26, PI=19, NMC=33, %200=68			SS-1	4	8	8	16
	3.5			3.5					
		Fill - Very stiff, red brown orange, medium to fine, sandy lean CLAY (CL) [A-7-6 (12)], trace crushed stone			SS-2	3	6	13	19
718.7	5.0	Boring Terminated at 5 feet							
713.7									
708.7									



LEGEND

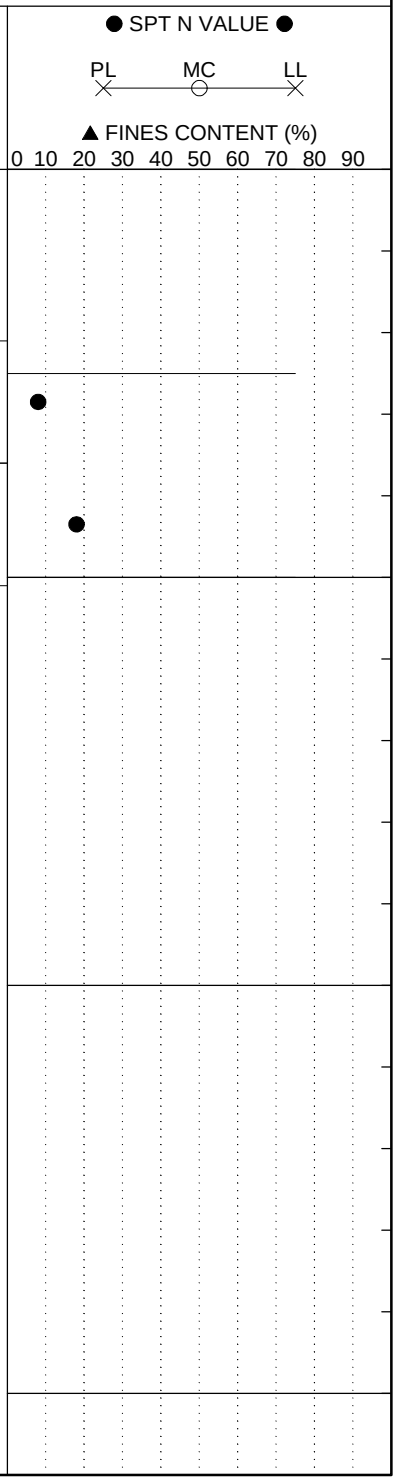
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-33
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1347+00	**Offset:**	11 RT
Alignment:	NB				
Elev.:	716.1 ft	**Latitude:**	35.07794	**Longitude:**	-81.72169
Date Started:	4/21/2015				
Total Depth:	5.1 ft	**Soil Depth:**	5.1 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
		Asphalt - 2.1 feet						
	2.1	**Fill** - Firm, moist, brown red, fine to medium, sandy lean CLAY (CL) [A-6]	2.1	SS-1	3	3	5	8
	3.6	**Fill** - Medium dense, dark brown, medium to fine, silty SAND (SM) [A-2], trace rock fragments (<1.5")	3.6	SS-2	4	8	10	18
711.1	5.1	Boring Terminated at 5.1 feet						
706.1								
701.1								



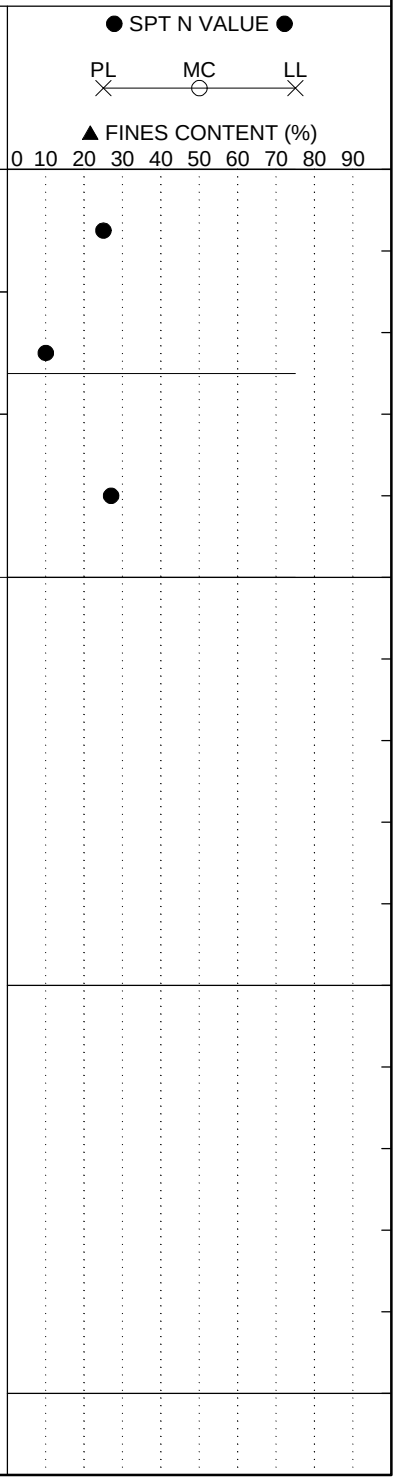
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-34
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1362+00	**Offset:**	17 RT
Alignment:	NB				
Elev.:	763.6 ft	**Latitude:**	35.07903	**Longitude:**	-81.71719
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Asphalt mixed with very stiff, brown, fine to medium, sandy SILT (ML) [A-4]		0.0	SS-1	1	14	11	25
	1.5	**Fill** - Loose to medium dense, tan olive, fine to medium, silty SAND (SM) [A-2], trace gravel, trace elastic silt		1.5	SS-2	3	4	6	10
				3.0	SS-3	7	11	16	27
758.6	5.0	Boring Terminated at 5 feet							
753.6									
748.6									



LEGEND

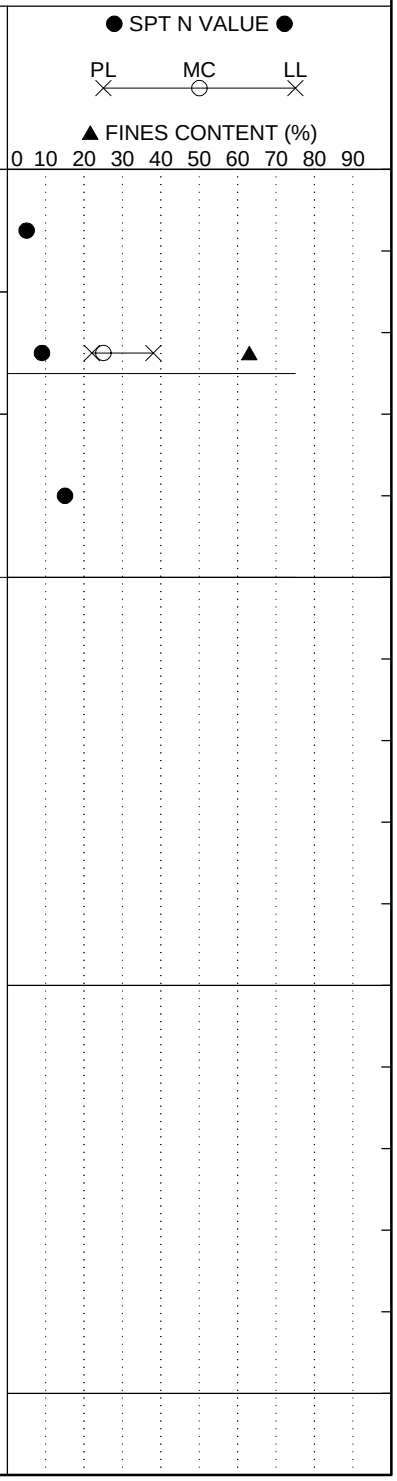
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-35
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1376+50	**Offset:**	15 RT
Alignment:	NB				
Elev.:	809.6 ft	**Latitude:**	35.08016	**Longitude:**	-81.71255
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, brown olive, fine to medium, silty SAND (SM) [A-4], trace mica, trace roots			SS-1	3	2	3	5
	1.5	**Residuum** - Stiff, red brown orange, fine, sandy lean CLAY (CL) [A-6 (8)] LL=38, PL=22, PI=16, NMC=25, %200=63		1.5	SS-2	4	4	5	9
	3.0	Medium dense, brown orange, fine to medium, silty SAND (SM) [A-4], trace lean clay		3.0	SS-3	4	6	9	15
804.6	5.0	Boring Terminated at 5 feet							
799.6									
794.6									



LEGEND

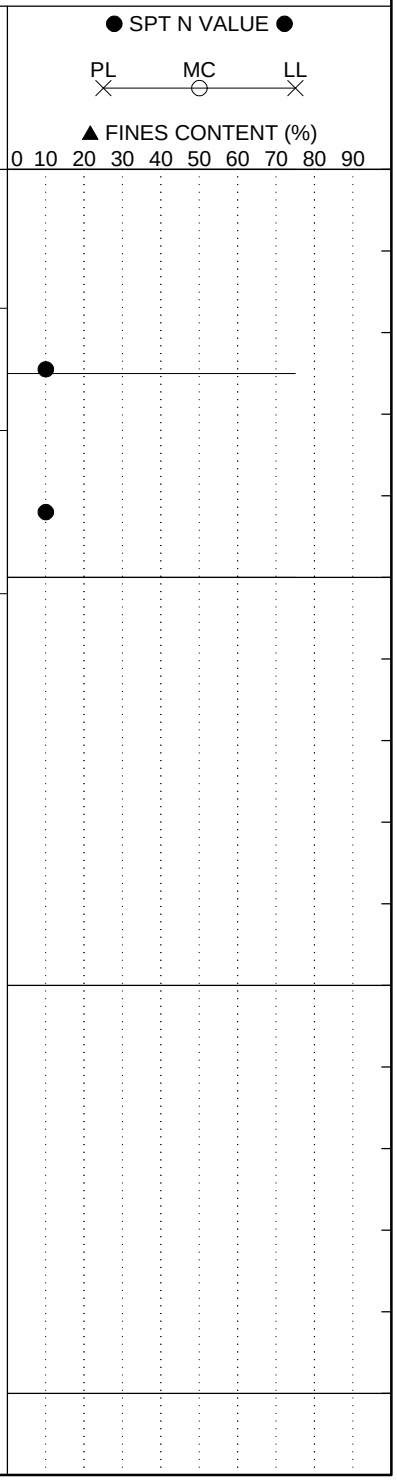
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-36
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1391+05	**Offset:**	6 RT
Alignment:	NB				
Elev.:	814.3 ft	**Latitude:**	35.08157	**Longitude:**	-81.70801
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 1.7 feet							
	1.7	**Fill** - Loose, moist, dark brown orange, fine to coarse, clayey SAND (SC) [A-2]		1.7	SS-1	6	6	4	10
				3.2	SS-2	3	4	6	10
809.3	5.2	Boring Terminated at 5.2 feet							
804.3									
799.3									



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 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-37
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1406+10	**Offset:**	6 RT
Alignment:	NB				
Elev.:	792.3 ft	**Latitude:**	35.08374	**Longitude:**	-81.70373
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Top of Ground								
		Asphalt - 1.5 feet								
	1.5			1.5						
		Fill - Loose, slightly moist, brown, fine to medium, silty SAND (SM) [A-4], trace clay, trace roots			SS-1	6	6	4	10	●
	3.0			3.0						
		Residuum - Firm, brown orange, elastic SILT (MH) [A-7]			SS-2	1	3	4	7	●
787.3	5.0									
		Boring Terminated at 5 feet								
782.3										
777.3										

LEGEND

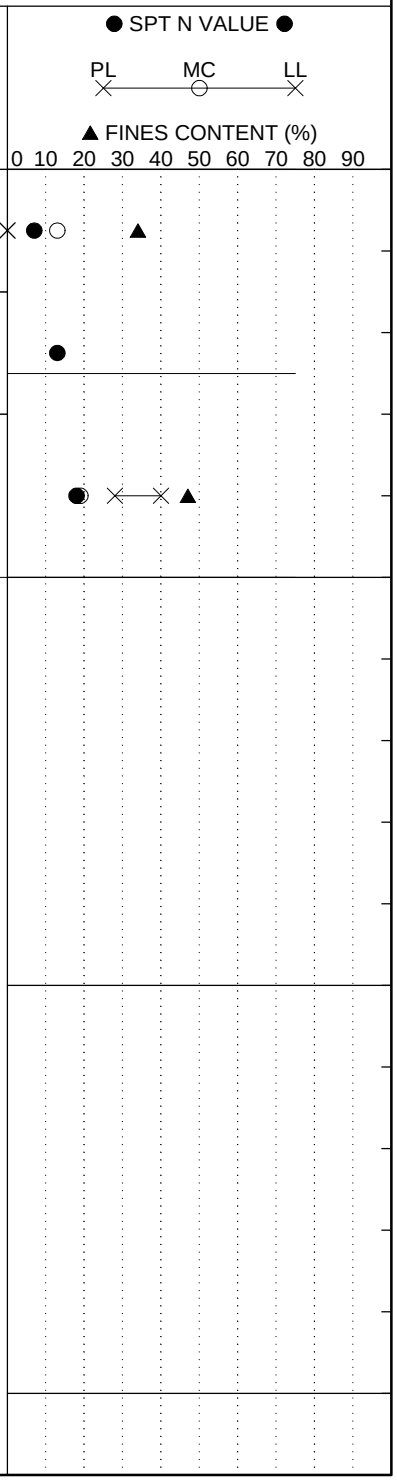
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-38
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1420+75	**Offset:**	7 RT
Alignment:	NB				
Elev.:	750.8 ft	**Latitude:**	35.08599	**Longitude:**	-81.69965
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, brown, medium to fine, clayey SAND (SC) [A-2-4], trace roots, trace clay LL/PL/PI="NP", NMC=13, %200=34			SS-1	1	3	4	7
	1.5			1.5					
		Fill - Medium dense, brown tan orange, medium to fine, silty SAND (SM) [A-2]			SS-2	3	5	8	13
	3.0			3.0					
		Fill - Medium dense, red, tan, medium to fine, silty SAND (SM) [A-6 (3)] LL=40, PL=28, PI=12, NMC=19, %200=47			SS-3	3	9	9	18
745.8	5.0	Boring Terminated at 5 feet							
740.8									
735.8									



LEGEND

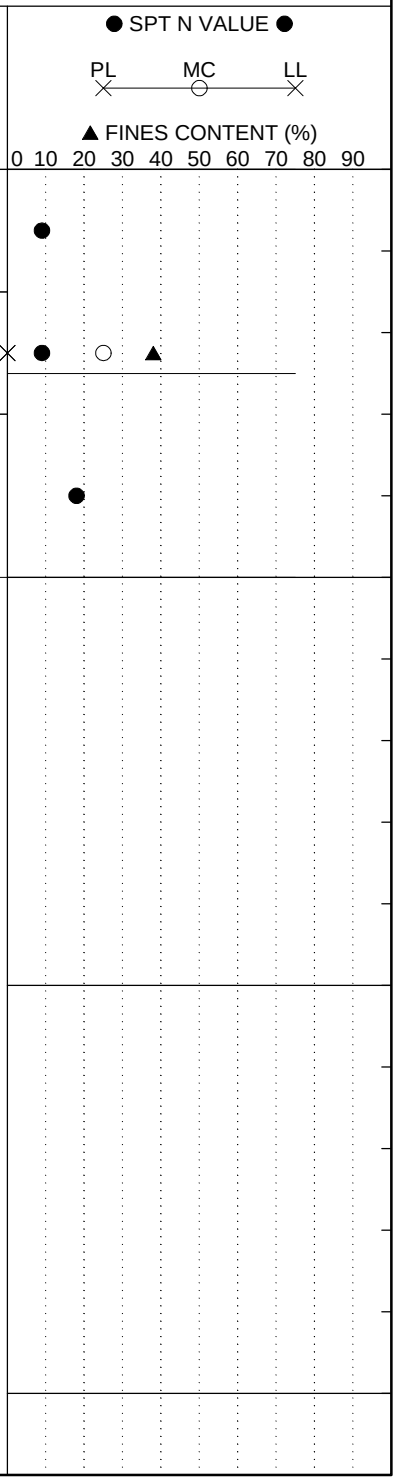
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-39
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1435+60	**Offset:**	9 RT
Alignment:	NB				
Elev.:	806.9 ft	**Latitude:**	35.0883	**Longitude:**	-81.69557
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, dark brown, fine to coarse, silty SAND (SM) [A-2], trace gravel, trace roots, trace clay			SS-1	2	5	4	9
	1.5	**Residuum** - Loose to medium dense, orange tan, fine to medium, clayey SAND (SC) [A-4 (0)], trace mica LL/PL/PI="NP", NMC=25, %200=38		1.5	SS-2	2	4	5	9
				3.0	SS-3	3	8	10	18
801.9	5.0	Boring Terminated at 5 feet							
796.9									
791.9									



LEGEND

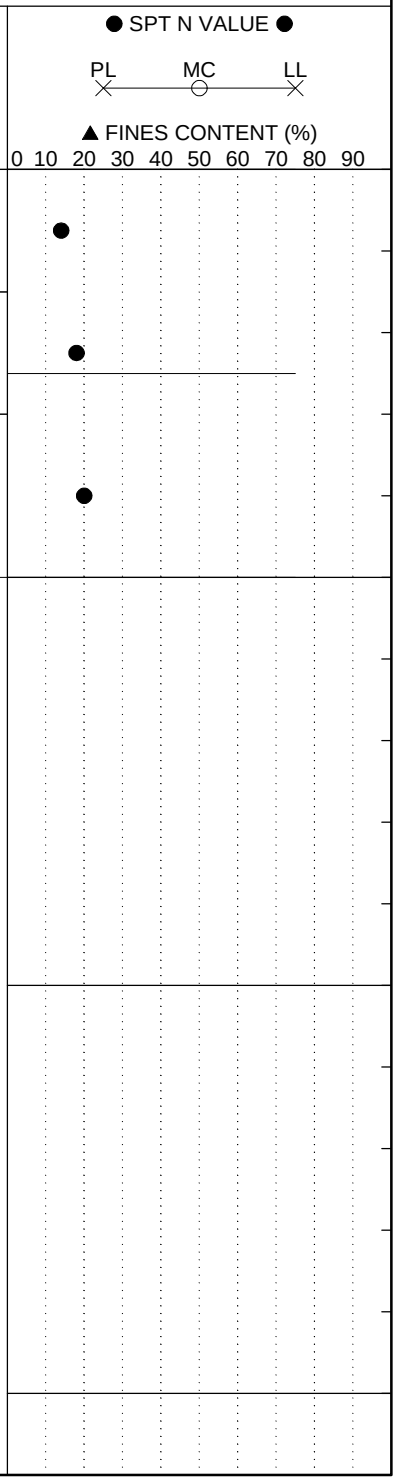
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-40
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1450+00	**Offset:**	10 RT
Alignment:	NB				
Elev.:	847.1 ft	**Latitude:**	35.09054	**Longitude:**	-81.69159
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Medium dense, slightly moist, dark brown, medium to coarse, silty SAND (SM) [A-2], trace roots, trace gravel			SS-1	2	6	8	14
	1.5	**Fill** - Very stiff, brown red tan, fine to medium, sandy CLAY (CL) [A-6]		1.5	SS-2	5	10	8	18
	3.0	**Possible Fill** - Medium dense, orange tan, medium to fine, silty SAND (SM) [A-4], trace clay		3.0	SS-3	4	8	12	20
842.1	5.0	Boring Terminated at 5 feet							
837.1									
832.1									



LEGEND

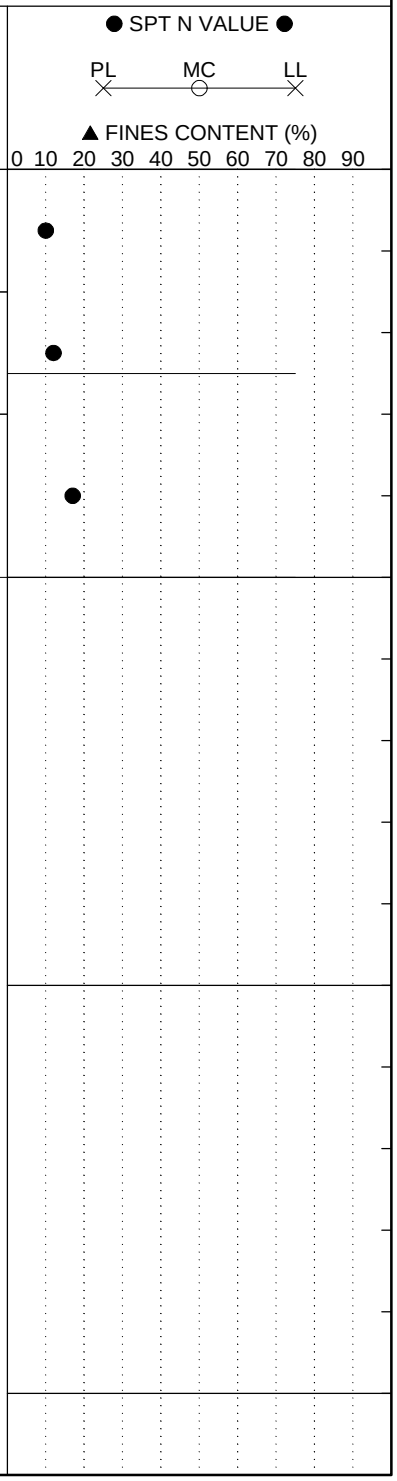
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-41
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1465+00	**Offset:**	7 RT
Alignment:	NB				
Elev.:	824.7 ft	**Latitude:**	35.09284	**Longitude:**	-81.68744
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, slightly moist, dark brown gray, fine to coarse, silty SAND (SC) [A-4], trace gravel, trace roots, organically stained		SS-1	2	4	6	10
	1.5	**Fill** - Stiff, tan red brown, fine to medium, sandy lean CLAY (CL) [A-6]	1.5	SS-2	5	5	7	12
	3.0	**Fill** - Very stiff, tan olive red, fine to medium, sandy elastic SILT (MH) [A-5], trace mica	3.0	SS-3	4	7	10	17
819.7	5.0	Boring Terminated at 5 feet						
814.7								
809.7								



LEGEND

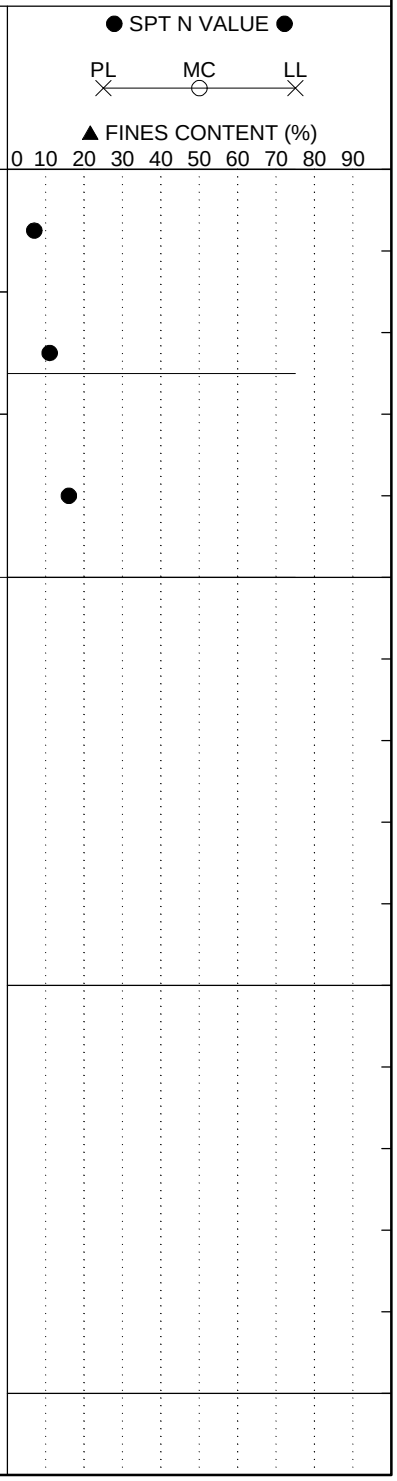
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-42
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1479+60	**Offset:**	8 RT
Alignment:	NB				
Elev.:	816.6 ft	**Latitude:**	35.09508	**Longitude:**	-81.68341
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, slightly moist, dark brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	1	2	5	7
	1.5	**Fill** - Stiff to very stiff, brown red with olive seams, fine to medium, sandy elastic SILT (MH) [A-5]		1.5	SS-2	3	5	6	11
				3.0	SS-3	3	6	10	16
811.6	5.0	Boring Terminated at 5 feet							
806.6									
801.6									



LEGEND

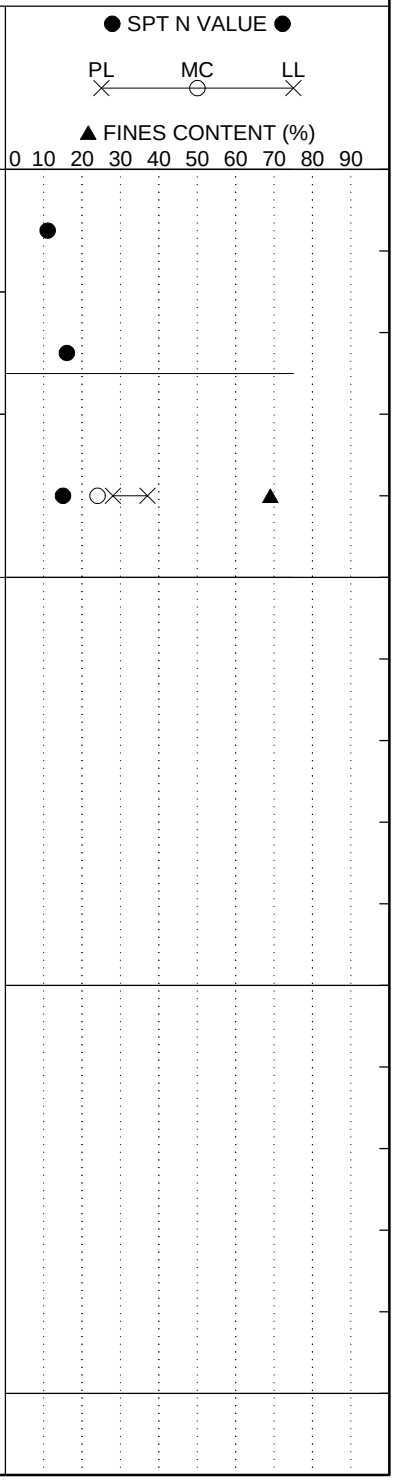
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-43
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1494+50	**Offset:**	9 RT
Alignment:	NB				
Elev.:	790.6 ft	**Latitude:**	35.09671	**Longitude:**	-81.67887
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Medium dense, slightly moist, tan brown red, medium to fine, silty SAND (SM) [A-4], trace roots, trace clay		SS-1	2	4	7	11
	1.5	**Fill** - Medium dense, tan brown olive, fine to medium, silty SAND (SM) [A-2]	1.5	SS-2	5	7	9	16
	3.0	**Residuum** - Stiff, brown, fine, sandy SILT (ML) [A-4 (6)], trace mica LL=37, PL=28, PI=9, NMC=24, %200=69	3.0	SS-3	3	7	8	15
785.6	5.0	Boring Terminated at 5 feet						
780.6								
775.6								



LEGEND

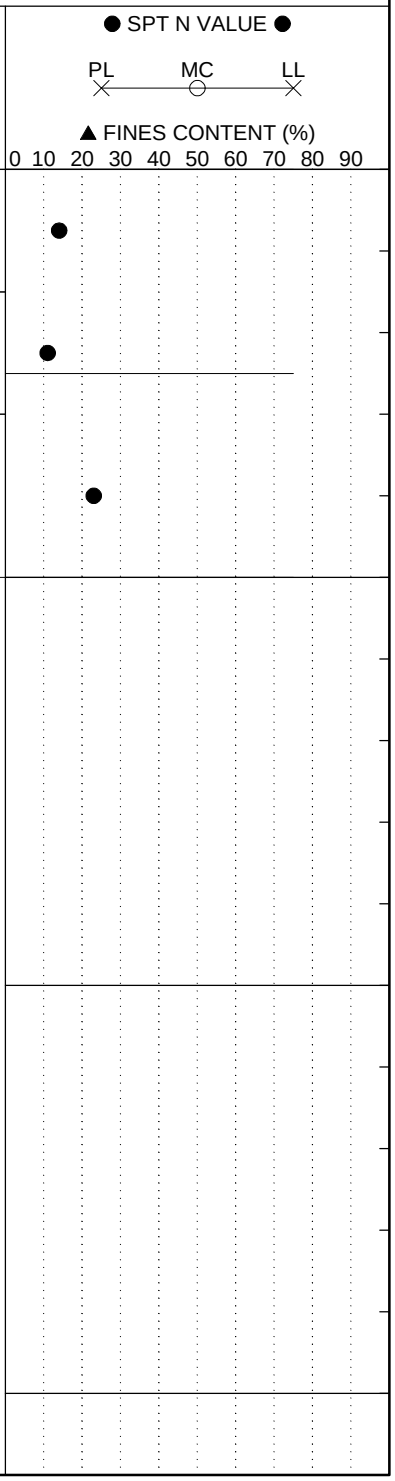
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-44
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1509+20	**Offset:**	16 RT
Alignment:	NB				
Elev.:	816.8 ft	**Latitude:**	35.09734	**Longitude:**	-81.67405
Date Started:	4/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/21/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Medium dense, dark brown yellow, fine to medium, silty SAND (SM) [A-4], trace roots, trace clay			SS-1	1	4	10	14
	1.5	**Fill** - Medium dense, olive red brown, medium to fine, silty SAND (SM) [A-2]		1.5	SS-2	7	4	7	11
	3.0	**Fill** - Very stiff, gray olive yellow, fine to medium, sandy elastic SILT (MH) [A-5], organic odor, organically stained		3.0	SS-3	7	11	12	23
811.8	5.0	Boring Terminated at 5 feet							
806.8									
801.8									



LEGEND

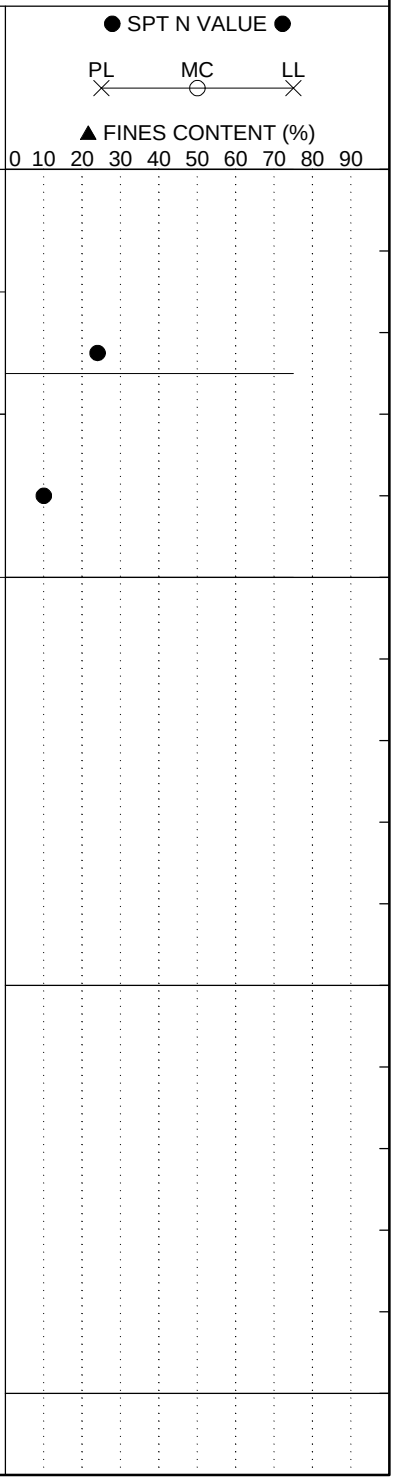
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-45
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1524+00	**Offset:**	14 RT
Alignment:	NB				
Elev.:	809.6 ft	**Latitude:**	35.0971	**Longitude:**	-81.66913
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 1.5 feet							
	1.5			1.5					
	2.1	**Fill** - Medium dense, moist, dark brown, fine to coarse, silty SAND (SM) [A-2], trace gravel, trace rock (<1.5")			SS-1	8	15	9	24
		Fill - Stiff, slightly moist, brown red olive, sandy elastic SILT (MH) [A-5]		3.0					
					SS-2	2	4	6	10
804.6	5.0	Boring Terminated at 5 feet							
799.6									
794.6									



LEGEND

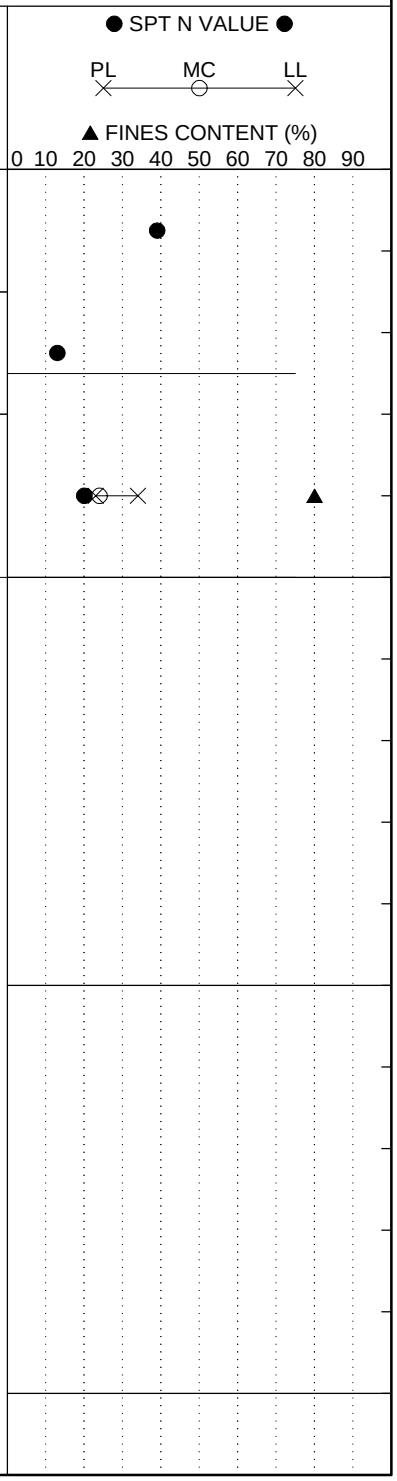
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-46
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1538+20	**Offset:**	25.5 RT
Alignment:	NB				
Elev.:	810.5 ft	**Latitude:**	35.09676	**Longitude:**	-81.66441
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Asphalt and dense, orange, medium to fine, silty SAND (SM) [A-2]		0.0	SS-1	4	27	12	39
	1.5	**Fill** - Medium dense, tan brown olive, medium to fine, silty SAND (SM) [A-2] trace gravel (<1")		1.5	SS-2	6	7	6	13
	3.0	**Residuum** - Very stiff, tan, fine, lean CLAY with sand (CL) [A-6 (8)], trace mica LL=34, PL=23, PI=11, NMC=24, %200=80		3.0	SS-3	3	8	12	20
805.5	5.0	Boring Terminated at 5 feet							
800.5									
795.5									



LEGEND

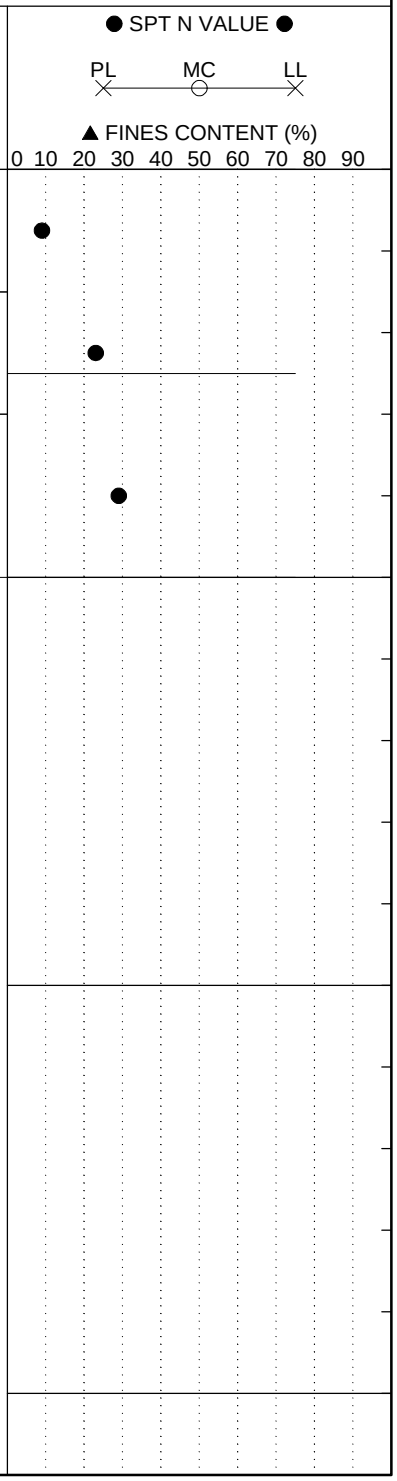
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-47
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1553+50	**Offset:**	16 RT
Alignment:	NB				
Elev.:	785.6 ft	**Latitude:**	35.09643	**Longitude:**	-81.6593
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, tan dark brown, fine to coarse, silty SAND (SM) [A-2], trace roots			SS-1	3	4	5	9
	1.5	**Residuum** - Medium dense, tan olive red, fine to medium, silty SAND (SM) [A-4], trace mica		1.5	SS-2	3	10	13	23
				3.0	SS-3	3	13	16	29
780.6	5.0	Boring Terminated at 5 feet							
775.6									
770.6									



LEGEND

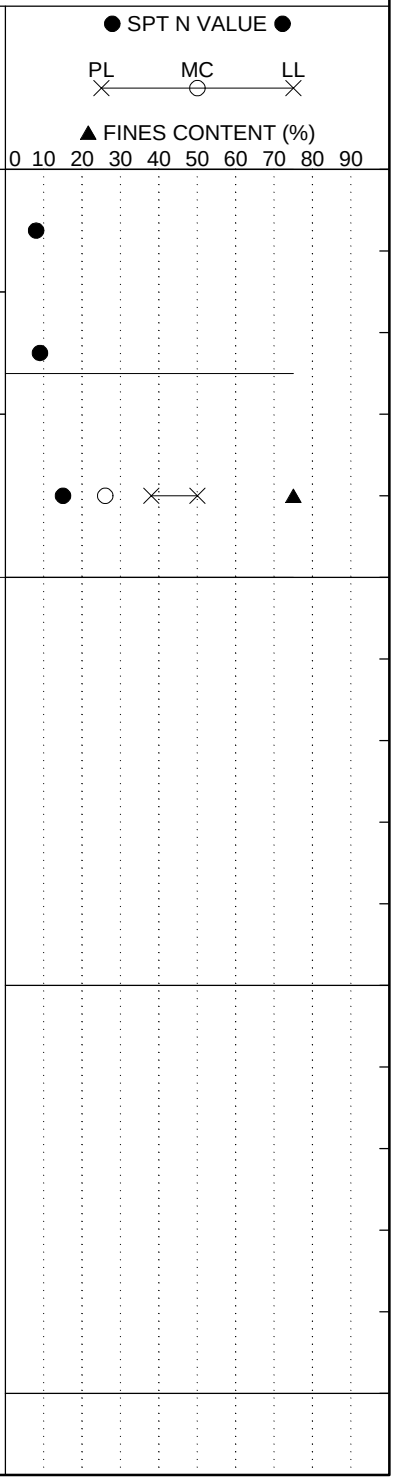
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-48
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1568+25	**Offset:**	17 RT
Alignment:	NB				
Elev.:	788.4 ft	**Latitude:**	35.09717	**Longitude:**	-81.65445
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, slightly moist, tan brown, medium to fine, silty SAND (SM) [A-2], trace roots, trace clay		SS-1	1	3	5	8
	1.5	**Fill** - Stiff, red brown, fine to medium, sandy elastic SILT (MH) [A-5]	1.5	SS-2	3	4	5	9
	3.0	**Residuum** - Stiff, brown orange, fine, elastic SILT with sand (MH) [A-7-5 (11)] LL=50, PL=38, PI=12, NMC=26, %200=75	3.0	SS-3	6	7	8	15
783.4	5.0	Boring Terminated at 5 feet						
778.4								
773.4								



LEGEND

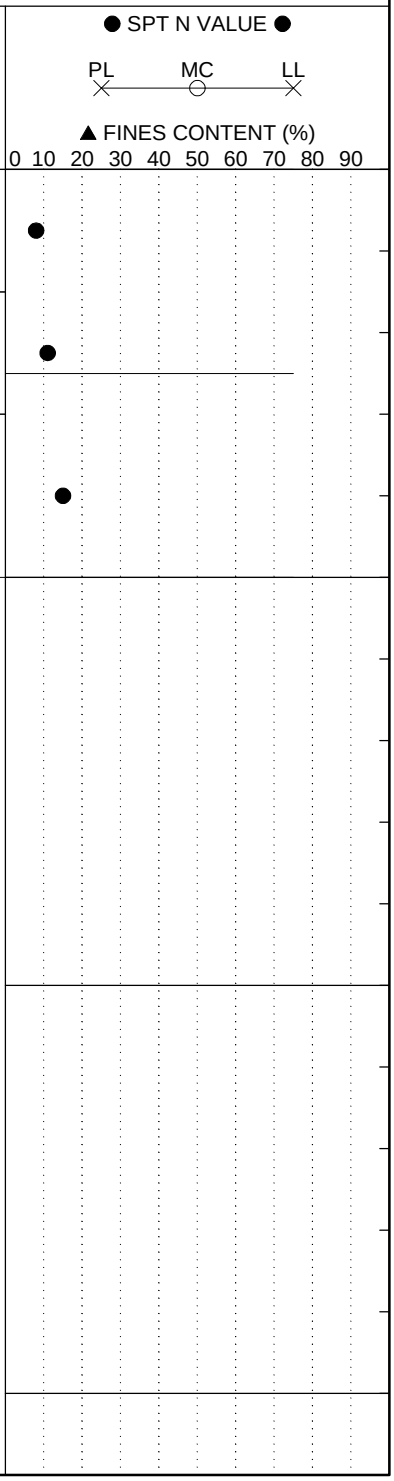
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-49
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1583+00	**Offset:**	17 RT
Alignment:	NB				
Elev.:	778.8 ft	**Latitude:**	35.09897	**Longitude:**	-81.65005
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Loose, tan brown, medium to fine, silty SAND (SM) [A-4], trace roots, trace clay		SS-1	1	5	3	8
	1.5	**Fill** - Stiff, red brown tan, fine to medium, sandy elastic SILT (MH) [A-5]	1.5	SS-2	2	3	8	11
	3.0	**Possible Fill** - Stiff, red tan olive, fine to coarse, sandy CLAY (CL) [A-6]	3.0	SS-3	7	4	11	15
773.8	5.0	Boring Terminated at 5 feet						
768.8								
763.8								



LEGEND

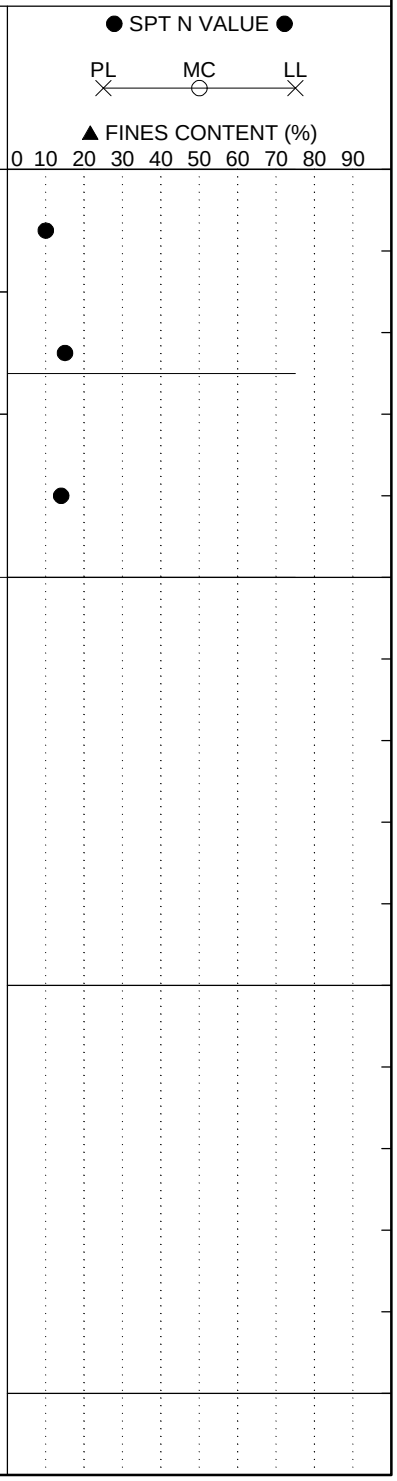
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-50
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1597+80	**Offset:**	9 RT
Alignment:	NB				
Elev.:	756.5 ft	**Latitude:**	35.10083	**Longitude:**	-81.64564
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Loose to medium dense, slightly moist, dark olive, medium to fine, silty SAND (SM) [A-4], trace clay, trace roots		0.0	SS-1	3	4	6	10
				1.5	SS-2	6	7	8	15
	2.5	**Residuum** - Stiff, red brown, fine to medium, sandy elastic SILT (MH) [A-5], trace clay, trace roots		3.0	SS-3	5	6	8	14
751.5	5.0	Boring Terminated at 5 feet							
746.5									
741.5									



LEGEND

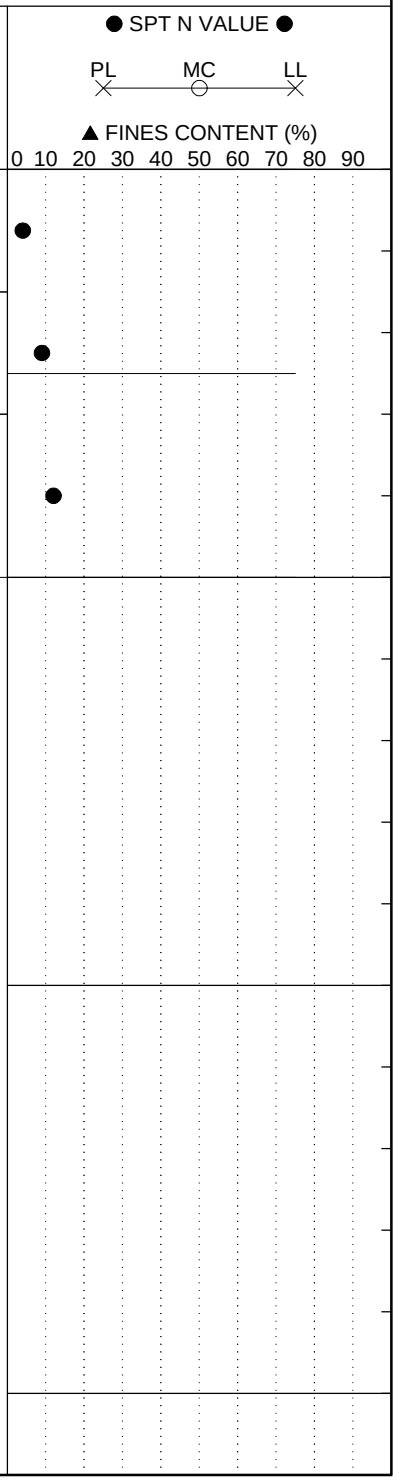
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-51
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1612+50	**Offset:**	8 RT
Alignment:	NB				
Elev.:	726.2 ft	**Latitude:**	35.10214	**Longitude:**	-81.64105
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Very loose, tan brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	1	2	2	4
	1.5	**Fill** - Stiff, red brown tan olive, medium to fine, sandy elastic SILT (MH) [A-5], trace clay		1.5	SS-2	2	5	4	9
				3.0	SS-3	3	5	7	12
721.2	5.0	Boring Terminated at 5 feet							
716.2									
711.2									



LEGEND

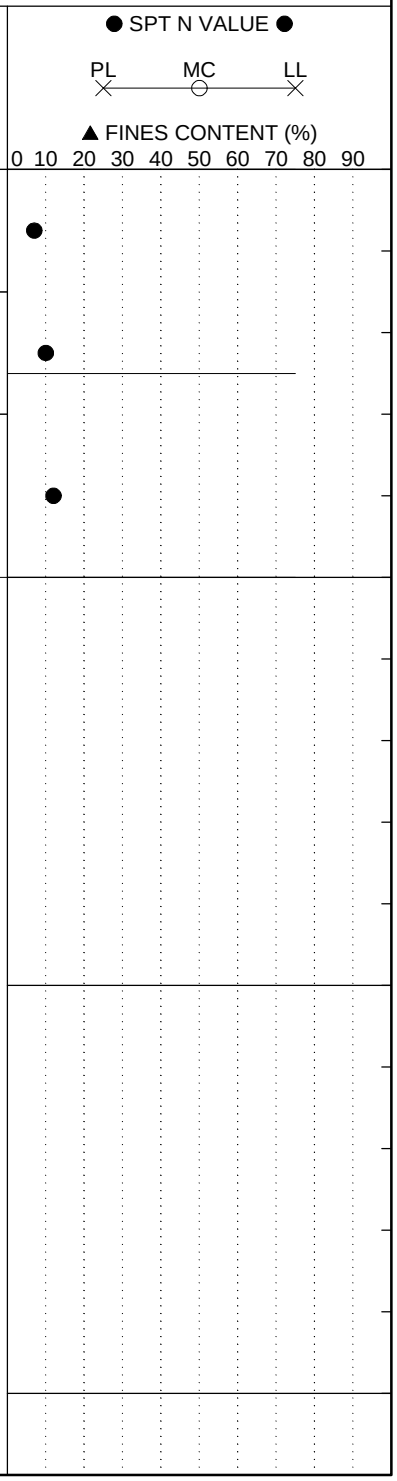
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-52
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1627+30	**Offset:**	10 RT
Alignment:	NB				
Elev.:	716.0 ft	**Latitude:**	35.10237	**Longitude:**	-81.63612
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, slightly moist, tan brown, medium to fine, silty SAND (SM) [A-2], trace roots, trace clay			SS-1	1	3	4	7
	1.5	**Fill** - Stiff, brown red gray, fine to medium, sandy elastic SILT (MH) [A-5], trace mica		1.5	SS-2	6	5	5	10
				3.0	SS-3	3	6	6	12
711.0	5.0	Boring Terminated at 5 feet							
706.0									
701.0									



LEGEND

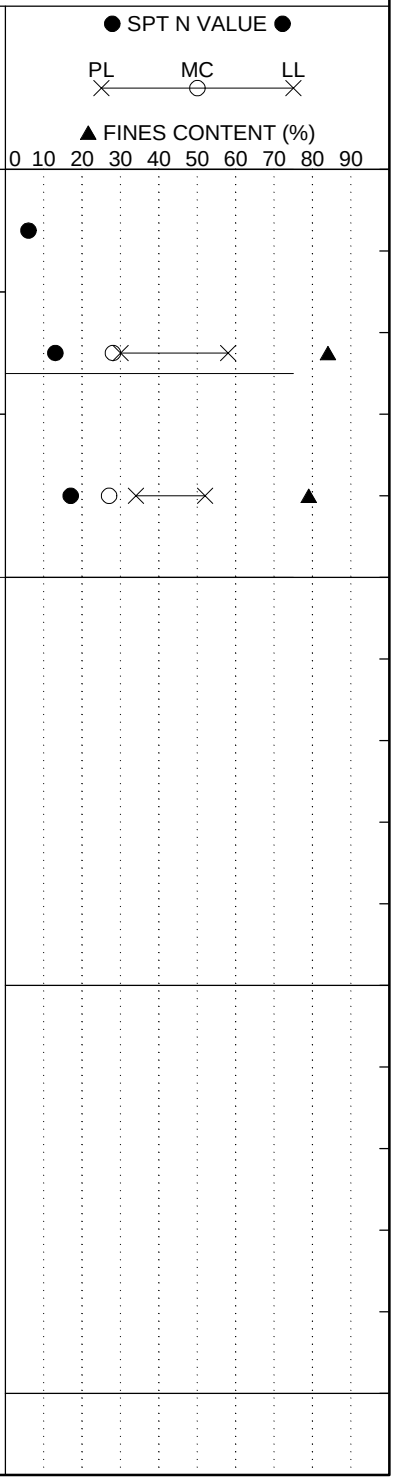
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-53
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1642+00	**Offset:**	9 RT
Alignment:	NB				
Elev.:	705.7 ft	**Latitude:**	35.10254	**Longitude:**	-81.63121
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Loose, tan brown, medium to fine, silty SAND (SM) [A-4], trace roots		SS-1	1	2	4	6
	1.5	**Residuum** - Stiff, red, fine, fat CLAY with sand (CH) [A-7-5 (27)], trace mica LL=58, PL=30, PI=28, NMC=28, %200=84	1.5	SS-2	3	3	7	13
	3.0	Very stiff, red, fine, elastic SILT with sand (MH) [A-7-5 (17)], trace mica LL=52, PL=34, PI=18, NMC=27, %200=79	3.0	SS-3	3	7	10	17
700.7	5.0	Boring Terminated at 5 feet						
695.7								
690.7								



LEGEND

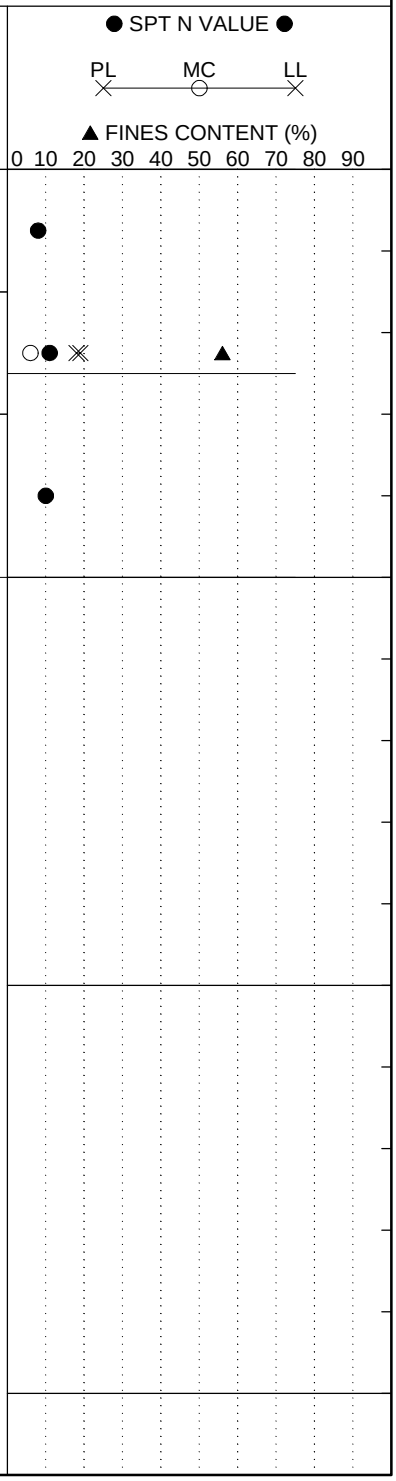
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-54
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1656+85	**Offset:**	9 RT
Alignment:	NB				
Elev.:	693.7 ft	**Latitude:**	35.10271	**Longitude:**	-81.62625
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, tan brown, medium to fine, clayey SAND (SM) [A-4], trace roots			SS-1	2	2	4	8
	1.5	**Fill** - Stiff, moist, gray, fine, sandy SILT with gravel (ML) [A-4 (0)] LL=19, PL=18, PI=1, NMC=6, %200=56		1.5	SS-2	5	5	6	11
	3.0	**Fill** - Stiff, brown red, fine to medium, sandy elastic SILT (MH) [A-5], trace mica		3.0	SS-3	2	4	6	10
688.7	5.0	Boring Terminated at 5 feet							
683.7									
678.7									



LEGEND

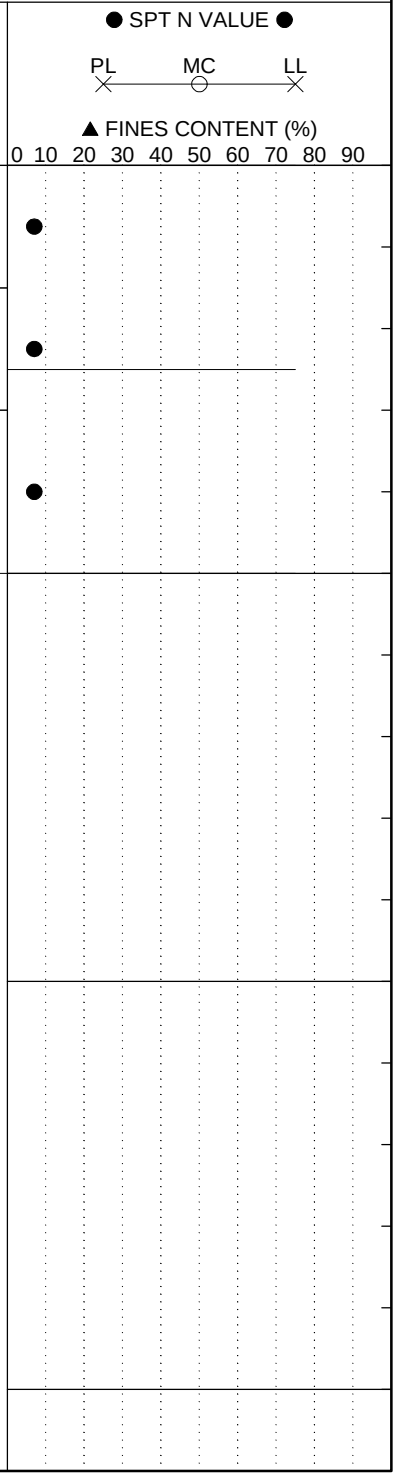
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-55
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1671+50	**Offset:**	165 RT
Alignment:	NB				
Elev.:	682.6 ft	**Latitude:**	35.10319	**Longitude:**	-81.62129
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, dark brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	2	2	5	7
	1.5	**Fill** - Loose, moist, brown tan, fine to coarse, silty SAND (SM) [A-2], trace mica		1.5	SS-2	4	4	3	7
				3.0	SS-3	2	3	4	7
677.6	5.0	Boring Terminated at 5 feet							
672.6									
667.6									



LEGEND

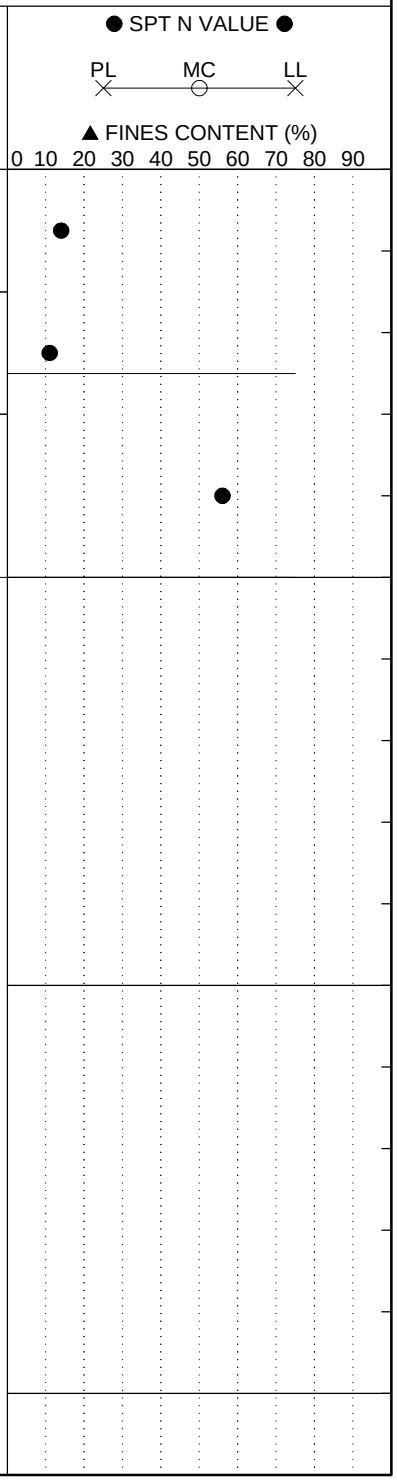
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-56
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1684+80	**Offset:**	82 RT
Alignment:	NB				
Elev.:	669.6 ft	**Latitude:**	35.10485	**Longitude:**	-81.61725
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Asphalt & medium dense, dark brown black, fine to medium, silty SAND (SM) [A-2]		0.0	SS-1	16	8	6	14
	1.5	**Fill** - Medium dense, moist, dark brown, fine to coarse, silty SAND (SM) [A-2], trace roots		1.5	SS-2	3	4	7	11
	3.0	**Residuum** - Very hard, tan olive yellow, fine, sandy SILT (ML) [A-4], trace mica		3.0	SS-3	9	25	31	56
664.6	5.0	Boring Terminated at 5 feet							
659.6									
654.6									



LEGEND

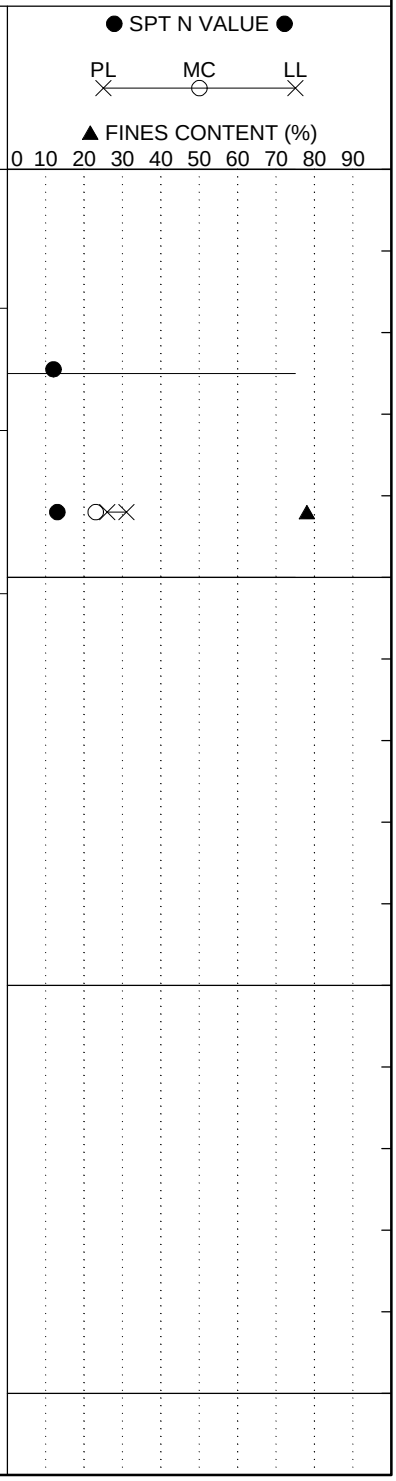
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-57
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1698+10	**Offset:**	15 RT
Alignment:	NB				
Elev.:	627.0 ft	**Latitude:**	35.10644	**Longitude:**	-81.61331
Date Started:	4/22/2015				
Total Depth:	5.2 ft	**Soil Depth:**	5.2 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 1.7 feet							
	1.7			1.7					
		Fill - Stiff, olive tan, fine, SILT with sand (ML) [A-4], trace mica			SS-1	3	3	7	12
	3.2			3.2					
		Fill - Stiff, olive tan, fine, SILT with sand (ML) [A-4 (4)], trace mica LL=31, PL=26, PI=5, NMC=23, %200=78		4.2	SS-2	3	5	8	13
622.0	5.2								
		Boring Terminated at 5.2 feet							
617.0									
612.0									



LEGEND

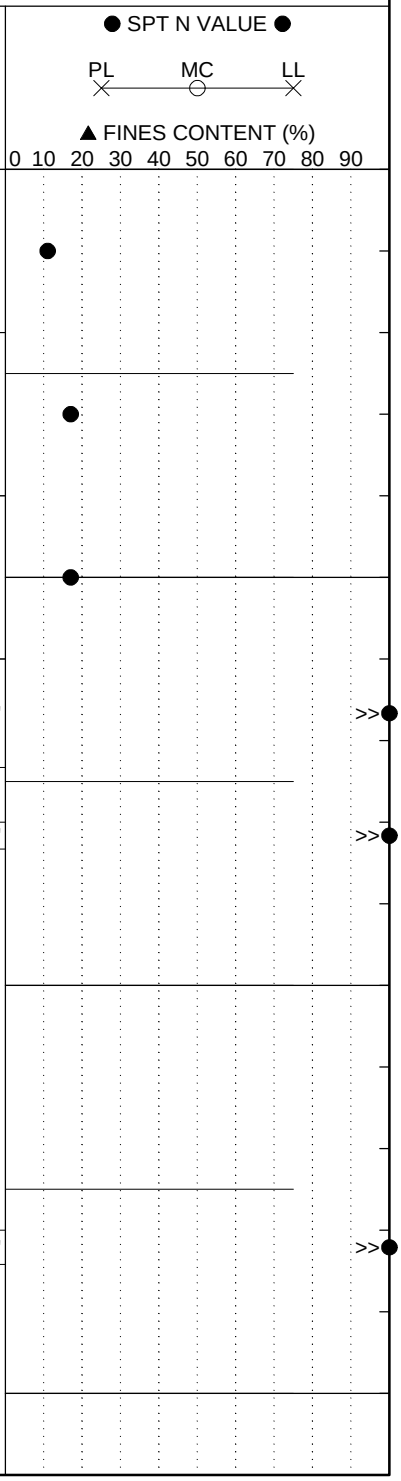
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-58
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1711+40	**Offset:**	9 RT
Alignment:	NB				
Elev.:	657.9 ft	**Latitude:**	35.10787	**Longitude:**	-81.60919
Date Started:	4/22/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
		Fill - Medium dense, dark brown, fine to medium, silty SAND (SM) [A-2], trace roots	0.0	SS-1	2	5	6	11
	2.0	**Residuum** - Medium dense, slightly moist, olive gray, fine, silty SAND (SM) [A-4], trace mica	2.0	SS-2	4	8	9	17
			4.0	SS-3	4	7	11	17
652.9	6.0	**Partially Weathered Rock** - Very dense, moist, dark brown gray orange, fine to medium, silty SAND (SM) [A-2]	6.0	SS-4	7	31	50/4"	50/4"
			8.0	SS-5	50/4"			50/4"
647.9			13.0	SS-6	50/5"			50/5"
642.9	15.0	Boring Terminated at 15 feet						



LEGEND

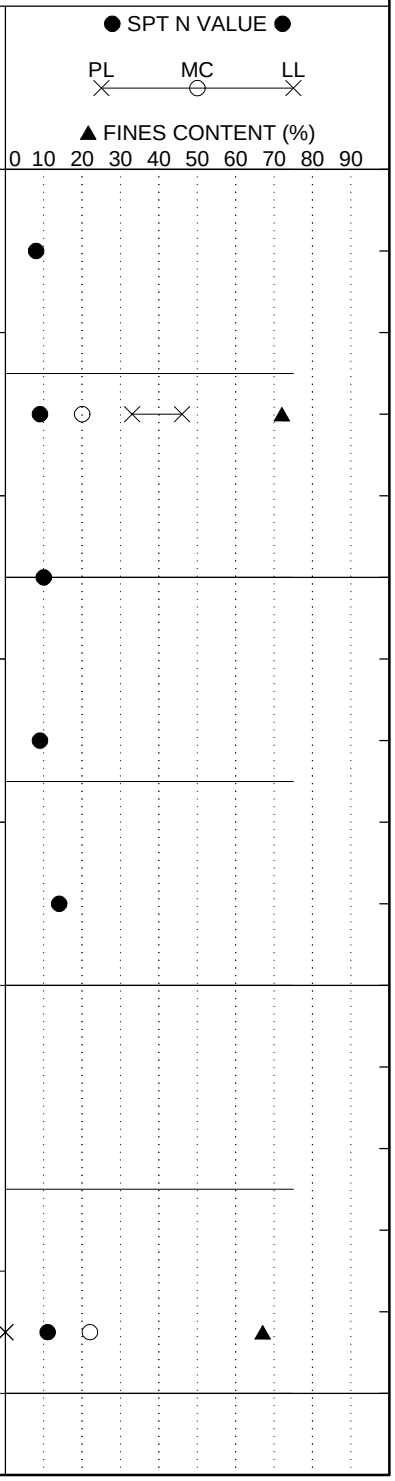
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-59
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1724+70	**Offset:**	9 RT
Alignment:	NB				
Elev.:	703.2 ft	**Latitude:**	35.10928	**Longitude:**	-81.6051
Date Started:	4/22/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.5	**Topsoil** - 6 inches	0.0					
		Fill - Loose, red brown gray, fine to medium, silty SAND (SM) [A-2], trace roots		SS-1	10	3	5	8
	1.5	**Fill** - Stiff, slightly moist, red brown, SILT with sand (ML) [A-7-5 (10)], trace mica LL=46, PL=33, PI=13, NMC=20, %200=72	2.0					
				SS-2	4	4	5	9
			4.0					
698.2				SS-3	3	4	6	10
	6.0	**Fill** - Stiff, gray olive red, elastic SILT with sand (MH) [A-5], trace roots (6-8')	6.0					
				SS-4	2	4	5	9
			8.0					
				SS-5	4	7	7	14
693.2								
	13.0	**Residuum** - Stiff, slightly moist, yellow brown, fine, sandy SILT (ML) [A-4 (0)], trace mica LL/PL/PI="NP", NMC=22, %200=67	13.5					
				SS-6	4	5	6	11
688.2	15.0	Boring Terminated at 15 feet						



LEGEND

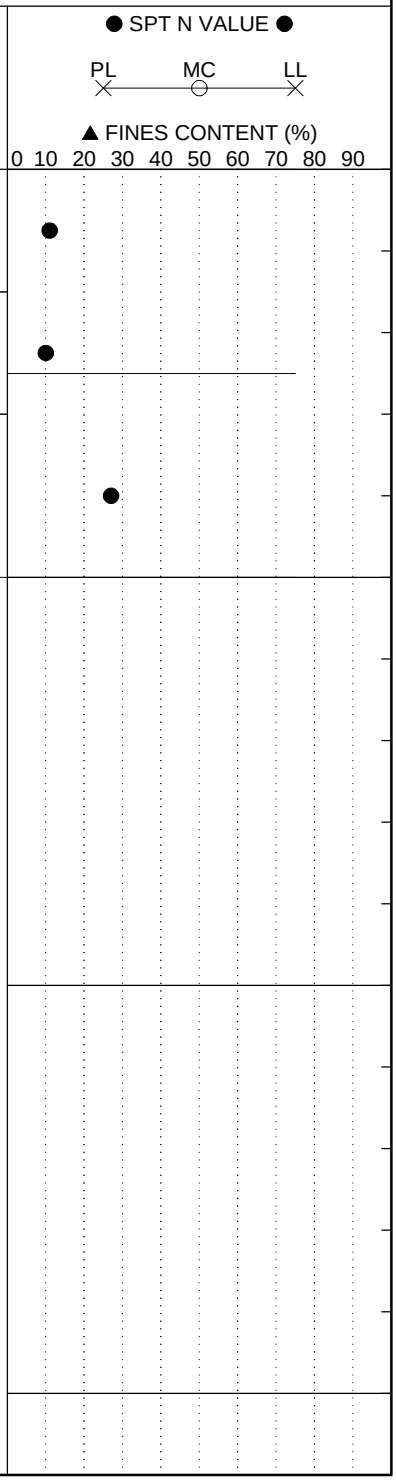
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-60
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1738+00	**Offset:**	10 RT
Alignment:	NB				
Elev.:	723.2 ft	**Latitude:**	35.11001	**Longitude:**	-81.60081
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Medium dense, tan brown black, fine to medium, silty SAND (SM) [A-2], trace roots, trace asphalt		0.0	SS-1	3	4	7	11
	1.5	**Fill** - Loose, tan brown black, fine to medium, silty SAND (SM) [A-2], trace roots, trace asphalt		1.5	SS-2	3	5	5	10
	3.0	**Possible Fill** - Medium dense, orange black brown, medium to fine, silty SAND (SM) [A-4], trace mica		3.0	SS-3	4	7	20	27
718.2	5.0	Boring Terminated at 5 feet							
713.2									
708.2									



LEGEND

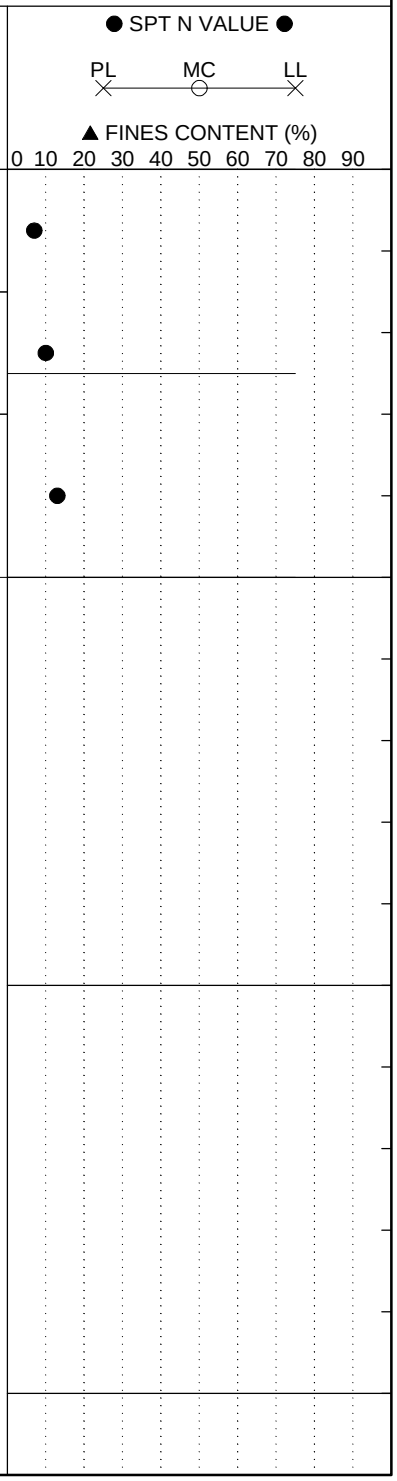
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-61
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1751+25	**Offset:**	16.5 RT
Alignment:	NB				
Elev.:	706.9 ft	**Latitude:**	35.11018	**Longitude:**	-81.59638
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Loose, slightly moist, tan gray, medium to fine, silty SAND (SM) [A-2], trace roots		0.0	SS-1	2	3	4	7
	1.5	**Possible Fill** - Stiff, olive, orange, tan, sandy SILT (ML) [A-4], trace mica		1.5	SS-2	3	4	6	10
				3.0	SS-3	3	6	7	13
701.9	5.0	Boring Terminated at 5 feet							
696.9									
691.9									



LEGEND

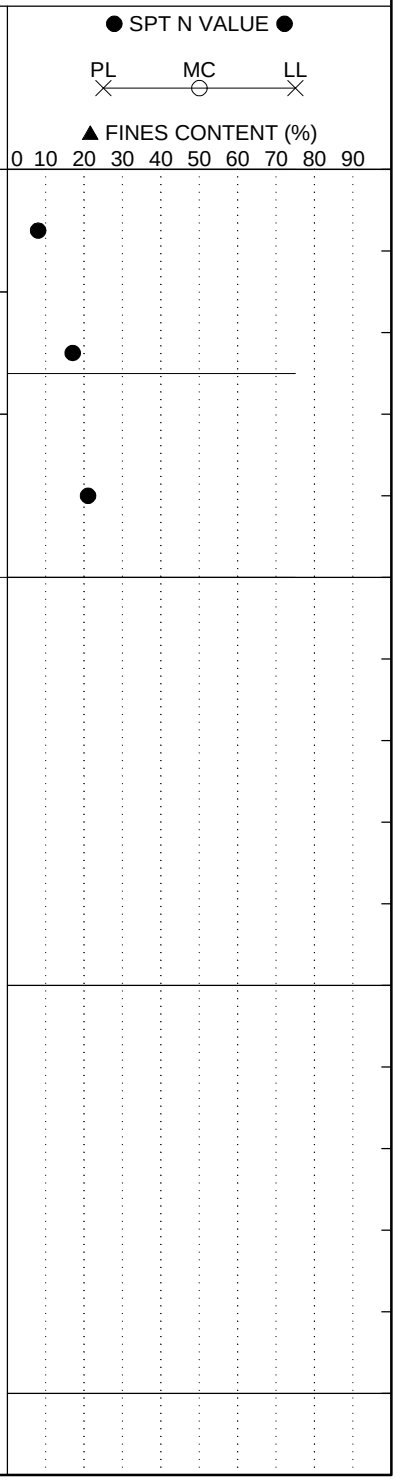
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-62
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1764+60	**Offset:**	17 RT
Alignment:	NB				
Elev.:	670.5 ft	**Latitude:**	35.11033	**Longitude:**	-81.59194
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, slightly moist, tan brown, medium to fine, silty SAND (SM) [A-4], trace roots, trace clay			SS-1	1	3	5	8
	1.5	**Residuum** - Medium dense, gray white, fine to medium, silty SAND (SM) [A-2], trace mica		1.5	SS-2	3	8	9	17
				3.0	SS-3	4	10	11	21
665.5	5.0	Boring Terminated at 5 feet							
660.5									
655.5									



LEGEND

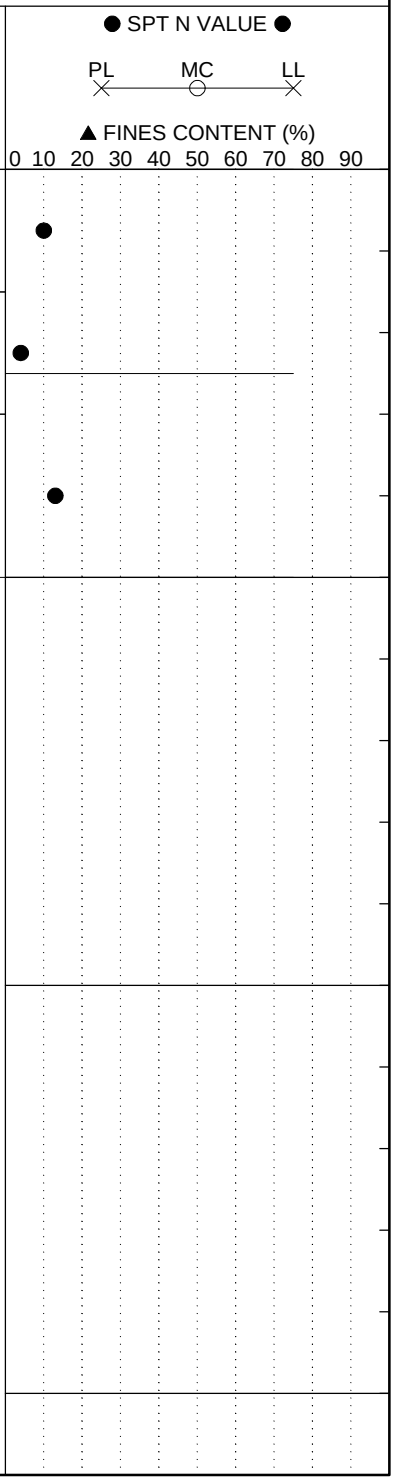
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-63
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1777+90	**Offset:**	18 RT
Alignment:	NB				
Elev.:	632.9 ft	**Latitude:**	35.11057	**Longitude:**	-81.5875
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, tan brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	2	4	6	10
	1.5	**Residuum** - Soft, slightly moist, orange tan red, fine, sandy SILT (ML) [A-4]		1.5	SS-2	4	2	2	4
	3.0	Stiff, slightly moist, orange tan, sandy SILT (ML) [A-4]		3.0	SS-3	3	4	9	13
627.9	5.0	Boring Terminated at 5 feet							
622.9									
617.9									



LEGEND

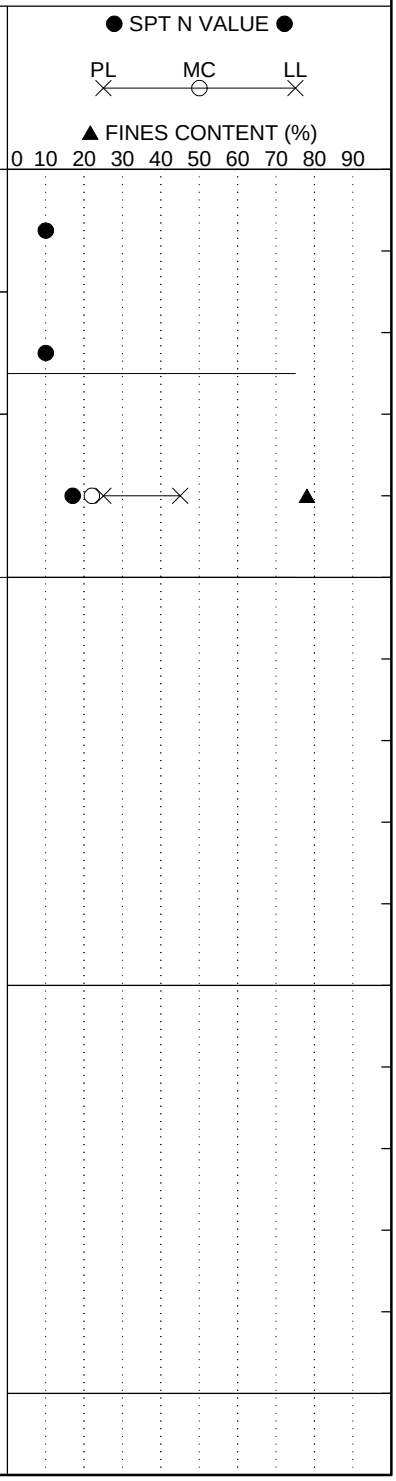
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-64
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1791+15	**Offset:**	17 RT
Alignment:	NB				
Elev.:	593.8 ft	**Latitude:**	35.11205	**Longitude:**	-81.58345
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, brown, medium to fine, silty SAND (SM) [A-4], trace roots, trace clay		1.5	SS-1	2	4	6	10
	2.5	**Fill** - Stiff to very stiff, brown red, lean CLAY with sand (CL) [A-7-6 (16)] LL=45, PL=25, PI=20, NMC=22, %200=78		3.0	SS-2	3	4	6	10
					SS-3	5	6	11	17
588.8	5.0	Boring Terminated at 5 feet							
583.8									
578.8									



LEGEND

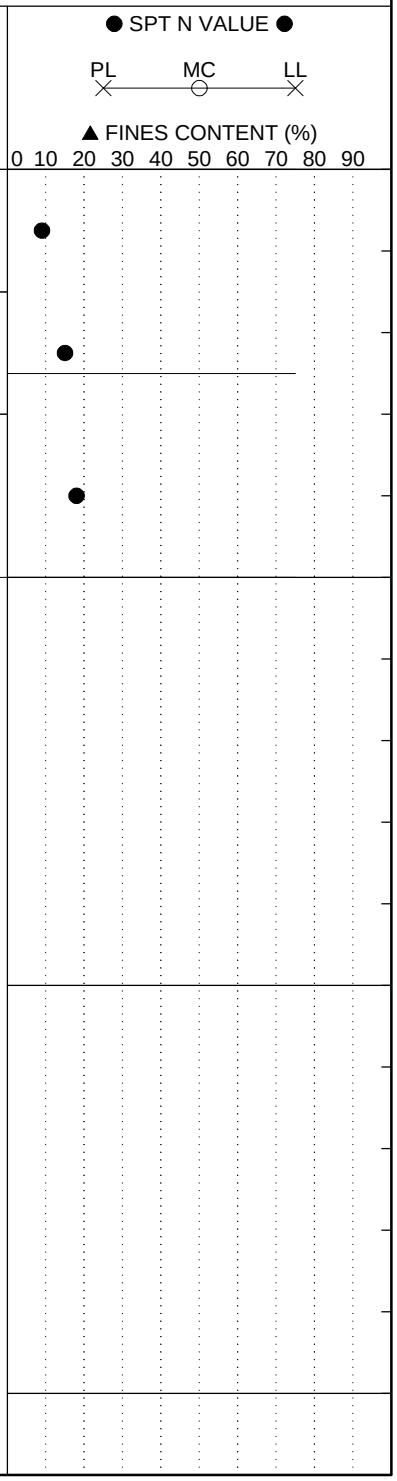
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	NB-65
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1804+50	**Offset:**	9 RT
Alignment:	NB				
Elev.:	580.2 ft	**Latitude:**	35.11457	**Longitude:**	-81.58023
Date Started:	4/22/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/22/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Stiff, olive tan, medium to fine, sandy SILT (ML) [A-4], trace roots			SS-1	2	3	6	9
				1.5					
	2.0	**Fill** - Stiff to very stiff, brown red olive, elastic SILT with sand (MH) [A-5]			SS-2	5	9	6	15
				3.0					
					SS-3	4	6	12	18
575.2	5.0	Boring Terminated at 5 feet							
570.2									
565.2									



LEGEND

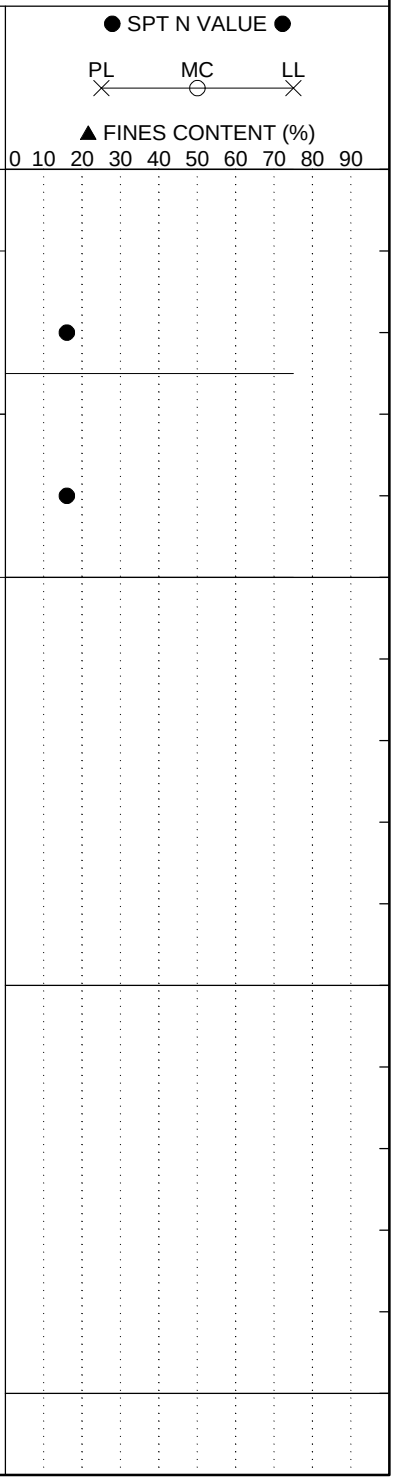
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - NB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-1
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	897+00	**Offset:**	2 LT
Alignment:	SB				
Elev.:	731.0 ft	**Latitude:**	35.03089	**Longitude:**	-81.85892
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 12 inches							
	1.0			1.0					
		Granular Base - Medium dense, gray, medium to fine, sandy GRAVEL (GW) [A-1]							
	2.0				SS-1	12	9	7	16
		Possible Fill - Very stiff, brown red olive, medium to fine, sandy SILT (ML) [A-4], trace clay							
	3.0			3.0					
		Residuum - Very stiff, moist, red olive gray, fine to medium, sandy SILT (ML) [A-4]							
					SS-2	7	7	9	16
726.0	5.0								
		Boring Terminated at 5 feet							
721.0									
716.0									



LEGEND

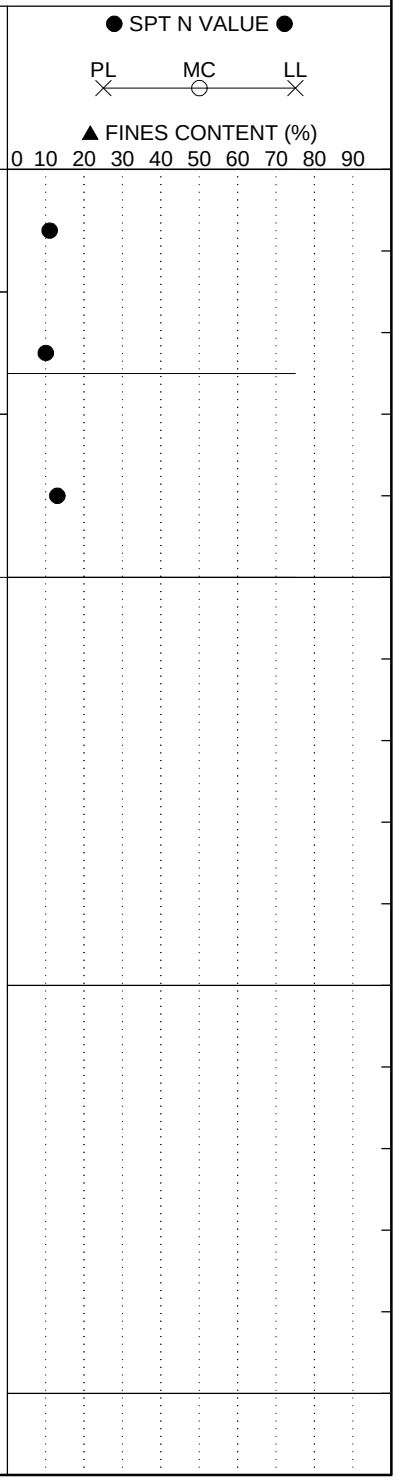
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-2
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	911+70	**Offset:**	5 LT
Alignment:	SB				
Elev.:	731.2 ft	**Latitude:**	35.03201	**Longitude:**	-81.8542
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Possible Fill - Medium dense, brown, fine to medium, silty SAND (SM) [A-2], trace roots			SS-1	4	7	4	11
	1.5	**Residuum** - Stiff, brown olive gray, fine, sandy SILT (ML) [A-4], some mica, some clay		1.5	SS-2	3	4	6	10
				3.0	SS-3	3	5	8	13
726.2	5.0	Boring Terminated at 5 Feet							
721.2									
716.2									



LEGEND

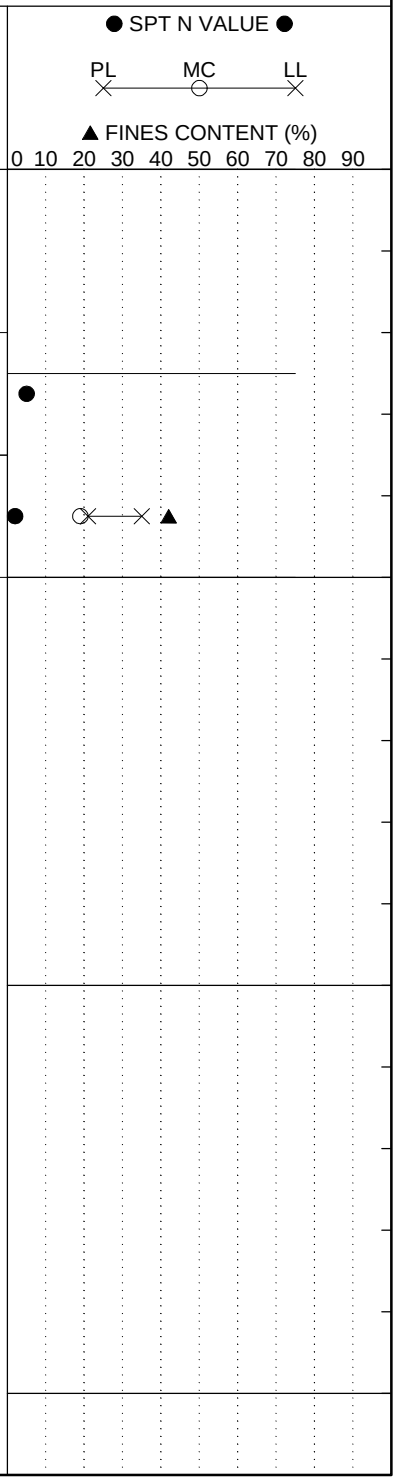
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-3
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	926+50	**Offset:**	10.5 LT
Alignment:	SB				
Elev.:	689.1 ft	**Latitude:**	35.03325	**Longitude:**	-81.849
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 24 inches							
	2.0			2.0					
		Fill - Loose, wet, dark brown gray, fine to coarse, clayey SAND (SC) [A-6 (2)], trace gravel			SS-1	4	3	2	5
	3.5			3.5					
		Fill - Very loose, moist, brown red, fine to medium, clayey SAND (SC) [A-6 (2)], trace rock fragments; LL=35, PL=21, PI=14, NMC=19, %200=42			SS-2	1	1	1	2
684.1	5.0	Boring Terminated at 5 Feet							
679.1									
674.1									



LEGEND

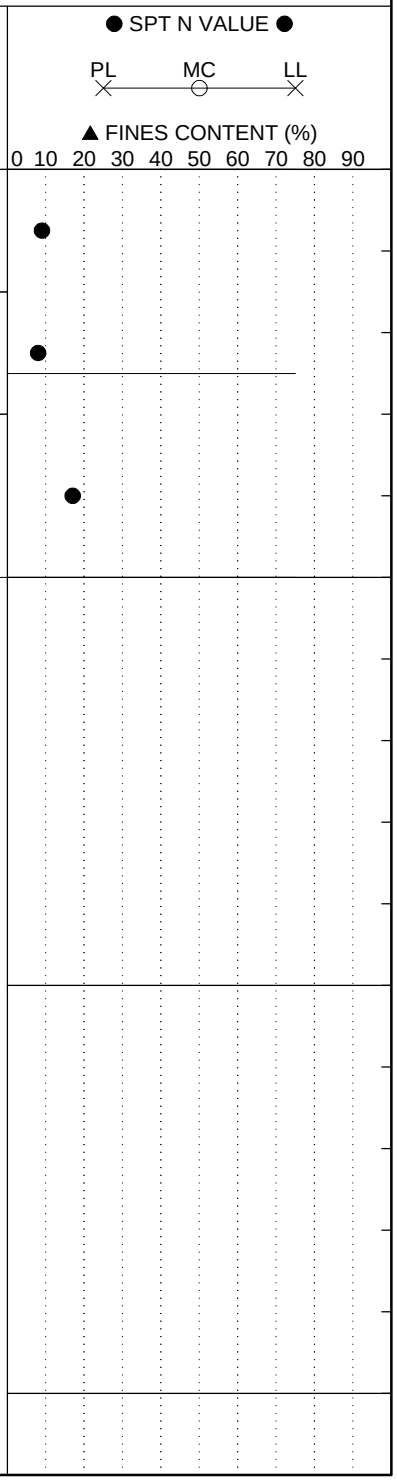
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-4
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	941+30	**Offset:**	9.5 LT	**Alignment:**	SB
Elev.:	715.4 ft	**Latitude:**	35.03431	**Longitude:**	-81.84471	**Date Started:**	4/30/2015
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft	**Date Completed:**	4/30/2015
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic	**Energy Ratio:**	81%
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown, fine to coarse, silty SAND (SM) [A-2], with roots, trace gravel			SS-1	3	5	4	9
				1.5	SS-2	7	3	5	8
	3.0	**Possible Fill** - Medium dense, olive, fine to coarse, silty SAND (SM) [A-2], trace rock fragments		3.0	SS-3	7	8	9	17
710.4	5.0	Boring Terminated at 5 Feet							
705.4									
700.4									



LEGEND

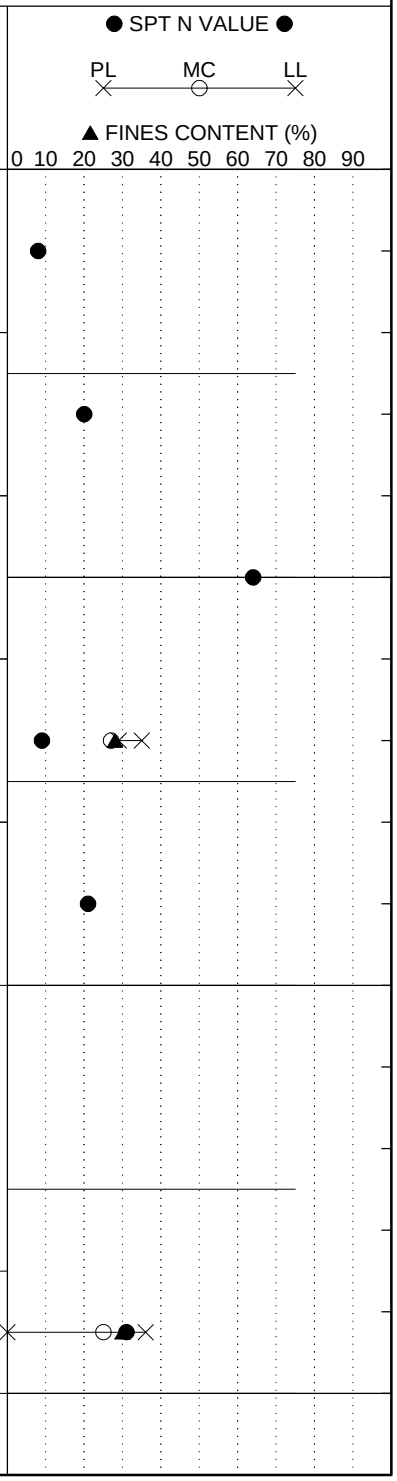
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-5
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	956+00	**Offset:**	10.5 LT
Alignment:	SB				
Elev.:	780.4 ft	**Latitude:**	35.03546	**Longitude:**	-81.84002
Date Started:	4/30/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Possible Fill - Loose, brown, medium to fine, silty SAND (SM) [A-4], trace roots		SS-1	4	4	4	8
	2.0	**Residuum** - Loose to very dense, moist to very moist, red brown, fine to medium, silty SAND (SM) [A-2-4], some mica, some clay	2.0	SS-2	4	8	12	20
			4.0					
775.4				SS-3	30	39	25	64
			6.0					
		LL=35, PL=29, PI=6, NMC=27, %200=28		SS-4	6	4	5	9
			8.0					
				SS-5	8	9	12	21
770.4								
			13.5					
		LL=36, PL/PI="NP", NMC=25, %200=30		SS-6	12	16	15	31
765.4	15.0	Boring Terminated at 15 Feet						



LEGEND

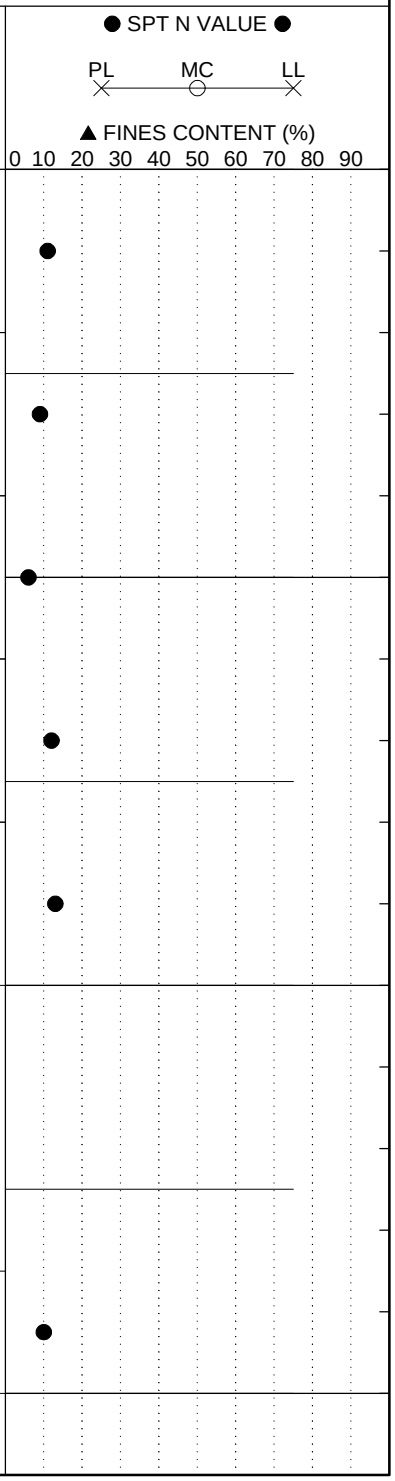
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-6
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	971+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	824.7 ft	**Latitude:**	35.03666	**Longitude:**	-81.83523
Date Started:	4/30/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Possible Fill - Medium dense to loose, brown, fine to medium, silty SAND (SM) [A-2], trace roots		SS-1	5	8	3	11
			2.0					
	3.0	**Residuum** - Firm to stiff, olive gray white, fine, sandy SILT (ML) [A-4]		SS-2	5	3	6	9
			4.0					
819.7				SS-3	2	3	3	6
			6.0					
				SS-4	3	5	7	12
			8.0					
				SS-5	5	5	8	13
814.7								
	12.0	Loose to medium dense, olive gray white, fine, silty SAND (SM) [A-2-4]						
			13.5					
				SS-6	3	5	5	10
809.7	15.0	Boring Terminated at 15 Feet						



LEGEND

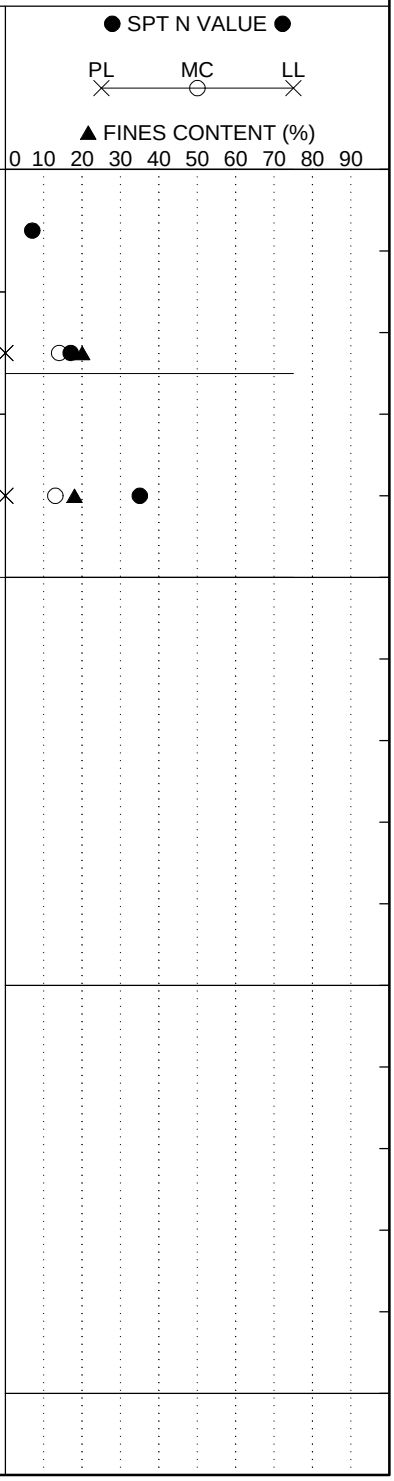
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-7
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	985+45	**Offset:**	9 LT
Alignment:	SB				
Elev.:	826.8 ft	**Latitude:**	35.03831	**Longitude:**	-81.83083
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, dark brown, fine to coarse, silty SAND (SM) [A-2], trace roots, trace gravel and asphalt			SS-1	3	3	4	7
	1.5	**Residuum** - Medium dense to dense, brown, fine to medium, silty SAND with gravel (SM) [A-2-4], trace mica, some gravel		1.5	SS-2	8	8	9	17
		LL/PL/PI="NP", NMC=14, %200=20		3.0					
		LL/PL/PI="NP", NMC=13, %200=18			SS-3	7	14	21	35
821.8	5.0	Boring Terminated at 5 Feet							
816.8									
811.8									



LEGEND

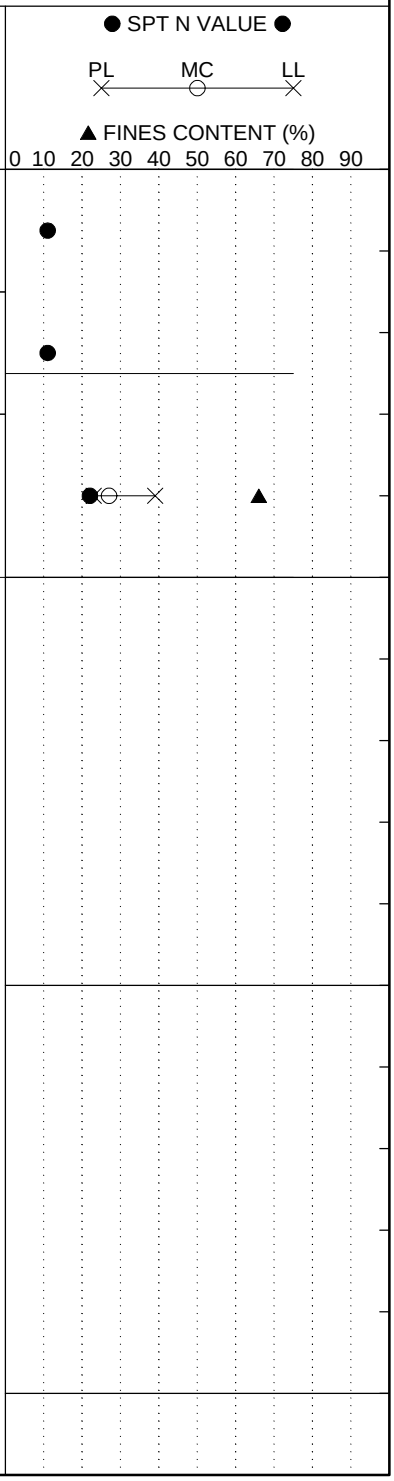
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-8
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1000+40	**Offset:**	9.5 LT
Alignment:	SB				
Elev.:	851.4 ft	**Latitude:**	35.04012	**Longitude:**	-81.82633
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Possible Fill - Medium dense, brown, fine to coarse, silty SAND (SM) [A-2], trace roots		1.5	SS-1	3	7	4	11
	2.5	**Residuum** - Very stiff, brown yellow pink white, fine, sandy lean CLAY (CL) [A-6 (9)]		3.0	SS-2	7	4	7	11
		LL=39, PL=23, PI=16, NMC=27, %200=66			SS-3	4	8	14	22
846.4	5.0	Boring Terminated at 5 Feet							
841.4									
836.4									



LEGEND

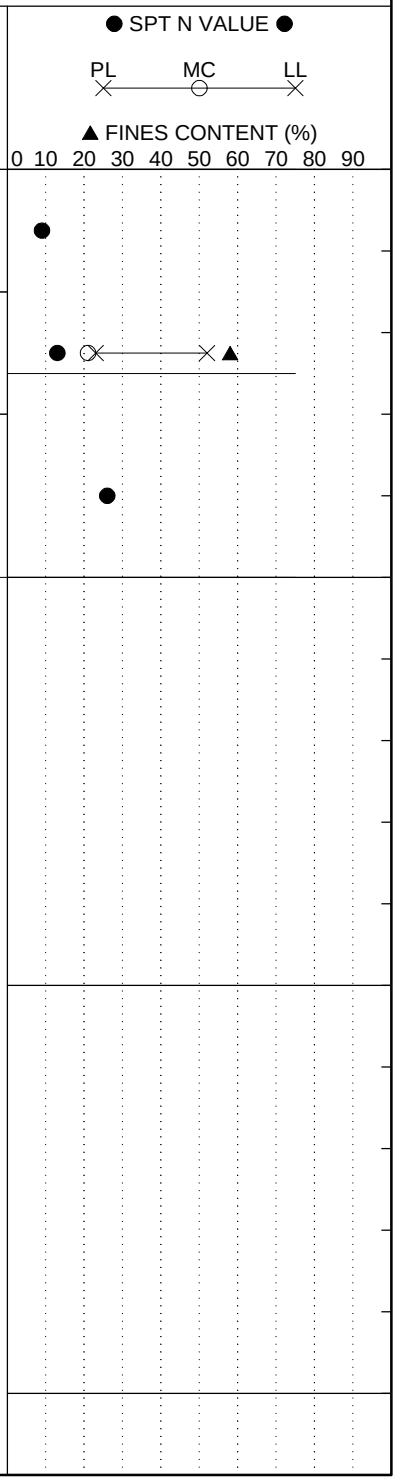
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-9
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1015+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	836.5 ft	**Latitude:**	35.04191	**Longitude:**	-81.822
Date Started:	4/30/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/30/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Loose, brown tan, medium to fine, silty SAND (SM) [A-2], trace roots		SS-1	2	4	5	9
	1.5	**Fill** - Stiff, red white olive, fine to medium, sandy fat CLAY (CH) [A-7-6 (14)] LL=52, PL=23, PI=29, NMC=21, %200=58	1.5	SS-2	7	7	6	13
	3.0	**Residuum** - Very stiff, olive red brown, fine to medium, lean CLAY (CL) [A-6 (6)], trace clay	3.0	SS-3	3	11	15	26
831.5	5.0	Boring Terminated at 5 Feet						
826.5								
821.5								



LEGEND

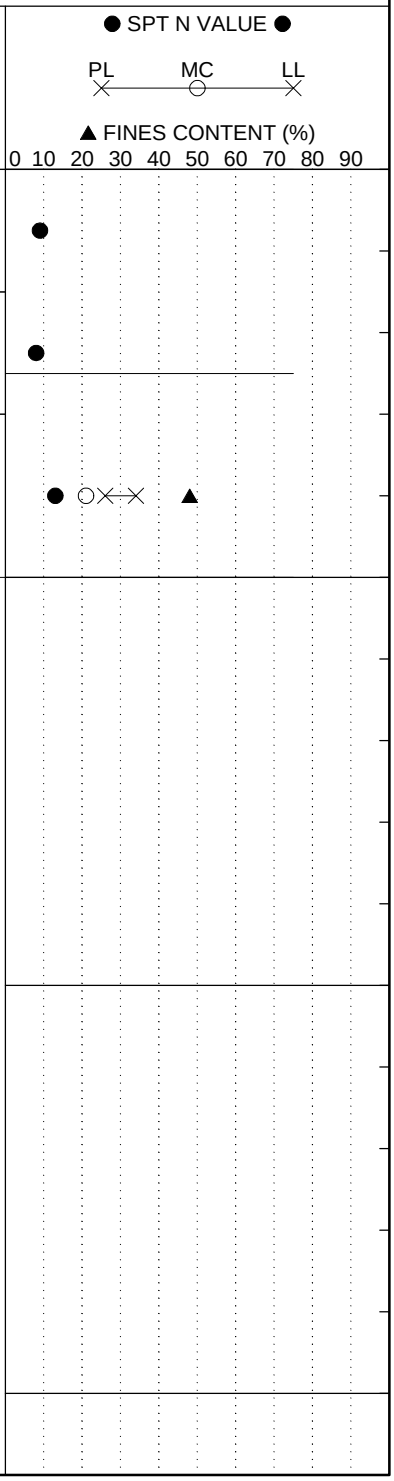
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-10
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1030+00	**Offset:**	16.5 LT
Alignment:	SB				
Elev.:	876.1 ft	**Latitude:**	35.04373	**Longitude:**	-81.8175
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Loose, brown tan, medium to fine, silty SAND (SM) [A-4], trace roots		SS-1	2	5	4	9
	1.5	**Possible Fill** - Firm, orange brown red, medium to fine, sandy SILT (ML) [A-4], trace roots, trace clay	1.5	SS-2	4	3	5	8
	3.0	**Residuum** - Medium dense, orange red, medium to fine, silty SAND (SM) [A-4 (2)] LL=34, PL=26, PI=8, NMC=21, %200=48	3.0	SS-3	5	5	8	13
871.1	5.0	Boring Terminated at 5 Feet						
866.1								
861.1								



LEGEND

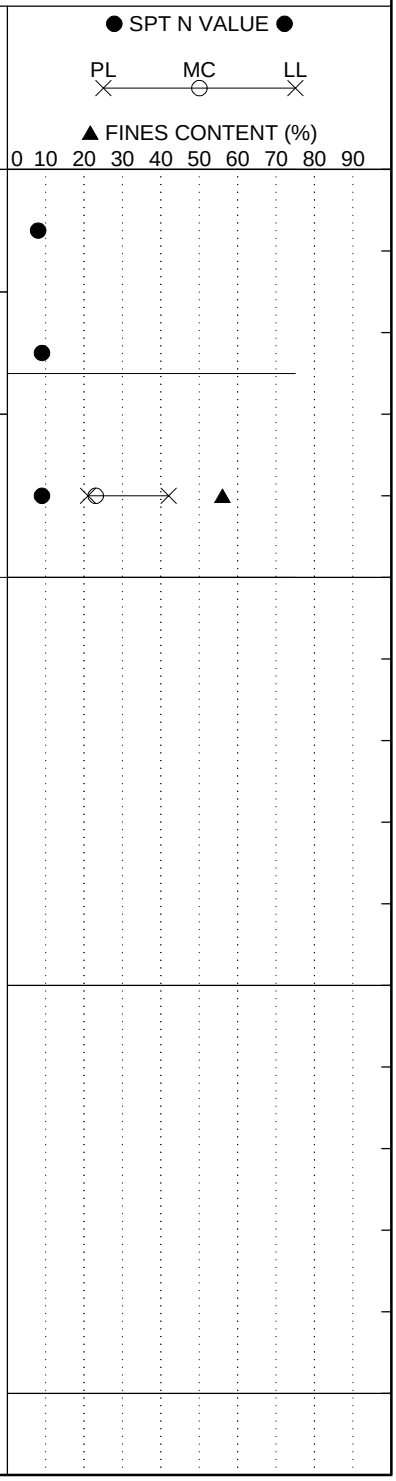
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-11
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1044+50	**Offset:**	9.5 LT
Alignment:	SB				
Elev.:	887.5 ft	**Latitude:**	35.04551	**Longitude:**	-81.81315
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, dark brown tan, medium to fine, silty SAND (SM) [A-4], trace roots, trace clay		1.5	SS-1	2	4	4	8
	2.5	**Possible Fill** - Stiff, brown red, sandy lean CLAY (CL) [A-7-6 (9)]		3.0	SS-2	3	4	5	9
		LL=42, PL=21, PI=21, NMC=23, %200=56			SS-3	2	4	5	9
882.5	5.0	Boring Terminated at 5 Feet							
877.5									
872.5									



LEGEND

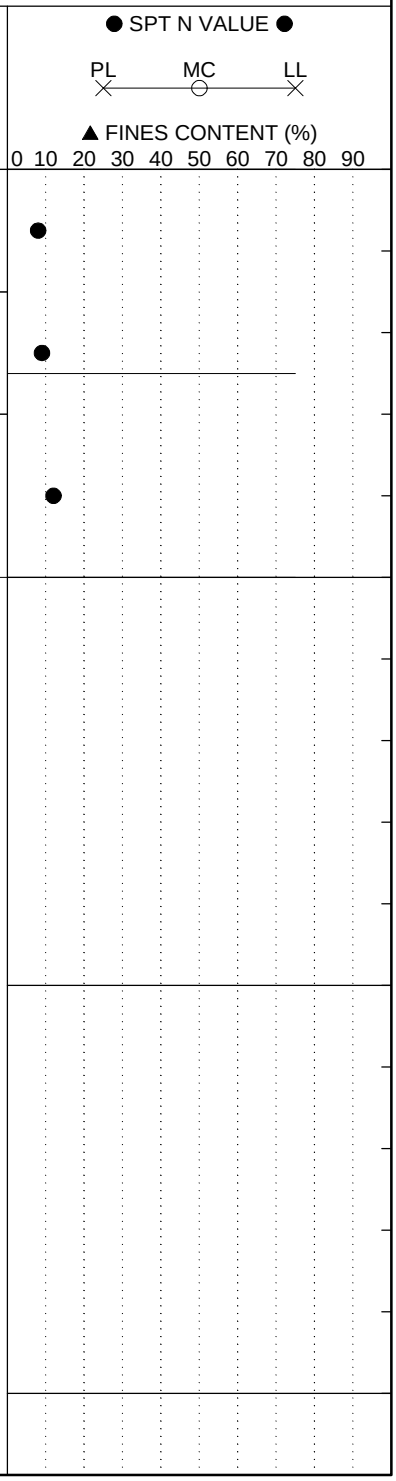
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-12
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1059+40	**Offset:**	9 LT
Alignment:	SB				
Elev.:	841.5 ft	**Latitude:**	35.04733	**Longitude:**	-81.80868
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Possible Fill - Loose, dark brown, fine to coarse, silty SAND (SM) [A-2], trace roots, trace gravel			SS-1	3	4	4	8
	1.5	**Residuum** - Loose to medium dense, black dark olive orange, fine to medium, silty SAND (SM) [A-2], trace mica		1.5	SS-2	4	4	5	9
				3.0	SS-3	3	4	8	12
836.5	5.0	Boring Terminated at 5 feet							
831.5									
826.5									



LEGEND

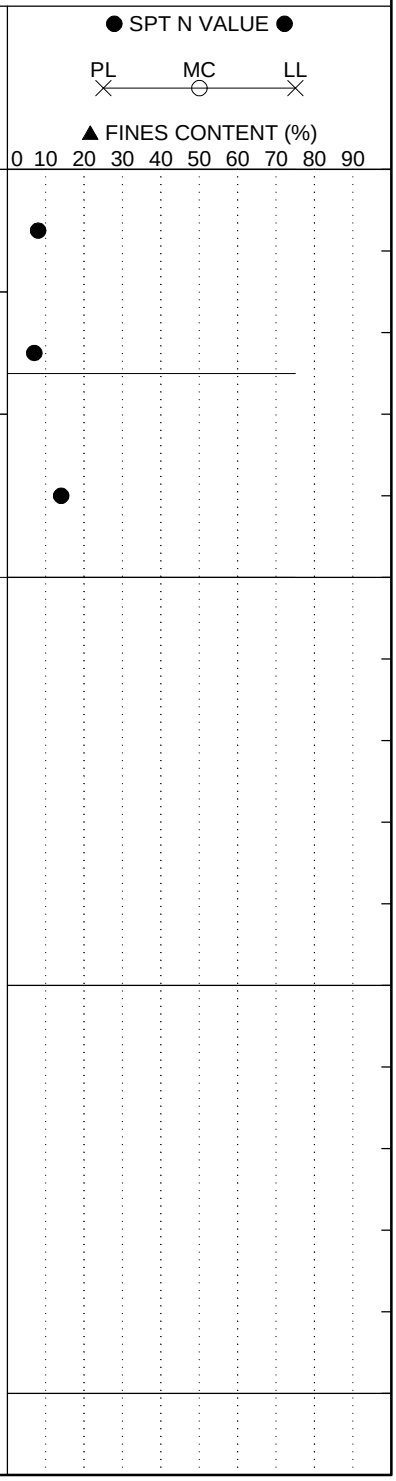
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-13
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1074+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	830.5 ft	**Latitude:**	35.04912	**Longitude:**	-81.80434
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Possible Fill - Loose, brown, medium to fine, silty SAND (SM) [A-4], trace roots			SS-1	2	4	4	8
				1.5					
					SS-2	3	4	3	7
	3.0			3.0					
		Residuum - Medium dense, black olive, fine to medium, silty SAND (SM) [A-4]							
					SS-3	5	6	8	14
825.5	5.0	Boring Terminated at 5 Feet							
820.5									
815.5									



LEGEND

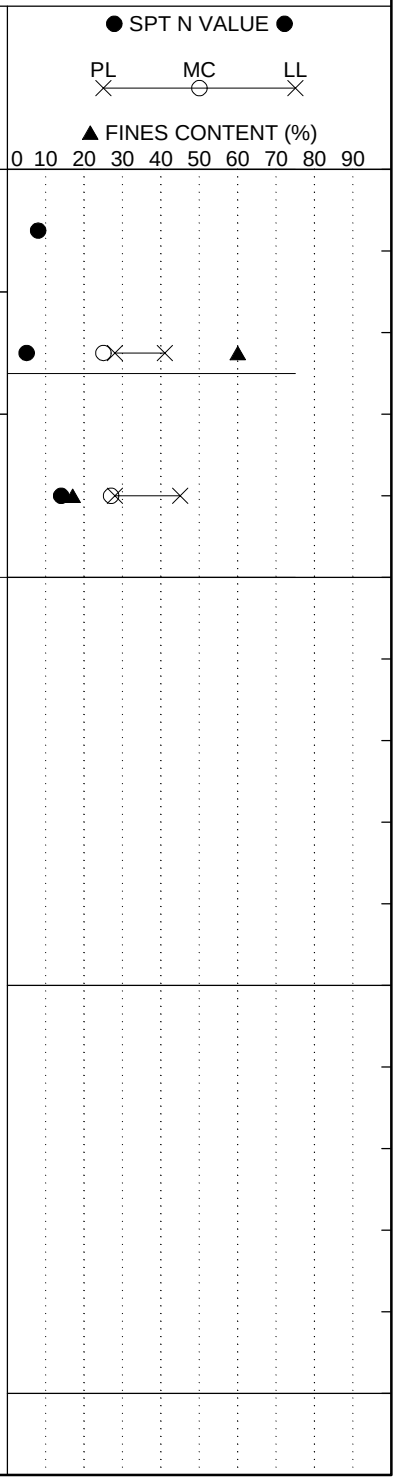
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-14
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1088+90	**Offset:**	10 LT
Alignment:	SB				
Elev.:	848.8 ft	**Latitude:**	35.05095	**Longitude:**	-81.79988
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, gray dark brown, medium to fine, silty SAND (SM) [A-4], trace roots			SS-1	2	4	4	8
	1.5	**Fill** - Firm, brown red, fine to medium, sandy SILT (ML) [A-7-6 (6)], trace mica LL=41, PL=28, PI=13, NMC=25, %200=60		1.5	SS-2	3	2	3	5
	3.0	**Fill** - Stiff, brown red, sandy SILT (ML) [A-7-6 (9)], trace sand LL=45, PL=28, PI=17, NMC=27, %200=61		3.0	SS-3	3	5	9	14
843.8	5.0	Boring Terminated at 5 Feet							
838.8									
833.8									



LEGEND

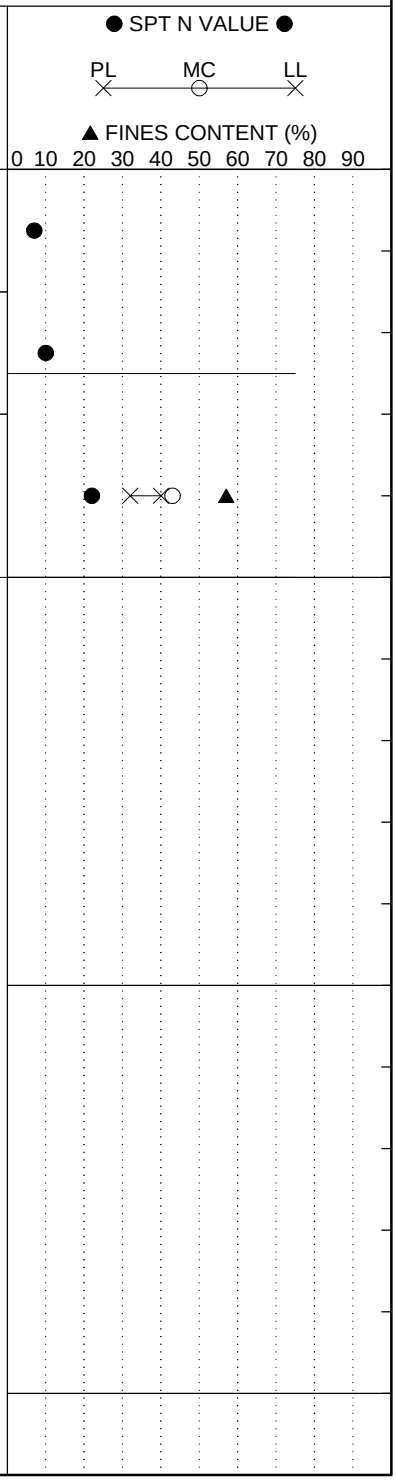
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-15
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1103+60	**Offset:**	9.5 LT
Alignment:	SB				
Elev.:	878.0 ft	**Latitude:**	35.05272	**Longitude:**	-81.7955
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, dark brown gray, fine to coarse, silty SAND (SM) [A-2], trace roots and gravel			SS-1	1	3	4	7
	1.5	**Fill** - Stiff, brown red, fine to medium, sandy SILT (ML) [A-5], trace clay		1.5	SS-2	4	4	6	10
	3.0	**Possible Fill** - Very stiff, red brown olive, fine to medium, sandy SILT (ML) [A-7-5 (5)] LL=32, PL=40, PI=11, NMC=43, %200=57		3.0	SS-3	4	10	12	22
873.0	5.0	Boring Terminated at 5 Feet							
868.0									
863.0									



LEGEND

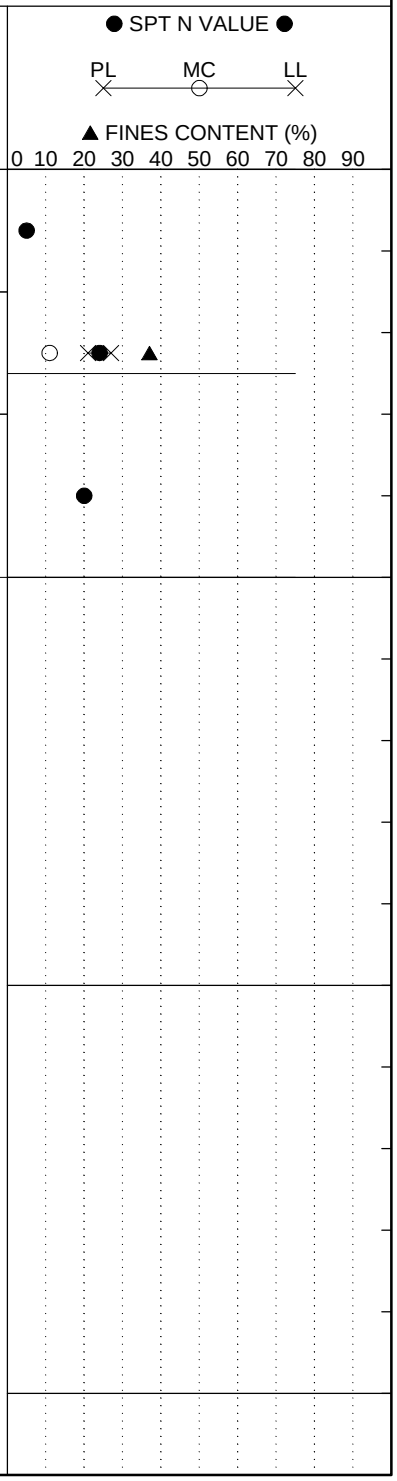
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-16
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1118+20	**Offset:**	9 LT
Alignment:	SB				
Elev.:	892.4 ft	**Latitude:**	35.05452	**Longitude:**	-81.7911
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, dark brown tan, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	2	2	3	5
	1.5	**Residuum** - Medium dense, brown red, fine to medium, silty, clayey SAND (SC-SM) [A-4 (0)], trace mica LL=27, PL=21, PI=6, NMC=11, %200=37		1.5	SS-2	8	9	15	24
				3.0	SS-3	14	10	10	20
887.4	5.0	Boring Terminated at 5 Feet							
882.4									
877.4									



LEGEND

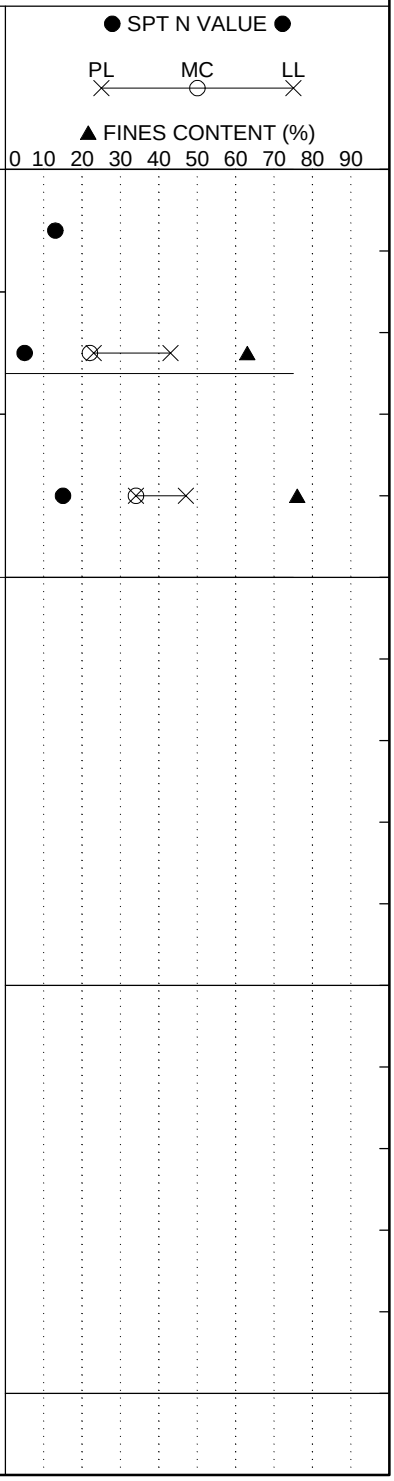
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-17
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1133+00	**Offset:**	9.5 LT
Alignment:	SB				
Elev.:	907.1 ft	**Latitude:**	35.05632	**Longitude:**	-81.78669
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Medium dense, brown, medium to fine, silty SAND (SM),[A-2], trace roots, trace gravel		SS-1	2	5	8	13
	1.5	**Fill** - Firm, red brown, medium to fine, sandy lean CLAY (CL) [A-7-6 (11)]; LL=43, PL=23, PI=20, NMC=22, %200=63	1.5	SS-2	3	2	3	5
	3.0	**Residuum** - Stiff, brown red, SILT with sand, (ML) [A-7-5 (11)]; LL=47, PL=34, PI=13, NMC=34, %200=76	3.0	SS-3	3	5	10	15
902.1	5.0	Boring Terminated at 5 Feet						
897.1								
892.1								



LEGEND

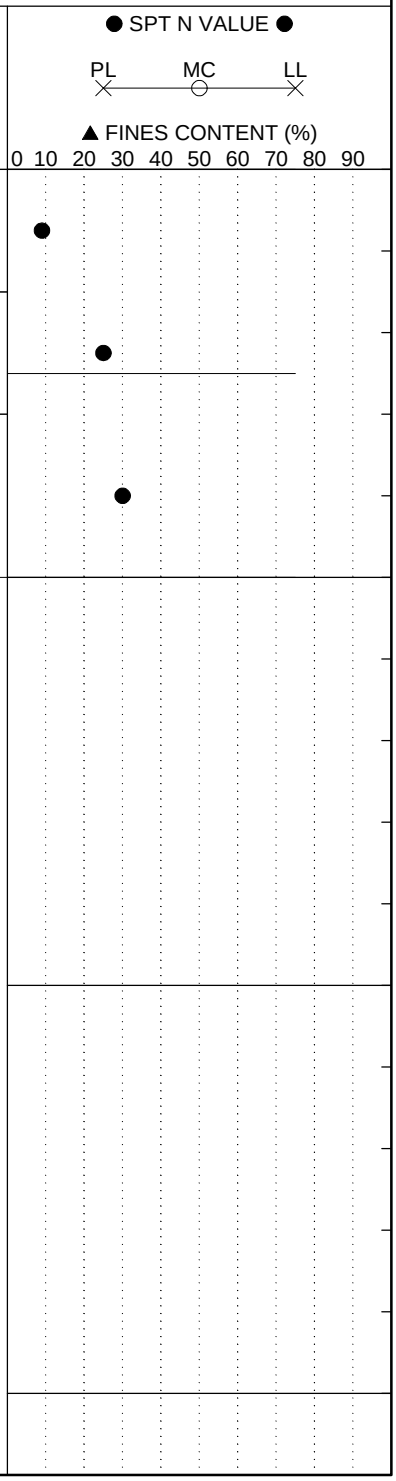
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-18
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1148+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	906.5 ft	**Latitude:**	35.05866	**Longitude:**	-81.78258
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose to medium dense, dark brown tan, medium to fine, silty SAND (SM) [A-2], trace roots, trace gravel		1.5	SS-1	2	4	5	9
					SS-2	4	5	20	25
	3.0	**Residuum** - Medium dense, olive red, slightly micaceous, fine to medium, silty SAND (SM) [A-4]		3.0	SS-3	12	14	16	30
901.5	5.0	Boring Terminated at 5 Feet							
896.5									
891.5									



LEGEND

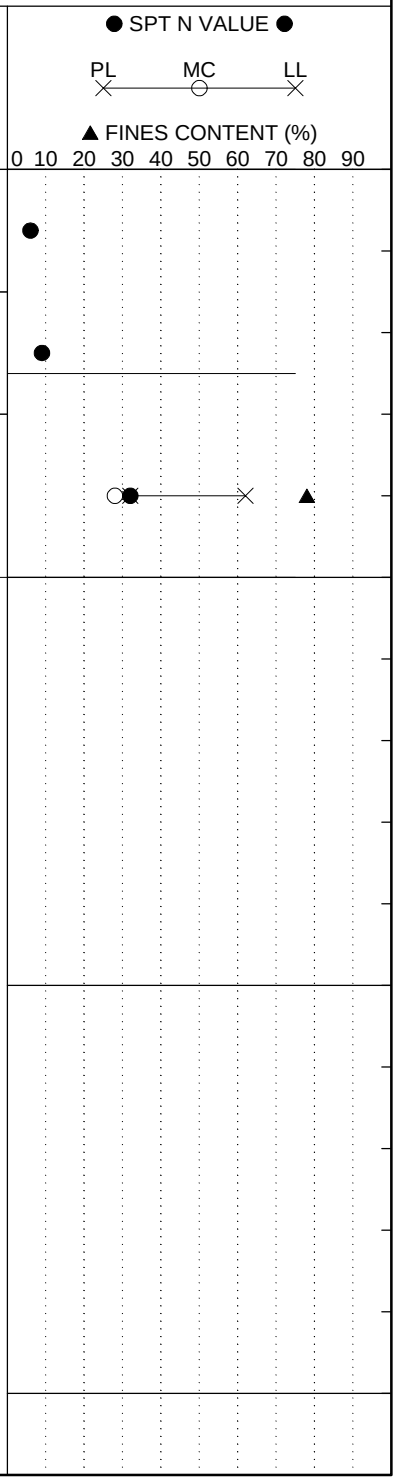
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-19
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1162+50	**Offset:**	9 LT
Alignment:	SB				
Elev.:	877.5 ft	**Latitude:**	35.06101	**Longitude:**	-81.77864
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	3	3	3	6
	1.5	**Possible Fill** - Stiff, orange olive brown, SILT with sand, (ML) [A-5], trace clay		1.5	SS-2	4	4	5	9
	3.0	**Residuum** - Hard, brown red yellow gray, fine, elastic SILT with sand, (MH) [A-7-5 (26)], trace clay LL=62, PL=32, PI=30, NMC=28, %200=78		3.0	SS-3	8	16	16	32
872.5	5.0	Boring Terminated at 5 Feet							
867.5									
862.5									



LEGEND

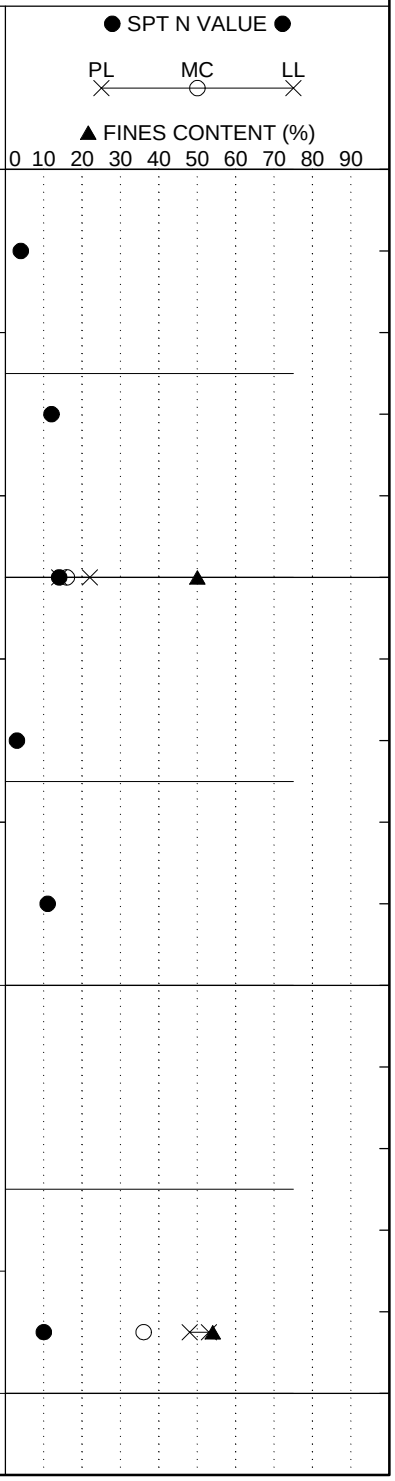
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-20
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1177+30	**Offset:**	9.5 LT
Alignment:	SB				
Elev.:	879.6 ft	**Latitude:**	35.0634	**Longitude:**	-81.77465
Date Started:	4/29/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2 inches						
		Fill - Very loose, moist, dark brown, medium to fine, silty SAND (SM) [A-2], trace roots	0.0	SS-1	2	2	2	4
	2.0	**Fill** - Stiff, slightly moist, tan brown, slightly micaceous, fine to coarse, sandy SILT (ML) [A-4], trace rock fragments	2.0	SS-2	1	5	7	12
	4.0	**Fill** - Medium dense, brown red, fine, clayey SAND (SC) [A-4 (1)], trace asphalt fragments, trace clay LL=22, PL=14, PI=8, NMC=16, %200=50	4.0	SS-3	4	7	7	14
874.6								
	6.0	**Fill** - Soft, wet, brown green gray, medium to fine, sandy SILT (ML) [A-4]	6.0	SS-4	1	2	1	3
	8.0	**Residuum** - Stiff, brown red pink olive, slightly micaceous, fine, sandy elastic SILT (MH) [A-5 (3)]	8.0	SS-5	3	5	6	11
869.6								
			13.5	SS-6	3	4	6	10
		LL=53, PL=48, PI=5, NMC=36, %200=54						
864.6	15.0	Boring Terminated at 15 Feet						



LEGEND

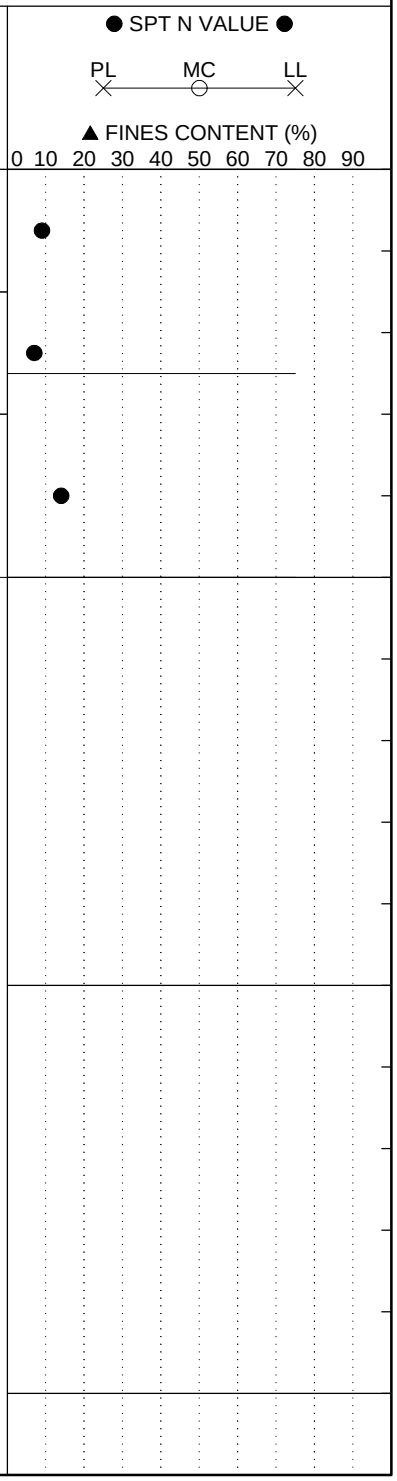
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-21
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1192+00	**Offset:**	10 LT
Alignment:	SB				
Elev.:	894.3 ft	**Latitude:**	35.06577	**Longitude:**	-81.77067
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, dark brown gray, medium to fine, silty SAND (SM) [A-4], trace roots		1.5	SS-1	2	5	4	9
	2.5	**Fill** - Stiff, red brown, fine, elastic SILT with sand, (MH) [A-5], trace roots		3.0	SS-2	3	3	4	7
					SS-3	3	6	8	14
889.3	5.0	Boring Terminated at 5 Feet							
884.3									
879.3									



LEGEND

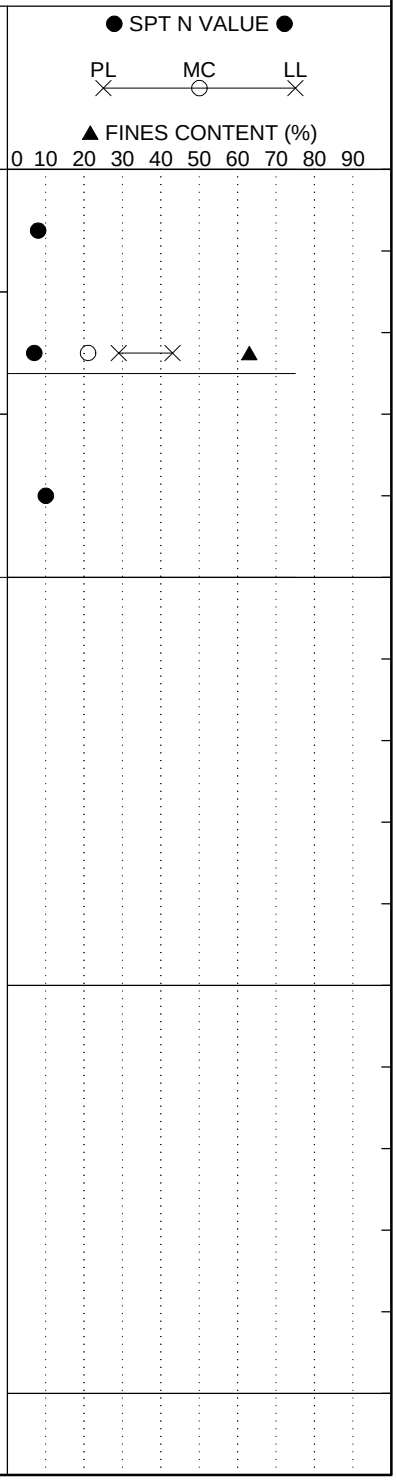
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-22
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1206+50	**Offset:**	9 LT
Alignment:	SB				
Elev.:	932.0 ft	**Latitude:**	35.06811	**Longitude:**	-81.76676
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, dark brown gray, medium to fine, silty SAND (SM) [A-4], trace roots			SS-1	2	4	4	8
	1.5	**Possible Fill** - Firm, orange red, fine, sandy SILT (ML) [A-7-6 (8)], trace roots; LL=43, PL=29, PI=14, NMC=21, %200=63		1.5	SS-2	4	3	4	7
	3.0	**Residuum** - Stiff, tan peach orange, fine, sandy SILT (ML) [A-4]		3.0	SS-3	4	5	5	10
927.0	5.0	Boring Terminated at 5 Feet							
922.0									
917.0									



LEGEND

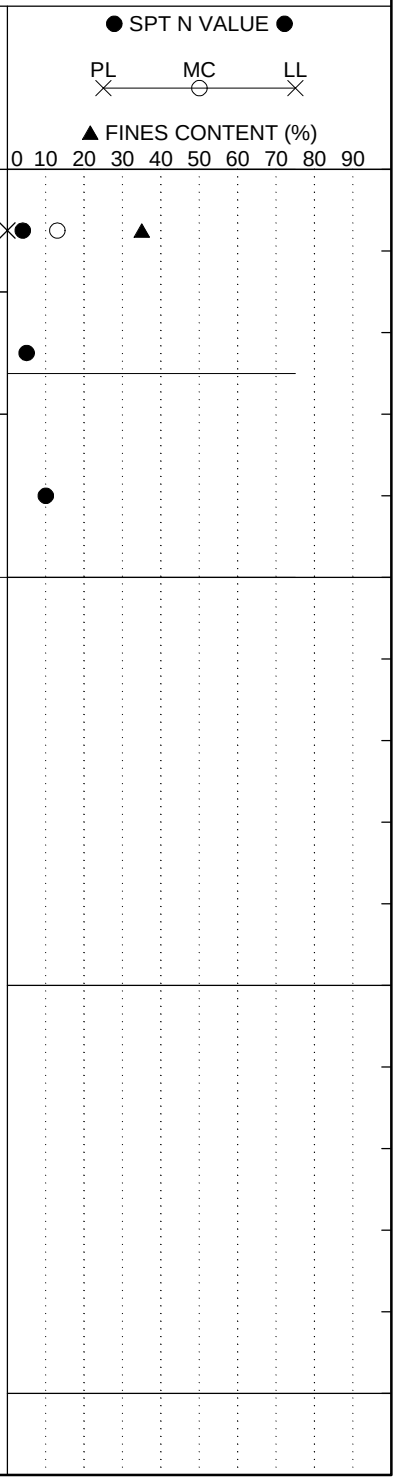
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-23
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1221+60	**Offset:**	9 LT
Alignment:	SB				
Elev.:	910.7 ft	**Latitude:**	35.07051	**Longitude:**	-81.7627
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Very loose, dark brown red, medium to fine, clayey SAND (SC) [A-2-4], trace roots			SS-1	2	2	2	4
	1.5	LL/PL/PI="NP" , NMC=13, %200=35		1.5					
		Fill - Firm to stiff, brown red tan, fine to medium, sandy lean CLAY (CL) [A-6 (5)]			SS-2	3	2	3	5
				3.0					
					SS-3	4	6	4	10
905.7	5.0	Boring Terminated at 5 Feet							
900.7									
895.7									



LEGEND

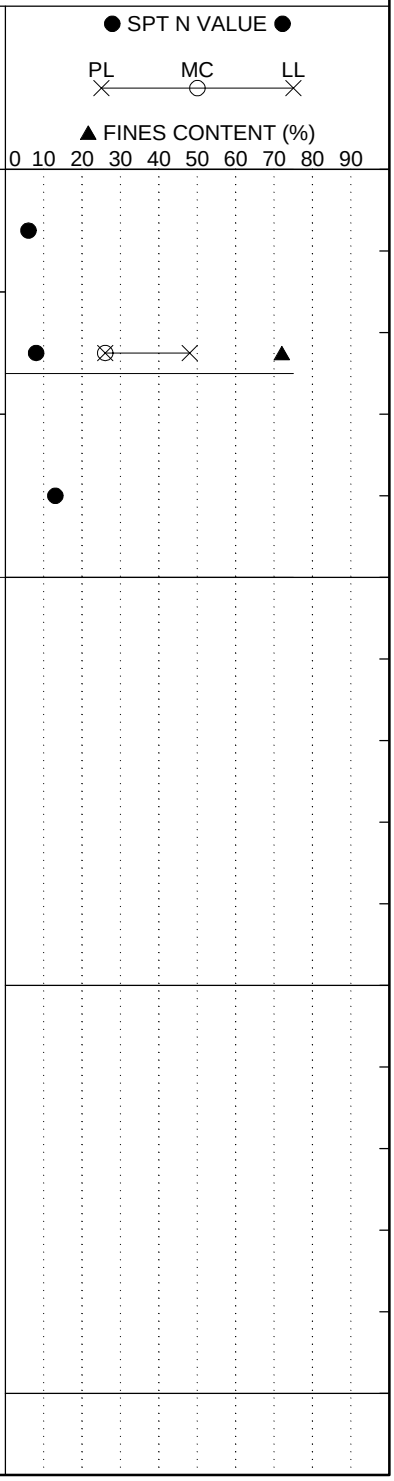
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-24
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1236+40	**Offset:**	16.5 LT
Alignment:	SB				
Elev.:	866.6 ft	**Latitude:**	35.07258	**Longitude:**	-81.75839
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2 inches	0.0					
		Fill - Firm, slightly moist, dark brown, medium to fine, sandy SILT (ML) [A-4], trace roots		SS-1	2	3	3	6
	1.5	**Residuum** - Firm, red, lean CLAY with sand, (CL) [A-7-6 (16)], trace mica, trace roots	1.5	SS-2	3	3	5	8
		LL=48, PL=26, PI=22, NMC=26, %200=72						
	3.0	Stiff, red/orange/brown, SILT with sand, (ML) [A-5], trace mica	3.0	SS-3	4	6	7	13
861.6	5.0	Boring Terminated at 5 Feet						
856.6								
851.6								



LEGEND

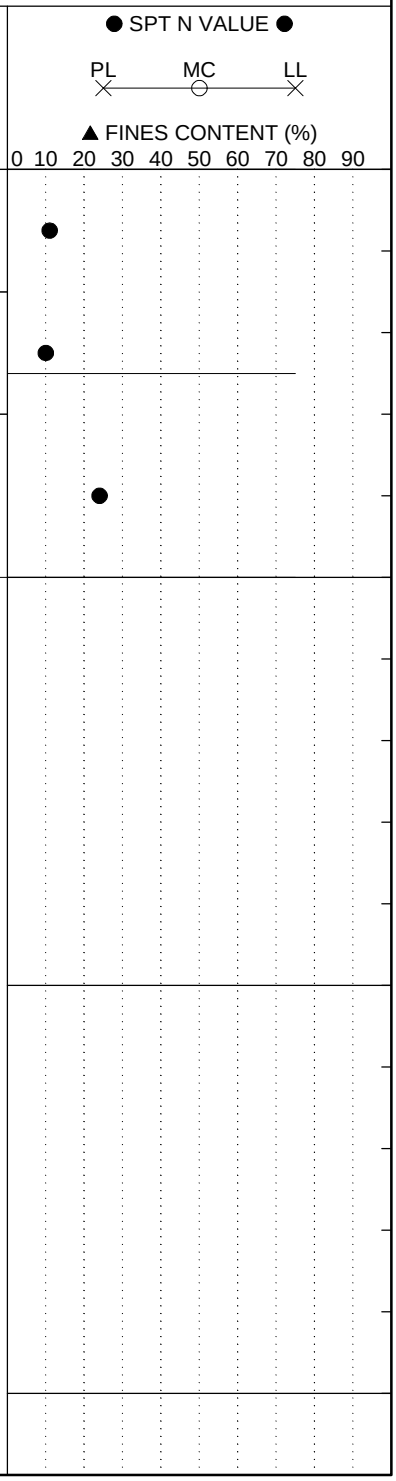
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-25
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1251+00	**Offset:**	18 LT
Alignment:	SB				
Elev.:	872.0 ft	**Latitude:**	35.0734	**Longitude:**	-81.75363
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Stiff, dark brown, fine to coarse, sandy SILT (ML) [A-4], trace roots, trace gravel, (<1.5")		0.0	SS-1	3	7	4	11
	1.5	**Fill** - Loose, olive tan, medium to fine, silty SAND (SM) [A-2]		1.5	SS-2	4	3	7	10
	3.0	**Residuum** - Medium dense, olive pink tan, silty SAND (SM) [A-2], trace mica		3.0	SS-3	3	8	16	24
867.0	5.0	Boring Terminated at 5 Feet							
862.0									
857.0									



LEGEND

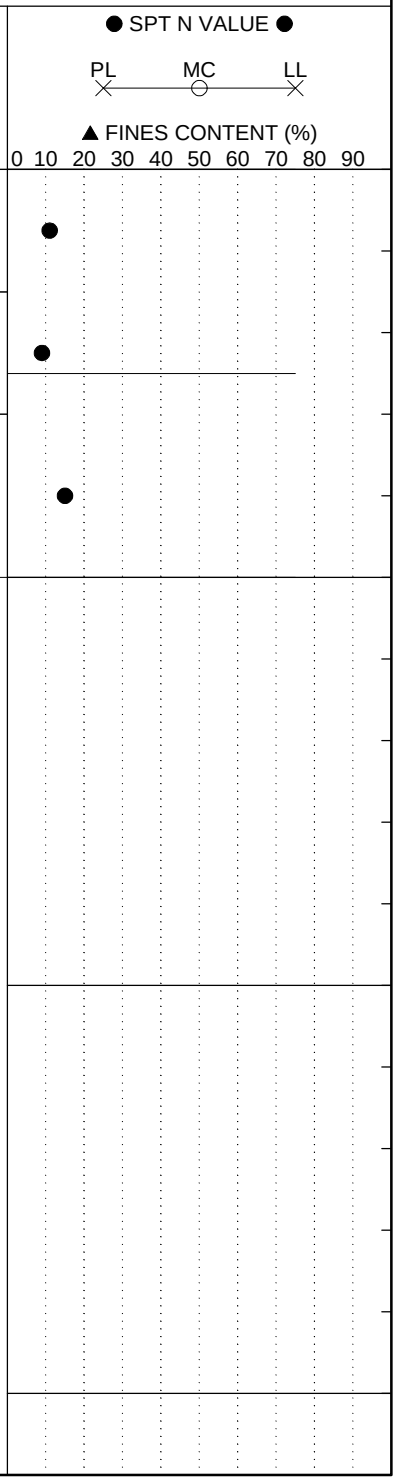
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-26
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1265+85	**Offset:**	17 LT
Alignment:	SB				
Elev.:	840.7 ft	**Latitude:**	35.07405	**Longitude:**	-81.74872
Date Started:	4/29/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/29/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Medium dense, dark brown, fine to coarse, silty SAND (SM) [A-2], trace roots, trace rock fragments, (<1.5")			SS-1	4	6	5	11
	1.5	**Fill** - Loose to medium dense, slightly moist to moist, brown red tan, fine to medium, clayey SAND (SC) [A-6 (3)]		1.5	SS-2	4	3	6	9
				3.0	SS-3	5	6	9	15
835.7	5.0	Boring Terminated at 5 Feet							
830.7									
825.7									



LEGEND

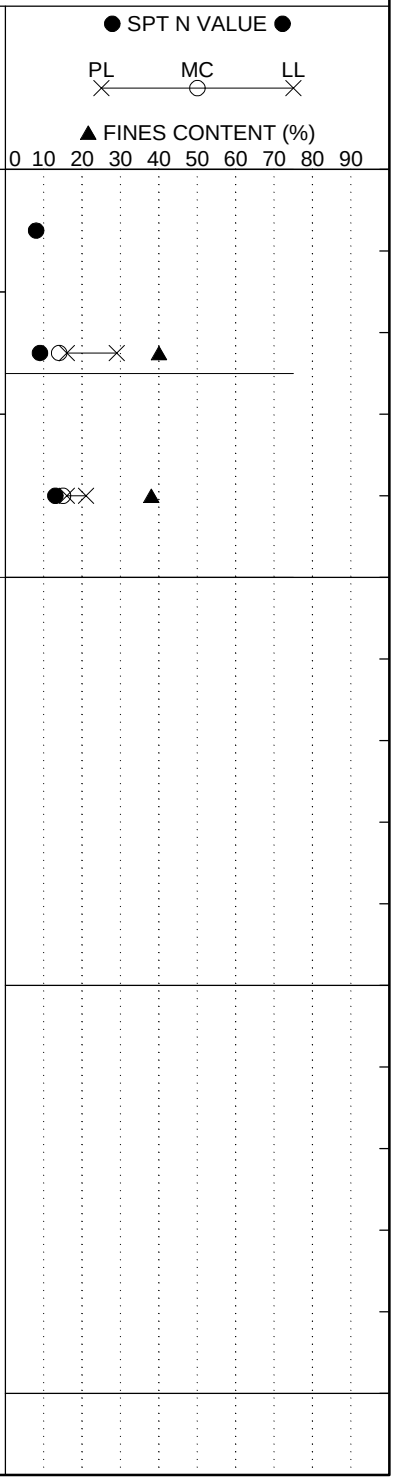
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-27
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1280+60	**Offset:**	16.5 LT
Alignment:	SB				
Elev.:	825.8 ft	**Latitude:**	35.07468	**Longitude:**	-81.74385
Date Started:	4/28/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, dark brown, medium to fine, silty SAND (SM) [A-4], trace roots		SS-1	3	4	4	8
	1.5	**Fill** - Stiff, moist, orange red, fine, clayey SAND (SC) [A-6 (1)] LL=29, PL=16, PI=13, NMC=14, %200=40	1.5	SS-2	4	4	5	9
	3.0	**Fill** - Stiff, moist, dark red brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)] LL=21, PL=16, PI=5, NMC=15, %200=38	3.0	SS-3	4	6	7	13
820.8	5.0	Boring Terminated at 5 Feet						
815.8								
810.8								



LEGEND

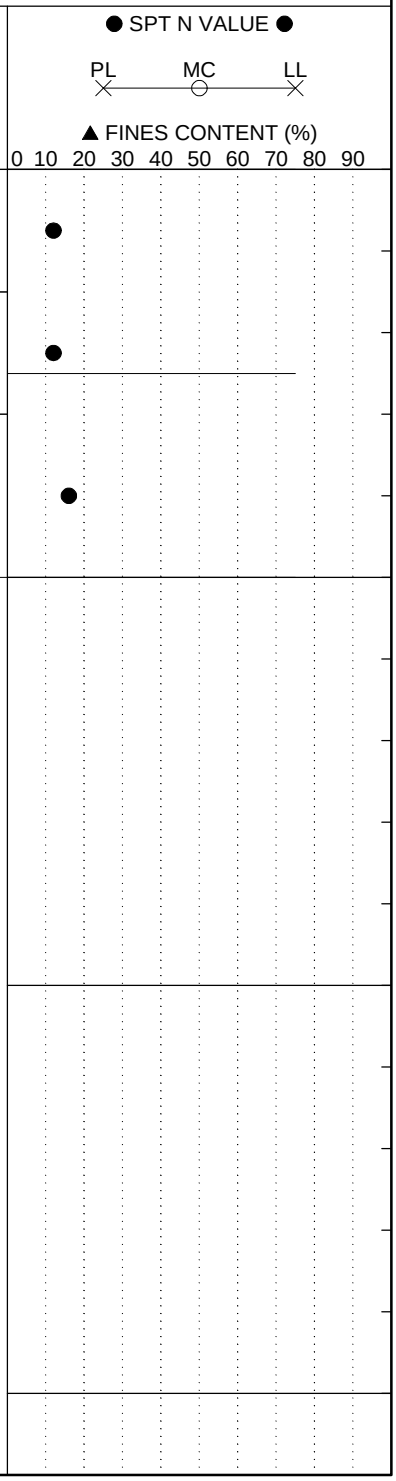
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-28
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1295+40	**Offset:**	16 LT
Alignment:	SB				
Elev.:	796.9 ft	**Latitude:**	35.07535	**Longitude:**	-81.73897
Date Started:	4/28/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Medium dense, dark brown, fine to medium, silty SAND (SM) [A-2], trace roots		1.5	SS-1	3	6	6	12
	2.0	**Possible Fill** - Stiff, brown tan, fine to medium, sandy SILT (ML) [A-4], trace mica			SS-2	3	5	7	12
	3.0	**Residuum** - Medium dense, tan brown, fine, silty SAND (SM) [A-4], very micaceous		3.0	SS-3	3	7	9	16
791.9	5.0	Boring Terminated at 5 Feet							
786.9									
781.9									



LEGEND

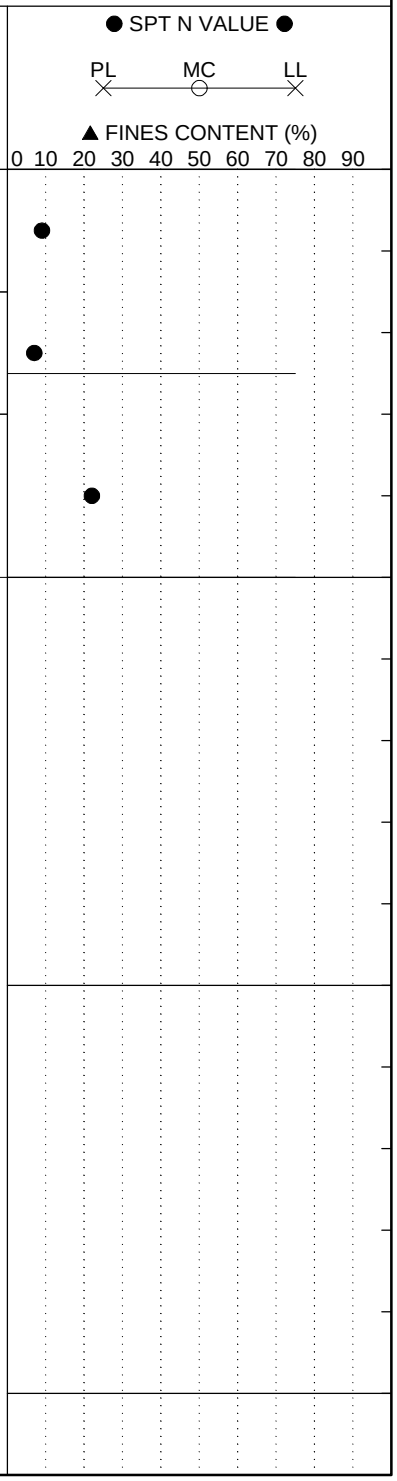
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-29
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1310+00	**Offset:**	16.5 LT
Alignment:	SB				
Elev.:	759.3 ft	**Latitude:**	35.07599	**Longitude:**	-81.73415
Date Started:	4/28/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, brown, fine to medium, silty SAND (SM) [A-2], trace roots			SS-1	4	4	5	9
	1.5	**Fill** - Firm, brown olive red, fine to medium, sandy lean CLAY (CL) [A-6 (5)]		1.5	SS-2	3	3	4	7
	3.0	**Residuum** - Very stiff, red brown, fine to medium, sandy lean CLAY (CL) [A-6 (5)]		3.0	SS-3	4	10	12	22
754.3	5.0	Boring Terminated at 5 Feet							
749.3									
744.3									



LEGEND

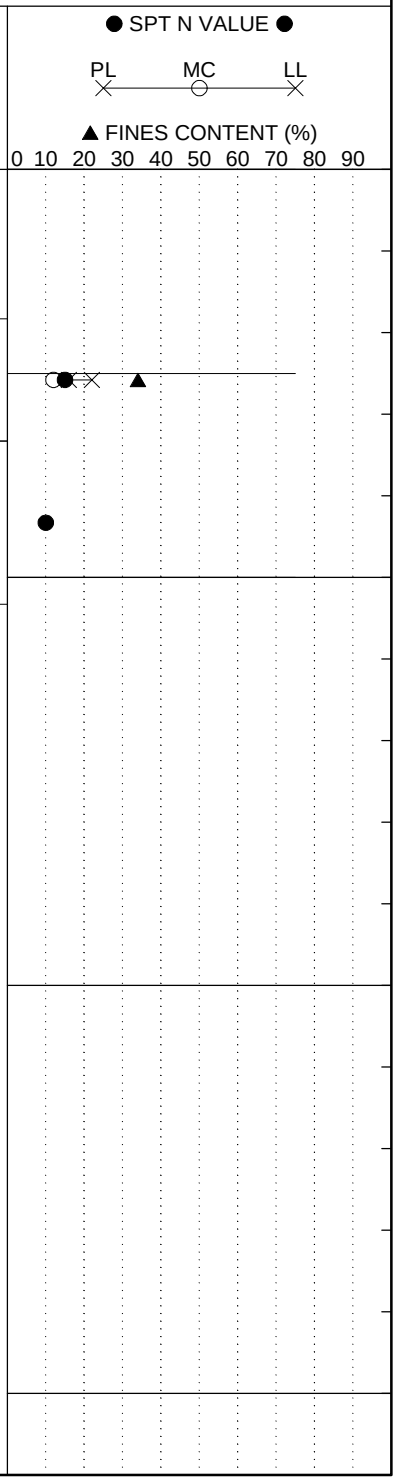
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-30
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1325+00	**Offset:**	10.5 LT
Alignment:	SB				
Elev.:	735.2 ft	**Latitude:**	35.07663	**Longitude:**	-81.72921
Date Started:	4/28/2015				
Total Depth:	5.3 ft	**Soil Depth:**	5.3 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 1 foot, 10 inches							
	1.8			1.8					
		Fill - Medium dense, brown red, fine, silty clayey SAND with gravel, (SC-SM) [A-2-4] LL=22, PL=16, PI=6, NMC=12, %200=34			SS-1	12	10	5	15
	3.3			3.3					
		Residuum - Stiff, tan pink olive, fine, sandy SILT (ML) [A-4]			SS-2	8	5	5	10
730.2	5.3								
		Boring Terminated at 5.3 Feet							
725.2									
720.2									



LEGEND

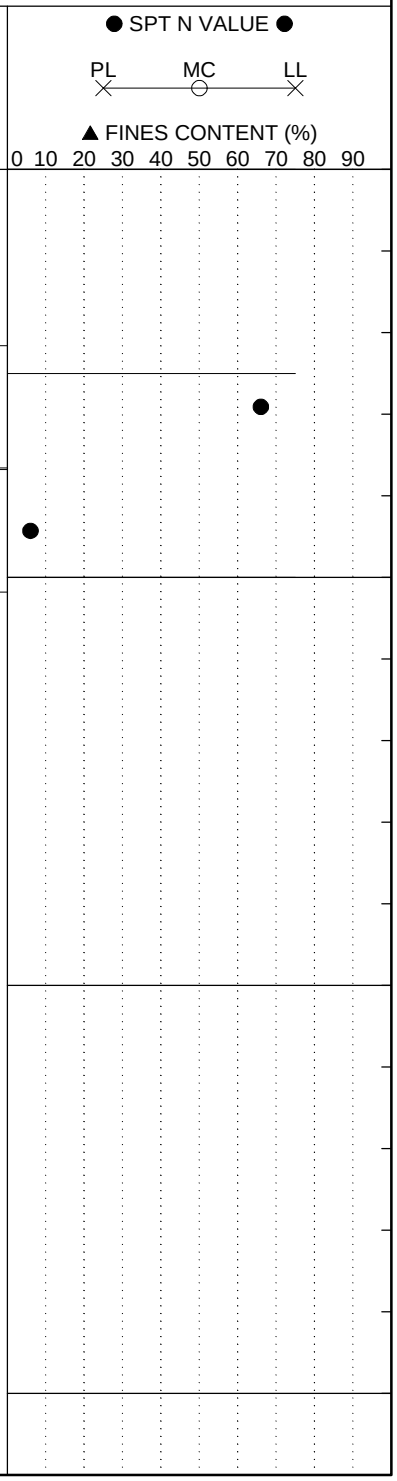
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-31
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1340+00	**Offset:**	11 LT
Alignment:	SB				
Elev.:	663.9 ft	**Latitude:**	35.07742	**Longitude:**	-81.7243
Date Started:	4/28/2015				
Total Depth:	5.2 ft	**Soil Depth:**	5.2 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt/Gravel Base - 2 feet, 2 inches							
	2.2	**Fill** - Very dense, very moist, gray, medium to fine, silty SAND, (SM) [A-2], trace clay		2.2	SS-1	28	50	16	66
	3.5	**Fill** - Firm, very moist, brown red, fine to moist, sandy CLAY, (CL) [A-6]		3.7	SS-2	3	4	2	6
658.9	5.2	Boring Terminated at 5.2 Feet							
653.9									
648.9									



LEGEND

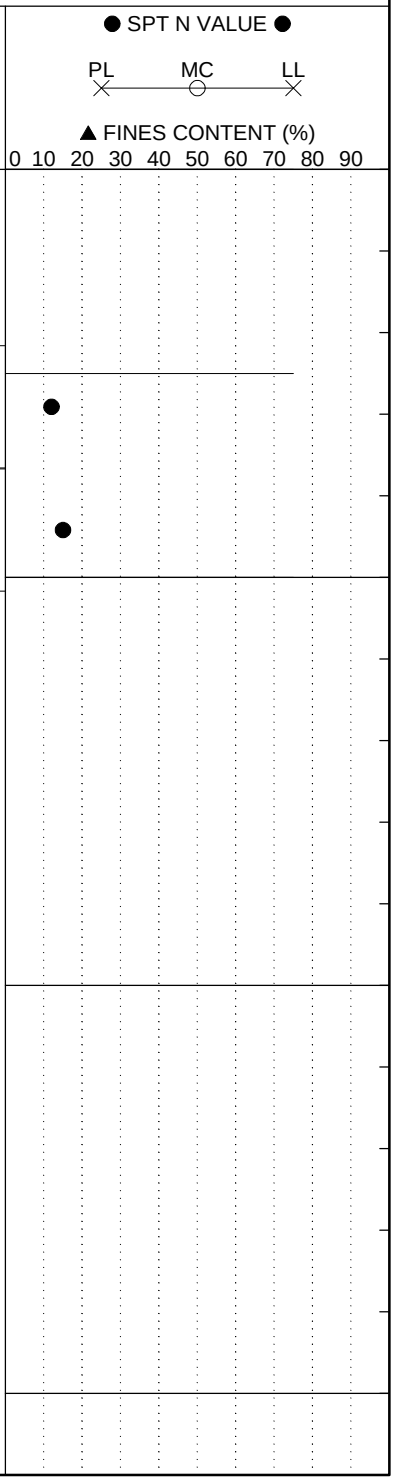
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-32
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1354+30	**Offset:**	10 LT
Alignment:	SB				
Elev.:	737.6 ft	**Latitude:**	35.0785	**Longitude:**	-81.7197
Date Started:	4/28/2015				
Total Depth:	5.2 ft	**Soil Depth:**	5.2 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 2 feet, 2 inches							
	2.2	**Fill** - Stiff, moist, red brown, slightly micaceous, fine to coarse, sandy elastic SILT, (MH) [A-5], trace gravel		2.2	SS-1	5	5	7	12
	3.7	**Residuum** - Medium dense, tan olive orange, slightly micaceous, fine to medium, silty SAND, (SM) [A-2]		3.7	SS-2	5	9	6	15
732.6	5.2	Boring Terminated at 5.2 Feet							
727.6									
722.6									



LEGEND

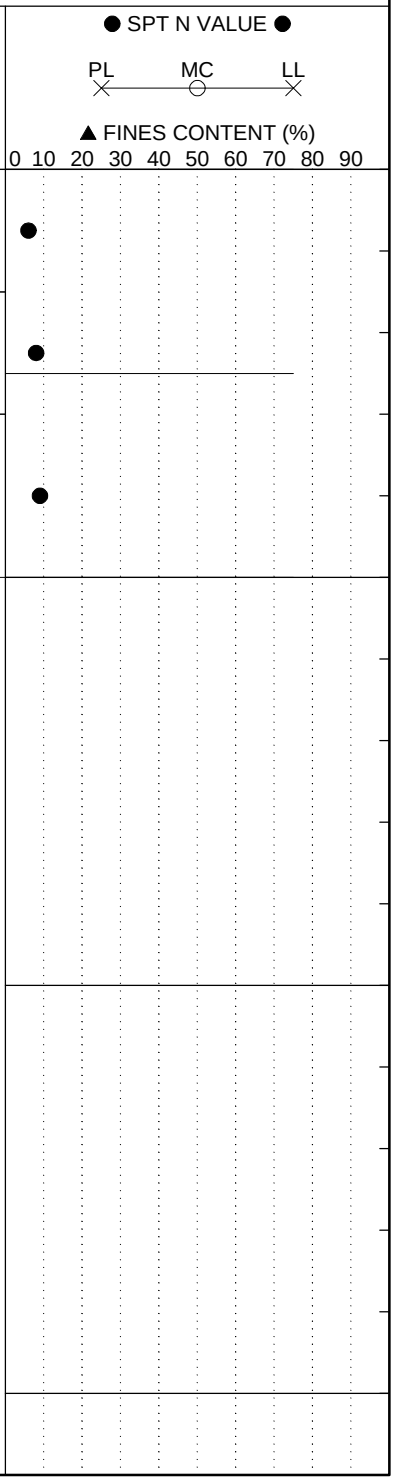
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-33
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1370+00	**Offset:**	10.5 LT
Alignment:	SB				
Elev.:	787.4 ft	**Latitude:**	35.07966	**Longitude:**	-81.715
Date Started:	4/28/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2 inches	0.0					
		Fill - Loose, dark brown, fine to coarse, silty SAND, (SM) [A-2], trace roots		SS-1	1	2	4	6
	1.5	**Fill** - Firm, red gray brown, medium to fine, sandy SILT, (ML) [A-4], trace clay	1.5	SS-2	6	4	4	8
	3.0	**Fill** - Stiff, very moist, red brown olive, medium to fine, sandy elastic SILT (MH) [A-5]	3.0	SS-3	3	4	5	9
782.4	5.0	Boring Terminated at 5 Feet						
777.4								
772.4								



LEGEND

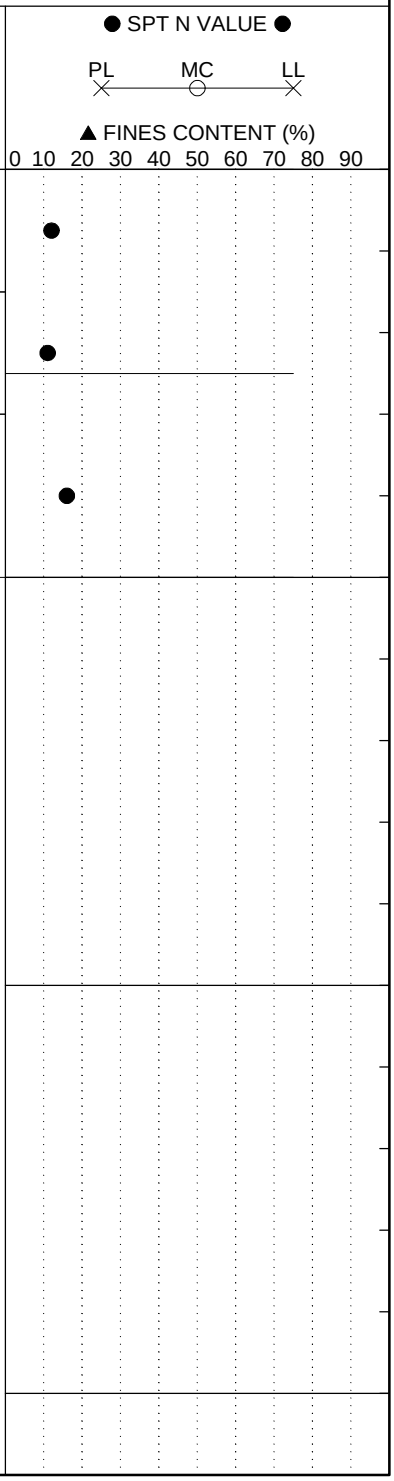
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-34
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1384+00	**Offset:**	10 LT
Alignment:	SB				
Elev.:	815.7 ft	**Latitude:**	35.08089	**Longitude:**	-81.71022
Date Started:	4/28/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Medium dense, dark brown olive gray, silty SAND (SM) [A-2], trace roots (2"-1.5'), trace gravel (2"-1.5'), trace mica		1.5	SS-1	2	4	8	12
	2.5	**Fill** - Very stiff, tan yellow brown, elastic SILT with sand (MH) [A-6]		3.0	SS-2	5	6	5	11
					SS-3	4	7	9	16
810.7	5.0	Boring Terminated at 5 Feet							
805.7									
800.7									



LEGEND

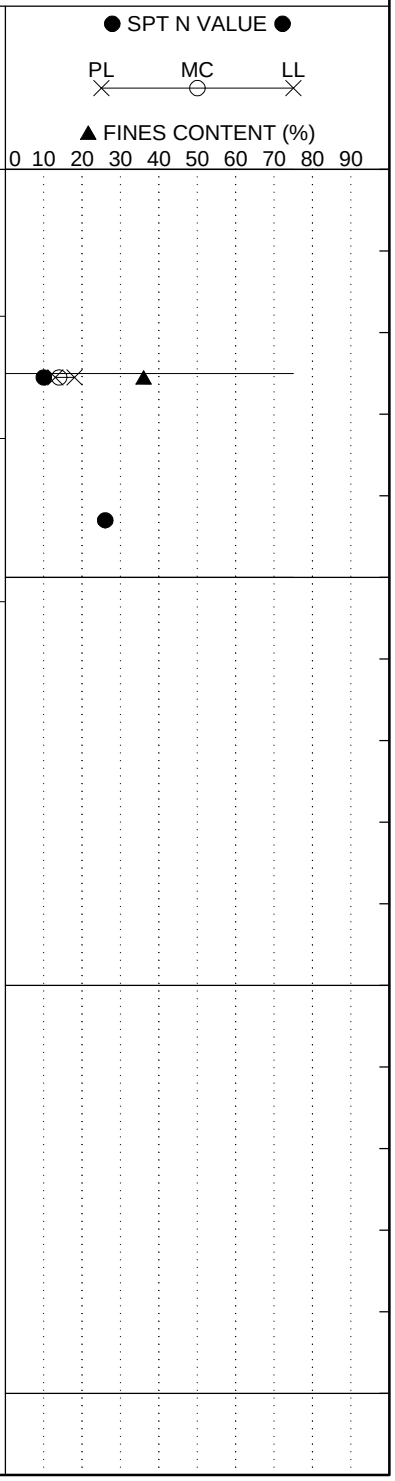
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-35
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1398+60	**Offset:**	5 LT
Alignment:	SB				
Elev.:	811.2 ft	**Latitude:**	35.08266	**Longitude:**	-81.70584
Date Started:	4/28/2015				
Total Depth:	5.3 ft	**Soil Depth:**	5.3 ft	**Core Depth:**	0 ft
Date Completed:	4/28/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
		Asphalt - 1 foot, 10 inches						
	1.8	**Fill** - Loose, moist, brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)] LL=18, PL=13, PI=5, NMC=14, %200=36	1.8	SS-1	4	5	5	10
	3.3	**Residuum** - Medium dense, slightly moist, tan white yellow, medium to fine, silty SAND (SM) [A-4]	3.3	SS-2	4	10	16	26
806.2	5.3	Boring Terminated at 5.3 Feet						
801.2								
796.2								



LEGEND

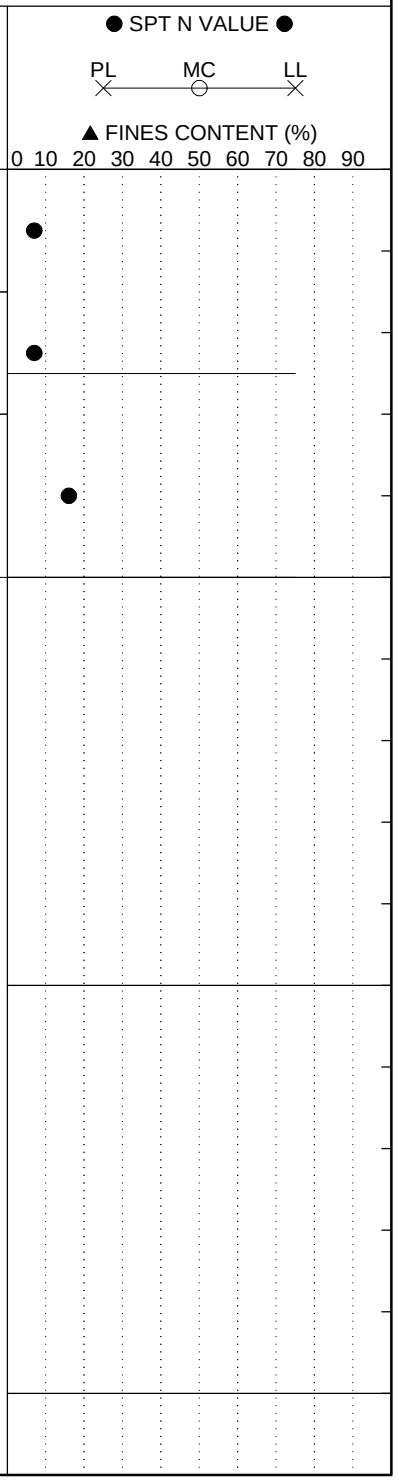
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-36
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1413+35	**Offset:**	17 LT
Alignment:	SB				
Elev.:	766.5 ft	**Latitude:**	35.08495	**Longitude:**	-81.70177
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Firm, brown tan red, medium to fine, sandy SILT (ML) [A-4], trace roots			SS-1	3	4	3	7
	1.5	**Residuum** - Loose to medium dense, slightly moist, brown plum, fine to medium, clayey SAND (SC) [A-4 (1)], trace rock fragments (3'-5')		1.5	SS-2	3	3	4	7
				3.0	SS-3	3	7	9	16
761.5	5.0	Boring Terminated at 5 Feet							
756.5									
751.5									



LEGEND

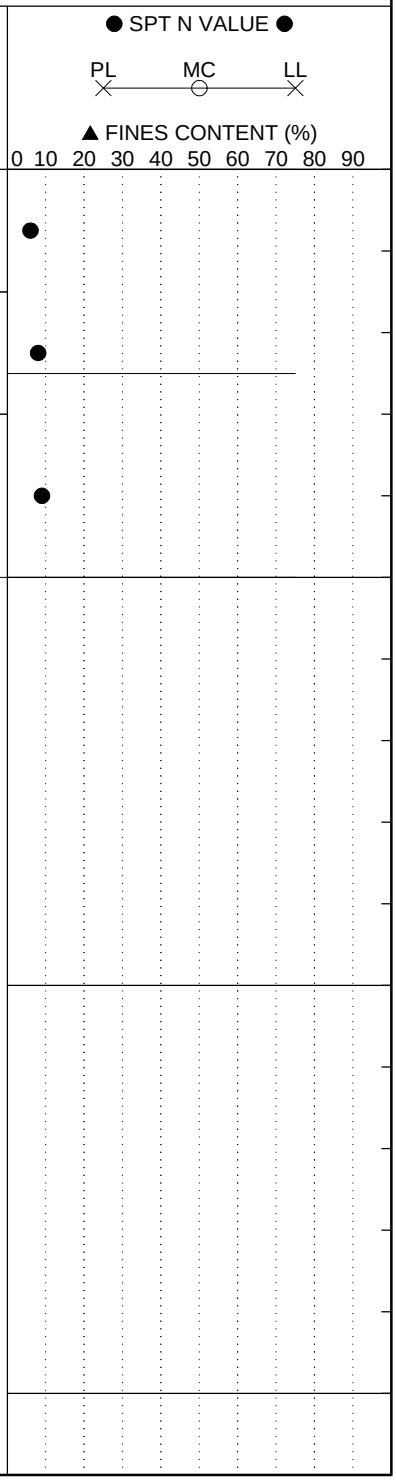
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-37
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1428+15	**Offset:**	17 LT
Alignment:	SB				
Elev.:	776.6 ft	**Latitude:**	35.08723	**Longitude:**	-81.69769
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, dark gray brown tan, fine to coarse, silty SAND (SM) [A-2], trace roots			SS-1	1	2	4	6
				1.5					
					SS-2	6	4	4	8
	3.0	**Residuum** - Loose, gray yellow orange, fine to medium, silty SAND (SM) [A-4]		3.0					
					SS-3	8	4	5	9
771.6	5.0	Boring Terminated at 5 Feet							
766.6									
761.6									



LEGEND

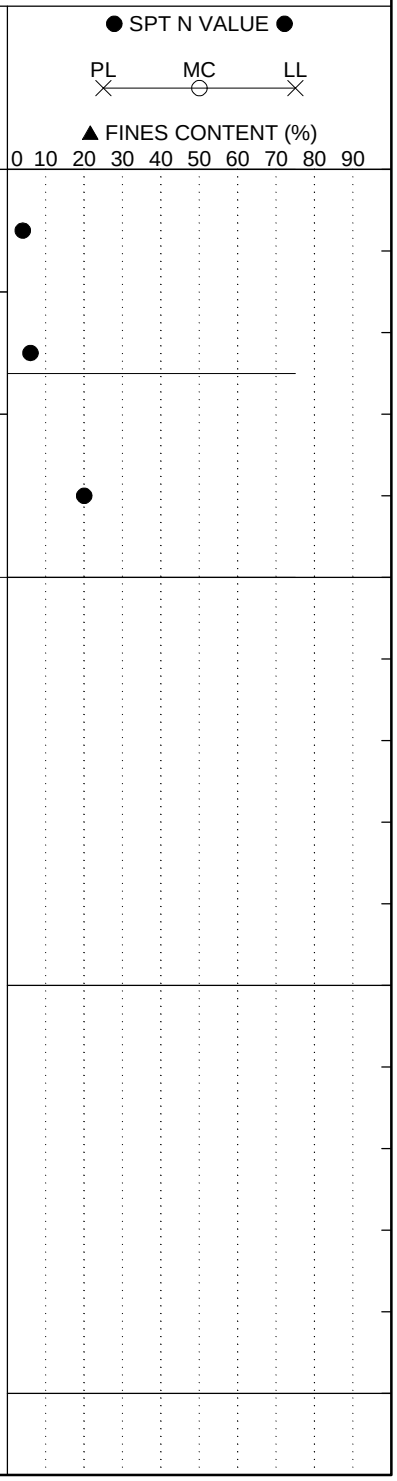
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-38
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1443+00	**Offset:**	18 LT
Alignment:	SB				
Elev.:	833.3 ft	**Latitude:**	35.08954	**Longitude:**	-81.6936
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Very loose, dark brown, medium to coarse, silty SAND (SM) [A-2], trace roots			SS-1	1	2	2	4
	1.5	**Fill** - Firm, red brown tan, SILT with sand, (ML) [A-4], trace clay, trace roots		1.5	SS-2	3	2	4	6
	3.0	**Possible Fill** - Medium dense, red gray olive, medium to fine, silty SAND (SM) [A-4]		3.0	SS-3	4	10	10	20
828.3	5.0	Boring Terminated at 5 Feet							
823.3									
818.3									



LEGEND

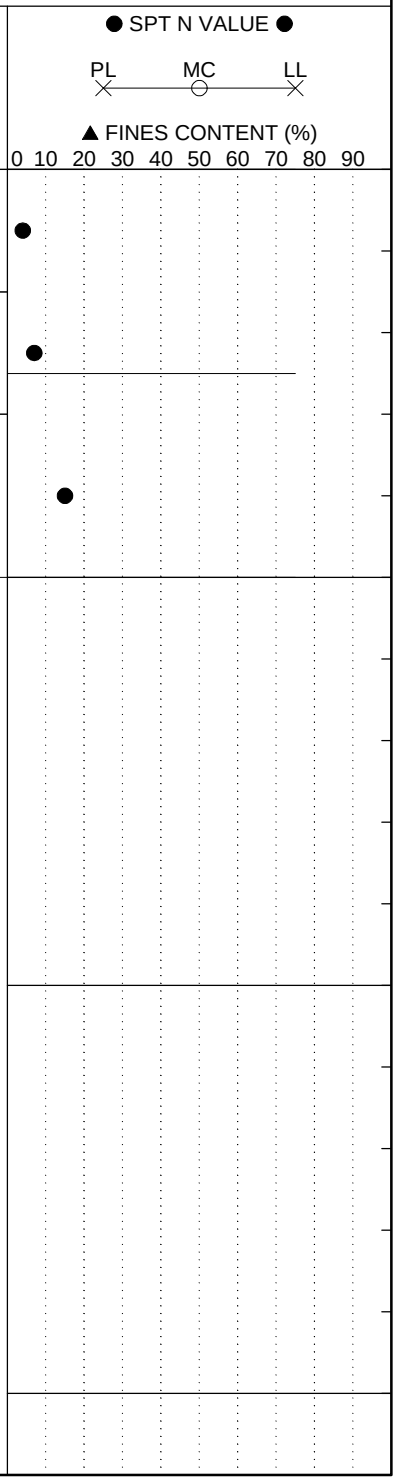
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-39
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1457+50	**Offset:**	16.5 LT
Alignment:	SB				
Elev.:	835.9 ft	**Latitude:**	35.09177	**Longitude:**	-81.68959
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Very loose to loose, dark gray brown tan, medium to fine, silty SAND (SM) [A-2], trace roots (4"-1.5'), trace gravel (4"-1.5')		1.5	SS-1	2	2	2	4
					SS-2	3	2	5	7
	3.0	**Fill** - Stiff, slightly moist, brown red gray, medium to fine, sandy elastic SILT (MH) [A-5]		3.0	SS-3	5	8	7	15
830.9	5.0	Boring Terminated at 5 Feet							
825.9									
820.9									



LEGEND

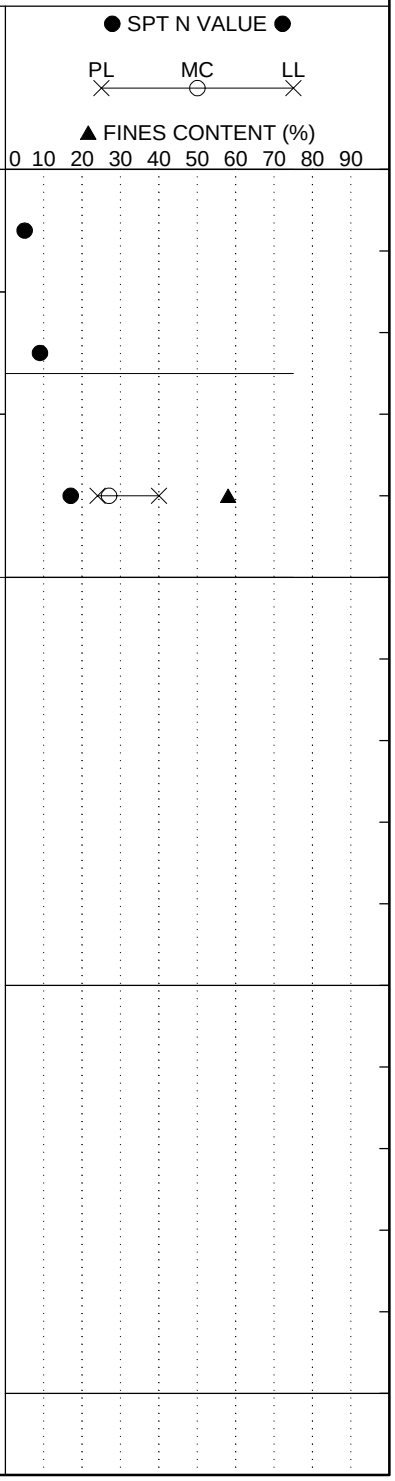
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-40
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1472+50	**Offset:**	17 LT
Alignment:	SB				
Elev.:	833.9 ft	**Latitude:**	35.0941	**Longitude:**	-81.68546
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2 inches	0.0					
		Fill - Loose, dark brown, fine to medium, silty SAND (SM) [A-4], trace roots		SS-1	2	2	3	5
	1.5	**Fill** - Stiff, orange brown, medium to fine, sandy lean CLAY (CL) [A-6 (3)], trace wood fragments	1.5	SS-2	4	4	5	9
	3.0	**Fill** - Very stiff, orange red tan, medium to fine, lean sandy CLAY (CL) [A-6 (7)] LL=40, PL=24, PI=16, NMC=27, %200=58	3.0	SS-3	3	7	10	17
828.9	5.0	Boring Terminated at 5 Feet						
823.9								
818.9								



LEGEND

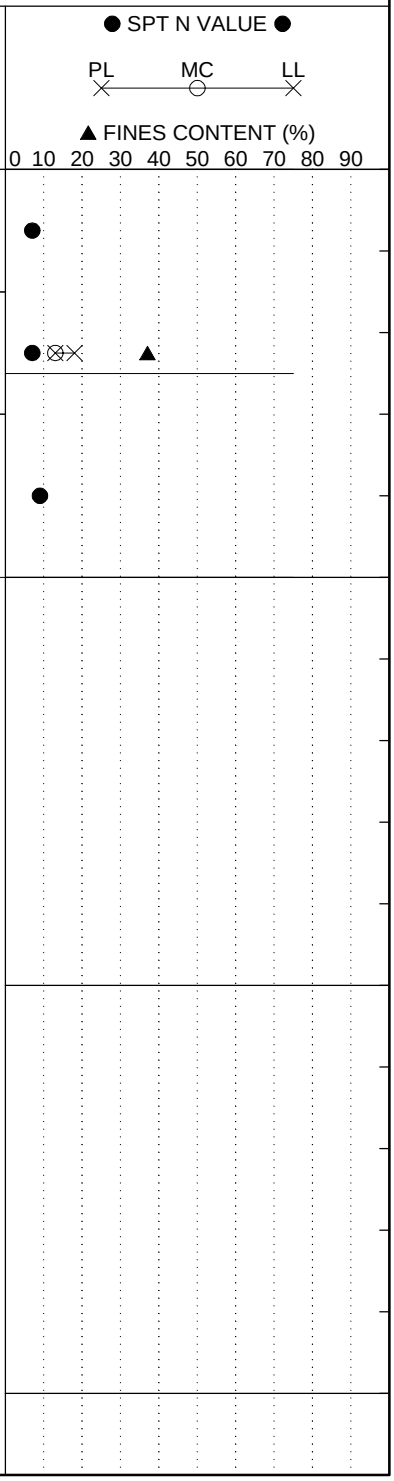
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-41
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1487+00	**Offset:**	5 LT
Alignment:	SB				
Elev.:	787.7 ft	**Latitude:**	35.09613	**Longitude:**	-81.68128
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, dark brown green, medium to coarse, silty SAND (SM) [A-2], trace roots		SS-1	1	4	3	7
	1.5	**Fill** - Loose, moist, brown red, medium to fine, silty clayey SAND (SP-SM) [A-4 (0)] LL=18, PL=13, PI=5, NMC=13, %200=37	1.5	SS-2	2	3	4	7
	3.0	**Fill** - Stiff, very moist, red brown olive, fine to medium, sandy elastic SILT (MH) [A-5]	3.0	SS-3	3	3	6	9
782.7	5.0	Boring Terminated at 5 Feet						
777.7								
772.7								



LEGEND

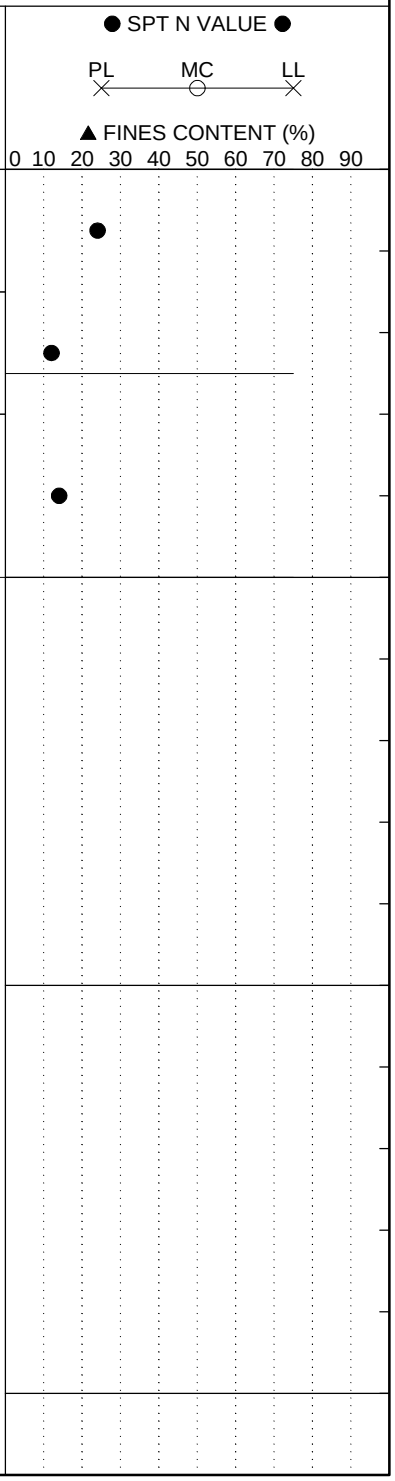
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-42
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1502+00	**Offset:**	8 LT
Alignment:	SB				
Elev.:	817.9 ft	**Latitude:**	35.09727	**Longitude:**	-81.67647
Date Started:	4/27/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/27/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Asphalt and sand mix		SS-1	4	22	2	24
	1.5	**Fill** - Stiff, brown red gray, medium to fine, sandy SILT (ML) [A-4]	1.5	SS-2	3	5	7	12
	3.0	**Residuum** - Stiff, red brown, elastic SILT (MH) [A-5]	3.0	SS-3	5	7	7	14
812.9	5.0	Boring Terminated at 5 Feet						
807.9								
802.9								



LEGEND

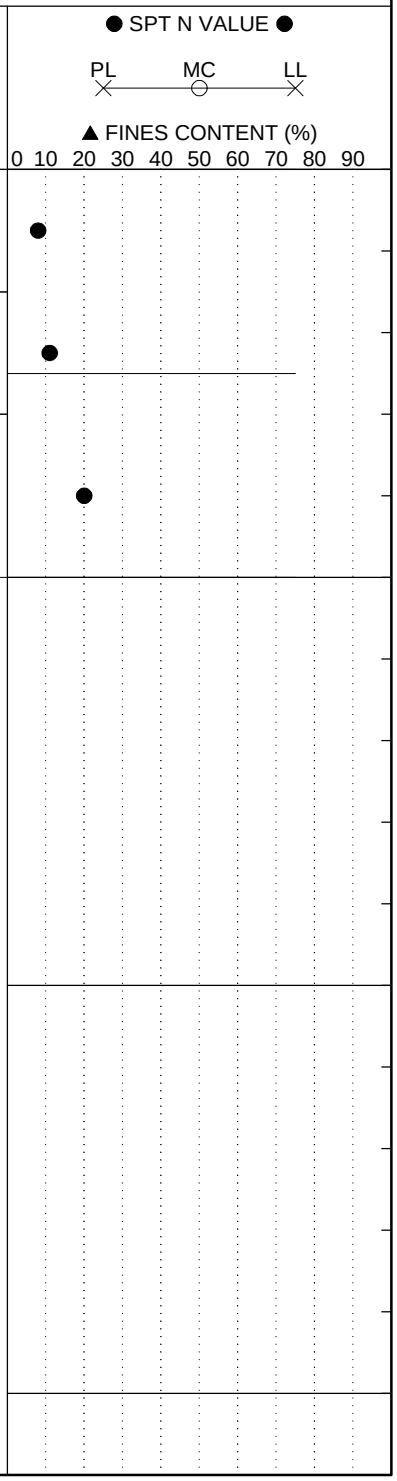
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-43
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1516+50	**Offset:**	17 LT
Alignment:	SB				
Elev.:	810.0 ft	**Latitude:**	35.09735	**Longitude:**	-81.67162
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, dark brown gray, medium to coarse, silty SAND (SM) [A-2], trace roots, trace gravel			SS-1	4	3	5	8
	1.5	**Fill** - Stiff, brown olive red, fine to medium, sandy lean CLAY (CL) [A-6], trace gravel		1.5	SS-2	5	3	8	11
	3.0	**Fill** - Very stiff, red brown, sandy lean CLAY (CL) [A-6], trace gravel		3.0	SS-3	4	8	12	20
805.0	5.0	Boring Terminated at 5 Feet							
800.0									
795.0									



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 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-44
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1531+40	**Offset:**	10 LT
Alignment:	SB				
Elev.:	813.1 ft	**Latitude:**	35.09698	**Longitude:**	-81.66665
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Asphalt - 2 feet							
	2.0			2.0					
		Fill - Very stiff, brown/red, medium to fine, sandy elastic SILT (MH) [A-5]			SS-1	6	7	11	18
	3.5			3.5					
		Possible Fill - Very stiff, red brown, elastic SILT (MH) [A-5]			SS-2	6	8	10	18
808.1	5.0	Boring Terminated at 5 Feet							
803.1									
798.1									

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

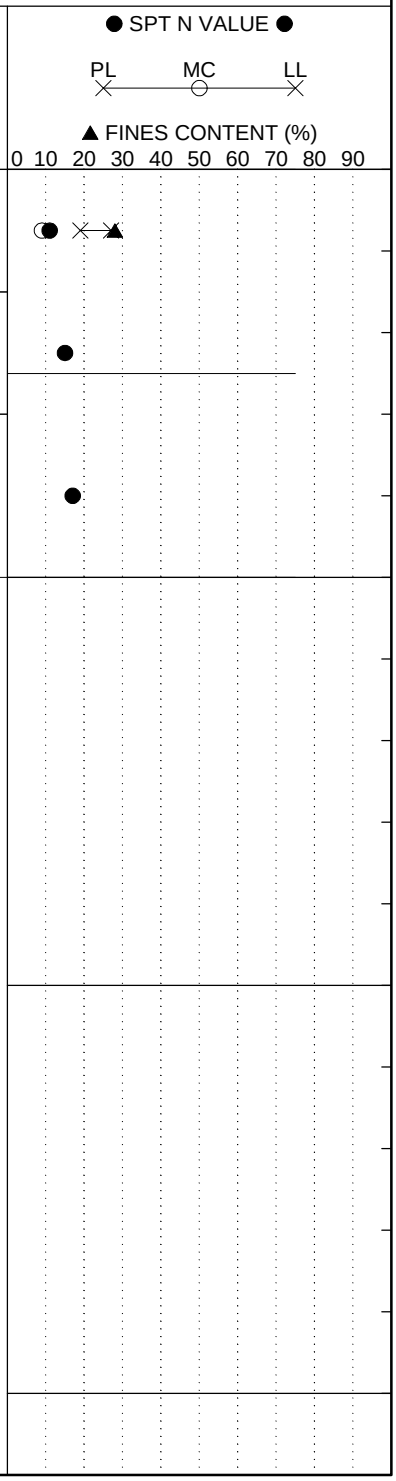
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-45
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1546+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	790.8 ft	**Latitude:**	35.09664	**Longitude:**	-81.6618
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Medium dense, brown red, fine to medium, clayey SAND with gravel, (SC) [A-2-4], trace roots (9"-13") LL=27, PL=19, PI=8, NMC=9, %200=28		0.0	SS-1	3	4	7	11
				1.5	SS-2	10	9	6	15
	3.0	**Fill** - Very stiff, brown red olive, fine to medium, sandy SILT (ML) [A-4], trace clay		3.0	SS-3	3	8	9	17
785.8	5.0	Boring Terminated at 5 Feet							
780.8									
775.8									



LEGEND

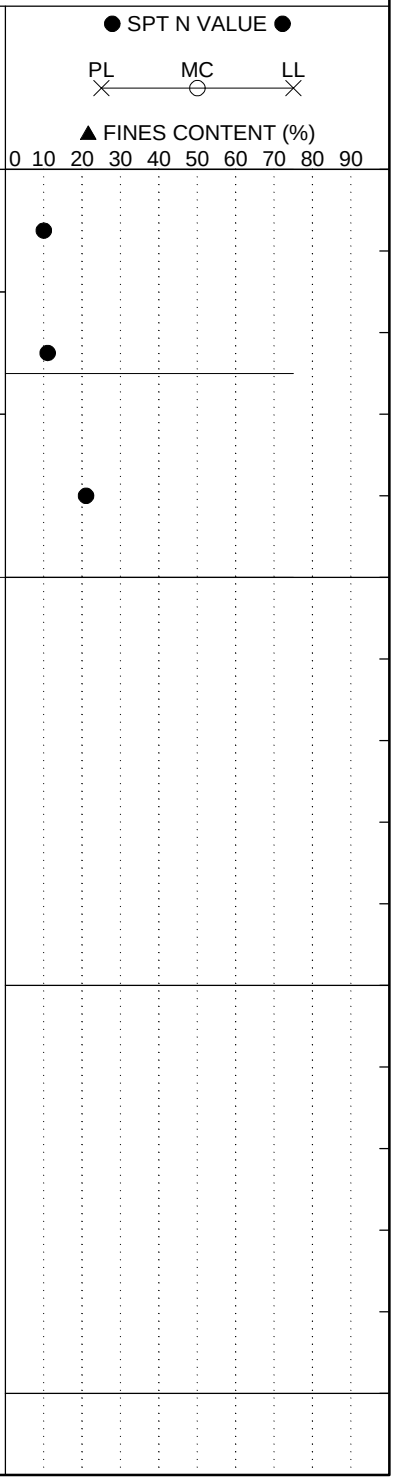
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-46
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1561+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	786.2 ft	**Latitude:**	35.09667	**Longitude:**	-81.65681
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, dark brown dark gray, fine to medium, silty SAND (SM) [A-4], trace roots		SS-1	2	4	6	10
	1.5	**Fill** - Stiff, fine to medium, sandy SILT (ML) [A-4], trace clay	1.5	SS-2	5	4	7	11
	3.0	**Fill** - Very stiff, red brown, elastic SILT with sand, (MH) [A-5], trace gravel	3.0	SS-3	3	10	11	21
781.2	5.0	Boring Terminated at 5 Feet						
776.2								
771.2								



LEGEND

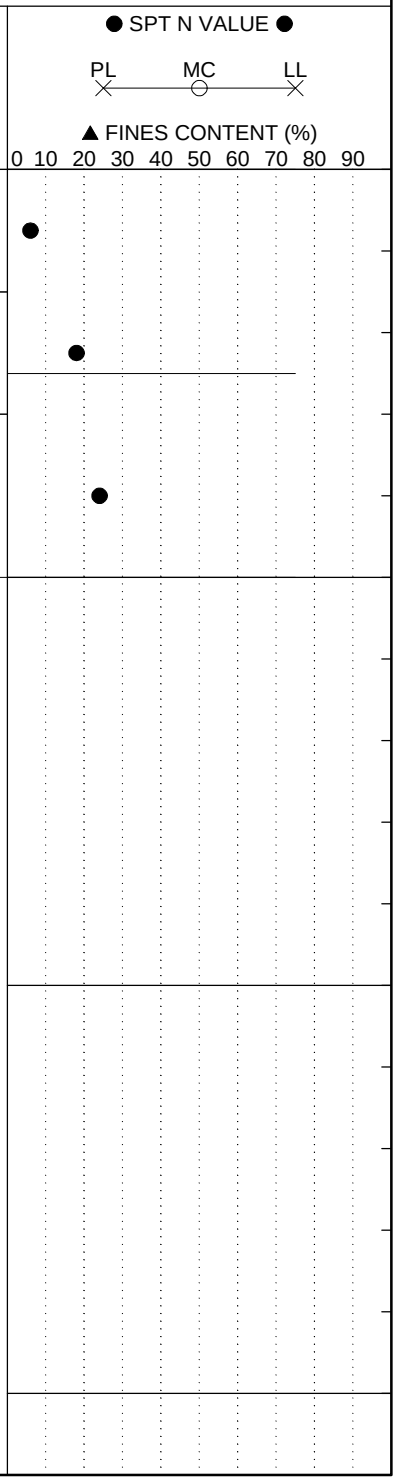
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-47
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1575+60	**Offset:**	13 LT
Alignment:	SB				
Elev.:	785.4 ft	**Latitude:**	35.09809	**Longitude:**	-81.65227
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown dark gray, fine to coarse, silty SAND (SM) [A-2], trace roots			SS-1	1	2	4	6
	1.5	**Fill** - Very stiff, brown red olive, elastic SILT with sand, (MH) [A-5]		1.5	SS-2	3	6	12	18
				3.0	SS-3	7	10	14	24
	4.0	**Residuum** - Very stiff, red brown, elastic SILT (MH) [A-6], trace clay							
780.4	5.0	Boring Terminated at 5 Feet							
775.4									
770.4									



LEGEND

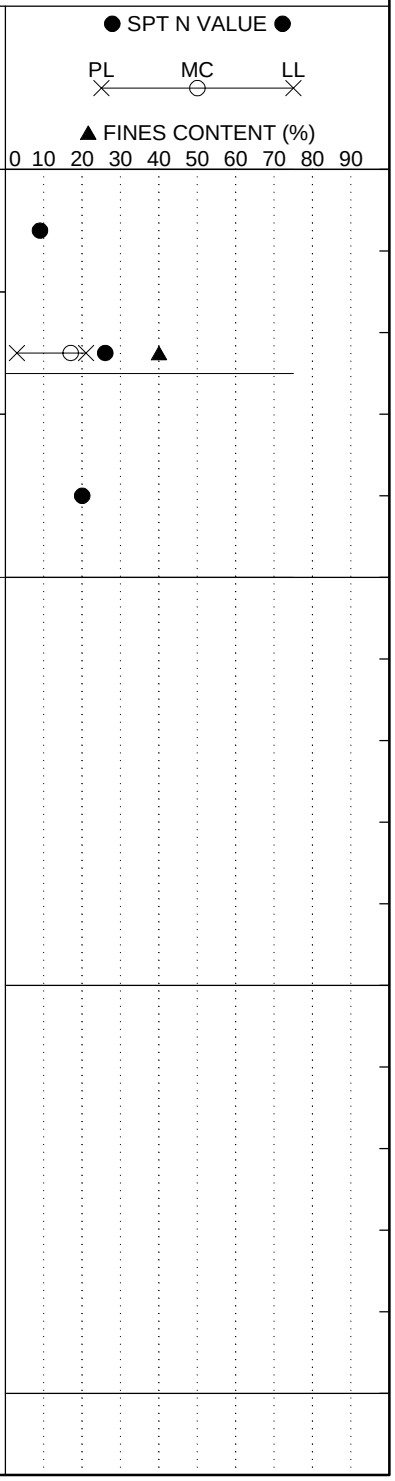
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-48
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1590+45	**Offset:**	17 LT
Alignment:	SB				
Elev.:	770.8 ft	**Latitude:**	35.09996	**Longitude:**	-81.64786
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, brown dark gray, fine to coarse, silty SAND (SM) [A-2], trace roots			SS-1	1	4	5	9
	1.5	**Fill** - Medium dense, brown red orange, medium to fine, clayey SAND (SC) [A-6 (1)] LL=33, PL=21, PI=12, NMC=17, %200=40		1.5	SS-2	3	4	22	26
	3.0	**Fill** - Medium dense, brown red gray, fine to medium, clayey SAND (SC) [A-4 (1)]		3.0	SS-3	3	8	12	20
765.8	5.0	Boring Terminated at 5 Feet							
760.8									
755.8									



LEGEND

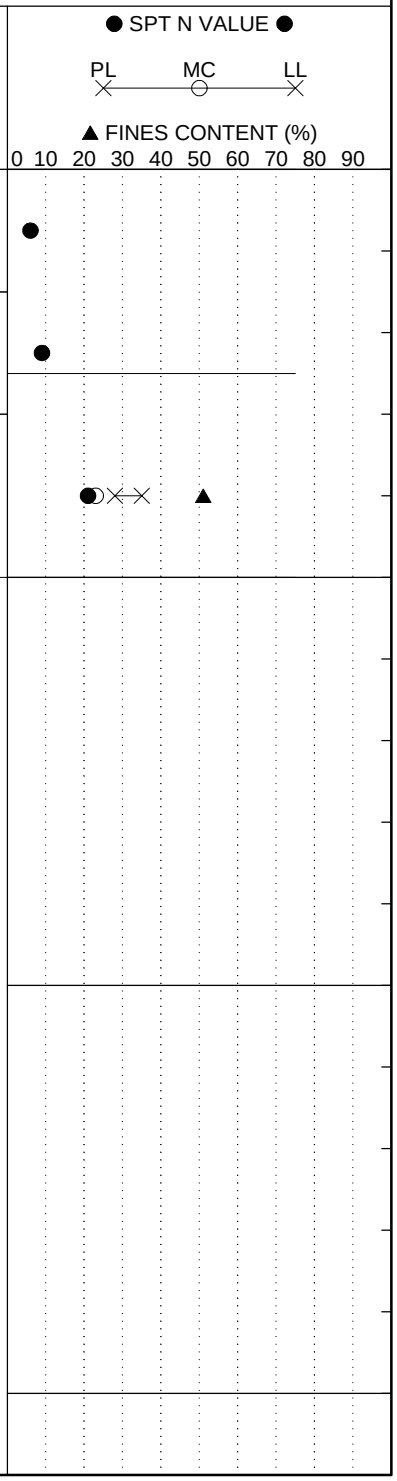
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-49
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1605+00	**Offset:**	17.5 LT
Alignment:	SB				
Elev.:	740.7 ft	**Latitude:**	35.10171	**Longitude:**	-81.64349
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, tan dark gray, fine to medium, silty SAND, (SM) [A-2], trace roots			SS-1	1	2	4	6
	1.5	**Fill** - Stiff, red brown olive, fine to coarse, sandy SILT (ML) [A-4]		1.5	SS-2	2	4	5	9
	3.0	**Residuum** - Very stiff, orange brown tan, medium to fine, sandy SILT (ML) [A-4 (2)], trace mica LL=35, PL=28, PI=7, NMC=23, %200=51		3.0	SS-3	3	9	12	21
735.7	5.0	Boring Terminated at 5 Feet							
730.7									
725.7									



LEGEND

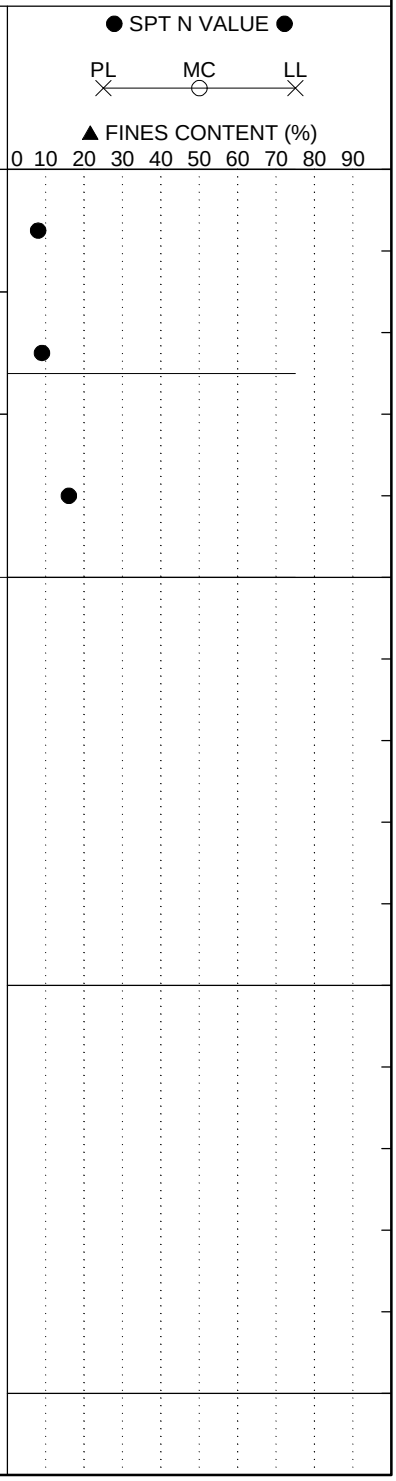
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-50
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1620+00	**Offset:**	18 LT
Alignment:	SB				
Elev.:	720.5 ft	**Latitude:**	35.10235	**Longitude:**	-81.63856
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, moist, brown, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	1	4	4	8
	1.5	**Residuum** - Stiff to very stiff, red brown, slightly micaceous, elastic SILT (MH) [A-5], trace roots		1.5	SS-2	4	4	5	9
				3.0	SS-3	3	7	9	16
715.5	5.0	Boring Terminated at 5 Feet							
710.5									
705.5									



LEGEND

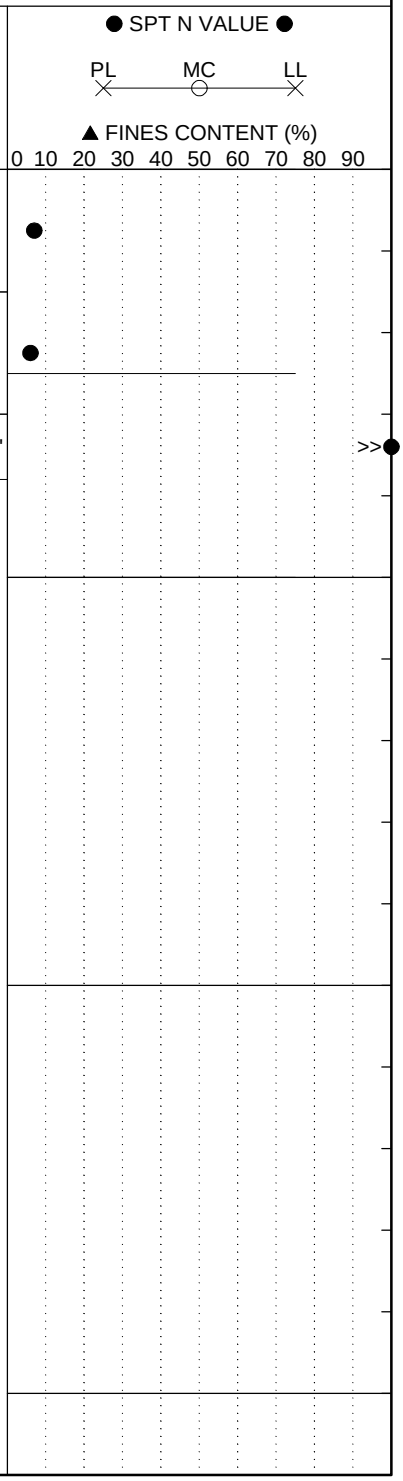
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-51
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1634+50	**Offset:**	16 LT
Alignment:	SB				
Elev.:	711.4 ft	**Latitude:**	35.10251	**Longitude:**	-81.63372
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4 inches		0.0					
		Fill - Loose, slightly moist, dark brown, medium to fine, clayey SAND (SC) [A-2], trace roots, trace rock fragments			SS-1	1	3	4	7
				1.5	SS-2	5	4	2	6
	3.0			3.0					
	3.5	**Residuum** - Loose, red brown, silty clayey SAND (SC-SM) [A-4 (0)], trace mica			SS-3	4	50/3"		50/3"
		Partially Weathered Rock - Very dense, white gray, fine to coarse, silty SAND (SM) [A-2] (little recovery)							
706.4	5.0	Boring Terminated at 5 Feet							
701.4									
696.4									



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 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-52
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1649+00	**Offset:**	6 LT
Alignment:	SB				
Elev.:	700.4 ft	**Latitude:**	35.10272	**Longitude:**	-81.62887
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Top of Ground								
	0.3	**Topsoil** - 4 inches		0.0						
		Fill - Loose, dark brown, fine to medium, silty SAND (SM) [A-4], trace roots			SS-1	2	3	4	7	●
	1.5	**Fill** - Firm to stiff, brown red olive, elastic SILT with sand, (MH) [A-5], little mica		1.5	SS-2	2	3	4	7	●
				3.0	SS-3	3	3	7	10	●
695.4	5.0	Boring Terminated at 5 Feet								
690.4										
685.4										

LEGEND

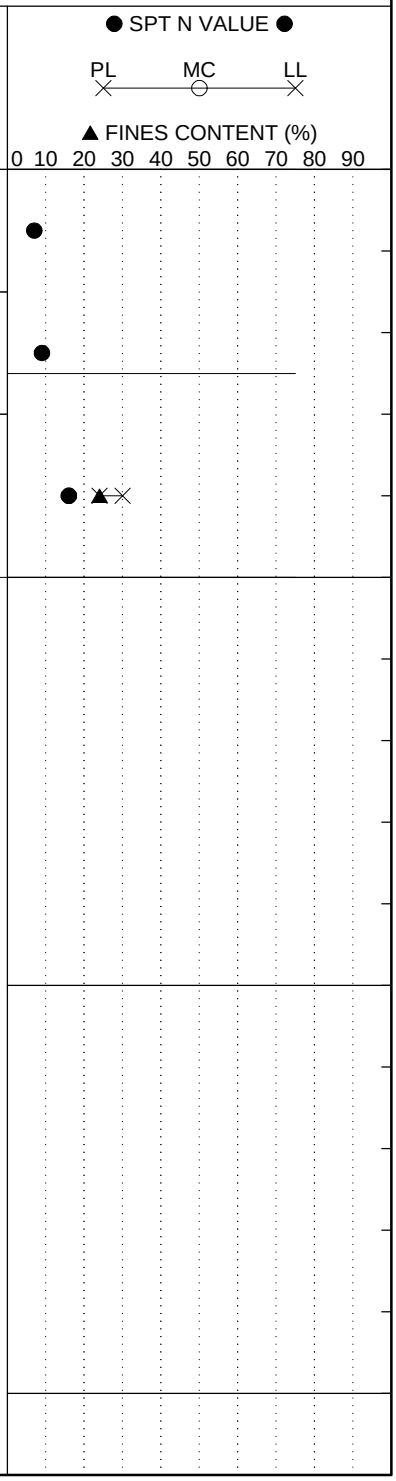
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-53
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1664+00	**Offset:**	9 LT
Alignment:	SB				
Elev.:	689.0 ft	**Latitude:**	35.10299	**Longitude:**	-81.62389
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Loose, brown tan, fine to medium, silty SAND (SM) [A-2], trace roots (3"-1.5'), trace rock fragments, <1" (1.5-3')			SS-1	2	3	4	7
				1.5	SS-2	5	5	4	9
	3.0	**Residuum** - Medium dense, slightly moist, brown orange tan, fine to medium, silty SAND (SM) [A-2-4] LL=30, PL=24, PI=6, NMC=16, %200=24		3.0	SS-3	4	6	10	16
684.0	5.0	BoringTerminated at 5 Feet							
679.0									
674.0									



LEGEND

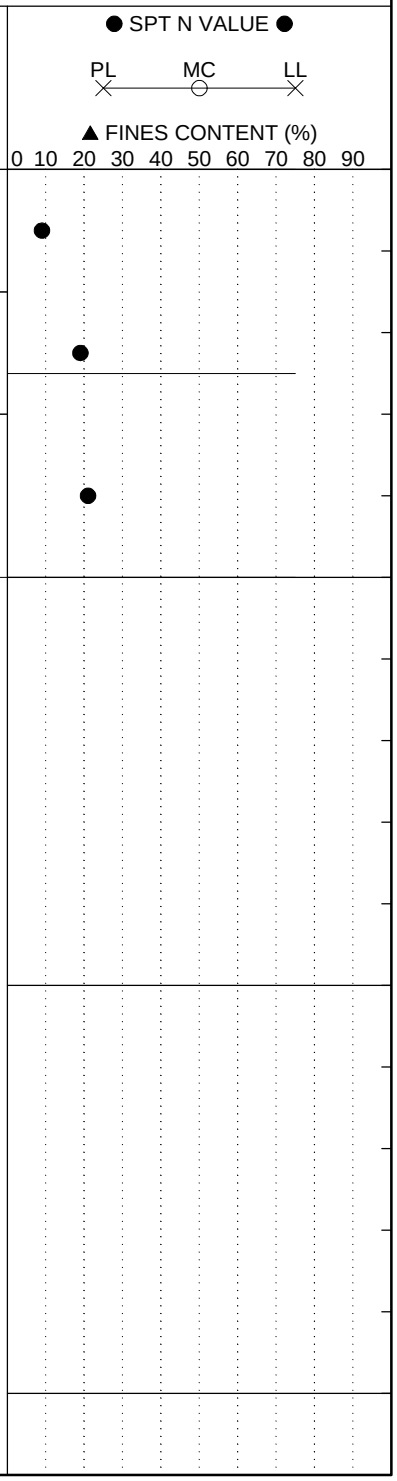
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-54
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1678+38	**Offset:**	5 LT
Alignment:	SB				
Elev.:	672.5 ft	**Latitude:**	35.10439	**Longitude:**	-81.61941
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, yellow tan, fine to coarse, silty SAND (SM) [A-2]			SS-1	1	5	4	9
	1.5	No recovery		1.5	SS-2	3	6	13	19
	3.0	**Residuum** - Medium dense, white gray, fine to coarse, poorly graded SAND (SP) [A-1], trace rock fragments		3.0	SS-3	7	8	13	21
667.5	5.0	Boring Terminated at 5 Feet							
662.5									
657.5									



LEGEND

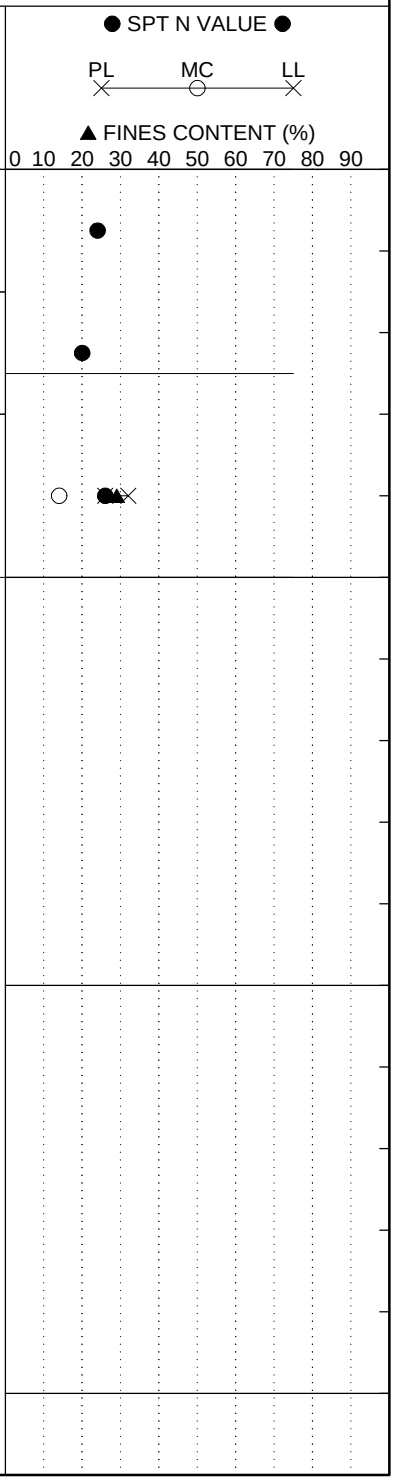
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-55
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1692+20	**Offset:**	10.5 LT
Alignment:	SB				
Elev.:	647.2 ft	**Latitude:**	35.10587	**Longitude:**	-81.61515
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Very stiff, brown olive, fine to medium, sandy SILT (ML) [A-4], trace roots (3"-1.5'), trace mica		1.5	SS-1	4	8	16	24
					SS-2	7	9	11	20
	3.0	**Possible Fill** - Medium dense, dark brown red, fine to medium, silty SAND (SM) [A-2-4] LL=32, PL=26, PI=6, NMC=14, %200=29		3.0	SS-3	4	10	16	26
642.2	5.0	Boring Terminated at 5 Feet							
637.2									
632.2									



LEGEND

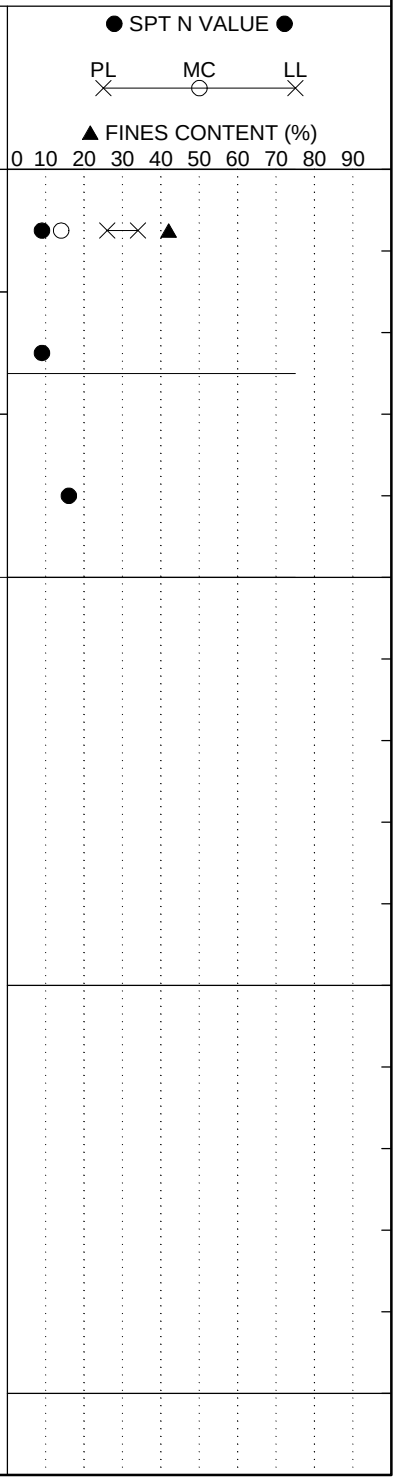
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-56
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1705+00	**Offset:**	15.5 LT
Alignment:	SB				
Elev.:	631.3 ft	**Latitude:**	35.10723	**Longitude:**	-81.6112
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
		Fill - Loose, red brown, fine to medium, silty SAND (SM) [A-4 (1)], trace roots, trace gravel LL=34, PL=26, PI=8, NMC=14, %200=42		0.0	SS-1	4	4	5	9
	1.5	**Fill** - Stiff to very stiff, tan brown, fine to medium, sandy SILT (ML) [A-4], trace mica		1.5	SS-2	2	4	5	9
				3.0	SS-3	4	6	10	16
626.3	5.0	Boring Terminated at 5 Feet							
621.3									
616.3									



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	

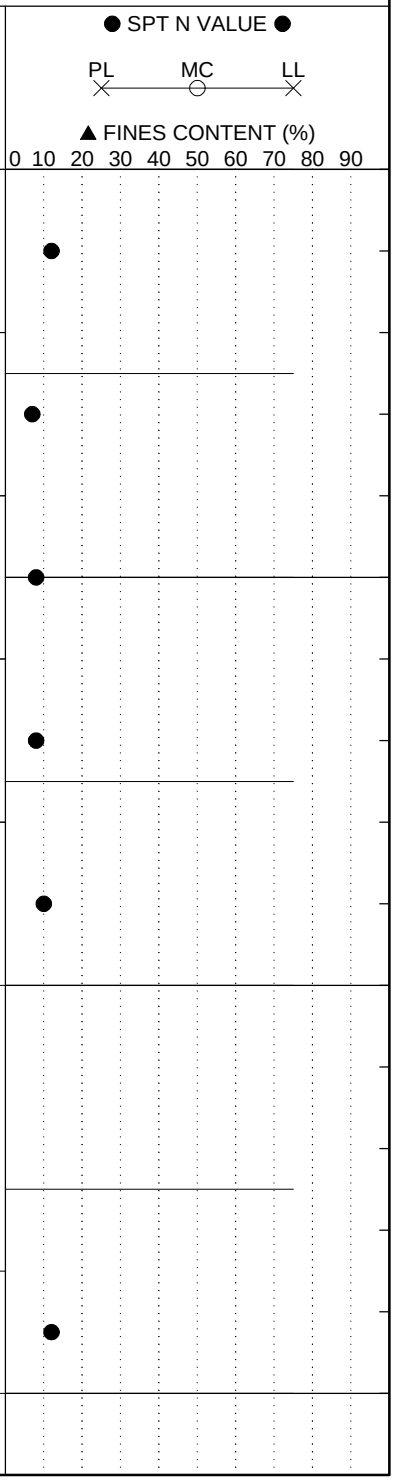
SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-57
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1718+50	**Offset:**	7 LT
Alignment:	SB				
Elev.:	694.4 ft	**Latitude:**	35.10867	**Longitude:**	-81.60705
Date Started:	4/23/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4 inches	0.0					
		Fill - Medium dense, slightly moist, brown, fine to coarse, silty SAND (SM) [A-2], trace roots		SS-1	2	6	6	12
	2.0	**Residuum** - Loose, slightly moist, brown red, medium to fine, silty SAND (SM) [A-4 (2)], trace mica	2.0	SS-2	3	3	4	7
			4.0	SS-3	3	4	4	8
689.4	6.0	Loose, slightly moist, dark olive gray brown, silty SAND, (SM) [A-4], some mica	6.0	SS-4	4	4	4	8
			8.0	SS-5	3	4	6	10
684.4	12.0	Stiff, slightly moist, dark olive gray brown, sandy SILT, (ML) [A-4], some mica	13.5	SS-6	4	4	8	12
679.4	15.0	BoringTerminated at 15 Feet						

Graphic Log



LEGEND

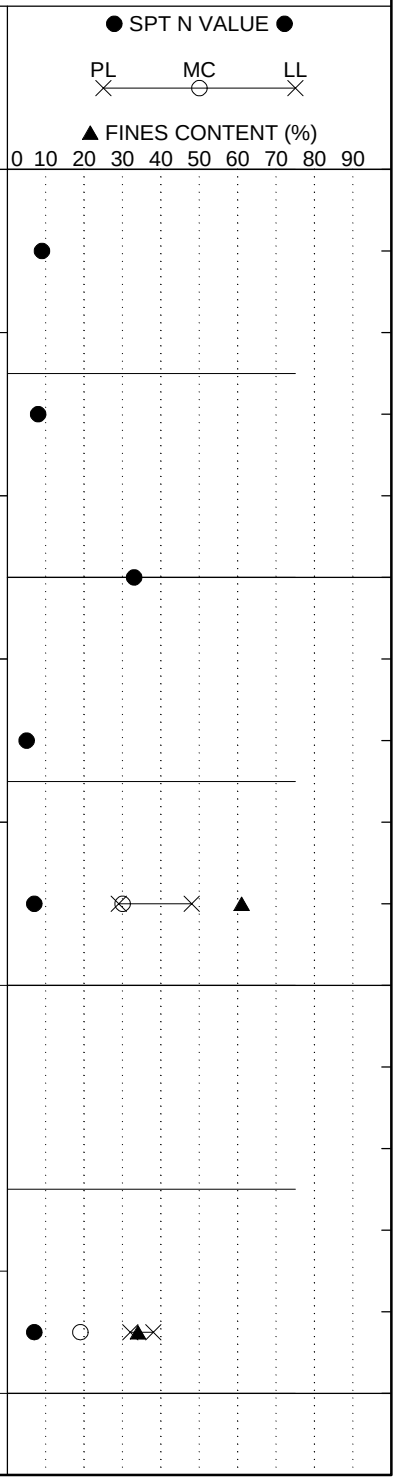
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-58
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1731+50	**Offset:**	7 LT
Alignment:	SB				
Elev.:	710.7 ft	**Latitude:**	35.1099	**Longitude:**	-81.60298
Date Started:	4/23/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Fill - Loose, dark tan brown, medium to fine, silty SAND (SM) [A-2], trace roots, trace gravel (<1")		SS-1	2	4	5	9
	2.0	**Fill** - Firm, brown red, elastic SILT (MH), [A-5]	2.0	SS-2	3	4	4	8
	4.0	**Fill** - Brown, medium to fine, sandy elastic SILT (MH) [A-5], some asphalt fragments (*likely amplified N value)	4.0	SS-3	6	26	7	33
705.7	6.0	**Fill** - Firm, very moist, brown, elastic SILT with sand, (MH) [A-5], trace rock fragments, trace mica	6.0	SS-4	2	3	2	5
	8.0	**Residuum** - Firm, brown red, sandy SILT (ML) [A-7-6 (10)] LL=48, PL=29, PI=19, NMC=30, %200=61	8.0	SS-5	2	3	4	7
700.7	12.0	Loose, tan brown orange, fine to medium, silty SAND (SM) [A-2-4], trace rock fragments, trace mica	13.5	SS-6	5	4	3	7
		LL=38, PL=32, PI=6, NMC=19, %200=34						
695.7	15.0	Boring Terminated at 15 Feet						



LEGEND

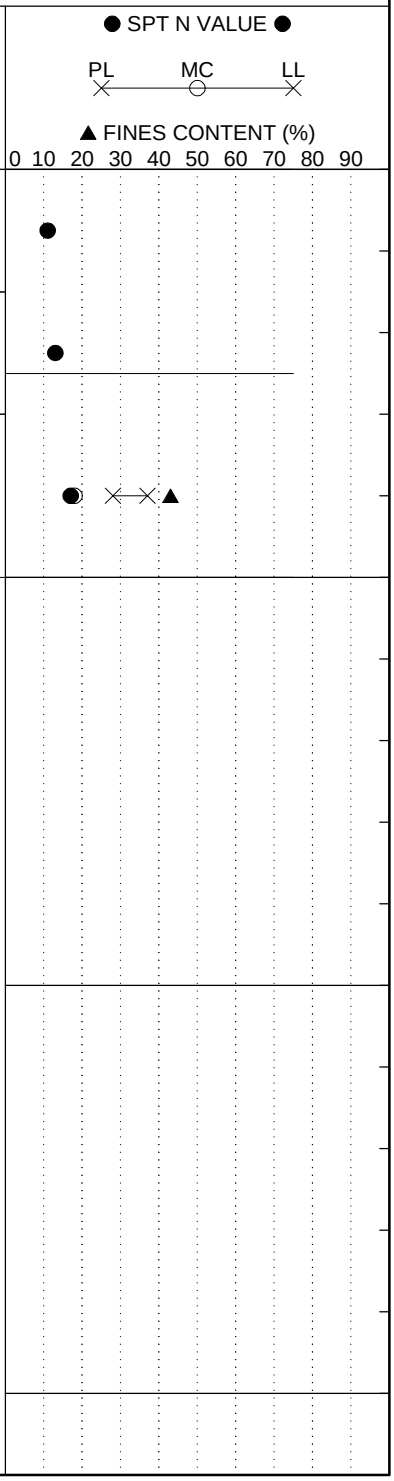
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-59
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1744+45	**Offset:**	6 LT
Alignment:	SB				
Elev.:	724.3 ft	**Latitude:**	35.11017	**Longitude:**	-81.59867
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3 inches		0.0					
		Fill - Medium dense, dark brown, medium to coarse, silty SAND (SM) [A-2], trace roots			SS-1	2	4	7	11
	1.5	**Fill** - Medium dense, dark brown, medium to fine, silty SAND (SM) [A-4]		1.5	SS-2	6	6	7	13
	3.0	**Residuum** - Medium dense, light red tan white, fine to medium, silty SAND (SM) [A-4 (1)] LL=37, PL=28, PI=9, NMC=18, %200=43		3.0	SS-3	3	7	10	17
719.3	5.0	Boring Terminated at 5 Feet							
714.3									
709.3									



LEGEND

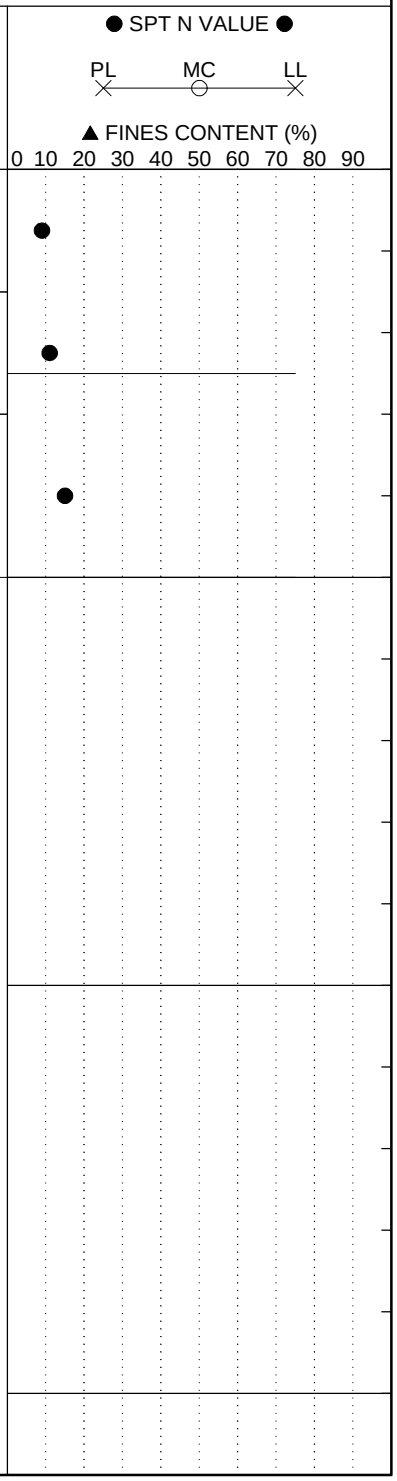
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-60
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1758+35	**Offset:**	9 LT
Alignment:	SB				
Elev.:	687.7 ft	**Latitude:**	35.11033	**Longitude:**	-81.59401
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, dark brown tan, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	2	4	5	9
	1.5	**Fill** - Stiff, dark brown gray, medium to fine, sandy SILT (ML) [A-4], trace rock fragments (<1.5')		1.5	SS-2	5	7	4	11
	3.0	**Residuum** - Stiff, orange red tan, SILT with sand, (ML) [A-4], trace mica		3.0	SS3	5	5	10	15
682.7	5.0	Boring Terminated at 5 Feet							
677.7									
672.7									



LEGEND

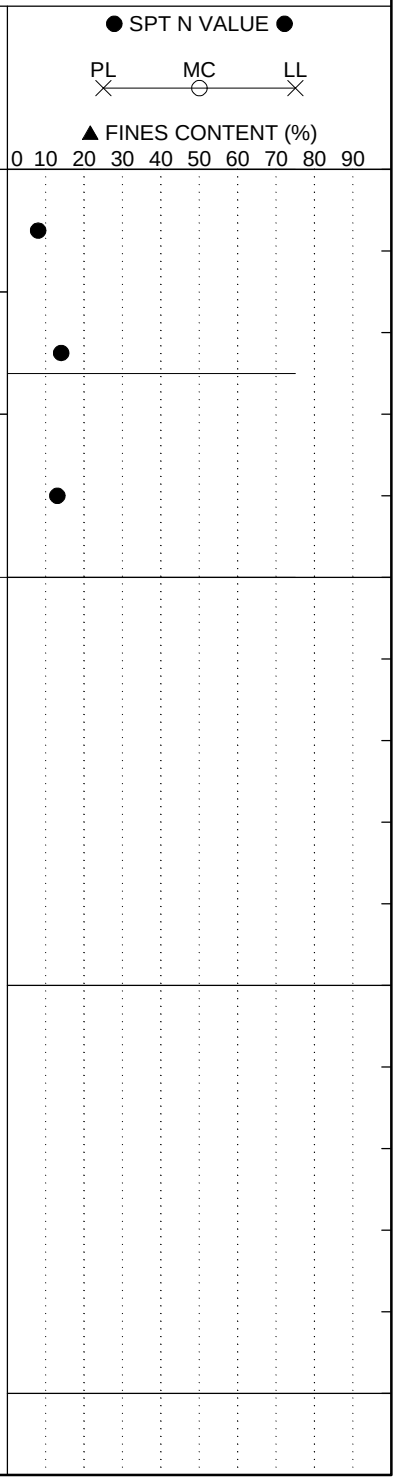
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-61
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1771+80	**Offset:**	9 LT
Alignment:	SB				
Elev.:	650.2 ft	**Latitude:**	35.11048	**Longitude:**	-81.58952
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2 inches		0.0					
		Fill - Loose, dark brown tan, medium to fine, silty SAND (SM) [A-2], trace roots			SS-1	1	4	4	8
	1.5	**Fill** - Stiff, brown orange red, fine to medium, sandy lean CLAY (CL) [A-6 (6)], trace mica		1.5	SS-2	4	6	8	14
	3.0	**Residuum** - Stiff, brown orange red, sandy lean CLAY (CL) [A-6 (6)], trace small roots, trace mica		3.0	SS-3	4	4	9	13
645.2	5.0	Boring Terminated at 5 Feet							
640.2									
635.2									



LEGEND

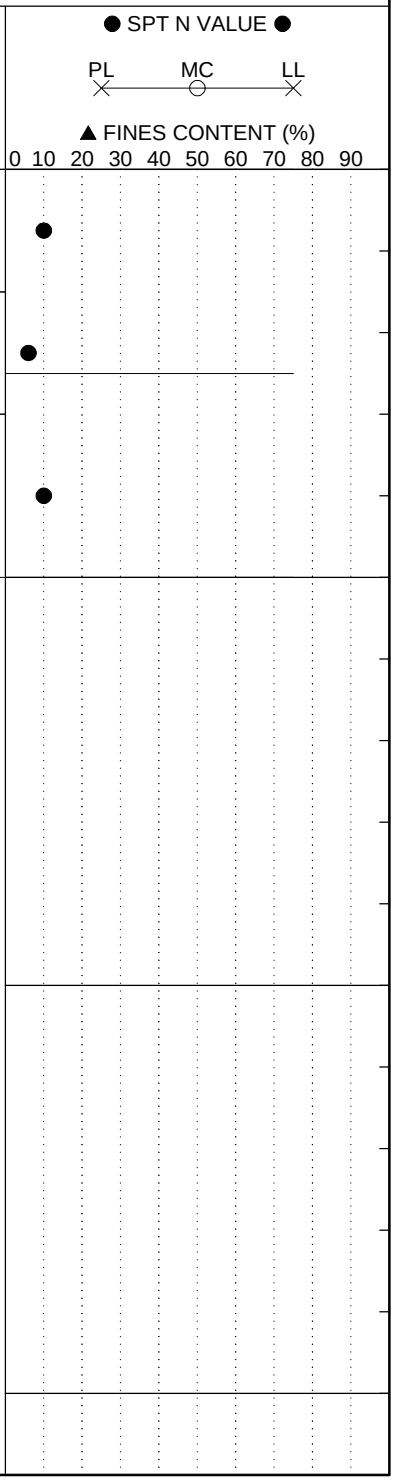
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-62
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1784+95	**Offset:**	9 LT
Alignment:	SB				
Elev.:	612.8 ft	**Latitude:**	35.11123	**Longitude:**	-81.58529
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.4	**Topsoil** - 5 inches	0.0					
	1.5	**Fill** - Loose, dark brown, medium to fine, silty SAND (SM) [A-2], trace roots, trace gravel	1.5	SS-1	2	4	6	10
	3.0	**Fill** - Firm, dark brown, medium to fine, sandy elastic SILT (MH) [A-5]	3.0	SS-2	6	3	3	6
	5.0	**Residuum** - Stiff, brown red, fine to medium, sandy SILT (ML) [A-4], trace mica		SS-3	3	4	6	10
607.8		Boring Terminated at 5 Feet						
602.8								
597.8								



LEGEND

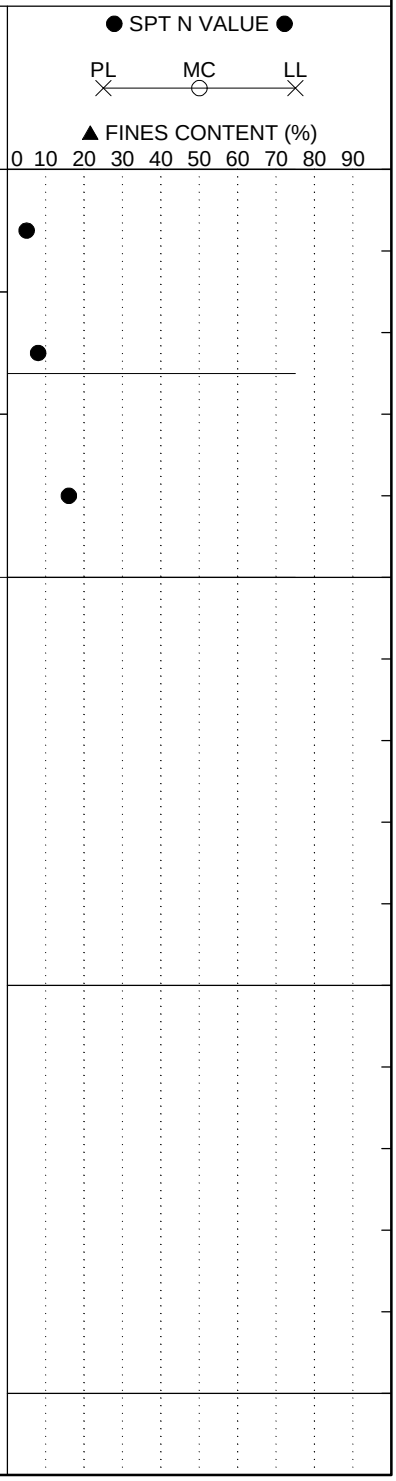
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	SB-63
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	P. Chesney	**Boring Location:**	1798+30	**Offset:**	8.5 LT
Alignment:	SB				
Elev.:	580.6 ft	**Latitude:**	35.11344	**Longitude:**	-81.58178
Date Started:	4/23/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	4/23/2015				
Bore Hole Diameter (in):	4"	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	Mud Rotary	**Hammer Type:**	Automatic
Energy Ratio:	81%				
Core Size:	N/A	**Driller:**	SCI	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5 inches		0.0					
		Fill - Loose, dark brown, coarse to fine, silty SAND (SM) [A-2], trace roots			SS-1	2	2	3	5
				1.5					
	2.5				SS-2	2	3	5	8
		Fill - Firm to very stiff, brown tan red, medium to fine, sandy SILT (ML) [A-4], trace mica		3.0					
					SS-3	4	7	9	16
575.6	5.0	Boring Terminated at 5 Feet							
570.6									
565.6									



LEGEND

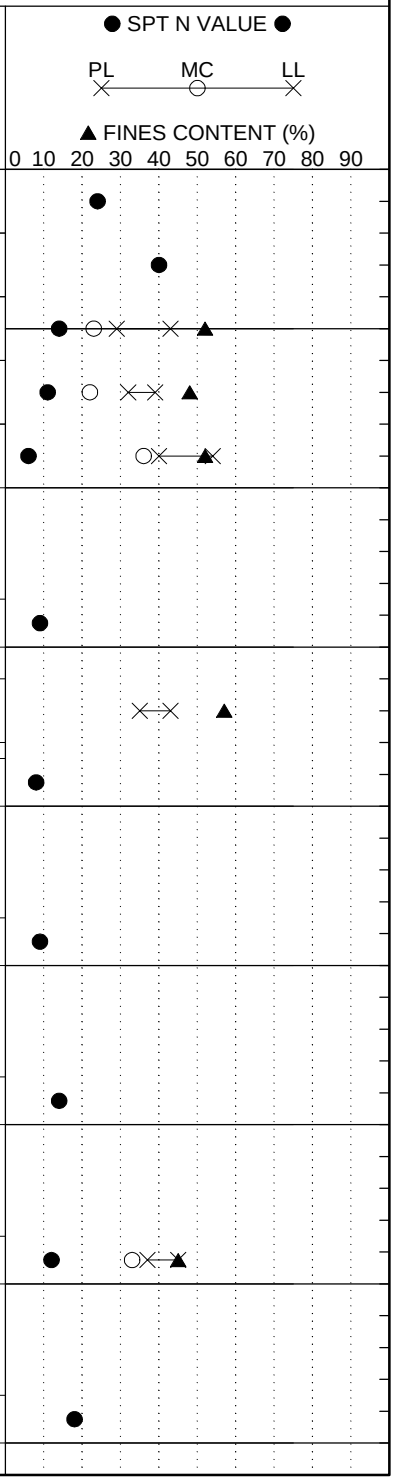
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 142614161 - SB I85 WIDENING, SPARTANBURG-CHEROKEE COUNTY.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/3/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-1		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1031+24	**Offset:**	105 LT	**Alignment:**	Mainline
Elev.:	878.9 ft	**Latitude:**	35.044138	**Longitude:**	-81.8172896	**Date Started:**	9/23/2015
Total Depth:	76 ft	**Soil Depth:**	53.8 ft	**Core Depth:**	22.2 ft	**Date Completed:**	9/24/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	30 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 1" Topsoil						
		Residuum - very stiff to hard, slightly moist, reddish brown, CLAY with trace sand (CL) [A-7]	0.0	SS-1	6	11	13	24
			2.0	SS-2	15	20	20	40
	4.0		4.0					
873.9		Stiff, slightly moist, red brown, fine, sandy SILT (ML) [A-7-6 (5)]		SS-3	5	6	8	14
	6.0	LL=43, PL=29, PI=14, NMC=23, %200=52	6.0					
				SS-4	4	5	6	11
	8.0	Medium dense, slightly moist, red brown, fine, silty SAND (SM) [A-4 (2)]	8.0					
		LL=39, PL=32, PI=7, NMC=22, %200=48 [UD-1 pushed in offset boring, 6'-8']		SS-5	2	2	4	6
868.9								
	13.0	Firm, moist, red, tan, brown, slightly micaceous, fine, sandy elastic SILT (MH) [A-7-5 (6)]	13.5					
		LL=54, PL=40, PI=14, NMC=36, %200=52		SS-6	3	4	5	9
863.9			16.0					
		Firm to stiff, moist to very moist, grayish red, light brown, yellow, micacous to very micaceous, fine, sandy SILT (ML) [A-5 (4)]		UD-2				
		LL=43, PL=35, PI=8, %200=57 [UD-2 pushed in offset boring, 16'-18']	18.5					
				SS-7	3	3	5	8
858.9								
			23.5					
				SS-8	3	3	6	9
853.9								
	28.0		28.5					
		Medium dense, wet, brown, grayish brown and yellowish brown, micaceous to very micaceous, fine, silty SAND (SM) [A-5 (2)]		SS-9	4	5	9	14
848.9		LL=45, PL=37, PI=8, NMC=33, %200=45						
			33.5					
				SS-10	4	5	7	12
843.9								
			38.5					
				SS-11	3	7	11	18
838.9								



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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-1
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1031+24	**Offset:**	105 LT
Alignment:	Mainline				
Elev.:	878.9 ft	**Latitude:**	35.044138	**Longitude:**	-81.8172896
Date Started:	9/23/2015				
Total Depth:	76 ft	**Soil Depth:**	53.8 ft	**Core Depth:**	22.2 ft
Date Completed:	9/24/2015				
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --
24HR	30 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● (PL ✕ MC ○ LL ✕) ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
			43.5	SS-12	7	7	10	17	●
833.9	48.0	**Partially Weathered Rock** - very dense, moist, dark grayish brown and brown, micaceous, fine to medium, silty SAND (SM) [A-2], with trace rock fragments	48.5	SS-13	33	50/3"		50/3"	>>●
828.9			53.0						
	53.8	Tri-cone refusal encountered at 53.8 feet; Commenced NQ coring of **Rock**:	53.8	SS-14	50/1"			50/1"	>>●
823.9		Biotite Gneiss, interlayered with quartz-rich Granitoid Gneiss - white and gray, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-sulfides, slightly to freshly weathered, hard to very hard, 0 to 70 deg. dip, jointing, no infilling, irregular surface, very close to close spacing, slightly rough to rough surface		NQ-1					REC=66%, RQD=23%
			56.0						
				NQ-2					REC=98%, RQD=90%, q_u=18,550 psi
818.9		RMR (NQ-1) = 20 (Class V)	61.0						
		RMR (NQ-2/3) = 53 (Class III)		NQ-3					REC=92%, RQD=75%
813.9		RMR (NQ-4/5) = 76 (Class II)	66.0						
				NQ-4					REC=100%, RQD=99%, q_u=16,630 psi
808.9			71.0						
				NQ-5					REC=100%, RQD=99%
803.9	76.0	Coring Terminated at 76 Feet							
798.9									

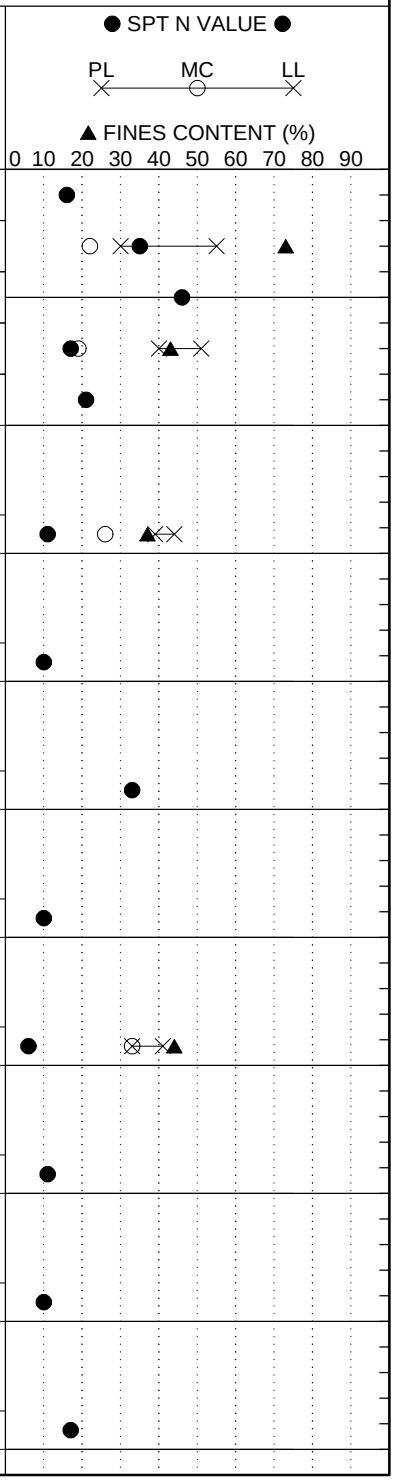
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-2		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1031+15	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	876.9 ft	**Latitude:**	35.043645	**Longitude:**	-81.817014	**Date Started:**	9/21/2015
Total Depth:	90.2 ft	**Soil Depth:**	67 ft	**Core Depth:**	23.2 ft	**Date Completed:**	9/23/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	29 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 1" Topsoil						
		Possible Fill - very stiff to hard, dry to slightly moist, reddish brown and yellowish brown, slightly micaceous, fine, elastic SILT with sand (MH) [A-7-5 (19)] LL=55, PL=30, PI=25, NMC=22, %200=73	0.0	SS-1	7	8	8	16
			2.0	SS-2	15	17	18	35
871.9	6.0		4.0	SS-3	15	21	25	46
		Residuum - medium dense, moist, grayish red and yellowish brown, micaceous, fine, silty SAND (SM) [A-7-5 (2)] LL=51, PL=40, PI=25, NMC=19, %200=43	6.0	SS-4	5	8	9	17
			8.0	SS-5	8	10	11	21
866.9	13.0							
		Medium dense to loose, moist, grayish red and yellowish brown, micaceous, fine, silty SAND (SM) [A-5 (0)] LL=44, PL=39, PI=5, NMC=26, %200=37	13.5	SS-6	4	5	6	11
861.9								
			18.5	SS-7	3	3	7	10
856.9	23.0							
		Dense, moist, brown, slightly kaolinitic, micaceous, fine to medium, silty SAND (SM) [A-2]	23.5	SS-8	7	16	17	33
851.9	28.0							
		▼Loose to medium dense, moist to wet, brown, yellowish brown and gray, kaolinitic lenses, micaceous to very micaceous, fine, silty SAND (SM) [A-5 (1)], with PWR lenses at 35 ft (6" thick) and 45 ft (12" thick) LL=41, PL=33, PI=8, NMC=33, %200=44 (composite of SS-8/9/10/11/12)	28.5	SS-9	3	5	5	10
846.9								
			33.5	SS-10	4	3	3	6
841.9								
			38.5	SS-11	3	4	7	11
836.9								
			43.5	SS-12	2	5	5	10
831.9								
			48.5	SS-13	3	5	12	17
826.9								



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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-2		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1031+15	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	876.9 ft	**Latitude:**	35.043645	**Longitude:**	-81.817014	**Date Started:**	9/21/2015
Total Depth:	90.2 ft	**Soil Depth:**	67 ft	**Core Depth:**	23.2 ft	**Date Completed:**	9/23/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	29 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● (PL ✕ MC ○ LL ✕) ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	52.0	**Partially Weathered Rock** - very hard, wet, gray and brown, micaceous, fine, sandy SILT (ML) [A-5], with coarse sand and trace rock fragments	53.5	SS-14	43	25	50/3"	50/3"	>>
821.9			58.5	SS-15	33	50/4"		50/4"	>>
816.9	60.0	**Partially Weathered Rock** - very dense, moist, dark gray, fine to coarse, silty SAND (SM) [A-2], in thin cemented layers, with rock fragments	63.5	SS-16	50/2"			50/2"	>>
811.9	67.0	Tri-cone refusal encountered at 67 feet; Commenced NQ coring of **Rock**:	67.0	NQ-1					REC=33%, RQD=0%
806.9		Biotite Gneiss - gray and white, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-sulfides, moderately to freshly weathered, moderately hard to very hard, 0 to 80 deg. dip, jointing, no infilling, irregular surface, very close to close spacing, slightly rough to rough surface	70.2	NQ-2					REC=74%, RQD=21%
801.9		RMR (NQ-1/2) = 11 (Class V)	75.2	NQ-3					REC=100%, RQD=41%, q_u=6,420 psi
796.9		RMR (NQ-3) = 36 (Class IV)	80.2	NQ-4					REC=100%, RQD=100%
791.9		RMR (NQ-4/5) = 59 (Class III)	85.2	NQ-5					REC=100%, RQD=84%, q_u=6,330 psi
786.9	90.2	Coring Terminated at 90.2 Feet							
781.9									
776.9									

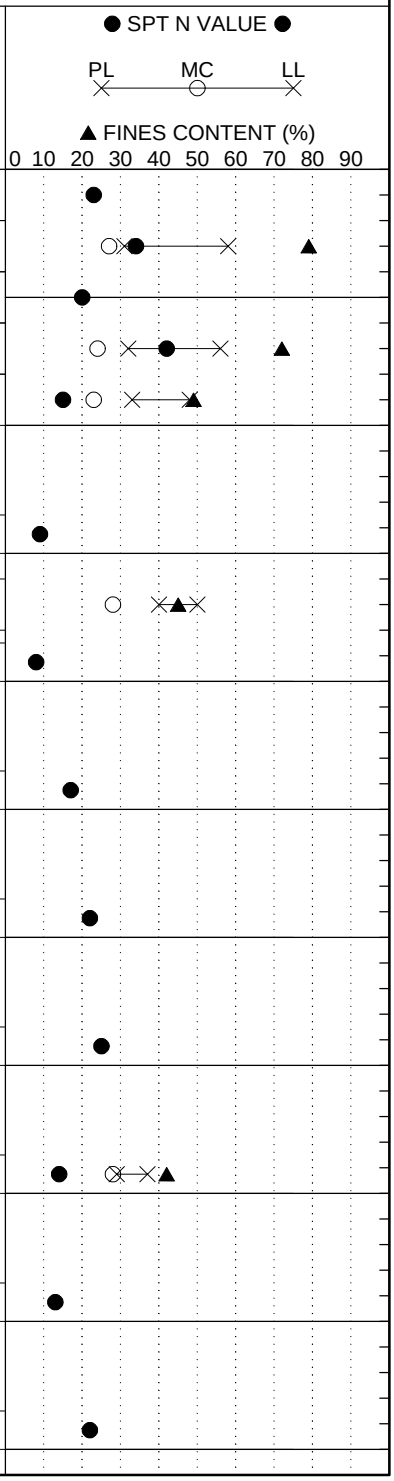
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-3		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1128+40	**Offset:**	90 LT	**Alignment:**	Mainline
Elev.:	901.4 ft	**Latitude:**	35.055947	**Longitude:**	-81.788185	**Date Started:**	9/24/2015
Total Depth:	94.3 ft	**Soil Depth:**	71.8 ft	**Core Depth:**	22.5 ft	**Date Completed:**	9/25/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** --	**24HR**	25 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 5" Topsoil	0.0	SS-1	6	10	13	23
	2.0	**Fill** - very stiff, dry, reddish brown, sandy CLAY (CL) [A-6]	2.0	SS-2	8	17	17	34
896.4	4.0	**Residuum** - hard to very stiff, slightly moist, red brown, fine, elastic SILT with sand (MH) [A-7-5 (24/18)] LL=58, PL=31, PI=27, NMC=27, %200=79 LL=56, PL=32, PI=24, NMC=24, %200=72	6.0	SS-3	9	8	12	20
	8.0		8.0	SS-4	19	21	21	42
891.4		Medium dense to loose, slightly moist to moist, grayish red and yellowish brown, micaceous, fine to medium, silty SAND (SM) [A-7-5 (5) / A-5 (3)] LL=48, PL=33, PI=15, NMC=23, %200=49 LL=50, PL=40, PI=10, NMC=28, %200=45 (UD-1 pushed in offset boring, 16'-18')		SS-5	4	7	8	15
			13.5	SS-6	3	4	5	9
886.4			16.0	UD-1				
			18.5	SS-7	2	3	5	8
881.4	22.0							
876.4		Very stiff, very moist to wet, brownish red, white and yellow, micaceous, fine to coarse, sandy SILT (ML) [A-4], with kaolin	23.5	SS-8	6	8	9	17
			28.5	SS-9	6	12	10	22
871.4	31.0							
866.4		Very stiff, wet, brown, micaceous, fine to coarse, sandy SILT (ML) [A-4]; observed hard drilling 35'-37'	33.5	SS-10	3	10	15	25
	37.0							
861.4		Medium dense, wet, yellowish brown and brown, slightly micaceous to micaceous, fine, silty SAND (SM) [A-4 (1)] LL=37, PL=29, PI=8, NMC=28, %200=42	38.5	SS-11	4	6	8	14
856.4			43.5	SS-12	4	5	8	13
851.4			48.5	SS-13	7	7	15	22



LEGEND

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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-3
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1128+40	**Offset:**	90 LT
Alignment:	Mainline				
Elev.:	901.4 ft	**Latitude:**	35.055947	**Longitude:**	-81.788185
Date Started:	9/24/2015				
Total Depth:	94.3 ft	**Soil Depth:**	71.8 ft	**Core Depth:**	22.5 ft
Date Completed:	9/25/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** --
24HR	25 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	52.0								
846.4		Very stiff, wet, yellowish brown, grayish red and black, micaceous to very micaceous, fine, sandy SILT (ML) [A-4]; observed hard drilling below 52 feet	53.5	SS-14	12	18	26	44	
841.4			58.5	SS-15	6	9	15	24	
836.4	63.0	**Partially Weathered Rock** - very hard, wet, yellowish brown and dark brown, micaceous, fine to coarse, sandy SILT (ML) [A-4], with rock fragments	63.5	SS-16	50	50/1"		50/1"	>>
831.4			68.5	SS-17	50/2"			50/2"	>>
	71.8	Tri-cone refusal encountered at 71.8 feet; Commenced NQ coring of **Rock**:	71.8						
826.4		Biotite Gneiss - black and gray, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-muscovite-garnet-sulfides, highly weathered (completely weathered at 76.7', and soft/weak from 76' to 79') to fresh, low hardness (friable at 76.7') to very hard, 0 to 70 deg. dip, jointing, no infilling, irregular surface, close to very close spacing, slightly rough to rough surface	74.3	NQ-1					REC=82%, RQD=58%
821.4			79.3	NQ-2					REC=100%, RQD=70%
816.4		RMR (NQ-1) = 25 (Class IV) RMR (NQ-2) = 21 (Class IV) RMR (NQ-3/4) = 50 (Class III) RMR (NQ-5) = 73 (Class II)	84.3	NQ-3					REC=96%, RQD=90%, q_u=12,430 psi
811.4			89.3	NQ-4					REC=94%, RQD=82%, q_u=10,230 psi
	94.3			NQ-5					REC=96%, RQD=96%
806.4		Coring Terminated at 94.3 Feet							
801.4									

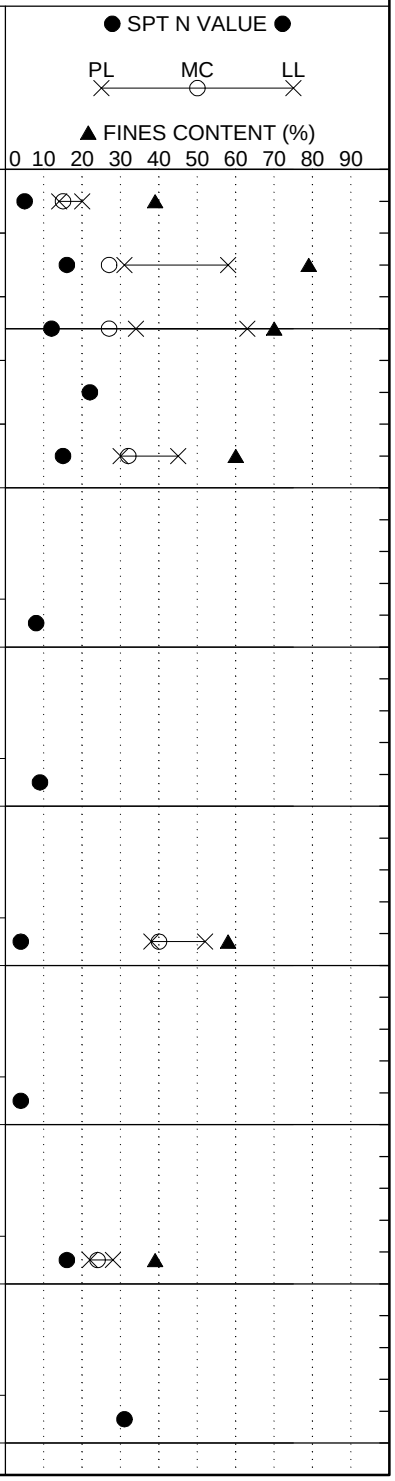
LEGEND

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	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-4		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	N. Bradley / GMT	**Boring Location:**	1128+36	**Offset:**	67 RT	**Alignment:**	Mainline
Elev.:	899.0 ft	**Latitude:**	35.055527	**Longitude:**	-81.7879302	**Date Started:**	10/7/2015
Total Depth:	65 ft	**Soil Depth:**	45.4 ft	**Core Depth:**	19.6 ft	**Date Completed:**	10/8/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** --	**24HR**	28 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 1" Topsoil	0.0	SS-1	2	2	3	5
	2.0	**Fill** - loose, slightly moist, brown red, silty clayey SAND (SC-SM) [A-4 (0)] LL=20, PL=14, PI=6, NMC=15, %200=39	2.0	SS-2	5	7	9	16
894.0		**Residuum** - very stiff to stiff, slightly moist, red brown, fine, elastic SILT with sand (MH) [A-7-5 (24/21)] LL=58, PL=31, PI=27, NMC=27, %200=79 LL=63, PL=34, PI=29, NMC=27, %200=70 (UD-1 pushed in offset boring, 4'-6')	4.0	SS-3	3	5	7	12
	8.0		6.0	SS-4	7	10	12	22
889.0		Stiff to firm, slightly moist to moist, grayish red, brown and yellow, micaceous, fine, sandy SILT (ML) [A-7-5 (8)], with trace kaolin and coarse sand LL=45, PL=30, PI=15, NMC=32, %200=60	8.0	SS-5	5	6	9	15
884.0			13.5	SS-6	2	4	4	8
879.0			18.5	SS-7	2	3	6	9
	21.0	Soft, very moist to wet, grayish red, yellow and black, micaceous, fine, sandy elastic SILT (MH) [A-7-5 (8)] LL=52, PL=38, PI=14, NMC=40, %200=58 (UD-2 pushed in offset boring, 24'-26')	23.5	SS-8	2	2	2	4
874.0			28.5	SS-9	2	2	2	4
869.0								
	32.0	Medium dense to dense, wet, brown and yellow, slightly micaceous, fine to coarse, silty clayey SAND (SC-SM) [A-4 (0)], with silt seams LL=28, PL=22, PI=6, NMC=24, %200=39	33.5	SS-10	4	7	9	16
864.0			38.5	SS-11	13	17	14	31
859.0								



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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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-4
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley / GMT	**Boring Location:**	1128+36	**Offset:**	67 RT	**Alignment:**	Mainline
Elev.:	899.0 ft	**Latitude:**	35.055527	**Longitude:**	-81.7879302	**Date Started:**	10/7/2015
Total Depth:	65 ft	**Soil Depth:**	45.4 ft	**Core Depth:**	19.6 ft	**Date Completed:**	10/8/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** --	**24HR**	28 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	42.0	**Partially Weathered Rock** - very hard, wet, brown gray and yellow, fine to coarse, sandy SILT (ML) [A-4], with rock fragments		43.5	SS-12	10	50/4"		50/4"	>>●
854.0	45.4	Tri-cone refusal encountered at 45.4 feet; Commenced NQ coring of **Rock**:		45.4	NQ-1					REC=80%, RQD=28%
849.0		Biotite Gneiss, interlayered with quartz-rich Granitoid Gneiss - gray and white, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-garnet, highly to slightly weathered, low hardness to hard, 0 to 80 deg. dip, jointing, no infilling, irregular surface, very close to close spacing, slightly rough to rough surface		50.0	NQ-2					REC=97%, RQD=36%, q_u=3,020 psi
844.0		RMR (NQ-1/2) = 18 (Class V)		55.0	NQ-3					REC=100%, RQD=72%, q_u=12,650 psi
		RMR (NQ-3) = 42 (Class III)								
		RMR (NQ-4) = 71 (Class II)		60.0	NQ-4					REC=97%, RQD=92%
839.0										
834.0	65.0	Coring Terminated at 65 Feet								
829.0										
824.0										
819.0										

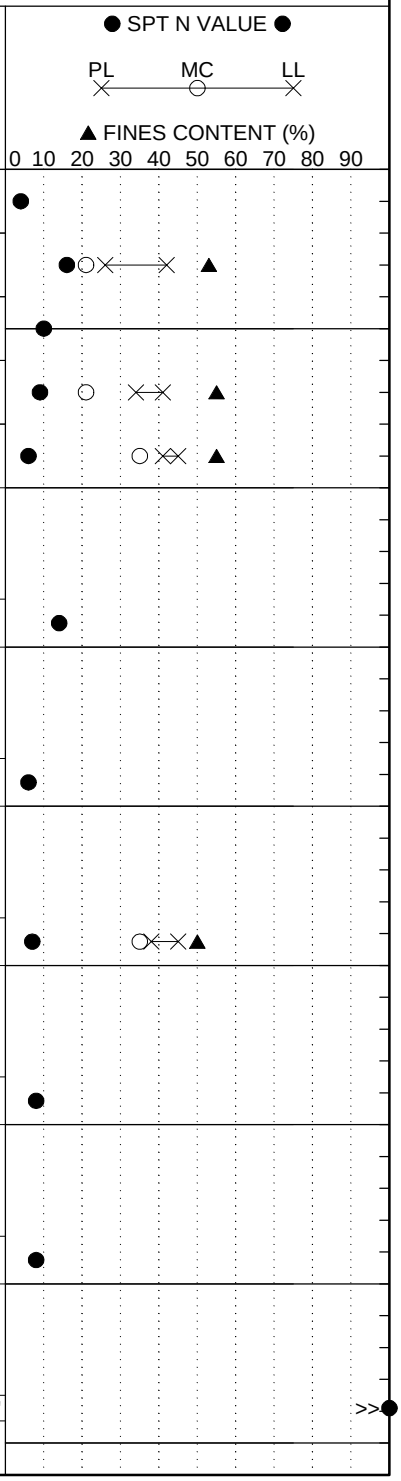
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-5
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1229+00	**Offset:**	90 LT
Alignment:	Mainline				
Elev.:	877.2 ft	**Latitude:**	35.071866	**Longitude:**	-81.760759
Date Started:	10/7/2015				
Total Depth:	61 ft	**Soil Depth:**	41.0 ft	**Core Depth:**	20.0 ft
Date Completed:	10/8/2015				
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --
24HR	17 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 1" Topsoil						
		Residuum - soft to very stiff, moist, red brown, fine, sandy lean CLAY (CL) [A-7-6 (6)], with trace roots and gravel	0.0	SS-1	2	2	2	4
		LL=42, PL=26, PI=16, NMC=21, %200=53	2.0	SS-2	6	7	9	16
	4.0		4.0					
872.2		Stiff to firm, slightly moist to moist (to wet at 17'), red, yellowish brown and light brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-5 (3/2)]		SS-3	2	5	5	10
		LL=41, PL=34, PI=7, NMC=21, %200=55	6.0	SS-4	4	4	5	9
		LL=45, PL=41, PI=4, NMC=35, %200=55 (UD-1 pushed in offset boring, 8'-10')	8.0	SS-5	2	2	4	6
867.2		LL=45, PL=38, PI=7, NMC=35, %200=50 (composite of SS-6/7/8/9/10)						
			13.5	SS-6	5	7	7	14
862.2								
			18.5	SS-7	2	1	5	6
857.2								
			23.5	SS-8	2	3	4	7
852.2								
	28.0	Firm, wet, light brown and brown, very micaceous, fine, sandy SILT (ML) [A-5]	28.5	SS-9	3	3	5	8
847.2								
			33.5	SS-10	3	3	5	8
842.2								
	37.0	**Partially Weathered Rock** - very dense, wet, yellow, brown and white, micaceous, fine to coarse, silty SAND (SM) [A-2], with rock fragments	38.5	SS-11	50/4"			50/4"
837.2	41.0		41.0					



LEGEND

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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-5		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1229+00	**Offset:**	90 LT	**Alignment:**	Mainline
Elev.:	877.2 ft	**Latitude:**	35.071866	**Longitude:**	-81.760759	**Date Started:**	10/7/2015
Total Depth:	61 ft	**Soil Depth:**	41.0 ft	**Core Depth:**	20.0 ft	**Date Completed:**	10/8/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	17 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	42.2	Tri-cone refusal encountered at 41 feet; Commenced NQ coring of **Rock**:								
832.2	46.5	Quartz-rich Granitoid Gneiss - white, fine grained, thinly foliated, quartz-biotite, slightly to moderately weathered, hard, 0 to 10 deg. dip, jointing, no infilling, irregular surface, very close spacing, slightly rough surface; RMR = 44 (Class III)		46.0	NQ-1					REC=82%, RQD=43%, q_u=12,320 psi
827.2		Biotite Gneiss - black and white, fine to medium grained, thinly foliated, biotite-quartz-feldspar, highly weathered to residual soil (6" soil seams at 42.5' and 46'), moderately hard to soft, 0 to 10 deg. dip, jointing, no infilling, irregular surface, very close spacing, slightly rough to rough surface; RMR = 26 (Class IV)		51.0	NQ-2					REC=90%, RQD=78%
822.2				56.0	NQ-3					REC=RQD=100%, q_u=15,740 psi
817.2	61.0	Biotite Gneiss, interlayered with Granitoid Gneiss - gray and white, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-sulfides, slight to freshly weathered, hard to very hard, 10 to 20 deg. dip, jointing, no infilling, irregular surface, very close to close spacing, sl. rough to rough surface; RMR (NQ-2)=50 (Class III), RMR (NQ-3/4)=76 (Class II)			NQ-4					REC=100%, RQD=100%
		Coring Terminated at 61 Feet								
812.2										
807.2										
802.2										
797.2										

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-6		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1228+80	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	872.5 ft	**Latitude:**	35.071418	**Longitude:**	-81.760533	**Date Started:**	10/8/2015
Total Depth:	50.5 ft	**Soil Depth:**	28.7 ft	**Core Depth:**	21.8 ft	**Date Completed:**	10/9/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	14 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / FINES CONTENT (%)
	0.0	Top of Ground - 1" Topsoil							
		Residuum - stiff, slightly moist, red brown, slightly micaceous, fine, sandy elastic SILT (MH) [A-7-5 (10)] LL=52, PL=39, PI=13, NMC=28, %200=68	0.0	SS-1	3	5	6	11	
			2.0	SS-2	5	5	6	11	
	4.0	Firm to soft, slightly moist to very moist, grayish red and yellowish brown, micaceous, fine, sandy SILT (ML) [A-5 (2)], interbedded with silty sand LL=44, PL=39, PI=5, %200=52 (UDs-1/2 from offset boring, 4'-6' / 8'-10') LL=46, PL=40, PI=6, NMC=28, %200=50	4.0	SS-3	2	3	5	8	
867.5			6.0	SS-4	3	3	4	7	
			8.0	SS-5	2	1	2	3	
862.5									
	13.0	Very stiff, moist, dark brown, yellow and red, fine to medium, sandy SILT (ML) [A-4]	13.5	SS-6	9	12	15	27	
857.5									
	17.0	Soft to stiff, wet, light brown, yellow and gray, slightly micaceous, fine, sandy SILT (ML) [A-5 (3)] LL=42, PL=37, PI=5, NMC=39, %200=57	18.5	SS-7	2	2	1	3	
852.5									
			23.5	SS-8	4	4	7	11	
847.5									
	27.0	**Partially Weathered Rock** - very dense, wet, dark brown, gray and yellow, fine to coarse, silty SAND (SM) [A-2]	27.9						
	28.7		28.7	SS-9	50/1"			50/1"	>>
842.5		Tri-cone refusal encountered at 28.7 feet; Commenced NQ coring of **Rock**:	30.5	NQ-1					REC=86%, RQD=67%, q_u=11,270 psi
	34.4	Quartz-rich Granitoid Gneiss, interlayered with Biotite Gneiss - white and gray, fine grained, very thinly foliated, quartz-biotite-muscovite, slightly to moderately weathered, low hardness to very hard, 0 to 90 deg. dip, jointing, no infilling, irregular surface, very close spacing, slightly rough to rough surface; observed loss of coring water return at 31 ft; RMR=22 (Class IV)		NQ-2					REC=100%, RQD=40%
837.5			35.5	NQ-3					REC=RQD=100%, q_u=14,040 psi
832.5		Biotite Gneiss, interlayered with quartz-rich Granitoid Gneiss - gray and white, fine to	40.5						

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-6
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1228+80	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	872.5 ft	**Latitude:**	35.071418	**Longitude:**	-81.760533	**Date Started:**	10/8/2015
Total Depth:	50.5 ft	**Soil Depth:**	28.7 ft	**Core Depth:**	21.8 ft	**Date Completed:**	10/9/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** --	**24HR**	14 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
		very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-muscovite-garnet, fresh weathering, hard to very hard, 0 to 60 deg. dip, jointing, no infilling, irregular surface, moderately to very close spacing, slightly rough to rough surface RMR = 66 (Class II)		45.5	NQ-4					REC=100%, RQD=100%
827.5					NQ-5					REC=100%, RQD=94%
822.5	50.5	Coring Terminated at 50.5 Feet								
817.5										
812.5										
807.5										
802.5										
797.5										
792.5										

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-7		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1656+80	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	690.0 ft	**Latitude:**	35.102498	**Longitude:**	-81.626261	**Date Started:**	10/6/2015
Total Depth:	51 ft	**Soil Depth:**	29.0 ft	**Core Depth:**	22.0 ft	**Date Completed:**	10/6/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	HSA / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 20 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Top of Pavement							
	0.7	**Asphalt** - 5" / **Stone Base** - 3"							
	3.0	**Fill** - stiff, moist, red brown, slightly micaceous, sandy CLAY (CL) [A-6], with sand layers and gravel (*likely amplified N)	1.5	SS-1	3	4	25	29	
685.0	5.0	**Fill** - loose, slightly moist, gray, white, brown, fine to coarse, SAND (SP) [A-1-b]	3.5	SS-2	3	5	4	9	
	8.0	**Fill** - loose, moist, brown red, fine to medium, silty SAND (SM) [A-6 (2)] LL=40, PL=29, PI=11, NMC=24, %200=43	5.5	SS-3	3	4	5	9	
680.0	10.0	**Fill** - firm, moist, brown red, slightly micaceous, fine to medium, sandy SILT (ML) [A-4]	7.5	SS-4	1	2	3	5	
	13.0	**Residuum** - stiff, moist, brown red, slightly micaceous, fine to medium, silty SAND (SM) [A-7-6 (5)] LL=44, PL=27, PI=17, NMC=21, %200=46	9.5	SS-5	3	5	8	13	
675.0	18.0	Loose, moist, brown, slightly micaceous, fine to medium, silty clayey SAND (SC-SM) [A-4 (0)] LL=25, PL=18, PI=7, NMC=24, %200=44 (UD-2 pushed in offset boring, 13'-15')	13.5	SS-6	2	2	4	6	
670.0	23.0	Stiff, moist, brown, gray and yellow, micaceous, fine, sandy SILT (ML) [A-4]	18.5	SS-7	7	5	7	12	
665.0	29.0	**Partially Weathered Rock** - very dense, wet, gray, black, and yellow, micaceous, fine to coarse, silty SAND (SM) [A-2], with rock fragments	23.5	SS-8	50/5"			50/5"	>>
			28.2	SS-9	50/2"			50/2"	>>
660.0		Auger refusal encountered at 29 feet; Commenced NQ coring of **Rock**:	29.0	NQ-1					REC=70%, RQD=23%
655.0		Biotite Gneiss - dark gray and white, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-muscovite-garnet-sulfides, slightly to highly weathered, low hardness to hard, 0 to 30 deg. dip, jointing, no infilling, irregular surface, very close spacing, sl. rough to rough surface	31.0	NQ-2					REC=100%, RQD=15%
		RMR (NQ-1/2) = 18 (Class V)	36.0	NQ-3					REC=100%, RQD=51%, q_u=2,140 psi
		RMR (NQ-3) = 29 (Class IV)							
		RMR (NQ-4/5) = 41 (Class III)							
650.0			41.0						

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-7		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante / GMT	**Boring Location:**	1656+80	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	690.0 ft	**Latitude:**	35.102498	**Longitude:**	-81.626261	**Date Started:**	10/6/2015
Total Depth:	51 ft	**Soil Depth:**	29.0 ft	**Core Depth:**	22.0 ft	**Date Completed:**	10/6/2015
Bore Hole Diameter (in):	4.5	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	HSA / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	NQ	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 20 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
645.0				46.0	NQ-4					REC=100%, RQD=79%
					NQ-5					REC=100%, RQD=79%, q_u=4,550 psi
640.0	51.0	Coring Terminated at 51 Feet								
635.0										
630.0										
625.0										
620.0										
615.0										
610.0										

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-8		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1656+75	**Offset:**	80 LT	**Alignment:**	Mainline
Elev.:	693.4 ft	**Latitude:**	35.102955	**Longitude:**	-81.6263096	**Date Started:**	10/6/2015
Total Depth:	43 ft	**Soil Depth:**	21.2 ft	**Core Depth:**	21.8 ft	**Date Completed:**	10/6/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Top of Pavement							
	1.5	**Asphalt** - 10" / **Stone Base** - 8"	0.0	SS-1	12	33	16	49	
	3.0	**Fill** - stiff, moist, brown and gray, sandy fat CLAY (CH) [A-7], with organics/roots	2.0	SS-2	6	7	7	14	Organic Content (2'-3') = 6.5%
688.4	6.0	**Fill** - loose, slightly moist, dark brown red, fine to medium, clayey SAND (SC) [A-6 (1)] LL=30, PL=19, PI=11, NMC=19, %200=43	4.0	SS-3	4	4	5	9	
	8.0	**Residuum** - stiff, very moist, brown red, fine, sandy elastic SILT (MH) [A-7-5 (8)] LL=56, PL=42, PI=14, NMC=44, %200=56 (UD-1 pushed in offset boring, 6'-8')	6.0	SS-4	4	4	6	10	
683.4			8.0	SS-5	7	8	8	16	
		Medium dense, slightly moist to moist, yellowish brown, red and gray, micaceous, fine to medium, silty SAND (SM) [A-4 (0/1)], with trace rock fragments	13.5	SS-6	4	7	10	17	
678.4		LL=39, PL=31, PI=8, NMC=31, %200=36							
		▽LL=36, PL=28, PI=8, NMC=19, %200=41	18.5	SS-7	10	12	10	22	
673.4	21.2		21.2						
		Auger refusal encountered at 21.2 feet; Commenced NQ coring of **Rock**:		NQ-1					REC=RQD=100%, q_u=11,070 psi
668.4		Granite Gneiss, interlayered with quartz-rich Granitoid Gneiss - black and white, fine to very coarse grained, very thinly to thinly foliated, quartz-biotite-feldspar, freshly weathered, hard to very hard, 0 to 50 deg. dip, jointing (only one joint at 24.3'), no infilling, irregular surface, close spacing, rough surface; RMR=71 (Class II)	25.0	NQ-2					REC=82%, RQD=60%, q_u=7,330 psi
663.4	28.5		30.0	NQ-3					REC=98%, RQD=26%
658.4		Biotite Gneiss - white and gray, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-garnet, slightly to moderately weathered, low hardness to hard, 0 to 40 deg. dip, jointing, no infilling, irregular surface, very close spacing, slightly rough to rough surface; RMR = 19 (Class V)	35.0	NQ-4					REC=94%, RQD=24%
653.4			40.0	NQ-5					REC=100%, RQD=17%
	43.0	Coring Terminated at 43 Feet							
648.4									
643.4									

LEGEND

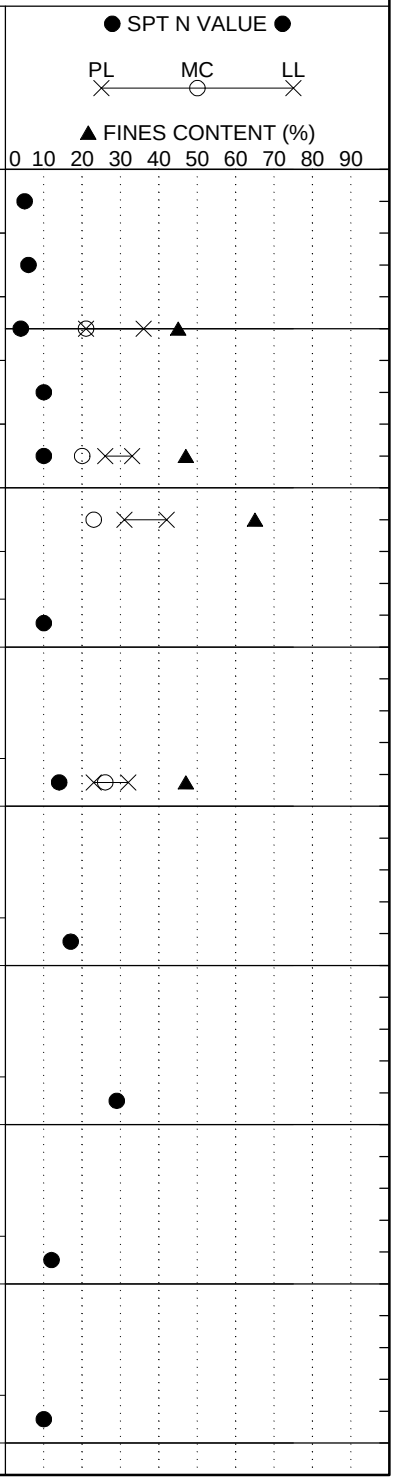
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 BRIDGE BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-9
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1734+10	**Offset:**	90 RT
Alignment:	Mainline				
Elev.:	706.8 ft	**Latitude:**	35.109739	**Longitude:**	-81.602079
Date Started:	9/21/2015				
Total Depth:	69.2 ft	**Soil Depth:**	45.7 ft	**Core Depth:**	23.5 ft
Date Completed:	9/22/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 4" Topsoil						
		Fill - firm, moist, brown red, micaceous, sandy SILT (ML) [A-4]	0.0	SS-1	2	2	3	5
	3.0		2.0	SS-2	3	3	3	6
		Fill - loose, very moist, brown red, fine to medium, clayey SAND (SC) [A-6 (3)] LL=36, PL=21, PI=15, NMC=21, %200=45	4.0					
701.8	6.0		6.0	SS-3	2	2	2	4
		Residuum - stiff, slightly moist, red, elastic SILT (MH) [A-7]		SS-4	4	4	6	10
	8.0		8.0					
		Loose, slightly moist, yellowish red and brown, fine to medium, silty SAND (SM) [A-4 (1)]		SS-5	3	4	6	10
696.8	10.0	LL=33, PL=26, PI=7, NMC=20, %200=47	10.0	UD-1				
		Stiff, slightly moist, light reddish yellow and brown, fine to medium, sandy SILT (ML) [A-7-5 (7)]	13.5	SS-6	3	4	6	10
691.8		LL=42, PL=31, PI=11, NMC=23, %200=65 [UD-1 pushed in offset boring, 10'-12']						
	18.0 ▽		18.5	SS-7	4	6	8	14
686.8		Medium dense, very moist to wet, red, gray and yellowish brown, micaceous, fine to medium, clayey SAND (SC) [A-4 (2)], in thin cemented layers LL=32, PL=23, PI=9, NMC=26, %200=47	23.5	SS-8	6	6	11	17
681.8			28.5	SS-9	11	9	20	29
676.8	32.0							
		Medium dense, wet, brownish yellow and white, fine to coarse, silty SAND (SM) [A-2]	33.5	SS-10	5	6	6	12
671.8	37.0							
		Stiff, wet, yellowish brown and gray, micaceous, fine, sandy SILT (ML) [A-4]	38.5	SS-11	4	5	5	10
666.8								



LEGEND

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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-9		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1734+10	**Offset:**	90 RT	**Alignment:**	Mainline
Elev.:	706.8 ft	**Latitude:**	35.109739	**Longitude:**	-81.602079	**Date Started:**	9/21/2015
Total Depth:	69.2 ft	**Soil Depth:**	45.7 ft	**Core Depth:**	23.5 ft	**Date Completed:**	9/22/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	42.0	Very hard, wet, dark gray, very micaceous, fine, sandy SILT (ML) [A-4]	43.5	SS-12	9	21	45	66	●
661.8	45.7	Tri-cone refusal encountered at 45.7 feet; Commenced NQ coring of **Rock**: Biotite Gneiss, interlayered with quartz-rich Granitoid Gneiss - gray and white, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-muscovite-garnet, highly to slightly weathered, low hardness to hard, 0 to 90 deg. dip, jointing, no infilling, irregular surface, very close spacing, slickensided to rough surface (slickensides at 68.2') RMR (NQ-1/2) = 15 (Class V) RMR (NQ-3/4/5) = 35 (Class IV) NQ-5 samples: q_u=2,550 psi & 7,580 psi	45.7	NQ-1				REC=64%, RQD=27%
656.8			49.2	NQ-2					REC=78%, RQD=0%
651.8			54.2	NQ-3					REC=98%, RQD=60%
646.8			59.2	NQ-4					REC=98%, RQD=68%
641.8			64.2	NQ-5					REC=100%, RQD=78%
636.8	69.2	Coring Terminated at 69.2 Feet							
631.8									
626.8									

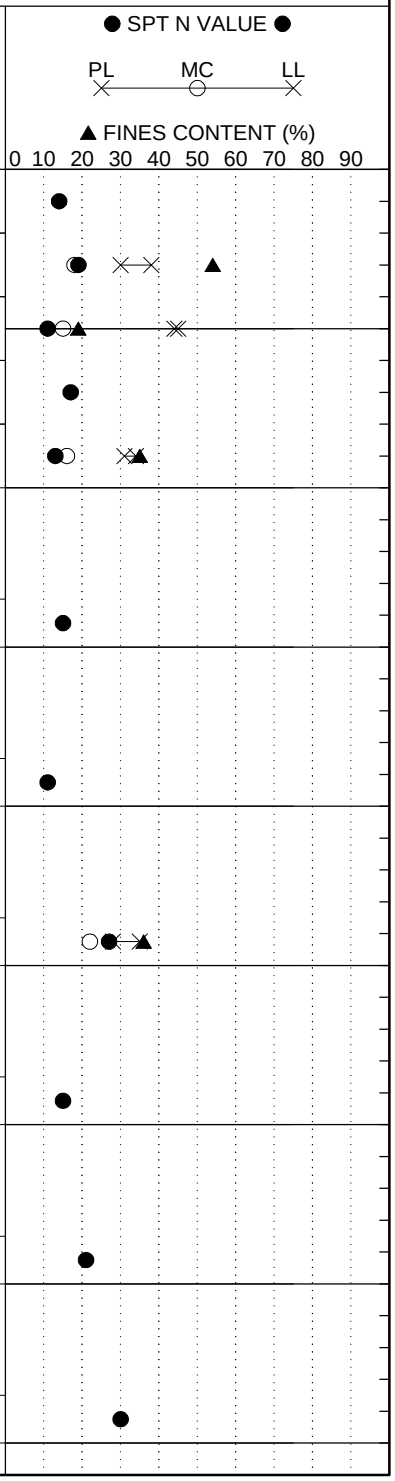
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-10		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1734+05	**Offset:**	75 LT	**Alignment:**	Mainline
Elev.:	712.7 ft	**Latitude:**	35.110185	**Longitude:**	-81.602162	**Date Started:**	9/23/2015
Total Depth:	71.8 ft	**Soil Depth:**	49.8 ft	**Core Depth:**	22.0 ft	**Date Completed:**	9/24/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground - 4" Topsoil						
	2.0	**Fill** - stiff, slightly moist, brown red, sandy elastic SILT (MH) [A-7]	0.0	SS-1	4	7	7	14
	4.0	**Fill** - very stiff, slightly moist, light red brown, sandy SILT (ML) [A-4 (3)] LL=38, PL=30, PI=8, NMC=18, %200=54	2.0	SS-2	6	9	10	19
707.7	6.0	**Residuum** - medium dense, slightly moist, brown, yellow and white, micaceous, fine to coarse, silty SAND (SM) [A-1-b] LL=45, PL=44, PI=1, NMC=15, %200=19 (UD-1 pushed in offset boring, 4'-6')	4.0	SS-3	3	5	6	11
			6.0	SS-4	8	8	9	17
			8.0	SS-5	4	6	7	13
702.7	13.0	Medium dense, slightly moist, light red, grayish brown and white, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=34, PL=31, PI=3, NMC=16, %200=35	13.5	SS-6	5	6	9	15
697.7	18.0	Medium dense, moist, light brown, slightly micaceous, fine to medium, silty SAND (SM) [A-4]	18.5	SS-7	4	6	5	11
692.7	23.0	Stiff, very moist, yellowish brown and gray, micaceous, fine, sandy SILT (ML) [A-4]	23.5	SS-8	10	13	14	27
687.7		Medium dense, very moist, light yellowish brown and white, micaceous, fine to coarse, silty SAND (SM) [A-4 (0)], with kaolin LL=35, PL=28, PI=7, NMC=22, %200=36 (composite of SS-6/7/8/9/10)	28.5	SS-9	4	7	8	15
682.7			33.5	SS-10	7	8	13	21
677.7	36.0	Medium dense, wet, brown, gray and yellow, micaceous to very micaceous, fine, silty SAND (SM) [A-4], with trace coarse sand and rock fragments	38.5	SS-11	6	10	20	30
672.7								



LEGEND

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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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	BR-10
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Wells / GMT	**Boring Location:**	1734+05	**Offset:**	75 LT
Alignment:	Mainline				
Elev.:	712.7 ft	**Latitude:**	35.110185	**Longitude:**	-81.602162
Date Started:	9/23/2015				
Total Depth:	71.8 ft	**Soil Depth:**	49.8 ft	**Core Depth:**	22.0 ft
Date Completed:	9/24/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	RW / RC	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	NQ	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / FINES CONTENT (%)
			43.5	SS-12	10	15	15	30	
667.7	46.0	**Partially Weathered Rock** - very hard, wet, brownish gray, very micaceous, sandy SILT (ML) [A-4]	48.5	SS-13	41	50/2"		50/2"	>>
662.7	49.8	Tri-cone refusal encountered at 49.8 feet; Commenced NQ coring of **Rock**: Biotite Gneiss, interlayered with quartz-rich Granitoid Gneiss - white, gray and tan, fine to very coarse grained, very thinly to thinly foliated, biotite-quartz-feldspar-garnet, residual soil (seam at 59.1' to 59.8') to moderately weathered, friable to hard, 0 to 90 deg. dip, jointing, no infilling, irregular surface, very close spacing, slightly rough to rough surface; RMR = 13 (Class V)	49.8	NQ-1					REC=44%, RQD=10%
657.7			54.8	NQ-2					REC=78%, RQD=22%
652.7		Note: There were no core specimens suitable for compressive strength testing, due to insufficient length or low hardness/strength of the samples.	59.8	NQ-3					REC=17%, RQD=0%
647.7			64.8	NQ-4					REC=58%, RQD=0%
642.7			69.8	NQ-5					REC=88%, RQD=0%
	71.8	Coring Terminated at 71.8 Feet							
637.7									
632.7									

SPT N VALUE: PL MC LL

FINES CONTENT (%): 0 10 20 30 40 50 60 70 80 90

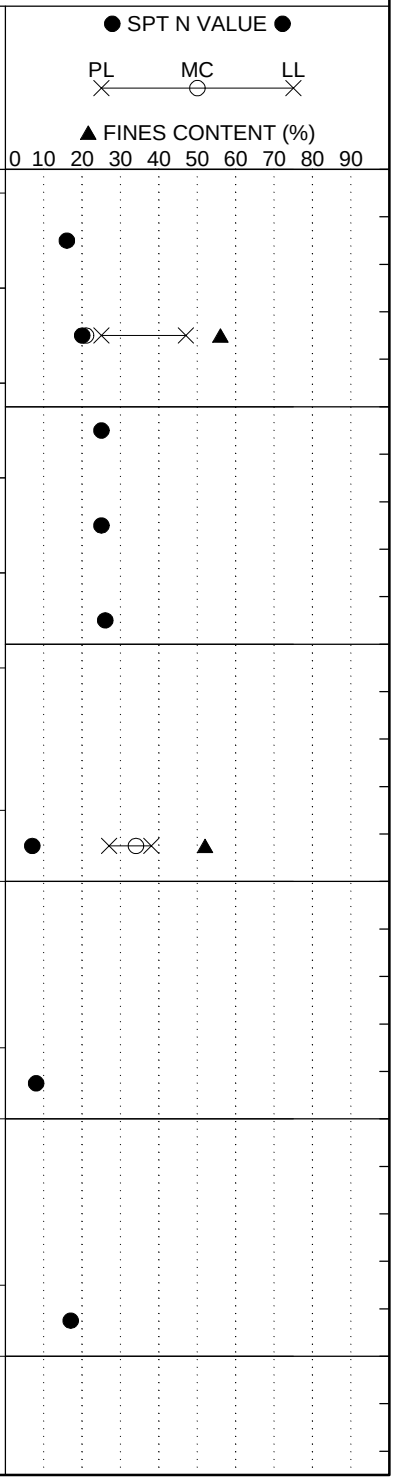
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-1
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1506+80	**Offset:**	100 LT	**Alignment:**	Mainline
Elev.:	821.1 ft	**Latitude:**	35.097638	**Longitude:**	-81.674894	**Date Started:**	10/22/2015
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft	**Date Completed:**	10/22/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 23 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.6	**Asphalt** - 6" / **Stone Base** 1"	0.5					
		Residuum - Very stiff, slightly moist, brown, sandy CLAY (CL) [A-7]		SS-1	6	8	8	16
	3.0		2.5					
		Very stiff, slightly moist, red and yellowish brown, fine to medium, sandy lean CLAY (CL) [A-7-6 (10)]		SS-2	8	9	11	20
		LL=44, PL=22, PI=22, NMC=23, %#200=60	4.5					
816.1				SS-3	9	11	14	25
			6.5					
				SS-4	14	12	13	25
			8.5					
				SS-5	11	12	14	26
811.1	11.0							
		Firm to very stiff, moist to wet (at 23'), light brown, brown and yellow, fine to medium, sandy SILT (ML) [A-6 (4)]						
		LL=38, PL=27, PI=11, NMC=34, %#200=52	13.5					
				SS-6	3	3	4	7
806.1								
			18.5					
				SS-7	2	3	5	8
801.1								
			23.5					
				SS-8	3	7	10	17
796.1	25.0	Boring Terminated at 25 feet						



LEGEND

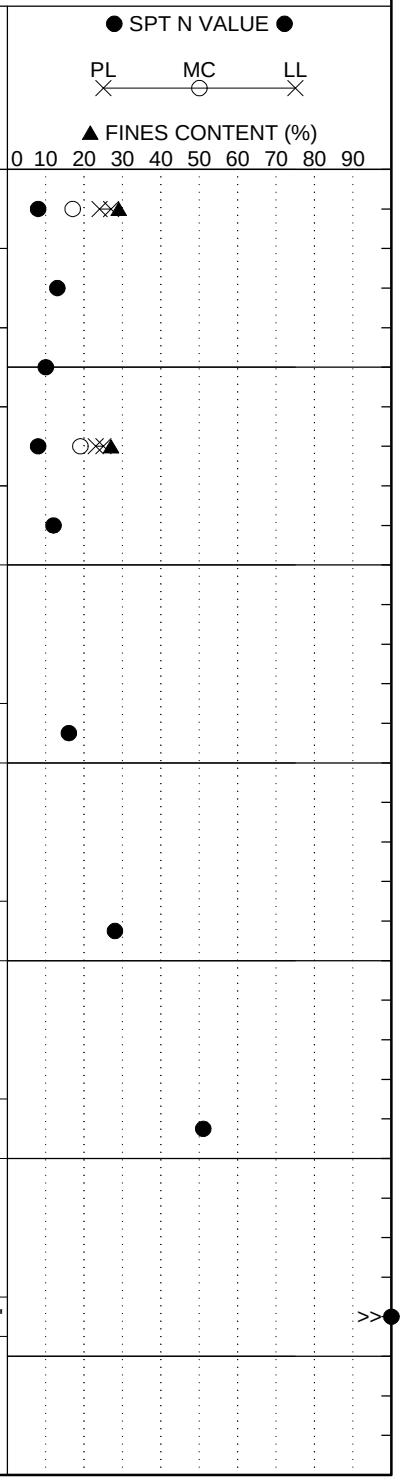
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-2
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	901+20	**Offset:**	70 RT	**Alignment:**	Mainline
Elev.:	720.6 ft	**Latitude:**	35.030977	**Longitude:**	-81.857483	**Date Started:**	10/22/2015
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft	**Date Completed:**	10/22/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 13 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.1	**Topsoil** - 1"		0.0	SS-1	1	4	4	8
		Fill - Loose to medium dense, slightly moist to moist, brown, sl. micaceous, fine to coarse, silty SAND (SM) [A-2-4] LL=27, PL=24, PI=3, NMC=17, %#200=29		2.0	SS-2	6	6	7	13
	4.0			4.0					
715.6		**Residuum** - Loose to medium dense, moist, brownish yellow and yellowish red, slightly micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=25, PL=23, PI=2, NMC=19, %#200=27			SS-3	3	4	6	10
				6.0	SS-4	2	2	6	8
				8.0	SS-5	8	7	5	12
710.6									
	12.0	Medium dense to very dense, moist to very moist, brown, gray and yellow, micaceous, fine to medium, silty SAND (SM) [A-2]		13.5	SS-6	4	9	7	16
705.6									
				18.5	SS-7	8	8	20	28
700.6									
				23.5	SS-8	22	25	26	51
695.6									
	28.0	**Partially Weathered Rock** - Very dense, very moist, grayish brown, yellow and white, micaceous, fine to coarse, silty SAND (SM) [A-2]		28.5	SS-9	44	50/2"		50/2"
690.6	30.0	Boring Terminated at 30 feet							



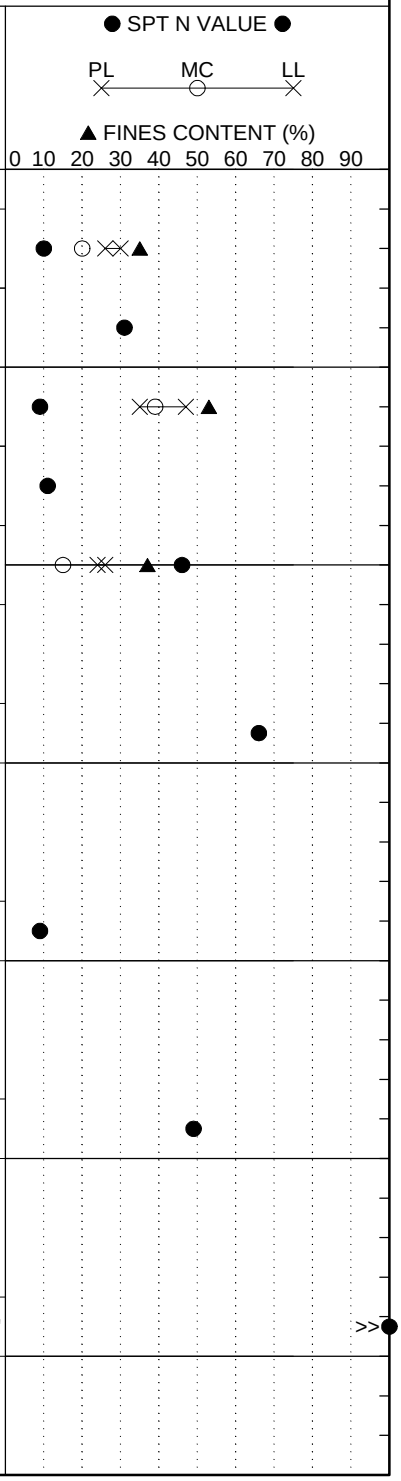
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-3
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	957+00	**Offset:**	97 LT	**Alignment:**	Mainline
Elev.:	800.0 ft	**Latitude:**	35.035768	**Longitude:**	-81.839806	**Date Started:**	10/14/2015
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.8	**Asphalt** - 3" / **Stone Base** - 6"						
		Residuum - Loose to dense, slightly moist, red, gray and brown, slightly micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=30, PL=26, PI=4, NMC=20, %#200=35	1.0	SS-1	2	5	5	10
			3.0	SS-2	10	17	14	31
795.0	5.0	Stiff, slightly moist to moist, red, brown and white, micaceous, fine to medium, sandy SILT (ML) [A-7-5 (5)] LL=47, PL=35, PI=12, NMC=39, %#200=53	5.0	SS-3	10	6	3	9
			7.0	SS-4	4	6	5	11
	9.0	Very dense to loose, slightly moist to moist, brown, yellow and gray, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-4 (0)] LL=26, PL=24, PI=2, NMC=15, %#200=37	9.0	SS-5	15	27	19	46
790.0								
			13.5	SS-6	15	26	40	66
785.0								
			18.5	SS-7	12	5	4	9
780.0								
			23.5	SS-8	7	21	28	49
775.0								
			28.5	SS-9	36	42	50/1"	50/1"
	29.0	**Partially Weathered Rock** - Very dense, moist, gray brown, fine to coarse, silty SAND (SM) [A-2]						
770.0	30.0	Boring Terminated at 30 feet						



LEGEND

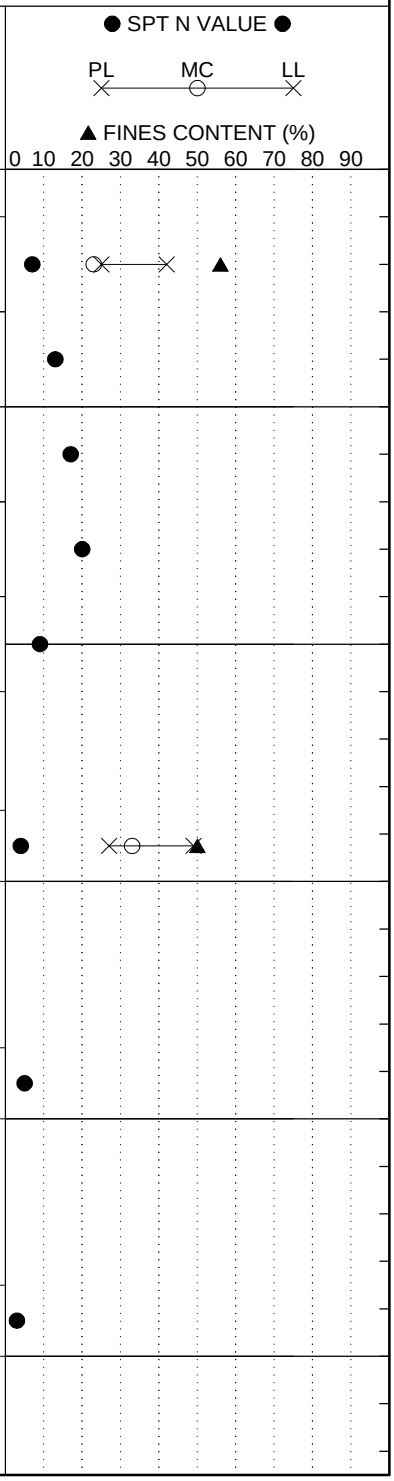
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-4
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	978+00	**Offset:**	96 LT	**Alignment:**	Mainline
Elev.:	797.3 ft	**Latitude:**	35.037594	**Longitude:**	-81.833199	**Date Started:**	10/14/2015
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 16 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.7	**Asphalt** - 6.5" / **Stone Base** - 2"						
		Fill - Firm to stiff, moist, red brown, fine, sandy lean CLAY (CL) [A-7-6 (7)] LL=42, PL=25, PI=17, NMC=23, %#200=56	1.0	SS-1	2	3	4	7
			3.0	SS-2	6	8	5	13
792.3	5.0	**Fill** - Very stiff, slightly moist, brown and reddish brown, slightly micaceous, sandy SILT (ML) [A-4], with some gravel and sandy layers	5.0	SS-3	5	9	8	17
			7.0	SS-4	7	10	10	20
	9.0	**Fill** - Stiff, moist, red brown, slightly micaceous, sandy CLAY (CL) [A-6]	9.0	SS-5	3	4	5	9
787.3								
	12.0	**Fill/Alluvium** - Soft, very moist to wet, red brown, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-7-6 (8)] LL=49, PL=27, PI=22, NMC=33, %#200=50	13.5	SS-6	2	2	2	4
782.3								
	17.0	**Alluvium** - Firm to soft, wet, dark brown and gray, sandy SILT (ML) [A-5], with roots and gravel	18.5	SS-7	2	2	3	5
777.3								
	24.0		23.5	SS-8	2	2	1	3
772.3	25.0	**Residuum** - Soft, wet, gray and yellowish brown, micaceous, fine, sandy SILT (ML) [A-4]						
		Boring Terminated at 25 feet						



LEGEND

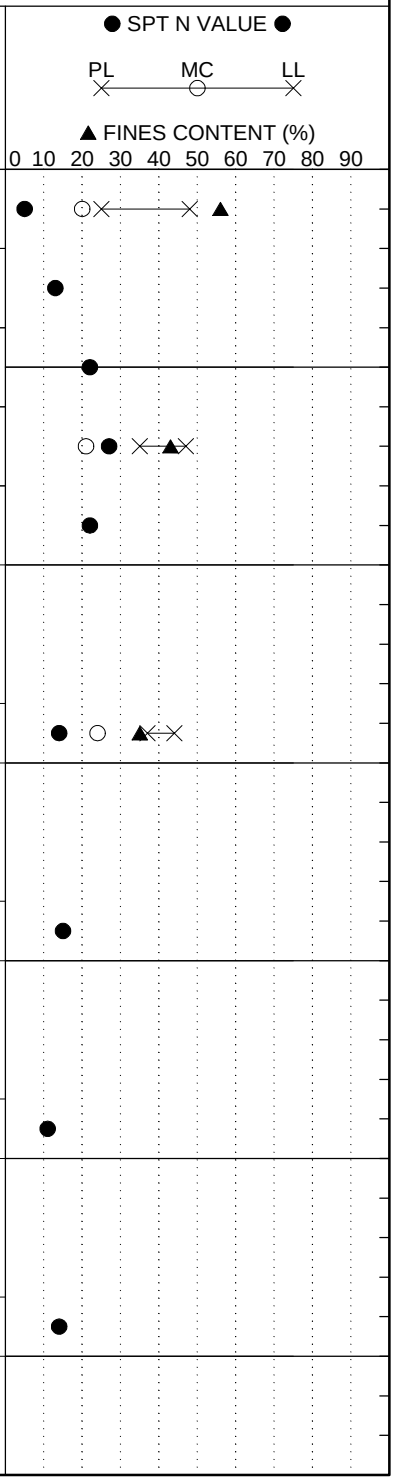
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-5
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	989+80	**Offset:**	70 RT	**Alignment:**	Mainline
Elev.:	837.5 ft	**Latitude:**	35.038637	**Longitude:**	-81.829401	**Date Started:**	10/26/2015
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft	**Date Completed:**	10/26/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.1	**Topsoil** - 1"		0.0	SS-1	2	3	2	5
		Possible Fill - Firm to stiff, slightly moist, brown and reddish brown, fine, sandy lean CLAY (CL) [A-7-6 (10)] LL=48, PL=25, PI=23, NMC=20, %#200=56		2.0	SS-2	3	6	7	13
	4.0			4.0					
832.5		**Residuum** - Very stiff, slightly moist, brownish red, fine, sandy elastic SILT (MH) [A-7]			SS-3	9	10	12	22
	6.0			6.0					
		Medium dense, slightly moist, brown, reddish brown, white, and black, micaceous, fine to medium, silty SAND (SM) [A-7-5 (2) / A-2-5] LL=47, PL=35, PI=12, NMC=21, %#200=43 LL=44, PL=37, PI=7, NMC=24, %#200=35			SS-4	11	13	14	27
				8.0	SS-5	8	11	11	22
827.5									
				13.5	SS-6	2	7	7	14
822.5									
	18.0	Stiff, moist to wet, dark red, white and brown, fine, sandy SILT (ML) [A-4]		18.5	SS-7	2	5	10	15
817.5									
				23.5	SS-8	6	5	6	11
812.5									
				28.5	SS-9	3	6	8	14
807.5	30.0	Boring Terminated at 30 feet							



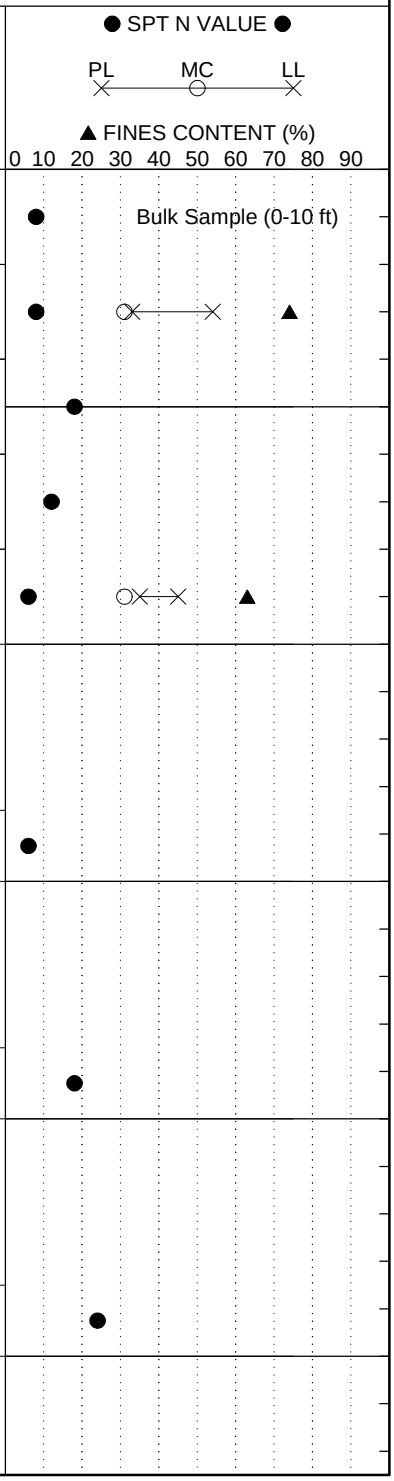
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-6
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1002+00	**Offset:**	80 LT
Alignment:	Mainline				
Elev.:	856.8 ft	**Latitude:**	35.040489	**Longitude:**	-81.825993
Date Started:	10/12/2015				
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft
Date Completed:	10/12/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"	0.0	SS-1	2	3	5	8
	2.0	**Fill** - Firm, moist, red brown, elastic SILT (MH) [A-7]	2.0	SS-2	2	3	5	8
851.8		**Residuum** - Firm to very stiff, slightly moist to moist, red brown and yellowish brown, slightly micaceous, fine, elastic SILT with sand (MH) [A-7-5 (17)] LL=54, PL=33, PI=21, NMC=31, %#200=74	4.0	SS-3	5	9	9	18
			6.0	SS-4	5	6	6	12
	8.0	Firm, slightly moist, grayish red and yellowish brown, slightly micaceous, fine, sandy SILT (ML) [A-5 (6)] LL=45, PL=35, PI=10, NMC=31, %#200=63	8.0	SS-5	2	3	3	6
846.8								
			13.5	SS-6	1	3	3	6
841.8								
	18.0	Very stiff, moist, yellowish brown and grayish red, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4], with layers of silt	18.5	SS-7	8	9	9	18
836.8								
			23.5	SS-8	6	7	17	24
831.8	25.0	Boring Terminated at 25 feet						



LEGEND

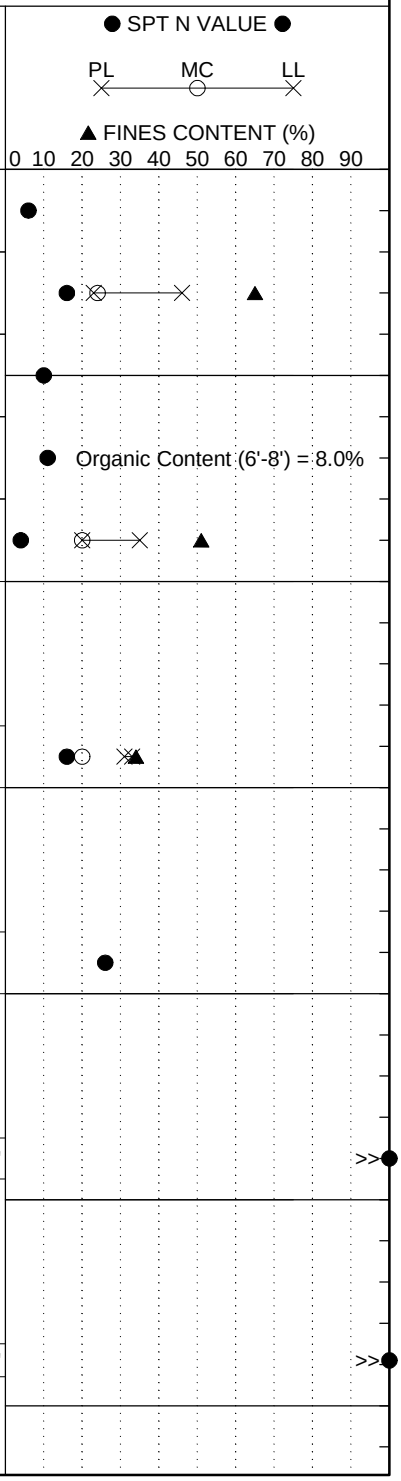
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-7
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1016+60	**Offset:**	76 LT	**Alignment:**	Mainline
Elev.:	832.8 ft	**Latitude:**	35.042265	**Longitude:**	-81.8216102	**Date Started:**	10/23/2015
Total Depth:	28.8 ft	**Soil Depth:**	28.8 ft	**Core Depth:**	0 ft	**Date Completed:**	10/23/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 15 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log
	0.0	Top of Ground	
	0.1	**Topsoil** - 1"	
		Fill - Firm to very stiff, slightly moist to moist, reddish brown and brown, slightly micaceous, fine, sandy lean CLAY (CL) [A-7-6 (13)], with roots, decaying wood pieces, and gravel LL=46, PL=23, PI=23, NMC=24, %#200=65	
827.8			
	8.0	**Possible Cultivated Soil** - Soft, very moist, brown, fine, sandy lean CLAY (CL) [A-6 (5)] LL=35, PL=20, PI=15, NMC=20, %#200=51	
822.8			
	12.0	**Residuum** - Medium dense, moist to very moist, dark brown & yellowish brown, micaceous, fine to coarse, silty SAND (SM) [A-2-4], with trace rock fragments LL=33, PL=31, PI=2, NMC=20, %#200=34	
817.8			
812.8			
	23.0	**Partially Weathered Rock** - Very dense, slightly moist, gray, slightly micaceous, fine to medium, silty SAND (SM) [A-2]	
807.8			
	28.8	Auger Refusal Encountered at 28.8 feet; Boring Terminated	
802.8			

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS-1	3	2	4	6
2.0	SS-2	6	8	8	16
4.0	SS-3	5	5	5	10
6.0	SS-4	7	5	6	11
8.0	SS-5	1	2	2	4
13.5	SS-6	5	8	8	16
18.5	SS-7	6	12	14	26
23.5	SS-8	22	50/2"		50/2"
28.5	SS-9	50/2"			50/2"



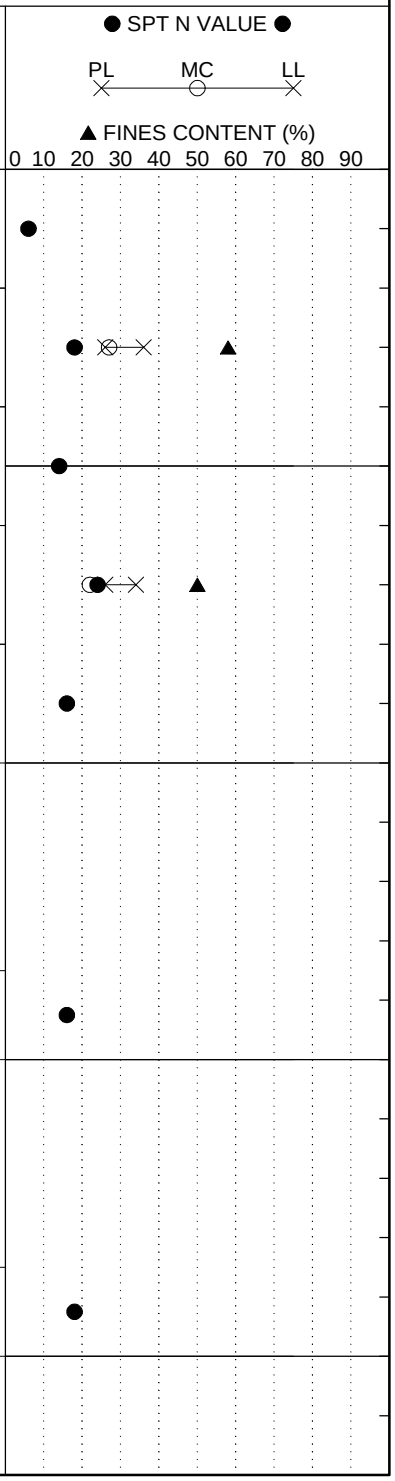
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-8
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1025+70	**Offset:**	86 LT	**Alignment:**	Mainline
Elev.:	865.9 ft	**Latitude:**	35.043403	**Longitude:**	-81.818912	**Date Started:**	10/12/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/12/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.1	**Topsoil** - 1"							
		Residuum - Firm to very stiff, slightly moist, yellowish brown and light grayish red, slightly micaceous, fine, sandy SILT (ML) [A-4 (4)] LL=36, PL=26, PI=10, NMC=27, %#200=58		0.0	SS-1	1	3	3	6
				2.0	SS-2	5	9	9	18
				4.0	SS-3	5	7	7	14
860.9	6.0	Medium dense, slightly moist (to moist at 18'), yellowish brown and light grayish red, slightly micaceous to micaceous, fine, silty SAND (SM) [A-4 (2)] LL=34, PL=26, PI=8, NMC=22, %#200=50		6.0	SS-4	7	9	15	24
				8.0	SS-5	11	9	7	16
855.9									
				13.5	SS-6	5	8	8	16
850.9									
				18.5	SS-7	2	6	12	18
845.9	20.0	Boring Terminated at 20 feet							



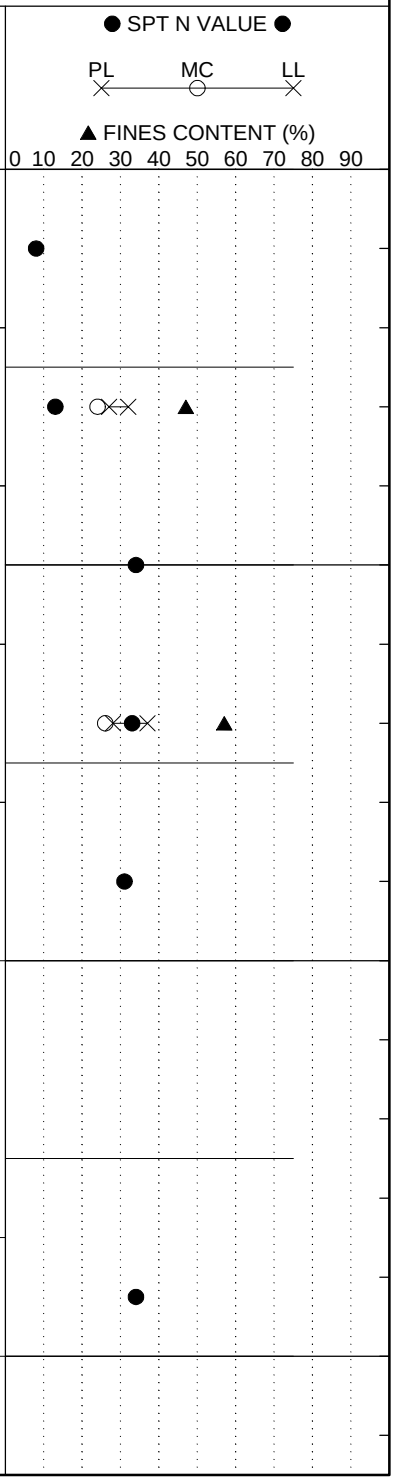
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-9
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1024+70	**Offset:**	95 RT	**Alignment:**	Mainline
Elev.:	859.8 ft	**Latitude:**	35.042834	**Longitude:**	-81.818946	**Date Started:**	10/12/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/12/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3"	0.0					
	1.0	**Fill** - Firm, slightly moist, dark brown, sandy CLAY (CL) [A-6]		SS-1	6	4	4	8
		Residuum - Medium dense to dense, slightly moist, red, gray and brown, slightly micaceous, fine to medium, silty SAND (SM) [A-4 (0)]	2.0					
		LL=32, PL=27, PI=5, NMC=24, %#200=47		SS-2	6	4	9	13
			4.0					
854.8				SS-3	7	12	22	34
	6.0	Hard, slightly moist, brown, yellow, gray and red, slightly micaceous, fine to medium, sandy SILT (ML) [A-4 (4)]	6.0					
		LL=37, PL=28, PI=9, NMC=26, %#200=57		SS-4	17	20	13	33
			8.0					
				SS-5	7	9	22	31
849.8								
	12.0	Dense, moist, brown and yellowish brown, fine, silty SAND (SM) [A-4]						
			13.5					
				SS-6	7	12	22	34
844.8	15.0	Boring Terminated at 15 feet						



LEGEND

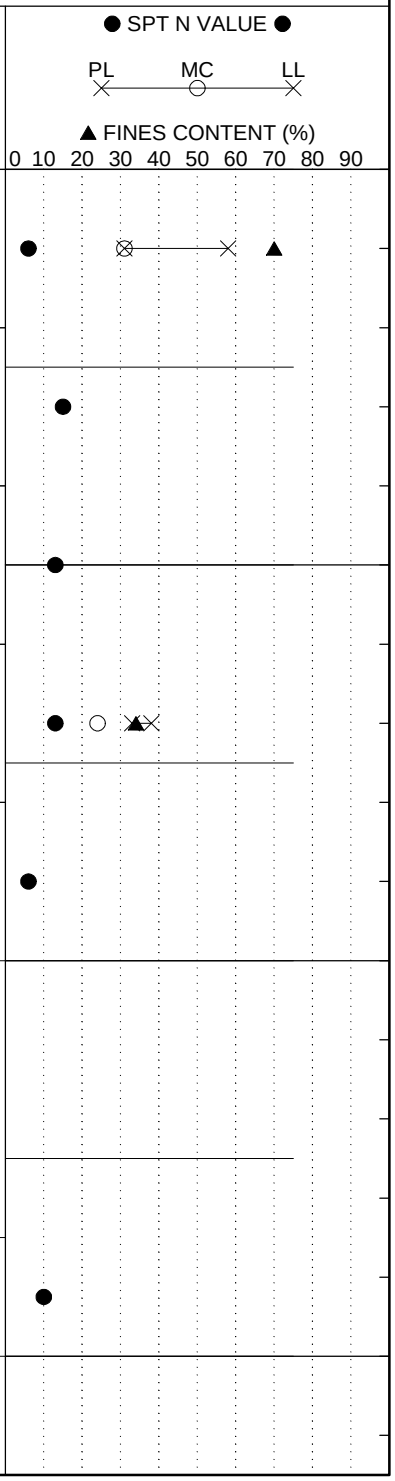
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-10
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	SC-110
Eng./Geo.:	N. Bradley	**Boring Location:**	25+20	**Offset:**	15 RT
Alignment:	Reloc. CL				
Elev.:	877.8 ft	**Latitude:**	35.045683	**Longitude:**	-81.8178298
Date Started:	10/13/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	10/13/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3 inches	0.0					
		Residuum - Firm to stiff, slightly moist, red and yellowish brown, slightly micaceous, fine, sandy elastic SILT (MH) [A-7-5 (20)] LL=58, PL=31, PI=27, NMC=31, %#200=70		SS-1	2	3	3	6
			2.0					
				SS-2	5	7	8	15
			4.0					
872.8				SS-3	6	7	6	13
	6.0	Medium dense to loose, slightly moist to moist, red brown and yellow, slightly micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=38, PL=33, PI=5, NMC=24, %#200=34	6.0					
				SS-4	5	8	5	13
			8.0					
				SS-5	3	3	3	6
867.8								
	11.0	Stiff, moist, yellowish brown and grayish red, micaceous, fine, sandy SILT (ML) [A-4]						
			13.5					
				SS-6	3	4	6	10
862.8	15.0	Boring Terminated at 15 feet						



LEGEND

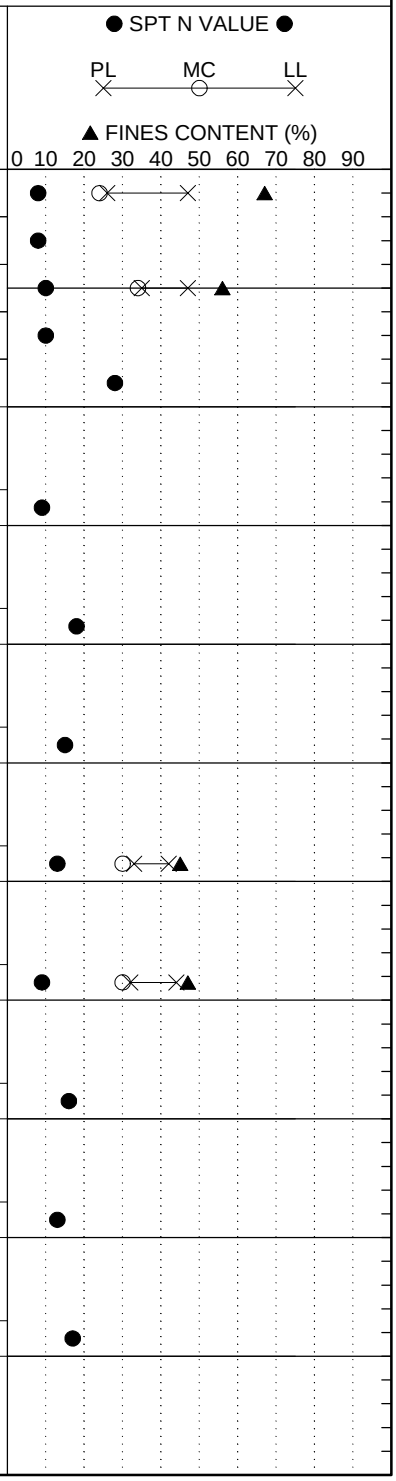
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-11
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	SC-110
Eng./Geo.:	N. Bradley	**Boring Location:**	38+35	**Offset:**	18 RT	**Alignment:**	Reloc. CL
Elev.:	860.8 ft	**Latitude:**	35.042386	**Longitude:**	-81.8161797	**Date Started:**	10/12/2015
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft	**Date Completed:**	10/12/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 40 ft	**24HR**	17 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	Top of Ground
	0.3	**Topsoil** - 4"
	2.0	**Residuum** - Firm, slightly moist, red brown, sandy lean CLAY (CL) [A-7-6 (13)] LL=47, PL=26, PI=21, NMC=24, %#200=67
855.8	6.0	Firm to stiff, moist, red and yellowish brown, slightly micaceous, fine, sandy SILT (ML) [A-7-5 (6)] LL=47, PL=35, PI=12, NMC=34, %#200=56
850.8	13.0	Stiff to very stiff, moist, brown, yellow and gray, slightly micaceous, fine to medium, sandy SILT (ML) [A-5]
845.8		Stiff to very stiff, moist, grayish brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-5]
840.8	23.0	Loose to medium dense, moist to very moist, grayish brown, slightly micaceous to micaceous, fine, silty SAND (SM) [A-5 (2) / A-7-5 (3)] LL=42, PL=33, PI=9, NMC=30, %#200=45 LL=44, PL=32, PI=12, NMC=30, %#200=47
835.8		
830.8		
825.8		
820.8		
815.8		
810.8	50.0	Boring Terminated at 50 feet

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS-1	2	3	5	8
2.0	SS-2	2	3	5	8
4.0	SS-3	2	5	5	10
6.0	SS-4	2	4	6	10
8.0	SS-5	4	12	16	28
13.5	SS-6	3	4	5	9
18.5	SS-7	5	9	9	18
23.5	SS-8	4	6	9	15
28.5	SS-9	3	4	9	13
33.5	SS-10	3	4	5	9
38.5	SS-11	4	6	10	16
43.5	SS-12	4	5	8	13
48.5	SS-13	5	7	10	17



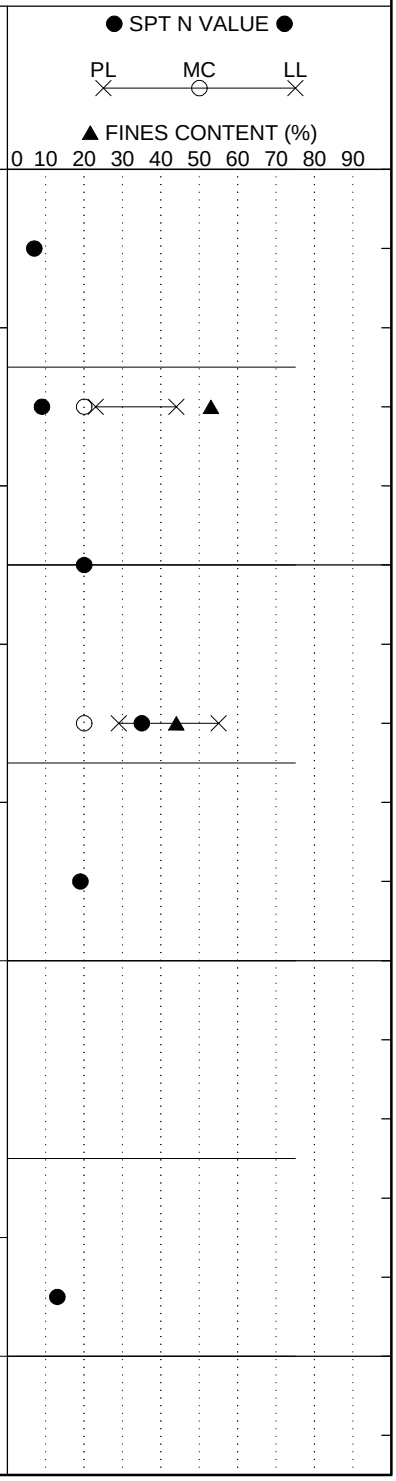
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-12
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	S-1009/2005
Eng./Geo.:	N. Bradley	**Boring Location:**	68+90	**Offset:**	60 RT	**Alignment:**	Reloc. CL
Elev.:	865.3 ft	**Latitude:**	35.045659	**Longitude:**	-81.821565	**Date Started:**	10/13/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/13/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.4	**Topsoil** - 5"	0.0					
		Fill - Loose, very moist, orange brown, fine to coarse, clayey SAND (SC) [A-2-6]		SS-1	3	3	4	7
	2.0	**Residuum** - Stiff, moist, red brown, fine to medium, sandy lean CLAY (CL) [A-7-6 (8)] LL=44, PL=23, PI=21, NMC=20, %#200=53	2.0	SS-2	2	3	6	9
	4.0	Medium dense to dense, slightly moist to moist, red brown and yellow, fine to coarse, clayey SAND (SC) [A-7-6 (7)], with trace rock fragments LL=55, PL=29, PI=26, NMC=20, %#200=44	4.0	SS-3	5	10	10	20
860.3			6.0	SS-4	11	19	16	35
			8.0	SS-5	6	10	9	19
855.3	11.0	Stiff, moist, tan brown, slightly micaceous, sandy SILT (ML) [A-4]	13.5	SS-6	3	6	8	13
850.3	15.0	Boring Terminated at 15 feet						



LEGEND

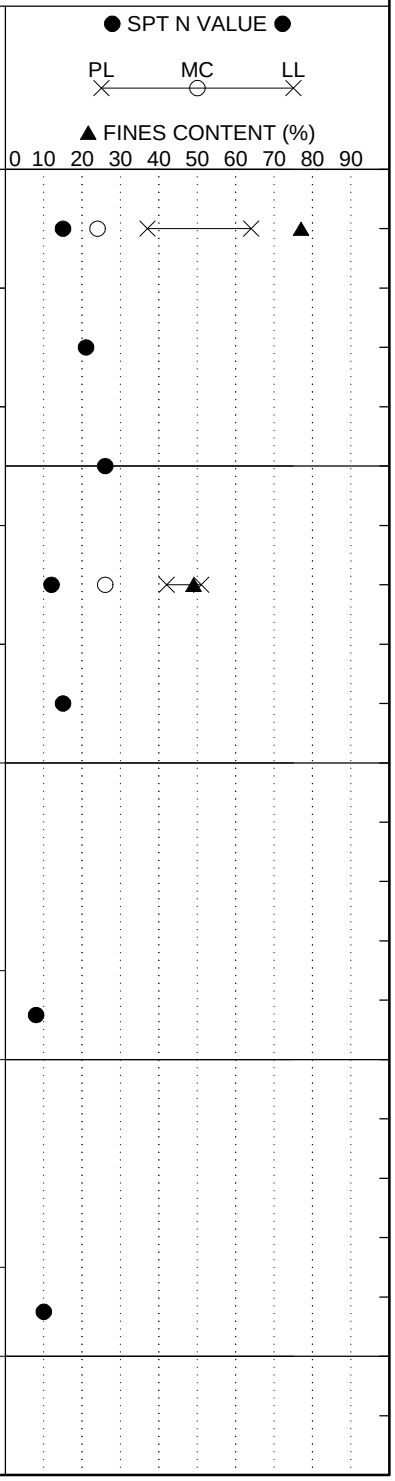
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-13
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	Phillips Dr.
Eng./Geo.:	N. Bradley	**Boring Location:**	83+00	**Offset:**	10 LT	**Alignment:**	Reloc. CL
Elev.:	892.1 ft	**Latitude:**	35.047065	**Longitude:**	-81.817204	**Date Started:**	10/13/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/13/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3"	0.0	SS-1	5	6	9	15
		Residuum - Stiff to very stiff, slightly moist, red brown, fine, elastic SILT with sand (MH) [A-7-5 (24)] LL=64, PL=37, PI=27, NMC=24, %#200=77	2.0	SS-2	7	10	11	21
			4.0					
887.1				SS-3	12	14	12	26
	6.0	Medium dense to loose, slightly moist to moist, grayish red and yellowish brown, slightly micaceous to micaceous, fine, silty SAND (SM) [A-5 (3)] LL=51, PL=42, PI=9, NMC=26, %#200=49	6.0	SS-4	6	6	6	12
			8.0	SS-5	7	8	7	15
882.1								
			13.5	SS-6	3	3	5	8
877.1								
			18.5	SS-7	3	4	6	10
872.1	20.0	Boring Terminated at 20 feet						



LEGEND

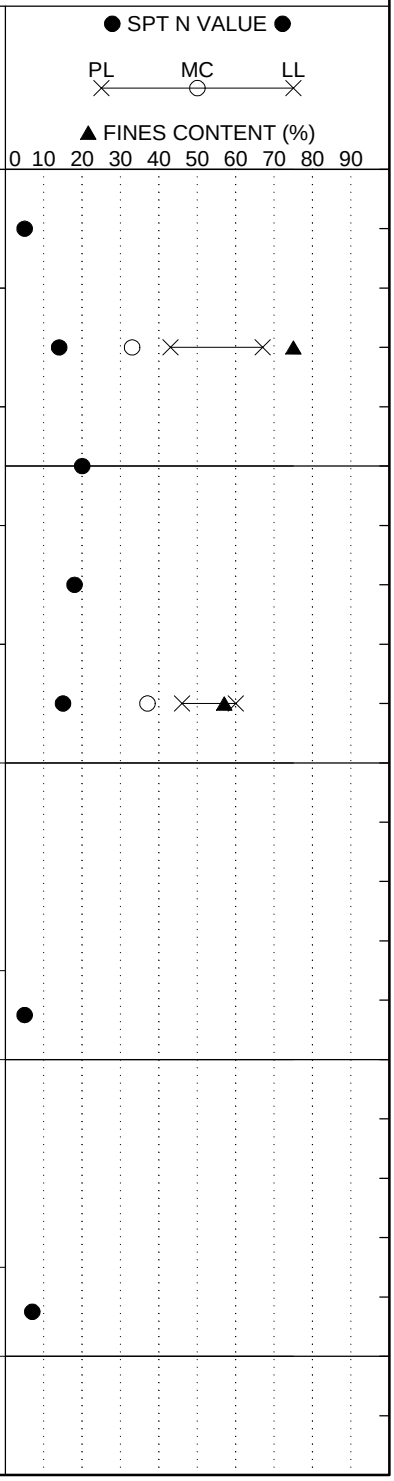
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-14		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante	**Boring Location:**	1035+50	**Offset:**	85 LT	**Alignment:**	Mainline
Elev.:	883.9 ft	**Latitude:**	35.044597	**Longitude:**	-81.815984	**Date Started:**	10/23/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/23/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 19 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3"	0.0					
		Possible Fill - Firm, very moist, brown, fine to medium, sandy CLAY (CL) [A-7]		SS-1	2	2	3	5
	2.0	**Residuum** - Stiff to very stiff, slightly moist to moist, brownish red, slightly micaceous, elastic SILT with sand (MH) [A-7-5 (22)] LL=67, PL=43, PI=24, NMC=33, %#200=75	2.0	SS-2	4	6	8	14
			4.0					
878.9				SS-3	6	9	11	20
			6.0					
				SS-4	8	9	9	18
	8.0	Stiff to firm, slightly moist to very moist, reddish brown, grayish red and yellow, micaceous, fine, sandy elastic SILT (MH) [A-7-5 (8)] LL=60, PL=46, PI=14, NMC=37, %#200=57	8.0					
				SS-5	7	8	7	15
873.9								
			13.5					
				SS-6	2	2	3	5
868.9								
			18.5					
				SS-7	3	3	4	7
863.9	20.0	Boring Terminated at 20 feet						



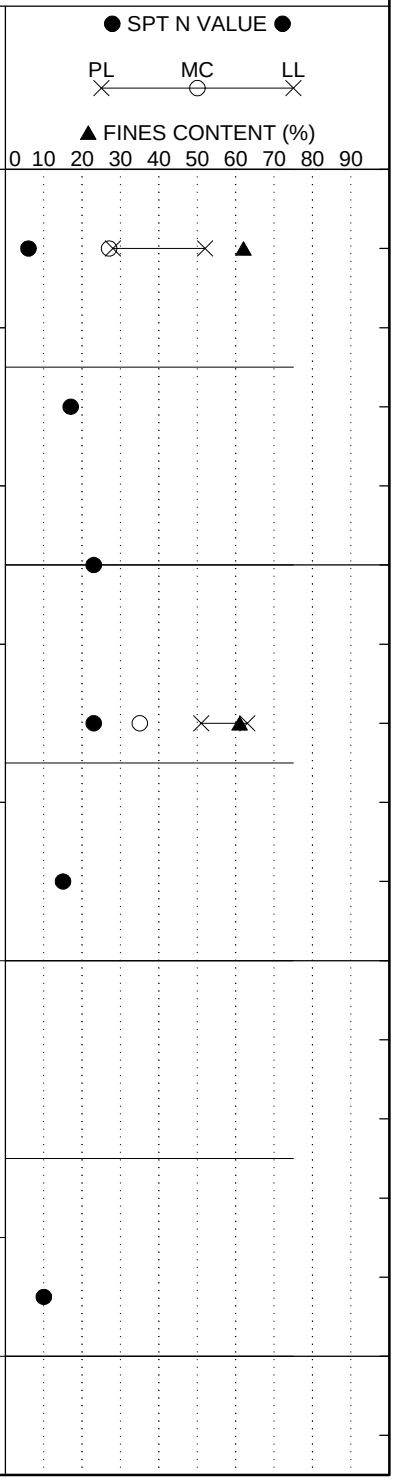
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-15
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 83
Eng./Geo.:	N. Bradley	**Boring Location:**	1037+60	**Offset:**	55 RT
Alignment:	A 83 RD				
Elev.:	887.3 ft	**Latitude:**	35.044108	**Longitude:**	-81.814452
Date Started:	10/13/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	10/13/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4"		0.0					
		Fill - Firm, moist, tan brown, fine, sandy fat CLAY (CH) [A-7-6 (14)] LL=52, PL=28, PI=24, NMC=28, %#200=62			SS-1	2	3	3	6
				2.0					
	3.0	**Residuum** - Very stiff, slightly moist to moist, red brown and yellowish brown, slightly micaceous, fine, sandy elastic SILT (MH) [A-7-5 (9)] LL=63, PL=51, PI=12, NMC=35, %#200=61			SS-2	6	8	9	17
				4.0					
882.3					SS-3	9	12	11	23
				6.0					
					SS-4	11	11	12	23
				8.0					
	9.0	Stiff, slightly moist to moist, grayish red and yellowish brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-5]			SS-5	6	8	7	15
877.3									
				13.5					
					SS-6	3	4	6	10
872.3	15.0	Boring Terminated at 15 feet							



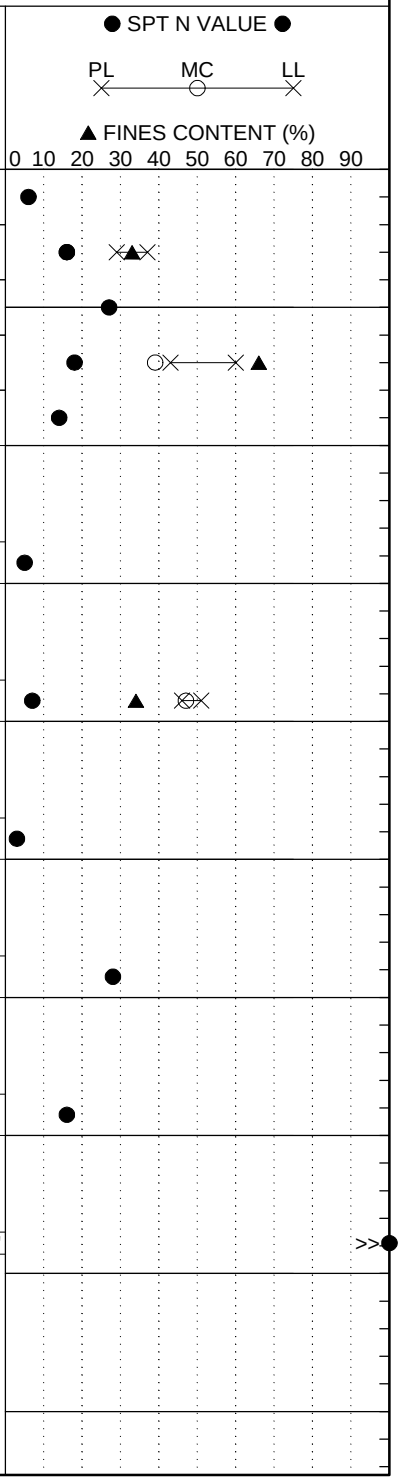
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-16
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1063+75	**Offset:**	80 LT	**Alignment:**	Mainline
Elev.:	826.6 ft	**Latitude:**	35.048035	**Longitude:**	-81.807495	**Date Started:**	10/21/2015
Total Depth:	43 ft	**Soil Depth:**	43 ft	**Core Depth:**	0 ft	**Date Completed:**	10/21/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 25 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	2.0	**Fill** - Firm, moist, red brown, elastic SILT (MH) [A-7]	0.0	SS-1	3	3	3	6
		Possible Fill - Medium dense, slightly moist, reddish brown and brown, fine to medium, silty SAND (SM) [A-2-4]	2.0	SS-2	4	5	11	16
821.6	6.0	LL=37, PL=29, PI=8, NMC=16, %#200=33	4.0	SS-3	10	16	11	27
		Residuum - Very stiff, slightly moist to moist, red brown, micaceous, fine, sandy elastic SILT (MH) [A-7-5 (13)]	6.0	SS-4	7	10	8	18
816.6		LL=60, PL=43, PI=17, NMC=39, %#200=66	8.0	SS-5	7	7	7	14
	13.0	Loose to very loose, moist to very moist, reddish brown and brown, slightly micaceous, fine to medium, silty SAND (SM) [A-2-5]	13.5	SS-6	2	2	3	5
811.6		LL=51, PL=46, PI=5, NMC=47, %#200=34	18.5	SS-7	4	4	3	7
806.6			23.5	SS-8	1	2	1	3
801.6	28.0	Medium dense, wet, dark grayish brown and brownish yellow, fine to coarse, silty SAND (SM) [A-2], with rock fragments	28.5	SS-9	3	21	7	28
796.6			33.5	SS-10	2	13	3	16
791.6	38.0	Very dense, wet, dark brown, fine to coarse, silty SAND (SM) [A-2], with rock fragments	38.5	SS-11	50/5"			50/5"
786.6	43.0	Auger Refusal Encountered at 43 feet; Boring Terminated						
781.6								



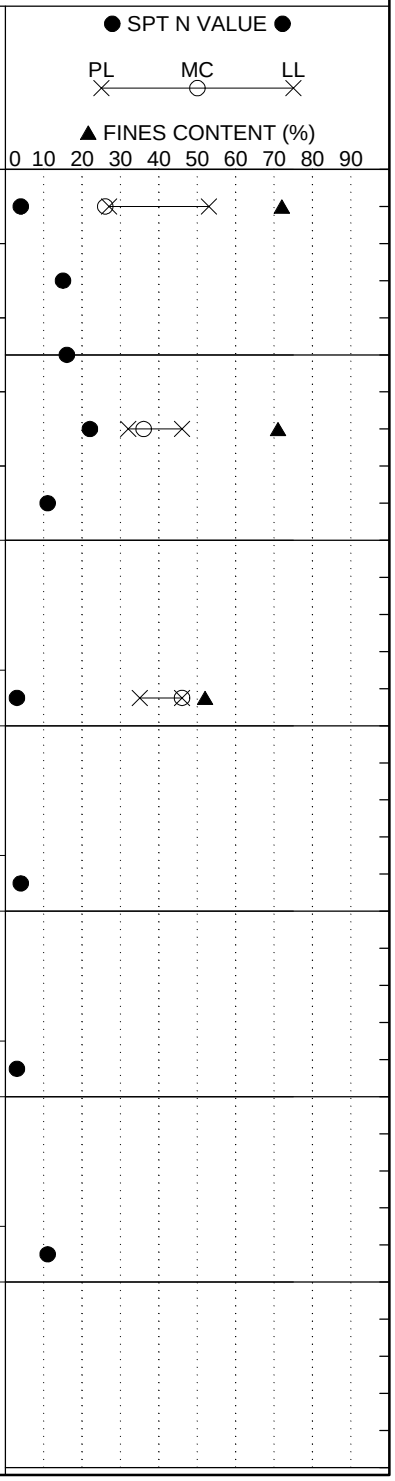
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-17		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante	**Boring Location:**	1070+60	**Offset:**	75 LT	**Alignment:**	Mainline
Elev.:	823.7 ft	**Latitude:**	35.048871	**Longitude:**	-81.805475	**Date Started:**	10/23/2015
Total Depth:	32 ft	**Soil Depth:**	32 ft	**Core Depth:**	0 ft	**Date Completed:**	10/23/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground	0.0	SS-1	2	2	2	4
		Residuum - Soft to stiff, slightly moist to moist, brownish red, fine, fat CLAY with sand (CH) [A-7-6 (19)] LL=53, PL=27, PI=26, NMC=26, %#200=72	2.0	SS-2	8	8	7	15
	4.0		4.0	SS-3	8	8	8	16
818.7		Very stiff to stiff, slightly moist to moist, reddish brown, fine, SILT with sand (ML) [A-7-5 (11)] LL=46, PL=32, PI=14, NMC=36, %#200=71	6.0	SS-4	10	12	10	22
			8.0	SS-5	7	6	5	11
813.7								
	12.0	Soft, very moist to wet, reddish brown, brown and yellow, slightly micaceous, fine, sandy SILT (ML) [A-7-5 (4)] LL=46, PL=35, PI=11, NMC=46, %#200=52	13.5	SS-6	1	1	2	3
808.7								
			18.5	SS-7	1	2	2	4
803.7								
	23.0	Soft, wet, dark brown, micaceous, fine, sandy SILT (ML) [A-4]	23.5	SS-8	2	1	2	3
798.7								
	28.0	Medium dense, dark grayish brown, micaceous, fine, silty SAND (SM) [A-2]	28.5	SS-9	6	7	4	11
793.7								
	32.0	Auger Refusal Encountered at 32 feet; Boring Terminated						



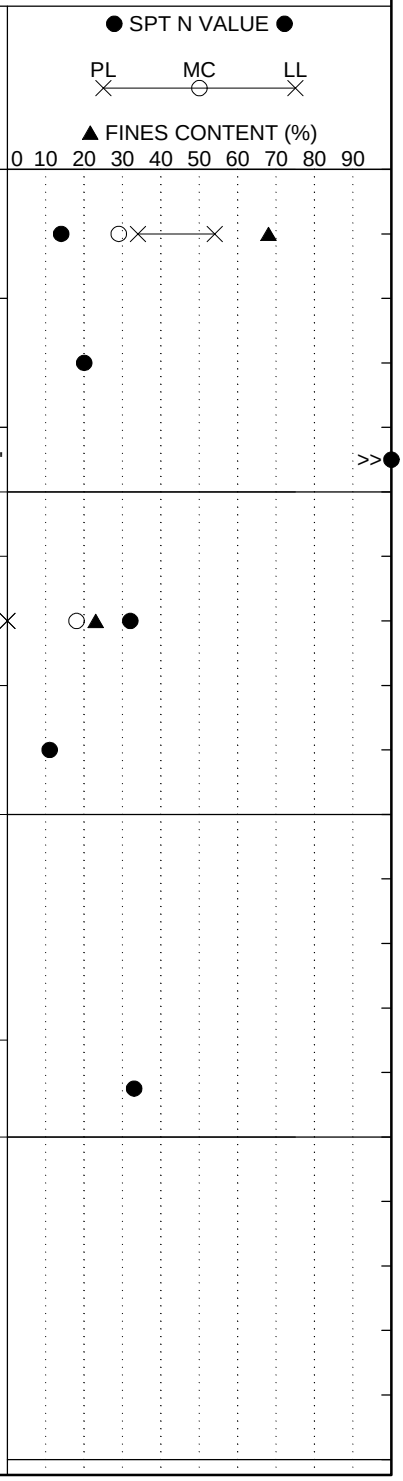
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-18
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1064+25	**Offset:**	74 RT
Alignment:	Mainline				
Elev.:	826.3 ft	**Latitude:**	35.047721	**Longitude:**	-81.807136
Date Started:	10/23/2015				
Total Depth:	18.4 ft	**Soil Depth:**	18.4 ft	**Core Depth:**	0 ft
Date Completed:	10/23/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2"		0.0					
		Residuum - Stiff to very stiff, slightly moist, brownish red, slightly micaceous, fine, sandy elastic SILT (MH) [A-7-5 (14)] LL=54, PL=34, PI=20, NMC=29, %#200=68			SS-1	4	6	8	14
				2.0	SS-2	8	9	11	20
	4.0	**PWR Lens** - Very dense, slightly moist, white and grayish brown, fine to coarse, SAND (SP) [A-1], with rock fragments		4.0	SS-3	16	50/5"		50/5"
821.3									
	6.0	Dense to medium dense, slightly moist, reddish brown, dark brown and yellow, micaceous, fine to medium, silty SAND (SM) [A-2-4], with rock fragments LL=PL=PI="NP", NMC=18, %#200=23		6.0	SS-4	40	21	11	32
				8.0	SS-5	5	6	5	11
816.3									
				13.5	SS-6	6	8	25	33
811.3									
	18.4	Auger Refusal Encountered at 18.4 feet; Boring Terminated							
806.3									



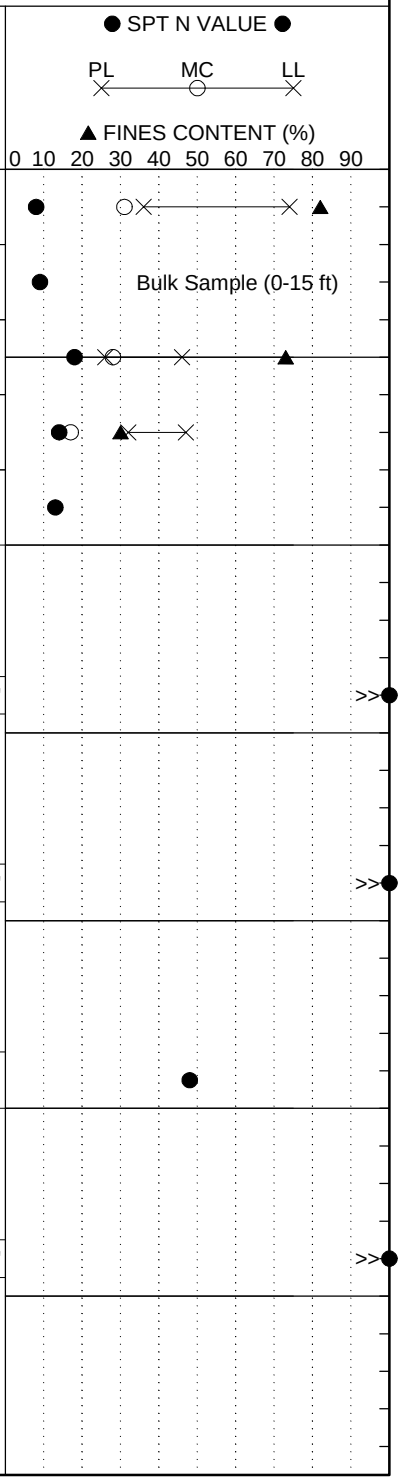
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-19
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1073+07	**Offset:**	96 RT	**Alignment:**	Mainline
Elev.:	842.6 ft	**Latitude:**	35.0487499	**Longitude:**	-81.804442	**Date Started:**	10/16/2015
Total Depth:	31.6 ft	**Soil Depth:**	31.6 ft	**Core Depth:**	0 ft	**Date Completed:**	10/16/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 28 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"	0.0	SS-1	3	3	5	8
		Residuum - Firm to stiff, slightly moist to moist, reddish brown, elastic SILT with sand (MH) [A-7-5 (36)] LL=74, PL=36, PI=38, NMC=31, %#200=82	2.0	SS-2	2	3	6	9
	4.0		4.0					
837.6		Very stiff, slightly moist, reddish brown and brown, fine, lean CLAY with sand (CL) [A-7-6 (15)] LL=46, PL=26, PI=20, NMC=28, %#200=73 (Bulk Sample 0-15')		SS-3	8	9	9	18
	6.0		6.0	SS-4	4	7	7	14
			8.0	SS-5	6	5	8	13
832.6		Medium dense, slightly moist, red brown, fine to medium, silty SAND (SM) [A-2-7 (1)] LL=47, PL=32, PI=15, NMC=17, %#200=30						
	13.0	**Partially Weathered Rock** - Very dense, slightly moist, brown, white and yellowish brown, fine to coarse, silty SAND (SM) [A-2]	13.5	SS-6	29	50/5"		50/5"
827.6								
			18.5	SS-7	3	50/5"		50/5"
822.6								
	22.0	Dense, moist, brown, gray and white, fine to medium, silty SAND (SM) [A-2]	23.5	SS-8	17	20	28	48
817.6								
	27.0	**Partially Weathered Rock** - Very hard, wet, brown and black, fine to medium, sandy SILT (ML) [A-4]	28.5	SS-9	20	50/5"		50/5"
812.6								
	31.6	Auger Refusal Encountered at 31.6 feet; Boring Terminated						



LEGEND

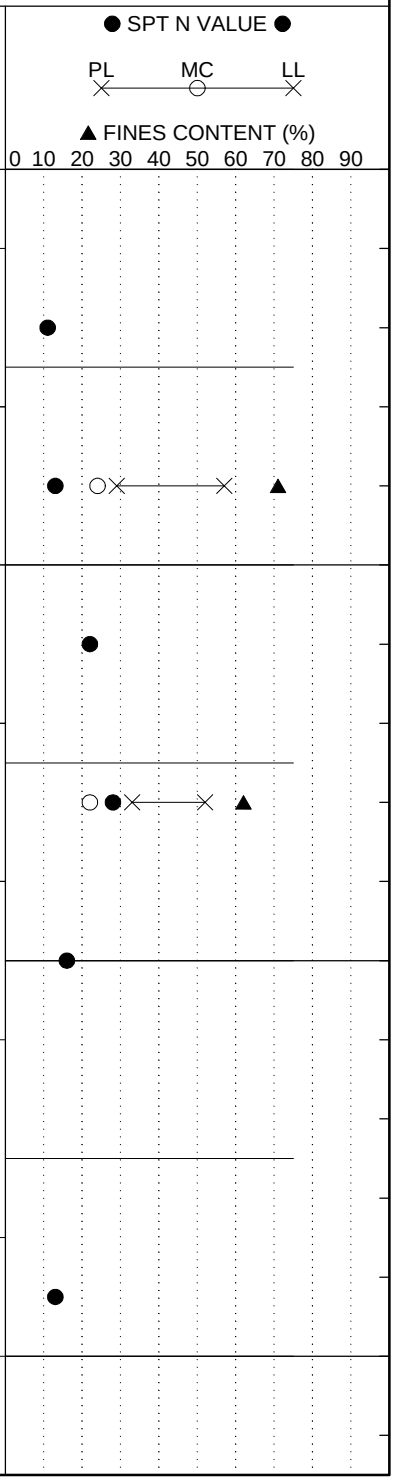
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-20		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-665		
Eng./Geo.:	N. Bradley	**Boring Location:**	1116+50	**Offset:**	23 RT	**Alignment:**	Reloc. CL
Elev.:	897.2 ft	**Latitude:**	35.055255	**Longitude:**	-81.791971	**Date Started:**	10/14/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
		Asphalt - 4.5" / **Concrete** - 7.5" / **Stone Base** - 5"						
	1.4	**Fill** - Stiff, slightly moist, red brown, sandy SILT with clay (ML) [A-5]	1.0	SS-1	4	6	5	11
	3.0	**Residuum** - Stiff to very stiff, slightly moist, red brown, fine, fat CLAY with sand (CH) [A-7-6 (20)] LL=57, PL=29, PI=28, NMC=24, %#200=71	3.0	SS-2	4	6	7	13
892.2			5.0	SS-3	4	11	11	22
	7.0	Very stiff, slightly moist, red brown, fine to medium, sandy elastic SILT (MH) [A-7-5 (11)] LL=52, PL=33, PI=19, NMC=22, %#200=62	7.0	SS-4	13	16	12	28
			9.0	SS-5	8	8	8	16
887.2	10.0	Very stiff to stiff, slightly moist, grayish red and yellowish brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-5]						
			13.5	SS-6	5	6	7	13
882.2	15.0	Boring Terminated at 15 feet						



LEGEND

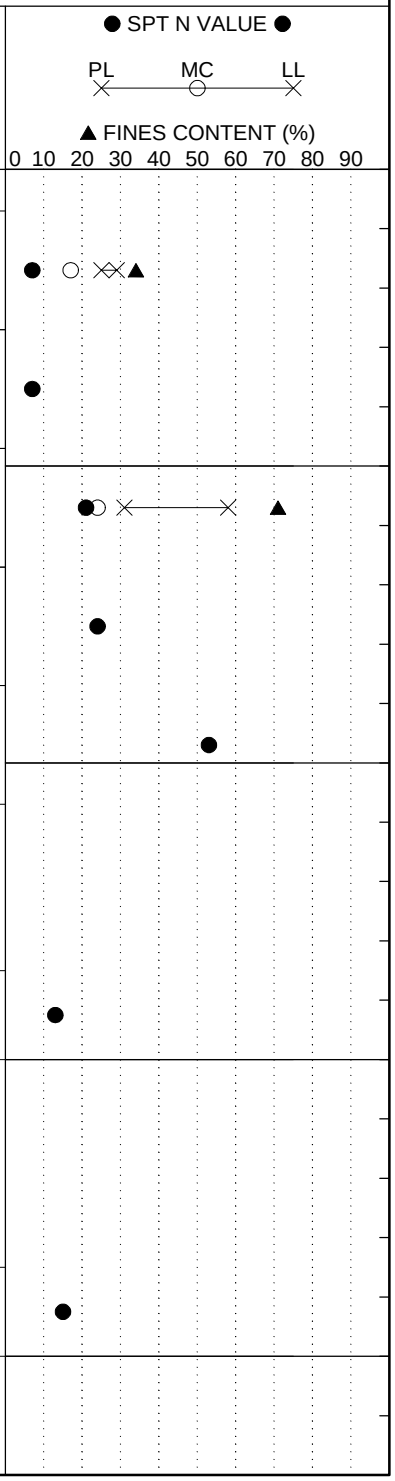
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-21		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	N. Bradley	**Boring Location:**	1141+15	**Offset:**	82 LT	**Alignment:**	Mainline
Elev.:	905.2 ft	**Latitude:**	35.057698	**Longitude:**	-81.784553	**Date Started:**	10/14/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.7	**Asphalt** - 3.5" / **Stone Base** - 5"						
		Fill - Loose, moist, brown red, slightly micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=29, PL=25, PI=4, NMC=17, %#200=34	0.7	SS-1	3	4	3	7
			2.7	SS-2	3	4	3	7
	4.0	**Fill** - Very stiff, slightly moist, red brown, fine, elastic SILT with sand (MH) [A-7-5 (20)] LL=58, PL=31, PI=27, NMC=24, %#200=71	4.7	SS-3	5	10	11	21
900.2	7.0	**Residuum** - Very stiff to hard, slightly moist, brown, red and white, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4]	6.7	SS-4	7	12	12	24
			8.7	SS-5	12	30	23	53
895.2	11.0	Stiff, slightly moist to moist, grayish red and yellowish brown, micaceous, fine, sandy SILT (ML) [A-4]						
			13.5	SS-6	5	6	7	13
890.2								
			18.5	SS-7	4	6	9	15
885.2	20.0	Boring Terminated at 20 feet						



LEGEND

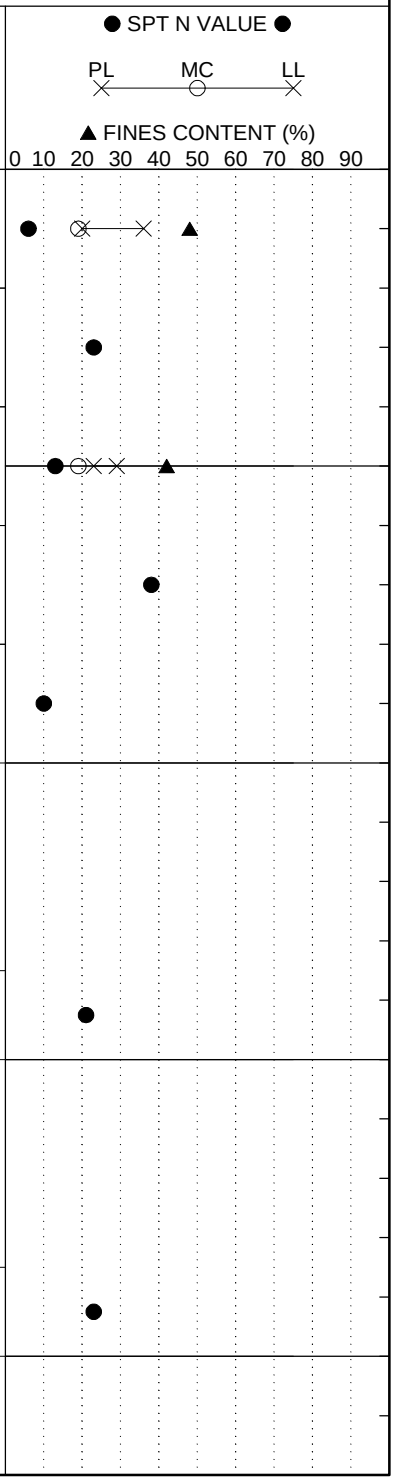
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-22
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-11-131
Eng./Geo.:	N. Bradley	**Boring Location:**	20+85	**Offset:**	10 LT
Alignment:	Reloc. CL				
Elev.:	902.5 ft	**Latitude:**	35.054226	**Longitude:**	-81.786975
Date Started:	10/9/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/9/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4"	0.0					
		Fill - Loose, moist, red brown, fine to coarse, clayey SAND (SC) [A-6 (4)], with gravel		SS-1	5	3	3	6
	2.0	LL=36, PL=20, PI=16, NMC=19, %#200=48	2.0					
		Residuum - Medium dense, slightly moist, red, brown and yellow, slightly micaceous, fine to coarse, silty SAND (SM) [A-4 (0)]		SS-2	8	9	14	23
		LL=29, PL=23, PI=6, NMC=19, %#200=42	4.0					
897.5				SS-3	5	6	7	13
	6.0	Dense, dry, reddish brown and yellowish brown, micaceous, fine, silty SAND (SM) [A-4], in thin cemented layers	6.0	SS-4	14	12	26	38
			8.0					
	9.0	Stiff to very stiff, slightly moist, grayish red and yellowish brown, slightly micaceous, fine, sandy SILT (ML) [A-4]		SS-5	12	6	4	10
892.5								
			13.5	SS-6	8	10	11	21
887.5								
	16.0	Medium dense, slightly moist, brown and yellowish brown, slightly micaceous, fine, silty SAND (SM) [A-2]						
			18.5	SS-7	10	12	11	23
882.5	20.0	Boring Terminated at 20 feet						



LEGEND

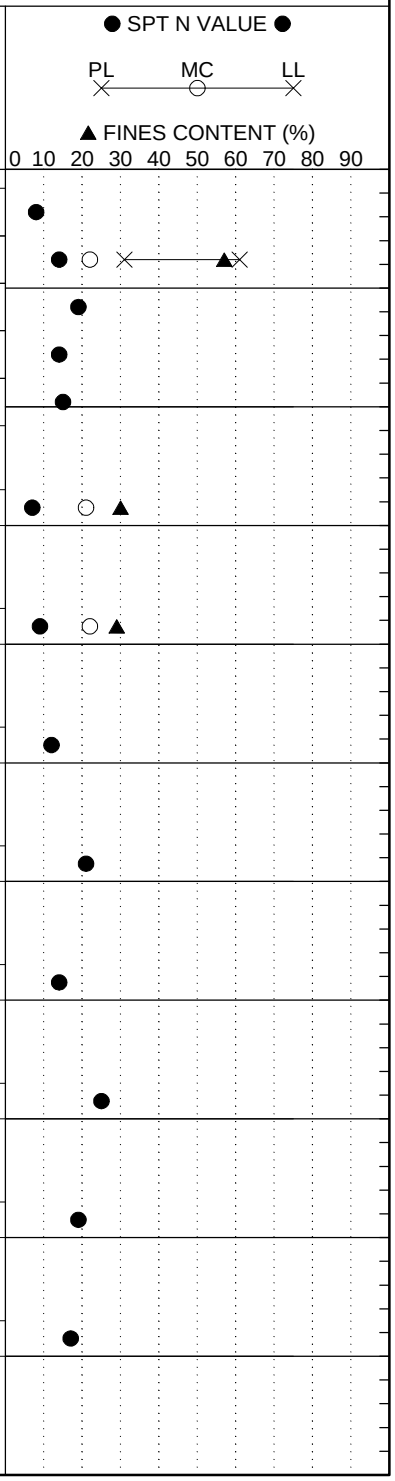
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-23
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1213+00	**Offset:**	96 LT
Alignment:	Mainline				
Elev.:	953.2 ft	**Latitude:**	35.069349	**Longitude:**	-81.765172
Date Started:	10/15/2015				
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft
Date Completed:	10/15/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement							
	0.8	**Asphalt** - 3.5" / **Stone Base** - 6"		0.8					
		Residuum - Firm to stiff, moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (15)]		2.8	SS-1	3	5	3	8
948.2	5.0	LL=61, PL=31, PI=30, NMC=22, %#200=57		4.8	SS-2	7	7	7	14
		Very stiff to stiff, slightly moist, light brownish red and yellow, slightly micaceous, fine, sandy SILT (ML) [A-4]		6.8	SS-3	7	9	10	19
				8.8	SS-4	6	8	6	14
943.2	11.0				SS-5	5	8	7	15
		Loose, slightly moist, light red, yellow, and brown, fine to medium, silty SAND (SM) [A-2]		13.5	SS-6	3	3	4	7
938.2		NMC=21, %#200=30							
		NMC=22, %#200=29		18.5	SS-7	4	4	5	9
933.2	22.0								
		Stiff, slightly moist, white, brown and gray, slightly micaceous, fine to medium, sandy SILT (ML) [A-4]		23.5	SS-8	6	6	6	12
928.2	28.0			28.5	SS-9	9	11	10	21
		Medium dense, slightly moist, brown, yellow and black, micaceous, fine, silty SAND (SM) [A-4]							
923.2	33.0			33.5	SS-10	8	6	8	14
		Stiff to very stiff, slightly moist, grayish brown and brownish yellow, micaceous to slightly micaceous, fine, sandy SILT (ML) [A-4]		38.5	SS-11	11	13	12	25
918.2									
913.2	42.0			43.5	SS-12	6	8	11	19
		Medium dense, slightly moist to moist, white, yellowish brown and gray, micaceous, fine, silty SAND (SM) [A-4], with trace coarse sand		48.5	SS-13	5	7	10	17
908.2									
903.2	50.0	Boring Terminated at 50 feet							



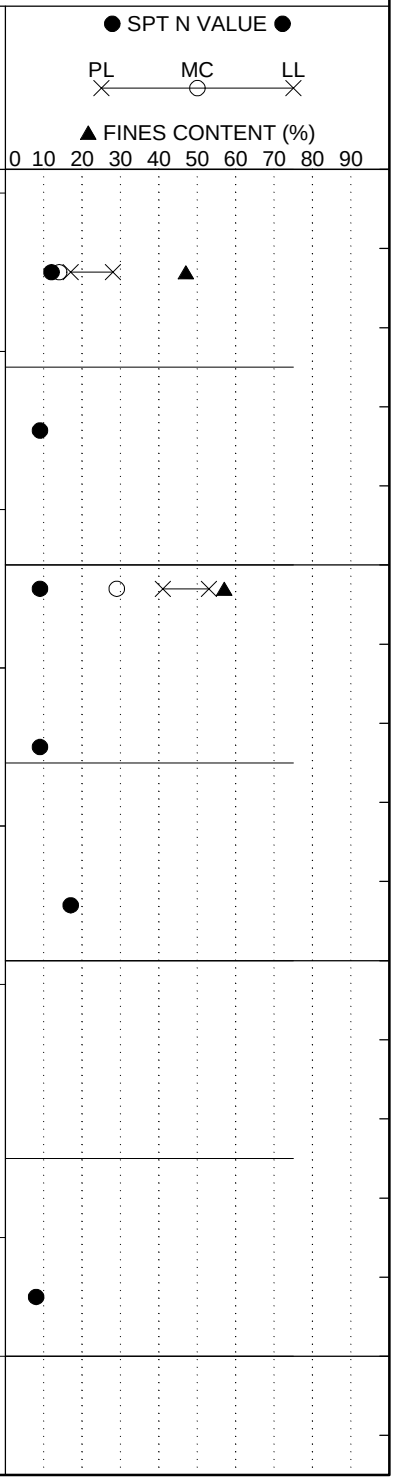
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-24		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	Cann. Campg.		
Eng./Geo.:	N. Bradley	**Boring Location:**	302+00	**Offset:**	8 LT	**Alignment:**	Exist. CL
Elev.:	907.0 ft	**Latitude:**	35.067745	**Longitude:**	-81.764353	**Date Started:**	10/15/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/15/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.5	**Asphalt** - 3" / **Stone Base** - 3"	0.3					
		Fill - Medium dense, slightly moist, red brown, slightly micaceous, fine, clayey SAND (SC) [A-6 (2)] LL=28, PL=17, PI=11, NMC=14, %#200=47		SS-1	5	7	5	12
	2.5	**Residuum** - Stiff, slightly moist to moist, grayish red and yellowish brown, slightly micaceous to micaceous, fine, sandy elastic SILT (MH) [A-7-5 (7)], with layers of silt LL=53, PL=41, PI=12, NMC=29, %#200=57	2.3	SS-2	3	5	4	9
902.0			4.3	SS-3	4	4	5	9
			6.3	SS-4	4	4	5	9
			8.3	SS-5	5	9	8	17
897.0	9.0	Very stiff to firm, slightly moist, red, brownish yellow and dark brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4], with some coarse sand						
			13.5	SS-6	3	4	4	8
892.0	15.0	Boring Terminated at 15 feet						



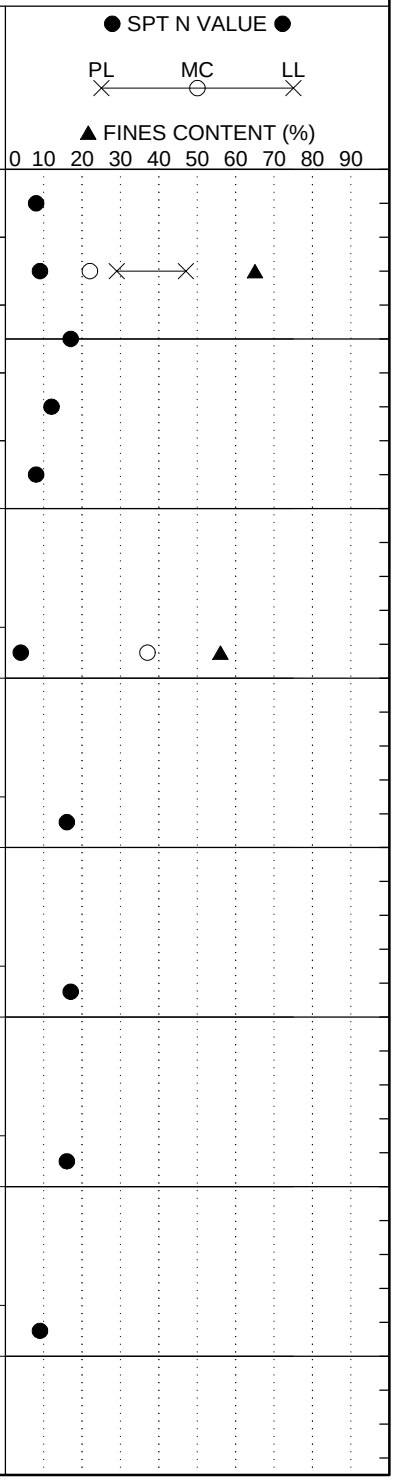
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-25
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 87
Eng./Geo.:	J. Jansante	**Boring Location:**	1225+50	**Offset:**	15 RT
Alignment:	Ramp C				
Elev.:	881.9 ft	**Latitude:**	35.070414	**Longitude:**	-81.761194
Date Started:	10/9/2015				
Total Depth:	35 ft	**Soil Depth:**	35 ft	**Core Depth:**	0 ft
Date Completed:	10/9/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 28 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.1	**Topsoil** - 1"		0.0	SS-1	2	3	5	8
		Residuum - Firm to stiff, moist to slightly moist, brownish red, slightly micaceous, fine, sandy SILT (ML) [A-7-6 (11)]		2.0	SS-2	1	3	6	9
	4.0	LL=47, PL=29, PI=18, NMC=22, %#200=65		4.0					
876.9		Very stiff to firm, slightly moist, brown red and yellowish brown, slightly micaceous, fine, sandy SILT (ML) [A-4]			SS-3	5	7	10	17
				6.0	SS-4	3	6	6	12
				8.0	SS-5	3	3	5	8
871.9									
	12.0	Soft, moist, red, brown and white, fine, sandy SILT (ML) [A-4]							
		NMC=37, %#200=56		13.5	SS-6	1	1	3	4
866.9									
	18.0	Medium dense, moist, dark brown and yellow, micaceous, fine, silty SAND (SM) [A-4]		18.5	SS-7	5	6	10	16
861.9									
				23.5	SS-8	5	9	8	17
856.9									
	27.0	Very stiff to stiff, moist to very moist, dark brown, yellow and gray, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4]		28.5	SS-9	6	7	9	16
851.9									
				33.5	SS-10	2	2	7	9
846.9	35.0	Boring Terminated at 35 feet							



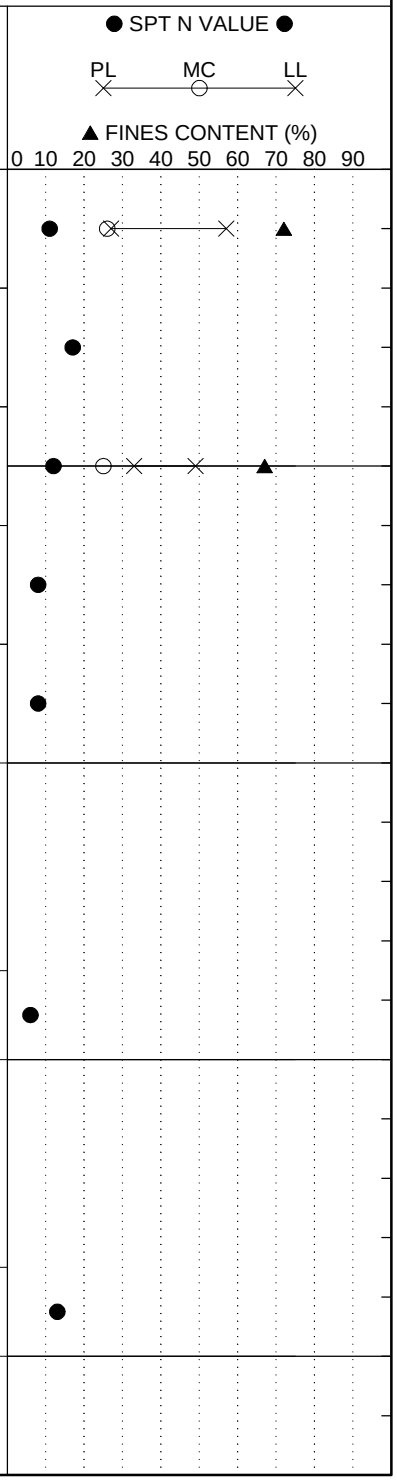
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-26
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85, Exit 87
Eng./Geo.:	J. Jansante	**Boring Location:**	1226+45	**Offset:**	50 RT	**Alignment:**	Ramp B
Elev.:	891.9 ft	**Latitude:**	35.071638	**Longitude:**	-81.761678	**Date Started:**	10/12/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/12/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	Caved 8'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground	0.0	SS-1	2	5	6	11
	0.2	**Topsoil** - 2"	2.0	SS-2	7	8	9	17
	2.0	**Residuum** - Stiff, slightly moist, reddish brown, fine, fat CLAY with sand (CH) [A-7-6 (22)] LL=57, PL=27, PI=30, NMC=27, %#200=72 Very stiff to stiff, slightly moist, brownish red, fine, sandy SILT (ML) [A-7-5 (11)] LL=49, PL=33, PI=16, NMC=25, %#200=67	4.0	SS-3	4	5	7	12
886.9	6.0	Firm to stiff, slightly moist to moist, brownish yellow, grayish red and white, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4], with some kaolin layers below 13 feet	6.0	SS-4	3	4	4	8
			8.0	SS-5	3	4	4	8
881.9			13.5	SS-6	2	3	3	6
876.9			18.5	SS-7	6	5	8	13
871.9	20.0	Boring Terminated at 20 feet						



LEGEND

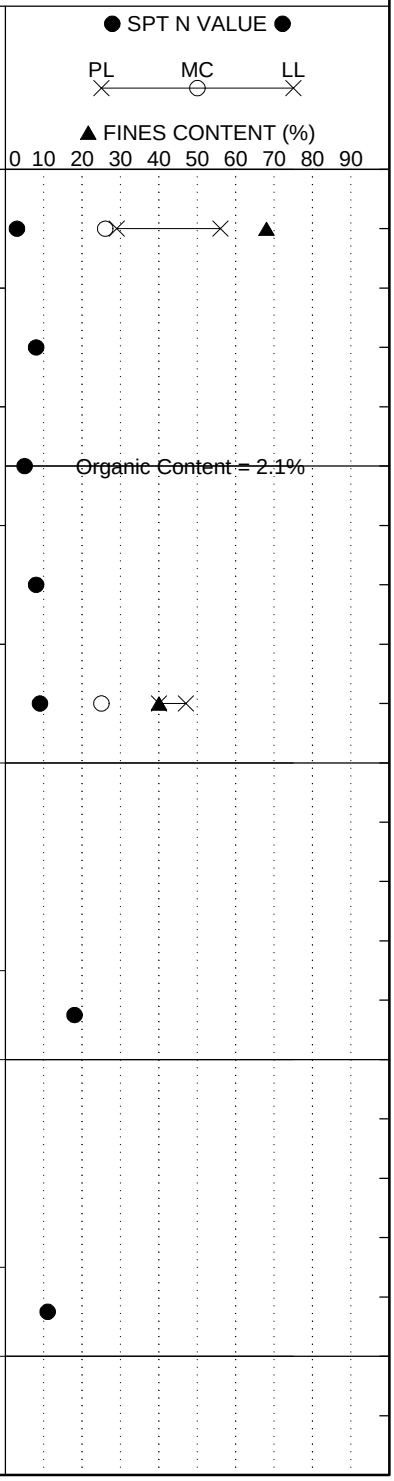
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-27
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	S-11-39
Eng./Geo.:	J. Jansante	**Boring Location:**	116+50	**Offset:**	20 LT	**Alignment:**	Reloc. CL
Elev.:	876.8 ft	**Latitude:**	35.074049	**Longitude:**	-81.7616498	**Date Started:**	10/12/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/12/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"	0.0	SS-1	1	1	2	3
	2.0	**Fill** - Soft, moist, red brown, slightly micaceous, fine to medium, sandy fat CLAY (CH) [A-7-6 (18)] LL=56, PL=29, PI=27, NMC=26, %#200=68	2.0	SS-2	2	3	5	8
		Fill - Firm, moist, brownish red and brown, slightly micaceous, fine, sandy SILT (ML) [A-4], with roots and organic material below 4'	4.0	SS-3	1	2	3	5
871.8	6.0	**Residuum** - Loose to medium dense, slightly moist to moist, brownish yellow, grayish red and dark brown, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-5 (0)] LL=47, PL=40, PI=7, NMC=25, %#200=40	6.0	SS-4	3	4	4	8
			8.0	SS-5	2	3	6	9
866.8			13.5	SS-6	5	10	8	18
861.8	16.0	Stiff, very moist, reddish brown and yellowish brown, micaceous, fine, SILT with sand (ML) [A-4]	18.5	SS-7	6	6	5	11
856.8	20.0	Boring Terminated at 20 feet						

Graphic Log



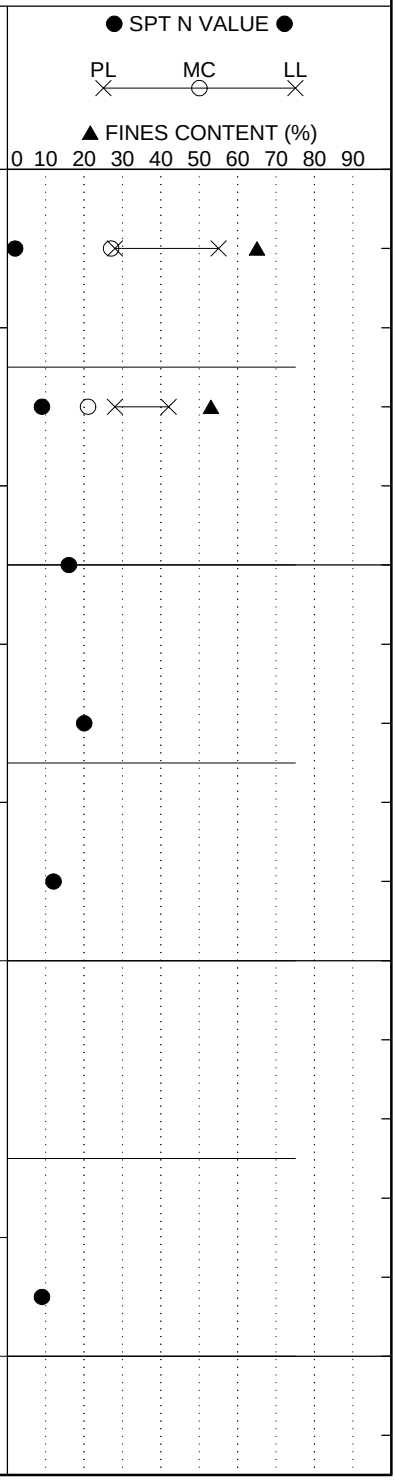
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-28
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-11-39
Eng./Geo.:	N. Bradley	**Boring Location:**	142+55	**Offset:**	40 LT
Alignment:	Reloc. CL				
Elev.:	869.1 ft	**Latitude:**	35.067442	**Longitude:**	-81.7583296
Date Started:	10/8/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	10/8/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3"		0.0					
		Fill - Very soft, moist, red brown, fine, sandy fat CLAY (CH) [A-7-6 (17)] LL=55, PL=28, PI=27, NMC=27, %#200=65			SS-1	1	1	1	2
	2.0	**Possible Fill** - Stiff, moist, red brown, fine to medium, sandy SILT (ML) [A-7-6 (5)] LL=42, PL=28, PI=14, NMC=21, %#200=53		2.0	SS-2	3	4	5	9
	4.0	**Residuum** - Very stiff to stiff, slightly moist, dark brown, grayish red and brown, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4]		4.0	SS-3	5	7	9	16
864.1				6.0	SS-4	5	9	11	20
				8.0	SS-5	5	7	5	12
859.1	11.0	Stiff, moist, yellowish brown and dark brown, SILT (ML) [A-4], with trace fine sand		13.5	SS-6	5	5	4	9
854.1	15.0	Boring Terminated at 15 feet							



LEGEND

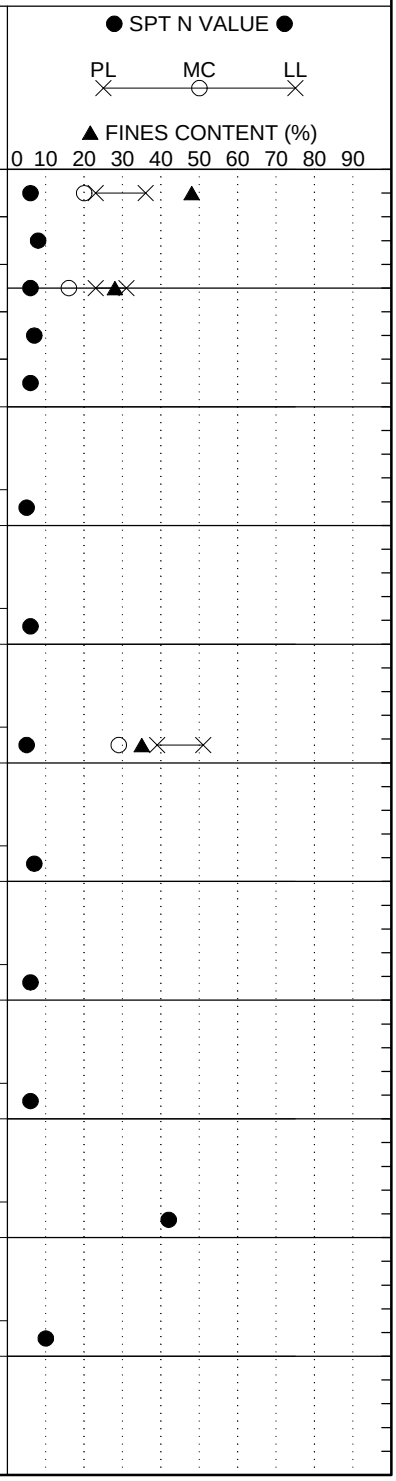
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-29
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 87
Eng./Geo.:	J. Jansante	**Boring Location:**	1233+20	**Offset:**	30 LT
Alignment:	Ramp A				
Elev.:	868.1 ft	**Latitude:**	35.072799	**Longitude:**	-81.759518
Date Started:	10/12/2015				
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft
Date Completed:	10/12/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 14 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	Top of Ground
	0.1	**Topsoil** - 1 inch
863.1		**Fill** - Loose, moist to moist, brown red, slightly micaceous, fine to coarse, clayey SAND (SC) [A-6 (3) / A-2-4], with gravel, with decaying wood pieces below 6'
		LL=36, PL=23, PI=13, NMC=20, %#200=48
	8.0	LL=31, PL=23, PI=8, NMC=16, %#200=28
858.1		**Possible Alluvium** - Loose, very moist, brownish gray, fine to medium, clayey SAND (SC) [A-6]
	12.0	
853.1		**Possible Alluvium** - Firm, very moist, light brownish gray and brown, fine, sandy CLAY (CL) [A-6], with trace organics
	16.0	
848.1		**Residuum** - Firm, wet, brown, yellow and gray, micaceous to very micaceous, fine, sandy SILT (ML) [A-4]
	23.0	
843.1		Loose, wet, gray, white and brown, micaceous to very micaceous, fine to medium, silty SAND (SM) [A-2-7 (0)]
		LL=51, PL=39, PI=12, NMC=29, %#200=35
838.1		
	32.0	
833.1		Firm, wet, light grayish brown and light yellow, micaceous, fine, sandy SILT (ML) [A-4]
828.1		
	42.0	
823.1		Hard, wet, brown, very micaceous, fine, sandy SILT (ML) [A-4], in thin cemented layers
	46.0	
818.1		Loose, wet, light grayish brown and yellowish brown, micaceous, fine, silty SAND (SM) [A-4]
	50.0	
		Boring Terminated at 50 feet

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS-1	1	3	3	6
2.0	SS-2	2	4	4	8
4.0	SS-3	1	2	4	6
6.0	SS-4	2	4	3	7
8.0	SS-5	6	3	3	6
13.5	SS-6	2	2	3	5
18.5	SS-7	2	2	4	6
23.5	SS-8	WOH	2	3	5
28.5	SS-9	3	3	4	7
33.5	SS-10	2	2	4	6
38.5	SS-11	2	3	3	6
43.5	SS-12	9	25	17	42
48.5	SS-13	3	4	6	10



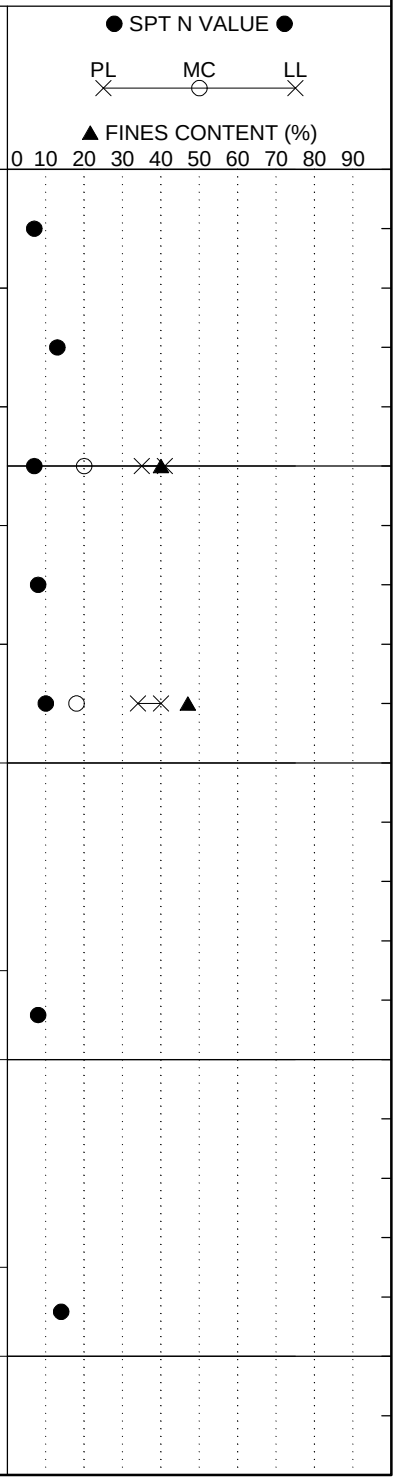
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-30
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85, Exit 87
Eng./Geo.:	J. Jansante	**Boring Location:**	1238+80	**Offset:**	25 RT	**Alignment:**	Ramp D
Elev.:	865.3 ft	**Latitude:**	35.072386	**Longitude:**	-81.757465	**Date Started:**	10/9/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/9/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.1	**Topsoil** - 1"							
		Possible Fill - Firm, moist, brownish red, slightly micaceous, elastic SILT with sand (MH) [A-7]		0.0	SS-1	1	3	4	7
				2.0	SS-2	3	7	6	13
	3.0	**Residuum** - Medium dense to loose, slightly moist, yellowish brown and red, micaceous, fine to medium, silty SAND (SM) [A-5 (0)]		4.0					
860.3		LL=41, PL=35, PI=6, NMC=20, %#200=40			SS-3	1	3	4	7
	6.0	Loose, slightly moist to moist, grayish red and yellowish brown, micaceous, fine, silty SAND (SM) [A-4 (1)]		6.0	SS-4	1	4	4	8
		LL=40, PL=34, PI=6, NMC=18, %#200=47		8.0	SS-5	4	4	6	10
855.3									
				13.5	SS-6	3	4	4	8
850.3	16.0	Stiff, moist, grayish red, fine, sandy SILT (ML) [A-4], with layers of light gray fine sand							
				18.5	SS-7	2	5	9	14
845.3	20.0	Boring Terminated at 20 feet							



LEGEND

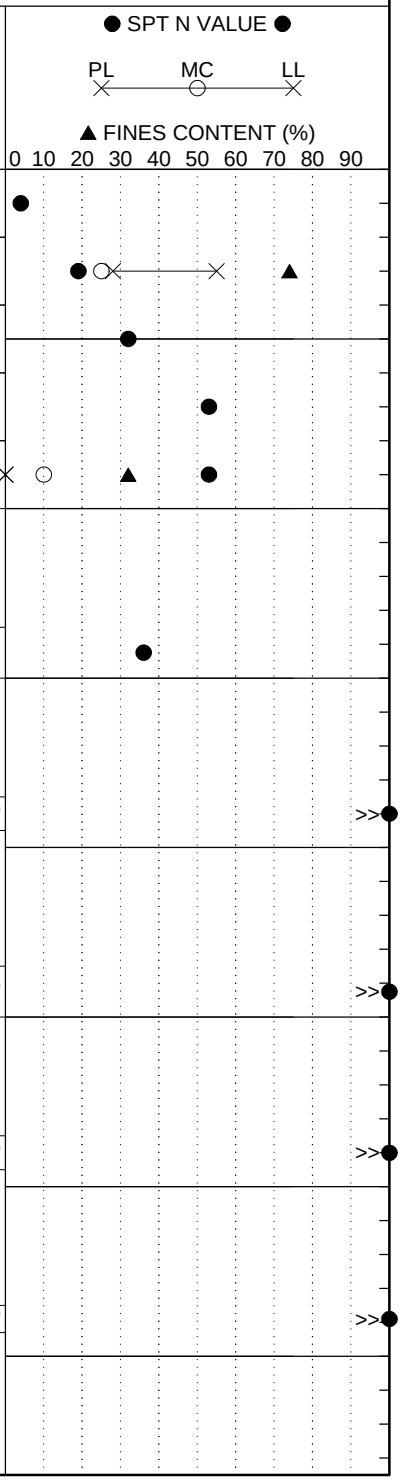
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-31
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1250+40	**Offset:**	120 RT
Alignment:	Mainline				
Elev.:	881.5 ft	**Latitude:**	35.0730096	**Longitude:**	-81.753712
Date Started:	10/9/2015				
Total Depth:	35 ft	**Soil Depth:**	35 ft	**Core Depth:**	0 ft
Date Completed:	10/9/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.5	**Topsoil** - 6 inches	0.0	SS-1	2	2	2	4
	2.0	**Possible Fill** - Soft, moist, red, elastic SILT (MH) [A-7]	2.0	SS-2	6	8	11	19
	5.0	**Residuum** - Very stiff, slightly moist, red brown, fat CLAY with fine sand (CH) [A-7-6 (21)] LL=55, PL=28, PI=27, NMC=25, %#200=74	4.0	SS-3	15	19	13	32
876.5			6.0	SS-4	14	23	30	53
		Dense to very dense, slightly moist, red, brown and yellow, micaceous, fine to medium, silty SAND (SM) [A-2-4], with trace rock fragments LL=PL=PI="NP", NMC=10, %#200=32	8.0	SS-5	17	26	27	53
871.5								
	12.0	Hard, slightly moist, dark brown and dark red, micaceous, fine to medium, sandy SILT (ML) [A-4]	13.5	SS-6	11	12	24	36
866.5								
	18.0	**Partially Weathered Rock** - Very hard, moist, dark brown, yellowish brown and red, micaceous, fine to coarse, sandy SILT (ML) [A-4], with clay seams and trace rock fragments	18.5	SS-7	22	50/4"		50/4"
861.5			23.5	SS-8	26	28	50/3"	50/3"
856.5	26.0	**Partially Weathered Rock** - Very dense, slightly moist to dry, dark reddish brown and yellowish brown, micaceous, fine, silty SAND (SM) [A-2], in thin cemented layers	28.5	SS-9	47	50/4"		50/4"
851.5			33.5	SS-10	50/3"			50/3"
846.5	35.0	Boring Terminated at 35 feet						



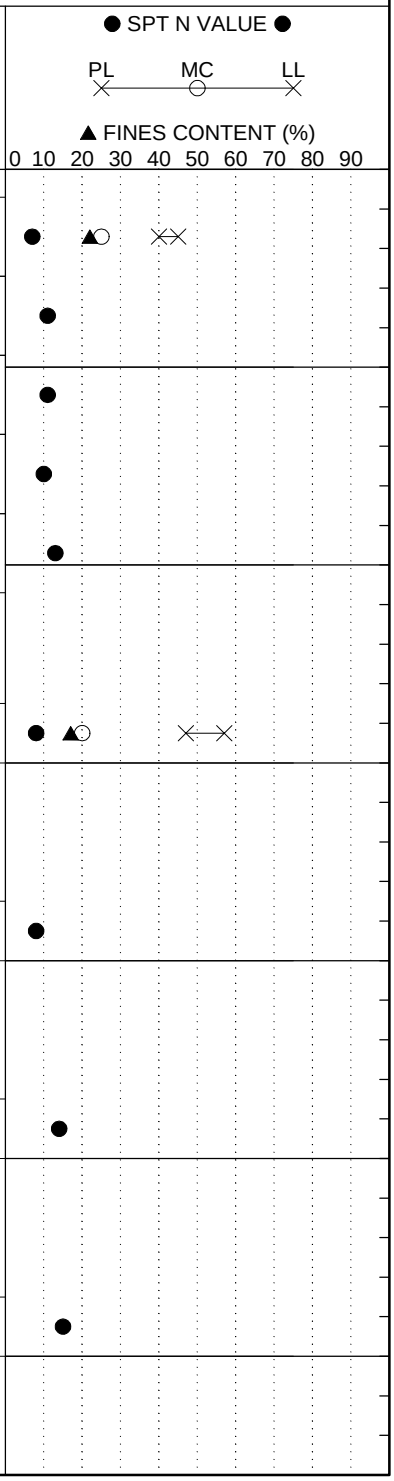
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-32
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1302+10	**Offset:**	110 LT
Alignment:	Mainline				
Elev.:	778.9 ft	**Latitude:**	35.075898	**Longitude:**	-81.7368299
Date Started:	10/15/2015				
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft
Date Completed:	10/15/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.7	**Asphalt** - 2.5" / **Stone Base** - 6"	0.7					
	3.0	**Fill** - Loose, slightly moist, brown and yellow, slightly micaceous, fine to medium, silty SAND (SM) [A-2-5] LL=45, PL=40, PI=5, NMC=25, %#200=22	2.7	SS-1	2	3	4	7
			4.7	SS-2	4	5	6	11
773.9		**Residuum** - Stiff, slightly moist, yellowish brown and grayish red, micaceous to very micaceous, fine, sandy SILT (ML) [A-5]	6.7	SS-3	5	5	6	11
			8.7	SS-4	5	4	6	10
768.9				SS-5	5	7	6	13
	13.0	Loose, slightly moist, grayish brown and brown, micaceous to very micaceous, fine to medium, silty SAND (SM) [A-2-5] LL=57, PL=47, PI=10, NMC=20, %#200=17	13.5	SS-6	6	4	4	8
763.9			18.5	SS-7	6	4	4	8
758.9								
	23.0	Stiff, slightly moist, grayish brown and brown, micaceous to very micaceous, fine, sandy SILT (ML) [A-5]	23.5	SS-8	6	6	8	14
753.9			28.5	SS-9	5	7	8	15
748.9	30.0	Boring Terminated at 30 feet						



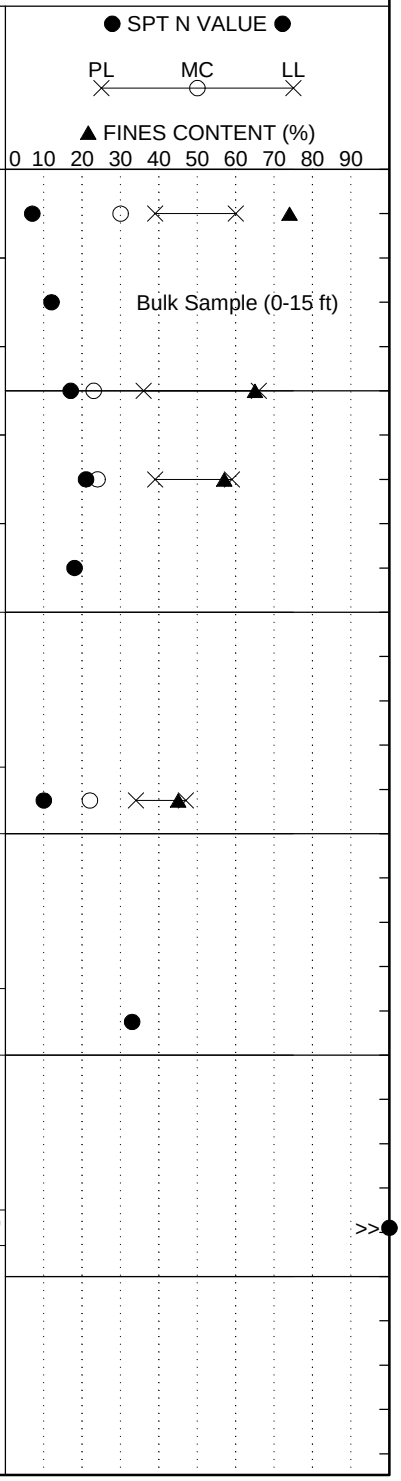
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-33
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1347+10	**Offset:**	120 RT
Alignment:	Mainline				
Elev.:	738.4 ft	**Latitude:**	35.077614	**Longitude:**	-81.721863
Date Started:	10/26/2015				
Total Depth:	26.8 ft	**Soil Depth:**	26.8 ft	**Core Depth:**	0 ft
Date Completed:	10/26/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.1	**Topsoil** - 1 inch	0.0	SS-1	1	3	4	7
		Residuum - Firm to stiff, moist to slightly moist, reddish brown, elastic SILT with sand (MH) [A-7-5 (18)] LL=60, PL=39, PI=21, NMC=30, %#200=74	2.0	SS-2	3	5	7	12
	4.0	Very stiff, slightly moist, reddish brown and yellowish brown, micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (11/20)] LL=59, PL=39, PI=20, NMC=24, %#200=57 LL=66, PL=36, PI=30, NMC=23, %#200=65 (Bulk Sample, 0-15')	4.0	SS-3	7	8	9	17
733.4			6.0	SS-4	9	11	10	21
	8.0	Medium dense to loose, slightly moist, reddish brown, light brown and white, micaceous, fine to medium, silty SAND (SM) [A-7-5 (3)] LL=47, PL=34, PI=13, NMC=22, %#200=45	8.0	SS-5	6	10	8	18
728.4			13.5	SS-6	3	4	6	10
723.4	18.0	Dense, slightly moist to moist, dark red, light brown and black, fine to coarse, silty SAND (SM) [A-2]	18.5	SS-7	10	18	15	33
718.4	23.0	**Partially Weathered Rock** - Very dense, moist, brown, yellowish brown and white, fine to coarse, silty SAND (SM) [A-2]	23.5	SS-8	50/5"			50/5"
713.4	26.8	Auger Refusal Encountered at 26.8 feet; Boring Terminated						



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 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-34
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1428+00	**Offset:**	85 LT
Alignment:	Mainline				
Elev.:	782.0 ft	**Latitude:**	35.087379	**Longitude:**	-81.697883
Date Started:	10/21/2015				
Total Depth:	5 ft	**Soil Depth:**	5 ft	**Core Depth:**	0 ft
Date Completed:	10/21/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Top of Ground								
		Residuum - Medium dense, slightly moist, brown, tan and white, fine to medium, silty SAND (SM) [A-4 (0)] LL=35, PL=30, PI=5, NMC=20, %#200=46		0.0	SS-1	3	5	7	12	
	2.0	**Partially Weathered Rock** - Very dense, moist, brown, tan and white, fine to coarse, silty SAND (SM) [A-2], with rock fragments		2.0	SS-2	50/2"			50/2"	>>
				4.0	SS-3	28	50/4"		50/4"	>>
777.0	5.0	Auger Refusal Encountered at 5 feet; Boring Terminated [Offset 10' upstation/north, and encountered similar refusal conditions at 2.5']								

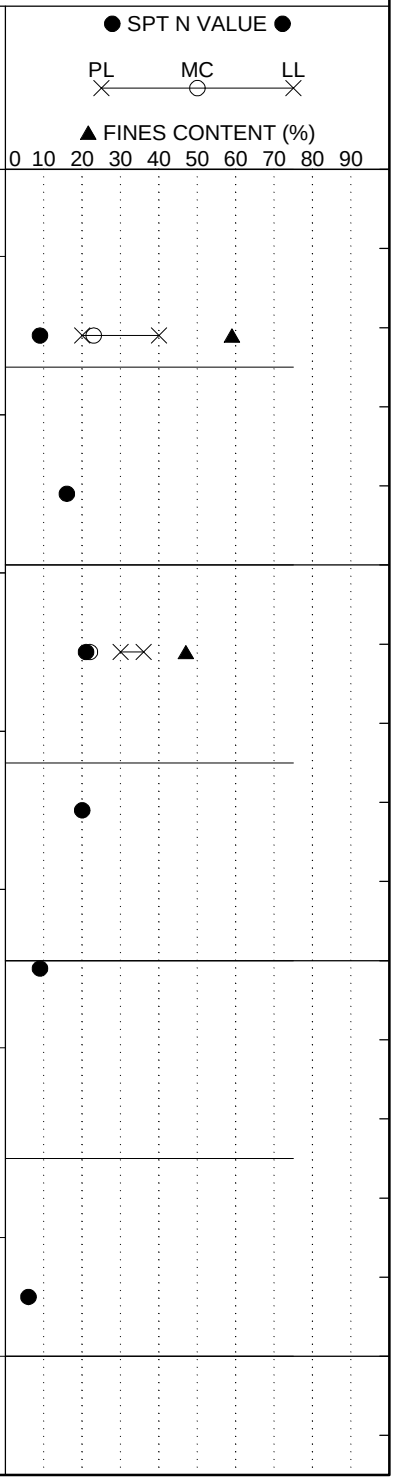
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-35
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1473+00	**Offset:**	95 LT	**Alignment:**	Mainline
Elev.:	837.8 ft	**Latitude:**	35.094347	**Longitude:**	-81.685511	**Date Started:**	10/16/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/16/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 13 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement							
		Asphalt - 7" / **Stone Base** - 6"							
	1.1	**Residuum** - Stiff to very stiff, moist to slightly moist, brown red, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-6 (9)] LL=40, PL=20, PI=20, NMC=23, %#200=59		1.1	SS-1	3	5	4	9
				3.1	SS-2	3	6	10	16
832.8	5.0	Medium dense, slightly moist, yellowish brown and red, micaceous, fine to medium, silty SAND (SM) [A-4 (1)] LL=36, PL=30, PI=6, NMC=22, %#200=47		5.1	SS-3	6	11	10	21
				7.1	SS-4	6	10	10	20
	9.0	Firm, moist to very moist, brownish yellow, white and gray, slightly micaceous, fine to medium, sandy SILT (ML) [A-4], with layers of kaolin		9.1	SS-5	4	5	4	9
827.8									
				13.5	SS-6	2	2	4	6
822.8	15.0	Boring Terminated at 15 feet							



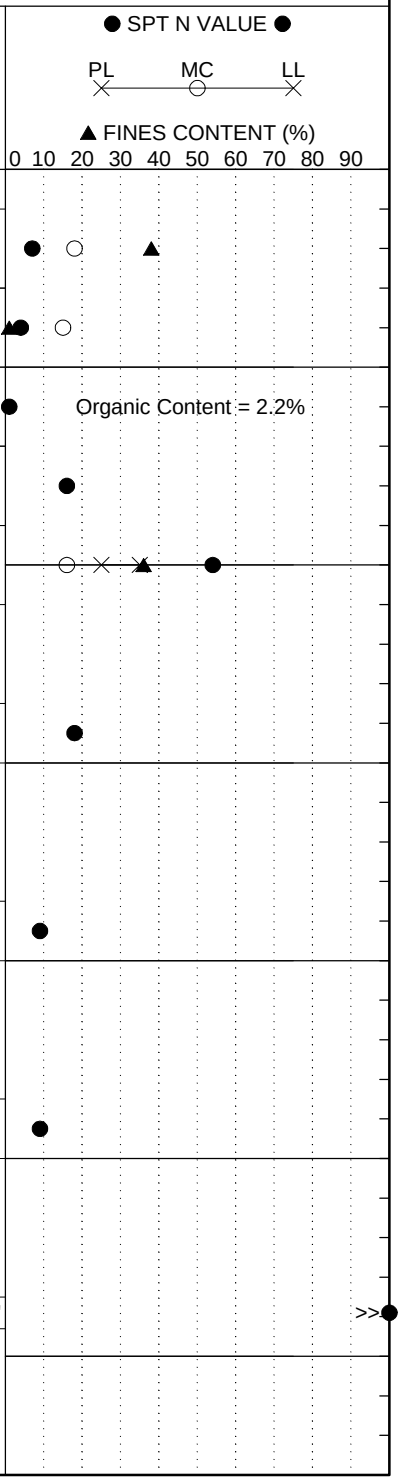
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-36
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1484+00	**Offset:**	95 LT	**Alignment:**	Mainline
Elev.:	791.3 ft	**Latitude:**	35.095937	**Longitude:**	-81.682304	**Date Started:**	10/15/2015
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft	**Date Completed:**	10/15/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 5 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	1.0	**Asphalt** - 7.5" / **Stone Base** - 4.5"	1.0					
	3.0	**Fill** - Loose, moist, brown, fine to medium, clayey SAND (SC) [A-2] NMC=18, %#200=38	3.0	SS-1	3	4	3	7
786.3	5.0	**Alluvium** - Very loose, wet, orange tan, medium to coarse SAND (SP) [A-1-b], with trace gravel; NMC=15, %#200=1	5.0	SS-2	2	2	2	4
	7.0	**Alluvium** - Very loose, wet, brownish gray, fine to medium, clayey SAND (SC) [A-2], with wood pieces and gravel	7.0	SS-3	WOH	1	WOH	1
	9.0	**Alluvium** - Medium dense, wet, orange brown, medium to coarse, SAND with silt (SP-SM) [A-1]	9.0	SS-4	3	5	11	16
781.3		**Residuum** - Very dense to medium dense, moist to slightly moist, brown, yellow and gray, micaceous, fine to medium, silty SAND (SM) [A-4 (0)] LL=35, PL=25, PI=10, NMC=16, %#200=36		SS-5	26	30	24	54
			13.5	SS-6	6	8	10	18
776.3	16.0	Loose, very moist to wet, dark brown, grayish brown and white, very micaceous to micaceous, fine to medium, silty SAND (SM) [A-2], with trace clay and coarse sand	18.5	SS-7	6	5	4	9
771.3								
			23.5	SS-8	2	3	6	9
766.3	27.0	**Partially Weathered Rock** - Very dense, moist, gray and tan, fine to coarse, silty SAND (SM) [A-2-4]	28.5	SS-9	50/4"			50/4"
761.3	30.0	Boring Terminated at 30 feet						



LEGEND

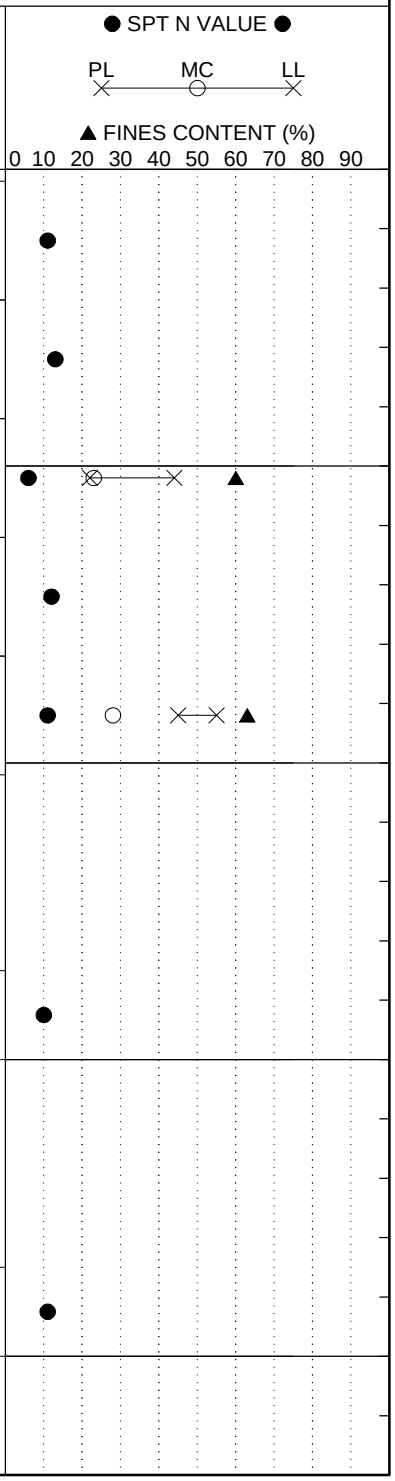
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-37
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Wells	**Boring Location:**	1563+50	**Offset:**	70 RT
Alignment:	Mainline				
Elev.:	784.0 ft	**Latitude:**	35.096598	**Longitude:**	-81.655923
Date Started:	10/4/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/4/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.6	**Asphalt** - 2" / **Stone Base** - 5"						
		Fill - Stiff to firm, slightly moist, red brown, fine to medium, sandy lean CLAY (CL) [A-7-6 (11)] LL=47, PL=25, PI=22, NMC=21, %#200=56	0.2	SS-1	4	4	7	11
			2.2	SS-2	4	5	8	13
			4.2	SS-3	2	2	4	6
779.0	6.0	**Residuum** - Stiff, slightly moist, brownish red, slightly micaceous, sandy elastic SILT (MH) [A-5 (8)] LL=55, PL=45, PI=10, NMC=28, %#200=63	6.2	SS-4	2	4	8	12
			8.2	SS-5	3	4	7	11
774.0	12.0	Stiff, slightly moist to moist, grayish brown, yellow and red, micaceous, fine, sandy SILT (ML) [A-4]	13.5	SS-6	3	4	6	10
769.0			18.5	SS-7	3	5	6	11
764.0	20.0	Boring Terminated at 20 feet						



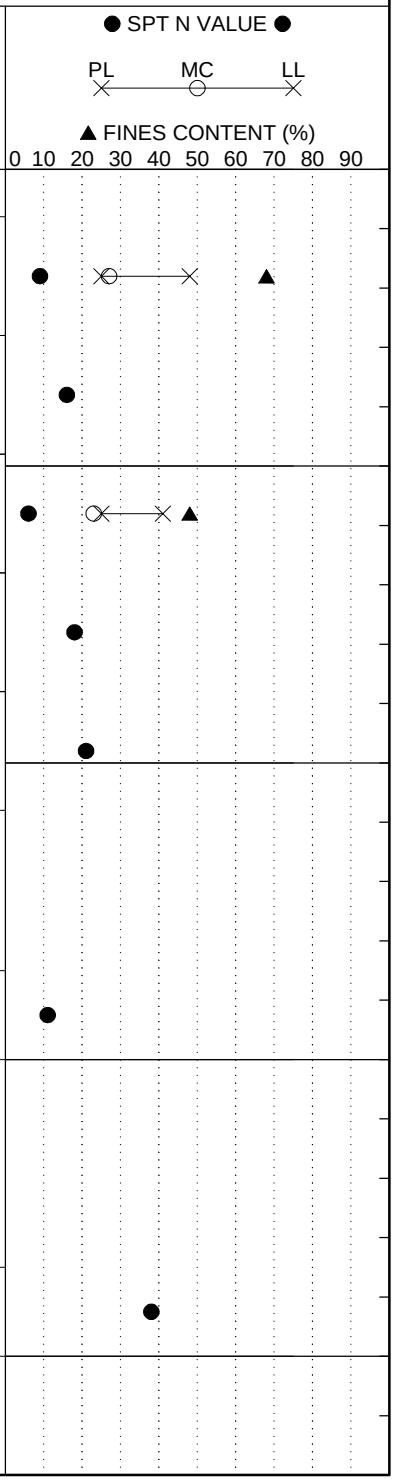
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-38
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1601+00	**Offset:**	75 LT	**Alignment:**	Mainline
Elev.:	745.8 ft	**Latitude:**	35.101452	**Longitude:**	-81.644829	**Date Started:**	10/19/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.8	**Asphalt** - 5" / **Stone Base** - 4"						
		Fill - Stiff, slightly moist, red brown, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-7-6 (15)] LL=48, PL=25, PI=23, NMC=27, %#200=68	0.8	SS-1	4	5	4	9
	3.0	**Fill** - Medium dense, slightly moist, gray brown, fine to coarse, silty SAND (SM) [A-2]	2.8	SS-2	3	5	11	16
740.8	5.0	**Fill** - Loose to medium dense, slightly moist, red, orange and brown, fine to medium, clayey SAND (SC) [A-7-6 (5)] LL=41, PL=25, PI=16, NMC=23, %#200=48	4.8	SS-3	3	2	4	6
			6.8	SS-4	8	9	9	18
	9.0	**Residuum** - Very stiff to stiff, slightly moist, tan brown, slightly micaceous, sandy SILT (ML) [A-4]	8.8	SS-5	7	10	11	21
735.8								
			13.5	SS-6	5	6	5	11
730.8								
	17.0	Dense, moist, black and brown, slightly micaceous, fine to coarse, silty SAND (SM) [A-4]	18.5	SS-7	2	8	30	38
725.8	20.0	Boring Terminated at 20 feet						



LEGEND

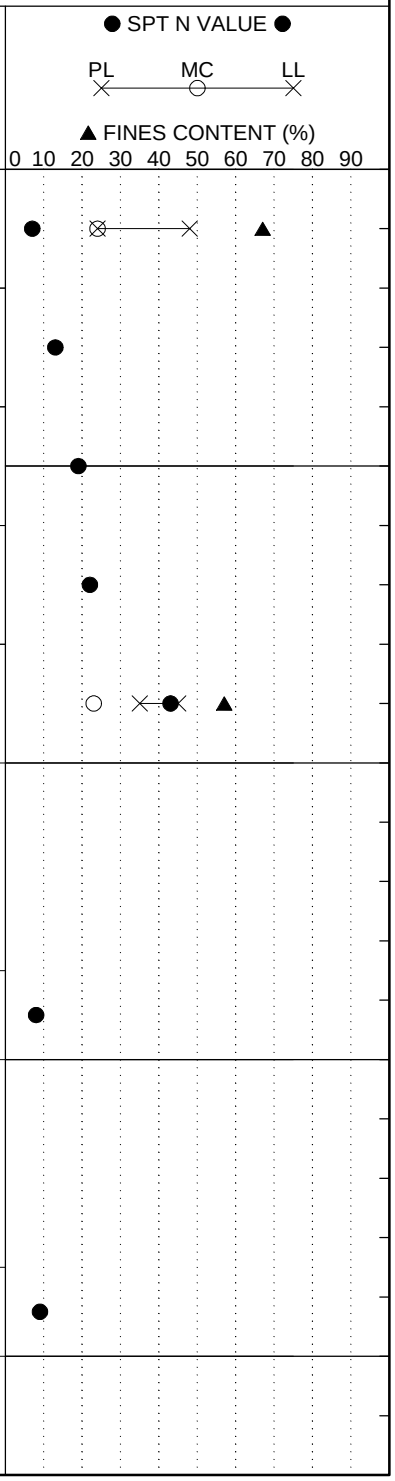
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-39		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante	**Boring Location:**	1621+00	**Offset:**	76 RT	**Alignment:**	Mainline
Elev.:	714.3 ft	**Latitude:**	35.102123	**Longitude:**	-81.6382699	**Date Started:**	10/22/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/22/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 16 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"	0.0					
		Fill - Firm to stiff, moist, brownish red, fine to medium, sandy lean CLAY (CL) [A-7-6 (15)] LL=48, PL=24, PI=24, NMC=24, %#200=67		SS-1	2	3	4	7
			2.0	SS-2	5	6	7	13
	4.0	**Residuum** - Very stiff, moist, brownish red, sandy CLAY (CL) [A-6]	4.0					
709.3				SS-3	7	10	9	19
			6.0					
	7.0	Very stiff to hard, moist to slightly moist, yellowish brown, red and gray, slightly micaceous to micaceous, fine to medium, sandy SILT (ML) [A-5 (5)] LL=45, PL=35, PI=10, NMC=23, %#200=57		SS-4	9	10	12	22
			8.0					
				SS-5	17	21	22	43
704.3								
	13.0	Loose, very moist, reddish brown and yellowish brown, slightly micaceous, fine to coarse, silty SAND (SM) [A-2]	13.5					
				SS-6	6	4	4	8
699.3								
	17.0	Stiff, very moist, grayish brown and brownish red, very micaceous, fine, sandy SILT (ML) [A-5]	18.5					
				SS-7	2	4	5	9
694.3	20.0	Boring Terminated at 20 feet						



LEGEND

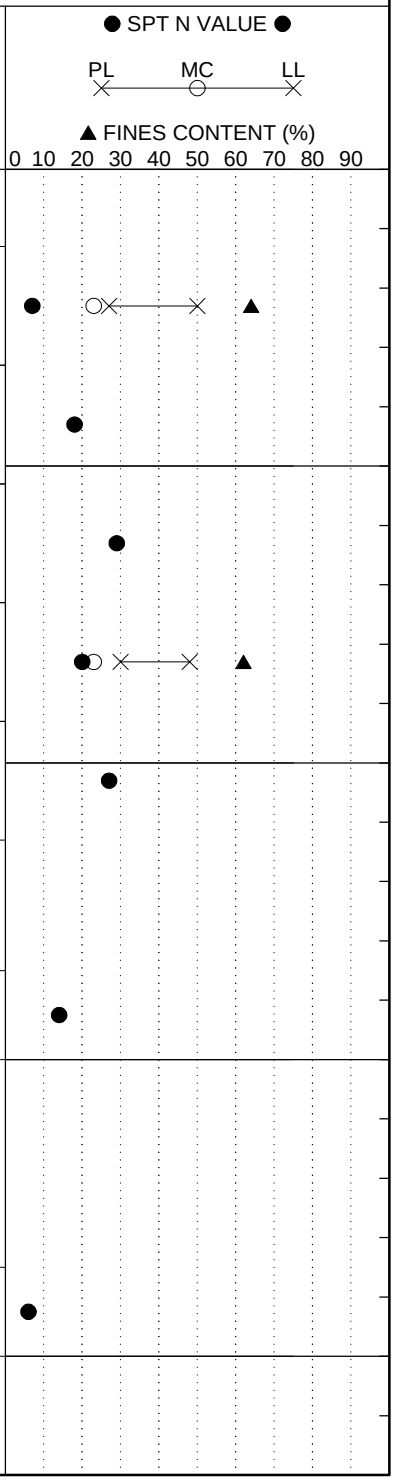
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-40
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1637+00	**Offset:**	83 RT
Alignment:	Mainline				
Elev.:	701.3 ft	**Latitude:**	35.102296	**Longitude:**	-81.632857
Date Started:	10/19/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/19/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
		Asphalt - 8" / **Stone Base** - 7"						
	1.3	**Residuum** - Firm to very stiff, moist, red brown, fine to medium, sandy fat CLAY (CH) [A-7-6 (14)] LL=50, PL=27, PI=23, NMC=23, %#200=64	1.3	SS-1	3	4	3	7
			3.3	SS-2	5	8	10	18
696.3	6.0	Very stiff, slightly moist, red brown, fine to medium, sandy SILT (ML) [A-7-5 (10)] LL=48, PL=30, PI=18, NMC=23, %#200=62	5.3	SS-3	11	14	15	29
			7.3	SS-4	9	10	10	20
			9.3	SS-5	12	13	14	27
691.3	12.0	Stiff to firm, moist, tan brown, slightly micaceous, sandy SILT (ML) [A-4]	13.5	SS-6	3	6	8	14
686.3			18.5	SS-7	3	3	3	6
681.3	20.0	Boring Terminated at 20 feet						



LEGEND

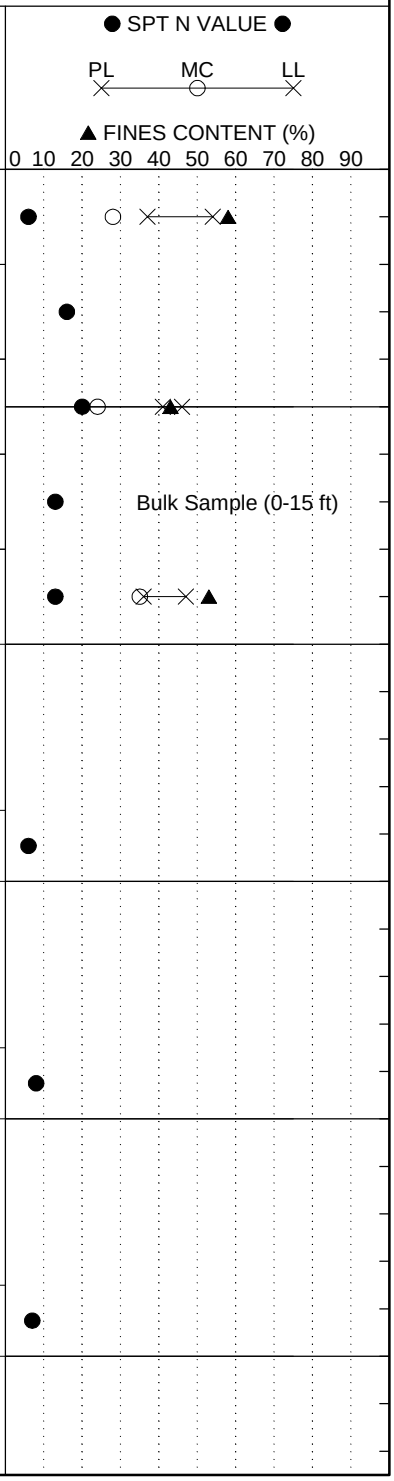
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-41
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 95
Eng./Geo.:	N. Bradley	**Boring Location:**	1649+60	**Offset:**	35 RT
Alignment:	Ramp B				
Elev.:	700.7 ft	**Latitude:**	35.102864	**Longitude:**	-81.628668
Date Started:	10/19/2015				
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft
Date Completed:	10/19/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 20 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 4"		0.0	SS-1	3	2	4	6
		Residuum - Firm, slightly moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (9)]		2.0	SS-2	3	7	9	16
	3.0	LL=54, PL=37, PI=17, NMC=28, %#200=58							
		Medium dense, slightly moist, gray and brown, micaceous, fine to medium, silty SAND (SM) [A-5 (0)]		4.0	SS-3	6	12	8	20
695.7		LL=46, PL=41, PI=5, NMC=24, %#200=43		6.0	SS-4	4	7	6	13
	8.0	Stiff, slightly moist, gray and brown, slightly micaceous, fine to medium, sandy SILT (ML) [A-7-5 (5)]		8.0	SS-5	4	6	7	13
690.7		LL=47, PL=36, PI=11, NMC=35, %#200=53 (Bulk Sample 0-15')							
	12.0	Firm, moist to wet, gray brown, micaceous, sandy SILT (ML) [A-5]		13.5	SS-6	2	2	4	6
685.7				18.5	SS-7	3	4	4	8
680.7				23.5	SS-8	3	4	3	7
675.7	25.0	Boring Terminated at 25 feet							



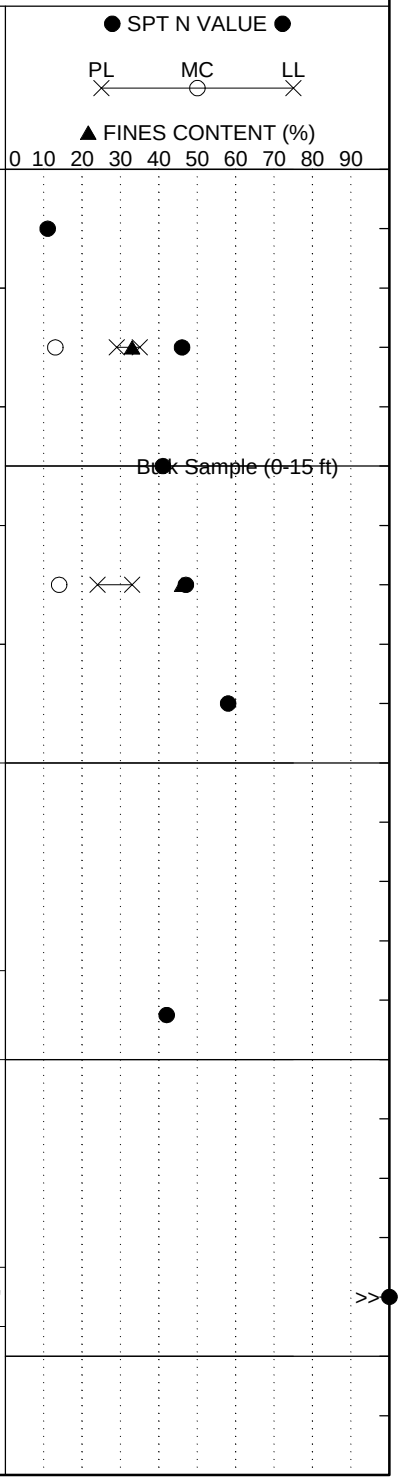
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-42
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-614
Eng./Geo.:	J. Jansante	**Boring Location:**	1651+00	**Offset:**	32 LT
Alignment:	Reloc. CL				
Elev.:	668.9 ft	**Latitude:**	35.100561	**Longitude:**	-81.628306
Date Started:	10/6/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/6/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"						
		Possible Fill - Medium dense, slightly moist, yellowish brown and red, micaceous, fine to medium, silty SAND (SM) [A-2]	0.0	SS-1	3	4	7	11
	2.0	**Residuum** - Dense to very dense, slightly moist (to moist below 14 feet), brown, reddish yellow and gray, micaceous to very micaceous, fine to medium, silty SAND (SM) [A-2-4 / A-4 (2)], with rock fragments below 14 feet	2.0	SS-2	17	22	24	46
			4.0					
663.9		LL=35, PL=29, PI=6, NMC=13, %#200=33		SS-3	17	19	22	41
		LL=33, PL=24, PI=9, NMC=14, %#200=46 (Bulk Sample 0-15')	6.0					
				SS-4	11	21	26	47
			8.0					
				SS-5	13	24	34	58
658.9								
			13.5					
				SS-6	3	8	34	42
653.9								
	18.0	**Partially Weathered Rock** - Very dense, very moist, brown and grayish brown, micaceous, fine to medium, silty SAND (SM) [A-2], with rock fragments	18.5	SS-7	17	50/4"		50/4"
648.9	20.0	Auger Refusal Encountered at 20 feet; Boring Terminated						



LEGEND

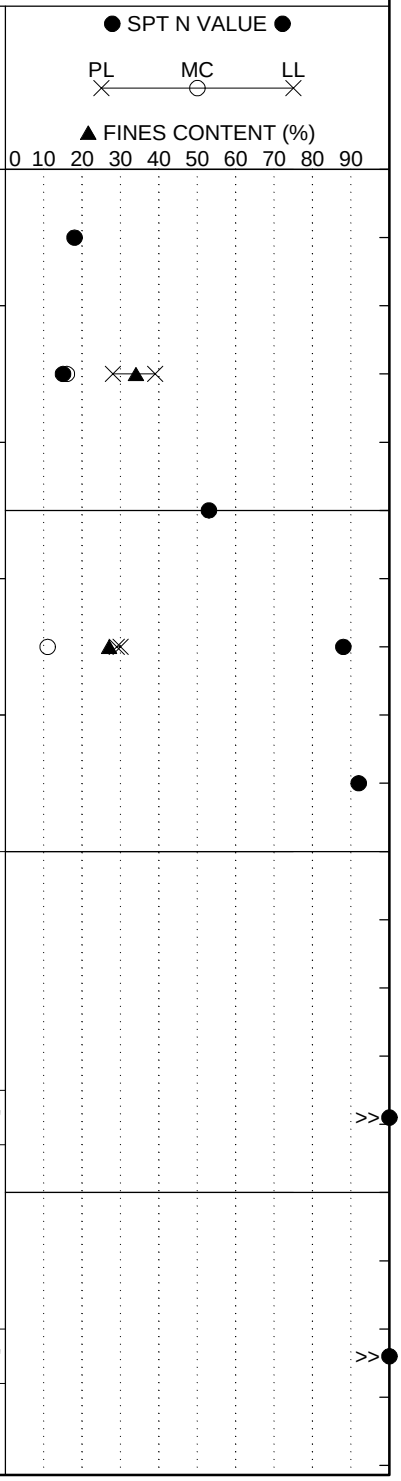
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-43
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	S-11-82
Eng./Geo.:	N. Bradley	**Boring Location:**	192+75	**Offset:**	20 LT	**Alignment:**	Reloc. CL
Elev.:	667.7 ft	**Latitude:**	35.100891	**Longitude:**	-81.626977	**Date Started:**	10/20/2015
Total Depth:	17.4 ft	**Soil Depth:**	17.4 ft	**Core Depth:**	0 ft	**Date Completed:**	10/20/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 15 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 4"	0.0					
	1.0	**Fill** - Medium dense, dry, light gray, fine to coarse, sandy GRAVEL (GP) [A-1]		SS-1	20	12	6	18
		Fill - Medium dense, slightly moist, red brown, slightly micaceous, fine to medium, silty SAND (SM) [A-2-6 (0)] LL=39, PL=28, PI=11, NMC=16, %#200=34	2.0	SS-2	4	6	9	15
	4.0	**Residuum** - Very dense, slightly moist to moist, tan brown, slightly micaceous, fine to coarse, silty SAND (SM) [A-2-4]; observed difficult drilling below 6' LL=30, PL=29, PI=1, NMC=11, %#200=27	4.0	SS-3	23	26	27	53
662.7			6.0	SS-4	22	43	45	88
			8.0	SS-5	23	44	48	92
657.7								
	12.0	**Partially Weathered Rock** - Very dense, slightly moist to moist, tan brown, slightly micaceous, fine to coarse, silty SAND (SM) [A-2]	13.5	SS-6	50/5"			50/5"
652.7								
	17.4	Auger Refusal Encountered at 17.4 feet; Boring Terminated	17.0	SS-7	50/2"			50/2"



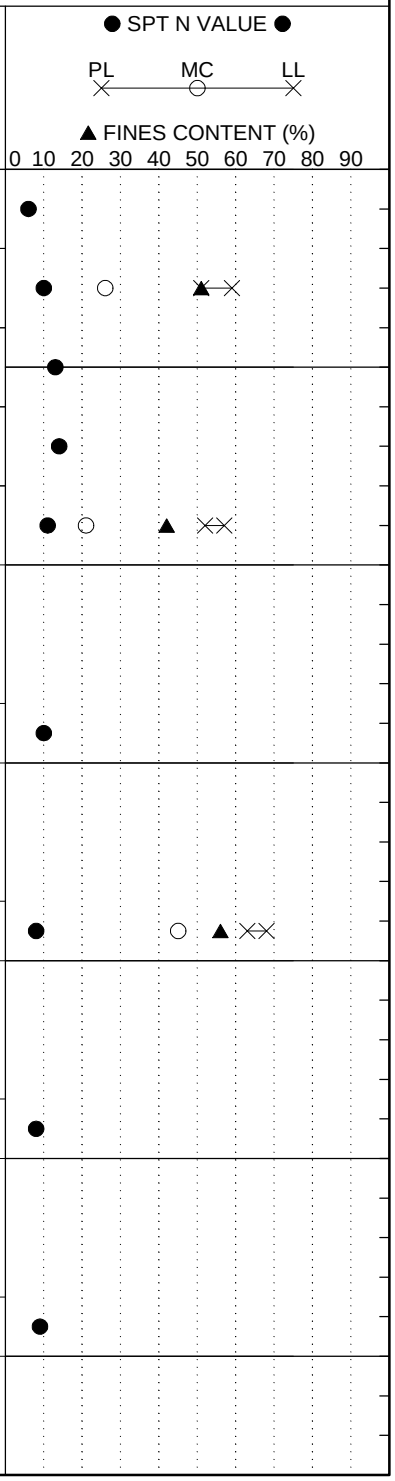
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-44
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	S-11-82
Eng./Geo.:	N. Bradley	**Boring Location:**	212+40	**Offset:**	15 RT	**Alignment:**	Reloc. CL
Elev.:	707.3 ft	**Latitude:**	35.105794	**Longitude:**	-81.625189	**Date Started:**	10/20/2015
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft	**Date Completed:**	10/20/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.5	**Topsoil** - 6 inches	0.0	SS-1	2	2	4	6
	2.0	**Residuum** - Firm, moist, red brown, slightly micaceous, elastic SILT (MH) [A-7]	2.0	SS-2	5	5	5	10
		Stiff, slightly moist, tan brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-5 (4)]	4.0	SS-3	5	7	6	13
702.3		LL=59, PL=51, PI=8, NMC=26, %#200=51						
	6.0	Medium dense to loose, slightly moist, gray and brown, slightly micaceous, fine to medium, silty SAND (SM) [A-5 (1)]	6.0	SS-4	8	8	6	14
		LL=57, PL=52, PI=5, NMC=21, %#200=42	8.0	SS-5	5	5	6	11
697.3								
			13.5	SS-6	6	5	5	10
692.3								
	17.0	Firm to stiff, moist to very moist, tan brown, slightly micaceous, fine, sandy elastic SILT (MH) [A-5 (5)]	18.5	SS-7	4	4	4	8
		LL=68, PL=63, PI=5, NMC=45, %#200=56						
687.3								
			23.5	SS-8	3	4	4	8
682.3								
			28.5	SS-9	2	4	5	9
677.3	30.0	Boring Terminated at 30 feet						



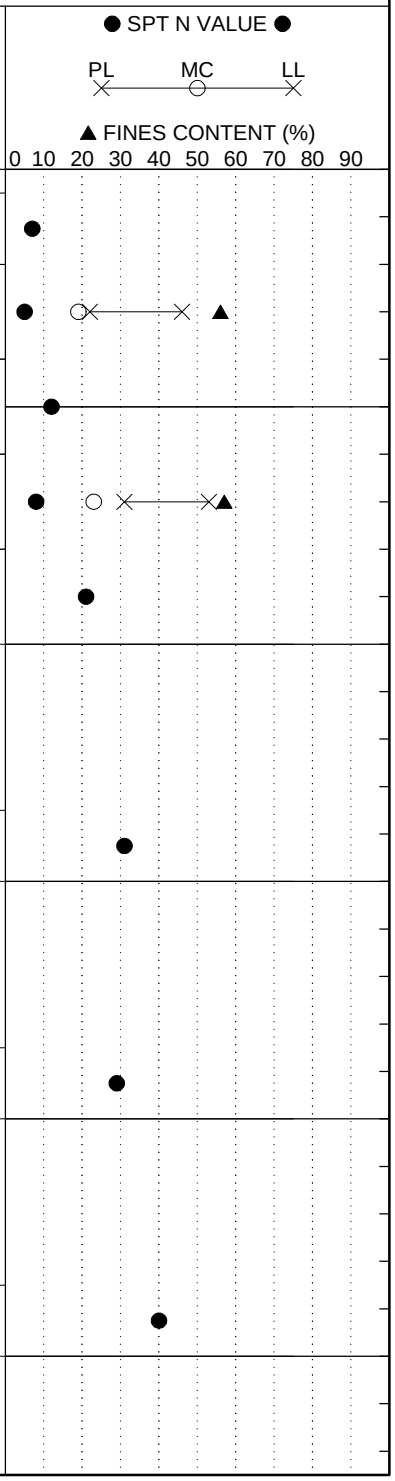
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-45		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-668		
Eng./Geo.:	J. Jansante	**Boring Location:**	1661+80	**Offset:**	150 RT	**Alignment:**	Reloc. CL
Elev.:	699.3 ft	**Latitude:**	35.104334	**Longitude:**	-81.624984	**Date Started:**	10/14/2015
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	Caved 19'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.4	**Asphalt** - 1.5" / **Stone Base** - 3"	0.5					
	2.0	**Fill** - Firm, slightly moist, dark brown, fine to medium, sandy SILT (ML) [A-4], with gravel	2.0	SS-1	2	3	4	7
	4.0	**Possible Fill** - Firm, moist, red brown, fine to medium, sandy lean CLAY (CL) [A-7-6 (11)] LL=46, PL=22, PI=24, NMC=19, %#200=56	4.0	SS-2	2	2	3	5
694.3		**Residuum** - Stiff to firm, slightly moist, red and yellowish brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (11)]	6.0	SS-3	3	6	6	12
	8.0	LL=53, PL=31, PI=22, NMC=23, %#200=57	8.0	SS-4	4	4	4	8
689.3		Very stiff to hard, slightly moist, yellowish brown, reddish brown and gray, slightly micaceous to micaceous, fine, sandy SILT (ML) [A-4], with trace coarse sand and rock fragments		SS-5	2	7	14	21
			13.5	SS-6	10	16	15	31
684.3			18.5	SS-7	7	14	15	29
679.3	21.0	Dense, very moist, yellowish brown and gray, micaceous, fine to medium, silty SAND (SM) [A-2], with interbedded silt layers	23.5	SS-8	10	13	27	40
674.3	25.0	Boring Terminated at 25 feet						



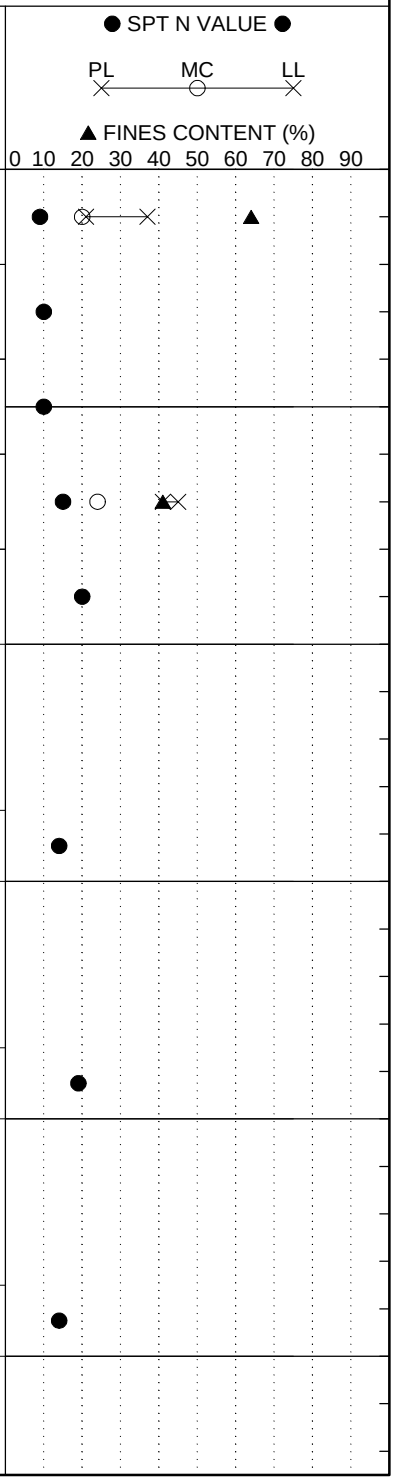
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-46
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 95
Eng./Geo.:	N. Bradley	**Boring Location:**	1663+00	**Offset:**	2 LT
Alignment:	Ramp A				
Elev.:	700.2 ft	**Latitude:**	35.103366	**Longitude:**	-81.624362
Date Started:	10/20/2015				
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft
Date Completed:	10/20/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 21 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3"		0.0	SS-1	3	4	5	9
		Fill - Stiff, slightly moist, red brown, slightly micaceous, fine to medium, sandy lean CLAY (CL) [A-6 (8)] LL=37, PL=21, PI=16, NMC=20, %#200=64		2.0	SS-2	4	4	6	10
	4.0	**Residuum** - Stiff, moist, red brown, elastic SILT (MH) [A-7]		4.0	SS-3	5	5	5	10
695.2	6.0	Medium dense, slightly moist, grayish red and yellowish brown, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-5 (0)] LL=45, PL=41, PI=4, NMC=24, %#200=41		6.0	SS-4	5	7	8	15
				8.0	SS-5	9	10	10	20
690.2									
				13.5	SS-6	6	6	8	14
685.2	17.0	Very stiff to stiff, moist to wet, grayish brown and brownish red, micaceous, fine, sandy SILT (ML) [A-4]		18.5	SS-7	6	7	12	19
680.2				23.5	SS-8	3	4	10	14
675.2	25.0	Boring Terminated at 25 feet							



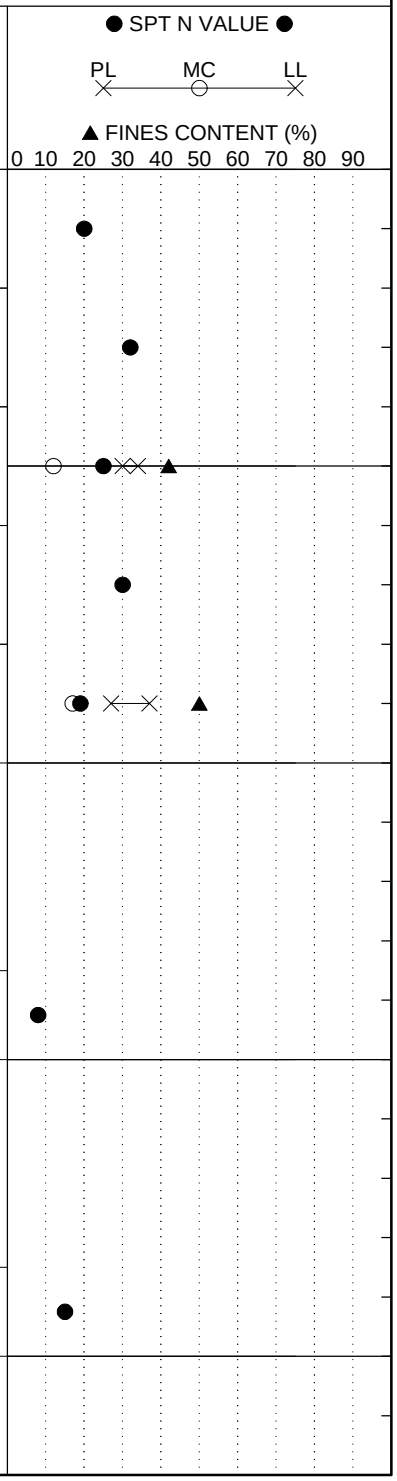
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-47
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 95
Eng./Geo.:	J. Wells	**Boring Location:**	1665+00	**Offset:**	60 RT
Alignment:	Ramp D				
Elev.:	703.2 ft	**Latitude:**	35.102149	**Longitude:**	-81.623259
Date Started:	10/5/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/5/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** Caved 14'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Gravel						
	0.4	**Gravel** - 5"						
	1.5	**Fill** - Very stiff, slightly moist, red, elastic SILT (MH) [A-7]	0.0	SS-1	11	9	11	20
		Residuum - Dense to medium dense, slightly moist, grayish red and yellowish brown, micaceous, fine to medium, silty SAND (SM) [A-4 (0)] LL=34, PL=30, PI=4, NMC=12, %#200=42	2.0	SS-2	10	13	19	32
			4.0	SS-3	9	10	15	25
698.2			6.0	SS-4	13	15	15	30
	7.0	Very stiff, slightly moist, grayish red and yellowish brown, micaceous, fine to medium, sandy SILT (ML) [A-4 (3)] LL=37, PL=27, PI=10, NMC=17, %#200=50	8.0	SS-5	5	8	11	19
693.2								
	12.0	Firm to stiff, moist, grayish red. brown and yellow, micaceous, fine to medium, sandy SILT (ML) [A-4]	13.5	SS-6	6	3	5	8
688.2								
			18.5	SS-7	6	6	9	15
683.2	20.0	Boring Terminated at 20 feet						



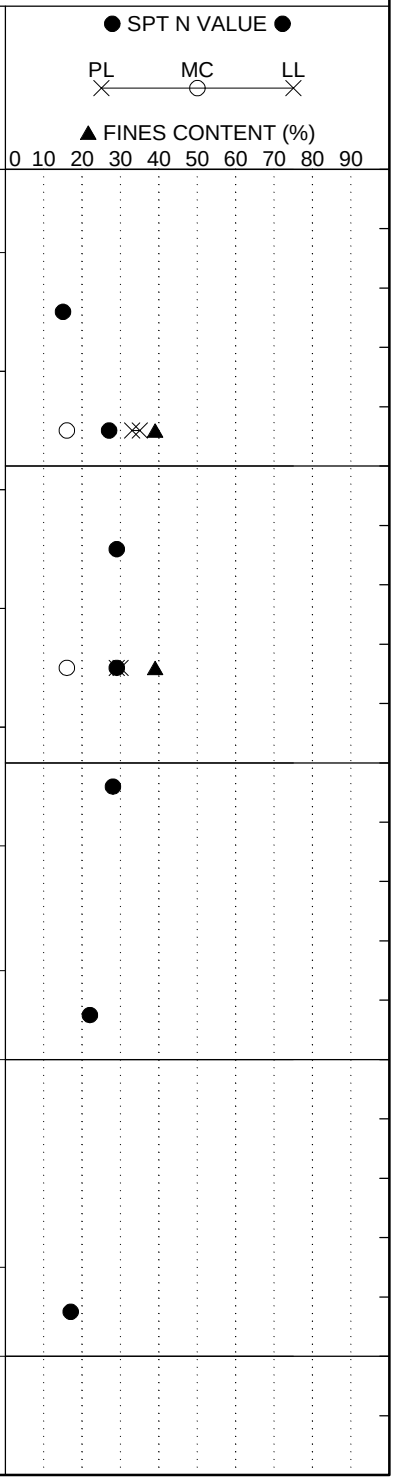
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-48
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	SC-18
Eng./Geo.:	N. Bradley	**Boring Location:**	127+40	**Offset:**	5 LT	**Alignment:**	Reloc. CL
Elev.:	685.4 ft	**Latitude:**	35.103221	**Longitude:**	-81.619967	**Date Started:**	10/19/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement							
		Asphalt - 7" / **Stone Base** - 10"							
	1.4	**Residuum** - Stiff, slightly moist, brown, micaceous, sandy SILT (ML) [A-4]		1.4	SS-1	4	6	9	15
	4.0	Medium dense, slightly moist to moist, gray brown, slightly micaceous, fine to medium, silty SAND (SM) [A-4 (0], with some coarse sand		3.4	SS-2	7	14	13	27
680.4		LL=35, PL=33, PI=2, NMC=16, %#200=39		5.4	SS-3	7	15	14	29
		LL=30, PL=29, PI=1, NMC=16, %#200=39		7.4	SS-4	11	13	16	29
675.4				9.4	SS-5	9	14	14	28
				13.5	SS-6	5	10	12	22
670.4				18.5	SS-7	6	7	10	17
665.4	20.0	Boring Terminated at 20 feet							



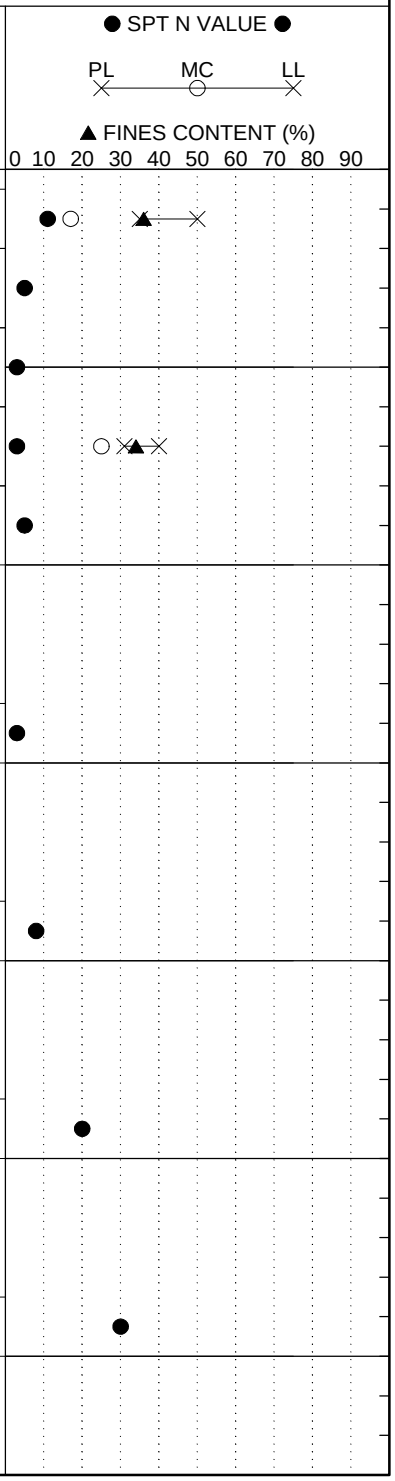
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-49
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1678+40	**Offset:**	100 LT
Alignment:	Mainline				
Elev.:	663.7 ft	**Latitude:**	35.104582	**Longitude:**	-81.6195301
Date Started:	10/15/2015				
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft
Date Completed:	10/15/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 22 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement							
	0.5	**Asphalt** - 2" / **Stone Base** - 4"		0.5					
		Fill - Medium dense to loose, moist, red brown, slightly micaceous, fine to medium, silty SAND (SM) [A-7-5 (1)], with trace gravel		2.0	SS-1	3	6	5	11
	4.0	LL=50, PL=35, PI=15, NMC=17, %#200=36		4.0	SS-2	3	2	3	5
658.7		**Fill** - Very loose to loose, moist, brown red, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-2-4], with trace gravel		6.0	SS-3	2	1	2	3
		LL=40, PL=31, PI=9, NMC=25, %#200=34		8.0	SS-4	1	1	2	3
					SS-5	2	2	3	5
653.7	12.0	**Possible Fill** - Soft, wet, reddish brown, fine to coarse, sandy CLAY (CL) [A-6]		13.5	SS-6	1	2	1	3
648.7	17.0	**Residuum** - Firm, moist, yellowish brown and gray, micaceous, SILT (ML) [A-6], with trace fine sand		18.5	SS-7	2	4	4	8
643.7									
	23.0	Very stiff, moist, yellowish brown and gray, micaceous to very micaceous, fine, sandy SILT (ML) [A-4]		23.5	SS-8	8	8	12	20
638.7				28.5	SS-9	7	16	14	30
633.7	30.0	Boring Terminated at 30 feet							



LEGEND

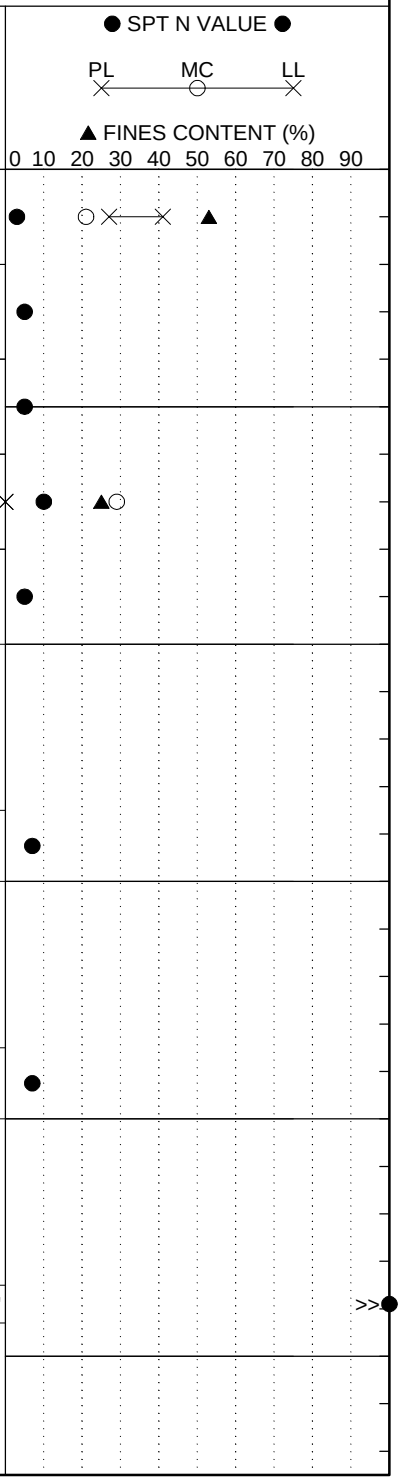
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-50		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante	**Boring Location:**	1703+00	**Offset:**	90 LT	**Alignment:**	Mainline
Elev.:	620.3 ft	**Latitude:**	35.107198	**Longitude:**	-81.6119602	**Date Started:**	10/15/2015
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft	**Date Completed:**	10/15/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.1	**Topsoil** - 1.5"	0.0	SS-1	2	1	2	3
		Fill - Soft to firm, moist, brown and red, micaceous, fine to medium, sandy SILT (ML) [A-7-6 (5)] LL=41, PL=27, PI=14, NMC=21, %#200=53	2.0	SS-2	2	2	3	5
	4.0	**Fill** - Loose, moist to very moist, brown, red and dark brown, micaceous to very micaceous, fine to medium, silty SAND (SM) [A-2-4] LL=PL=PI="NP", NMC=29, %#200=25	4.0	SS-3	2	3	2	5
615.3			6.0	SS-4	10	5	5	10
			8.0	SS-5	3	2	3	5
610.3	11.0	**Fill** - Firm, moist, brown, very micaceous, fine, sandy SILT (ML) [A-4]	13.5	SS-6	2	3	4	7
605.3	17.0	**Alluvium** - Firm, wet, gray and olive brown, CLAY (CL) [A-6], with trace sand and silt	18.5	SS-7	3	3	4	7
600.3	21.0	**Possible Alluvium** - Wet, gray, micaceous, fine to medium, silty SAND (SM) [A-2], with clay	23.5	SS-8	50/4"			50/4"
	24.0	**Partially Weathered Rock** - Very dense (based on SPT N value); apparent PWR, or possible boulder; little recovery in SS-8						
595.3	25.0	Boring Terminated at 25 feet						



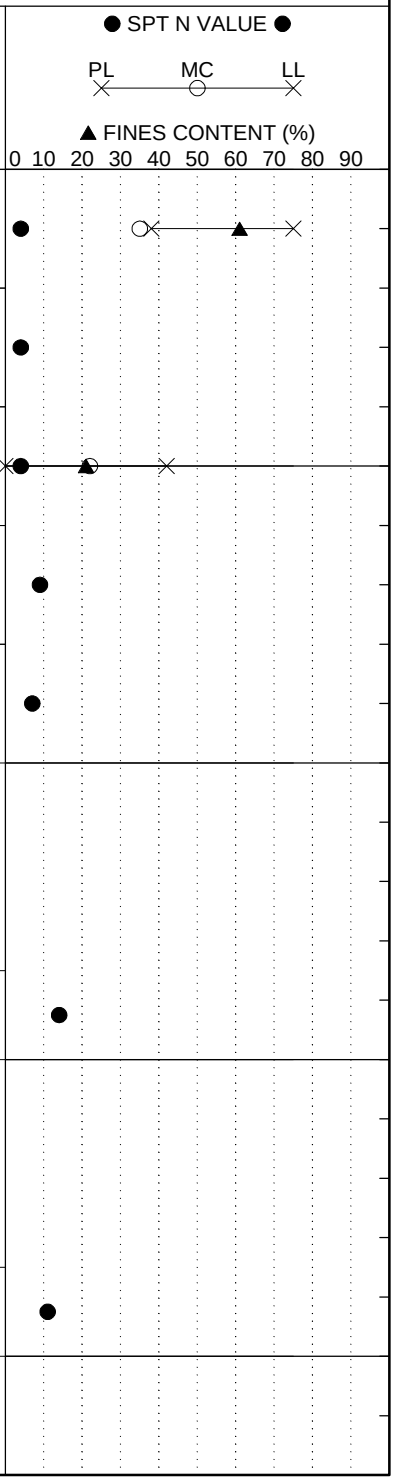
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	R-51
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1723+00	**Offset:**	94 LT	**Alignment:**	Mainline
Elev.:	710.0 ft	**Latitude:**	35.109353	**Longitude:**	-81.605773	**Date Started:**	10/15/2015
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft	**Date Completed:**	10/15/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3"	0.0					
		Possible Fill - Soft, moist, reddish brown, micaceous, fine, sandy elastic SILT (MH) [A-7-5 (22)]		SS-1	2	2	2	4
	2.0	LL=75, PL=38, PI=37, NMC=35, %#200=61	2.0					
		Possible Fill - Very loose, slightly moist to moist, brown and reddish brown, very micaceous, fine to medium, silty SAND (SM) [A-2-5]		SS-2	2	2	2	4
			4.0					
705.0		LL=42, PL=PI="NP", NMC=22, %#200=21		SS-3	1	2	2	4
	6.0		6.0					
		Residuum - Stiff to firm, slightly moist, grayish brown and yellowish brown, micaceous to very micaceous, fine, sandy SILT (ML) [A-5]		SS-4	2	3	6	9
			8.0					
				SS-5	2	3	4	7
700.0								
	13.0							
		Medium dense, slightly moist to moist, grayish brown and yellowish brown, micaceous to very micaceous, fine, silty SAND (SM) [A-5], with interbedded silt layers	13.5					
				SS-6	7	8	6	14
695.0								
			18.5					
				SS-7	5	5	6	11
690.0	20.0	Boring Terminated at 20 feet						



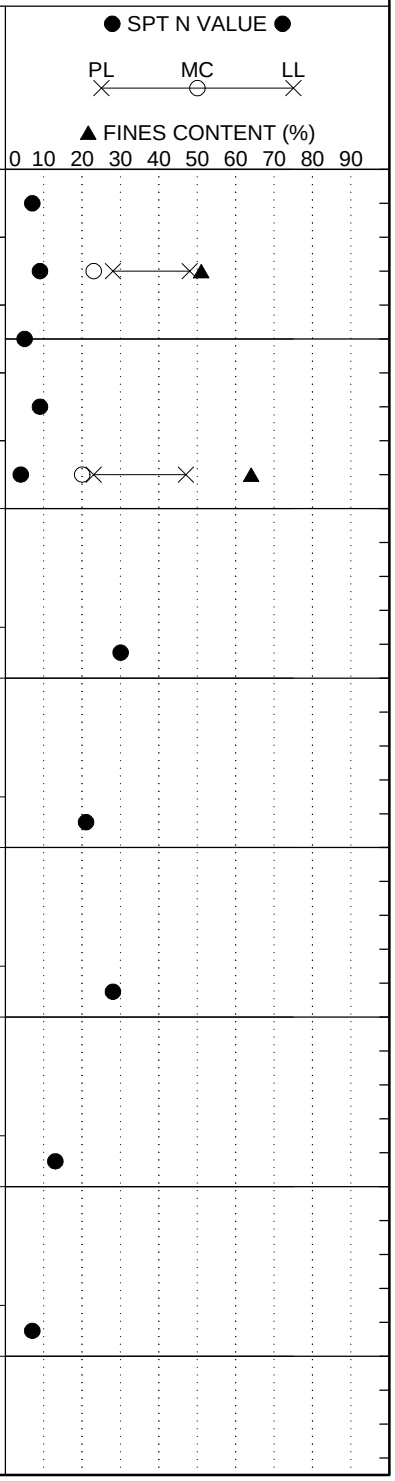
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-52
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 96
Eng./Geo.:	J. Jansante	**Boring Location:**	1732+60	**Offset:**	45 RT
Alignment:	Ramp B				
Elev.:	719.6 ft	**Latitude:**	35.110515	**Longitude:**	-81.602991
Date Started:	10/14/2015				
Total Depth:	35 ft	**Soil Depth:**	35 ft	**Core Depth:**	0 ft
Date Completed:	10/14/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** Caved 24'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.2	**Topsoil** - 2"		0.0	SS-1	2	3	4	7
		Fill - Firm to stiff, moist, reddish brown and brownish gray, slightly micaceous, fine to medium, sandy SILT (ML) [A-7-6 (7)], with trace gravel		2.0	SS-2	4	4	5	9
714.6		LL=48, PL=28, PI=20, NMC=23, %#200=51		4.0	SS-3	2	2	3	5
	6.0	**Possible Fill** - Stiff, moist, brown, fine, sandy CLAY (CL) [A-6]		6.0	SS-4	4	4	5	9
	8.0	**Residuum** - Soft, moist, reddish brown, fine to medium, sandy lean CLAY (CL) [A-7-6 (14)]		8.0	SS-5	2	2	2	4
709.6		LL=47, PL=23, PI=24, NMC=20, %#200=64							
	13.0	Very stiff, slightly moist, grayish red, yellowish brown and white, micaceous, fine to medium, sandy SILT (ML) [A-4]		13.5	SS-6	4	12	18	30
704.6				18.5	SS-7	8	9	12	21
699.6	21.0	Very stiff to stiff, brown, yellow and gray, micaceous to very micaceous, fine, sandy SILT (ML) [A-4]		23.5	SS-8	12	14	14	28
694.6				28.5	SS-9	4	6	7	13
689.6	31.0	Loose, moist, grayish brown and yellow, very micaceous, fine, silty SAND (SM) [A-4]		33.5	SS-10	2	4	3	7
684.6	35.0	Boring Terminated at 35 Feet							



LEGEND

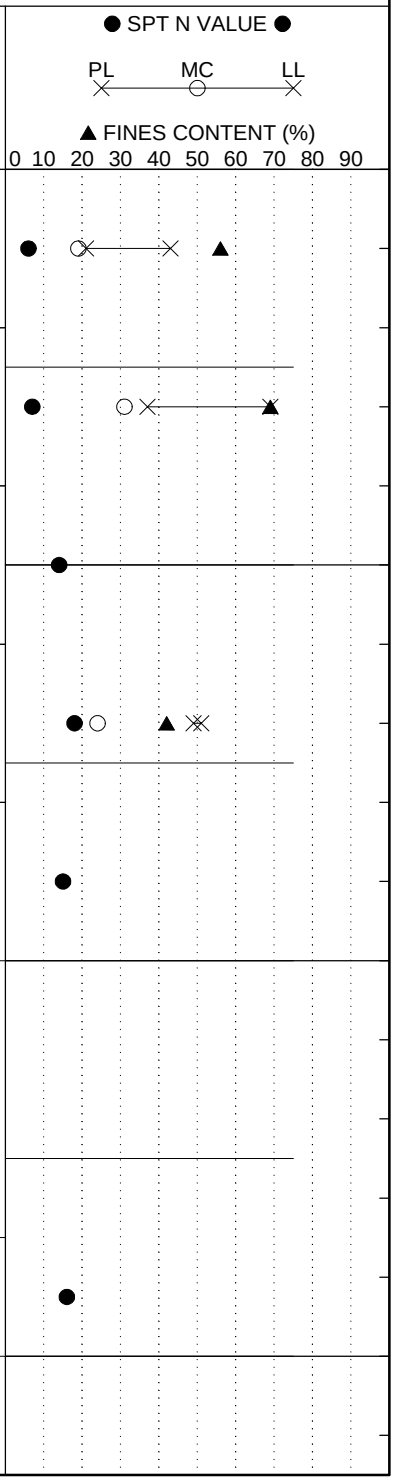
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-53		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-668		
Eng./Geo.:	N. Bradley	**Boring Location:**	1733+10	**Offset:**	10 RT	**Alignment:**	Reloc. CL
Elev.:	711.5 ft	**Latitude:**	35.111752	**Longitude:**	-81.604004	**Date Started:**	10/20/2015
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft	**Date Completed:**	10/20/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.3	**Topsoil** - 3"	0.0					
		Fill - Firm, moist, brown red, fine to medium, sandy lean CLAY (CL) [A-7-6 (9)], with trace roots LL=43, PL=21, PI=22, NMC=19, %#200=56		SS-1	2	3	3	6
	2.0	**Residuum** - Firm, slightly moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (24)] LL=69, PL=37, PI=32, NMC=31, %#200=69	2.0	SS-2	2	3	4	7
			4.0	SS-3	4	6	8	14
706.5	5.0	Medium dense, slightly moist, grayish red and brown, micaceous, fine to medium, silty SAND (SM) [A-5 (0)] LL=51, PL=49, PI=2, NMC=24, %#200=42	6.0	SS-4	6	9	9	18
	8.0	Medium dense, slightly moist, light brownish yellow and brown, slightly micaceous, fine to medium, silty SAND (SM) [A-2]	8.0	SS-5	7	7	8	15
701.5								
	12.0	Very stiff, moist, red and grayish brown, micaceous, fine to medium, sandy SILT (ML) [A-5]	13.5	SS-6	7	9	7	16
696.5	15.0	Boring Terminated at 15 feet						



LEGEND

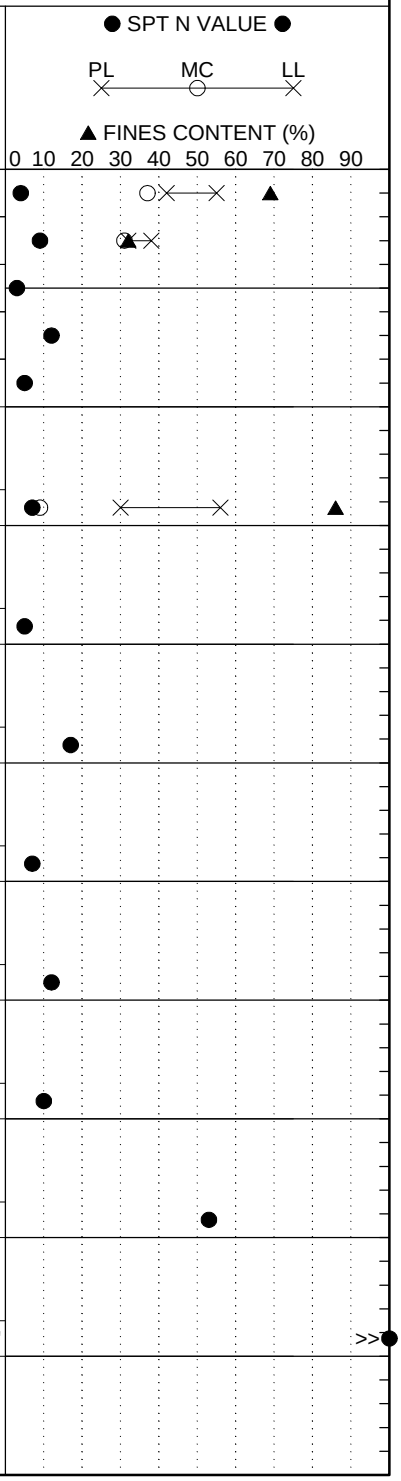
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-54
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 96
Eng./Geo.:	J. Jansante	**Boring Location:**	1729+00	**Offset:**	20 LT
Alignment:	Ramp C				
Elev.:	701.0 ft	**Latitude:**	35.109315	**Longitude:**	-81.603581
Date Started:	10/13/2015				
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft
Date Completed:	10/13/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 28 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	Top of Ground
	2.0	**Fill** - Soft, moist, orange brown, fine, sandy elastic SILT (MH) [A-7-5 (11)] LL=55, PL=42, PI=13, NMC=37, %#200=69
696.0	4.0	**Fill** - Loose, moist, brown orange, fine to medium, silty SAND (SM) [A-2-4] LL=38, PL=32, PI=6, NMC=31, %#200=32
691.0	8.0	**Fill** - Soft to stiff, slightly moist, red and yellowish brown, slightly micaceous, fine, sandy SILT (ML) [A-4]
686.0	12.0	**Fill** - Firm, slightly moist, reddish brown, fine, sandy CLAY (CL) [A-6]
		Fill - Firm, slightly moist, red, elastic SILT (MH) [A-7-5 (26)], with trace organics/roots LL=56, PL=30, PI=26, NMC=9, %#200=86
681.0	18.0	**Possible Alluvium** - Firm, very moist, brown and black, fat CLAY (CH) [A-7], with trace sand and organics
676.0	23.0	**Residuum** - Very stiff to firm, very moist to wet, grayish brown and brown, micaceous, fine, sandy SILT (ML) [A-5]
671.0	32.0	Medium dense to loose, wet, brown, gray and yellow, slightly micaceous to micaceous, fine, silty SAND (SM) [A-4], with trace medium to coarse sand
666.0		
661.0	42.0	Very dense, wet, brown, yellow and white, fine to coarse, silty SAND (SM) [A-2], with rock fragments
656.0	47.0	**Partially Weathered Rock** - Very dense, wet, brown, white and yellow, fine to coarse, silty SAND (SM) [A-2], with rock fragments
651.0	50.0	Boring Terminated at 50 feet

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS-1	1	2	2	4
2.0	SS-2	4	4	5	9
4.0	SS-3	2	1	2	3
6.0	SS-4	4	5	7	12
8.0	SS-5	2	2	3	5
13.5	SS-6	2	3	4	7
18.5	SS-7	3	2	3	5
23.5	SS-8	4	8	9	17
28.5	SS-9	3	3	4	7
33.5	SS-10	3	3	9	12
38.5	SS-11	3	3	7	10
43.5	SS-12	14	37	16	53
48.5	SS-13	21	37	50/5"	50/5"



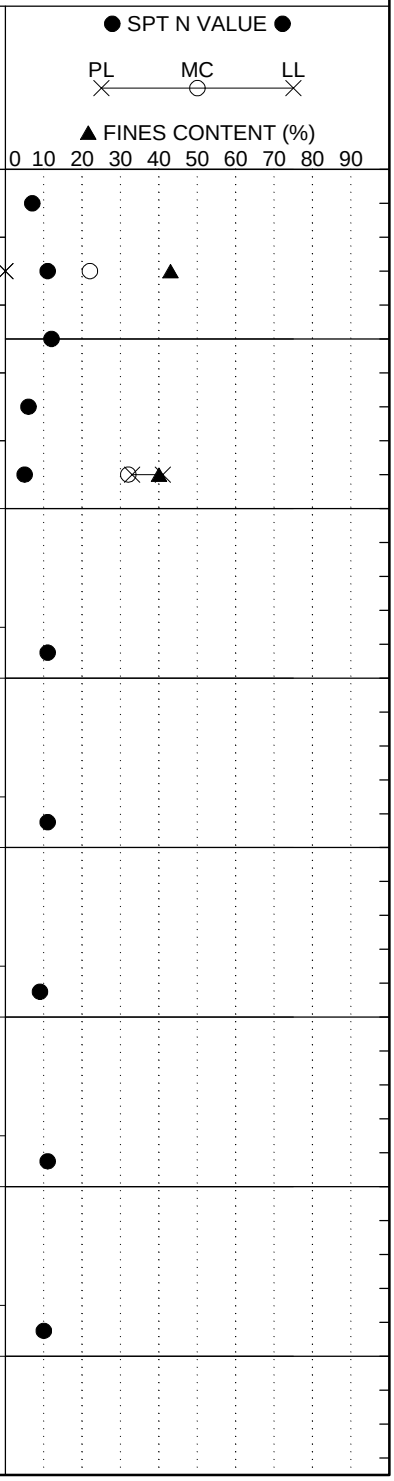
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-55
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	SC-329
Eng./Geo.:	J. Jansante	**Boring Location:**	183+85	**Offset:**	40 LT
Alignment:	Reloc. CL				
Elev.:	691.2 ft	**Latitude:**	35.106078	**Longitude:**	-81.599868
Date Started:	10/13/2015				
Total Depth:	35 ft	**Soil Depth:**	35 ft	**Core Depth:**	0 ft
Date Completed:	10/13/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 34 ft
24HR	28 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"	0.0	SS-1	2	3	4	7
	2.0	**Residuum** - Firm, moist, brown red, sandy CLAY (CL) [A-6]	2.0	SS-2	4	5	6	11
		Medium dense, slightly moist, brownish gray and yellow, micaceous, fine to medium, silty SAND (SM) [A-4 (0)]	4.0	SS-3	4	6	6	12
686.2	6.0	LL=PL=PI="NP", NMC=22, %#200=43	6.0	SS-4	3	3	3	6
		Loose, moist, light grayish brown and red, fine to medium, silty SAND (SM) [A-5 (1)]	8.0	SS-5	2	2	3	5
		LL=41, PL=33, PI=8, NMC=32, %#200=40						
681.2								
	13.0	Medium dense, slightly moist, gray, brown and yellow, slightly micaceous, fine, silty SAND (SM) [A-5]	13.5	SS-6	3	5	6	11
676.2								
			18.5	SS-7	3	5	6	11
671.2								
	22.0	Stiff, very moist, olive and brownish yellow, fine, sandy SILT (ML) [A-5]	23.5	SS-8	5	5	4	9
666.2								
	28.0	Medium dense to loose, wet, gray, olive-brown and yellow, fine, silty SAND (SM) [A-4], with interbedded silt layers	28.5	SS-9	3	4	7	11
661.2								
			33.5	SS-10	3	5	5	10
656.2	35.0	Boring Terminated at 35 feet						



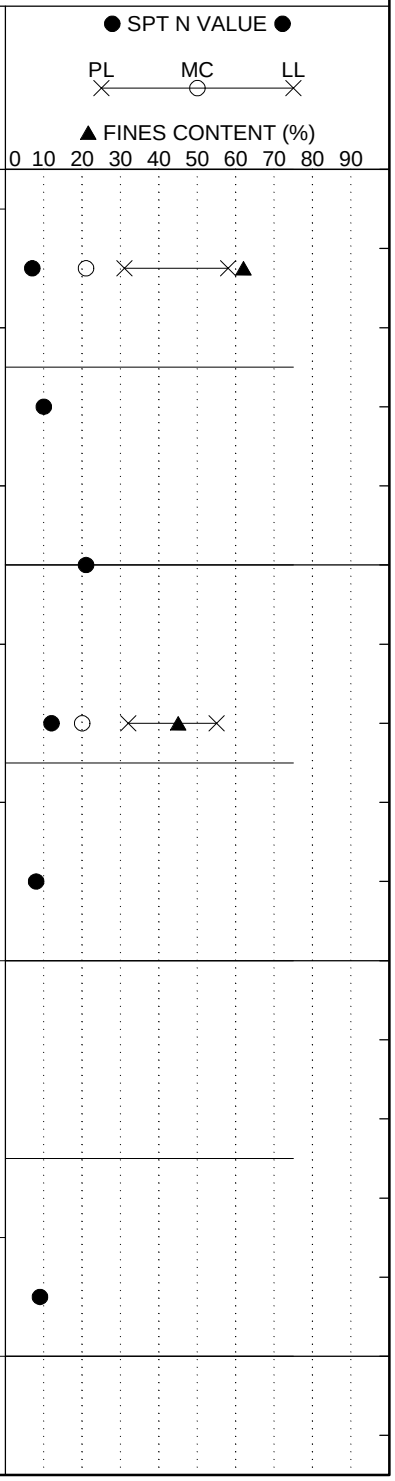
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-56
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	SC-329
Eng./Geo.:	J. Jansante	**Boring Location:**	193+20	**Offset:**	2 LT
Alignment:	Reloc. CL				
Elev.:	723.0 ft	**Latitude:**	35.108174	**Longitude:**	-81.601568
Date Started:	10/13/2015				
Total Depth:	15 ft	**Soil Depth:**	15 ft	**Core Depth:**	0 ft
Date Completed:	10/13/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 550X	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	86%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.2	**Topsoil** - 2"						
		Fill - Firm to very stiff, slightly moist, reddish brown, fine to medium, sandy elastic SILT (ML) [A-7-5 (16)], with trace gravel LL=58, PL=31, PI=27, NMC=21, %#200=62	0.5	SS-1	2	3	4	7
			2.0	SS-2	2	3	7	10
			4.0	SS-3	2	4	17	21
718.0	5.0	**Residuum** - Medium dense to loose, slightly moist, brownish red, slightly micaceous, fine to medium, silty SAND (SM) [A-7-5 (7)] LL=55, PL=32, PI=23, NMC=20, %#200=45	6.0	SS-4	5	5	7	12
			8.0	SS-5	2	4	4	8
713.0								
	12.0	Loose, slightly moist, light brown and light red, fine to medium, silty SAND (SM) [A-2]	13.5	SS-6	2	4	5	9
708.0	15.0	Boring Terminated at 15 feet						



LEGEND

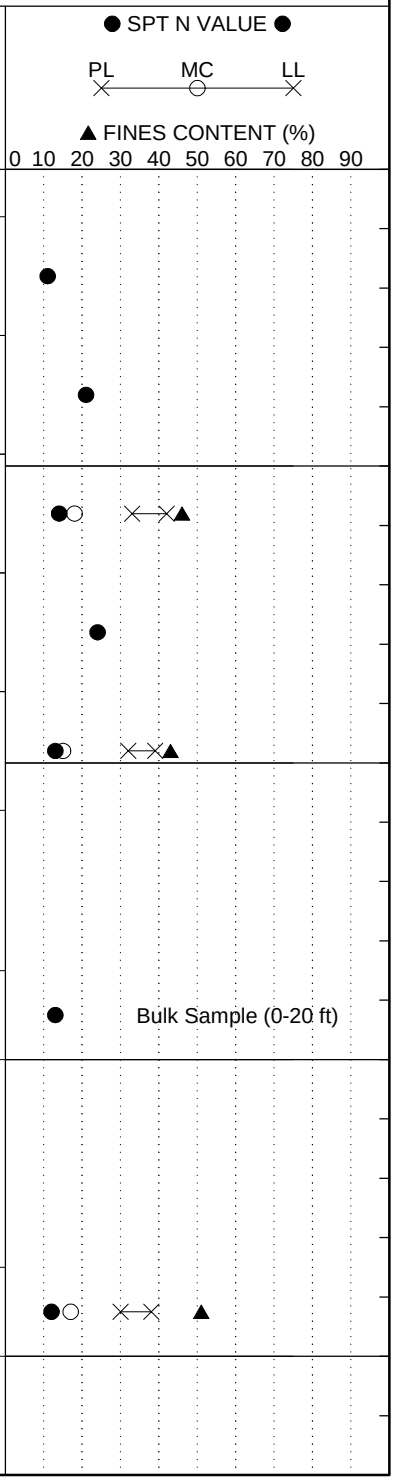
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-57
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	SC-329
Eng./Geo.:	J. Wells	**Boring Location:**	211+40	**Offset:**	20 RT
Alignment:	Reloc. CL				
Elev.:	708.2 ft	**Latitude:**	35.113042	**Longitude:**	-81.601398
Date Started:	10/5/2015				
Total Depth:	20 ft	**Soil Depth:**	20 ft	**Core Depth:**	0 ft
Date Completed:	10/5/2015				
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.8	**Asphalt** - 6" / **Stone Base** - 4"						
		Fill - Stiff, slightly moist, brown and red, fine, sandy CLAY (CL) [A-6]	0.8	SS-1	4	5	6	11
	3.0	**Residuum** - Medium dense, slightly moist, grayish brown, red and yellow, micaceous, fine to medium, silty SAND (SM) [A-5 (2)] LL=42, PL=33, PI=9, NMC=18, %#200=46	2.8	SS-2	7	9	12	21
703.2			4.8	SS-3	5	6	8	14
			6.8	SS-4	6	12	12	24
	9.0	Medium dense, slightly moist, light yellowish brown, slightly micaceous, fine to medium, silty SAND (SM) [A-4 (1)] LL=39, PL=32, PI=7, NMC=15, %#200=43	8.8	SS-5	5	6	7	13
698.2			13.5	SS-6	5	6	7	13
693.2	15.0	Stiff, moist, grayish brown and yellow, micaceous, fine to medium, sandy SILT (ML) [A-4 (2)] LL=38, PL=30, PI=8, NMC=17, %#200=51 (Bulk Sample 0-20')	18.5	SS-7	8	5	7	12
688.2	20.0	Boring Terminated at 20 feet						



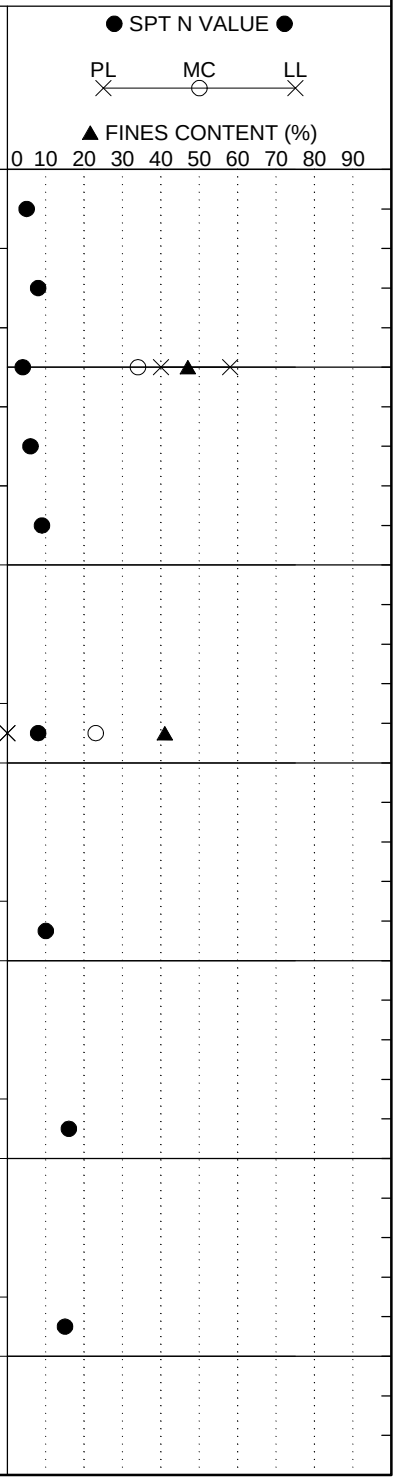
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-58
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 96
Eng./Geo.:	J. Jansante	**Boring Location:**	1735+80	**Offset:**	30 LT
Alignment:	Ramp D				
Elev.:	719.8 ft	**Latitude:**	35.109595	**Longitude:**	-81.601531
Date Started:	10/15/2015				
Total Depth:	30 ft	**Soil Depth:**	30 ft	**Core Depth:**	0 ft
Date Completed:	10/15/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	**Topsoil** - 3"		0.0	SS-1	2	3	2	5
	2.0	**Fill** - Firm, moist, brown, sandy CLAY (CL) [A-6], with gravel		2.0	SS-2	2	3	5	8
		Residuum - Loose to very loose, moist, red brown, micaceous to very micaceous, fine, silty SAND (SM) [A-7-5 (6)]		4.0	SS-3	2	1	3	4
714.8		LL=58, PL=40, PI=18, NMC=34, %#200=47		6.0	SS-4	1	3	3	6
	8.0	Loose, moist, brown, yellow and gray, micaceous, fine to coarse, silty SAND (SM) [A-2], with trace gravel and kaolin		8.0	SS-5	2	3	6	9
709.8									
	12.0	Loose, slightly moist, grayish brown, brown and red, micaceous, fine to medium, silty SAND (SM) [A-4 (0)]		13.5	SS-6	2	3	5	8
		LL=PL=PI="NP", NMC=23, %#200=41							
704.8									
				18.5	SS-7	2	4	6	10
699.8									
	22.0	Medium dense, slightly moist to moist, gray, brownish yellow and white, slightly micaceous, fine to medium, silty SAND (SM) [A-2], with trace coarse sand and gravel		23.5	SS-8	4	7	9	16
694.8									
				28.5	SS-9	5	7	8	15
689.8	30.0	Boring Terminated at 30 feet							



LEGEND

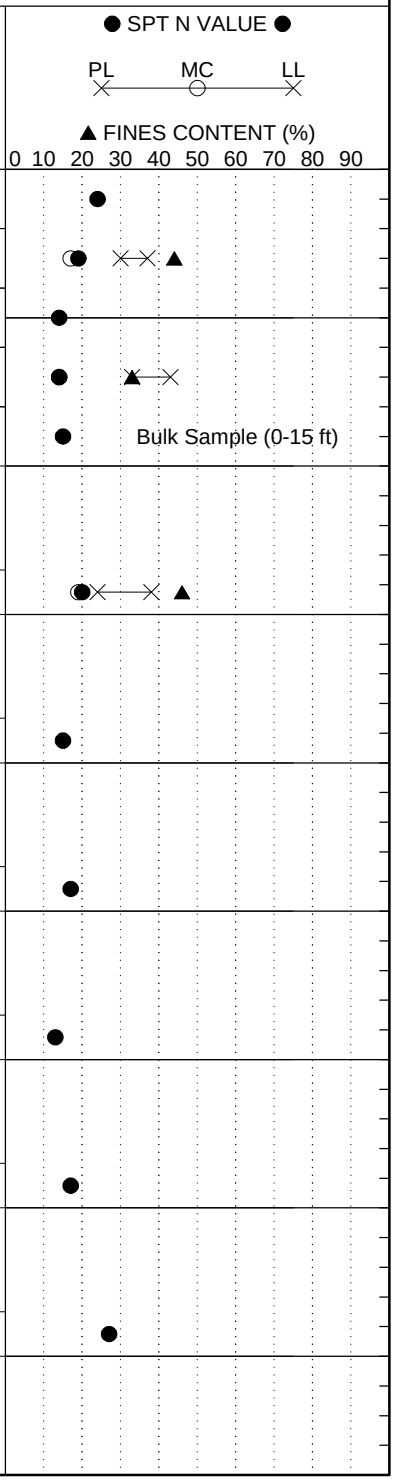
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-59
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85, Exit 96
Eng./Geo.:	J. Jansante	**Boring Location:**	1744+00	**Offset:**	10 LT
Alignment:	Ramp A				
Elev.:	738.4 ft	**Latitude:**	35.110502	**Longitude:**	-81.598793
Date Started:	10/15/2015				
Total Depth:	40 ft	**Soil Depth:**	40 ft	**Core Depth:**	0 ft
Date Completed:	10/15/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log
	0.0	Top of Ground	
	0.3	**Topsoil** - 3"	
	4.0	**Residuum** - Medium dense, slightly moist, yellowish brown, white and red, slightly micaceous, fine to medium, silty SAND (SM) [A-4 (1)], with quartz rock fragments LL=37, PL=30, PI=7, NMC=17, %#200=44	
733.4	10.0	Medium dense, slightly moist, grayish red, yellowish brown and black, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-2-5], with seams of quartz sand LL=43, PL=33, PI=10, NMC=14, %#200=33	
728.4	16.0	Medium dense, slightly moist, grayish red, yellowish brown and orange, slightly micaceous to micaceous, fine to medium, clayey SAND (SC) [A-6 (3)], with seams of quartz sand LL=38, PL=24, PI=14, NMC=19, %#200=46 (Bulk Sample 0-15')	
723.4	26.0	Stiff to very stiff, slightly moist, red, yellowish brown and black, fine, sandy SILT (ML) [A-4], with seams of coarse sand and rock fragments	
718.4	36.0	Stiff to very stiff, moist, yellow, brown and red, SILT (ML) [A-4], with clay and fine sand	
713.4	40.0	Medium dense, slightly moist, light grayish brown and light yellow, fine, silty SAND (SM) [A-4]	
708.4		Boring Terminated at 40 feet	
703.4			
698.4			

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS-1	3	15	9	24
2.0	SS-2	3	7	12	19
4.0	SS-3	6	6	8	14
6.0	SS-4	2	6	8	14
8.0	SS-5	4	6	9	15
13.5	SS-6	6	12	8	20
18.5	SS-7	6	7	8	15
23.5	SS-8	6	7	10	17
28.5	SS-9	4	6	7	13
33.5	SS-10	7	10	7	17
38.5	SS-11	10	13	14	27



LEGEND

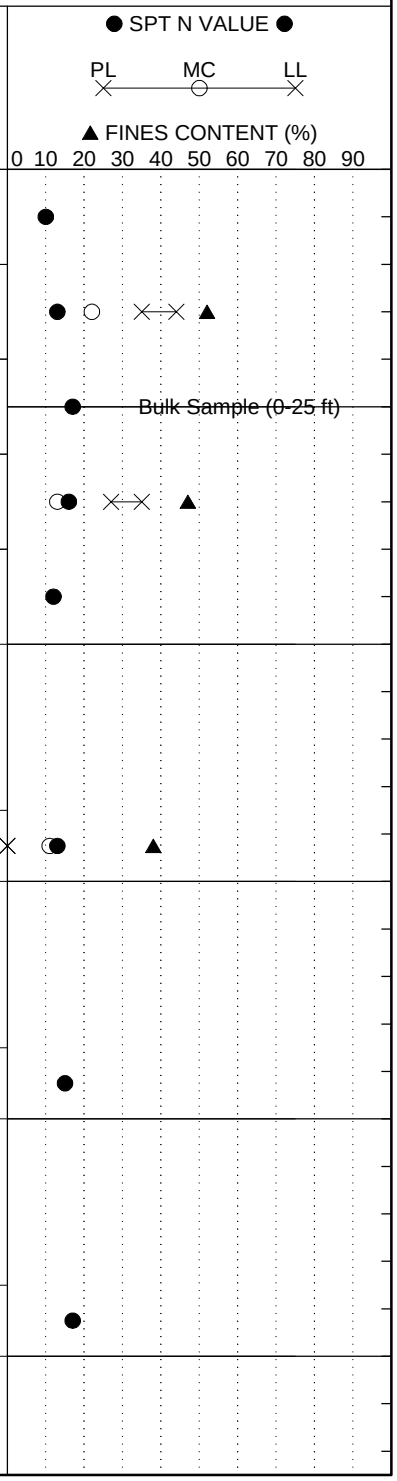
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	R-60
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-668
Eng./Geo.:	J. Wells	**Boring Location:**	1750+00	**Offset:**	15 LT
Alignment:	Reloc. CL				
Elev.:	710.3 ft	**Latitude:**	35.110581	**Longitude:**	-81.5968001
Date Started:	10/5/2015				
Total Depth:	25 ft	**Soil Depth:**	25 ft	**Core Depth:**	0 ft
Date Completed:	10/5/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	87%				
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** Not Encl. **24HR** --

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.4	**Topsoil** - 5"		0.0	SS-1	5	5	5	10
	2.0	**Residuum** - Stiff, slightly moist, brown red, fine, sandy elastic SILT (MH) [A-7]		2.0	SS-2	5	6	7	13
	5.0	Stiff, slightly moist, red and brownish yellow, slightly micaceous, fine to medium, sandy SILT (ML) [A-5 (3)] LL=44, PL=35, PI=9, NMC=22, %#200=52		4.0	SS-3	5	8	9	17
705.3	9.0	Medium dense, slightly moist, yellowish red, slightly micaceous, fine, silty SAND (SM) [A-4 (1)] LL=35, PL=27, PI=8, NMC=13, %#200=47 (Bulk Sample 0-25')		6.0	SS-4	5	8	8	16
700.3		Medium dense, dry to slightly moist, light grayish brown, light yellowish brown and white, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-4 (0)] LL=PL=PI="NP", NMC=11, %#200=38		8.0	SS-5	5	6	6	12
695.3				13.5	SS-6	5	5	8	13
690.3				18.5	SS-7	6	6	9	15
685.3	25.0	Boring Terminated at 25 feet		23.5	SS-8	3	8	9	17



LEGEND

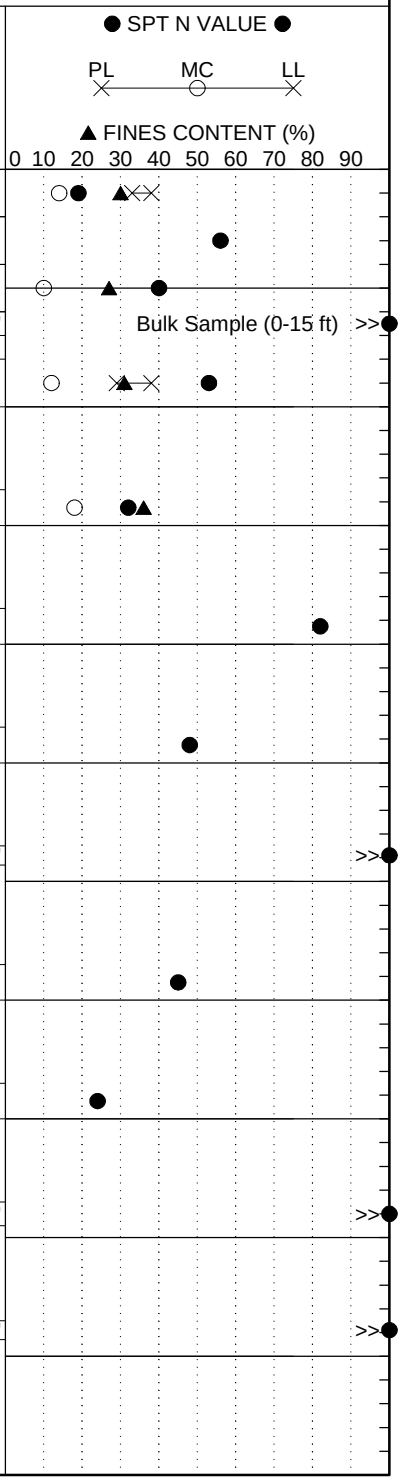
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 1426-14-161 ROADWAY AND CULVERT BORINGS.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 3/2/16

SCDOT Soil Test Log

Project ID:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	RW-61		
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	I-85		
Eng./Geo.:	J. Jansante	**Boring Location:**	1777+50	**Offset:**	115 RT	**Alignment:**	Mainline
Elev.:	658.6 ft	**Latitude:**	35.110262	**Longitude:**	-81.587575	**Date Started:**	10/14/2015
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft	**Date Completed:**	10/14/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** Not Enct.	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
		Residuum - Medium dense to very dense, slightly moist, grayish red, brown and yellow, micaceous, fine to medium, silty SAND (SM) [A-2-4], with trace rock fragments	0.0	SS-1	4	7	12	19
			2.0	SS-2	12	22	34	56
653.6			4.0	SS-3	12	18	22	40
	6.0	LL=38, PL=33, PI=5, NMC=14, %200=30; NMC=10, %#200=27	6.0	SS-4	26	50/5"		50/5"
	8.0		8.0					
648.6		**PWR Lens** - Very hard, dry, red brown, micaceous, fine, sandy SILT (ML) [A-4], in thin cemented layers		SS-5	24	27	26	53
		Very dense to dense, slightly moist, brown, red, yellow and gray, micaceous, fine to medium, silty SAND (SM) [A-2-4 / A-4], with some coarse sand and rock fragments	13.5	SS-6	22	17	15	32
643.6	18.0	LL=38, PL=29, PI=9, NMC=12, %#200=31 (Bulk Sample 0-15'); NMC=18, %#200=36	18.5	SS-7	27	32	50	82
638.6								
		Very dense to dense, slightly moist, red brown, very micaceous, fine, silty SAND (SM) [A-4]	23.5	SS-8	21	24	24	48
633.6								
	28.0	**PWR Lens** - Very dense, slightly moist, light grayish brown, micaceous, fine to coarse, silty SAND (SM) [A-4], with rock fragments	28.5	SS-9	50/5"			50/5"
628.6	32.0							
		Dense to medium dense, slightly moist, reddish brown and grayish brown, micaceous to very micaceous, fine to medium, silty SAND (SM) [A-4], with trace rock fragments	33.5	SS-10	32	28	17	45
623.6								
			38.5	SS-11	11	12	12	24
618.6								
	43.0	**Partially Weathered Rock** - Very dense, slightly moist to moist, grayish brown and yellowish brown, micaceous, fine to medium, silty SAND (SM) [A-2], with rock fragments	43.5	SS-12	18	50/5"		50/5"
613.6								
			48.5	SS-13	50/5"			50/5"
608.6	50.0	Boring Terminated at 50 Feet						



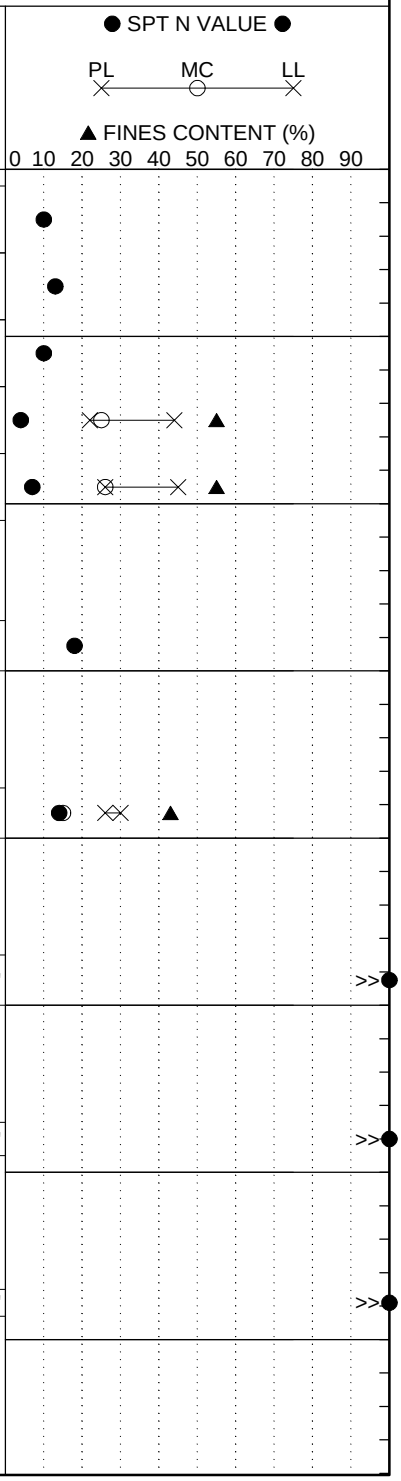
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	C-1
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	J. Jansante	**Boring Location:**	1016+70	**Offset:**	125 RT	**Alignment:**	Mainline
Elev.:	820.5 ft	**Latitude:**	35.041779	**Longitude:**	-81.821248	**Date Started:**	10/22/2015
Total Depth:	35.5 ft	**Soil Depth:**	35.5 ft	**Core Depth:**	0 ft	**Date Completed:**	10/22/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 21 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.3	**Asphalt** - 2" / **Stone Base** - 2"	0.5					
		Fill - Stiff, slightly moist, red brown, sandy CLAY (CL) [A-7], with trace gravel		SS-1	3	4	6	10
	4.0		2.5	SS-2	6	6	7	13
815.5		**Fill** - Loose, very moist, brown, fine to coarse, clayey SAND (SC) [A-2]	4.5	SS-3	5	5	5	10
	6.0	**Fill** - Soft, very moist, reddish brown, fine to coarse, sandy lean CLAY (CL) [A-7-6 (9)] LL=44, PL=22, PI=22, NMC=25, %#200=55	6.5	SS-4	2	2	2	4
	8.0	**Possible Alluvium** - Firm, very moist, yellowish brown and light gray, fine, sandy lean CLAY (CL) [A-7-6 (8)] LL=45, PL=26, PI=19, NMC=26, %#200=55	8.5	SS-5	4	4	3	7
810.5	12.0	**Residuum** - Medium dense, slightly moist to moist, yellowish brown and gray, slightly micaceous to micaceous, fine to medium, silty SAND (SM) [A-4 (0)] LL=30, PL=26, PI=4, NMC=15, %#200=43	13.5	SS-6	7	6	12	18
805.5			18.5	SS-7	4	7	7	14
800.5	23.0	**Partially Weathered Rock** - Very dense, slightly moist, gray, fine, silty SAND (SM) [A-4], in thin cemented layers (in SS-10)	23.5	SS-8	7	28	50/5"	50/5"
795.5			28.5	SS-9	38	50/4"		50/4"
790.5			33.5	SS-10	50/5"			50/5"
785.5	35.5	Auger Refusal Encountered at 35.5 feet; Boring Terminated						



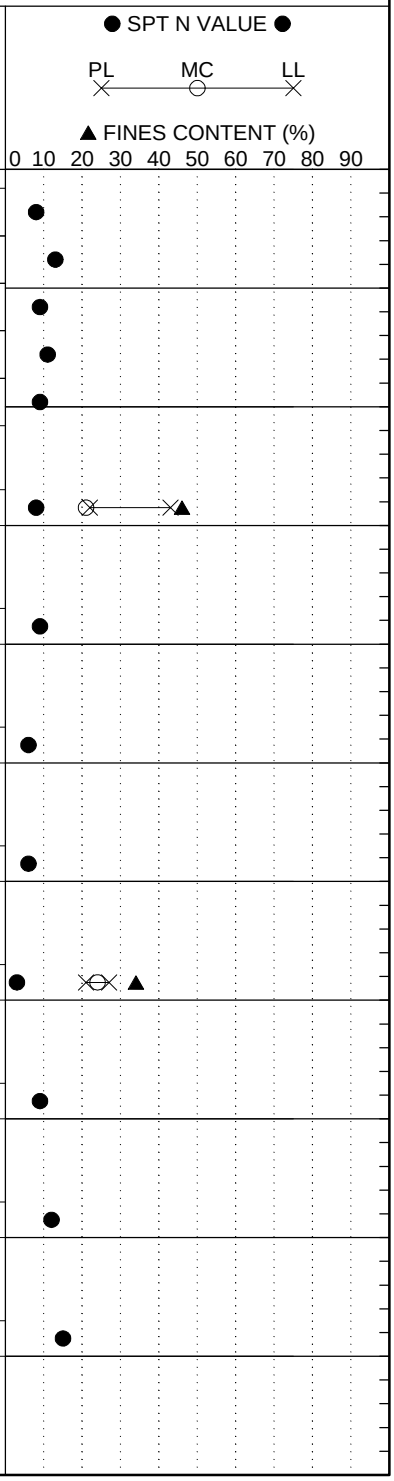
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	C-4
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1420+00	**Offset:**	118 RT	**Alignment:**	Mainline
Elev.:	736.1 ft	**Latitude:**	35.085619	**Longitude:**	-81.699665	**Date Started:**	10/16/2015
Total Depth:	50 ft	**Soil Depth:**	50 ft	**Core Depth:**	0 ft	**Date Completed:**	10/16/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 28 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement	0.8					
	0.8	**Asphalt** - 4.5" / **Stone Base** - 5"	2.8	SS-1	3	4	4	8
731.1	6.0	**Fill** - Firm to stiff, moist, red brown, slightly micaceous, fine to medium, sandy SILT (ML) [A-4], with clay and trace gravel	4.8	SS-2	5	6	7	13
			6.8	SS-3	3	4	5	9
726.1	12.0	**Fill** - Stiff, slightly moist to moist, red brown, elastic SILT (MH) [A-7], with trace mica and gravel	8.8	SS-4	4	5	6	11
				SS-5	3	3	6	9
721.1	17.0	**Fill** - Loose, moist, brown red, fine to medium, clayey SAND (SC) [A-7-6 (6)] LL=43, PL=22, PI=21, NMC=21, %#200=46	13.5	SS-6	2	4	4	8
716.1	27.0	**Fill** - Stiff to firm, moist, red, brown and yellow, slightly micaceous, fine to medium, sandy SILT (ML) [A-4], with clay	18.5	SS-7	3	4	5	9
711.1			23.5	SS-8	2	3	3	6
706.1	32.0	**Alluvium** - Loose, wet, brown, fine to coarse, SAND (SP) [A-1], with layers of gray sandy clay	28.5	SS-9	1	3	3	6
701.1	37.0	**Possible Alluvium** - Very loose, wet, gray and reddish brown, silty clayey SAND (SC-SM) [A-2-4] LL=27, PL=21, PI=6, NMC=24, %#200=34	33.5	SS-10	3	1	2	3
696.1		**Residuum** - Firm to stiff, moist, brown and yellowish brown, micaceous, fine, sandy SILT (ML) [A-4], with rock fragments below 45 feet	38.5	SS-11	2	3	6	9
691.1			43.5	SS-12	5	5	7	12
686.1	50.0	Boring Terminated at 50 feet	48.5	SS-13	4	6	9	15



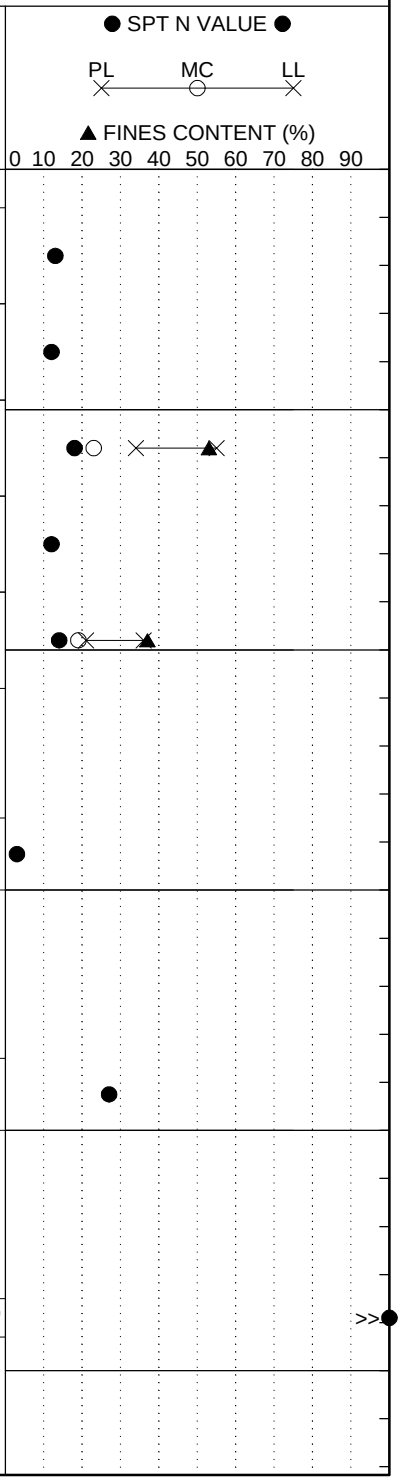
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	C-7
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	I-85
Eng./Geo.:	N. Bradley	**Boring Location:**	1489+40	**Offset:**	105 RT	**Alignment:**	Mainline
Elev.:	779.9 ft	**Latitude:**	35.096081	**Longitude:**	-81.680388	**Date Started:**	10/16/2015
Total Depth:	24.7 ft	**Soil Depth:**	24.7 ft	**Core Depth:**	0 ft	**Date Completed:**	10/16/2015
Bore Hole Diameter (in):	3.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 55	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	87%
Core Size:	N/A	**Driller:**	T. Miller (S&ME)	**Groundwater:**	**TOB** 12 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.8	**Asphalt** - 6" / **Stone Base** - 4"	0.8					
		Fill - Stiff, moist, red brown, fine to medium, sandy CLAY (CL) [A-6], with trace gravel and mica		SS-1	3	6	7	13
			2.8	SS-2	3	3	9	12
	4.0	**Fill** - Very stiff to stiff, moist, red, gray and brown, fine to medium, sandy elastic SILT (MH) [A-7-5 (9)], trace organics (also with apparent chemical/solvent odor at 7') LL=55, PL=34, PI=21, NMC=23, %#200=53	4.8	SS-3	7	10	8	18
774.9			6.8	SS-4	4	7	5	12
	9.0	**Fill** - Medium dense, moist, gray, brown and red, slightly micaceous, fine to coarse, clayey SAND (SC) [A-6 (1)], with gravel and trace mica LL=36, PL=21, PI=15, NMC=19, %#200=37	8.8	SS-5	5	7	7	14
769.9	12.0	**Alluvium** - Soft, wet, gray, sandy fat CLAY (CH) [A-7], with large wood pieces and odor of decaying organics	13.5	SS-6	2	1	2	3
764.9	17.0	**Residuum** - Medium dense, moist, brown, yellow and gray, very micaceous, fine to coarse, silty SAND (SM) [A-2]	18.5	SS-7	4	15	12	27
759.9	23.0	**Partially Weathered Rock** - Very dense, moist, gray, micaceous, fine to medium, silty SAND (SM) [A-2], with rock fragments	23.5	SS-8	50/3"			50/3"
754.9	24.7	Auger Refusal Encountered at 24.7 feet; Boring Terminated						



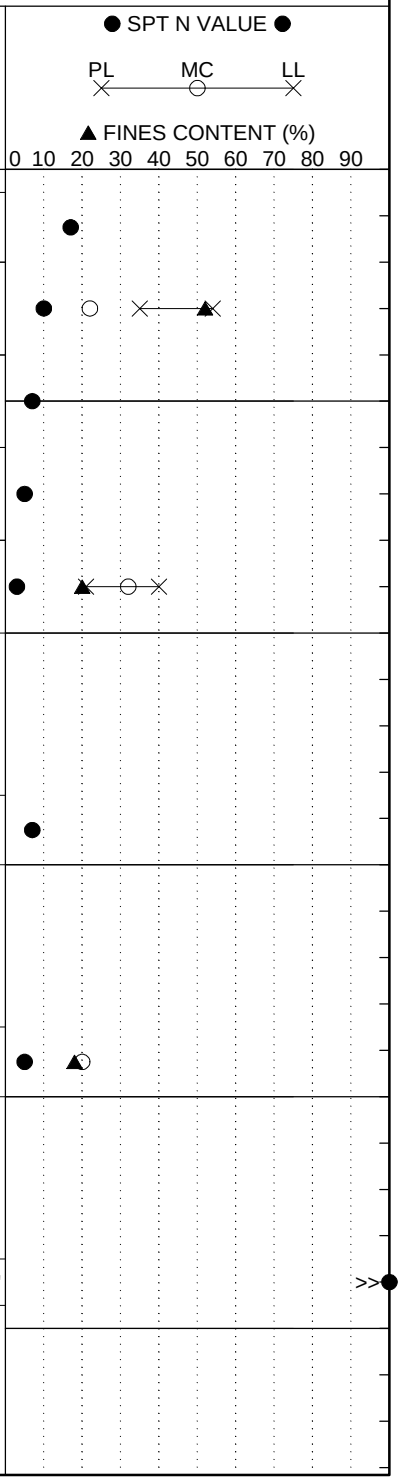
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1			**County:**	Sprtbg./Cherokee	**Boring No.:**	C-9
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]					**Route:**	S-11-82
Eng./Geo.:	J. Jansante	**Boring Location:**	185+00	**Offset:**	7 RT	**Alignment:**	Reloc. CL
Elev.:	640.2 ft	**Latitude:**	35.099105	**Longitude:**	-81.628339	**Date Started:**	10/16/2015
Total Depth:	25.6 ft	**Soil Depth:**	25.6 ft	**Core Depth:**	0 ft	**Date Completed:**	10/16/2015
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95%
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 18 ft	**24HR**	--

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
	0.5	**Asphalt** - 6"	0.5					
		Fill - Very stiff to firm, slightly moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (8)], with trace gravel (*likely amplified N values) LL=54, PL=35, PI=19, NMC=22, %#200=52	2.0	SS-1	9	10	7	17
			4.0	SS-2	5	5	5	10
635.2				SS-3	3	4	3	7
	6.0	**Fill** - Loose to very loose, slightly moist to moist, red brown and white, slightly micaceous, fine to coarse, clayey SAND (SC) [A-2-6 (1)], with layers of clay and gravel LL=40, PL=21, PI=19, NMC=32, %#200=21	6.0	SS-4	2	3	2	5
			8.0	SS-5	1	1	2	3
630.2								
	12.0	**Fill** - Firm, moist, red brown, slightly micaceous, fine to medium, sandy SILT (ML) [A-5], with gravel	13.5	SS-6	2	3	4	7
625.2								
	18.0	**Alluvium** - Loose, wet, light grayish brown, fine to medium, silty SAND (SM) [A-2] NMC=20, %#200=18	18.5	SS-7	3	2	3	5
620.2								
	23.0	**Partially Weathered Rock** - Very dense, moist, gray, micaceous, fine to coarse, silty SAND (SM) [A-2], with rock fragments	23.5	SS-8	17	50/4"		50/4"
615.2	25.6	Auger Refusal Encountered at 25.6 feet; Boring Terminated						



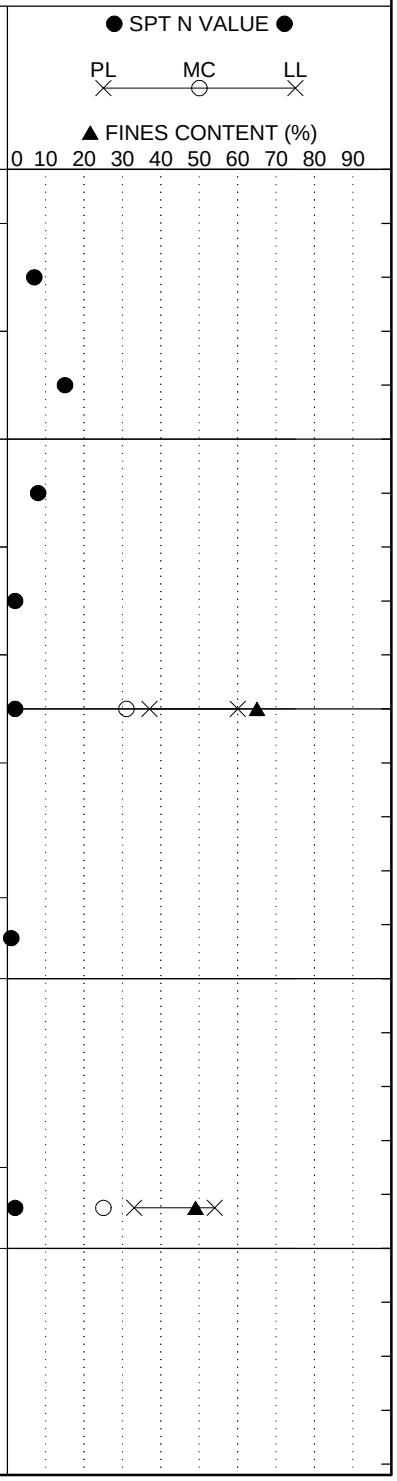
LEGEND

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:	WBS No. 88-**P027114**-E1.SLB.1	**County:**	Sprtbg./Cherokee	**Boring No.:**	C-10
Site Description:	I-85 Widening MM80-96 [S&ME Project 1426-14-161]			**Route:**	S-11-82
Eng./Geo.:	J. Jansante	**Boring Location:**	184+65	**Offset:**	20 LT
Alignment:	Reloc. CL				
Elev.:	640.4 ft	**Latitude:**	35.099046	**Longitude:**	-81.628505
Date Started:	10/16/2015				
Total Depth:	22 ft	**Soil Depth:**	22 ft	**Core Depth:**	0 ft
Date Completed:	10/16/2015				
Bore Hole Diameter (in):	4.25	**Sampler Configuration**		**Liner Required:**	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME 45B	**Drill Method:**	HSA	**Hammer Type:**	Automatic
Energy Ratio:	95%				
Core Size:	N/A	**Driller:**	T. Lanham (S&ME)	**Groundwater:**	**TOB** 18 ft
24HR	--				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Pavement						
		Asphalt - 6" / **Stone Base** - 6"						
	1.0	**Fill** - Firm, slightly moist, gray, brown and red, sandy CLAY (CL) [A-7], with trace wood pieces and gravel	1.0	SS-1	3	3	4	7
	3.0	**Fill** - Stiff to firm, slightly moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7], with trace gravel (*likely amplified N values)	3.0	SS-2	4	5	10	15
635.4			5.0	SS-3	2	3	5	8
	7.0	**Fill** - Very soft, slightly moist to moist, red brown, slightly micaceous, fine to medium, sandy elastic SILT (MH) [A-7-5 (16)], with trace gravel LL=60, PL=37, PI=23, NMC=31, %#200=65	7.0	SS-4	1	1	1	2
			9.0	SS-5	1	1	1	2
630.4								
	12.0	**Fill** - Very loose, moist (to wet below 18 feet), red brown, slightly micaceous, fine to medium, silty SAND (SM) [A-7-5 (8)], with trace gravel LL=54, PL=33, PI=21, NMC=25, %#200=49	13.5	SS-6	1	0	1	1
625.4								
			18.5	SS-7	WOH	1	1	2
620.4								
	22.0	Auger Refusal Encountered at 22 feet; Boring Terminated						



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	

SPT Energy Measurements Data Sheet

Drill Rig:	Charlotte CME 550X ATV (SN290593)	**Test Date:**	12/14/2015
Hammer:	Autohammer	**Project Name/No.:**	Rock Hill Commerce Park / 1335-15-057
Oper./Engr.:	C. Odom / J. Grupp	**Boring ID:**	B-18
Location:	Rock Hill, SC	**Drilling Method:**	3.25-in. Hollow-stem Augers

Rod Type/ID: 203AWJ **Area of Rod:** 1.19 in^2

Depth: 23.5 ft
LE: 28.5 ft
Blow Count: 4, 5, 9

Blow No.	EFV Energy
1	0.30
2	0.30
3	0.32
4	0.31
5	0.31
6	0.30
7	0.30
8	0.30
9	0.30
10	0.30
11	0.30
12	0.30
13	0.30
14	0.31
15	0.30
16	0.30
17	0.30
18	0.30

Depth: 28.5 ft
LE: 33.5 ft
Blow Count: 4, 5, 5

Blow No.	EFV Energy
1	0.29
2	0.28
3	0.30
4	0.30
5	0.30
6	0.29
7	0.30
8	0.30
9	0.30
10	0.30
11	0.31
12	0.30
13	0.30
14	0.30

Depth: 33.5 ft
LE: 38.5 ft
Blow Count: 3, 4, 7

Blow No.	EFV Energy
1	0.29
2	0.28
3	0.30
4	0.30
5	0.29
6	0.30
7	0.31
8	0.31
9	0.29
10	0.29
11	0.29
12	0.30
13	0.30
14	0.29

Depth: 38.5 ft
LE: 43.5 ft
Blow Count: 3, 4, 6

Blow No.	EFV Energy
1	0.31
2	0.26
3	0.29
4	0.29
5	0.30
6	0.30
7	0.30
8	0.32
9	0.31
10	0.30
11	0.31
12	0.31
13	0.31

Avg. Energy:	0.30 ft-kips	0.30 ft-kips	0.30 ft-kips	0.30 ft-kips
Max. Rated Energy:	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips
Efficiency:	87%	85%	84%	86%
Std. Deviation:	0.01 ft-kips	0.01 ft-kips	0.01 ft-kips	0.01 ft-kips

Average efficiency from all tests **86%**

Comments: LE = length from gages to end of sampler. EFV method used for energy.
The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft).

SPT Energy Measurements Data Sheet

Drill Rig:	Charlotte CME 55 Truck (SN328245)	**Test Date:**	12/14/2015
Hammer:	Autohammer	**Project Name/No.:**	Rock Hill Commerce Park / 1335-15-057
Oper./Engr.:	T. Miller / J. Grupp	**Boring ID:**	B-18A
Location:	Rock Hill, SC	**Drilling Method:**	3.25-in. Hollow-stem Augers

Rod Type/ID: 203AWJ **Area of Rod:** 1.19 in^2

Depth:	23.5 ft	**Depth:**	28.5 ft
LE:	28.5 ft	LE:	33.5 ft
Blow Count:	5, 6, 8	Blow Count:	4, 6, 10

Blow No.	EFV Energy	Blow No.	EFV Energy
1	0.28	1	0.30
2	0.29	2	0.31
3	0.28	3	0.31
4	0.28	4	0.31
5	0.28	5	0.30
6	0.29	6	0.31
7	0.29	7	0.30
8	0.29	8	0.30
9	0.29	9	0.31
10	0.30	10	0.31
11	0.29	11	0.30
12	0.29	12	0.31
13	0.30	13	0.31
14	0.29	14	0.31
15	0.30	15	0.30
16	0.30	16	0.31
17	0.30	17	0.31
18	0.30	18	0.31
19	0.30	19	0.32

Depth:	33.5 ft	**Depth:**	38.5 ft
LE:	38.5 ft	LE:	43.5 ft
Blow Count:	4, 6, 7	Blow Count:	2, 4, 6

Blow No.	EFV Energy	Blow No.	EFV Energy
1	0.32	1	0.31
2	0.31	2	0.31
3	0.31	3	0.31
4	0.32	4	0.31
5	0.32	5	0.31
6	0.31	6	0.31
7	0.32	7	0.31
8	0.32	8	0.31
9	0.32	9	0.31
10	0.32	10	0.30
11	0.32	11	0.31
12	0.32	12	0.31
13	0.32		
14	0.32		
15	0.32		

Avg. Energy:	0.29	ft-kips	0.31	ft-kips	0.32	ft-kips	0.31	ft-kips
Max. Rated Energy:	0.35	ft-kips	0.35	ft-kips	0.35	ft-kips	0.35	ft-kips
Efficiency:	83%		88%		91%		88%	
Std. Deviation:	0.01	ft-kips	0.01	ft-kips	0.00	ft-kips	0.00	ft-kips

Average efficiency from all tests **87%**

Comments: LE = length from gages to end of sampler. EFV method used for energy.
The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft).

SPT Energy Measurements Data Sheet

Drill Rig:	Charlotte CME 45B Truck (SN298904)	**Test Date:**	12/14/2015
Hammer:	Autohammer	**Project Name/No.:**	Rock Hill Commerce Park / 1335-15-057
Oper./Engr.:	T. Miller / J. Grupp	**Boring ID:**	B-18B
Location:	Rock Hill, SC	**Drilling Method:**	3.25-in. Hollow-stem Augers

Rod Type/ID: 203AWJ **Area of Rod:** 1.19 in^2

Depth: 23.5 ft
LE: 28.5 ft
Blow Count: 3, 5, 7

Blow No.	EFV Energy
1	0.33
2	0.35
3	0.35
4	0.35
5	0.35
6	0.34
7	0.34
8	0.35
9	0.34
10	0.34
11	0.33
12	0.33
13	0.33
14	0.33
15	0.32

Depth: 28.5 ft
LE: 33.5 ft
Blow Count: 3, 5, 7

Blow No.	EFV Energy
1	0.32
2	0.33
3	0.35
4	0.33
5	0.33
6	0.33
7	0.33
8	0.33
9	0.33
10	0.32
11	0.32
12	0.33
13	0.33
14	0.32
15	0.31

Depth: 33.5 ft
LE: 38.5 ft
Blow Count: 2, 3, 6

Blow No.	EFV Energy
1	0.31
2	0.32
3	0.32
4	0.33
5	0.35
6	0.35
7	0.32
8	0.33
9	0.33
10	0.33
11	0.30

Avg. Energy:	0.34	ft-kips	0.33	ft-kips	0.33	ft-kips
Max. Rated Energy:	0.35	ft-kips	0.35	ft-kips	0.35	ft-kips
Efficiency:	97%		94%		93%	
Std. Deviation:	0.01	ft-kips	0.01	ft-kips	0.02	ft-kips

Average efficiency from all tests **95%**

Comments: LE = length from gages to end of sampler. EFV method used for energy.
The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft).

SPT HAMMER EFFICIENCY

SCI Construction Materials
Non Destructive
Geotechnical
Environmental

Drill Rig:	SCI CME 55	Test Date:	9/29/14	Boring ID:	TB-1
Hammer:	Automatic	Project No. :		Rod Type:	BW
Rig Operator:	Nard	Location:	SCI Yard	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Rod Area:	1.81 in^2

Depth: 40 ft
LE: 43 ft
Blow Count: 1, 2, 2

Blow No.	Energy
1	0.266
2	0.265
3	0.269
4	0.269
5	0.275
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

Average Energy: 0.269 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 77%
Std. Deviation: 0.004 kip-ft

Depth: 45 ft
LE: 48 ft
Blow Count: 15, 18, 20

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.285	26	0.291	51	0.294
2	0.291	27	0.292	52	0.297
3	0.290	28	0.290	53	0.295
4	0.282	29	0.296	54	
5	0.289	30	0.295	55	
6	0.289	31	0.291	56	
7	0.290	32	0.294	57	
8	0.294	33	0.290	58	
9	0.291	34	0.288	59	
10	0.290	35	0.290	60	
11	0.292	36	0.294	61	
12	0.294	37	0.293	62	
13	0.288	38	0.290	63	
14	0.290	39	0.294	64	
15	0.295	40	0.292	65	
16	0.293	41	0.289	66	
17	0.293	42	0.291	67	
18	0.294	43	0.291	68	
19	0.291	44	0.290	69	
20	0.288	45	0.292	70	
21	0.295	46	0.294	71	
22	0.290	47	0.290	72	
23	0.294	48	0.298	73	
24	0.290	49	0.294	74	
25	0.295	50	0.295	75	

Average Energy: 0.292 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 83%
Std. Deviation: 0.003 kip-ft

Depth: 50 ft
LE: 53 ft
Blow Count: 12, 17, 15

Blow No.	Energy	Blow No.	Energy
1	0.283	26	0.268
2	0.270	27	0.270
3	0.274	28	0.268
4	0.273	29	0.269
5	0.275	30	0.265
6	0.279	31	0.271
7	0.278	32	0.270
8	0.278	33	0.270
9	0.276	34	0.272
10	0.279	35	0.270
11	0.279	36	0.272
12	0.277	37	0.275
13	0.277	38	0.272
14	0.271	39	0.272
15	0.275	40	0.271
16	0.271	41	0.273
17	0.272	42	0.272
18	0.267	43	0.272
19	0.275	44	0.269
20	0.269	45	
21	0.268	46	
22	0.271	47	
23	0.270	48	
24	0.272	49	
25	0.272	50	

Average Energy: 0.273 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 78%
Std. Deviation: 0.004 kip-ft

Average efficiency from all tests: 81%

Comments: LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on a hammer weight of 0.14 kips and a drop height of 2.5 feet.

SOIL BORING AND SAMPLING PROCEDURES

INTRODUCTION

The American Society for Testing and Materials (ASTM) publishes standard methods to explore soil, rock and ground water conditions in Practice D-420-98, "*Standard Guide to Site Characterization for Engineering Design and Construction Purposes.*" The boring and sampling plan must consider the geologic or topographic setting. While the scope and extent of the exploration may vary with the objectives of the client, each exploration includes the following key tasks:

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

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

RECONNAISSANCE OF THE PROJECT AREA

Where practical, we review available topographic maps, county soil surveys, reports of nearby investigations and aerial photographs when preparing the boring and sampling plan. Then we walked over the site to note land use, topography, ground cover, and surface drainage. We observed general access to proposed sampling points and noted any existing structures.

PREPARATION OF EXPLORATION PLAN

The exploration plan or drilling assignment sheet consists of a set of written directions to the drillers or to other field exploration staff. The plan tabulates the minimum depth of borings, method of drilling and stabilizing the boring, sampling methods and depths, procedures for backfilling, and procedures to be followed if certain subsurface conditions were encountered.

The location, number and depth of the borings, the method of drilling, and the method and depths of sampling were discussed prior to commencement of the exploration and were outlined in our initial proposal. This scope of work formed the basis of the initial exploration plan attached in the appendices.

Utility Locator Service

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

Utility Checks with Owner

Where the site lies beyond junction boxes or meters these areas will not be checked by the utility location crews dispatched in response to our utility locate request. In these cases we check proposed sampling points for conflicts during the site walkover with a representative of the facility.

Federal, State and Local Regulatory Permitting

S&ME did not attempt to obtain federal or state permits for any part of its work unless specifically described in the accompanying report. S&ME also assumes that in circumstances where we are directed by the client to perform sampling or borings at specific locations - that these locations have been determined by the client to be in compliance with applicable regulatory statues.

Health and Safety Plan

A job-specific health and safety plan is not prepared for geotechnical explorations at sites with no known environmental contamination. Geotechnical explorations are conducted under the S&ME general health and safety plan.

Drilling Assumed to be Permitted at Designated Locations

S&ME assumes permission to perform borings or other exploratory work is conveyed either with notice to proceed by the client. Where S&ME personnel are denied access to proposed boring or sample locations upon or following arrival at the site, they are instructed to demobilize pending resolution of any dispute.

S&ME also assumes that contamination of the soils or ground water of the site has not occurred unless otherwise specifically indicated by the client in advance of our exploration. S&ME will not perform intrusive exploration in any area known to contain hazardous wastes except under a plan specifically prepared in advance. Where suspected hazardous materials are unexpectedly encountered, S&ME suspends all work and evacuates the area immediately until a determination can be made as to the nature of the material encountered.

Use of S&ME Data From Other Projects

Where previous S&ME boring or sounding data pertinent to the project is known to exist and can be readily retrieved, such data is incorporated into our evaluation process. Boring or sounding data, in-situ tests or laboratory data may be incorporated into the cross sections presented in the report. Boring and sounding records and laboratory records may also be included in the appendices or in summary tables embedded in the report.

Where boring or sounding records predate the computerized database record system now in use, records included in the report will be paper hard copies of the records in their original forms. In most cases S&ME will not re-enter the data into the database to produce a new record in the current format.

Use of Other Firms' Boring and Sounding Data

While S&ME may review this data as part of planning of our exploration, such data will not be incorporated into our evaluation unless the data is independently verified by S&ME using parallel borings or other appropriate means, except under some very limited circumstances which will be detailed in the text of the project report.

Other firms' boring or sounding records typically can not be read by the computerized database record system now in use by S&ME. Foreign boring or sounding records included in the report will be paper hard copies of the records in their original forms. In most cases S&ME will not re-enter foreign data into the S&ME database to produce a new record in the current format.

Use of Building Plans and Construction Data

Where S&ME is provided as-built building plans, pile driving records, PDA data or other construction data pertinent to the project, such data is incorporated into our evaluation process. However, S&ME can typically not independently verify the accuracy of as-built data.

S&ME

FIELD LAYOUT AND SAMPLE POINT ELEVATIONS

The type of site plan provided to us determines largely how well the sampling locations can be depicted on the site. We normally locate sampling points using very rough field methods. The report will indicate the type of layout plan we use to locate each sampling point, how we approximate each sampling point elevation, and how we stake the sampling point location in the field.

Layout Plan

There are typically five alternative means available to depict sampling point locations. Which one is used depends on the type of drawing or map provided to us by the client or his designer.

(1) No Plan or Sketch Provided – Where the client provides no plan of the site, we will prepare a sketch using large scale aerial photographs, USGS topographic maps, or plain paper as a base. The sketch is not to scale. The "Boring Location Plan" will depict only very a general location of each sampling point relative to the proposed construction.

(2) Unscaled Sketch – Where the client provides only an unscaled sketch of the site indicating proposed structures, we attempt to reproduce that sketch as the "Boring Location Plan." We will plot the sampling points on the sketch. But we can not warrant that the sketch depicts the true positions of the sampling points relative to one another, to physical features on the site, or to the actual dimensions of the structure.

(3) Scaled Survey Property Plat – Where the client provides a scaled survey property plat that shows property corners and major site features, we attempt to reproduce the plat as the "Boring Location Plan." We will plot sample points at their approximately locations using reconnaissance methods described below. But plotted locations depicted on the plan are not warranted.

(4) Scaled Topographic Site Survey – Where a topographic site survey plan is provided, indicating the general orientation or outline of proposed structures, S&ME attempts to reproduce this drawing with sampling points indicated in their approximate positions subject to the limitations of the method used in staking the locations, using normal care and diligence in plotting the positions. We emphasize that the plotted positions are not exact.

(5) Scaled Building Layout Plan – Where we are provided a building layout plan indicating numbered column lines prior to commencement of field work, we attempt to reproduce the plan with sampling points approximately plotted relative to the column lines.

Sampling Point Elevations

S&ME does not directly measure ground surface elevation at the sample points, unless this is included in the contract, We estimate sample point elevations in several ways, which we describe below. The attached report states the method used.

(1) No Elevation Information Provided – Where a topographic site plan is not available, we do not show elevations. Boring data and strata are stated in terms of depth below ground on all boring records.

(2) Interpolation From Large Scale Topographical Maps – We may get a rough elevation for each boring from a large-scale topographic quadrangle map of the area. We use this method only on very rough sites, with large differences in elevation. We do this only to profile uneven ground. Elevations are "illustration only" and do not accurately show site contours.

(3) Interpolation From Topographic Site Plan – We interpolate the elevation of each boring from the plotted contours on topographic site plans. We use the care and judgment ordinarily exercised in similar work. We consider sample point elevations accurate only to the degree that the contours shown on the plans reflect actual site topography.

(4) Use of Spirit Level – S&ME may use a spirit level to measure ground surface elevations at sampling point locations. S&ME establishes a temporary benchmark on the site as a reference point for the survey. This is done only when specifically stated in our proposal as part of our scope of work for the project,

S&ME uses the degree of care normally exercised for rough layout work, but we do not attempt to tie survey loops back to the origin. Boring elevations must be considered approximate and not exact.

(5) Leveling Survey by Others - Top-of-ground elevations are surveyed by others at sampling point locations. They then provide the elevations to us for us to use to complete our report. We do not independently verify any of the surveyed elevations.

Staking of Sampling Points in the Field

Since S&ME does not provide surveying services, typically we provide only rough staking of sample point locations, unless specifically required in our contracted scope of services. The report will describe the means used to locate sampling points in the field.

(1) Reconnaissance Methods - Locations are stepped off from existing site features, turning rough right angles from existing features marked on the site plan. Locations are marked with small colored flags with the sampling point numbers inscribed.

(2) Rough Measurement - Sampling points are laid out by measuring distances from existing site features with a measuring wheel and by turning rough right angles from existing features. Locations were marked in the field with small colored flags.

(3) Handheld Global Positioning System – Sampling points are laid out using a hand-held Global Positioning System (GPS) device. The GPS measures from a base coordinate on the site provided to us before beginning field work. The device used is considered accurate within 1 meter of the true coordinate.

(4) Surveyed and Marked by Others Prior to Exploration – Sampling points are staked by others. Sampling point numbers shown on the attached "Boring Location Plan" match markings on the survey stakes at each boring location. Offsets from staked locations are indicated on the sampling point records.

(5) Surveyed and Marked by Others Subsequent to Exploration – Sampling point locations are surveyed by others after drilling and sampling was completed. Sampling point numbers shown on the attached "Boring Location Plan" match markings left on the survey stakes or flags at each sampling point location by our crew. Sampling point locations on the "Boring Location Plan" are accurate only to the degree of surveying accuracy used by the surveyor.

S&ME

ACCESS TO SAMPLING LOCATIONS

We perform all borings at marked location stakes unless they are offset because of slopes, ditches, overhead power or other obstructions. Where we must offset from the stake, we indicate the offset distance and relative direction on the field boring record. The final Soil Test Boring Record and the attached "Boring Location Plan" in the Appendix indicates all offsets.

(1) ATV Access Over Sloping Ground - All-terrain-mounted drilling and sampling equipment allows movement to the sampling points over sloping ground. This requires careful alignment and positioning of the rig on the face of the slope during both ascent and descent. The crew moves only over a marked access route to each staked boring location. They attempt to move only on firm ground and they avoid rutting or disturbing the surface as much as possible. We do not attempt to repair any ruts or other disturbance unless required by our contract.

(2) Access Restricted by Stacked Construction Materials S&ME makes no attempt to pick up or move construction materials obstructing access to the borings. In these cases we offset the borings from the stakes to provide safe clearance between the drilling equipment and the material.

(3) Access Restricted by Soft, Marshy Ground - Truck-mounted drilling and sampling equipment can usually only access soft, marshy sites on existing roads or paths - dirt, gravel, pavement. Where they need to move on natural ground, the crew will move only over marked routes to the staked boring locations. They will attempt to move only on firm ground and will limit rutting or disturbance of the ground surface as much as they can. S&ME's field crew also will avoid cutting or taking apart any fences to reach any of the staked borings, except where the landowner specifically grants permission.

(4) Access Restricted by Locked Gates or Fences – Where access to sampling points is prevented by gates or fences, we defer performing these borings until the end of field work. In the meantime we attempt to obtain access through the land owner. S&ME will make no attempt to cut locks or disassemble any fencing to access boring locations.

(5) Access Restricted by Parked Vehicles – Where parked cars or trucks restrict our access to sampling points, we defer performing these borings until the parking locations are empty. At that time we place a traffic cone in the vacated spot until the boring can be performed. Where this can not be done, we offset the boring to the closest feasible location that does not block traffic.

(6) Access Restricted by Overhead Utilities - Access to one or more of the sampling points may be restricted by close clearances to energized utilities. In this case we make no attempt to perform the boring at the staked location. We offset the boring a sufficient distance to provide a minimum clearance or we abandon the boring.

(7) Access Along Highways – Where a sampling point lies close to heavy traffic, we perform lane or shoulder closures using the signage layout shown in state department of transportation work zone safety guidelines. Closures may be either two-lane or four-lane, and may include flagmen or police.

We may need to shift traffic to opposing lanes or establish one-way traffic during the lane closure period. Public notice of all work is made to the media before any operation which requires shifting lanes. Supplemental traffic control, including floggers, barriers and flashing signs are also required.

(8) Use of Temporary Work Barriers Required – We may place traffic cones, stanchions and rope, tape, or wooden barricades when drilling in public areas. This is to prevent people from approaching the rig. We then remove these barriers when the rig is moved. .

(9) Access by ATV, Vegetation Pushed Over - Where the site is lightly to moderately covered with small brush or saplings, flagged sampling points may be accessed by either a truck-mounted or all-terrain tractor mounted drill rig by pushing over underbrush or saplings as required. It is understood in our contract that no attempt will be made to restore the access route to its original condition. To the extent possible, the crew avoids pushing over man-made plantings such as crops, ornamental shrubs or fruit trees.

(10) Heavy Vegetation, Dozer Clearing - A crawler-mounted bulldozer is often needed to get to staked boring locations in heavy woods. The dozer follows flags or other marks that our personnel place along the access route. The operator attempts to clear small brush and saplings to the minimum extent possible to allow passage of the equipment.

We do not attempt to topple or fell large trees or snags, nor do we attempt to strip or grub the surface. Felled vegetation is pushed to the side of the path to allow equipment to pass but is not stacked or burned. Unless specifically stated as part of our contract, no attempt is made to restore the route to its original condition.

FIELD SAMPLING AND TESTING OF EARTH MATERIALS

In general, soil test borings, cone penetration or dilatometer soundings, or other sampling methods were advanced at the marked locations by methods as described more fully below.

All borings or soundings were advanced approximately at their assigned locations and to their assigned depths in the exploration plan, subject to the limitations in staking described above, except as specifically described in the text summary.

Numbering of Borings and Soundings

Soil test borings are usually denoted "B-" on the boring location plan except as specifically described in the report text. CPT soundings are denoted "C-", Marchetti dilatometer soundings "D-", hand auger borings "HA-", and machine excavated test pits or trenches "TP-". Temporary or permanent piezometers are denoted "P-."

Drilling and Direct Push Sounding Procedures

Procedures used to perform soil test borings, hand auger borings, test pits, CPT soundings, or other sampling are summarized on the attached pages. The report text explains necessary exceptions to standard procedures.

Field Records

The chief driller prepares field test boring records or sounding records recording subsurface conditions encountered during field work. Field records contain information about the drilling or push method, samples attempted and sample recovery, presence of coarse gravel, cobbles, etc, and indications of materials encountered between sample intervals. Field records are retained at our office.

Preservation and Handling of Recovered Samples

Handling of recovered samples is in general accordance with one or more of the procedures described by ASTM D 4220, section 4, or ASTM D 5079, section 7.5.1, as described below. Carbon copies of field boring records accompanied the samples. Recovered samples not expended in laboratory tests are commonly retained in our laboratory for 60 days following completion of drilling.

METHODS FOR AUGERING OR DRILLING

The Soil Test Boring Records enclosed with this report indicate methods used to advance the borings.

Measurement of Topsoil Layers

The thickness of the organic topsoil layers, including humus and underlying stained soils, was measured by taping at shovel cuts made near each boring or sounding.

Surface Coring of Concrete Pavement for Thickness Measurement or Boring Access

Coring of concrete slabs or concrete pavement is performed in general accordance with ASTM C 42, "*Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete*." Samples were obtained for measuring approximate thickness only. Moisture conditioning and end surface preparation of recovered cores described in Section 7 of ASTM C 42 was not performed.

Surface Coring of Asphalt Pavement for Thickness Measurement or Boring Access

Asphalt pavement layers are sampled using diamond coring in general accordance with ASTM D 979, "*Standard Practice for Sampling Bituminous Paving Mixtures.*" Coring is performed to allow penetration of the pavement layers by soil drilling equipment, so random sampling and averaging of data points, described in paragraph 5.2.6 of the Practice, is not performed.

Auger Borings

Auger borings are advanced mechanically by a drill rig using a flight auger or hollow stem auger in general accordance with ASTM D 1452, "*Standard Practice for Soil Investigation and Sampling by Auger Borings*". The soils encountered are identified by examining the cuttings brought to the surface. Soil consistency is qualitatively estimated by the relative difficulty of advancing the augers.

Soil Test Boring with Flight Auger

Borings were made by mechanically twisting a continuous steel flight auger into the soil. The auger consists of a flighted solid drive tube having hex couplings at each end. The drive head consists of either a steel clay split or spade bit, or a carbide finger bit with tungsten carbide teeth.

Continuous flight augering is limited to stiff cohesive soils that are able to stand unsupported for the full length of the boring. Use of split barrel samplers requires withdrawal of the drill string from the boring and insertion of a separate sampling string. Grab samples can also be recovered by "dead stick withdrawal" in which the loaded augers are withdrawn from the boring without rotation.

Soil Test Boring with Hollow-Stem Auger

The hollow stem auger consists of a hollow cutting head for cutting soil, mounted on the terminal section of the lead auger. Following auger sections consist of hollow tube with continuous helical flights on the outside to lift cuttings to the surface. Inside diameter of the hollow stem ranges from 2-1/4 inches to 6-5/8 inches and outside diameters of the auger flights range from 5 to 18 inches.

Use of hollow stem augers to obtain soil samples for engineering purposes is described by ASTM D 6151-97(2000), "*Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*." Hollow stem augering allows drilling and casing the boring simultaneously. Sampling or penetration testing is conducted through the hollow auger column below the lead auger assembly.

Heaving, blow-in or sanding-in, sand lock or wedging of cuttings into the lead auger assembly may occur in cohesionless soils. Water or drilling fluid added to the auger column to provide hydrostatic balance and limit entry of sands, or use of special pilot bit assemblies, are noted on the field boring logs.

Soil Test Boring with Rotary Wash

A rotary drill rig has three functions: rotating the drill string, hoisting the drill string, and circulating the drilling fluid. A bit is rotated against the formation while mud is pumped down the drill pipe, through ports in the bit, and back to the ground surface through the well bore hole. Rotary drilling is sometimes called mud rotary drilling.

The drilling apparatus consists of a rotating kelly with hollow drill rod and either a rotary roller bit or drag type bit with either a side discharge or bottom discharge orifice for the drilling fluid. Drill pipes or rods are joined to a bit to form the drill string. A separate sampling string consists of either split spoon samplers or Shelby tube samplers mounted on NX drill rod. Hole diameter is typically restricted to the minimum necessary for passage of the sampling device.

A heavy drilling fluid is circulated in the boreholes to stabilize the sides and flush the cuttings. Drilling fluid may consist of either water without additives or water with heavy bentonite slurry added to raise the specific gravity of the circulating fluid. Synthetic polymer drilling fluids such as Revert also may be used. The type of drilling fluid used and the portion(s) of each boring mudded are indicated on the boring records.

A short length of drill casing is installed to stabilize the upper few feet of the boring near the ground surface. A mud pump of suitable capacity is used to push the drilling fluid through drill rod and up to the surface. Drilling fluid is recirculated through a mud tub with baffles to allow separation of the drilling cuttings from the fluid. The mud tub also serves as an initial reservoir for mixing of the drilling fluid.

Field boring records indicate size and type of drilling bit, type of drilling fluid used, and note any loss or increase in the volume of the circulating fluid during drilling. At selected intervals, circulation of the mud is turned off, the drill string withdrawn from the hole, and the sampling string inserted into the open boring to obtain samples and perform penetration testing.

Hand Auger Borings

Borings are advanced by hand augering and the soils encountered identified by cuttings brought to the surface. Representative samples of the cuttings are placed in glass jars and transported to the laboratory. Soil consistency is estimated by the relative difficulty of advancing the augers.

Backhoe Test Pits

Test pits excavated with a backhoe or excavator provide a view of a relatively large section of the strata. During excavation, the bottom of the pit is kept relatively horizontal so that each lift represents a uniform horizon. Excavated material brought up is placed in separate stacks or piles adjacent to the pit to allow segregation of the material by depth. The excavated bucket is used to clean or chip a vertical band along the side of the pit to allow inspection and identification of the soil or rock layers.

A field engineer is present to examine the soil strata exposed in each pit, estimate the relative ease of excavation, the amount of subsurface water entering the pits, and the maximum depth the pits could be excavated. However, field staff do not enter the pit to inspect the sides after the pits were extended further than five feet below the surface.

SPLIT BARREL SAMPLER WITH STANDARD PENETRATION TEST

Soil sampling and penetration testing in the soil test borings were performed in general accordance with ASTM D1586, *"Standard Test Method for Penetration Test and Split Barrel Sampling of Soils."* At regular intervals, soil samples were obtained with a standard 1.4 inch I. D., two-inch O. D., split barrel sampler.

Standard Sample Intervals

Standard sample intervals used by S&ME are as follows unless otherwise described in the report text:

Sample No.	Depth Interval (ft)	
SS-1	1-2.5	
SS-2	3.5-5	subsequent samples
SS-3	6-7.5	are taken at five foot
SS-4	8.5-10	intervals
SS-5	13.5-15	
SS-6	18.5-20	.

SPT Hammer Arrangement

S&ME uses a conventional rope and cathead arrangement with a Saf-T hammer on most of its rigs. In this arrangement the 140-lb hammer telescopes over the sampling rods and is lifted by means of hemp rope wrapped around the rotating cathead. The hammer is rhythmically lifted and dropped through a 30-inch travel along the guide by the operator.

The cathead rope is is looped around the rotating drum or cathead with the rope coming off the bottom of the cathead, making 2-1/4 total turns around the drum. The cathead rotates at 100 rpm unless noted otherwise on the field boring log. Borings performed using a donut hammer are specifically described as such in the report text.

Use of SPT Autohammer

Sampling is performed using a trip, automatic or semi-automatic hammer drop system which lifts the 140-lb hammer and allows it to drop the required 30-in distance unimpeded. This method is allowed in Section 7.4 of ASTM D 1586.

Standard penetration test N-values obtained using one of the available autohammer systems often vary widely from those obtained using conventional rope and cathead arrangements. While corrections to the resulting N-value have been developed for certain specific applications, N-values presented on S&ME graphical boring records represent field blow counts which are not modified to account for hammer energy variations.

Split Barrel Sampler

The sampler is constructed to the dimensions indicated in Fig. 2 of ASTM D 1586. The driving shoe is of hardened steel with a 35mm inside diameter. The shoe is inspected for damage at the beginning of each production day. The split barrel sample has a minimum diameter of 38 mm. ASTM D 1586 allows use of a 16-gage thick liner within the sampler, but no liner is used unless otherwise noted on the boring log. ,

Use of Retainers or Sample Catchers

Saturated, clean cohesionless sands may tend to flow out when the sampler is withdrawn from the boring. Steel or plastic sample retainers may be required to keep samples of clean granular soils in the sampler barrel. Retainers or baskets are inserted between the shoe and the sampler barrel to help retain loose or flowing materials. The retainers permit the soil to enter the sampler during driving but upon withdrawal they close and thereby retain the sample. Use of sample baskets or retainers is noted in the boring records.

Description of Soil Consistency

The sampler is first seated six inches to penetrate loose cuttings, then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler through the two final six inch increments is recorded as the penetration resistance (SPT N) value. The N-value, when properly interpreted by qualified professional staff, is an index of the soil strength and foundation support capability.

Boring records will indicate partial increments in which sampling was terminated due to excessive driving (>50 blows/6 inch) or the length in which the sampler is advanced beyond the increment by a single blow. The records will note whether the static weight of the drill rods (WOR) or the static weight of the drill rods plus the hammer (W-O-H) was required to advance the sampler beyond the sample interval.

Sample descriptions in the soil test boring logs contain a descriptor of the relative density or consistency of each soil penetrated in the boring. Soil consistency is described using SPT N-values, using the terminology in the table.

SANDS		SILTS AND CLAYS	
Penetration Resistance (bpf)	Relative Density	Penetration Resistance (bpf)	Consistency
0-4	Very Loose	0- 2	Very Soft
5-9	Loose	3 - 4	Soft
10 - 29	Medium Dense	5 - 8	Firm
		9 - 16	Stiff
30 - 50	Dense	16 - 30	Very Stiff
>50	Very Dense	31 – 50	Hard
		>50	Very Hard

Interpreted Soil Consistency Using SPT Blow Count

Correction to SPT Blow Count

Corrections to the Standard Penetration test N-value in sands have been developed to account for variations in confining stress, hole diameter, rod length and other factors. These corrections are frequently made in interpreting the N-values obtained in certain geologic environments. Under certain circumstances the corrected N-values may allow a more realistic appraisal of the relative density of sandy soils penetrated by the borings. But N-values presented on S&ME graphical boring records represent field blow counts and not modified blow counts.

Dynamic Cone Penetrometer

The dynamic cone penetrometer is a handheld penetrometer used to qualitatively estimate soil relative density or consistency in hand auger borings or test pits. At selected intervals, the penetrometer is inserted into the open boring. The conical point of the penetrometer is first seated 1-3/4 inches to penetrate any loose cuttings in the boring, then driven two additional 1-3/4 inch increments by a 15 pound hammer falling 20 inches. The number of hammer blows required to achieve this penetration is recorded. When properly evaluated by qualified professional staff, the blow count is an index to the soil strength and ability to support foundations.

RECOVERY OF BULK AND UNDISTURBED SAMPLES

Bulk samples provide a sufficient quantity of material to allow laboratory evaluation of compaction or bearing ratio tests of laboratory-fabricated samples.

Split spoon or split barrel sampling provide samples suitable for visual examination and classification tests but not sufficiently intact for quantitative laboratory testing. To provide samples for quantitative tests, relatively undisturbed samples are obtained by use of either driven or pushed Shelby tubes or other techniques further described below.

Block samples often allow strength or compressibility tests of cohesive materials where it is desired to evaluate shear strength along predetermined failure planes or if other techniques are not feasible or do not provide sufficiently intact samples.

Bulk Samples

At selected locations and depths, representative bulk samples of the soils are obtained by randomly taking shovel loads from the cuttings or spoil brought to the surface by the hoe or by the auger scrolls used to advance soil test borings. Typically a minimum sample of 30 to 50 lbs is obtained. The bulk sample is placed in a cloth or plastic sack marked with appropriate descriptive information.

Recovered materials are typically treated as Group A samples as defined by ASTM D 4220, Section 4, except that in most cases a small quantity of soil may be placed in a sealed jar to allow a moisture content determination. Samples are protected from freezing at all times.

Stockpile Sampling

At selected locations and depths, representative bulk samples of stockpiled materials soils are obtained by randomly taking shovel loads from the surface of the pile. Typically a minimum sample of 50 lbs to 100 lbs is obtained, but a quantity sufficient to meet the requirements of section 7.2 of ASTM D 2487 is obtained if the Unified classification will be determined for the material.

The bulk sample was prepared by initially obtaining approximately three times the required quantity of material, then quartering the sample to the minimum size. The resulting sample is placed in a cloth or plastic sack marked with appropriate descriptive information.

Block Samples

Representative sections of cohesive soils are hand trimmed from large blocks of the excavated material recovered from test pits or excavations. The trimmed blocks are approximately 6 in. x 6 in. x 8 in. in length. Field trimmed block samples are treated as Group C samples as defined in ASTM 4220, section 4. Each block sample after field trimming is sealed in plastic wrap and encased by sand or other inert filler material in a suitable box or container. Samples are then immediately transported to our laboratory for further study. Unwrapped block samples are further trimmed to size suitable for shear strength or consolidation testing in the laboratory.

Shelby Tube Sampling

Undisturbed samples are obtained either in conjunction with conventional split spoon sampling and penetration tests, or in separate parallel borings advanced specifically for the purpose of obtaining samples in targeted horizons or seams. Where hollow-stem augers are used to advance the borings, open boring diameter is limited to 11.5 inches for a 3-inch diameter Shelby tube.

Undisturbed samples are obtained by pushing sections of three-inch O. D., 16 gauge, steel tubing (Shelby tube) into the soil at the desired sampling intervals. The procedures used generally follow those described in ASTM D 1587*, "Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils*." Tube lengths are standard 30-inches unless otherwise indicated. After advancing the tube, a short set period is allowed for pore pressure dissipation, then the tube slowly spun in place to shear and break off the end of the sample. The Shelby tube, together with the encased soil, is then carefully removed from the ground.

After withdrawal, the length of the recovered soil is measured and the sample preserved in accordance with the sampling plan. Recovered Shelby tube samples are typically treated as either Group B or Group C samples as defined by ASTM D 4220, Section 4, depending on the level of care to be exercised during transport. Locations and depths of undisturbed samples are recorded on each field test boring record.

UD Shelby Tube Insertion by Pushing - After cleaning out the boring, Shelby tubes are typically advanced 24 inches by pushing the tube relatively rapidly without rotating the sampling string as described in Section 7.3 of ASTM D 1587. Other push lengths, if deemed to be appropriate depending on soil conditions, are indicated on the boring records.

UD Shelby Tube Insertion by Driving - When the formation is too hard for push insertion, Shelby tubes are advanced by driving as described in Section 7.5 of ASTM D 1587. The weight and fall of the drive hammer used, the length of advance, and the penetration required are indicated on the boring records. Where drive methods of used, the sample is termed a "driven sample."

Piston Sampler

The piston sampler is a thin-wall tube with a piston, rod and a modified sampler head used for sampling soft soils where the sample recovery is difficult. The sampler is lowered to the bottom of the cleaned boring with the piston fully extended to the bottom of the tube. The piston is held fixed against the bottom of the hole and the thin walled tube is slowly advanced by hydraulic pressure or jacking.

The sampler is then carefully removed from the boring and the vacuum between the piston and the sample helps retain the sample in position. Recovered piston samples are typically treated as Group C samples as defined by ASTM D 4220, Section 4. Piston samplers are never driven. Locations and depths of undisturbed piston samples attempted are recorded on each field test boring record.

Double Tube, Pitcher Type Sampling

Samples of highly compacted, hard, stiff uncemented or slightly cemented materials are obtained using a double tube soil core barrel with liner. The double-tube core barrel is advanced by rotating the outer barrel, which cuts a circular groove and loosens the soil material to be displaced by the two barrels. Drilling fluid was forced downward through the drill stem. The inner barrel, which does not rotate, moves downward over the relatively undisturbed core of soil formed by rotation of the outer barrel. A liner is inserted into the inner barrel before the sampler was assembled.

After drilling the required length, the sampler is withdrawn and the liner removed, made airtight, and transported to the laboratory. Recovered samples are typically treated as Group B samples as defined by ASTM D 4220, Section 4. Locations and depths of undisturbed samples were recorded on each field test boring record.

S&ME

MEASUREMENT OF STATIC WATER LEVELS

Water level readings are made in the open boreholes immediately after completing drilling and withdrawal of the tools. Where feasible, measurements are repeated after an elapsed period of 24 hours to gauge the stabilized water level. Procedures for measurement of liquid levels in open boreholes are described in ASTM D 4750, "*Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well).*"

We note that ground water levels are influenced by precipitation, long term climatic variations, and nearby construction. Ground water measurements made a different times than our exploration may indicate ground water levels substantially different than indicated on the boring records in the Appendix.

Weighted Tape Method

A weighted measuring tape is slowly lowered into each borehole until the liquid surface is penetrated by the weighted end. The reading on the tape is recorded at a reference point on the surface and compared to the reading at the demarcation of the wetted and unwetted portions of the tape. The difference between the two readings is recorded as the depth of the liquid surface below the reference point. Measurements made by this method are then repeated until approximately consistent values are obtained.

Calibrated Electric Cable Method

A calibrated cable with electrical wire encased, equipped with a weighted sensing tip at one end and an electric meter at the other, is slowly lowered into each borehole until the liquid surface is penetrated by the weighted end. Contact with the water closes an electric circuit and is recorded by the meter. The depth reading on the cable is then recorded relative to a reference point on the surface. Measurements made by this method are then repeated until approximately consistent values are obtained.

Time of Boring Reading

The level of free water standing in the boring is noted immediately following completion of each boring, except where the boring is performed using rotary mud drilling and the presence of the drilling mud in the open boring precludes determining a free water level. Where the water table is believed to be shallow we may attempt to drill a shallow parallel open boring immediately adjacent to allow us to measure the free water level.

24-Hour Reading

Ground water in low permeability soils may require many hours to seep into the open borings. Where feasible, measurements are repeated after an elapsed period of at least 24 hours to gauge the stabilized water level. Notes on the boring records will indicate the actual elapsed time between completion of drilling and final recording of ground-water level. Both time of boring and 24-hour readings are indicated on the boring records where these readings are available.

Caving/Collapse of Boring

Collapse of the boring or caving of the sides and filling of the bottom of the boring may occur during the period subsequent to completion of the boring. While it is common for caving or callapse to occur within two or three feet of the static water level, accumulation of water on top of the collapsed material could result where infiltration from the surface occurs. In this case a misleading level could result. When obtaining water levels in a boring we attempt to measure the full depth of the boring to provide an indication as to whether caving or collapse may have occurred and a notation made on the boring record.

Loss/Gain of Drilling Fluid

Boring Records will indicate depths at which changes in volume of drilling fluid returning to the surface are noted. This implies that some fluid pumped down the drill pipe is entering the soil, or that fluid is entering the boring under pressure from the soil. Flow can occur through open-graded sand or gravel or open joints in rock, or could indicate open voids in the soil. Fluid loss can also occur when cuttings are not washed out and the borehole annulus becomes restricted, resulting in increased down-hole pressure.

Installation of Temporary PVC Casing (Observation Well)

Water level readings taken during boring operations do not provide information on long term fluctuations of the water table. In several of the borings, a temporary observation well was constructed by inserting PVC casing to the indicated depth. A slotted PVC well screen is attached to the bottom of the PVC pipe to allow subsurface water to enter the well. Soil is mounded around the observation wells at the ground surface to prevent surface runoff from entering the boreholes.

CPT Methods

CPT penetration pore pressures include the *in-situ equilibrium pore pressure*, controlled by the local ground water regime, and the *excess pore pressure*, generated by insertion of the probe. In clays and silts, penetration is essentially undrained and recorded pore pressures significantly exceed in-situ equilibrium pore pressures.

In sands and gravels, penetration is essentially drained and recorded pore pressures are essentially equal to the in-situ equilibrium pore pressure. The piezometric surface, defined as the point of zero equilibrium pore pressure, was obtained by plotting in-situ equilibrium pore pressure vs. depth using only pore pressure data from sand or gravel soils. Where possible, derived piezometric surface was verified by tape measurement through the sounding opening after removal of the CPT rod and before collapse of the soils.

Free Water Surface vs. Piezometric Surface

The ground-water characteristics of a soil profile consisting of alternating beds of pervious and relatively impervious soils is difficult to define by a single set of borings or wells. Borings or wells extending through relatively impervious soils into an aquifer may indicate a piezometric surface which can exist well above the top of the saturated, fully confined aquifer. In this case the measured water level in the boring or well indicates the piezometric surface – an imaginary surface that everywhere coincides with the static water level in an aquifer – not necessarily the free water surface in the surrounding soils.

Borings or wells may also reflect the presence of unconfined ground water separated from an underlying body of ground water by an unsaturated zone. A perched water table may exist over a limited area at an elevation above the normal free water elevation by an intervening impervious zone. Perched water from shallow depth entering the boring from the surface may accumulate at depth. Water entering the boring from multiple aquifers may provide a reading at some level independent of the static water level in any one layer.

TERMINATION OF DRILLING AND SAMPLING

The boring records indicate the circumstances under which drilling or excavation was terminated. Borings or test pits advanced to their assigned depths and intentionally terminated are indicated as such on the boring or test pit records. Boreholes or test pits may also be prematurely terminated due to encountering dense strata or other obstructions which prevent further advance.

Refusal to Augers

The term "refusal" in the context of this report refers to the inability of the drill rig employed on the project to further advance the boring with the type of soil auger and bit in use. Practical refusal of the tools may take the form of binding or seizing of the bit, "walking off" of the drill string, or liftoff of the rig itself when the operator attempts to crowd the kelly. The term refusal is not used to describe zero penetration of the split spoon sampler in 50 blows.

In natural soils, refusal to the soil drilling methods used at a particular site may result from encountering hard cemented soil, soft weathered rock, coarse gravel, cobbles or boulders, thin rock seams, or the upper surface of sound continuous rock. In fill zones, refusal may also occur from encountering buried debris or objects within the fill mass.

The composition and density of materials below the refusal level of the borings can not be reliably estimated based on the boring data. Core drilling would be required to determine the character and continuity, strength, compressibility and bearing capacity of materials below refusal of the soil auger in natural soils. Exploration of debris laden fill would require use of machine excavated test pits at refusal locations.

Additional Probe Borings Performed at Refusal Locations

Where refusal is encountered at shallow depth (typically less than 15 feet) in a site with deep cuts anticipated, one or more additional auger borings may be performed at locations offset 10 to 20 feet from the original location. The purpose of these offset borings would be to attempt to gauge whether initial refusal occurred on a boulder or lens.

Where offset borings are performed, the strategy used to further define the profile of the obstruction(s) is discussed in the report text. Offset borings are designated with the original boring number with the suffix "A" , "B", or "C" added as appropriate.

Refusal to Augers in Fill Soils

Where fills are present, refusal to drilling may result from encountering buried debris, building materials, or objects. Where the operator judges the material to consist predominantly of rockfill or other debris, borings may also be discontinued to avoid twisting-off of the drill string. In each case, backhoe test pits would be required to expose and identify buried materials below refusal levels in filled areas.

Test Pit Refusal to Machine Excavation

Refusal to the excavator used at the test pits may have resulted from encountering hard cemented soil, soft weathered rock, coarse gravel, cobbles or boulders, thin rock seams, or the upper surface of sound continuous rock. Since a test pit represents a confined excavation, refusal to digging will vary depending on the size of the bucket. Core drilling is required to determine the character and continuity of materials below refusal of the excavator.

METHODS FOR CLOSING AND PROTECTION OF BOREHOLES

Depending on the level of protection required at the surface, different procedures for abandoning the borings may be used. State regulations may also mandate certain procedures under some circumstances. The report text will indicate which procedure was used to abandon the soil borings.

Boreholes Closed Immediately with Auger Cuttings

Boreholes in areas subject to foot traffic or farm animals are closed immediately after drilling. Boreholes are filled by slowly pouring auger cuttings into the open hole such that minimal "bridging" of the material occurs in the hole. Backfill in the upper two feet of each hole is tamped as heavily as possible with a shovel handle or other hand held equipment, and the backfill crowned to direct rainfall away on the surface. Where boreholes exceeds five feet in depth, a plastic hole plug is firmly tamped into place within the backfill at a depth of about two feet.

Boreholes Barricaded and Subsequently Filled with Cuttings

Boreholes in areas subject to foot traffic or farm animals are barricaded immediately after drilling using inverted traffic cones. After completing 24-hour water measurements, boreholes are filled by slowly pouring auger cuttings into the open hole such that minimal "bridging" of the material occurs in the hole. Backfill in the upper two feet of each hole is tamped as heavily as possible with a shovel handle or other hand held equipment, and the backfill crowned to direct rainfall away on the surface. Where boreholes exceed five feet in depth, a plastic hole plug is firmly tamped into place within the backfill at a depth of about two feet.

Borehole Closure with Grout

Boreholes are barricaded immediately after drilling using inverted traffic cones. After completing 24-hour water measurements, boreholes are filled using forced injection or tremie methods by a cement-bentonite or a neat cement grout up to the ground surface.

Closure of Test Pits and Trenches

After completion of excavation, test pits are backfilled with the spoil material; however, since the pits are narrow, deep excavations, very limited compactive effort can be applied to the backfill. Backfill is bucket-tamped during placement and surface rolled. The backfill is heaped up slightly above the level of the ground surface to reduce the possibility of future formation of a depression in the ground surface after the spoil has consolidated.

Patching of Asphalt Surfaces

Where specified in our scope fo work, penetrations of asphalt surfaces made during the drilling process are patched using compacted asphalt cold patch material. Cold patch asphalt is placed to provide a surface flush with existing pavement adjacent to the boring. Cold patch asphalt is compacted by tamping it into the boring with a shovel handle or similar hand held equipment.

Patching of Concrete Surfaces

Where specified in our scope of work, penetrations or cores through concrete surfaces in areas subject to foot traffic are patched using a high strength, quick setting concrete grout. Grout is placed to provide a surface flush with existing pavement adjacent to the boring. The borehole location is barricaded to prevent traffic in the area of the patch for a minimum of 4 hours.

PRESERVATION AND HANDLING OF SOIL SAMPLES

PRESERVATION AND HANDLING OF SOIL SAMPLES

Procedures for preserving soil samples obtained in the field and transportation of samples to the laboratory generally follow those given in ASTM D 4220, "*Standard Practice for Preserving and Transporting Soil Samples*" for one of four groups of samples described in section 4. Sample groups are designated A through D, each group representing progressively greater effort to control the integrity and moisture content of the sample.

Soil Samples without Moisture Control – ASTM Group A

Group A samples are those samples not suspected of being contaminated and for which only a general visual description will be performed. These samples include bulk or stockpile samples transported in open containers, or jar or bag samples that are not sealed.

No attempt is made to maintain samples at the field moisture content value. Representative samples of the cuttings or split spoon samples, or representative bulk samples, are placed in suitably identified, non-sealed containers and transported to the laboratory. Sample identification numbers on the containers correspond to sample numbers recorded on field boring records or test pit records.

Soil Samples with Control of Field Moisture – ASTM Group B

Group B samples are those samples not suspected of being contaminated and for which only water content and classification, Proctor, relative density, or profile logging will be performed. Group B samples also include portions of bulk samples intended to be remolded in the laboratory for compaction, swell pressure, percent swell, consolidation, permeability, CBR, or shear testing, which are segregated from the sample to preserve natural water content.

Representative samples of the cuttings or split spoon samples, or representative bulk samples, are placed in suitably identified, sealed glass jars or plastic containers and transported to the laboratory. Sample identification numbers on the containers correspond to sample numbers recorded on field boring records or test pit records. Thin-walled tube samples are sealed at the ends with paraffin and capped with plastic end caps.

Intact Soil Samples – ASTM Group C

Group C samples are intact, naturally formed or field fabricated, samples for density determination, swell pressure, percent swell, permeability testing or shear testing with or without stress-strain plots or volume change measurement, including dynamic and cyclic testing. These samples must be obtained and handled in ways that will preserve the natural soil fabric and stratification with little disturbance.

Representative thin walled tube samples must be protected against vibration or shock, or extreme heat or cold, during transport to the laboratory. Sample identification numbers on the containers correspond to sample numbers recorded on field boring records or test pit records.

Thin-walled tube samples are sealed at the ends with paraffin and capped with plastic end caps. Samples are transported in the upright position in containers providing complete encasement in cushioning or insulation for individual samples.

Sensitive Soil Samples – ASTM Group D

Group D samples are intact, naturally formed or field fabricated, samples of high sensitivity or fragility which will be subjected to density determination, swell pressure, percent swell, permeability testing or shear testing with or without stress-strain plots or volume change measurement, including dynamic and cyclic testing.

Representative thin-walled tube samples are protected against vibration or shock, or extreme heat or cold, during transport to the laboratory in specially loaded metal or wood reusable containers. Sample identification numbers on the containers correspond to sample numbers recorded on field boring records or test pit records.

Thin-walled tube samples are sealed at the ends with paraffin and capped with plastic end caps. Samples are transported in the same position as the sampling orientation in sufficient packing material to provide complete encasement and cushioning or insulation for individual samples. Transport of the samples is supervised by a qualified person at all times.

SAMPLE IDENTIFICATION NUMBER

All samples are assigned a laboratory identification number upon arrival. In most cases the laboratory identification number corresponds to the boring and sample numbers assigned in the field and shown on field boring records. A list is prepared which matches the laboratory tests to the field or laboratory identification numbers. When requesting laboratory testing, both the field identification number and the laboratory identification number (if different) are used on the request form.

SAMPLE STORAGE

All soil samples that are Group B or higher are transported and stored to maintain moisture content as close as possible to natural conditions. Samples are not placed in direct sunlight. Undisturbed soil samples are stored in an upright position with the top side of the sample up.

As storage time increases, moisture will migrate within a tube or condense within a sample jar. Potential for disturbance and moisture migration increases with time. Excessive storage time can lead to sample disturbance that will affect strength and compressibility properties. Additionally, stress relaxation, temperature changes over time also affect sample performance. All samples are discarded after 60 days or are returned to the client. Where tests are carried out on samples more than 30 days old, a notation is made on the test report.

Long term storage may result in excessive adhesion of the soil to the Shelby tube. Resistance to extrusion may cause internal failures to occur in some soils during extrusion. Often these failures cannot be seen by the naked eye. If these samples are tested as "undisturbed" specimens, the results may be misleading. Where "old" Shelby tube samples are proposed for strength tests, S&ME may recommend x-ray radiography (ASTM D 4452) or oedometer tests assess the sample condition prior to using the strength test data.

Extrusion and Trimming of Groups B or C Samples

Undisturbed samples are stored in the vertical position in the laboratory. Samples are extruded from the thin-walled sampler, using a specially constructed extruder, in the same direction of travel as the sample entered the tube during sampling. In certain cases it may be necessary to cut the tube into short sections to facilitate removal of the soil without compressing or disturbing the sample.

Specimens are trimmed using a wire saw or steel straightedge. Where removal of pebbles or crumbling resulting from trimming causes voids on the surface of the specimens selected for quantitative laboratory testing, they are filled with remolded soil obtained from the trimmed portion of the sample.

S&ME

APPENDIX IV

LABORATORY TEST DATA

Summary of Laboratory Test Data – Northbound Median Borings

Summary of Laboratory Test Data – Southbound Median Borings

Summary of Laboratory Index Test Data – Bridge Borings

Summary of Laboratory Test Data for UD Samples – Bridge Borings

Summary of Electrochemical/Corrosion Series Testing – Bridge Borings

Summary of Laboratory Test Data – Roadway and Culvert Borings

Laboratory Test Reports (613)

Laboratory Test Procedures

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Northbound Median Borings
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		CBR (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
NB-2	SS-3	3.5-5	34.9	15.1	41	23	18	SC	A-2-7 (2)	-	-	-
NB-4	SS-3	4-5	42.3	22.1	41	32	9	SM	A-5 (1)	-	-	-
NB-6	SS-5	8-10	26.7	18.4	31	20	11	SC	A-2-6 (0)	-	-	-
NB-8	SS-2	1.5-3	39.6	17.1	30	20	10	SC	A-4 (1)	-	-	-
NB-10	SS-2	1.5-3	44.0	15.5	37	21	16	SC	A-6 (3)	-	-	-
NB-12	SS-2	1.5-3	66.7	19.9	49	27	22	CL	A-7-6 (14)	-	-	-
NB-16	SS-2	1.5-3	53.7	19.7	40	23	17	CL	A-6 (7)	-	-	-
NB-18	SS-2	1.5-3	45.6	21.0	33	22	11	SC	A-6 (2)	-	-	-
NB-18	SS-3	3-5	60.7	24.9	47	27	20	CL	A-7-6 (11)	-	-	-
NB-19	SS-2	1.5-3	40.9	17.3	35	24	11	SC	A-6 (1)	-	-	-
NB-19	SS-3	3-5	25.9	13.9	31	23	8	SC	A-2-4	-	-	-
NB-20	SS-3	3-5	29.2	12.1	23	14	9	SC	A-2-4	-	-	-
NB-23	SS-1	0-1.5	24.7	14.2	27	20	7	SC-SM	A-2-4	-	-	-
NB-24	SS-2	1.5-3	59.4	22.5	40	29	11	ML	A-6 (5)	-	-	-
NB-24	SS-3	3-5	54.3	21.6	41	29	12	ML	A-7-6 (5)	-	-	-
NB-25	SS-2	1.5-3	57.8	19.1	38	26	12	ML	A-6 (5)	-	-	-
NB-27	SS-3	3-5	30.7	9.9	19	15	4	SC-SM	A-2-4	-	-	-
NB-28	SS-3	3-5	27.8	13.0	NP	NP	NP	SM	A-2-4	-	-	-
NB-29	SS-3	3-5	52.5	31.1	47	36	11	ML	A-7-5 (5)	-	-	-
NB-32	SS-2	2-3.5	67.8	32.7	45	26	19	CL	A-7-6 (12)	-	-	-
NB-35	SS-2	1.5-3	62.5	25.4	38	22	16	CL	A-6 (8)	-	-	-
NB-38	SS-1	0-1.5	34.1	13.2	NP	NP	NP	SC	A-2-4	-	-	-
NB-38	SS-3	3-5	47.1	19.0	40	28	12	SM	A-6 (3)	-	-	-
NB-39	SS-2	1.5-3	37.9	25.1	NP	NP	NP	SC	A-4 (0)	-	-	-
NB-43	SS-3	3-5	69.3	24.0	37	28	9	ML	A-4 (6)	-	-	-
NB-46	SS-3	3-5	79.5	23.5	34	23	11	CL	A-6 (8)	-	-	-
NB-48	SS-3	3-5	74.5	25.7	50	38	12	MH	A-7-5 (11)	-	-	-
NB-53	SS-2	1.5-3	83.8	27.7	58	30	28	CH	A-7-5 (27)	-	-	-
NB-53	SS-3	3-5	78.9	26.8	52	34	18	MH	A-7-5 (17)	-	-	-
NB-54	SS-2	1.5-3	56.4	6.3	19	18	1	ML	A-4 (0)	-	-	-
NB-57	SS-2	3.2-5.2	77.5	22.7	31	26	5	ML	A-4 (4)	-	-	-
NB-59	SS-2	2-4	72.4	20.3	46	33	13	ML	A-7-5 (10)	-	-	-
NB-59	SS-6	13.5-15	67.0	22.4	NP	NP	NP	ML	A-4 (0)	-	-	-
NB-64	SS-2	3-5	77.6	22.1	45	25	20	CL	A-7-6 (16)	-	-	-

Notes:

USCS = Unified Soil Classification System
MDD = Maximum Dry Density
OMC = Optimum Moisture Content
pcf = pounds per cubic foot

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
NP = Non-Plastic

CBR tests remolded to 95% of maximum dry density at +2% over optimum moisture content, and soaked for 96 hours prior to testing.

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SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Southbound Median Borings
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		CBR (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
SB-2	Bulk	1-5	50	-	37	23	14	CL	A-6 (4)	112.8	13.9	2.0
SB-3	SS-2	3.5-5	41.9	19.1	35	21	14	SC	A-6 (2)	-	-	-
SB-5	Bulk	1-5	53.3	14.0	30	18	12	CL	A-6 (3)	117.9	14.0	5.5
SB-5	SS-4	6-8	27.8	26.7	35	29	6	SM	A-2-4	-	-	-
SB-5	SS-6	13.5-15	29.7	24.9	36	NP	NP	SM	A-2-4	-	-	-
SB-7	SS-2	1.5-3	20.2	14.3	NP	NP	NP	SM	A-2-4	-	-	-
SB-7	SS-3	3-5	17.9	13.0	NP	NP	NP	SM	A-2-4	-	-	-
SB-8	SS-3	3-5	66.0	26.7	39	23	16	CL	A-6 (9)	-	-	-
SB-9	Bulk	1-5	56.0	-	34	17	17	CL	A-6 (6)	109.6	17.2	3.6
SB-9	SS-2	1.5-3	58.0	21.3	52	23	29	CH	A-7-6 (14)	-	-	-
SB-10	SS-3	3-5	47.7	20.5	34	26	8	SM	A-4 (2)	-	-	-
SB-11	SS-3	3-5	56.2	23.0	42	21	21	CL	A-7-6 (9)	-	-	-
SB-13	Bulk	1-5	44.4	-	32	26	6	SM	A-4 (0)	109.9	16.5	6.2
SB-14	SS-2	1.5-3	59.8	24.6	41	28	13	ML	A-7-6 (6)	-	-	-
SB-14	SS-3	3-5	61.3	26.6	45	28	17	ML	A-7-6 (9)	-	-	-
SB-15	SS-3	3-5	56.7	24.1	43	32	11	ML	A-7-5 (5)	-	-	-
SB-16	SS-2	1.5-3	36.8	11.2	27	21	6	SC-SM	A-4 (0)	-	-	-
SB-16	Bulk	1-5	48.6	-	30	19	11	SC	A-6 (2)	117.9	13.1	6
SB-17	SS-2	1.5-3	62.9	22.1	43	23	20	CL	A-7-6 (11)	-	-	-
SB-17	SS-3	3-5	76.1	33.8	47	34	13	ML	A-7-5 (11)	-	-	-
SB-19	SS-3	3-5	78.3	27.8	62	32	30	MH	A-7-5 (26)	-	-	-
SB-20	Bulk	1-5	49.1	-	28	17	11	SC	A-6 (2)	117.1	13.7	6.3
SB-20	SS-3	4-6	49.9	16.1	22	14	8	SC	A-4 (1)	-	-	-
SB-20	SS-6	13.5-15	53.8	36.1	53	45	8	MH	A-5 (3)	-	-	-
SB-22	SS-2	1.5-3	62.9	21.2	43	29	14	ML	A-7-6 (8)	-	-	-
SB-23	SS-1	0-1.5	34.9	12.6	NP	NP	NP	SC	A-2-4	-	-	-
SB-23	Bulk	1-5	51.1	-	35	19	16	CL	A-6 (5)	114.0	15.0	3.7
SB-24	SS-2	1.5-3	71.9	26.3	48	26	22	CL	A-7-6 (16)	-	-	-
SB-26	Bulk	1-5	47.5	-	32	19	13	SC	A-6 (3)	118.0	13.8	5.9
SB-27	SS-2	1.5-3	39.7	13.5	29	16	13	SC	A-6 (1)	-	-	-
SB-27	SS-3	3-5	37.7	15.0	21	16	5	SC-SM	A-4 (0)	-	-	-
SB-29	Bulk	1-5	58.0	-	31	18	13	CL	A-6 (5)	110.9	17.8	9
SB-30	SS-1	1.8-3.3	33.9	12.0	22	16	6	SC-SM	A-2-4	-	-	-
SB-35	SS-1	1.8-3.3	36.4	13.8	18	13	5	SC-SM	A-4 (0)	-	-	-
SB-36	Bulk	1-5	44.3	-	26	18	8	SC	A-4 (1)	116.7	13.6	11.2
SB-40	Bulk	1-5	51.1	-	30	18	12	CL	A-6 (3)	112.5	15.5	8.8
SB-40	SS-3	3-5	57.8	26.7	40	24	16	CL	A-6 (7)	-	-	-
SB-41	SS-2	1.5-3	36.9	13.0	18	13	5	SC-SM	A-4 (0)	-	-	-
SB-43	Bulk	1-5	53.8	-	38	21	17	CL	A-6 (6)	107.8	18.2	7.3
SB-45	SS-1	0-1.5	27.8	9.2	27	19	8	SC	A-2-4	-	-	-
SB-48	Bulk	1-5	42.0	-	27	18	9	SC	A-4 (1)	116.1	14.3	9.2
SB-48	SS-2	1.5-3	39.6	17.0	33	21	12	SC	A-6 (1)	-	-	-
SB-49	SS-3	3-5	50.6	23.0	35	28	7	ML	A-4 (2)	-	-	-
SB-51	Bulk	1-5	38.0	-	22	15	7	SC-SM	A-4 (0)	122.2	11.2	13.7
SB-53	SS-3	3-5	23.7	16.4	30	24	6	SM	A-2-4	-	-	-
SB-55	SS-3	3-5	29.4	13.6	32	26	6	SM	A-2-4	-	-	-
SB-56	SS-1	0-1.5	42.4	13.8	34	26	8	SM	A-4 (1)	-	-	-
SB-57	Bulk	1-5	47.9	-	36	26	10	SM	A-4 (2)	113.9	13.5	4.8
SB-58	SS-5	8-10	60.5	30.1	48	29	19	ML	A-7-6 (10)	-	-	-
SB-58	SS-6	13.5-15	34.0	19.3	38	32	6	SM	A-2-4	-	-	-
SB-59	SS-3	3-5	42.9	18.0	37	28	9	SM	A-4 (1)	-	-	-
SB-61	Bulk	1-5	56.4	-	36	20	16	CL	A-6 (6)	109.3	17.0	5.9

Notes:

USCS = Unified Soil Classification System
MDD = Maximum Dry Density
OMC = Optimum Moisture Content

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index

CBR tests remolded to 95% of maximum dry density at +2% over optimum moisture content, and soaked for 96 hours prior to testing.

S&ME
301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Borings for Replacement Bridges (BR-1 through BR-10)
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Other Laboratory Tests (See other Summary Tables)
					LL (%)	PL (%)	PI (%)			
BR-1	SS-3	4'-6'	52.1	22.5	43	29	14	ML	A-7-6 (5)	-
BR-1	UD-1	6'-8'	48.2	21.5	39	32	7	SM	A-4 (2)	One-Dimensional Consolidation
BR-1	SS-5	8'-10'	51.7	36.0	54	40	14	MH	A-7-5 (6)	-
BR-1	UD-2	16'-18'	57.0	see CU rpt.	43	35	8	ML	A-5 (4)	Consolidated-Undrained Triaxial Shear
BR-1	SS-9/10	28.5'-35'	44.8	33.1	45	37	8	SM	A-5 (2)	-
BR-2	SS-2	2'-4'	73.0	21.8	55	30	25	MH	A-7-5 (19)	-
BR-2	SS-4	6'-8'	43.3	18.8	51	40	11	SM	A-7-5 (2)	-
BR-2	SS-6/7	13.5'-20'	37.0	25.7	44	39	5	SM	A-5 (0)	-
BR-2	SS-8/9/10/11/12	23.5'-45'	44.0	33.2	41	33	8	SM	A-5 (1)	Electrochemical (Corrosion Series)
BR-3	SS-4	6'-8'	72.3	23.9	56	32	24	MH	A-7-5 (18)	-
BR-3	SS-5	8'-10'	49.1	23.2	48	33	15	SM	A-7-5 (5)	-
BR-3	UD-1	16'-18'	45.2	28.4	50	40	10	SM	A-5 (3)	One-Dimensional Consolidation
BR-3	SS-11/13	38.5'-50'	41.6	27.8	37	29	8	SM	A-4 (1)	-
BR-3/4	SS-2/3	2'-6'	78.9	27.1	58	31	27	MH	A-7-5 (24)	Electrochemical (Corrosion Series)
BR-4	SS-1	0'-2'	38.9	14.5	20	14	6	SC-SM	A-4 (0)	-
BR-4	UD-1	4'-6'	70.4	27.2 (avg.)	63	34	29	MH	A-7-5 (21)	Unconsolidated-Undrained (UU) Shear
BR-4	SS-5	8'-10'	59.7	32.1	45	30	15	ML	A-7-5 (8)	-
BR-4	UD-2	24'-26'	57.5	39.7 (avg.)	52	38	14	MH	A-7-5 (8)	Consolidated-Undrained Triaxial Shear
BR-4	SS-10/11	33.5'-40'	38.7	23.8	28	22	6	SC-SM	A-4 (0)	-
BR-5	SS-2	2'-4'	53.0	21.4	42	26	16	CL	A-7-6 (6)	-
BR-5	SS-4	6'-8'	54.5	21.2	41	34	7	ML	A-5 (3)	-
BR-5	UD-1	8'-10'	55.1	34.8	45	41	4	ML	A-5 (2)	One-Dimensional Consolidation
BR-5	SS-6/7/8/9/10	13.5'-35'	50.4	35.1	45	38	7	ML	A-5 (2)	Electrochemical (Corrosion Series)
BR-6	SS-2	2'-4'	67.5	28.2	52	39	13	MH	A-7-5 (10)	-
BR-6	UD-1/2	4'-6' / 8'-10'	52.4	see CU rpt.	44	39	5	ML	A-5 (2)	Consolidated-Undrained Triaxial Shear
BR-6	SS-4	6'-8'	49.8	28.1	46	40	6	SM	A-5 (2)	-
BR-6	SS-7/8	18.5'-25'	57.3	39.2	42	37	5	ML	A-5 (3)	-
BR-7	SS-3	5.5-7.5'	43.0	24.3	40	29	11	SM	A-6 (2)	-
BR-7	SS-5	9.5-11.5'	45.7	20.8	44	27	17	SM	A-7-6 (5)	-
BR-7	UD-2	13'-15'	43.9	24.2	25	18	7	SC-SM	A-4 (0)	One-Dimensional Consolidation
BR-8	SS-2	2'-3'	-	-	-	-	-	CH	-	Organic Content = 6.5%
BR-8	SS-3	4'-6'	42.7	18.5	30	19	11	SC	A-6 (1)	-
BR-8	UD-1	6'-8'	56.1	43.6 (avg.)	56	42	14	MH	A-7-5 (8)	Consolidated-Undrained Triaxial Shear
BR-8	SS-5	8'-10'	36.4	31.4	39	31	8	SM	A-4 (0)	-
BR-8	SS-2, 4, 6, 7	3'-20'	41.3	19.0	36	28	8	SM	A-4 (1)	Electrochemical (Corrosion Series)
BR-9	SS-3	4'-6'	44.8	21.0	36	21	15	SC	A-6 (3)	-
BR-9	SS-5	8'-10'	47.3	19.7	33	26	7	SM	A-4 (1)	-
BR-9	UD-1	10'-12'	64.6	23.1	42	31	11	ML	A-7-5 (7)	One-Dimensional Consolidation
BR-9	SS-7/8	18.5'-25'	47.1	25.5	32	23	9	SC	A-4 (2)	-
BR-10	SS-2	2'-4'	54.2	17.6	38	30	8	ML	A-4 (3)	-
BR-10	UD-1	4'-6'	18.6	14.9	45	44	1	SM	A-1-b	-
BR-10	SS-5	8'-10'	34.5	15.5	34	31	3	SM	A-2-4	-
BR-10	SS-6/7/8/9/10	13.5'-35'	35.7	22.2	35	28	7	SM	A-4 (0)	Electrochemical (Corrosion Series)

Notes:
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PL = Plasticity Limit
PI = Plasticity Index

S&ME

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY TEST DATA FOR UD SAMPLES
I-85 WIDENING MM80-96
Borings for Replacement Bridges (BR-1 through BR-10)
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	SPT N (bpf)	Triaxial Shear (CU / UU)				Pre-Consolidation Pressure (from Consolidation Test) (psf)
					LL (%)	PL (%)	PI (%)				c' (psf)	Φ' (deg.)	c (psf)	Φ (deg.)	
BR-1	UD-1	6'-8'	48.2	21.5	39	32	7	SM	A-4 (2)	11	--	--	--	--	1900
BR-1	UD-2	16'-18'	57.0	see CU rpt.	43	35	8	ML	A-5 (4)	9/8	0	36	1000	11	--
BR-3	UD-1	16'-18'	45.2	28.4	50	40	10	SM	A-5 (3)	9/8	--	--	--	--	4200
BR-4	UD-1	4'-6'	70.4	27.2 (avg.)	63	34	29	MH	A-7-5 (21)	12	--	--	800	34	--
BR-4	UD-2	24'-26'	57.5	39.7 (avg.)	52	38	14	MH	A-7-5 (8)	4	200	34	400	17	--
BR-5	UD-1	8'-10'	55.1	34.8	45	41	4	ML	A-5 (2)	6	--	--	--	--	3400
BR-6	UD-1/2	4'-6' / 8'-10'	52.4	see CU rpt.	44	39	5	ML	A-5 (2)	8/3	200	31	600	23	--
BR-7	UD-2	13'-15'	43.9	24.2	25	18	7	SC-SM	A-4 (0)	6	--	--	--	--	3400
BR-8	UD-1	6'-8'	56.1	43.6 (avg.)	56	42	14	MH	A-7-5 (8)	10	400	31	1300	11	--
BR-9	UD-1	10'-12'	64.6	23.1	42	31	11	ML	A-7-5 (7)	10	--	--	--	--	5000

Notes:

USCS = Unified Soil Classification System
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PI = Plasticity Index

c' = Effective Cohesion
Φ' = Effective Angle of Internal Friction
c = Total Cohesion
Φ = Total Angle of Internal Friction

CU = Consolidated-Undrained, w/ pore pressure measurement
UU = Unconsolidated-Undrained
psf = pounds per square foot
bpf = SPT blows per foot

Form No. TR-126-pH/R-1
Revision No. 0
Revision Date: 08/10/11

S&ME
Quality Assurance

Electrochemical / Corrosion Series Testing
(pH / Resistivity / Chloride / Sulfate)
AASHTO T 289 / AASHTO T 288 / EPA SW9056A

Project #: 1426-14-161

Project Name: I-85 Widening MM80-96

Test Date(s): 12/1/15 - 12/4/15

BORING NUMBER	SAMPLE DEPTH / NUMBER	USCS / AASHTO CLASSIFICATION	pH	RESISTIVITY (Ω-cm)	CHLORIDE CONTENT (mg / Kg)	SULFATE CONTENT (mg / Kg)
BR-2	23.5' - 45' (SS-8/9/10/11/12)	SM / A-5 (1)	5.7	17,000	15	32
BR-3/4	2' - 6' (SS-2/3)	MH / A-7-5 (24)	6.6	9,200	* BRL	150
BR-5	13.5' - 35' (SS-6/78/9/10)	ML / A-5 (2)	5.1	18,000	24	25
BR-8	3' - 20' (SS-2/4/6/7)	SM / A-4 (1)	6.2	6,100	54	53
BR-10	13.5' - 35' (SS-6/78/9/10)	SM / A-4 (0)	4.8	13,500	50	^ BRL

* Below Reporting Limit of 13

^ Below Reporting Limit of 12

S&ME
301 Zima Park Drive
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SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Roadway Borings - I-85 Segment A (Sta. 843+44 to Sta. 1185+00)
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		Organic Content (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
RW-2	SS-1/2	0'-4'	29.3	17.1	27	24	3	SM	A-2-4	-	-	-
RW-2	SS-4/5	6'-10'	26.8	19.2	25	23	2	SM	A-2-4	-	-	-
RW-3	SS-1/2	1'-5'	35.2	19.5	30	26	4	SM	A-2-4	-	-	-
RW-3	SS-3	5'-7'	52.7	38.6	47	35	12	ML	A-7-5 (5)	-	-	-
RW-3	SS-5/6	9'-15'	36.8	15.4	26	24	2	SM	A-4 (0)	-	-	-
RW-4	SS-1/2	1'-5'	55.9	23.2	42	25	17	CL	A-7-6 (7)	-	-	-
RW-4	SS-6	13.5'-15'	50.0	33.1	49	27	22	CL	A-7-6 (8)	-	-	-
RW-5	SS-1/2	0'-4'	55.5	19.5	48	25	23	CL	A-7-6 (10)	-	-	-
RW-5	SS-4/5	6'-10'	43.2	20.6	47	35	12	SM	A-7-5 (2)	-	-	-
RW-5	SS-6	13.5-15'	34.8	23.7	44	37	7	SM	A-2-5	-	-	-
R-6	Bulk	0'-10'	74.1	30.8	54	33	21	MH	A-7-5 (17)	97.0	23.7	-
R-6	SS-5	8'-10'	62.8	31.4	45	35	10	ML	A-5 (6)	-	-	-
RW-7	SS-2/3	2'-6'	64.6	24.0	46	23	23	CL	A-7-6 (13)	-	-	-
RW-7	SS-4	6'-8'	-	-	-	-	-	CL	-	-	-	8.0
RW-7	SS-5	8'-10'	51.1	20.0	35	20	15	CL	A-6 (5)	-	-	-
RW-7	SS-6/7	13.5-20'	34.0	20.1	33	31	2	SM	A-2-4	-	-	-
C-1	SS-4	6'-8'	55.2	24.8	44	22	22	CL	A-7-6 (9)	-	-	-
C-1	SS-5	8'-10'	55.2	25.8	45	26	19	CL	A-7-6 (8)	-	-	-
C-1	SS-6/7	13.5'-20'	42.9	15.1	30	26	4	SM	A-4 (0)	-	-	-
R-8	SS-2	2'-4'	57.5	26.5	36	26	10	ML	A-4 (4)	-	-	-
R-8	SS-4/5	6'-10'	49.9	21.5	34	26	8	SM	A-4 (2)	-	-	-
R-9	SS-2	2'-4'	47.3	23.8	32	27	5	SM	A-4 (0)	-	-	-
R-9	SS-4	6'-8'	56.8	25.9	37	28	9	ML	A-4 (4)	-	-	-
R-10	SS-1	0'-2'	69.5	31.1	58	31	27	MH	A-7-5 (20)	-	-	-
R-10	SS-4/5	6'-10'	34.2	23.6	38	33	5	SM	A-2-4	-	-	-
R-11	SS-1	0'-2'	66.7	24.2	47	26	21	CL	A-7-6 (13)	-	-	-
R-11	SS-2/3	2'-6'	56.1	34.1	47	35	12	ML	A-7-5 (6)	-	-	-
R-11	SS-9	28.5'-30'	45.4	30.0	42	33	9	SM	A-5 (2)	-	-	-
R-11	SS-10	33.5'-35'	47.1	30.0	44	32	12	SM	A-7-5 (3)	-	-	-
R-12	SS-2	2'-4'	53.1	20.2	44	23	21	CL	A-7-6 (8)	-	-	-
R-12	SS-3/4	4'-8'	43.9	19.6	55	29	26	SC	A-7-6 (7)	-	-	-
R-13	SS-1	0'-2'	76.5	24.4	64	37	27	MH	A-7-5 (24)	-	-	-
R-13	SS-4/5	6'-10'	49.1	25.7	51	42	9	SM	A-5 (3)	-	-	-
R-14	SS-2/3	2'-6'	75.4	32.8	67	43	24	MH	A-7-5 (22)	-	-	-
R-14	SS-5/6	8-15'	56.9	36.6	60	46	14	MH	A-7-5 (8)	-	-	-
R-15	SS-1	0'-2'	61.9	27.5	52	28	24	CH	A-7-6 (14)	-	-	-
R-15	SS-4	6'-8'	61.0	35.4	63	51	12	MH	A-7-5 (9)	-	-	-
RW-16	SS-2/3	2'-6'	33.3	16.3	37	29	8	SM	A-2-4	-	-	-
RW-16	SS-4/5	6'-10'	66.2	38.9	60	43	17	MH	A-7-5 (13)	-	-	-
RW-16	SS-7/8	18.5-25'	34.1	47.1	51	46	5	SM	A-2-5	-	-	-
RW-17	SS-1/2	0'-4'	72.1	25.6	53	27	26	CH	A-7-6 (19)	-	-	-
RW-17	SS-4/5	6'-10'	70.9	35.7	46	32	14	ML	A-7-5 (11)	-	-	-
RW-17	SS-6/7	13.5-20'	51.8	46.1	46	35	11	ML	A-7-5 (4)	-	-	-
RW-18	SS-1/2	0'-4'	67.5	28.9	54	34	20	MH	A-7-5 (14)	-	-	-
RW-18	SS-4/5	6'-10'	23.2	17.5	NP	NP	NP	SM	A-2-4	-	-	-
RW-19	SS-1/2	0'-4'	82.4	30.5	74	36	38	MH	A-7-5 (36)	-	-	-
RW-19	SS-4/5	6'-10'	29.7	16.9	47	32	15	SM	A-2-7 (1)	-	-	-
RW-19	Bulk	0'-15'	72.7	28.0	46	26	20	CL	A-7-6 (15)	112.5	15.2	-
R-20	SS-2/3	3'-7'	70.5	23.9	57	29	28	CH	A-7-6 (20)	-	-	-
R-20	SS-4	7-9'	62.0	21.6	52	33	19	MH	A-7-5 (11)	-	-	-
R-21	SS-1/2	0.7'-4.7'	34.2	17.1	29	25	4	SM	A-2-4	-	-	-
R-21	SS-3	4.7-6.7'	71.2	24.4	58	31	27	MH	A-7-5 (20)	-	-	-
R-22	SS-1	0'-2'	48.1	19.1	36	20	16	SC	A-6 (4)	-	-	-
R-22	SS-2/3	2'-6'	41.5	19.4	29	23	6	SM	A-4 (0)	-	-	-

Notes:

USCS = Unified Soil Classification System
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OMC = Optimum Moisture Content
pcf = pounds per cubic foot

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
NP = Non-Plastic

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Roadway Borings - I-85 Segment B (Sta. 1185+00 to Sta. 1485+00)
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		Organic Content (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
RW-23	SS-2	2.8-4.8'	56.9	21.8	61	31	30	MH	A-7-5 (15)	-	-	-
RW-23	SS-6	13.5'-15'	29.5	20.9	-	-	-	SM	A-2	-	-	-
RW-23	SS-7	18.5'-20'	28.9	21.5	-	-	-	SM	A-2	-	-	-
R-24	SS-1	0.3-2.3'	47.0	14.2	28	17	11	SC	A-6 (2)	-	-	-
R-24	SS-2/3	2.3'-6.3'	57.2	28.6	53	41	12	MH	A-7-5 (7)	-	-	-
R-25	SS-1/2	0'-4'	64.5	21.5	47	29	18	ML	A-7-6 (11)	-	-	-
R-25	SS-6	13.5'-15'	55.9	37.0	-	-	-	ML	-	-	-	-
R-26	SS-1	0'-2'	71.9	26.5	57	27	30	CH	A-7-6 (22)	-	-	-
R-26	SS-3	4'-6'	67.3	24.8	49	33	16	ML	A-7-5 (11)	-	-	-
R-27	SS-1	0'-2'	67.6	25.5	56	29	27	CH	A-7-6 (18)	-	-	-
R-27	SS-3	4'-6	-	-	-	-	-	SM	-	-	-	2.1
R-27	SS-4/5	6'-10'	39.9	24.5	47	40	7	SM	A-5 (0)	-	-	-
R-28	SS-1	0'-2'	64.7	27.0	55	28	27	CH	A-7-6 (17)	-	-	-
R-28	SS-2	2'-4'	52.8	21.2	42	28	14	ML	A-7-6 (5)	-	-	-
RW-29	SS-1	0'-2'	47.9	19.6	36	23	13	SC	A-6 (3)	-	-	-
RW-29	SS-3	4'-6'	28.1	15.9	31	23	8	SC	A-2-4	-	-	-
RW-29	SS-8	23.5'-25'	34.7	28.6	51	39	12	SM	A-2-7 (0)	-	-	-
R-30	SS-3	4'-6'	40.0	20.3	41	35	6	SM	A-5 (0)	-	-	-
R-30	SS-4/5	6'-10'	47.2	18.2	40	34	6	SM	A-4 (1)	-	-	-
RW-31	SS-2	2'-4'	74.2	24.8	55	28	27	CH	A-7-6 (21)	-	-	-
RW-31	SS-5	8'-10'	31.9	9.5	NP	NP	NP	SM	A-2-4	-	-	-
RW-32	SS-1	0.7-2.7'	22.0	25.3	45	40	5	SM	A-2-5	-	-	-
RW-32	SS-6	13.5'-15'	16.7	19.6	57	47	10	SM	A-2-5	-	-	-
RW-33	SS-1/2	0'-4'	73.6	29.5	60	39	21	MH	A-7-5 (18)	-	-	-
RW-33	SS-3/4	4'-8'	57.1	24.3	59	39	20	MH	A-7-5 (11)	-	-	-
RW-33	SS-5/6	8'-15'	45.2	21.6	47	34	13	SM	A-7-5 (3)	-	-	-
RW-33	Bulk	0'-15'	65.4	23.0	66	36	30	MH	A-7-5 (20)	105.2	19.0	-
C-4	SS-6	13.5'-15'	46.2	21.2	43	22	21	SC	A-7-6 (6)	-	-	-
C-4	SS-10	33.5'-35'	33.6	24.2	27	21	6	SC-SM	A-2-4	-	-	-
R-34	SS-1	0'-2'	46.4	20.4	35	30	5	SM	A-4 (0)	-	-	-
R-35	SS-1	1.1'-3.1'	59.0	22.6	40	20	20	CL	A-6 (9)	-	-	-
R-35	SS-3	5.1-7.1'	46.7	22.0	36	30	6	SM	A-4 (1)	-	-	-
RW-36	SS-1	1-3'	37.8	17.6	-	-	-	SC	A-6	-	-	-
RW-36	SS-2	3-5'	0.6	14.9	-	-	-	SP	A-1-b	-	-	-
RW-36	SS-3	5'-7'	-	-	-	-	-	SC	-	-	-	2.2
RW-36	SS-5/6	9'-15'	35.9	15.5	35	25	10	SM	A-4 (0)	-	-	-

Notes:

USCS = Unified Soil Classification System
MDD = Maximum Dry Density
OMC = Optimum Moisture Content
pcf = pounds per cubic foot

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
NP = Non-Plastic

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Roadway Borings - I-85 Segment C (Sta. 1485+00 to Sta. 1806+14)
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		Organic Content (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
C-7	SS-3	4.8-6.8'	52.5	23.2	55	34	21	MH	A-7-5 (9)	-	-	-
C-7	SS-5	8.8-10.8'	37.2	19.4	36	21	15	SC	A-6 (1)	-	-	-
RW-1	SS-2/3	2.5'-6.5'	55.7	20.6	47	25	22	CL	A-7-6 (10)	-	-	-
RW-1	SS-6/7	13.5-20'	51.6	33.9	38	27	11	ML	A-6 (4)	-	-	-
RW-37	SS-3	4.2'-6.2'	59.5	22.6	44	22	22	CL	A-7-6 (11)	-	-	-
RW-37	SS-5	8.2'-10.2'	63.3	27.9	55	45	10	MH	A-5 (8)	-	-	-
RW-38	SS-1	0.8'-2.8'	67.6	26.7	48	25	23	CL	A-7-6 (15)	-	-	-
RW-38	SS-3	4.8'-6.8'	47.7	23.4	41	25	16	SC	A-7-6 (5)	-	-	-
RW-39	SS-1/2	0'-4'	67.1	24.2	48	24	24	CL	A-7-6 (15)	-	-	-
RW-39	SS-4/5	6'-10'	56.9	23.3	45	35	10	ML	A-5 (5)	-	-	-
RW-40	SS-1/2	1.3'-5.3'	64.2	23.0	50	27	23	CH	A-7-6 (14)	-	-	-
RW-40	SS-4/5	7.3'-11.3'	62.0	23.4	48	30	18	ML	A-7-5 (10)	-	-	-
R-41	SS-1	0'-2'	58.3	27.6	54	37	17	MH	A-7-5 (9)	-	-	-
R-41	SS-3/4	4'-8'	43.0	23.8	46	41	5	SM	A-5 (0)	-	-	-
R-41	Bulk	0'-15'	53.3	35.4	47	36	11	ML	A-7-5 (5)	100.2	20.7	-
R-42	SS-2	2'-4'	33.3	13.1	35	29	6	SM	A-2-4	-	-	-
R-42	Bulk	0'-15'	45.7	13.7	33	24	9	SM	A-4 (2)	114.0	14.0	-
C-9	SS-2/3	2'-6'	51.6	21.7	54	35	19	MH	A-7-5 (8)	-	-	-
C-9	SS-5	8'-10'	20.5	31.7	40	21	19	SC	A-2-6 (1)	-	-	-
C-9	SS-7	18.5'-20'	18.3	20.1	-	-	-	SM	A-2	-	-	-
C-10	SS-5	9'-11'	64.8	30.5	60	37	23	MH	A-7-5 (16)	-	-	-
C-10	SS-6/7	13.5'-20'	49.4	24.7	54	33	21	SM	A-7-5 (8)	-	-	-
R-43	SS-2	2'-4'	33.6	16.0	39	28	11	SM	A-2-6 (0)	-	-	-
R-43	SS-3/4	4'-8'	26.8	10.5	30	29	1	SM	A-2-4	-	-	-
R-44	SS-2/3	2'-6'	51.4	25.7	59	51	8	MH	A-5 (4)	-	-	-
R-44	SS-5/6	8'-15'	41.6	20.7	57	52	5	SM	A-5 (1)	-	-	-
R-44	SS-7/8	18.5'-25'	55.7	44.5	68	63	5	MH	A-5 (5)	-	-	-
R-45	SS-2	2'-4'	55.9	19.4	46	22	24	CL	A-7-6 (11)	-	-	-
R-45	SS-3/4	4'-8'	57.4	23.1	53	31	22	MH	A-7-5 (11)	-	-	-
R-46	SS-1/2	0'-4'	63.9	20.3	37	21	16	CL	A-6 (8)	-	-	-
R-46	SS-4/5	6'-10'	40.6	24.1	45	41	4	SM	A-5 (0)	-	-	-
R-47	SS-3	4'-6'	41.9	12.3	34	30	4	SM	A-4 (0)	-	-	-
R-47	SS-5	8'-10'	50.3	16.9	37	27	10	ML	A-4 (3)	-	-	-
R-48	SS-2/3	3.4'-7.4'	38.9	16.1	35	33	2	SM	A-4 (0)	-	-	-
R-48	SS-4/5	7.4'-11.4'	39.0	16.0	30	29	1	SM	A-4 (0)	-	-	-
RW-49	SS-1/2	0'-4'	36.3	16.9	50	35	15	SM	A-7-5 (1)	-	-	-
RW-49	SS-4	6'-8'	33.8	24.5	40	31	9	SM	A-2-4	-	-	-
RW-50	SS-1	0'-2'	52.9	21.2	41	27	14	ML	A-7-6 (5)	-	-	-
RW-50	SS-4/5	6'-10'	25.1	29.3	NP	NP	NP	SM	A-2-4	-	-	-
R-51	SS-1	0'-2'	61.4	34.6	75	38	37	MH	A-7-5 (22)	-	-	-
R-51	SS-3	4'-6'	21.1	21.6	42	NP	NP	SM	A-2-5	-	-	-
R-52	SS-1/2	0'-4'	50.5	23.3	48	28	20	ML	A-7-6 (7)	-	-	-
R-52	SS-5	8'-10'	64.1	20.2	47	23	24	CL	A-7-6 (14)	-	-	-
R-53	SS-1	0'-2'	56.1	18.9	43	21	22	CL	A-7-6 (9)	-	-	-
R-53	SS-2	2'-4'	68.8	31.1	69	37	32	MH	A-7-5 (24)	-	-	-
R-53	SS-4	6'-8'	42.3	23.5	51	49	2	SM	A-5 (0)	-	-	-

Notes:

USCS = Unified Soil Classification System
MDD = Maximum Dry Density
OMC = Optimum Moisture Content
pcf = pounds per cubic foot

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
NP = Non-Plastic

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF LABORATORY INDEX TEST DATA
I-85 WIDENING MM80-96
Roadway Borings - I-85 Segment C (Sta. 1485+00 to Sta. 1806+14), *continued*
WBS No. 88P027114E1.SIB.1, S&ME Project No. 1426-14-161

Boring Number	Sample Number	Sample Depth (feet)	Percent Finer #200 (%)	Natural Moisture (%)	Atterberg Limits			USCS Symbol	AASHTO Classif.	Standard Proctor		Organic Content (%)
					LL (%)	PL (%)	PI (%)			MDD (pcf)	OMC (%)	
RW-54	SS-1	0'-2'	68.9	37.3	55	42	13	MH	A-7-5 (11)	-	-	-
RW-54	SS-2	2'-4'	31.7	31.3	38	32	6	SM	A-2-4	-	-	-
RW-54	SS-6	13.5'-15'	85.5	9.0	56	30	26	MH	A-7-5 (26)	-	-	-
R-55	SS-2/3	2'-6'	42.6	21.7	NP	NP	NP	SM	A-4 (0)	-	-	-
R-55	SS-5	8'-10'	39.7	31.9	41	33	8	SM	A-5 (1)	-	-	-
R-56	SS-1/2	0'-4'	61.7	20.8	58	31	27	MH	A-7-5 (16)	-	-	-
R-56	SS-4/5	6'-10'	44.9	19.9	55	32	23	SM	A-7-5 (7)	-	-	-
R-57	SS-3	4.8'-6.8'	45.5	17.7	42	33	9	SM	A-5 (2)	-	-	-
R-57	SS-5	8.8'-10.8'	42.6	15.0	39	32	7	SM	A-4 (1)	-	-	-
R-57	Bulk	0'-20'	50.9	16.7	38	30	8	ML	A-4 (2)	103.2	16.4	-
R-58	SS-3	4'-6'	46.5	34.3	58	40	18	SM	A-7-5 (6)	-	-	-
R-58	SS-6/7	13.5'-20'	40.9	23.3	NP	NP	NP	SM	A-4 (0)	-	-	-
R-59	SS-2	2'-4'	43.7	17.1	37	30	7	SM	A-4 (1)	-	-	-
R-59	SS-4	6'-8'	32.9	13.9	43	33	10	SM	A-2-5	-	-	-
R-59	Bulk	0'-15'	46.0	18.6	38	24	14	SC	A-6 (3)	111.9	14.8	-
R-60	SS-2	2'-4'	51.7	21.9	44	35	9	ML	A-5 (3)	-	-	-
R-60	SS-6	13.5'-15'	37.8	11.1	NP	NP	NP	SM	A-4 (0)	-	-	-
R-60	Bulk	0'-25'	47.2	12.9	35	27	8	SM	A-4 (1)	107.0	15.0	-
RW-61	SS-1	0'-2'	29.6	14.3	38	33	5	SM	A-2-4	-	-	-
RW-61	SS-3	4'-6'	26.5	9.6	-	-	-	SM	A-2	-	-	-
RW-61	SS-6	13.5'-15'	35.5	17.9	-	-	-	SM	A-4	-	-	-
RW-61	Bulk	0'-15'	31.0	11.7	38	29	9	SM	A-2-4	115.2	14.0	-

Notes:

USCS = Unified Soil Classification System
MDD = Maximum Dry Density
OMC = Optimum Moisture Content
pcf = pounds per cubic foot

LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
NP = Non-Plastic

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

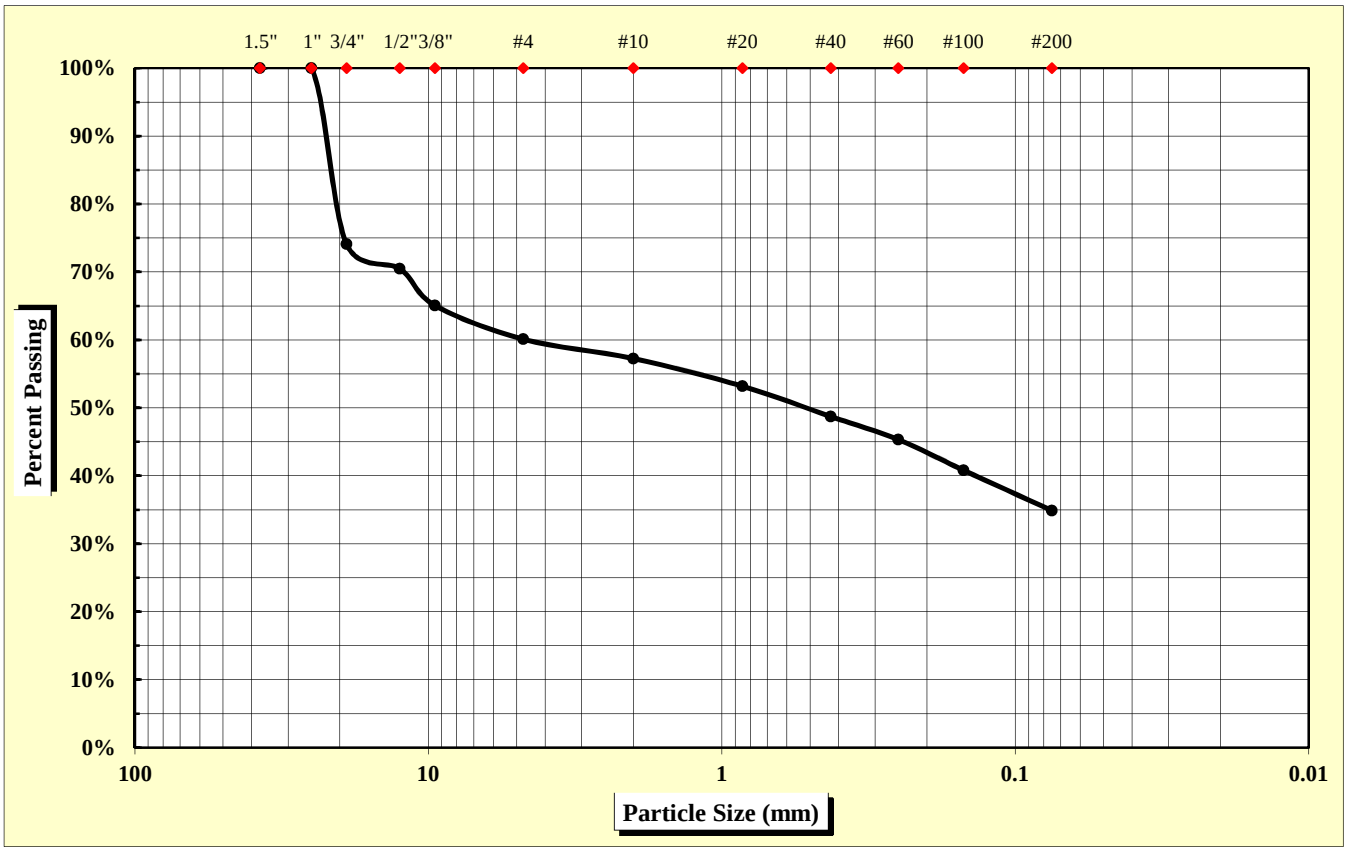
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-2	Sample #:	86	Sample Date:	4/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.5 - 5.0'
Sample Description:	Red orange brown, fine, clayey SAND with gravel (SC) [A-2-7 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	42.7%	Fine Sand	13.9%
		Coarse Sand	8.5%	Silt & Clay	34.9%
Liquid Limit	41	Plastic Limit	23	Plastic Index	18
		Moisture Content	15.1%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

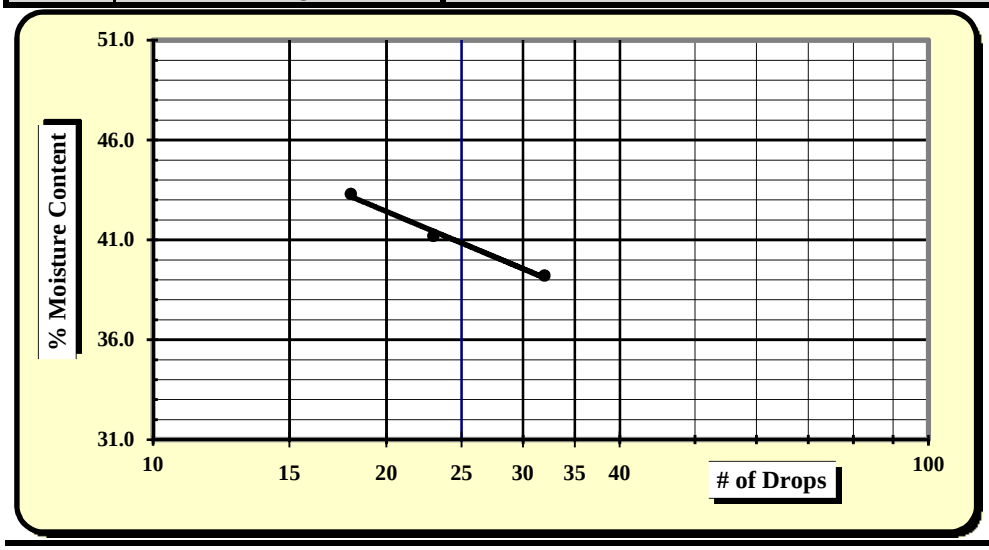
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-2	Sample #:	86	Sample Date:	4/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.5 - 5.0'

Sample Description: Red orange brown, fine, clayey SAND with gravel (SC) [A-2-7 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.69	15.72				12.16		
B	Wet Soil Weight + A	39.50	39.98	39.35				22.48		
C	Dry Soil Weight + A	33.08	33.19	32.21				20.58		
D	Water Weight (B-C)	6.42	6.79	7.14				1.90		
E	Dry Soil Weight (C-A)	16.36	16.50	16.49				8.42		
F	% Moisture (D/E)*100	39.2%	41.2%	43.3%				22.6%		
N	# OF DROPS	32	23	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**23**
Plastic Index	**18**
Group Symbol	**SC / A-2-7**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

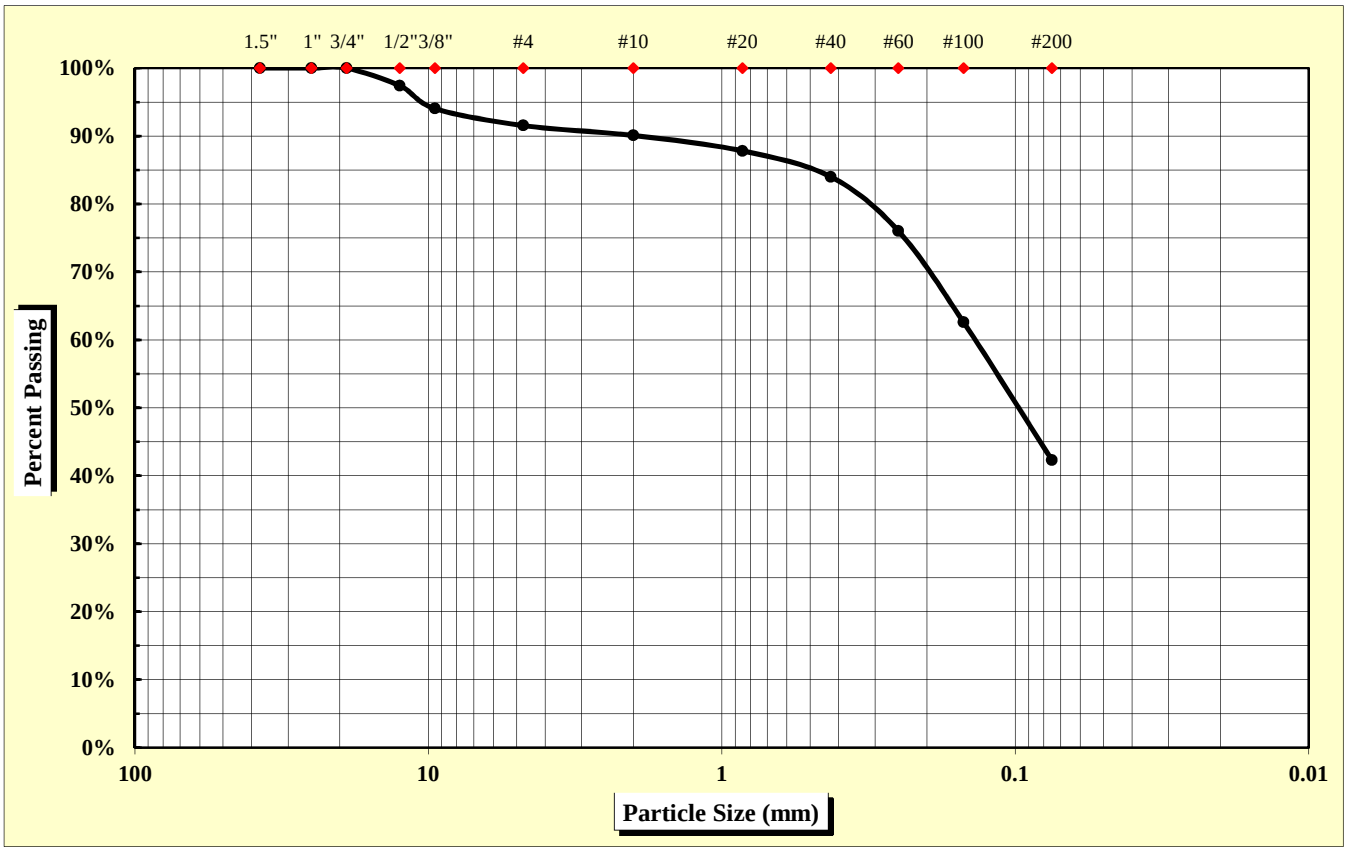
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-4	Sample #:	86	Sample Date:	4/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.0 - 5.5'
Sample Description:	Light brown, fine, silty SAND (SM) [A-5 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	9.9%	Fine Sand	41.7%
		Coarse Sand	6.1%	Silt & Clay	42.3%
Liquid Limit	41	Plastic Limit	32	Plastic Index	9
		Moisture Content	22.1%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
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AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

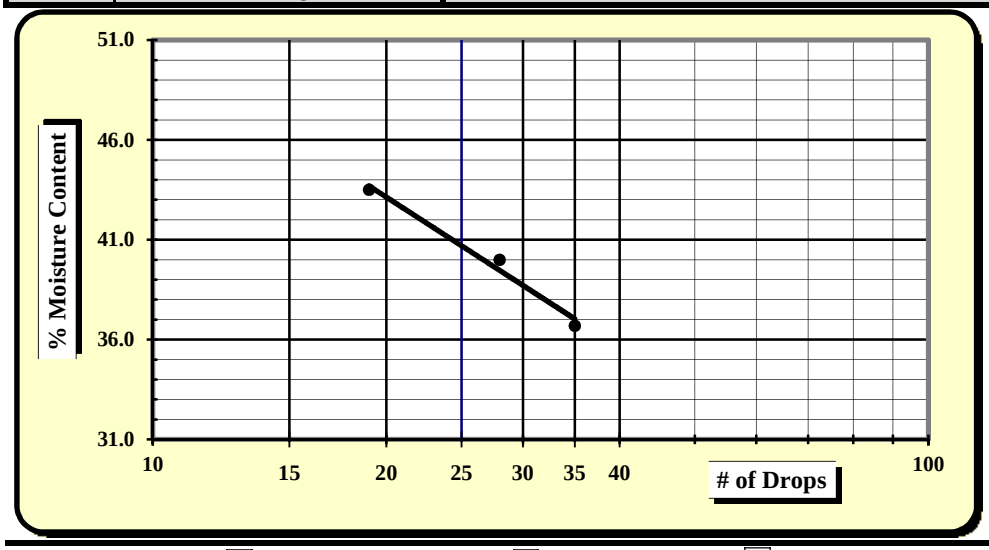
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-4	Sample #:	86	Sample Date:	4/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.0 - 5.0'

Sample Description: Light brown, fine, silty SAND (SM) [A-5 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.47	16.50	16.99				11.59		
B	Wet Soil Weight + A	39.17	38.87	38.06				19.79		
C	Dry Soil Weight + A	33.08	32.48	31.67				17.82		
D	Water Weight (B-C)	6.09	6.39	6.39				1.97		
E	Dry Soil Weight (C-A)	16.61	15.98	14.68				6.23		
F	% Moisture (D/E)*100	36.7%	40.0%	43.5%				31.6%		
N	# OF DROPS	35	28	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**32**
Plastic Index	**9**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

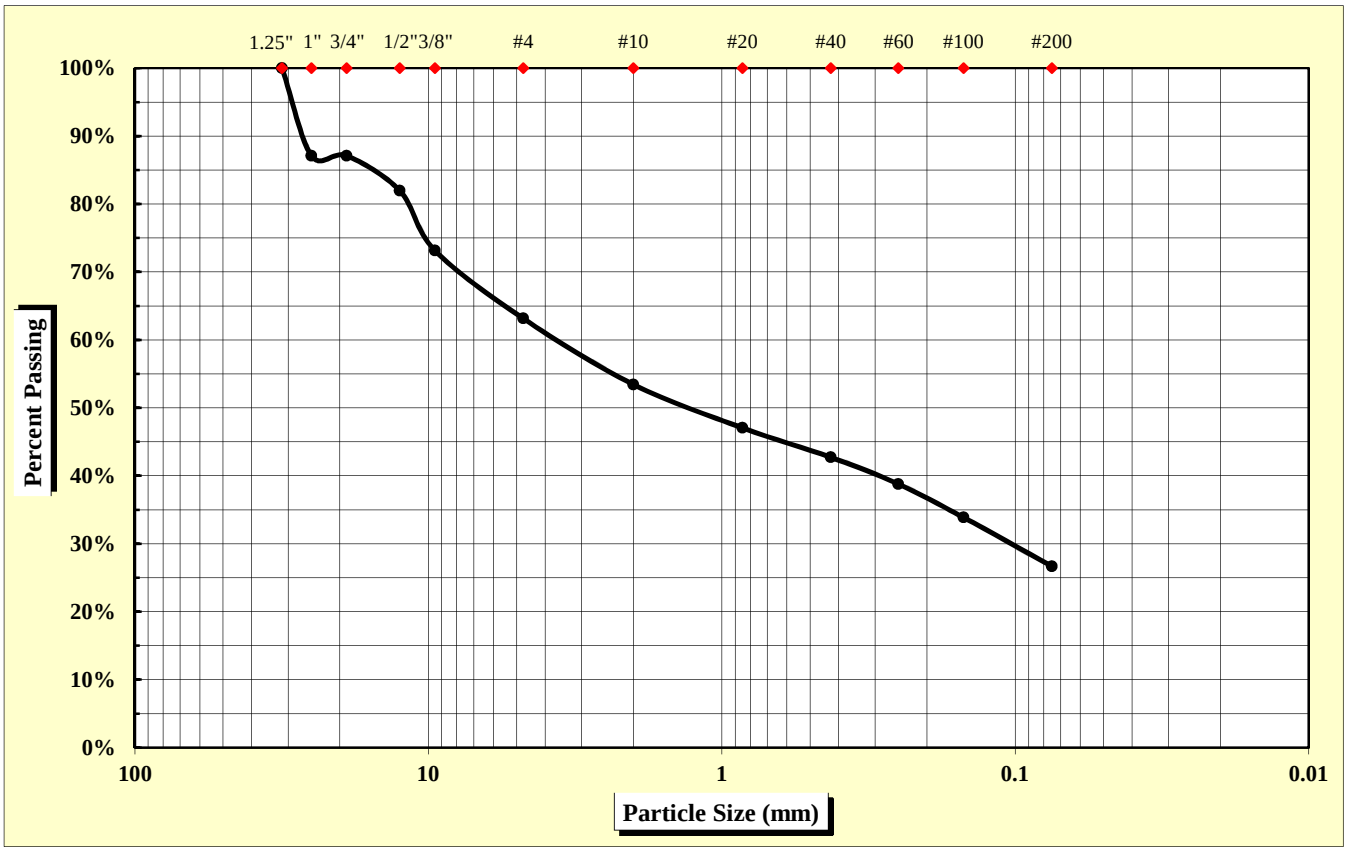
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-6	Sample #:	86	Sample Date:	4/12/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.0 - 10.0'
Sample Description:	Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-2-6 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	31.50 mm	Gravel	46.6%	Fine Sand	16.0%
		Coarse Sand	10.7%	Silt & Clay	26.7%
Liquid Limit	31	Plastic Limit	20	Plastic Index	11
		Moisture Content	18.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

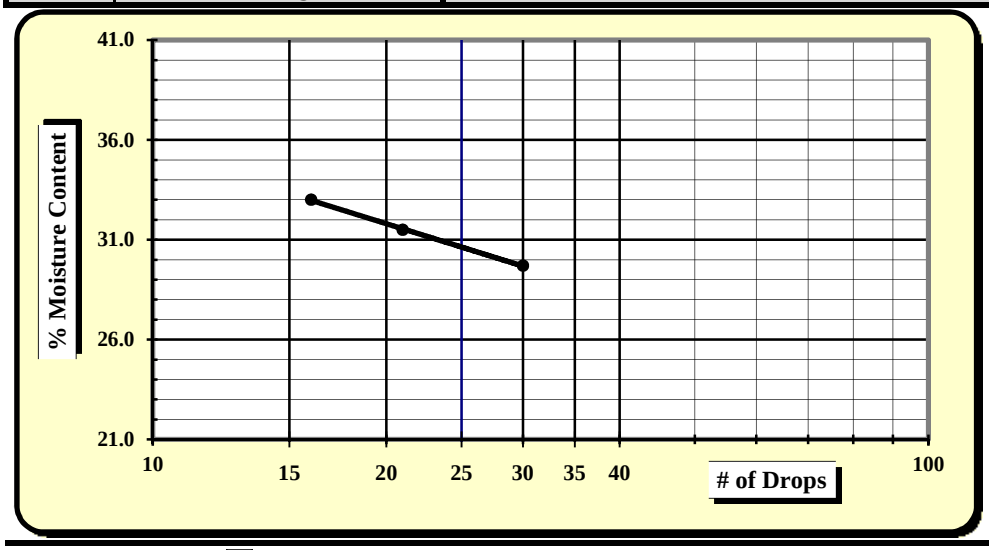
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-6	Sample #:	86	Sample Date:	4/12/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.0 - 10.0'

Sample Description: Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-2-6 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.96	16.66	16.78				12.26		
B	Wet Soil Weight + A	39.34	41.90	40.24				21.95		
C	Dry Soil Weight + A	33.98	35.86	34.42				20.31		
D	Water Weight (B-C)	5.36	6.04	5.82				1.64		
E	Dry Soil Weight (C-A)	18.02	19.20	17.64				8.05		
F	% Moisture (D/E)*100	29.7%	31.5%	33.0%				20.4%		
N	# OF DROPS	30	21	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**31**
Plastic Limit	**20**
Plastic Index	**11**
Group Symbol	**SC / A-2-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 26.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

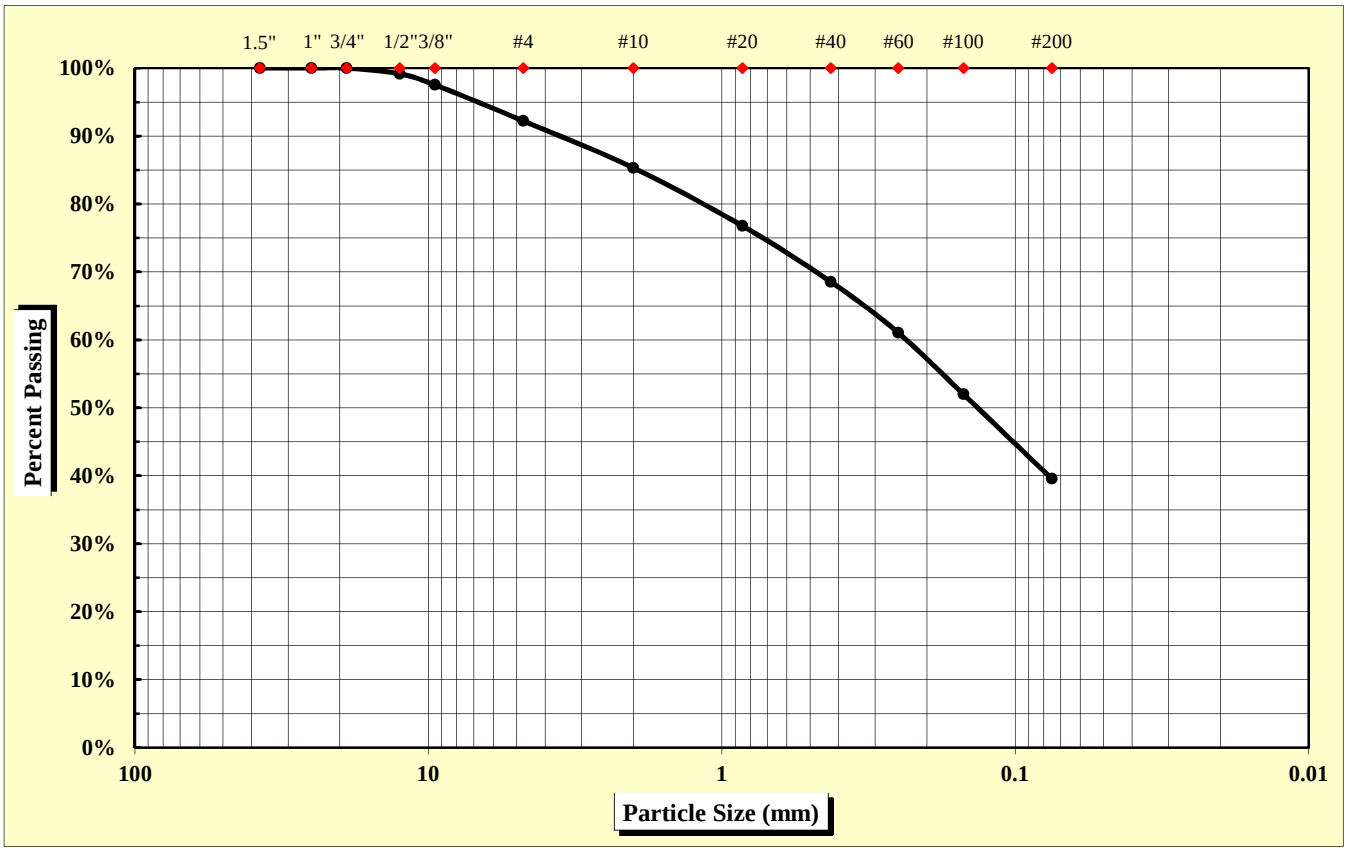
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-8	Sample #:	86	Sample Date:	4/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	14.7%	Fine Sand	29.0%
		Coarse Sand	16.8%	Silt & Clay	39.6%
Liquid Limit	30	Plastic Limit	20	Plastic Index	10
		Moisture Content	17.1%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

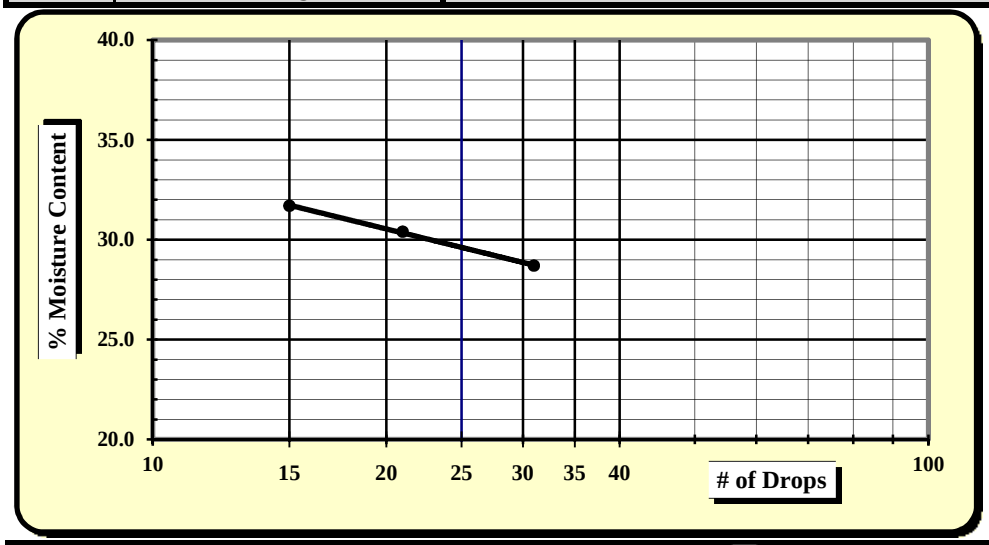
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-8	Sample #:	86	Sample Date:	4/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.66	16.67	15.97				12.09		
B	Wet Soil Weight + A	43.09	41.17	40.62				21.70		
C	Dry Soil Weight + A	37.19	35.46	34.69				20.10		
D	Water Weight (B-C)	5.90	5.71	5.93				1.60		
E	Dry Soil Weight (C-A)	20.53	18.79	18.72				8.01		
F	% Moisture (D/E)*100	28.7%	30.4%	31.7%				20.0%		
N	# OF DROPS	31	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**20**
Plastic Index	**10**
Group Symbol	**SC / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

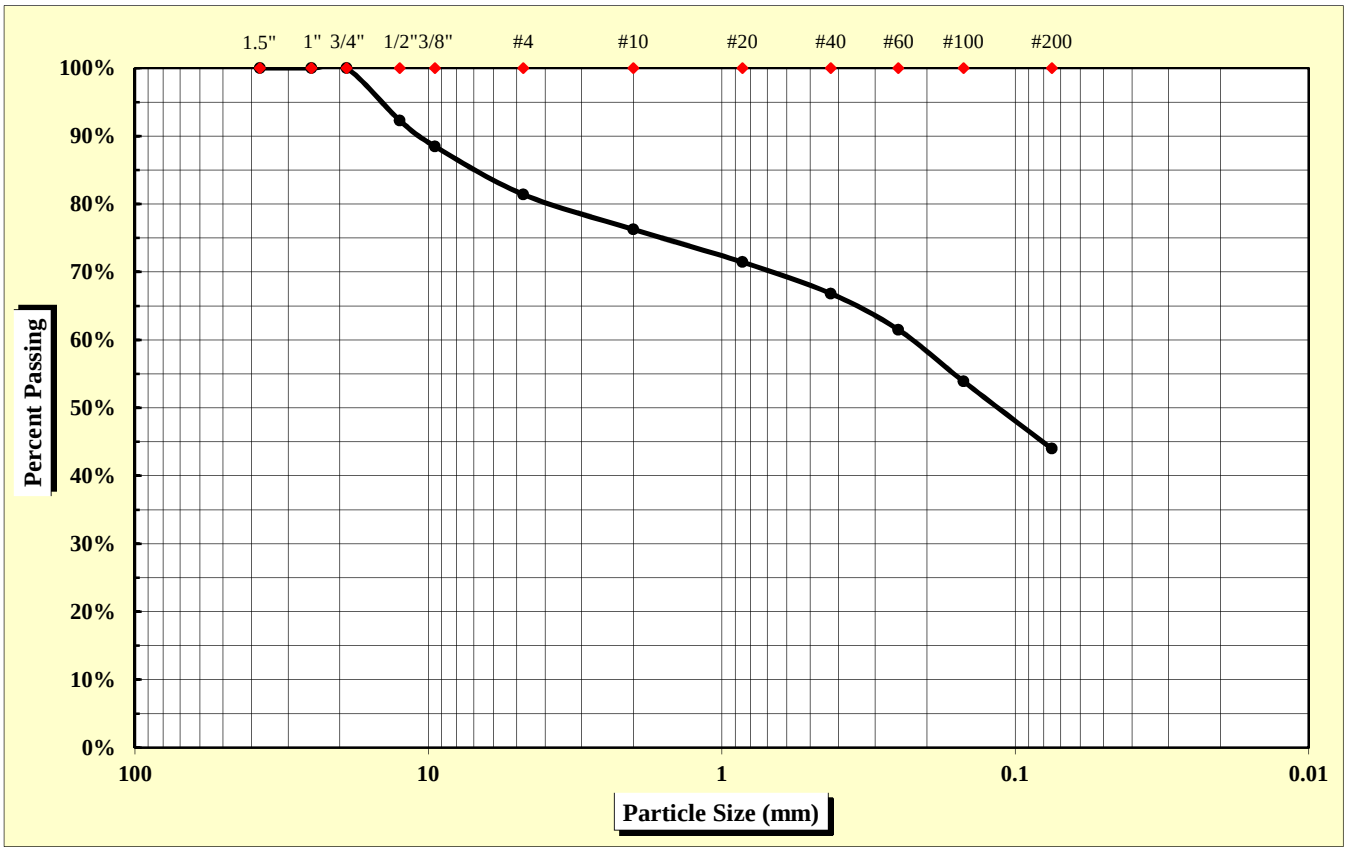
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-10	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red brown, fine, clayey SAND (SC) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	23.8%	Fine Sand	22.8%
		Coarse Sand	9.4%	Silt & Clay	44.0%
Liquid Limit	37	Plastic Limit	21	Plastic Index	16
		Moisture Content	15.5%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

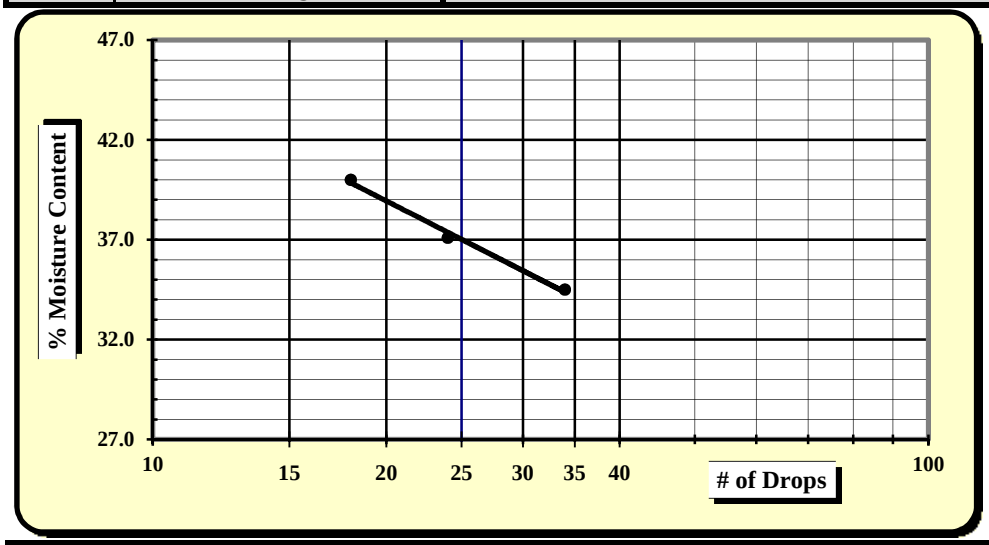
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-10	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red brown, fine, clayey SAND (SC) [A-6 (3)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.87	16.81				12.29		
B	Wet Soil Weight + A	41.18	41.32	40.53				22.10		
C	Dry Soil Weight + A	34.91	34.70	33.75				20.42		
D	Water Weight (B-C)	6.27	6.62	6.78				1.68		
E	Dry Soil Weight (C-A)	18.20	17.83	16.94				8.13		
F	% Moisture (D/E)*100	34.5%	37.1%	40.0%				20.7%		
N	# OF DROPS	34	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**21**
Plastic Index	**16**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

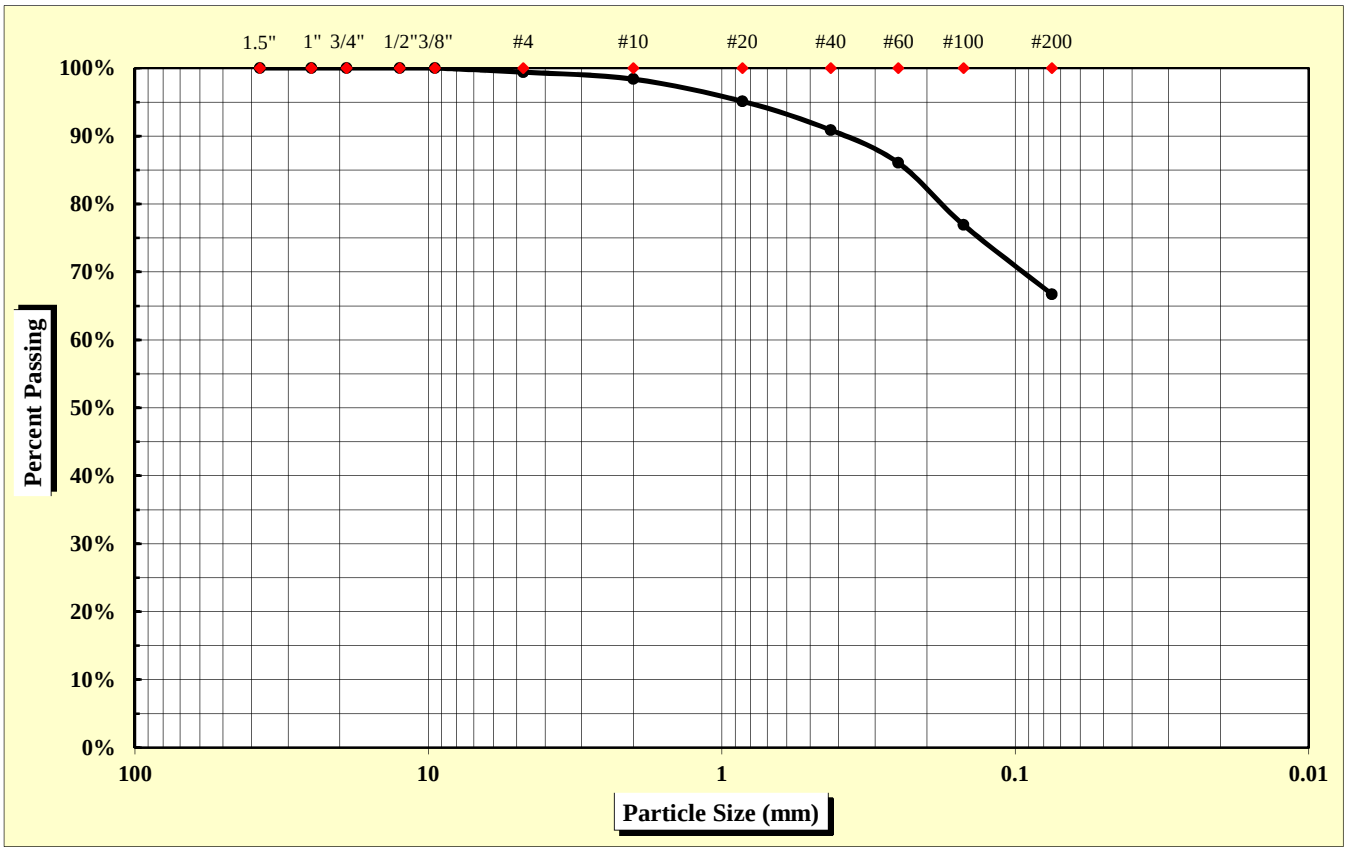
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-12	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red brown, fine, sandy LEAN CLAY (CL) [A-7-6 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.6%	Fine Sand	24.2%
		Coarse Sand	7.5%	Silt & Clay	66.7%
Liquid Limit	49	Plastic Limit	27	Plastic Index	22
		Moisture Content	19.9%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

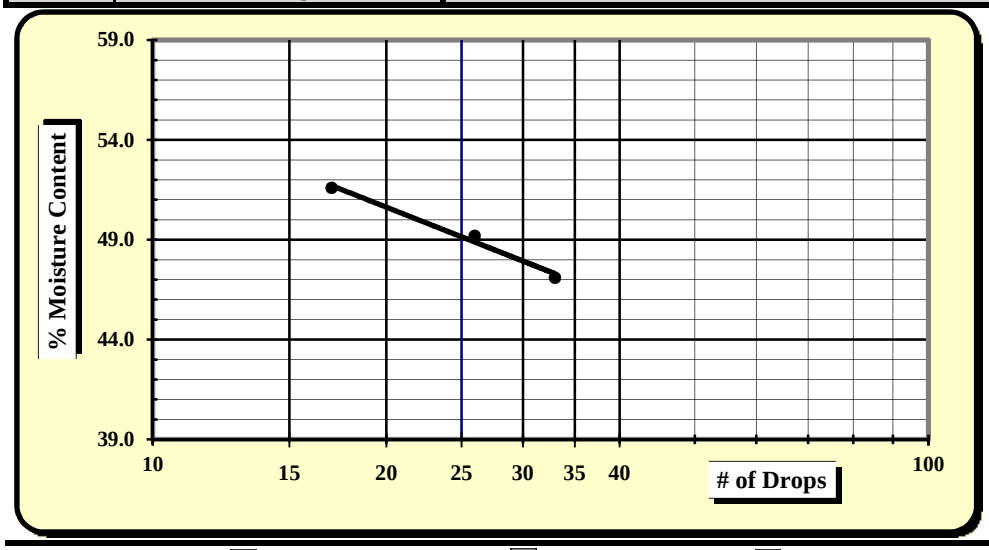
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-12	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Red brown, fine, sandy LEAN CLAY (CL) [A-7-6 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.41	15.31	16.53				12.11		
B	Wet Soil Weight + A	37.74	36.85	36.47				20.97		
C	Dry Soil Weight + A	30.91	29.75	29.68				19.07		
D	Water Weight (B-C)	6.83	7.10	6.79				1.90		
E	Dry Soil Weight (C-A)	14.50	14.44	13.15				6.96		
F	% Moisture (D/E)*100	47.1%	49.2%	51.6%				27.3%		
N	# OF DROPS	33	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**49**
Plastic Limit	**27**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 66.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

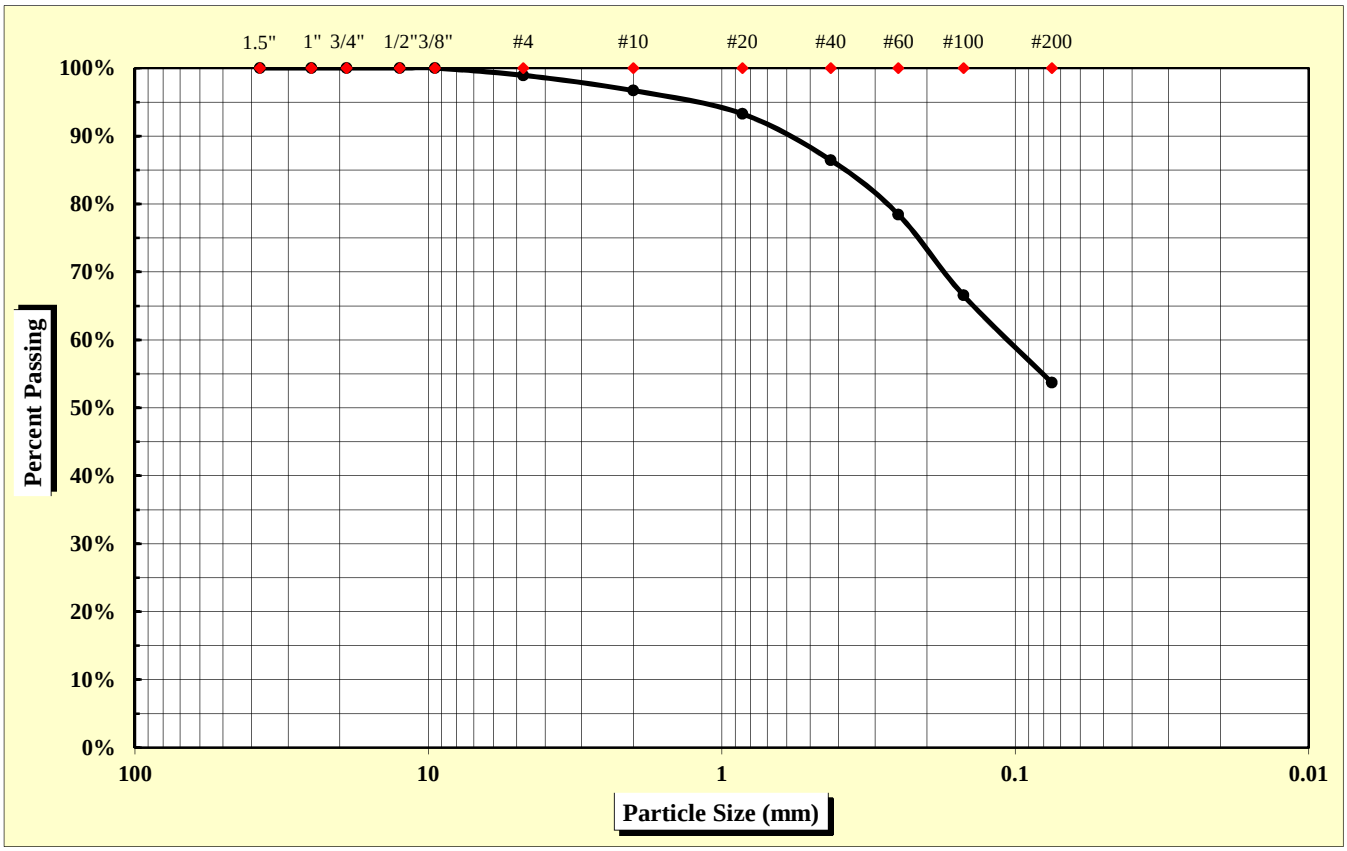
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-16	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Orange tan brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.3%	Fine Sand	32.8%
		Coarse Sand	10.3%	Silt & Clay	53.7%
Liquid Limit	40	Plastic Limit	23	Plastic Index	17
		Moisture Content	19.7%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

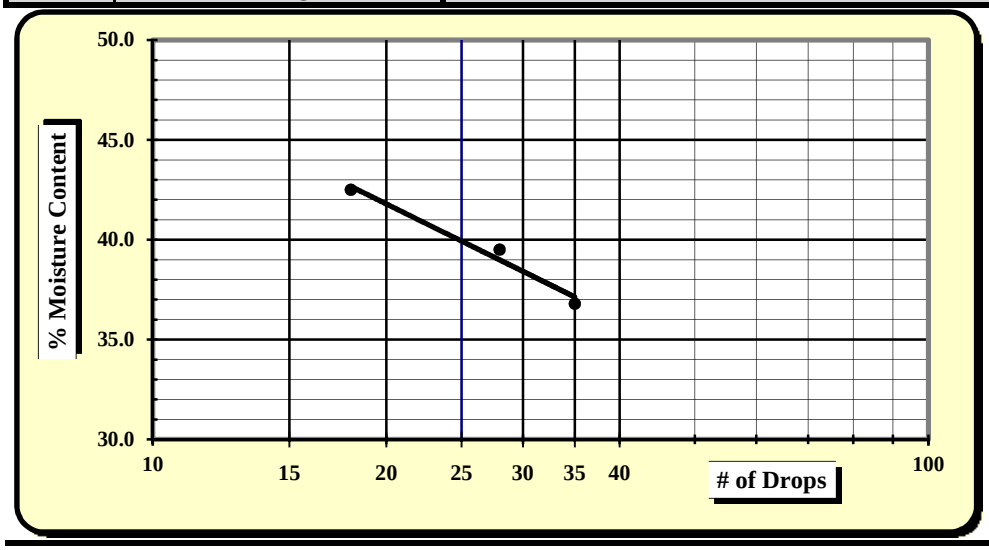
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-16	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Orange tan brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.69	15.72				12.15		
B	Wet Soil Weight + A	38.27	40.12	39.59				22.13		
C	Dry Soil Weight + A	32.47	33.49	32.47				20.25		
D	Water Weight (B-C)	5.80	6.63	7.12				1.88		
E	Dry Soil Weight (C-A)	15.75	16.80	16.75				8.10		
F	% Moisture (D/E)*100	36.8%	39.5%	42.5%				23.2%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**23**
Plastic Index	**17**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

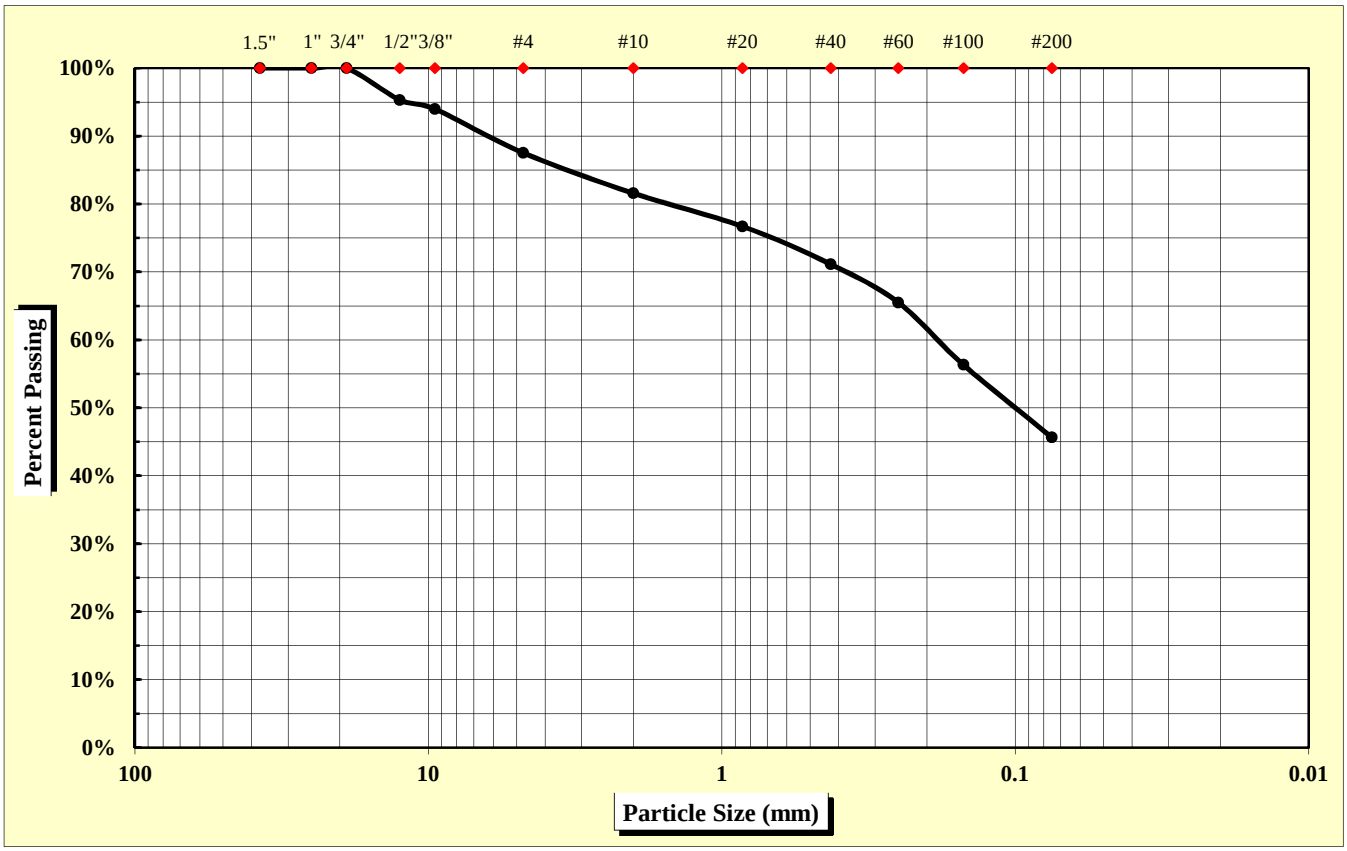
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-18	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	18.4%	Fine Sand	25.5%
		Coarse Sand	10.4%	Silt & Clay	45.6%
Liquid Limit	33	Plastic Limit	22	Plastic Index	11
		Moisture Content	21.0%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

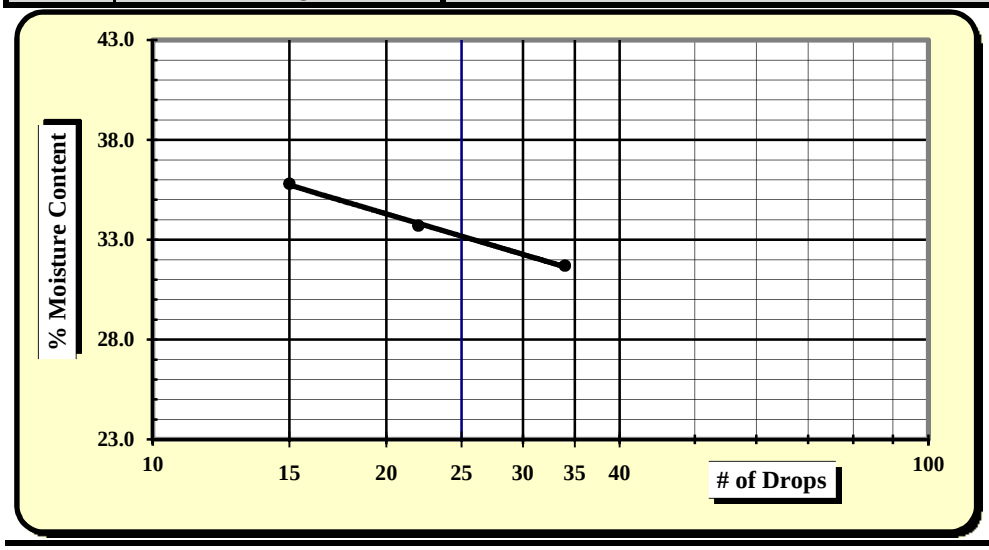
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-18	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.46	16.50	17.00				11.59		
B	Wet Soil Weight + A	38.44	39.67	39.28				20.62		
C	Dry Soil Weight + A	33.15	33.83	33.41				19.01		
D	Water Weight (B-C)	5.29	5.84	5.87				1.61		
E	Dry Soil Weight (C-A)	16.69	17.33	16.41				7.42		
F	% Moisture (D/E)*100	31.7%	33.7%	35.8%				21.7%		
N	# OF DROPS	34	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**33**
Plastic Limit	**22**
Plastic Index	**11**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

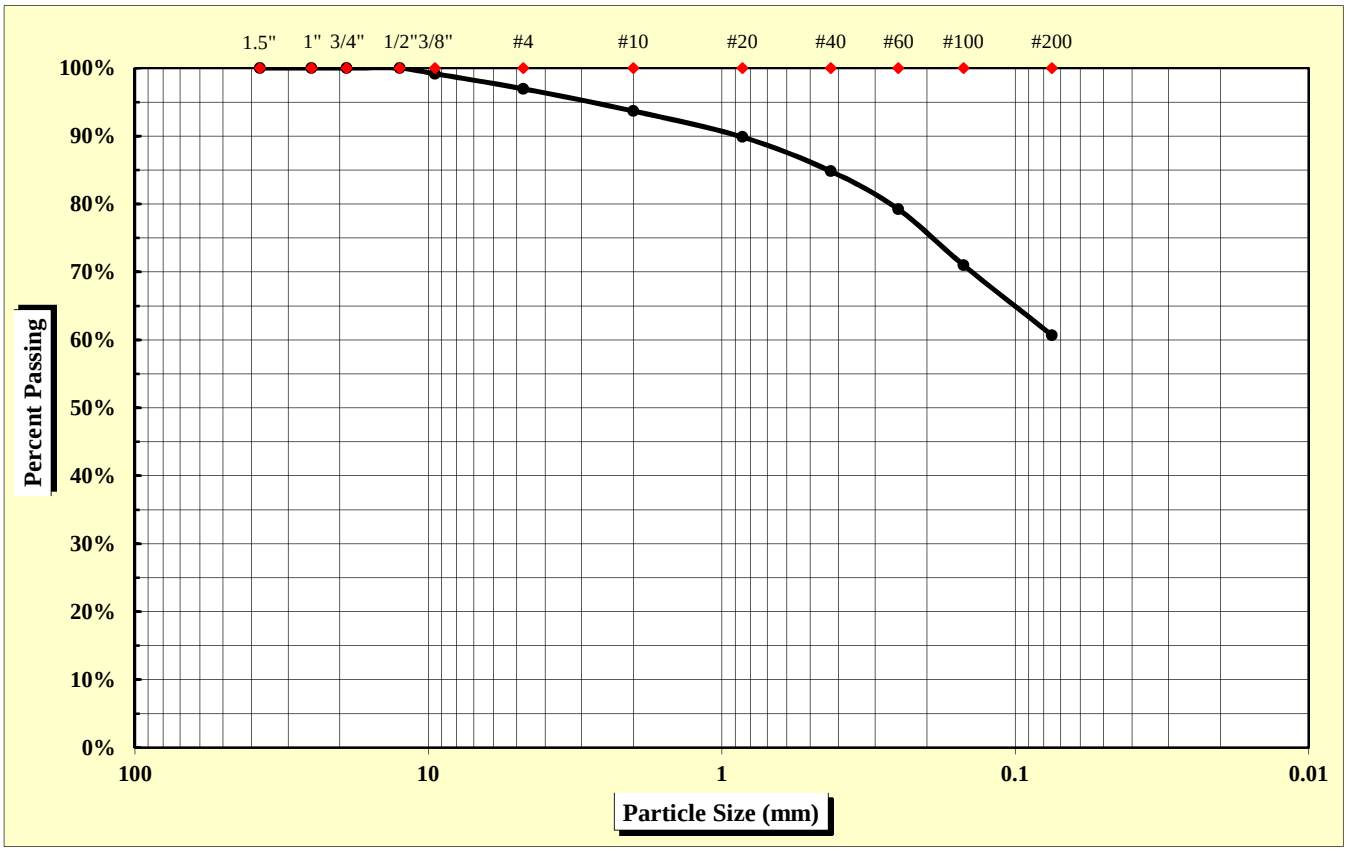
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/6 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-18	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red tan brown, fine, sandy LEAN CLAY (CL) [A-7-6 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.3%	Fine Sand	24.1%
		Coarse Sand	8.9%	Silt & Clay	60.7%
Liquid Limit	47	Plastic Limit	27	Plastic Index	20
		Moisture Content	24.9%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

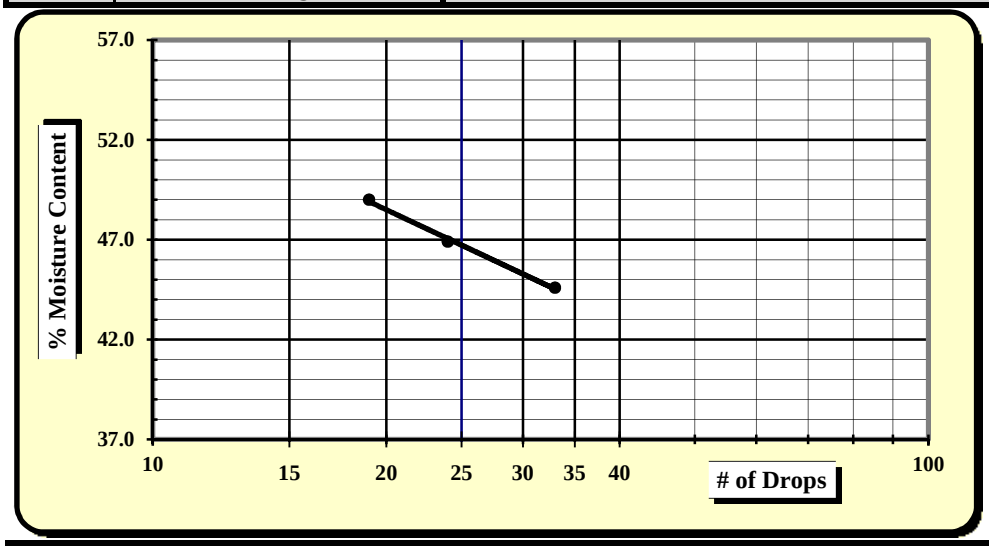
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-18	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red tan brown, fine, sandy LEAN CLAY (CL) [A-7-6 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.96	16.67	16.78				12.27		
B	Wet Soil Weight + A	38.01	38.58	37.84				22.03		
C	Dry Soil Weight + A	31.21	31.58	30.91				19.97		
D	Water Weight (B-C)	6.80	7.00	6.93				2.06		
E	Dry Soil Weight (C-A)	15.25	14.91	14.13				7.70		
F	% Moisture (D/E)*100	44.6%	46.9%	49.0%				26.8%		
N	# OF DROPS	33	24	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**27**
Plastic Index	**20**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 60.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

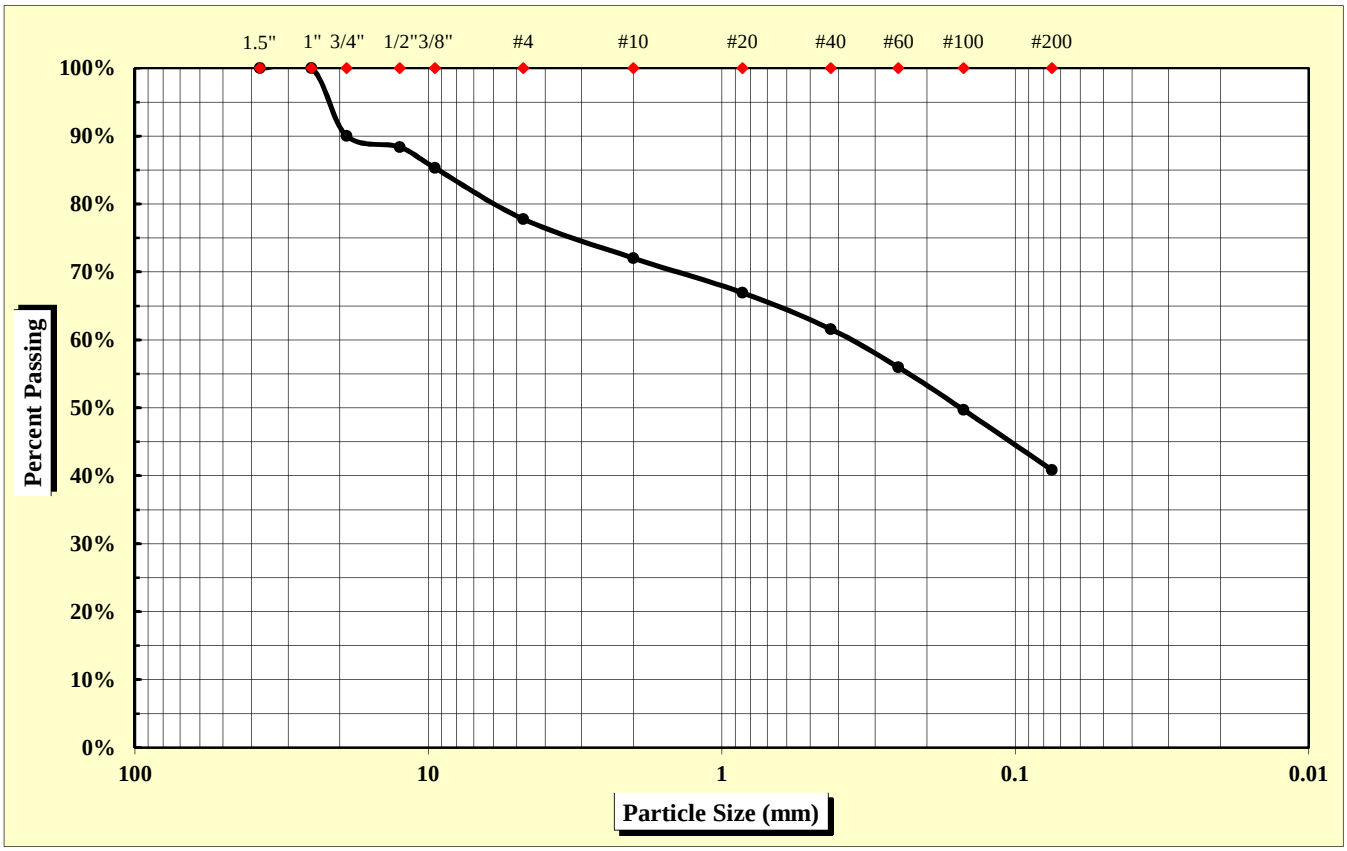
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-19	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	28.0%	Fine Sand	20.7%
		Coarse Sand	10.5%	Silt & Clay	40.9%
Liquid Limit	35	Plastic Limit	24	Plastic Index	11
		Moisture Content	17.3%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

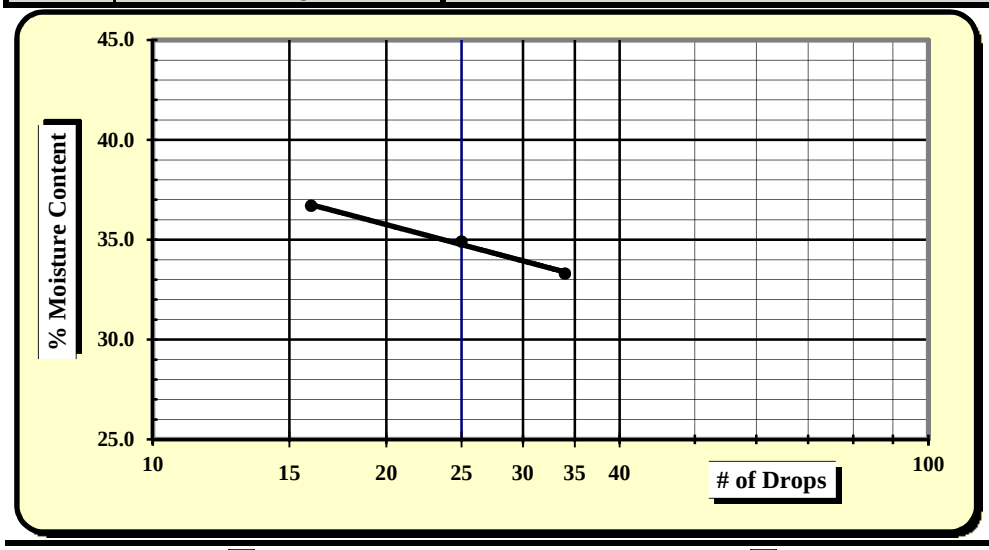
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-19	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-6 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.67	16.67	15.97				12.10		
B	Wet Soil Weight + A	41.49	38.13	39.32				20.90		
C	Dry Soil Weight + A	35.29	32.58	33.05				19.22		
D	Water Weight (B-C)	6.20	5.55	6.27				1.68		
E	Dry Soil Weight (C-A)	18.62	15.91	17.08				7.12		
F	% Moisture (D/E)*100	33.3%	34.9%	36.7%				23.6%		
N	# OF DROPS	34	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**24**
Plastic Index	**11**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 40.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

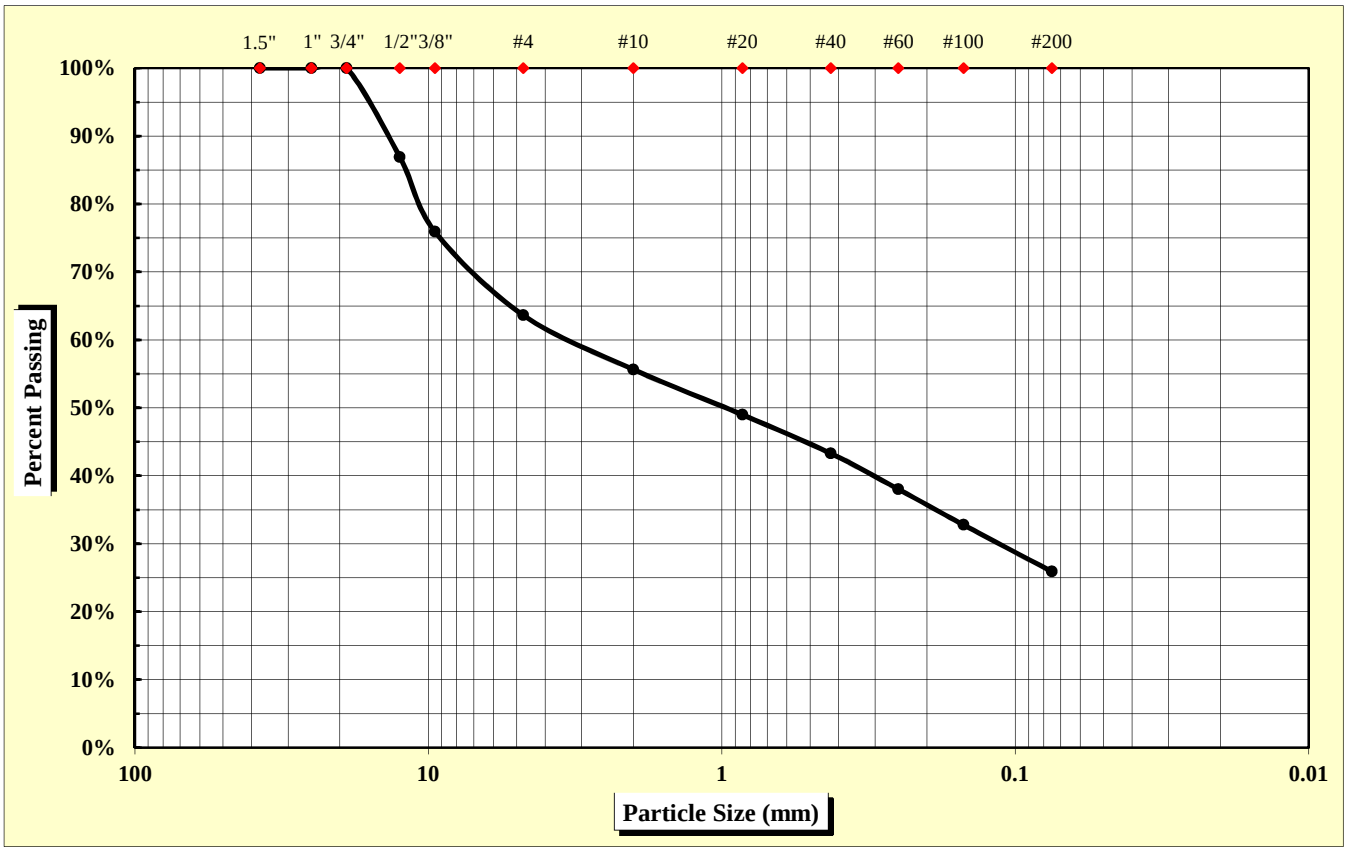
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-19	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	44.4%	Fine Sand	17.4%
		Coarse Sand	12.4%	Silt & Clay	25.9%
Liquid Limit	31	Plastic Limit	23	Plastic Index	8
		Moisture Content	13.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

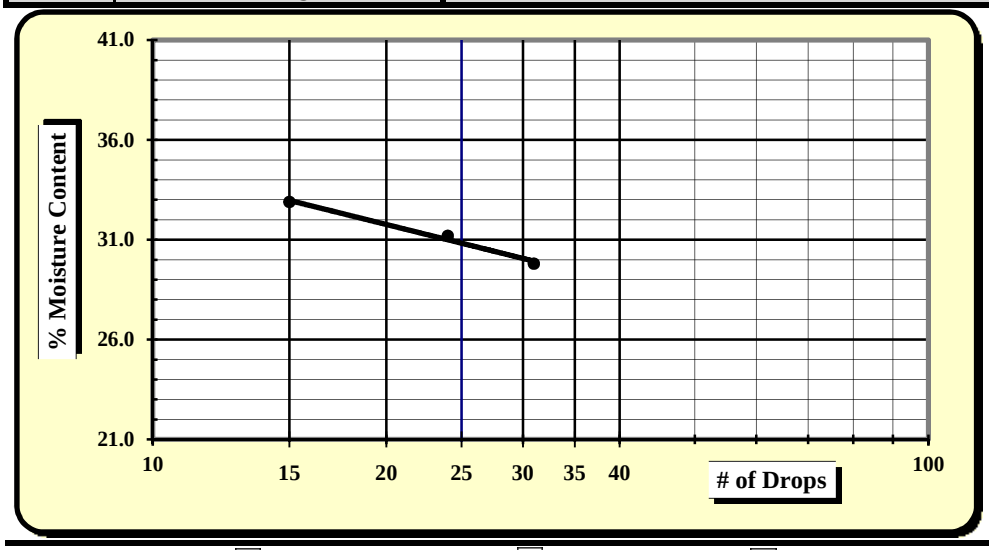
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-19	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red tan brown, medium to fine, clayey SAND with gravel (SC) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.72	16.87	16.80				12.29		
B	Wet Soil Weight + A	41.06	40.72	40.18				23.28		
C	Dry Soil Weight + A	35.47	35.05	34.39				21.23		
D	Water Weight (B-C)	5.59	5.67	5.79				2.05		
E	Dry Soil Weight (C-A)	18.75	18.18	17.59				8.94		
F	% Moisture (D/E)*100	29.8%	31.2%	32.9%				22.9%		
N	# OF DROPS	31	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**31**
Plastic Limit	**23**
Plastic Index	**8**
Group Symbol	**SC / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 25.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

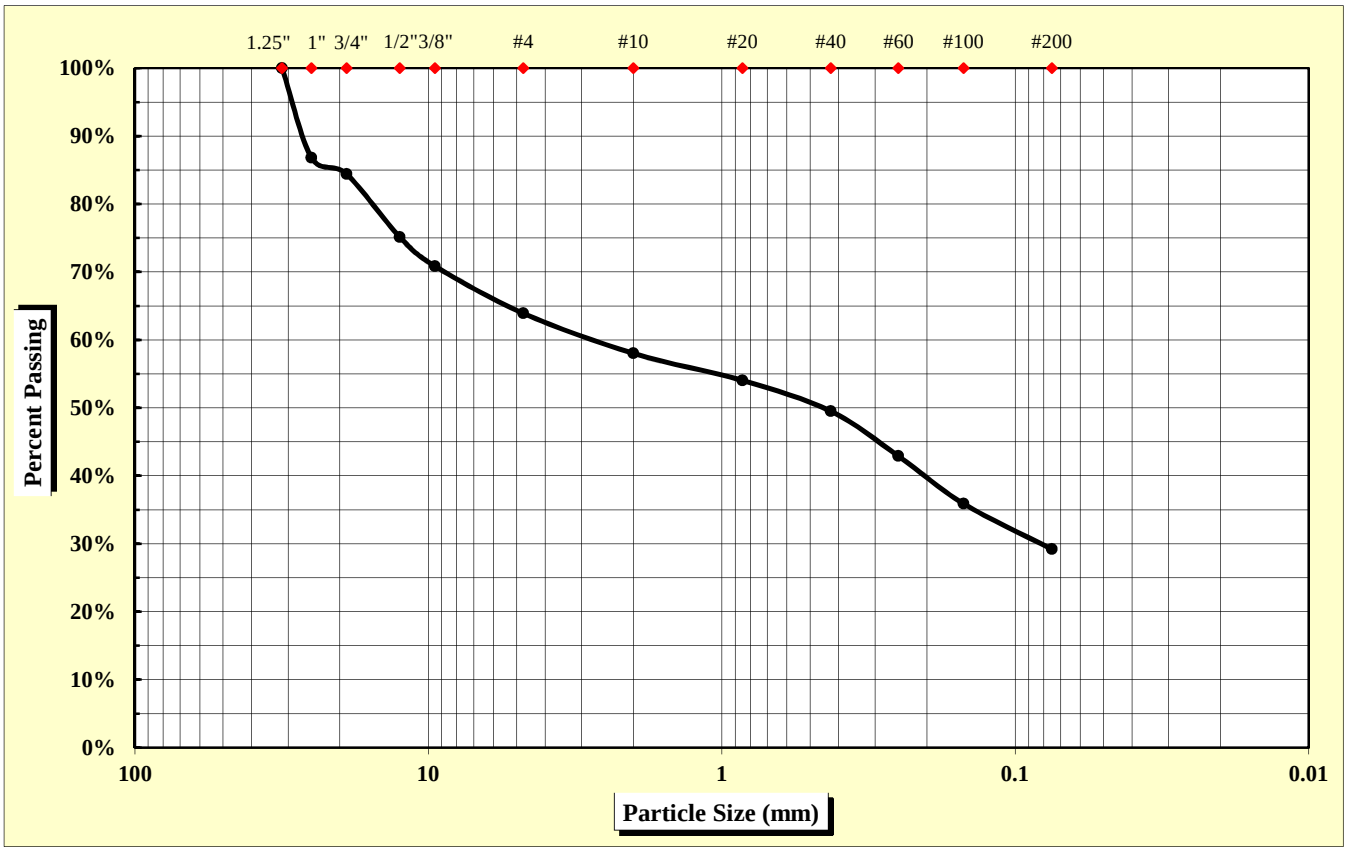
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-20	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, fine, clayey SAND with gravel (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	31.50 mm	Gravel	42.0%	Fine Sand	20.3%
		Coarse Sand	8.5%	Silt & Clay	29.2%
Liquid Limit	23	Plastic Limit	14	Plastic Index	9
		Moisture Content	12.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

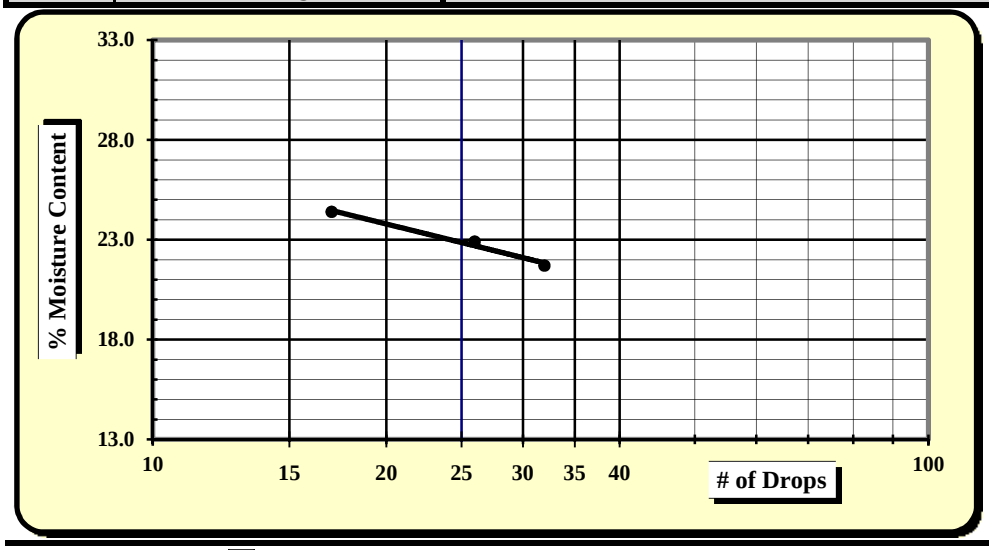
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-20	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red brown, fine, clayey SAND with gravel (SC) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.83	16.76	15.92				12.00		
B	Wet Soil Weight + A	44.34	44.80	44.06				22.18		
C	Dry Soil Weight + A	39.44	39.57	38.54				20.90		
D	Water Weight (B-C)	4.90	5.23	5.52				1.28		
E	Dry Soil Weight (C-A)	22.61	22.81	22.62				8.90		
F	% Moisture (D/E)*100	21.7%	22.9%	24.4%				14.4%		
N	# OF DROPS	32	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**14.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**23**
Plastic Limit	**14**
Plastic Index	**9**
Group Symbol	**SC / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

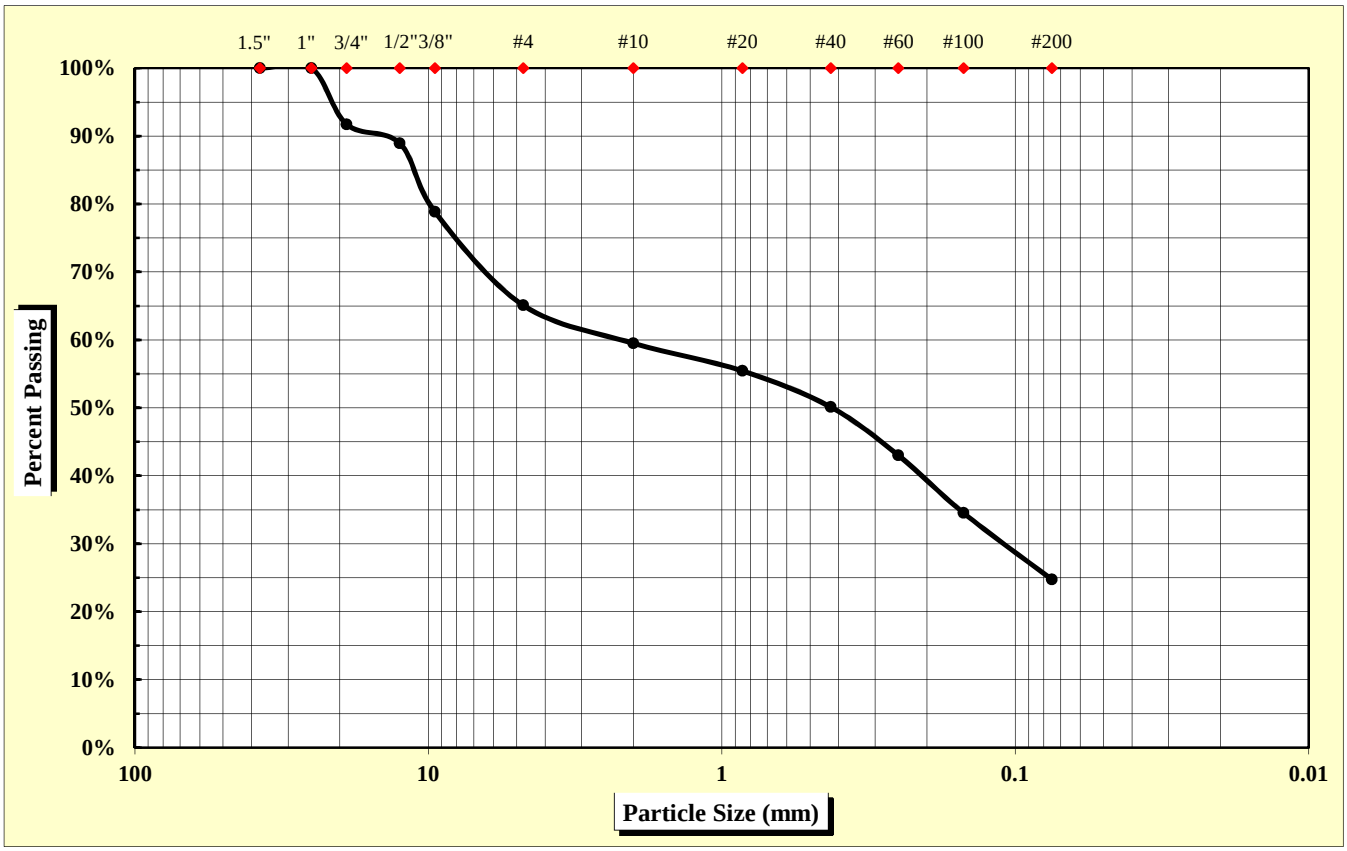
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-23	Sample #:	86	Sample Date:	4/20/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Dark brown red, fine, silty clayey SAND with gravel (SC-SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	40.5%	Fine Sand	25.4%
		Coarse Sand	9.4%	Silt & Clay	24.7%
Liquid Limit	27	Plastic Limit	20	Plastic Index	7
		Moisture Content	14.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

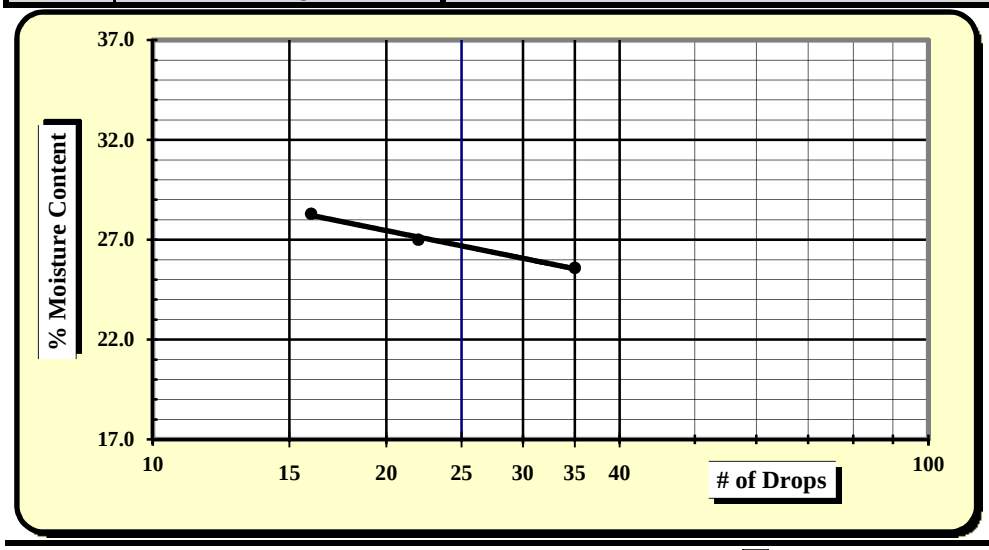
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-23	Sample #:	86	Sample Date:	4/20/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'

Sample Description: Dark brown red, fine, silty clayey SAND with gravel (SC-SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.77	15.59	16.93				12.23		
B	Wet Soil Weight + A	40.98	38.81	39.52				21.55		
C	Dry Soil Weight + A	35.84	33.87	34.54				19.99		
D	Water Weight (B-C)	5.14	4.94	4.98				1.56		
E	Dry Soil Weight (C-A)	20.07	18.28	17.61				7.76		
F	% Moisture (D/E)*100	25.6%	27.0%	28.3%				20.1%		
N	# OF DROPS	35	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**20**
Plastic Index	**7**
Group Symbol	SC-SM / A-2-4
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 24.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

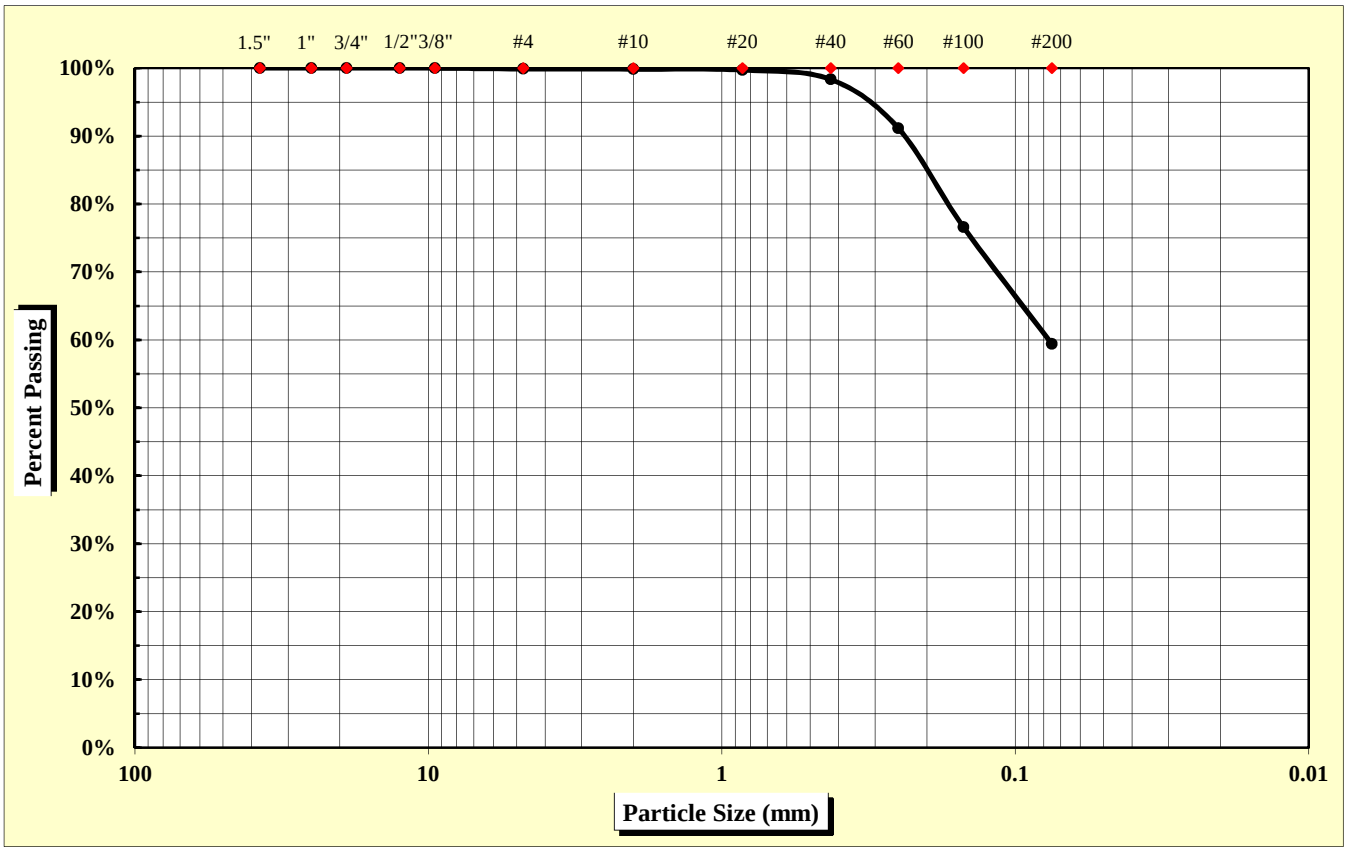
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-24	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange tan, fine, sandy SILT (ML) [A-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.1%	Fine Sand	38.9%
		Coarse Sand	1.5%	Silt & Clay	59.4%
Liquid Limit	40	Plastic Limit	29	Plastic Index	11
		Moisture Content	22.5%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

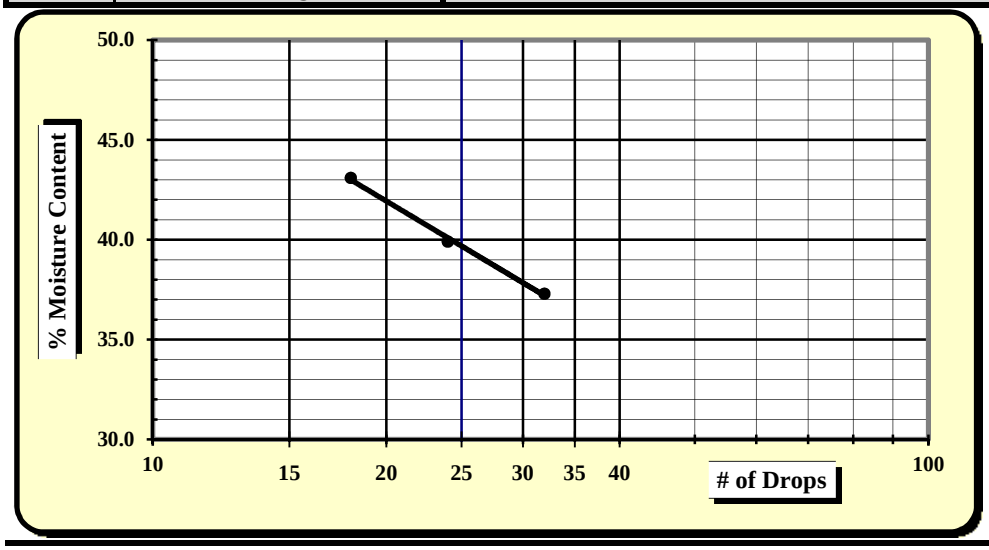
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-24	Sample #:	86	Sample Date:	4/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange tan, fine, sandy SILT (ML) [A-6 (5)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.71	15.94				11.17		
B	Wet Soil Weight + A	39.25	36.66	38.29				19.68		
C	Dry Soil Weight + A	32.88	30.69	31.56				17.77		
D	Water Weight (B-C)	6.37	5.97	6.73				1.91		
E	Dry Soil Weight (C-A)	17.08	14.98	15.62				6.60		
F	% Moisture (D/E)*100	37.3%	39.9%	43.1%				28.9%		
N	# OF DROPS	32	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**29**
Plastic Index	**11**
Group Symbol	**ML / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 59.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

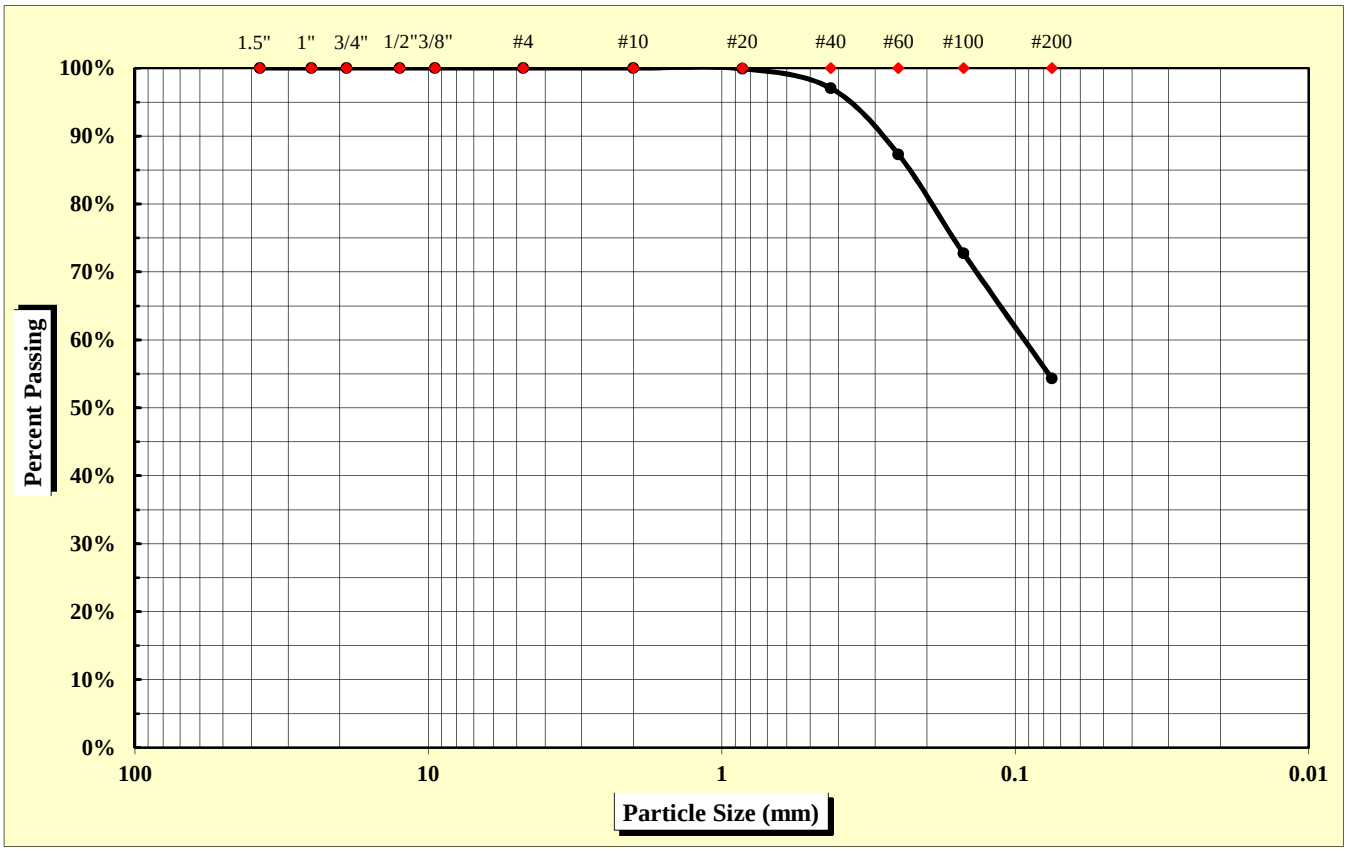
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-24	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange red tan, fine, sandy SILT (ML) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.85 mm	Gravel	0.0%	Fine Sand	42.7%
		Coarse Sand	3.0%	Silt & Clay	54.3%
Liquid Limit	41	Plastic Limit	29	Plastic Index	12
		Moisture Content	21.6%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

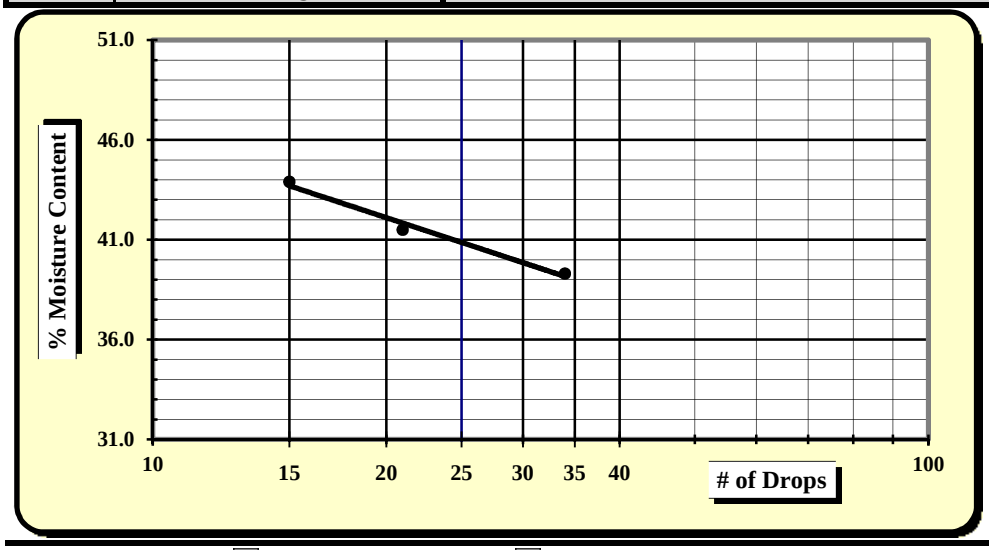
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-24	Sample #:	86	Sample Date:	4/20/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Orange red tan, fine, sandy SILT (ML) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.93	16.91	16.79				12.10		
B	Wet Soil Weight + A	39.49	39.39	38.64				21.89		
C	Dry Soil Weight + A	33.12	32.80	31.97				19.68		
D	Water Weight (B-C)	6.37	6.59	6.67				2.21		
E	Dry Soil Weight (C-A)	16.19	15.89	15.18				7.58		
F	% Moisture (D/E)*100	39.3%	41.5%	43.9%				29.2%		
N	# OF DROPS	34	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**29**
Plastic Index	**12**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 54.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

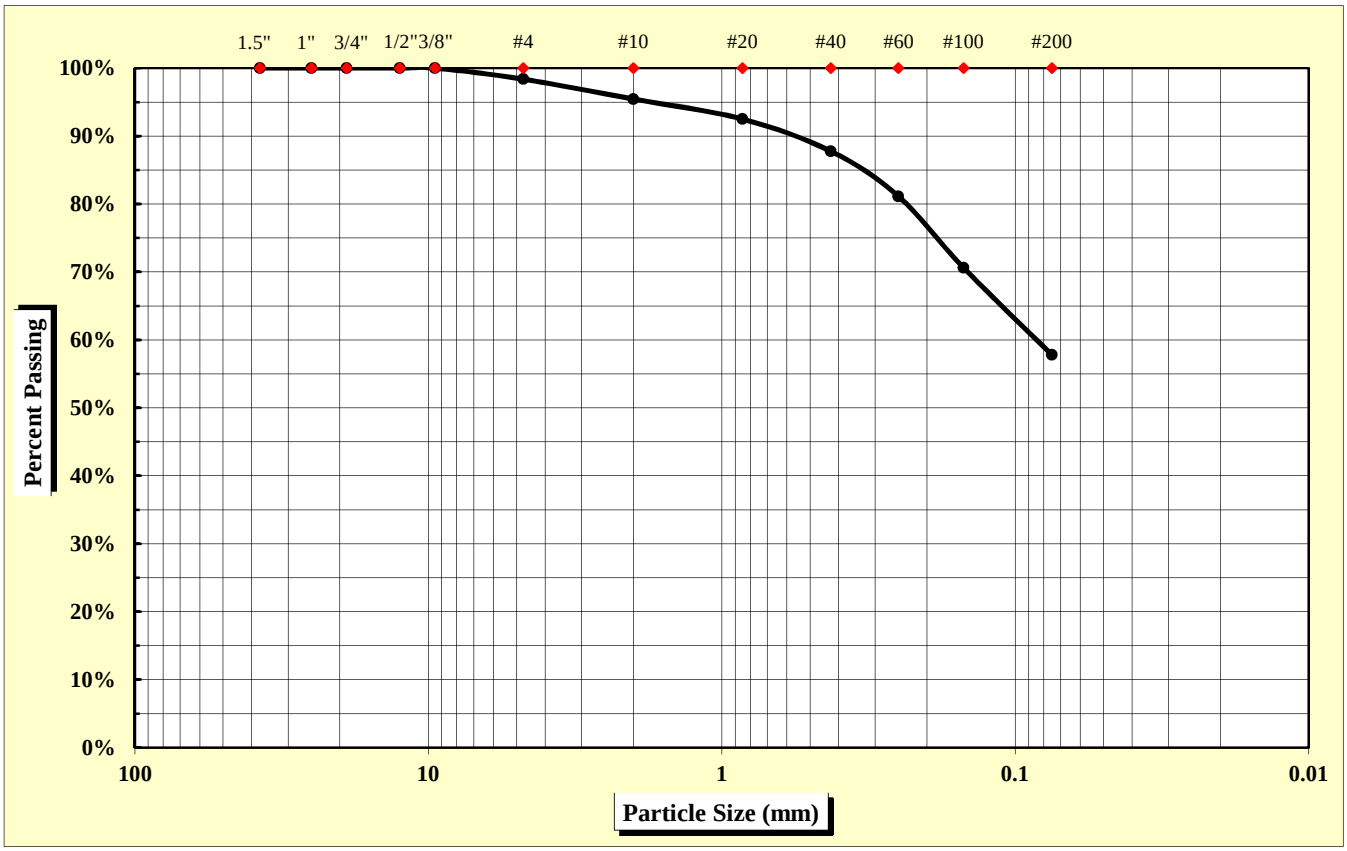
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-25	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red tan, fine, sandy SILT (ML) [A-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.5%	Fine Sand	30.0%
		Coarse Sand	7.7%	Silt & Clay	57.8%
Liquid Limit	38	Plastic Limit	26	Plastic Index	12
		Moisture Content	19.1%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

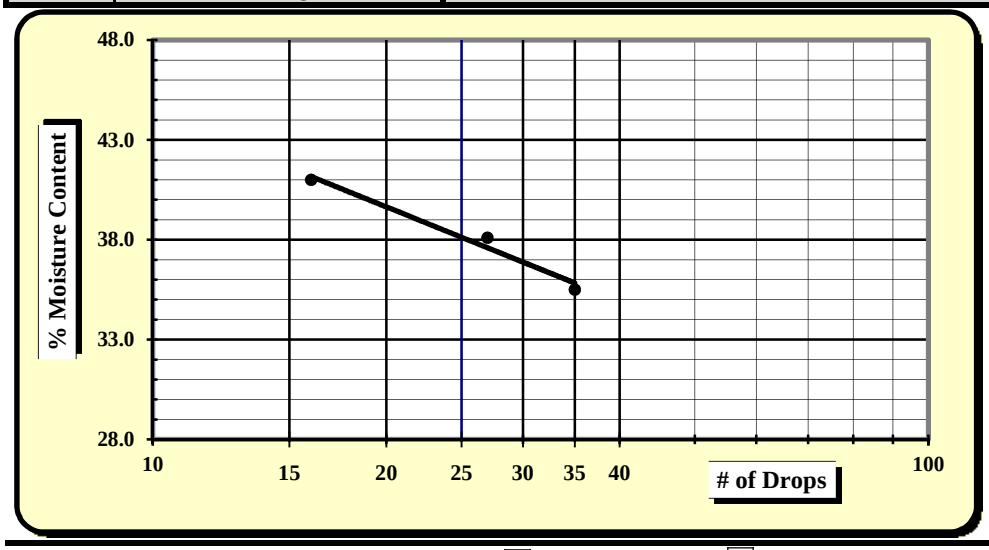
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-25	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red tan, fine, sandy SILT (ML) [A-6 (5)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.41	15.31	16.53				12.11		
B	Wet Soil Weight + A	37.78	35.93	36.61				21.75		
C	Dry Soil Weight + A	32.18	30.24	30.77				19.74		
D	Water Weight (B-C)	5.60	5.69	5.84				2.01		
E	Dry Soil Weight (C-A)	15.77	14.93	14.24				7.63		
F	% Moisture (D/E)*100	35.5%	38.1%	41.0%				26.3%		
N	# OF DROPS	35	27	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.3%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**26**
Plastic Index	**12**
Group Symbol	**ML / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

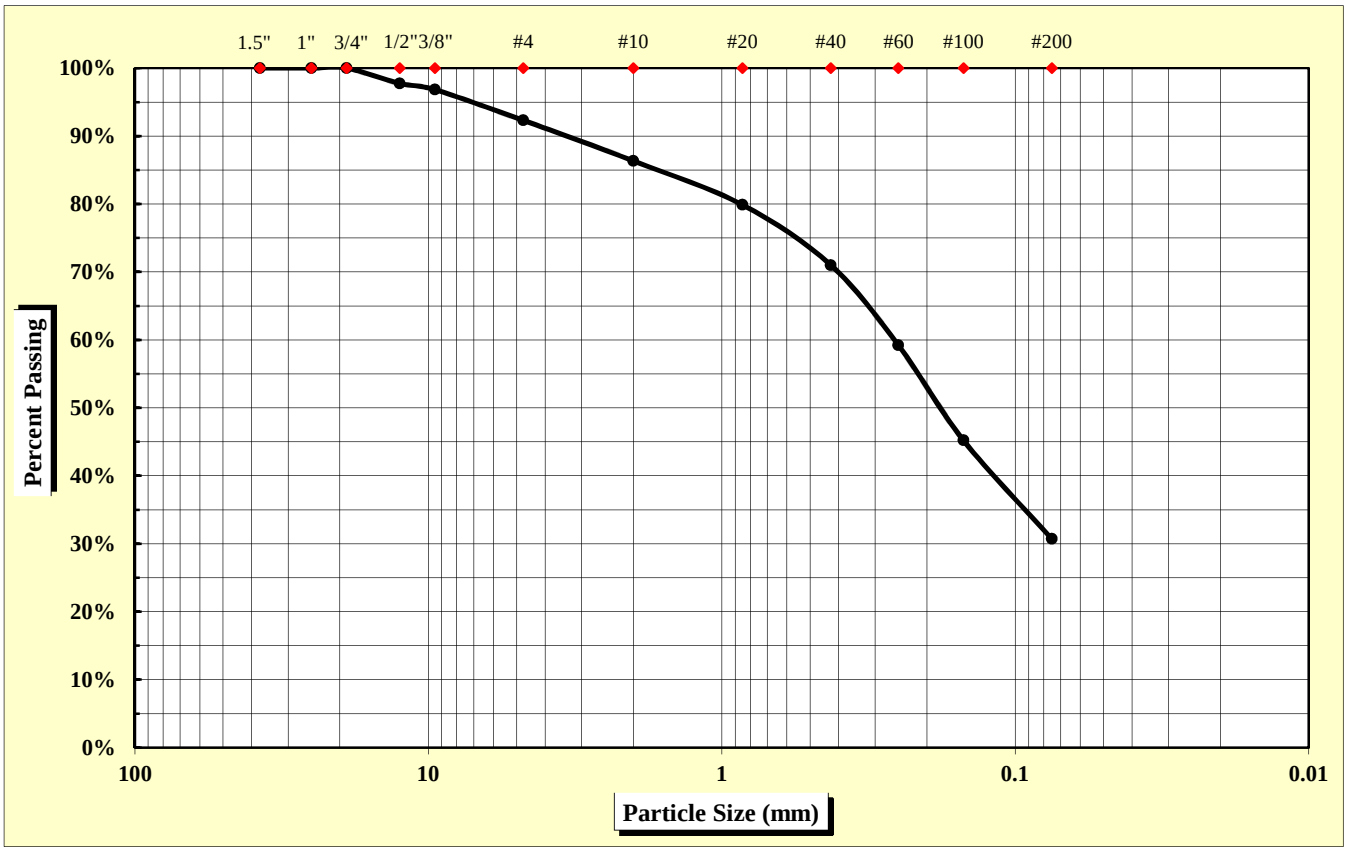
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/7 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-27	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Dark red brown, medium to fine, silty clayey SAND (SC-SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	13.7%	Fine Sand	40.3%
		Coarse Sand	15.3%	Silt & Clay	30.7%
Liquid Limit	19	Plastic Limit	15	Plastic Index	4
		Moisture Content	9.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

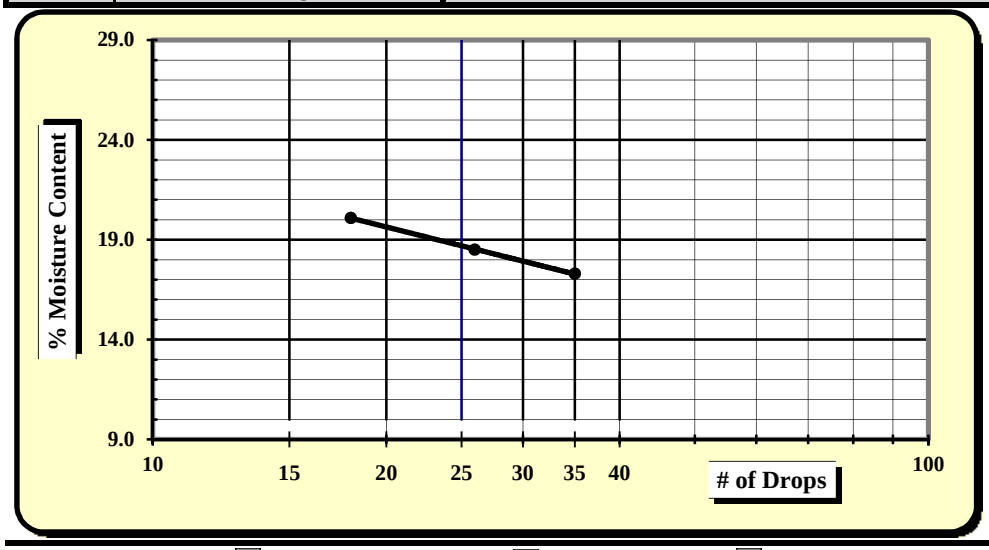
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-27	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Dark red brown, medium to fine, silty clayey SAND (SC-SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.73	16.69	15.72				12.16		
B	Wet Soil Weight + A	42.46	41.15	40.68				23.15		
C	Dry Soil Weight + A	38.67	37.34	36.51				21.73		
D	Water Weight (B-C)	3.79	3.81	4.17				1.42		
E	Dry Soil Weight (C-A)	21.94	20.65	20.79				9.57		
F	% Moisture (D/E)*100	17.3%	18.5%	20.1%				14.8%		
N	# OF DROPS	35	26	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**14.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**19**
Plastic Limit	**15**
Plastic Index	**4**
Group Symbol	SC-SM / A-2-4
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 30.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

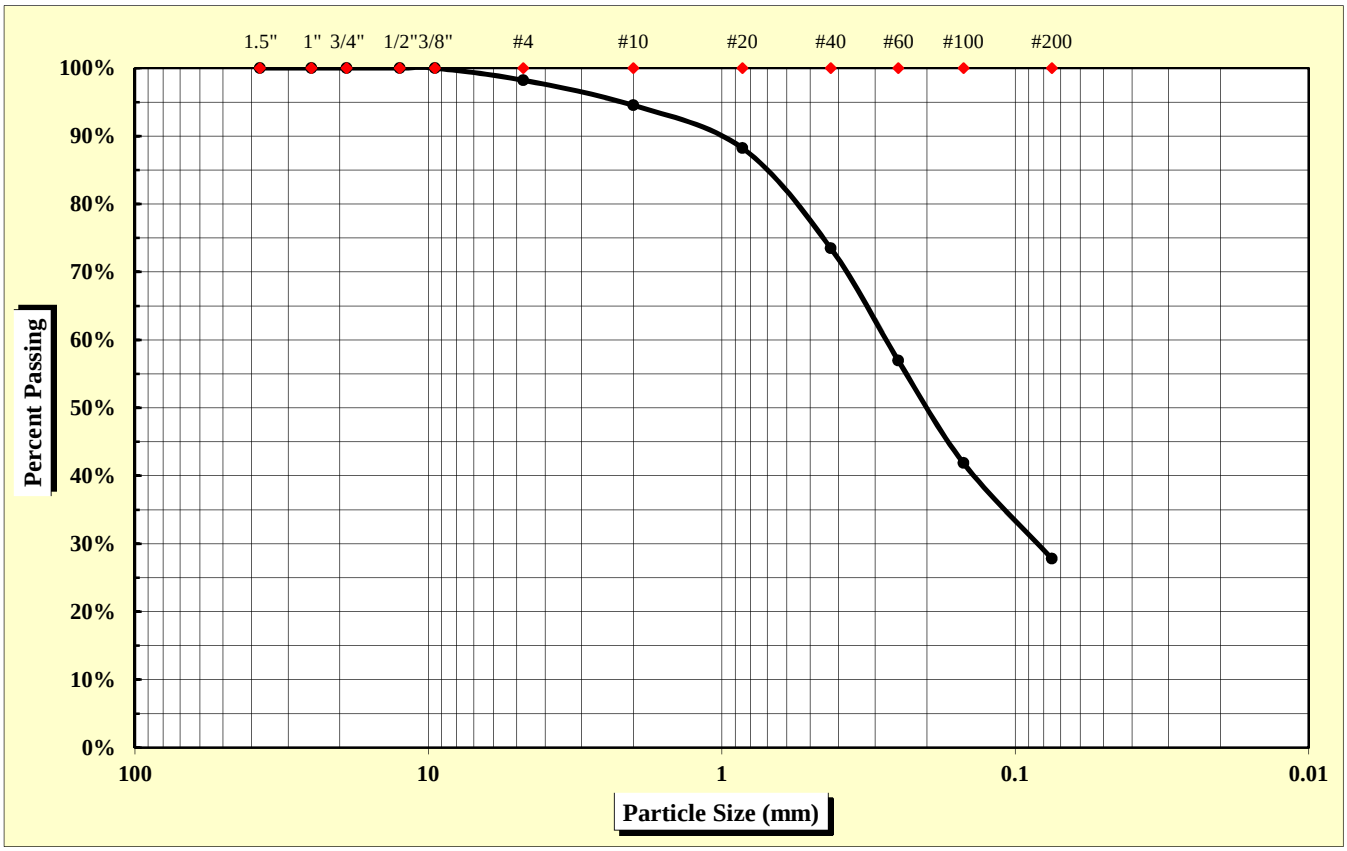
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1/ - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-28	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Yellow orange, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.5%	Fine Sand	45.7%
		Coarse Sand	21.0%	Silt & Clay	27.8%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	13.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

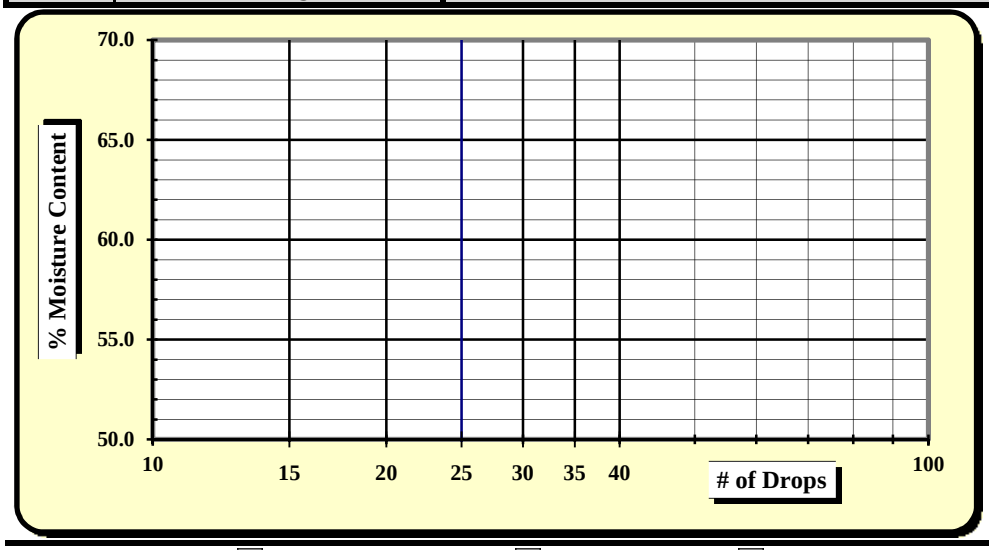
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-28	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Yellow orange, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 27.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

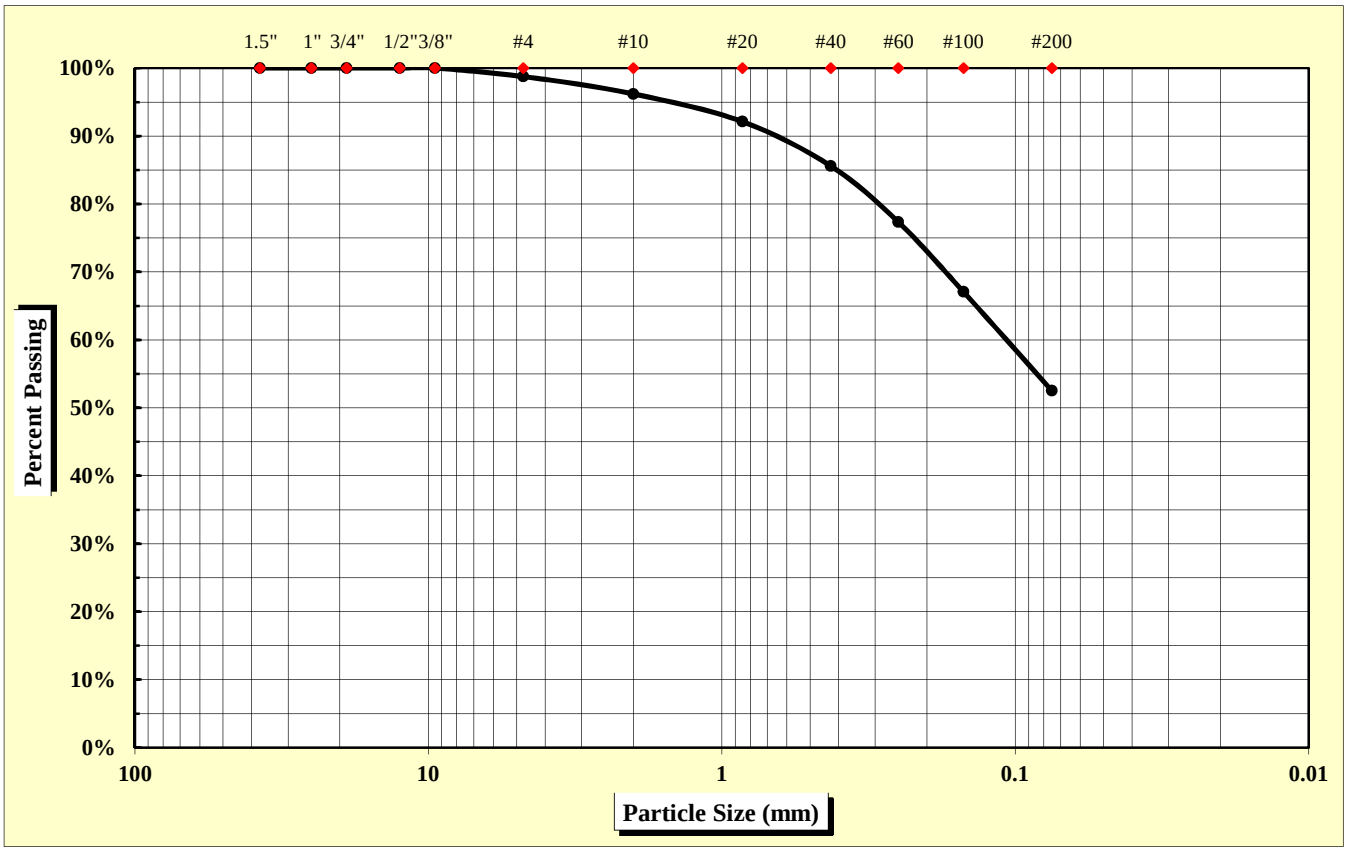
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-29	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red orange, medium to fine, sandy SILT (ML) [A-7-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.8%	Fine Sand	33.1%
		Coarse Sand	10.6%	Silt & Clay	52.5%
Liquid Limit	47	Plastic Limit	36	Plastic Index	11
		Moisture Content	31.1%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

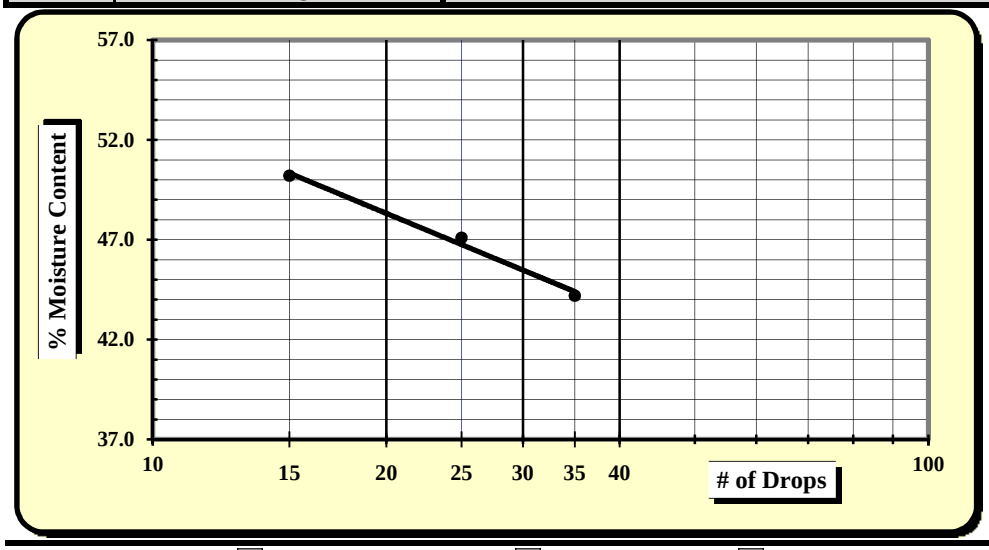
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-29	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red orange, medium to fine, sandy SILT (ML) [A-7-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	XX1	J4	XX6				500		
A	Tare Weight	12.24	12.41	12.10				12.09		
B	Wet Soil Weight + A	24.54	22.28	23.44				20.82		
C	Dry Soil Weight + A	20.77	19.12	19.65				18.50		
D	Water Weight (B-C)	3.77	3.16	3.79				2.32		
E	Dry Soil Weight (C-A)	8.53	6.71	7.55				6.41		
F	% Moisture (D/E)*100	44.2%	47.1%	50.2%				36.2%		
N	# OF DROPS	35	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**36.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**36**
Plastic Index	**11**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

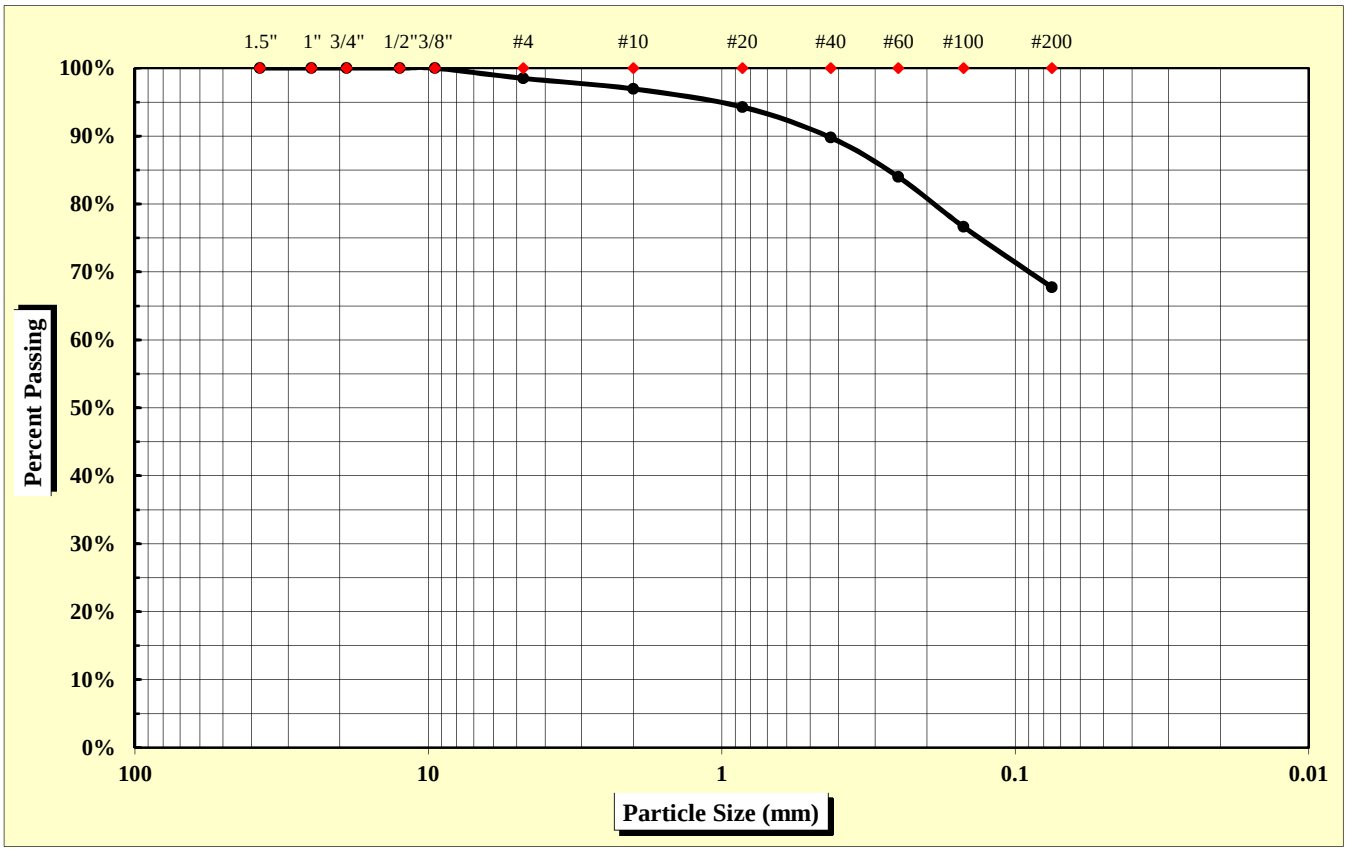
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-32	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	2.0 - 3.5'
Sample Description:	Red orange, fine, sandy LEAN CLAY (CL) [A-7-6 (12)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.1%	Fine Sand	22.0%
		Coarse Sand	7.2%	Silt & Clay	67.8%
Liquid Limit	45	Plastic Limit	26	Plastic Index	19
		Moisture Content	32.7%	Group Index	12

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

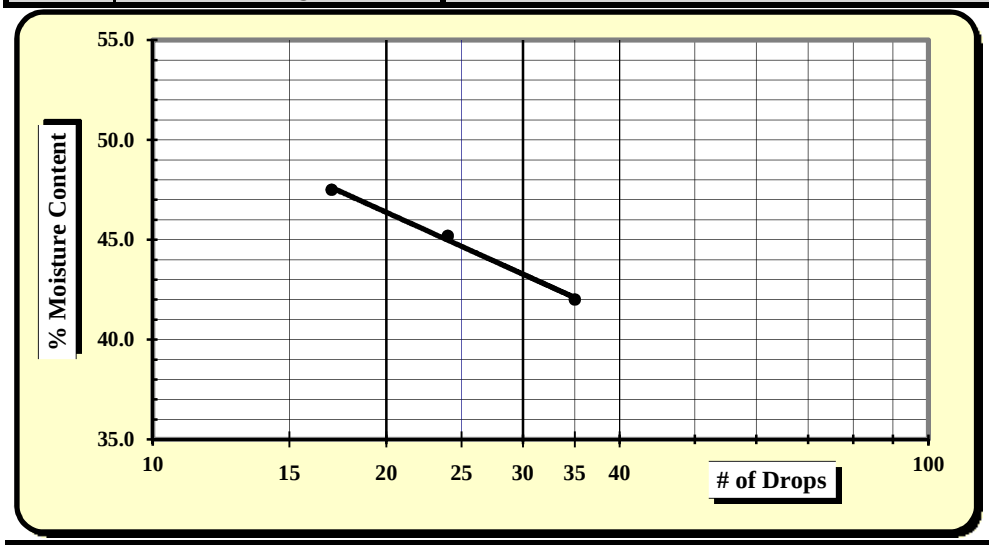
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-32	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	2.0 - 3.5'

Sample Description: Red orange, fine, sandy LEAN CLAY (CL) [A-7-6 (12)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	509	508	109				500		
A	Tare Weight	12.03	12.10	12.14				12.09		
B	Wet Soil Weight + A	25.38	23.56	22.36				21.14		
C	Dry Soil Weight + A	21.43	19.99	19.07				19.30		
D	Water Weight (B-C)	3.95	3.57	3.29				1.84		
E	Dry Soil Weight (C-A)	9.40	7.89	6.93				7.21		
F	% Moisture (D/E)*100	42.0%	45.2%	47.5%				25.5%		
N	# OF DROPS	35	24	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**26**
Plastic Index	**19**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

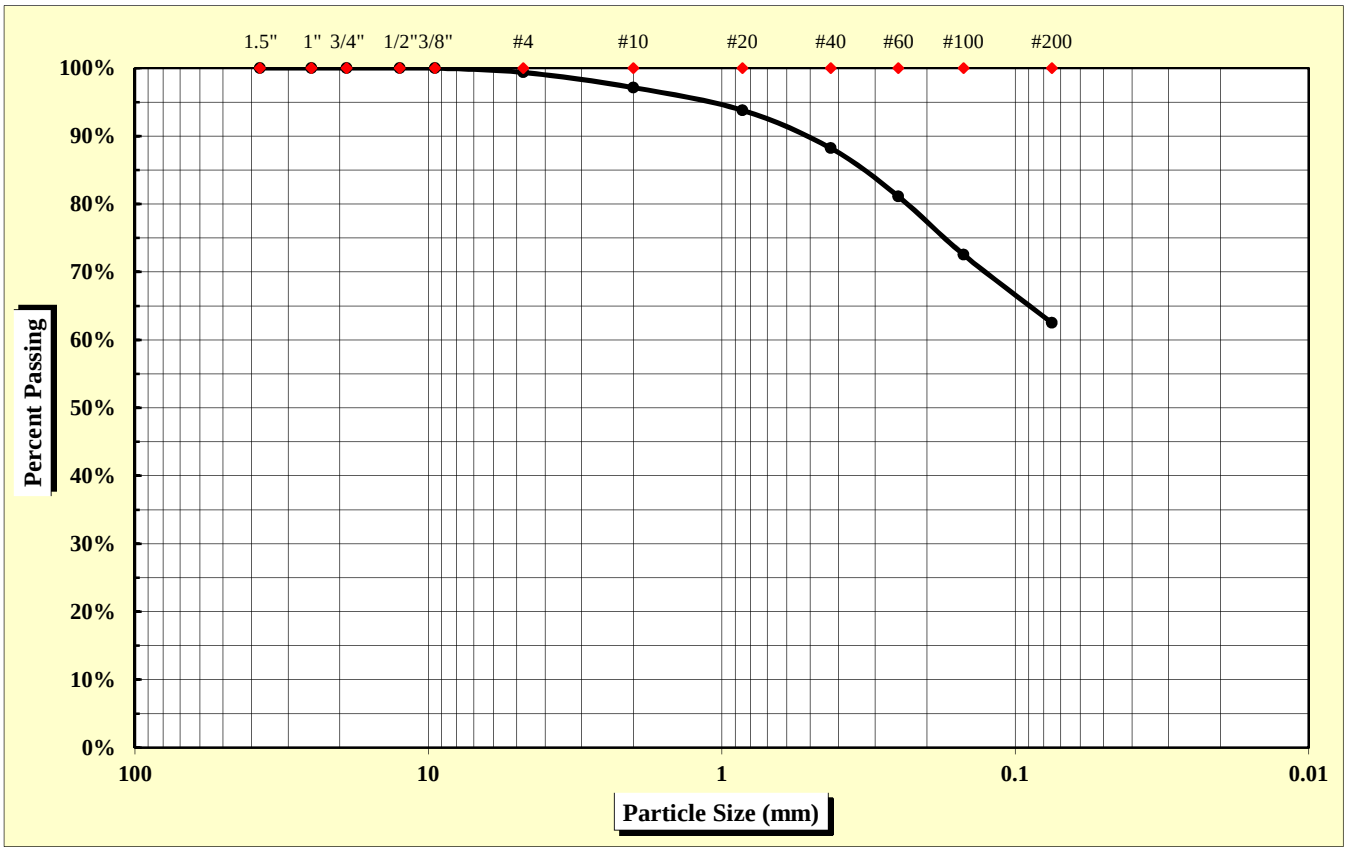
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-35	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red brown, fine, sandy LEAN CLAY (CL) [A-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.9%	Fine Sand	25.7%
		Coarse Sand	8.9%	Silt & Clay	62.5%
Liquid Limit	38	Plastic Limit	22	Plastic Index	16
		Moisture Content	25.4%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

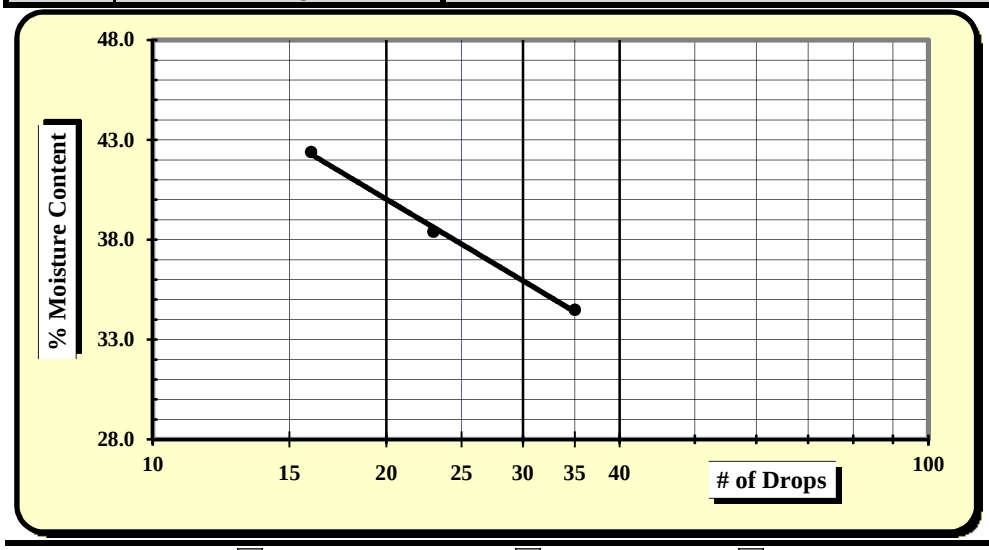
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-35	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red brown, fine, sandy LEAN CLAY (CL) [A-6 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	XX3	J02	106				502		
A	Tare Weight	12.00	12.01	12.03				12.16		
B	Wet Soil Weight + A	24.70	23.36	22.87				21.12		
C	Dry Soil Weight + A	21.44	20.21	19.64				19.51		
D	Water Weight (B-C)	3.26	3.15	3.23				1.61		
E	Dry Soil Weight (C-A)	9.44	8.20	7.61				7.35		
F	% Moisture (D/E)*100	34.5%	38.4%	42.4%				21.9%		
N	# OF DROPS	35	23	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**22**
Plastic Index	**16**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

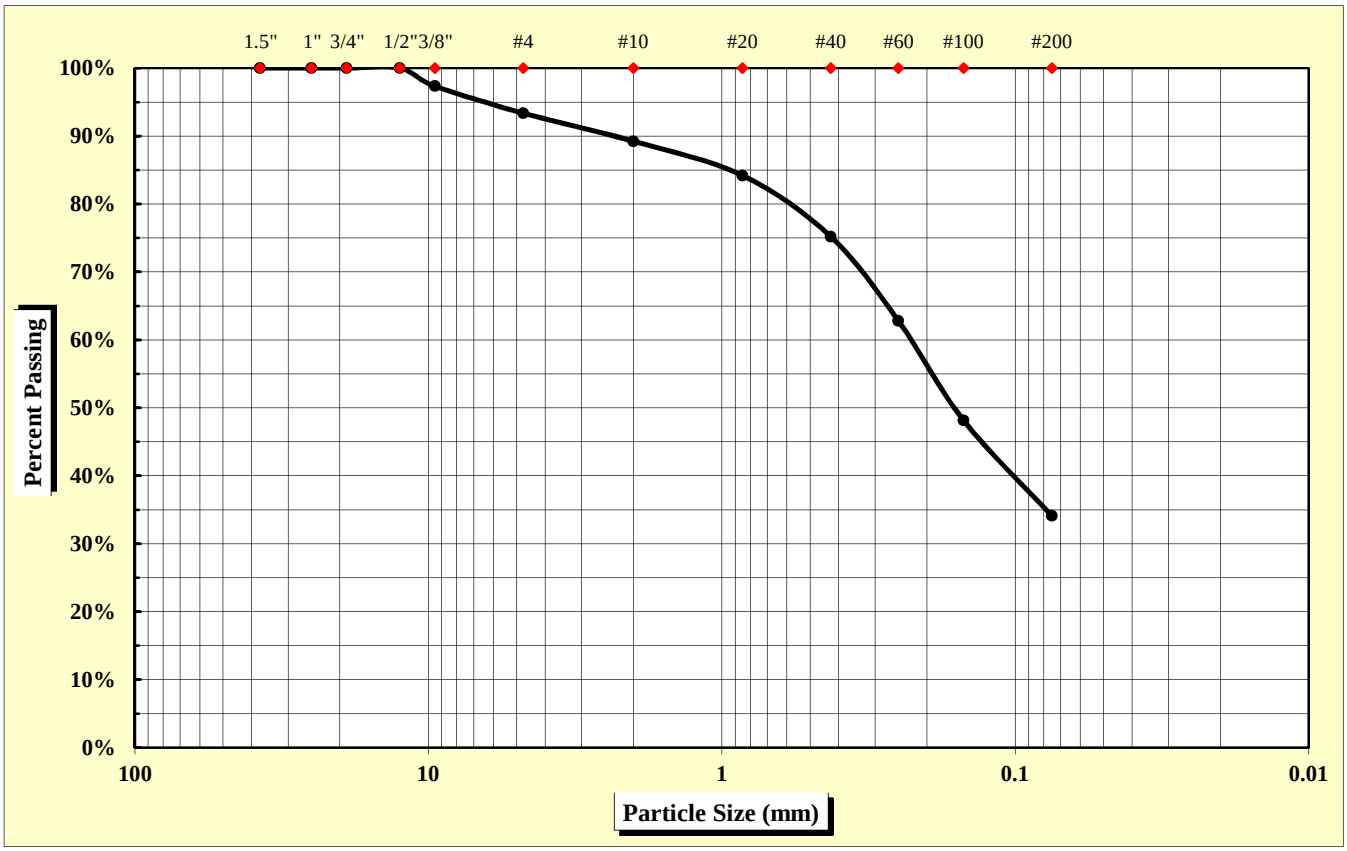
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-38	Sample #:	86	Sample Date:	4/29/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Brown, medium to fine, clayey SAND (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	10.8%	Fine Sand	41.1%
		Coarse Sand	14.0%	Silt & Clay	34.1%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	13.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

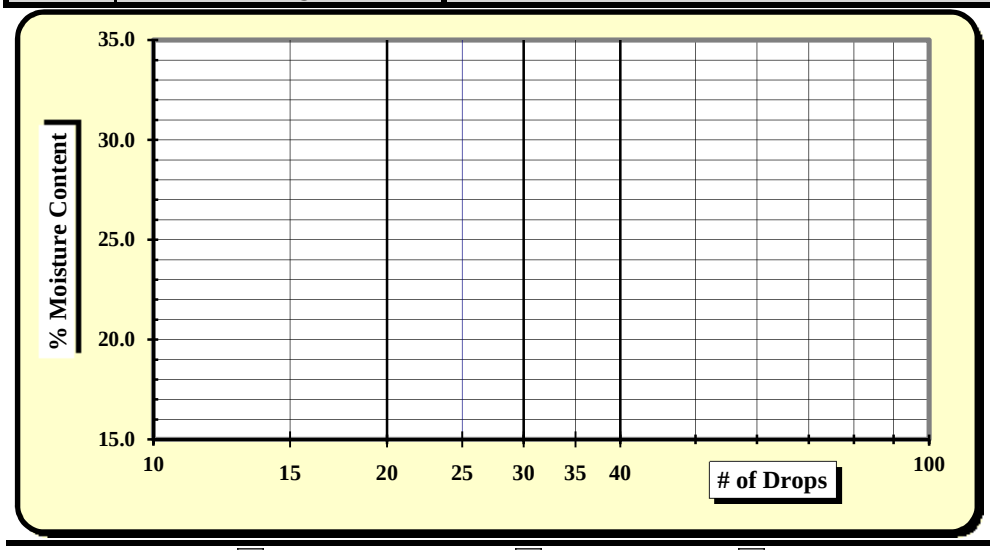
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-38	Sample #:	86	Sample Date:	4/29/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Brown, medium to fine, clayey SAND (SC) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SC / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	06/12/15	Brian Vaughan, P.E.	06/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

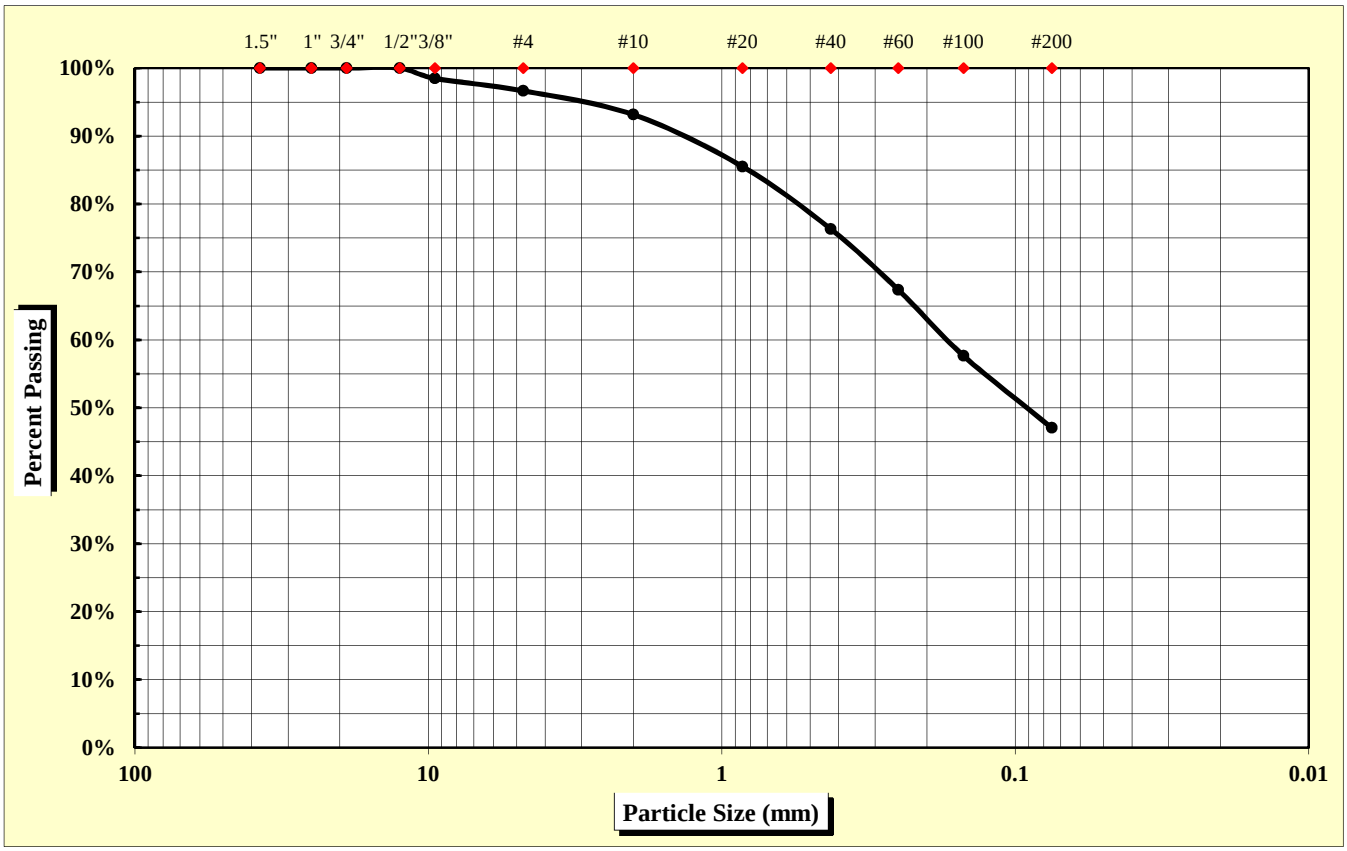
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-38	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red tan, medium to fine, silty SAND (SM) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	6.8%	Fine Sand	29.3%
		Coarse Sand	16.8%	Silt & Clay	47.1%
Liquid Limit	40	Plastic Limit	28	Plastic Index	12
		Moisture Content	19.0%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

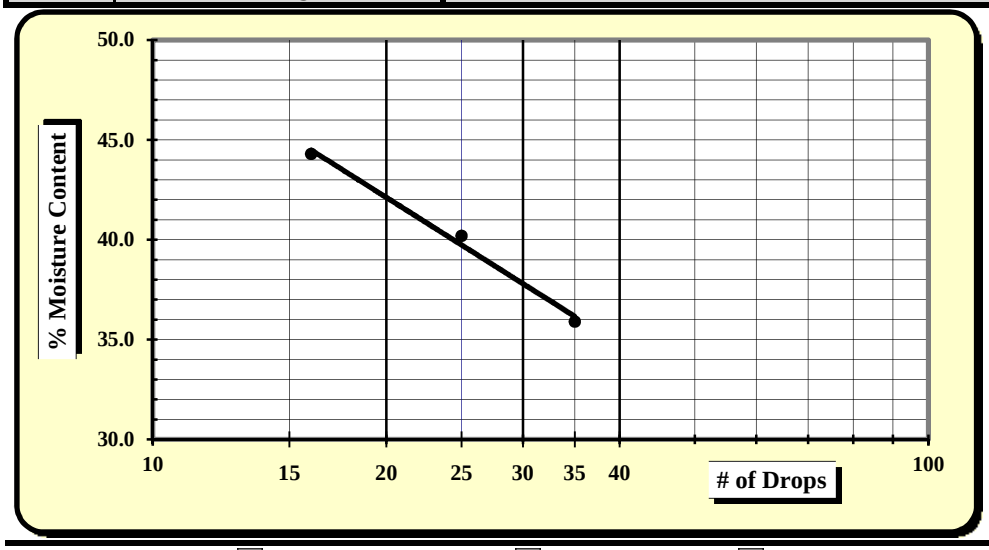
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-38	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red tan, medium to fine, silty SAND (SM) [A-6 (3)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	J5	996	508				XX4		
A	Tare Weight	12.10	12.37	12.10				12.10		
B	Wet Soil Weight + A	27.81	25.07	23.57				21.19		
C	Dry Soil Weight + A	23.66	21.43	20.05				19.23		
D	Water Weight (B-C)	4.15	3.64	3.52				1.96		
E	Dry Soil Weight (C-A)	11.56	9.06	7.95				7.13		
F	% Moisture (D/E)*100	35.9%	40.2%	44.3%				27.5%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**28**
Plastic Index	**12**
Group Symbol	**SM / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

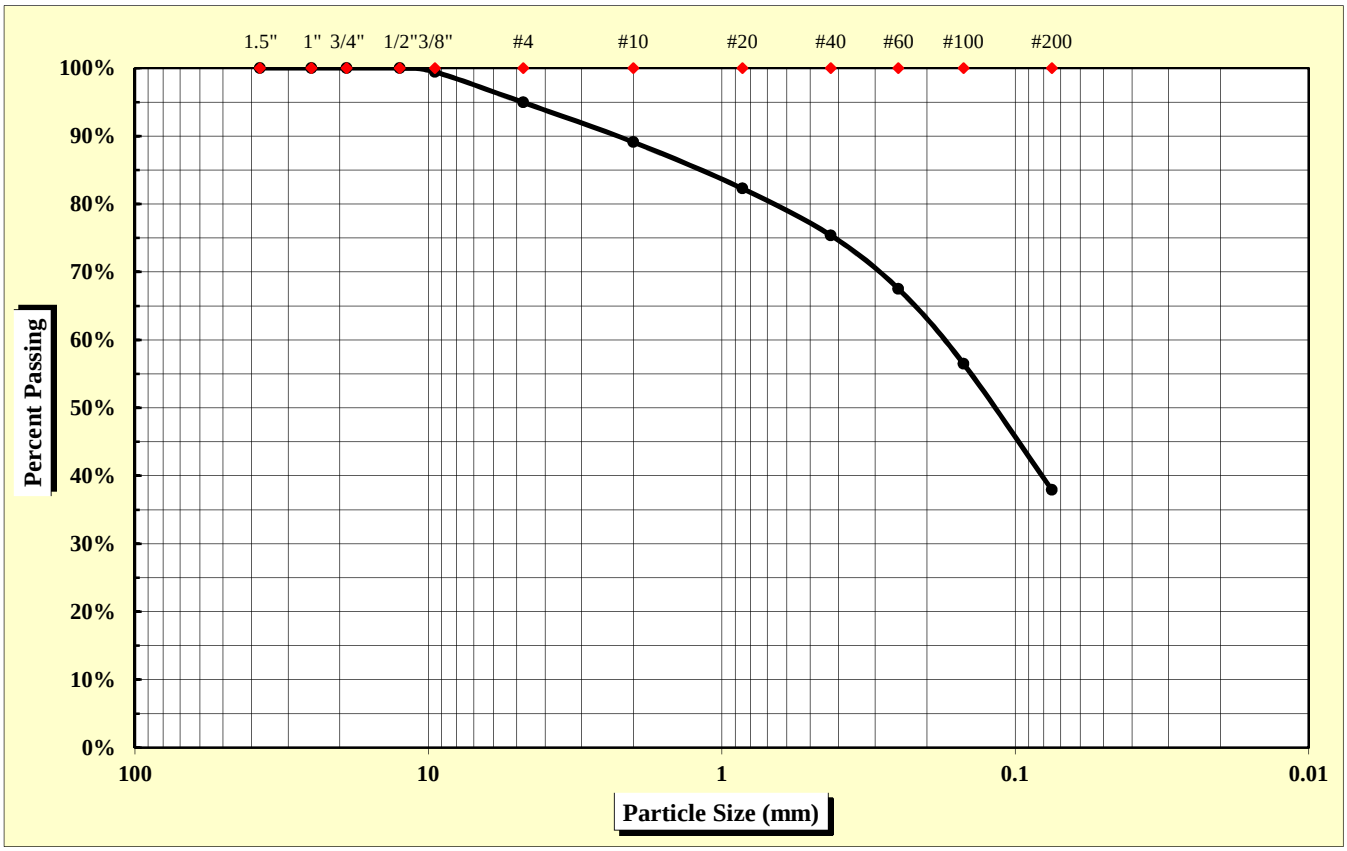
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-39	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Orange tan, medium to fine, clayey SAND (SC) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	10.9%	Fine Sand	37.5%
		Coarse Sand	13.7%	Silt & Clay	37.9%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	25.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

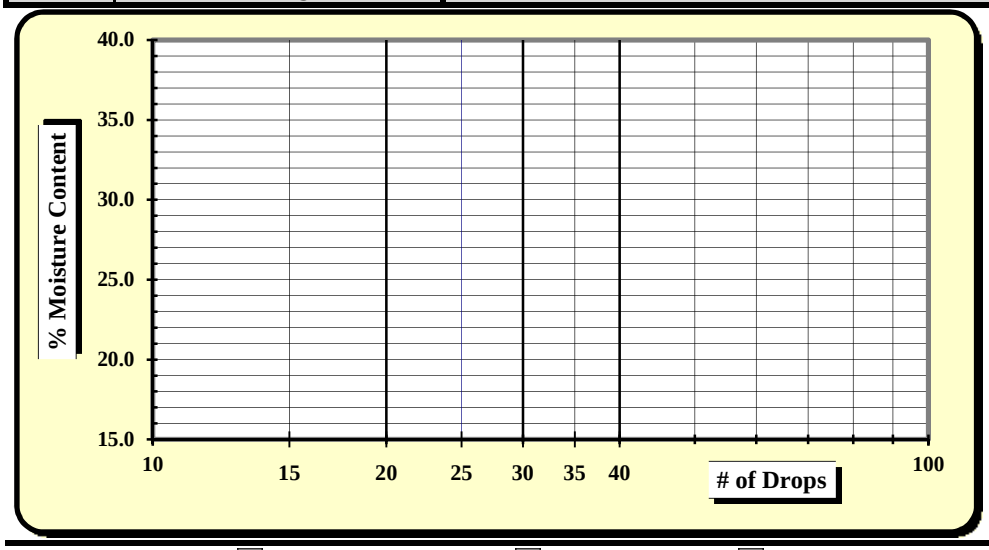
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-39	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Orange tan, medium to fine, clayey SAND (SC) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SC / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 37.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

Project #: **1426-14-161** Test Date(s): 5/28 - 6/9/15
Project Name: **I-85 Widening MM-80-96** Report Date: 6/12/15
Client Name: Infrastructure Consulting & Engineering
Client Address: 1021 Briargate Circle Columbia, South Carolina 29210

Boring #: NB-43 Sample #: 86 Sample Date: 4/21/15
Location: SS-3 Type: Split-spoon Depth: 3.0 - 5.0'
Sample Description: Brown, fine, sandy SILT (ML) [A-4 (6)] Group Index 6

	Tare Number	306		Moisture Content	
A	Tare Weight	134.18		Tare #	306
B	Total Sample Dry Wt. + Tare Wt.	494.08	A	Tare Weight	**134.18**
C	**Total Sample Dry Weight (B-A)**	359.90	B	Wet Weight + Tare Wt.	580.51
D	Total Sample Wt. After #200 Wash	110.35	C	Dry Weight + Tare Wt.	494.08
E	Percent Passing #200 (1-D/C)x100	69.3%	D	Water Wt. (B-C)	86.43
			E	Dry Wt.(C-A)	359.90
				Moisture Content (100 x D/E) (%)	**24.0%**

Sieve Size (mm)	Sieve Size	Retained Weight	Percent Retained	Percent Passing	Percent Passing Total Sample	% Retained Between Sieves	
37.50	1.5"	0.00	0.0%	100.0%	**100.0%**	0.0%	
25.00	1.0"	0.00	0.0%	100.0%	**100.0%**	0.0%	
19.00	3/4"	0.00	0.0%	100.0%	**100.0%**	0.0%	
12.50	1/2"	0.00	0.0%	100.0%	**100.0%**	0.0%	
9.50	3/8"	0.00	0.0%	100.0%	**100.0%**	0.0%	
4.75	#4	3.71	1.0%	99.0%	**99.0%**	1.0%	
2.000	#10	12.70	3.5%	96.5%	**96.5%**	2.5%	
0.850	#20	26.10	7.3%	92.7%	**92.7%**	3.7%	
0.425	#40	46.89	13.0%	87.0%	**87.0%**	5.8%	
0.250	#60	65.40	18.2%	81.8%	**81.8%**	5.1%	
0.150	#100	82.75	23.0%	77.0%	**77.0%**	4.8%	
0.075	#200	110.35	30.7%	69.3%	**69.3%**	7.7%	

Notes:	Maximum Particle Size	4.75 mm	Gravel	< 75 mm and > 2.00 mm	**3.5%**
			Coarse Sand	< 2.00 mm and > 0.425 mm	**9.5%**
Liquid Limit	37		Fine Sand	< 0.425 mm and > 0.075 mm	**17.6%**
Plastic Limit	28		% Silt and Clay	< 0.075 mm	**69.3%**
Plastic Index	9			% Passing #200 as a whole %	**69%**

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technician Name: Matthew Wolfe NICET Soils Level III #123218
Certification #

Technical Responsibility: Brian Vaughan, P.E. Brian Vaughan Location Coordinator
Signature *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

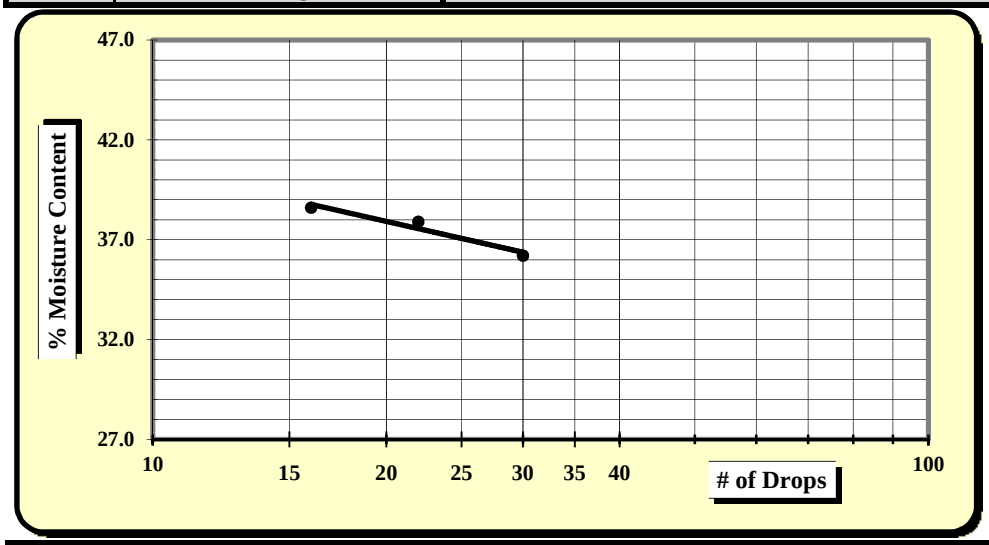
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-43	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown, fine, sandy SILT (ML) [A-4 (6)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	602	Liquid Limit						Plastic Limit		
	Tare #:	13	229	209				36		
A	Tare Weight	13.58	13.66	13.94				13.75		
B	Wet Soil Weight + A	26.29	24.86	25.80				23.07		
C	Dry Soil Weight + A	22.91	21.78	22.50				21.03		
D	Water Weight (B-C)	3.38	3.08	3.30				2.04		
E	Dry Soil Weight (C-A)	9.33	8.12	8.56				7.28		
F	% Moisture (D/E)*100	36.2%	37.9%	38.6%				28.0%		
N	# OF DROPS	30	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**28**
Plastic Index	**9**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 69.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/9/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

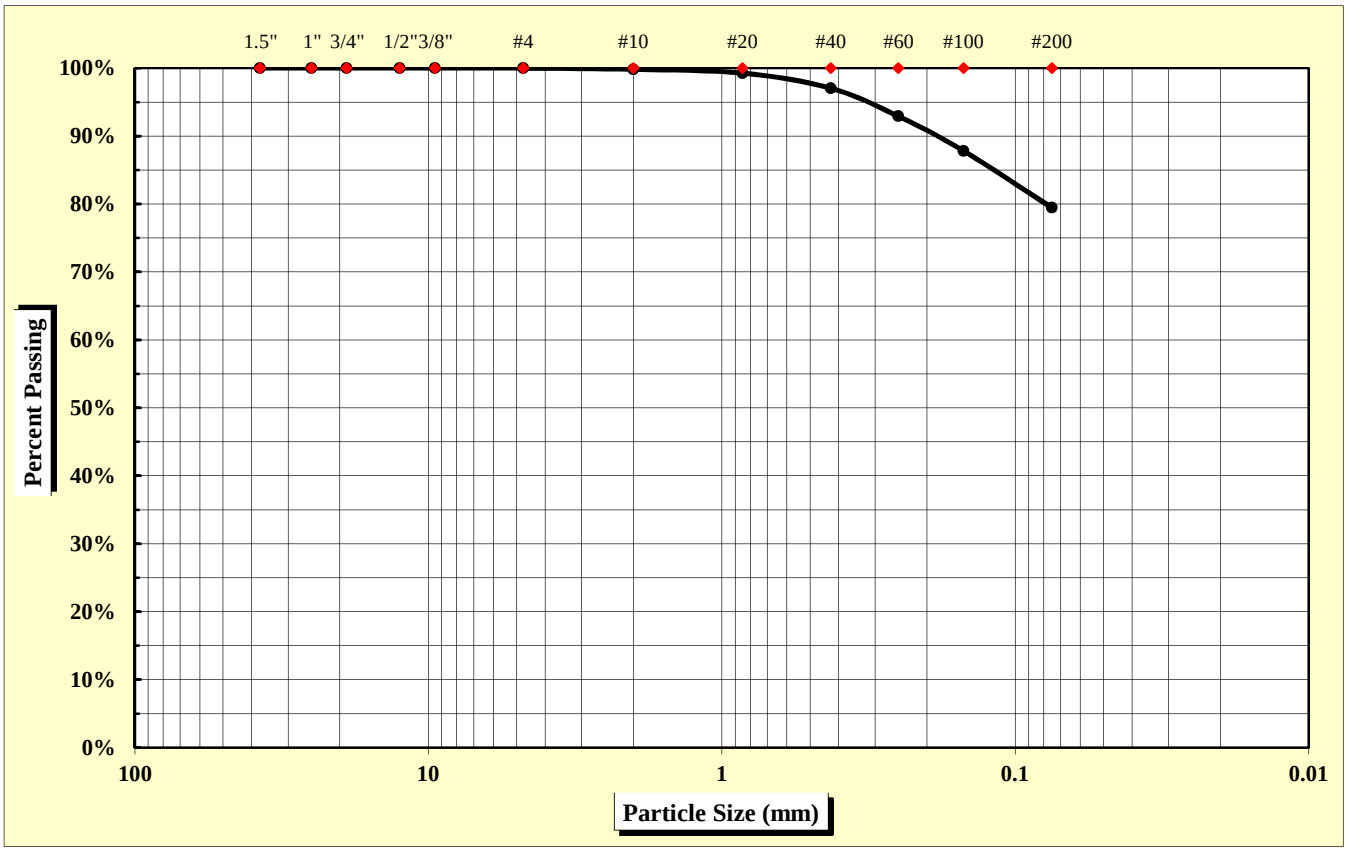
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-46	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Tan, fine, LEAN CLAY with sand (CL) [A-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	17.6%
		Coarse Sand	2.8%	Silt & Clay	79.5%
Liquid Limit	34	Plastic Limit	23	Plastic Index	11
		Moisture Content	23.5%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

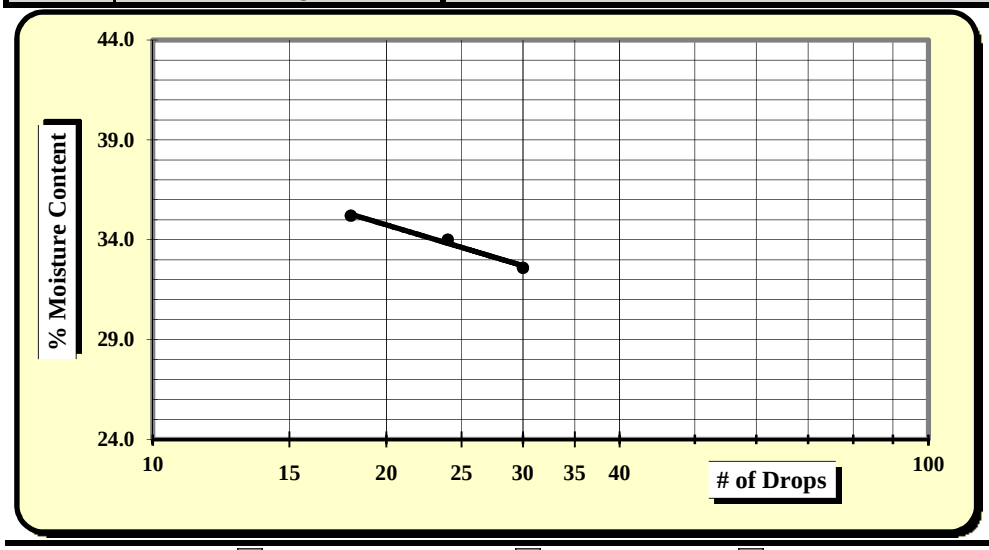
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-46	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Tan, fine, LEAN CLAY with sand (CL) [A-6 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	604	Liquid Limit						Plastic Limit		
	Tare #:	35	9	40				31		
A	Tare Weight	13.64	13.70	13.82				13.71		
B	Wet Soil Weight + A	25.18	24.58	24.34				22.93		
C	Dry Soil Weight + A	22.34	21.82	21.60				21.20		
D	Water Weight (B-C)	2.84	2.76	2.74				1.73		
E	Dry Soil Weight (C-A)	8.70	8.12	7.78				7.49		
F	% Moisture (D/E)*100	32.6%	34.0%	35.2%				23.1%		
N	# OF DROPS	30	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**23**
Plastic Index	**11**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 79.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/9/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

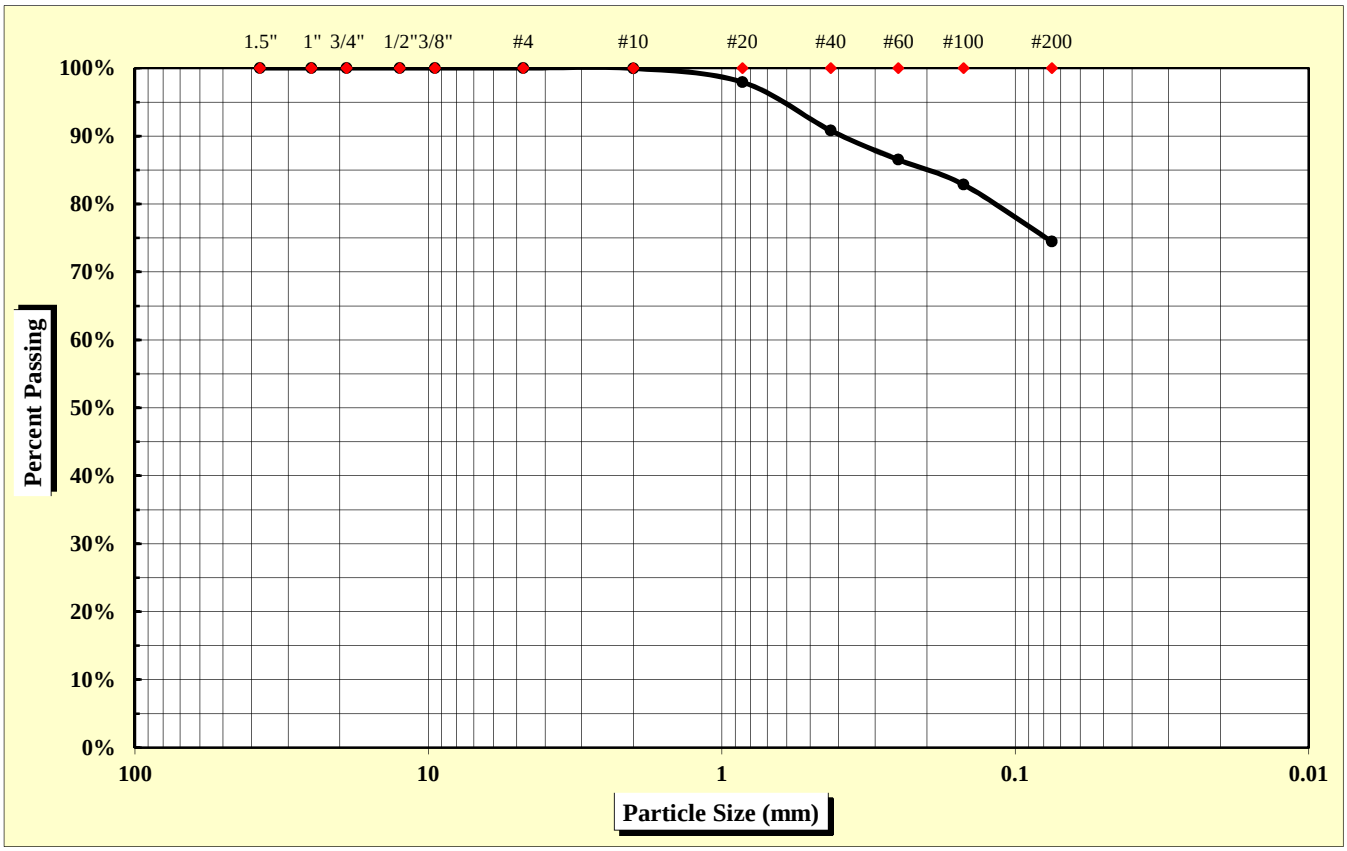
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-48	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.0%	Fine Sand	16.4%
		Coarse Sand	9.2%	Silt & Clay	74.5%
Liquid Limit	50	Plastic Limit	38	Plastic Index	12
		Moisture Content	25.7%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

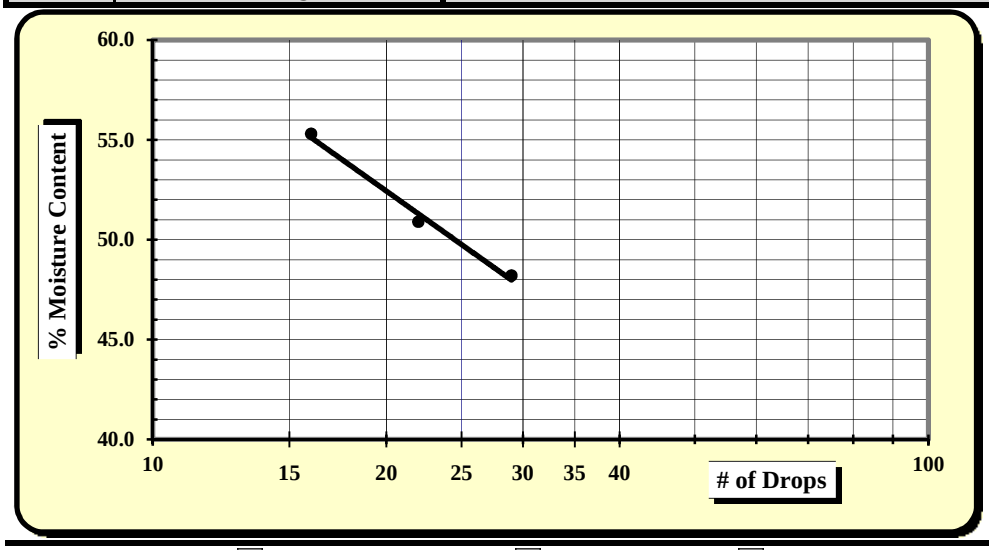
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-48	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (11)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	608	Liquid Limit						Plastic Limit		
	Tare #:	231	223	43				123		
A	Tare Weight	13.78	13.68	13.70				13.71		
B	Wet Soil Weight + A	22.67	23.05	23.92				22.63		
C	Dry Soil Weight + A	19.78	19.89	20.28				20.19		
D	Water Weight (B-C)	2.89	3.16	3.64				2.44		
E	Dry Soil Weight (C-A)	6.00	6.21	6.58				6.48		
F	% Moisture (D/E)*100	48.2%	50.9%	55.3%				37.7%		
N	# OF DROPS	29	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**50**
Plastic Limit	**38**
Plastic Index	**12**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 74.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/9/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

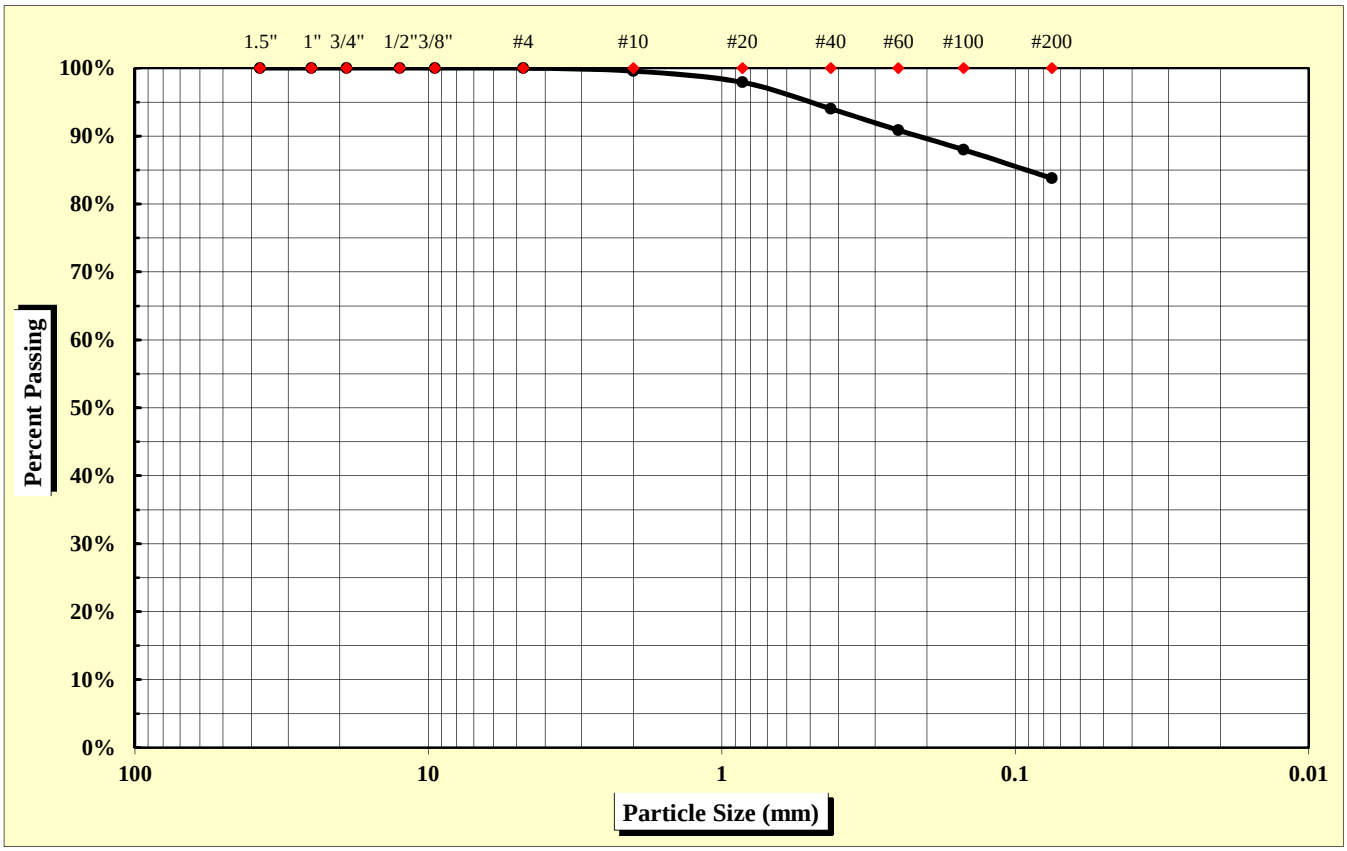
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-53	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red, fine, FAT CLAY with sand (CH) [A-7-5 (27)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.4%	Fine Sand	10.2%
		Coarse Sand	5.5%	Silt & Clay	83.8%
Liquid Limit	58	Plastic Limit	30	Plastic Index	28
		Moisture Content	27.7%	Group Index	27

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

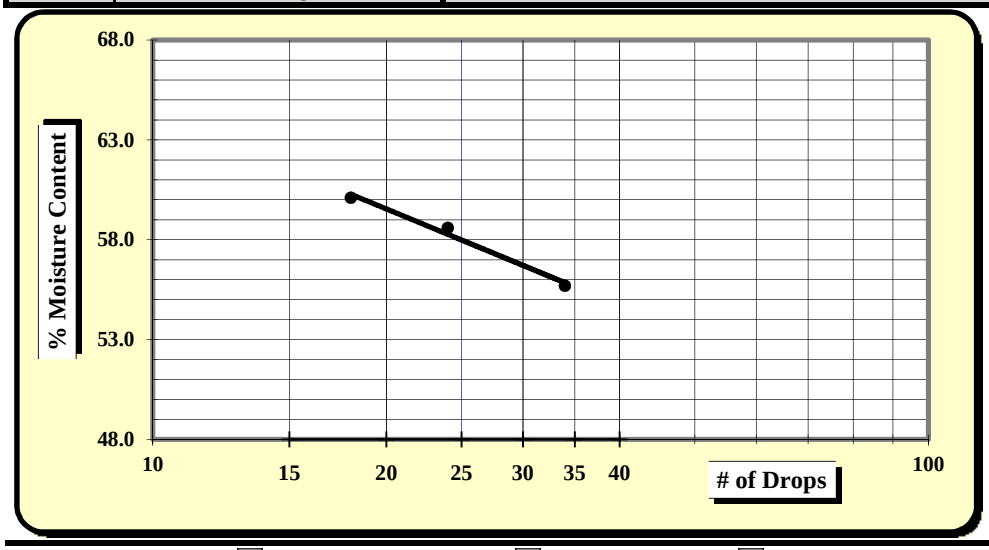
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-53	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red, fine, FAT CLAY with sand (CH) [A-7-5 (27)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	609	Liquid Limit						Plastic Limit		
	Tare #:	47	243	201				217		
A	Tare Weight	13.65	13.80	13.73				13.88		
B	Wet Soil Weight + A	24.24	24.44	23.16				22.15		
C	Dry Soil Weight + A	20.45	20.51	19.62				20.25		
D	Water Weight (B-C)	3.79	3.93	3.54				1.90		
E	Dry Soil Weight (C-A)	6.80	6.71	5.89				6.37		
F	% Moisture (D/E)*100	55.7%	58.6%	60.1%				29.8%		
N	# OF DROPS	34	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**30**
Plastic Index	**28**
Group Symbol	**CH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 83.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/9/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

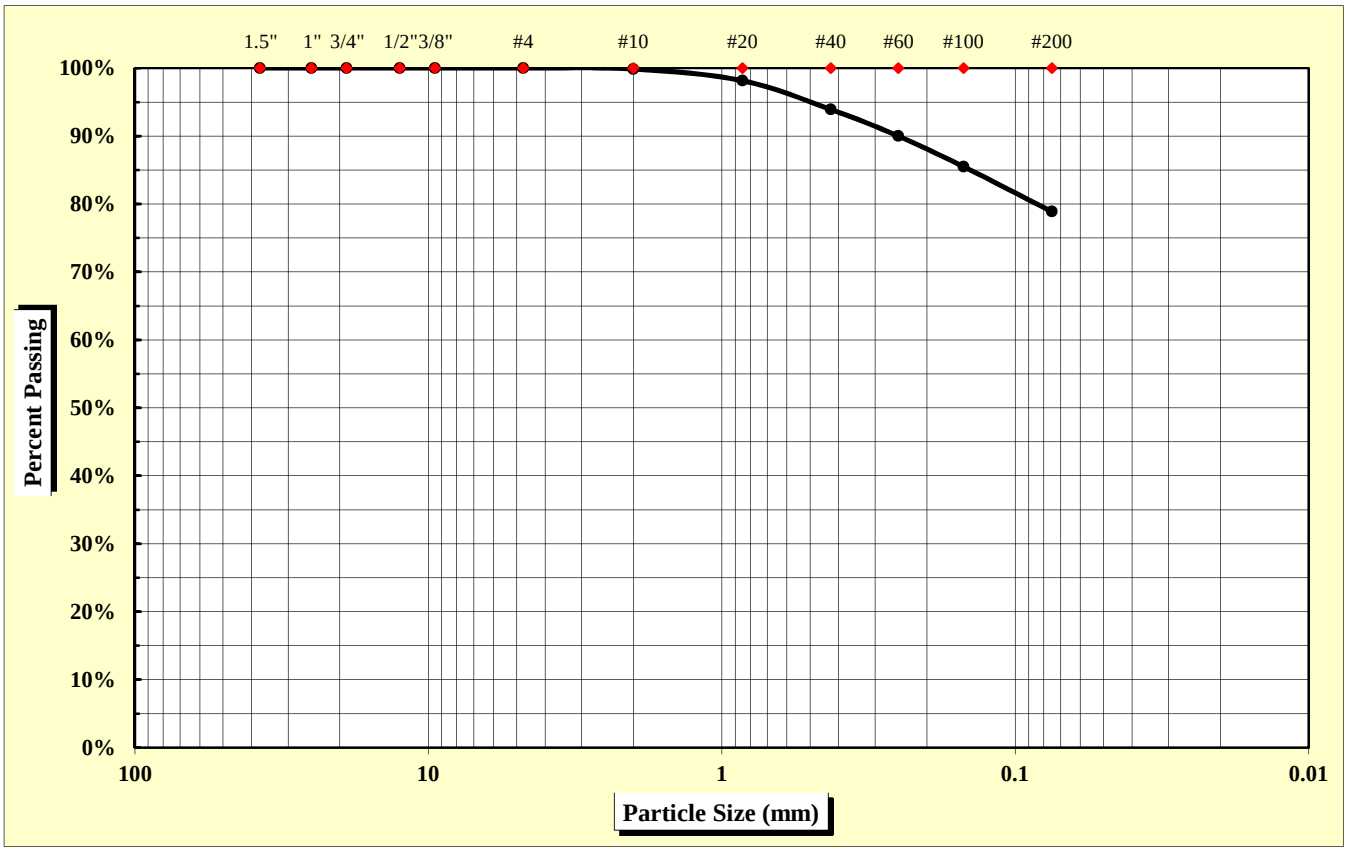
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-53	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red, fine, ELASTIC SILT with sand (MH) [A-7-5 (17)], trace mica				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	15.0%
		Coarse Sand	5.9%	Silt & Clay	78.9%
Liquid Limit	52	Plastic Limit	34	Plastic Index	18
		Moisture Content	26.8%	Group Index	17

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

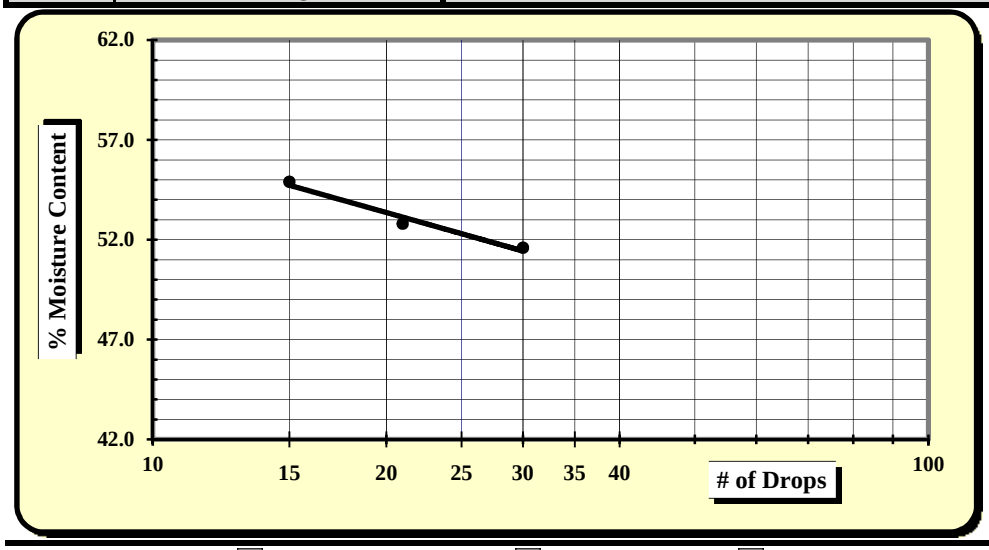
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-53	Sample #:	86	Sample Date:	4/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red, fine, ELASTIC SILT with sand (MH) [A-7-5 (17)], trace mica

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28435	6/9/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	601	Liquid Limit						Plastic Limit		
	Tare #:	242	36	226				13		
A	Tare Weight	13.79	13.76	13.76				13.59		
B	Wet Soil Weight + A	23.54	24.38	23.58				22.01		
C	Dry Soil Weight + A	20.22	20.71	20.10				19.87		
D	Water Weight (B-C)	3.32	3.67	3.48				2.14		
E	Dry Soil Weight (C-A)	6.43	6.95	6.34				6.28		
F	% Moisture (D/E)*100	51.6%	52.8%	54.9%				34.1%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**34**
Plastic Index	**18**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 78.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

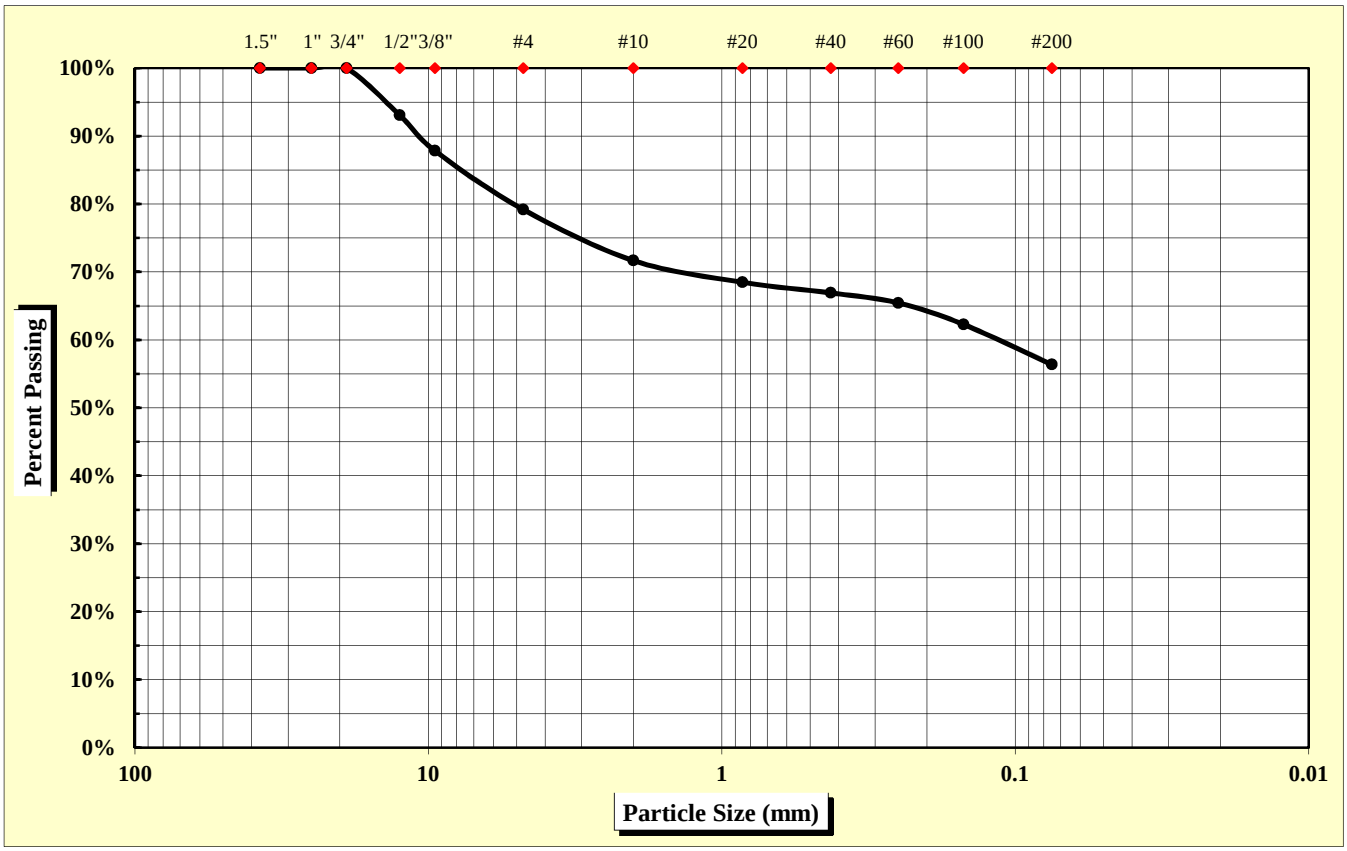
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-54	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Gray, fine, sandy SILT with gravel (ML) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	28.3%	Fine Sand	10.5%
		Coarse Sand	4.8%	Silt & Clay	56.4%
Liquid Limit	19	Plastic Limit	18	Plastic Index	1
		Moisture Content	6.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

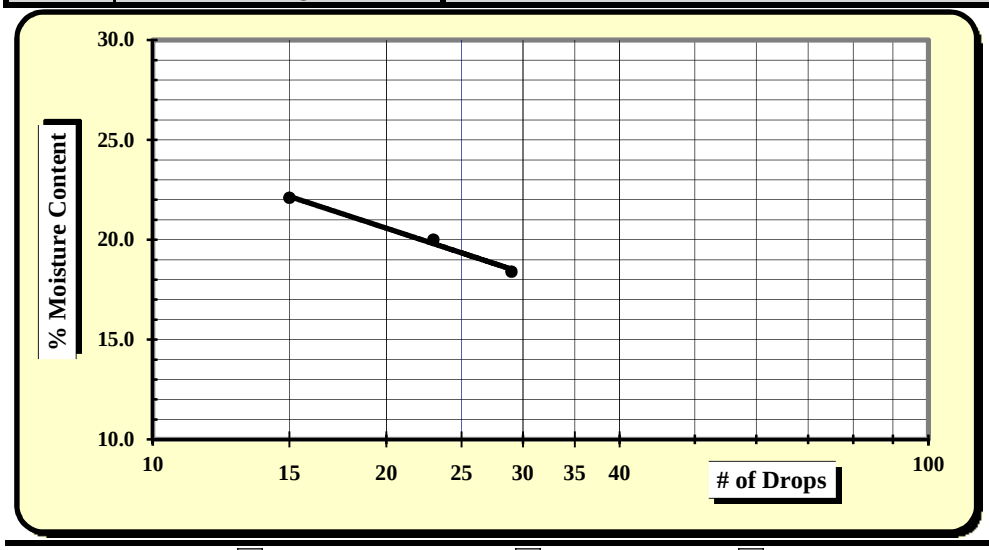
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-54	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Gray, fine, sandy SILT with gravel (ML) [A-4 (0)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28435	6/9/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	610	Liquid Limit						Plastic Limit		
	Tare #:	31	220	200				106		
A	Tare Weight	13.72	13.69	13.78				13.47		
B	Wet Soil Weight + A	26.67	24.44	26.36				22.36		
C	Dry Soil Weight + A	24.66	22.65	24.08				21.02		
D	Water Weight (B-C)	2.01	1.79	2.28				1.34		
E	Dry Soil Weight (C-A)	10.94	8.96	10.30				7.55		
F	% Moisture (D/E)*100	18.4%	20.0%	22.1%				17.7%		
N	# OF DROPS	29	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**19**
Plastic Limit	**18**
Plastic Index	**1**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

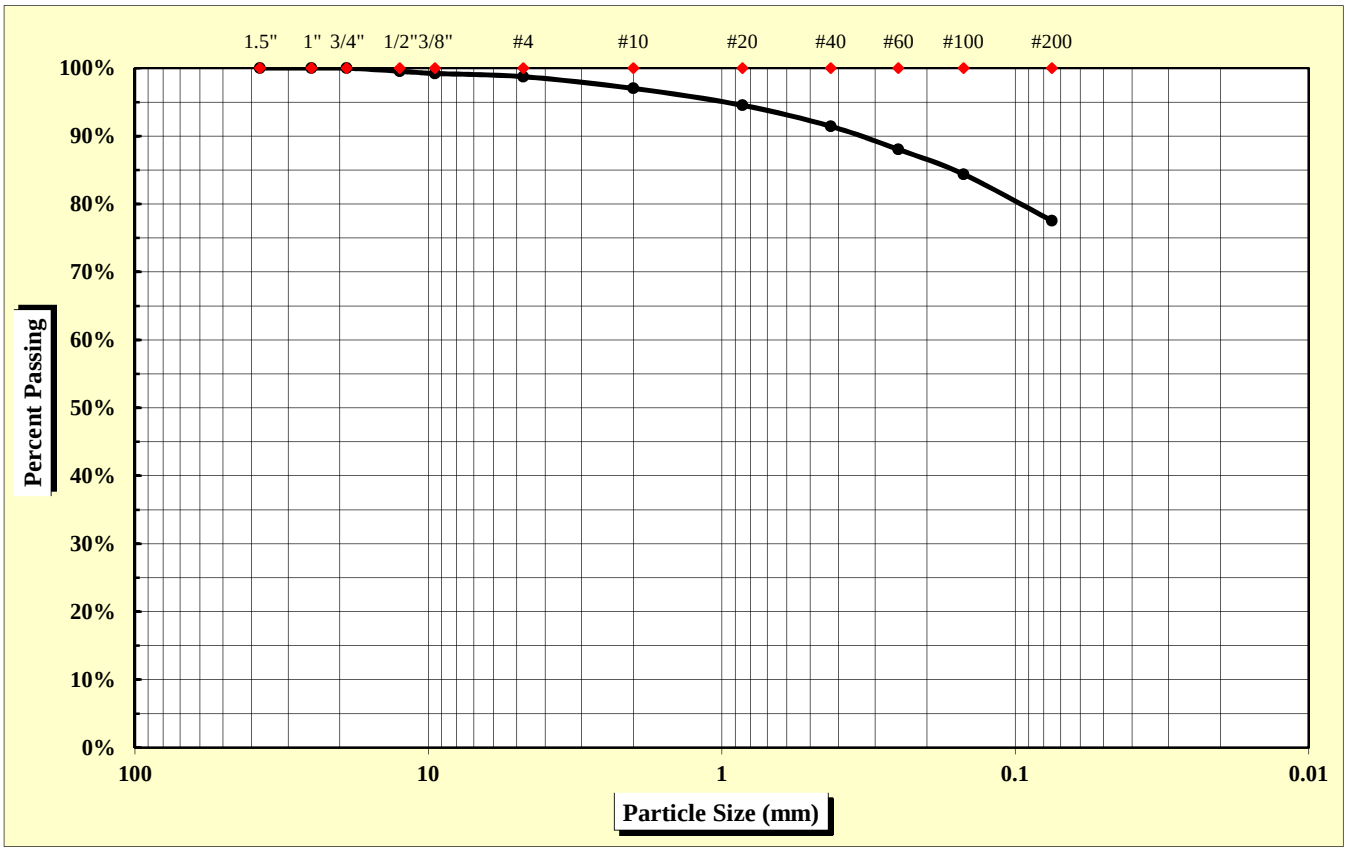
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-57	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.2 - 5.2'
Sample Description:	Tan, fine, SILT with sand (ML) [A-4 (4)], trace mica				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	3.0%	Fine Sand	13.9%
		Coarse Sand	5.6%	Silt & Clay	77.5%
Liquid Limit	31	Plastic Limit	26	Plastic Index	5
		Moisture Content	22.7%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

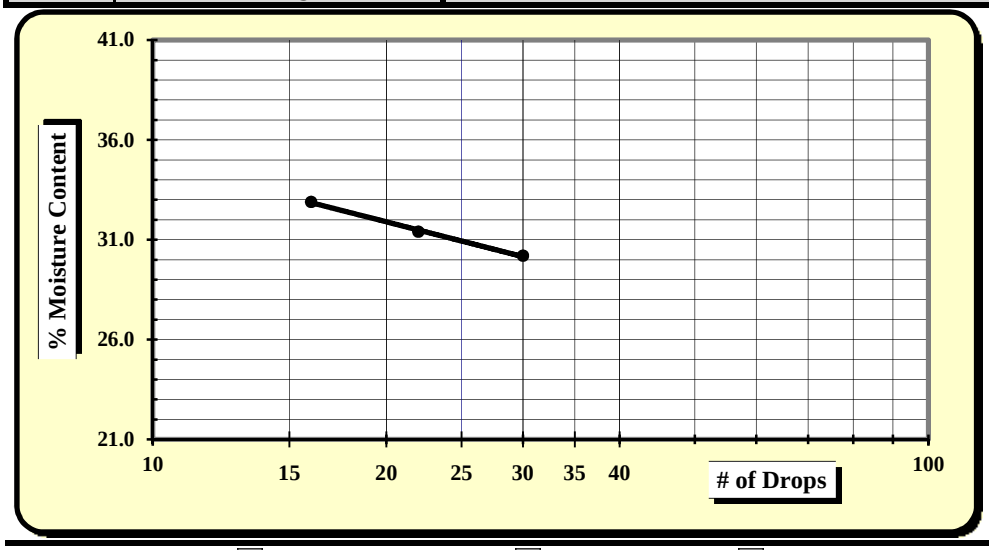
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-57	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.2 - 5.2'
Sample Description:	Tan, fine, micaceous, SILT with sand (ML) [A-4 (4)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28435	6/9/2015
LL Apparatus	25789				
Oven	25722				

Pan #	607	Liquid Limit						Plastic Limit		
	Tare #:	15	23	19				225		
A	Tare Weight	13.60	13.62	13.56				13.79		
B	Wet Soil Weight + A	30.25	24.70	26.49				21.98		
C	Dry Soil Weight + A	26.39	22.05	23.29				20.31		
D	Water Weight (B-C)	3.86	2.65	3.20				1.67		
E	Dry Soil Weight (C-A)	12.79	8.43	9.73				6.52		
F	% Moisture (D/E)*100	30.2%	31.4%	32.9%				25.6%		
N	# OF DROPS	30	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**31**
Plastic Limit	**26**
Plastic Index	**5**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 77.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

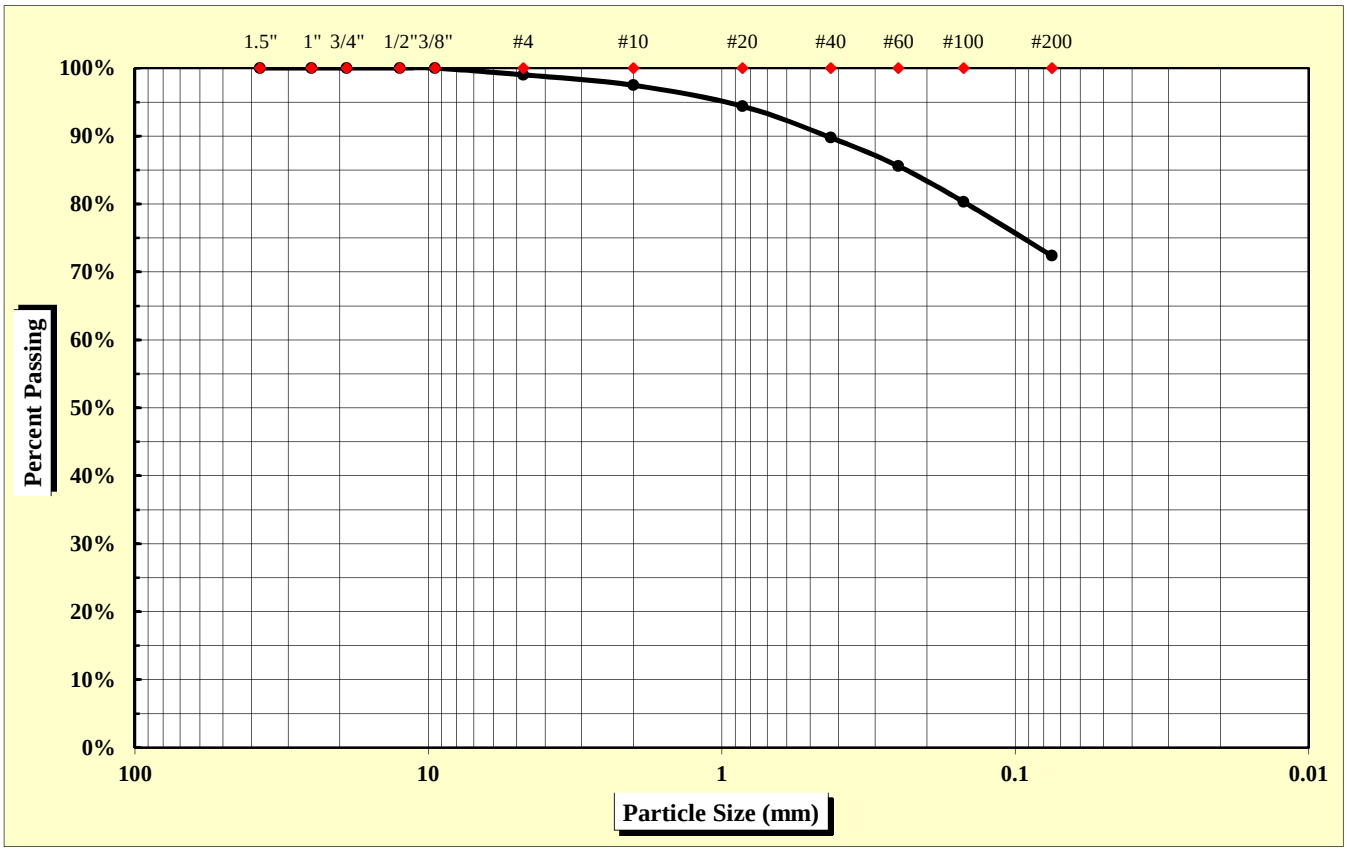
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-59	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	2.0 - 4.0'
Sample Description:	Red brown, fine, SILT with sand (ML) [A-7-5 (10)], trace mica				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.5%	Fine Sand	17.4%
		Coarse Sand	7.7%	Silt & Clay	72.4%
Liquid Limit	46	Plastic Limit	33	Plastic Index	13
		Moisture Content	20.3%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

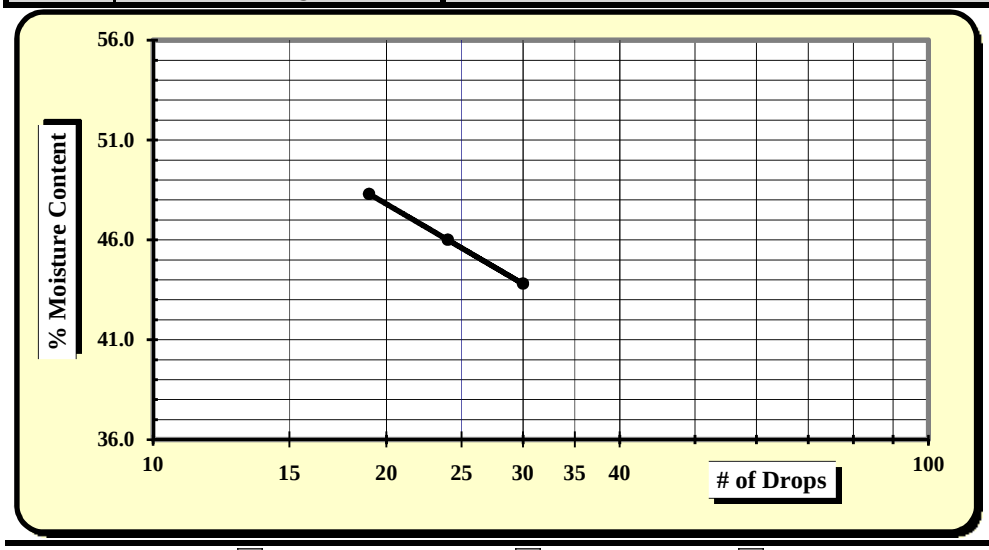
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-59	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	2.0 - 4.0'
Sample Description:	Red brown, fine, SILT with sand (ML) [A-7-5 (10)], trace mica				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28406	2/18/2015
LL Apparatus	25789				
Oven	25722				

Pan #	600	Liquid Limit						Plastic Limit		
	Tare #:	26	6	10				111		
A	Tare Weight	13.69	13.59	13.81				13.43		
B	Wet Soil Weight + A	27.35	23.87	24.04				22.49		
C	Dry Soil Weight + A	23.19	20.63	20.71				20.23		
D	Water Weight (B-C)	4.16	3.24	3.33				2.26		
E	Dry Soil Weight (C-A)	9.50	7.04	6.90				6.80		
F	% Moisture (D/E)*100	43.8%	46.0%	48.3%				33.2%		
N	# OF DROPS	30	24	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**33**
Plastic Index	**13**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 72.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

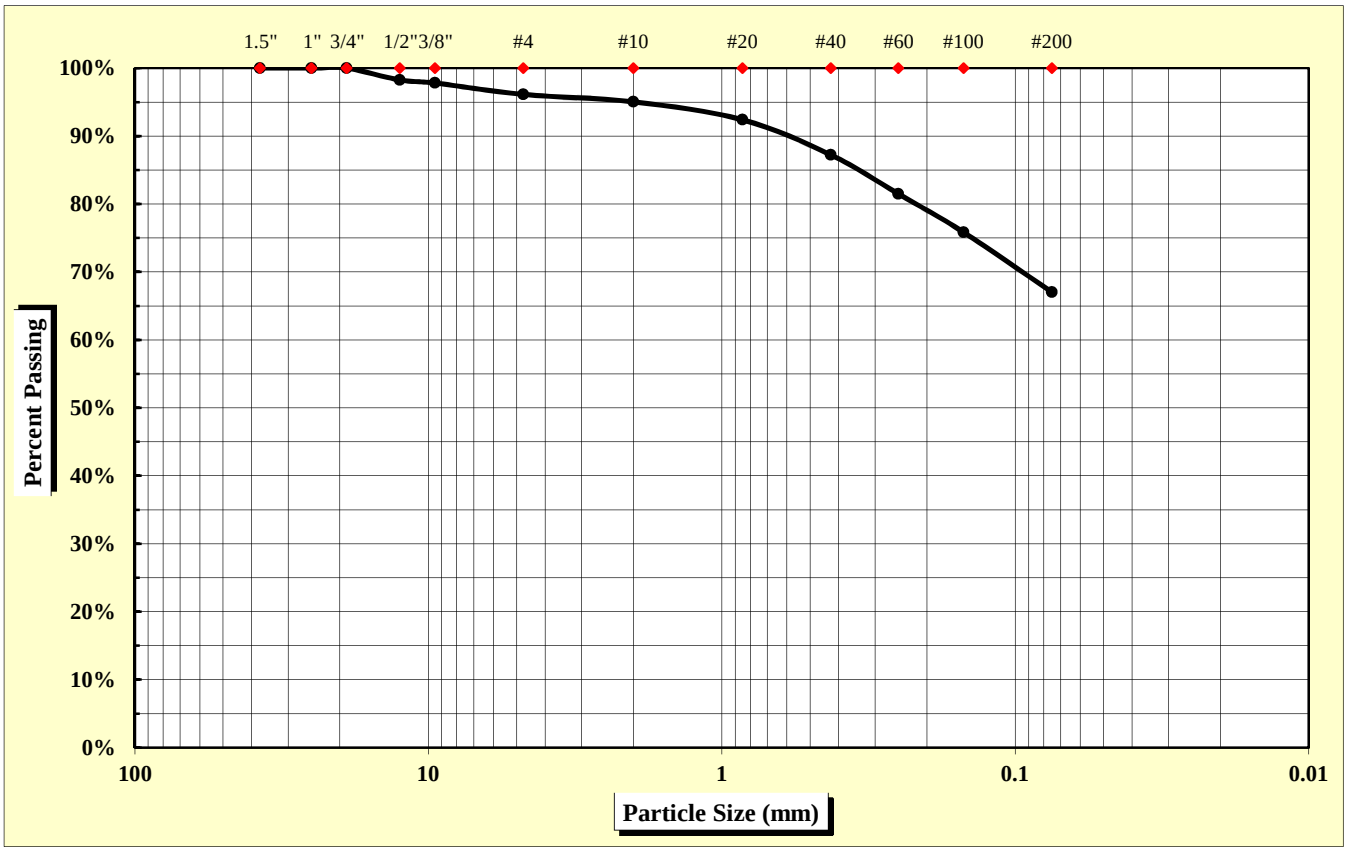
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-59	Sample #:	86	Sample Date:	4/21/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'
Sample Description:	Yellow brown, fine, sandy SILT (ML) [A-4 (0)], trace mica				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	5.0%	Fine Sand	20.2%
		Coarse Sand	7.8%	Silt & Clay	67.0%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	22.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

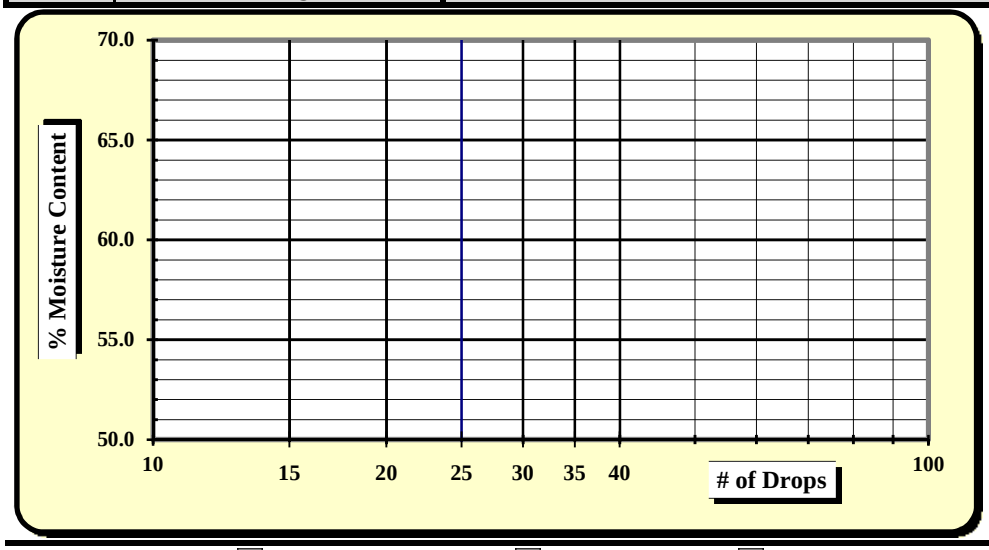
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-59	Sample #:	86	Sample Date:	4/21/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'

Sample Description: Yellow brown, fine, sandy SILT (ML) [A-4 (0)], trace mica

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28435	6/9/2015
LL Apparatus	25789				
Oven	25722				

Pan #	484	Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**ML / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

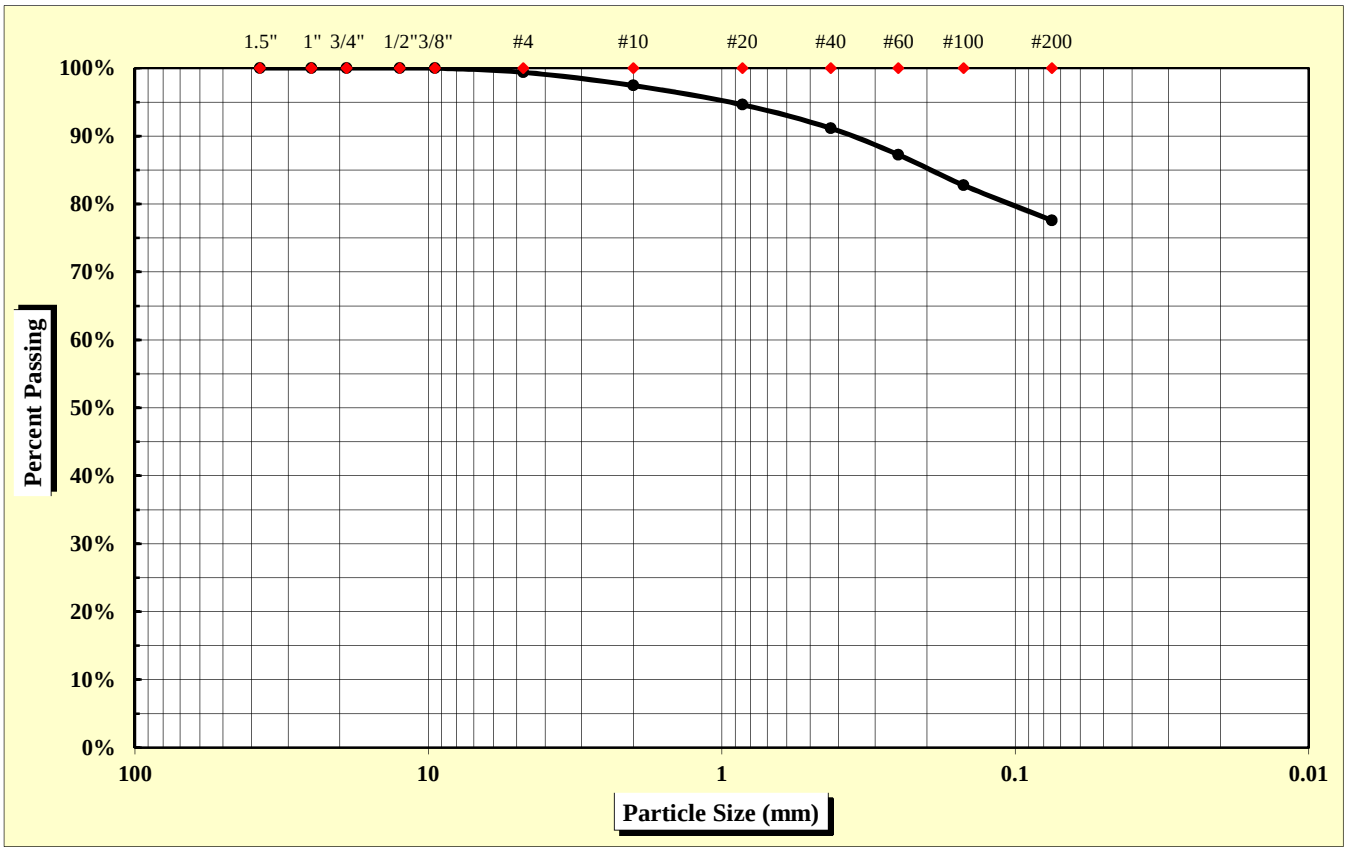
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/28 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-64	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, fine, LEAN CLAY with sand (CL) [A-7-6 (16)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.6%	Fine Sand	13.6%
		Coarse Sand	6.3%	Silt & Clay	77.6%
Liquid Limit	45	Plastic Limit	25	Plastic Index	20
		Moisture Content	22.1%	Group Index	16

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

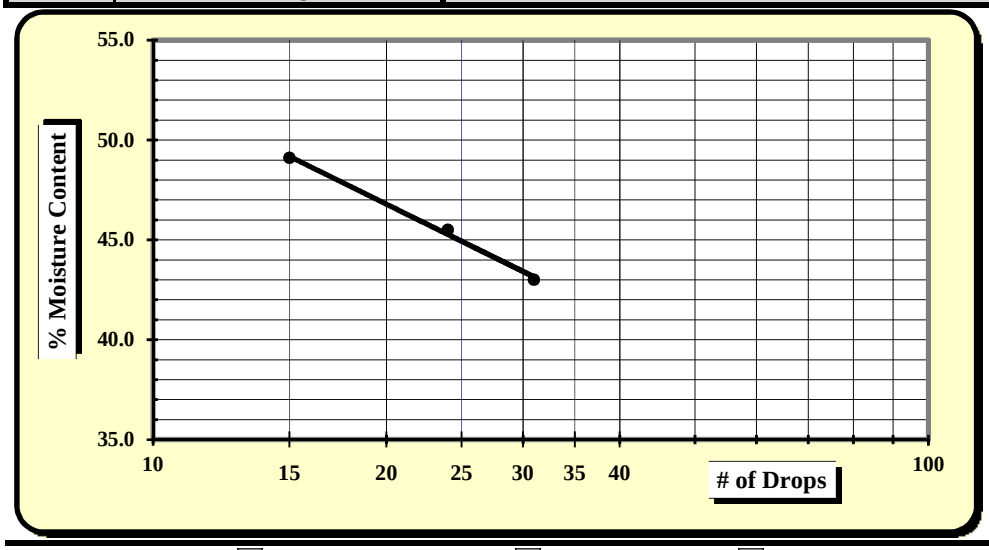
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	NB-64	Sample #:	86	Sample Date:	4/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, fine, LEAN CLAY with sand (CL) [A-7-6 (16)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/15/2014	Grooving tool	28435	6/9/2015
LL Apparatus	25789	7/14/2014			
Oven	25722	3/20/2015			

Pan #	zz	Liquid Limit						Plastic Limit		
	Tare #:	215	219	146				201		
A	Tare Weight	14.00	13.76	13.60				13.74		
B	Wet Soil Weight + A	26.90	26.20	23.04				22.91		
C	Dry Soil Weight + A	23.02	22.31	19.93				21.05		
D	Water Weight (B-C)	3.88	3.89	3.11				1.86		
E	Dry Soil Weight (C-A)	9.02	8.55	6.33				7.31		
F	% Moisture (D/E)*100	43.0%	45.5%	49.1%				25.4%		
N	# OF DROPS	31	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**25**
Plastic Index	**20**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 77.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	6/10/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

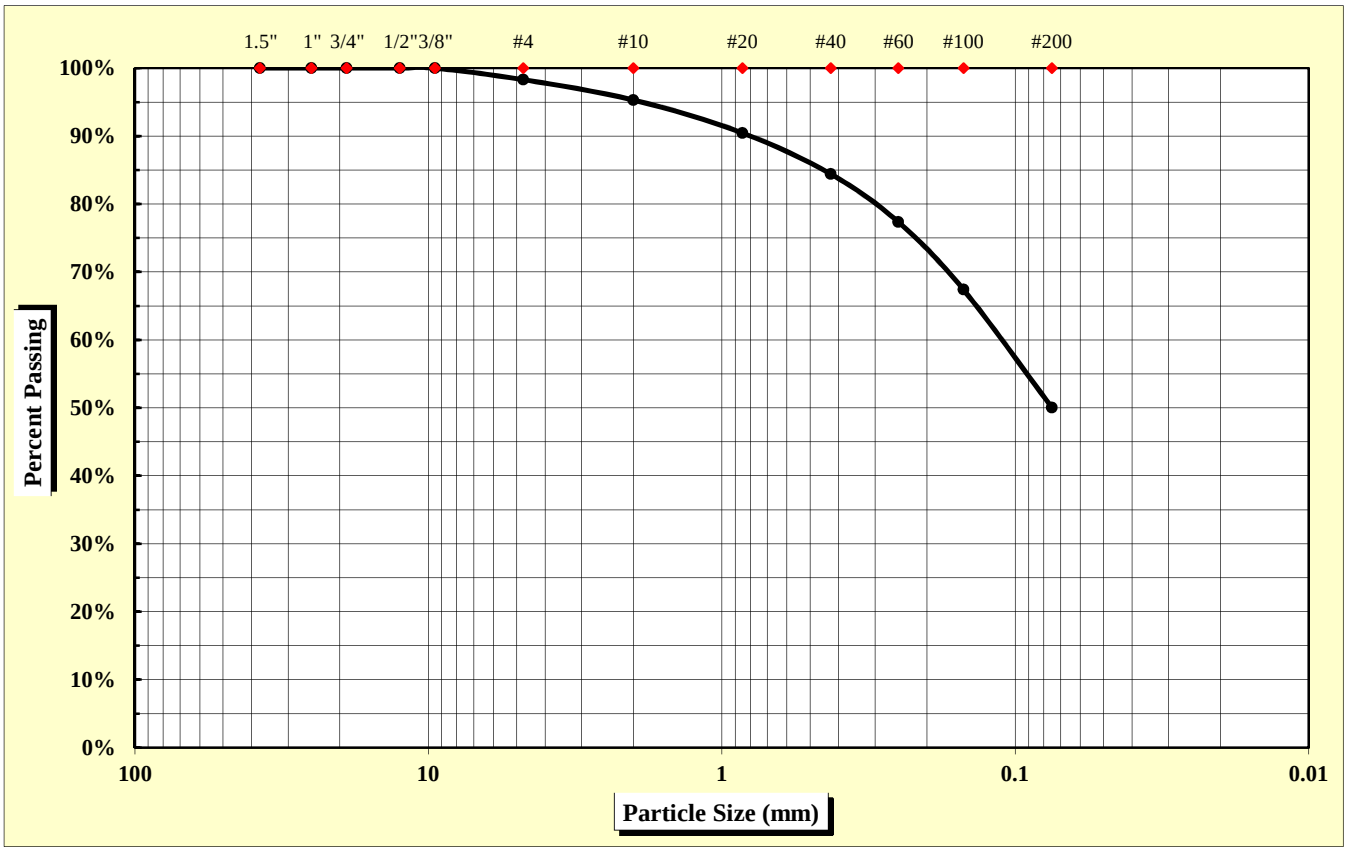
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-2	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.7%	Fine Sand	34.4%
		Coarse Sand	10.9%	Silt & Clay	50.0%
Liquid Limit	37	Plastic Limit	23	Plastic Index	14
		Moisture Content	N/A	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

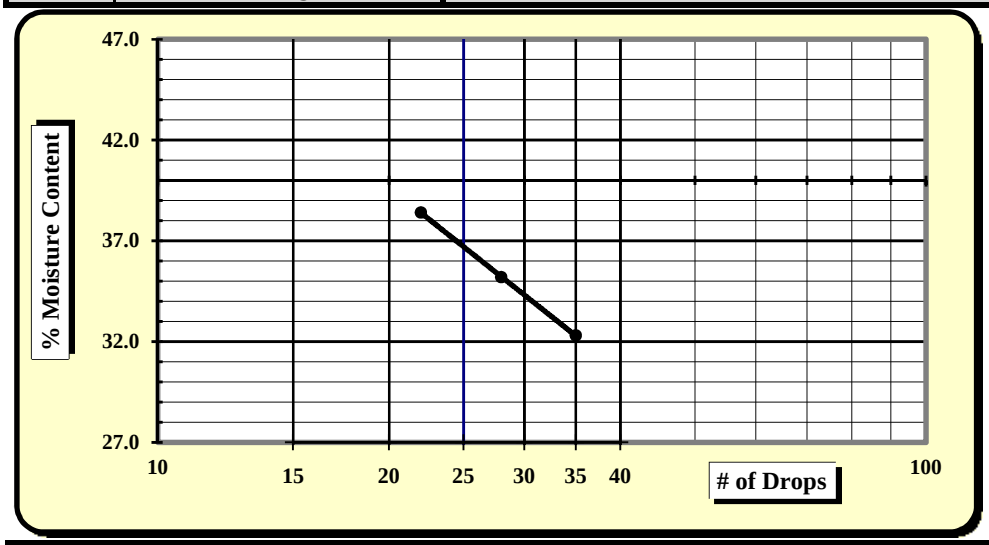
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-2	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	18	19				20		
A	Tare Weight	26.71	26.85	26.71				26.88		
B	Wet Soil Weight + A	45.40	43.05	46.28				36.05		
C	Dry Soil Weight + A	40.84	38.83	40.85				34.35		
D	Water Weight (B-C)	4.56	4.22	5.43				1.70		
E	Dry Soil Weight (C-A)	14.13	11.98	14.14				7.47		
F	% Moisture (D/E)*100	32.3%	35.2%	38.4%				22.8%		
N	# OF DROPS	35	28	22				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**23**
Plastic Index	**14**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.0%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

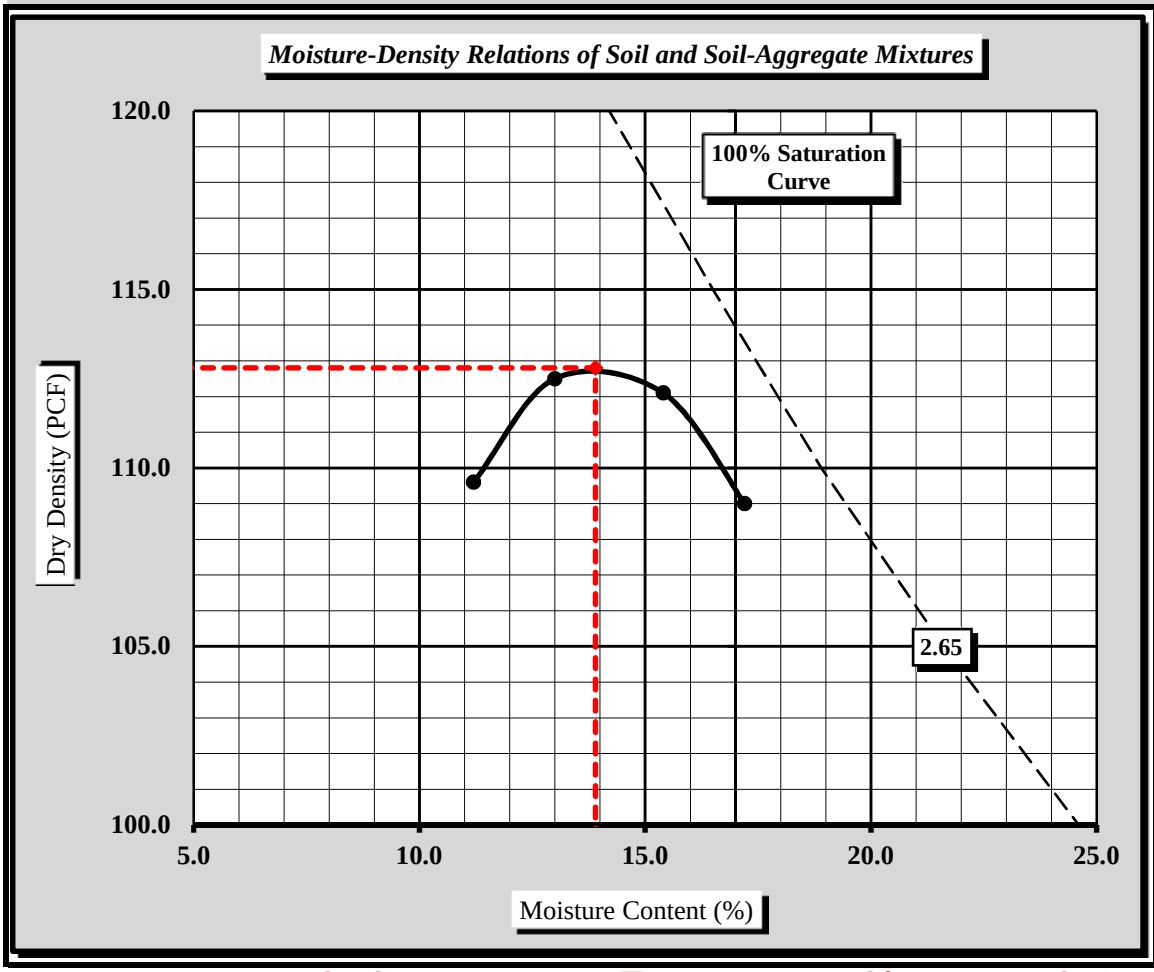
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-2	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (4)]

Maximum Dry Density 112.8 PCF. Optimum Moisture Content 13.9%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	37
Plastic Limit	23
Plastic Index	14

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.3%
#10	95.3%
#40	84.4%
#60	77.4%
#100	67.4%
#200	50.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/08 - 6/12/12
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-2	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (4)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **112.8 PCF** Optimum Moisture Content: **13.9%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 2.0	**CBR at 0.2 in. 2.0**	**CBR at 0.1 in. 2.0**	**CBR at 0.2 in. 2.0**

CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	95.6
Initial Dry Density (PCF)	107.4	Average Final Moisture Content	20.7%
Moisture Content of the Compacted Specimen	13.8%	Moisture Content (top 1" after soaking)	27.3%
Percent Compaction	95.2%	Percent Swell	5.9%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	37	Plastic Index	14	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

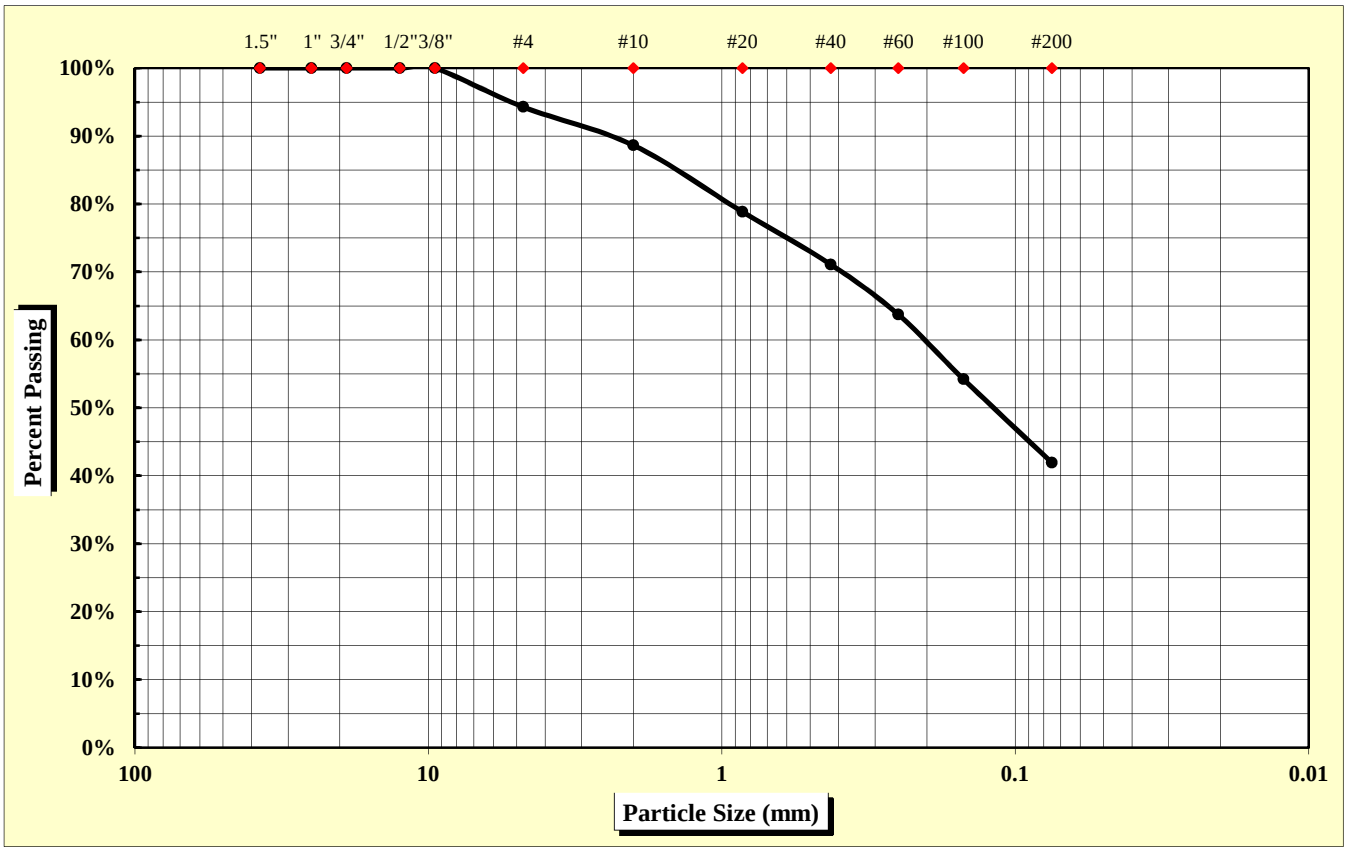
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-3	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.5 - 5.0'
Sample Description:	Red, medium to fine, clayey SAND (SC) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	11.4%	Fine Sand	29.2%
		Coarse Sand	17.5%	Silt & Clay	41.9%
Liquid Limit	35	Plastic Limit	21	Plastic Index	14
		Moisture Content	19.1%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

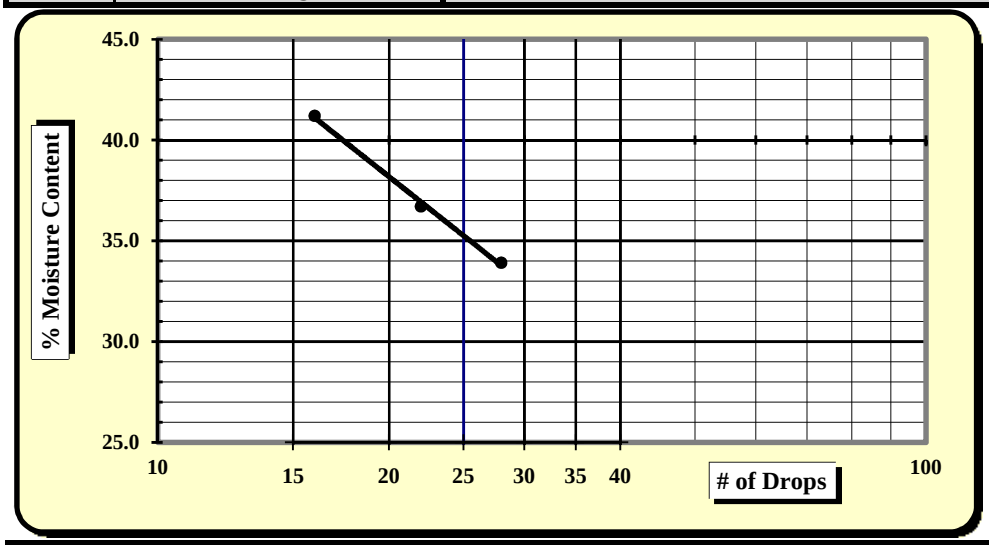
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-3	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-2	Type:	Split-spoon	Depth:	3.5 - 5.0'

Sample Description: Red, medium to fine, clayey SAND (SC) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	33	34	35				36		
A	Tare Weight	26.72	28.30	27.01				25.71		
B	Wet Soil Weight + A	37.58	43.01	38.60				34.38		
C	Dry Soil Weight + A	34.83	39.06	35.22				32.89		
D	Water Weight (B-C)	2.75	3.95	3.38				1.49		
E	Dry Soil Weight (C-A)	8.11	10.76	8.21				7.18		
F	% Moisture (D/E)*100	33.9%	36.7%	41.2%				20.8%		
N	# OF DROPS	28	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**21**
Plastic Index	**14**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.9%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

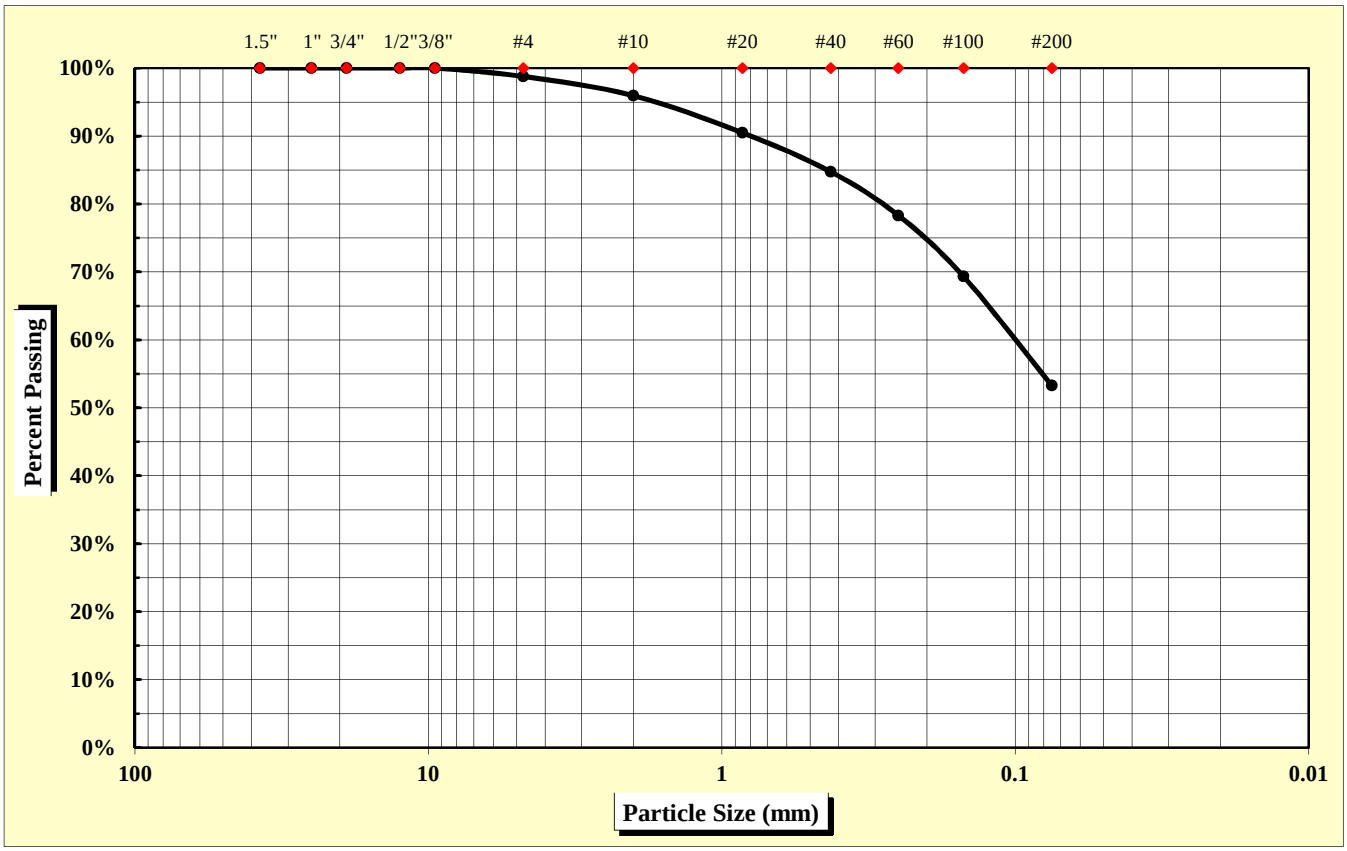
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Dark brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.0%	Fine Sand	31.5%
		Coarse Sand	11.2%	Silt & Clay	53.3%
Liquid Limit	30	Plastic Limit	18	Plastic Index	12
		Moisture Content	N/A	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

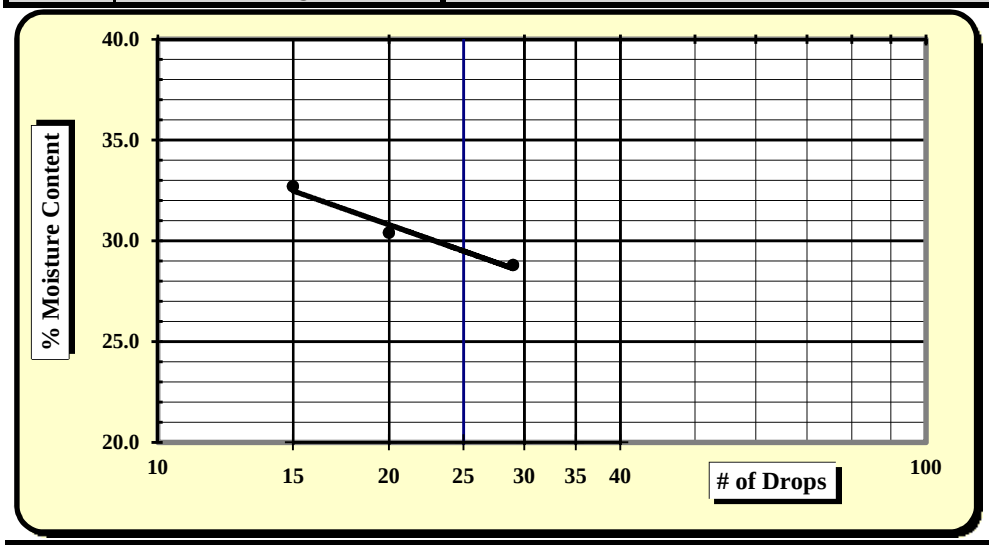
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.72	26.51	26.39				25.99		
B	Wet Soil Weight + A	45.12	44.25	45.95				36.19		
C	Dry Soil Weight + A	41.01	40.11	41.13				34.67		
D	Water Weight (B-C)	4.11	4.14	4.82				1.52		
E	Dry Soil Weight (C-A)	14.29	13.60	14.74				8.68		
F	% Moisture (D/E)*100	28.8%	30.4%	32.7%				17.5%		
N	# OF DROPS	29	20	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**18**
Plastic Index	**12**
Group Symbol	**CL / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.3%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

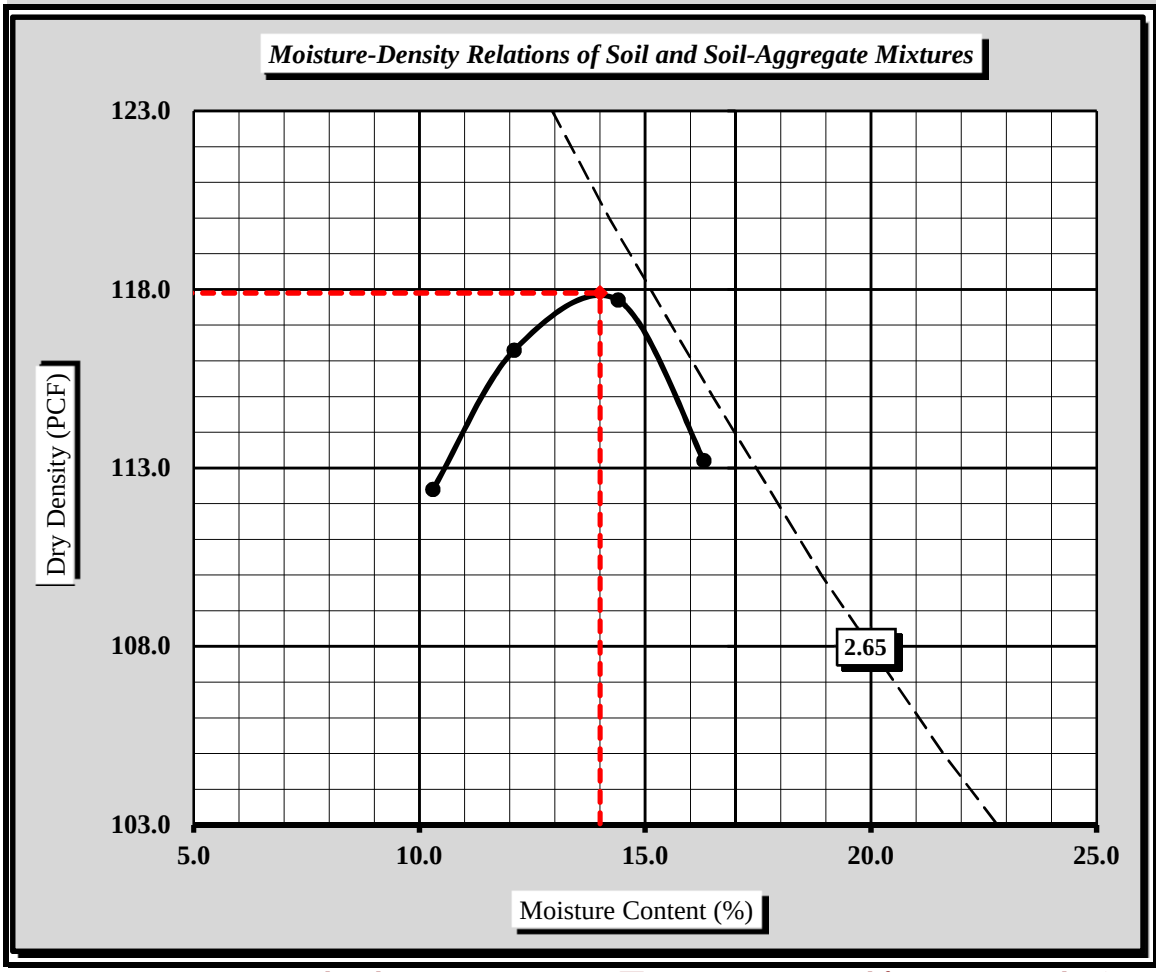
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/19/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

Maximum Dry Density 117.9 PCF. Optimum Moisture Content 14.0%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	30
Plastic Limit	18
Plastic Index	12

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.8%
#10	96.0%
#40	84.7%
#60	78.3%
#100	69.3%
#200	53.3%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/02 - 6/06/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **117.9 PCF** Optimum Moisture Content: **14.0%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 5.7	**CBR at 0.2 in. 5.5**	**CBR at 0.1 in. 5.7**	**CBR at 0.2 in. 5.5**

CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	109.5
Initial Dry Density (PCF)	112.4	Average Final Moisture Content	16.0%
Moisture Content of the Compacted Specimen	13.6%	Moisture Content (top 1" after soaking)	19.0%
Percent Compaction	95.3%	Percent Swell	0.5%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	30	Plastic Index	12	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

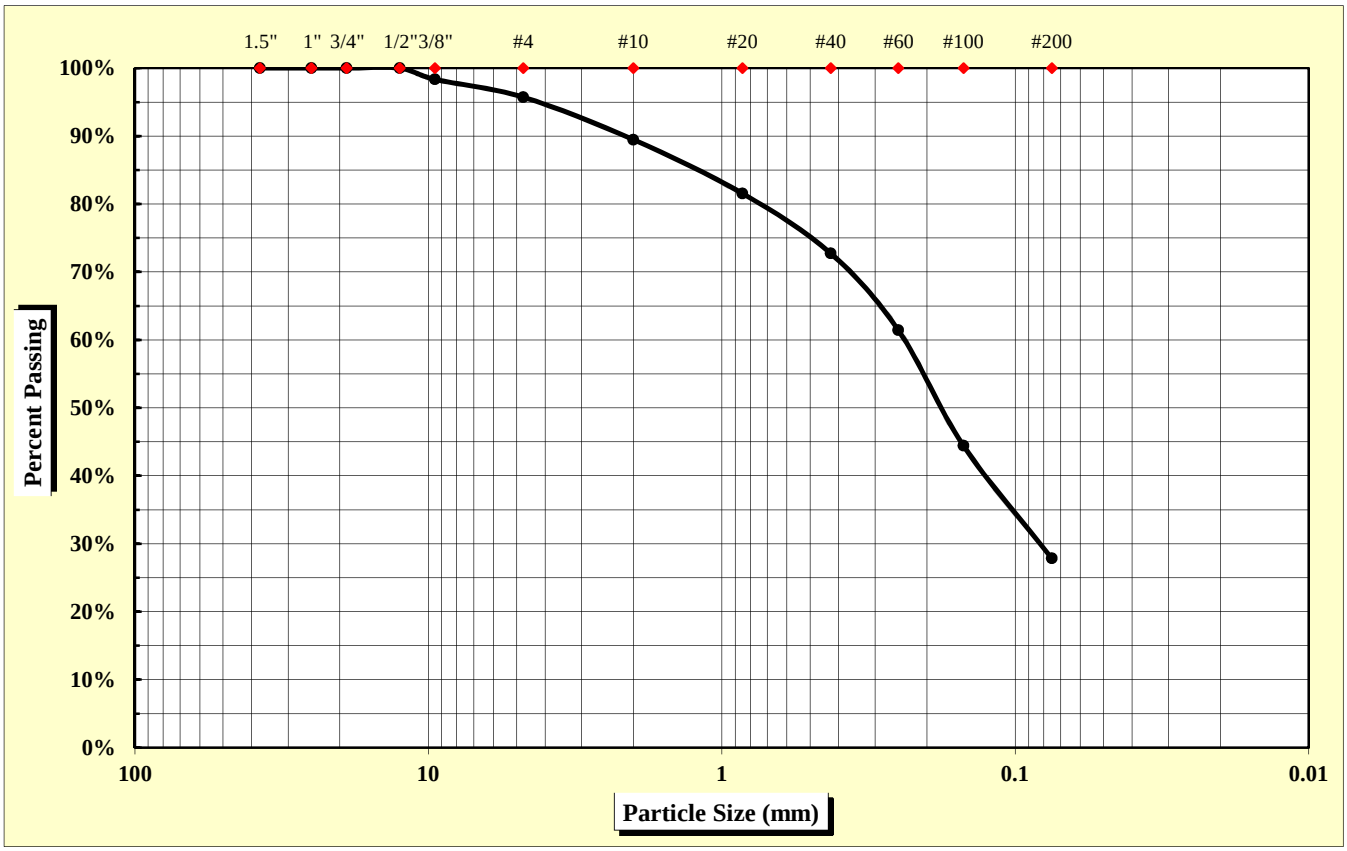
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-4	Type:	Split-spoon	Depth:	6.0 - 8.0'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	10.5%	Fine Sand	44.9%
		Coarse Sand	16.7%	Silt & Clay	27.8%
Liquid Limit	35	Plastic Limit	29	Plastic Index	6
		Moisture Content	26.7%	Group Index	N/A

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

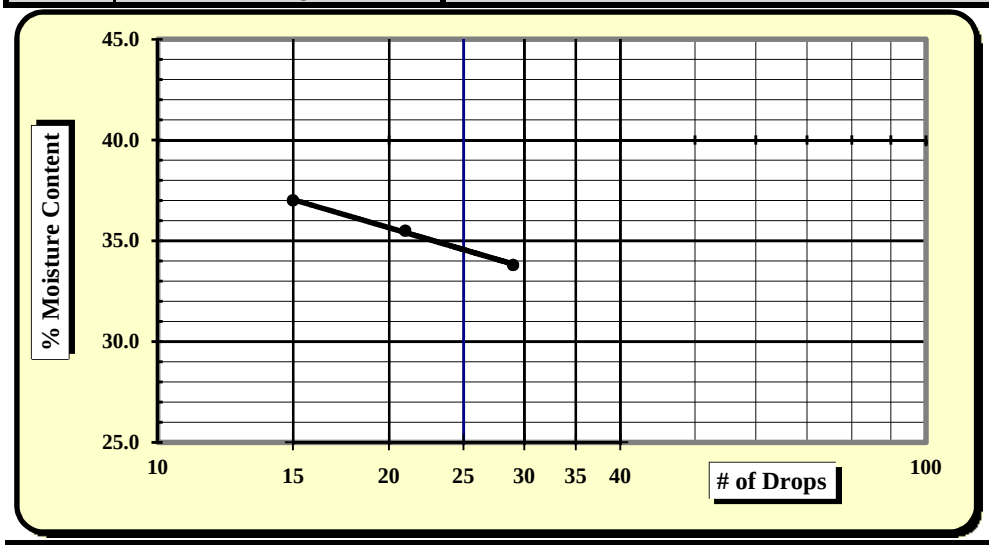
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-4	Type:	Split-spoon	Depth:	6.0 - 8.0'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	37	38	39				40		
A	Tare Weight	26.23	26.30	25.96				26.32		
B	Wet Soil Weight + A	44.44	45.55	43.73				34.98		
C	Dry Soil Weight + A	39.84	40.51	38.93				33.03		
D	Water Weight (B-C)	4.60	5.04	4.80				1.95		
E	Dry Soil Weight (C-A)	13.61	14.21	12.97				6.71		
F	% Moisture (D/E)*100	33.8%	35.5%	37.0%				29.1%		
N	# OF DROPS	29	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**29**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 27.8%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

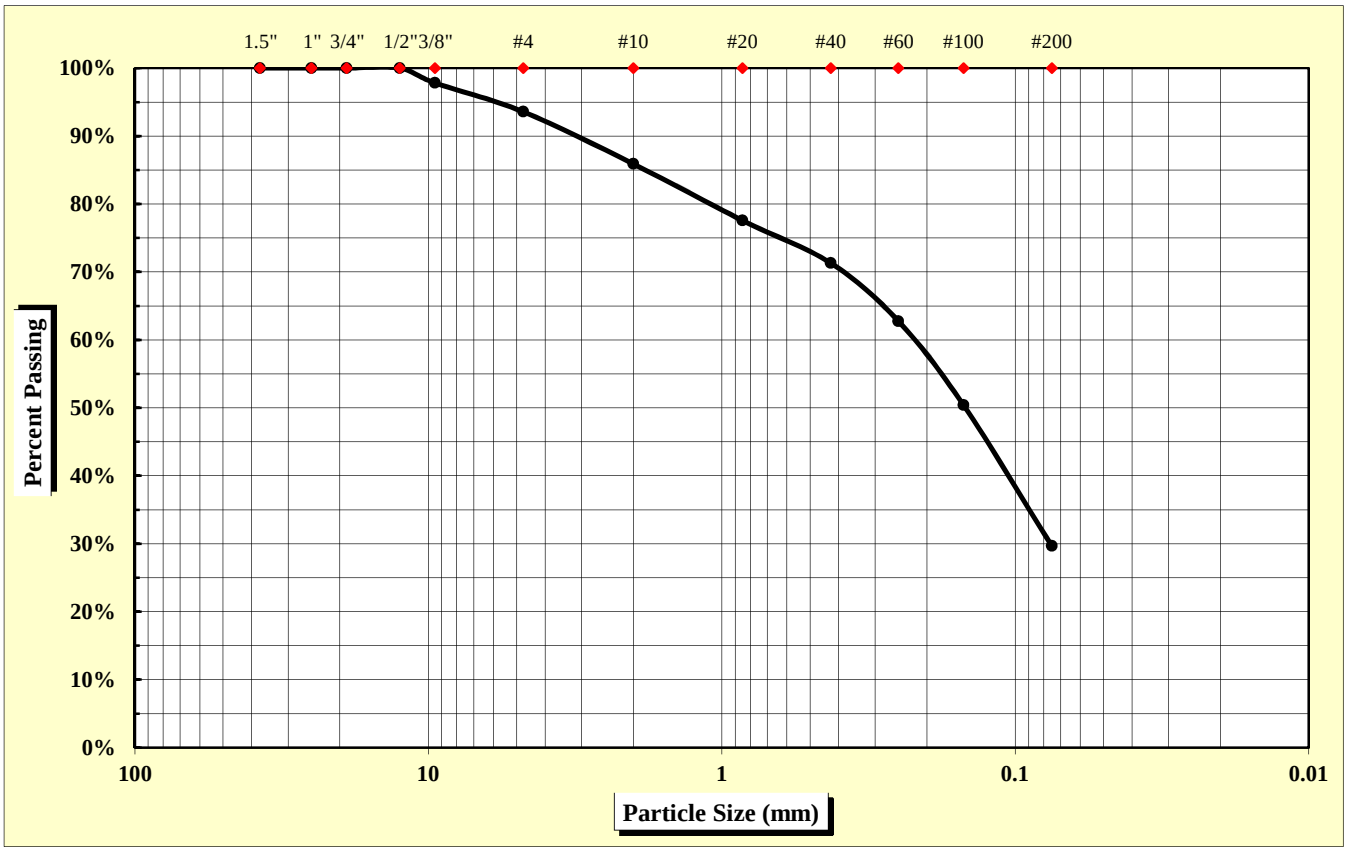
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5' - 15.0'
Sample Description:	Brown, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	14.1%	Fine Sand	41.6%
		Coarse Sand	14.6%	Silt & Clay	29.7%
Liquid Limit	36	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	24.9%	Group Index	N/A

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

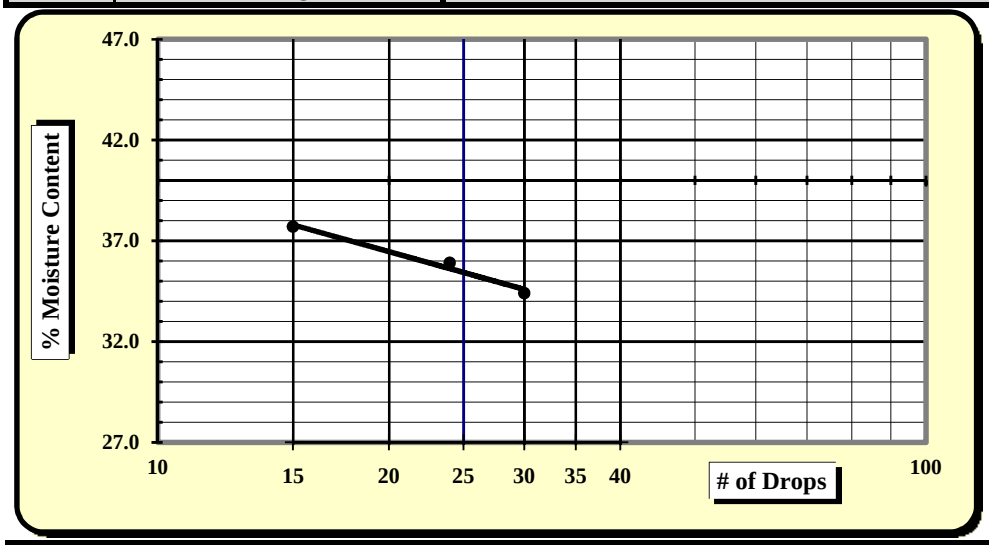
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-5	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5-15.0'

Sample Description: Brown, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	41	42	43						
A	Tare Weight	28.76	28.67	28.43						
B	Wet Soil Weight + A	44.15	46.71	46.21						
C	Dry Soil Weight + A	40.21	41.94	41.34						
D	Water Weight (B-C)	3.94	4.77	4.87						
E	Dry Soil Weight (C-A)	11.45	13.27	12.91						
F	% Moisture (D/E)*100	34.4%	35.9%	37.7%						
N	# OF DROPS	30	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☒
Liquid Limit	**36**
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.7%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

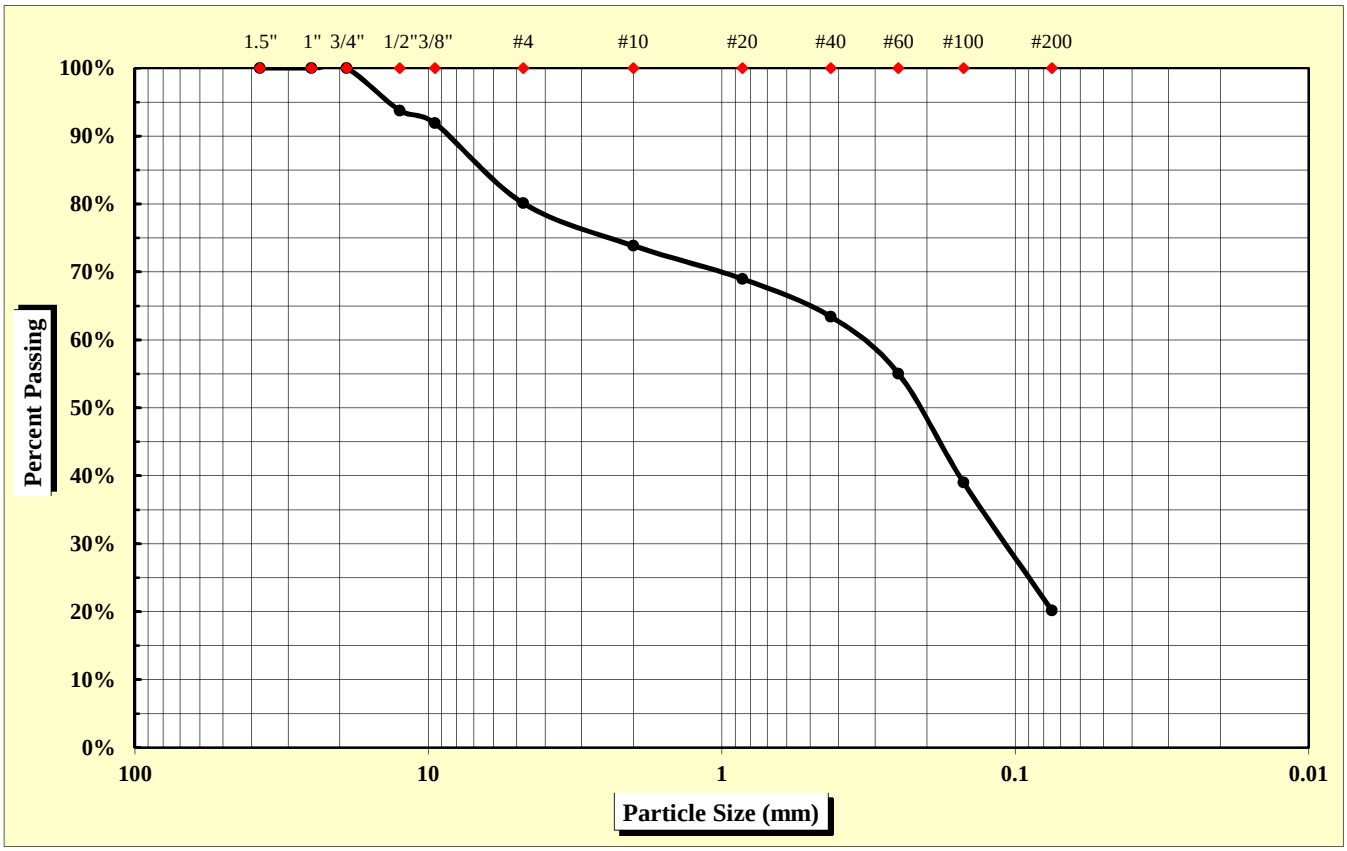
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-7	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown, medium to fine, silty SAND with gravel (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	26.1%	Fine Sand	43.3%
		Coarse Sand	10.4%	Silt & Clay	20.2%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	14.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

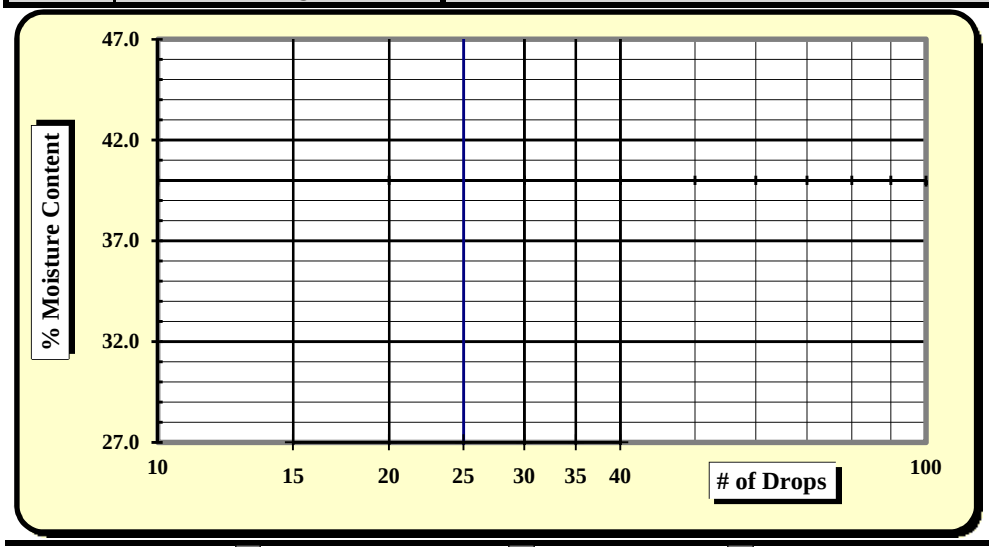
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-7	Sample #:	38g	Sample Date:	4/30/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Brown, medium to fine, silty SAND with gravel (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 20.2%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

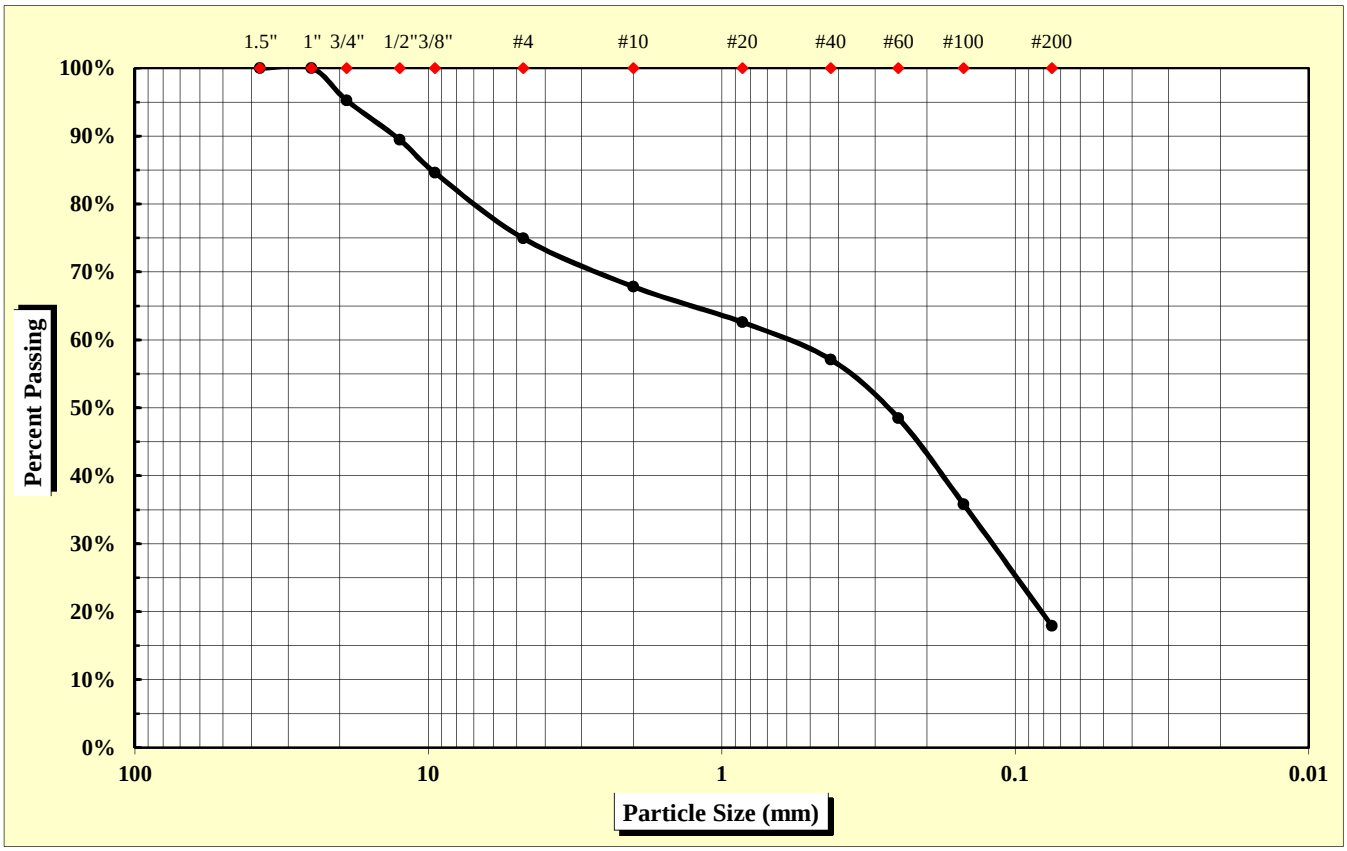
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-7	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown, medium to fine, silty SAND with gravel (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	32.2%	Fine Sand	39.2%
		Coarse Sand	10.7%	Silt & Clay	17.9%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	13.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

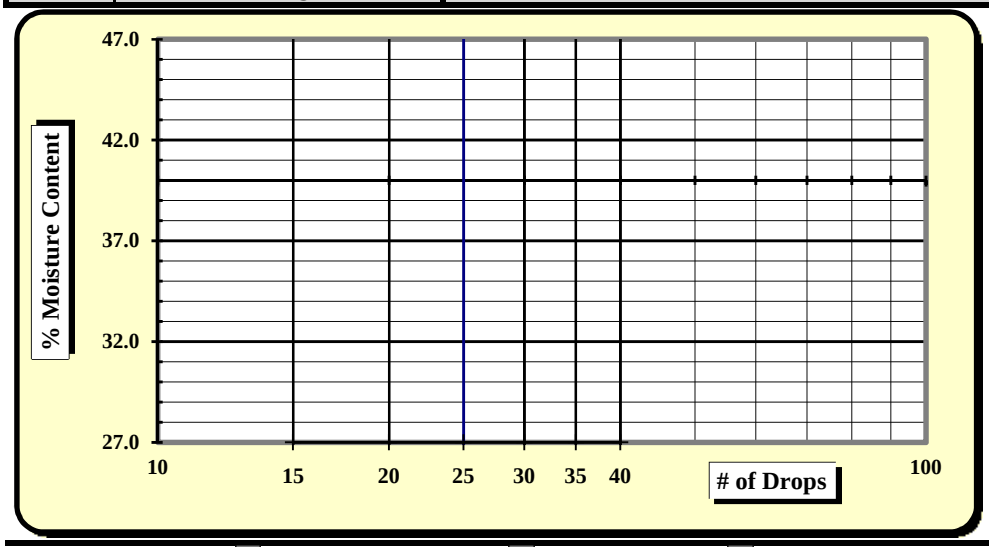
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-7	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Brown, medium to fine, silty SAND with gravel (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 17.9%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

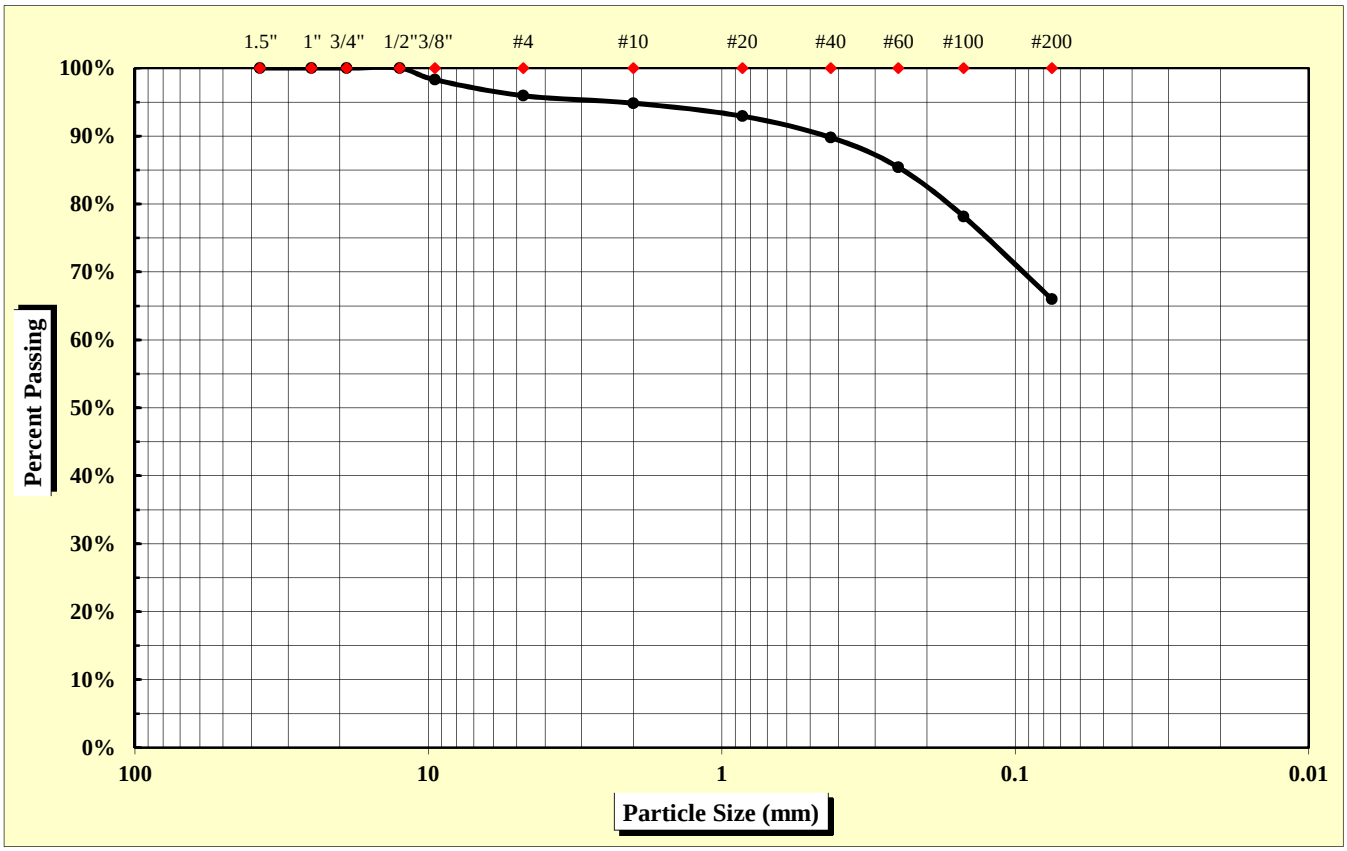
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-8	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown yellow pink white, fine, sandy LEAN CLAY (CL) [A-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	5.2%	Fine Sand	23.8%
		Coarse Sand	5.1%	Silt & Clay	66.0%
Liquid Limit	39	Plastic Limit	23	Plastic Index	16
		Moisture Content	26.7%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

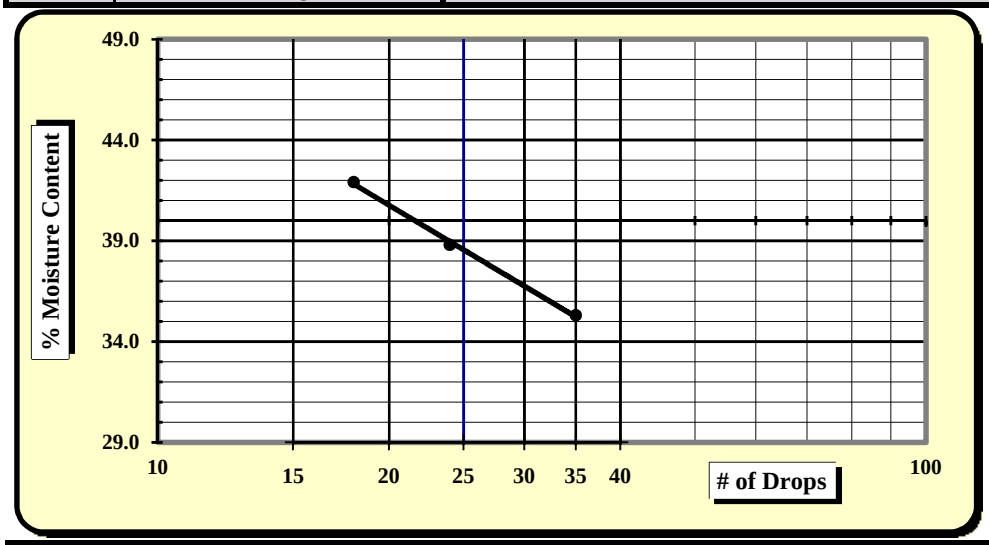
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-8	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Brown yellow pink white, fine, sandy LEAN CLAY (CL) [A-6 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	44	45	46				47		
A	Tare Weight	25.79	25.13	27.58				25.86		
B	Wet Soil Weight + A	42.94	40.32	45.30				35.89		
C	Dry Soil Weight + A	38.47	36.07	40.07				33.99		
D	Water Weight (B-C)	4.47	4.25	5.23				1.90		
E	Dry Soil Weight (C-A)	12.68	10.94	12.49				8.13		
F	% Moisture (D/E)*100	35.3%	38.8%	41.9%				23.4%		
N	# OF DROPS	35	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**39**
Plastic Limit	**23**
Plastic Index	**16**
Group Symbol	**CL / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 66.0%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

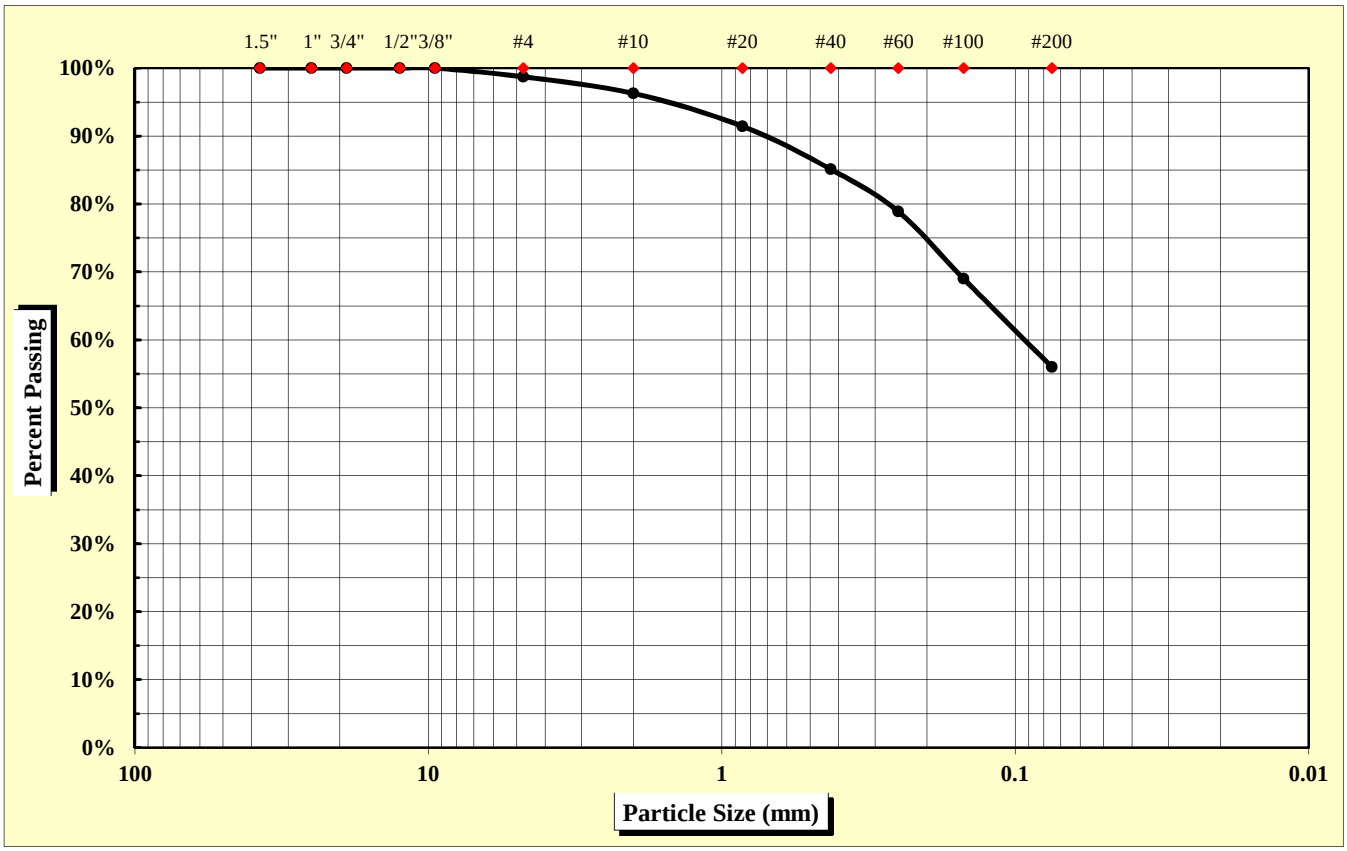
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-9	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.7%	Fine Sand	29.1%
		Coarse Sand	11.2%	Silt & Clay	56.0%
Liquid Limit	34	Plastic Limit	17	Plastic Index	17
		Moisture Content	N/A	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

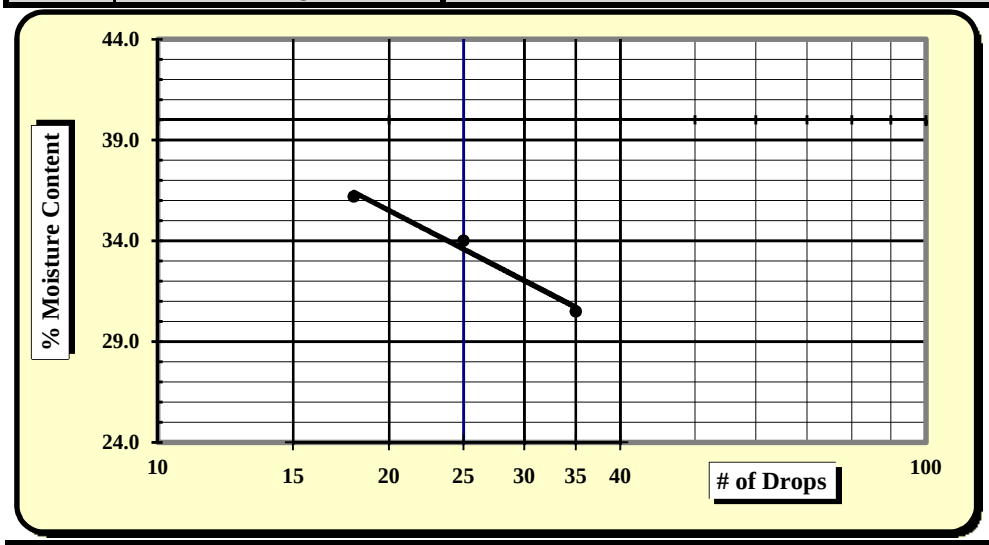
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-9	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	22	23				24		
A	Tare Weight	28.14	25.71	27.28				26.02		
B	Wet Soil Weight + A	46.92	46.57	48.63				35.04		
C	Dry Soil Weight + A	42.53	41.28	42.95				33.75		
D	Water Weight (B-C)	4.39	5.29	5.68				1.29		
E	Dry Soil Weight (C-A)	14.39	15.57	15.67				7.73		
F	% Moisture (D/E)*100	30.5%	34.0%	36.2%				16.7%		
N	# OF DROPS	35	25	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**16.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**17**
Plastic Index	**17**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.0%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

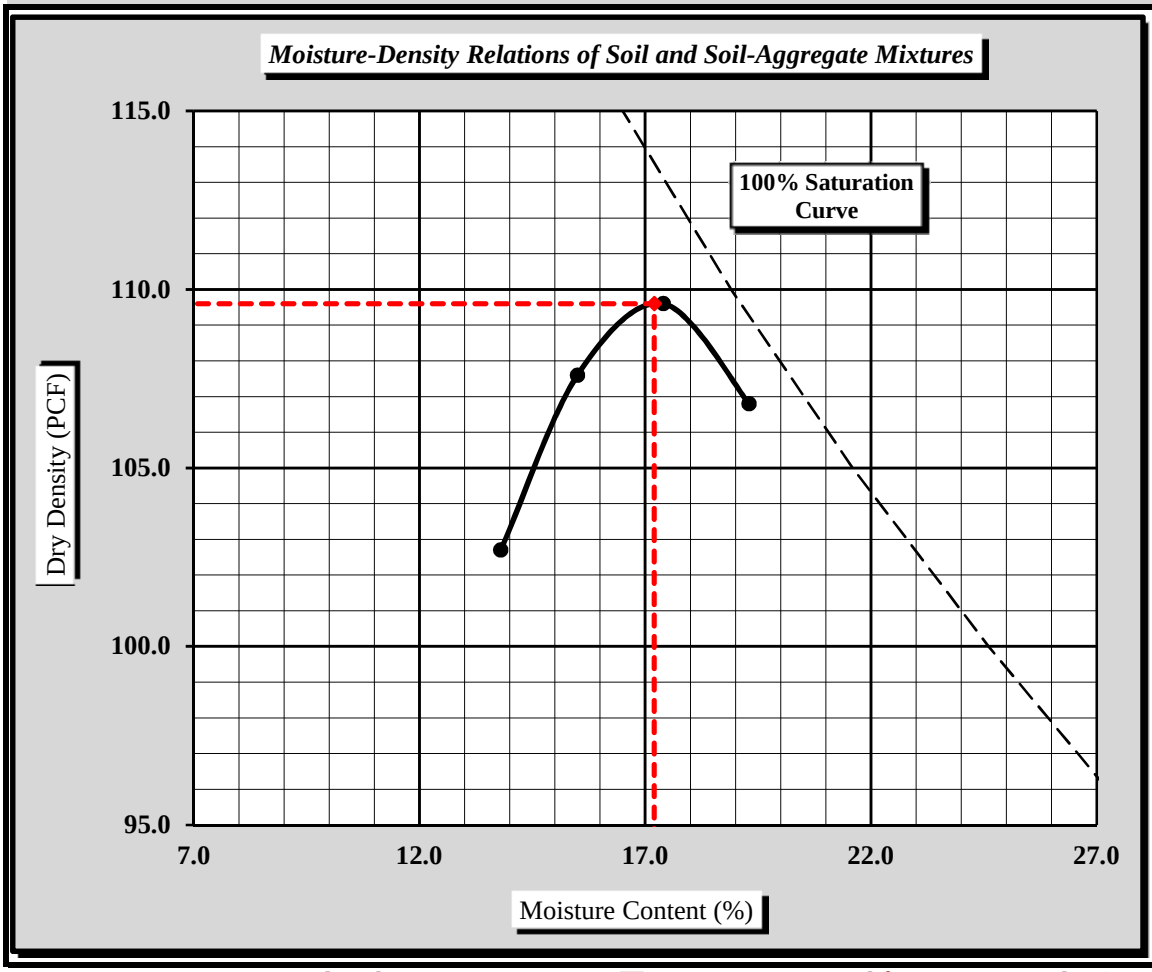
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-9	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Maximum Dry Density 109.6 PCF. Optimum Moisture Content 17.2%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	34
Plastic Limit	17
Plastic Index	17

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.7%
#10	96.3%
#40	85.1%
#60	78.9%
#100	69.0%
#200	56.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/08 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

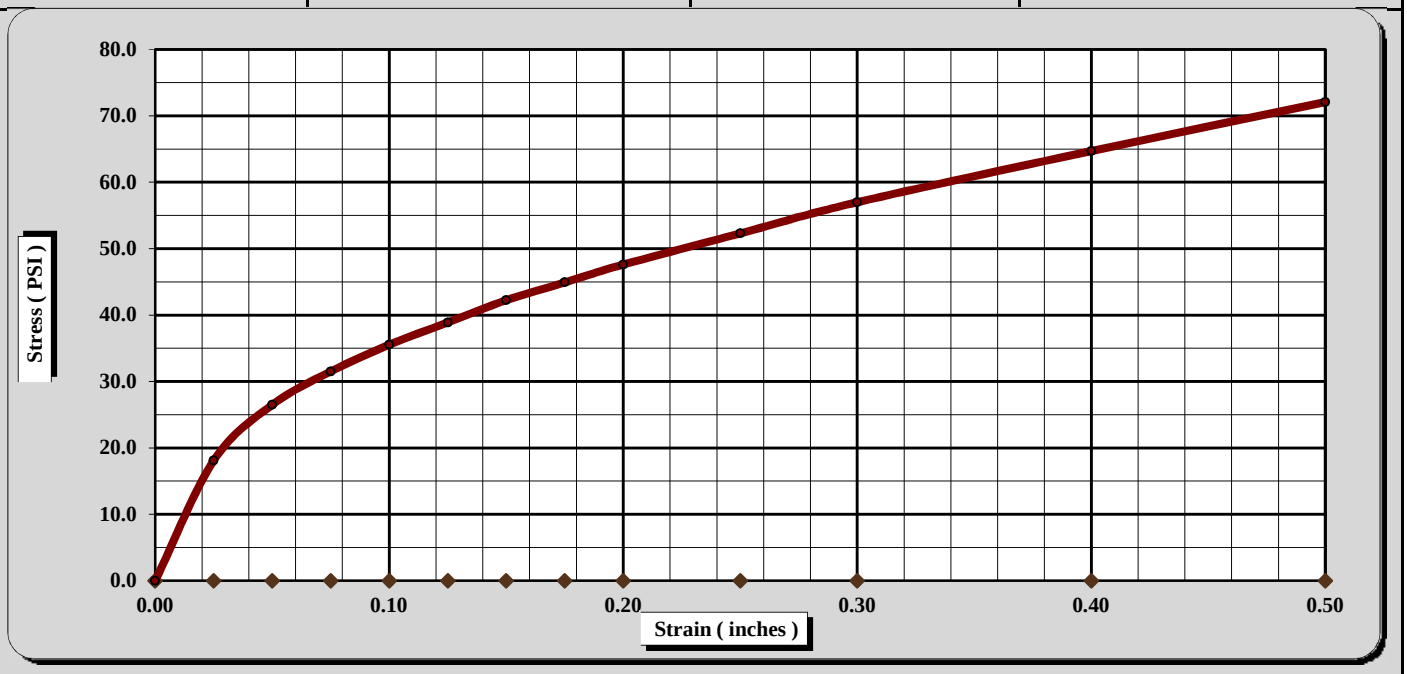
Boring #:	SB-9	Sample #:	36g	Sample Date:	4/30/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **109.6 PCF** Optimum Moisture Content: **17.2%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 3.6	**CBR at 0.2 in. 3.2**	**CBR at 0.1 in. 3.6**	**CBR at 0.2 in. 3.2**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	100.3
Initial Dry Density (PCF)	104.4	Average Final Moisture Content	20.6%
Moisture Content of the Compacted Specimen	16.8%	Moisture Content (top 1" after soaking)	26.0%
Percent Compaction	95.3%	Percent Swell	0.8%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	34	Plastic Index	17	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

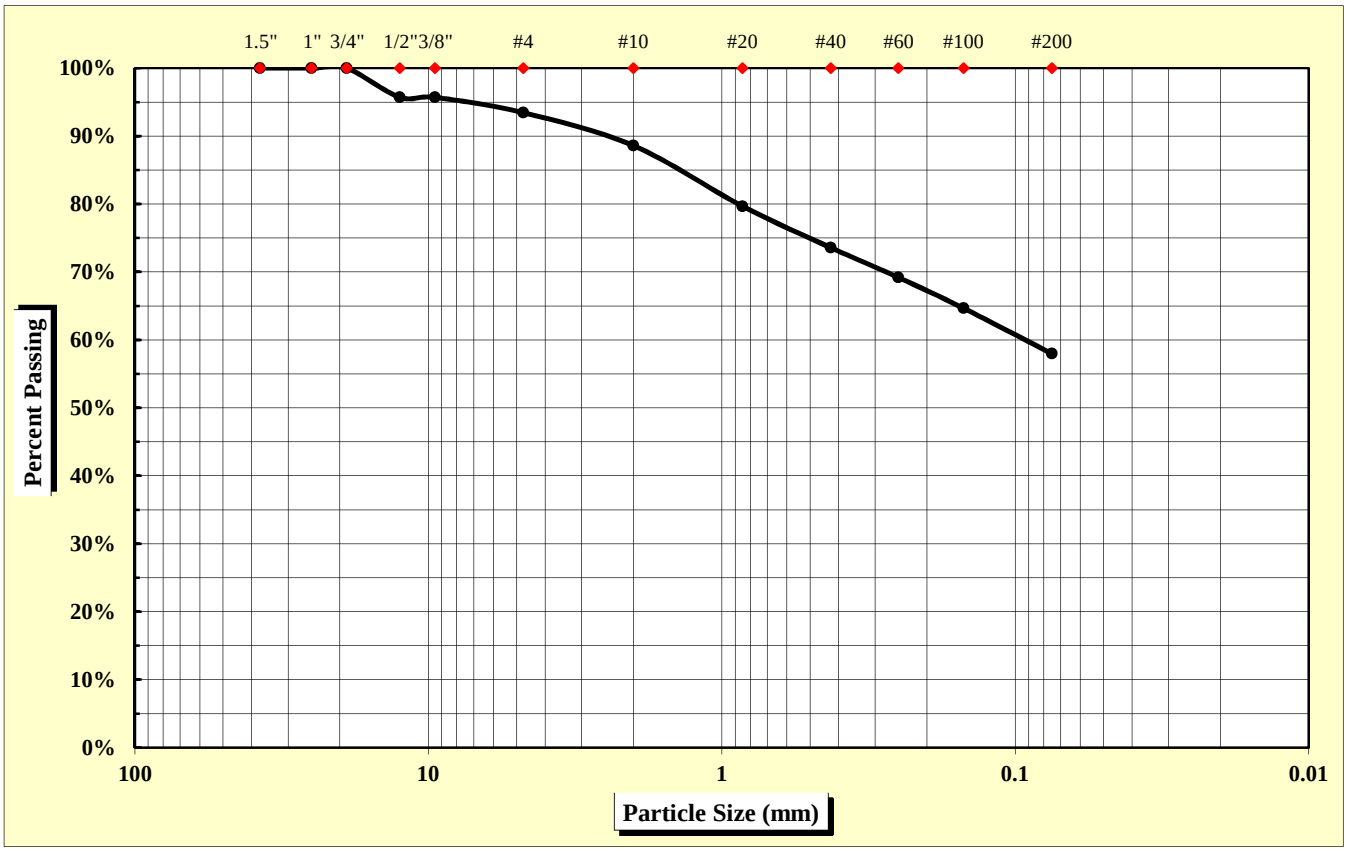
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-9	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red white, medium to fine, sandy FAT CLAY (CH) [A-7-6 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	11.4%	Fine Sand	15.6%
		Coarse Sand	15.0%	Silt & Clay	58.0%
Liquid Limit	52	Plastic Limit	23	Plastic Index	29
		Moisture Content	21.3%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

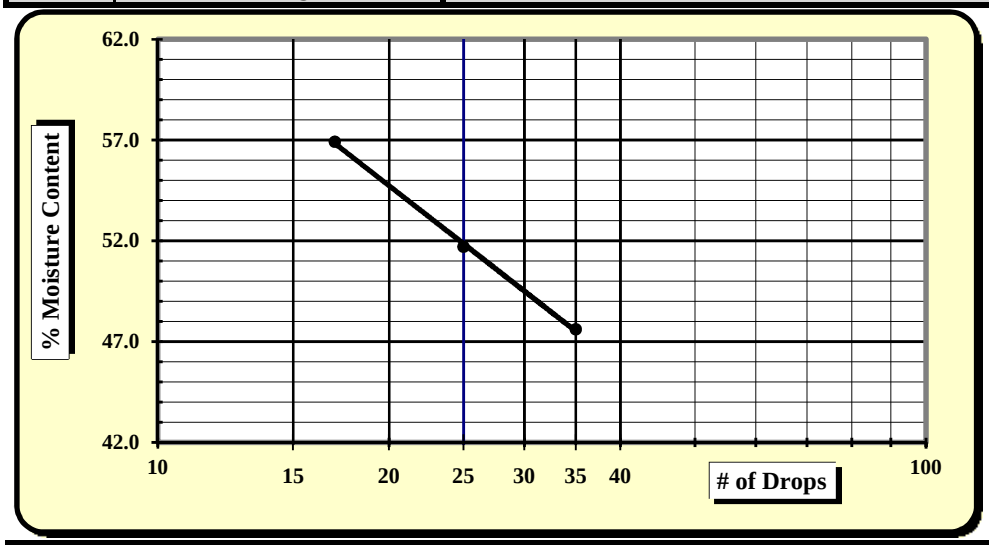
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-9	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Red white, medium to fine, sandy FAT CLAY (CH) [A-7-6 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	48	49	50				51		
A	Tare Weight	26.39	28.68	28.90				25.86		
B	Wet Soil Weight + A	43.48	45.23	45.75				35.89		
C	Dry Soil Weight + A	37.97	39.59	39.64				33.99		
D	Water Weight (B-C)	5.51	5.64	6.11				1.90		
E	Dry Soil Weight (C-A)	11.58	10.91	10.74				8.13		
F	% Moisture (D/E)*100	47.6%	51.7%	56.9%				23.4%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**23**
Plastic Index	**29**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 58.0%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

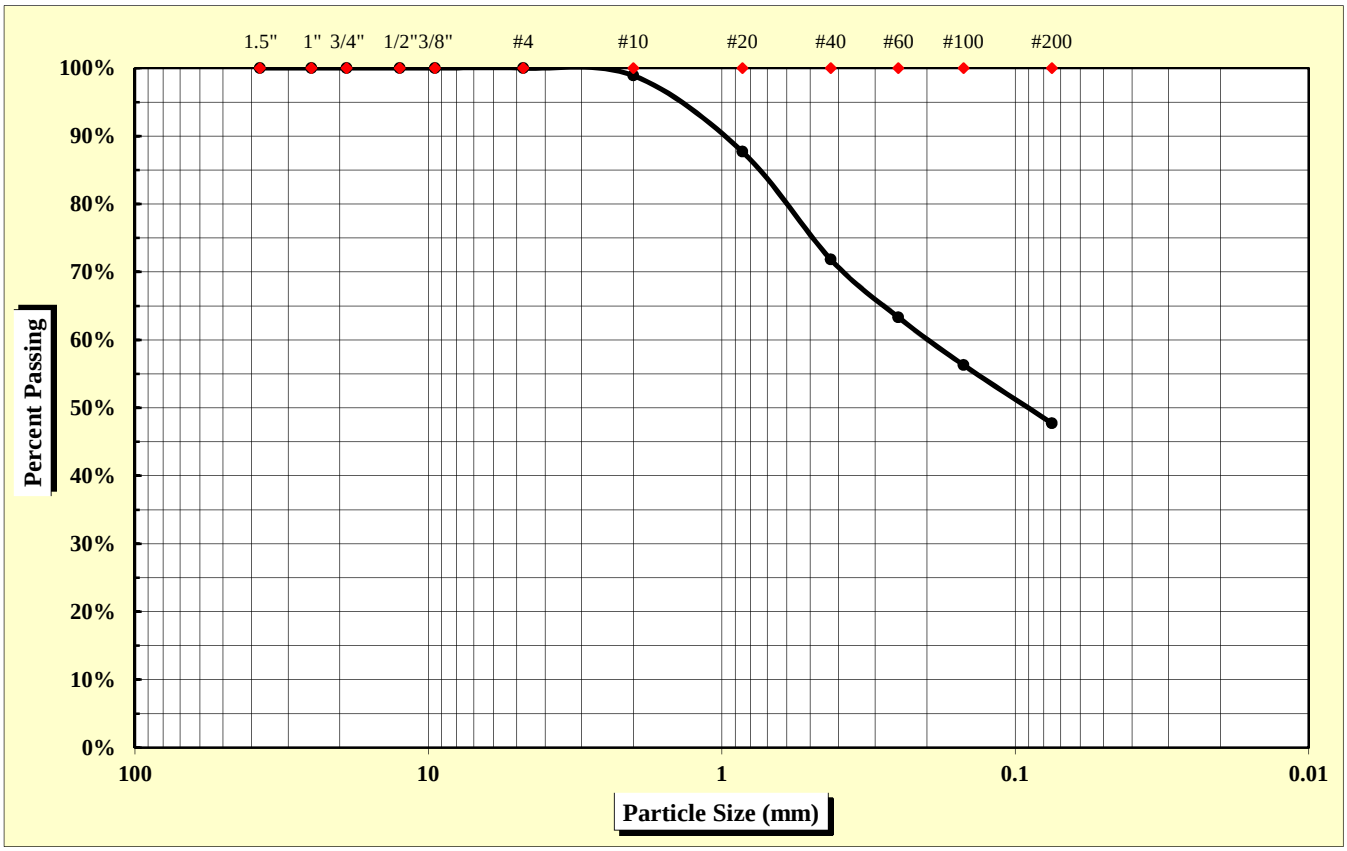
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-10	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red orange, fine to medium, silty SAND (SM) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.1%	Fine Sand	24.1%
		Coarse Sand	27.1%	Silt & Clay	47.7%
Liquid Limit	34	Plastic Limit	26	Plastic Index	8
		Moisture Content	20.5%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

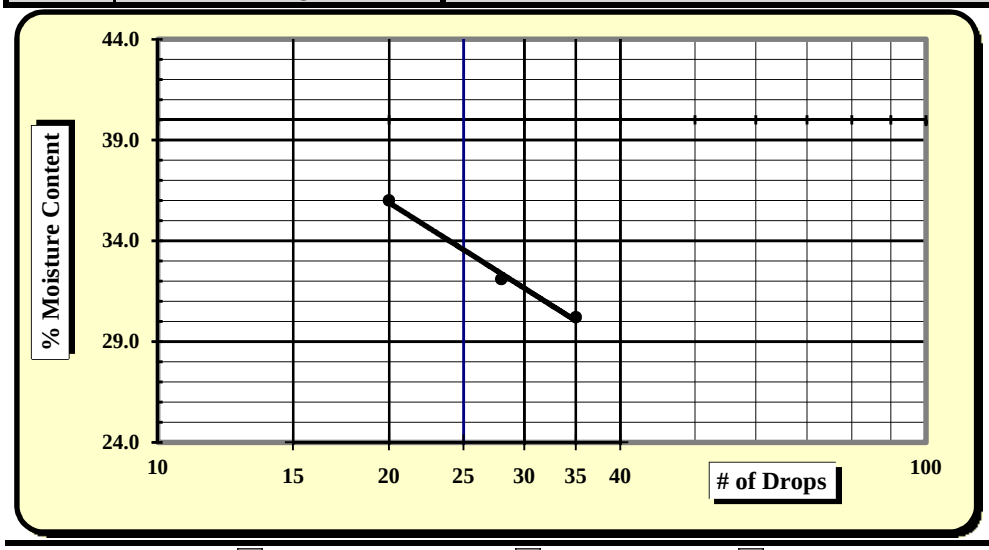
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-10	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red orange, fine to medium, silty SAND (SM) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	52	53	54				55		
A	Tare Weight	25.00	28.39	27.62				26.04		
B	Wet Soil Weight + A	42.47	43.23	45.02				36.11		
C	Dry Soil Weight + A	38.42	39.62	40.41				34.03		
D	Water Weight (B-C)	4.05	3.61	4.61				2.08		
E	Dry Soil Weight (C-A)	13.42	11.23	12.79				7.99		
F	% Moisture (D/E)*100	30.2%	32.1%	36.0%				26.0%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**26**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.7%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

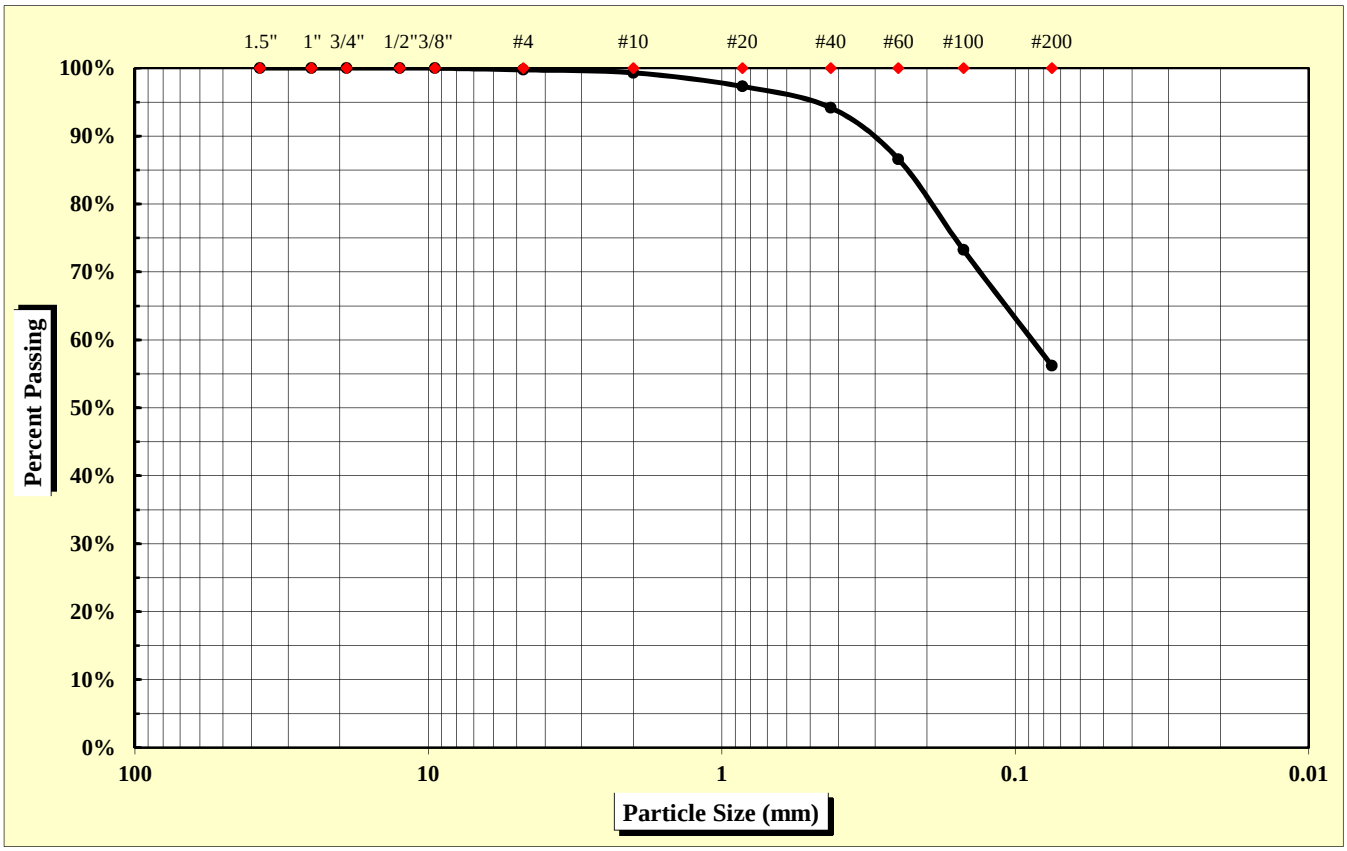
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-11	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red, fine, sandy LEAN CLAY (CL) [A-7-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.7%	Fine Sand	38.0%
		Coarse Sand	5.2%	Silt & Clay	56.2%
Liquid Limit	42	Plastic Limit	21	Plastic Index	21
		Moisture Content	23.0%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

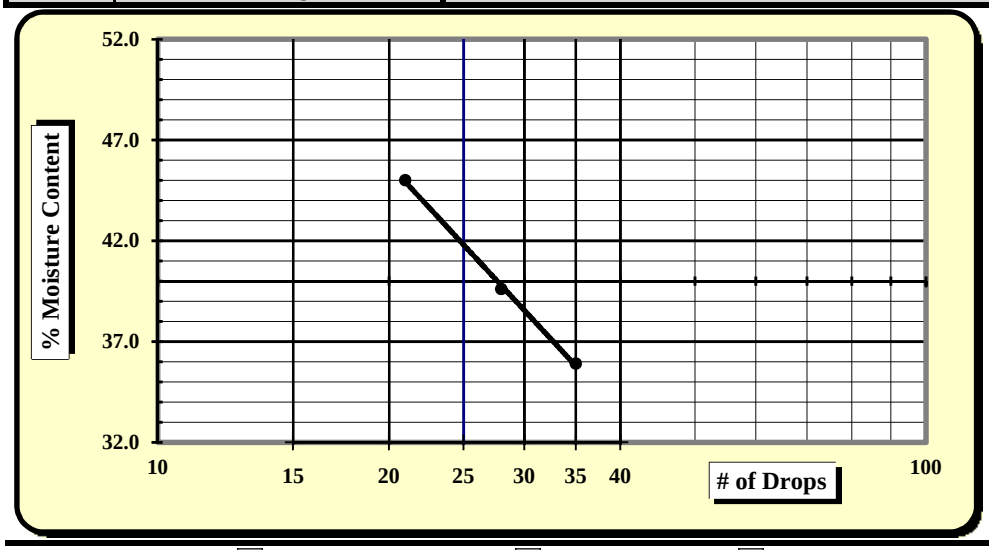
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-11	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Brown red, fine, sandy LEAN CLAY (CL) [A-7-6 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	S4	P1	P2				P5		
A	Tare Weight	3.78	3.70	3.61				3.66		
B	Wet Soil Weight + A	20.47	22.10	21.36				15.42		
C	Dry Soil Weight + A	16.06	16.88	15.85				13.42		
D	Water Weight (B-C)	4.41	5.22	5.51				2.00		
E	Dry Soil Weight (C-A)	12.28	13.18	12.24				9.76		
F	% Moisture (D/E)*100	35.9%	39.6%	45.0%				20.5%		
N	# OF DROPS	35	28	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**21**
Plastic Index	**21**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.2%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

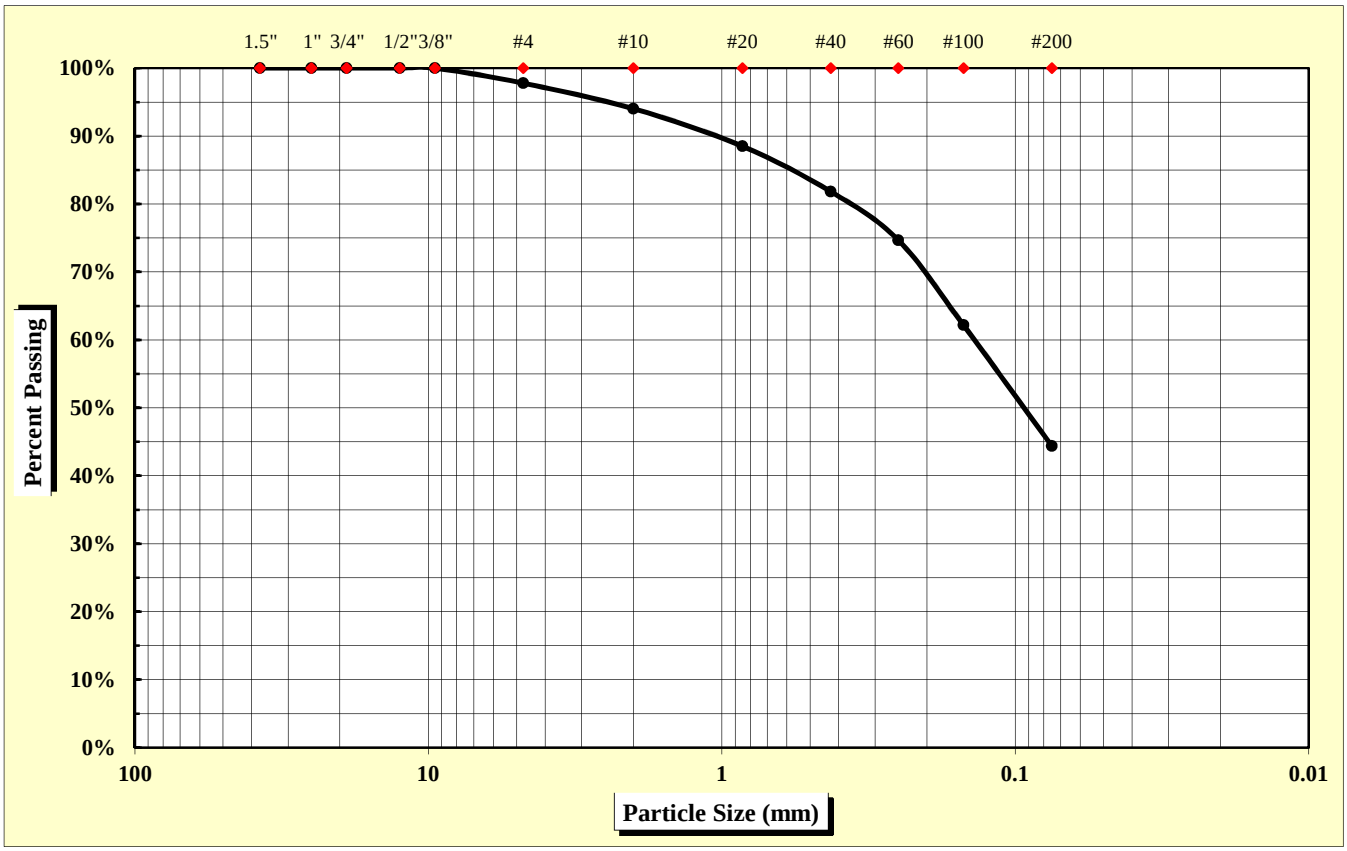
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-13	Sample #:	36g	Sample Date:	4/27/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Dark brown, medium to fine, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.0%	Fine Sand	37.4%
		Coarse Sand	12.2%	Silt & Clay	44.4%
Liquid Limit	32	Plastic Limit	26	Plastic Index	6
		Moisture Content	N/A	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

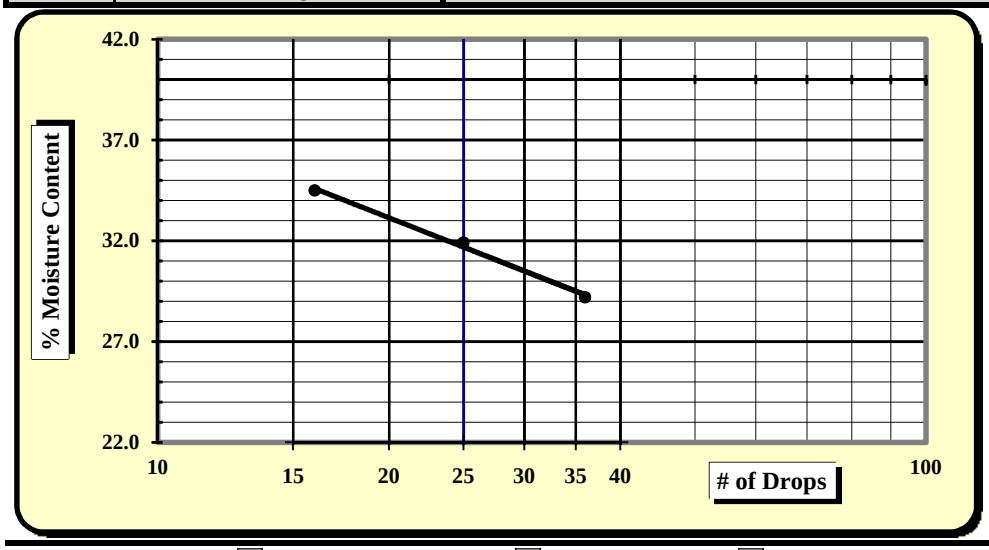
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-13	Sample #:	36g	Sample Date:	4/27/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	27.00	27.83	26.30				27.35		
B	Wet Soil Weight + A	46.85	47.11	42.60				36.05		
C	Dry Soil Weight + A	42.36	42.45	38.42				34.28		
D	Water Weight (B-C)	4.49	4.66	4.18				1.77		
E	Dry Soil Weight (C-A)	15.36	14.62	12.12				6.93		
F	% Moisture (D/E)*100	29.2%	31.9%	34.5%				25.5%		
N	# OF DROPS	36	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**32**
Plastic Limit	**26**
Plastic Index	**6**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.4%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

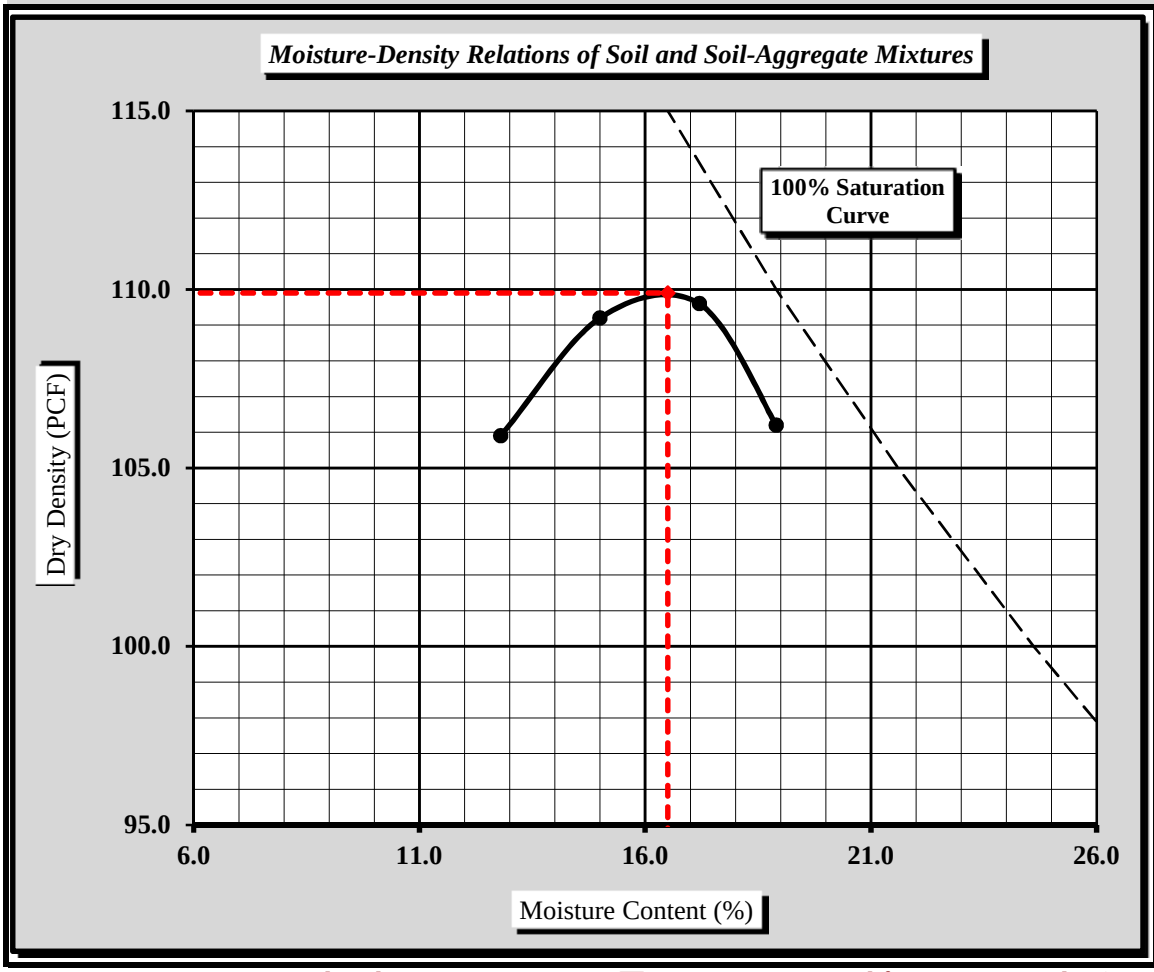
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/19/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-13	Sample #:	36g	Sample Date:	4/27/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, silty SAND (SM) [A-4 (0)]

Maximum Dry Density 109.9 PCF. **Optimum Moisture Content 16.5%**

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	32
Plastic Limit	26
Plastic Index	6

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	97.8%
#10	94.0%
#40	91.8%
#60	74.7%
#100	62.2%
#200	44.4%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/02 - 6/06/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

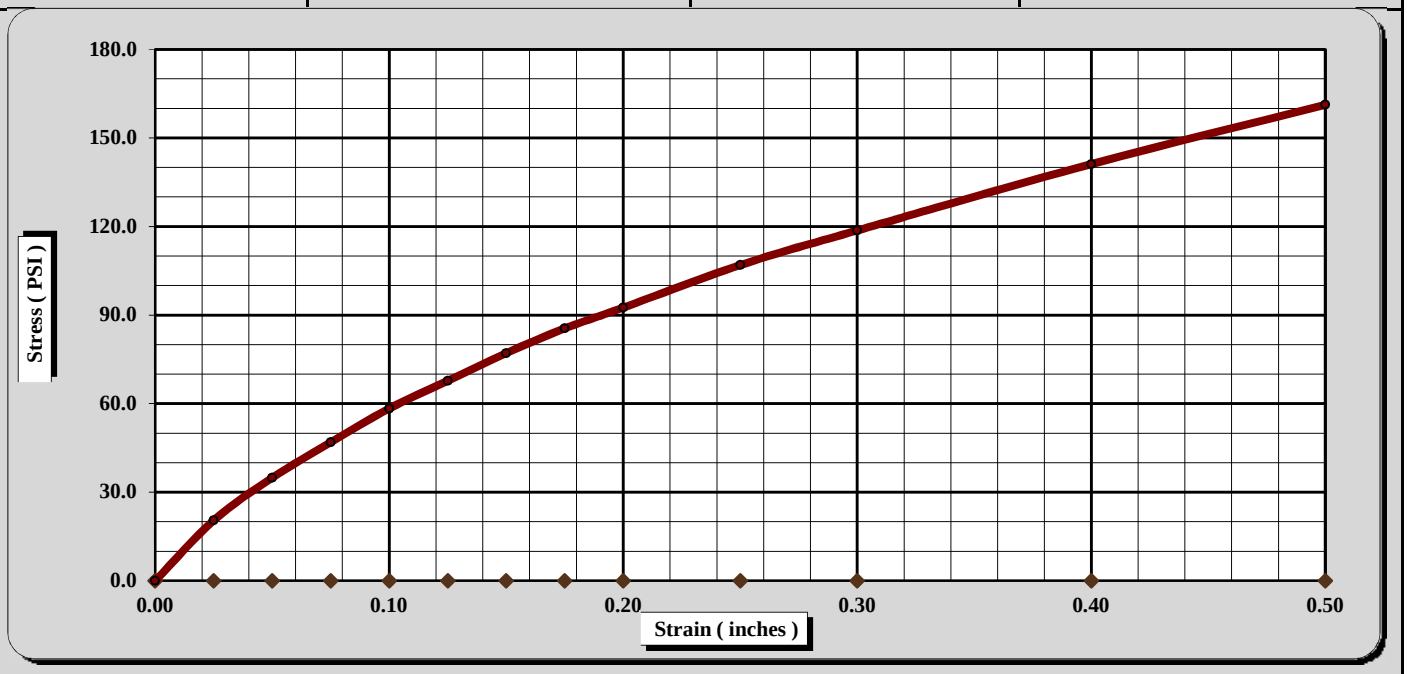
Boring #:	SB-13	Sample #:	36g	Sample Date:	4/27/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Dark brown, medium to fine, silty SAND (SM) [A-4 (0)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **109.9 PCF** Optimum Moisture Content: **16.5%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 5.8	**CBR at 0.2 in. 6.2**	**CBR at 0.1 in. 5.8**	**CBR at 0.2 in. 6.2**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	101.3
Initial Dry Density (PCF)	104.2	Average Final Moisture Content	19.3%
Moisture Content of the Compacted Specimen	16.7%	Moisture Content (top 1" after soaking)	22.3%
Percent Compaction	94.8%	Percent Swell	0.5%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	32	Plastic Index	6	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

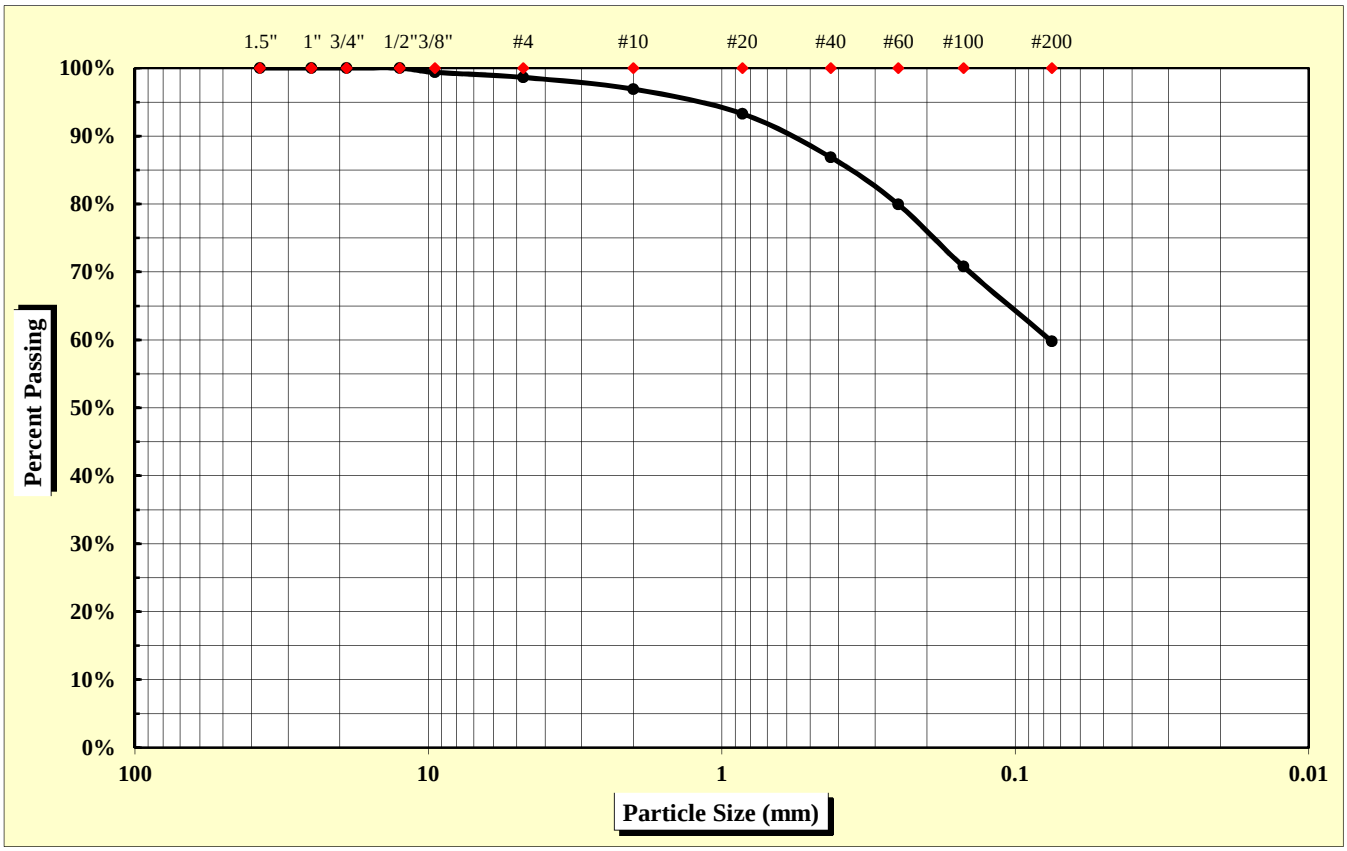
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-14	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, sandy SILT (ML) [A-7-6 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.1%	Fine Sand	27.1%
		Coarse Sand	10.0%	Silt & Clay	59.8%
Liquid Limit	41	Plastic Limit	28	Plastic Index	13
		Moisture Content	24.6%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

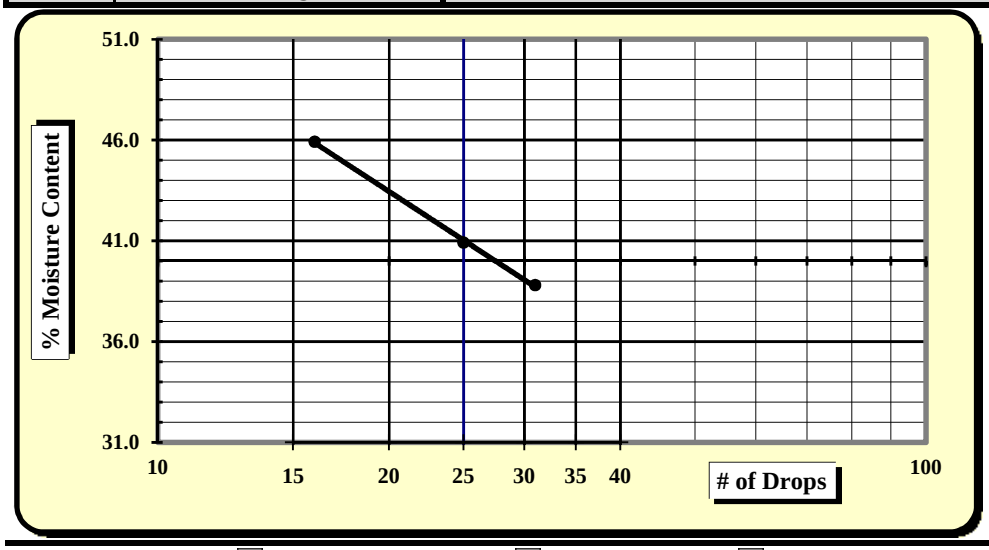
S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-14	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, sandy SILT (ML) [A-7-6 (6)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	S24	S13	S15				S21		
A	Tare Weight	3.63	3.64	3.69				3.61		
B	Wet Soil Weight + A	19.66	20.50	19.89				12.68		
C	Dry Soil Weight + A	15.18	15.61	14.79				10.70		
D	Water Weight (B-C)	4.48	4.89	5.10				1.98		
E	Dry Soil Weight (C-A)	11.55	11.97	11.10				7.09		
F	% Moisture (D/E)*100	38.8%	40.9%	45.9%				27.9%		
N	# OF DROPS	31	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**28**
Plastic Index	**13**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 59.8%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

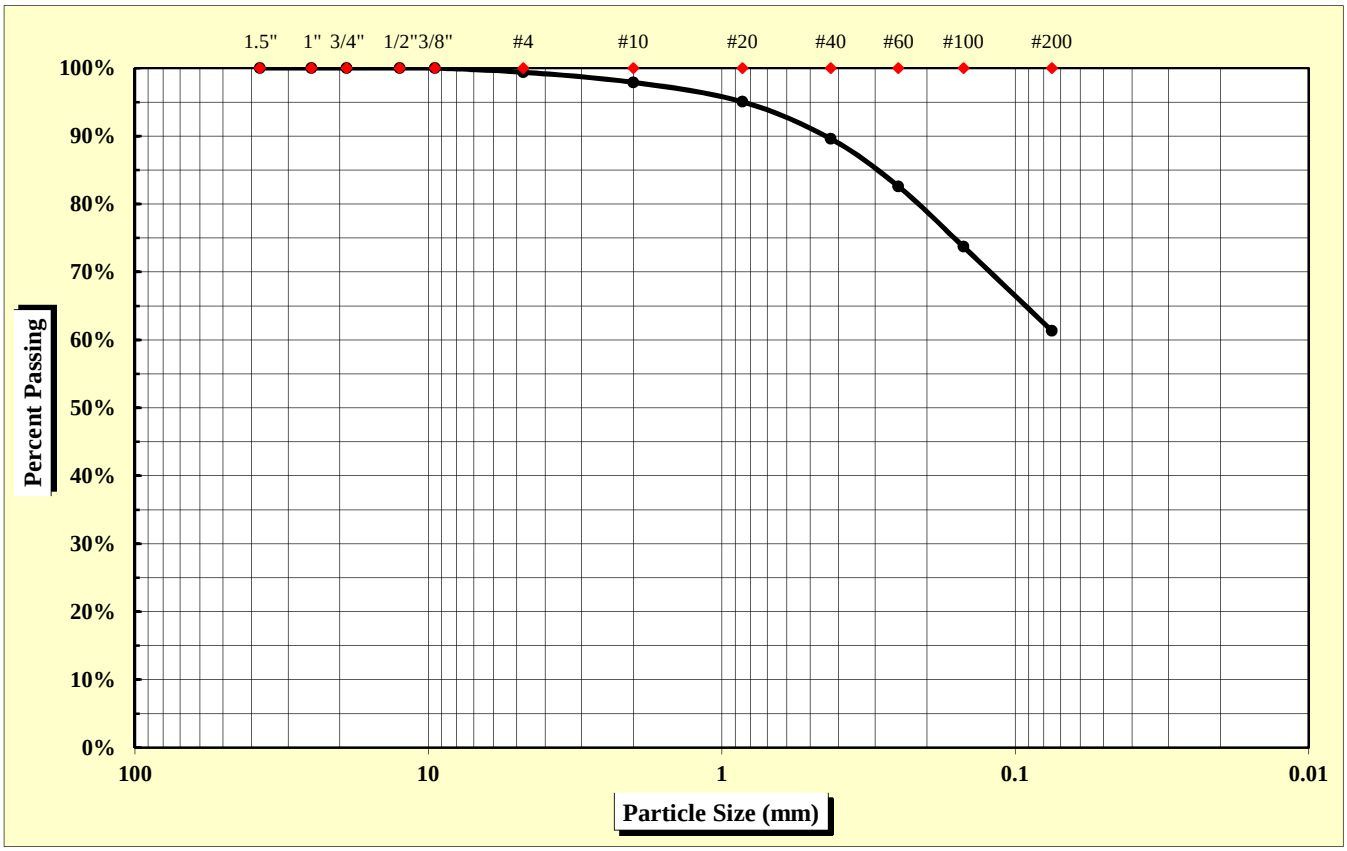
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-14	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, fine, sandy SILT (ML) [A-7-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.1%	Fine Sand	28.3%
		Coarse Sand	8.3%	Silt & Clay	61.3%
Liquid Limit	45	Plastic Limit	28	Plastic Index	17
		Moisture Content	26.6%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

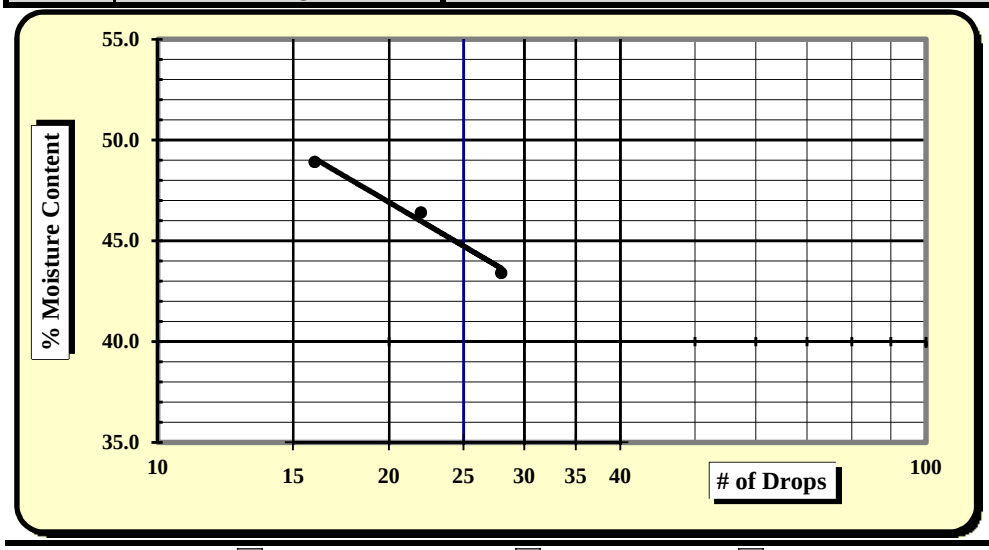
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-14	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red brown, fine, sandy SILT (ML) [A-7-6 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P10	P6	P15				P14		
A	Tare Weight	3.52	3.59	3.58				3.61		
B	Wet Soil Weight + A	26.01	20.51	18.83				12.68		
C	Dry Soil Weight + A	19.20	15.15	13.82				10.70		
D	Water Weight (B-C)	6.81	5.36	5.01				1.98		
E	Dry Soil Weight (C-A)	15.68	11.56	10.24				7.09		
F	% Moisture (D/E)*100	43.4%	46.4%	48.9%				27.9%		
N	# OF DROPS	28	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**28**
Plastic Index	**17**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 61.3%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

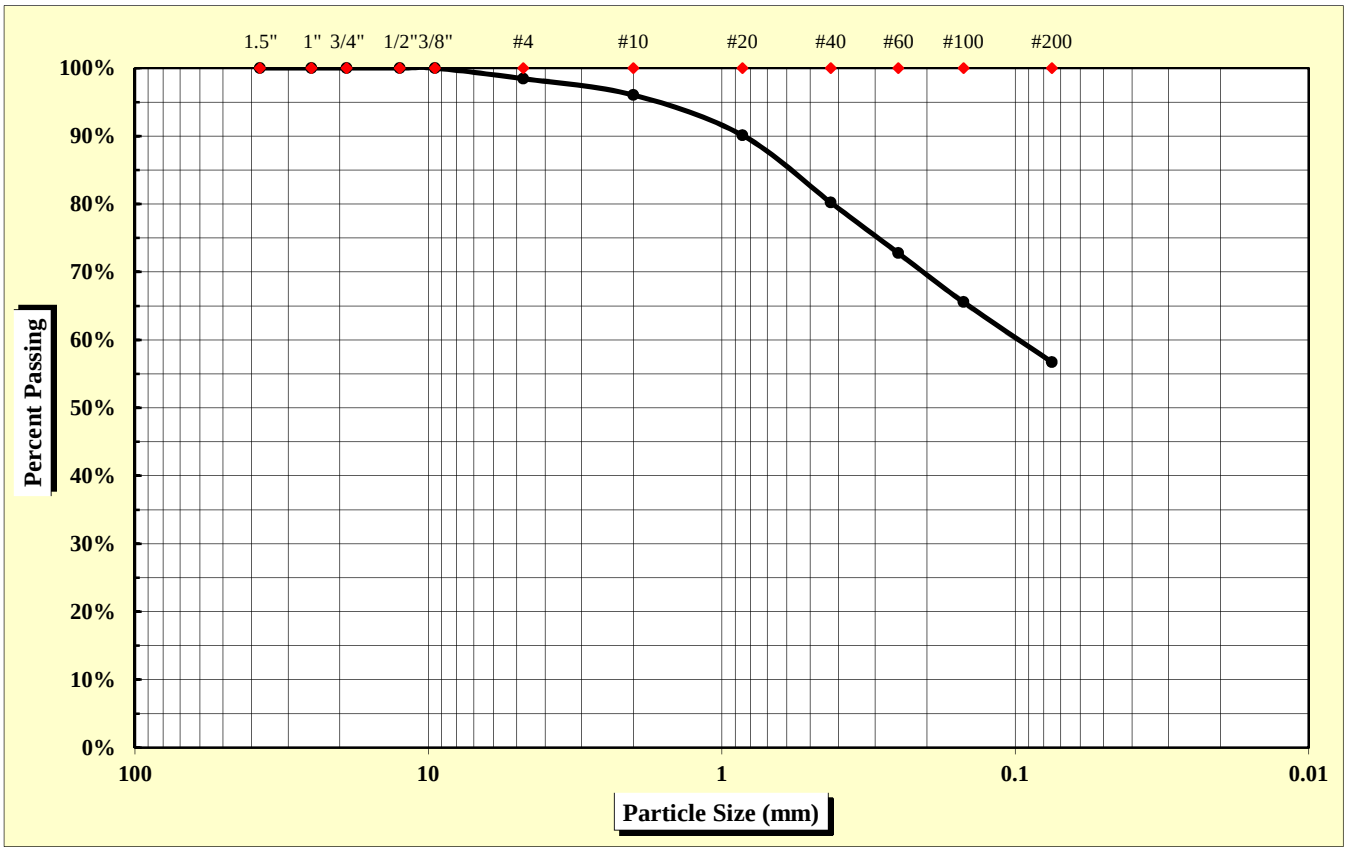
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-15	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, medium to fine, sandy SILT (ML) [A-7-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.0%	Fine Sand	23.5%
		Coarse Sand	15.8%	Silt & Clay	56.7%
Liquid Limit	43	Plastic Limit	32	Plastic Index	11
		Moisture Content	24.1%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

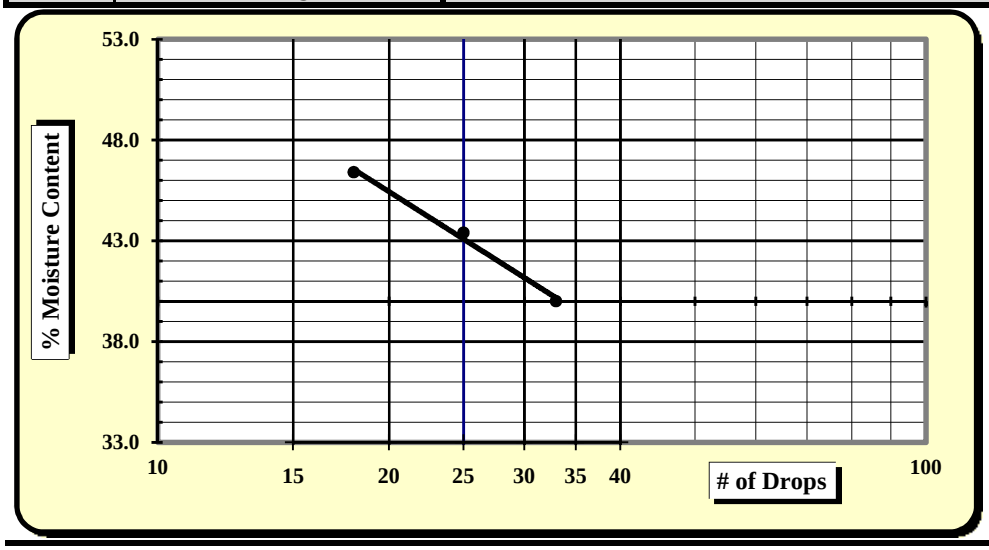
S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-15	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, medium to fine, sandy SILT (ML) [A-7-5 (5)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P11	S23	P13				P3		
A	Tare Weight	3.52	3.62	3.58				3.59		
B	Wet Soil Weight + A	21.87	18.91	19.95				12.60		
C	Dry Soil Weight + A	16.63	14.28	14.76				10.43		
D	Water Weight (B-C)	5.24	4.63	5.19				2.17		
E	Dry Soil Weight (C-A)	13.11	10.66	11.18				6.84		
F	% Moisture (D/E)*100	40.0%	43.4%	46.4%				31.7%		
N	# OF DROPS	33	25	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**32**
Plastic Index	**11**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.7%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

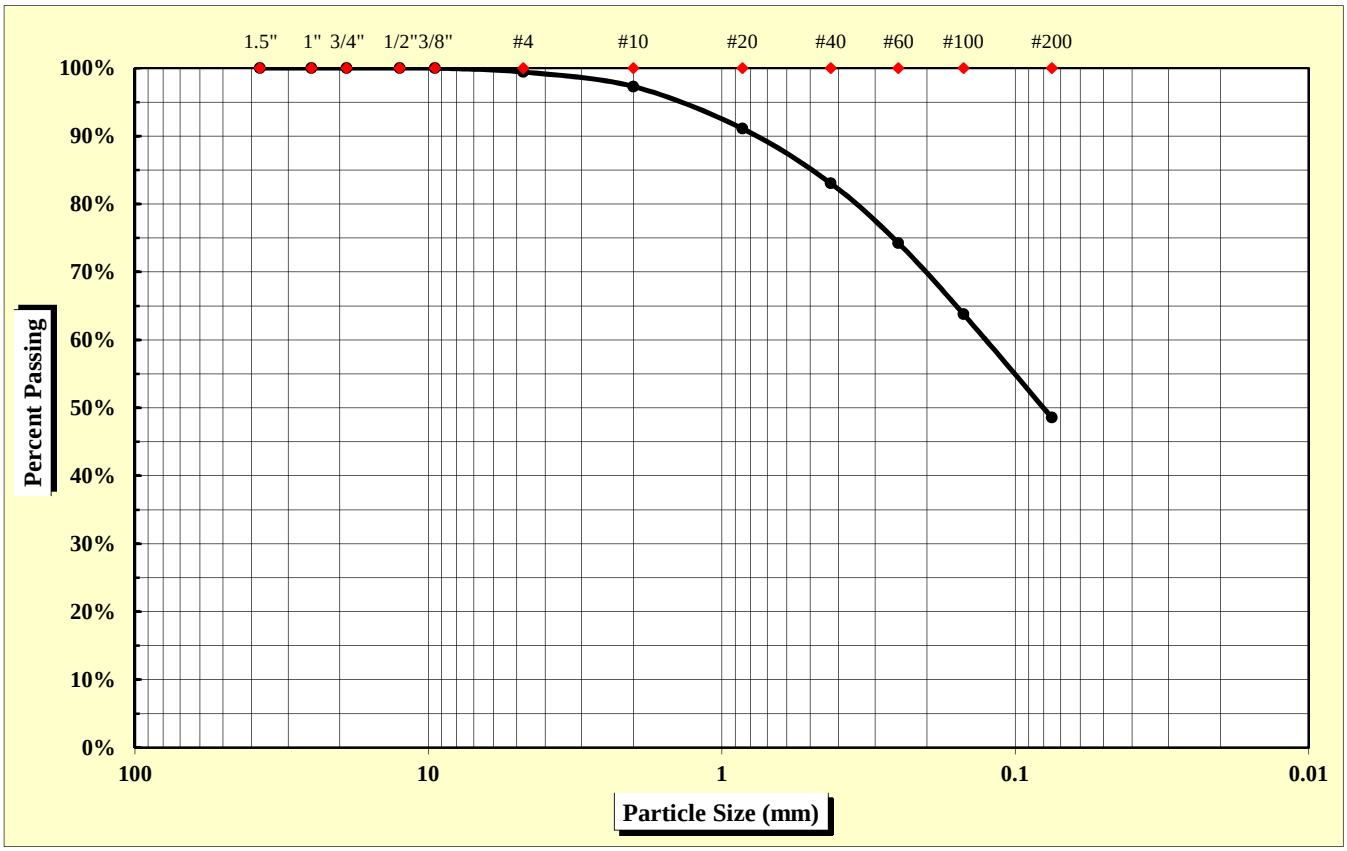
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-16	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown, medium to fine, clayey SAND (SC) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.7%	Fine Sand	34.5%
		Coarse Sand	14.2%	Silt & Clay	48.6%
Liquid Limit	30	Plastic Limit	19	Plastic Index	11
		Moisture Content	N/A	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

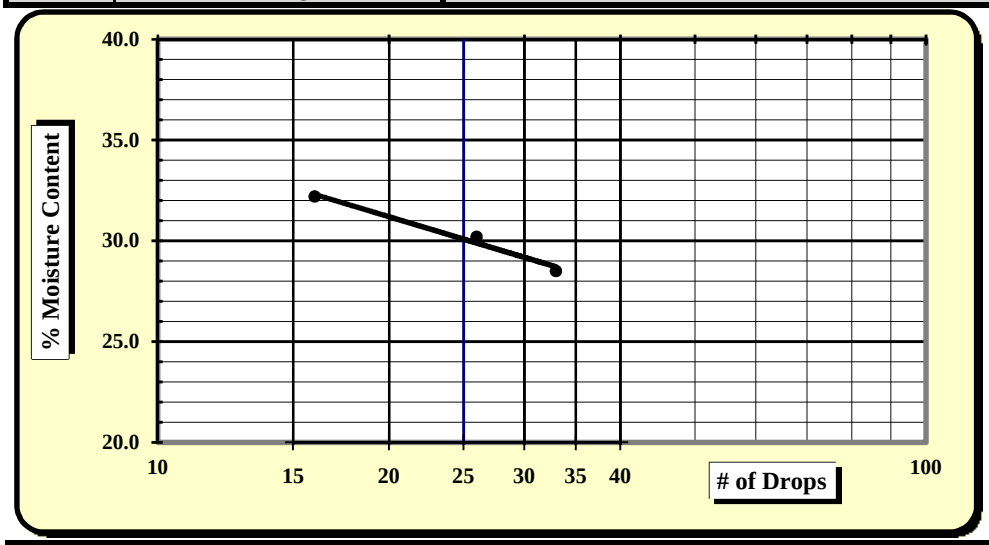
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-16	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, clayey SAND (SC) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	25	26	27				28		
A	Tare Weight	26.81	27.41	27.04				26.87		
B	Wet Soil Weight + A	48.57	45.16	46.40				36.10		
C	Dry Soil Weight + A	43.75	41.04	41.69				34.61		
D	Water Weight (B-C)	4.82	4.12	4.71				1.49		
E	Dry Soil Weight (C-A)	16.94	13.63	14.65				7.74		
F	% Moisture (D/E)*100	28.5%	30.2%	32.2%				19.3%		
N	# OF DROPS	33	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**19**
Plastic Index	**11**
Group Symbol	**SC / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 48.6%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

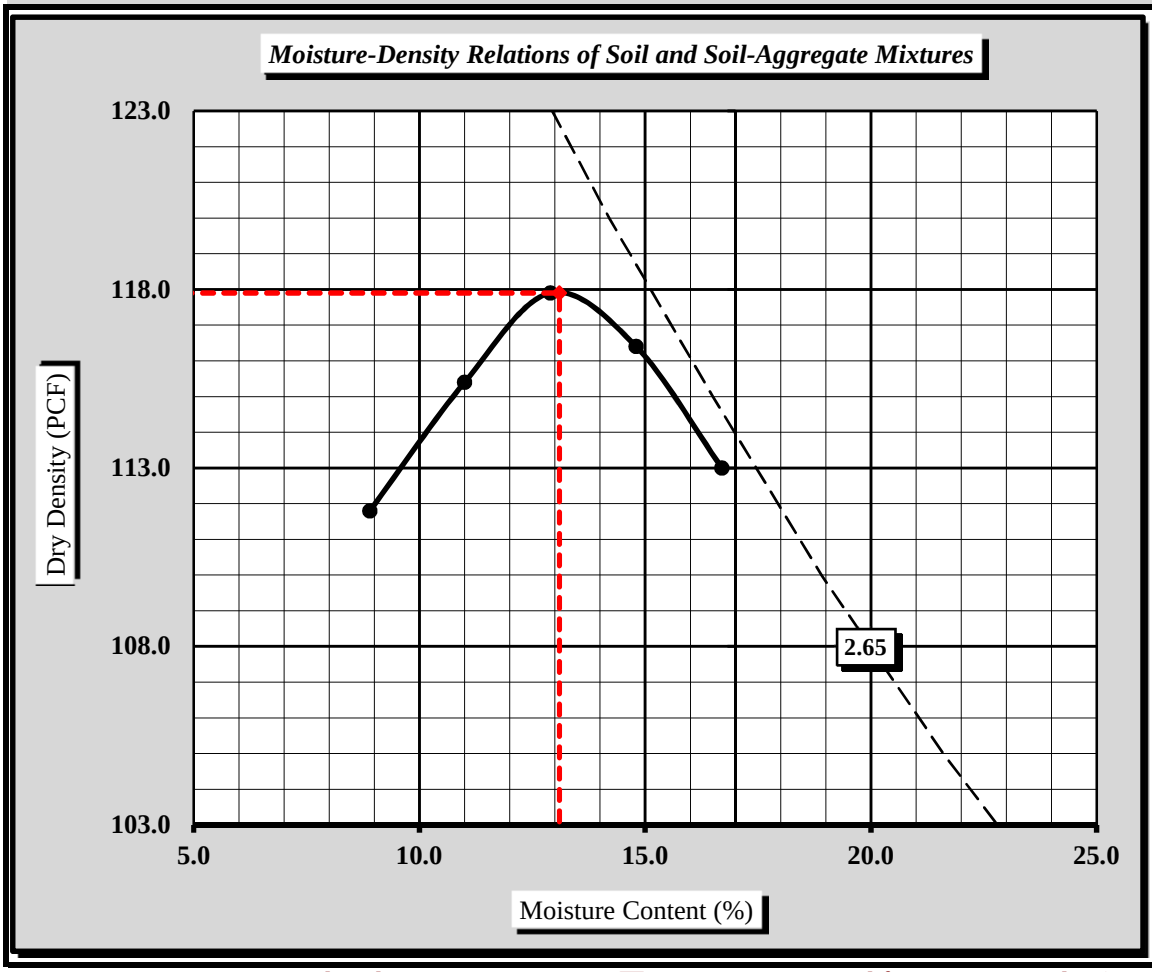
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-16	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, clayey SAND (SC) [A-6 (2)]

Maximum Dry Density 117.9 PCF. Optimum Moisture Content 13.1%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	30
Plastic Limit	19
Plastic Index	11

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	99.4%
#10	97.3%
#40	83.0%
#60	74.2%
#100	63.8%
#200	48.6%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/08 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

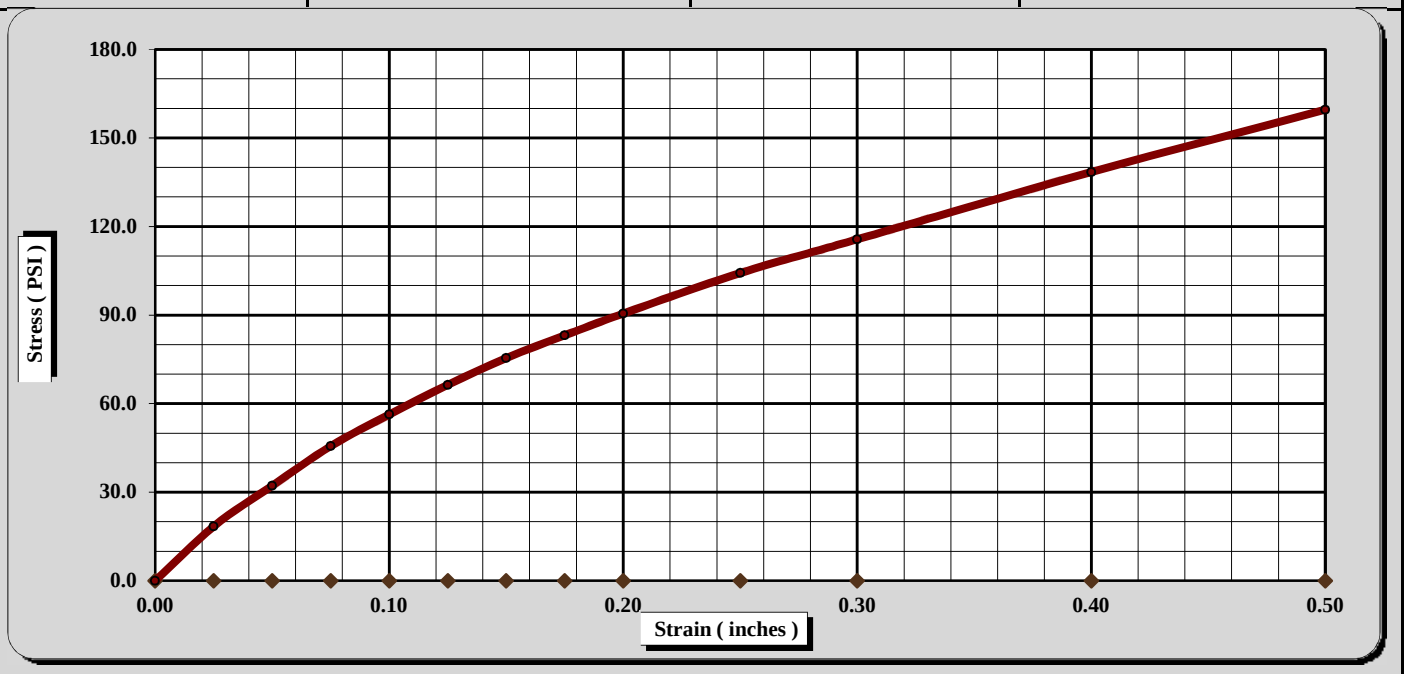
Boring #:	SB-16	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown, medium to fine, clayey SAND (SC) [A-6 (2)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **117.9 PCF** Optimum Moisture Content: **13.1%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 5.6	**CBR at 0.2 in. 6.0**	**CBR at 0.1 in. 5.6**	**CBR at 0.2 in. 6.0**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	107.0
Initial Dry Density (PCF)	112.4	Average Final Moisture Content	16.9%
Moisture Content of the Compacted Specimen	12.7%	Moisture Content (top 1" after soaking)	19.3%
Percent Compaction	95.3%	Percent Swell	1.3%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	30	Plastic Index	11	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

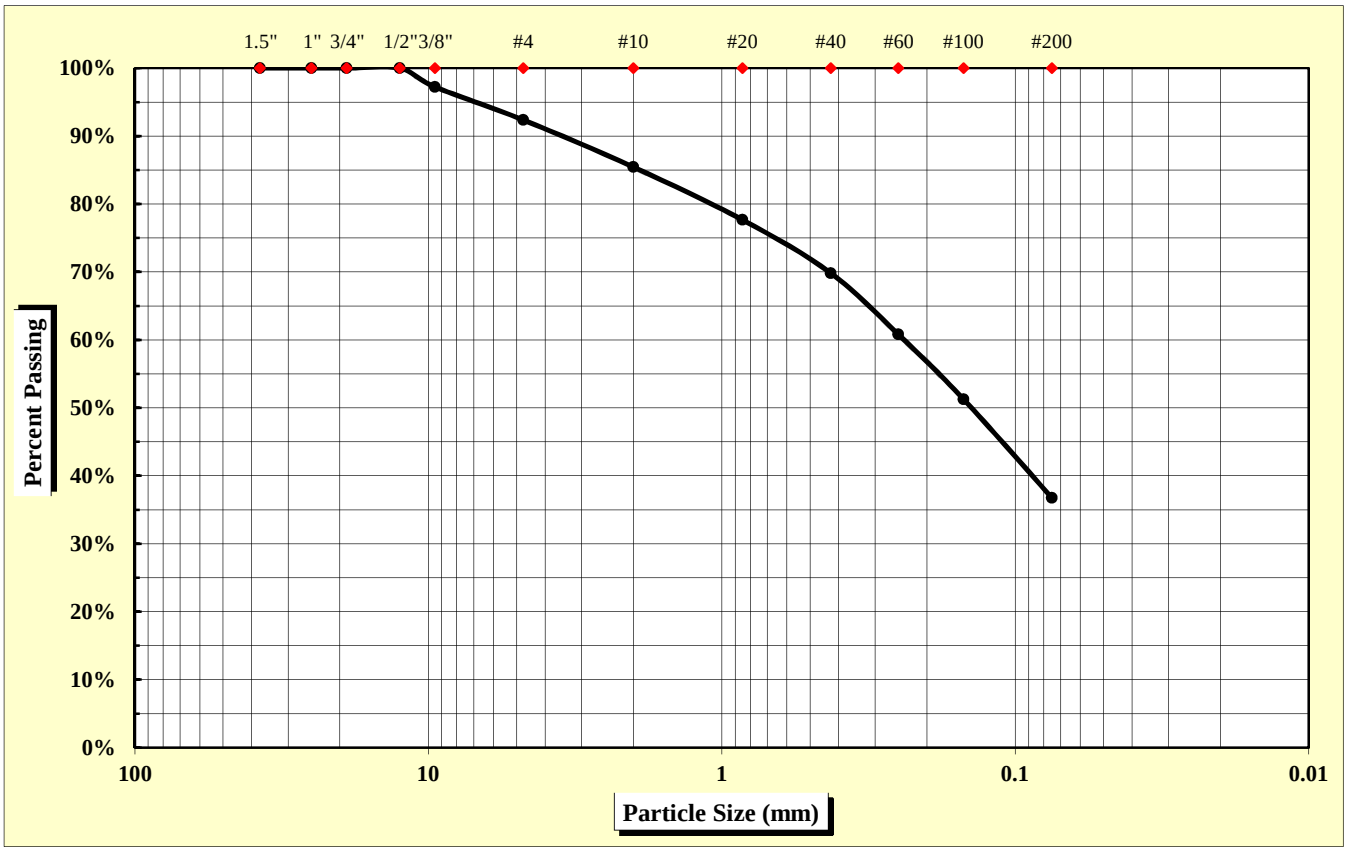
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-16	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, silty, clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	14.6%	Fine Sand	33.1%
		Coarse Sand	15.6%	Silt & Clay	36.8%
Liquid Limit	27	Plastic Limit	21	Plastic Index	6
		Moisture Content	11.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

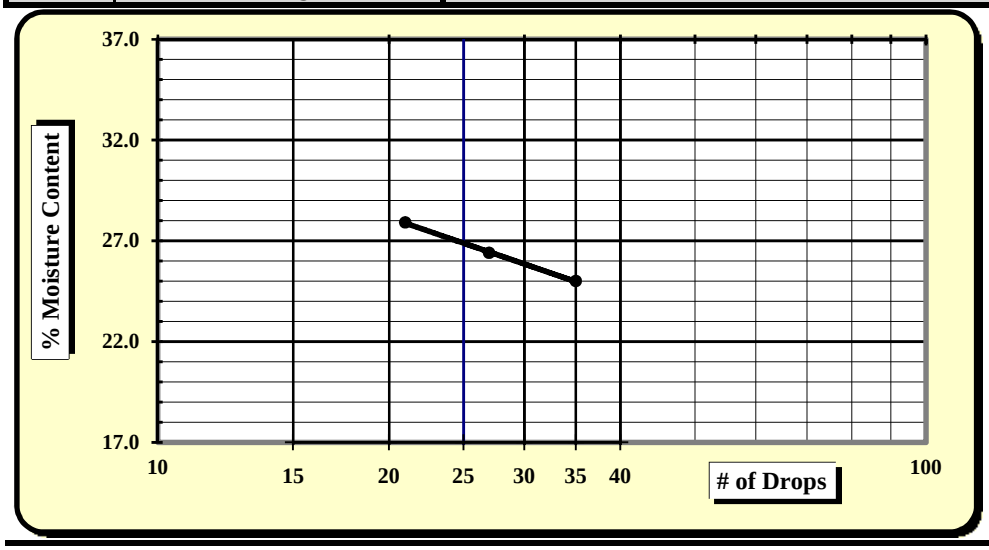
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-16	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Brown red, medium to fine, silty, clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	S12	S17	P8				P16		
A	Tare Weight	3.78	3.70	3.75				3.62		
B	Wet Soil Weight + A	22.54	19.94	23.14				13.47		
C	Dry Soil Weight + A	18.79	16.55	18.91				11.79		
D	Water Weight (B-C)	3.75	3.39	4.23				1.68		
E	Dry Soil Weight (C-A)	15.01	12.85	15.16				8.17		
F	% Moisture (D/E)*100	25.0%	26.4%	27.9%				20.6%		
N	# OF DROPS	35	27	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**21**
Plastic Index	**6**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.8%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

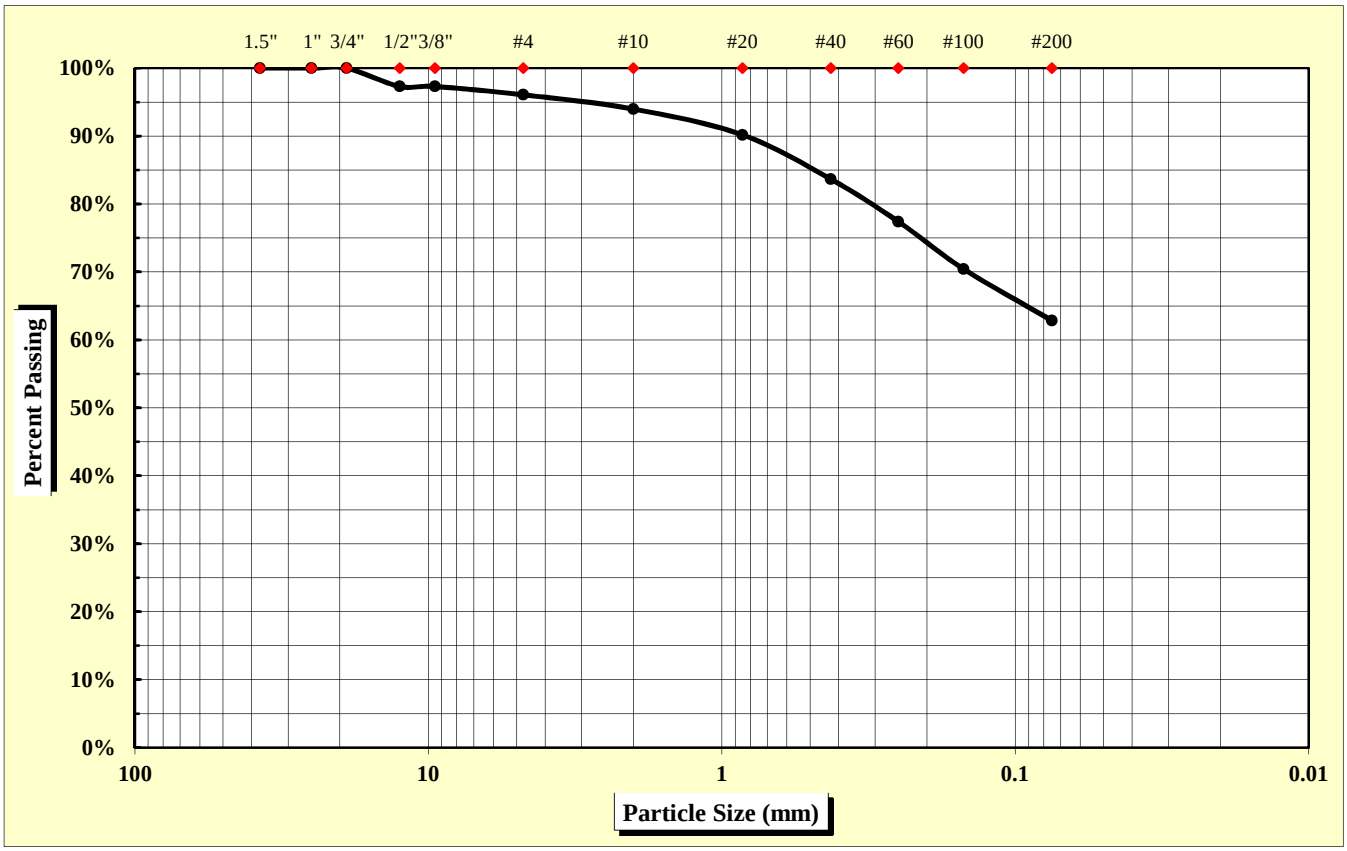
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-17	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	6.0%	Fine Sand	20.8%
		Coarse Sand	10.3%	Silt & Clay	62.9%
Liquid Limit	43	Plastic Limit	23	Plastic Index	20
		Moisture Content	22.1%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

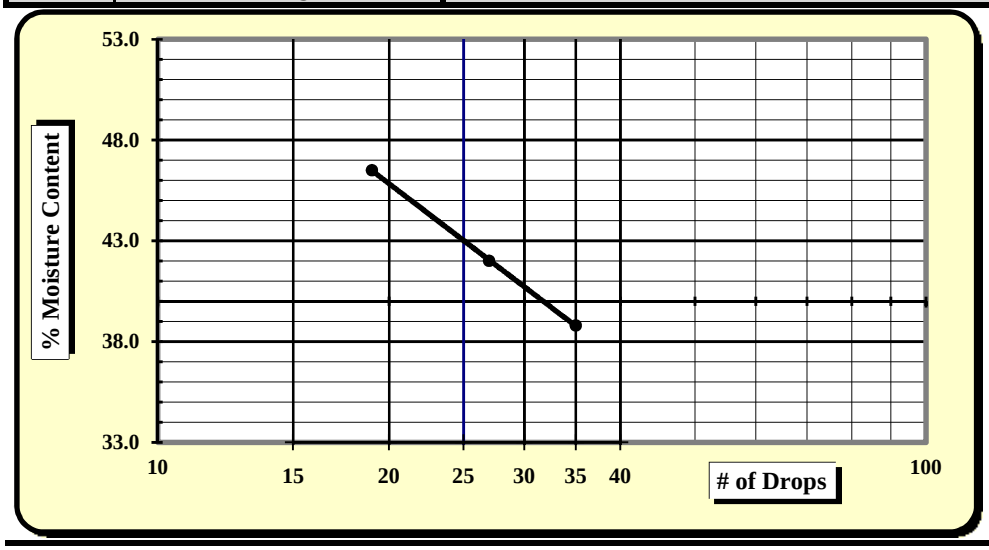
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-17	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	S19	S20	S6				S5		
A	Tare Weight	3.68	3.67	3.58				3.56		
B	Wet Soil Weight + A	19.48	22.16	19.65				13.29		
C	Dry Soil Weight + A	15.06	16.69	14.55				11.45		
D	Water Weight (B-C)	4.42	5.47	5.10				1.84		
E	Dry Soil Weight (C-A)	11.38	13.02	10.97				7.89		
F	% Moisture (D/E)*100	38.8%	42.0%	46.5%				23.3%		
N	# OF DROPS	35	27	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**23**
Plastic Index	**20**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.9%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

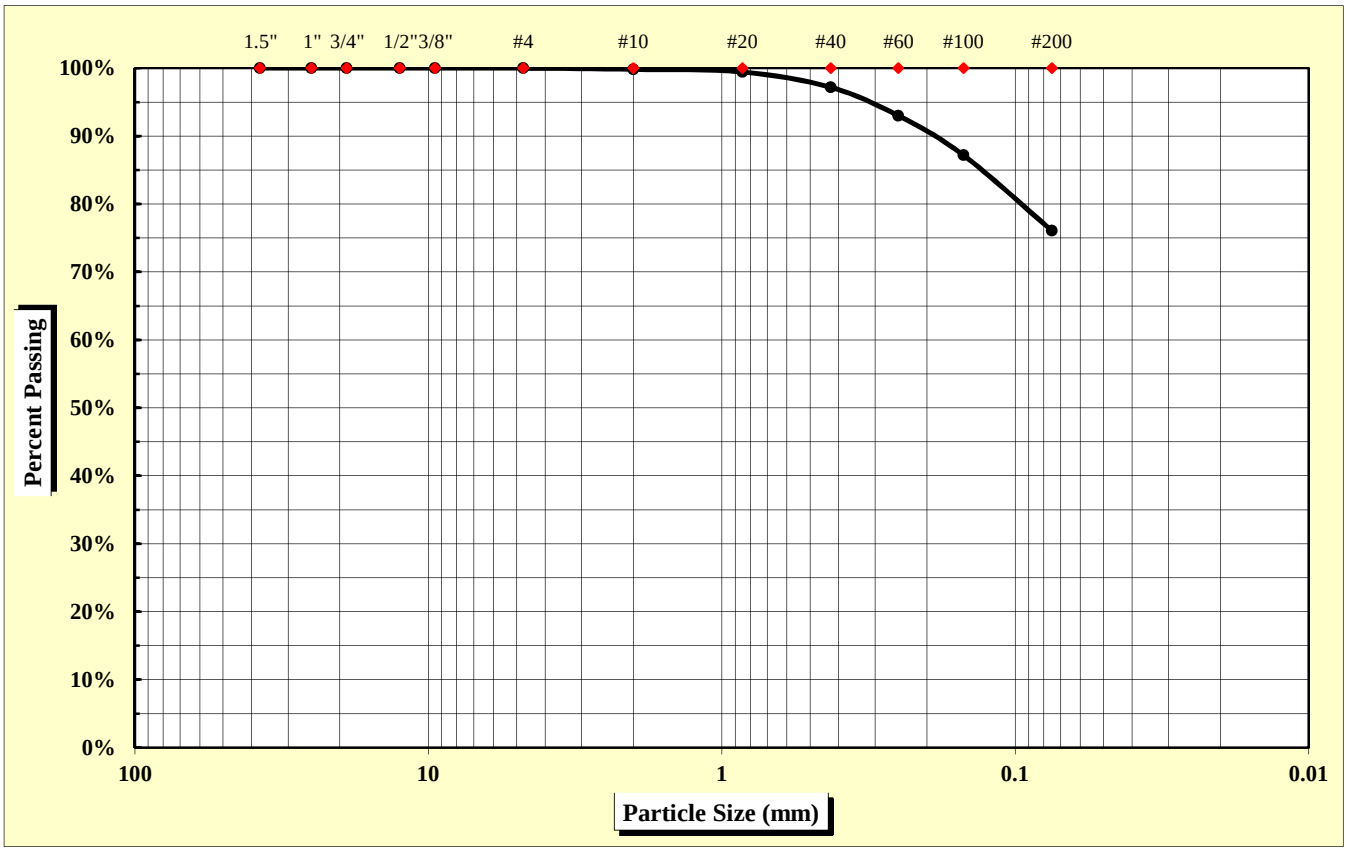
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-17	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red, fine, SILT with sand (ML) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.850 mm	Gravel	0.2%	Fine Sand	21.1%
		Coarse Sand	2.7%	Silt & Clay	76.1%
Liquid Limit	47	Plastic Limit	34	Plastic Index	13
		Moisture Content	33.8%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

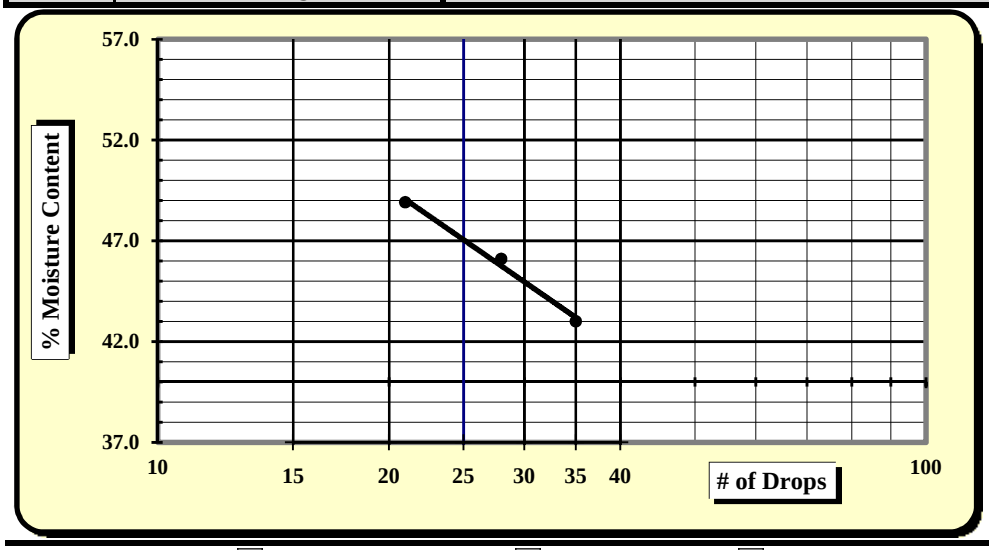
S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-17	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red, fine, SILT with sand (ML) [A-7-5 (11)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	S14	P9	S3				S18		
A	Tare Weight	3.67	3.58	3.64				3.67		
B	Wet Soil Weight + A	19.77	21.96	20.36				13.58		
C	Dry Soil Weight + A	14.93	16.16	14.87				11.07		
D	Water Weight (B-C)	4.84	5.80	5.49				2.51		
E	Dry Soil Weight (C-A)	11.26	12.58	11.23				7.40		
F	% Moisture (D/E)*100	43.0%	46.1%	48.9%				33.9%		
N	# OF DROPS	35	28	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**34**
Plastic Index	**13**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 76.1%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

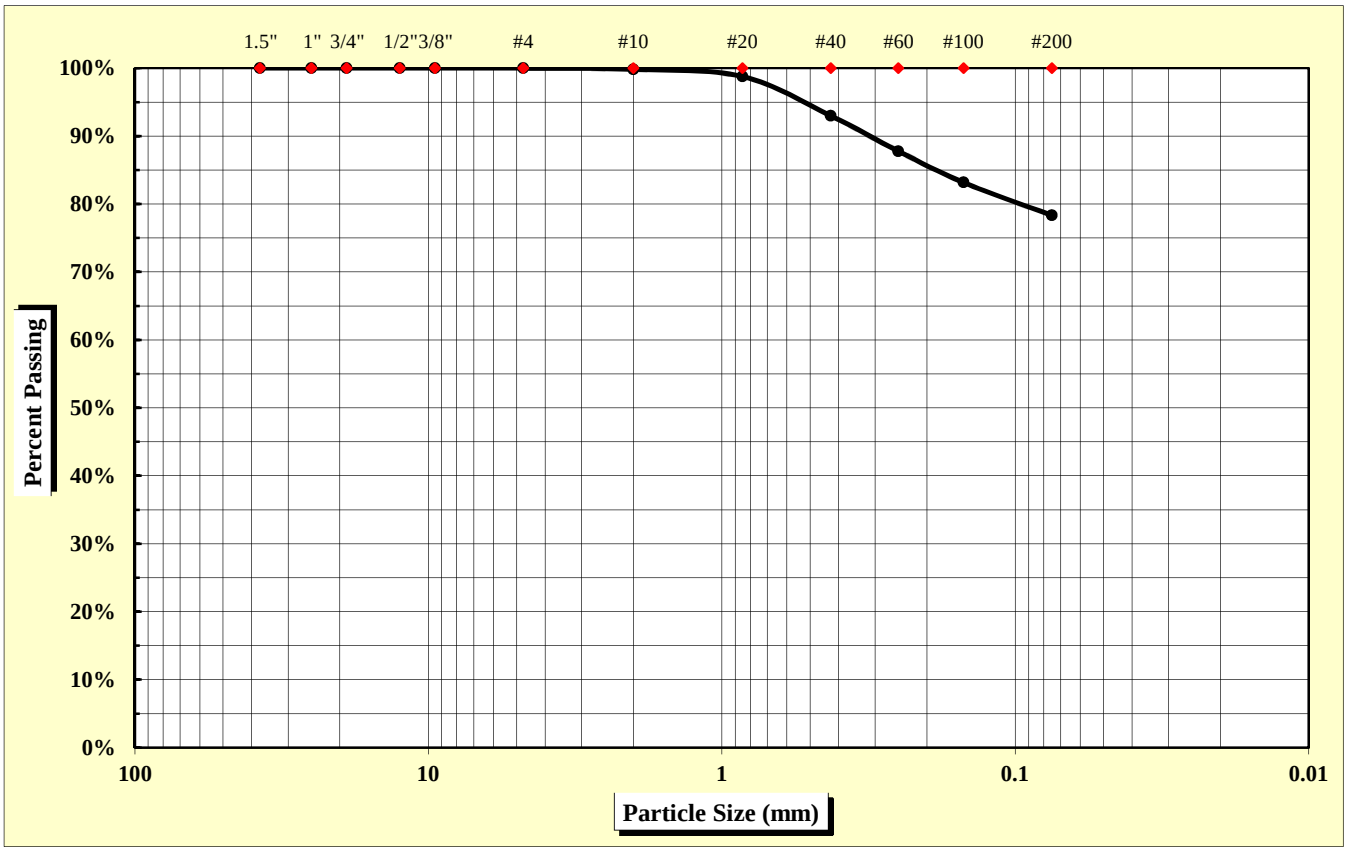
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-19	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red yellow gray, fine, ELASTIC SILT with sand (MH) [A-7-5 (26)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	14.7%
		Coarse Sand	6.8%	Silt & Clay	78.3%
Liquid Limit	62	Plastic Limit	32	Plastic Index	30
		Moisture Content	27.8%	Group Index	26

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

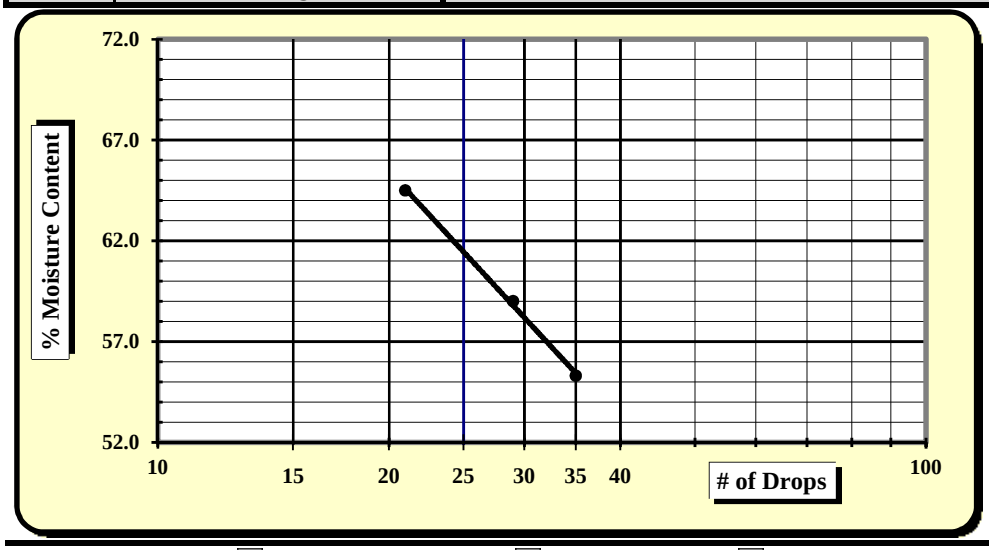
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-19	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Brown red yellow gray, fine, ELASTIC SILT with sand (MH) [A-7-5 (26)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.71	26.51	26.39				26.00		
B	Wet Soil Weight + A	42.15	39.88	41.80				34.15		
C	Dry Soil Weight + A	36.65	34.92	35.76				32.17		
D	Water Weight (B-C)	5.50	4.96	6.04				1.98		
E	Dry Soil Weight (C-A)	9.94	8.41	9.37				6.17		
F	% Moisture (D/E)*100	55.3%	59.0%	64.5%				32.1%		
N	# OF DROPS	35	29	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**62**
Plastic Limit	**32**
Plastic Index	**30**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 78.3%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

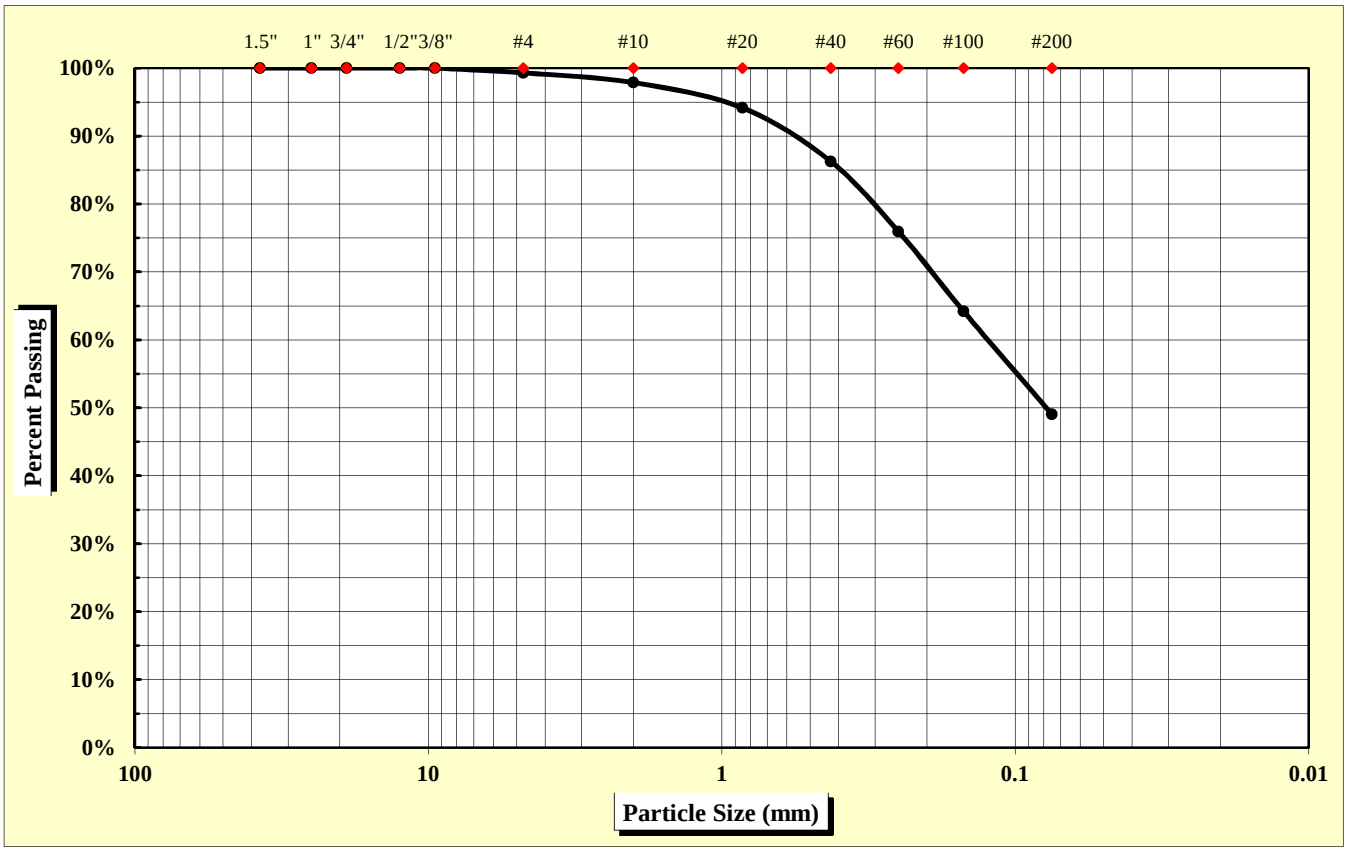
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.1%	Fine Sand	37.2%
		Coarse Sand	11.6%	Silt & Clay	49.1%
Liquid Limit	28	Plastic Limit	17	Plastic Index	11
		Moisture Content	N/A	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

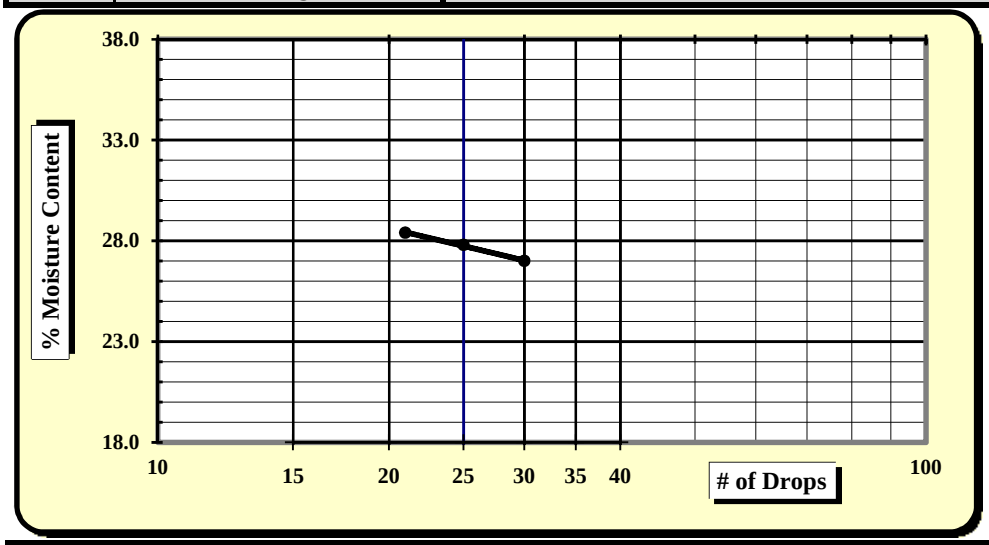
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.90	26.82	26.68				26.67		
B	Wet Soil Weight + A	46.67	49.20	48.01				34.34		
C	Dry Soil Weight + A	42.47	44.33	43.29				33.21		
D	Water Weight (B-C)	4.20	4.87	4.72				1.13		
E	Dry Soil Weight (C-A)	15.57	17.51	16.61				6.54		
F	% Moisture (D/E)*100	27.0%	27.8%	28.4%				17.3%		
N	# OF DROPS	30	25	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**28**
Plastic Limit	**17**
Plastic Index	**11**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.1%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

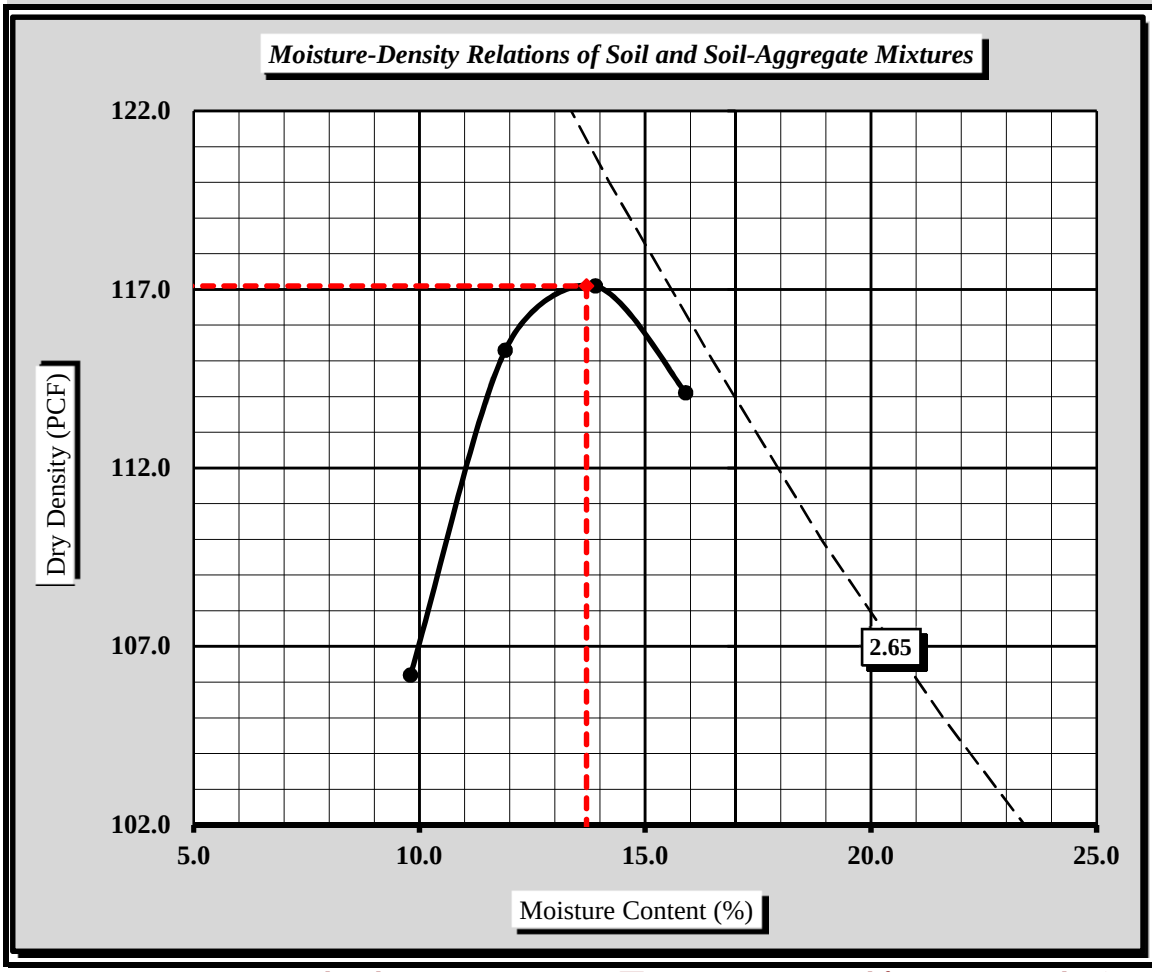
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]

Maximum Dry Density 117.1 PCF. Optimum Moisture Content 13.7%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	28
Plastic Limit	17
Plastic Index	11

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	99.3%
#10	97.9%
#40	86.3%
#60	76.0%
#100	64.2%
#200	49.1%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/01 - 6/05/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

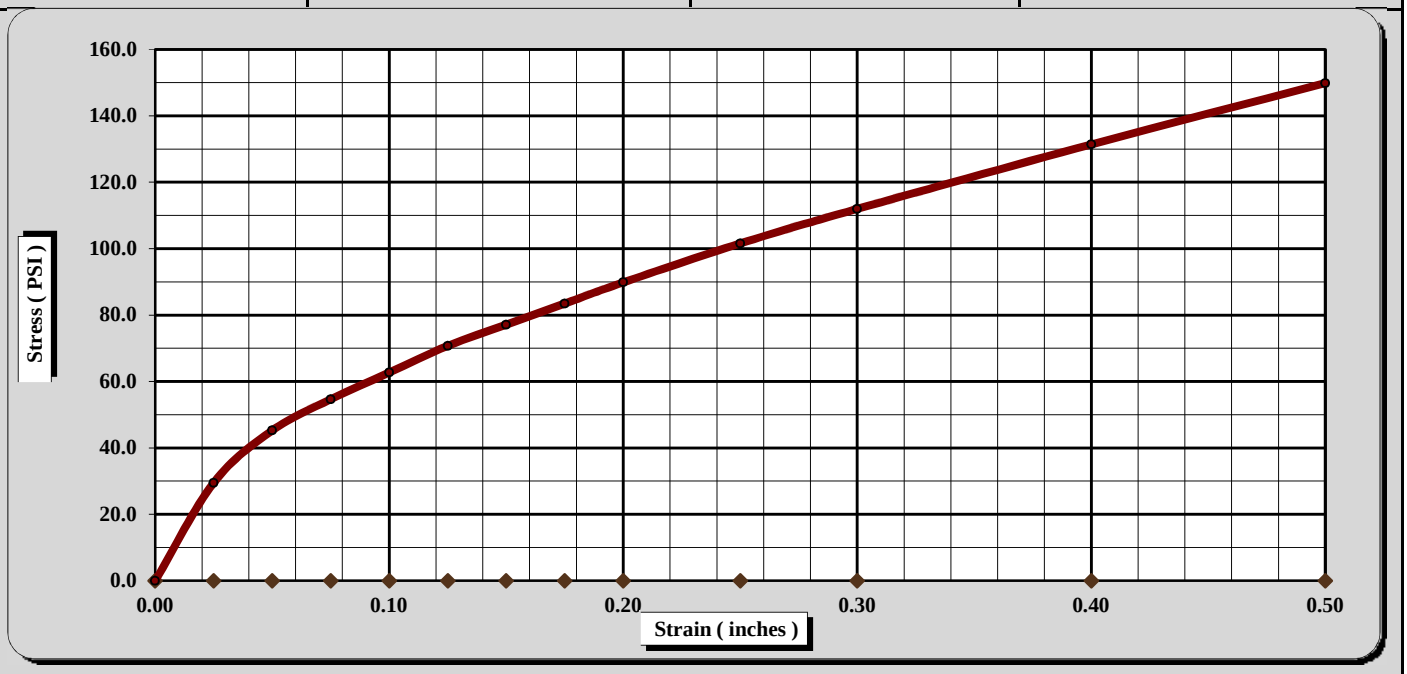
Boring #:	SB-20	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-6 (2)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **117.1 PCF** Optimum Moisture Content: **13.7%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 6.3	**CBR at 0.2 in. 6.0**	**CBR at 0.1 in. 6.3**	**CBR at 0.2 in. 6.0**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	109.2
Initial Dry Density (PCF)	111.1	Average Final Moisture Content	15.7%
Moisture Content of the Compacted Specimen	13.9%	Moisture Content (top 1" after soaking)	18.0%
Percent Compaction	94.8%	Percent Swell	0.2%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	28	Plastic Index	11	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

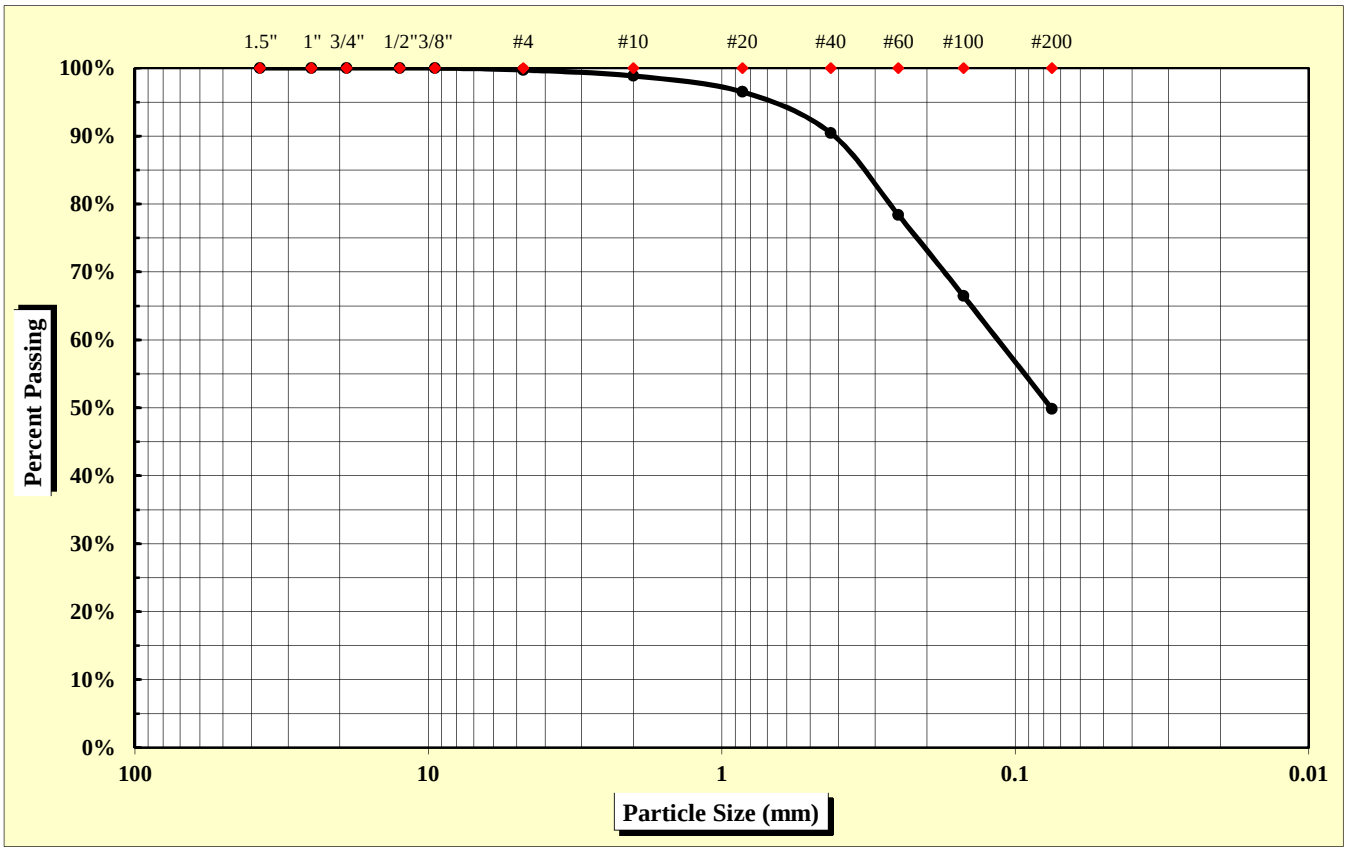
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.0 - 6.0'
Sample Description:	Brown red, fine, clayey SAND (SC) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.1%	Fine Sand	40.6%
		Coarse Sand	8.4%	Silt & Clay	49.9%
Liquid Limit	22	Plastic Limit	14	Plastic Index	8
		Moisture Content	16.1%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

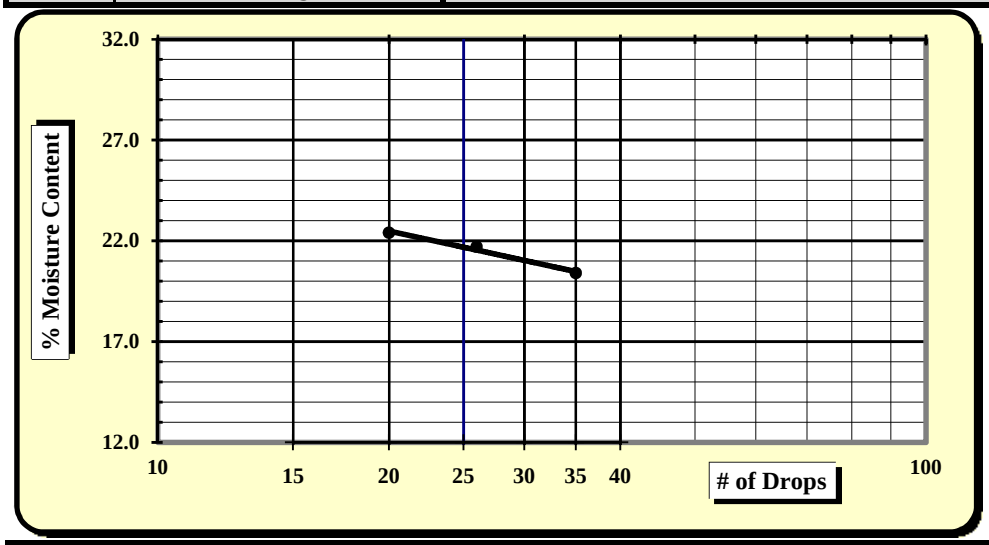
S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.0 - 6.0'
Sample Description:	Brown red, fine, clayey SAND (SC) [A-4 (1)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	27.00	27.81	26.31				27.36		
B	Wet Soil Weight + A	46.18	52.00	48.45				37.00		
C	Dry Soil Weight + A	42.93	47.68	44.40				35.82		
D	Water Weight (B-C)	3.25	4.32	4.05				1.18		
E	Dry Soil Weight (C-A)	15.93	19.87	18.09				8.46		
F	% Moisture (D/E)*100	20.4%	21.7%	22.4%				13.9%		
N	# OF DROPS	35	26	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**13.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**22**
Plastic Limit	**14**
Plastic Index	**8**
Group Symbol	**SC / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.9%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

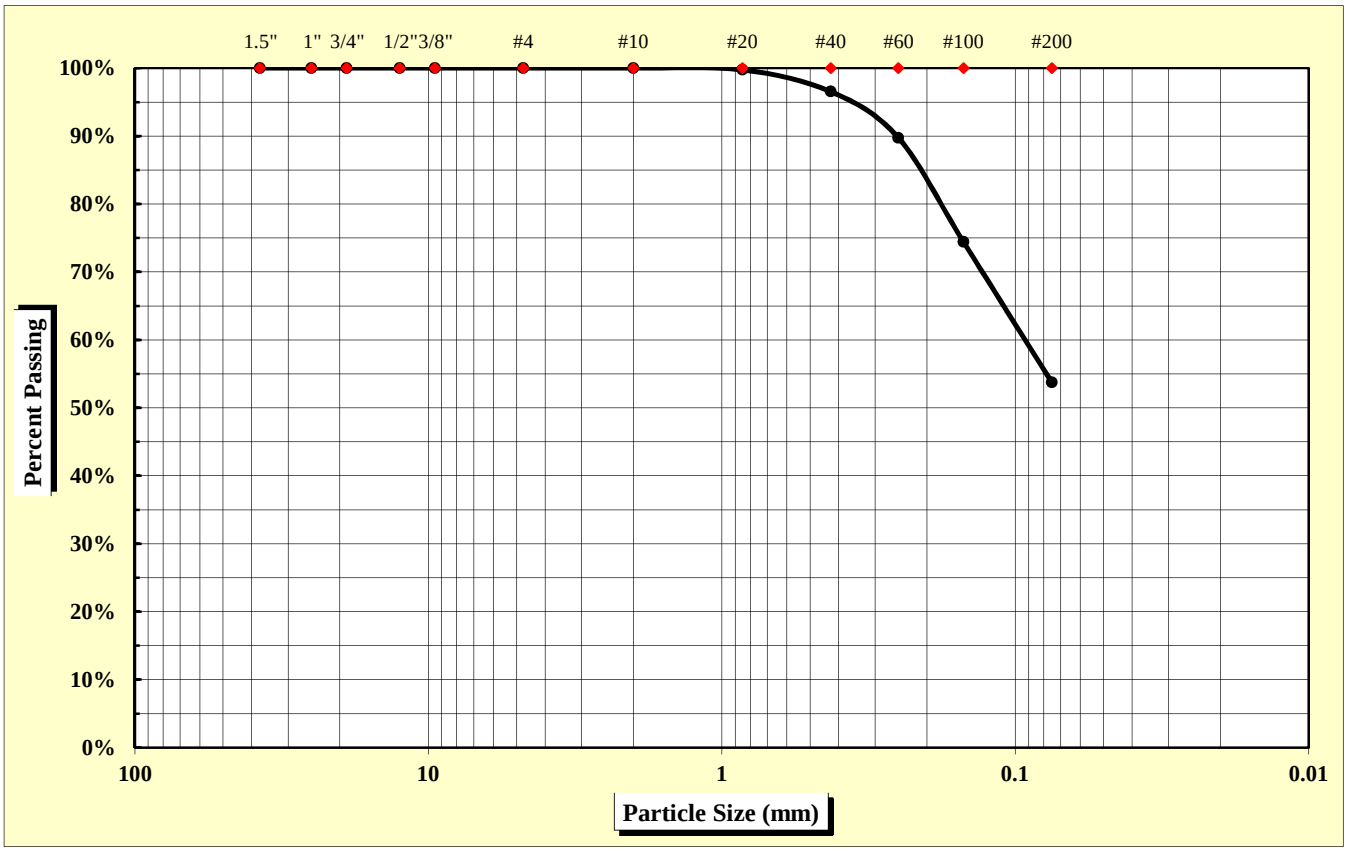
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'
Sample Description:	Brown red, fine, sandy ELASTIC SILT (MH) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.850 mm	Gravel	0.0%	Fine Sand	42.8%
		Coarse Sand	3.5%	Silt & Clay	53.8%
Liquid Limit	53	Plastic Limit	48	Plastic Index	5
		Moisture Content	36.1%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

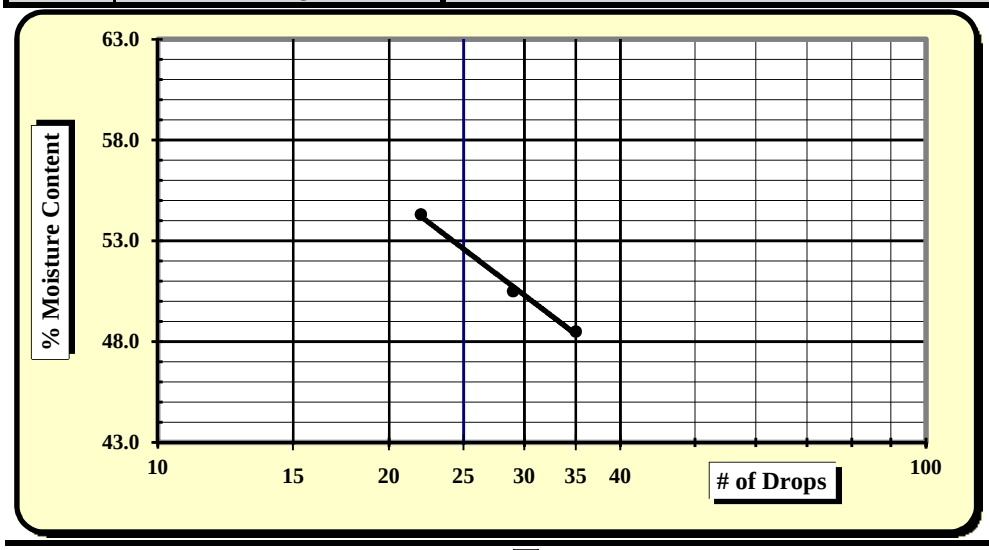
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-20	Sample #:	38g	Sample Date:	4/29/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'

Sample Description: Brown red, fine, sandy ELASTIC SILT (MH) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.90	26.83	26.70				26.68		
B	Wet Soil Weight + A	43.31	44.70	44.37				35.24		
C	Dry Soil Weight + A	37.95	38.70	38.15				32.57		
D	Water Weight (B-C)	5.36	6.00	6.22				2.67		
E	Dry Soil Weight (C-A)	11.05	11.87	11.45				5.89		
F	% Moisture (D/E)*100	48.5%	50.5%	54.3%				45.3%		
N	# OF DROPS	35	29	22				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**45.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**53**
Plastic Limit	**45**
Plastic Index	**8**
Group Symbol	**MH / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.8%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

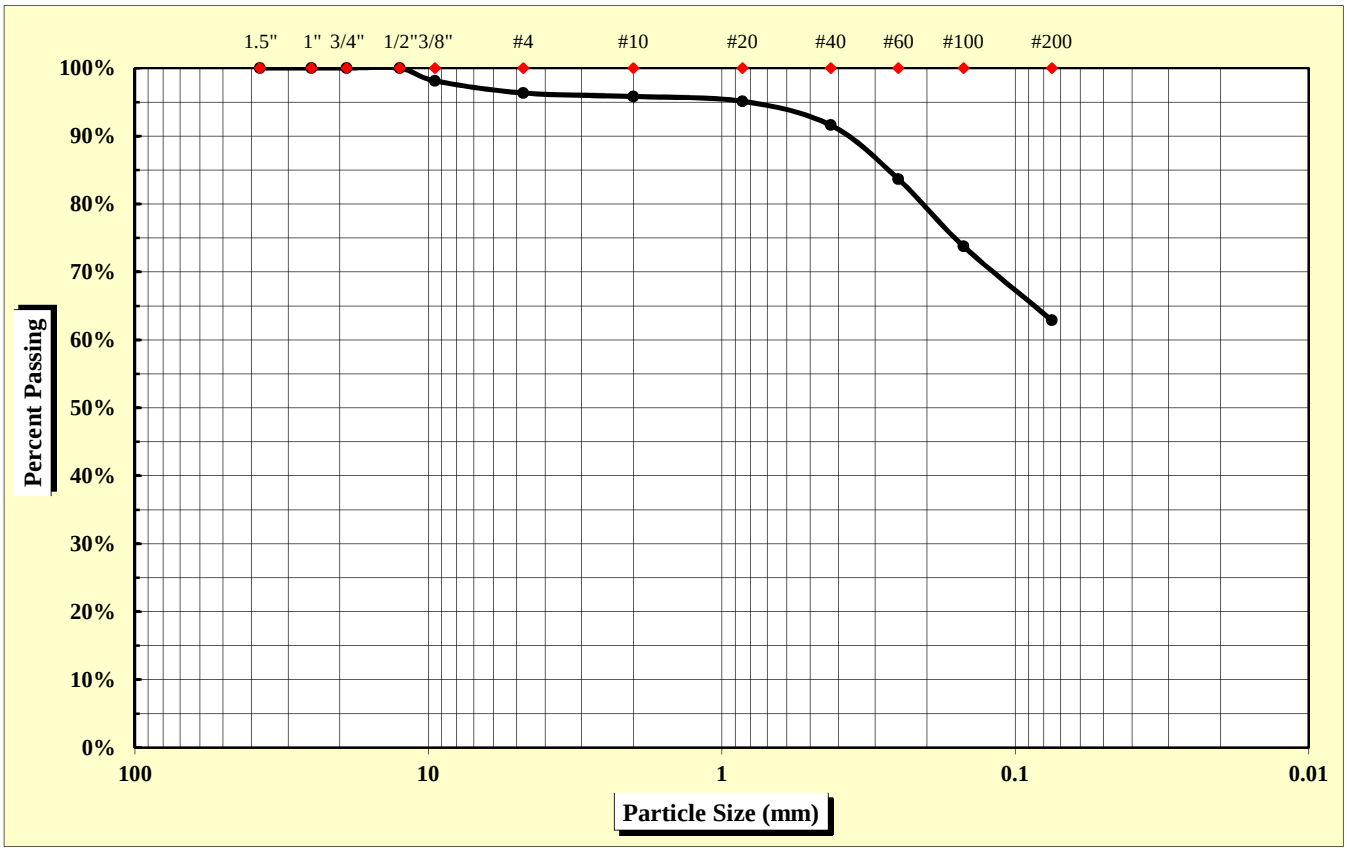
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-22	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange, fine, sandy SILT (ML) [A-7-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	4.2%	Fine Sand	28.7%
		Coarse Sand	4.2%	Silt & Clay	62.9%
Liquid Limit	43	Plastic Limit	29	Plastic Index	14
		Moisture Content	21.2%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

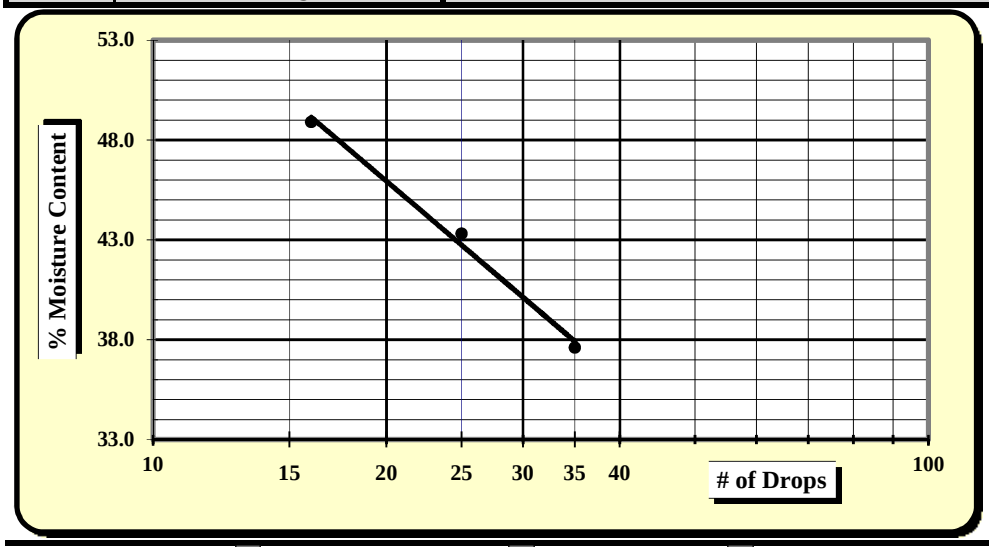
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-22	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange, fine, sandy SILT (ML) [A-7-6 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	J3	J1	104				998		
A	Tare Weight	12.45	12.09	12.15				12.21		
B	Wet Soil Weight + A	25.25	24.43	22.75				20.63		
C	Dry Soil Weight + A	21.75	20.70	19.27				18.76		
D	Water Weight (B-C)	3.50	3.73	3.48				1.87		
E	Dry Soil Weight (C-A)	9.30	8.61	7.12				6.55		
F	% Moisture (D/E)*100	37.6%	43.3%	48.9%				28.5%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**29**
Plastic Index	**14**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

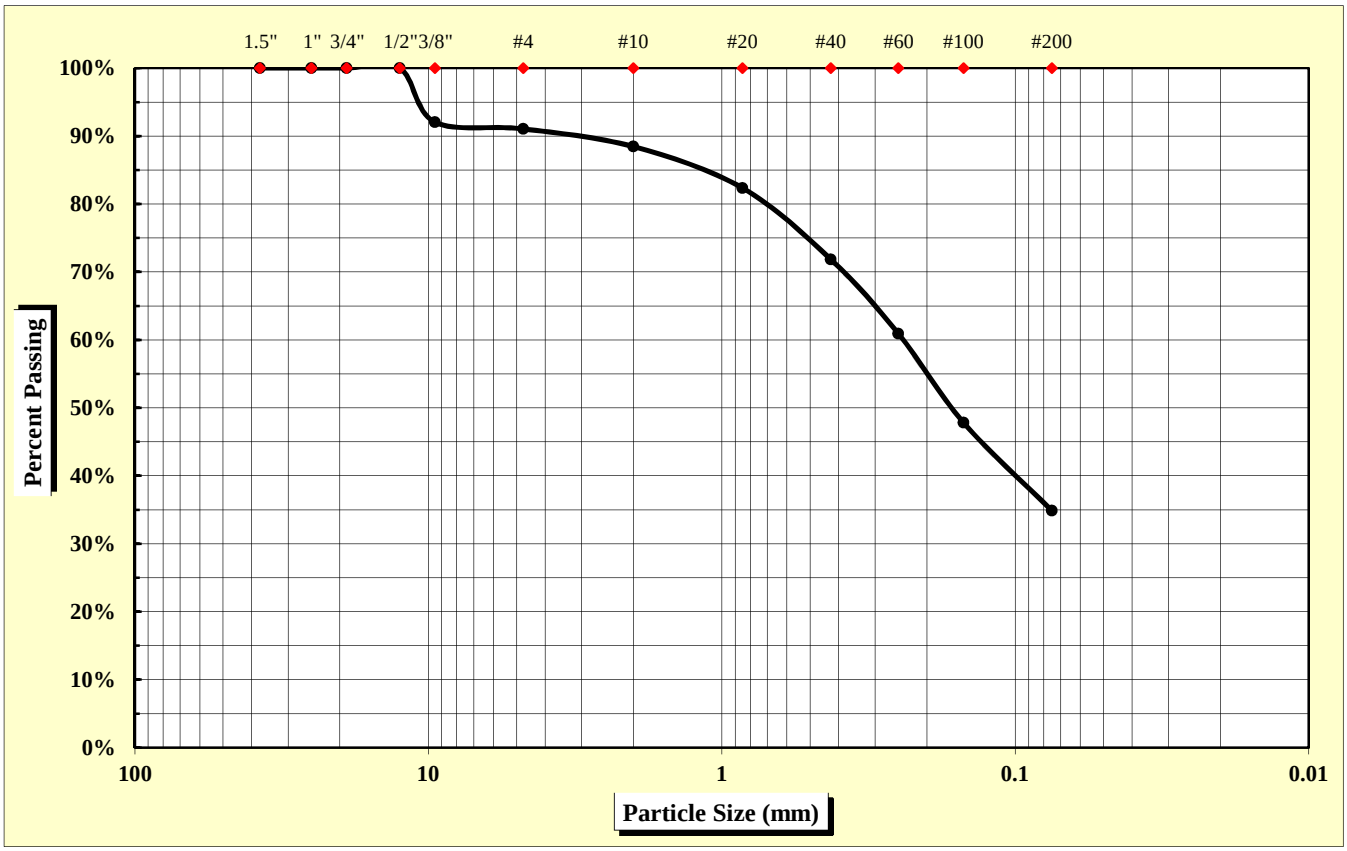
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-23	Sample #:	86	Sample Date:	4/29/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Dark brown red, medium to fine, clayey SAND (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	11.5%	Fine Sand	37.0%
		Coarse Sand	16.6%	Silt & Clay	34.9%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	12.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

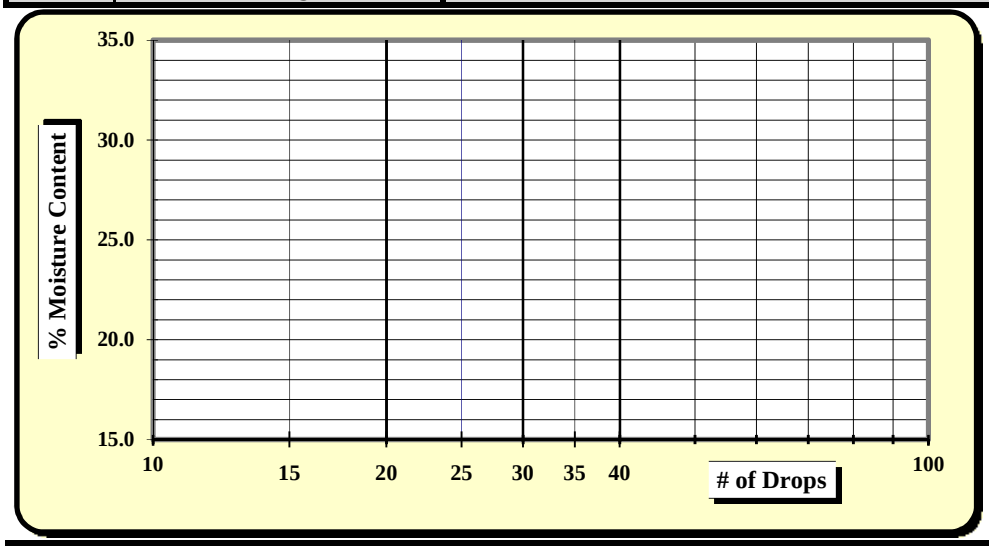
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-23	Sample #:	86	Sample Date:	4/29/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'

Sample Description: Dark brown red, medium to fine, clayey SAND (SC) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2014
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SC / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

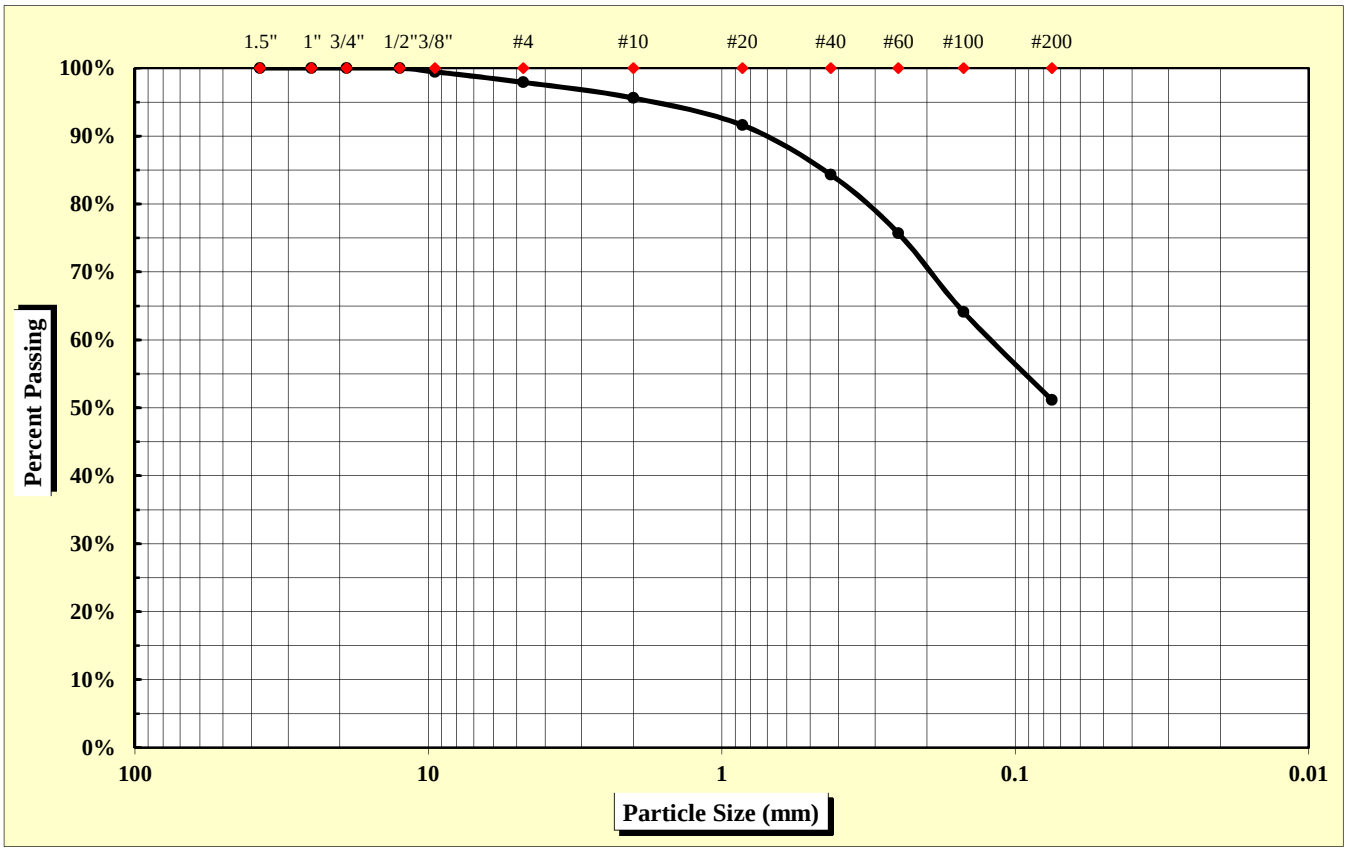
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-23	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.4%	Fine Sand	33.2%
		Coarse Sand	11.3%	Silt & Clay	51.1%
Liquid Limit	35	Plastic Limit	19	Plastic Index	16
		Moisture Content	N/A	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

Another code *ASTM D 4318* ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

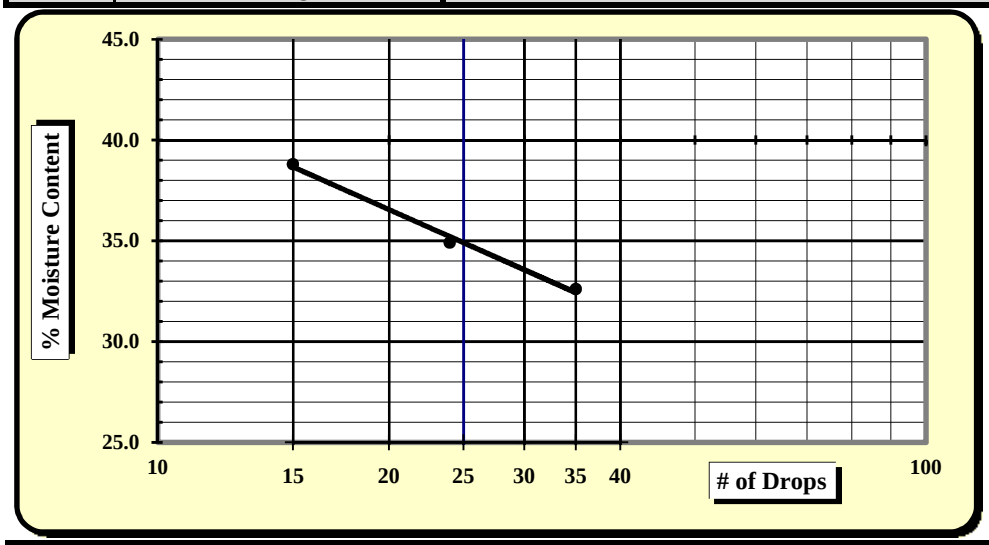
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-23	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	29	30	31				32		
A	Tare Weight	27.04	27.39	28.63				27.67		
B	Wet Soil Weight + A	45.30	46.45	52.09				37.13		
C	Dry Soil Weight + A	40.81	41.52	45.53				35.65		
D	Water Weight (B-C)	4.49	4.93	6.56				1.48		
E	Dry Soil Weight (C-A)	13.77	14.13	16.90				7.98		
F	% Moisture (D/E)*100	32.6%	34.9%	38.8%				18.5%		
N	# OF DROPS	35	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**18.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**19**
Plastic Index	**16**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.1%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughn	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

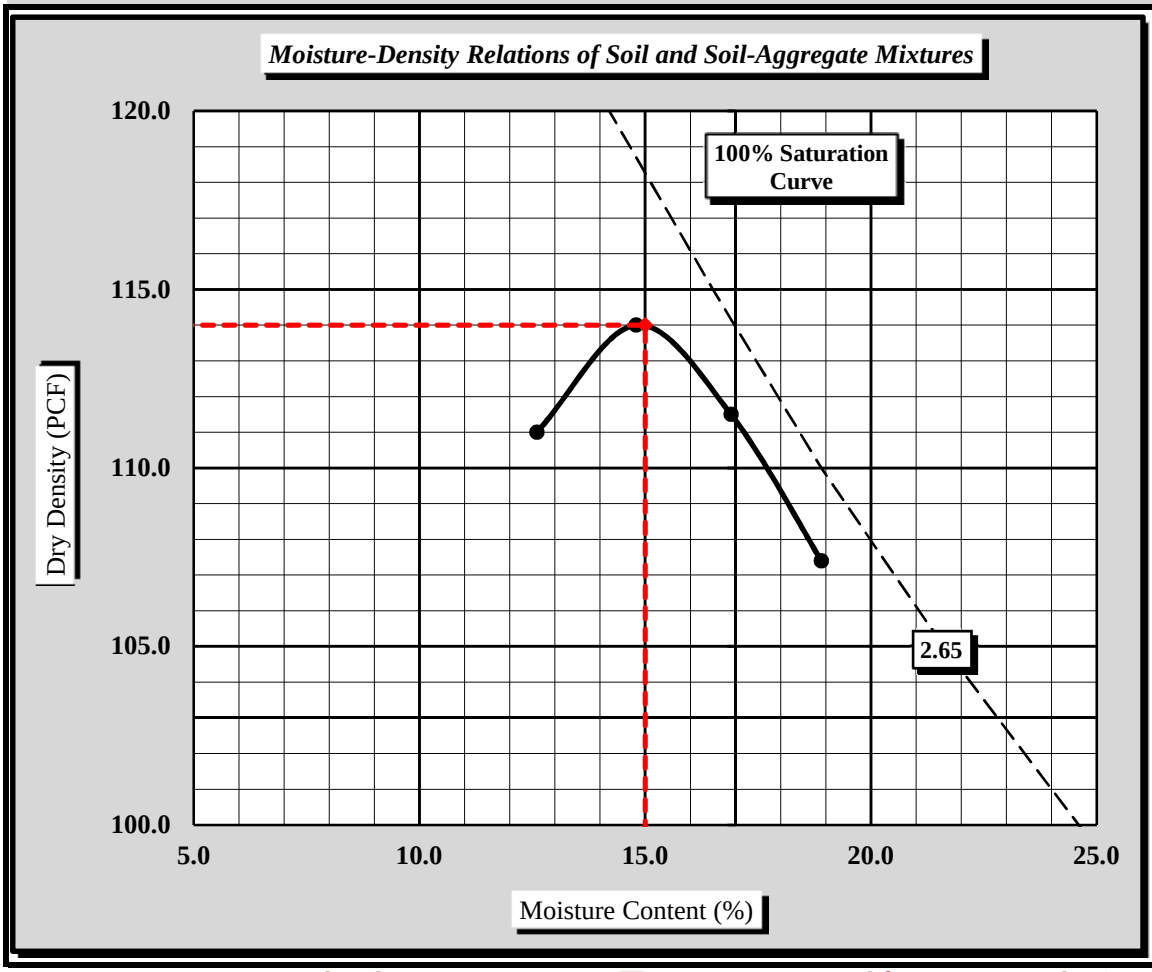
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-23	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (5)]

Maximum Dry Density 114.0 PCF. Optimum Moisture Content 15.0%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	35
Plastic Limit	19
Plastic Index	16

% Passing	
1/2"	100.0%
3/8"	99.5%
#4	97.9%
#10	95.6%
#40	84.3%
#60	75.7%
#100	64.1%
#200	51.1%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/08 - 6/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

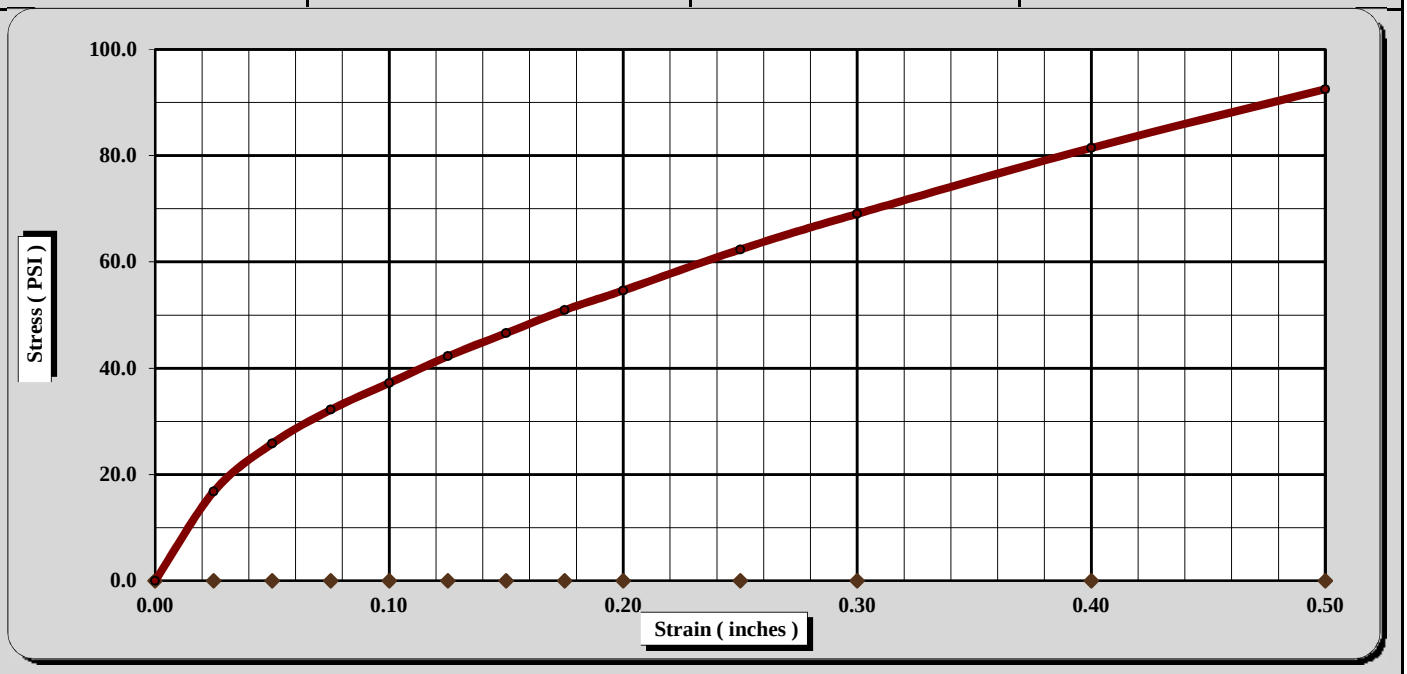
Boring #:	SB-23	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (5)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **114.0 PCF** Optimum Moisture Content: **15.0%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values				Corrected CBR Values			
CBR at 0.1 in.	**3.7**	**CBR at 0.2 in.**	**3.6**	**CBR at 0.1 in.**	**3.7**	**CBR at 0.2 in.**	**3.6**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	105.1
Initial Dry Density (PCF)	108.0	Average Final Moisture Content	18.2%
Moisture Content of the Compacted Specimen	15.4%	Moisture Content (top 1" after soaking)	20.7%
Percent Compaction	94.7%	Percent Swell	0.3%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	35	Plastic Index	16	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

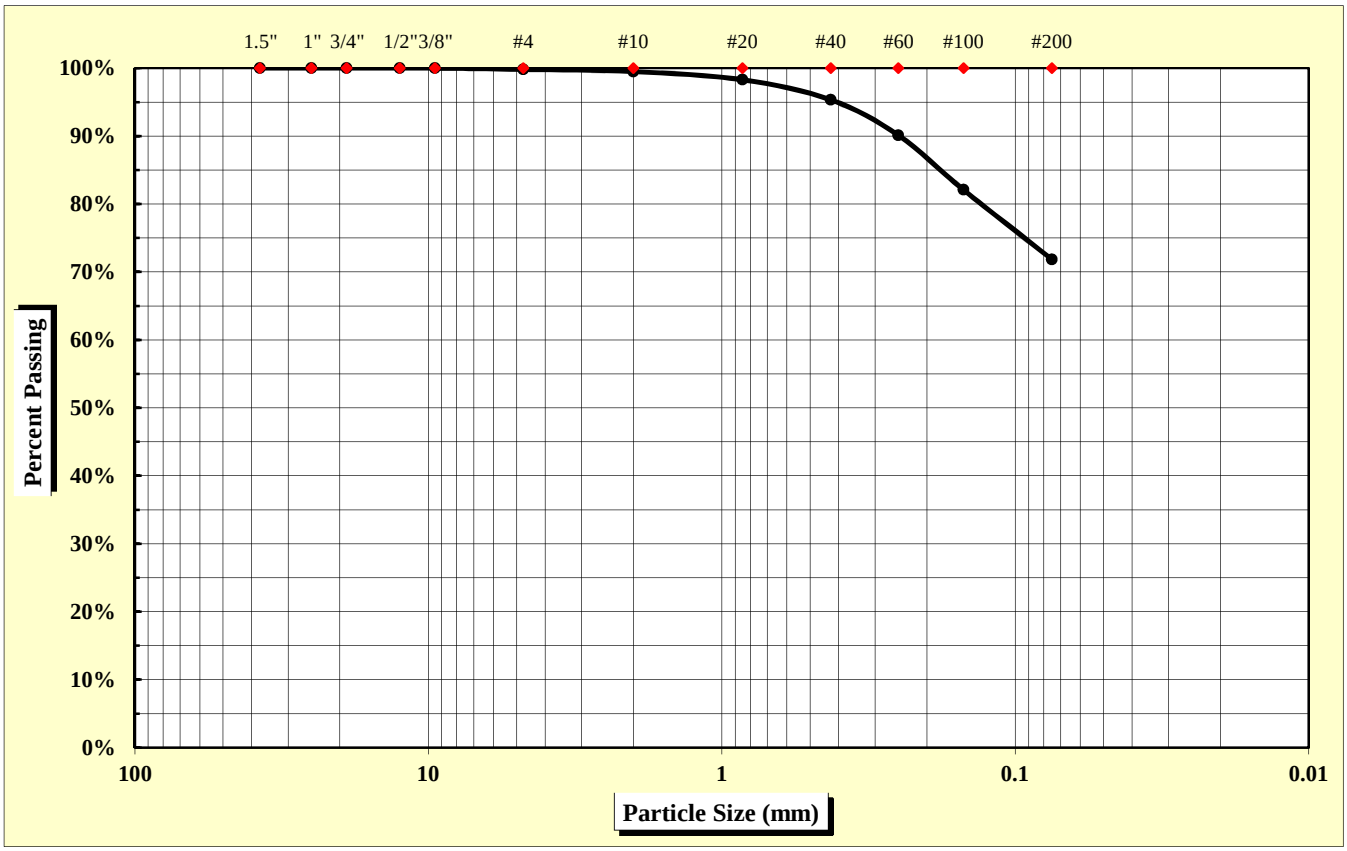
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-24	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red, fine, LEAN CLAY with sand (CL) [A-7-6 (16)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.5%	Fine Sand	23.5%
		Coarse Sand	4.2%	Silt & Clay	71.9%
Liquid Limit	48	Plastic Limit	26	Plastic Index	22
		Moisture Content	26.3%	Group Index	16

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

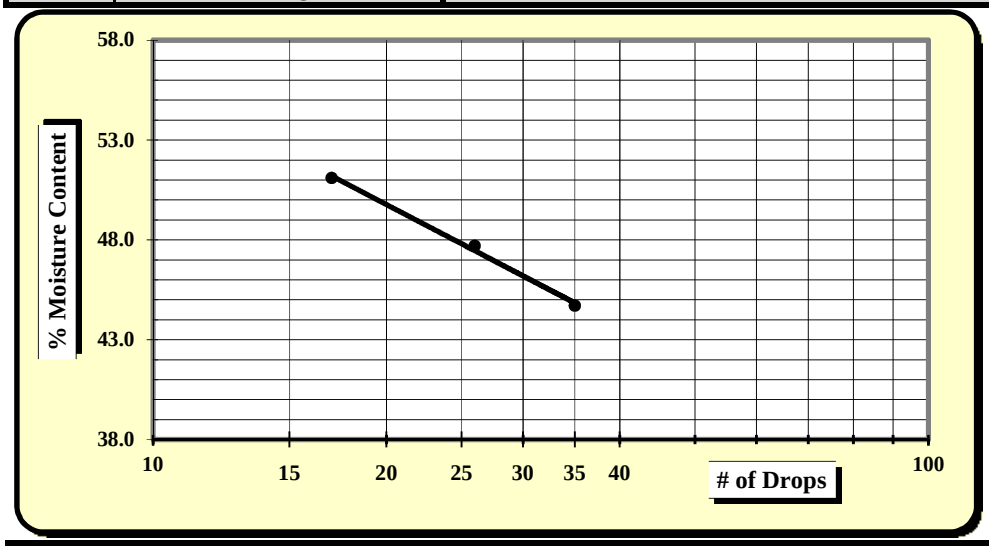
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-24	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red, fine, LEAN CLAY with sand (CL) [A-7-6 (16)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	509	506	XX5				507		
A	Tare Weight	12.03	12.06	12.10				12.15		
B	Wet Soil Weight + A	24.14	26.15	22.89				21.19		
C	Dry Soil Weight + A	20.40	21.60	19.24				19.30		
D	Water Weight (B-C)	3.74	4.55	3.65				1.89		
E	Dry Soil Weight (C-A)	8.37	9.54	7.14				7.15		
F	% Moisture (D/E)*100	44.7%	47.7%	51.1%				26.4%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.4%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**26**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 71.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

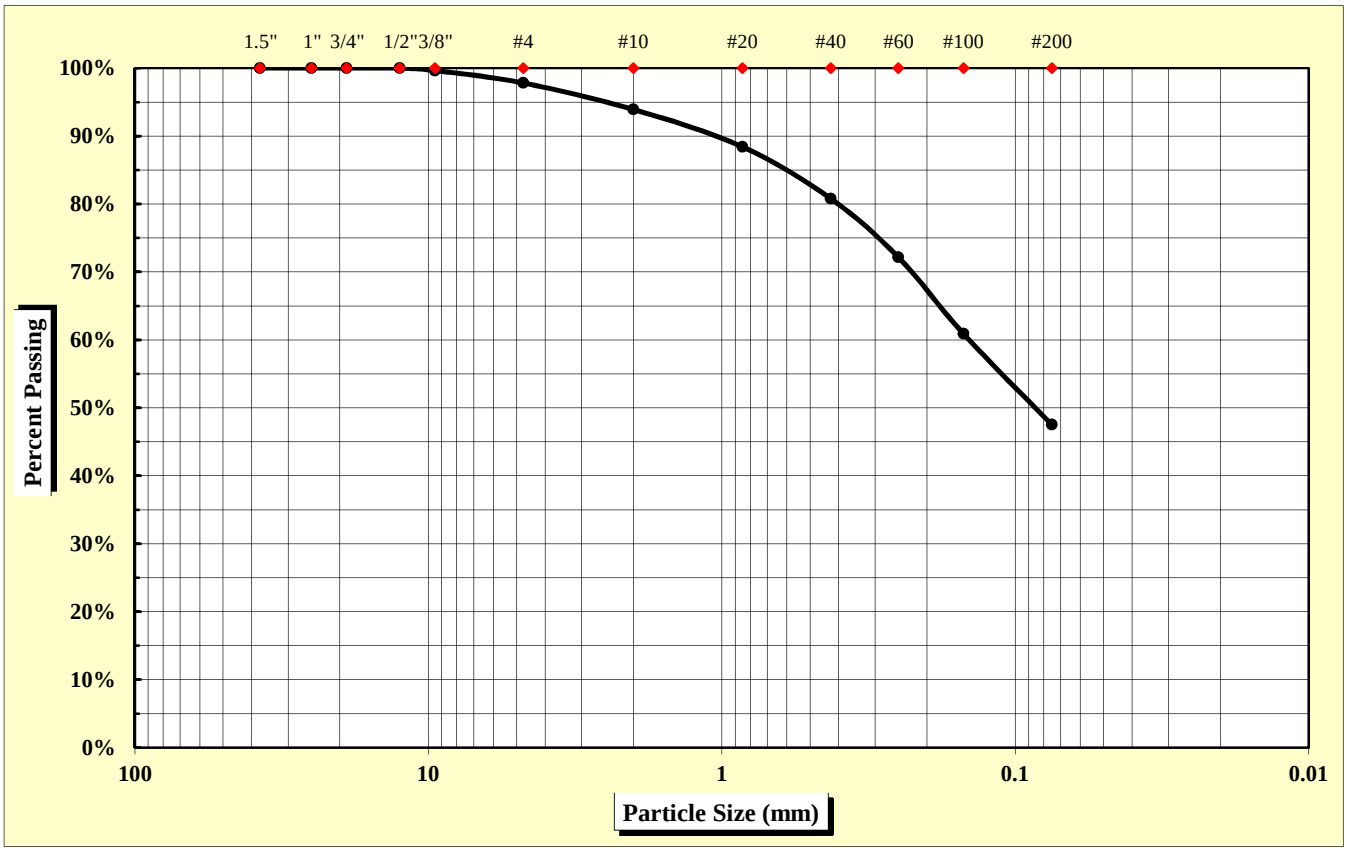
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-26	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Red brown, medium to fine, clayey SAND (SC) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.1%	Fine Sand	33.3%
		Coarse Sand	13.1%	Silt & Clay	47.5%
Liquid Limit	32	Plastic Limit	19	Plastic Index	13
		Moisture Content	N/A	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

Another code *ASTM D 4318* ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

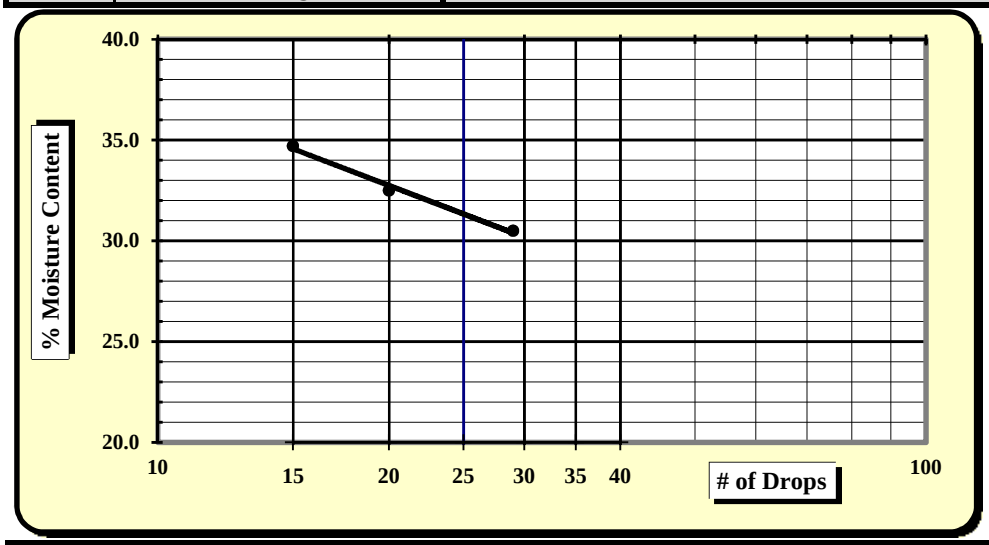
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/09/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-26	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Red brown, medium to fine, clayey SAND (SC) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/11/2014	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.77	26.69	27.65				26.59		
B	Wet Soil Weight + A	44.58	46.34	45.15				35.11		
C	Dry Soil Weight + A	40.42	41.52	40.64				33.74		
D	Water Weight (B-C)	4.16	4.82	4.51				1.37		
E	Dry Soil Weight (C-A)	13.65	14.83	12.99				7.15		
F	% Moisture (D/E)*100	30.5%	32.5%	34.7%				19.2%		
N	# OF DROPS	29	20	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**32**
Plastic Limit	**19**
Plastic Index	**13**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.5%**

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	6/12/15	Brian Vaughn	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

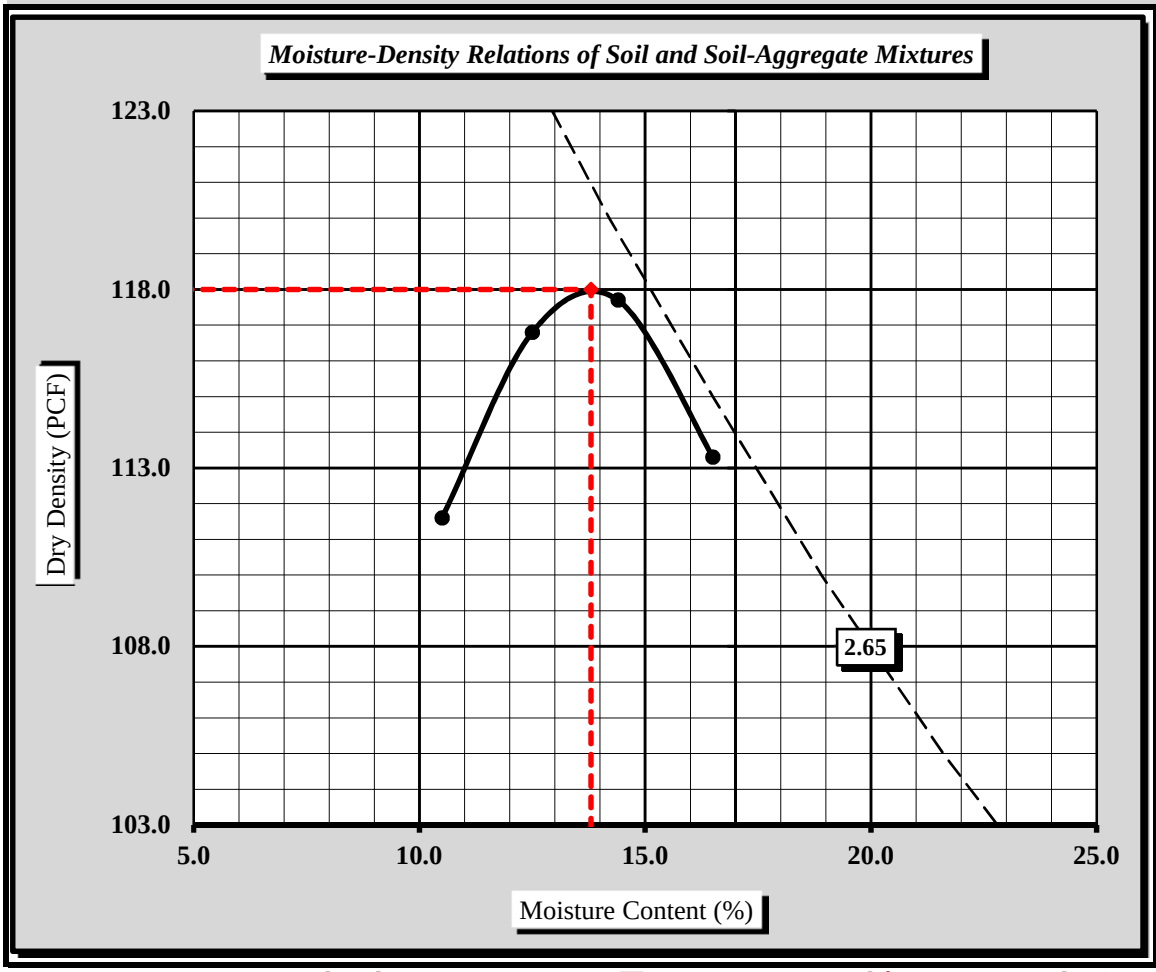
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-26	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Red brown, medium to fine, clayey SAND (SC) [A-6 (3)]

Maximum Dry Density 118.0 PCF. Optimum Moisture Content 13.8%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	32
Plastic Limit	19
Plastic Index	13

% Passing	
1/2"	100.0%
3/8"	99.6%
#4	97.8%
#10	93.9%
#40	80.8%
#60	72.2%
#100	60.9%
#200	47.5%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s)	6/01 - 6/05/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

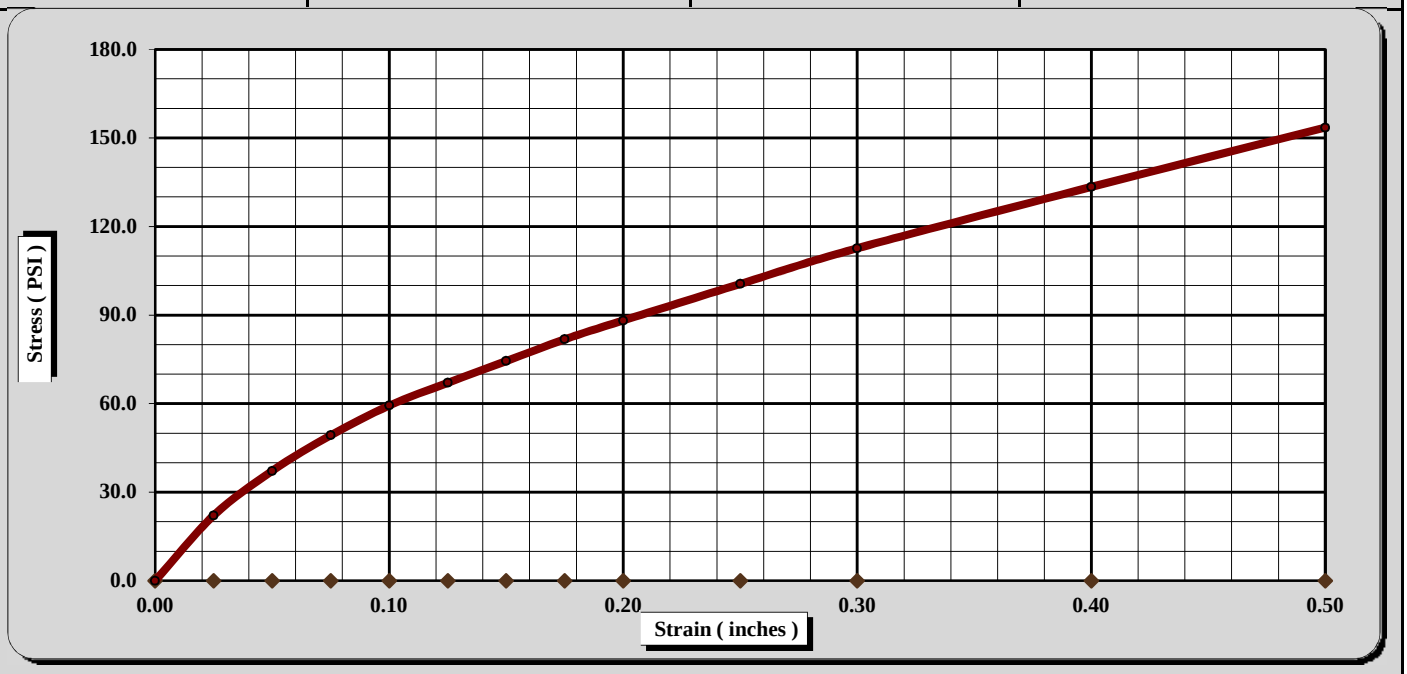
Boring #:	SB-26	Sample #:	36g	Sample Date:	4/29/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Red brown, medium to fine, clayey SAND (SC) [A-6 (3)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **118.0 PCF** Optimum Moisture Content: **13.8%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 5.9	**CBR at 0.2 in. 5.9**	**CBR at 0.1 in. 5.9**	**CBR at 0.2 in. 5.9**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	108.8
Initial Dry Density (PCF)	111.8	Average Final Moisture Content	16.5%
Moisture Content of the Compacted Specimen	14.1%	Moisture Content (top 1" after soaking)	19.8%
Percent Compaction	94.8%	Percent Swell	0.6%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	32	Plastic Index	13	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

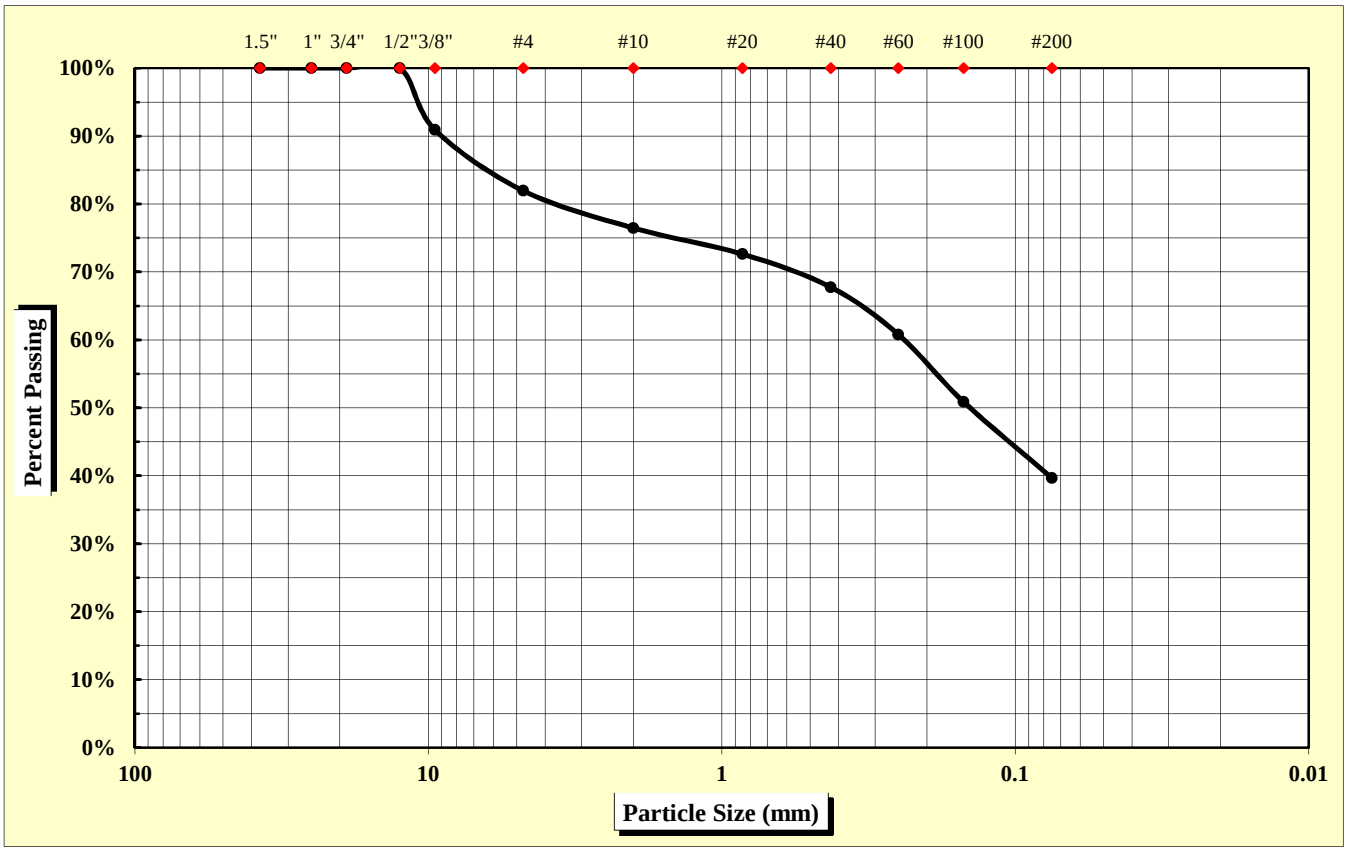
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-27	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange, fine, clayey SAND (SC) [A-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	23.5%	Fine Sand	28.1%
		Coarse Sand	8.7%	Silt & Clay	39.7%
Liquid Limit	29	Plastic Limit	16	Plastic Index	13
		Moisture Content	13.5%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

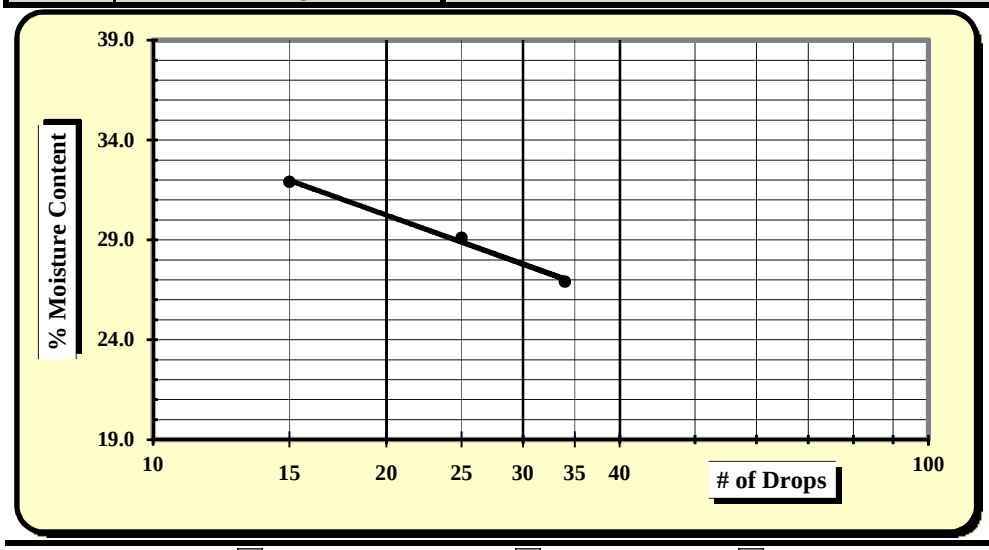
S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-27	Sample #:	86	Sample Date:	4/29/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange, fine, clayey SAND (SC) [A-6 (1)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	109	108	107				997		
A	Tare Weight	12.14	12.05	12.08				12.19		
B	Wet Soil Weight + A	25.74	24.39	24.40				21.27		
C	Dry Soil Weight + A	22.86	21.61	21.42				20.01		
D	Water Weight (B-C)	2.88	2.78	2.98				1.26		
E	Dry Soil Weight (C-A)	10.72	9.56	9.34				7.82		
F	% Moisture (D/E)*100	26.9%	29.1%	31.9%				16.1%		
N	# OF DROPS	34	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**16.1%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**29**
Plastic Limit	**16**
Plastic Index	**13**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

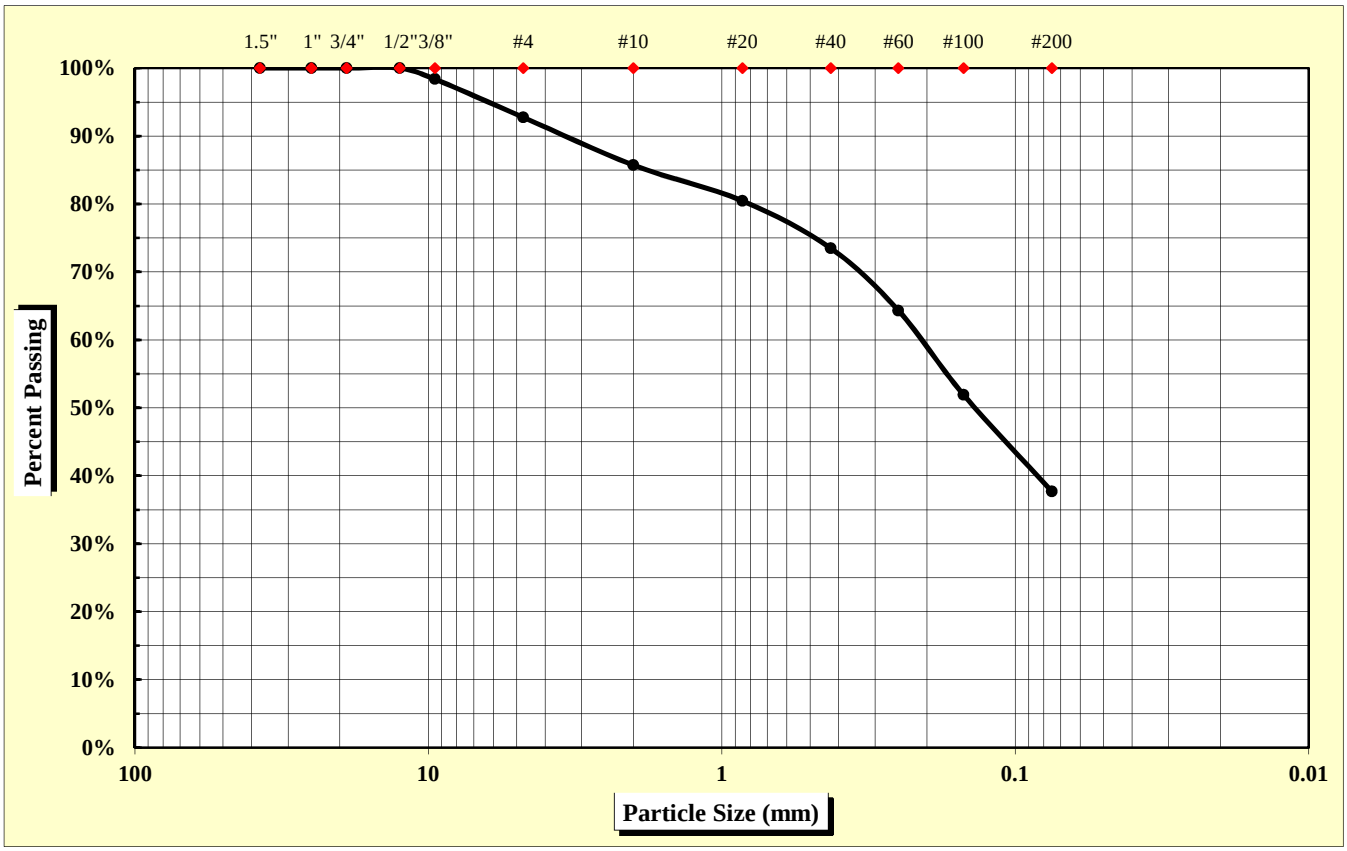
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/1 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-27	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Red brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	14.3%	Fine Sand	35.8%
		Coarse Sand	12.2%	Silt & Clay	37.7%
Liquid Limit	21	Plastic Limit	16	Plastic Index	5
		Moisture Content	15.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

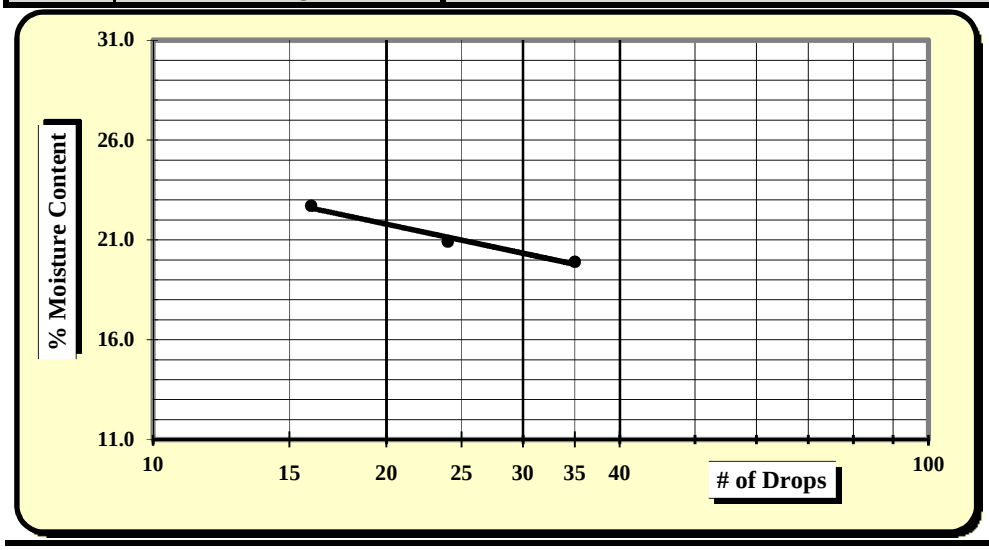
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-27	Sample #:	86	Sample Date:	4/29/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Red brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/31/2015	Grooving tool	25539	3/4/2015
LL Apparatus	25429	9/3/2014			
Oven	25829	9/3/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	505	503	100				103		
A	Tare Weight	12.15	12.17	12.06				12.36		
B	Wet Soil Weight + A	31.31	30.88	23.95				21.89		
C	Dry Soil Weight + A	28.13	27.64	21.75				20.56		
D	Water Weight (B-C)	3.18	3.24	2.20				1.33		
E	Dry Soil Weight (C-A)	15.98	15.47	9.69				8.20		
F	% Moisture (D/E)*100	19.9%	20.9%	22.7%				16.2%		
N	# OF DROPS	35	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**16.2%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**21**
Plastic Limit	**16**
Plastic Index	**5**
Group Symbol	**SC-SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 37.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Shaun Cameron	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

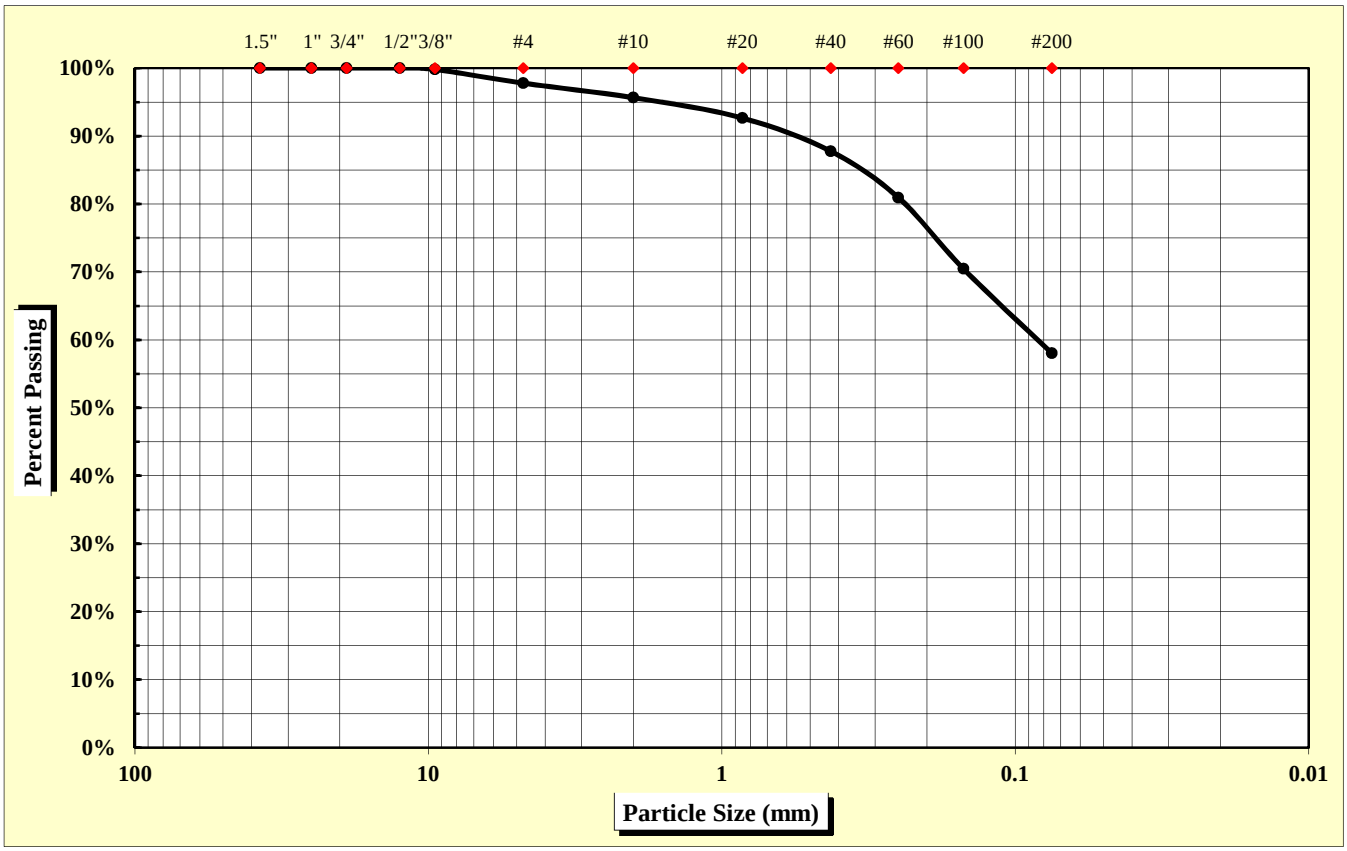
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/18 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-29	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Red brown, fine, sandy LEAN CLAY (CL) [A-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.3%	Fine Sand	29.7%
		Coarse Sand	7.9%	Silt & Clay	58.0%
Liquid Limit	31	Plastic Limit	18	Plastic Index	13
		Moisture Content	N/A	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

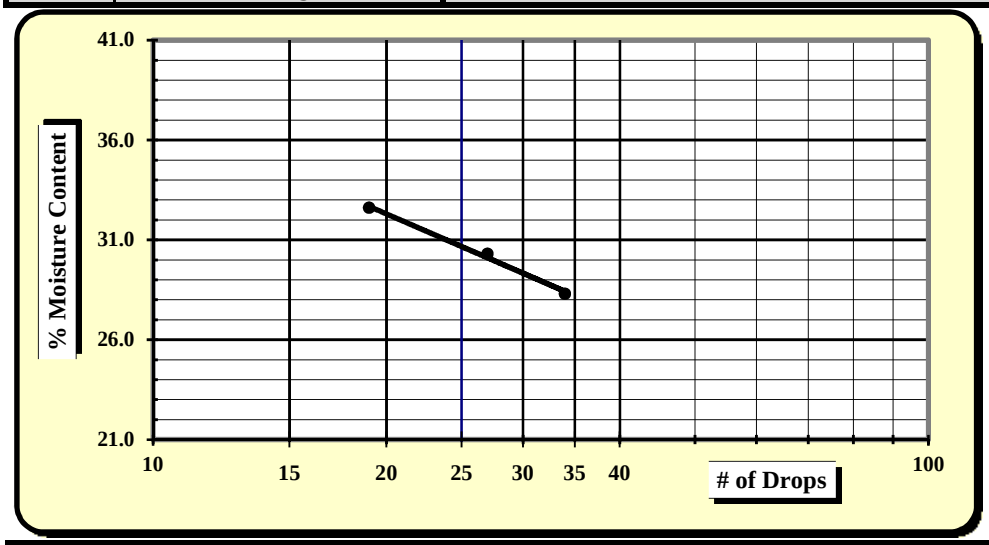
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-29	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Red brown, fine, sandy LEAN CLAY (CL) [A-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.41	15.30	16.53				12.11		
B	Wet Soil Weight + A	37.91	37.69	37.06				21.07		
C	Dry Soil Weight + A	33.17	32.49	32.01				19.72		
D	Water Weight (B-C)	4.74	5.20	5.05				1.35		
E	Dry Soil Weight (C-A)	16.76	17.19	15.48				7.61		
F	% Moisture (D/E)*100	28.3%	30.3%	32.6%				17.7%		
N	# OF DROPS	34	27	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**31**
Plastic Limit	**18**
Plastic Index	**13**
Group Symbol	**CL / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 58.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

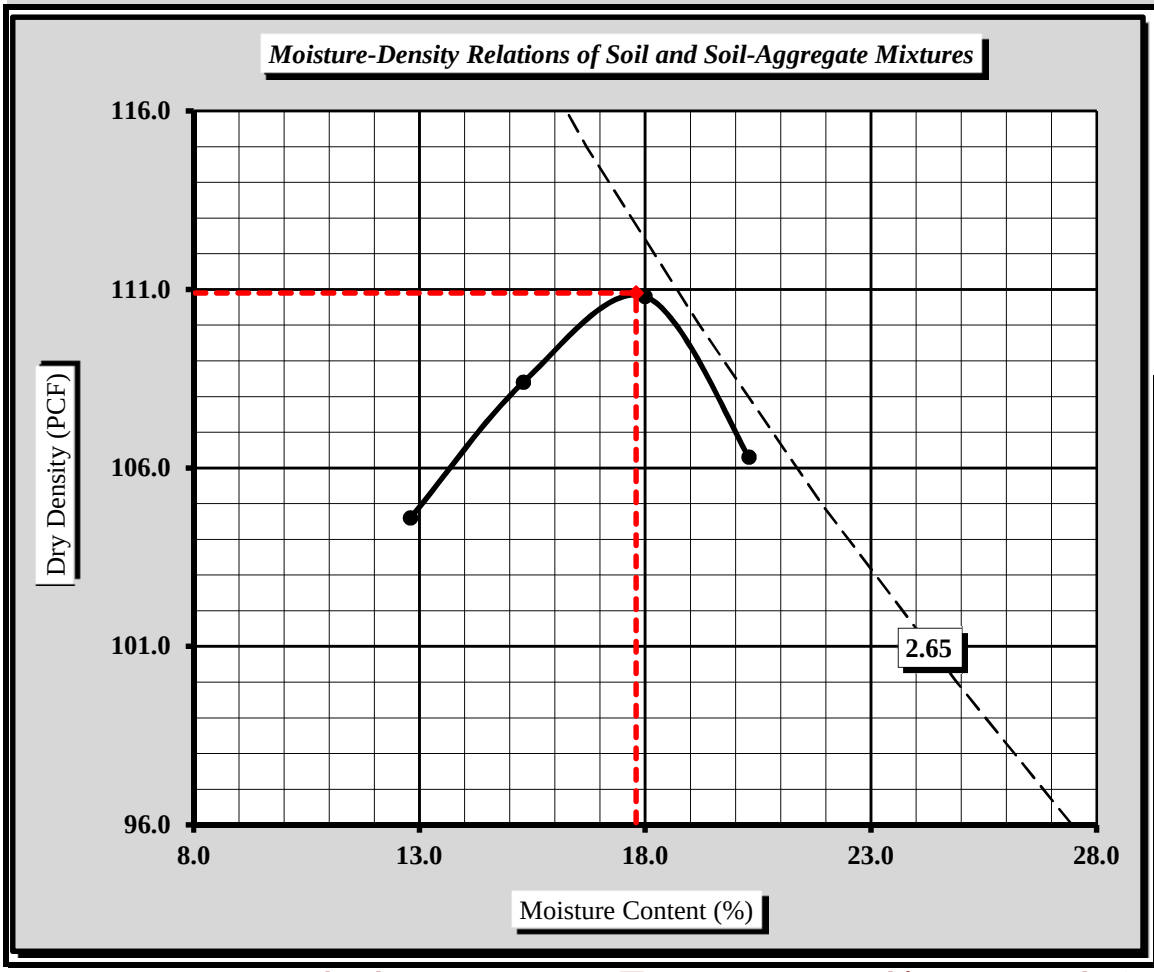
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/19/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-29	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Red brown, fine, sandy LEAN CLAY (CL) [A-6 (5)]

Maximum Dry Density 110.9 PCF. **Optimum Moisture Content 17.8%**

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	31
Plastic Limit	18
Plastic Index	13

% Passing	
1/2"	100.0%
3/8"	99.8%
#4	97.8%
#10	95.7%
#40	87.8%
#60	80.9%
#100	70.5%
#200	58.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	5/22 - 5/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

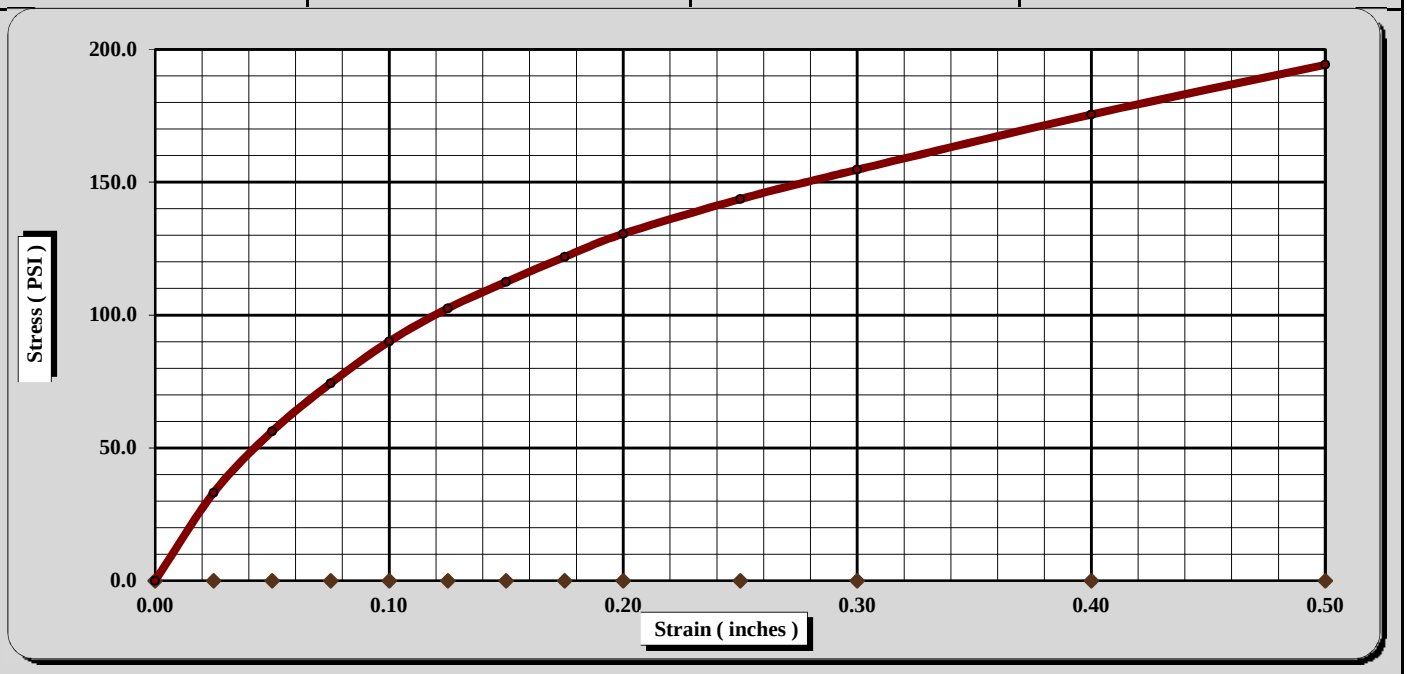
Boring #:	SB-29	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Red brown, fine, sandy LEAN CLAY (CL) [A-6 (5)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **110.9 PCF** Optimum Moisture Content: **17.8%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 9.0	**CBR at 0.2 in. 8.7**	**CBR at 0.1 in. 9.0**	**CBR at 0.2 in. 8.7**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	104.8
Initial Dry Density (PCF)	106.2	Average Final Moisture Content	19.0%
Moisture Content of the Compacted Specimen	17.8%	Moisture Content (top 1" after soaking)	20.5%
Percent Compaction	95.8%	Percent Swell	0.3%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	31	Plastic Index	13	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

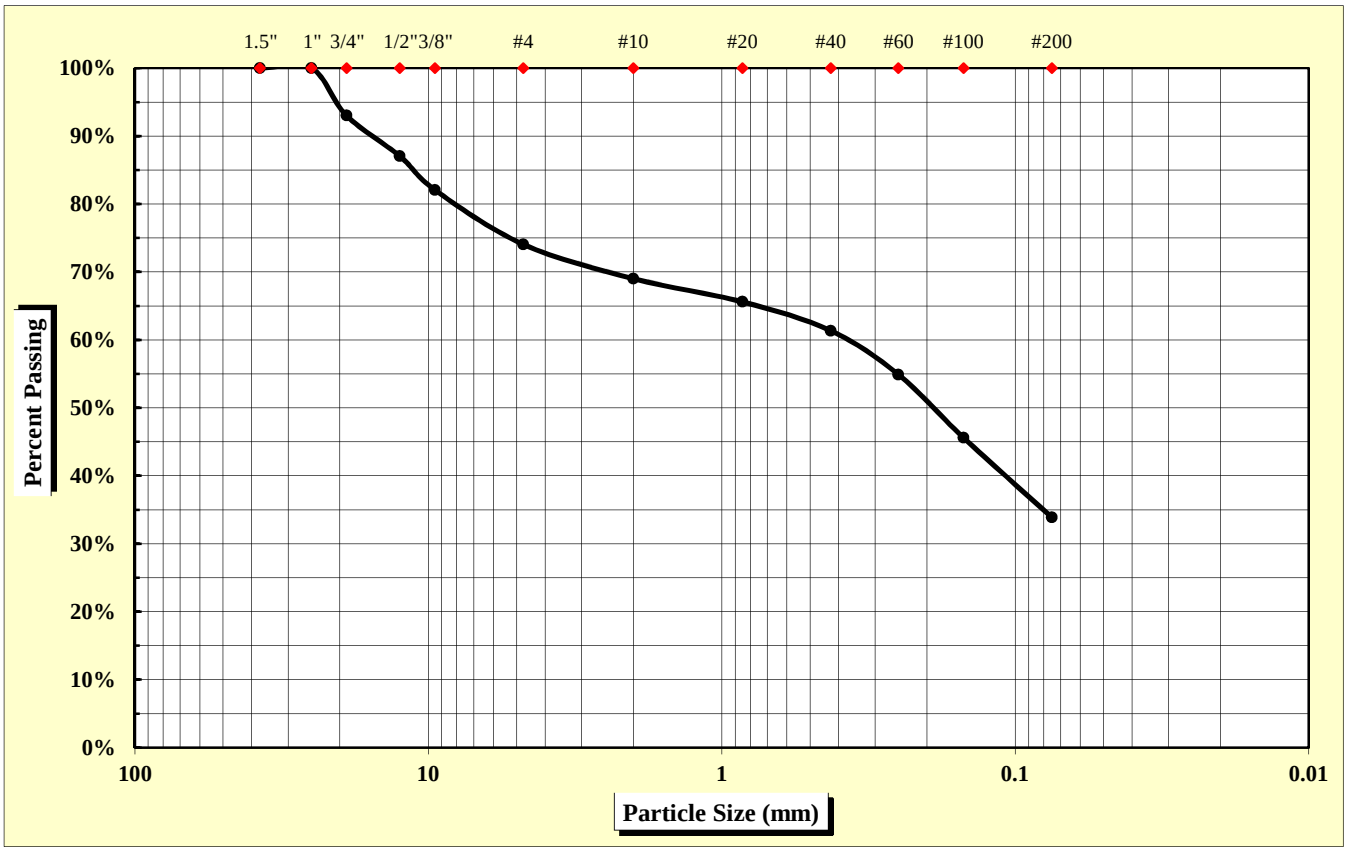
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/18 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-30	Sample #:	86	Sample Date:	4/28/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.8 - 3.3'
Sample Description:	Brown red, fine, silty clayey SAND w/ gravel (SC-SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	31.0%	Fine Sand	27.5%
		Coarse Sand	7.7%	Silt & Clay	33.9%
Liquid Limit	22	Plastic Limit	16	Plastic Index	6
		Moisture Content	12.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

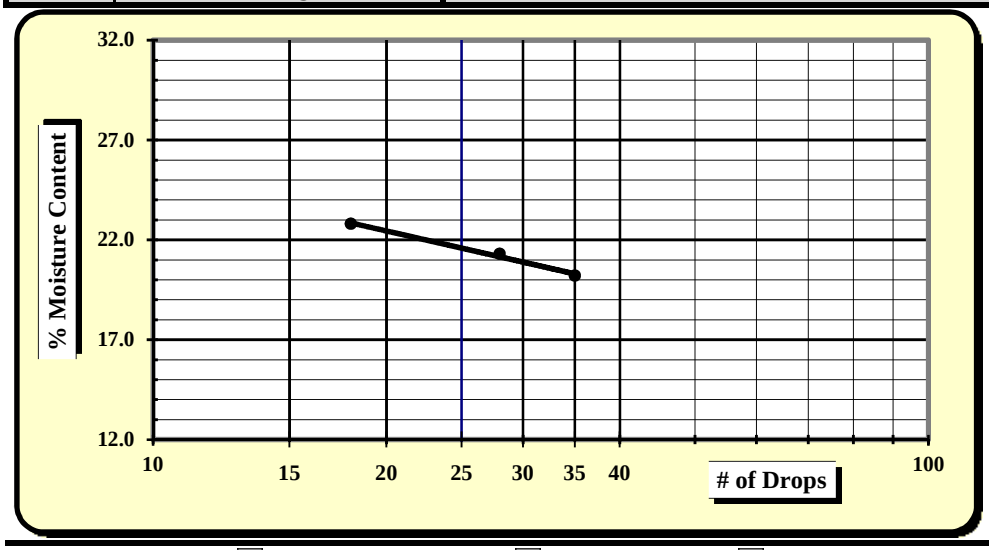
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-30	Sample #:	86	Sample Date:	4/28/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.8 - 3.3'

Sample Description: Brown red, fine, silty clayey SAND w/ gravel (SC-SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.69	15.73				12.16		
B	Wet Soil Weight + A	38.98	39.28	38.31				21.18		
C	Dry Soil Weight + A	35.24	35.32	34.12				19.91		
D	Water Weight (B-C)	3.74	3.96	4.19				1.27		
E	Dry Soil Weight (C-A)	18.52	18.63	18.39				7.75		
F	% Moisture (D/E)*100	20.2%	21.3%	22.8%				16.4%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**16.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**22**
Plastic Limit	**16**
Plastic Index	**6**
Group Symbol	SC-SM / A-2-4
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

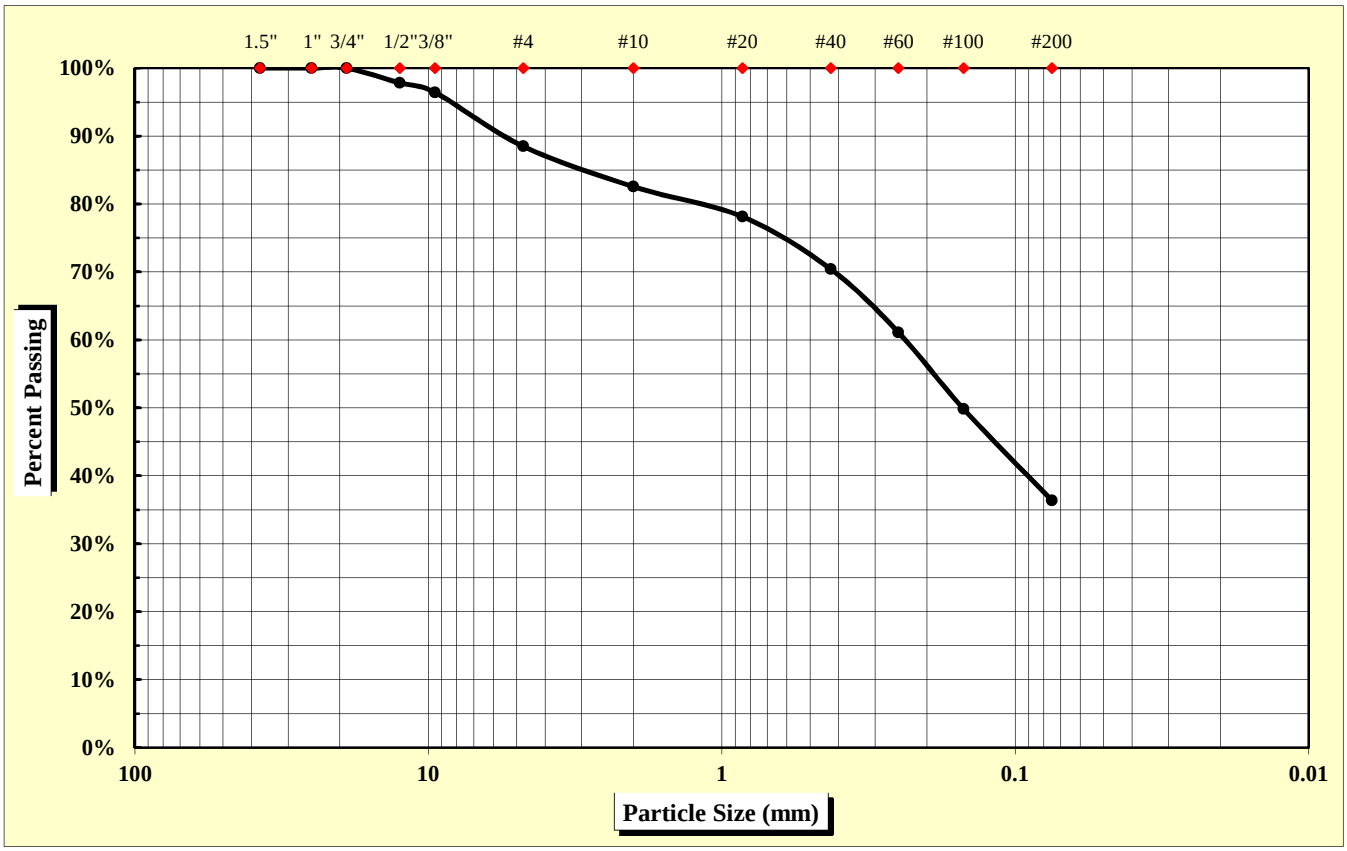
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/18 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-35	Sample #:	86	Sample Date:	4/27/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.8 - 3.3'
Sample Description:	Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	17.4%	Fine Sand	34.0%
		Coarse Sand	12.1%	Silt & Clay	36.4%
Liquid Limit	18	Plastic Limit	13	Plastic Index	5
		Moisture Content	13.8%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

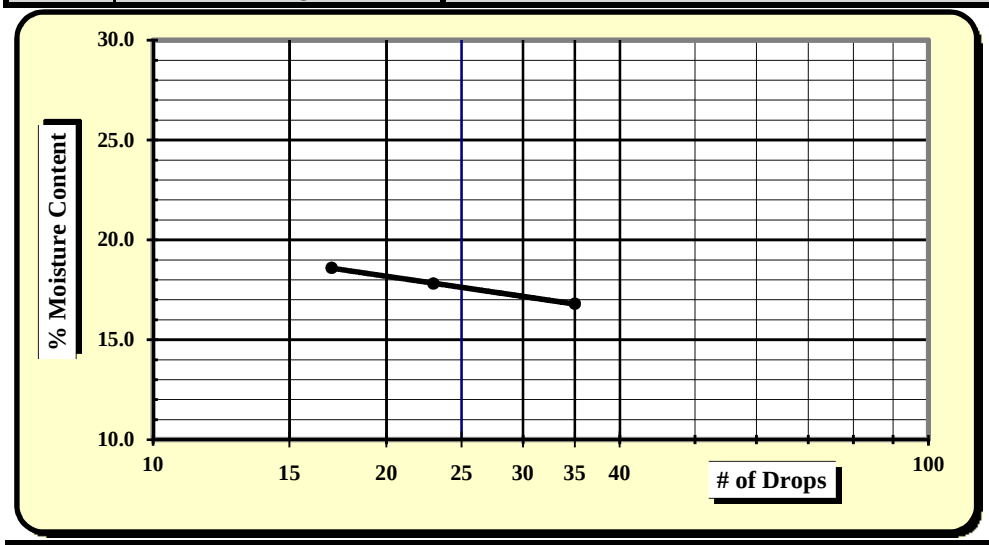
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-35	Sample #:	86	Sample Date:	4/27/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.8 - 3.3'

Sample Description: Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.47	16.50	17.00				11.59		
B	Wet Soil Weight + A	41.68	41.72	40.92				21.01		
C	Dry Soil Weight + A	38.05	37.91	37.17				19.94		
D	Water Weight (B-C)	3.63	3.81	3.75				1.07		
E	Dry Soil Weight (C-A)	21.58	21.41	20.17				8.35		
F	% Moisture (D/E)*100	16.8%	17.8%	18.6%				12.8%		
N	# OF DROPS	35	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**12.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**18**
Plastic Limit	**13**
Plastic Index	**5**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

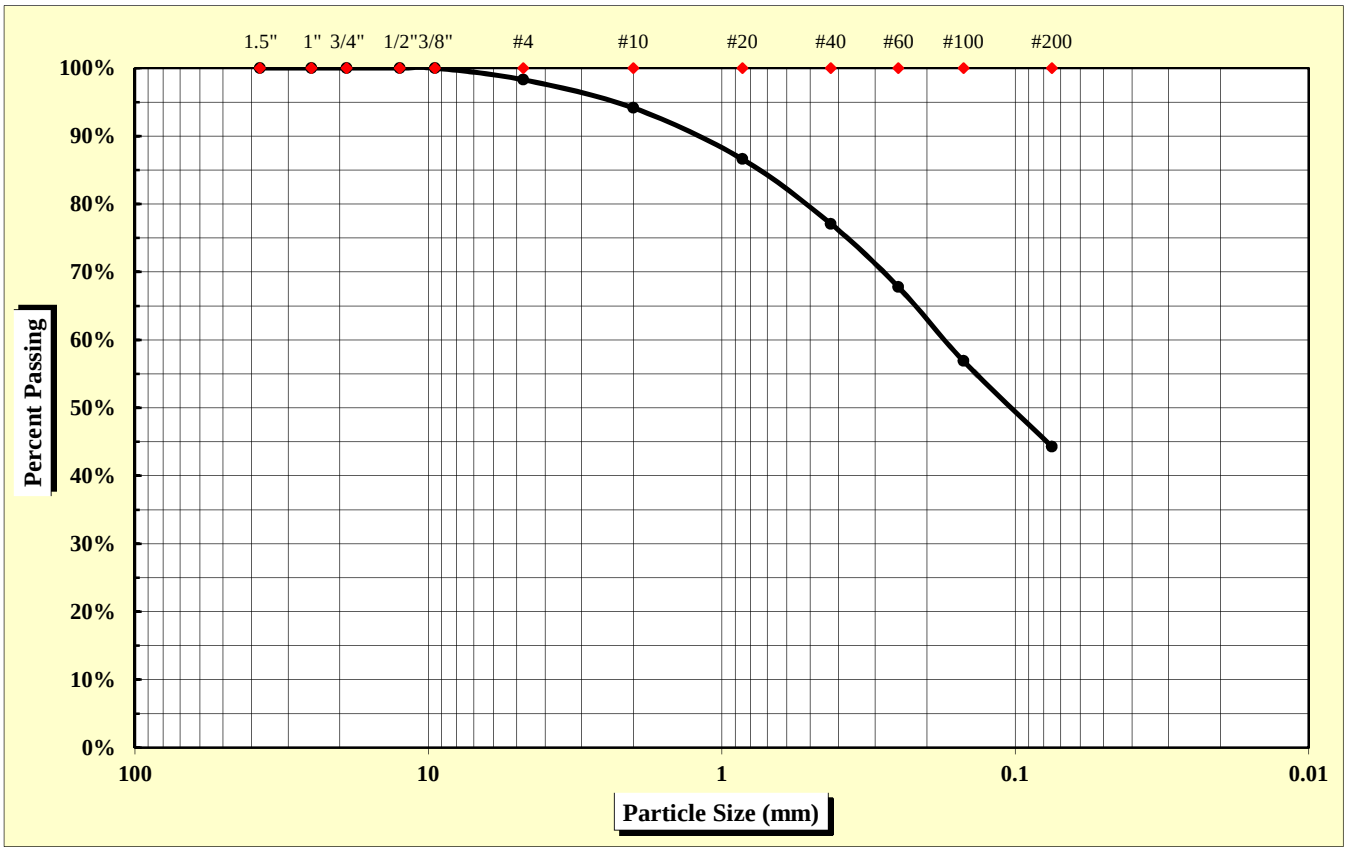
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/18 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-36	Sample #:	86	Sample Date:	4/27/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown plum, medium to fine, clayey SAND (SC) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.9%	Fine Sand	32.8%
		Coarse Sand	17.1%	Silt & Clay	44.3%
Liquid Limit	26	Plastic Limit	18	Plastic Index	8
		Moisture Content	N/A	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

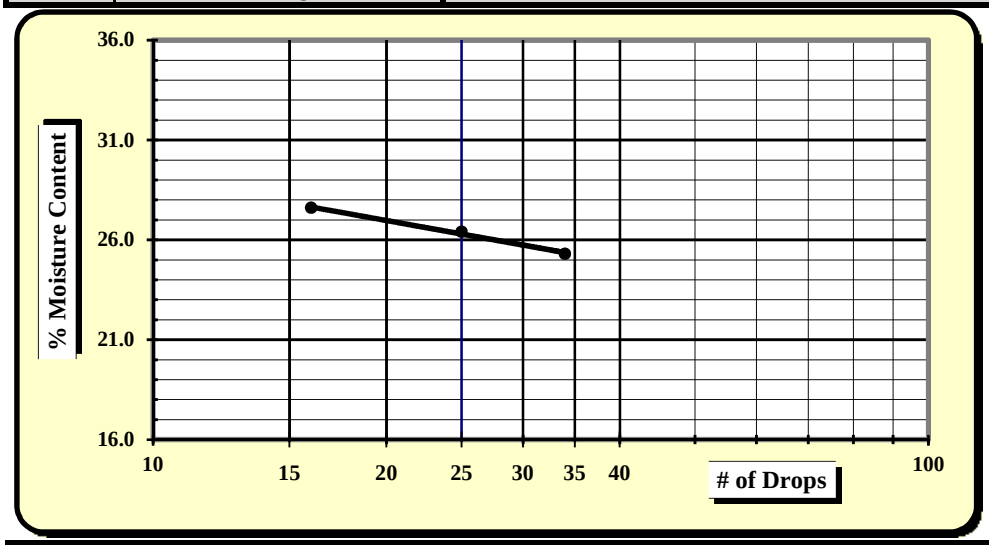
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-36	Sample #:	86	Sample Date:	4/27/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown plum, medium to fine, clayey SAND (SC) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.97	16.68	16.77				12.26		
B	Wet Soil Weight + A	38.31	40.01	39.64				21.02		
C	Dry Soil Weight + A	33.80	35.14	34.69				19.68		
D	Water Weight (B-C)	4.51	4.87	4.95				1.34		
E	Dry Soil Weight (C-A)	17.83	18.46	17.92				7.42		
F	% Moisture (D/E)*100	25.3%	26.4%	27.6%				18.1%		
N	# OF DROPS	34	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**18.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**26**
Plastic Limit	**18**
Plastic Index	**8**
Group Symbol	**SC / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

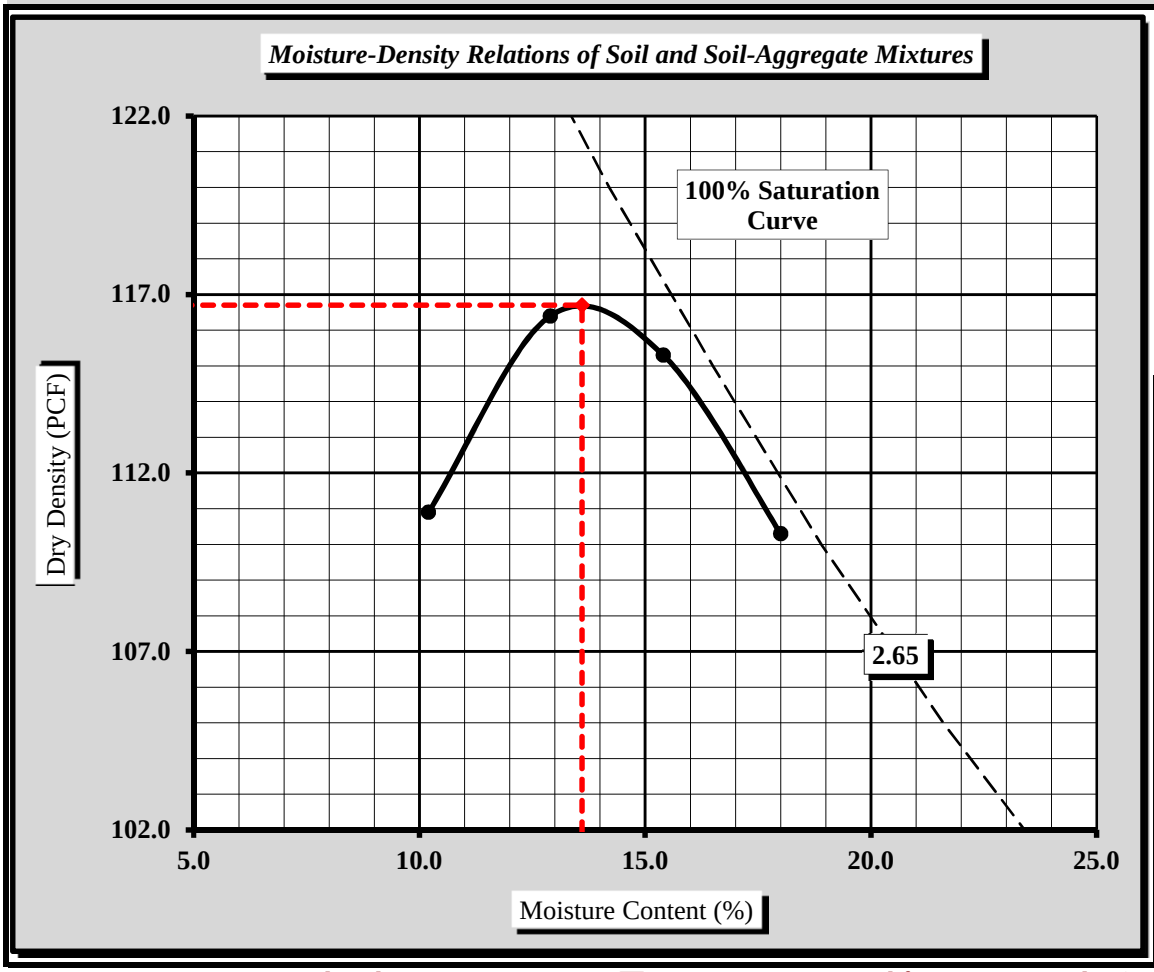
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/19/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-36	Sample #:	86	Sample Date:	4/27/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown plum, medium to fine, clayey SAND (SC) [A-4 (1)]

Maximum Dry Density 116.7 PCF. Optimum Moisture Content 13.6%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	26
Plastic Limit	18
Plastic Index	8

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.3%
#10	94.1%
#40	77.1%
#60	67.8%
#100	56.9%
#200	44.3%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	5/22 - 5/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

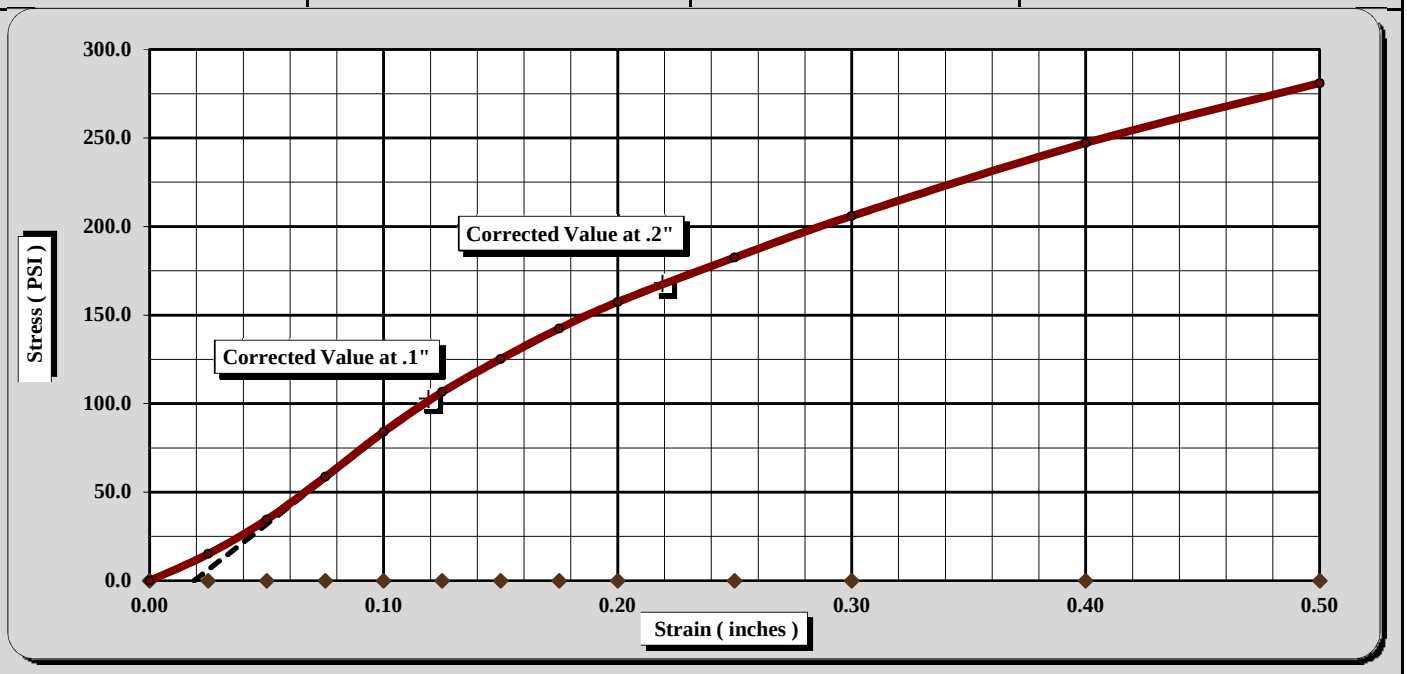
Boring #:	SB-36	Sample #:	86	Sample Date:	4/27/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown plum, medium to fine, clayey SAND (SC) [A-4 (1)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **116.7 PCF** Optimum Moisture Content: **13.6%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 8.4	**CBR at 0.2 in. 10.5**	**CBR at 0.1 in. 10.3**	**CBR at 0.2 in. 11.2**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	108.8
Initial Dry Density (PCF)	112.3	Average Final Moisture Content	15.8%
Moisture Content of the Compacted Specimen	13.6%	Moisture Content (top 1" after soaking)	18.9%
Percent Compaction	96.2%	Percent Swell	1.2%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	26	Plastic Index	8	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

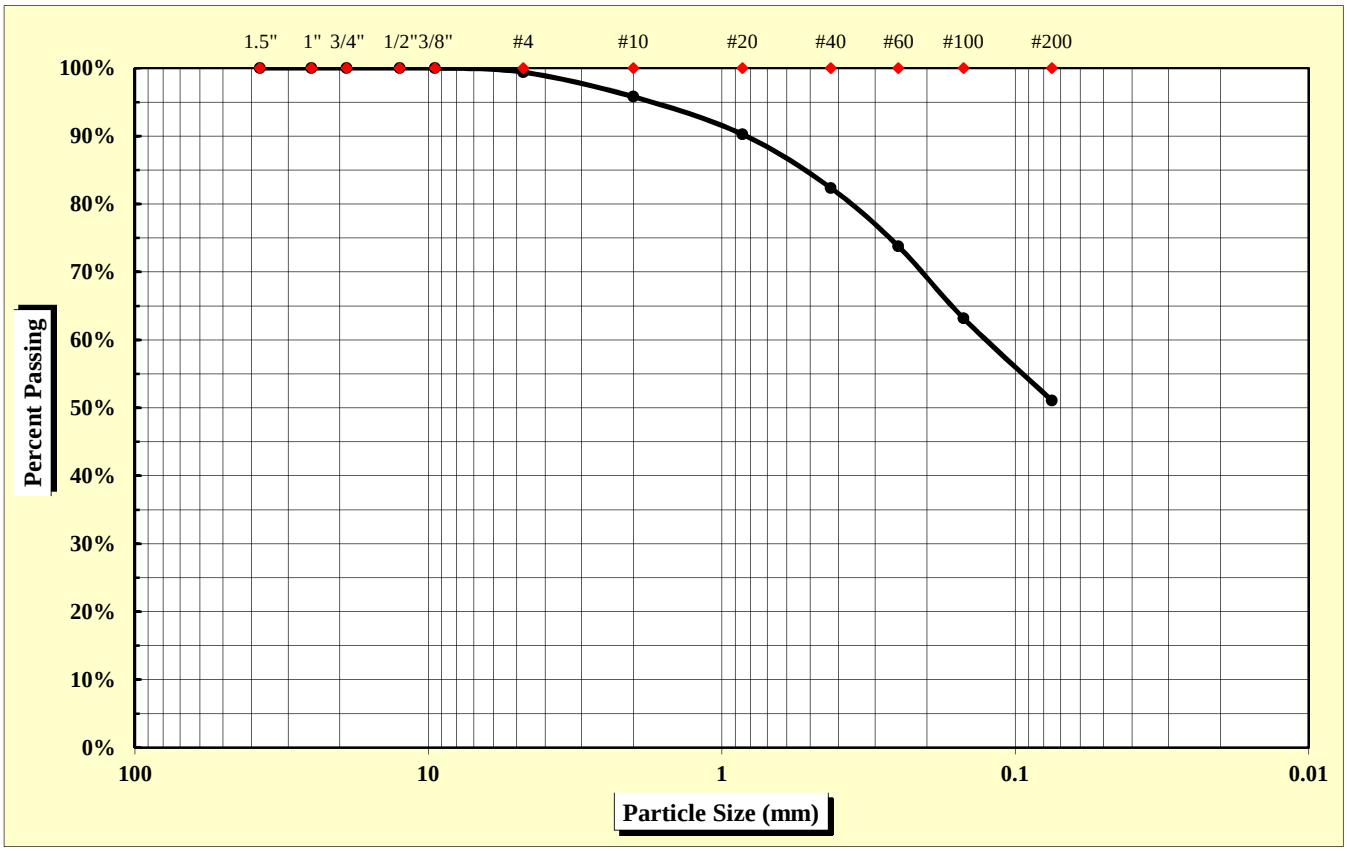
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-40	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.2%	Fine Sand	31.3%
		Coarse Sand	13.4%	Silt & Clay	51.1%
Liquid Limit	30	Plastic Limit	18	Plastic Index	12
		Moisture Content	N/A	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

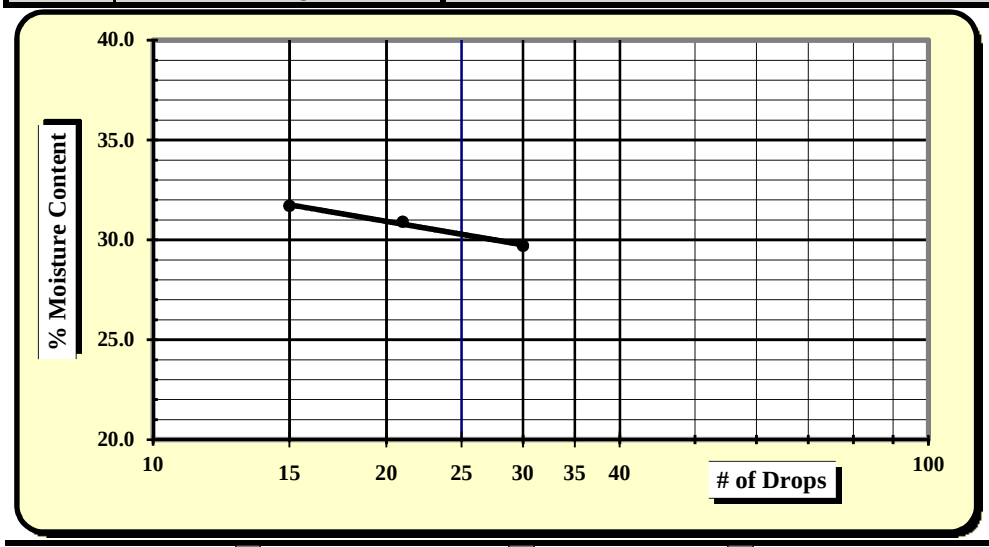
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-40	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.66	16.68	15.98				12.10		
B	Wet Soil Weight + A	38.44	41.70	39.66				20.60		
C	Dry Soil Weight + A	33.45	35.80	33.96				19.29		
D	Water Weight (B-C)	4.99	5.90	5.70				1.31		
E	Dry Soil Weight (C-A)	16.79	19.12	17.98				7.19		
F	% Moisture (D/E)*100	29.7%	30.9%	31.7%				18.2%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**18.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**18**
Plastic Index	**12**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

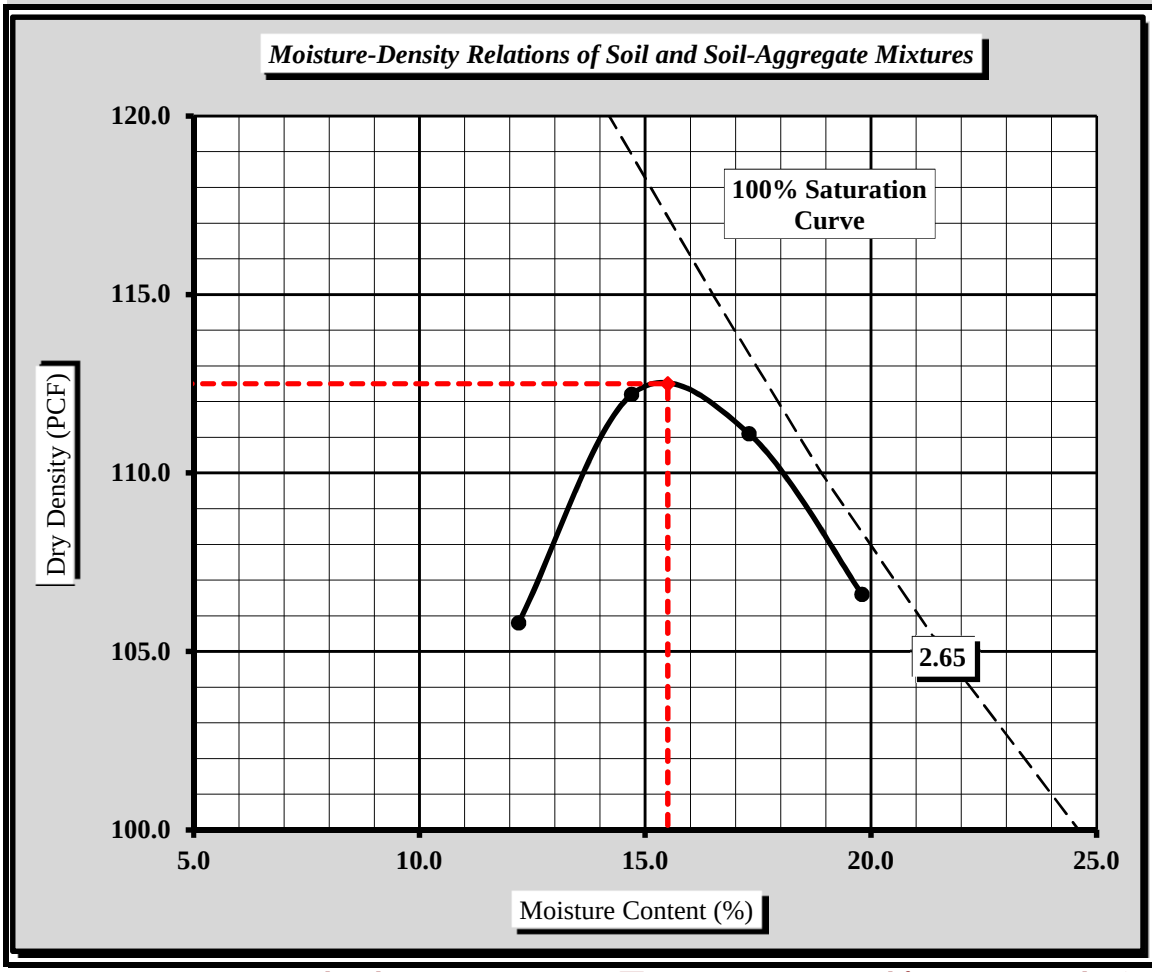
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/20/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-40	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

Maximum Dry Density 112.5 PCF. Optimum Moisture Content 15.5%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	30
Plastic Limit	18
Plastic Index	12

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	99.4%
#10	95.8%
#40	82.4%
#60	73.8%
#100	63.2%
#200	51.1%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	5/22 - 5/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

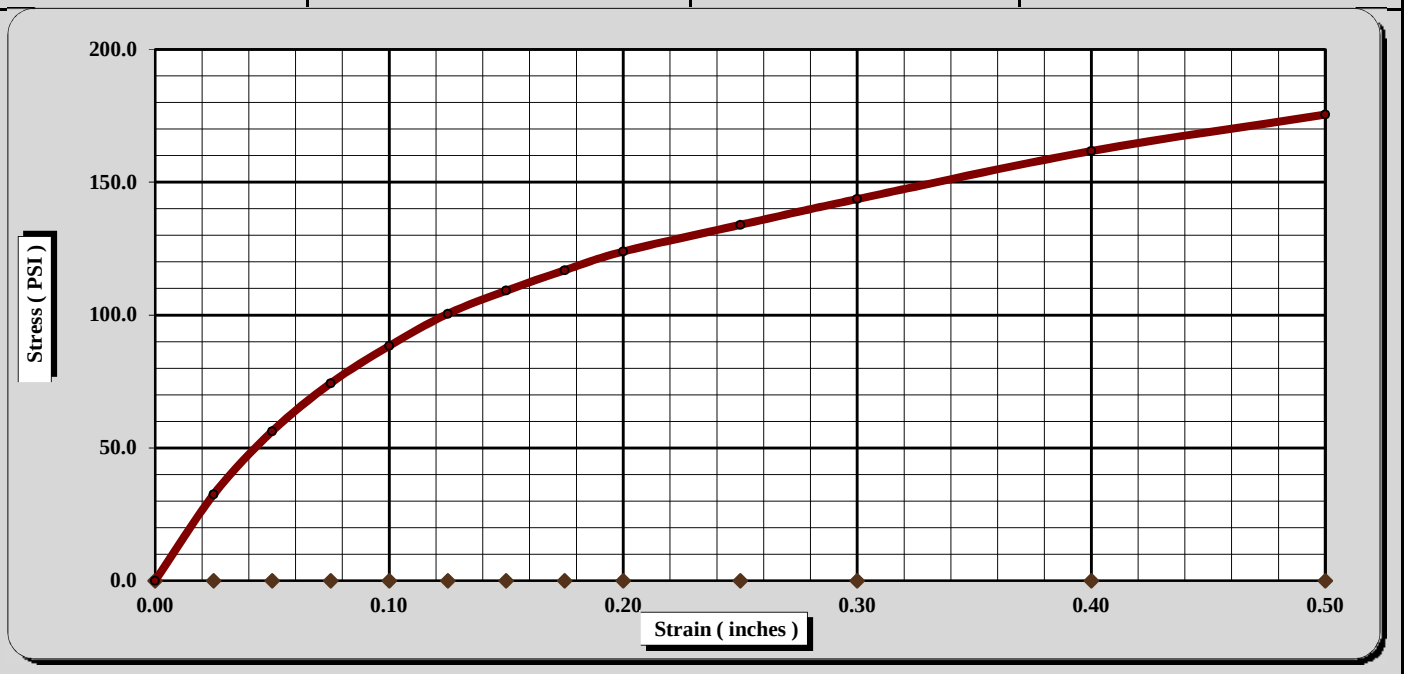
Boring #:	SB-40	Sample #:	86	Sample Date:	4/28/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (3)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **112.5 PCF** Optimum Moisture Content: **15.5%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 8.8	**CBR at 0.2 in. 8.3**	**CBR at 0.1 in. 8.8**	**CBR at 0.2 in. 8.3**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	103.6
Initial Dry Density (PCF)	106.9	Average Final Moisture Content	18.4%
Moisture Content of the Compacted Specimen	15.5%	Moisture Content (top 1" after soaking)	21.0%
Percent Compaction	95.1%	Percent Swell	0.7%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	30	Plastic Index	12	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

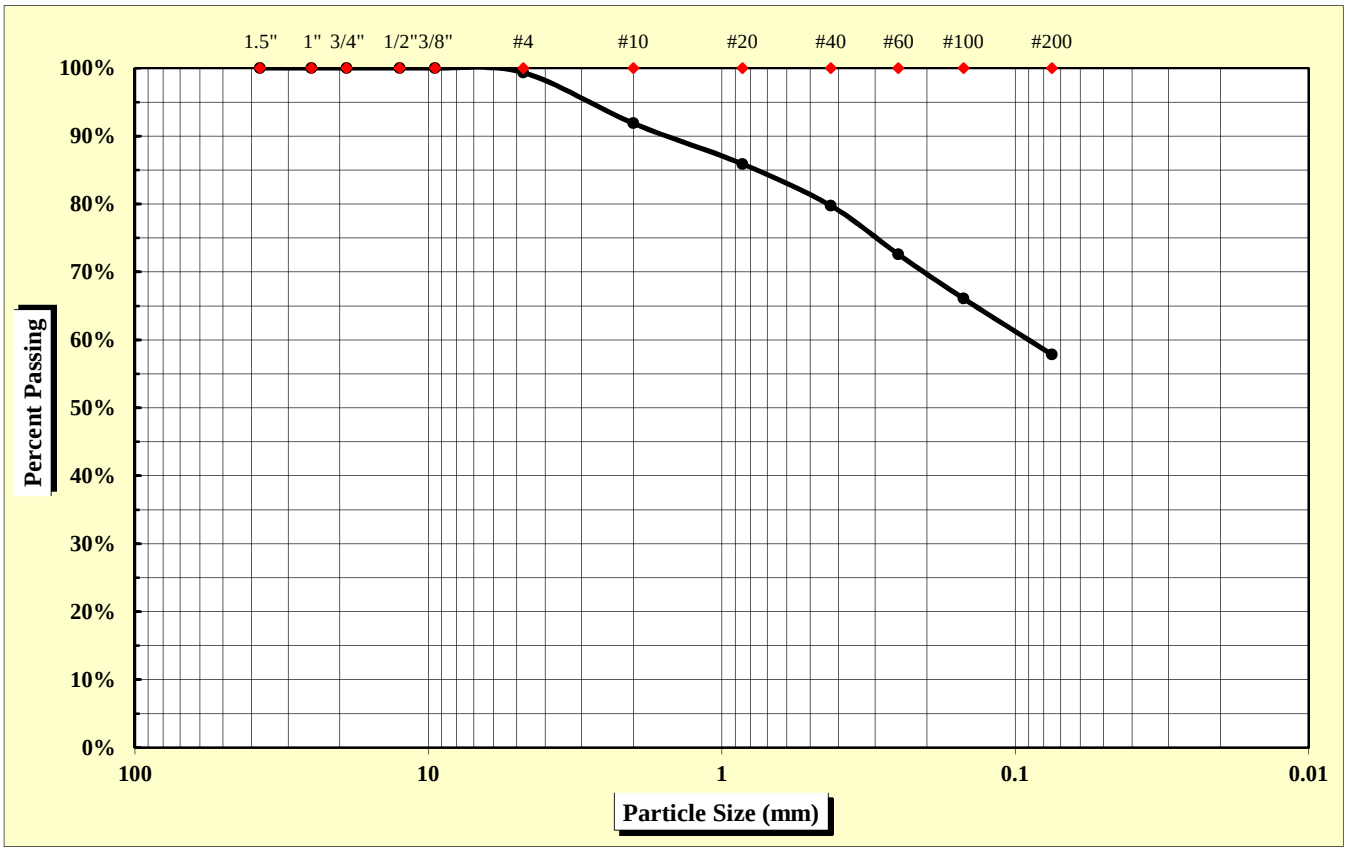
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-40	Sample #:	86	Sample Date:	4/27/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange red tan, medium to fine, sandy LEAN CLAY (CL) [A-6 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	8.1%	Fine Sand	21.9%
		Coarse Sand	12.1%	Silt & Clay	57.8%
Liquid Limit	40	Plastic Limit	24	Plastic Index	16
		Moisture Content	26.7%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

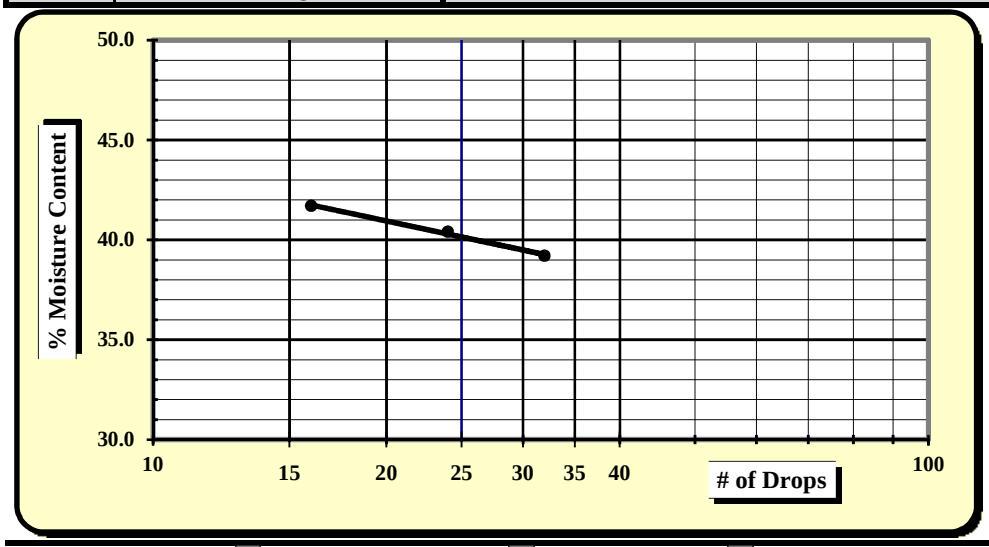
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-40	Sample #:	86	Sample Date:	4/27/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Orange red tan, medium to fine, sandy LEAN CLAY (CL) [A-6 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.88	16.82				12.30		
B	Wet Soil Weight + A	38.95	37.57	37.89				20.82		
C	Dry Soil Weight + A	32.69	31.62	31.69				19.15		
D	Water Weight (B-C)	6.26	5.95	6.20				1.67		
E	Dry Soil Weight (C-A)	15.98	14.74	14.87				6.85		
F	% Moisture (D/E)*100	39.2%	40.4%	41.7%				24.4%		
N	# OF DROPS	32	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**24**
Plastic Index	**16**
Group Symbol	**CL / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

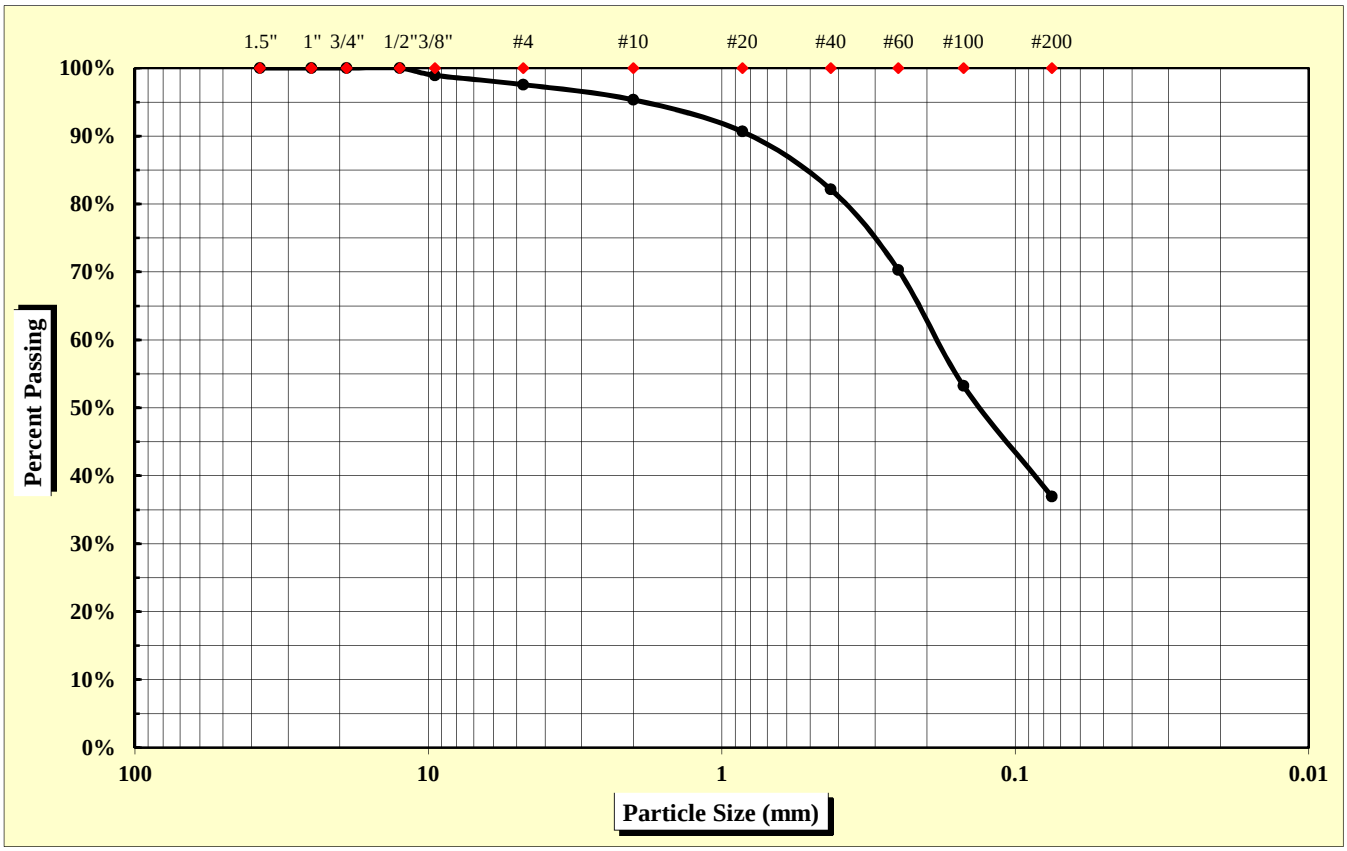
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-41	Sample #:	86	Sample Date:	4/27/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	4.7%	Fine Sand	45.2%
		Coarse Sand	13.2%	Silt & Clay	36.9%
Liquid Limit	18	Plastic Limit	13	Plastic Index	5
		Moisture Content	13.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

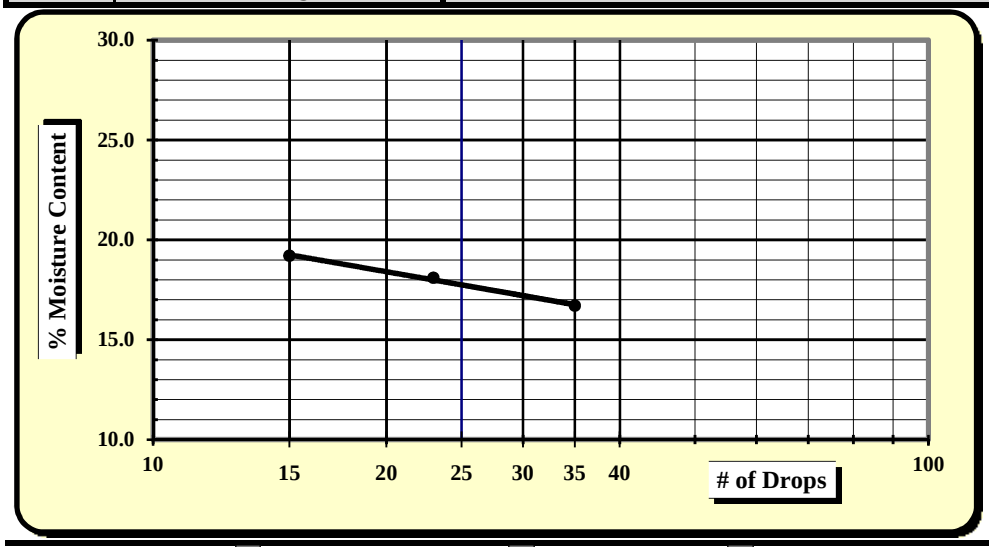
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-41	Sample #:	86	Sample Date:	4/27/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'

Sample Description: Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.85	16.76	15.92				12.00		
B	Wet Soil Weight + A	40.03	43.36	41.45				21.09		
C	Dry Soil Weight + A	36.72	39.29	37.34				20.06		
D	Water Weight (B-C)	3.31	4.07	4.11				1.03		
E	Dry Soil Weight (C-A)	19.87	22.53	21.42				8.06		
F	% Moisture (D/E)*100	16.7%	18.1%	19.2%				12.8%		
N	# OF DROPS	35	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**12.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**18**
Plastic Limit	**13**
Plastic Index	**5**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

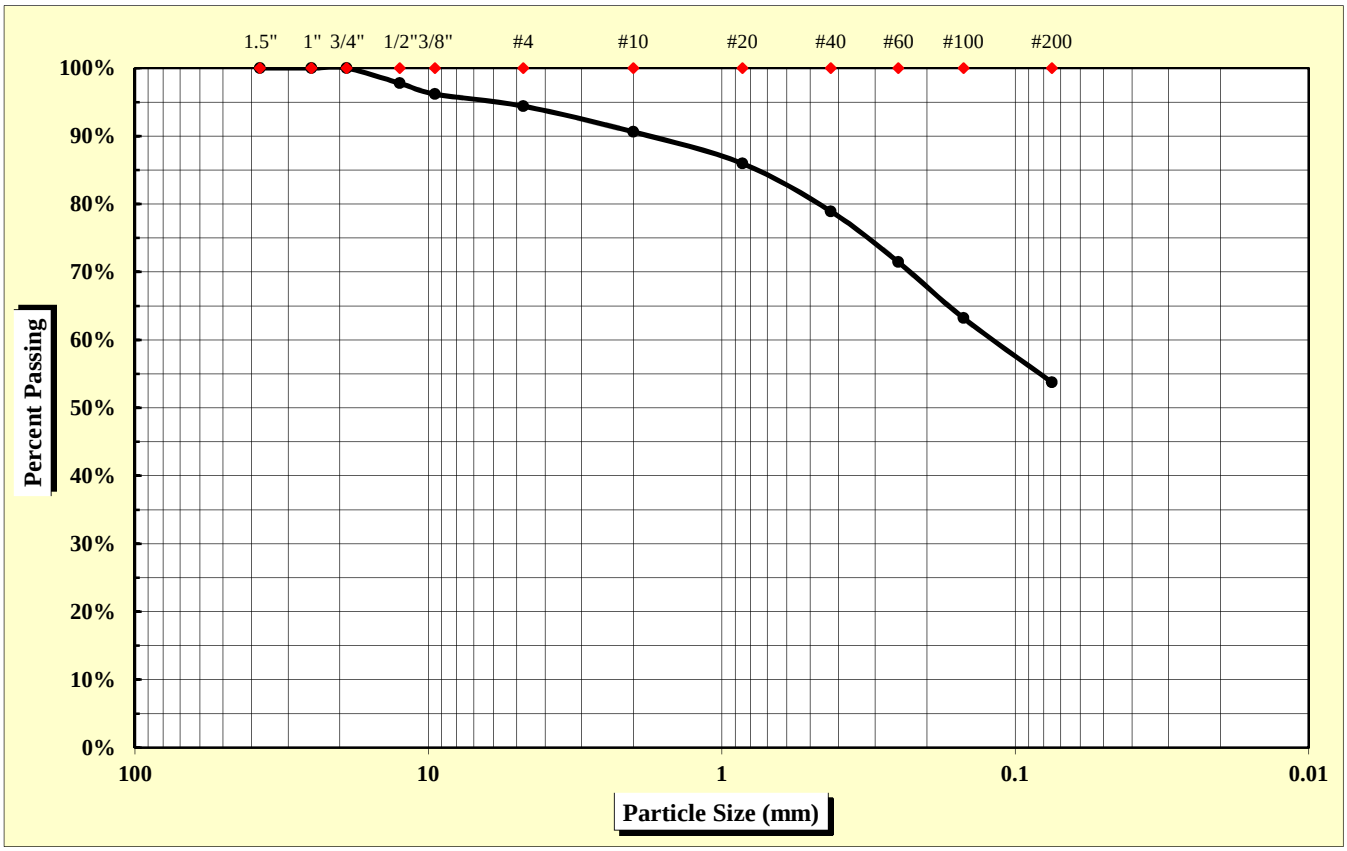
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/20 - 6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-43	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	9.4%	Fine Sand	25.2%
		Coarse Sand	11.7%	Silt & Clay	53.8%
Liquid Limit	38	Plastic Limit	21	Plastic Index	17
		Moisture Content	N/A	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

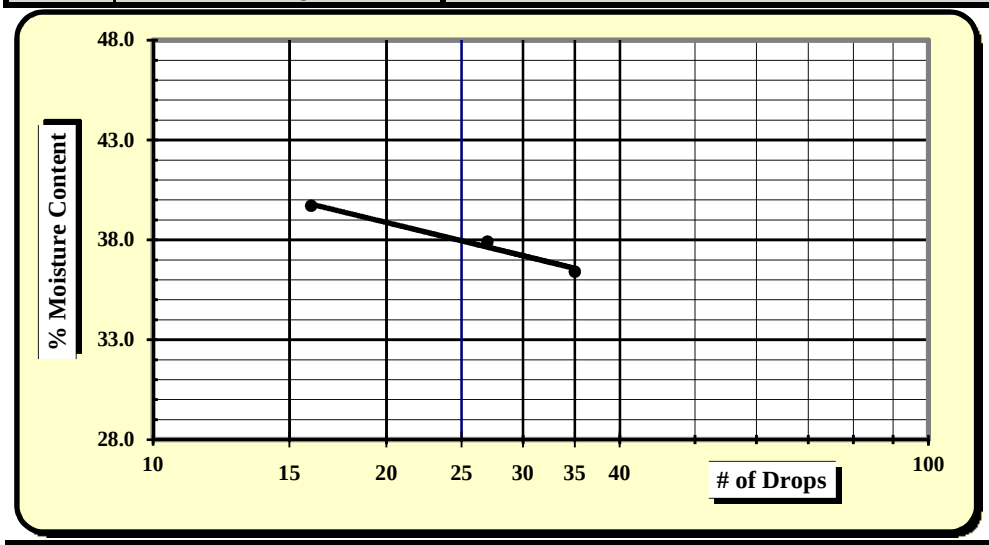
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-43	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.78	15.59	16.92				12.24		
B	Wet Soil Weight + A	39.42	39.13	39.86				20.57		
C	Dry Soil Weight + A	33.11	32.66	33.34				19.14		
D	Water Weight (B-C)	6.31	6.47	6.52				1.43		
E	Dry Soil Weight (C-A)	17.33	17.07	16.42				6.90		
F	% Moisture (D/E)*100	36.4%	37.9%	39.7%				20.7%		
N	# OF DROPS	35	27	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**21**
Plastic Index	**17**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

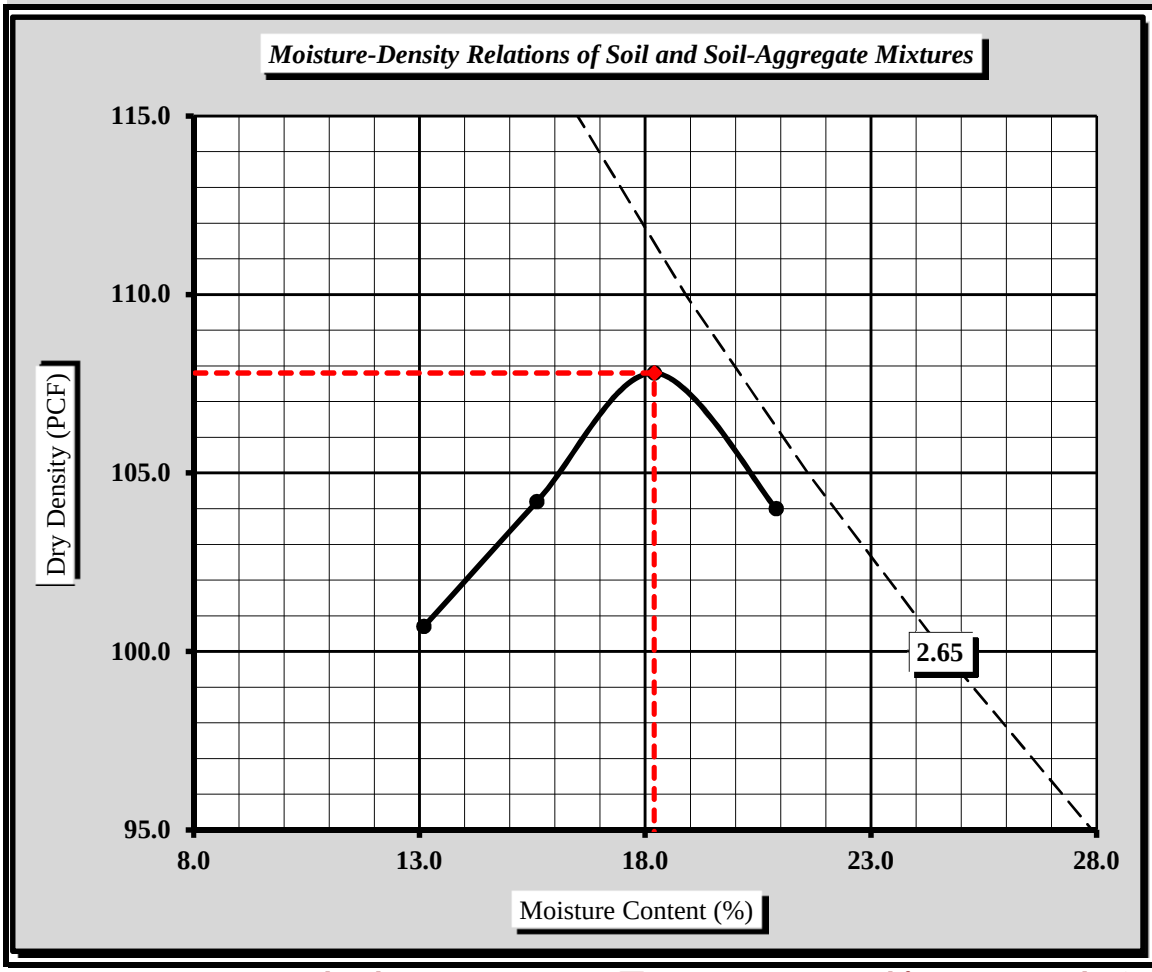
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/20/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-43	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Maximum Dry Density 107.8 PCF. Optimum Moisture Content 18.2%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	38
Plastic Limit	21
Plastic Index	17

% Passing	
1/2"	97.8%
3/8"	96.2%
#4	94.4%
#10	90.6%
#40	78.9%
#60	71.5%
#100	63.2%
#200	53.8%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	5/22 - 5/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

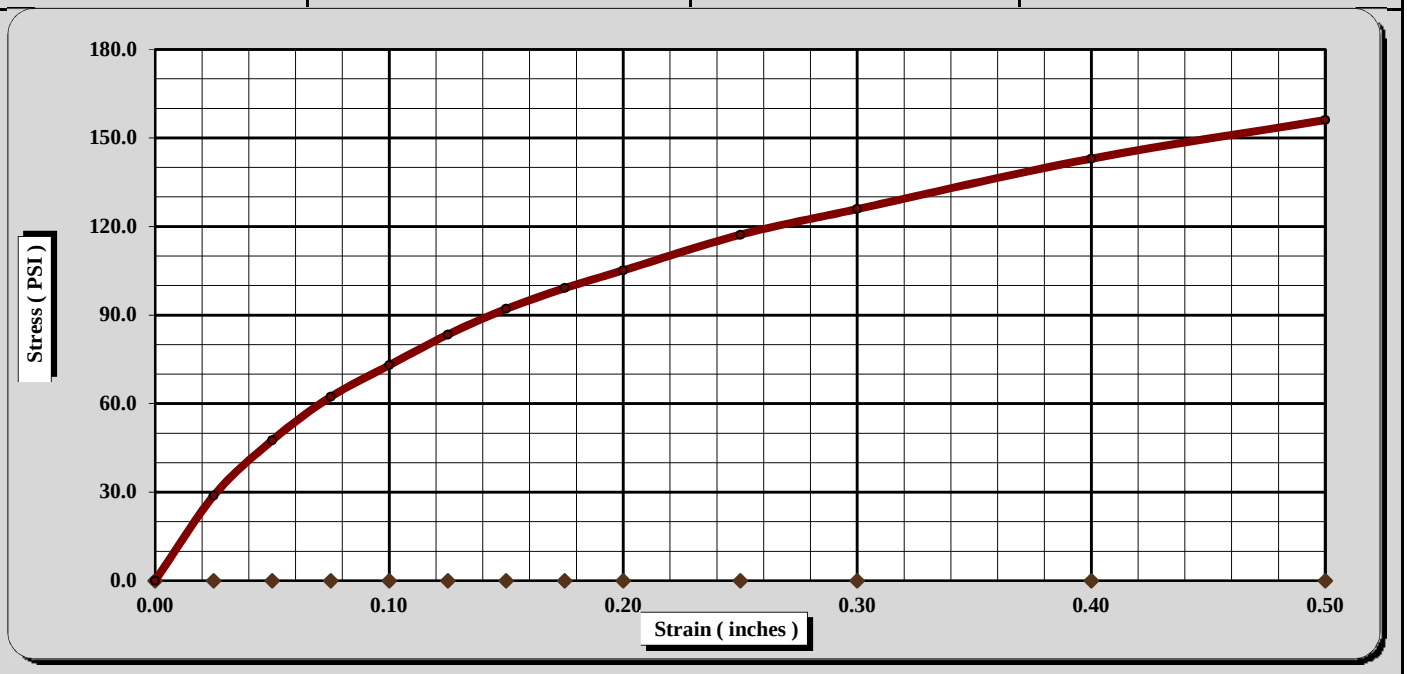
Boring #:	SB-43	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **107.8 PCF** Optimum Moisture Content: **18.2%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 7.3	**CBR at 0.2 in. 7.0**	**CBR at 0.1 in. 7.3**	**CBR at 0.2 in. 7.0**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	100.7
Initial Dry Density (PCF)	103.0	Average Final Moisture Content	20.0%
Moisture Content of the Compacted Specimen	18.2%	Moisture Content (top 1" after soaking)	22.2%
Percent Compaction	95.5%	Percent Swell	0.8%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	38	Plastic Index	17	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

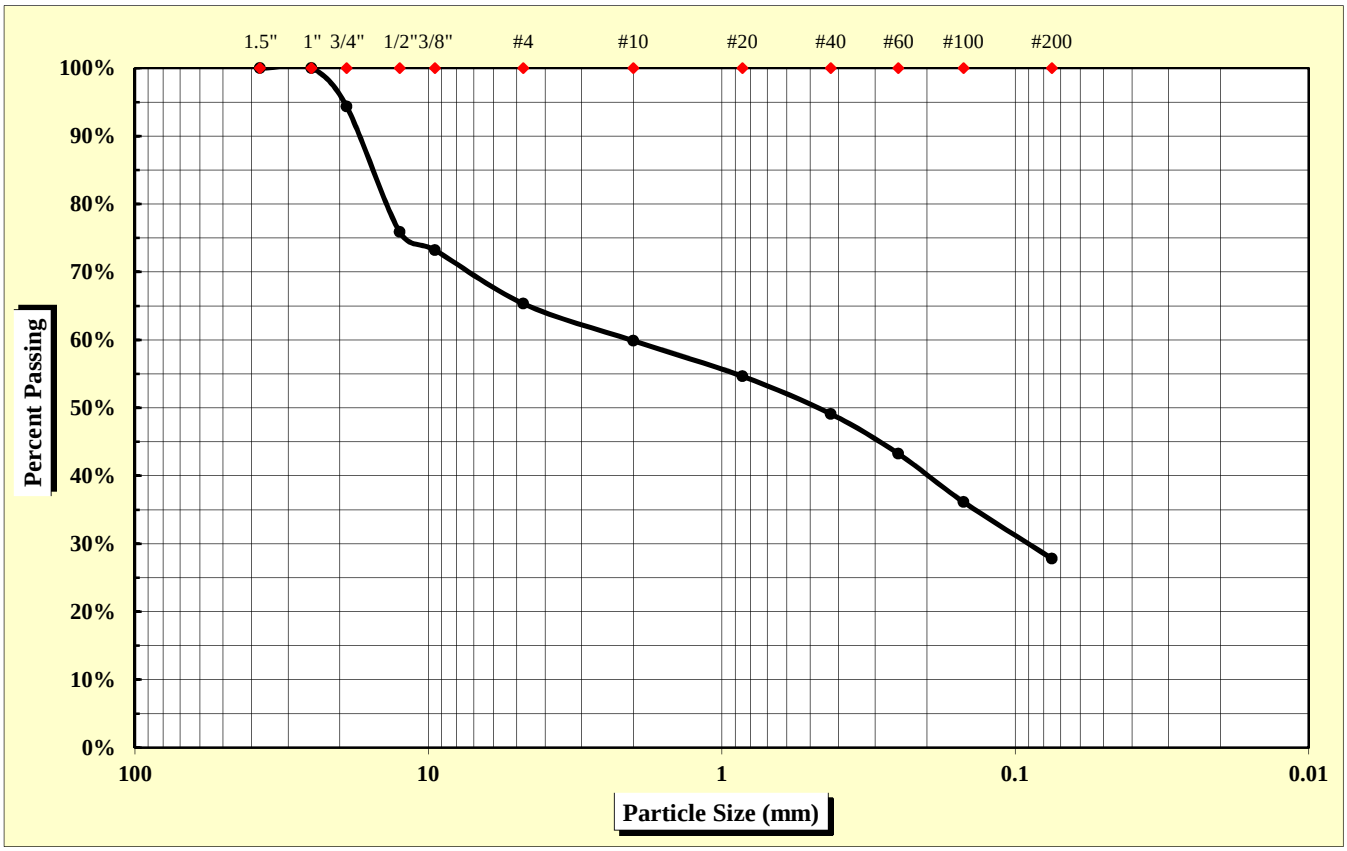
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-45	Sample #:	86	Sample Date:	4/23/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Brown red, medium to fine, clayey SAND w/ gravel (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	40.1%	Fine Sand	21.3%
		Coarse Sand	10.8%	Silt & Clay	27.8%
Liquid Limit	27	Plastic Limit	19	Plastic Index	8
		Moisture Content	9.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

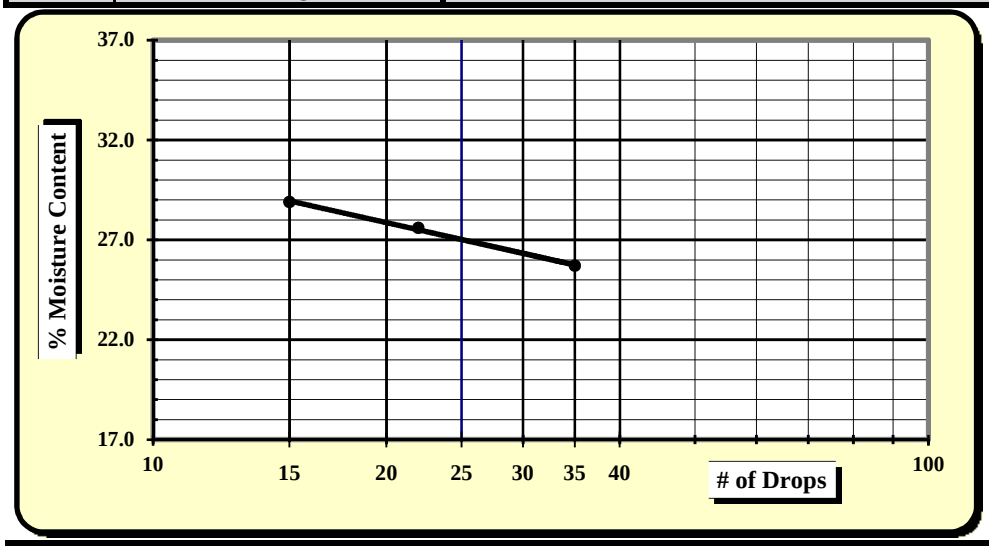
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-45	Sample #:	86	Sample Date:	4/23/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'

Sample Description: Brown red, medium to fine, clayey SAND w/ gravel (SC) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				20		
A	Tare Weight	16.72	16.68	15.73				12.13		
B	Wet Soil Weight + A	38.86	40.96	39.61				20.97		
C	Dry Soil Weight + A	34.34	35.71	34.26				19.59		
D	Water Weight (B-C)	4.52	5.25	5.35				1.38		
E	Dry Soil Weight (C-A)	17.62	19.03	18.53				7.46		
F	% Moisture (D/E)*100	25.7%	27.6%	28.9%				18.5%		
N	# OF DROPS	35	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**18.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**19**
Plastic Index	**8**
Group Symbol	**SC / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 27.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

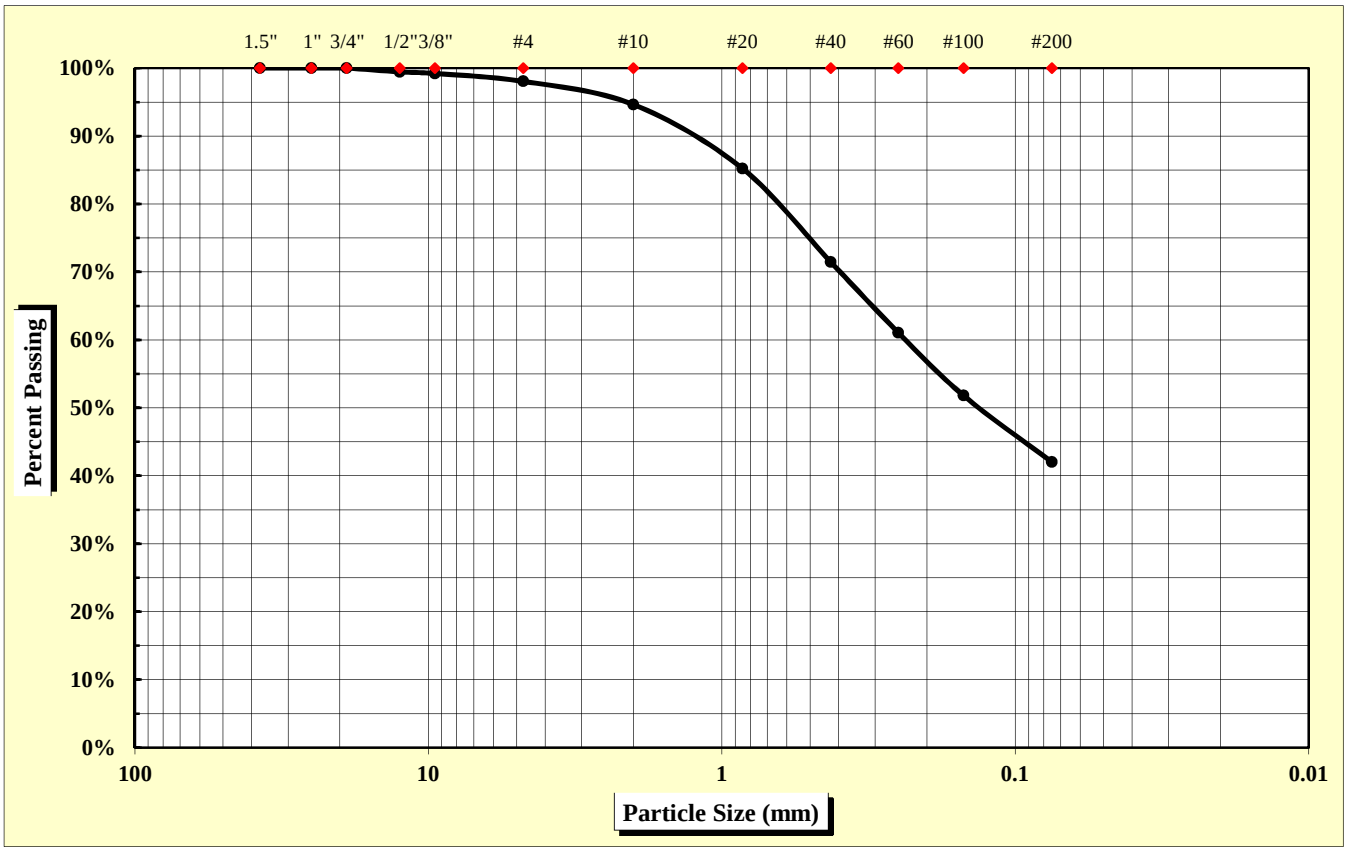
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/29 - 6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	5.4%	Fine Sand	29.4%
		Coarse Sand	23.2%	Silt & Clay	42.0%
Liquid Limit	27	Plastic Limit	18	Plastic Index	9
		Moisture Content	N/A	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

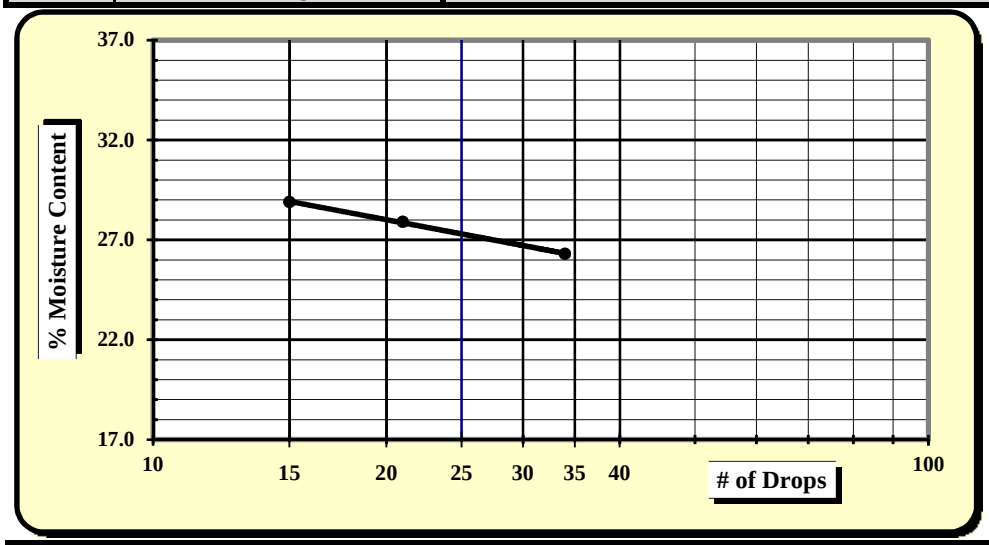
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.71	15.94				11.17		
B	Wet Soil Weight + A	40.49	40.96	39.71				20.51		
C	Dry Soil Weight + A	35.35	35.45	34.38				19.09		
D	Water Weight (B-C)	5.14	5.51	5.33				1.42		
E	Dry Soil Weight (C-A)	19.55	19.74	18.44				7.92		
F	% Moisture (D/E)*100	26.3%	27.9%	28.9%				17.9%		
N	# OF DROPS	34	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**18**
Plastic Index	**9**
Group Symbol	**SC / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

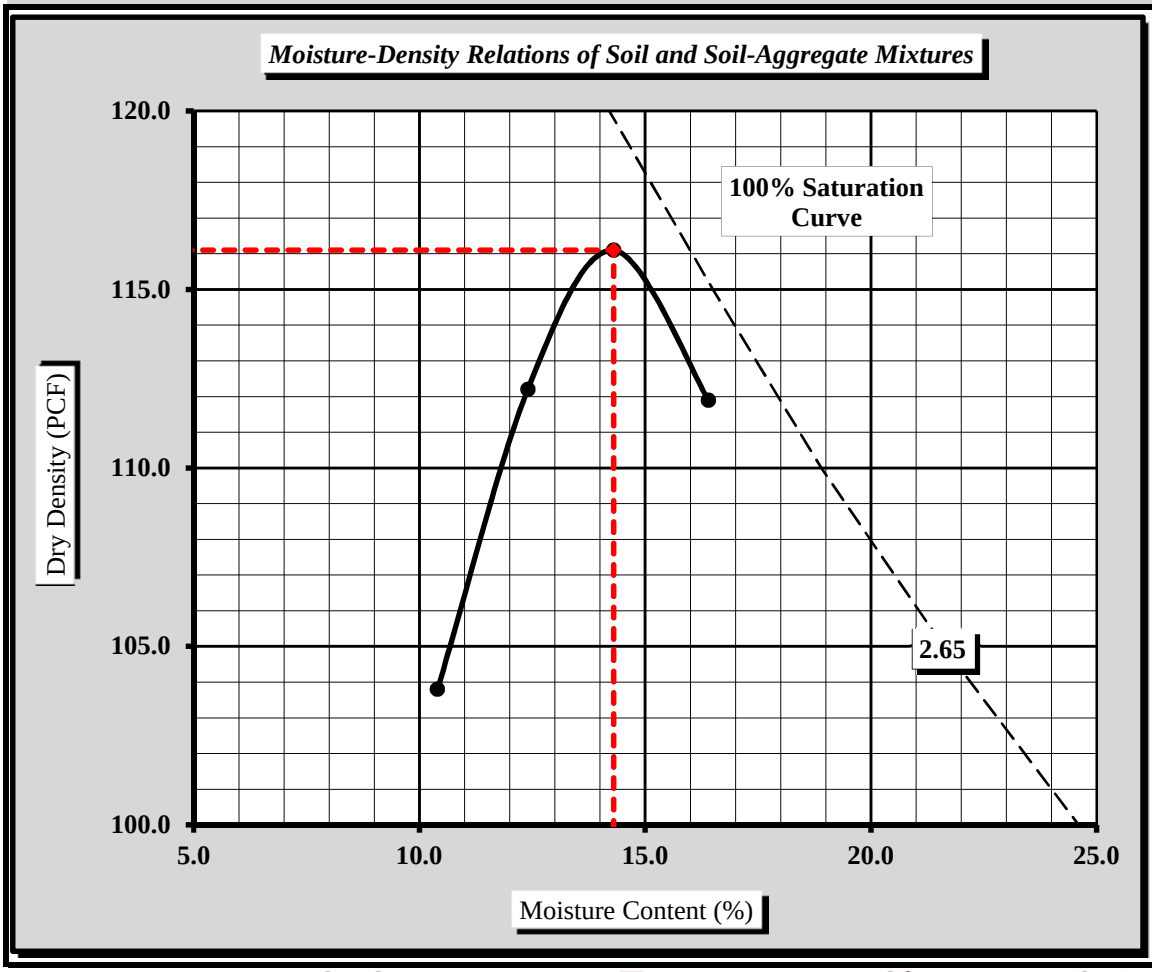
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]

Maximum Dry Density 116.1 PCF. Optimum Moisture Content 14.3%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	27
Plastic Limit	18
Plastic Index	9

% Passing	
1/2"	99.4%
3/8"	99.2%
#4	98.1%
#10	94.6%
#40	71.5%
#60	61.0%
#100	51.8%
#200	42.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	6/4 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-4 (1)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **116.1 PCF** Optimum Moisture Content: **14.3%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 7.9	**CBR at 0.2 in. 9.2**	**CBR at 0.1 in. 7.9**	**CBR at 0.2 in. 9.2**

CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	110.7
Initial Dry Density (PCF)	111.7	Average Final Moisture Content	15.2%
Moisture Content of the Compacted Specimen	14.3%	Moisture Content (top 1" after soaking)	16.0%
Percent Compaction	96.2%	Percent Swell	0.1%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	27	Plastic Index	9	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

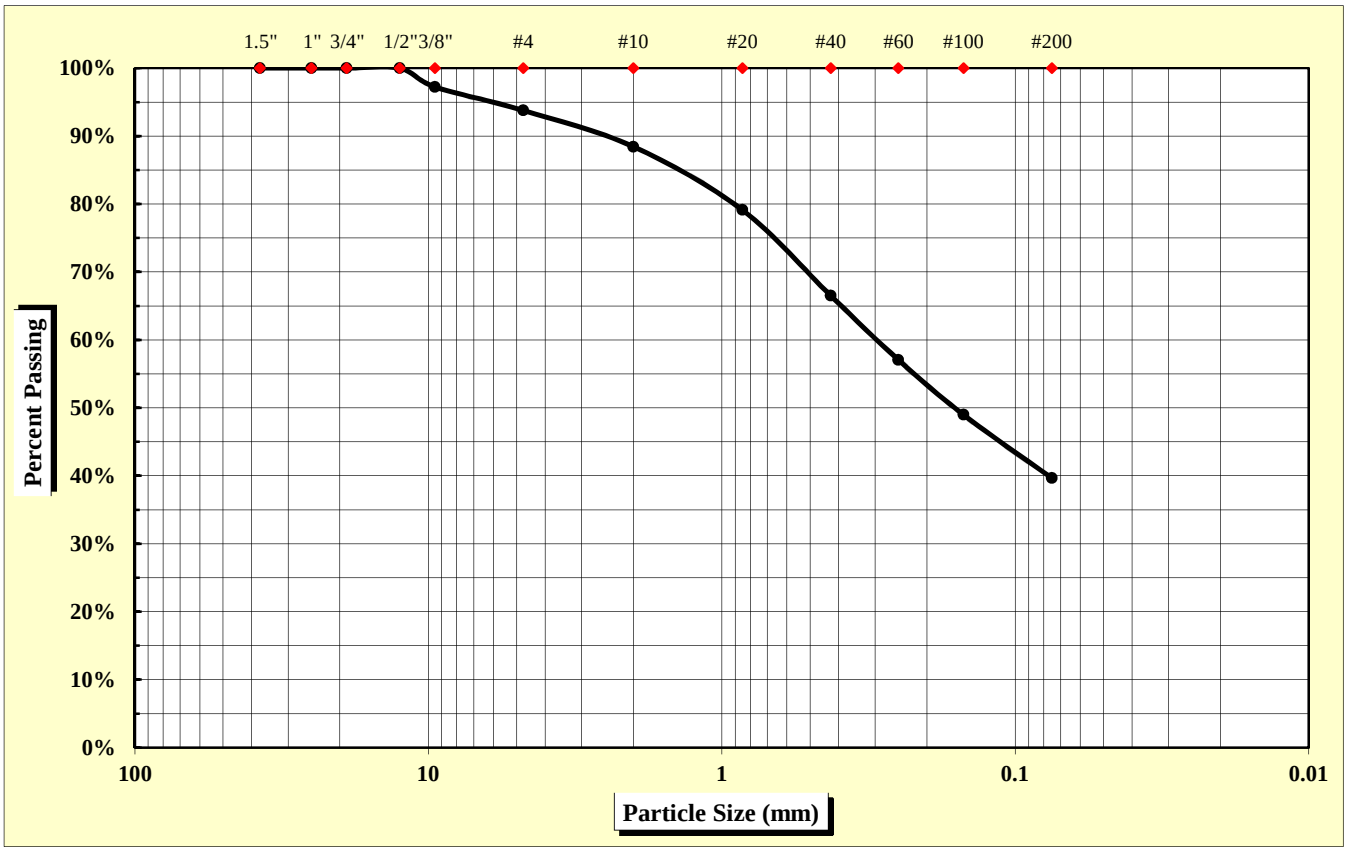
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange brown, medium to fine, clayey SAND (SC) [A-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	11.6%	Fine Sand	26.8%
		Coarse Sand	21.9%	Silt & Clay	39.6%
Liquid Limit	33	Plastic Limit	21	Plastic Index	12
		Moisture Content	17.0%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

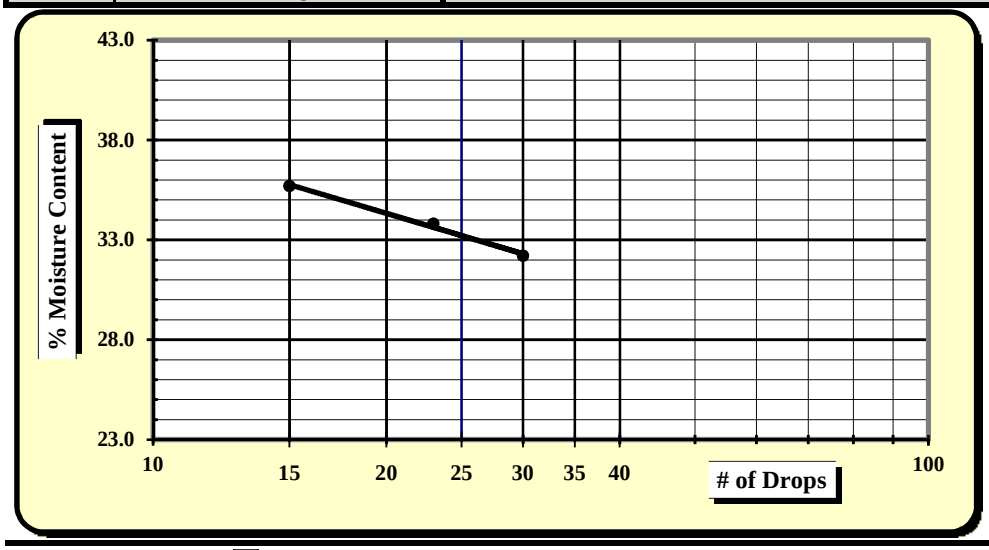
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-48	Sample #:	86	Sample Date:	4/23/15
Location:	SS-2	Type:	Split-spoon	Depth:	1.5 - 3.0'
Sample Description:	Red orange brown, medium to fine, clayey SAND (SC) [A-6 (1)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				21		
A	Tare Weight	16.46	16.50	16.99				12.07		
B	Wet Soil Weight + A	40.65	40.11	39.78				22.09		
C	Dry Soil Weight + A	34.76	34.14	33.78				20.36		
D	Water Weight (B-C)	5.89	5.97	6.00				1.73		
E	Dry Soil Weight (C-A)	18.30	17.64	16.79				8.29		
F	% Moisture (D/E)*100	32.2%	33.8%	35.7%				20.9%		
N	# OF DROPS	30	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**33**
Plastic Limit	**21**
Plastic Index	**12**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

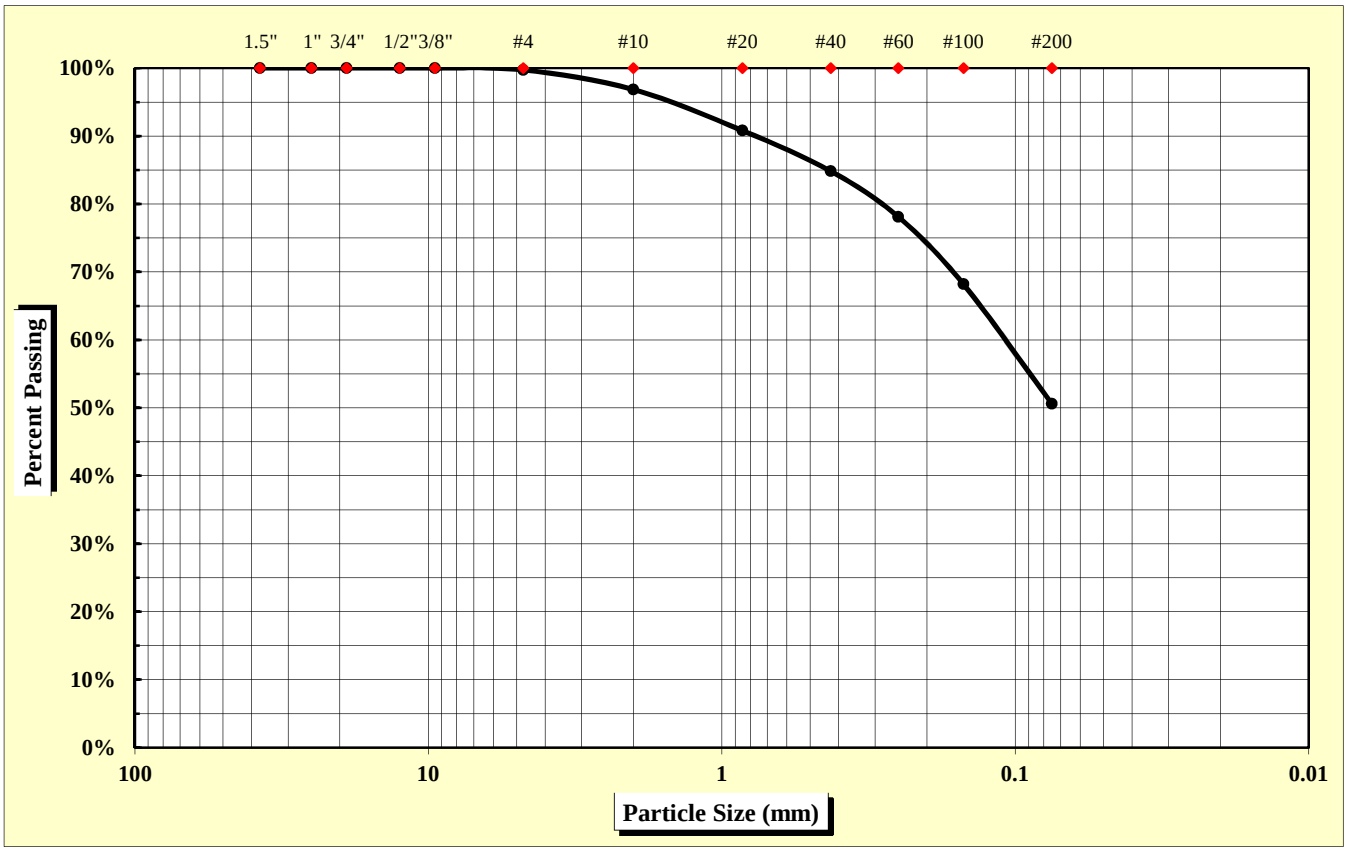
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-49	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange tan brown, medium to fine, sandy SILT (ML) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.1%	Fine Sand	34.2%
		Coarse Sand	12.0%	Silt & Clay	50.6%
Liquid Limit	35	Plastic Limit	28	Plastic Index	7
		Moisture Content	23.0%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

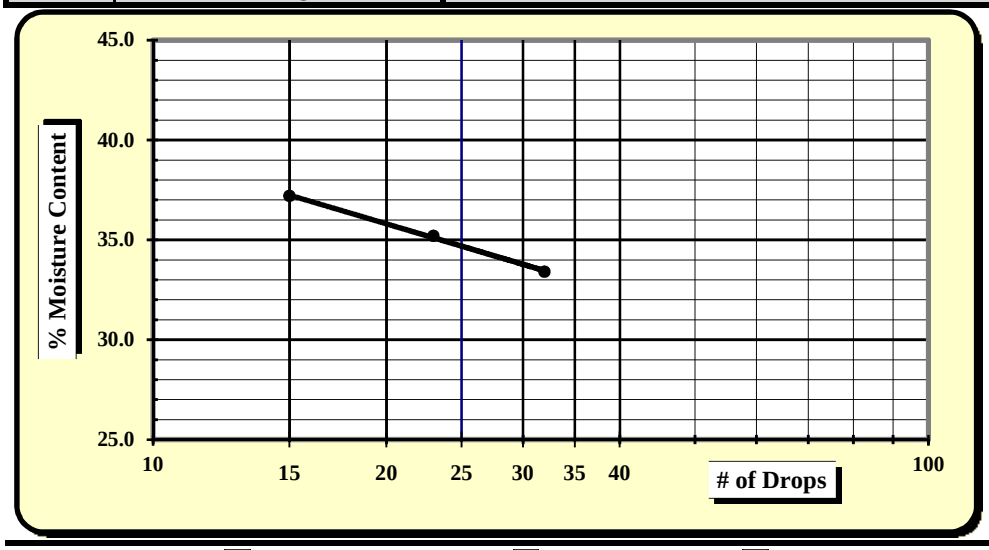
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-49	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Orange tan brown, medium to fine, sandy SILT (ML) [A-4 (2)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				22		
A	Tare Weight	15.96	16.67	16.77				11.91		
B	Wet Soil Weight + A	40.13	39.95	39.24				21.45		
C	Dry Soil Weight + A	34.08	33.89	33.15				19.38		
D	Water Weight (B-C)	6.05	6.06	6.09				2.07		
E	Dry Soil Weight (C-A)	18.12	17.22	16.38				7.47		
F	% Moisture (D/E)*100	33.4%	35.2%	37.2%				27.7%		
N	# OF DROPS	32	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**28**
Plastic Index	**7**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

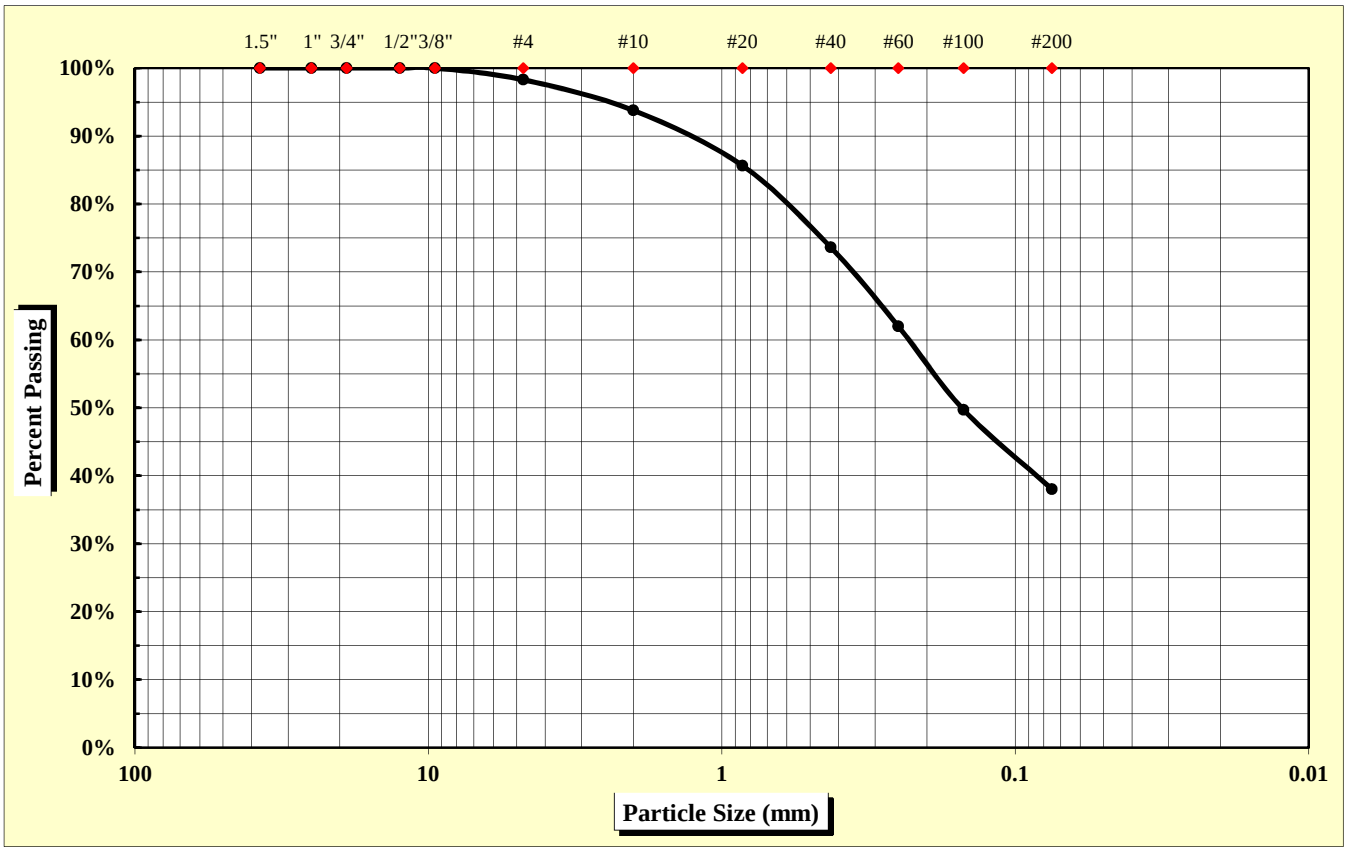
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/29 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-51	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.2%	Fine Sand	35.6%
		Coarse Sand	20.2%	Silt & Clay	38.0%
Liquid Limit	22	Plastic Limit	15	Plastic Index	7
		Moisture Content	N/A	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

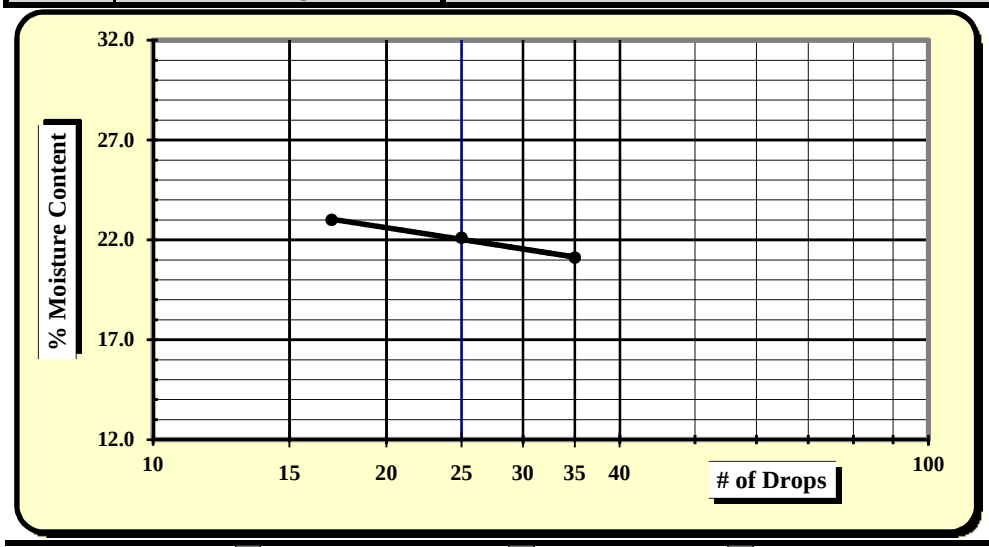
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-51	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.92	16.93	16.79				12.09		
B	Wet Soil Weight + A	43.01	45.80	44.12				21.91		
C	Dry Soil Weight + A	38.46	40.57	39.01				20.60		
D	Water Weight (B-C)	4.55	5.23	5.11				1.31		
E	Dry Soil Weight (C-A)	21.54	23.64	22.22				8.51		
F	% Moisture (D/E)*100	21.1%	22.1%	23.0%				15.4%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**15.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**22**
Plastic Limit	**15**
Plastic Index	**7**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 38.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

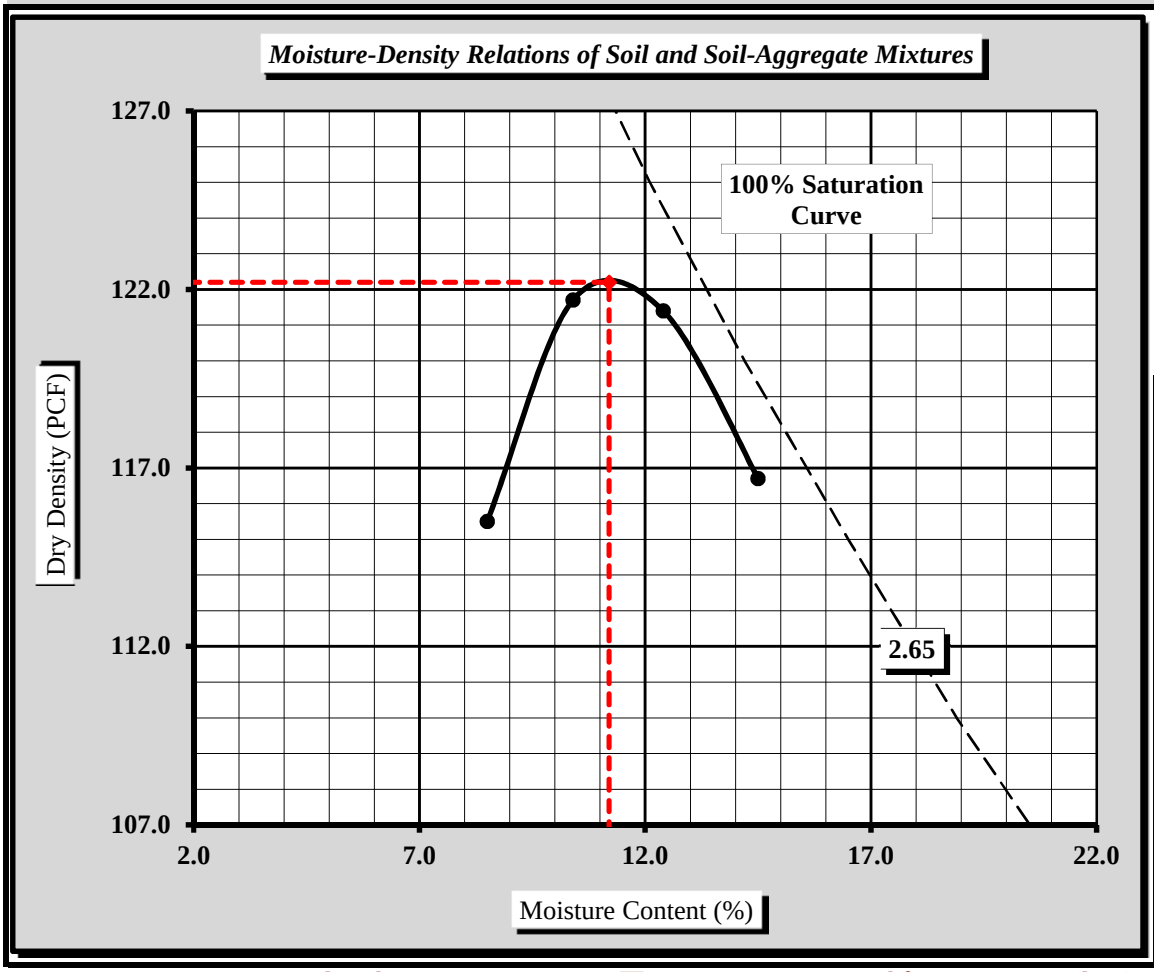
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-51	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Maximum Dry Density 122.2 PCF. Optimum Moisture Content 11.2%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	22
Plastic Limit	15
Plastic Index	7

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.3%
#10	93.8%
#40	73.6%
#60	62.0%
#100	49.7%
#200	38.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	6/4 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

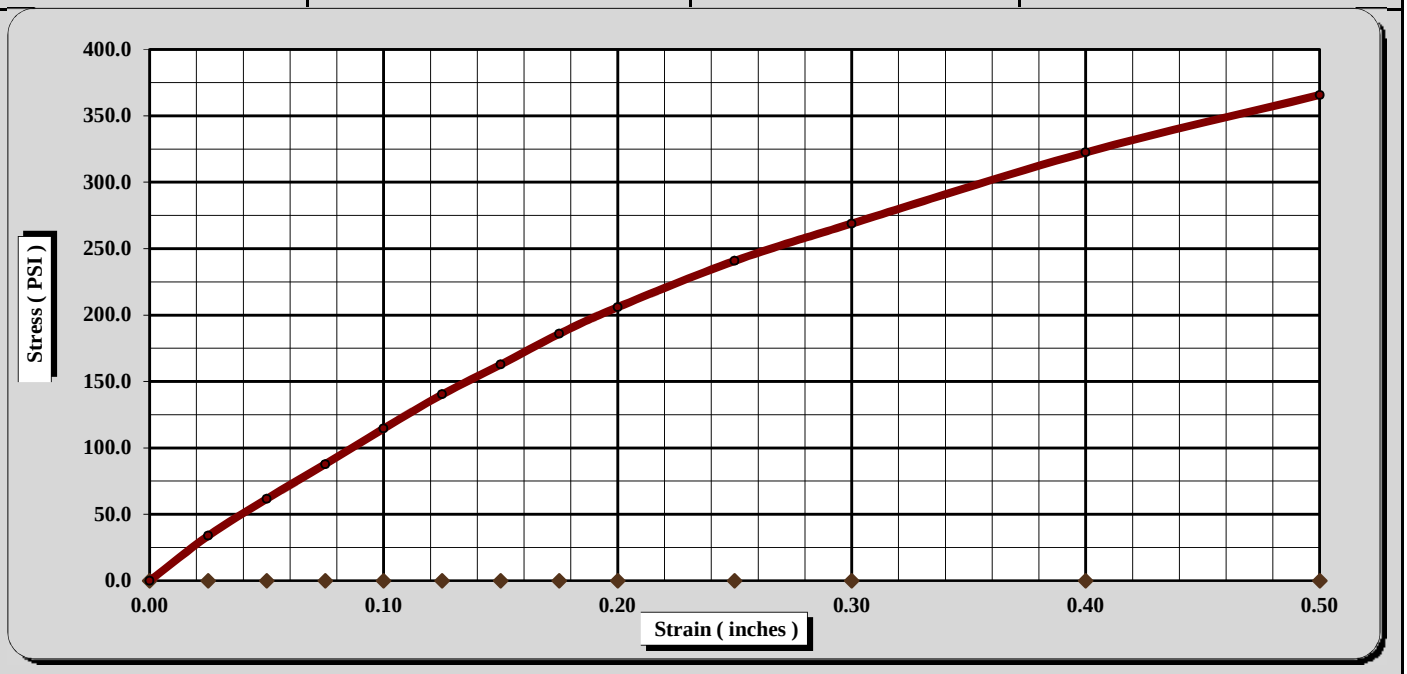
Boring #:	SB-51	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **122.2 PCF** Optimum Moisture Content: **11.2%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 11.5	**CBR at 0.2 in. 13.7**	**CBR at 0.1 in. 11.5**	**CBR at 0.2 in. 13.7**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	115.3
Initial Dry Density (PCF)	117.2	Average Final Moisture Content	12.9%
Moisture Content of the Compacted Specimen	11.2%	Moisture Content (top 1" after soaking)	13.2%
Percent Compaction	95.9%	Percent Swell	0.1%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	22	Plastic Index	7	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

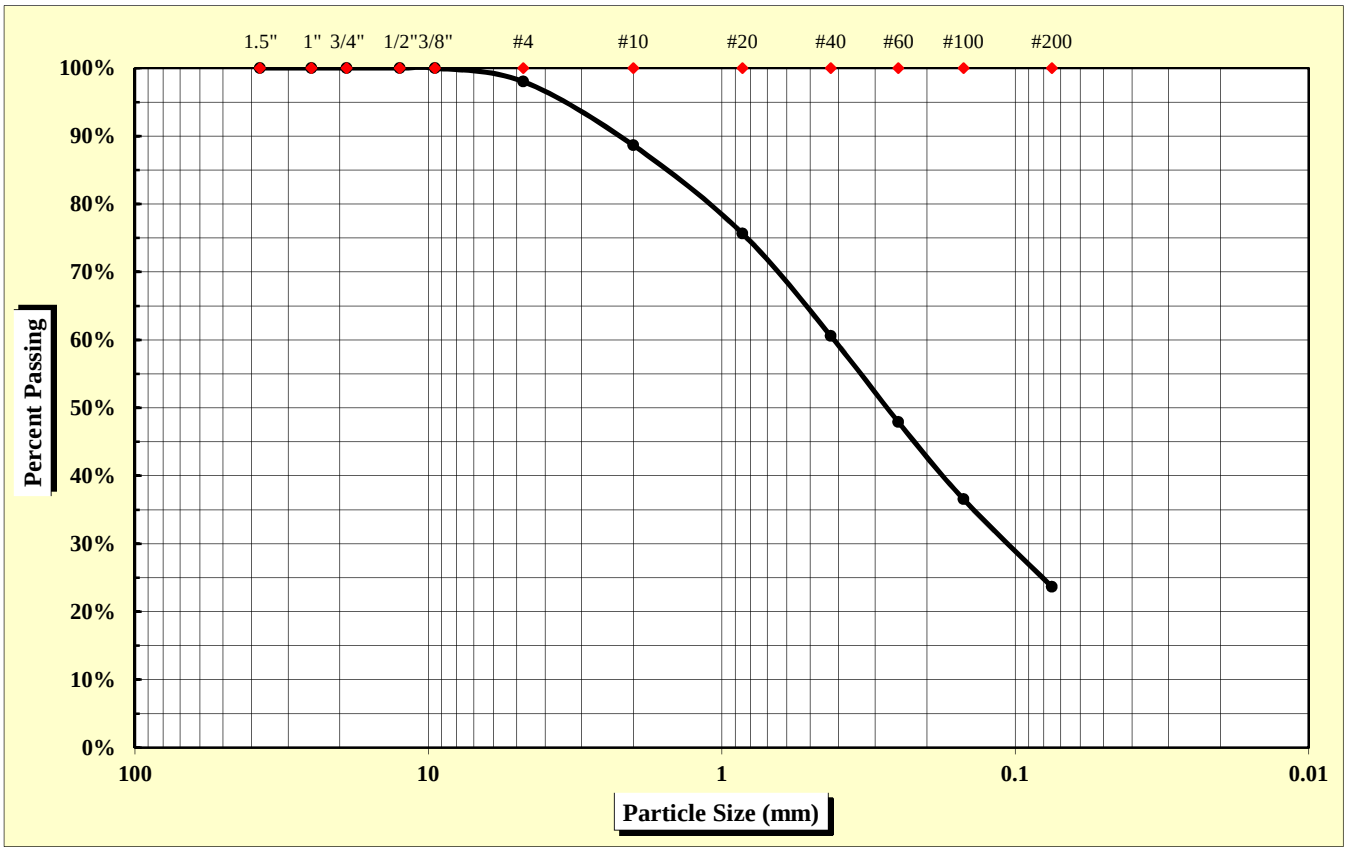
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-53	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown tan orange, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	11.4%	Fine Sand	36.9%
		Coarse Sand	28.1%	Silt & Clay	23.7%
Liquid Limit	30	Plastic Limit	24	Plastic Index	6
		Moisture Content	16.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

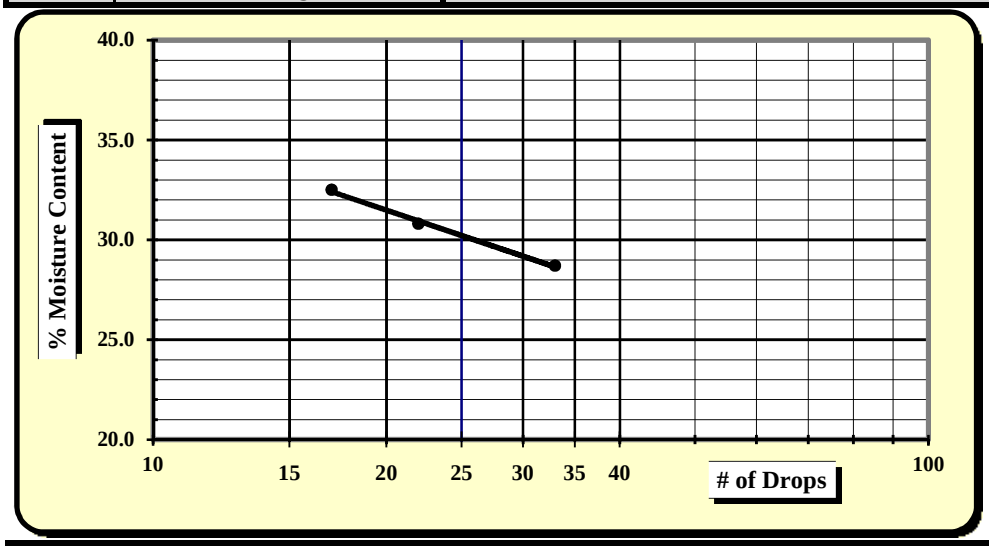
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-53	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown tan orange, medium to fine, silty SAND (SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				23		
A	Tare Weight	16.67	16.68	15.97				12.06		
B	Wet Soil Weight + A	42.46	42.93	41.63				22.14		
C	Dry Soil Weight + A	36.71	36.75	35.33				20.16		
D	Water Weight (B-C)	5.75	6.18	6.30				1.98		
E	Dry Soil Weight (C-A)	20.04	20.07	19.36				8.10		
F	% Moisture (D/E)*100	28.7%	30.8%	32.5%				24.4%		
N	# OF DROPS	33	22	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**24**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 23.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

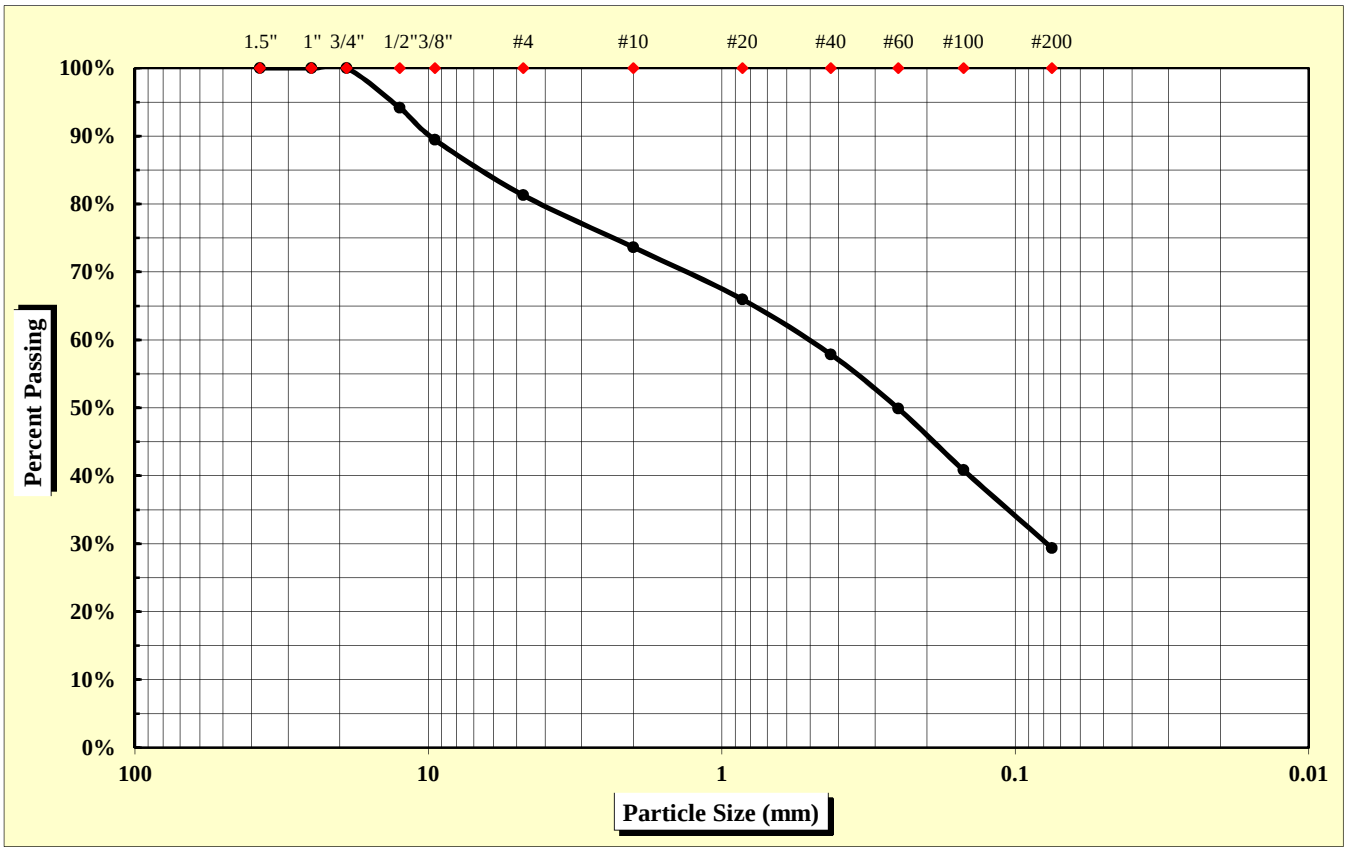
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-55	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	26.4%	Fine Sand	28.5%
		Coarse Sand	15.8%	Silt & Clay	29.4%
Liquid Limit	32	Plastic Limit	26	Plastic Index	6
		Moisture Content	13.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

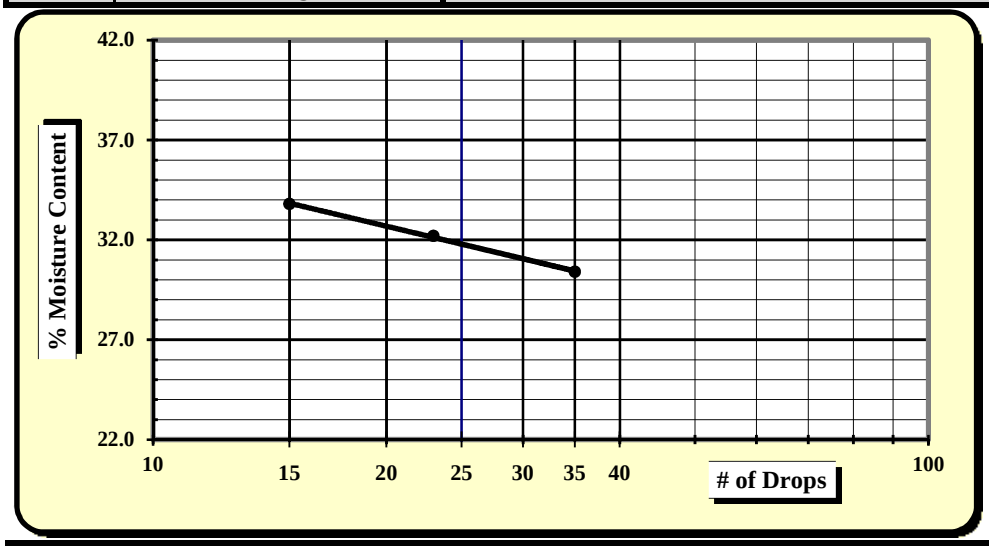
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-55	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				25		
A	Tare Weight	16.71	16.88	16.81				11.67		
B	Wet Soil Weight + A	42.29	41.81	41.17				21.10		
C	Dry Soil Weight + A	36.32	35.74	35.02				19.18		
D	Water Weight (B-C)	5.97	6.07	6.15				1.92		
E	Dry Soil Weight (C-A)	19.61	18.86	18.21				7.51		
F	% Moisture (D/E)*100	30.4%	32.2%	33.8%				25.6%		
N	# OF DROPS	35	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**32**
Plastic Limit	**26**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

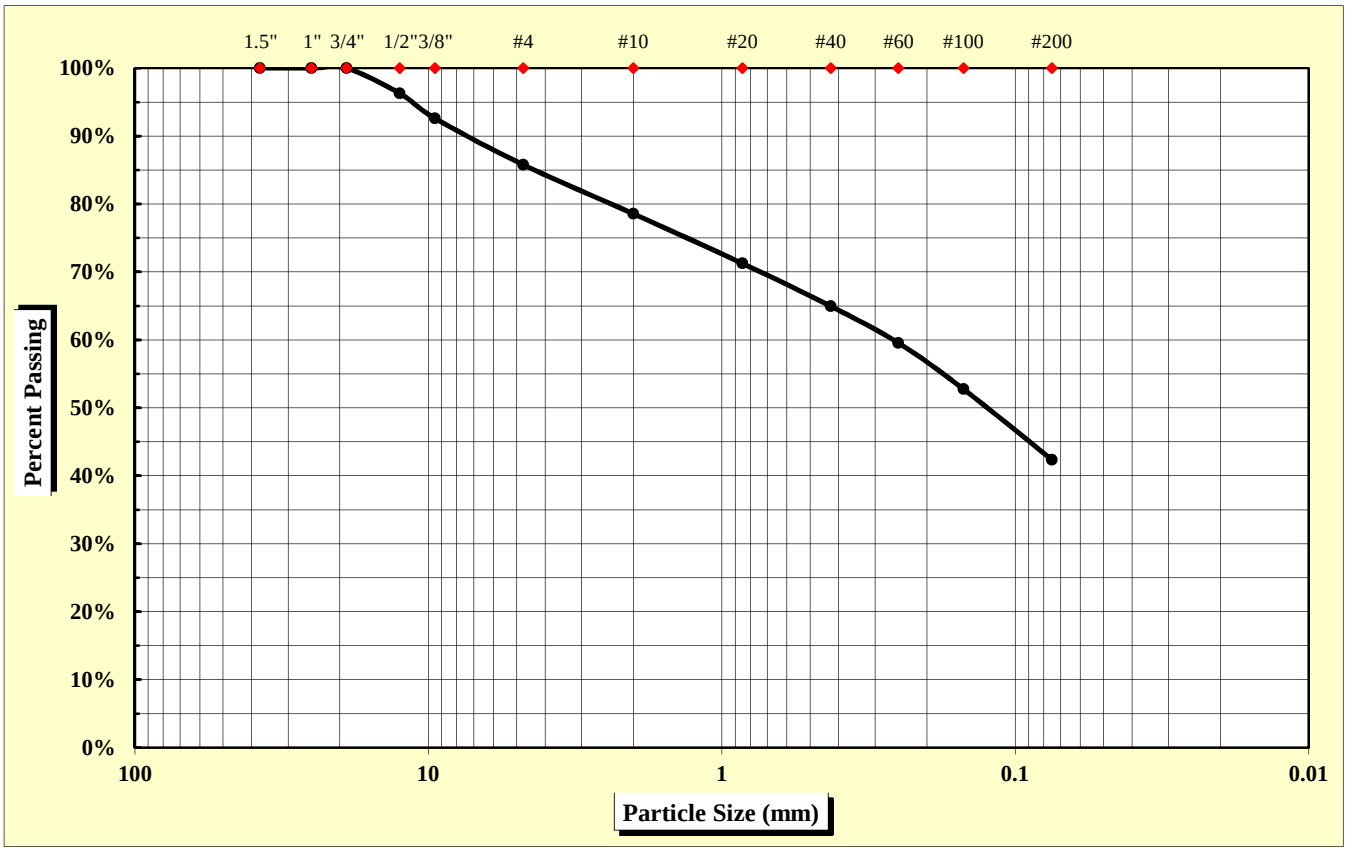
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-56	Sample #:	86	Sample Date:	4/23/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	21.4%	Fine Sand	22.6%
		Coarse Sand	13.6%	Silt & Clay	42.4%
Liquid Limit	34	Plastic Limit	26	Plastic Index	8
		Moisture Content	13.8%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

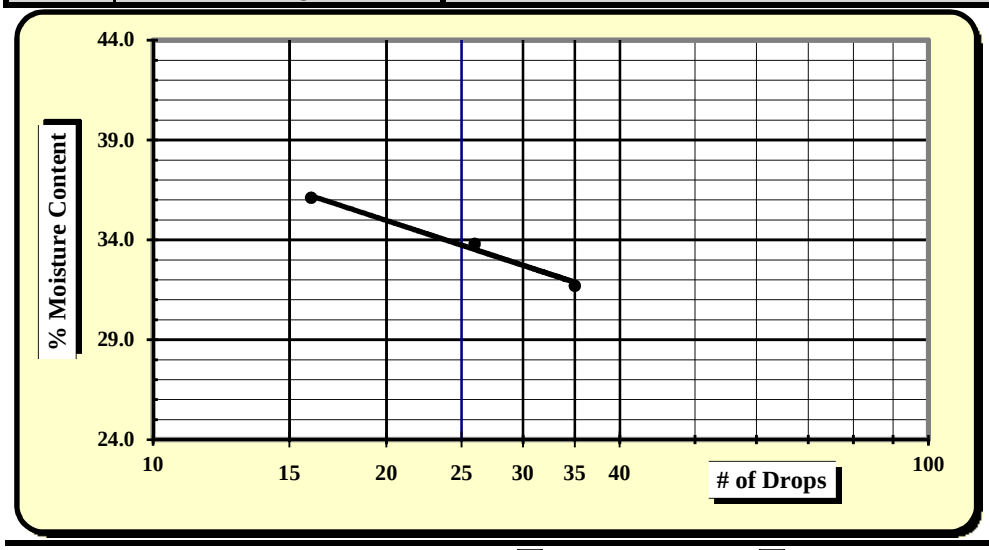
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-56	Sample #:	86	Sample Date:	4/23/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.0 - 1.5'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-4 (1)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				26		
A	Tare Weight	16.83	16.76	15.92				11.53		
B	Wet Soil Weight + A	42.08	41.80	41.14				22.15		
C	Dry Soil Weight + A	36.00	35.48	34.45				19.94		
D	Water Weight (B-C)	6.08	6.32	6.69				2.21		
E	Dry Soil Weight (C-A)	19.17	18.72	18.53				8.41		
F	% Moisture (D/E)*100	31.7%	33.8%	36.1%				26.3%		
N	# OF DROPS	35	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**26**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

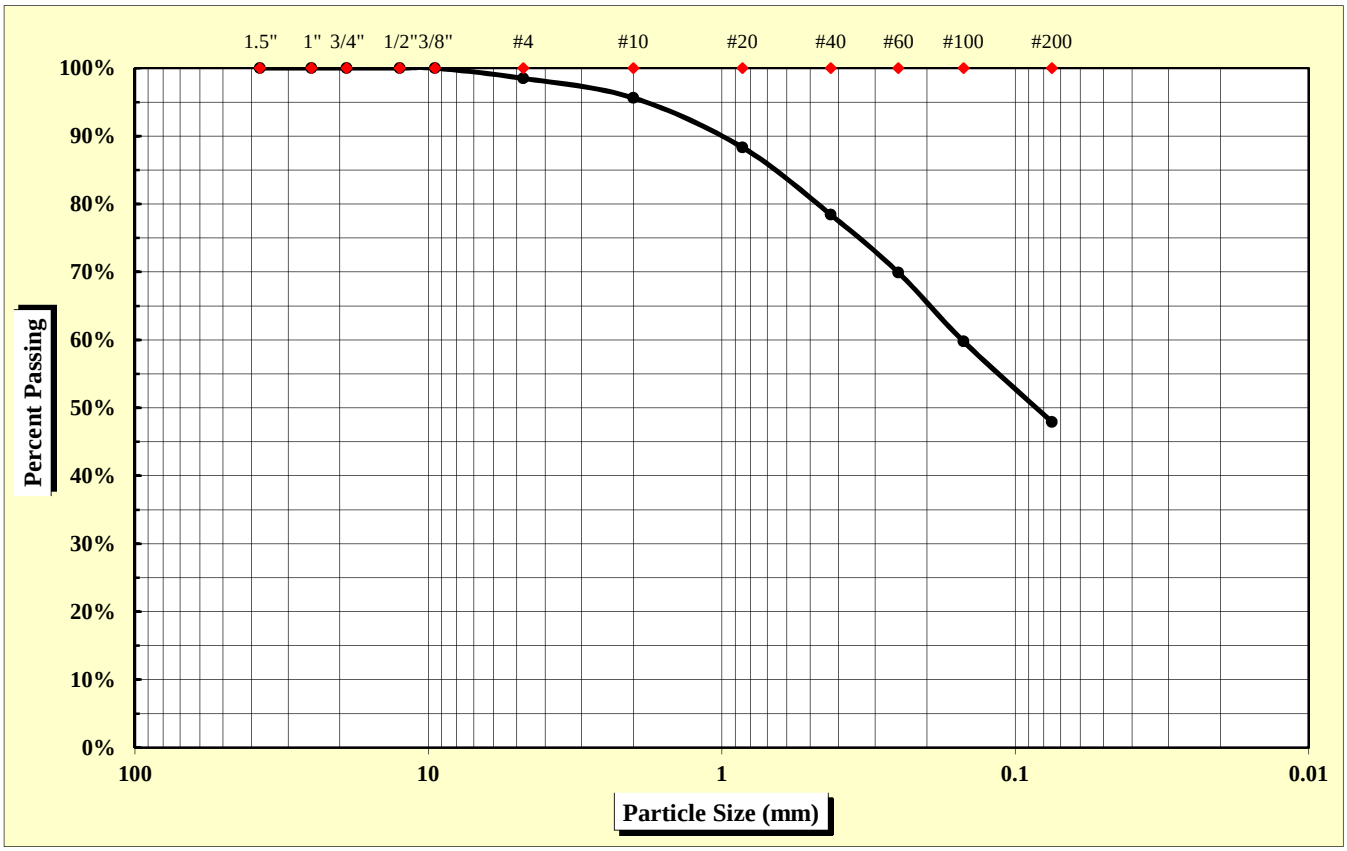
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/29 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-57	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-4 (2)], trace mica				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.4%	Fine Sand	30.5%
		Coarse Sand	17.2%	Silt & Clay	47.9%
Liquid Limit	36	Plastic Limit	26	Plastic Index	10
		Moisture Content	N/A	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

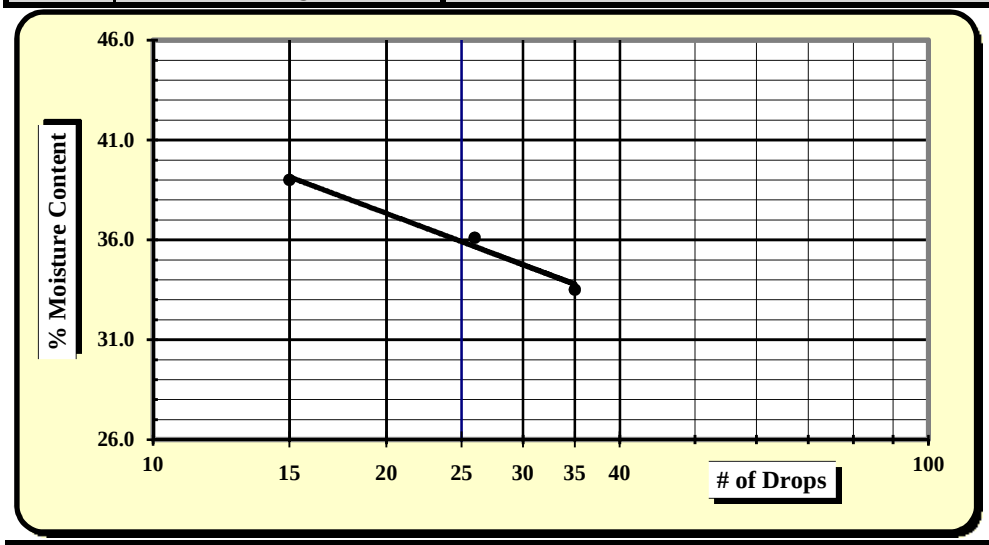
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-57	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-4 (2)], trace mica

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-7	Z-8	Z-9				17		
A	Tare Weight	16.76	15.76	16.77				12.11		
B	Wet Soil Weight + A	39.33	38.36	37.94				20.88		
C	Dry Soil Weight + A	33.67	32.37	32.00				19.10		
D	Water Weight (B-C)	5.66	5.99	5.94				1.78		
E	Dry Soil Weight (C-A)	16.91	16.61	15.23				6.99		
F	% Moisture (D/E)*100	33.5%	36.1%	39.0%				25.5%		
N	# OF DROPS	35	26	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**26**
Plastic Index	**10**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

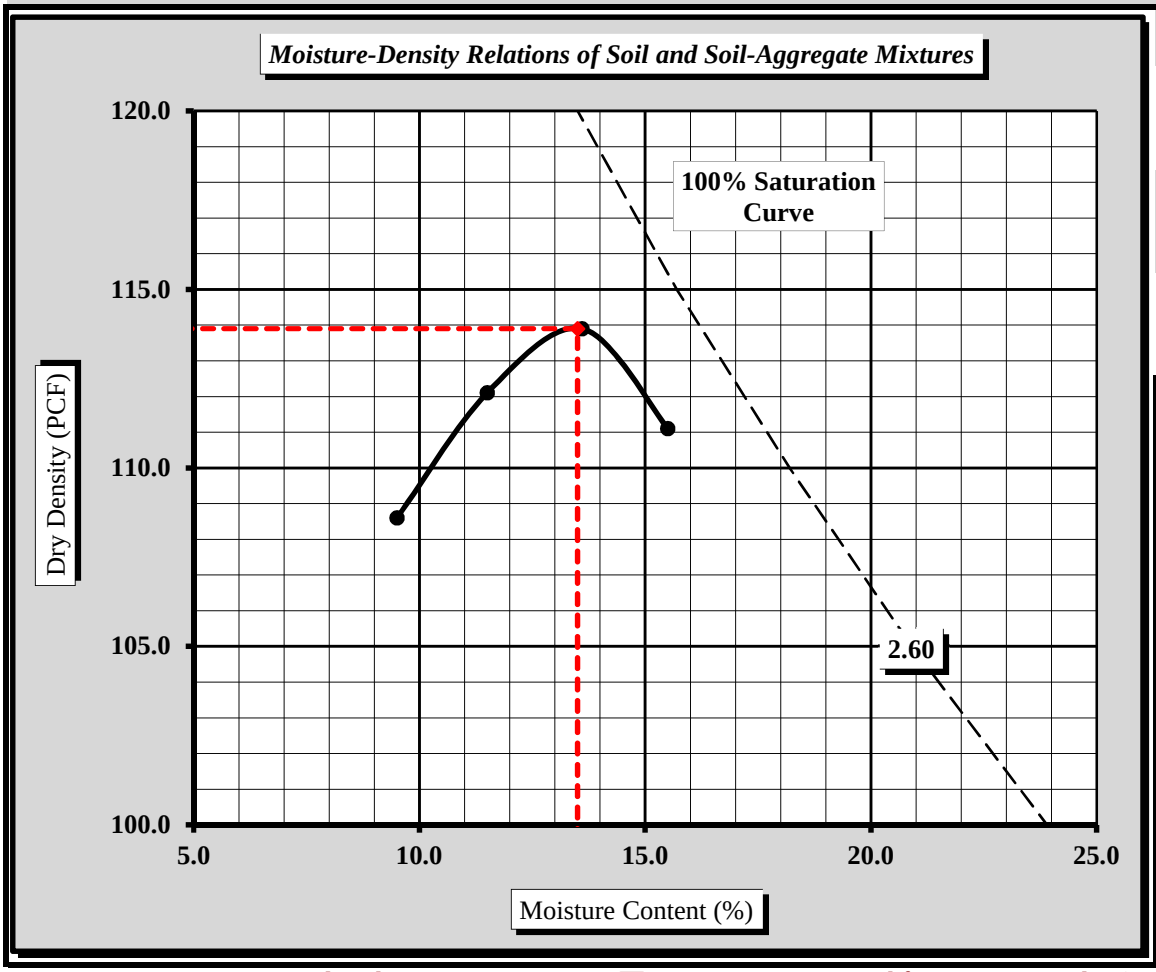
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-57	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-4 (2)], trace mica

Maximum Dry Density 113.9 PCF. **Optimum Moisture Content 13.5%**

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	**N/A**
Specific Gravity of Soil (T 100)	**2.600**
Liquid Limit	**36**
Plastic Limit	**26**
Plastic Index	**10**

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.5%
#10	95.6%
#40	78.4%
#60	69.9%
#100	59.8%
#200	47.9%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	6/4 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-57	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-4 (2)], trace mica

AASHTO T 99 ***Method D*** Maximum Dry Density: **113.9 PCF** Optimum Moisture Content: **13.5%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 3.5	**CBR at 0.2 in. 4.5**	**CBR at 0.1 in. 4.1**	**CBR at 0.2 in. 4.8**

CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	102.2
Initial Dry Density (PCF)	108.9	Average Final Moisture Content	18.0%
Moisture Content of the Compacted Specimen	13.5%	Moisture Content (top 1" after soaking)	22.4%
Percent Compaction	95.6%	Percent Swell	2.5%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	36	Plastic Index	10	Apparent Relative Density	2.600

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

This report shall not be reproduced, except in full without the written approval of S&ME, Inc.

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

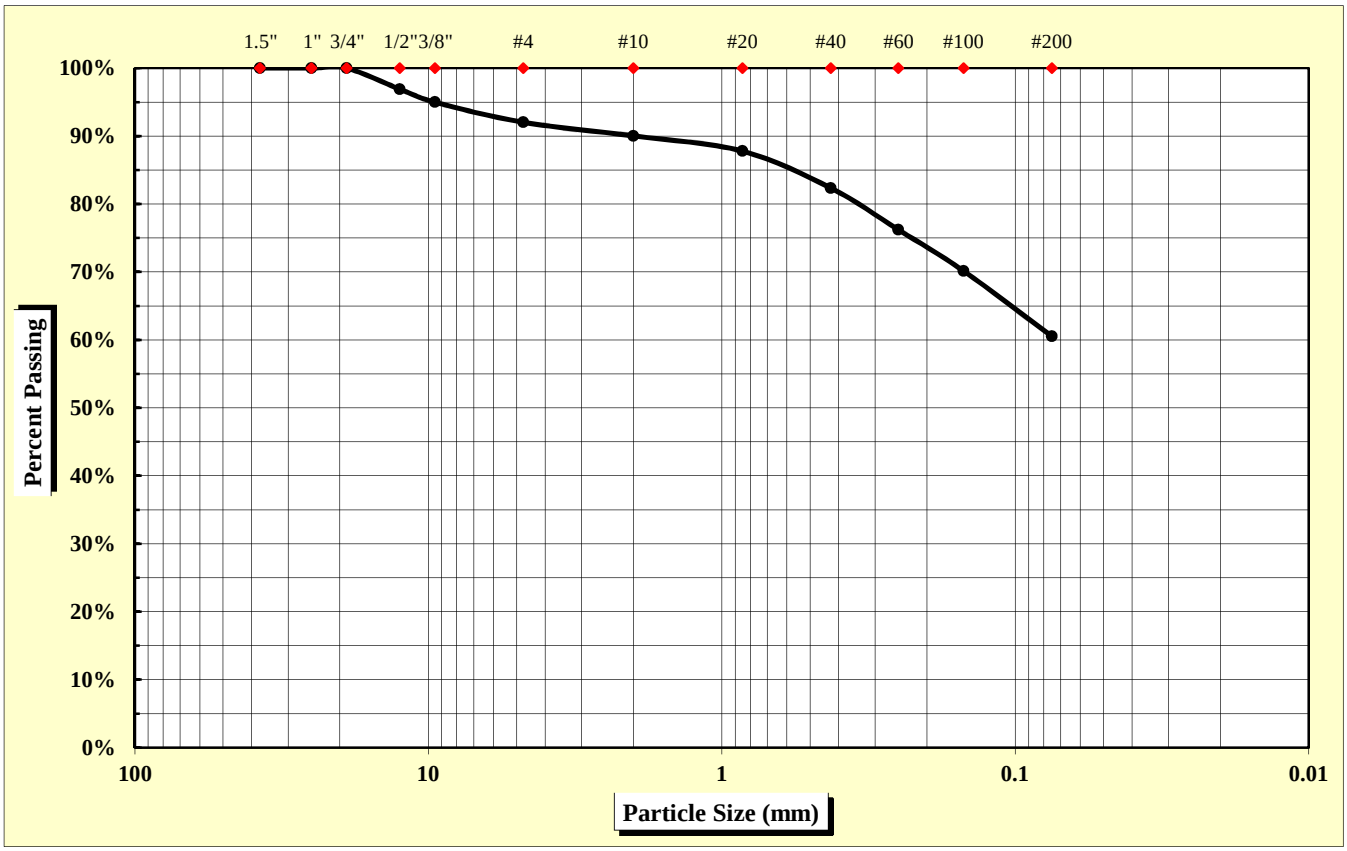
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-58	Sample #:	86	Sample Date:	4/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.0 - 10.0'
Sample Description:	Red brown, fine, sandy SILT (ML) [A-7-6 (10)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	10.0%	Fine Sand	21.8%
		Coarse Sand	7.7%	Silt & Clay	60.5%
Liquid Limit	48	Plastic Limit	29	Plastic Index	19
		Moisture Content	30.1%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

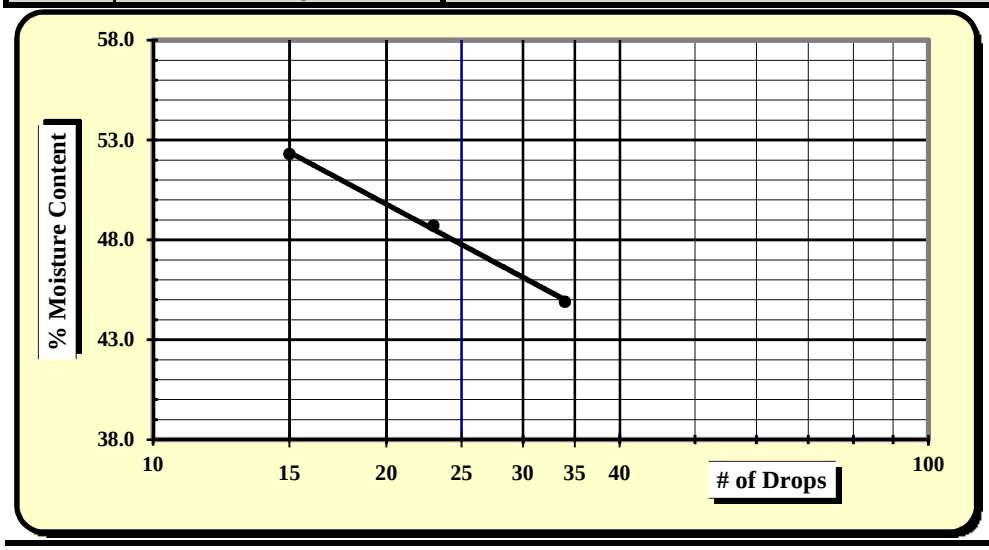
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-58	Sample #:	86	Sample Date:	4/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.0 - 10.0'

Sample Description: Red brown, fine, sandy SILT (ML) [A-7-6 (10)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				27		
A	Tare Weight	15.77	15.58	16.92				11.47		
B	Wet Soil Weight + A	38.85	37.91	38.20				21.07		
C	Dry Soil Weight + A	31.70	30.60	30.89				18.91		
D	Water Weight (B-C)	7.15	7.31	7.31				2.16		
E	Dry Soil Weight (C-A)	15.93	15.02	13.97				7.44		
F	% Moisture (D/E)*100	44.9%	48.7%	52.3%				29.0%		
N	# OF DROPS	34	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**29**
Plastic Index	**19**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 60.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

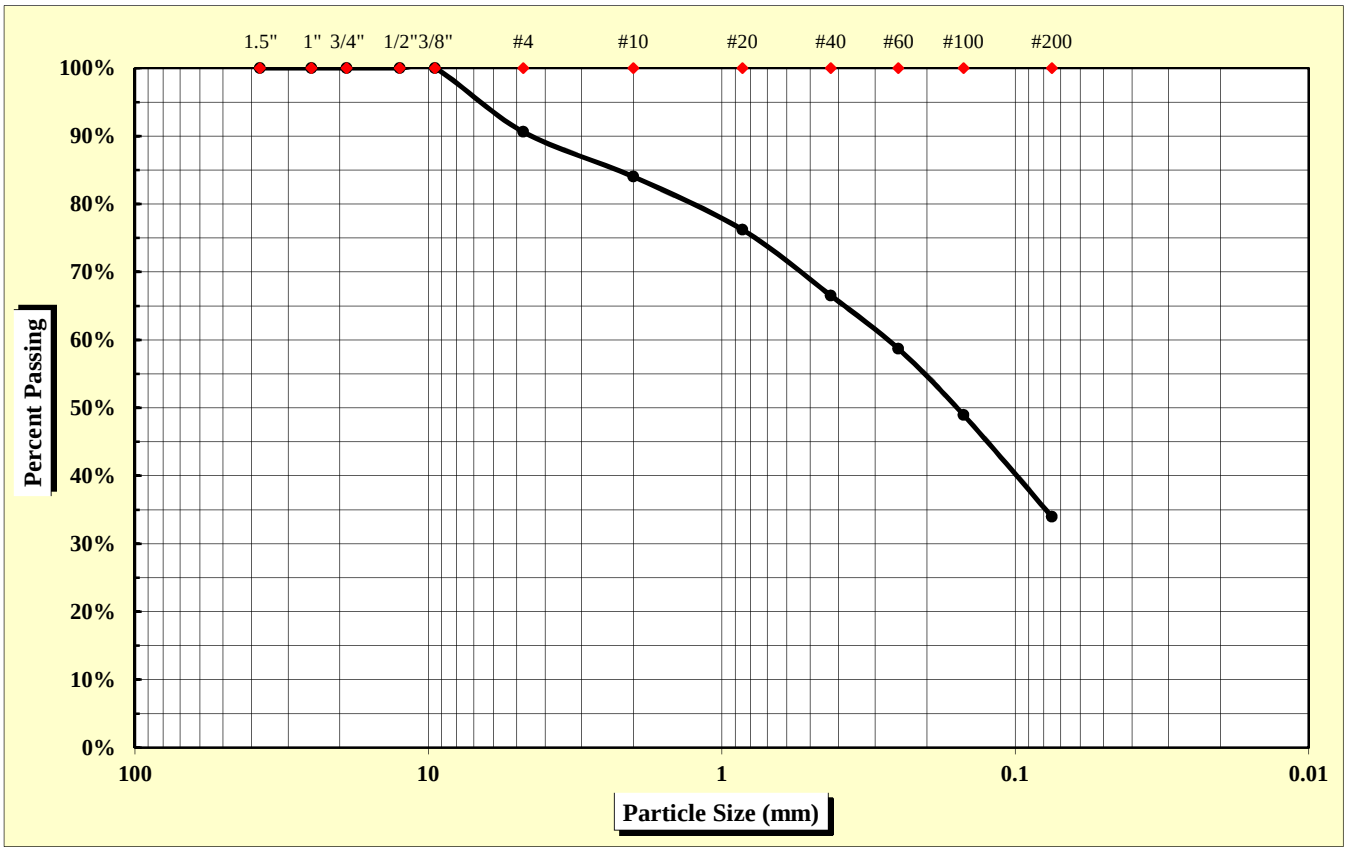
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-58	Sample #:	86	Sample Date:	4/23/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'
Sample Description:	Brown tan orange, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	16.0%	Fine Sand	32.6%
		Coarse Sand	17.5%	Silt & Clay	34.0%
Liquid Limit	38	Plastic Limit	32	Plastic Index	6
		Moisture Content	19.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

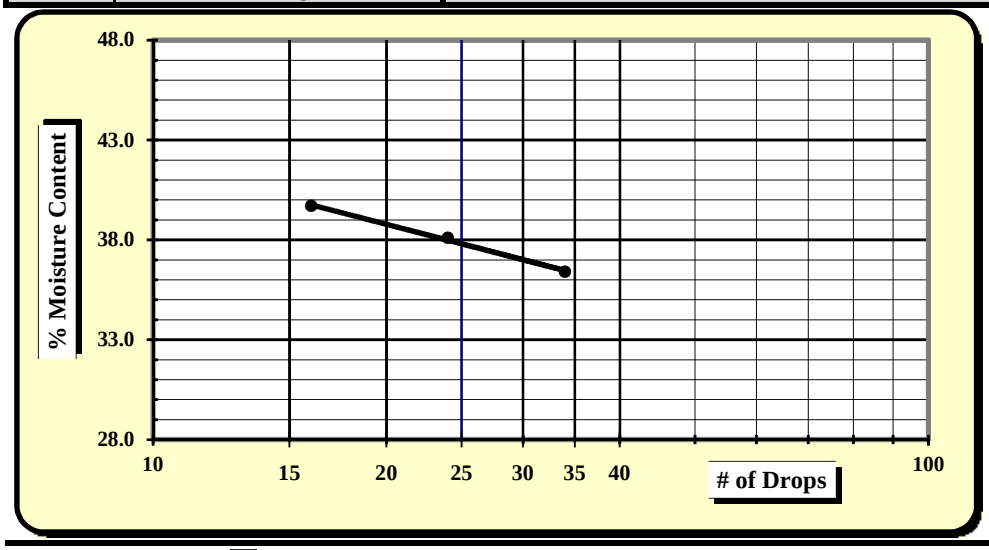
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-58	Sample #:	86	Sample Date:	4/23/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15.0'
Sample Description:	Brown tan orange, medium to fine, silty SAND (SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				28		
A	Tare Weight	15.80	15.70	15.94				11.47		
B	Wet Soil Weight + A	39.38	37.97	38.42				20.04		
C	Dry Soil Weight + A	33.09	31.83	32.03				17.97		
D	Water Weight (B-C)	6.29	6.14	6.39				2.07		
E	Dry Soil Weight (C-A)	17.29	16.13	16.09				6.50		
F	% Moisture (D/E)*100	36.4%	38.1%	39.7%				31.8%		
N	# OF DROPS	34	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**32**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

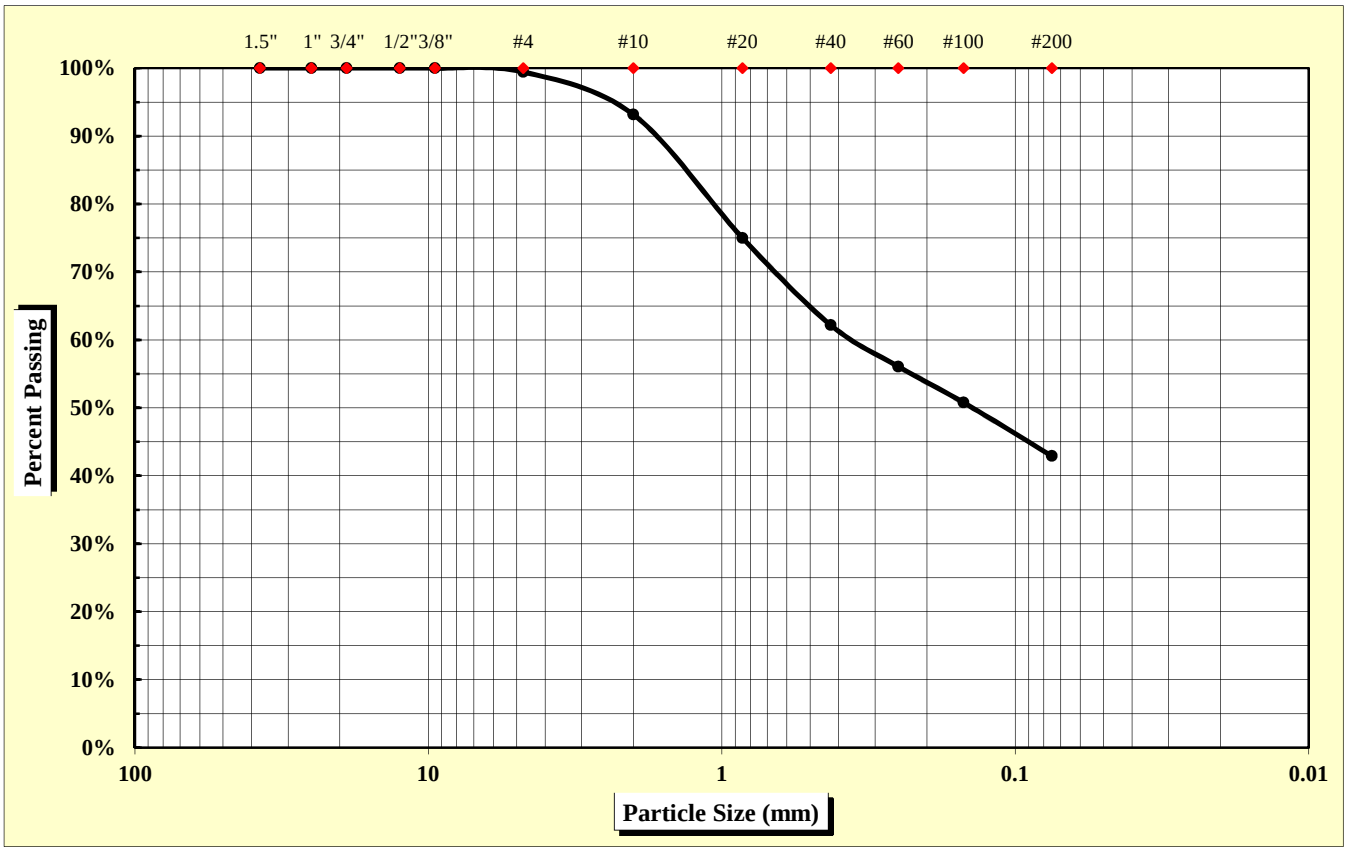
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	6/2 - 6/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-59	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'
Sample Description:	Light red tan white, fine to medium, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	6.8%	Fine Sand	19.3%
		Coarse Sand	31.0%	Silt & Clay	42.9%
Liquid Limit	37	Plastic Limit	28	Plastic Index	9
		Moisture Content	18.0%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

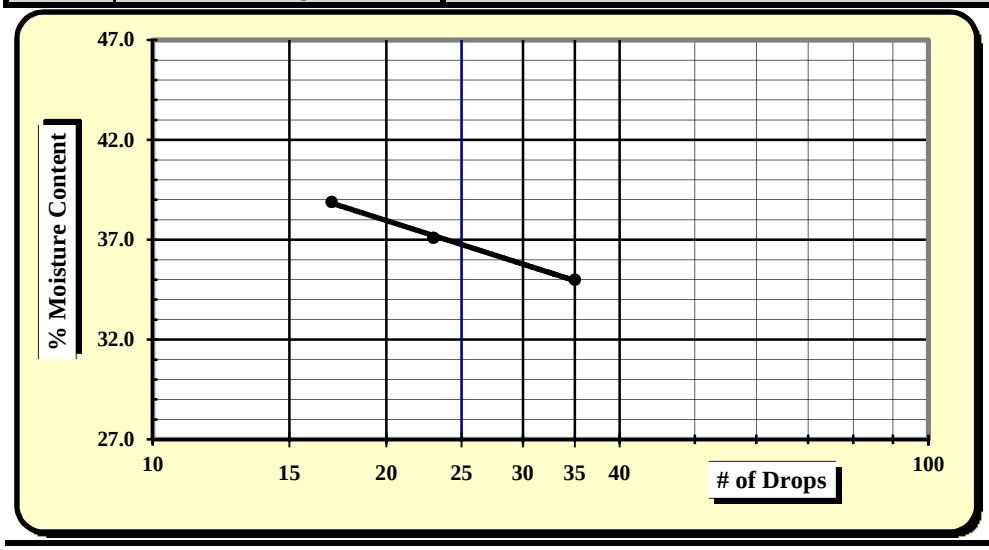
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/7/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-59	Sample #:	86	Sample Date:	4/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	3.0 - 5.0'

Sample Description: Light red tan white, fine to medium, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.41	15.31	16.53				12.11		
B	Wet Soil Weight + A	40.31	37.72	38.56				20.81		
C	Dry Soil Weight + A	34.12	31.65	32.39				18.91		
D	Water Weight (B-C)	6.19	6.07	6.17				1.90		
E	Dry Soil Weight (C-A)	17.71	16.34	15.86				6.80		
F	% Moisture (D/E)*100	35.0%	37.1%	38.9%				27.9%		
N	# OF DROPS	35	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**28**
Plastic Index	**9**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

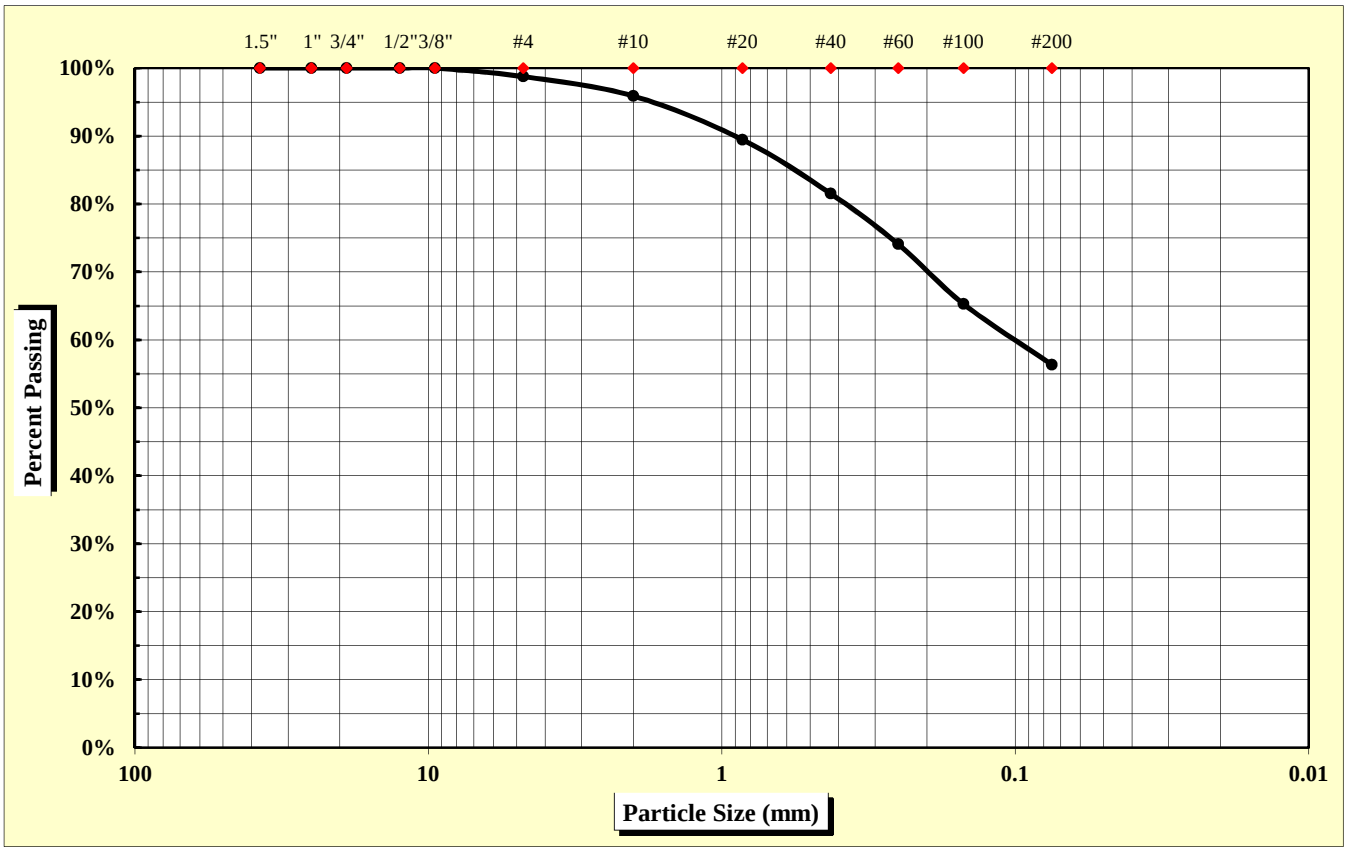
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	5/29 - 6/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-61	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'
Sample Description:	Brown red orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.1%	Fine Sand	25.2%
		Coarse Sand	14.4%	Silt & Clay	56.4%
Liquid Limit	36	Plastic Limit	20	Plastic Index	16
		Moisture Content	N/A	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

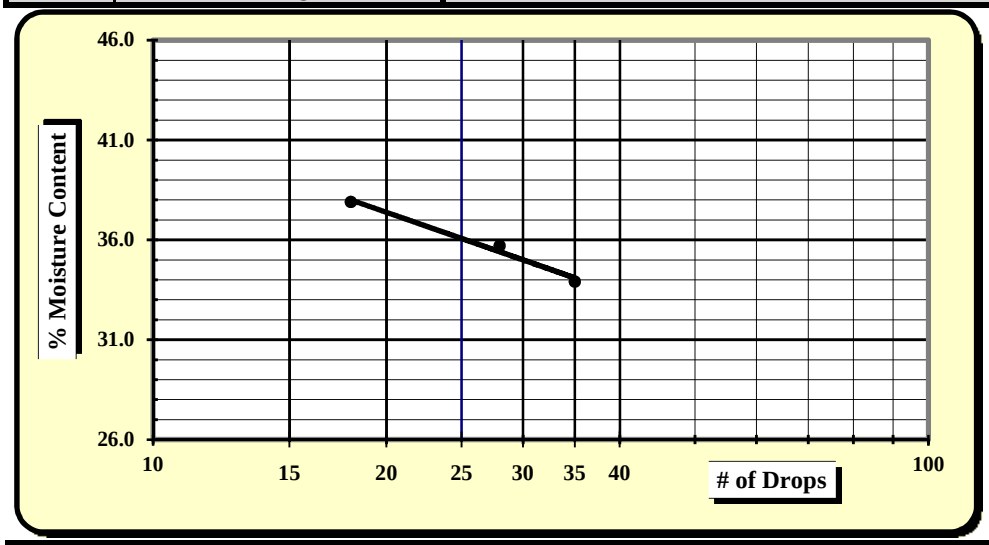
Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	6/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-61	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Type:	Bulk	Depth:	1.0 - 5.0'

Sample Description: Brown red orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/28/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				18		
A	Tare Weight	16.41	15.31	16.52				12.11		
B	Wet Soil Weight + A	38.18	38.14	37.66				22.18		
C	Dry Soil Weight + A	32.67	32.14	31.85				20.49		
D	Water Weight (B-C)	5.51	6.00	5.81				1.69		
E	Dry Soil Weight (C-A)	16.26	16.83	15.33				8.38		
F	% Moisture (D/E)*100	33.9%	35.7%	37.9%				20.2%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**20**
Plastic Index	**16**
Group Symbol	**CL / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	6/12/15	Brian Vaughan, P.E.	6/12/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

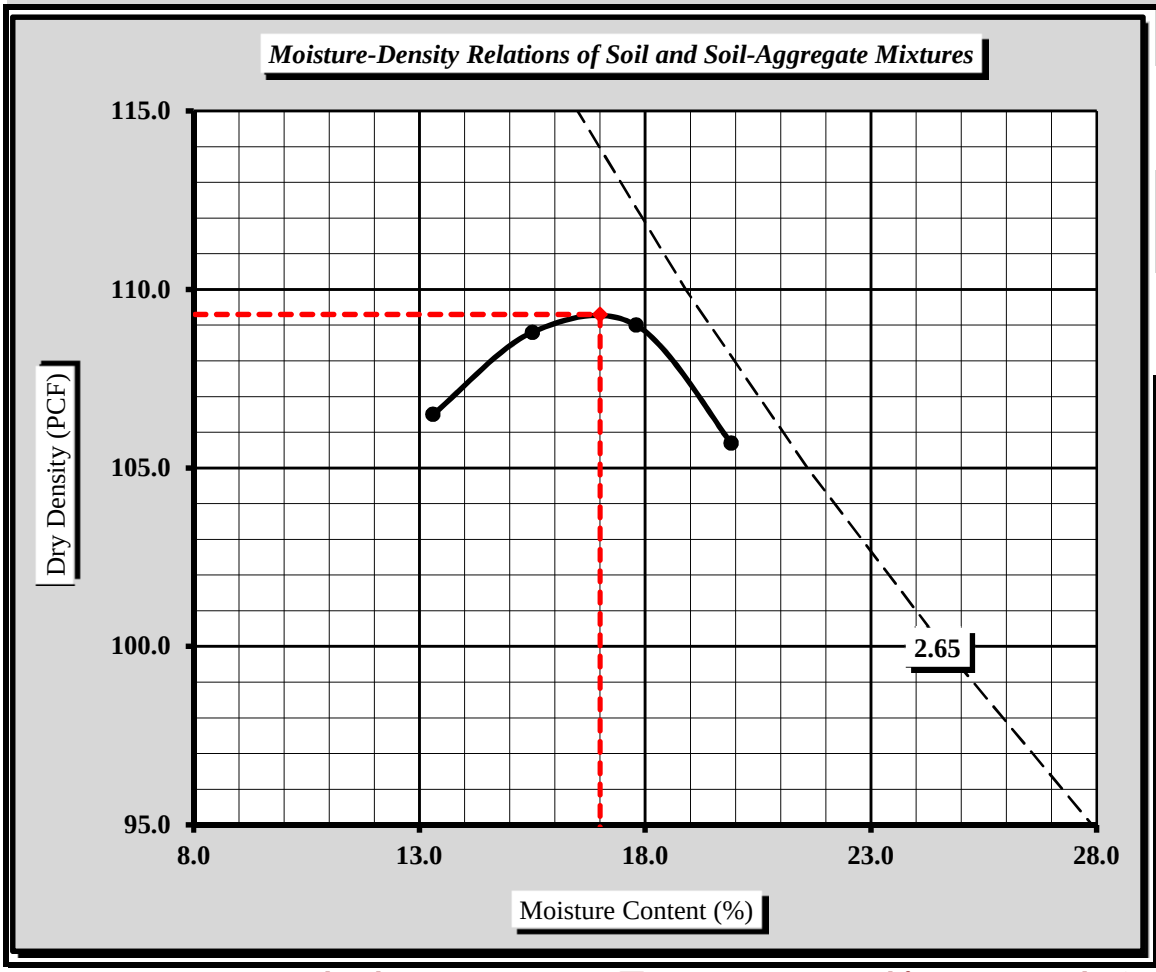
S&ME Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	5/29/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-61	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

Maximum Dry Density 109.3 PCF. Optimum Moisture Content 17.0%

AASHTO T 99 - - AASHTO Method D



Soil Properties	
Natural Moisture Content	N/A
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	36
Plastic Limit	20
Plastic Index	16

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.8%
#10	95.9%
#40	81.5%
#60	74.1%
#100	65.3%
#200	56.4%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/4 inch Sieve ☒

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1883-T193-3
Revision No. 1
Revision Date: 9/29/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T 193

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	6/12/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	6/4 - 6/8/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	SB-61	Sample #:	86	Sample Date:	4/23/15
Location:	Bulk	Offset:	N/A	Depth:	1.0 - 5.0'

Sample Description: Brown red orange, medium to fine, sandy LEAN CLAY (CL) [A-6 (6)]

AASHTO T 99 ***Method D*** Maximum Dry Density: **109.3 PCF** Optimum Moisture Content: **17.0%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 5.7	**CBR at 0.2 in. 5.9**	**CBR at 0.1 in. 5.7**	**CBR at 0.2 in. 5.9**

CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	25	Final Dry Density (PCF)	103.3
Initial Dry Density (PCF)	105.4	Average Final Moisture Content	18.5%
Moisture Content of the Compacted Specimen	17.0%	Moisture Content (top 1" after soaking)	20.5%
Percent Compaction	96.4%	Percent Swell	0.7%

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	36	Plastic Index	16	Apparent Relative Density	2.650

Notes/Deviations/References: AASHTO T 89, T 90, M 145

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	6/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

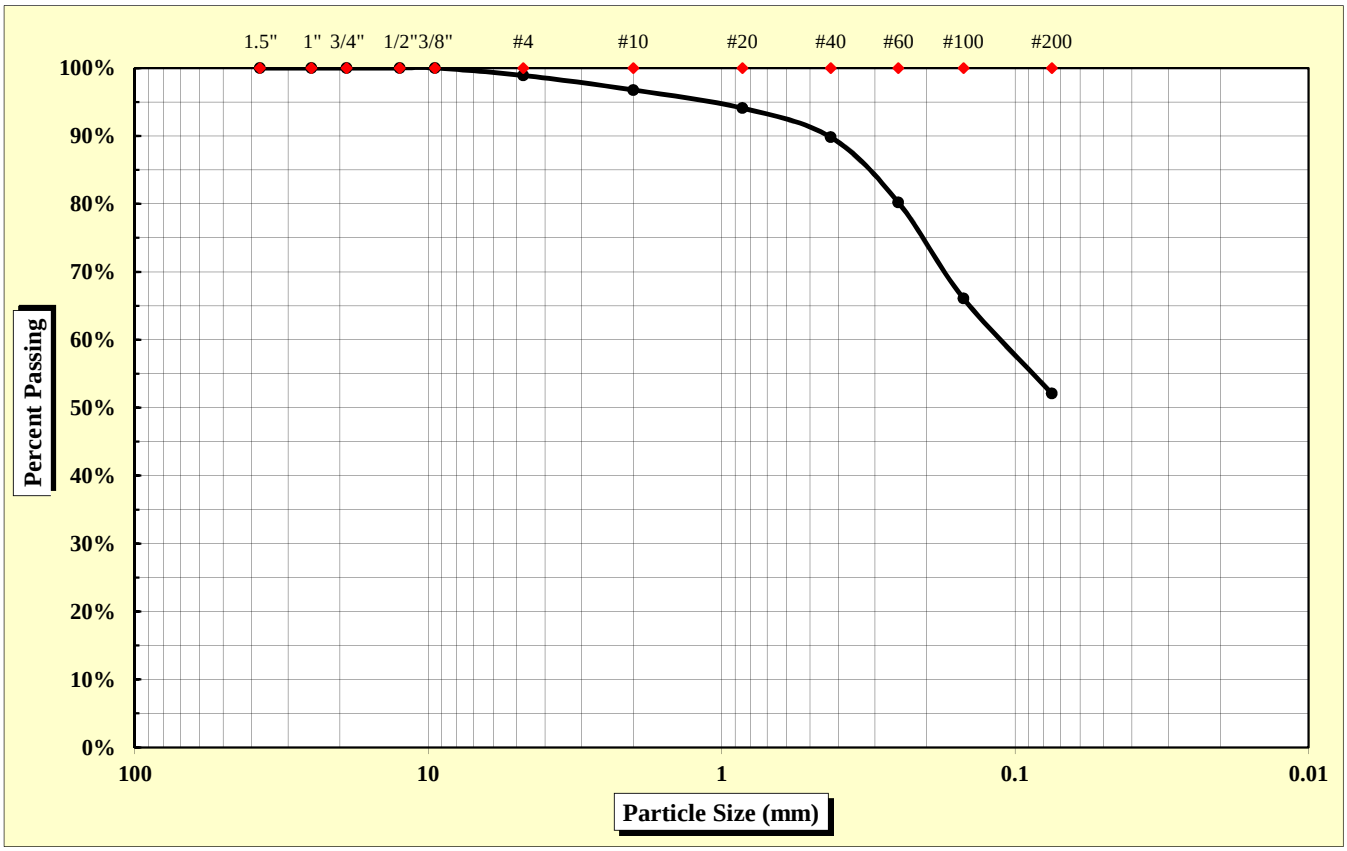
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	218	Sample Date:	9/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Red brown, fine, sandy SILT (ML) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.2%	Fine Sand	37.7%
		Coarse Sand	6.9%	Silt & Clay	52.1%
Liquid Limit	43	Plastic Limit	29	Plastic Index	14
		Moisture Content	22.5%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

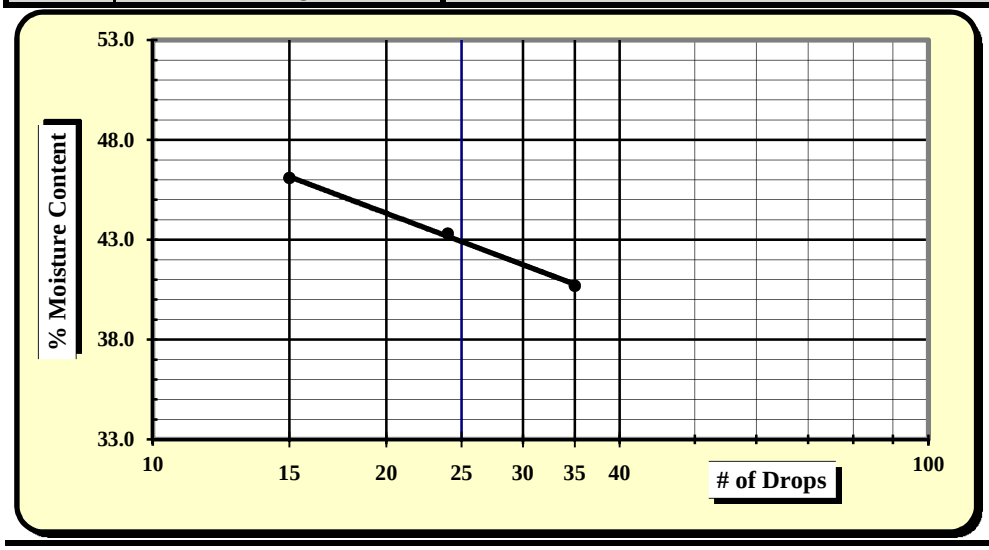
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	218	Sample Date:	9/23/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Red brown, fine, sandy SILT (ML) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.30	16.53				12.11		
B	Wet Soil Weight + A	37.54	36.15	37.19				20.77		
C	Dry Soil Weight + A	31.43	29.85	30.67				18.82		
D	Water Weight (B-C)	6.11	6.30	6.52				1.95		
E	Dry Soil Weight (C-A)	15.03	14.55	14.14				6.71		
F	% Moisture (D/E)*100	40.7%	43.3%	46.1%				29.1%		
N	# OF DROPS	35	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.1%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**29**
Plastic Index	**14**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

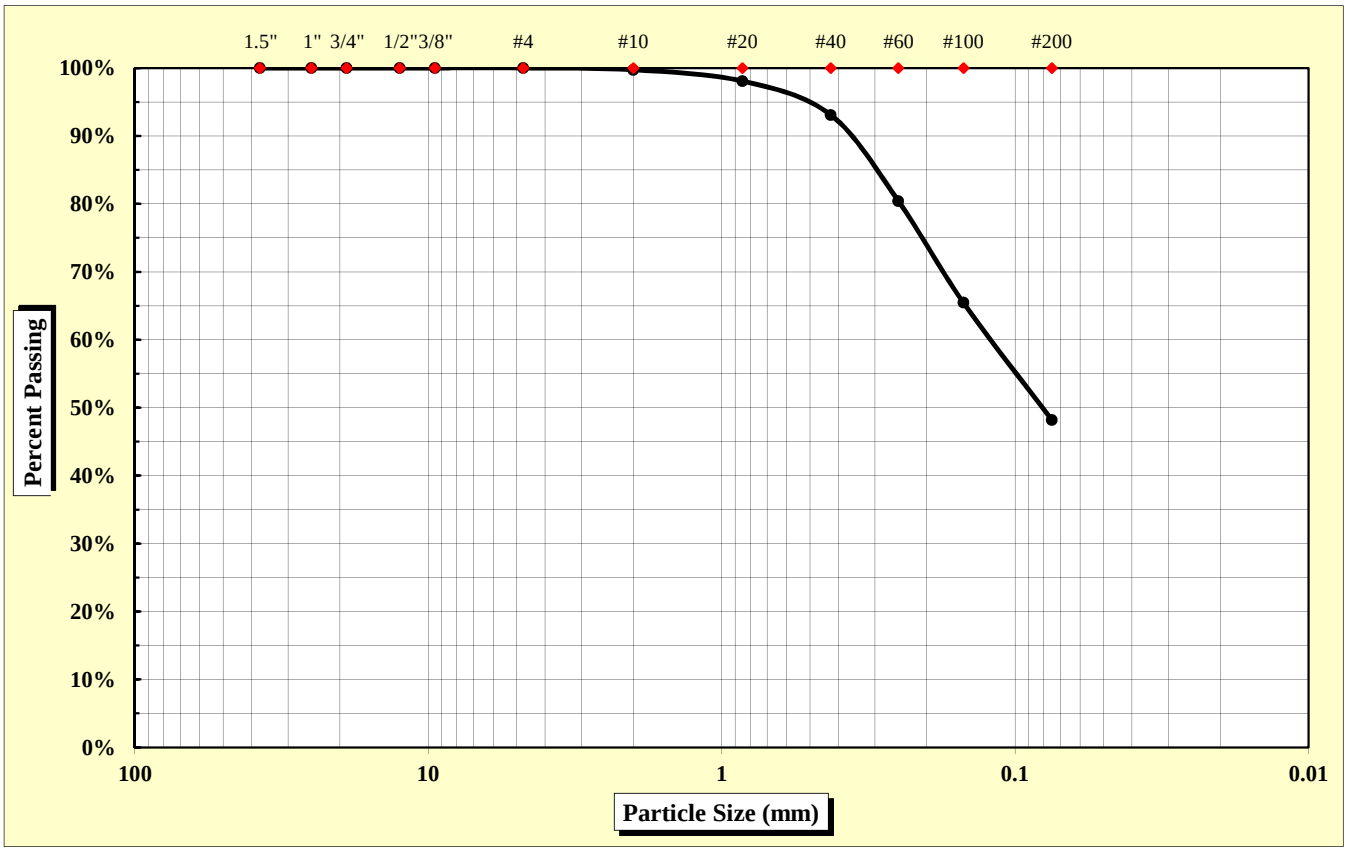
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/10 - 11/16/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	230	Sample Date:	9/23 - 9/24/15
Location:	UD-1	Type:	UD	Depth:	6 - 8'
Sample Description:	Red brown, fine, silty SAND (SM) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	44.9%
		Coarse Sand	6.6%	Silt & Clay	48.2%
Liquid Limit	39	Plastic Limit	32	Plastic Index	7
		Moisture Content	21.5%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

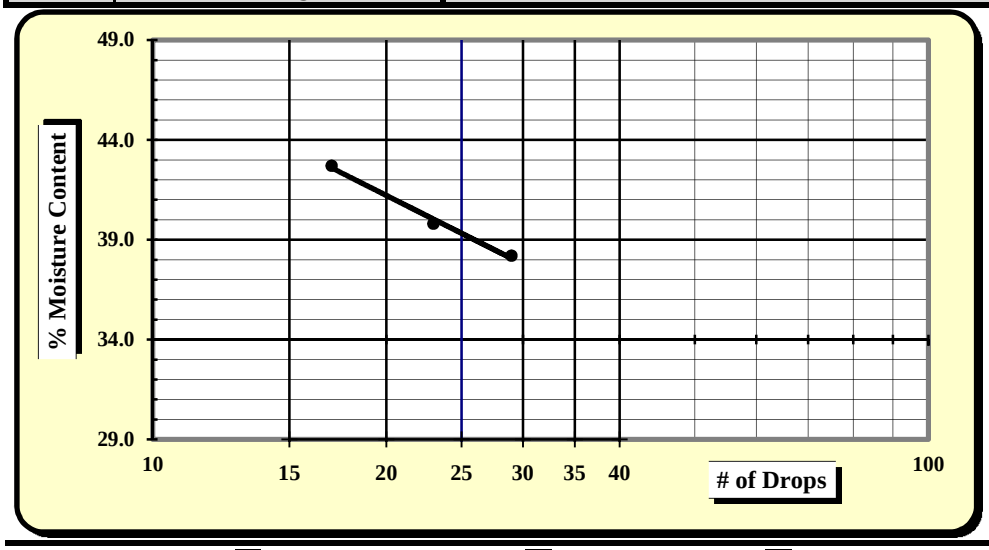
Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/16/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	230	Sample Date:	9/23 - 9/24/15
Location:	UD-1	Type:	UD	Depth:	6 - 8'

Sample Description: Red brown, fine, silty SAND (SM) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.72	26.51	26.38				25.99		
B	Wet Soil Weight + A	45.94	45.49	43.63				36.12		
C	Dry Soil Weight + A	40.63	40.09	38.47				33.67		
D	Water Weight (B-C)	5.31	5.40	5.16				2.45		
E	Dry Soil Weight (C-A)	13.91	13.58	12.09				7.68		
F	% Moisture (D/E)*100	38.2%	39.8%	42.7%				31.9%		
N	# OF DROPS	29	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**39**
Plastic Limit	**32**
Plastic Index	**7**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 48.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/18/15	Brian Vaughan, P.E.	11/18/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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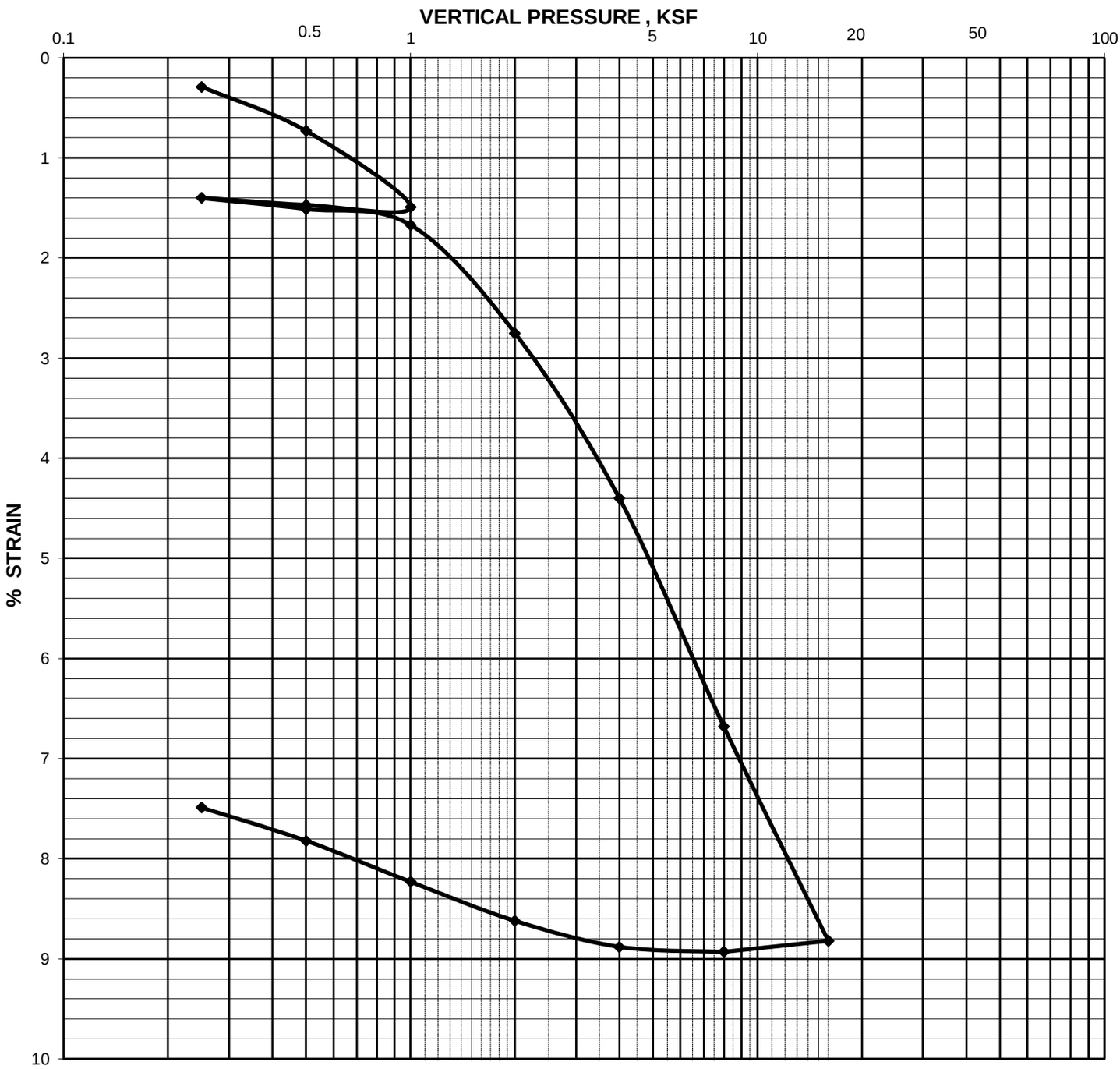
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-1
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	6 - 8'
Initial Wet Density, γ_{wet}, pcf:	117.0	**Load vs. Time Plot:**	Log of time	**Sample Type:**	UD
Initial Void Ratio, e_o:	0.745	**Final Void Ratio, e_f:**	0.615	**Log No.:**	230
Initial Saturation, S_O, %:	77.7	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.693
Initial Dry Density, γ_{DRY}, pcf:	96.3	**Final Dry Density, γ_{DRY}, pcf:**	101.8	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	21.5	**Final Moisture Content, %:**	26.6	**Stress, P_e, ksf:**	1.9
Liquid Limit, %:	39	**Plasticity Index, %:**	7	**Fines, %:**	48.2
Sample Description:	Red brown, fine, silty SAND (SM) [A-4 (2)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

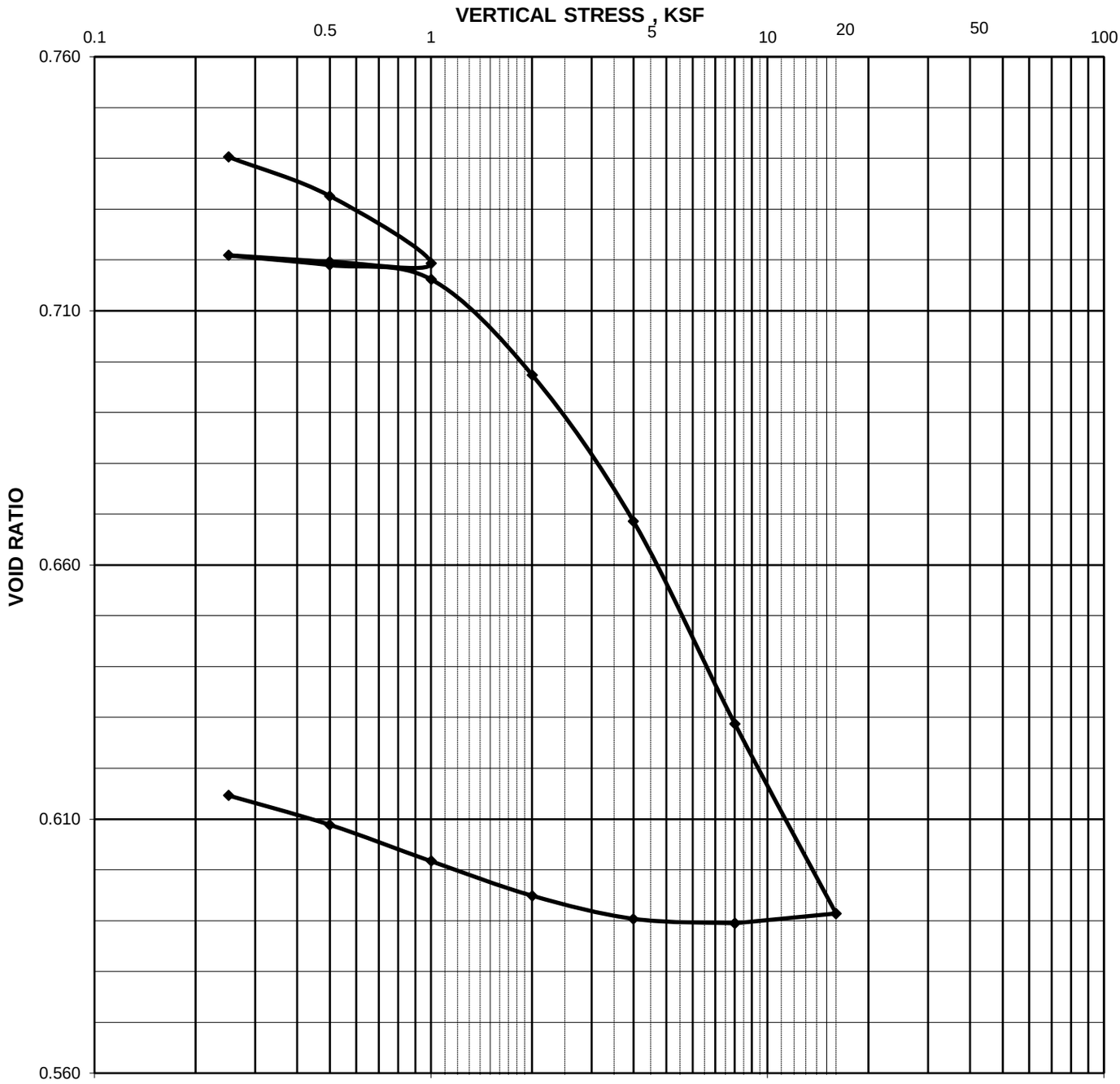


CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-1
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	6 - 8'
Initial Wet Density, γ_{wet}, pcf:	117.0	**Load vs. Time Plot:**	Log of time	**Sample Type:**	Shelby tube
Initial Void Ratio, e_o:	0.745	**Final Void Ratio, e_f:**	0.615	**Log No.:**	230
Initial Saturation, S_O, %:	77.7	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.693
Initial Dry Density, γ_{DRY}, pcf:	96.3	**Final Dry Density, γ_{DRY}, pcf:**	101.8	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	21.5	**Final Moisture Content, %:**	26.6	**Stress, P_e, ksf:**	1.9
Liquid Limit, %:	39	**Plasticity Index, %:**	7	**Fines, %:**	48.2
Sample Description:	Red brown, fine, silty SAND (SM) [A-4 (2)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

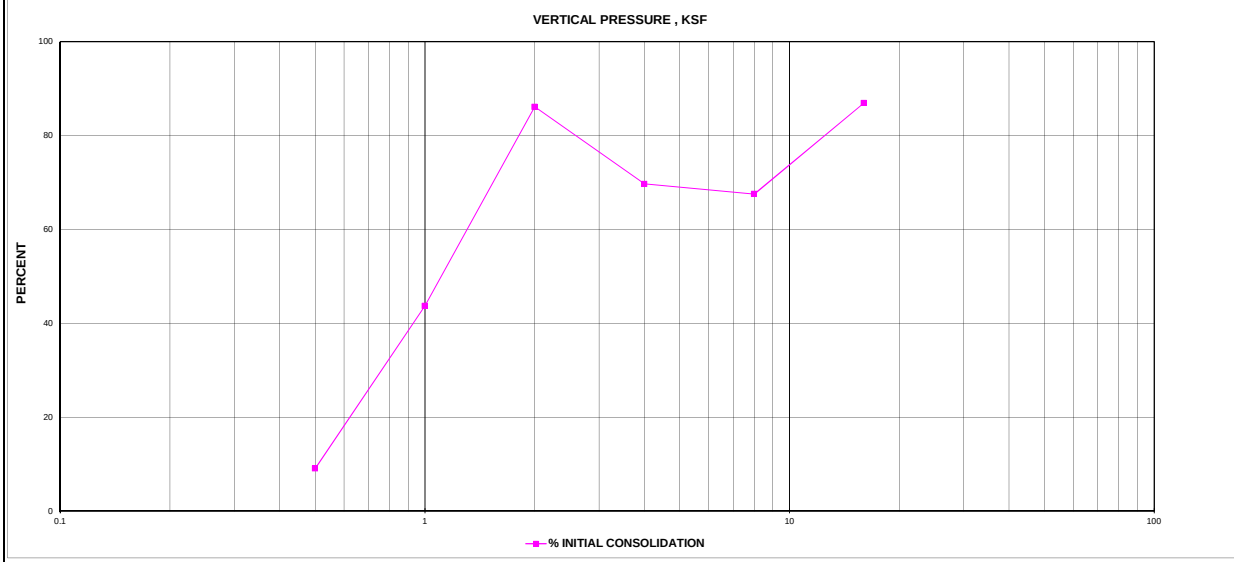


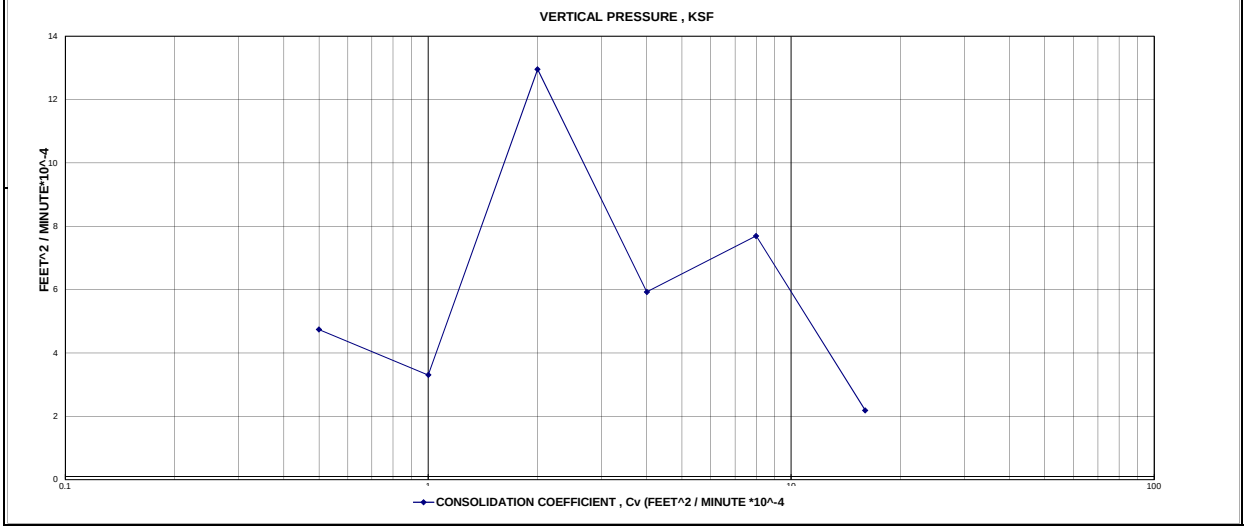
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering	**Boring No.:**	BR-1
Client Address:	1021 Briargate Circle Columbia, SC 29210	**Depth/Elev.:**	6 - 8'

Pressure (ksf)	D_0 (in.)	D_{100} (in.)	D_{50} (in.)	Stone Correction (in.)	D_{0c} (in.)	D_{100c}	D_{50c} (in.)	h (in.)	VOID RATIO e	Percent Strain (%)	t_{50}/t_{90} t_{50}	C_v Log of Time ($ft^2/10^{-4}min$)	C_i (%)
0.25		0.0036		0.0007		0.0029			0.740	0.290			
0.5		0.0085		0.0012		0.0073			0.733	0.730			
1.0		0.0167		0.0018		0.0149			0.719	1.490			
0.5		0.0159		0.0012		0.0147			0.720	1.470			
0.25		0.0147		0.0007		0.0140			0.721	1.400			
0.5	0.0153	0.0163	0.0158	0.0012	0.0141	0.0151	0.0146	0.4927	0.719	1.510	0.70	4.74	9.1
1.0	0.0176	0.0185	0.0181	0.0018	0.0158	0.0167	0.0163	0.4919	0.716	1.670	1.00	3.31	43.8
2.0	0.0286	0.0301	0.0294	0.0026	0.0260	0.0275	0.0268	0.4866	0.697	2.750	0.25	12.96	86.1
4.0	0.0426	0.0476	0.0451	0.0036	0.0390	0.0440	0.0415	0.4793	0.669	4.400	0.53	5.93	69.7
8.0	0.0643	0.0717	0.0680	0.0049	0.0594	0.0668	0.0631	0.4685	0.629	6.680	0.39	7.70	67.5
16.0	0.0918	0.0946	0.0946	0.0064	0.0854	0.0882	0.0882	0.4559	0.591	8.820	1.30	2.19	86.9
8.0		0.0947		0.0054		0.0893			0.589	8.930			
4.0		0.0932		0.0044		0.0888			0.590	8.880			
2.0		0.0897		0.0035		0.0862			0.595	8.620			
1.0		0.0850		0.0027		0.0823			0.602	8.230			
0.5		0.0803		0.0021		0.0782			0.609	7.820			
0.25		0.0765		0.0016		0.0749			0.615	7.490			





I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-1**
Sample ID: **"UD-1"**
Sample Depth: **6' - 8'**
Classification: **SM / A-4 (2)**
Test Performed: **Consolidation**
Estimated Pre-Consolidation Pressure: **1900 psf**

Torvane Shear Stress Measurements (3):
1000 psf, 1000 psf, & 1000 psf; **Average = 1000 psf**

Pocket Penetrometer Measurements (3):
7500 psf, 7500 psf, & 8000 psf; **Average = 7670 psf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

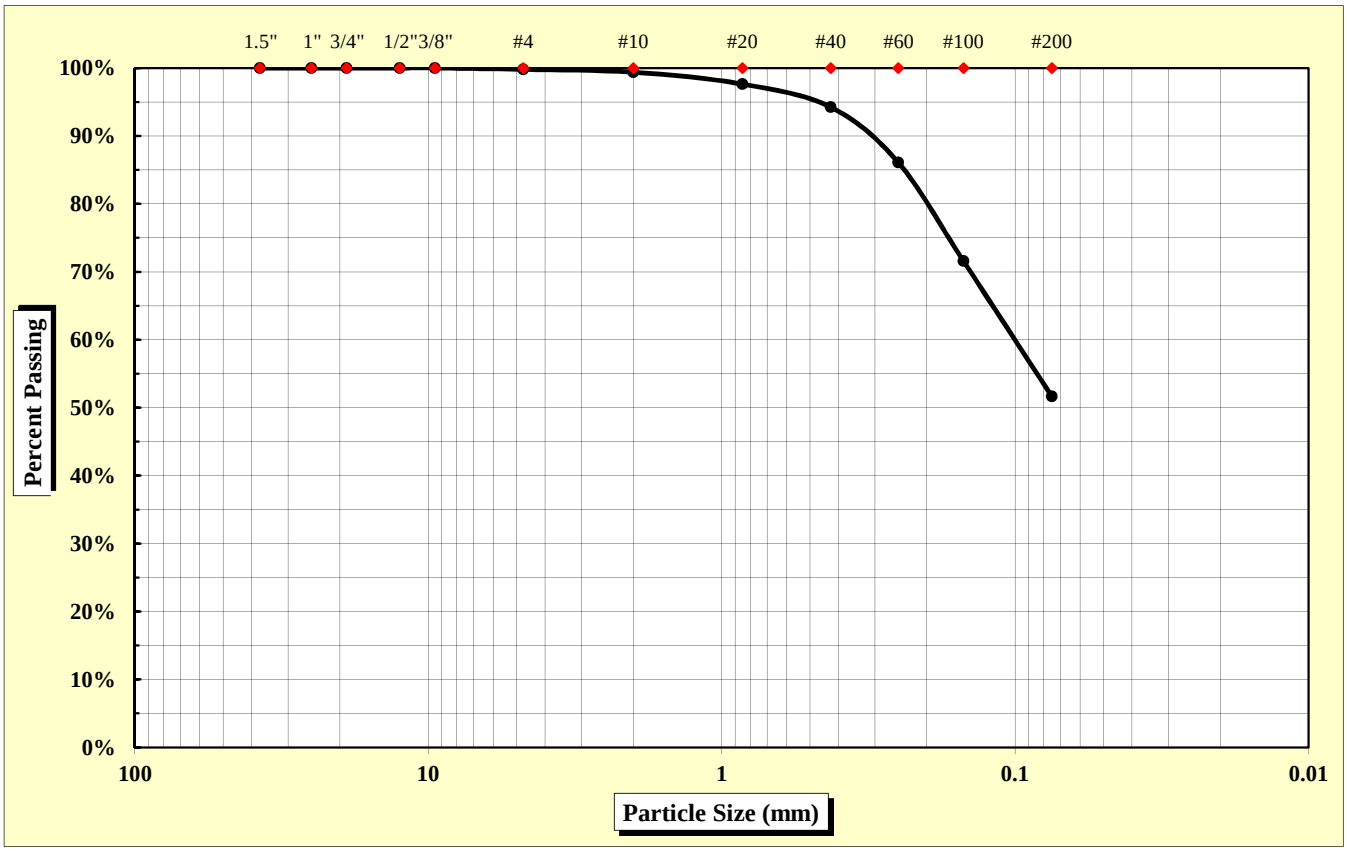
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	218	Sample Date:	9/24/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red tan brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.6%	Fine Sand	42.6%
		Coarse Sand	5.1%	Silt & Clay	51.7%
Liquid Limit	54	Plastic Limit	40	Plastic Index	14
		Moisture Content	36.0%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

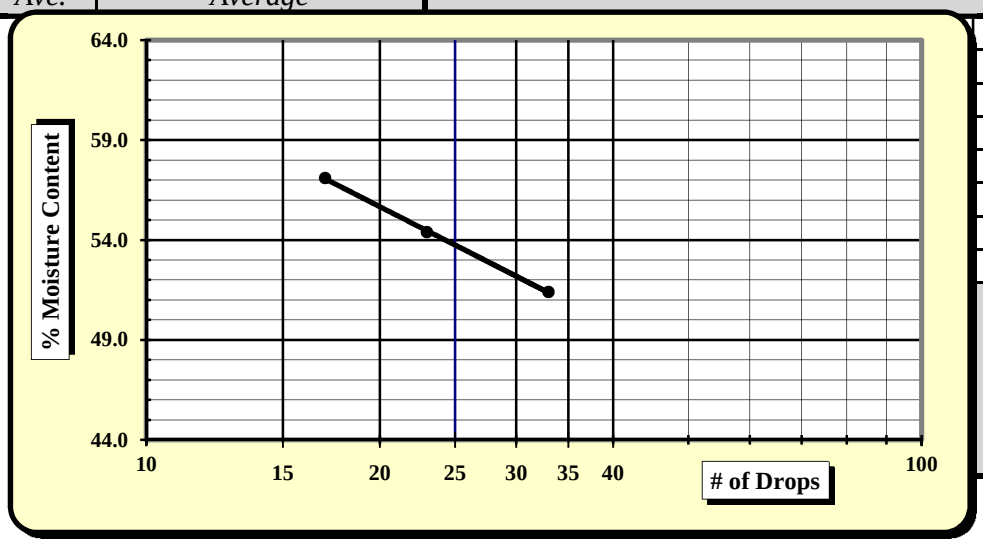
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	218	Sample Date:	9/24/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red tan brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.69	15.73				12.15		
B	Wet Soil Weight + A	37.09	36.34	36.51				20.68		
C	Dry Soil Weight + A	30.17	29.42	28.96				18.24		
D	Water Weight (B-C)	6.92	6.92	7.55				2.44		
E	Dry Soil Weight (C-A)	13.46	12.73	13.23				6.09		
F	% Moisture (D/E)*100	51.4%	54.4%	57.1%				40.1%		
N	# OF DROPS	33	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**40**
Plastic Index	**14**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

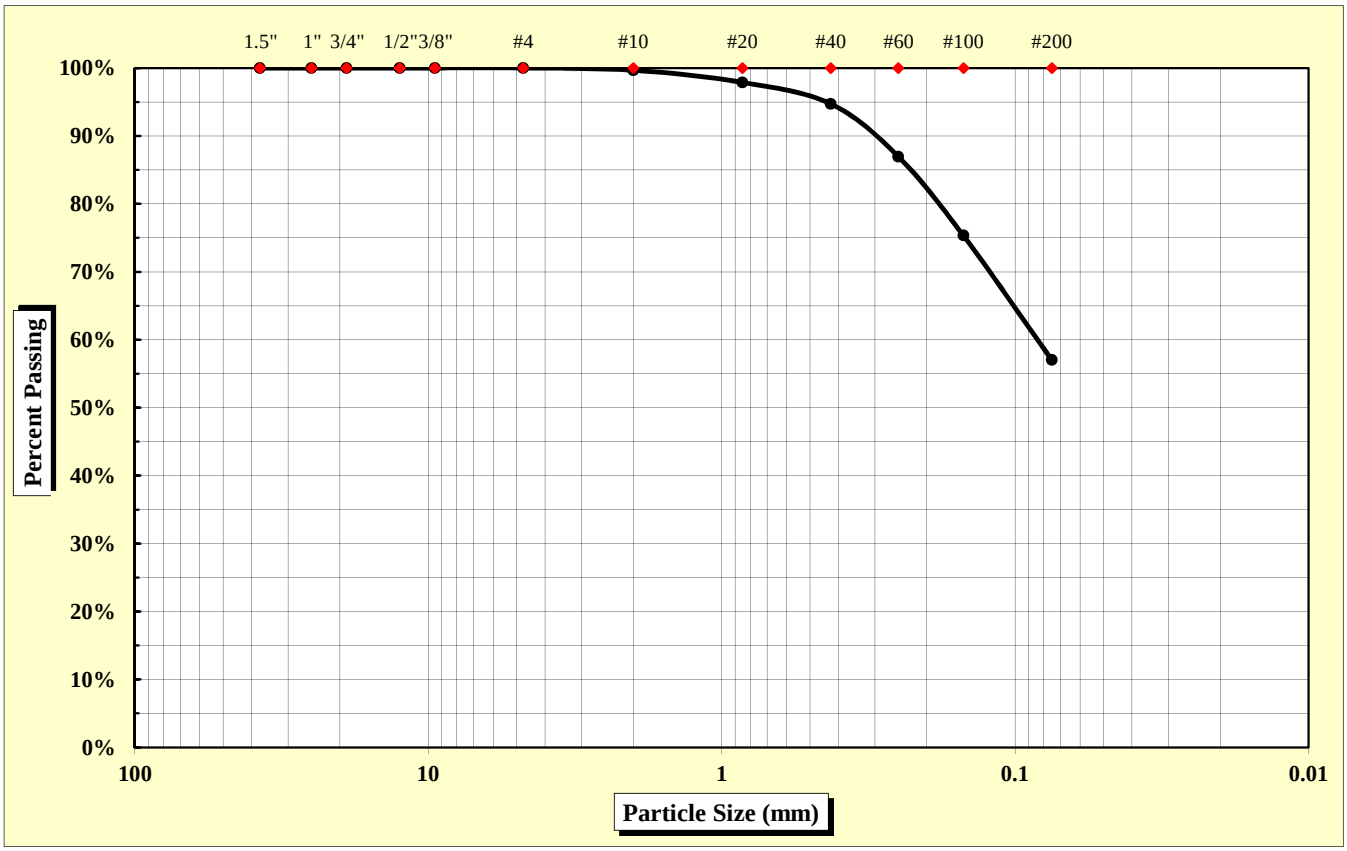
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/02/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/16 - 11/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	230	Sample Date:	9/24/15
Location:	UD-2	Type:	UD	Depth:	16 - 18'
Sample Description:	Yellow red brown, fine, sandy SILT (ML) [A-5 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	37.7%
		Coarse Sand	4.9%	Silt & Clay	57.0%
Liquid Limit	43	Plastic Limit	35	Plastic Index	8
		Moisture Content	N/A	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

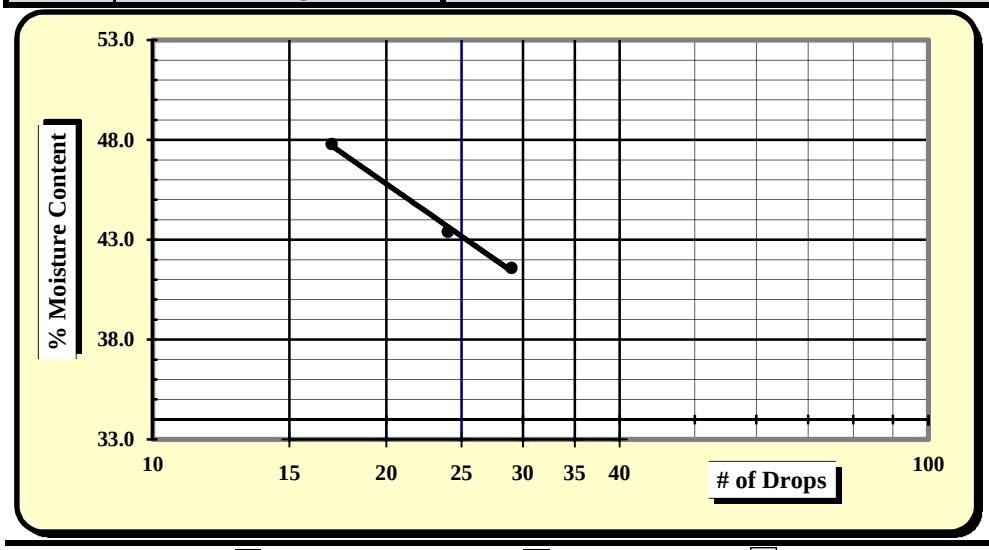
Project #:	**1426-14-161**	Report Date:	12/02/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/01/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	230	Sample Date:	9/24/15
Location:	UD-2	Type:	UD	Depth:	16 - 18'

Sample Description: Yellow red brown, fine, sandy SILT (ML) [A-5 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.71	26.50	26.38				25.97		
B	Wet Soil Weight + A	43.29	42.99	40.78				36.33		
C	Dry Soil Weight + A	38.42	38.00	36.12				33.64		
D	Water Weight (B-C)	4.87	4.99	4.66				2.69		
E	Dry Soil Weight (C-A)	11.71	11.50	9.74				7.67		
F	% Moisture (D/E)*100	41.6%	43.4%	47.8%				35.1%		
N	# OF DROPS	29	24	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**35**
Plastic Index	**8**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/02/15	Brian Vaughan, P.E.	12/02/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 4767)

REV4,1/13/04

AASHTO R18

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	12/02/15
Client Name:	Infrastructure Consulting & Engineering	**Test Date:**	11/20 - 11/30/15
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		
Boring No.:	BR-1	**Depth / Elev. :** 16 -18'	**Sample No.:** 230 **Type:** UD
Sample Location:	UD-2		
Sample Description:	Yellow red brown, fine, sandy SILT (ML) [A-5 (4)]		
LL, %: 43	**PI , %:** 8	**Percent Passing #200:** 57.0	**G_s:** 2.720

SPECIMEN PROPERTIES — **TEST PARAMETERS , TEST TYPE : CU/PP**

		INITIAL				AFTER CONSOLIDATION		
SPECIMEN NO.		1	2	3		1	2	3
DIAMETER , INCHES	D_o	2.86	2.86		D_c	2.84	2.81	
HEIGHT , INCHES	H_o	5.89	5.85		H_c	5.86	5.74	
WATER CONTENT, %	W_o	36.3	25.2		W_c	43.6	36.6	
DRY DENSITY, PCF	γ_{dryo}	76.2	80.5		γ_{dryc}	77.7	85.1	
SATURATION ,%	S_o	80.5	61.8		S_c	100.0	100.0	
VOID RATIO	e_o	1.227	1.109		e_c	1.185	0.995	

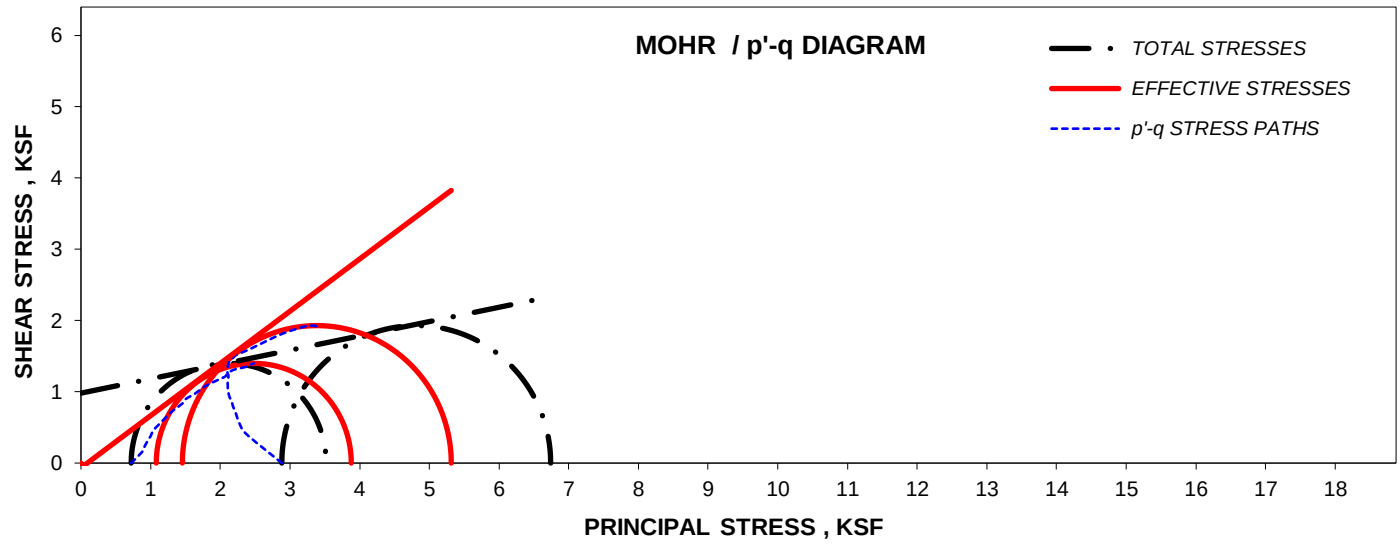
SPECIMEN NO.		1	2	3
B Value		0.98	0.97	
BACK PRESSURE, ksf	U_o	7.9	7.9	
CONFINING PRESSURE , ksf	σ_3'	0.7	2.9	
MAX. DEVIATOR STRESS ,ksf	σ_1-σ_3	2.8	3.9	
ULT. DEVIATOR STRESS , ksf	σ_1-σ_3	2.8	3.8	
Specimen Shape @ Failure	Sheared			

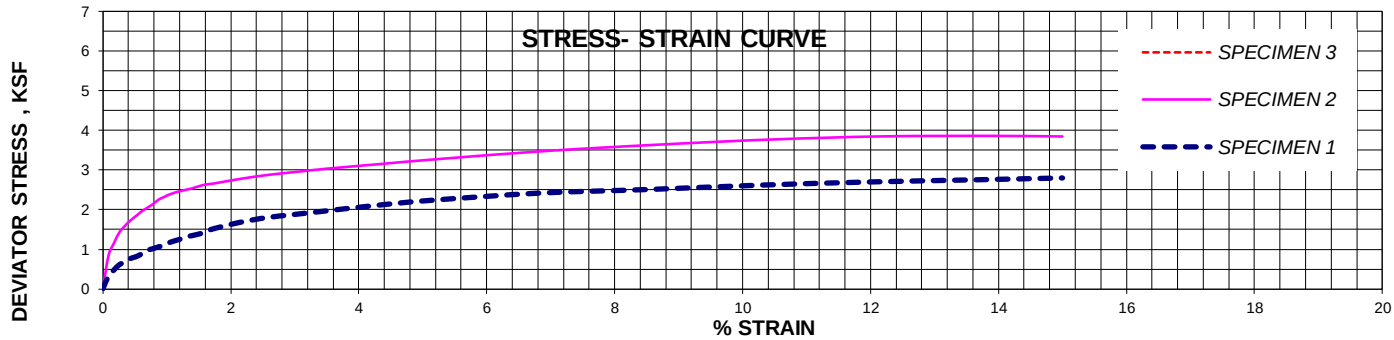
CONTROLLED : Strain @ 0.75 % per minute — T50, Minutes = 0.53

N/A

N/A

SHEAR STRENGTH PARAMETERS	TOTAL	EFFECTIVE
	COHESION , C (ksf) : 1.0	**APPARENT COHESION , (ksf) :** 0
	ANGLE OF INTER. FRICTION, Φ(DEGREES) 11	**ANGLE OF INTER. FRICTION, Φ' (DEGREES) :** 36





Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	12/02/15
Technical Responsibility	*Signature*	*Position*	*Date*

Upper Specimen (untrimmed)

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-1**
Sample ID: **"UD-2"**
Sample Depth: **16' - 18'**
Classification: **ML / A-5 (4)**
Test Performed: **CU Triaxial, w/ pore pressure measurement**

Torvane Shear Stress Measurements (4):
600 psf, 600 psf, 1200 psf & 2000 psf; **Average = 1100 psf**

Pocket Penetrometer Measurements (3):
6000 psf, 6500 psf, & 6500 psf; **Average = 6300 psf**

Upper Specimen (after shearing)

Lower Specimen (untrimmed)

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

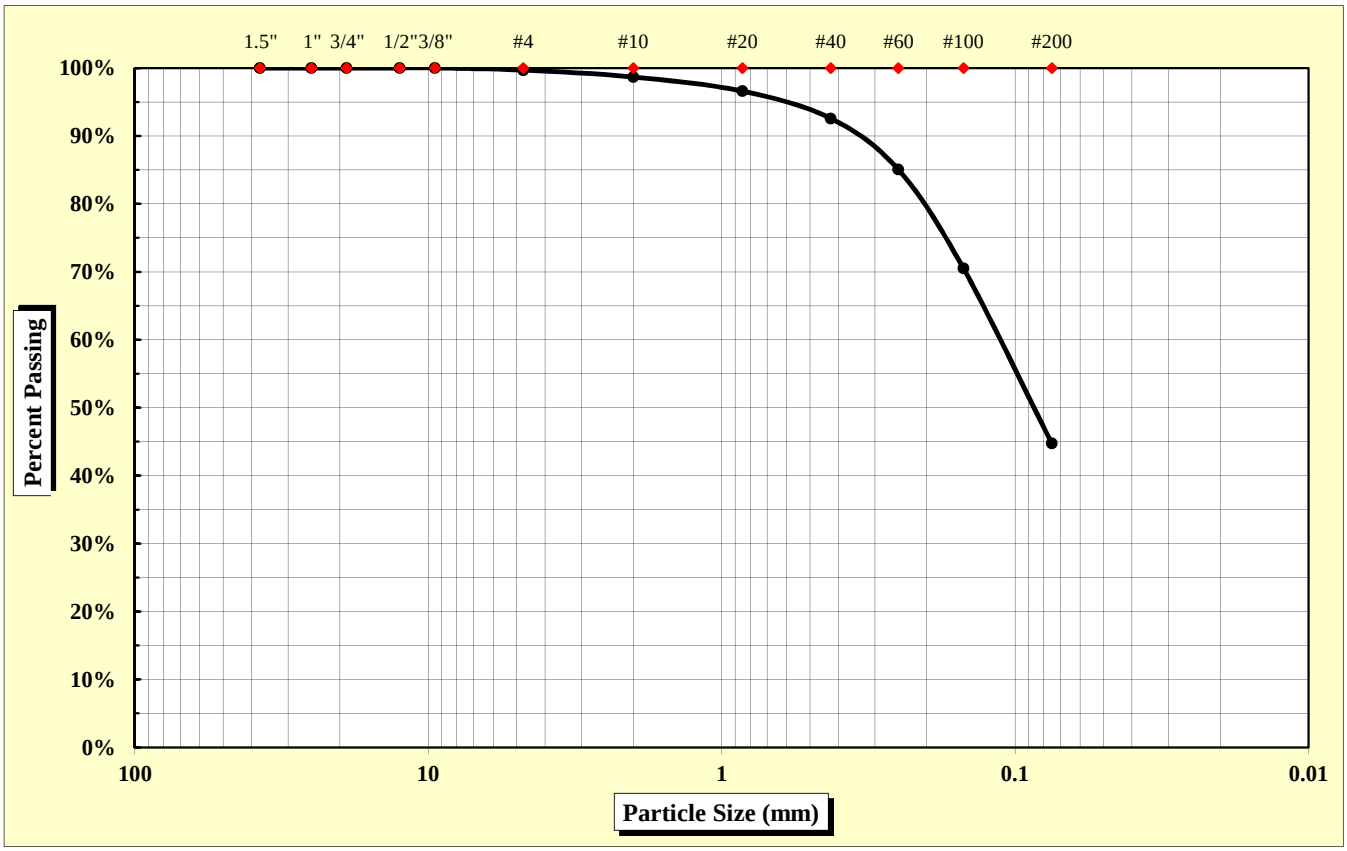
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/3/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	241	Sample Date:	9/24/15
Location:	SS-9/10	Type:	Split-spoon	Depth:	28.5 - 35'
Sample Description:	Brown, fine, micaceous, silty SAND (SM) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.3%	Fine Sand	47.8%
		Coarse Sand	6.1%	Silt & Clay	44.8%
Liquid Limit	45	Plastic Limit	37	Plastic Index	8
		Moisture Content	33.1%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

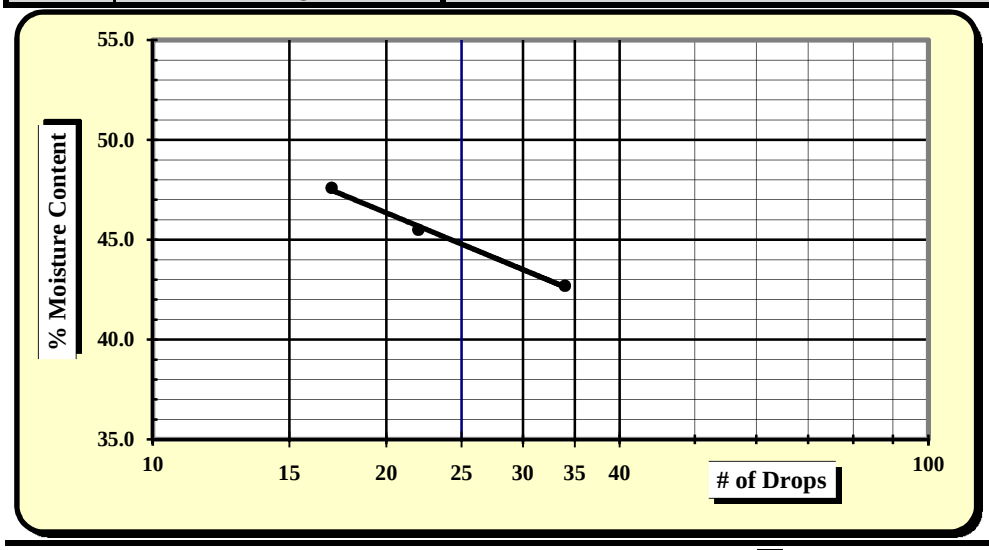
Project #:	**1426-14-161**	Report Date:	12/3/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-1	Sample #:	241	Sample Date:	9/24/15
Location:	SS-9/10	Type:	Split-spoon	Depth:	28.5 - 35'

Sample Description: Brown, fine, micaceous, silty SAND (SM) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.82	16.75	15.93				12.00		
B	Wet Soil Weight + A	39.47	38.17	38.50				21.12		
C	Dry Soil Weight + A	32.69	31.47	31.22				18.66		
D	Water Weight (B-C)	6.78	6.70	7.28				2.46		
E	Dry Soil Weight (C-A)	15.87	14.72	15.29				6.66		
F	% Moisture (D/E)*100	42.7%	45.5%	47.6%				36.9%		
N	# OF DROPS	34	22	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**36.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**37**
Plastic Index	**8**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/3/15	Brian Vaughan, P.E.	12/3/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

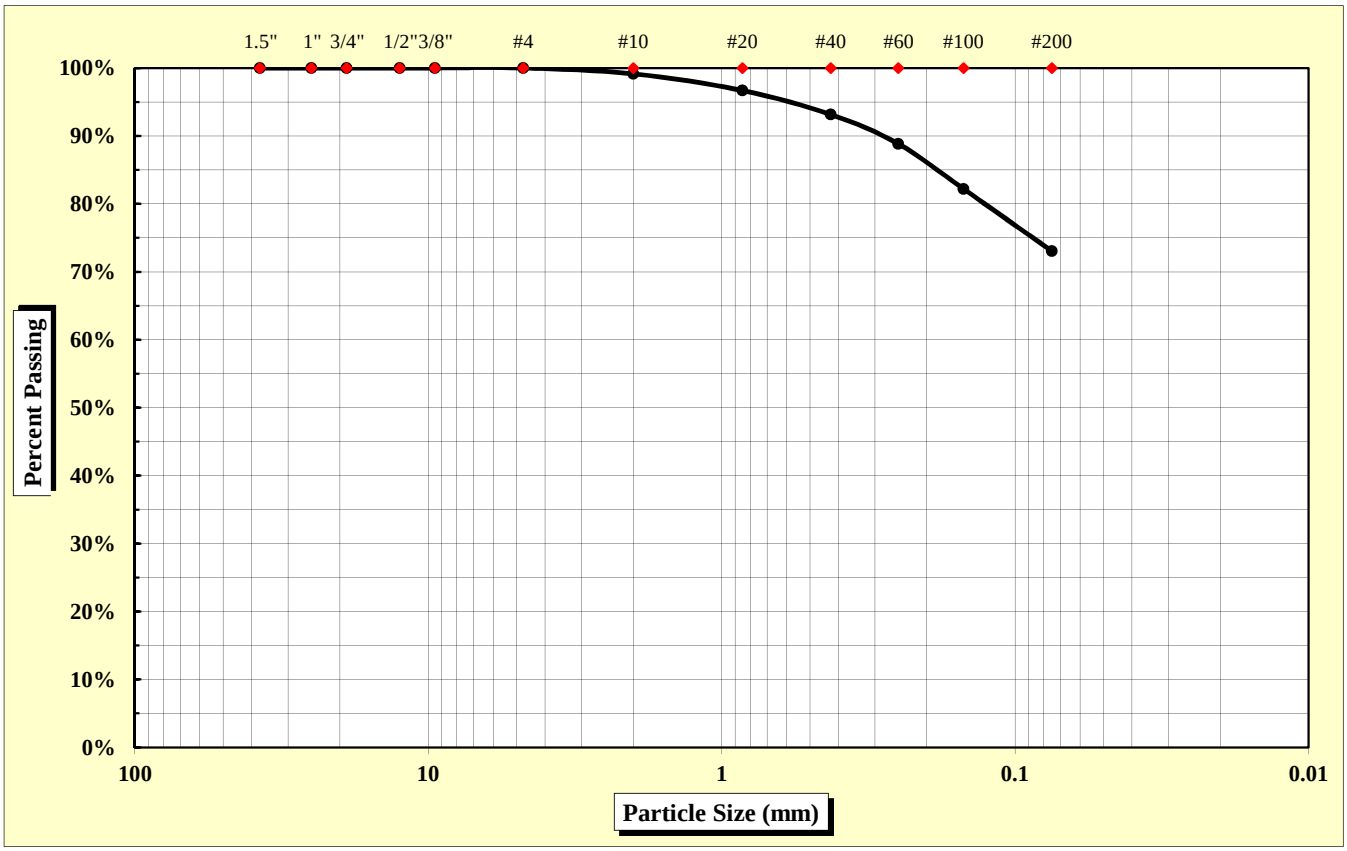
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	218	Sample Date:	9/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red orange tan, fine, ELASTIC SILT with sand (MH) [A-7-5 (19)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.9%	Fine Sand	20.1%
		Coarse Sand	6.0%	Silt & Clay	73.0%
Liquid Limit	55	Plastic Limit	30	Plastic Index	25
		Moisture Content	21.8%	Group Index	19

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

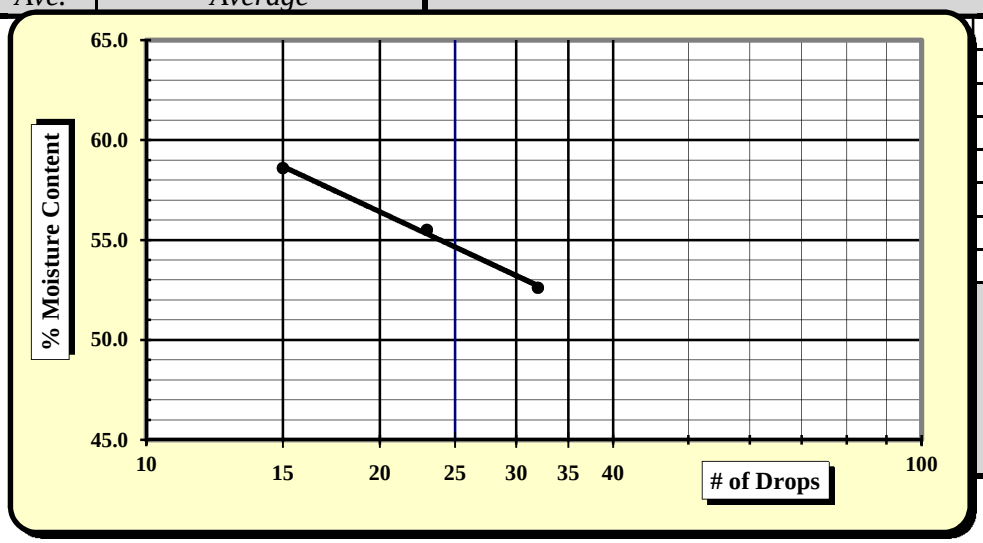
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	218	Sample Date:	9/21/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red orange tan, fine, ELASTIC SILT with sand (MH) [A-7-5 (19)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.46	16.50	16.99				11.59		
B	Wet Soil Weight + A	36.67	38.97	37.54				20.16		
C	Dry Soil Weight + A	29.70	30.95	29.95				18.19		
D	Water Weight (B-C)	6.97	8.02	7.59				1.97		
E	Dry Soil Weight (C-A)	13.24	14.45	12.96				6.60		
F	% Moisture (D/E)*100	52.6%	55.5%	58.6%				29.8%		
N	# OF DROPS	32	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**30**
Plastic Index	**25**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 73.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

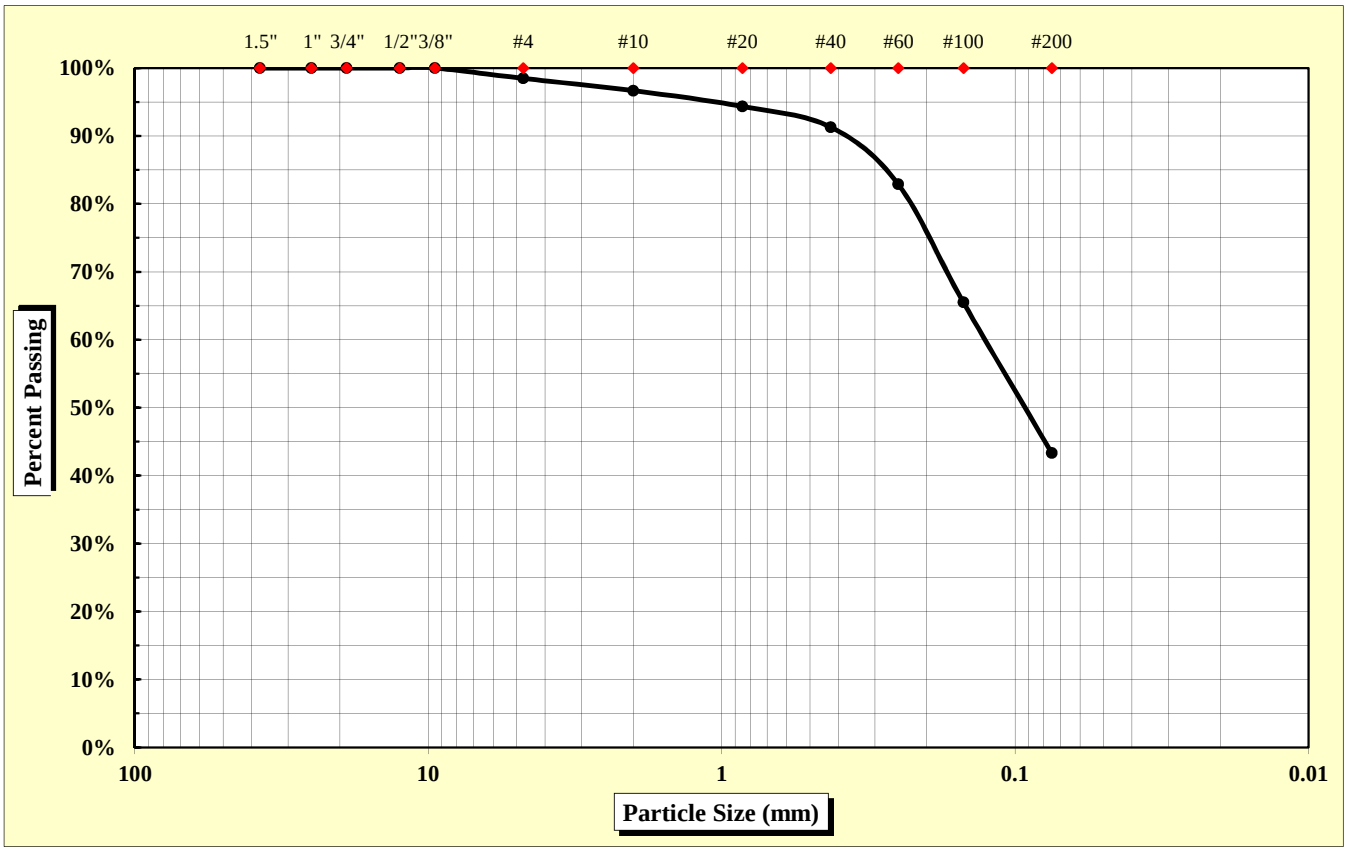
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	218	Sample Date:	9/21/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red tan brown, fine, silty SAND (SM) [A-7-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.3%	Fine Sand	48.0%
		Coarse Sand	5.4%	Silt & Clay	43.3%
Liquid Limit	51	Plastic Limit	40	Plastic Index	11
		Moisture Content	18.8%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

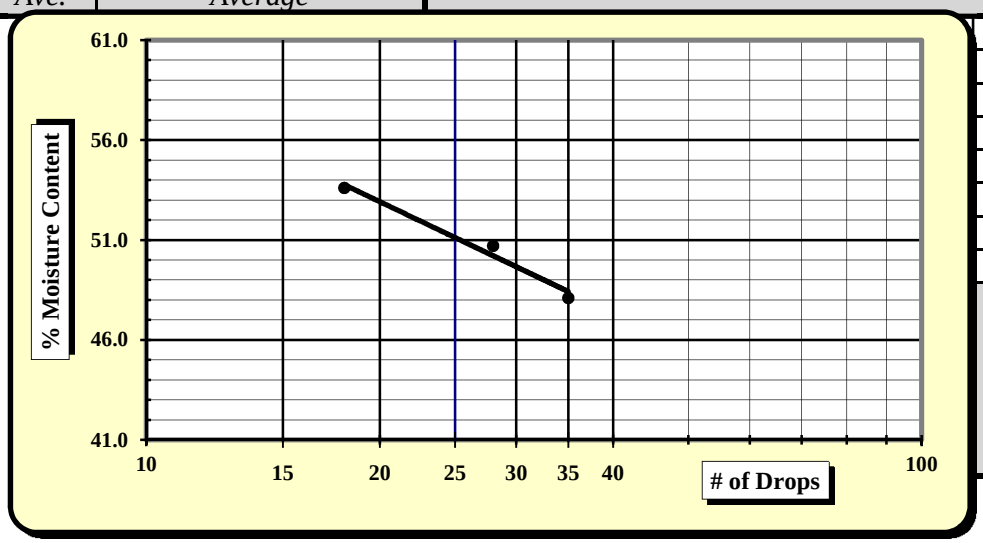
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	218	Sample Date:	9/21/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Red tan brown, fine, silty SAND (SM) [A-7-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.95	16.66	16.77				12.26		
B	Wet Soil Weight + A	34.21	36.58	35.83				21.55		
C	Dry Soil Weight + A	28.28	29.88	29.18				18.88		
D	Water Weight (B-C)	5.93	6.70	6.65				2.67		
E	Dry Soil Weight (C-A)	12.33	13.22	12.41				6.62		
F	% Moisture (D/E)*100	48.1%	50.7%	53.6%				40.3%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**51**
Plastic Limit	**40**
Plastic Index	**11**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

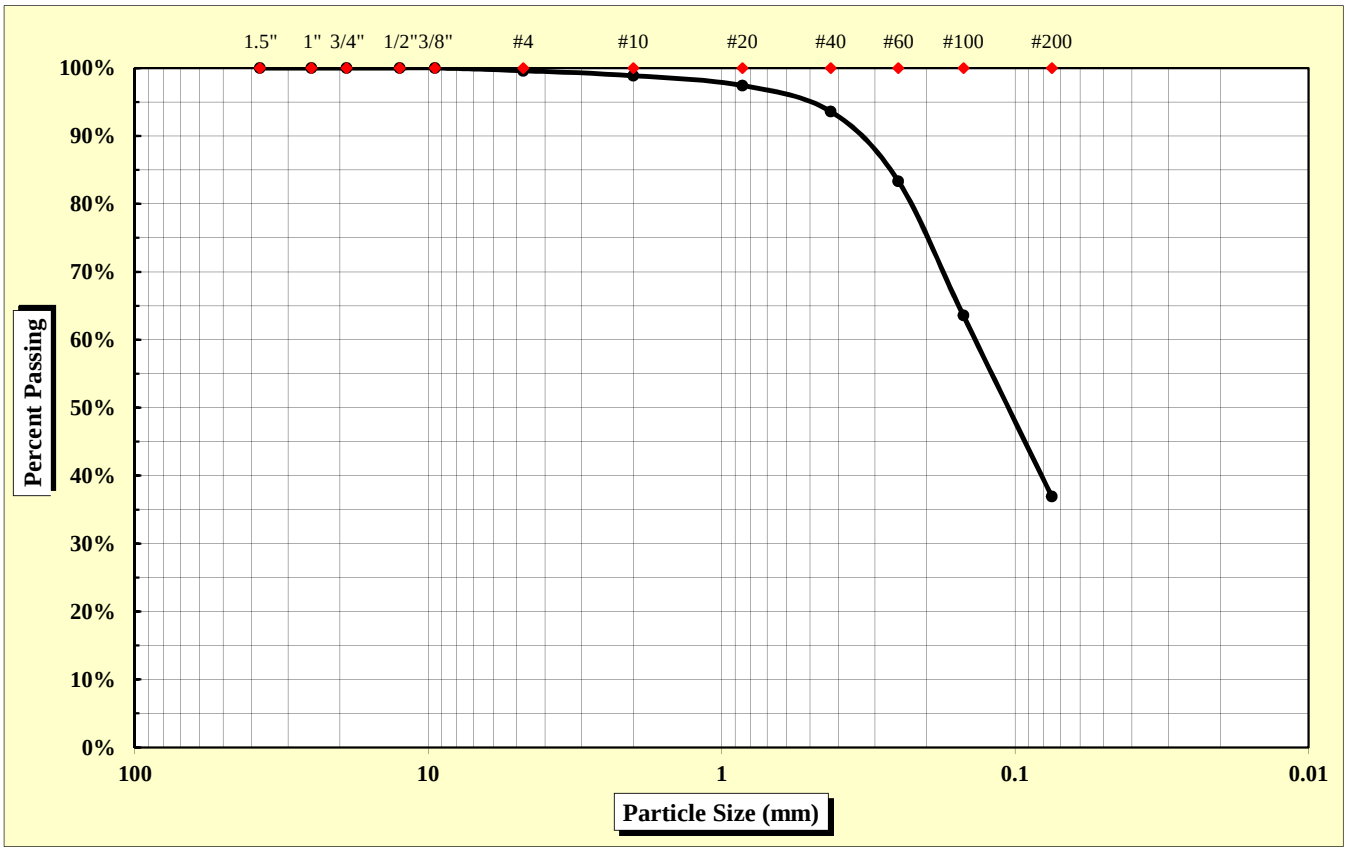
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/3/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	241	Sample Date:	9/21/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Red brown, fine, micaceous, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.1%	Fine Sand	56.7%
		Coarse Sand	5.3%	Silt & Clay	37.0%
Liquid Limit	44	Plastic Limit	39	Plastic Index	5
		Moisture Content	25.7%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

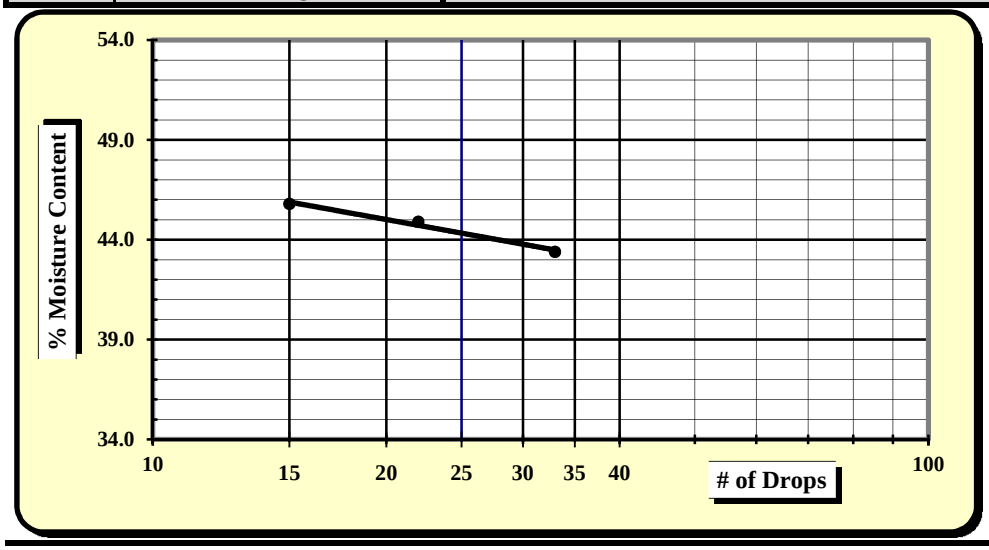
Project #:	**1426-14-161**	Report Date:	12/3/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	241	Sample Date:	9/21/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Red brown, fine, micaceous, silty SAND (SM) [A-5 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.77	15.57	16.92				12.24		
B	Wet Soil Weight + A	36.75	37.37	36.44				21.47		
C	Dry Soil Weight + A	30.40	30.61	30.31				18.89		
D	Water Weight (B-C)	6.35	6.76	6.13				2.58		
E	Dry Soil Weight (C-A)	14.63	15.04	13.39				6.65		
F	% Moisture (D/E)*100	43.4%	44.9%	45.8%				38.8%		
N	# OF DROPS	33	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**39**
Plastic Index	**5**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 37.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/3/15	Brian Vaughan, P.E.	12/3/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

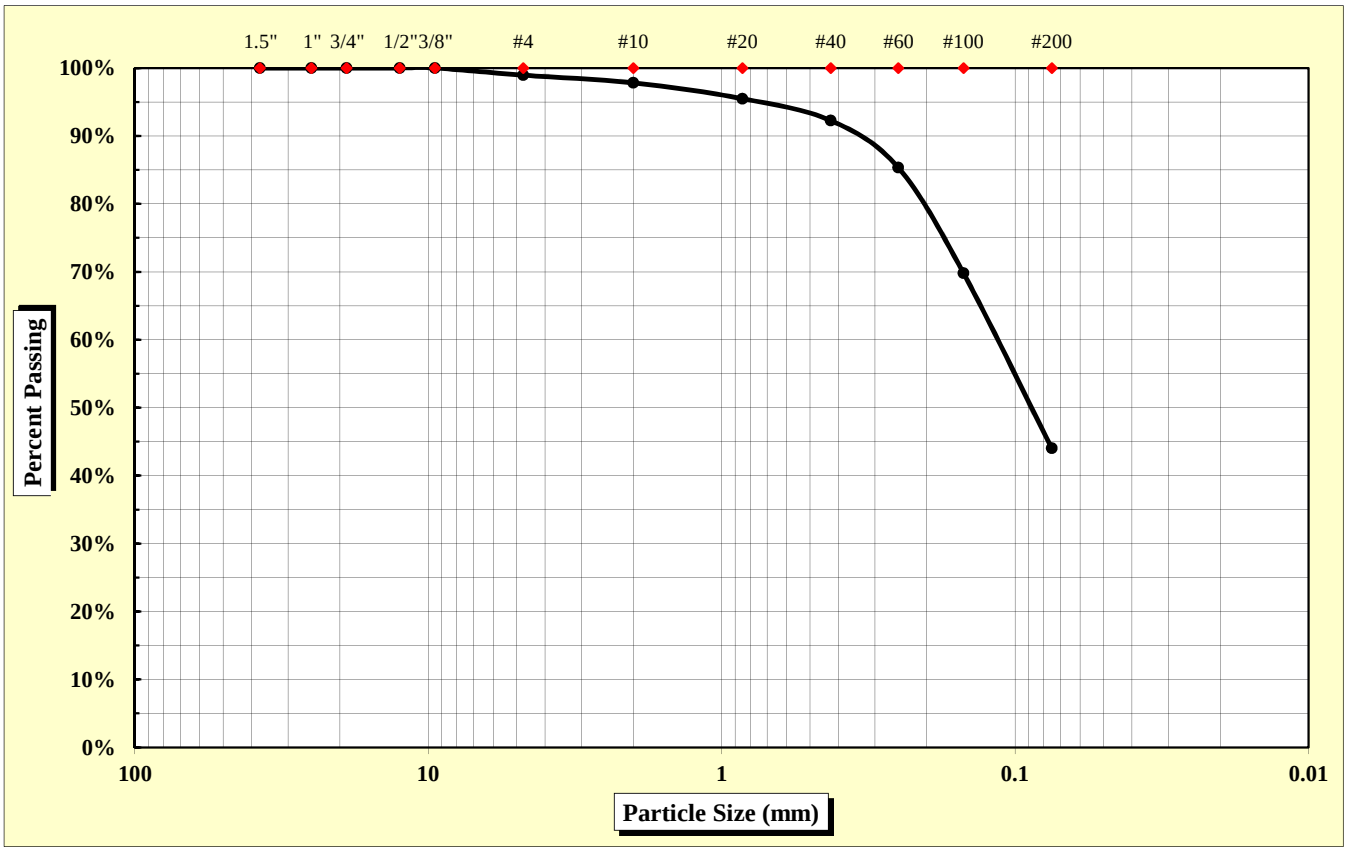
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	241	Sample Date:	9/21/15
Location:	SS-8/9/10/11/12	Type:	Split-spoon	Depth:	23.5 - 45'
Sample Description:	Brown, fine, micaceous, silty SAND (SM) [A-5 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	2.2%	Fine Sand	48.2%
		Coarse Sand	5.5%	Silt & Clay	44.0%
Liquid Limit	41	Plastic Limit	33	Plastic Index	8
		Moisture Content	33.2%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

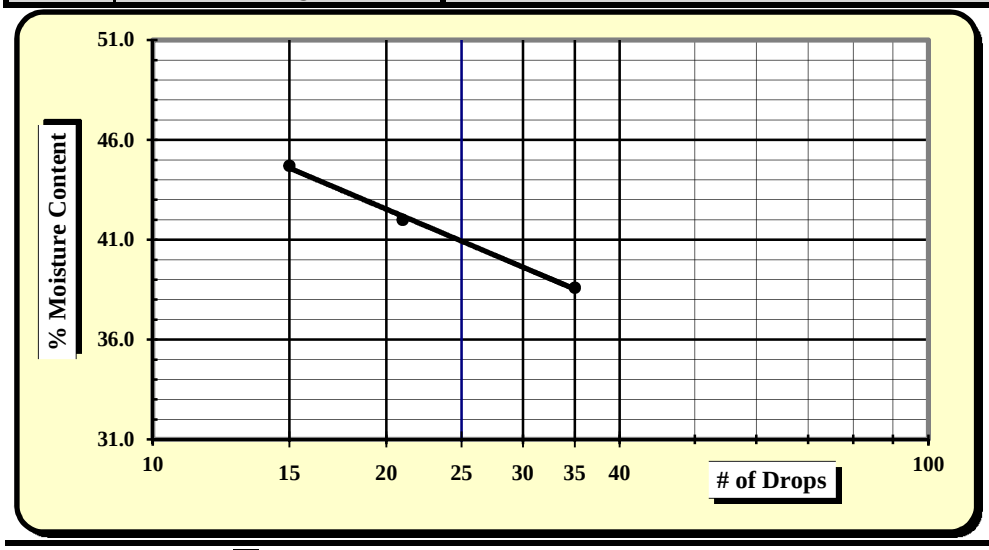
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-2	Sample #:	241	Sample Date:	9/21/15
Location:	SS-8/9/10/11/12	Type:	Split-spoon	Depth:	23.5 - 45'

Sample Description: Brown, fine, micaceous, silty SAND (SM) [A-5 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.29	16.53				12.11		
B	Wet Soil Weight + A	37.61	35.61	36.92				20.50		
C	Dry Soil Weight + A	31.70	29.60	30.62				18.44		
D	Water Weight (B-C)	5.91	6.01	6.30				2.06		
E	Dry Soil Weight (C-A)	15.30	14.31	14.09				6.33		
F	% Moisture (D/E)*100	38.6%	42.0%	44.7%				32.5%		
N	# OF DROPS	35	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**33**
Plastic Index	**8**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

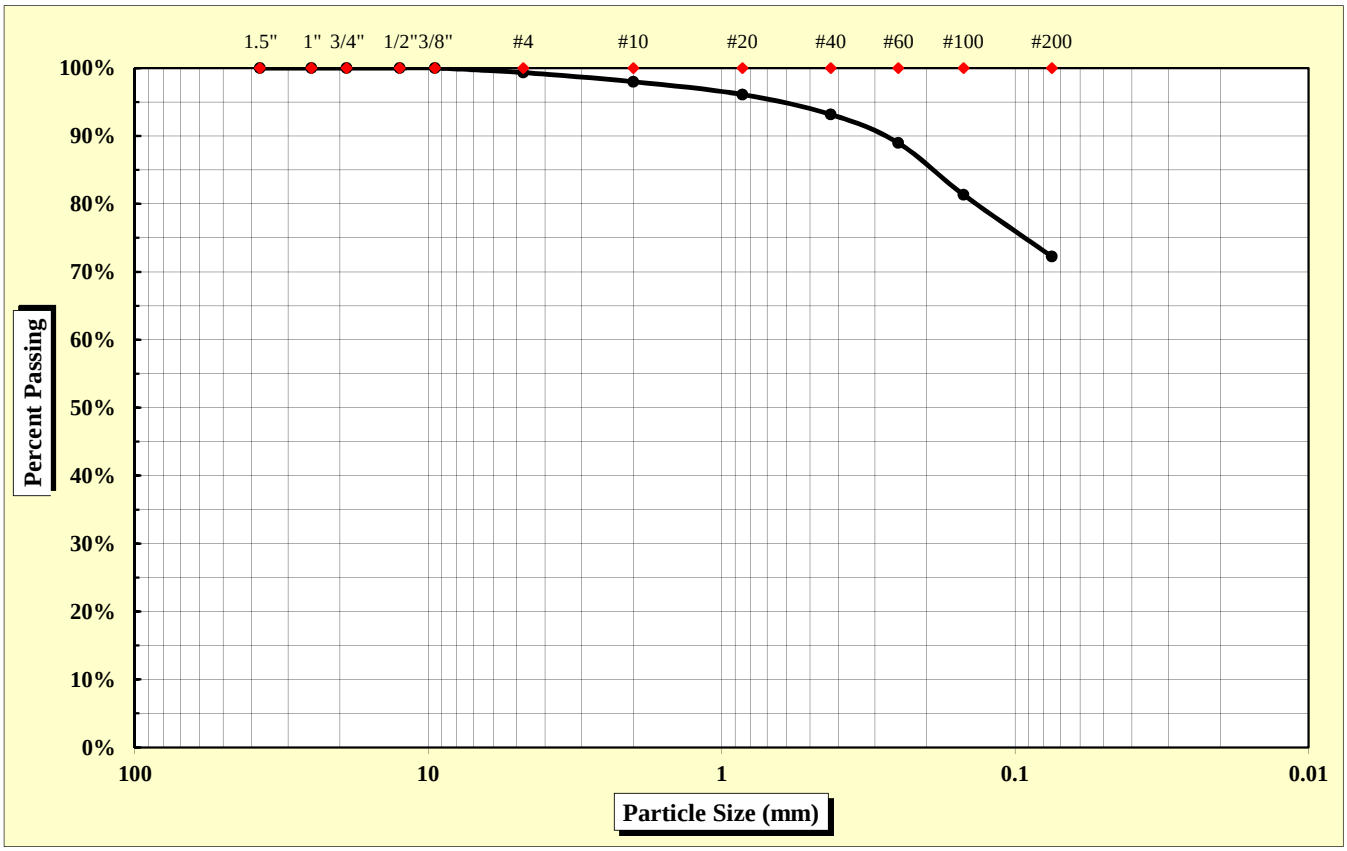
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	218	Sample Date:	9/24/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (18)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.0%	Fine Sand	20.9%
		Coarse Sand	4.8%	Silt & Clay	72.3%
Liquid Limit	56	Plastic Limit	32	Plastic Index	24
		Moisture Content	23.9%	Group Index	18

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

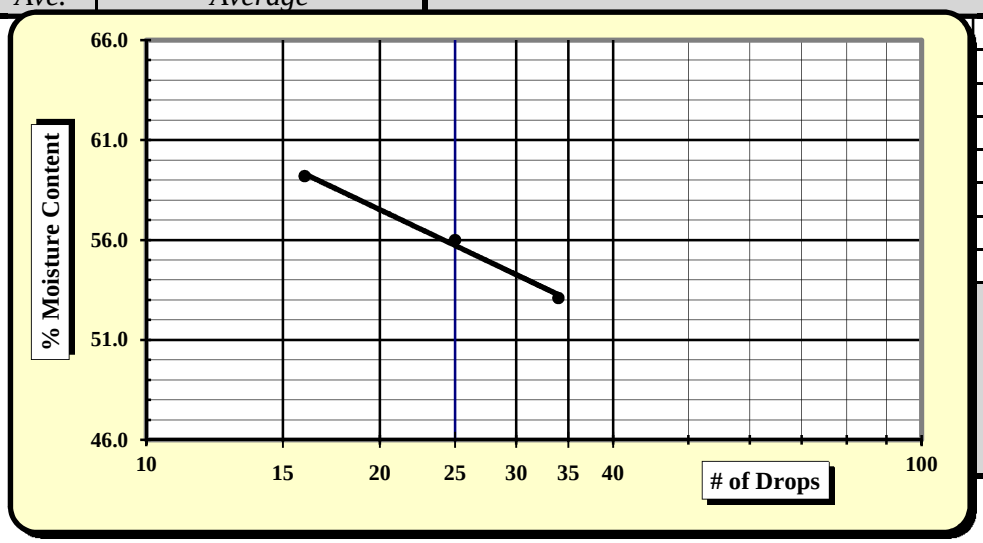
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	218	Sample Date:	9/24/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (18)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.66	16.67	15.97				12.09		
B	Wet Soil Weight + A	36.46	34.60	35.92				20.90		
C	Dry Soil Weight + A	29.59	28.16	28.50				18.78		
D	Water Weight (B-C)	6.87	6.44	7.42				2.12		
E	Dry Soil Weight (C-A)	12.93	11.49	12.53				6.69		
F	% Moisture (D/E)*100	53.1%	56.0%	59.2%				31.7%		
N	# OF DROPS	34	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**56**
Plastic Limit	**32**
Plastic Index	**24**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 72.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

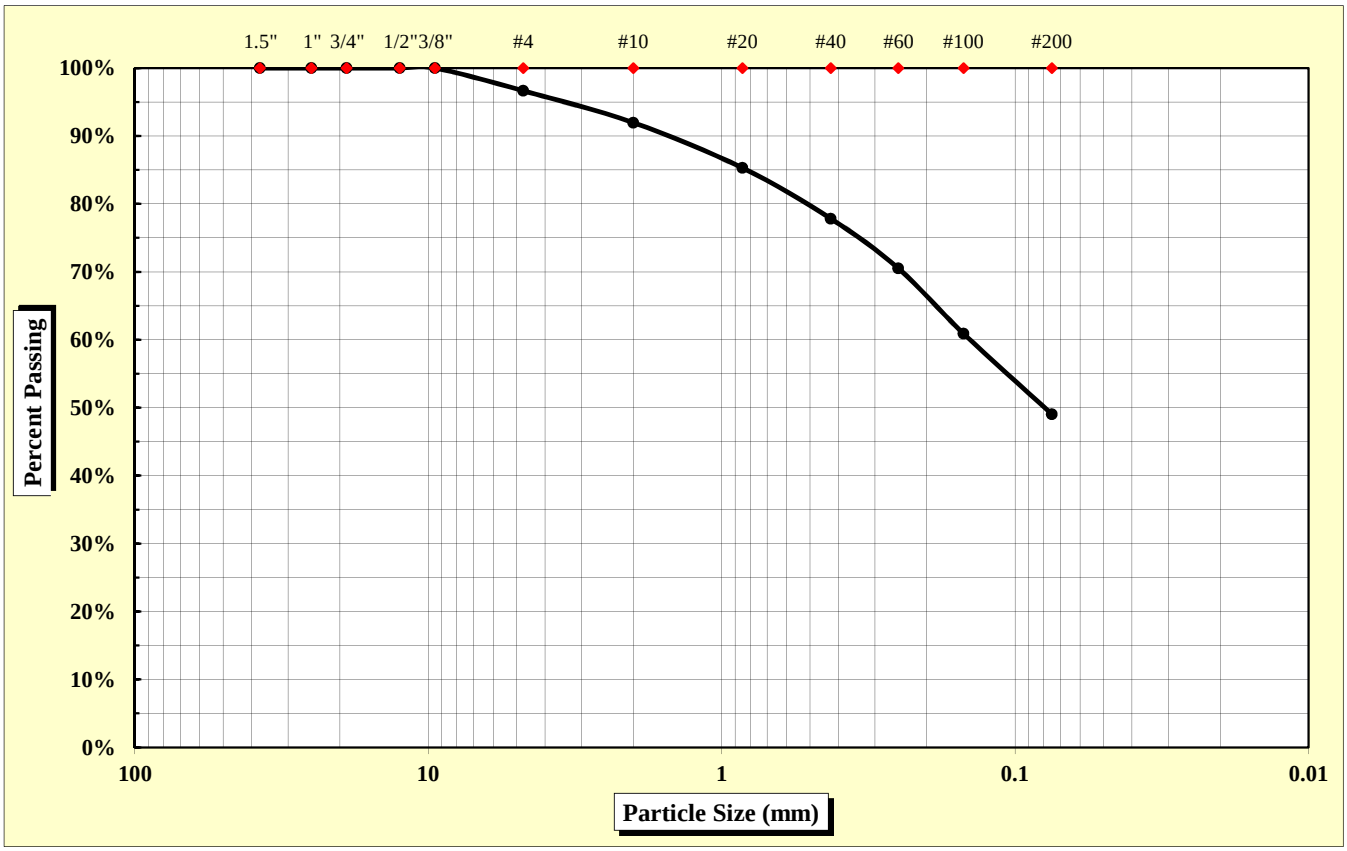
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	218	Sample Date:	9/24/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red tan brown, medium to fine, silty SAND (SM) [A-7-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	8.0%	Fine Sand	28.8%
		Coarse Sand	14.1%	Silt & Clay	49.1%
Liquid Limit	48	Plastic Limit	33	Plastic Index	15
		Moisture Content	23.2%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

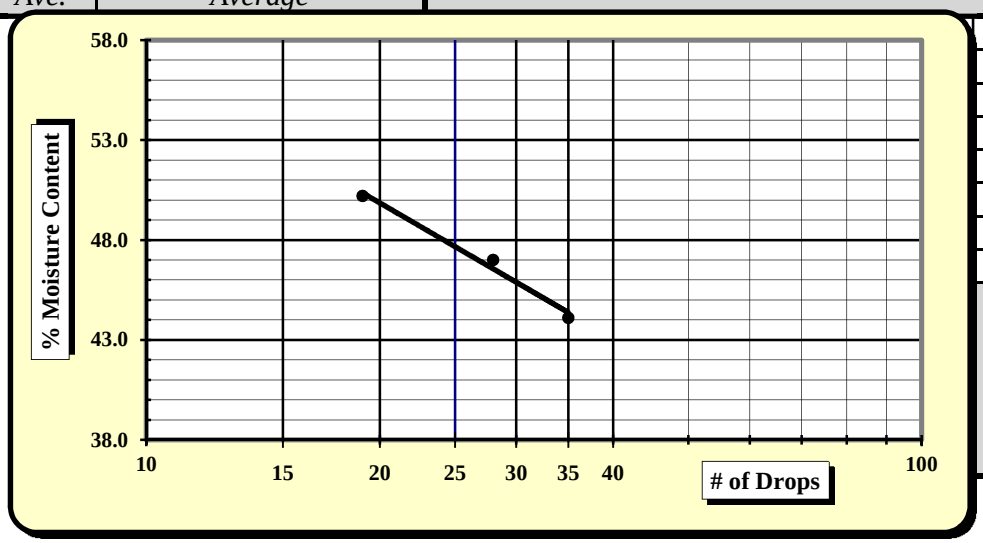
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	218	Sample Date:	9/24/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red tan brown, medium to fine, silty SAND (SM) [A-7-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.70	16.87	16.81				12.29		
B	Wet Soil Weight + A	38.86	35.83	36.64				21.25		
C	Dry Soil Weight + A	32.08	29.77	30.01				19.02		
D	Water Weight (B-C)	6.78	6.06	6.63				2.23		
E	Dry Soil Weight (C-A)	15.38	12.90	13.20				6.73		
F	% Moisture (D/E)*100	44.1%	47.0%	50.2%				33.1%		
N	# OF DROPS	35	28	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**33**
Plastic Index	**15**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

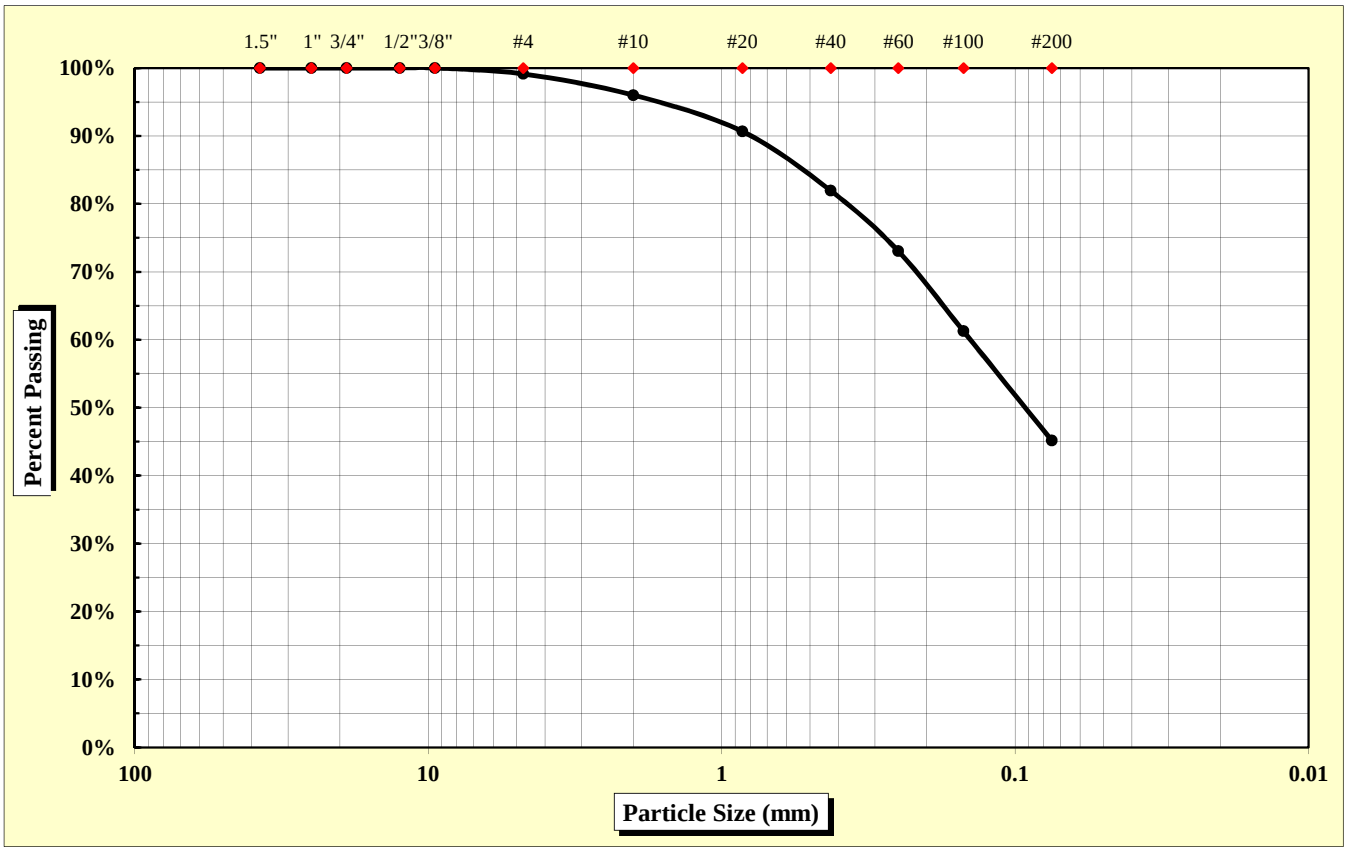
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/03/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/09 - 11/16/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	230	Sample Date:	9/25/15
Location:	UD-1	Type:	UD	Depth:	16 - 18'
Sample Description:	Red yellow, medium to fine, silty SAND (SM) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.0%	Fine Sand	36.8%
		Coarse Sand	14.1%	Silt & Clay	45.2%
Liquid Limit	50	Plastic Limit	40	Plastic Index	10
		Moisture Content	28.4%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

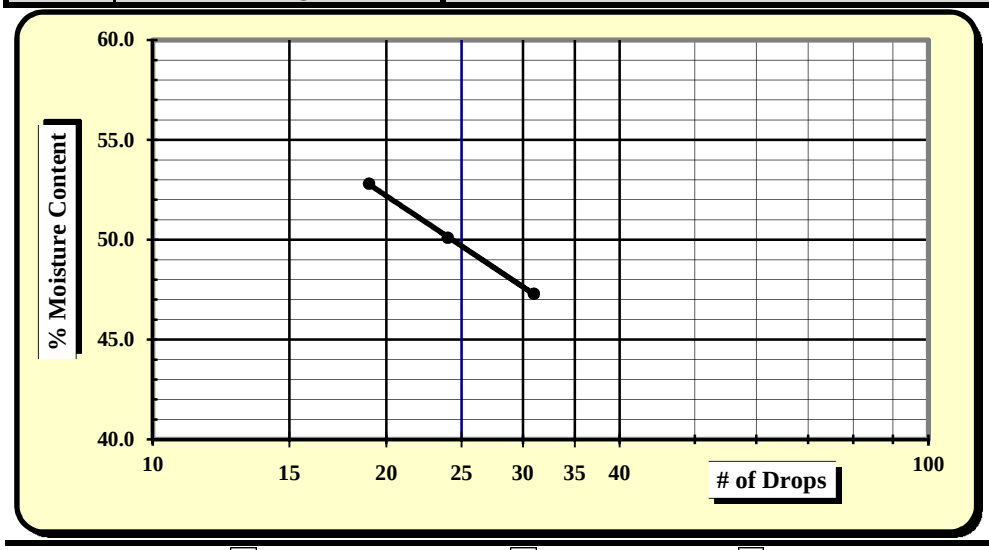
Project #:	**1426-14-161**	Report Date:	12/03/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	230	Sample Date:	9/25/15
Location:	UD-1	Type:	UD	Depth:	16 - 18'

Sample Description: Red yellow, medium to fine, silty SAND (SM) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.71	26.52	26.37				25.98		
B	Wet Soil Weight + A	42.88	41.79	44.63				34.94		
C	Dry Soil Weight + A	37.69	36.69	38.32				32.38		
D	Water Weight (B-C)	5.19	5.10	6.31				2.56		
E	Dry Soil Weight (C-A)	10.98	10.17	11.95				6.40		
F	% Moisture (D/E)*100	47.3%	50.1%	52.8%				40.0%		
N	# OF DROPS	31	24	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**50**
Plastic Limit	**40**
Plastic Index	**10**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/03/15	Brian Vaughan, P.E.	12/03/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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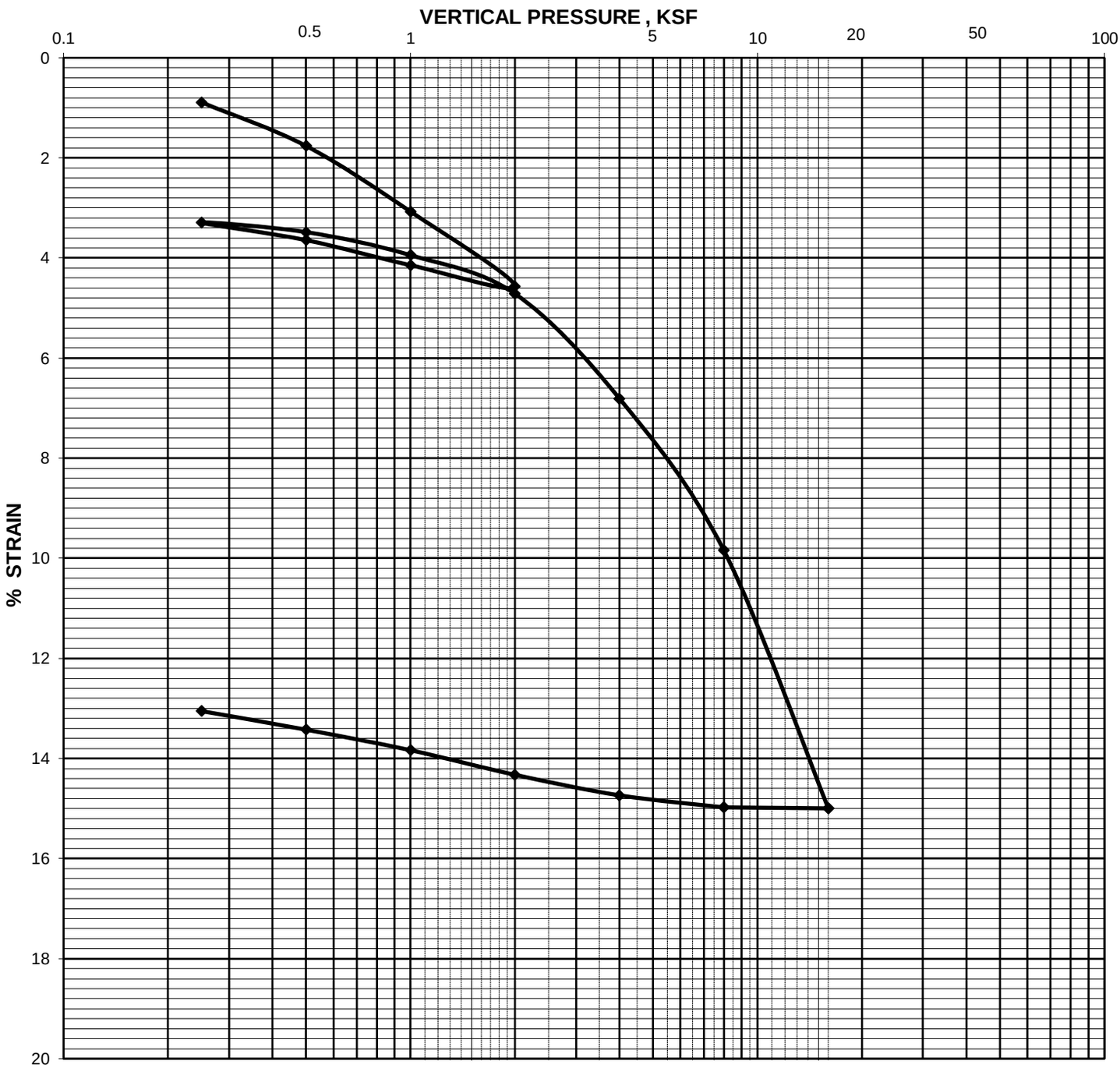
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	12/3/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-3
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	16 - 18'
Initial Wet Density, γ_{wet}, pcf:	104.5	**Load vs. Time Plot:**	Log of time	**Sample Type:**	UD
Initial Void Ratio, e_o:	1.131	**Final Void Ratio, e_f:**	0.853	**Log No.:**	230
Initial Saturation, S_O, %:	69.8	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.780
Initial Dry Density, γ_{DRY}, pcf:	81.4	**Final Dry Density, γ_{DRY}, pcf:**	87.6	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	28.4	**Final Moisture Content, %:**	32.1	**Stress, P_e, ksf:**	4.2
Liquid Limit, %:	50	**Plasticity Index, %:**	10	**Fines, %:**	45.2
Sample Description:	Red yellow, medium to fine, silty SAND (SM) [A-5 (3)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 2.0, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

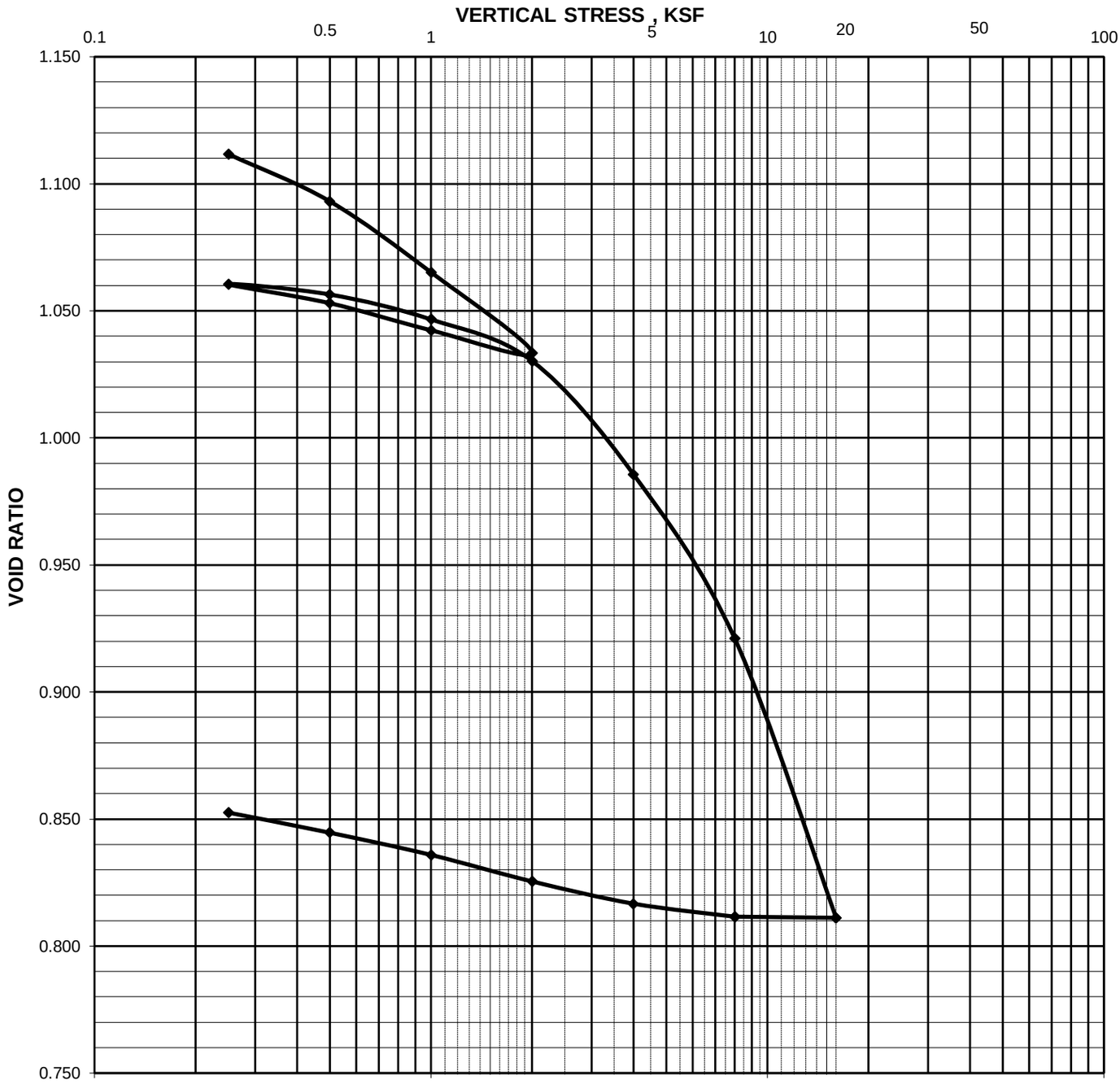


CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	12/3/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-3
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	16 - 18'
Initial Wet Density, γ_{wet}, pcf:	104.5	**Load vs. Time Plot:**	Log of time	**Sample Type:**	Shelby tube
Initial Void Ratio, e_o:	1.131	**Final Void Ratio, e_f:**	0.853	**Log No.:**	230
Initial Saturation, S_O, %:	69.8	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.780
Initial Dry Density, γ_{DRY}, pcf:	81.4	**Final Dry Density, γ_{DRY}, pcf:**	87.6	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	28.4	**Final Moisture Content, %:**	32.1	**Stress, P_e, ksf:**	4.2
Liquid Limit, %:	50	**Plasticity Index, %:**	10	**Fines, %:**	45.2
Sample Description:	Red yellow, medium to fine, silty SAND (SM) [A-5 (3)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 2.0, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

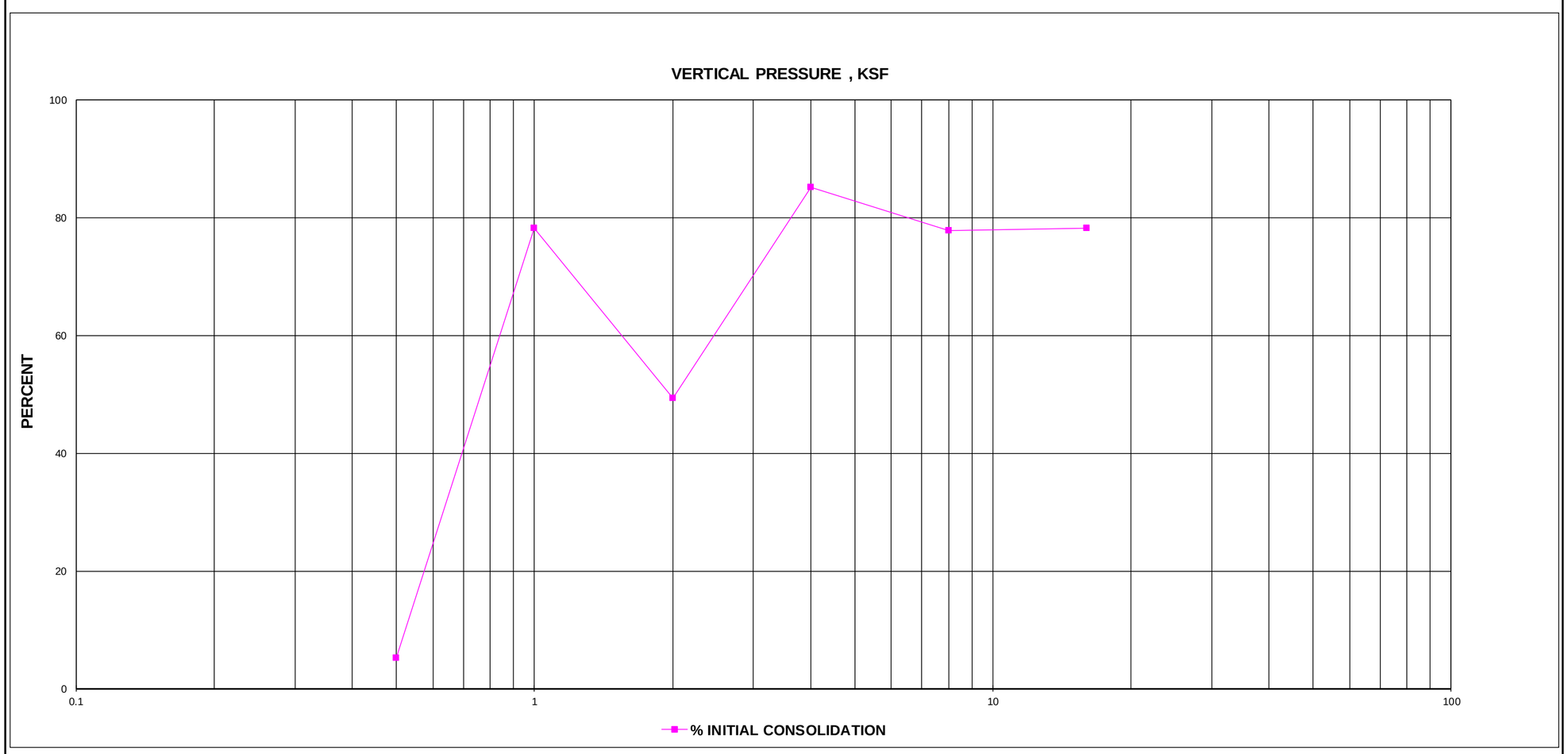


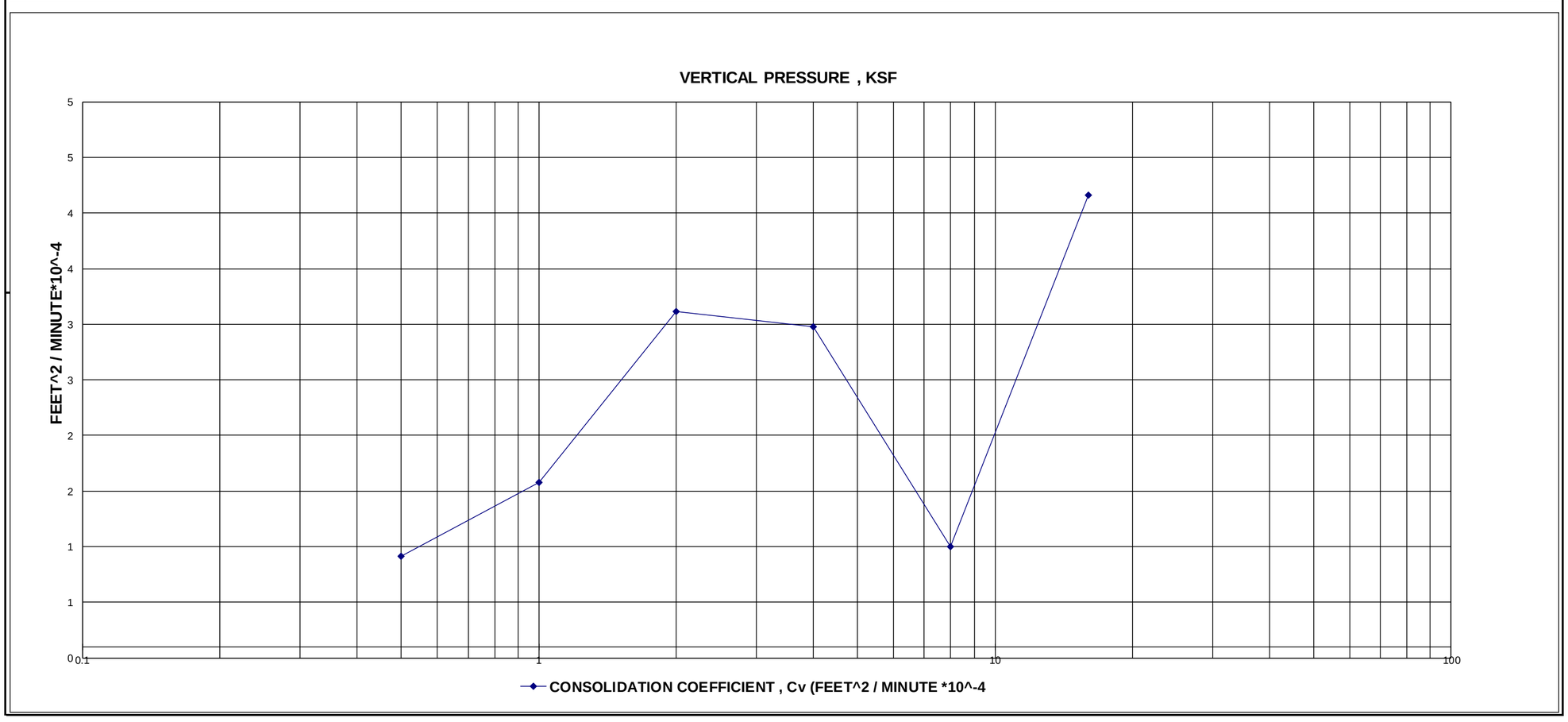
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	12/3/2015
Client Name:	Infrastructure Consulting & Engineering	**Boring No.:**	BR-3
Client Address:	1021 Briargate Circle Columbia, SC 29210	**Depth/Elev.:**	16 - 18'

Pressure (ksf)	D_0 (in.)	D_{100} (in.)	D_{50} (in.)	Stone Correction (in.)	D_{0c} (in.)	D_{100c}	D_{50c} (in.)	h (in.)	VOID RATIO e	Percent Strain (%)	t_{50}/t_{90} t_{50}	C_v Log of Time ($ft^2/10^{-4}min$)	C_i (%)
0.25		0.0091		0.0002		0.0089			1.112	0.891			
0.5		0.0182		0.0006		0.0176			1.093	1.762			
1.0		0.0323		0.0016		0.0307			1.065	3.073			
2.0		0.0481		0.0025		0.0456			1.033	4.565			
1.0		0.0430		0.0016		0.0414			1.042	4.145			
0.5		0.0374		0.0010		0.0364			1.053	3.644			
0.25		0.0334		0.0005		0.0329			1.060	3.294			
0.5	0.0336	0.0354	0.0345	0.0006	0.0330	0.0348	0.0339	0.4825	1.056	3.484	3.5	0.91	5.3
1.0	0.0400	0.0410	0.0405	0.0016	0.0384	0.0394	0.0389	0.4800	1.047	3.944	2.0	1.58	78.3
2.0	0.0457	0.0496	0.0477	0.0025	0.0432	0.0471	0.0452	0.4769	1.030	4.715	1.0	3.11	49.4
4.0	0.0686	0.0717	0.0701	0.0037	0.0649	0.0680	0.0664	0.4663	0.986	6.807	1.0	2.97	85.2
8.0	0.0965	0.1032	0.0999	0.0049	0.0916	0.0983	0.0950	0.4520	0.921	9.841	2.8	1.00	77.9
16.0	0.1447	0.1559	0.1503	0.0061	0.1386	0.1498	0.1442	0.4274	0.811	14.996	0.6	4.16	78.3
8.0		0.1545		0.0049		0.1496			0.812	14.976			
4.0		0.1509		0.0037		0.1472			0.817	14.736			
2.0		0.1456		0.0025		0.1431			0.825	14.326			
1.0		0.1398		0.0016		0.1382			0.836	13.835			
0.5		0.1346		0.0005		0.1341			0.845	13.425			
0.25		0.1308		0.0004		0.1304			0.853	13.054			





I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-3**
Sample ID: **"UD-1"**
Sample Depth: **16' - 18'**
Classification: **SM / A-5 (4)**
Test Performed: **Consolidation**
Estimated Pre-Consolidation Pressure: **4200 psf**

Torvane Shear Stress Measurements (3):
1900 psf, 1800 psf, & 2400 psf; **Average = 2030 psf**

Pocket Penetrometer Measurements (3):
8000 psf, 9000 psf, & 9000 psf; **Average = 8670 psf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

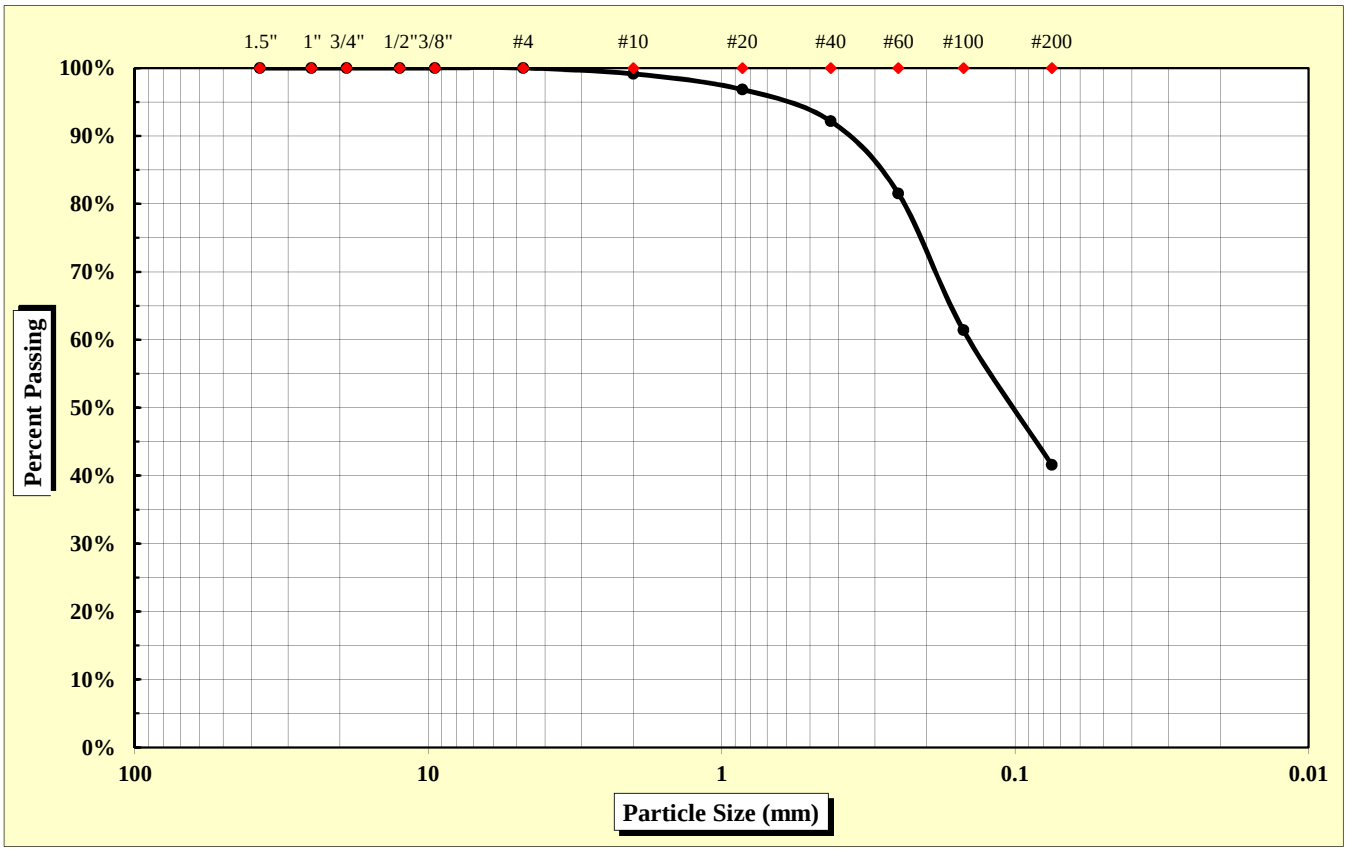
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	241	Sample Date:	9/21/15
Location:	SS-11/13	Type:	Split-spoon	Depth:	38.5 - 50'
Sample Description:	Orange tan brown, fine, micaceous, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.9%	Fine Sand	50.6%
		Coarse Sand	7.0%	Silt & Clay	41.6%
Liquid Limit	37	Plastic Limit	29	Plastic Index	8
		Moisture Content	27.8%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

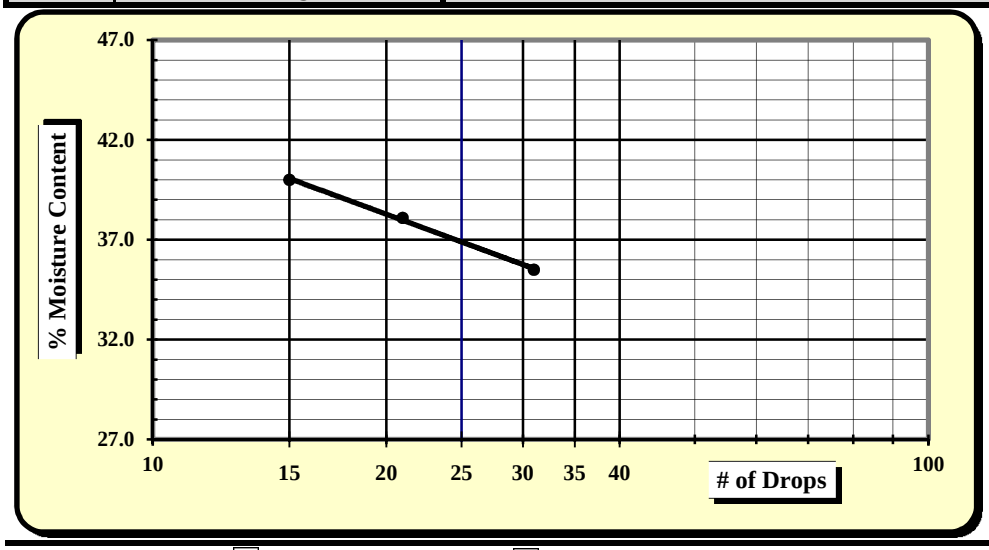
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3	Sample #:	241	Sample Date:	9/24/15
Location:	SS-11/13	Type:	Split-spoon	Depth:	38.5 - 50'

Sample Description: Orange tan brown, fine, micaceous, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.68	15.95				11.17		
B	Wet Soil Weight + A	37.88	37.65	37.12				19.55		
C	Dry Soil Weight + A	32.10	31.59	31.07				17.68		
D	Water Weight (B-C)	5.78	6.06	6.05				1.87		
E	Dry Soil Weight (C-A)	16.30	15.91	15.12				6.51		
F	% Moisture (D/E)*100	35.5%	38.1%	40.0%				28.7%		
N	# OF DROPS	31	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**29**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

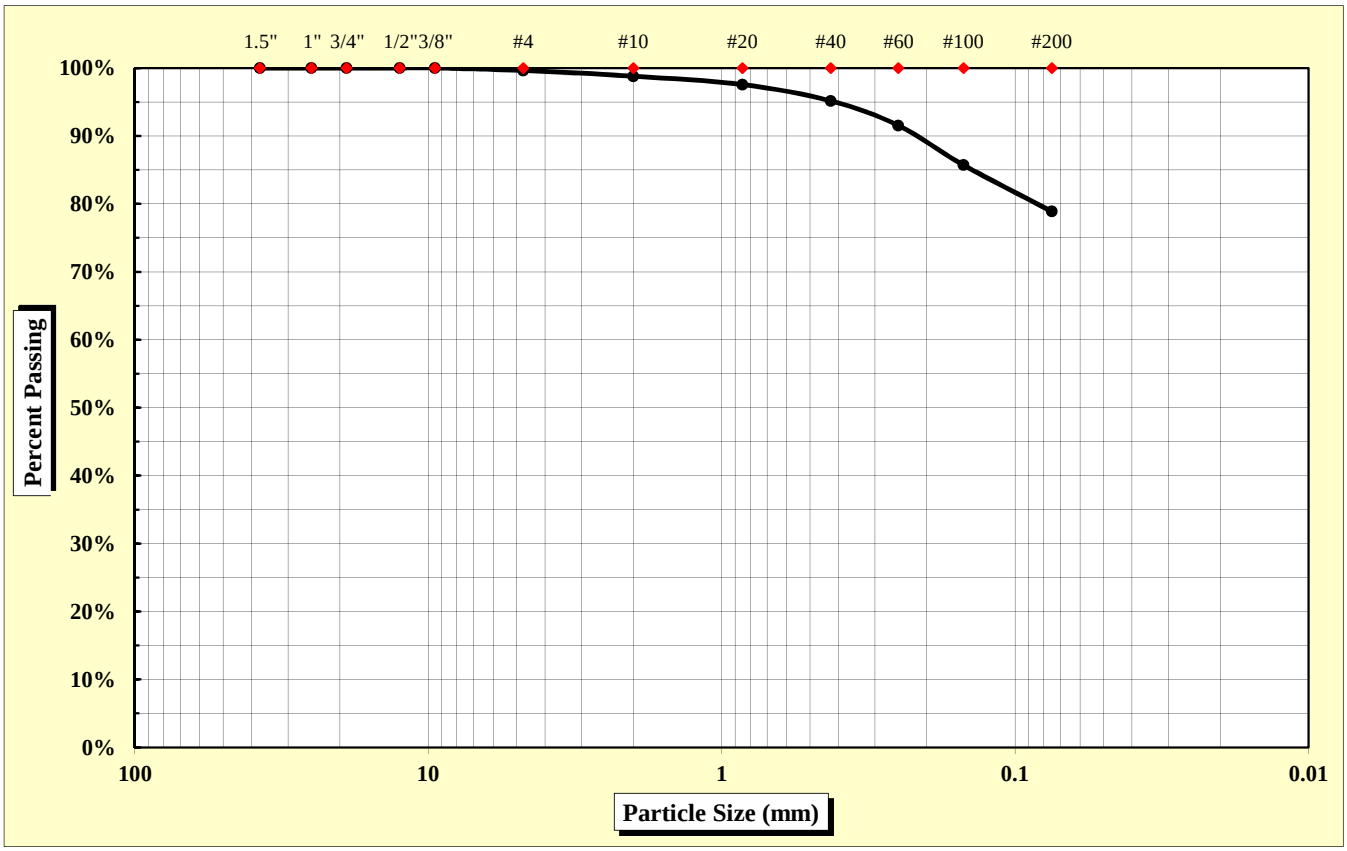
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3/4	Sample #:	241	Sample Date:	9/24 & 10/7/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (24)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.2%	Fine Sand	16.3%
		Coarse Sand	3.6%	Silt & Clay	78.9%
Liquid Limit	58	Plastic Limit	31	Plastic Index	27
		Moisture Content	27.1%	Group Index	24

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

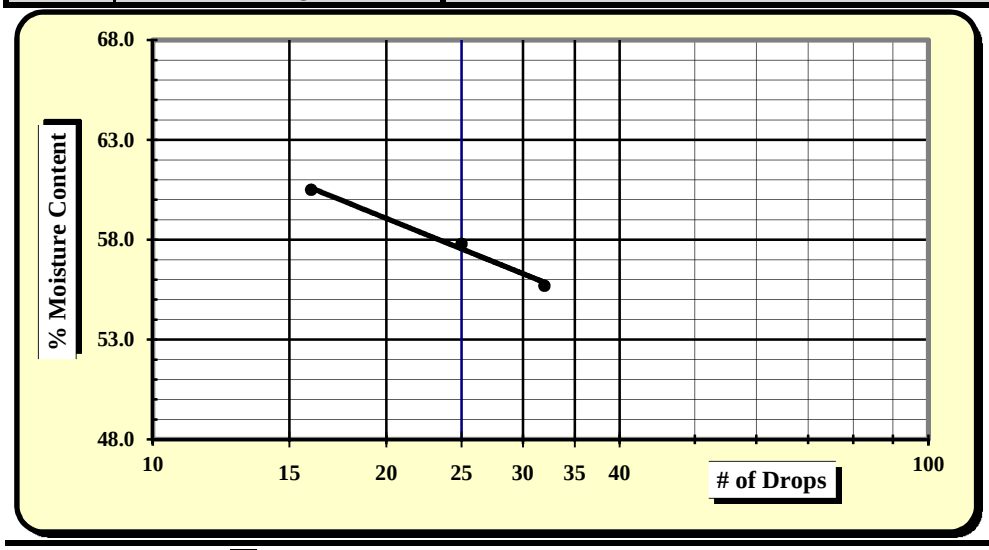
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-3/4	Sample #:	241	Sample Date:	9/24 & 10/7/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (24)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.67	15.73				12.16		
B	Wet Soil Weight + A	36.90	36.48	35.66				21.22		
C	Dry Soil Weight + A	29.68	29.22	28.15				19.09		
D	Water Weight (B-C)	7.22	7.26	7.51				2.13		
E	Dry Soil Weight (C-A)	12.96	12.55	12.42				6.93		
F	% Moisture (D/E)*100	55.7%	57.8%	60.5%				30.7%		
N	# OF DROPS	32	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**31**
Plastic Index	**27**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 78.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

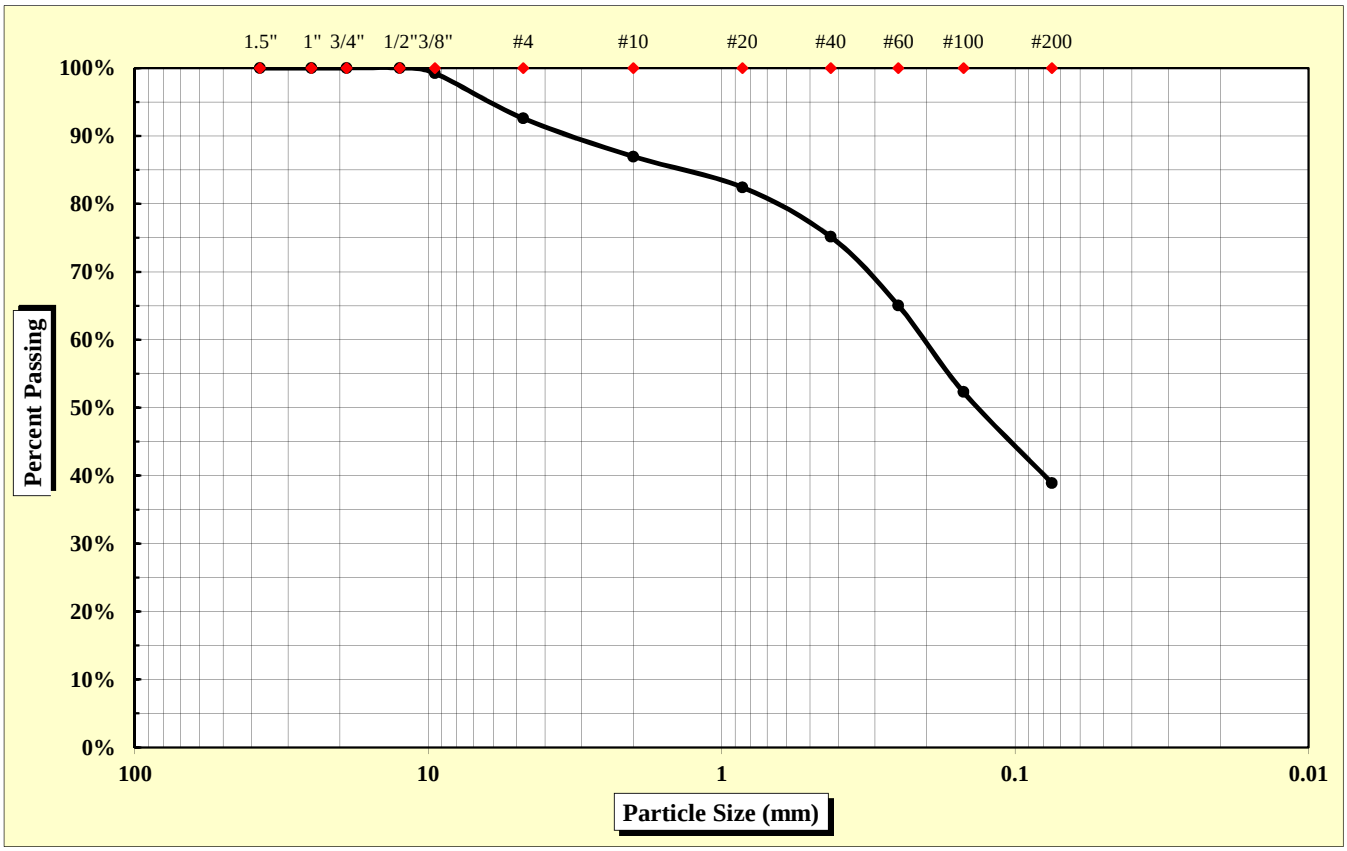
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	218	Sample Date:	10/7/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	13.0%	Fine Sand	36.2%
		Coarse Sand	11.8%	Silt & Clay	38.9%
Liquid Limit	20	Plastic Limit	14	Plastic Index	6
		Moisture Content	14.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

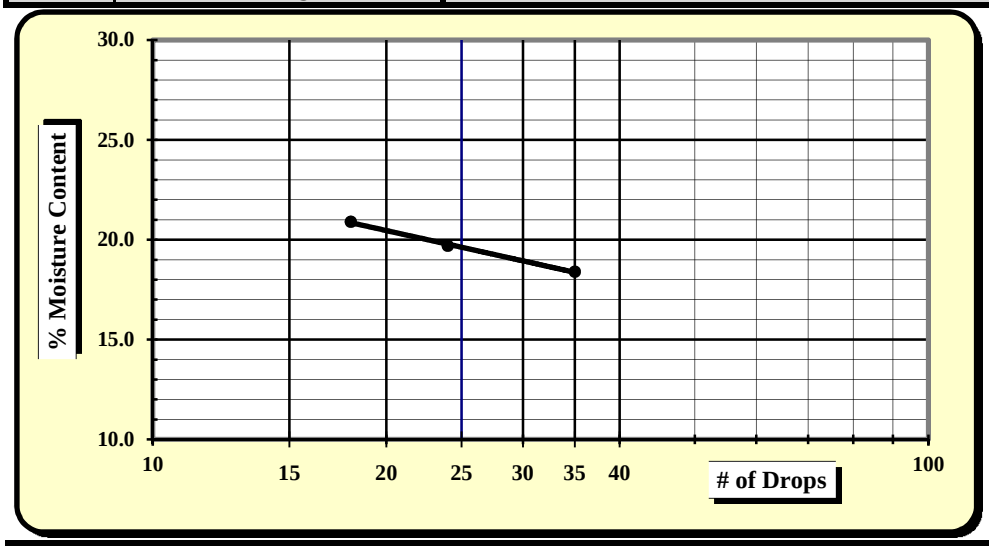
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	218	Sample Date:	10/7/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Brown red, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.30	16.53				12.11		
B	Wet Soil Weight + A	42.54	43.31	42.16				20.93		
C	Dry Soil Weight + A	38.48	38.70	37.73				19.84		
D	Water Weight (B-C)	4.06	4.61	4.43				1.09		
E	Dry Soil Weight (C-A)	22.08	23.40	21.20				7.73		
F	% Moisture (D/E)*100	18.4%	19.7%	20.9%				14.1%		
N	# OF DROPS	35	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**14.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**20**
Plastic Limit	**14**
Plastic Index	**6**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 38.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

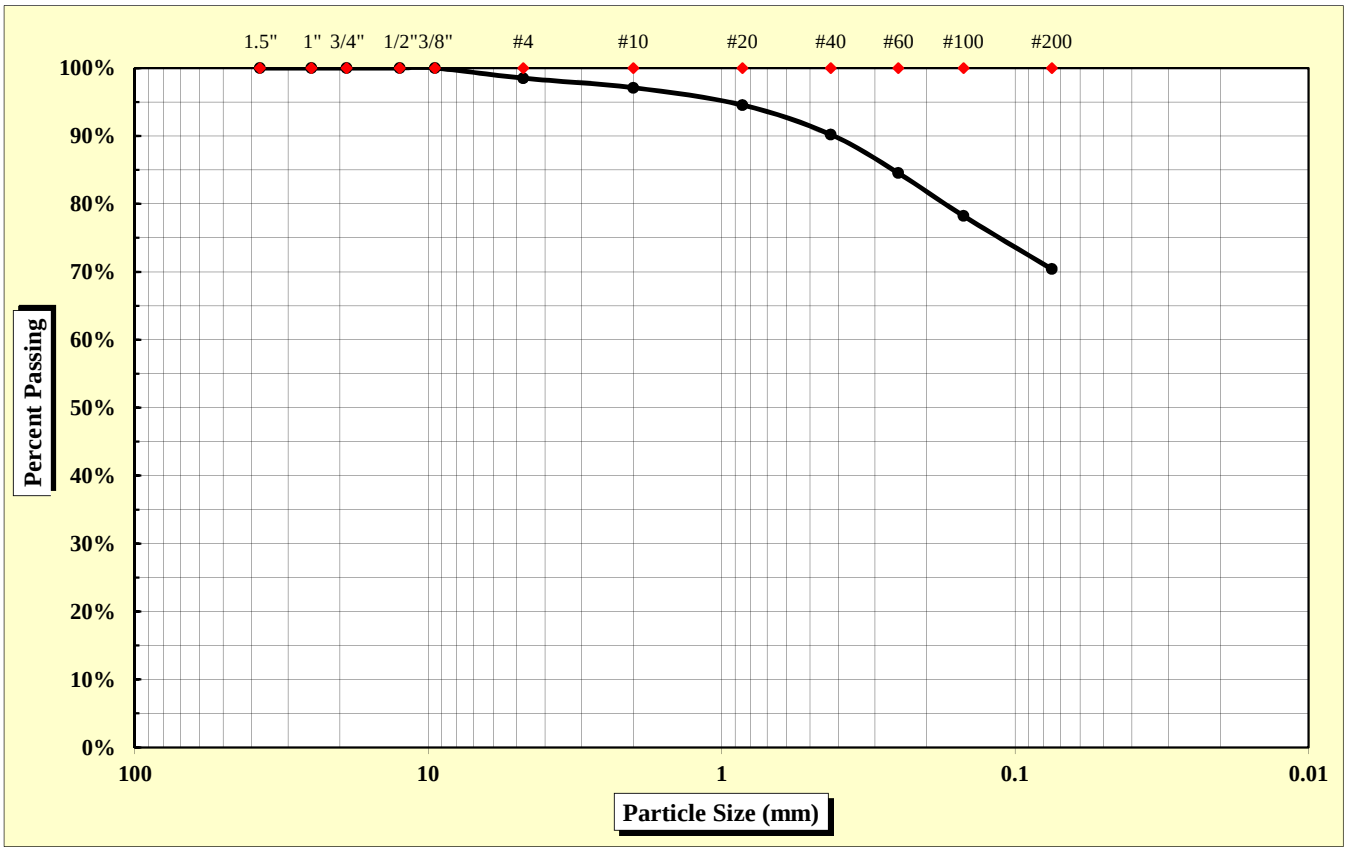
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/08/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	230	Sample Date:	10/07/15
Location:	UD-1	Type:	UD	Depth:	4 - 6'
Sample Description:	Red, fine, ELASTIC SILT with sand (MH) [A-7-5 (21)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	2.9%	Fine Sand	19.8%
		Coarse Sand	6.9%	Silt & Clay	70.4%
Liquid Limit	63	Plastic Limit	34	Plastic Index	29
		Moisture Content	N/A	Group Index	21

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

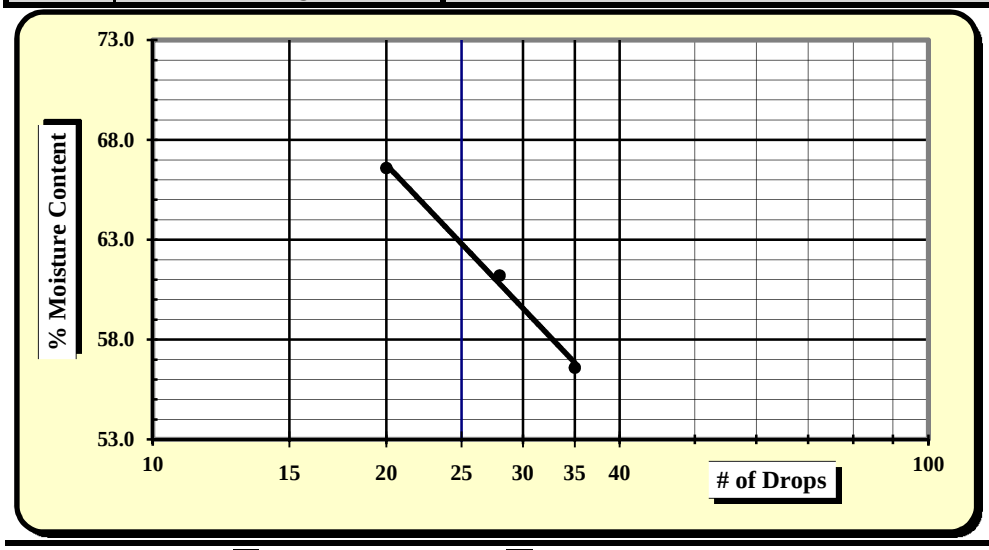
Project #:	**1426-14-161**	Report Date:	12/08/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/05/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	230	Sample Date:	10/07/15
Location:	UD-1	Type:	UD	Depth:	4 - 6'

Sample Description: Red, fine, ELASTIC SILT with sand (MH) [A-7-5 (21)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.88	26.83	26.68				26.67		
B	Wet Soil Weight + A	41.68	42.98	44.12				37.64		
C	Dry Soil Weight + A	36.33	36.85	37.15				34.85		
D	Water Weight (B-C)	5.35	6.13	6.97				2.79		
E	Dry Soil Weight (C-A)	9.45	10.02	10.47				8.18		
F	% Moisture (D/E)*100	56.6%	61.2%	66.6%				34.1%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**63**
Plastic Limit	**34**
Plastic Index	**29**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 70.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/08/15	Brian Vaughan, P.E.	12/08/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 2850)

Unconsolidated Undrained - Unsaturated

REV4,1/13/04

AASHTO R18

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-160**	**Report Date:**	12/08/15
Client Name:	Infrastructure Consulting & Engineering	**Test Date:**	12/07 - 12/08/15
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		
Boring No. : BR-4	**Depth / Elev. :** 4 - 6'	**Sample No . :** 230	**Type:** UD
Sample Location :	UD-1		
Sample Description :	Red, fine, ELASTIC SILT with sand (MH) [A-7-5 (21)]		
LL, % : 63	**PI , % :** 29	**Percent Passing #200 :** 70.4	**G_s :** 2.785

SPECIMEN PROPERTIES

		INITIAL				FINAL		
SPECIMEN NO.		**1**	**2**	**3**		**1**	**2**	**3**
DIAMETER , INCHES	D_o	*2.87*	*2.89*	*2.88*	D_c	*N/A*	*N/A*	*N/A*
HEIGHT , INCHES	H_o	*5.64*	*5.81*	*5.85*	H_c	*N/A*	*N/A*	*N/A*
WATER CONTENT, %	W_o	*25.0*	*27.6*	*28.9*	W_c	*N/A*	*N/A*	*N/A*
DRY DENSITY, PCF	γ_{dryo}	*92.4*	*92.9*	*92.4*	γ_{dryc}	*N/A*	*N/A*	*N/A*
SATURATION ,%	S_o	*79.0*	*88.2*	*91.3*	S_c	*N/A*	*N/A*	*N/A*
VOID RATIO	e_o	*0.881*	*0.871*	*0.881*	e_c	*N/A*	*N/A*	*N/A*

TEST PARAMETERS , TEST TYPE : UU

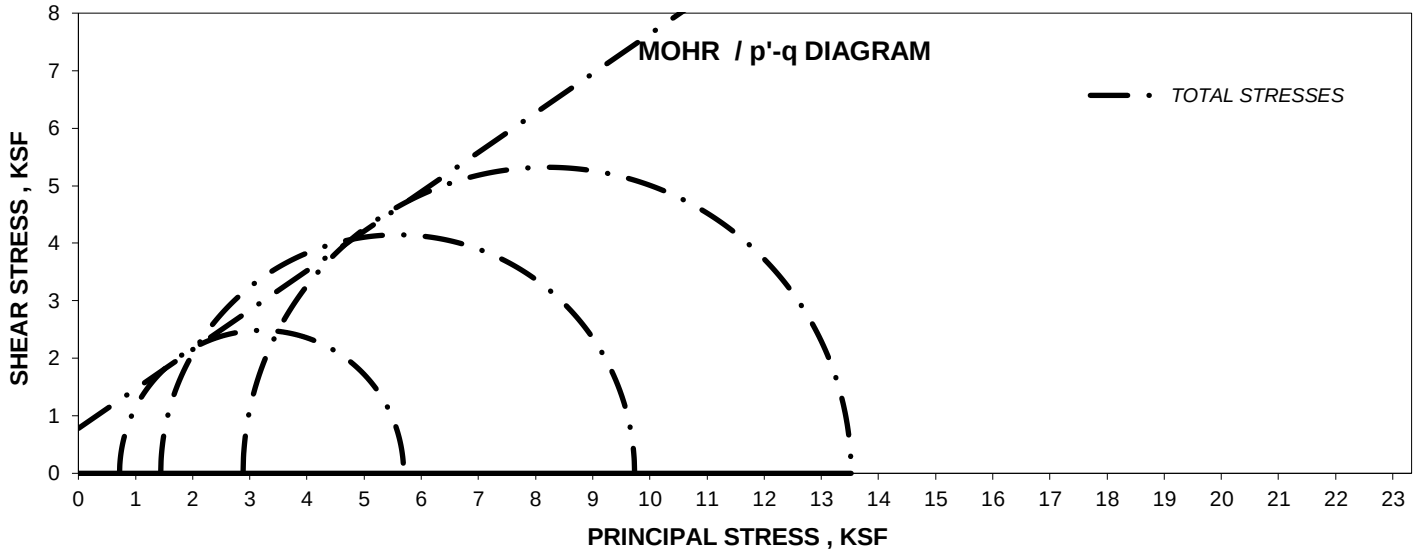
SPECIMEN NO.		**1**	**2**	**3**
B Value		*N/A*	*N/A*	*N/A*
BACK PRESSURE, ksf	U_o	*0.0*	*0.0*	*0.0*
CONFINING PRESSURE , ksf	σ_3'	*0.7*	*1.4*	*2.9*
MAX. DEVIATOR STRESS ,ksf	σ_1-σ_3	*5.0*	*8.3*	*10.6*
ULT. DEVIATOR STRESS , ksf	σ_1-σ_3	*5.0*	*7.9*	*10.6*
Specimen Shape @ Failure	Sheared			

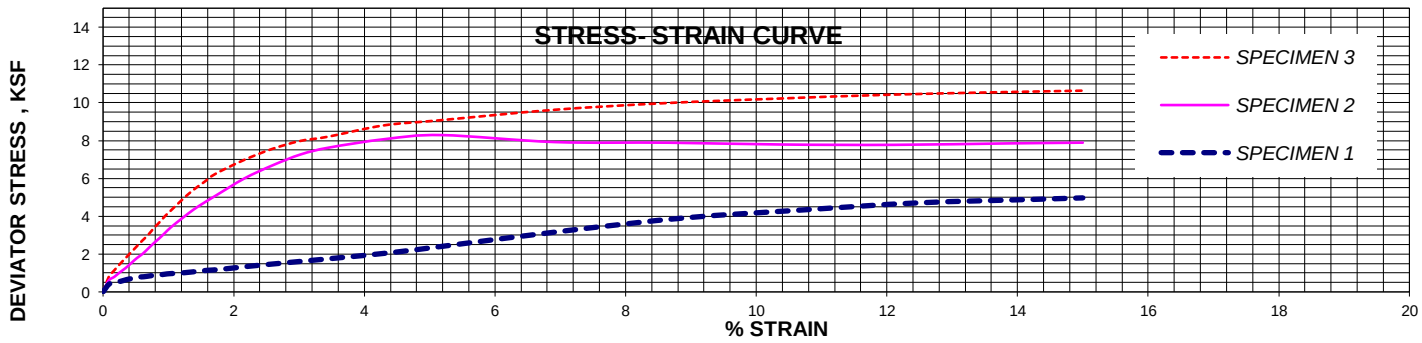
CONTROLLED : Strain @ 0.3 % per minute

N/A

N/A

SHEAR STRENGTH PARAMETERS	TOTAL	EFFECTIVE
	COHESION , C (ksf) : *0.8*	**APPARENT COHESION , (ksf) :** *N/A*
	ANGLE OF INTER. FRICTION, Φ(DEGREES) *34*	**ANGLE OF INTER. FRICTION, Φ' (DEGREES) :** *N/A*





Brian Vaughan, P.E.		Location Coordinator	12/08/15
Technical Responsibility	*Signature*	*Position*	*Date*

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-4**
Sample ID: **"UD-1"**
Sample Depth: **4' - 6'**
Classification: **MH / A-7-5 (21)**
Test Performed: **Unconsolidated-Undrained Triaxial Shear**

Torvane Shear Stress Measurements (3):
6000 psf, 6500 psf, & 6500 psf; **Average = 6330 psf**

Pocket Penetrometer Measurements (3):
9000 psf, 9000 psf, & 9000 psf; **Average = 9000 psf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

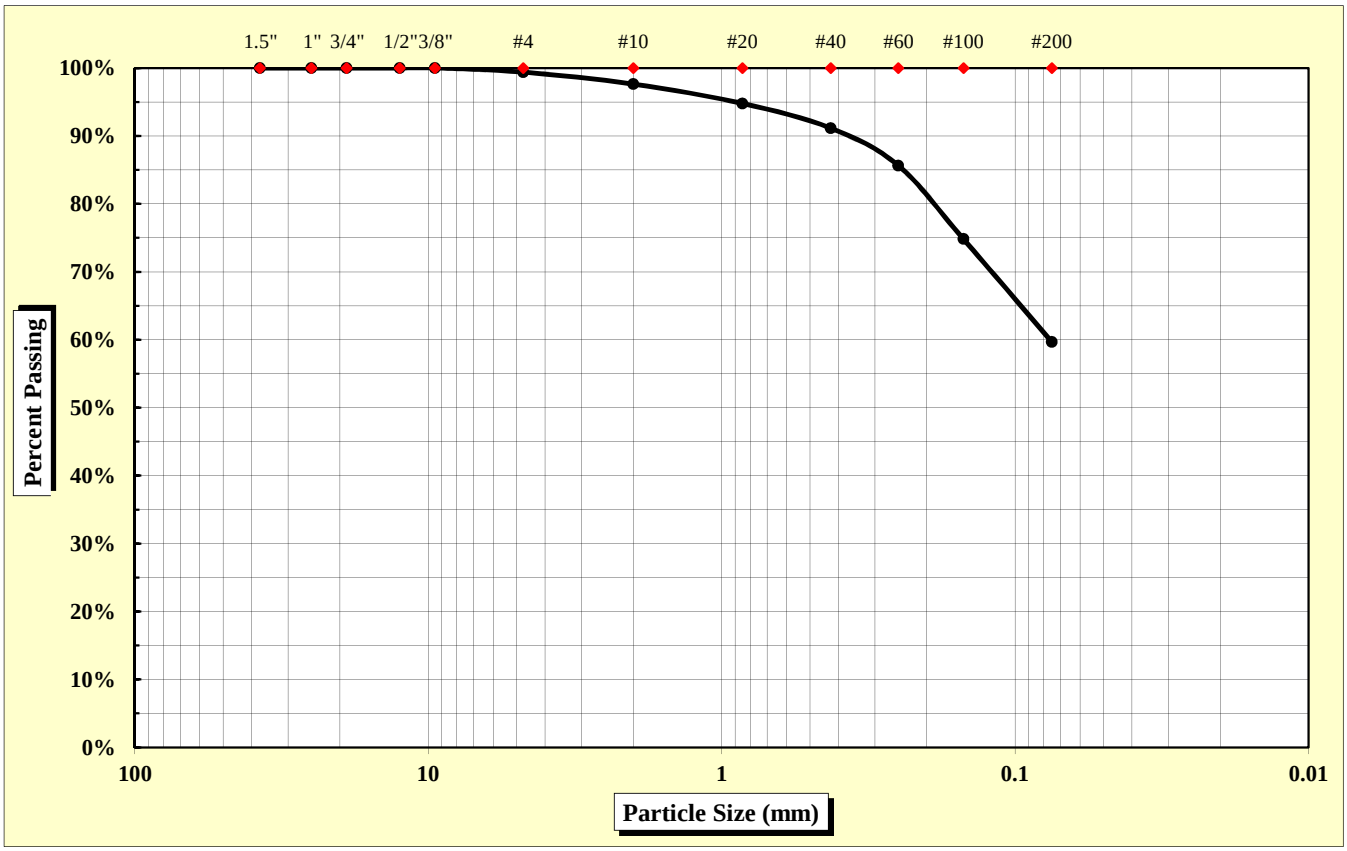
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	218	Sample Date:	10/7/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red tan, fine, sandy SILT (ML) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.4%	Fine Sand	31.5%
		Coarse Sand	6.5%	Silt & Clay	59.7%
Liquid Limit	45	Plastic Limit	30	Plastic Index	15
		Moisture Content	32.1%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

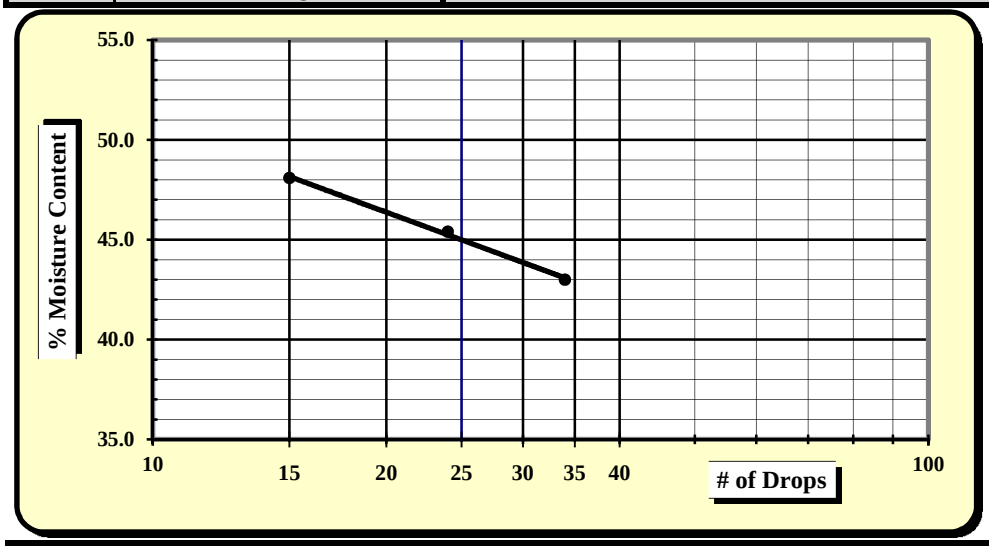
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	218	Sample Date:	10/7/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red tan, fine, sandy SILT (ML) [A-7-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.68	15.73				12.16		
B	Wet Soil Weight + A	39.48	38.40	38.08				21.85		
C	Dry Soil Weight + A	32.64	31.62	30.82				19.61		
D	Water Weight (B-C)	6.84	6.78	7.26				2.24		
E	Dry Soil Weight (C-A)	15.92	14.94	15.09				7.45		
F	% Moisture (D/E)*100	43.0%	45.4%	48.1%				30.1%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**30**
Plastic Index	**15**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 59.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

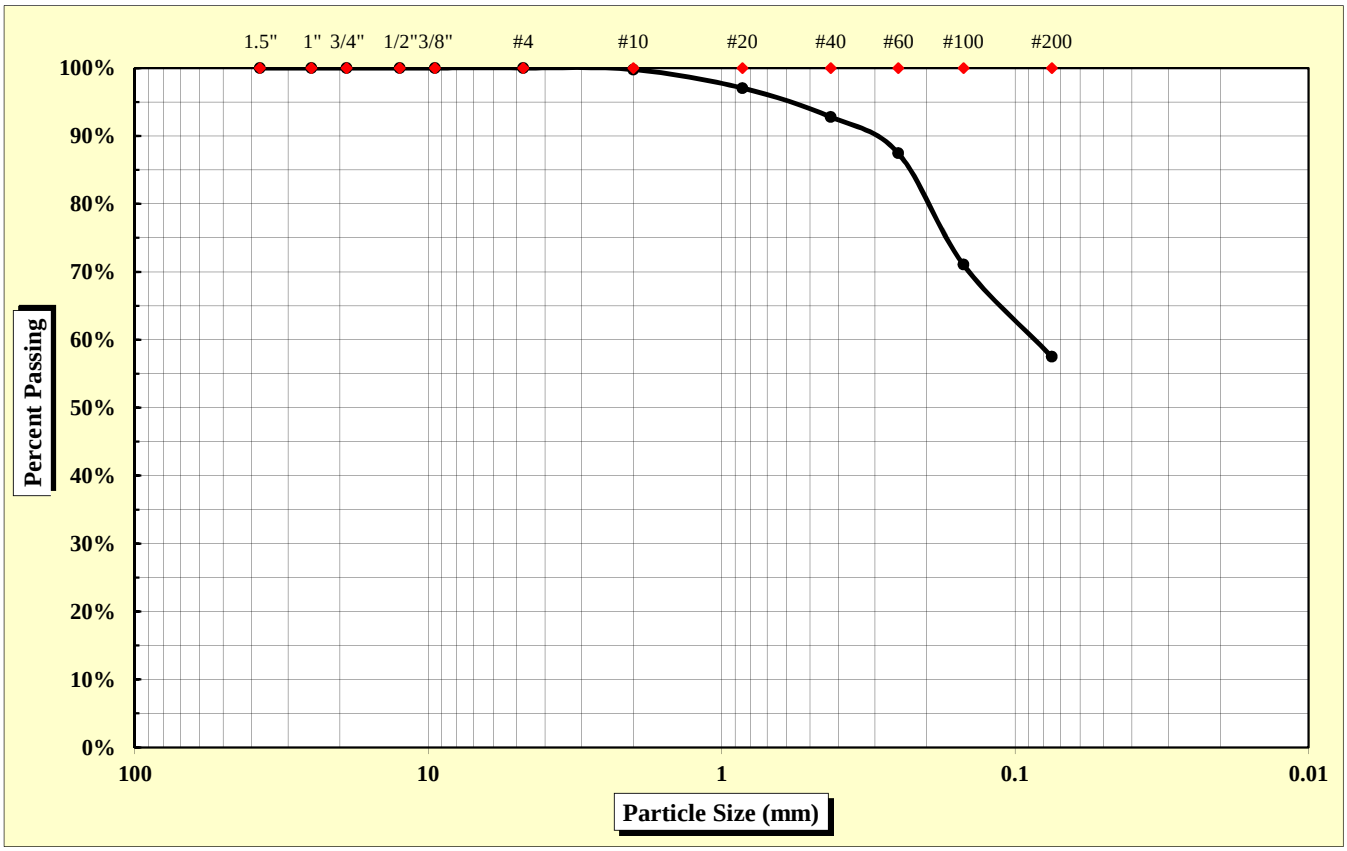
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/08/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	230	Sample Date:	10/07/15
Location:	UD-2	Type:	UD	Depth:	24 - 26'
Sample Description:	Red brown white, fine, sandy ELASTIC SILT (MH) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	35.3%
		Coarse Sand	7.0%	Silt & Clay	57.5%
Liquid Limit	52	Plastic Limit	38	Plastic Index	14
		Moisture Content	N/A	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

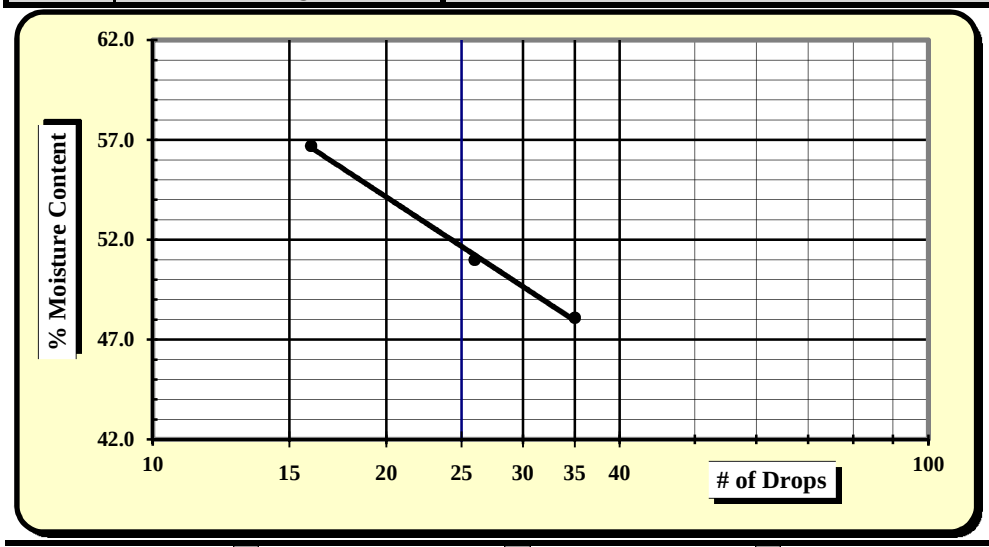
Project #:	**1426-14-161**	Report Date:	12/08/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/05/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	230	Sample Date:	10/07/15
Location:	UD-2	Type:	UD	Depth:	24 - 26'

Sample Description: Red brown white, fine, sandy ELASTIC SILT (MH) [A-7-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.71	26.50	26.37				25.96		
B	Wet Soil Weight + A	43.88	43.80	42.62				36.23		
C	Dry Soil Weight + A	38.30	37.96	36.74				33.39		
D	Water Weight (B-C)	5.58	5.84	5.88				2.84		
E	Dry Soil Weight (C-A)	11.59	11.46	10.37				7.43		
F	% Moisture (D/E)*100	48.1%	51.0%	56.7%				38.2%		
N	# OF DROPS	35	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**38**
Plastic Index	**14**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/08/15	Brian Vaughan, P.E.	12/08/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 4767)

REV4,1/13/04

AASHTO R18

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	12/08/15
Client Name:	Infrastructure Consulting & Engineering	**Test Date:**	11/30 - 12/08/15
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		
Boring No.:	BR-4	**Depth / Elev. :** 24 - 26'	**Sample No.:** 230 **Type:** UD
Sample Location:	UD-2		
Sample Description:	Red brown white, fine, sandy ELASTIC SILT (MH) [A-7-5 (8)]		
LL, %:	52	**PI , %:** 14	**Percent Passing #200:** 57.5 **G_s:** 2.820

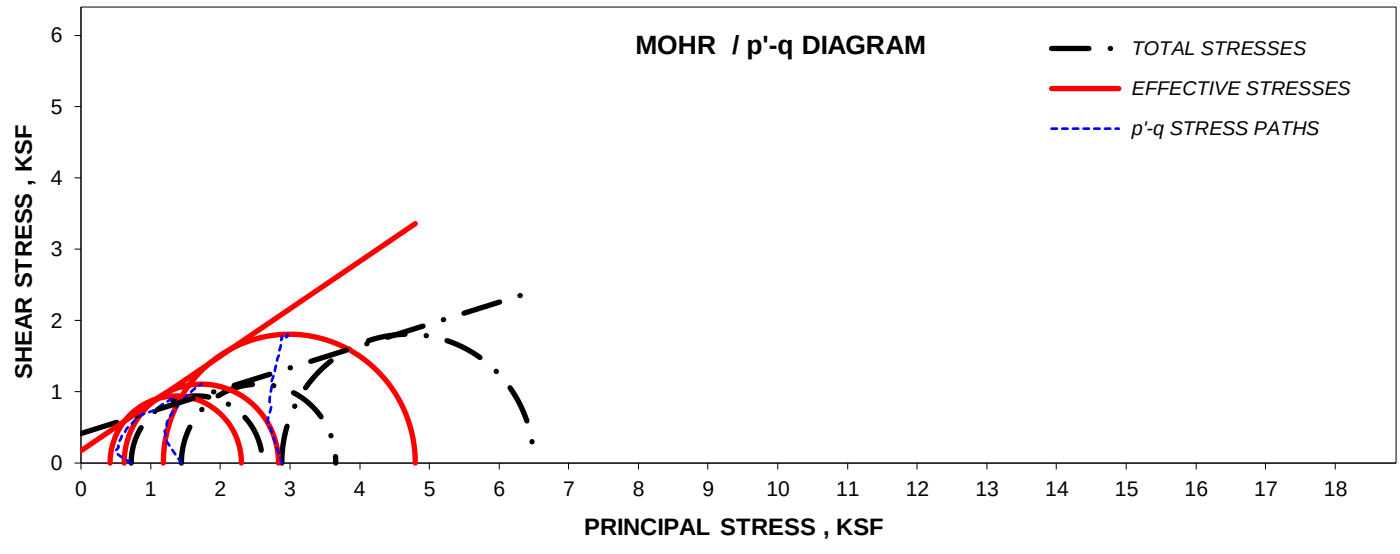
SPECIMEN PROPERTIES									**TEST PARAMETERS , TEST TYPE : CU/PP**				
		INITIAL			**AFTER CONSOLIDATION**				**SPECIMEN NO.**		**1**	**2**	**3**
SPECIMEN NO.		**1**	**2**	**3**		**1**	**2**	**3**	**B Value**		0.98	0.97	0.97
DIAMETER , INCHES	D_o	2.88	2.87	2.87	D_c	2.87	2.84	2.84	**BACK PRESSURE, ksf**	U_o	8.6	8.6	8.6
HEIGHT , INCHES	H_o	5.80	5.78	5.78	H_c	5.78	5.73	5.72	**CONFINING PRESSURE , ksf**	σ_3'	0.7	1.4	2.9
WATER CONTENT, %	W_o	38.5	40.3	40.3	W_c	39.1	45.4	45.3	**MAX. DEVIATOR STRESS ,ksf**	σ_1-σ_3	1.9	2.2	3.6
DRY DENSITY, PCF	γ_{dryo}	82.9	75.0	75.0	γ_{dryc}	83.7	77.1	77.3	**ULT. DEVIATOR STRESS , ksf**	σ_1-σ_3	1.9	2.2	3.5
SATURATION ,%	S_o	96.7	84.4	84.4	S_c	100.0	100.0	100.0	Specimen Shape @ Failure	Sheared			
VOID RATIO	e_o	1.123	1.346	1.346	e_c	1.103	1.282	1.277					

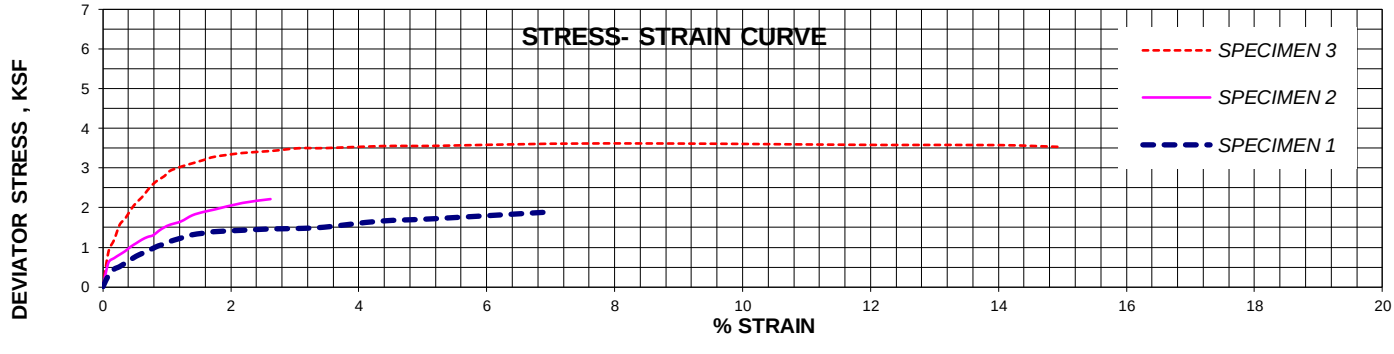
CONTROLLED : Strain @ 1.05 % per minute T50, Minutes = 0.38

N/A

N/A

SHEAR STRENGTH PARAMETERS	TOTAL	EFFECTIVE
	COHESION , C (ksf) : 0.4	**APPARENT COHESION , (ksf) :** 0.2
	ANGLE OF INTER. FRICTION, Φ(DEGREES) 17	**ANGLE OF INTER. FRICTION, Φ' (DEGREES) :** 34





Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	12/08/15
Technical Responsibility	*Signature*	*Position*	*Date*

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Upper Specimen (untrimmed)

Lower Specimen (untrimmed)

Boring: **BR-4**
Sample ID: **"UD-2"**
Sample Depth: **24' - 26'**
Classification: **MH / A-7-5 (8)**
Test Performed: **CU Triaxial, w/ pore pressure measurement**

Torvane Shear Stress Measurements (3):
500 psf, 500 psf, & 500 psf; **Average = 500 psf**

Pocket Penetrometer Measurements (3):
2500 psf, 2500 psf, & 2500 psf; **Average = 2500 psf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

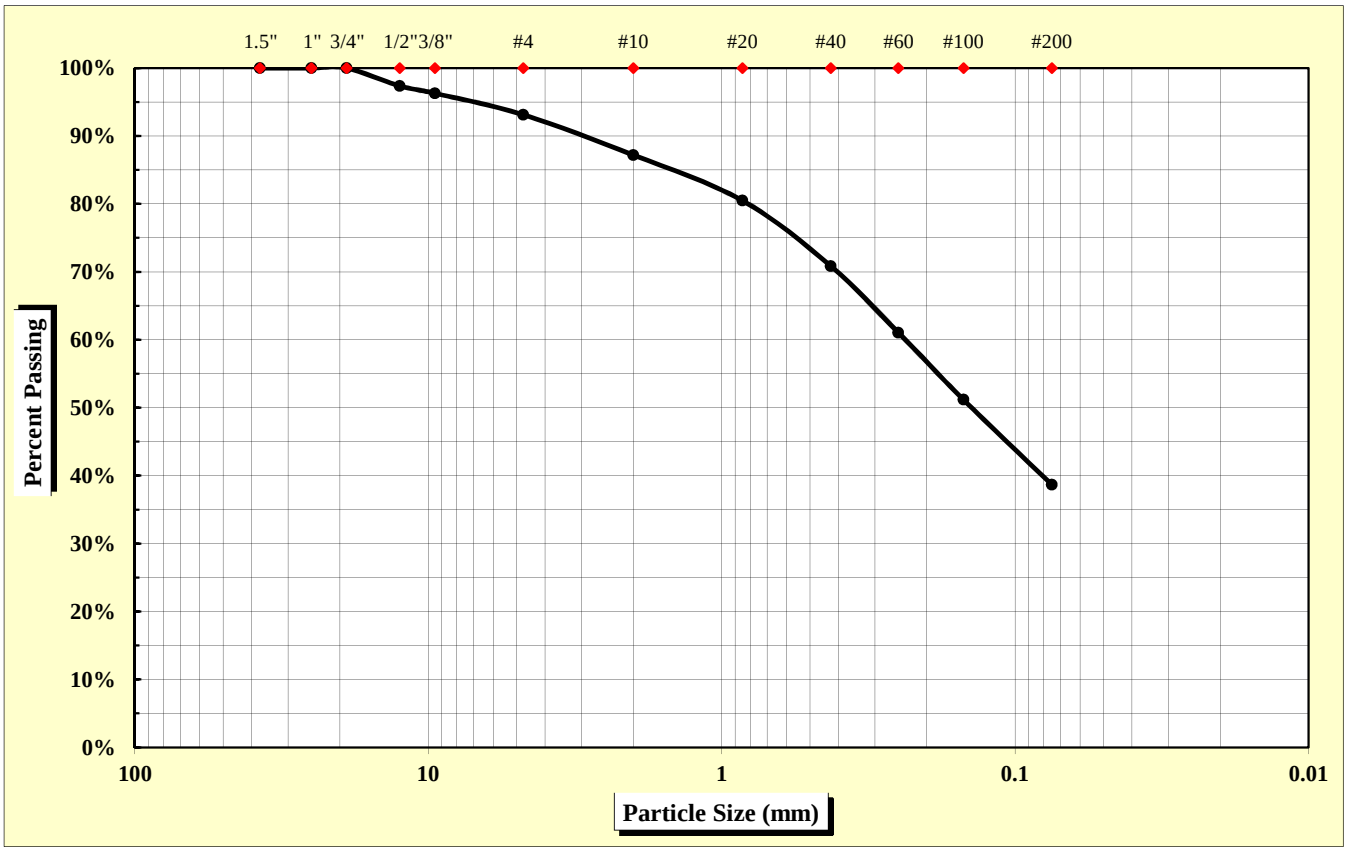
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	241	Sample Date:	10/7/15
Location:	SS-10/11	Type:	Split-spoon	Depth:	33.5 - 40'
Sample Description:	Tan orange brown, fine to coarse, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	12.8%	Fine Sand	32.2%
		Coarse Sand	16.3%	Silt & Clay	38.7%
Liquid Limit	28	Plastic Limit	22	Plastic Index	6
		Moisture Content	23.8%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

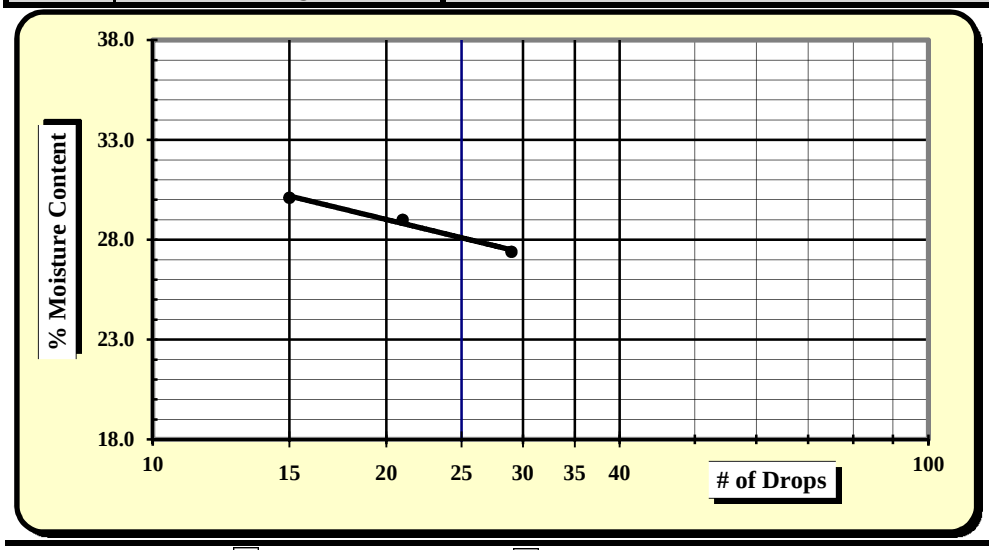
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-4	Sample #:	241	Sample Date:	10/7/15
Location:	SS-10/11	Type:	Split-spoon	Depth:	33.5 - 40'

Sample Description: Tan orange brown, fine to coarse, silty clayey SAND (SC-SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.90	16.92	16.79				12.10		
B	Wet Soil Weight + A	38.82	38.59	37.66				21.63		
C	Dry Soil Weight + A	34.11	33.72	32.83				19.93		
D	Water Weight (B-C)	4.71	4.87	4.83				1.70		
E	Dry Soil Weight (C-A)	17.21	16.80	16.04				7.83		
F	% Moisture (D/E)*100	27.4%	29.0%	30.1%				21.7%		
N	# OF DROPS	29	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**28**
Plastic Limit	**22**
Plastic Index	**6**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 38.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

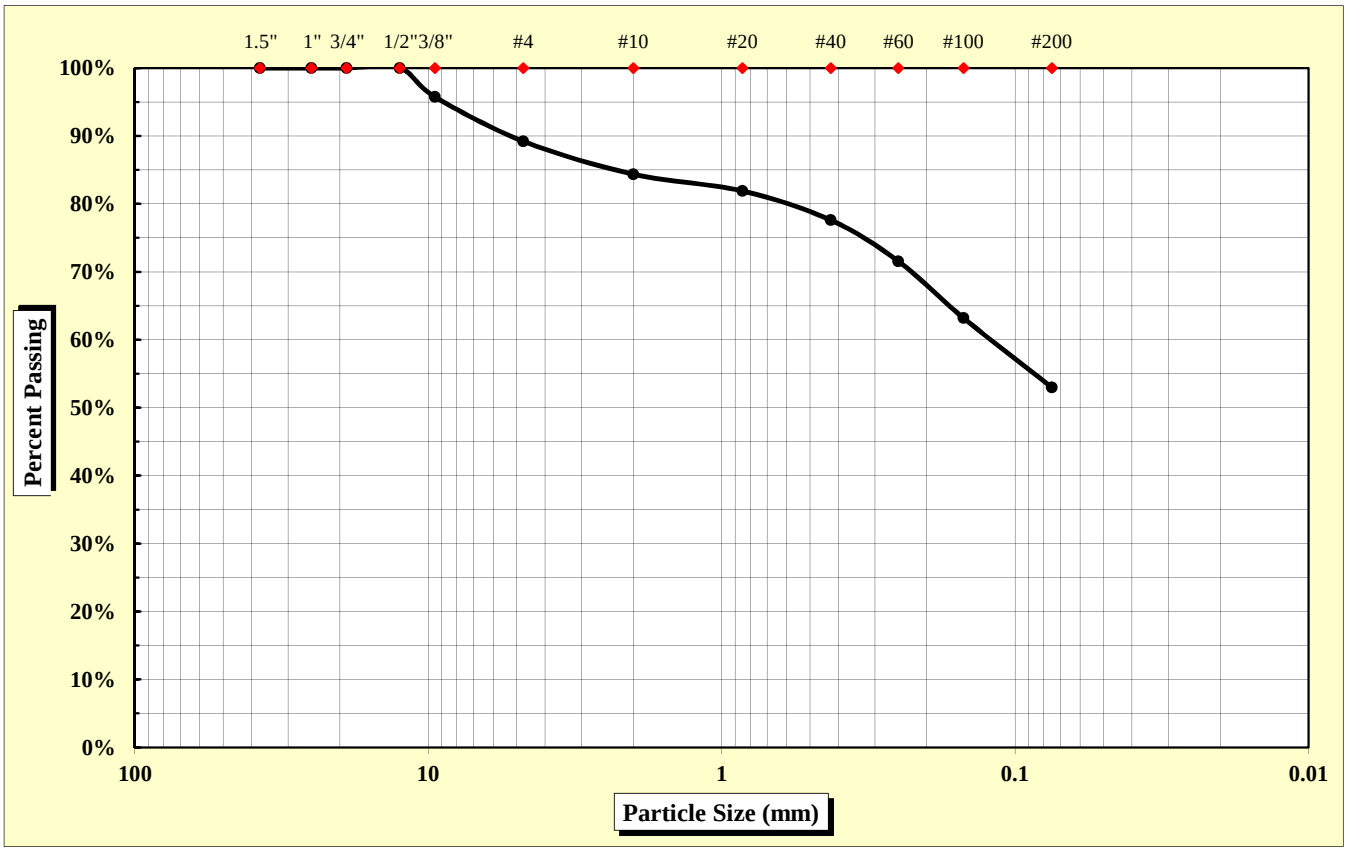
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	218	Sample Date:	10/7/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (6)], with trace gravel				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	15.6%	Fine Sand	24.6%
		Coarse Sand	6.8%	Silt & Clay	53.0%
Liquid Limit	42	Plastic Limit	26	Plastic Index	16
		Moisture Content	21.4%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

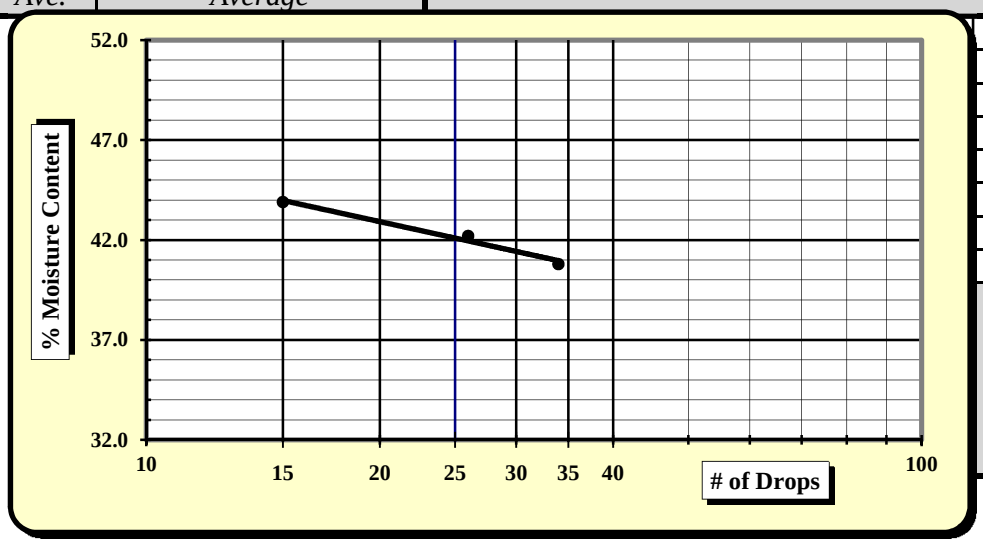
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	218	Sample Date:	10/7/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (6)], with trace gravel

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.50	17.00				11.59		
B	Wet Soil Weight + A	40.69	39.46	38.89				20.08		
C	Dry Soil Weight + A	33.67	32.65	32.21				18.32		
D	Water Weight (B-C)	7.02	6.81	6.68				1.76		
E	Dry Soil Weight (C-A)	17.22	16.15	15.21				6.73		
F	% Moisture (D/E)*100	40.8%	42.2%	43.9%				26.2%		
N	# OF DROPS	34	26	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**26**
Plastic Index	**16**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

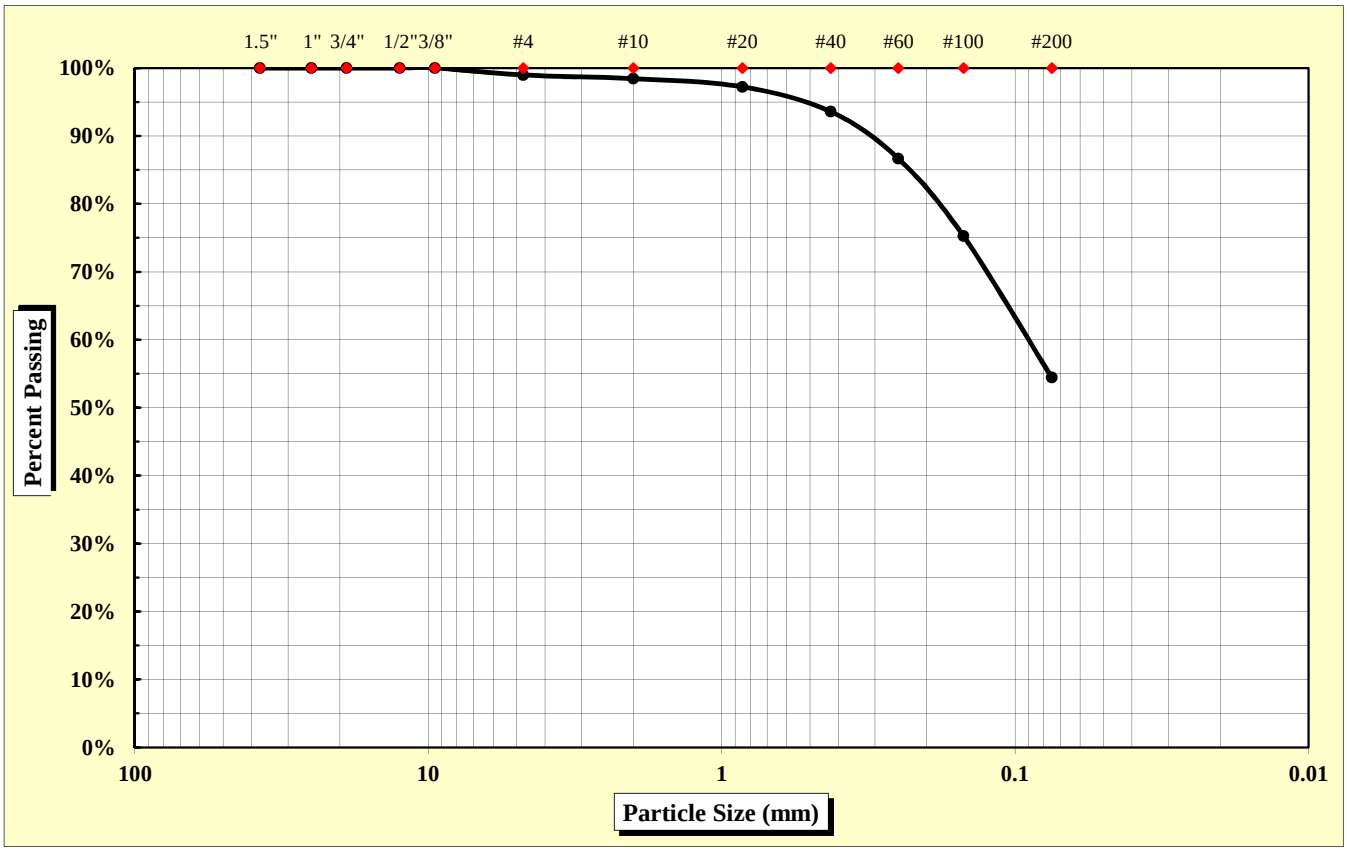
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	218	Sample Date:	10/7/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red tan brown, fine, trace mica, sandy SILT (ML) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.6%	Fine Sand	39.1%
		Coarse Sand	4.9%	Silt & Clay	54.5%
Liquid Limit	41	Plastic Limit	34	Plastic Index	7
		Moisture Content	21.2%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

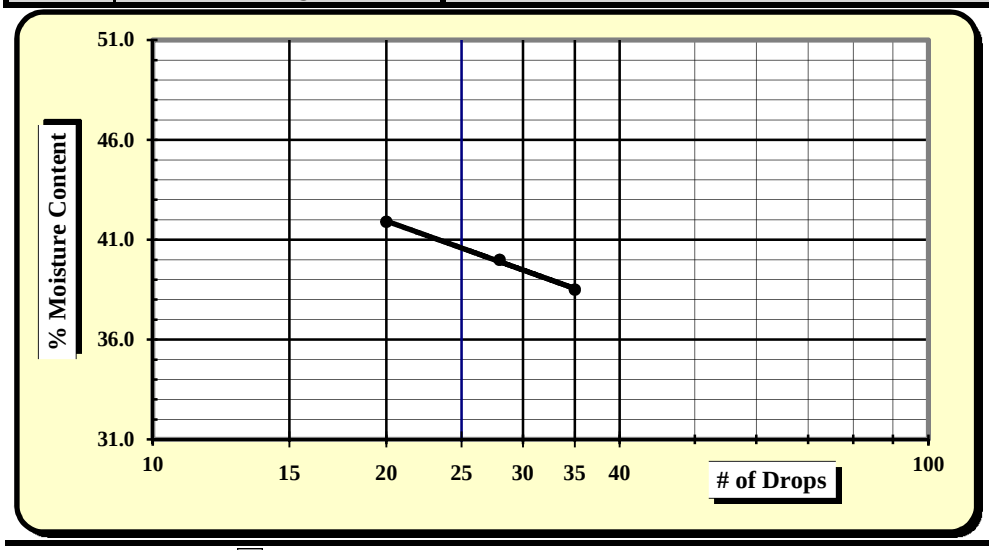
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	218	Sample Date:	10/7/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Red tan brown, fine, trace mica, sandy SILT (ML) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.95	16.66	16.78				12.27		
B	Wet Soil Weight + A	39.24	38.46	37.95				20.35		
C	Dry Soil Weight + A	32.76	32.23	31.70				18.31		
D	Water Weight (B-C)	6.48	6.23	6.25				2.04		
E	Dry Soil Weight (C-A)	16.81	15.57	14.92				6.04		
F	% Moisture (D/E)*100	38.5%	40.0%	41.9%				33.8%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**34**
Plastic Index	**7**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 54.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

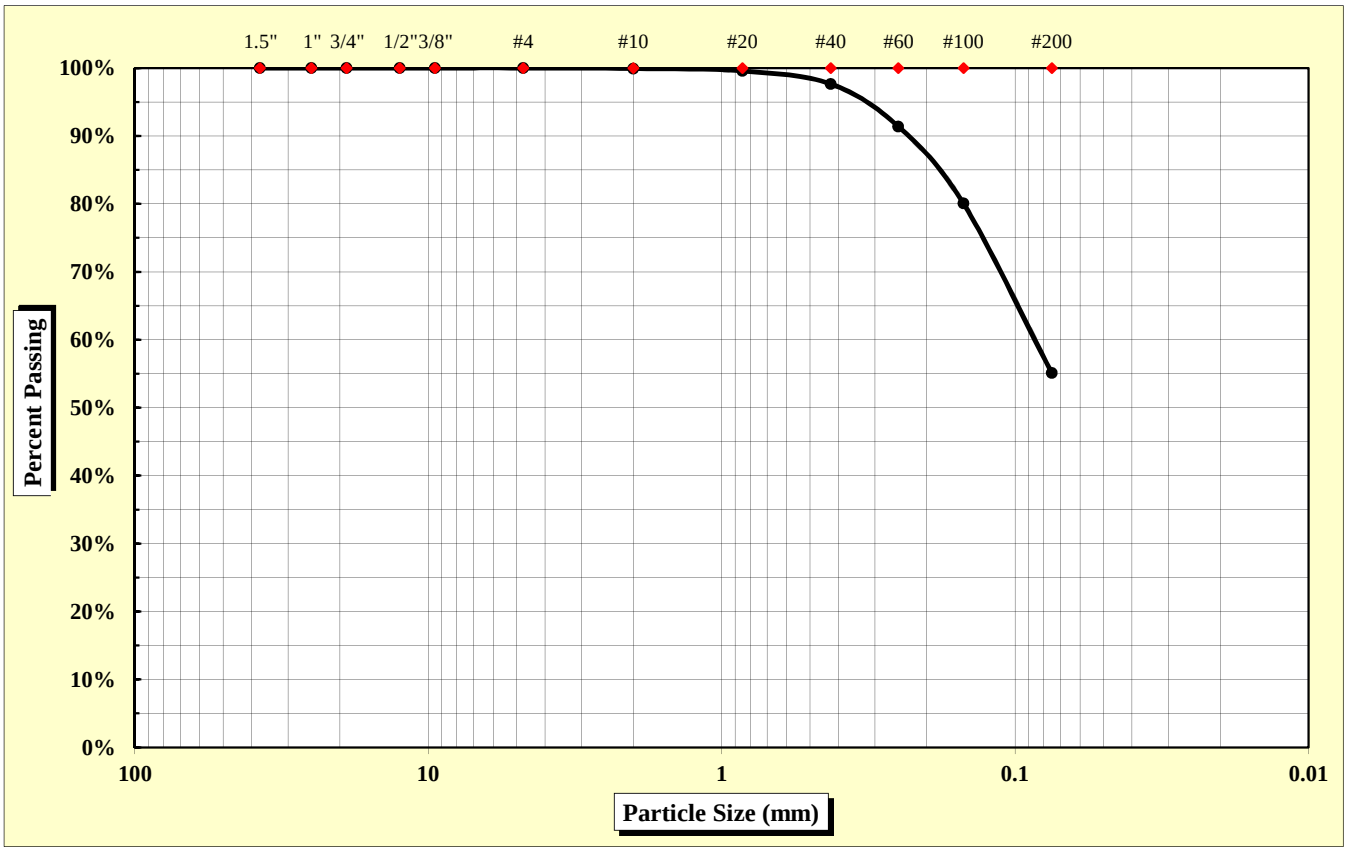
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/09 - 11/16/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	230	Sample Date:	10/08/15
Location:	UD-1	Type:	UD	Depth:	8 - 10'
Sample Description:	Brown red white, fine, sandy SILT (ML) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.850 mm	Gravel	0.1%	Fine Sand	42.5%
		Coarse Sand	2.3%	Silt & Clay	55.1%
Liquid Limit	45	Plastic Limit	41	Plastic Index	4
		Moisture Content	34.8%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

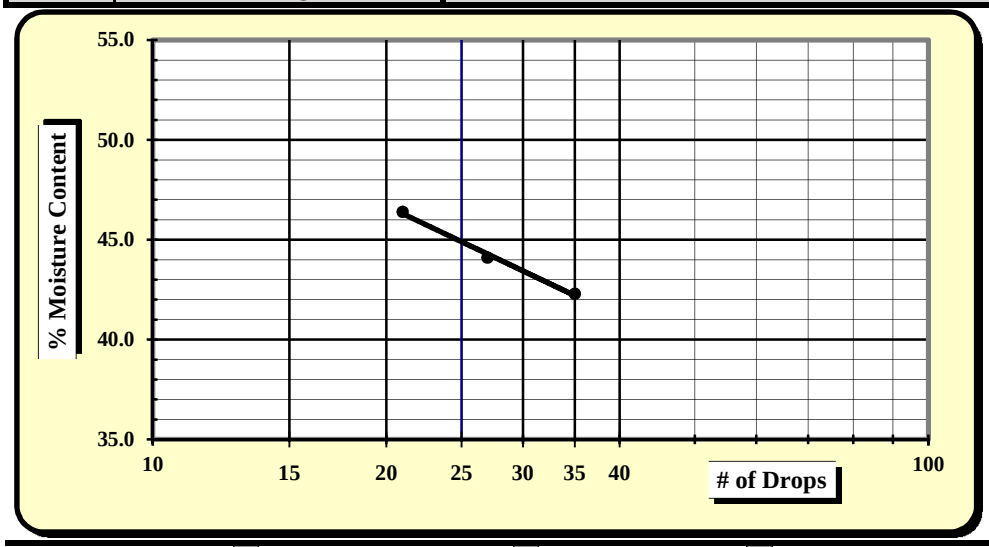
Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	230	Sample Date:	10/08/15
Location:	UD-1	Type:	UD	Depth:	8 - 10'

Sample Description: Brown red white, fine, sandy SILT (ML) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.99	27.78	26.30				27.36		
B	Wet Soil Weight + A	43.35	46.26	43.94				36.05		
C	Dry Soil Weight + A	38.49	40.60	38.35				33.54		
D	Water Weight (B-C)	4.86	5.66	5.59				2.51		
E	Dry Soil Weight (C-A)	11.50	12.82	12.05				6.18		
F	% Moisture (D/E)*100	42.3%	44.1%	46.4%				40.6%		
N	# OF DROPS	35	27	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**41**
Plastic Index	**4**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/30/15	Brian Vaughan, P.E.	11/30/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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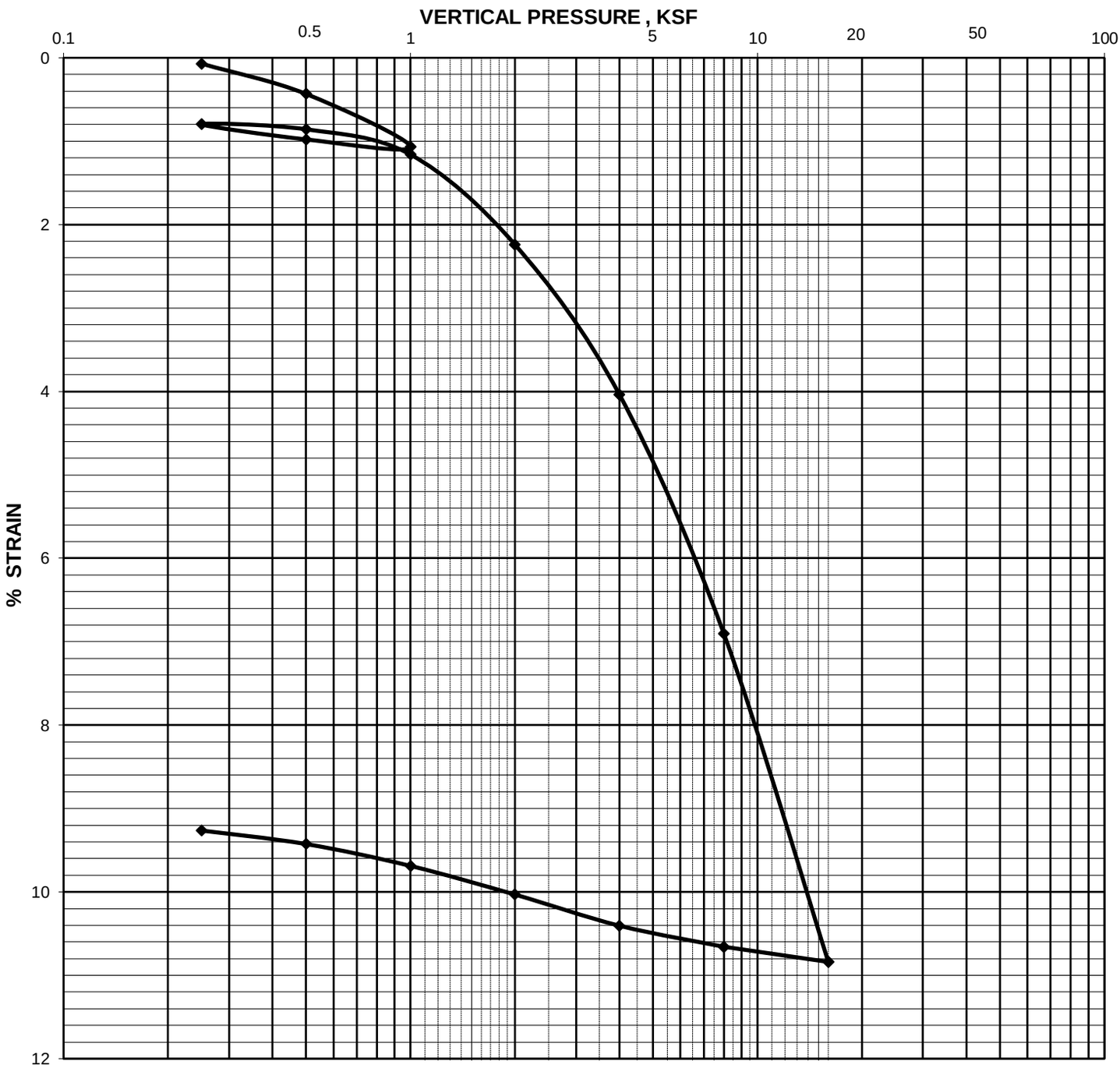
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	12/8/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-5
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	8 - 10'
Initial Wet Density, γ_{wet}, pcf:	99.7	**Load vs. Time Plot:**	Log of time	**Sample Type:**	UD
Initial Void Ratio, e_o:	1.253	**Final Void Ratio, e_f:**	1.044	**Log No.:**	230
Initial Saturation, S_O, %:	74.1	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.67
Initial Dry Density, γ_{DRY}, pcf:	73.9	**Final Dry Density, γ_{DRY}, pcf:**	76.5	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	34.8	**Final Moisture Content, %:**	46.6	**Stress, P_e, ksf:**	3.4
Liquid Limit, %:	45	**Plasticity Index, %:**	4	**Fines, %:**	55.1
Sample Description:	Brown red white, fine, sandy SILT (ML) [A-5 (2)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

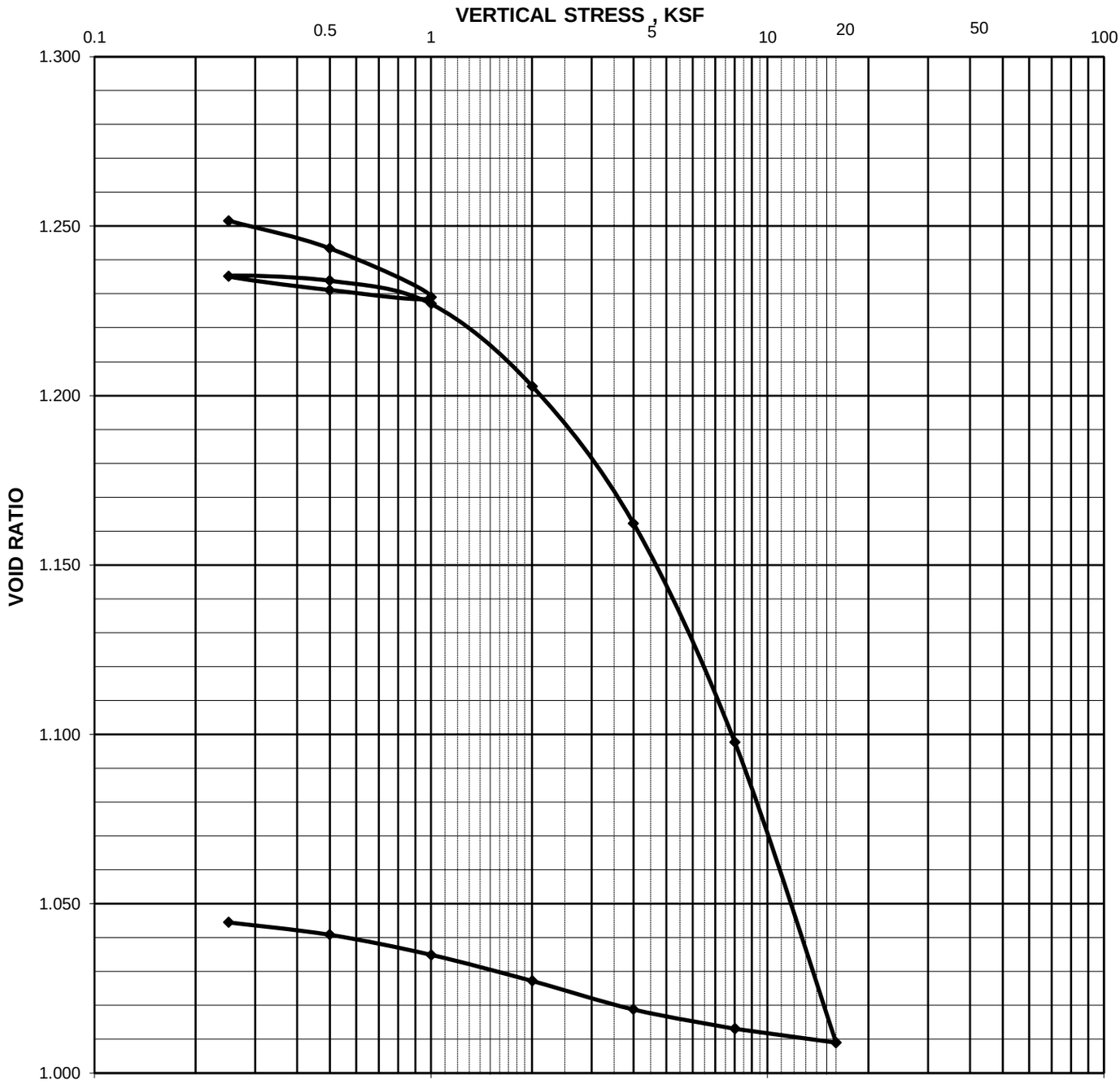


CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	12/8/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-5
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	8 - 10'
Initial Wet Density, γ_{wet}, pcf:	99.7	**Load vs. Time Plot:**	Log of time	**Sample Type:**	Shelby tube
Initial Void Ratio, e_o:	1.253	**Final Void Ratio, e_f:**	1.044	**Log No.:**	230
Initial Saturation, S_O, %:	74.1	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.67
Initial Dry Density, γ_{DRY}, pcf:	73.9	**Final Dry Density, γ_{DRY}, pcf:**	76.5	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	34.8	**Final Moisture Content, %:**	46.6	**Stress, P_e, ksf:**	3.4
Liquid Limit, %:	45	**Plasticity Index, %:**	4	**Fines, %:**	55.1
Sample Description:	Brown red white, fine, sandy SILT (ML) [A-5 (2)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.25, 0.5, 1.0, 0.5, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 8.0, 4.0, 2.0, 1.0, 0.5, 0.25

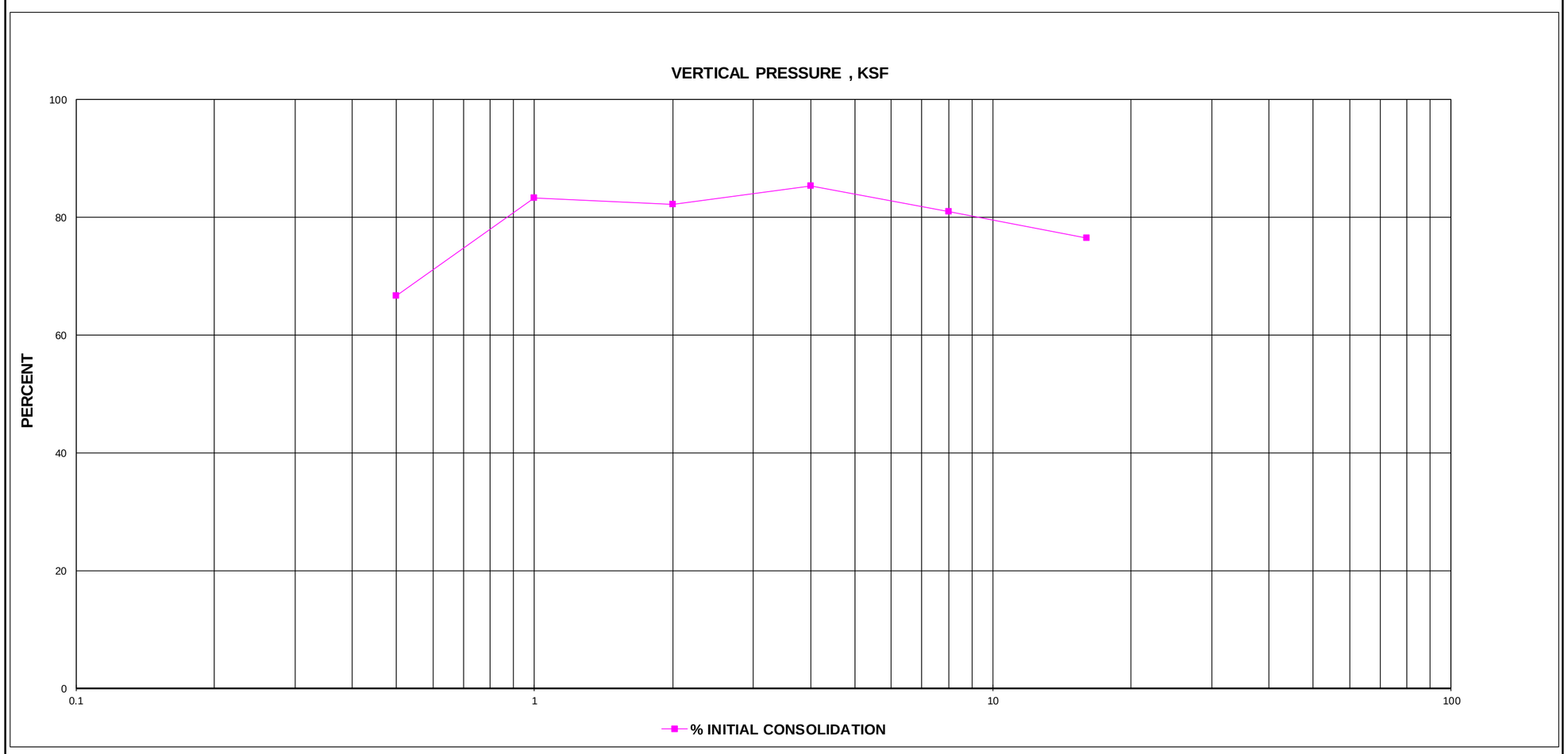


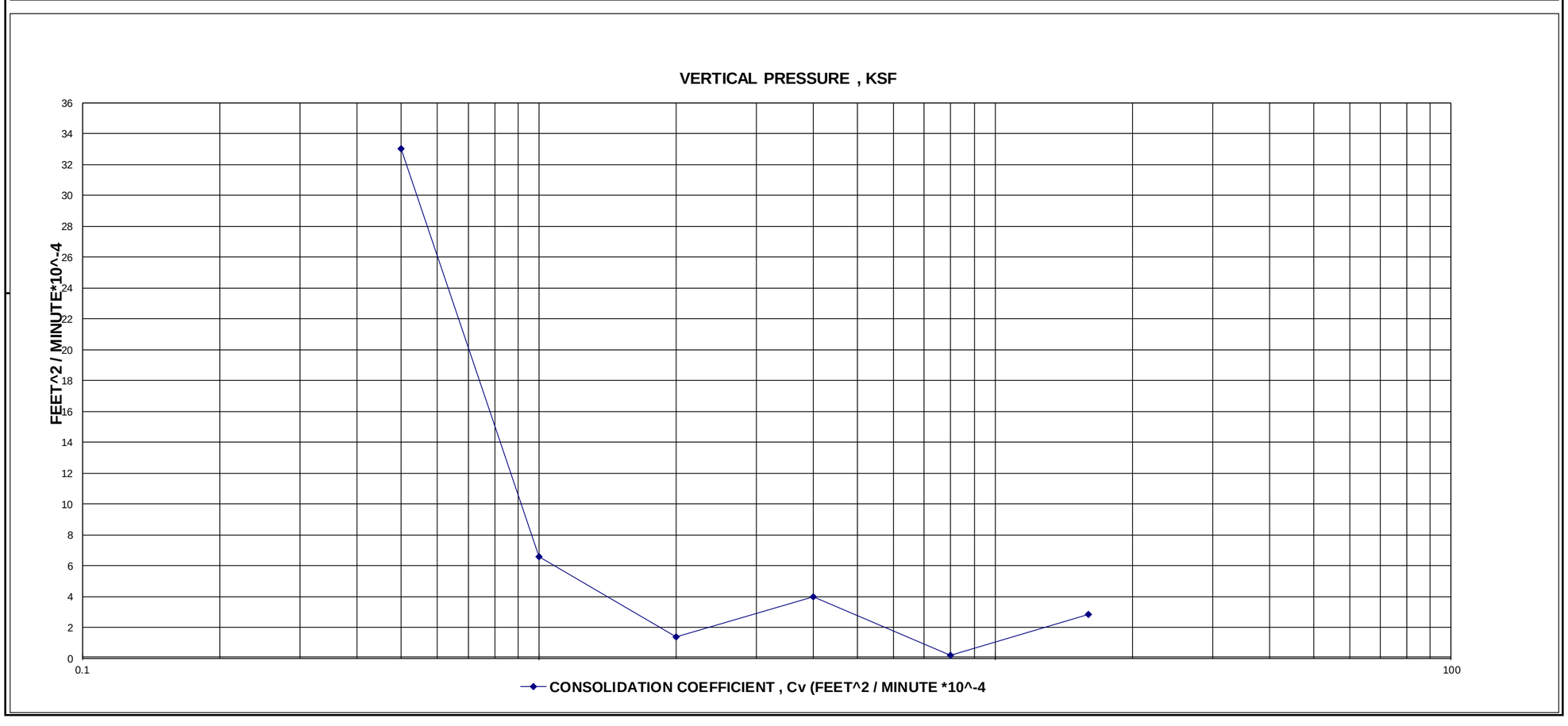
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	12/8/2015
Client Name:	Infrastructure Consulting & Engineering	**Boring No.:**	BR-5
Client Address:	1021 Briargate Circle Columbia, SC 29210	**Depth/Elev.:**	8 - 10'

Pressure (ksf)	D_0 (in.)	D_{100} (in.)	D_{50} (in.)	Stone Correction (in.)	D_{0c} (in.)	D_{100c}	D_{50c} (in.)	h (in.)	VOID RATIO e	Percent Strain (%)	t_{50}/t_{90} t_{50}	C_v Log of Time ($ft^2/10^{-4}min$)	C_i (%)
0.25		0.0007		0.0000		0.0007			1.252	0.071			
0.5		0.0048		0.0005		0.0043			1.243	0.434			
1.0		0.0115		0.0009		0.0106			1.229	1.070			
0.5		0.0102		0.0005		0.0097			1.231	0.979			
0.25		0.0080		0.0001		0.0079			1.235	0.797			
0.5	0.0088	0.0090	0.0089	0.0005	0.0083	0.0085	0.0084	0.4913	1.234	0.858	0.10	33.01	66.7
1.0	0.0119	0.0124	0.0122	0.0009	0.0110	0.0115	0.0113	0.4898	1.227	1.161	0.50	6.56	83.3
2.0	0.0223	0.0242	0.0232	0.0020	0.0203	0.0222	0.0212	0.4849	1.203	2.240	2.30	1.40	82.2
4.0	0.0406	0.0432	0.0419	0.0032	0.0374	0.0400	0.0387	0.4761	1.162	4.037	0.78	3.98	85.4
8.0	0.0674	0.0728	0.0701	0.0044	0.0630	0.0684	0.0657	0.4626	1.098	6.903	17.00	0.17	81.0
16.0	0.1035	0.1127	0.1081	0.0053	0.0982	0.1074	0.1028	0.4441	1.009	10.839	0.95	2.84	76.4
8.0		0.1100		0.0044		0.1056			1.013	10.657			
4.0		0.1063		0.0032		0.1031			1.019	10.405			
2.0		0.1015		0.0021		0.0994			1.027	10.031			
1.0		0.0970		0.0010		0.0960			1.035	9.688			
0.5		0.0940		0.0006		0.0934			1.041	9.426			
0.25		0.0920		0.0002		0.0918			1.044	9.264			





I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-5**
Sample ID: **"UD-1"**
Sample Depth: **8' - 10'**
Classification: **ML / A-5 (2)**
Test Performed: **Consolidation**
Estimated Pre-Consolidation Pressure: **3400 psf**

Torvane Shear Stress Measurements (3):
600 psf, 600 psf, & 500 psf; **Average = 570 psf**

Pocket Penetrometer Measurements (3):
1500 psf, 2000 psf, & 2500 psf; **Average = 2000 psf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

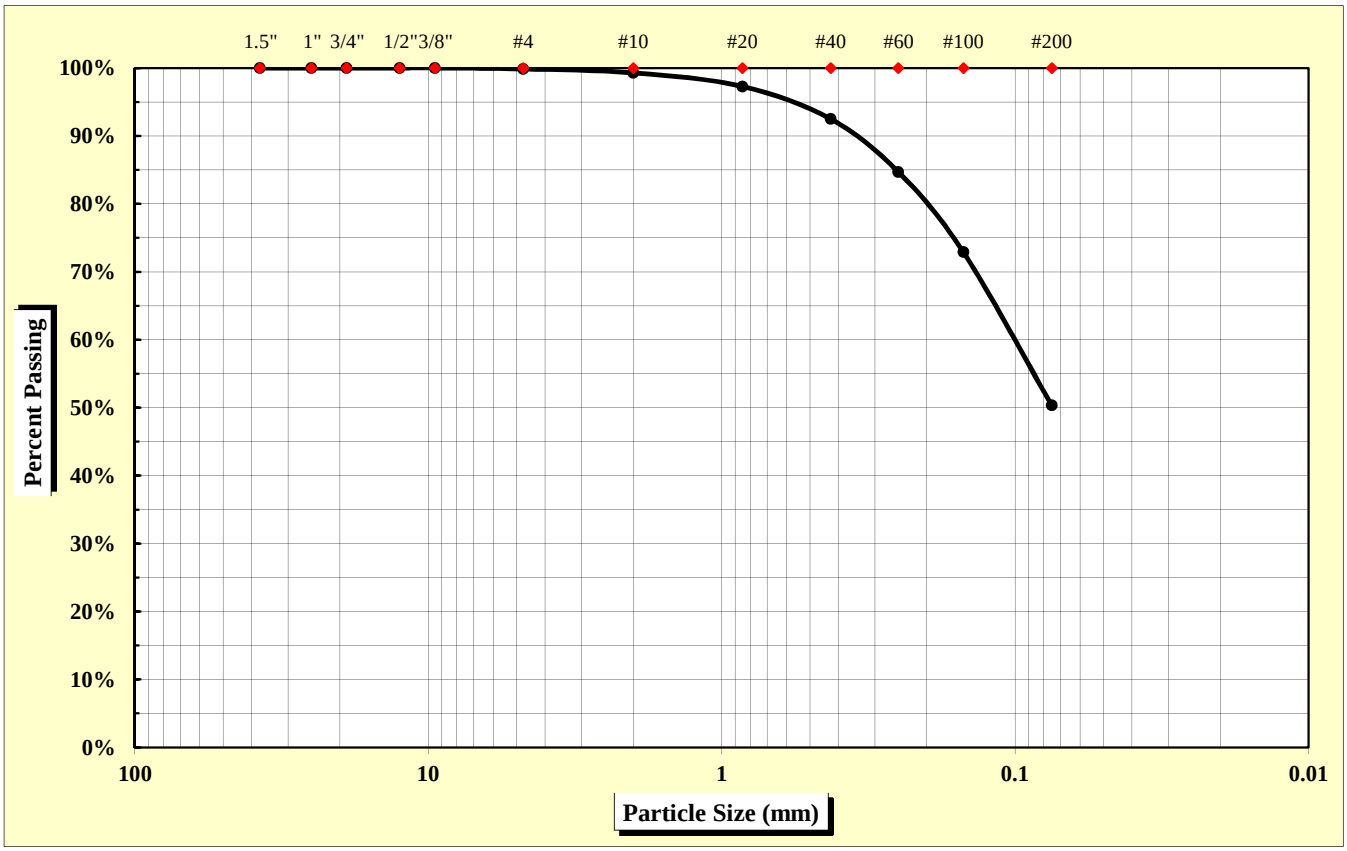
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	241	Sample Date:	10/7/15
Location:	SS-6/7/8/9/10	Type:	Split-spoon	Depth:	13.5 - 35'
Sample Description:	Light brown red, fine, micaceous, sandy SILT (ML) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.7%	Fine Sand	42.1%
		Coarse Sand	6.8%	Silt & Clay	50.4%
Liquid Limit	45	Plastic Limit	38	Plastic Index	7
		Moisture Content	35.1%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

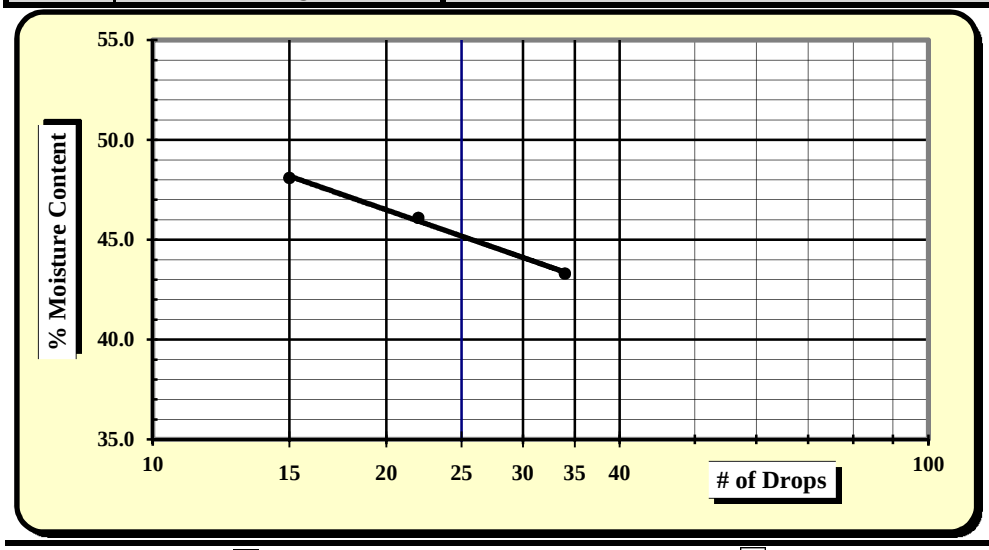
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-5	Sample #:	241	Sample Date:	10/7/15
Location:	SS-6/7/8/9/10	Type:	Split-spoon	Depth:	13.5 - 35'

Sample Description: Light brown red, fine, micaceous, sandy SILT (ML) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.49	17.00				11.59		
B	Wet Soil Weight + A	35.39	38.60	36.51				20.26		
C	Dry Soil Weight + A	29.67	31.62	30.17				17.89		
D	Water Weight (B-C)	5.72	6.98	6.34				2.37		
E	Dry Soil Weight (C-A)	13.22	15.13	13.17				6.30		
F	% Moisture (D/E)*100	43.3%	46.1%	48.1%				37.6%		
N	# OF DROPS	34	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**38**
Plastic Index	**7**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

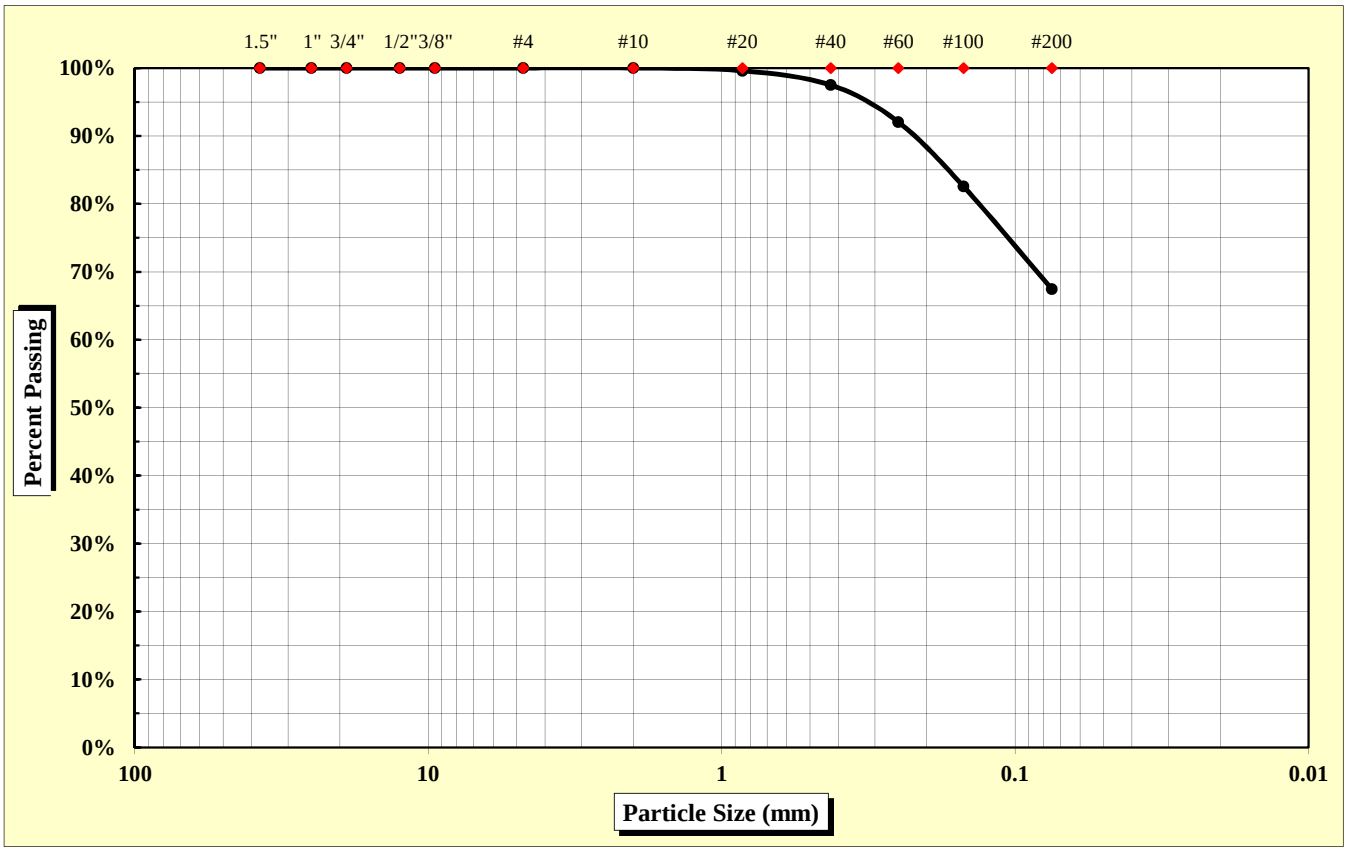
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	218	Sample Date:	10/8/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red orange tan, fine, sandy ELASTIC SILT (MH) [A-7-5 (10)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.85 mm	Gravel	0.0%	Fine Sand	30.0%
		Coarse Sand	2.5%	Silt & Clay	67.5%
Liquid Limit	52	Plastic Limit	39	Plastic Index	13
		Moisture Content	28.2%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

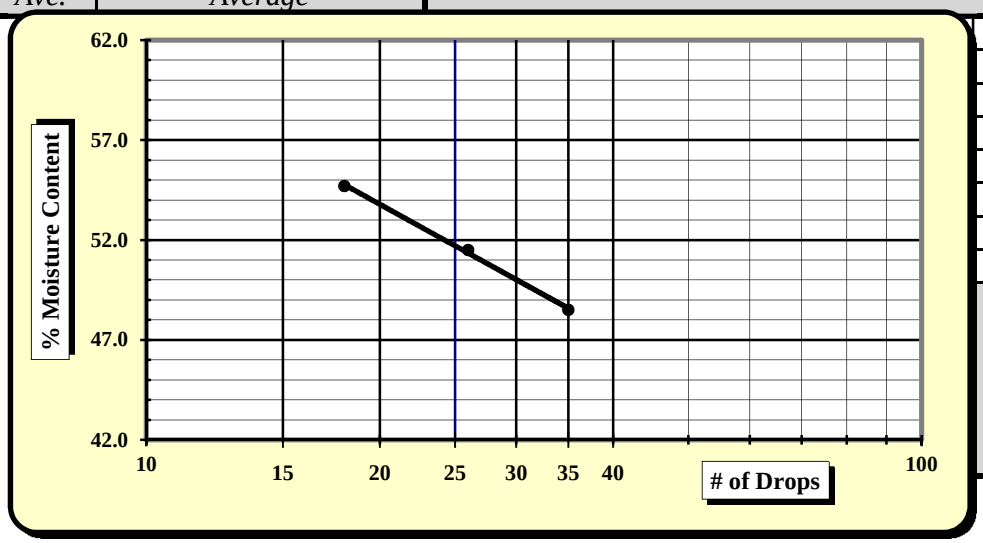
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	218	Sample Date:	10/8/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red orange tan, fine, sandy ELASTIC SILT (MH) [A-7-5 (10)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.66	16.67	15.97				12.09		
B	Wet Soil Weight + A	37.94	38.32	37.21				20.41		
C	Dry Soil Weight + A	30.99	30.96	29.70				18.09		
D	Water Weight (B-C)	6.95	7.36	7.51				2.32		
E	Dry Soil Weight (C-A)	14.33	14.29	13.73				6.00		
F	% Moisture (D/E)*100	48.5%	51.5%	54.7%				38.7%		
N	# OF DROPS	35	26	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**39**
Plastic Index	**13**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

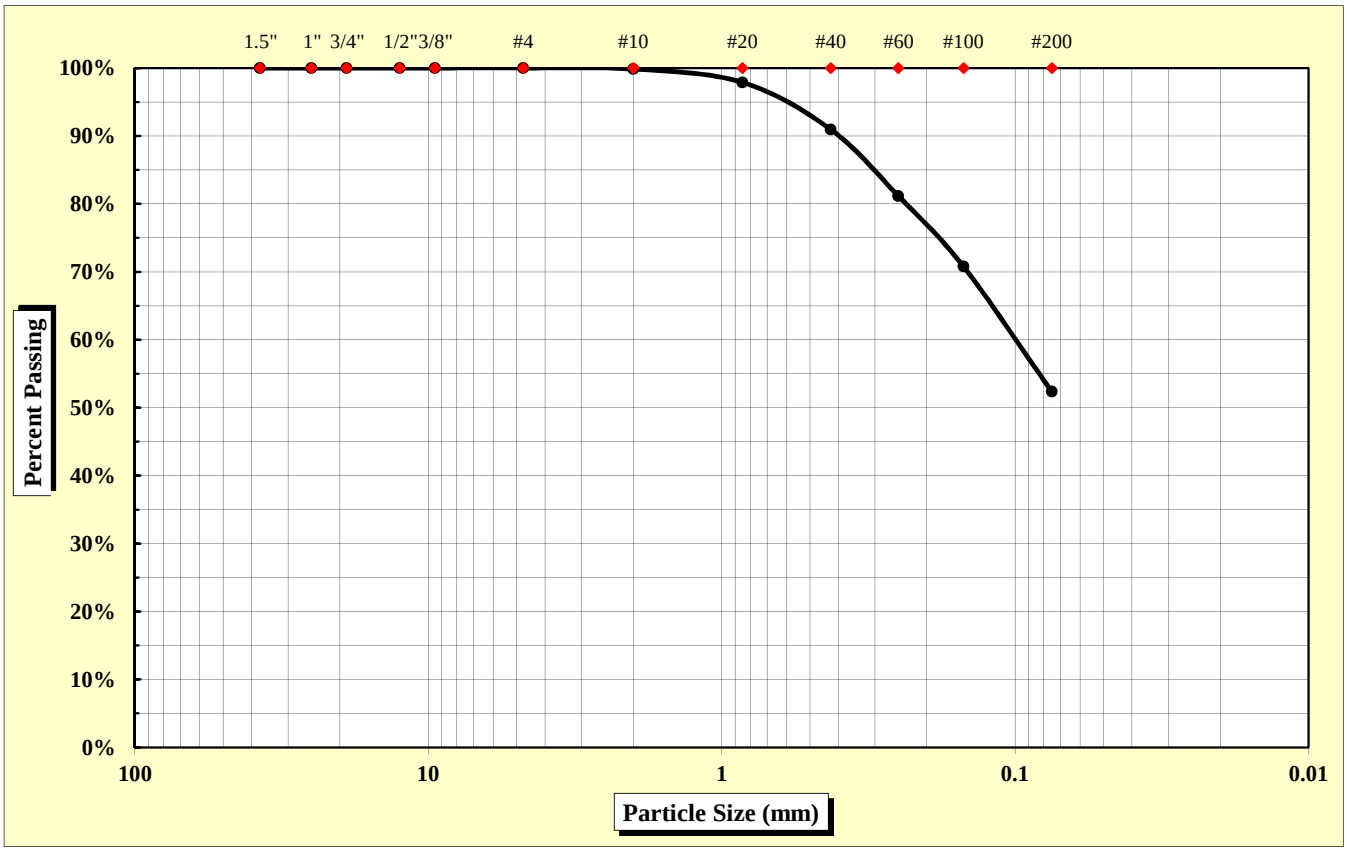
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/02/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/16 - 11/21/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	230	Sample Date:	10/08/15
Location:	UD-1 / UD-2	Type:	UD	Depth:	4 - 6' / 8-10'
Sample Description:	Brown red white, fine, sandy SILT (ML) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	38.6%
		Coarse Sand	8.9%	Silt & Clay	52.4%
Liquid Limit	44	Plastic Limit	39	Plastic Index	5
		Moisture Content	N/A	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

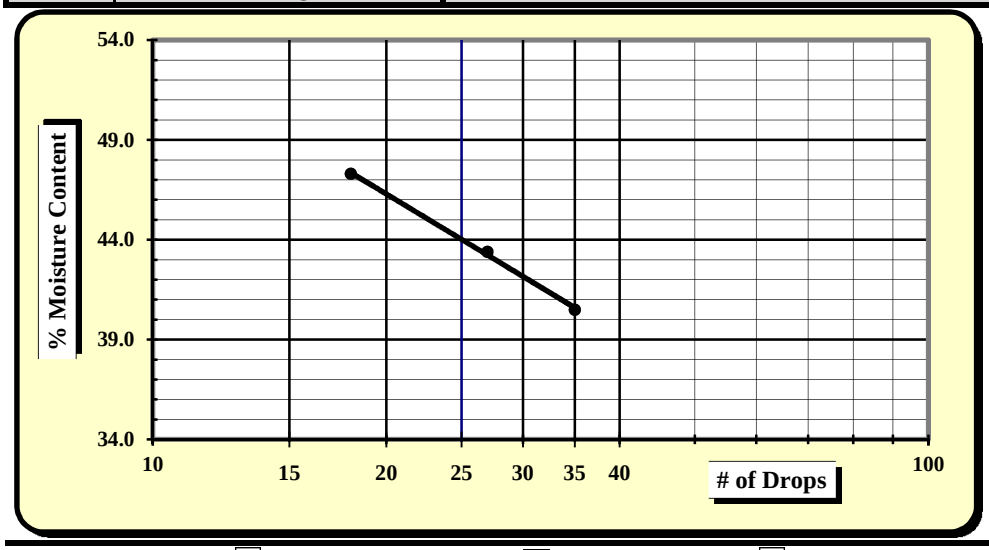
Project #:	**1426-14-161**	Report Date:	12/02/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/01/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	230	Sample Date:	10/08/15
Location:	UD-1 / UD-2	Type:	UD	Depth:	4 - 6' / 8 - 10'

Sample Description: Brown red white, fine, sandy SILT (ML) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.98	27.77	26.30				27.36		
B	Wet Soil Weight + A	41.32	41.51	45.31				35.60		
C	Dry Soil Weight + A	37.19	37.35	39.21				33.31		
D	Water Weight (B-C)	4.13	4.16	6.10				2.29		
E	Dry Soil Weight (C-A)	10.21	9.58	12.91				5.95		
F	% Moisture (D/E)*100	40.5%	43.4%	47.3%				38.5%		
N	# OF DROPS	35	27	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**39**
Plastic Index	**5**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/02/15	Brian Vaughan, P.E.	12/02/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 4767)

REV4,1/13/04

AASHTO R18

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	12/02/15
Client Name:	Infrastructure Consulting & Engineering	**Test Date:**	11/20 - 11/30/15
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		
Boring No.:	BR-6	**Depth / Elev. :** 4 - 6' / 8 - 10'	**Sample No.:** 230 **Type:** UD
Sample Location:	UD-1/2		
Sample Description:	Brown red white, fine, sandy SILT (ML) [A-5 (2)]		
LL, %: 44	**PI , %:** 5	**Percent Passing #200:** 52.4	**G_s:** 2.689

SPECIMEN PROPERTIES — **TEST PARAMETERS , TEST TYPE : CU/PP**

		INITIAL				AFTER CONSOLIDATION		
SPECIMEN NO.		1	2	3		1	2	3
DIAMETER , INCHES	D_o	2.87	2.84	2.87	D_c	2.85	2.81	2.79
HEIGHT , INCHES	H_o	5.74	5.53	5.88	H_c	5.71	5.48	5.72
WATER CONTENT, %	W_o	29.0	22.7	21.8	W_c	39.1	30.7	25.2
DRY DENSITY, PCF	γ_{dryo}	80.3	89.3	91.5	γ_{dryc}	81.8	91.9	100.0
SATURATION ,%	S_o	71.6	69.5	70.4	S_c	100.0	100.0	100.0
VOID RATIO	e_o	1.089	0.878	0.833	e_c	1.051	0.826	0.678

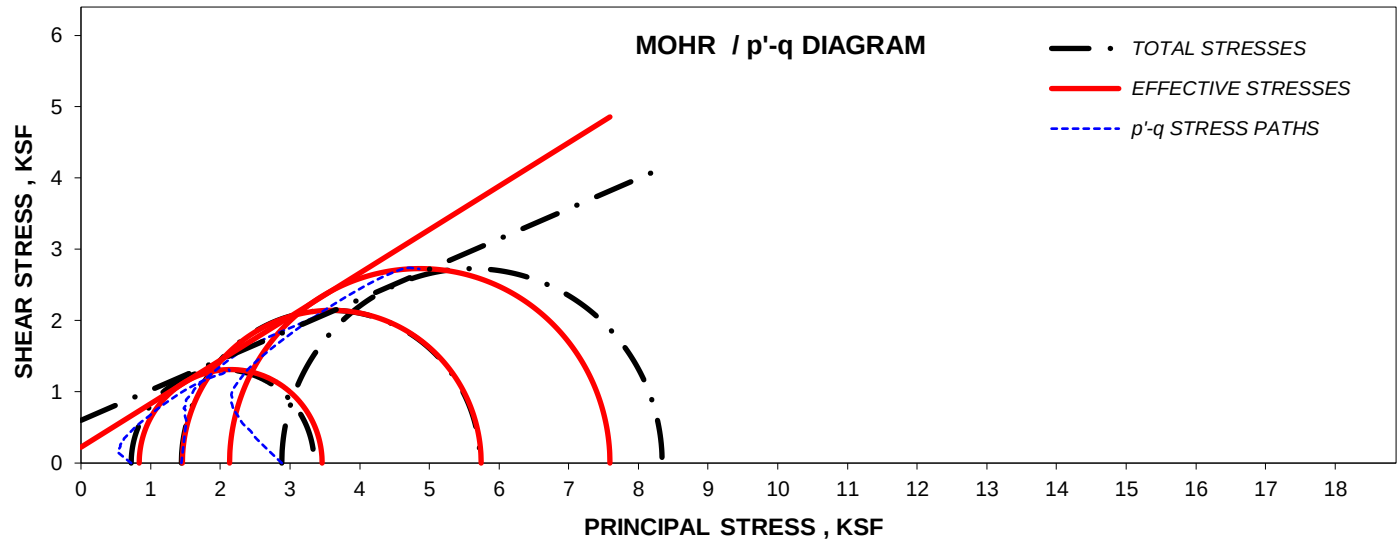
SPECIMEN NO.		1	2	3
B Value		0.98	0.98	0.95
BACK PRESSURE, ksf	U_o	10.1	10.1	10.1
CONFINING PRESSURE , ksf	σ_3'	0.7	1.4	2.9
MAX. DEVIATOR STRESS ,ksf	σ_1-σ_3	2.6	4.3	5.5
ULT. DEVIATOR STRESS , ksf	σ_1-σ_3	2.6	4.3	5.4
Specimen Shape @ Failure		Sheared		

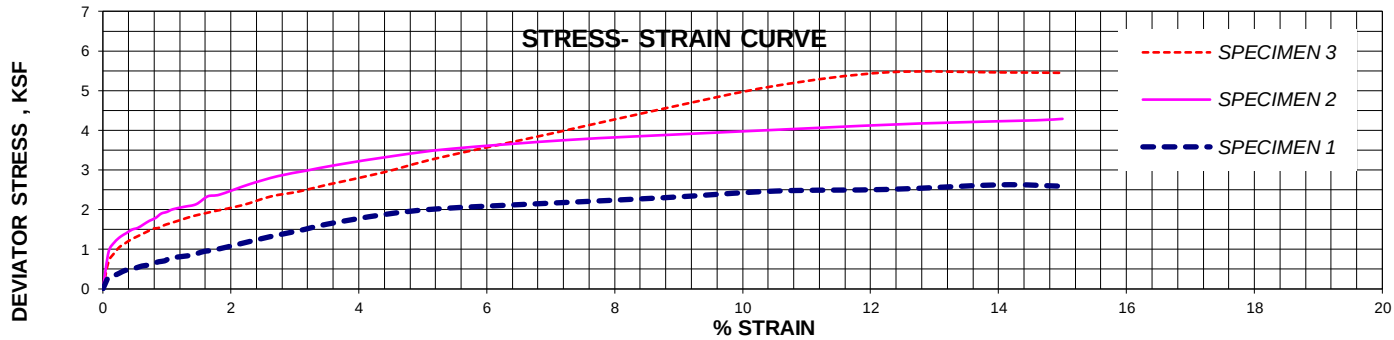
CONTROLLED : Strain @ 1.19 % per minute — T50, Minutes = 0.34

N/A

N/A

SHEAR STRENGTH PARAMETERS	TOTAL		EFFECTIVE	
	COHESION , C (ksf) :	0.6	**APPARENT COHESION , (ksf) :**	0.2
	ANGLE OF INTER. FRICTION, Φ(DEGREES)	23	**ANGLE OF INTER. FRICTION, Φ' (DEGREES) :**	31





Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	12/02/15
Technical Responsibility	*Signature*	*Position*	*Date*

I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

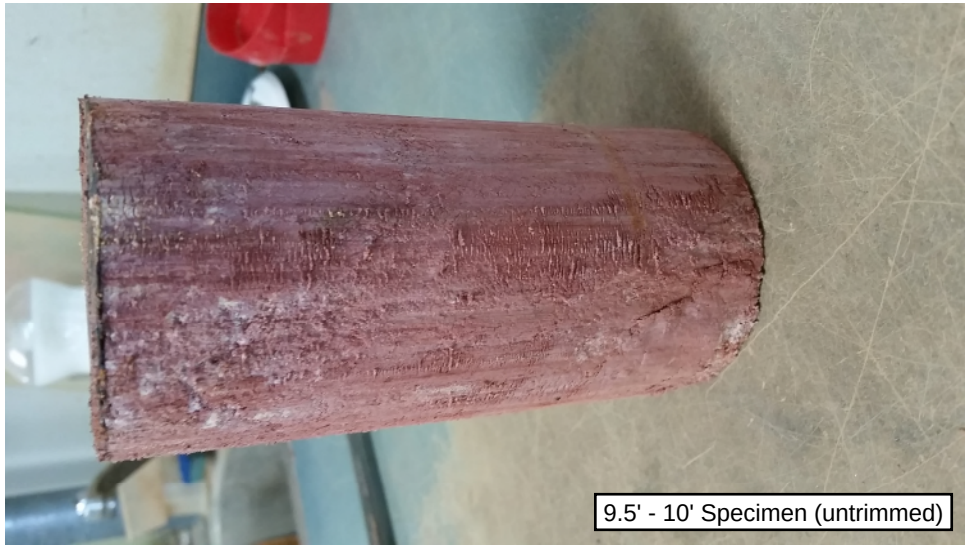
Boring: **BR-6**
Sample ID: **"UD-1" & "UD-2"**
Sample Depth: **4' - 6' / 8' - 10'**
Classification: **ML / A-5 (2)**
Test Performed: **CU Triaxial, w/ pore pressure measurement**

Torvane Shear Stress Measurements (4):
500 psf, 700 psf, 800 psf & 900 psf; **Average = 725 psf**

Pocket Penetrometer Measurements (3):
4500 psf, 5000 psf, & 6000 psf; **Average = 5170 psf**

5' - 5.5' Specimen (untrimmed)

5.5' - 6' Specimen (untrimmed)



9.5' - 10' Specimen (untrimmed)

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

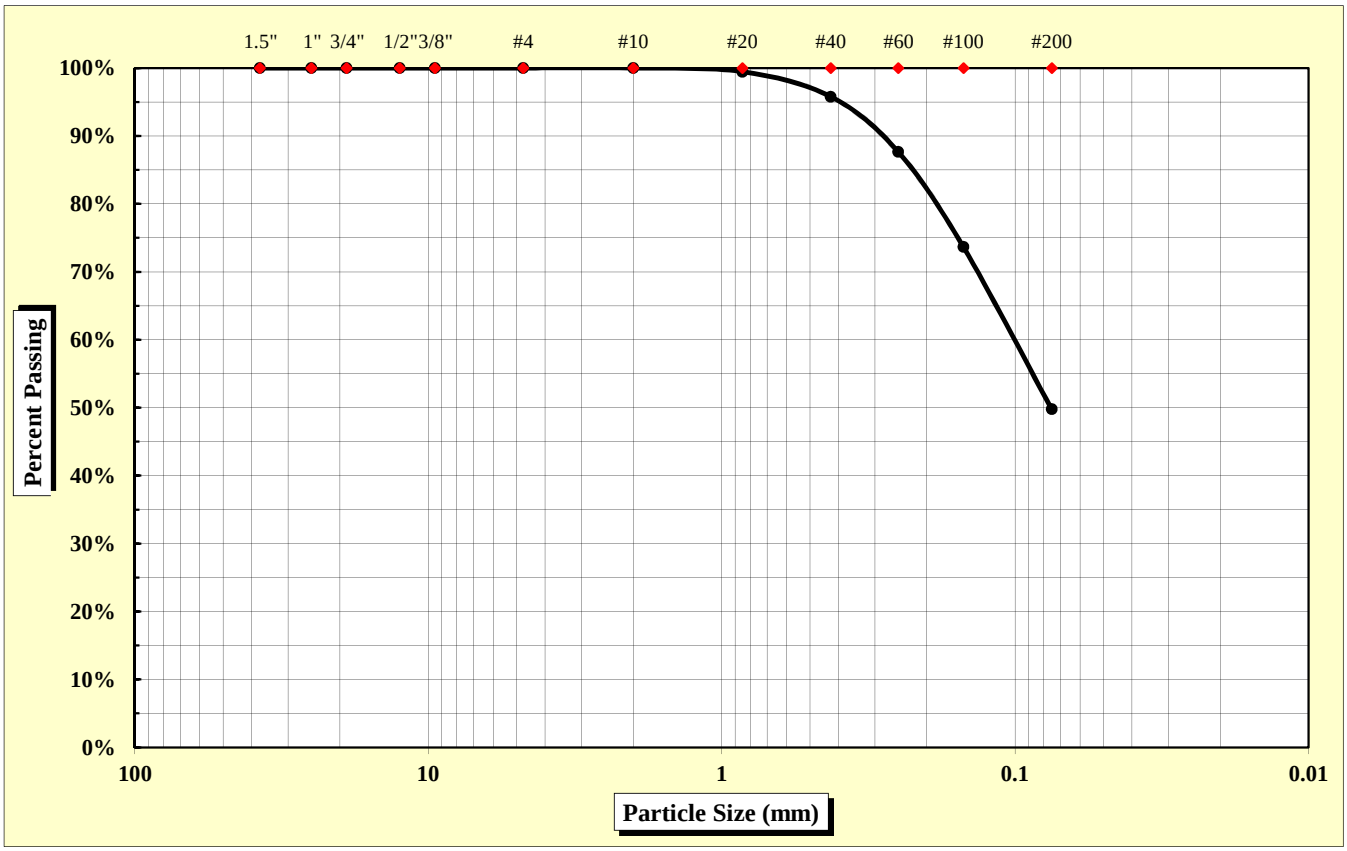
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	218	Sample Date:	10/8/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red plum tan, fine, trace mica, silty SAND (SM) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.0%	Fine Sand	46.0%
		Coarse Sand	4.2%	Silt & Clay	49.8%
Liquid Limit	46	Plastic Limit	40	Plastic Index	6
		Moisture Content	28.1%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

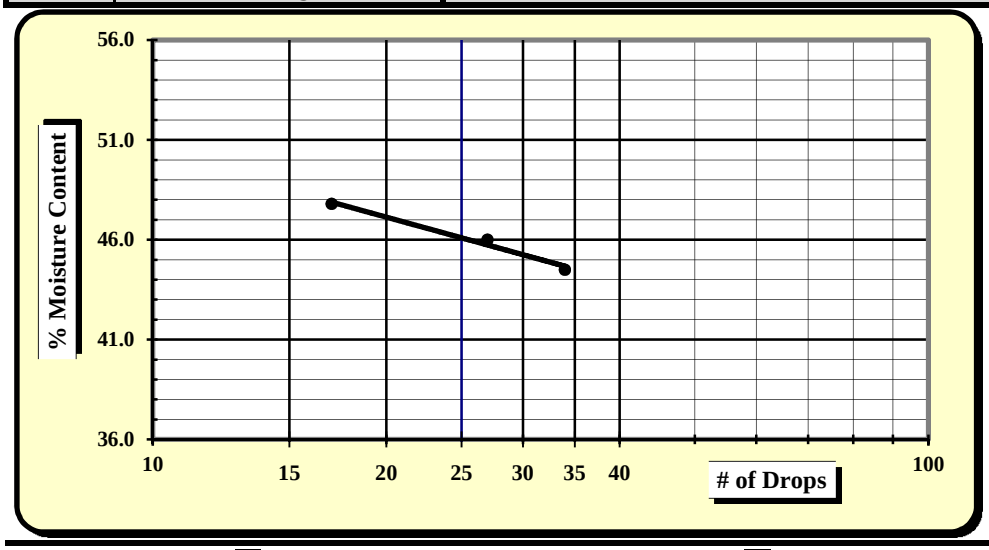
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	218	Sample Date:	10/8/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Red plum tan, fine, trace mica, silty SAND (SM) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.87	16.81				12.29		
B	Wet Soil Weight + A	39.07	38.54	37.64				21.09		
C	Dry Soil Weight + A	32.18	31.71	30.90				18.56		
D	Water Weight (B-C)	6.89	6.83	6.74				2.53		
E	Dry Soil Weight (C-A)	15.47	14.84	14.09				6.27		
F	% Moisture (D/E)*100	44.5%	46.0%	47.8%				40.4%		
N	# OF DROPS	34	27	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**40**
Plastic Index	**6**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

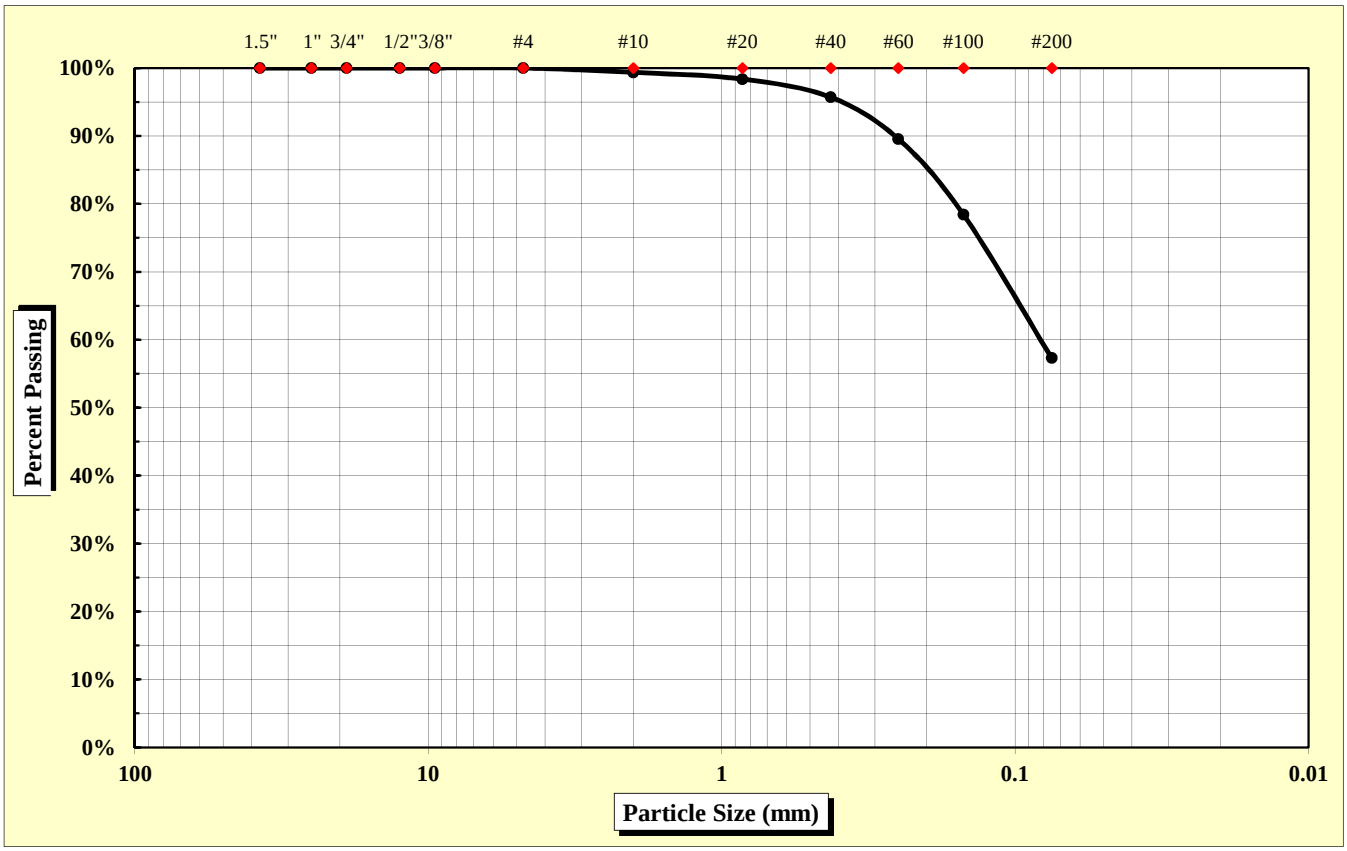
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	241	Sample Date:	10/8/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'
Sample Description:	Brown tan, fine, micaceous, sandy SILT (ML) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.6%	Fine Sand	38.4%
		Coarse Sand	3.7%	Silt & Clay	57.3%
Liquid Limit	42	Plastic Limit	37	Plastic Index	5
		Moisture Content	39.2%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

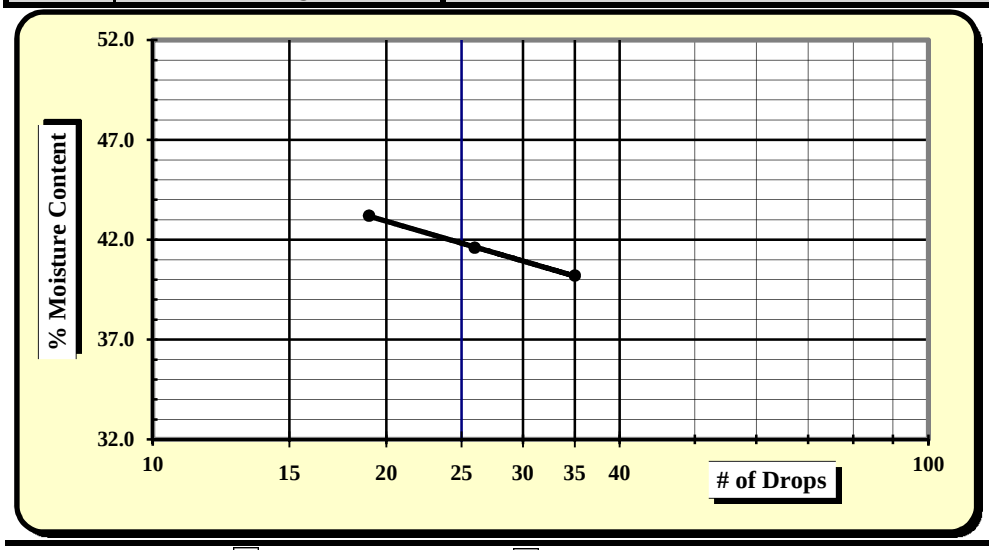
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/2/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-6	Sample #:	241	Sample Date:	10/8/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'

Sample Description: Brown tan, fine, micaceous, sandy SILT (ML) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-7	Z-8	Z-9				17		
A	Tare Weight	16.75	15.76	16.76				12.12		
B	Wet Soil Weight + A	37.20	36.79	38.02				21.42		
C	Dry Soil Weight + A	31.34	30.61	31.61				18.93		
D	Water Weight (B-C)	5.86	6.18	6.41				2.49		
E	Dry Soil Weight (C-A)	14.59	14.85	14.85				6.81		
F	% Moisture (D/E)*100	40.2%	41.6%	43.2%				36.6%		
N	# OF DROPS	35	26	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**36.6%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**37**
Plastic Index	**5**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

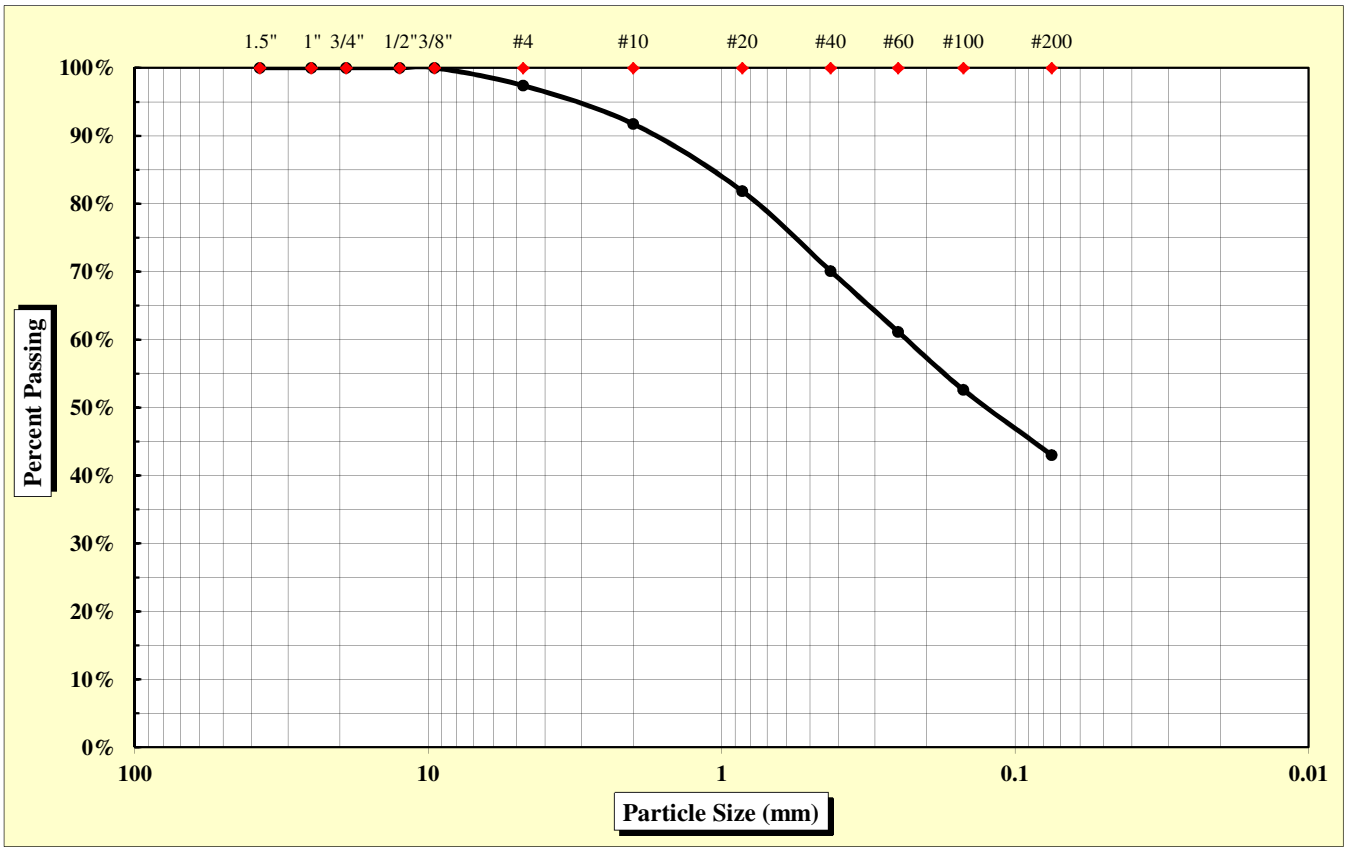
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	218	Sample Date:	10/6/15
Location:	SS-3	Type:	Split-spoon	Depth:	5.5 - 7.5'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	8.2%	Fine Sand	27.1%
		Coarse Sand	21.7%	Silt & Clay	43.0%
Liquid Limit	40	Plastic Limit	29	Plastic Index	11
		Moisture Content	24.3%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

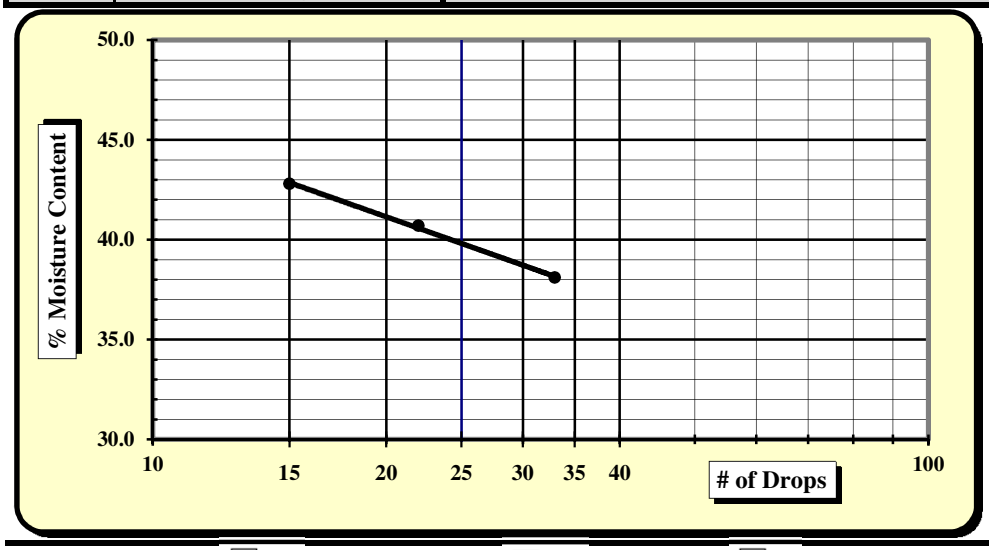
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/22/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	218	Sample Date:	10/6/15
Location:	SS-3	Type:	Split-spoon	Depth:	5.5 - 7.5'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.84	16.76	15.93				12.00		
B	Wet Soil Weight + A	39.52	38.71	38.40				21.06		
C	Dry Soil Weight + A	33.26	32.36	31.66				19.00		
D	Water Weight (B-C)	6.26	6.35	6.74				2.06		
E	Dry Soil Weight (C-A)	16.42	15.60	15.73				7.00		
F	% Moisture (D/E)*100	38.1%	40.7%	42.8%				29.4%		
N	# OF DROPS	33	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**29**
Plastic Index	**11**
Group Symbol	**SM / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

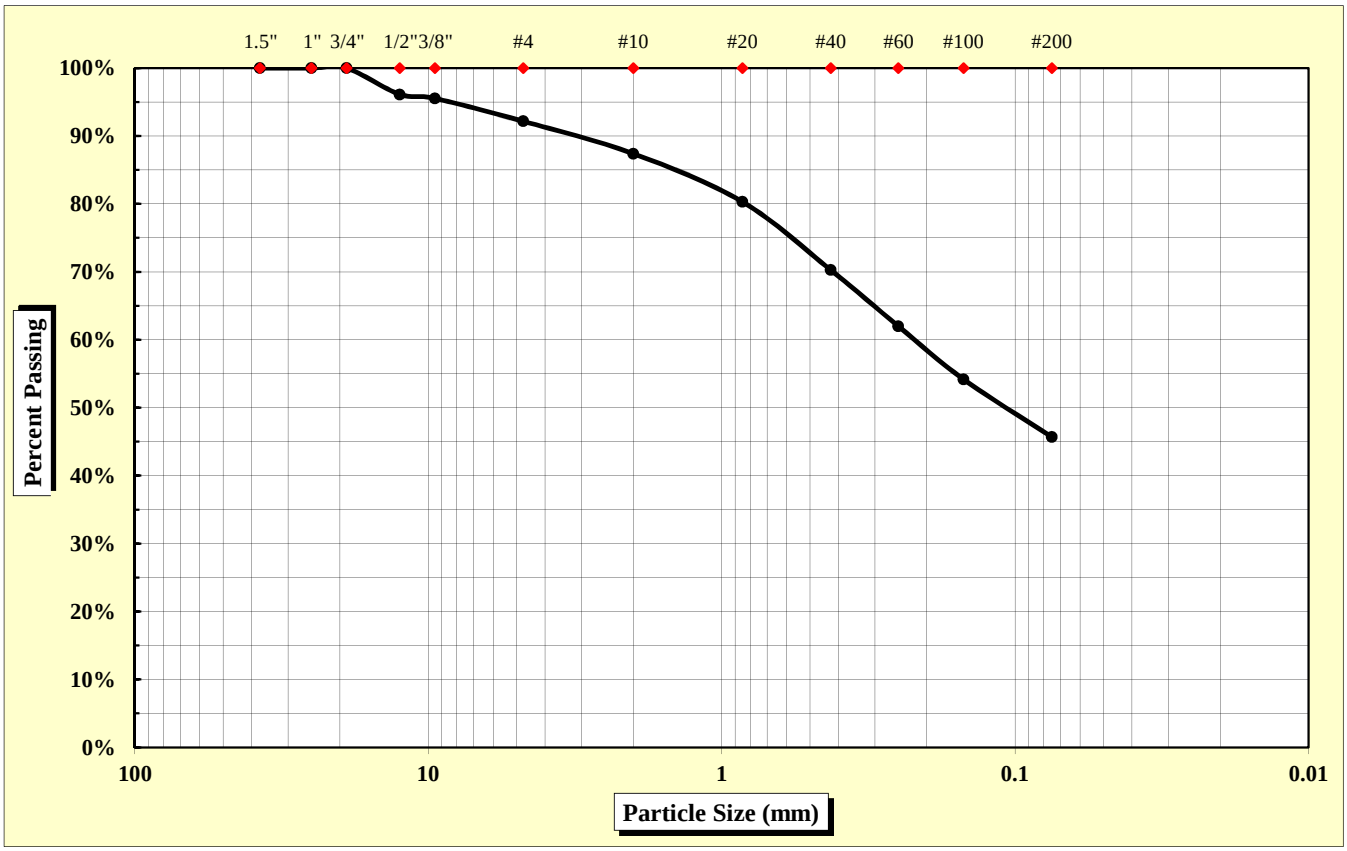
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	218	Sample Date:	10/6/15
Location:	SS-5	Type:	Split-spoon	Depth:	9.5 - 11.5'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	12.6%	Fine Sand	24.6%
		Coarse Sand	17.1%	Silt & Clay	45.7%
Liquid Limit	44	Plastic Limit	27	Plastic Index	17
		Moisture Content	20.8%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

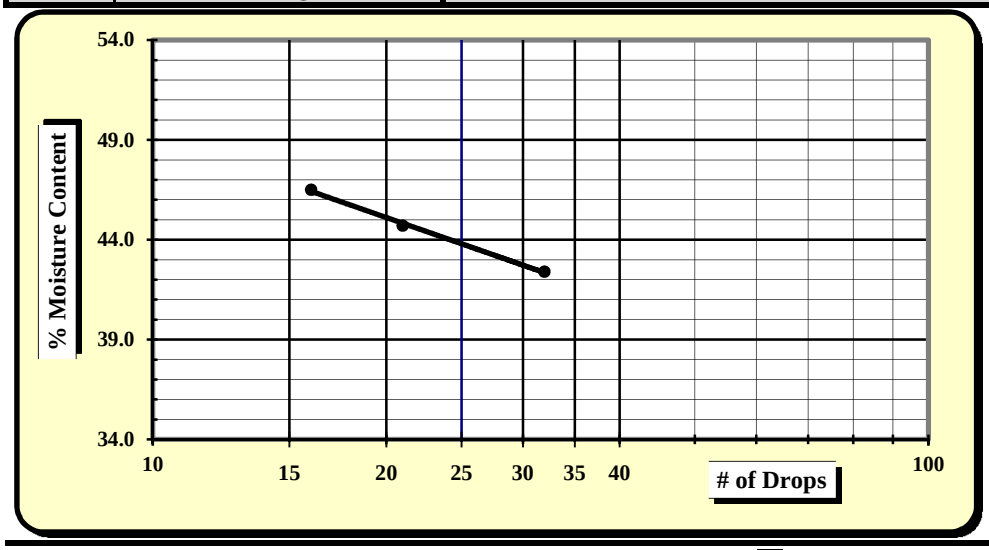
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	218	Sample Date:	10/6/15
Location:	SS-5	Type:	Split-spoon	Depth:	9.5 - 11.5'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.77	15.59	16.92				12.23		
B	Wet Soil Weight + A	36.99	36.97	37.56				21.12		
C	Dry Soil Weight + A	30.67	30.37	31.01				19.23		
D	Water Weight (B-C)	6.32	6.60	6.55				1.89		
E	Dry Soil Weight (C-A)	14.90	14.78	14.09				7.00		
F	% Moisture (D/E)*100	42.4%	44.7%	46.5%				27.0%		
N	# OF DROPS	32	21	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**27**
Plastic Index	**17**
Group Symbol	**SM / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

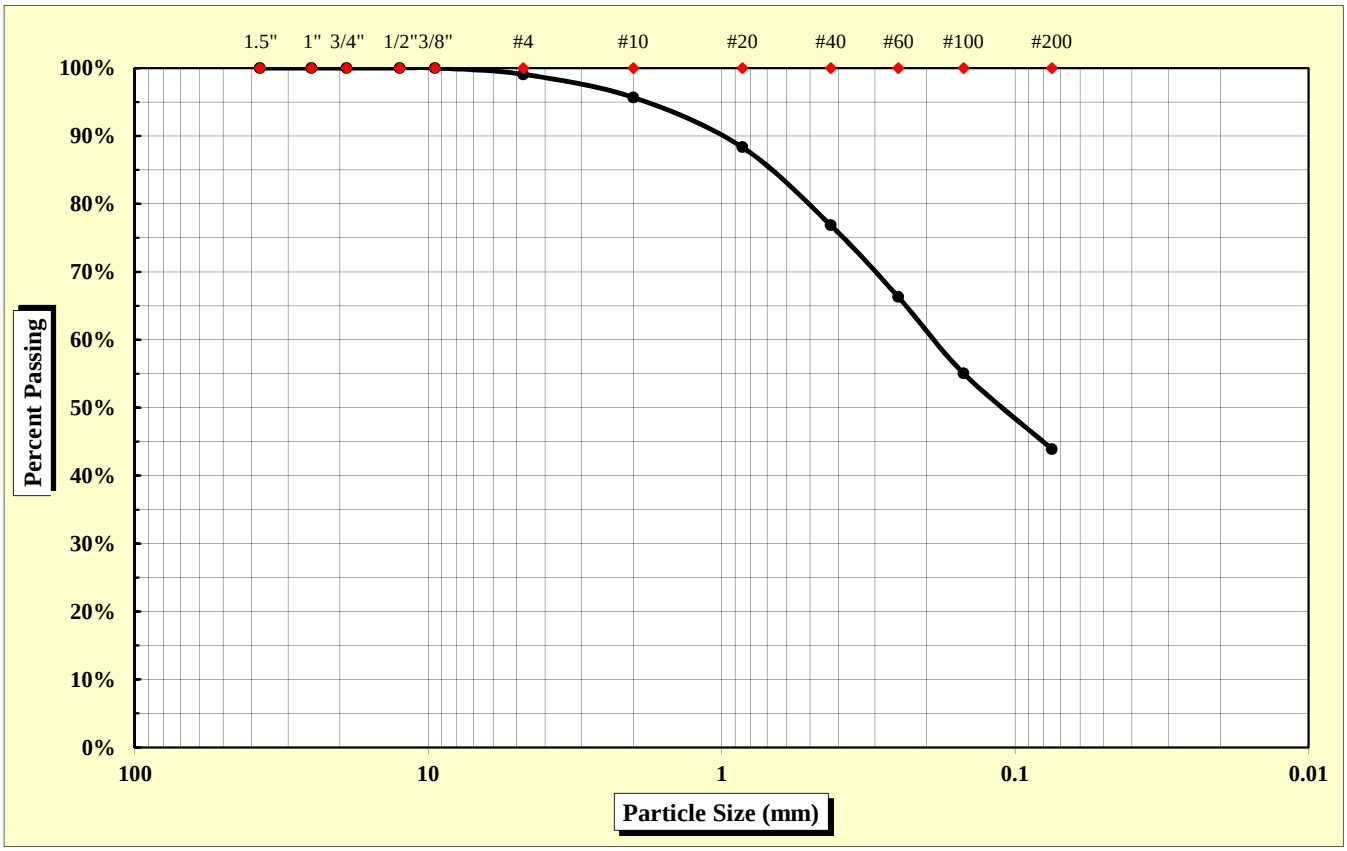
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	230	Sample Date:	10/6/15
Location:	UD-2	Type:	UD	Depth:	13 - 15'
Sample Description:	Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.3%	Fine Sand	32.9%
		Coarse Sand	18.8%	Silt & Clay	43.9%
Liquid Limit	25	Plastic Limit	18	Plastic Index	7
		Moisture Content	24.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

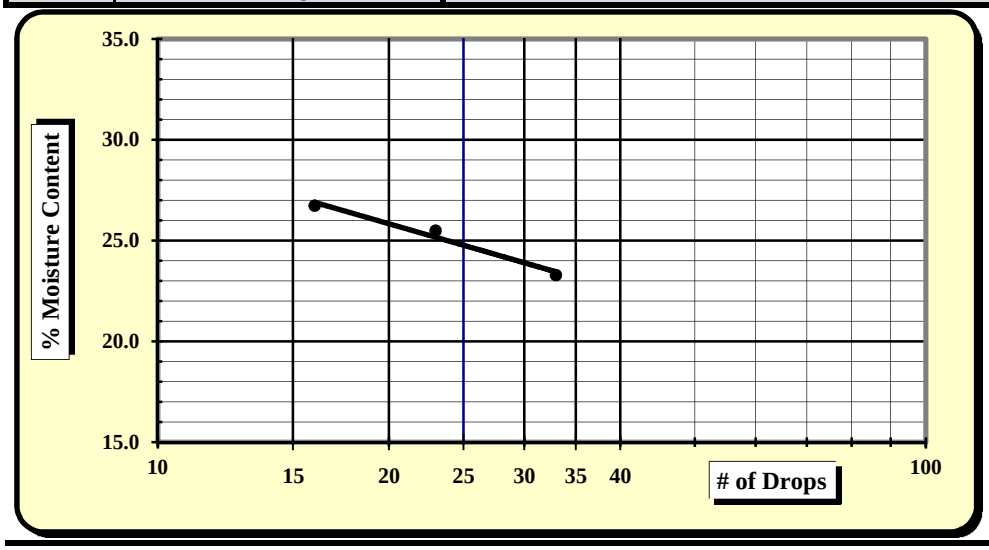
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-7	Sample #:	230	Sample Date:	10/6/15
Location:	UD-2	Type:	UD	Depth:	13 - 15'
Sample Description:	Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	16	25				808		
A	Tare Weight	13.05	13.05	12.93				16.69		
B	Wet Soil Weight + A	28.30	26.88	25.16				26.57		
C	Dry Soil Weight + A	25.42	24.07	22.58				25.07		
D	Water Weight (B-C)	2.88	2.81	2.58				1.50		
E	Dry Soil Weight (C-A)	12.37	11.02	9.65				8.38		
F	% Moisture (D/E)*100	23.3%	25.5%	26.7%				17.9%		
N	# OF DROPS	33	23	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**25**
Plastic Limit	**18**
Plastic Index	**7**
Group Symbol	**SC-SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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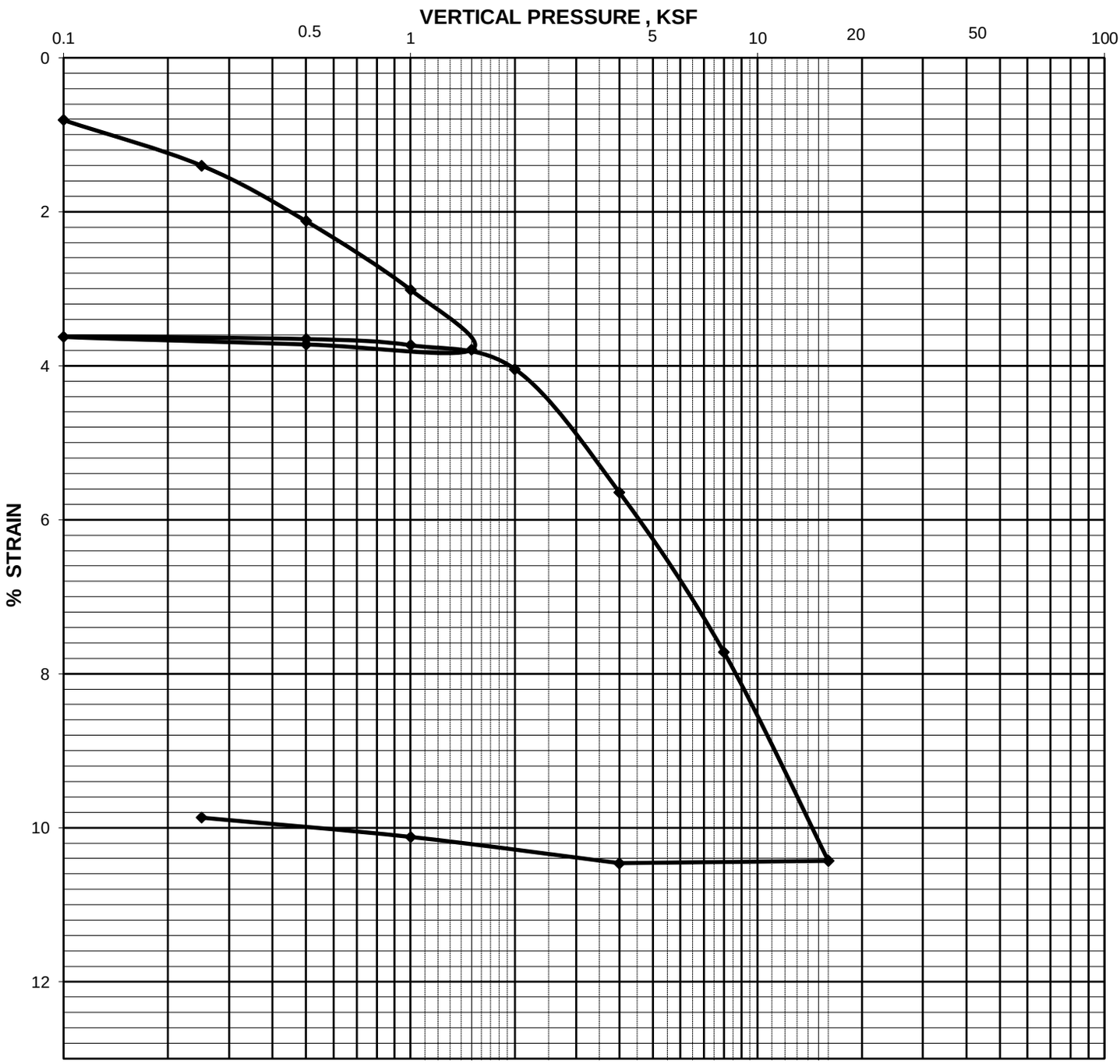
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/30/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-7
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	13 - 15'
Initial Wet Density, γ_{wet}, pcf:	126.9	**Load vs. Time Plot:**	Sq. root of t	**Sample Type:**	UD
Initial Void Ratio, e_o:	0.606	**Final Void Ratio, e_f:**	0.447	**Log No.:**	230
Initial Saturation, S_O, %:	101.5	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.65
Initial Dry Density, γ_{DRY}, pcf:	103.0	**Final Dry Density, γ_{DRY}, pcf:**	114.2	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	23.2	**Final Moisture Content, %:**	18.2	**Stress, P_e, ksf:**	3.4
Liquid Limit, %:	25	**Plasticity Index, %:**	7	**Fines, %:**	43.9
Sample Description:	Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.1, 0.25, 0.5, 1.0, 1.5, 0.5, 0.1, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 4.0, 1.0, 0.25

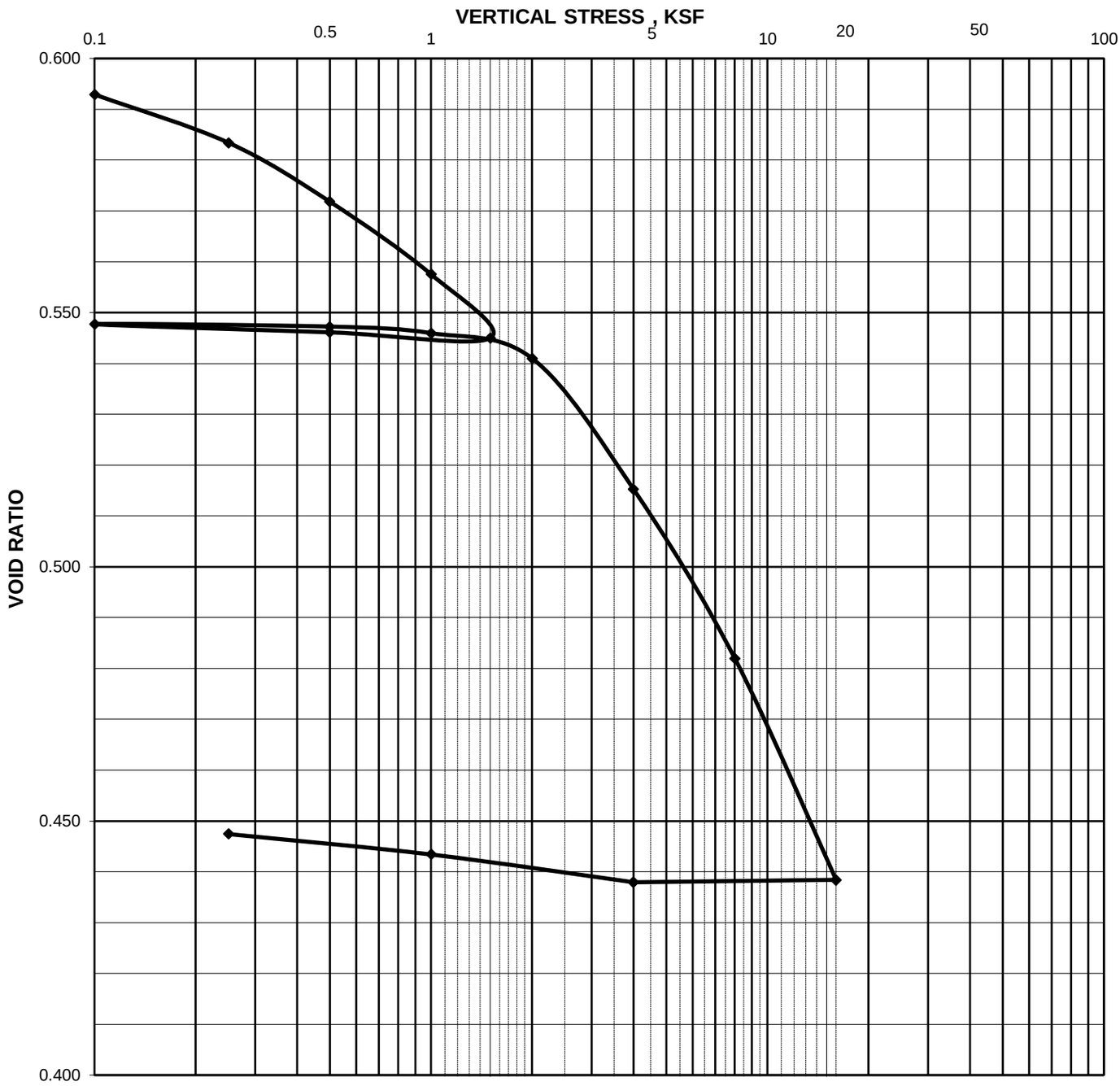


CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/30/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-7
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	13 - 15'
Initial Wet Density, γ_{wet}, pcf:	126.9	**Load vs. Time Plot:**	Sq. root of t	**Sample Type:**	Shelby tube
Initial Void Ratio, e_o:	0.606	**Final Void Ratio, e_f:**	0.447	**Log No.:**	230
Initial Saturation, S_O, %:	101.5	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.65
Initial Dry Density, γ_{DRY}, pcf:	103.0	**Final Dry Density, γ_{DRY}, pcf:**	114.2	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	23.2	**Final Moisture Content, %:**	18.2	**Stress, P_e, ksf:**	3.4
Liquid Limit, %:	25	**Plasticity Index, %:**	7	**Fines, %:**	43.9
Sample Description:	Brown, medium to fine, silty clayey SAND (SC-SM) [A-4 (0)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.1, 0.25, 0.5, 1.0, 1.5, 0.5, 0.1, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 4.0, 1.0, 0.25

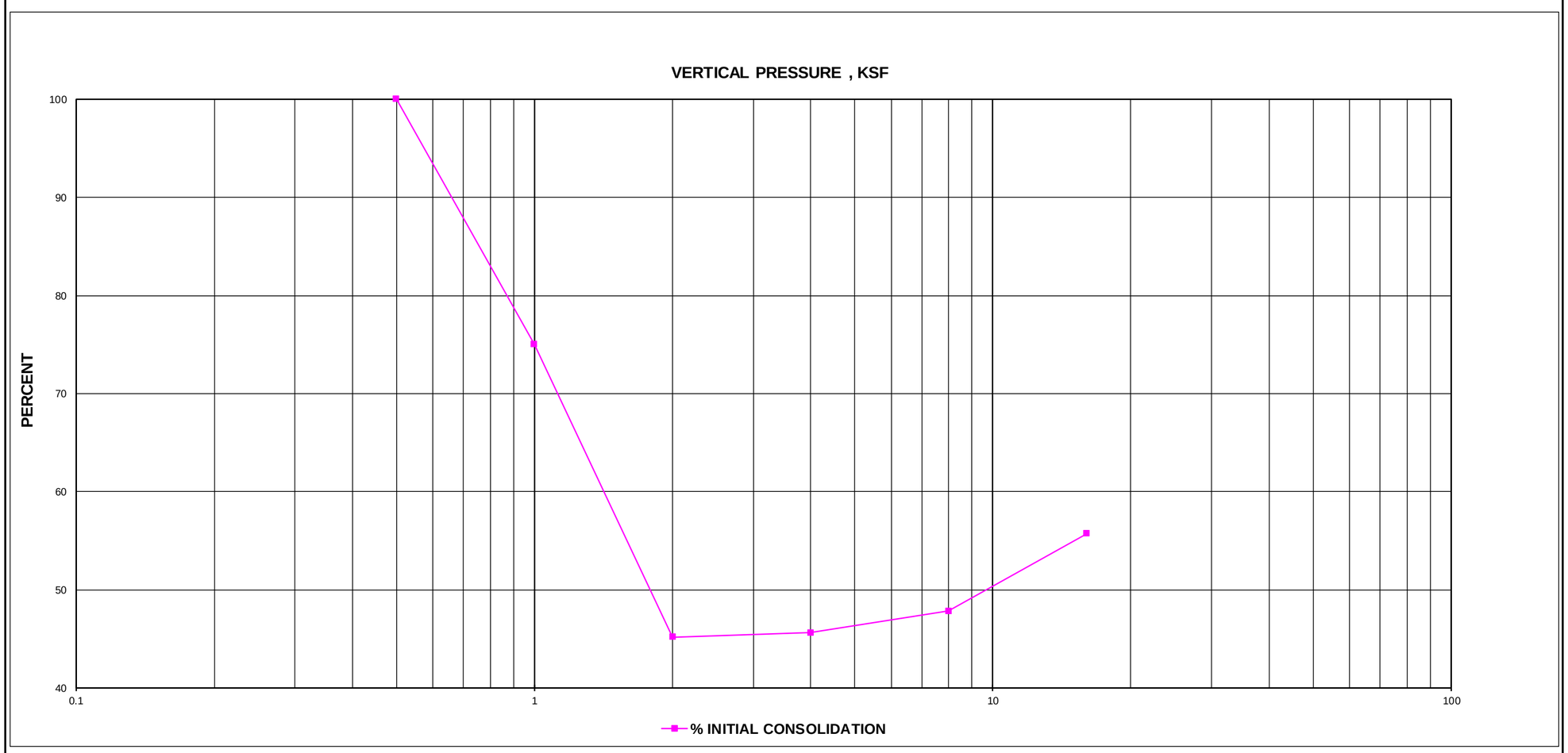


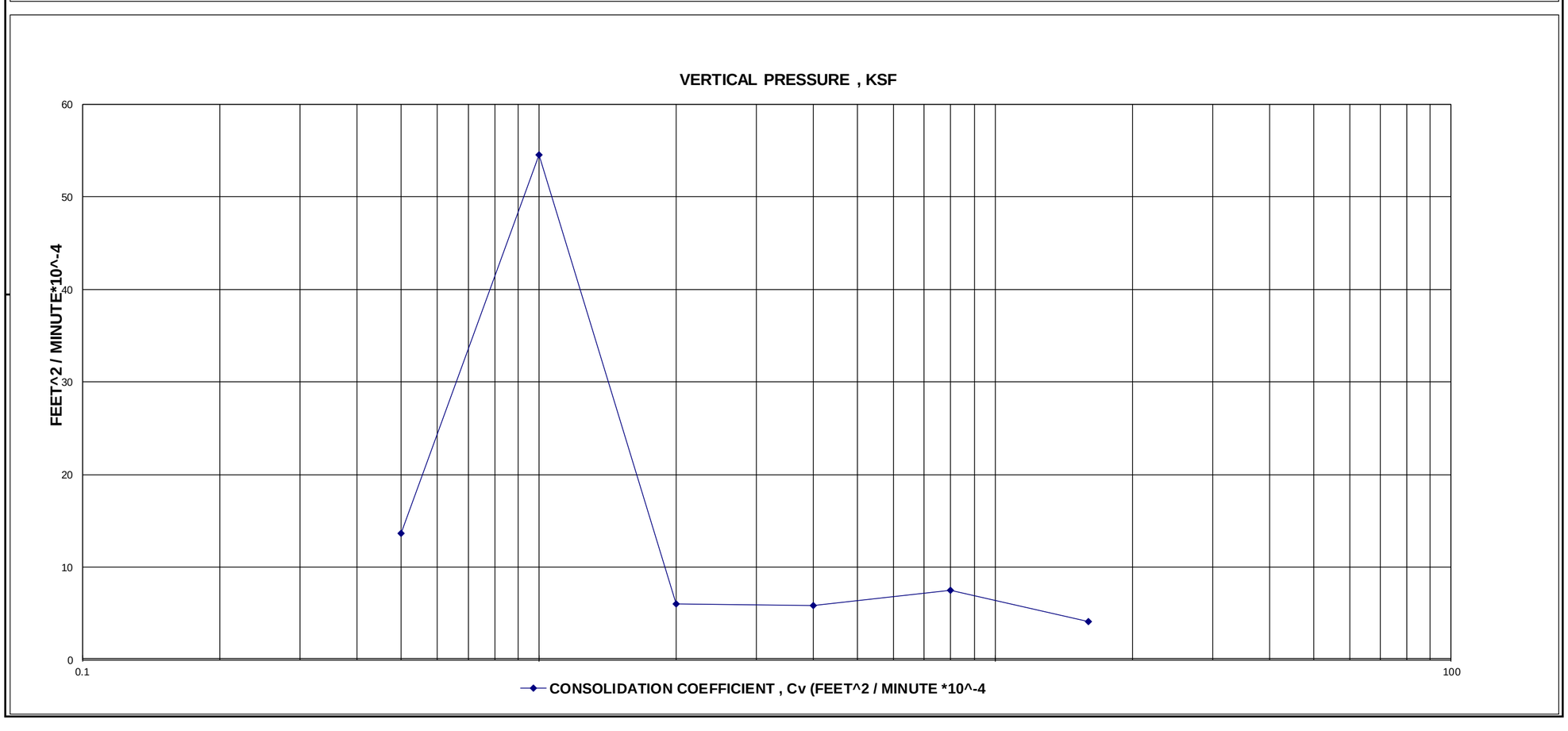
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	11/30/2015
Client Name:	Infrastructure Consulting & Engineering	**Boring No.:**	BR-7
Client Address:	1021 Briargate Circle Columbia, SC 29210	**Depth/Elev.:**	13 - 15'

Pressure (ksf)	D_0 (in.)	D_{100} (in.)	D_{50} (in.)	Stone Correction (in.)	D_{0c} (in.)	D_{100c}	D_{50c} (in.)	h (in.)	VOID RATIO e	Percent Strain (%)	t_{50}/t_{90} t_{90}	C_v Log of Time ($ft^2/10^{-4}min$)	C_i (%)
0.1		0.0081		0.0000		0.0081			0.593	0.811			
0.25		0.0140		0.0000		0.0140			0.583	1.401			
0.5		0.0212		0.0000		0.0212			0.572	2.122			
1.0		0.0301		0.0000		0.0301			0.558	3.013			
1.5		0.0379		0.0000		0.0379			0.545	3.794			
0.5		0.0372		0.0000		0.0372			0.546	3.724			
0.1		0.0362		0.0000		0.0362			0.548	3.624			
0.5	0.0365	0.0365	0.0365	0.0000	0.0365	0.0365	0.0365	0.4813	0.547	3.654	1.00	13.64	100.0
1.0	0.0371	0.0373	0.0372	0.0000	0.0371	0.0373	0.0372	0.4809	0.546	3.734	0.25	54.48	75.0
2.0	0.0387	0.0404	0.0395	0.0000	0.0387	0.0404	0.0395	0.4798	0.541	4.044	2.25	6.02	45.2
4.0	0.0477	0.0564	0.0520	0.0000	0.0477	0.0564	0.0520	0.4735	0.515	5.646	2.25	5.87	45.6
8.0	0.0663	0.0771	0.0717	0.0000	0.0663	0.0771	0.0717	0.4637	0.482	7.718	1.69	7.49	47.8
16.0	0.0922	0.1042	0.0982	0.0000	0.0922	0.1042	0.0982	0.4504	0.438	10.430	2.89	4.13	55.7
4.0		0.1045		0.0000		0.1045			0.438	10.460			
1.0		0.1011		0.0000		0.1011			0.443	10.120			
0.25		0.0986		0.0000		0.0986			0.447	9.870			





I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-7**
Sample ID: **"UD-2"**
Sample Depth: **13' - 15'**
Classification: **SC-SM / A-4 (0)**
Test Performed: **Consolidation**
Estimated Pre-Consolidation Pressure: **3400 psf**

Torvane Shear Stress Measurements (3):
400 psf, 350 psf, & 370 psf; **Average = 370 psf**

Pocket Penetrometer Measurements (3):
300 psf, 310 psf, & 350 psf; **Average = 320 psf**

Form No. TR-126-T267-1
Revision No. 0
Revision Date: 07/28/11

Moisture, Ash, and Organic Content

AASHTO T 267

S&ME *Quality Assurance*

Project #: **1426-14-161** Report Date: 11/24/15
Project Name: **I-85 Widening MM80-96** Test Date(s): 11/20 - 11/24/15
Client Name: Infrastructure Consulting & Engineering
Client Address: 1021 Briargate Circle Columbia, South Carolina 29210

Boring #:	BR-8	Sample #:	241	Sample Date:	10/6/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 3'
Sample Description:	Dark brown olive gray sandy FAT CLAY (CH)				

Equipment: Balance (GP1/G1): S&ME ID# **7537** *0.01 g.Readability, 500g. Minimum Capacity*
Oven: S&ME ID# **7313** Muffle Furnace: S&ME ID# **7312**

Moisture Content Determination

Oven Temperature: **110 ± 5 °C**

		Tare #	
t	Tare Weight	grams	
a	Mass of **As-Received** Specimen + Tare Wt.	grams	
b	Mass of Oven Dry Specimen + Tare Wt.	grams	
w	Water Weight	(a-b)	
A	Mass of As-Received Specimen	(a-t)	
B	Mass of Oven Dry Specimen	(b-t)	
	% Moisture Content as a % of As Received or Total Mass	(w/A)*100	
	% Moisture Content as a % of Oven-dried Mass	(w/B)*100	**N/A**

Ash Content and Organic Content Determination

Muffle Furnace Temperature: **455 ± 10 °C**

		Tare #	3
t	Tare Weight	grams	121.35
b	Mass of Oven Dry Specimen + Tare Wt.	grams	160.81
c	Ash Weight + Tare Wt.	grams	158.26
C	Ash Weight	c-t	36.91
B	Mass of Oven Dry Specimen	(b-t)	39.46
D	***% Ash Content***	(C/B)*100	**93.5%**
	% Organic Content	100-D	**6.5%**

Remarks: **Organic Content representative sample taken from material passing the 2.00 mm (#10) sieve**

References: AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition
AASHTO T 265: Laboratory Determination of Moisture Content of Soils

Technician Name: Matt Jacobs NICET Lab Level III 118202
Certification #

Technical Responsibility: Brian Vaughan, P.E. Brian Vaughan *Signature* Location Coordinator *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

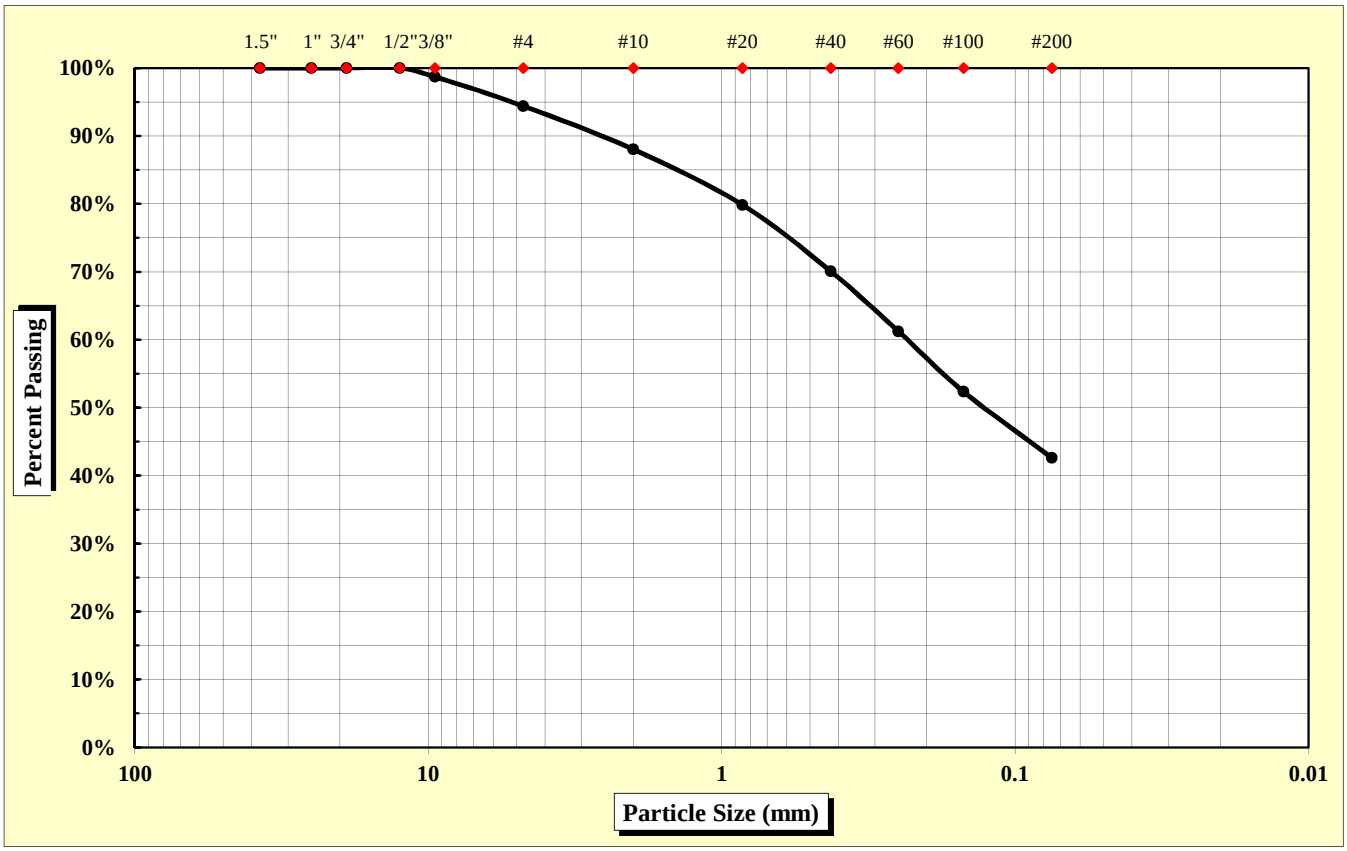
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	218	Sample Date:	10/6/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Dark brown red, medium to fine, clayey SAND (SC) [A-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	12.0%	Fine Sand	27.4%
		Coarse Sand	18.0%	Silt & Clay	42.7%
Liquid Limit	30	Plastic Limit	19	Plastic Index	11
		Moisture Content	18.5%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

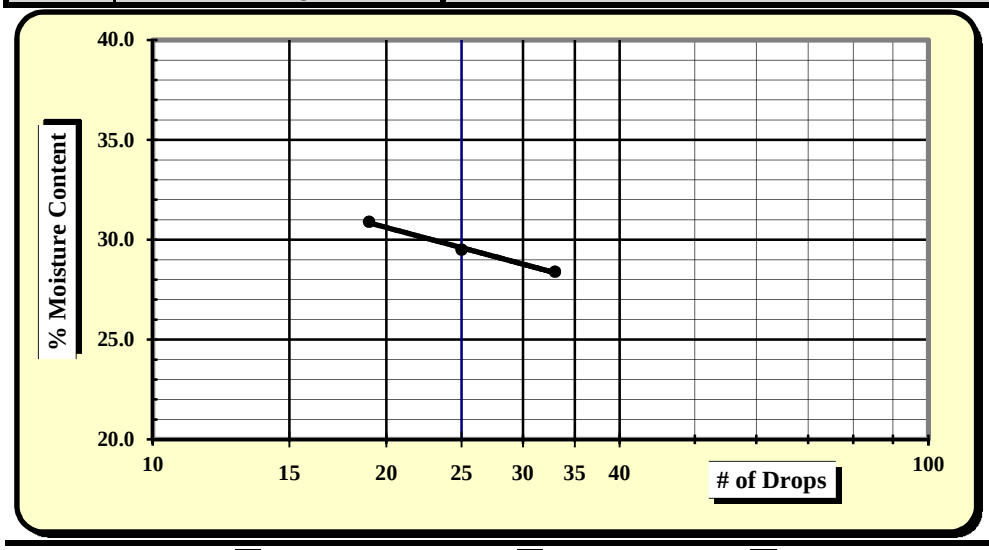
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	218	Sample Date:	10/6/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Dark brown red, medium to fine, clayey SAND (SC) [A-6 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.70	15.94				11.17		
B	Wet Soil Weight + A	37.44	38.65	38.30				20.77		
C	Dry Soil Weight + A	32.65	33.42	33.02				19.21		
D	Water Weight (B-C)	4.79	5.23	5.28				1.56		
E	Dry Soil Weight (C-A)	16.85	17.72	17.08				8.04		
F	% Moisture (D/E)*100	28.4%	29.5%	30.9%				19.4%		
N	# OF DROPS	33	25	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**19**
Plastic Index	**11**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

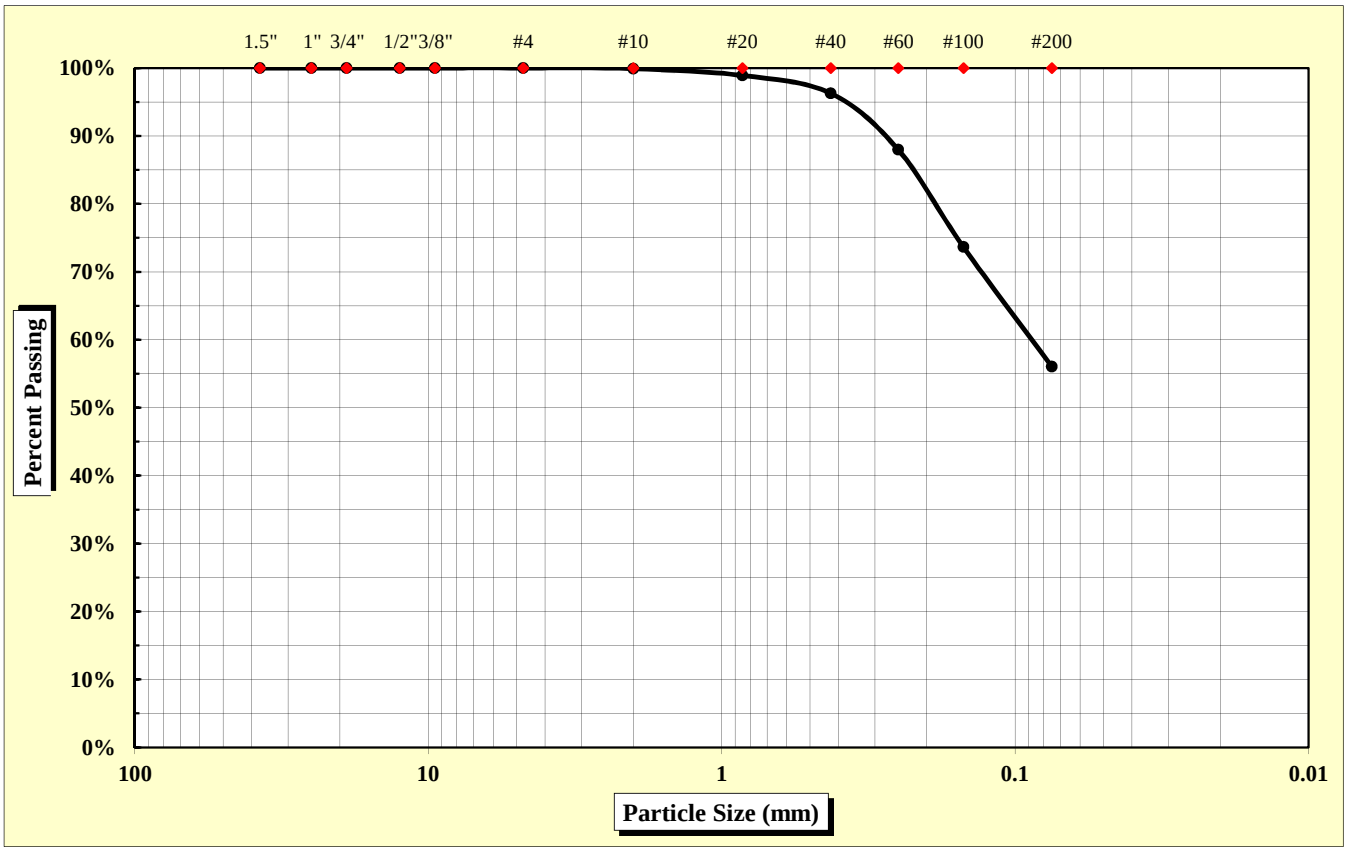
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	230	Sample Date:	10/6/15
Location:	UD-1	Type:	UD	Depth:	6 - 8'
Sample Description:	Brown, fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	40.2%
		Coarse Sand	3.6%	Silt & Clay	56.1%
Liquid Limit	56	Plastic Limit	42	Plastic Index	14
		Moisture Content	43.3%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

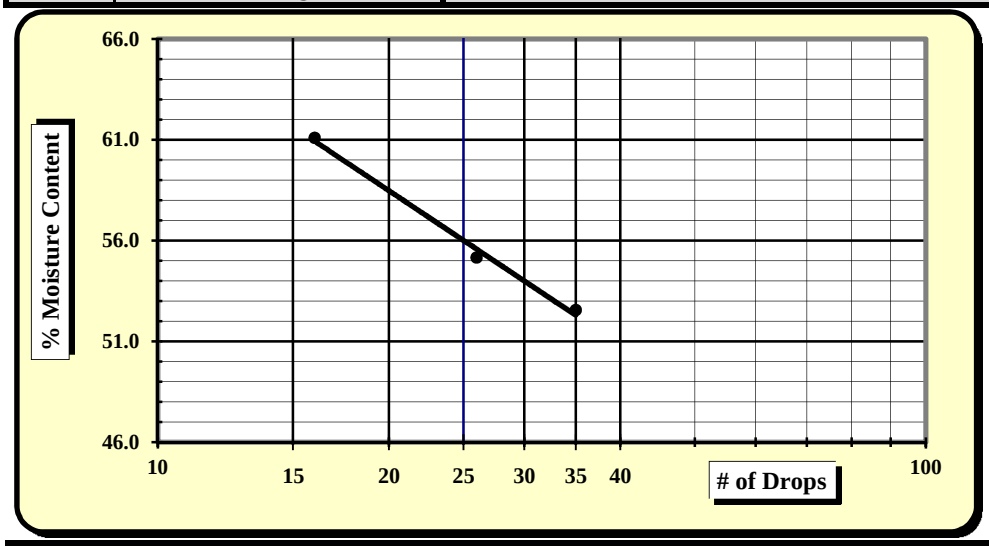
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	230	Sample Date:	10/6/15
Location:	UD-1	Type:	UD	Depth:	6 - 8'

Sample Description: Brown, fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	20	2	7				23		
A	Tare Weight	12.96	11.11	12.93				13.06		
B	Wet Soil Weight + A	25.79	23.43	24.40				22.52		
C	Dry Soil Weight + A	21.37	19.05	20.05				19.74		
D	Water Weight (B-C)	4.42	4.38	4.35				2.78		
E	Dry Soil Weight (C-A)	8.41	7.94	7.12				6.68		
F	% Moisture (D/E)*100	52.6%	55.2%	61.1%				41.6%		
N	# OF DROPS	35	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**41.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**56**
Plastic Limit	**42**
Plastic Index	**14**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 4767)

REV4,1/13/04

AASHTO R18

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	11/27/15
Client Name:	Infrastructure Consulting & Engineering	**Test Date:**	11/20 - 11/27/15
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		
Boring No.:	BR-8	**Depth / Elev. :** 6 - 8'	**Sample No.:** 230 **Type:** UD
Sample Location:	UD-1		
Sample Description:	Brown, fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (8)]		
LL, %:	56	**PI , %:** 14	**Percent Passing #200:** 56.1 **G_s:** 2.716

SPECIMEN PROPERTIES — **TEST PARAMETERS , TEST TYPE : CU/PP**

		INITIAL				AFTER CONSOLIDATION		
SPECIMEN NO.		1	2	3		1	2	3
DIAMETER , INCHES	D_o	2.87	2.87	2.86	D_c	2.84	2.83	2.82
HEIGHT , INCHES	H_o	5.77	6.03	5.79	H_c	5.72	5.96	5.72
WATER CONTENT, %	W_o	43.3	44.3	43.3	W_c	45.2	46.1	42.4
DRY DENSITY, PCF	γ_{dryo}	74.4	72.7	76.2	γ_{dryc}	76.1	75.3	78.7
SATURATION ,%	S_o	92.0	90.3	96.1	S_c	99.7	103.7	106.0
VOID RATIO	e_o	1.278	1.333	1.224	e_c	1.226	1.251	1.152

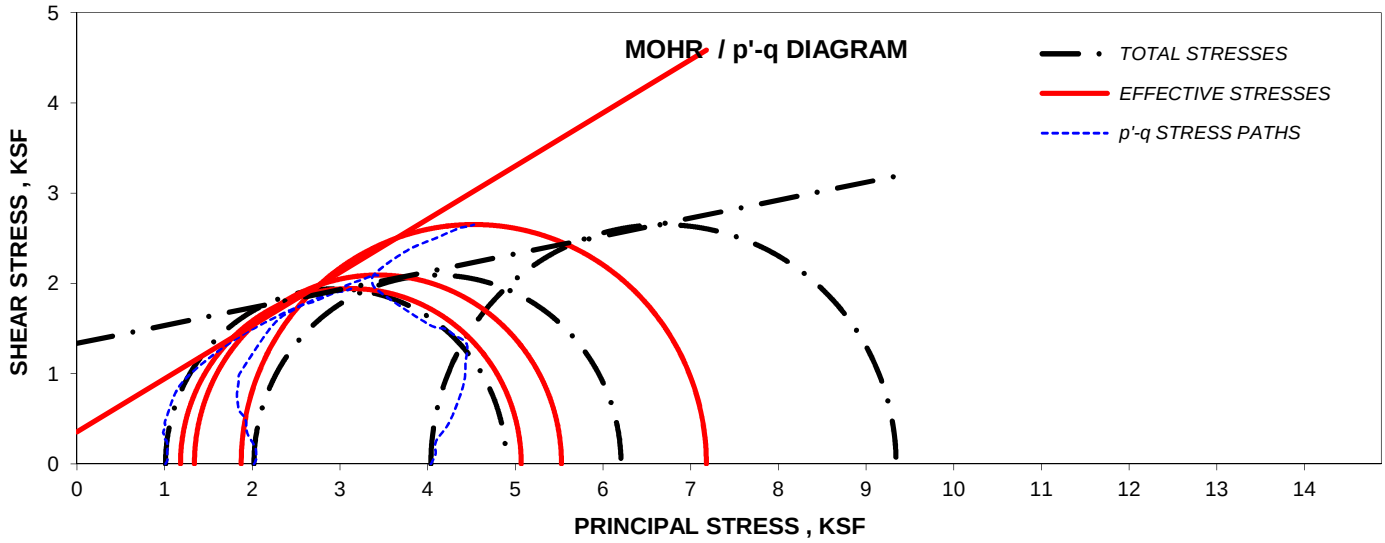
SPECIMEN NO.		1	2	3
B Value		0.96	0.96	0.98
BACK PRESSURE, ksf	U_o	7.2	7.2	7.2
CONFINING PRESSURE , ksf	σ_3'	1.0	2.0	4.0
MAX. DEVIATOR STRESS ,ksf	σ_1-σ_3	3.9	4.2	5.3
ULT. DEVIATOR STRESS , ksf	σ_1-σ_3	3.9	4.2	5.3
Specimen Shape @ Failure		Bulged		

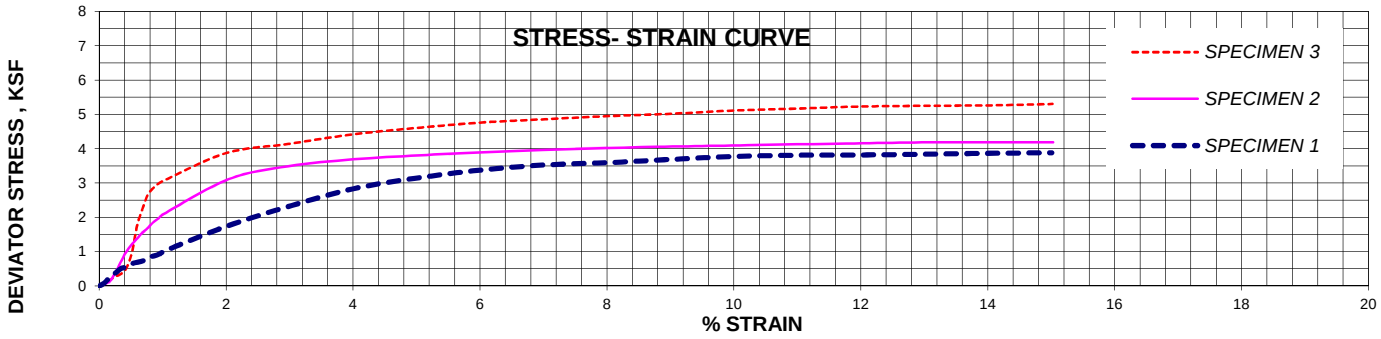
CONTROLLED : Strain @ 0.27 % per minute T50, Minutes = 1.5

N/A

N/A

SHEAR STRENGTH PARAMETERS	TOTAL	EFFECTIVE
	COHESION , C (ksf) : 1.3	**APPARENT COHESION , (ksf) :** 0.4
	ANGLE OF INTER. FRICTION, Φ(DEGREES) 11	**ANGLE OF INTER. FRICTION, Φ' (DEGREES) :** 31





Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/27/15
Technical Responsibility	*Signature*	*Position*	*Date*

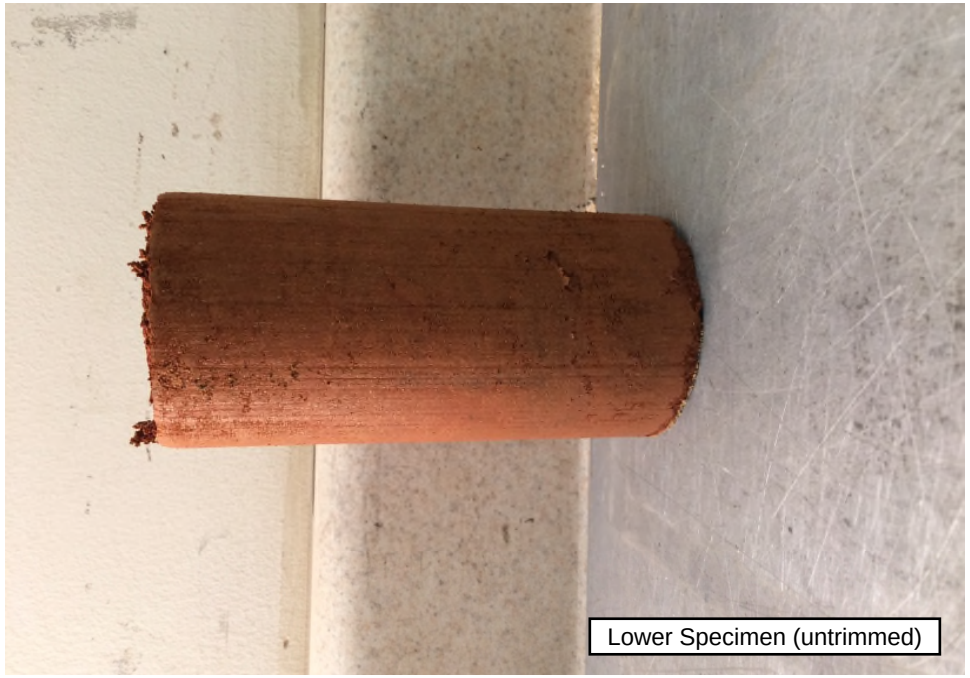
I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-8**
Sample ID: **"UD-1"**
Sample Depth: **6' - 8'**
Classification: **MH / A-7-5 (8)**
Test Performed: **CU Triaxial, w/ pore pressure measurement**

Torvane Shear Stress Measurements (3):
520 psf, 580 psf, & 500 psf; **Average = 530 psf**

Pocket Penetrometer Measurements (3):
800 psf, 750 psf, & 790 psf; **Average = 780 psf**

Middle Specimen (untrimmed)



Lower Specimen (untrimmed)

Upper Specimen (untrimmed)

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

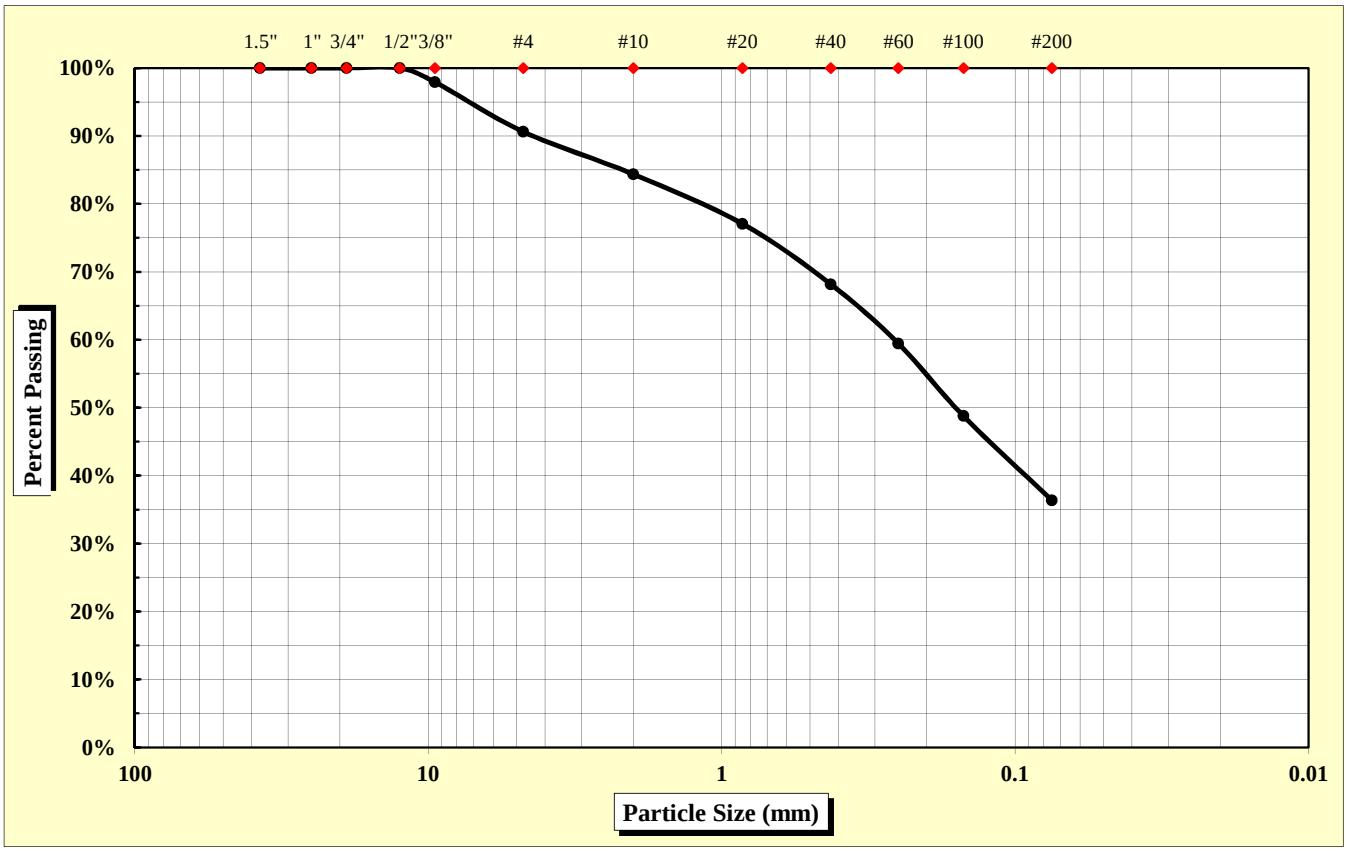
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	218	Sample Date:	10/6/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Brown red, medium to fine, trace mica, silty SAND (SM) [A-4 (0)], with trace gravel				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	15.6%	Fine Sand	31.8%
		Coarse Sand	16.2%	Silt & Clay	36.4%
Liquid Limit	39	Plastic Limit	31	Plastic Index	8
		Moisture Content	31.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

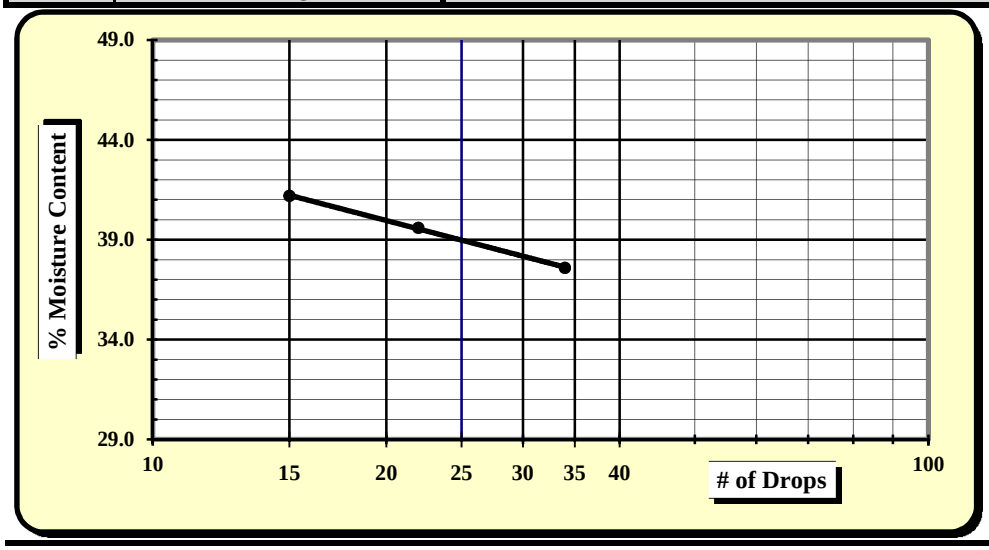
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	218	Sample Date:	10/6/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Brown red, medium to fine, trace mica, silty SAND (SM) [A-4 (0)], with trace gravel

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.91	16.93	16.79				12.10		
B	Wet Soil Weight + A	40.25	39.11	38.63				20.75		
C	Dry Soil Weight + A	33.87	32.82	32.26				18.69		
D	Water Weight (B-C)	6.38	6.29	6.37				2.06		
E	Dry Soil Weight (C-A)	16.96	15.89	15.47				6.59		
F	% Moisture (D/E)*100	37.6%	39.6%	41.2%				31.3%		
N	# OF DROPS	34	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**39**
Plastic Limit	**31**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

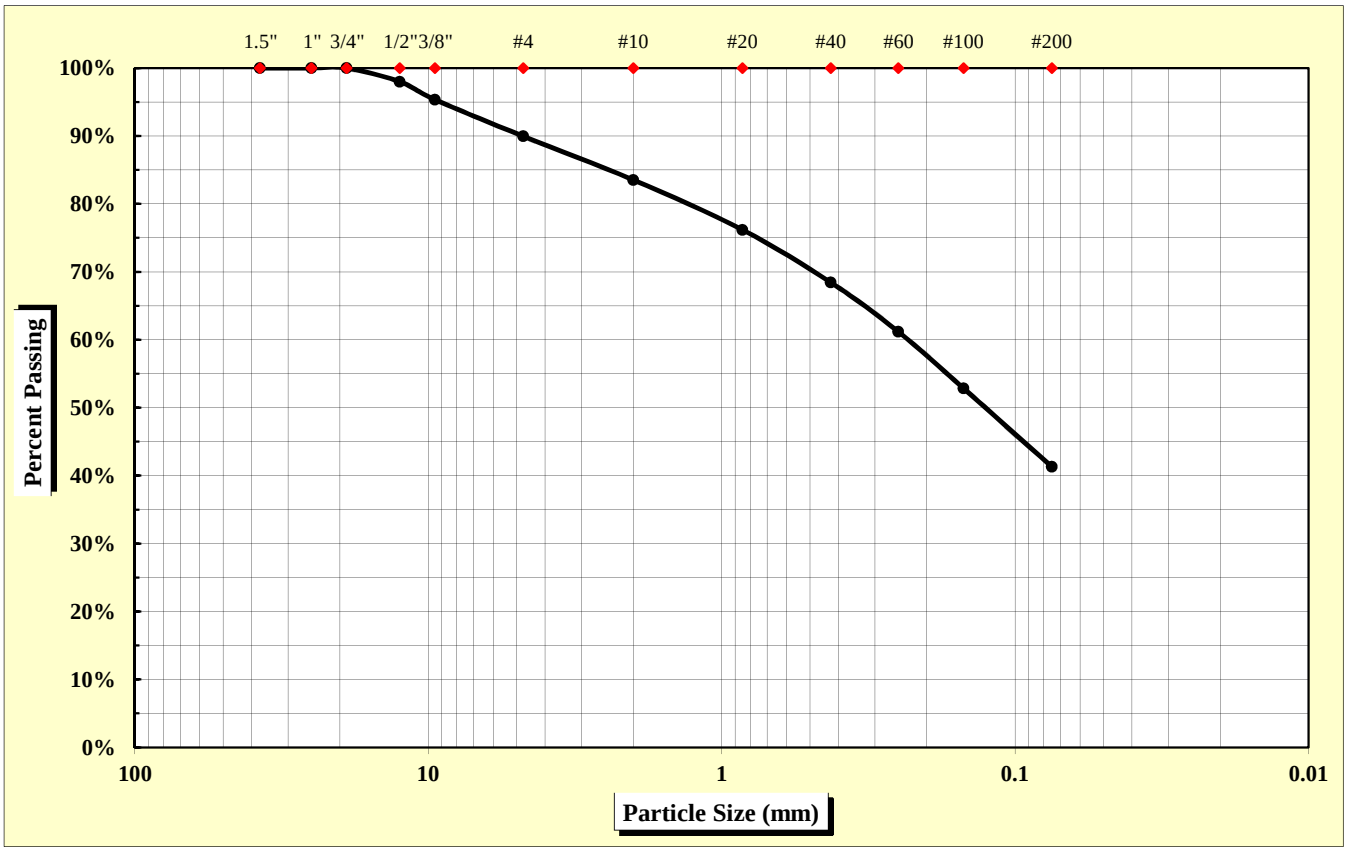
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	241	Sample Date:	10/6/15
Location:	SS-2, 4, 6, 7	Type:	Split-spoon	Depth:	3 - 20'
Sample Description:	Brown red, medium to fine, micaceous, silty SAND (SM) [A-4 (1)], with trace gravel				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	16.5%	Fine Sand	27.1%
		Coarse Sand	15.1%	Silt & Clay	41.3%
Liquid Limit	36	Plastic Limit	28	Plastic Index	8
		Moisture Content	19.0%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

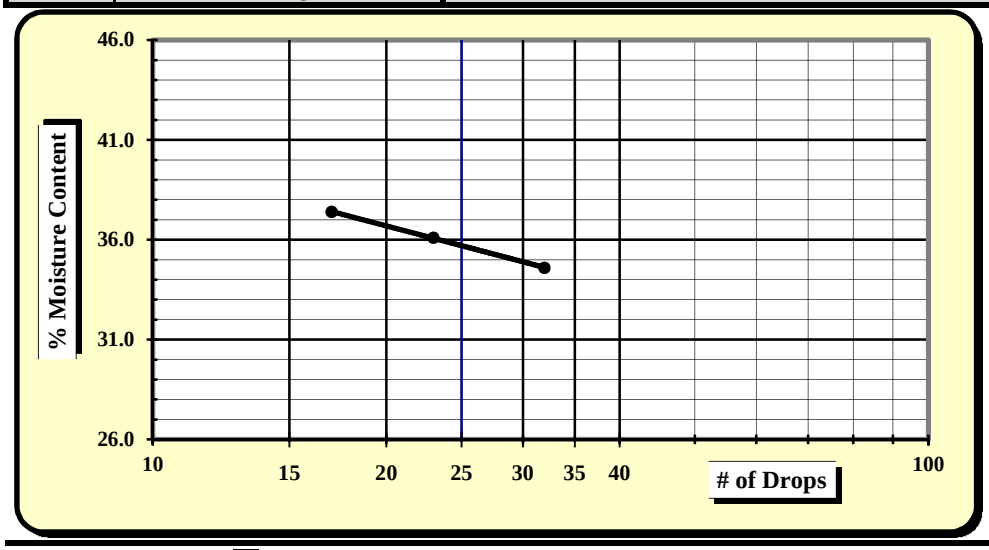
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-8	Sample #:	241	Sample Date:	10/6/15
Location:	SS-2, 4, 6, 7	Type:	Split-spoon	Depth:	3 - 20'

Sample Description: Brown red, medium to fine, micaceous, silty SAND (SM) [A-4 (1)], with trace gravel

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.95	16.65	16.78				12.27		
B	Wet Soil Weight + A	38.81	38.83	38.25				21.22		
C	Dry Soil Weight + A	32.93	32.95	32.41				19.26		
D	Water Weight (B-C)	5.88	5.88	5.84				1.96		
E	Dry Soil Weight (C-A)	16.98	16.30	15.63				6.99		
F	% Moisture (D/E)*100	34.6%	36.1%	37.4%				28.0%		
N	# OF DROPS	32	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**28**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

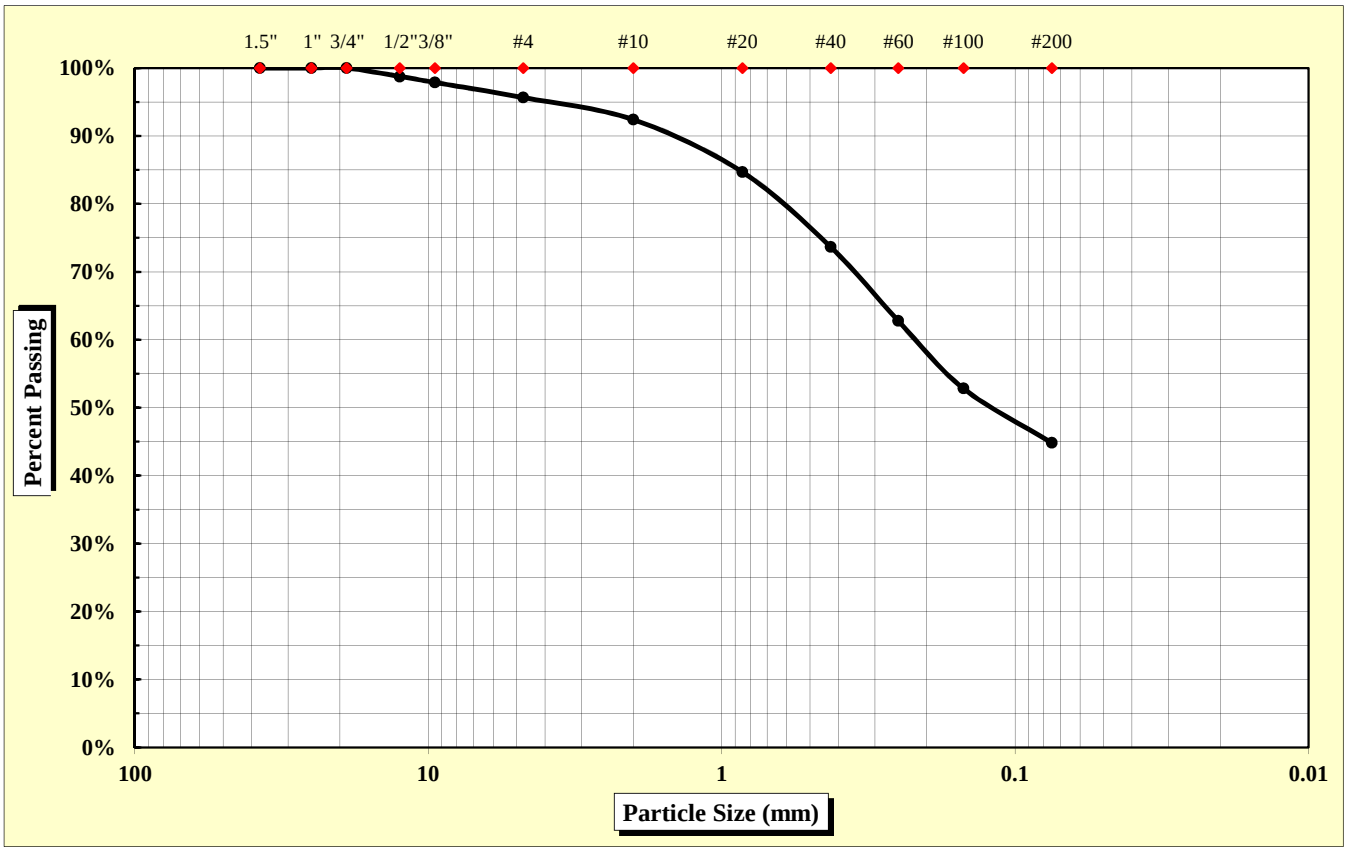
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	218	Sample Date:	9/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Brown red, medium to fine, clayey SAND (SC) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	7.6%	Fine Sand	28.8%
		Coarse Sand	18.7%	Silt & Clay	44.8%
Liquid Limit	36	Plastic Limit	21	Plastic Index	15
		Moisture Content	21.0%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

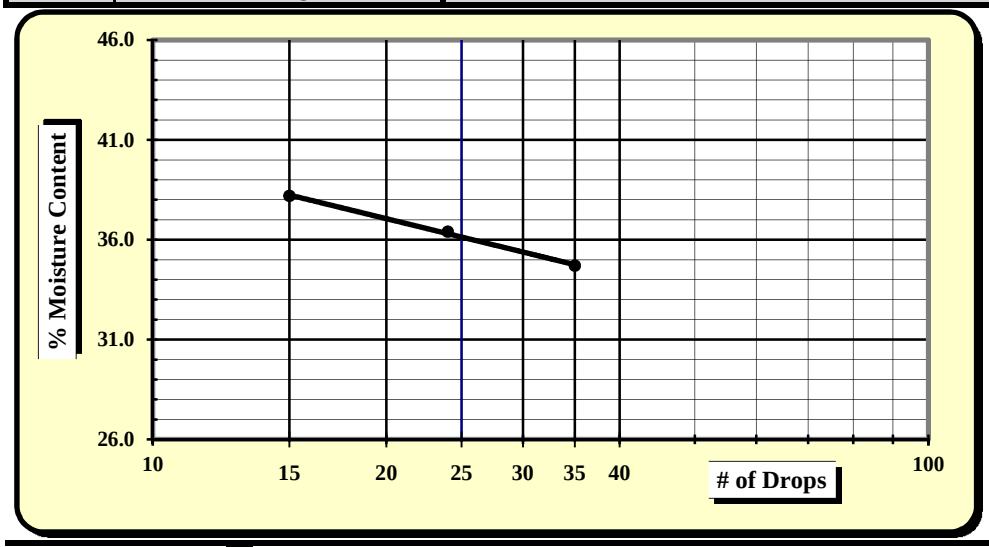
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	218	Sample Date:	9/21/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Brown red, medium to fine, clayey SAND (SC) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.84	16.76	15.93				12.00		
B	Wet Soil Weight + A	36.50	39.14	38.26				20.45		
C	Dry Soil Weight + A	31.44	33.17	32.09				18.99		
D	Water Weight (B-C)	5.06	5.97	6.17				1.46		
E	Dry Soil Weight (C-A)	14.60	16.41	16.16				6.99		
F	% Moisture (D/E)*100	34.7%	36.4%	38.2%				20.9%		
N	# OF DROPS	35	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**21**
Plastic Index	**15**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

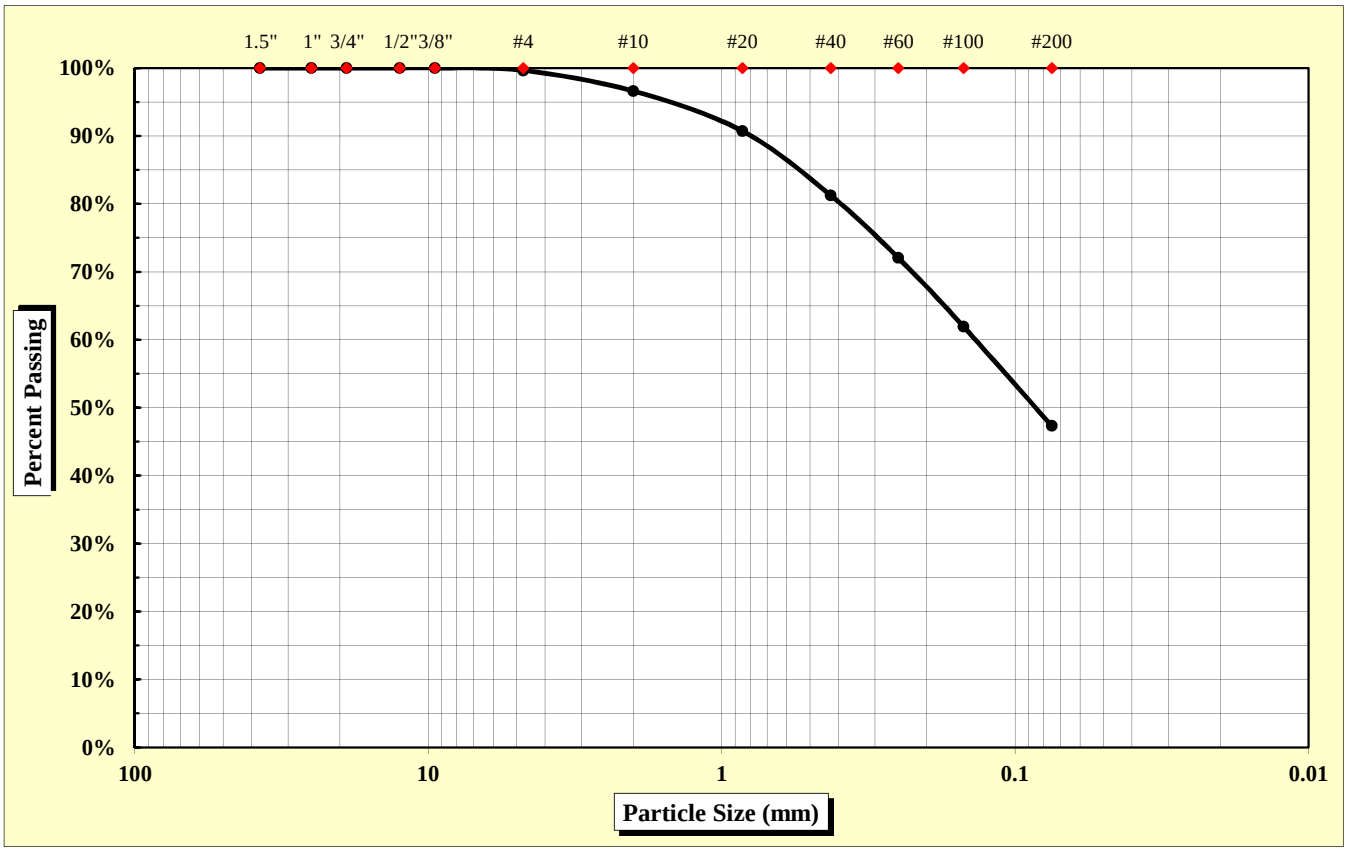
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	218	Sample Date:	9/21/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red orange brown, medium to fine, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.4%	Fine Sand	33.9%
		Coarse Sand	15.3%	Silt & Clay	47.3%
Liquid Limit	33	Plastic Limit	26	Plastic Index	7
		Moisture Content	19.7%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

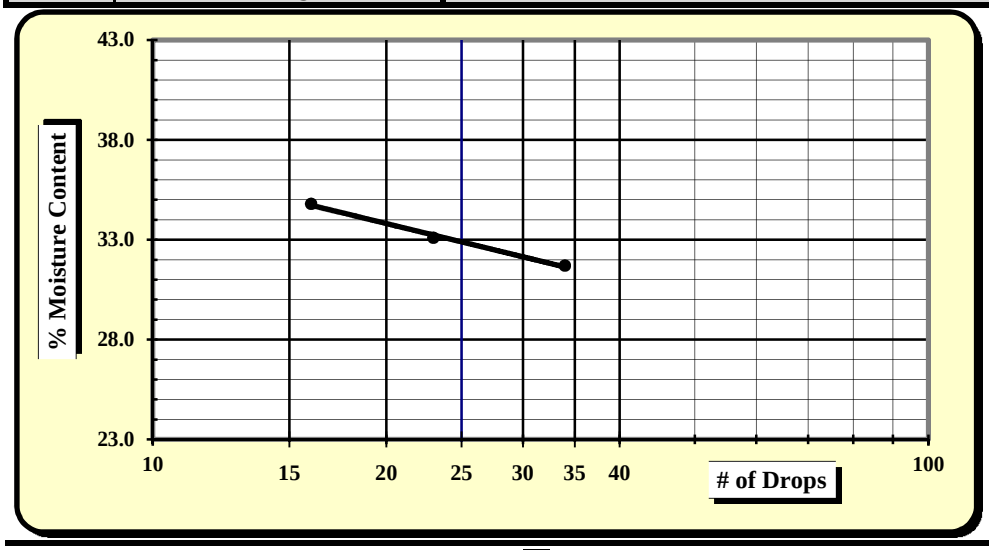
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	218	Sample Date:	9/21/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red orange brown, medium to fine, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.78	15.59	16.93				12.24		
B	Wet Soil Weight + A	38.91	38.48	37.60				21.47		
C	Dry Soil Weight + A	33.34	32.79	32.26				19.54		
D	Water Weight (B-C)	5.57	5.69	5.34				1.93		
E	Dry Soil Weight (C-A)	17.56	17.20	15.33				7.30		
F	% Moisture (D/E)*100	31.7%	33.1%	34.8%				26.4%		
N	# OF DROPS	34	23	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**33**
Plastic Limit	**26**
Plastic Index	**7**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

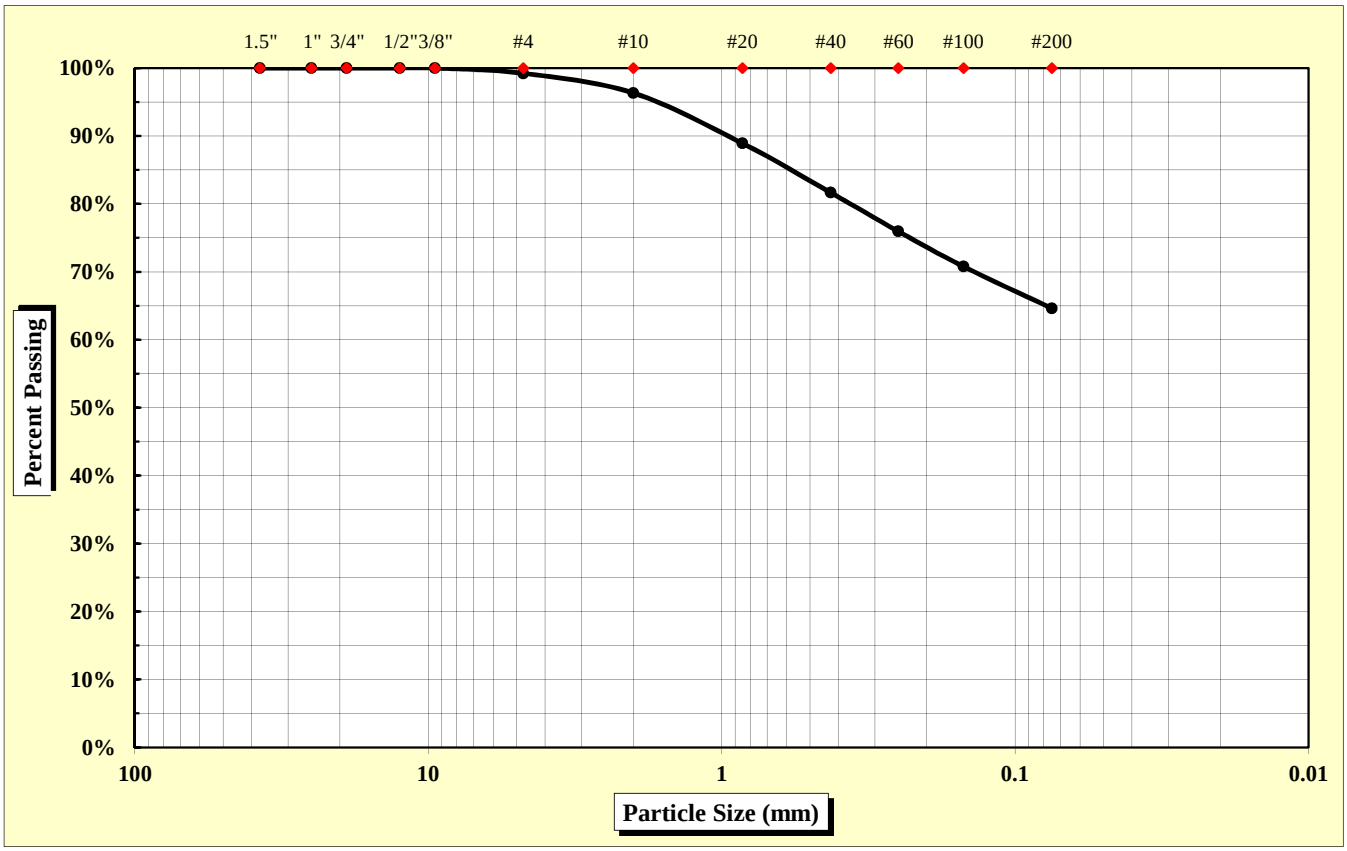
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/8 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	230	Sample Date:	9/22/15
Location:	UD-1	Type:	UD	Depth:	10 - 12'
Sample Description:	Brown orange, medium to fine, sandy SILT (ML) [A-7-5 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.7%	Fine Sand	17.0%
		Coarse Sand	14.7%	Silt & Clay	64.6%
Liquid Limit	42	Plastic Limit	31	Plastic Index	11
		Moisture Content	23.1%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Charlotte 9751 Southern Pine Boulevard Charlotte, NC 28273

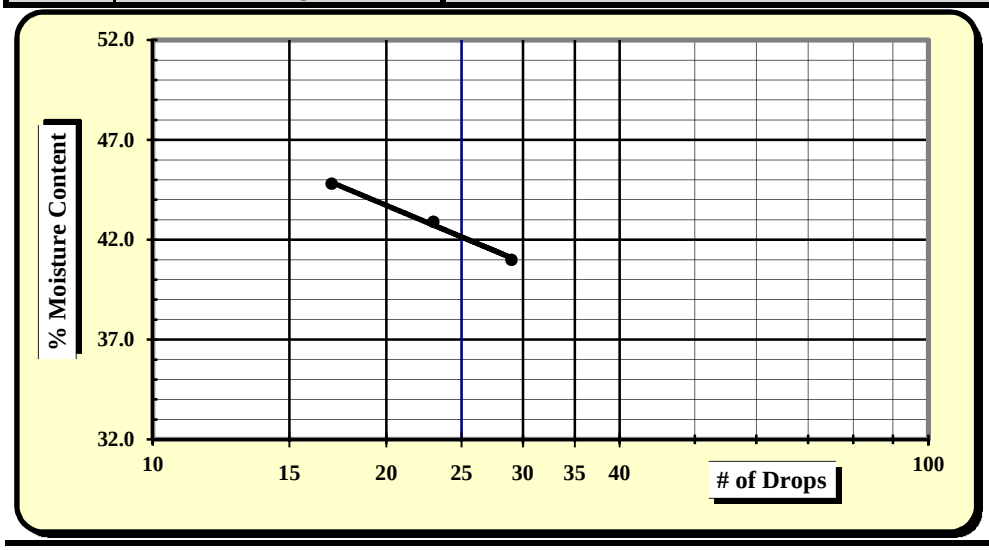
Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/8 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	230	Sample Date:	9/22/15
Location:	UD-1	Type:	UD	Depth:	10 - 12'

Sample Description: Brown orange, medium to fine, sandy SILT (ML) [A-7-5 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	3222	6/3/2015	Grooving tool	29919	1/26/2015
LL Apparatus	27716	1/21/2015			
Oven	22151	2/4/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	53	17	OO				48		
A	Tare Weight	15.80	14.00	16.32				14.00		
B	Wet Soil Weight + A	28.48	27.63	28.77				22.56		
C	Dry Soil Weight + A	24.79	23.54	24.92				20.53		
D	Water Weight (B-C)	3.69	4.09	3.85				2.03		
E	Dry Soil Weight (C-A)	8.99	9.54	8.60				6.53		
F	% Moisture (D/E)*100	41.0%	42.9%	44.8%				31.1%		
N	# OF DROPS	29	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**31**
Plastic Index	**11**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Karen Warner	11/18/15	Brian Vaughan, P.E.	11/18/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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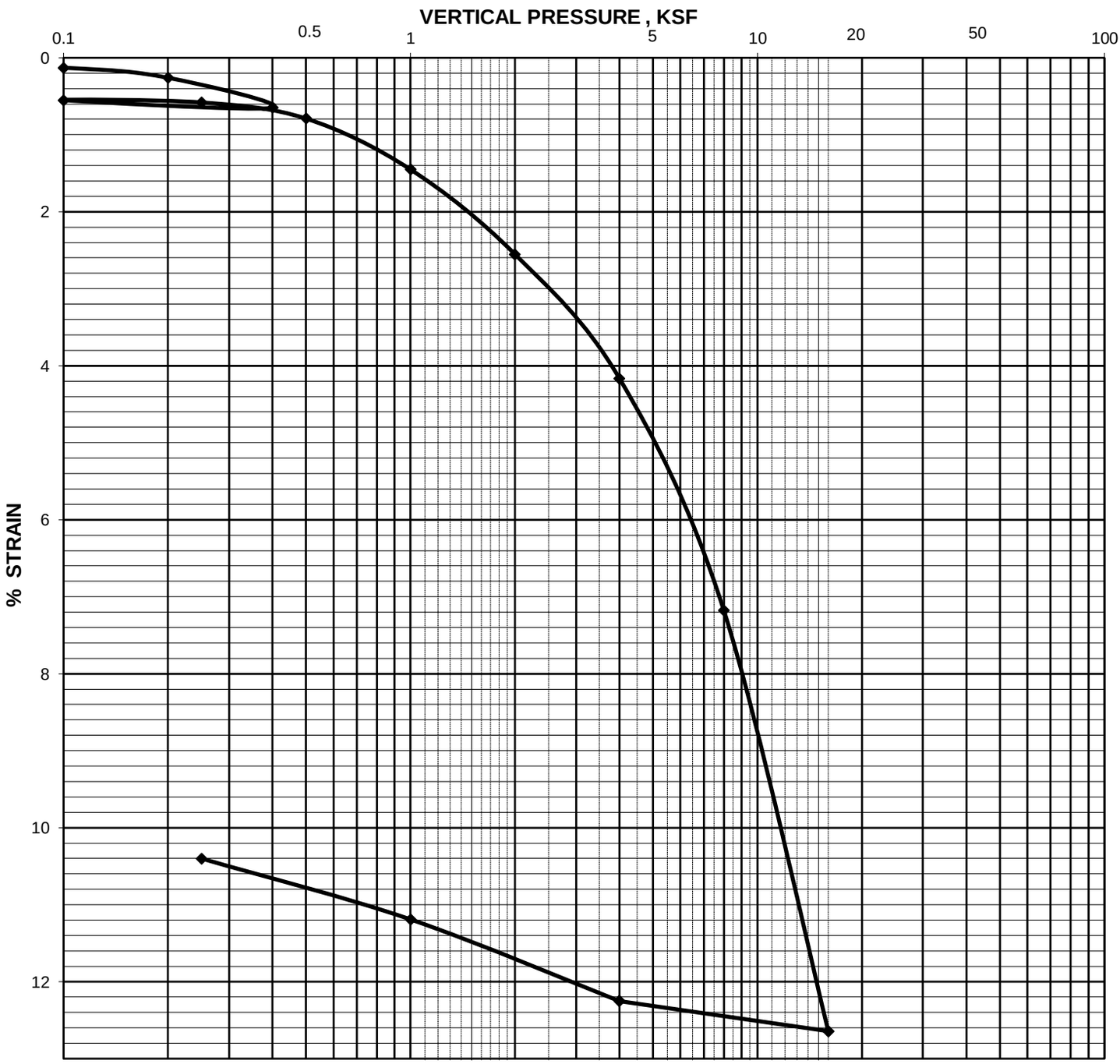
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-9
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	10 - 12'
Initial Wet Density, γ_{wet}, pcf:	112.0	**Load vs. Time Plot:**	Sq. root of t	**Sample Type:**	UD
Initial Void Ratio, e_o:	0.843	**Final Void Ratio, e_f:**	0.651	**Log No.:**	230
Initial Saturation, S_O, %:	78.2	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.65
Initial Dry Density, γ_{DRY}, pcf:	89.7	**Final Dry Density, γ_{DRY}, pcf:**	99.1	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	24.9	**Final Moisture Content, %:**	24.9	**Stress, P_e, ksf:**	5.0
Liquid Limit, %:	42	**Plasticity Index, %:**	11	**Fines, %:**	64.6
Sample Description:	Brown orange, medium to fine, sandy SILT (ML) [A-7-5 (7)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.025, 0.1, 0.2, 0.4, 0.1, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 4.0, 1.0, 0.25

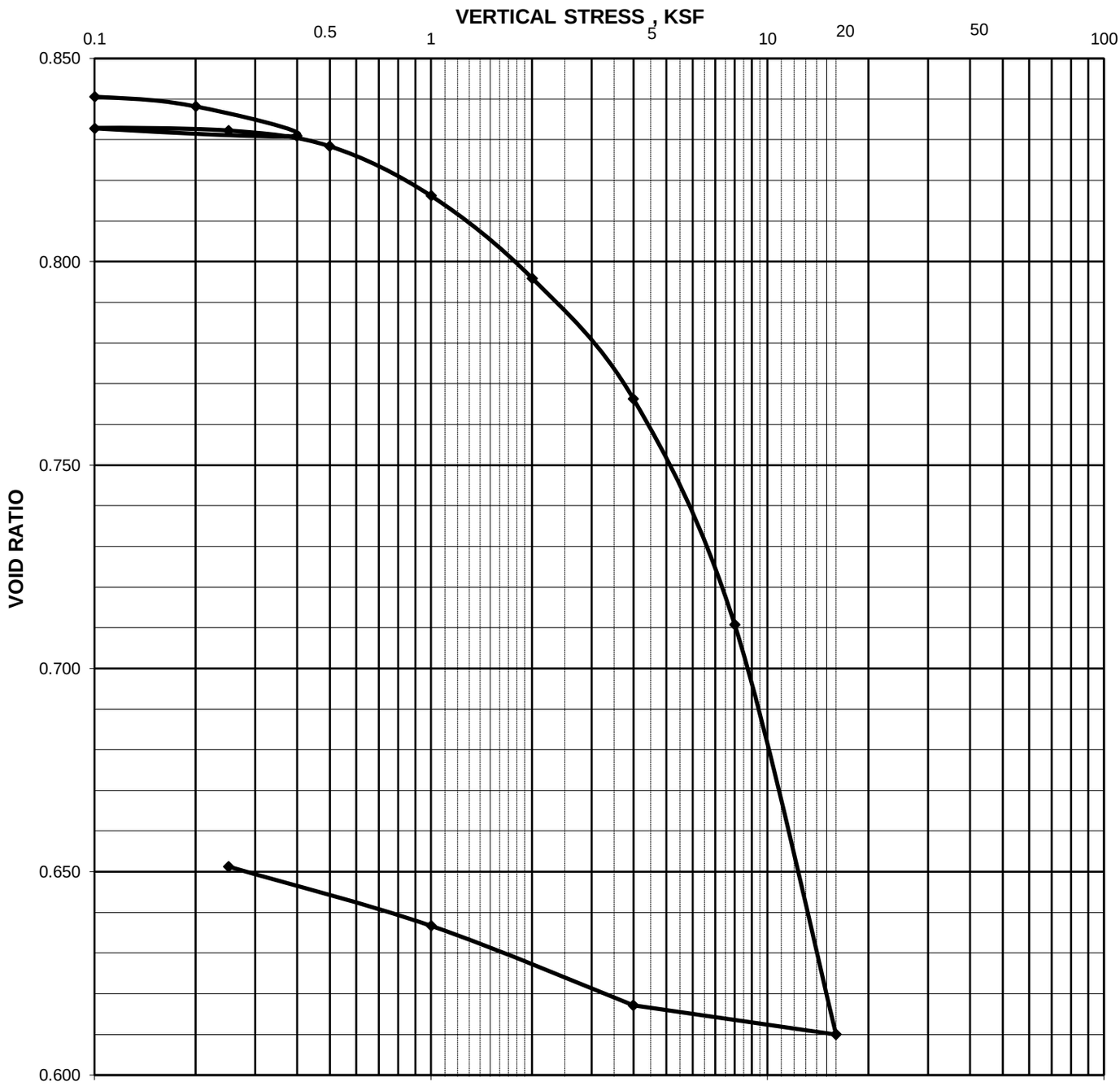


CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96				
Project No.:	**1426-14-161**			**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering			**Boring No.:**	BR-9
Client Address:	1021 Briargate Circle Columbia, SC 29210			**Depth/Elev.:**	10 - 12'
Initial Wet Density, γ_{wet}, pcf:	112.0	**Load vs. Time Plot:**	Sq. root of t	**Sample Type:**	Shelby tube
Initial Void Ratio, e_o:	0.843	**Final Void Ratio, e_f:**	0.651	**Log No.:**	230
Initial Saturation, S_O, %:	78.2	**Final Saturation, S_f, %:**	100.0	**Sp. Gravity, G_S:**	2.65
Initial Dry Density, γ_{DRY}, pcf:	89.7	**Final Dry Density, γ_{DRY}, pcf:**	99.1	**Estimated Preconsolidation**	
Initial Moisture Content, %.:	24.9	**Final Moisture Content, %:**	24.9	**Stress, P_e, ksf:**	5.0
Liquid Limit, %:	42	**Plasticity Index, %:**	11	**Fines, %:**	64.6
Sample Description:	Brown orange, medium to fine, sandy SILT (ML) [A-7-5 (7)]				
Remolded Properties:	-	-		-	

Notes: Loading Schedule - (ksf) - 0.025, 0.1, 0.2, 0.4, 0.1, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0, 4.0, 1.0, 0.25

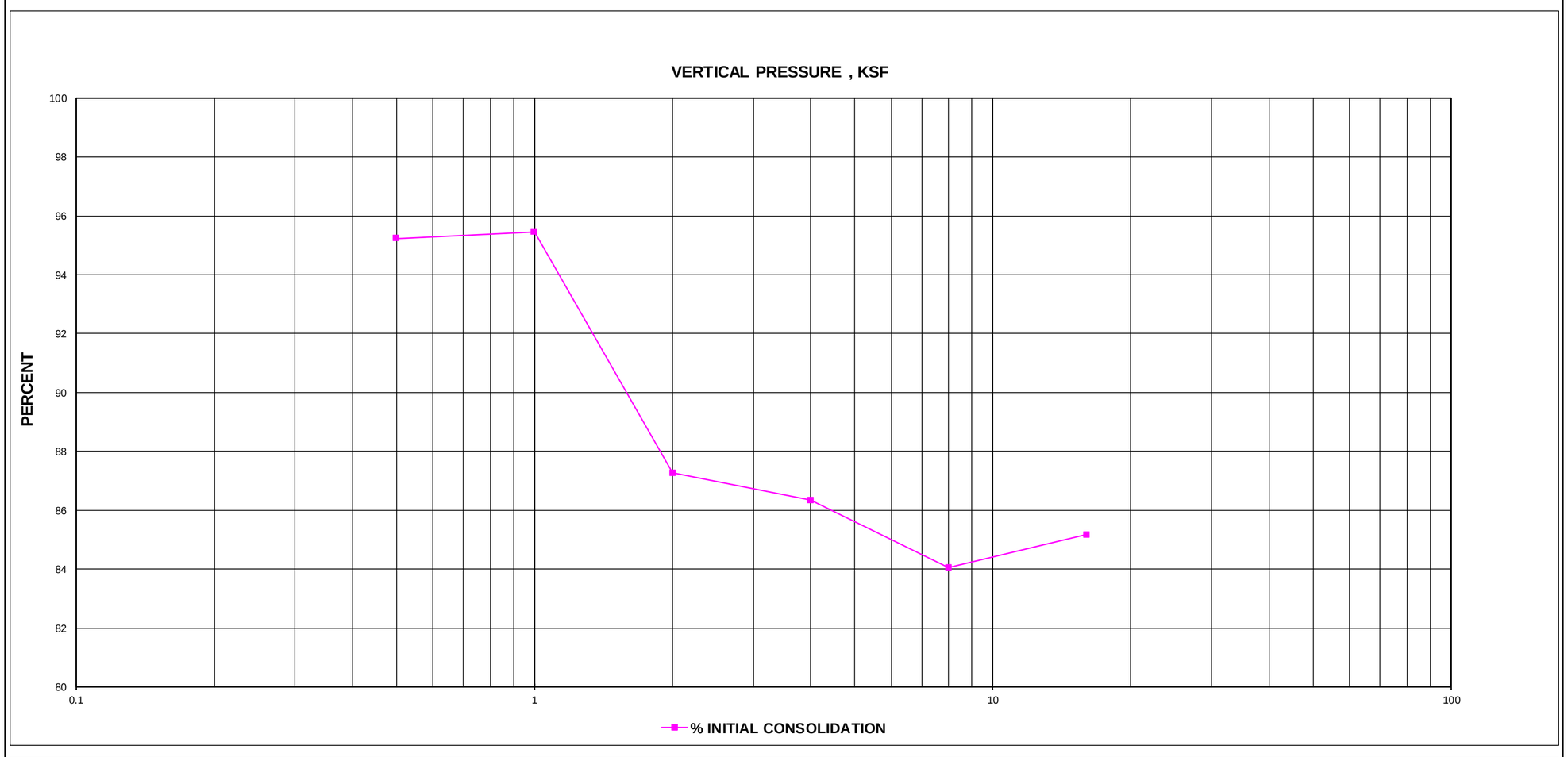


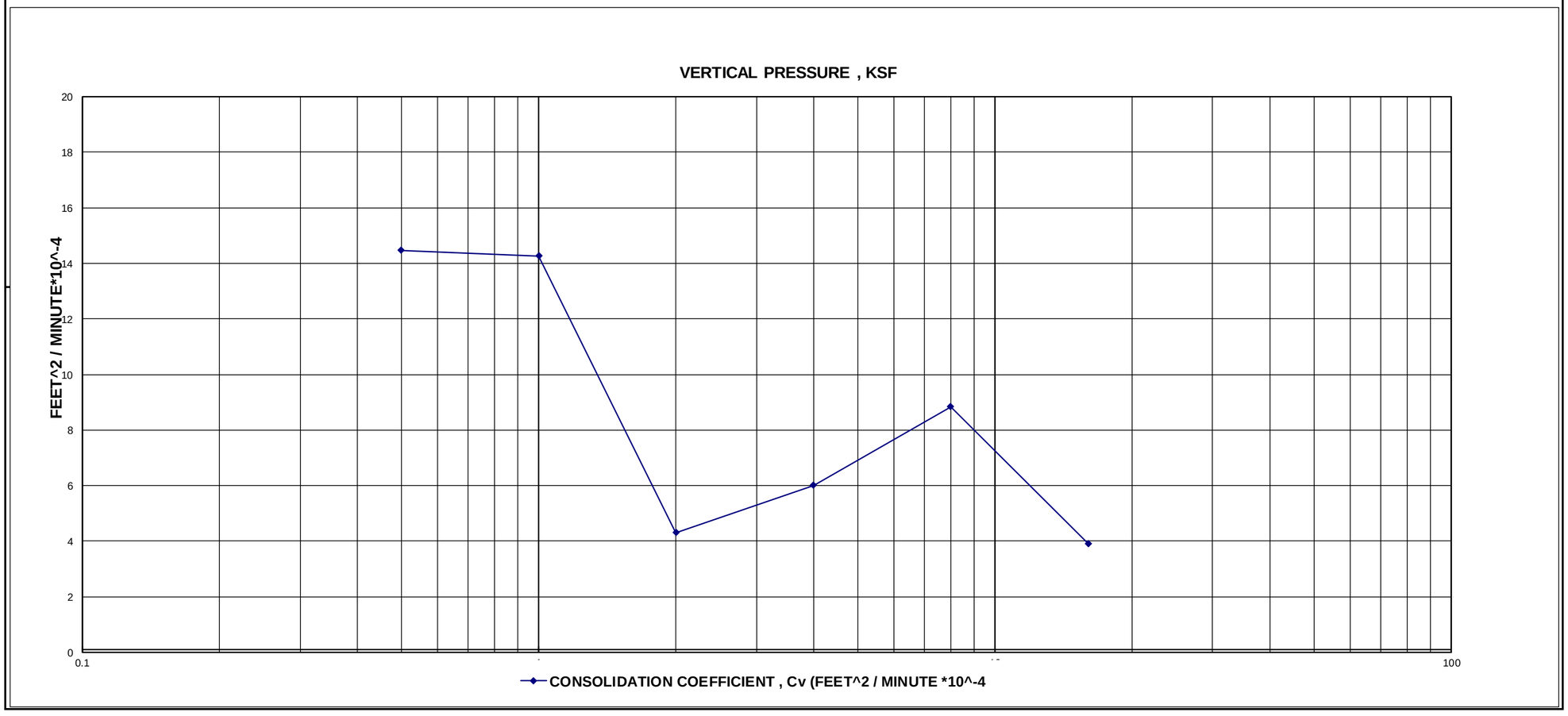
CONSOLIDATION TEST REPORT

(ASTM D 2435)

Project Name:	I-85 Widening MM80-96		
Project No.:	**1426-14-161**	**Report Date:**	11/18/2015
Client Name:	Infrastructure Consulting & Engineering	**Boring No.:**	BR-9
Client Address:	1021 Briargate Circle Columbia, SC 29210	**Depth/Elev.:**	10 - 12'

Pressure (ksf)	D_0 (in.)	D_{100} (in.)	D_{50} (in.)	Stone Correction (in.)	D_{0c} (in.)	D_{100c}	D_{50c} (in.)	h (in.)	VOID RATIO e	Percent Strain (%)	t_{50}/t_{90} t_{90}	C_v Log of Time ($ft^2/10^{-4}min$)	C_i (%)
0.025		0.0006		0.0000		0.0006			0.842	0.060			
0.1		0.0013		0.0000		0.0013			0.841	0.130			
0.2		0.0026		0.0000		0.0026			0.838	0.260			
0.4		0.0065		0.0000		0.0065			0.831	0.651			
0.1		0.0055		0.0000		0.0055			0.833	0.551			
0.25		0.0058		0.0000		0.0058			0.832	0.581			
0.5	0.0078	0.0079	0.0078	0.0000	0.0078	0.0079	0.0078	0.4956	0.828	0.791	1.00	14.46	95.2
1.0	0.0142	0.0145	0.0144	0.0000	0.0142	0.0145	0.0144	0.4923	0.816	1.451	1.00	14.27	95.5
2.0	0.0241	0.0255	0.0248	0.0000	0.0241	0.0255	0.0248	0.4871	0.796	2.553	3.24	4.31	87.3
4.0	0.0394	0.0416	0.0405	0.0000	0.0394	0.0416	0.0405	0.4793	0.766	4.164	2.25	6.01	86.3
8.0	0.0669	0.0717	0.0693	0.0000	0.0669	0.0717	0.0693	0.4649	0.711	7.177	1.44	8.84	84.1
16.0	0.1182	0.1263	0.1222	0.0000	0.1182	0.1263	0.1222	0.4384	0.610	12.643	2.89	3.92	85.2
4.0		0.1224		0.0000		0.1224			0.617	12.252			
1.0		0.1118		0.0000		0.1118			0.637	11.191			
0.25		0.1039		0.0000		0.1039			0.651	10.400			





I-85 Widening MM80 - MM96
Spartanburg & Cherokee Counties, South Carolina
SCDOT Project ID: WBS No. 88P027114E1.SIB.1
S&ME Project No. 1426-14-161

Boring: **BR-9**
Sample ID: **"UD-1"**
Sample Depth: **10' - 12'**
Classification: **ML / A-7-5 (7)**
Test Performed: **Consolidation**
Estimated Pre-Consolidation Pressure: **5000 psf**

Percent Finer #200 Sieve: **64.6%**
Natural Moisture Content: **23.1%**
Atterberg Limits: **LL = 42, PL = 31, PI = 11**
SPT N Value: **10 bpf**

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

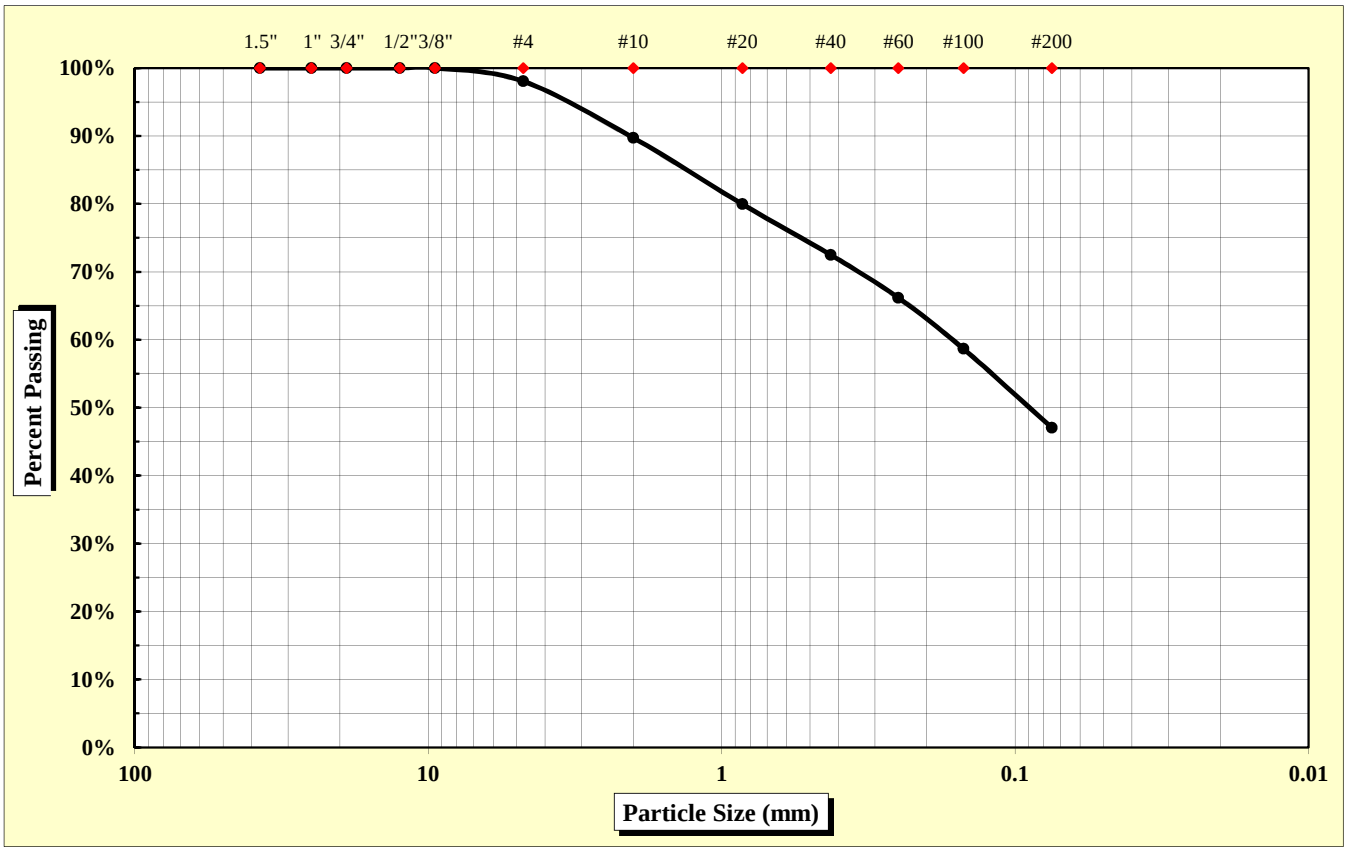
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	241	Sample Date:	9/21/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'
Sample Description:	Brown yellow red, medium to fine, micaceous, clayey SAND (SC) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	10.3%	Fine Sand	25.4%
		Coarse Sand	17.2%	Silt & Clay	47.1%
Liquid Limit	32	Plastic Limit	23	Plastic Index	9
		Moisture Content	25.5%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

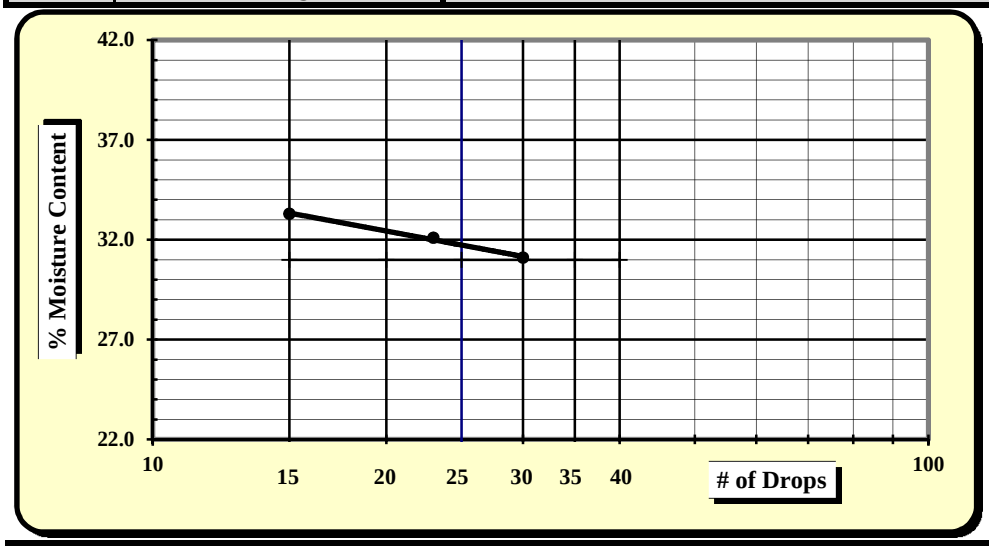
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-9	Sample #:	241	Sample Date:	9/21/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'

Sample Description: Brown yellow red, medium to fine, micaceous, clayey SAND (SC) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	100	507	J1				xx1		
A	Tare Weight	12.10	12.17	12.09				12.27		
B	Wet Soil Weight + A	19.81	24.56	23.47				20.84		
C	Dry Soil Weight + A	17.98	21.55	20.63				19.23		
D	Water Weight (B-C)	1.83	3.01	2.84				1.61		
E	Dry Soil Weight (C-A)	5.88	9.38	8.54				6.96		
F	% Moisture (D/E)*100	31.1%	32.1%	33.3%				23.1%		
N	# OF DROPS	30	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**32**
Plastic Limit	**23**
Plastic Index	**9**
Group Symbol	**SC / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

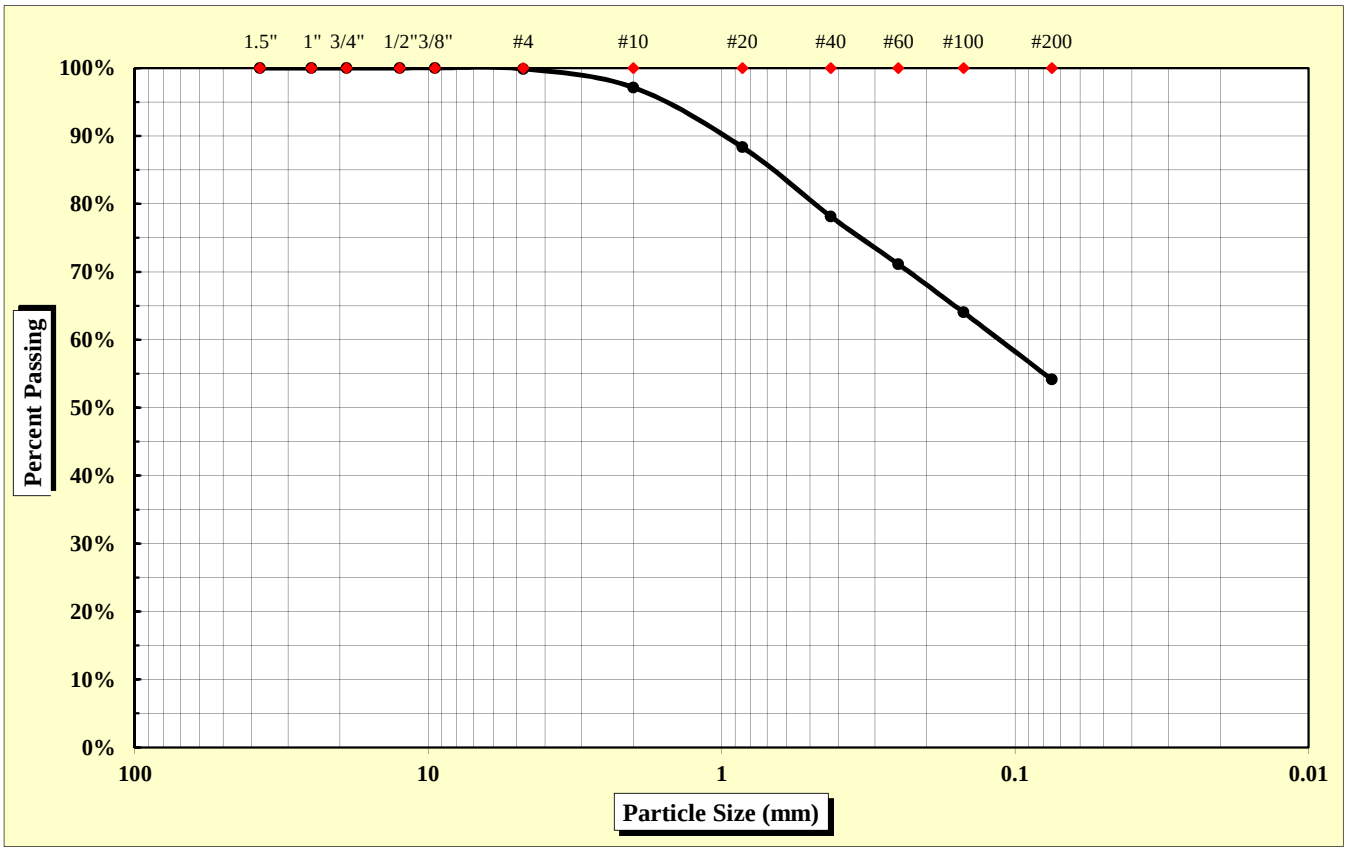
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	218	Sample Date:	9/23/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Orange tan, medium to fine, sandy SILT (ML) [A-4 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.8%	Fine Sand	24.0%
		Coarse Sand	19.0%	Silt & Clay	54.2%
Liquid Limit	38	Plastic Limit	30	Plastic Index	8
		Moisture Content	17.6%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

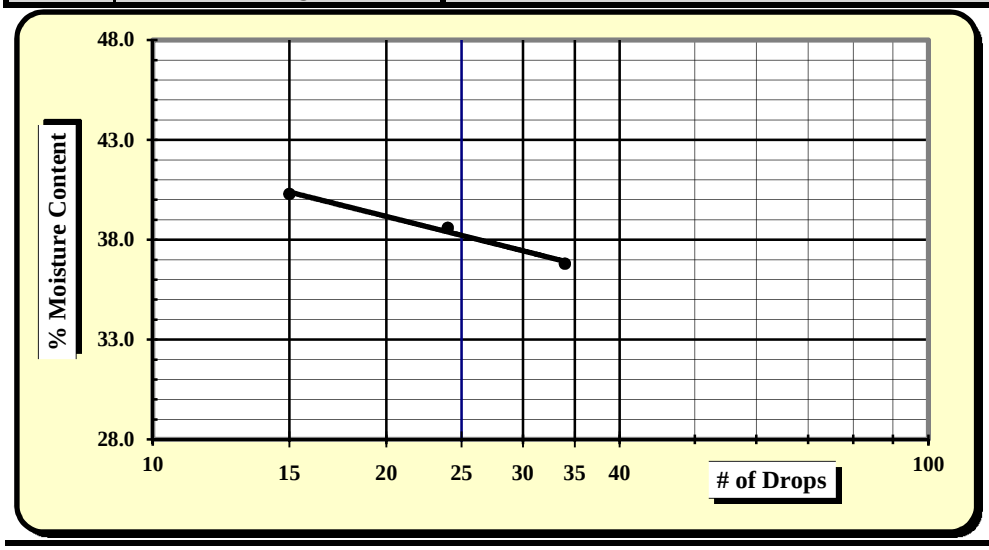
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	218	Sample Date:	9/23/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Orange tan, medium to fine, sandy SILT (ML) [A-4 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.81	15.70	15.93				11.17		
B	Wet Soil Weight + A	37.22	36.94	36.42				20.78		
C	Dry Soil Weight + A	31.46	31.03	30.53				18.55		
D	Water Weight (B-C)	5.76	5.91	5.89				2.23		
E	Dry Soil Weight (C-A)	15.65	15.33	14.60				7.38		
F	% Moisture (D/E)*100	36.8%	38.6%	40.3%				30.2%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**30**
Plastic Index	**8**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 54.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

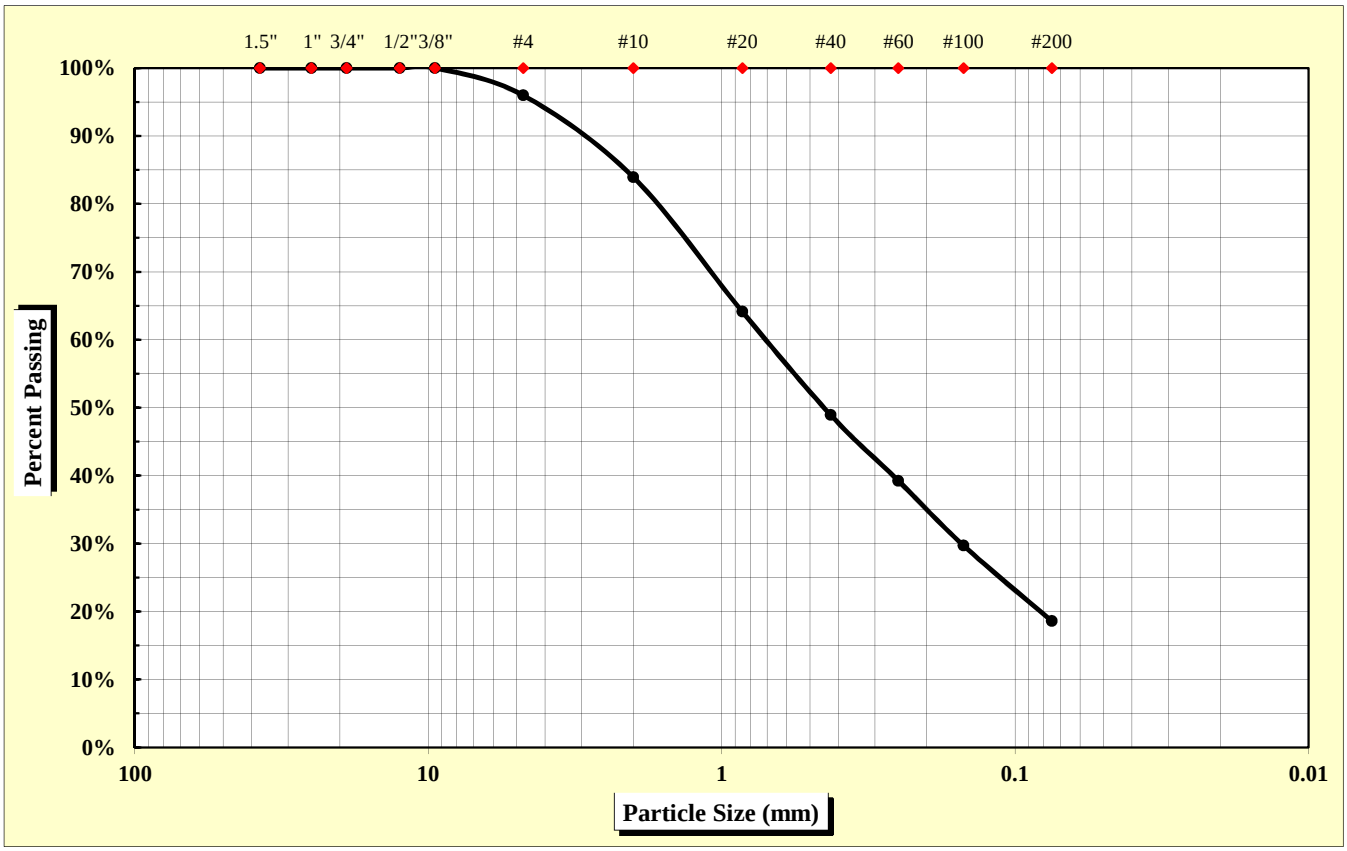
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	230	Sample Date:	9/23/15
Location:	UD-1	Type:	UD	Depth:	4 - 6'
Sample Description:	White brown gray, fine to coarse, micaceous, silty SAND (SM) [A-1-b]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	16.1%	Fine Sand	30.3%
		Coarse Sand	35.0%	Silt & Clay	18.6%
Liquid Limit	45	Plastic Limit	44	Plastic Index	1
		Moisture Content	14.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

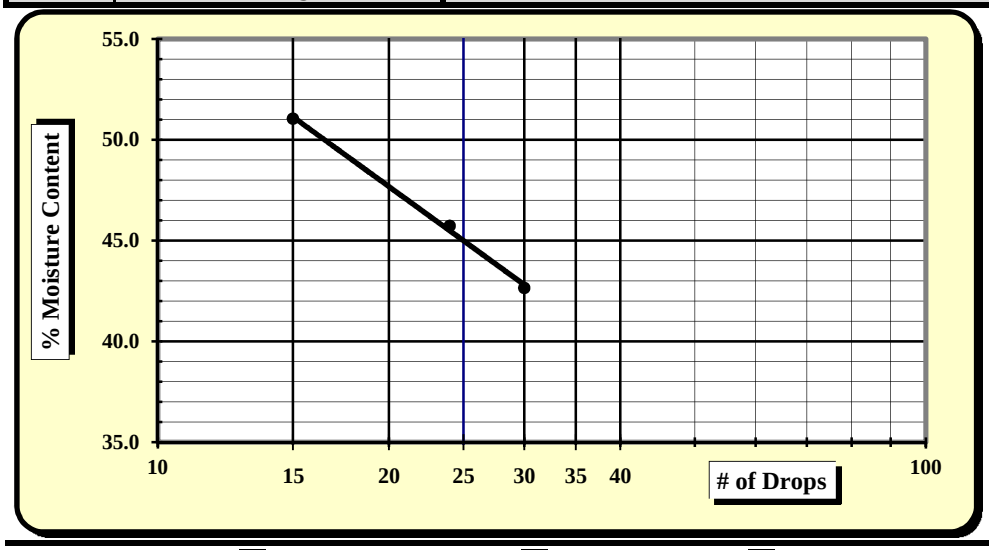
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	230	Sample Date:	9/23/15
Location:	UD-1	Type:	UD	Depth:	4 - 6'

Sample Description: White brown gray, fine to coarse, micaceous, silty SAND (SM) [A-1-b]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	55	12	4				14		
A	Tare Weight	15.20	11.13	10.98				12.97		
B	Wet Soil Weight + A	24.80	24.10	25.27				21.22		
C	Dry Soil Weight + A	21.93	20.03	20.44				18.70		
D	Water Weight (B-C)	2.87	4.07	4.83				2.52		
E	Dry Soil Weight (C-A)	6.73	8.90	9.46				5.73		
F	% Moisture (D/E)*100	42.6%	45.7%	51.1%				44.0%		
N	# OF DROPS	30	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**44.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**44**
Plastic Index	**1**
Group Symbol	**SM / A-1-b**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 18.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
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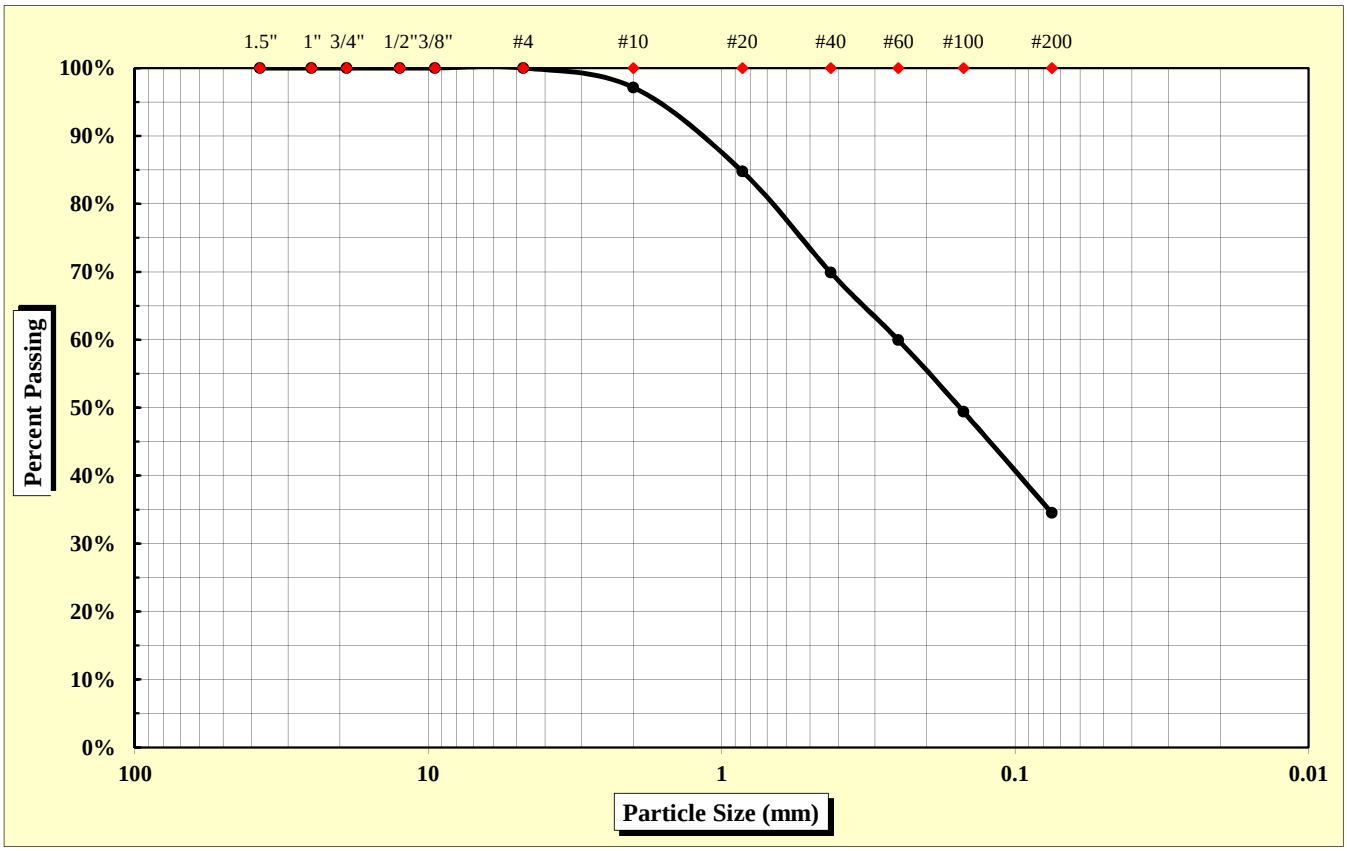
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/7 - 10/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	218	Sample Date:	9/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Tan brown, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.8%	Fine Sand	35.4%
		Coarse Sand	27.2%	Silt & Clay	34.5%
Liquid Limit	34	Plastic Limit	31	Plastic Index	3
		Moisture Content	15.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

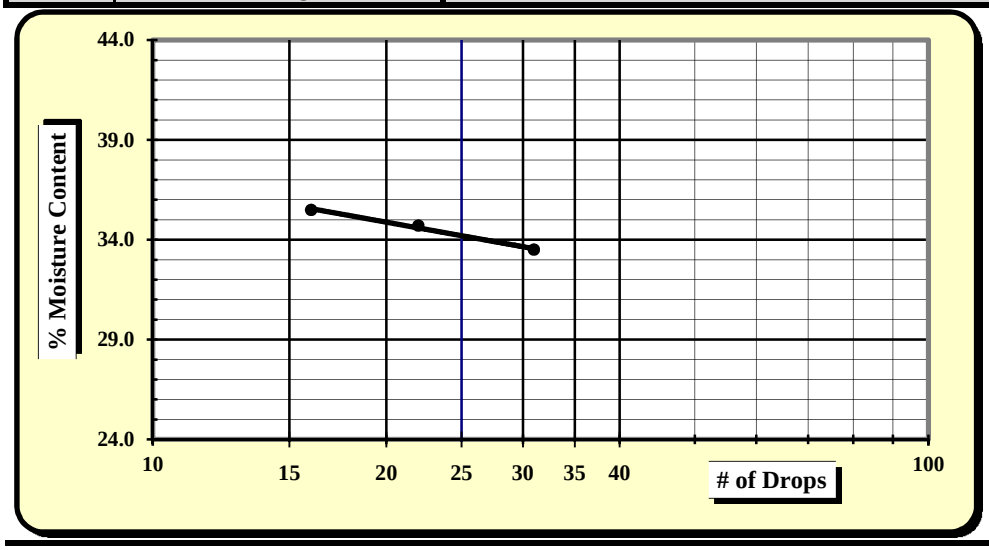
Project #:	**1426-14-161**	Report Date:	10/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	218	Sample Date:	9/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Tan brown, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.93	16.93	16.79				12.11		
B	Wet Soil Weight + A	38.53	39.72	37.82				21.07		
C	Dry Soil Weight + A	33.11	33.85	32.31				18.95		
D	Water Weight (B-C)	5.42	5.87	5.51				2.12		
E	Dry Soil Weight (C-A)	16.18	16.92	15.52				6.84		
F	% Moisture (D/E)*100	33.5%	34.7%	35.5%				31.0%		
N	# OF DROPS	31	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**31**
Plastic Index	**3**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/13/15	Brian Vaughan, P.E.	10/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

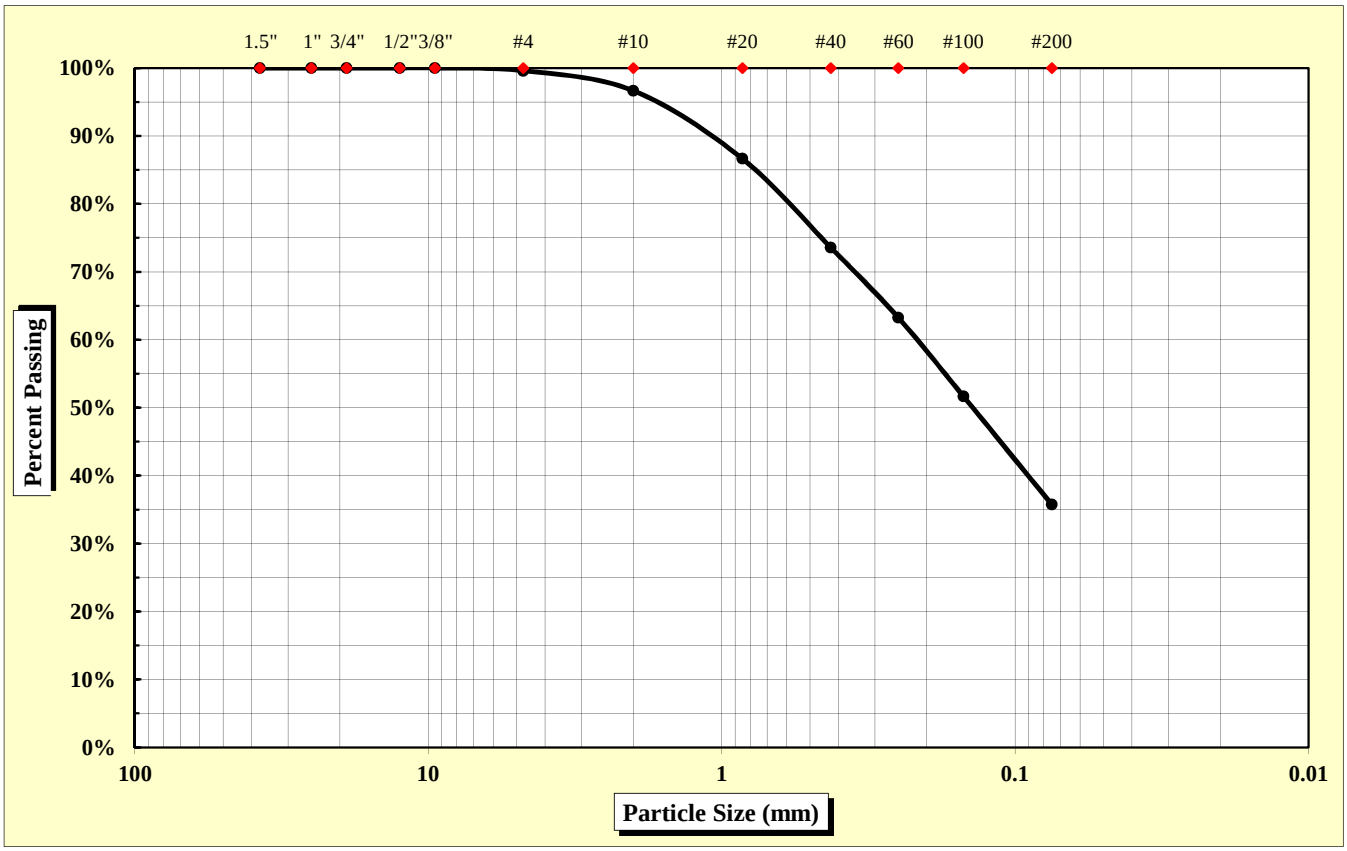
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/25 - 12/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	241	Sample Date:	9/23/15
Location:	SS-6/7/8/9/10	Type:	Split-spoon	Depth:	13.5 - 35'
Sample Description:	Light brown tan white, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.3%	Fine Sand	37.8%
		Coarse Sand	23.1%	Silt & Clay	35.7%
Liquid Limit	35	Plastic Limit	28	Plastic Index	7
		Moisture Content	22.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

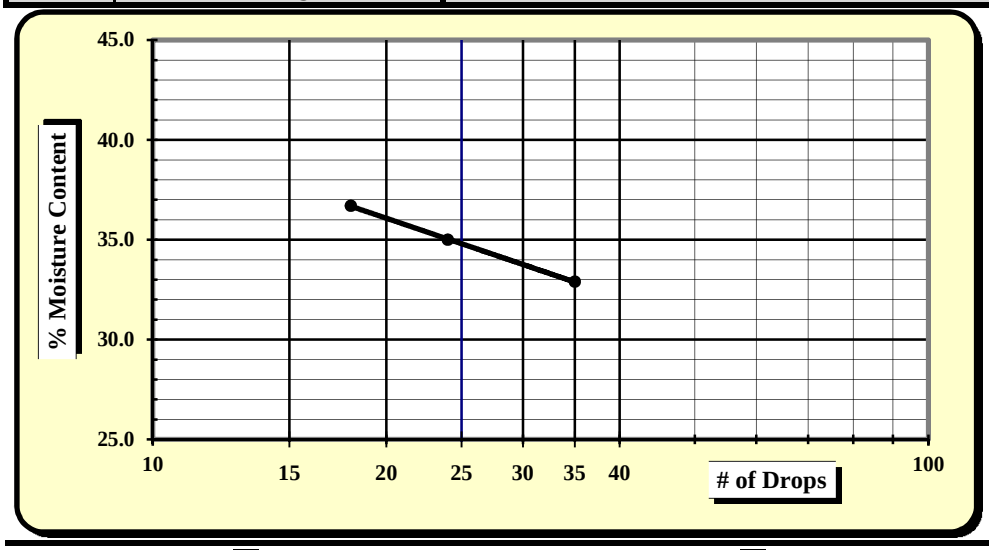
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	BR-10	Sample #:	241	Sample Date:	9/23/15
Location:	SS-6/7/8/9/10	Type:	Split-spoon	Depth:	13.5 - 35'

Sample Description: Light brown tan white, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.64	16.65	15.98				12.10		
B	Wet Soil Weight + A	40.71	40.51	39.37				20.75		
C	Dry Soil Weight + A	34.75	34.32	33.09				18.88		
D	Water Weight (B-C)	5.96	6.19	6.28				1.87		
E	Dry Soil Weight (C-A)	18.11	17.67	17.11				6.78		
F	% Moisture (D/E)*100	32.9%	35.0%	36.7%				27.6%		
N	# OF DROPS	35	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**28**
Plastic Index	**7**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 35.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

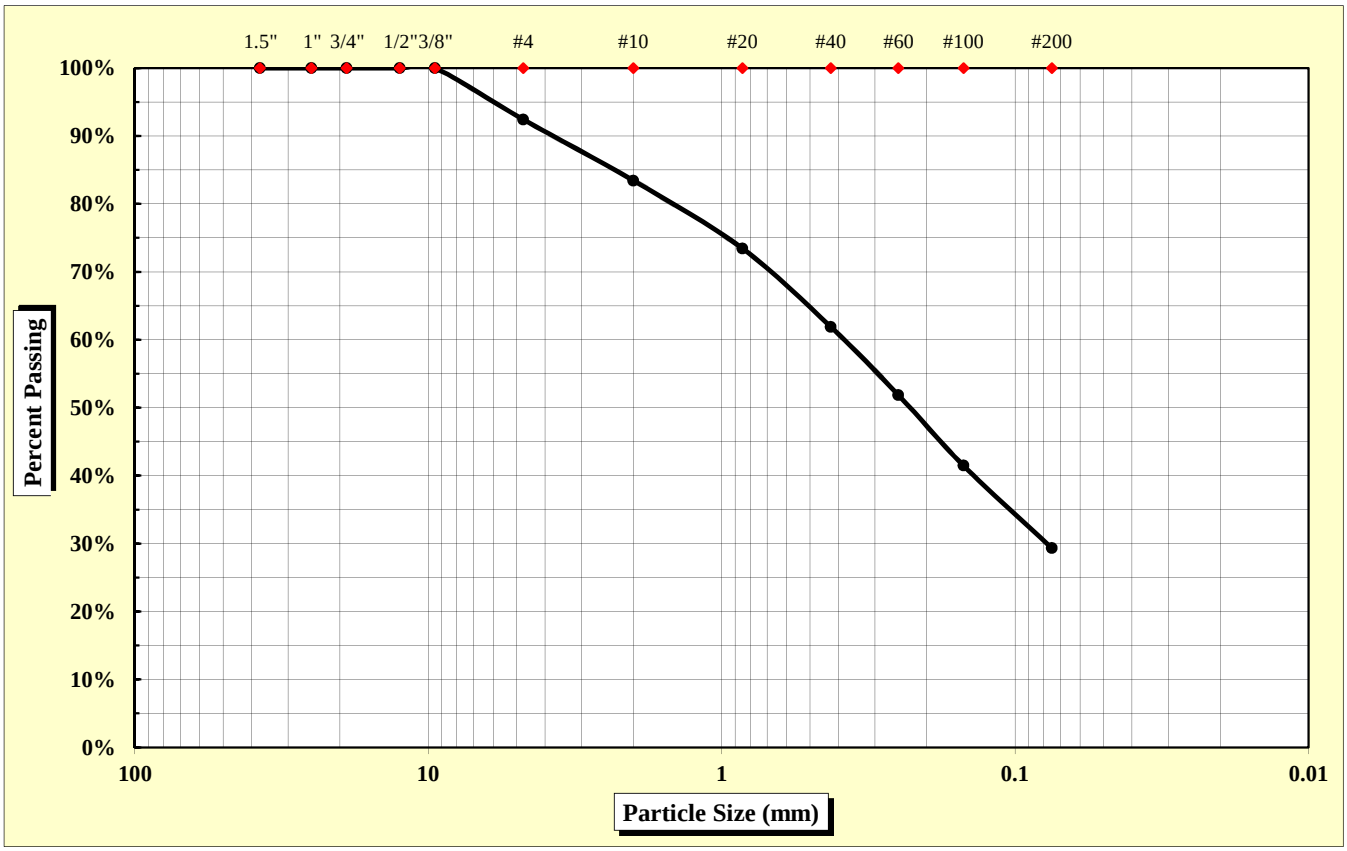
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-2	Sample #:	230	Sample Date:	10/22/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Brown, fine to coarse, slightly micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	16.6%	Fine Sand	32.6%
		Coarse Sand	21.5%	Silt & Clay	29.3%
Liquid Limit	27	Plastic Limit	24	Plastic Index	3
		Moisture Content	17.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

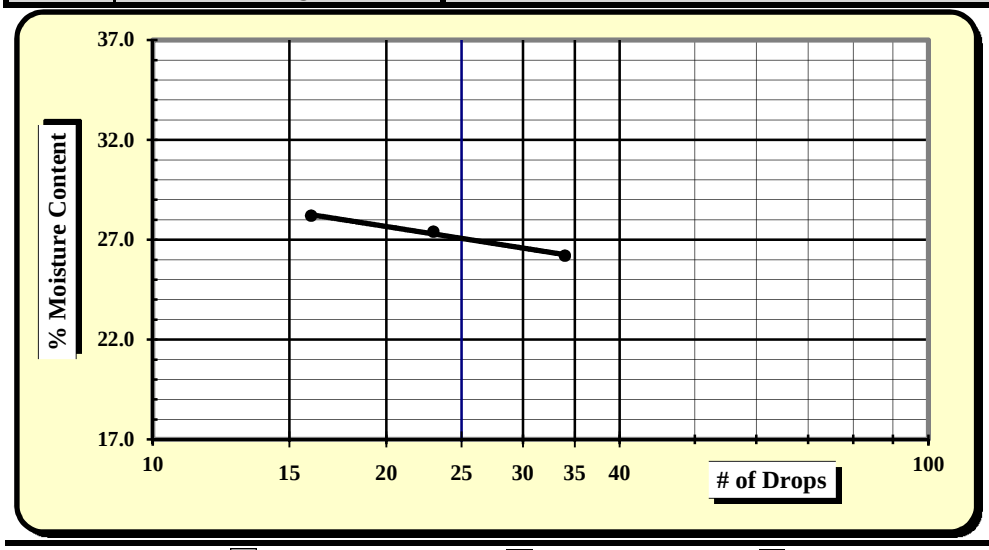
Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-2	Sample #:	230	Sample Date:	10/22/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Brown, fine to coarse, slightly micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.67	15.73				12.15		
B	Wet Soil Weight + A	41.50	40.32	40.59				21.40		
C	Dry Soil Weight + A	36.35	35.24	35.12				19.61		
D	Water Weight (B-C)	5.15	5.08	5.47				1.79		
E	Dry Soil Weight (C-A)	19.64	18.57	19.39				7.46		
F	% Moisture (D/E)*100	26.2%	27.4%	28.2%				24.0%		
N	# OF DROPS	34	23	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**24**
Plastic Index	**3**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/27/15	Brian Vaughan, P.E.	11/27/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

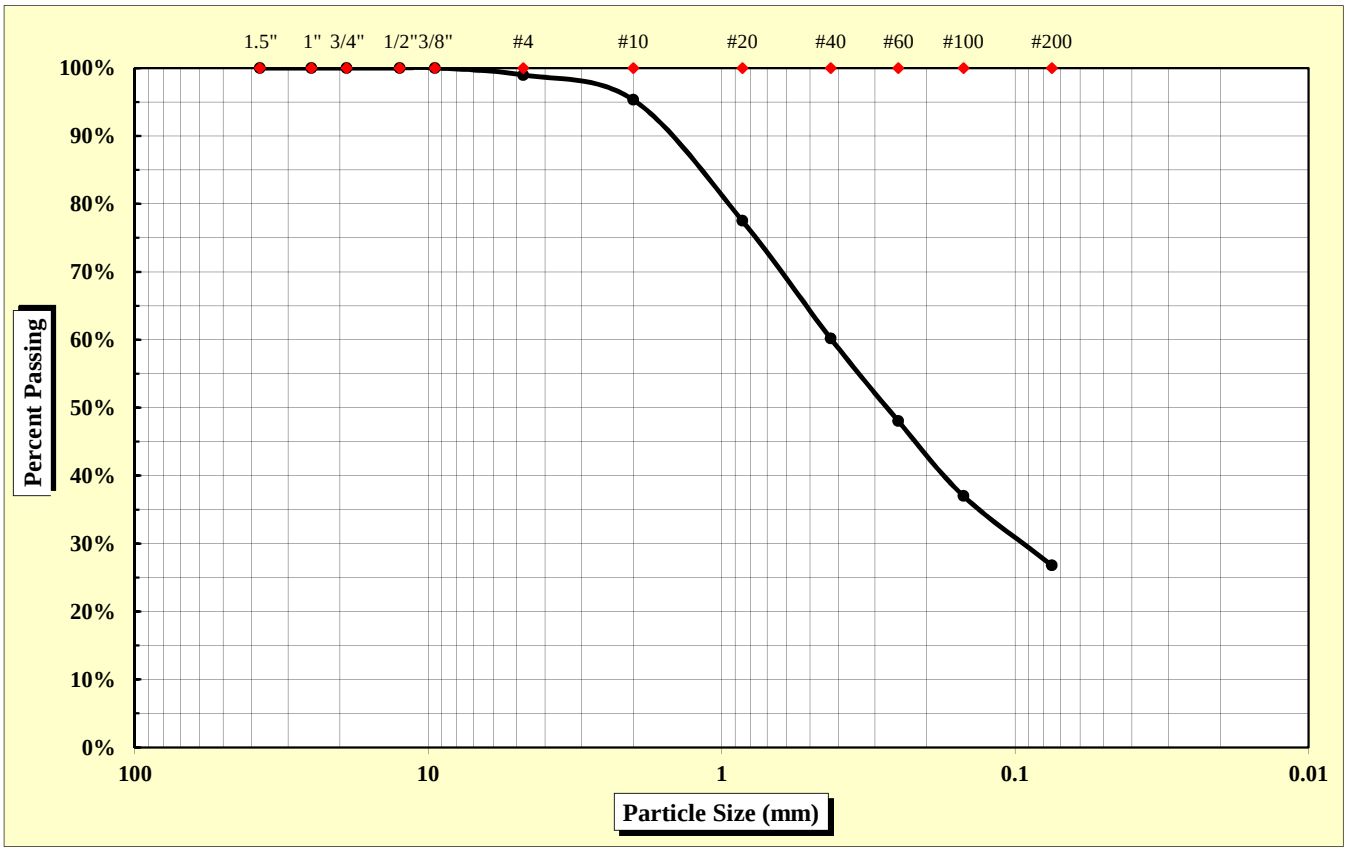
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-2	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Light red tan, fine to medium, slightly micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.7%	Fine Sand	33.4%
		Coarse Sand	35.1%	Silt & Clay	26.8%
Liquid Limit	25	Plastic Limit	23	Plastic Index	2
		Moisture Content	19.2%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

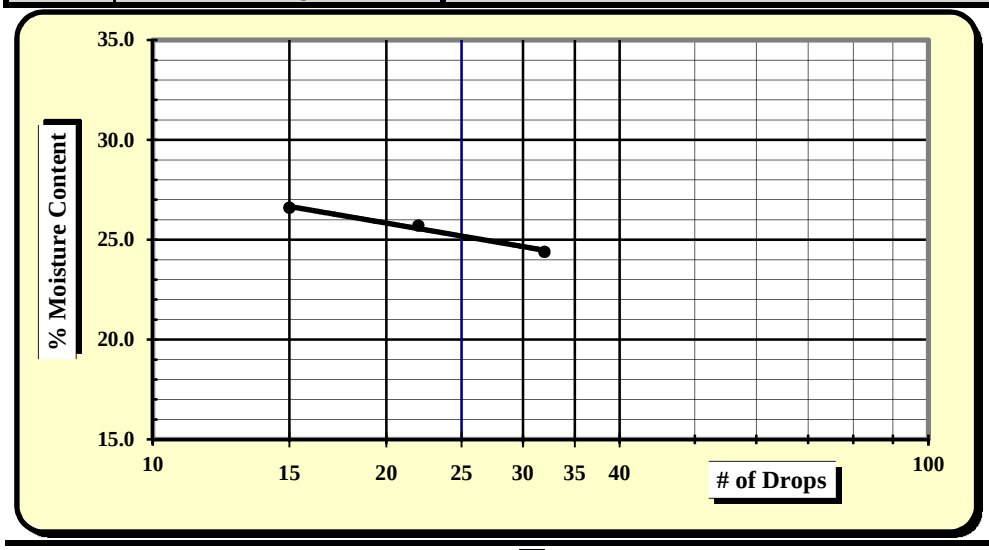
Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-2	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Light red tan, fine to medium, slightly micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.46	16.50	17.00				11.59		
B	Wet Soil Weight + A	42.89	41.00	41.37				19.74		
C	Dry Soil Weight + A	37.71	35.99	36.25				18.23		
D	Water Weight (B-C)	5.18	5.01	5.12				1.51		
E	Dry Soil Weight (C-A)	21.25	19.49	19.25				6.64		
F	% Moisture (D/E)*100	24.4%	25.7%	26.6%				22.7%		
N	# OF DROPS	32	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**25**
Plastic Limit	**23**
Plastic Index	**2**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 26.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/30/15	Brian Vaughan, P.E.	11/30/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

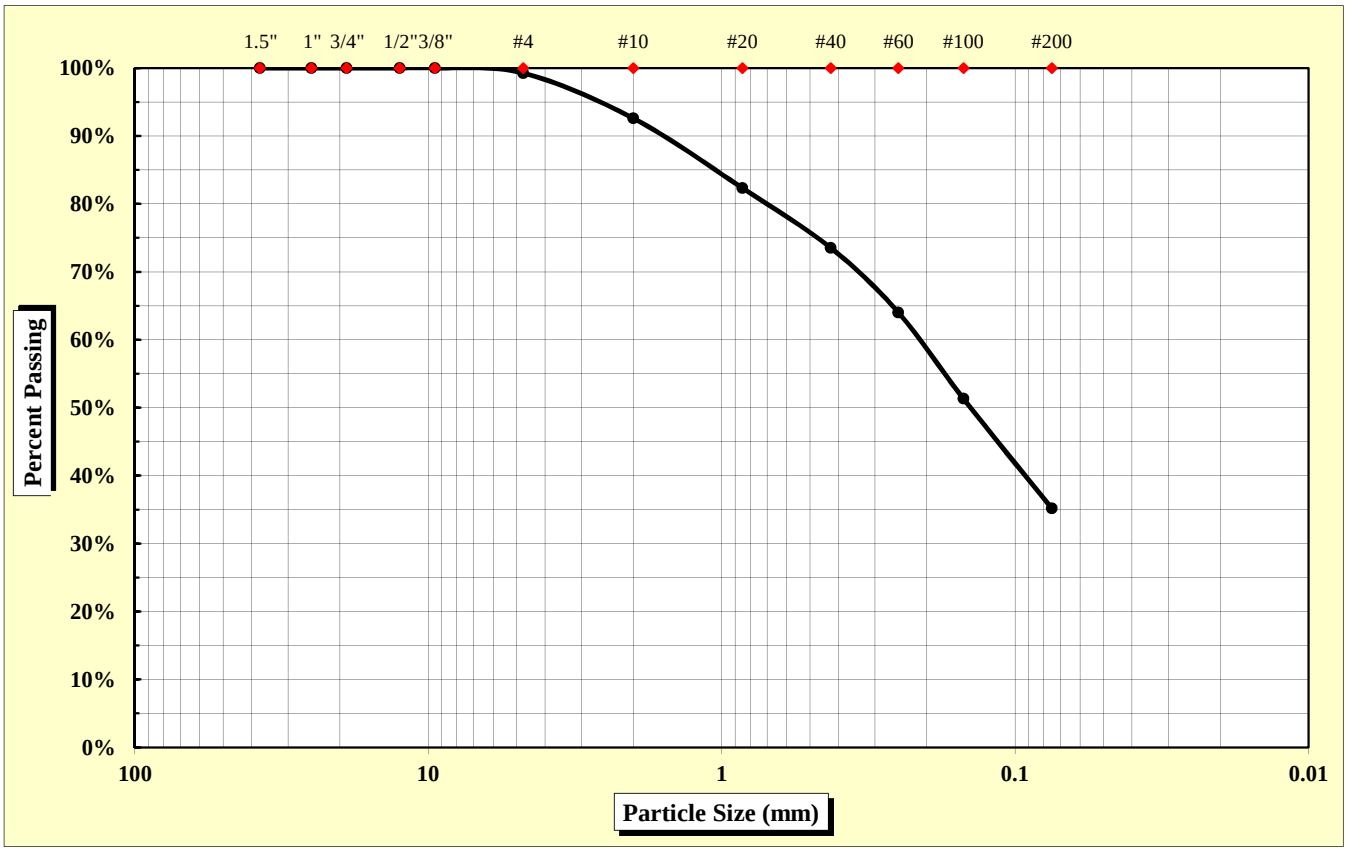
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/10 - 11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1 - 5'
Sample Description:	Dark plum brown, medium to fine, slightly micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	7.4%	Fine Sand	38.3%
		Coarse Sand	19.1%	Silt & Clay	35.2%
Liquid Limit	30	Plastic Limit	26	Plastic Index	4
		Moisture Content	19.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

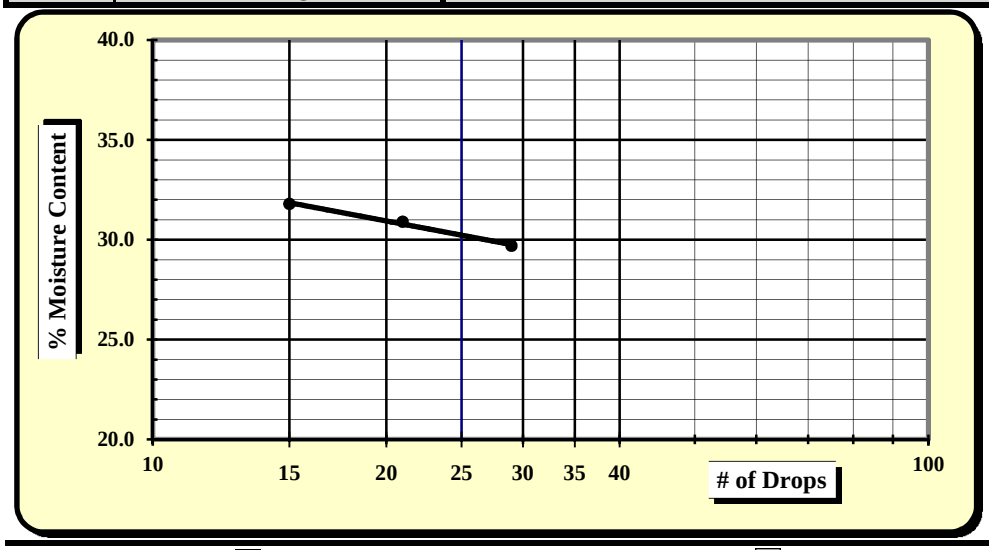
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1 - 5'

Sample Description: Dark plum brown, medium to fine, slightly micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.84	16.75	15.92				12.00		
B	Wet Soil Weight + A	39.25	38.60	38.39				20.51		
C	Dry Soil Weight + A	34.12	33.44	32.97				18.75		
D	Water Weight (B-C)	5.13	5.16	5.42				1.76		
E	Dry Soil Weight (C-A)	17.28	16.69	17.05				6.75		
F	% Moisture (D/E)*100	29.7%	30.9%	31.8%				26.1%		
N	# OF DROPS	29	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**26**
Plastic Index	**4**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 35.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

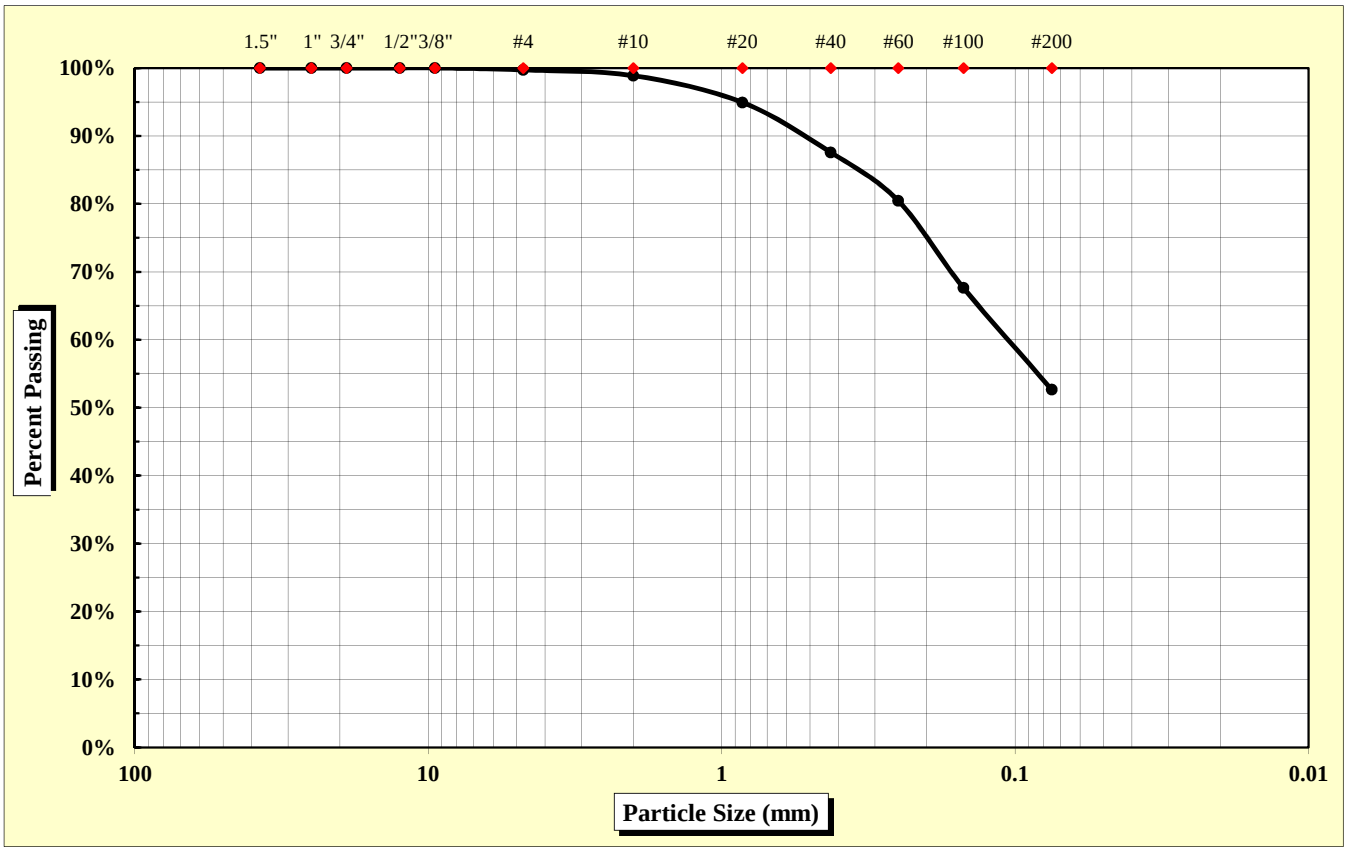
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-3	Type:	Split-spoon	Depth:	5 - 7'
Sample Description:	Red brown white, medium to fine, sandy SILT (ML) [A-7-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.1%	Fine Sand	34.9%
		Coarse Sand	11.3%	Silt & Clay	52.7%
Liquid Limit	47	Plastic Limit	35	Plastic Index	12
		Moisture Content	38.6%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

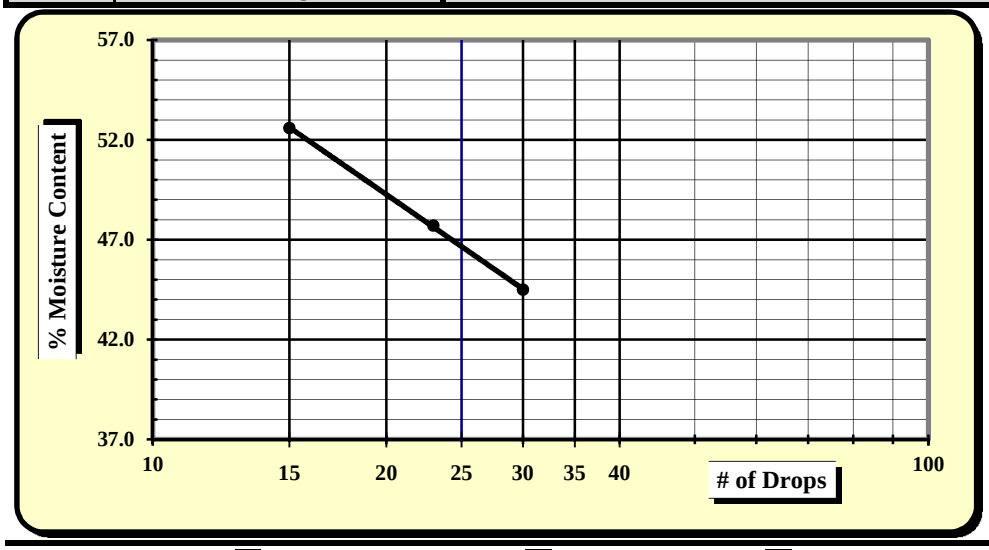
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-3	Type:	Split-spoon	Depth:	5 - 7'

Sample Description: Red brown white, medium to fine, sandy SILT (ML) [A-7-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.99	27.78	26.33				27.35		
B	Wet Soil Weight + A	44.89	45.17	43.93				37.49		
C	Dry Soil Weight + A	39.38	39.55	37.86				34.88		
D	Water Weight (B-C)	5.51	5.62	6.07				2.61		
E	Dry Soil Weight (C-A)	12.39	11.77	11.53				7.53		
F	% Moisture (D/E)*100	44.5%	47.7%	52.6%				34.7%		
N	# OF DROPS	30	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**35**
Plastic Index	**12**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

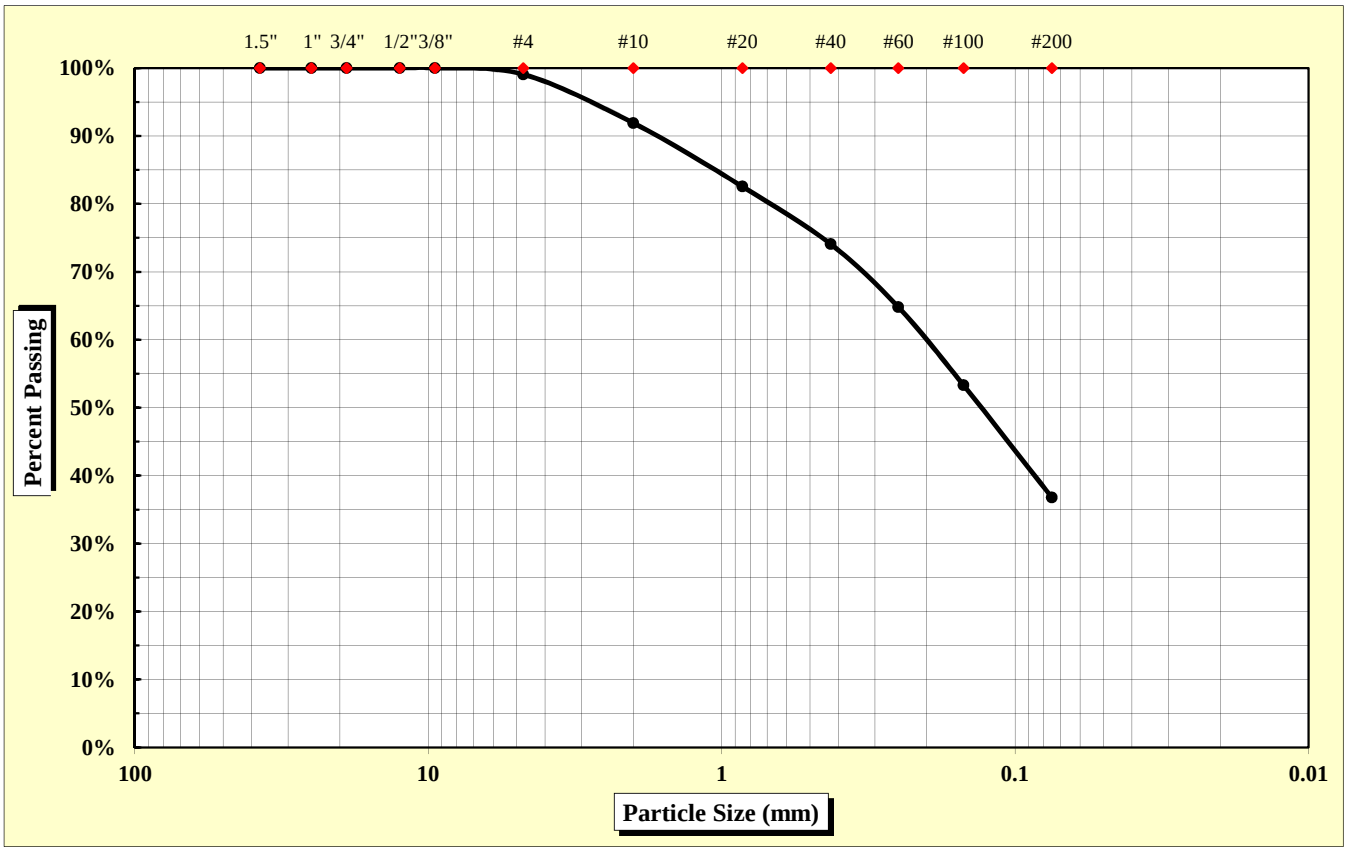
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/10 - 11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	9 - 15'
Sample Description:	Brown yellow, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	8.1%	Fine Sand	37.3%
		Coarse Sand	17.8%	Silt & Clay	36.8%
Liquid Limit	26	Plastic Limit	24	Plastic Index	2
		Moisture Content	15.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

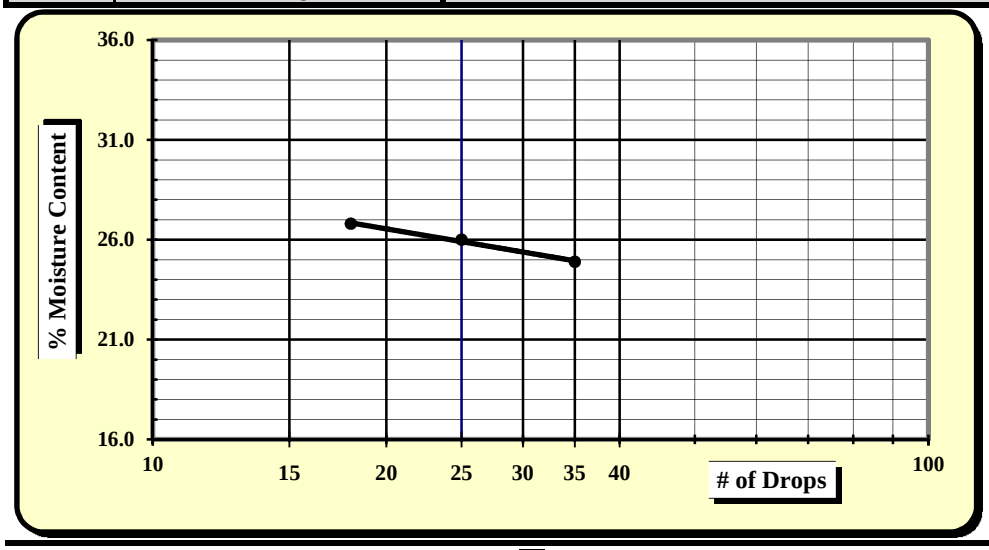
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-3	Sample #:	230	Sample Date:	10/14/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	9 - 15'

Sample Description: Brown yellow, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.77	15.58	16.92				12.24		
B	Wet Soil Weight + A	39.64	37.12	37.85				21.10		
C	Dry Soil Weight + A	34.88	32.67	33.42				19.41		
D	Water Weight (B-C)	4.76	4.45	4.43				1.69		
E	Dry Soil Weight (C-A)	19.11	17.09	16.50				7.17		
F	% Moisture (D/E)*100	24.9%	26.0%	26.8%				23.6%		
N	# OF DROPS	35	25	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**26**
Plastic Limit	**24**
Plastic Index	**2**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

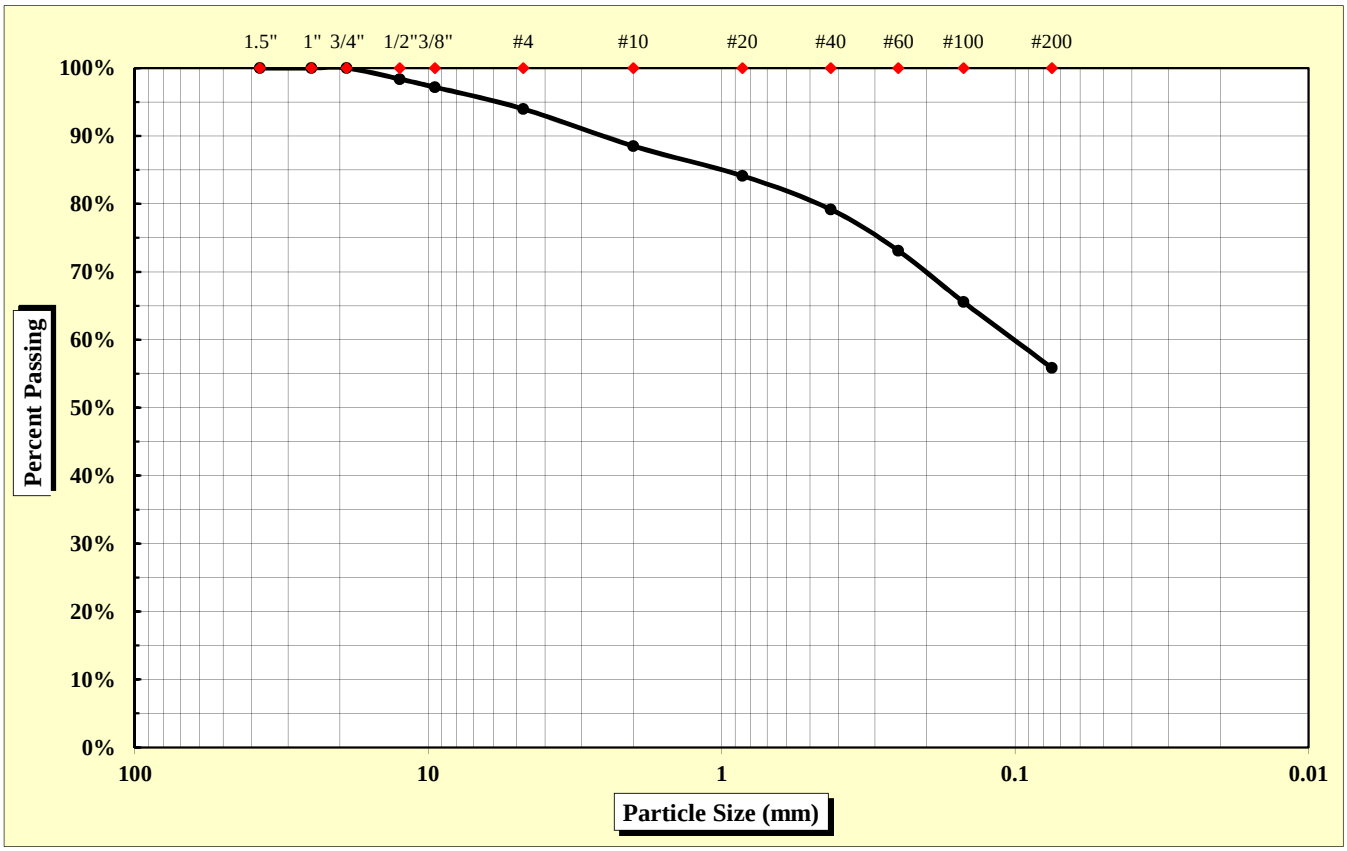
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/10 - 11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-4	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1 - 5'
Sample Description:	Red orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	11.5%	Fine Sand	23.3%
		Coarse Sand	9.3%	Silt & Clay	55.9%
Liquid Limit	42	Plastic Limit	25	Plastic Index	17
		Moisture Content	23.2%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

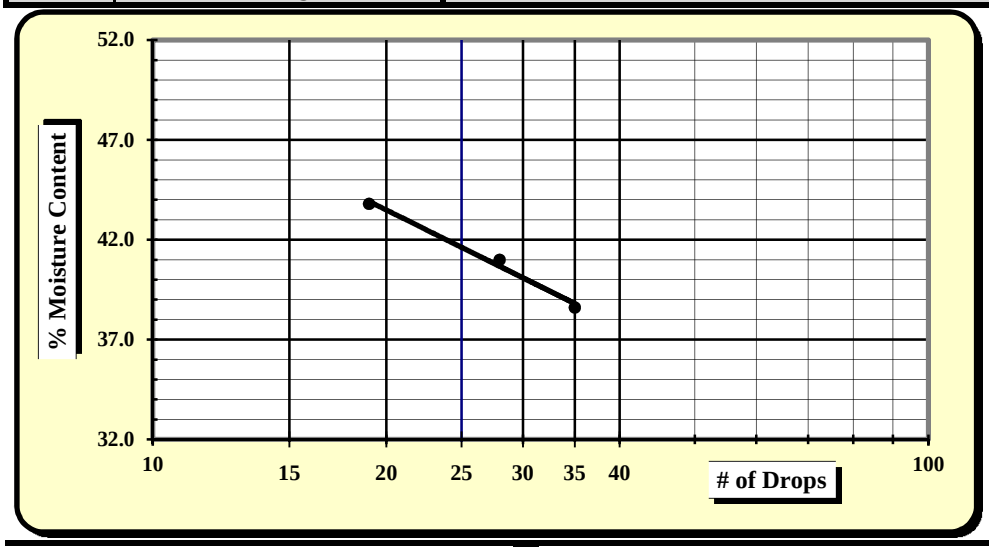
Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-4	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1 - 5'

Sample Description: Red orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.69	15.94				11.17		
B	Wet Soil Weight + A	36.63	38.35	37.88				20.23		
C	Dry Soil Weight + A	30.83	31.76	31.20				18.44		
D	Water Weight (B-C)	5.80	6.59	6.68				1.79		
E	Dry Soil Weight (C-A)	15.03	16.07	15.26				7.27		
F	% Moisture (D/E)*100	38.6%	41.0%	43.8%				24.6%		
N	# OF DROPS	35	28	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.6%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**25**
Plastic Index	**17**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/27/15	Brian Vaughan, P.E.	11/27/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

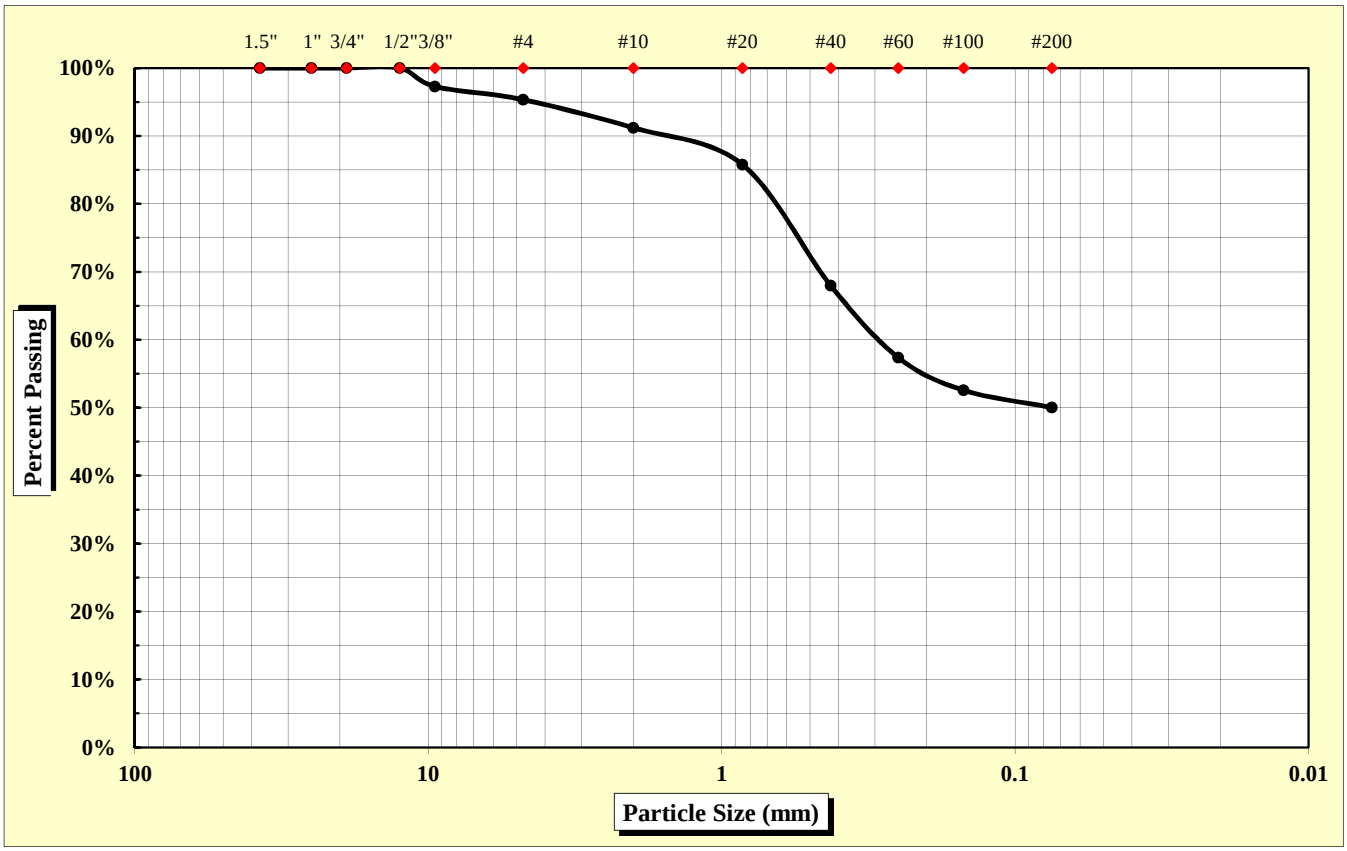
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-4	Sample #:	230	Sample Date:	10/14/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Red, fine to medium, sandy LEAN CLAY (CL) [A-7-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	8.8%	Fine Sand	18.0%
		Coarse Sand	23.2%	Silt & Clay	50.0%
Liquid Limit	49	Plastic Limit	27	Plastic Index	22
		Moisture Content	33.1%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

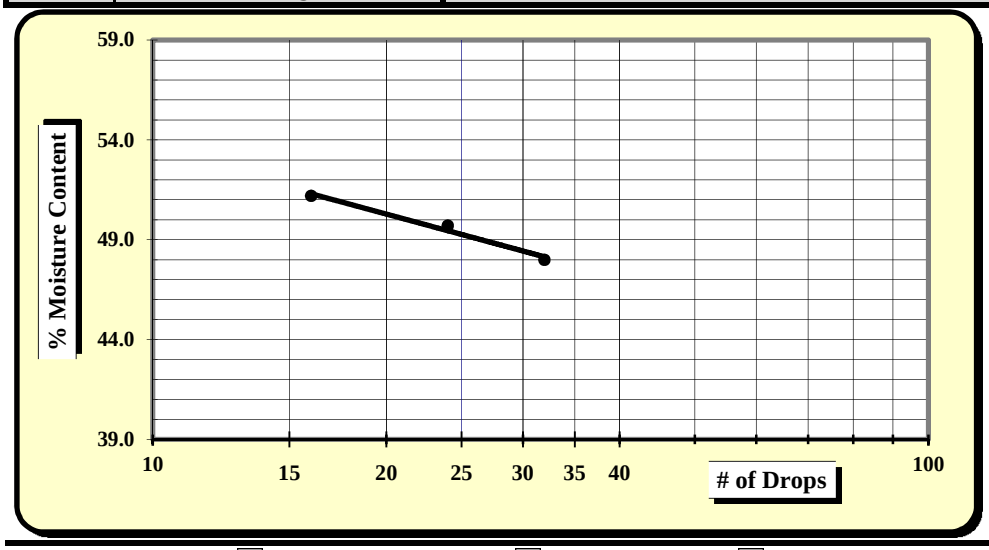
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-4	Sample #:	230	Sample Date:	10/14/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Red, fine to medium, sandy LEAN CLAY (CL) [A-7-6 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	601	Liquid Limit						Plastic Limit		
	Tare #:	3	217	13				207		
A	Tare Weight	20.71	20.83	20.72				20.93		
B	Wet Soil Weight + A	30.83	29.42	28.10				29.50		
C	Dry Soil Weight + A	27.55	26.57	25.60				27.69		
D	Water Weight (B-C)	3.28	2.85	2.50				1.81		
E	Dry Soil Weight (C-A)	6.84	5.74	4.88				6.76		
F	% Moisture (D/E)*100	48.0%	49.7%	51.2%				26.8%		
N	# OF DROPS	32	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**49**
Plastic Limit	**27**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

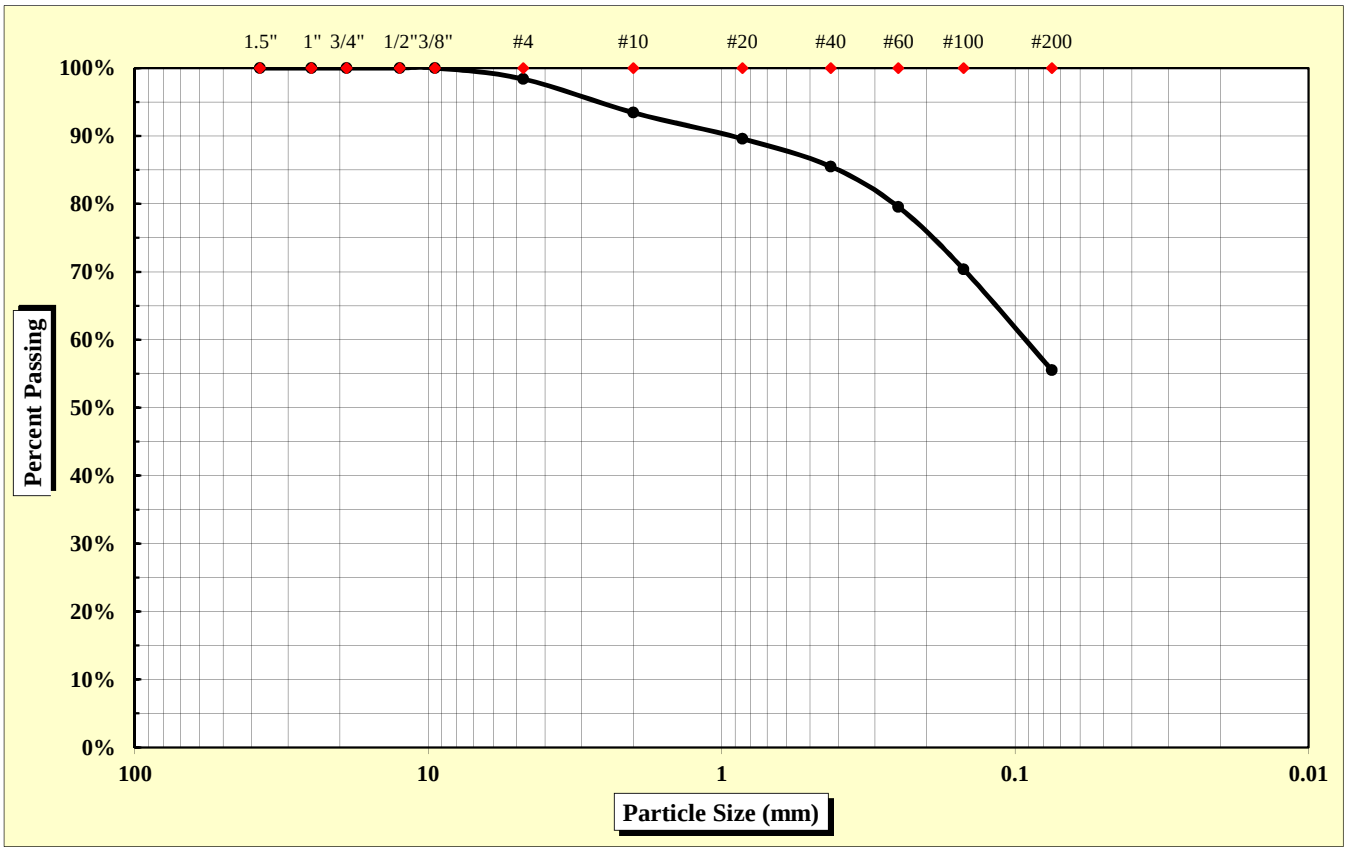
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red, fine, sandy LEAN CLAY (CL) [A-7-6 (10)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.6%	Fine Sand	30.0%
		Coarse Sand	7.9%	Silt & Clay	55.5%
Liquid Limit	48	Plastic Limit	25	Plastic Index	23
		Moisture Content	19.5%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

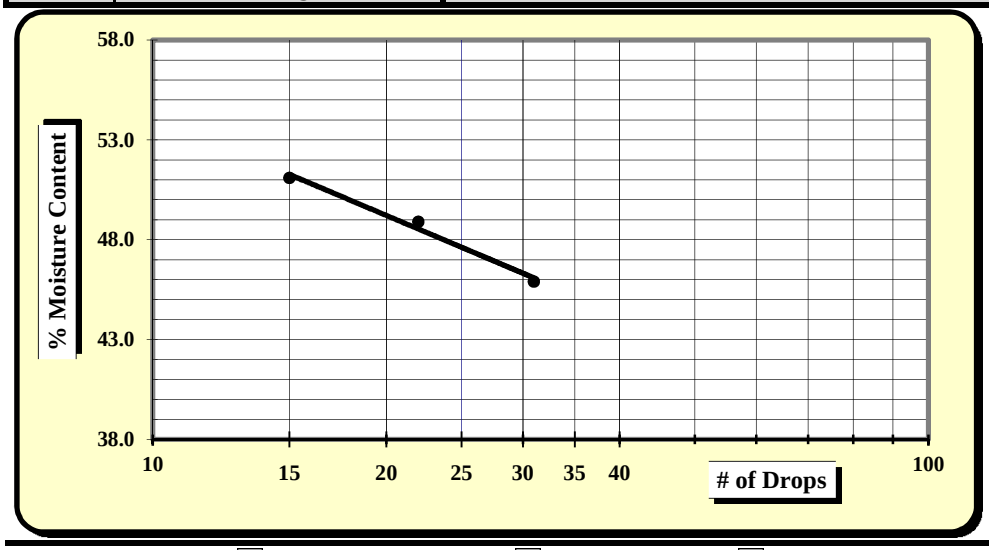
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red, fine, sandy LEAN CLAY (CL) [A-7-6 (10)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	607	Liquid Limit						Plastic Limit		
	Tare #:	245	43	13				201		
A	Tare Weight	20.78	20.70	20.73				20.87		
B	Wet Soil Weight + A	29.84	33.39	32.94				29.86		
C	Dry Soil Weight + A	26.99	29.22	28.81				28.07		
D	Water Weight (B-C)	2.85	4.17	4.13				1.79		
E	Dry Soil Weight (C-A)	6.21	8.52	8.08				7.20		
F	% Moisture (D/E)*100	45.9%	48.9%	51.1%				24.9%		
N	# OF DROPS	31	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**25**
Plastic Index	**23**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

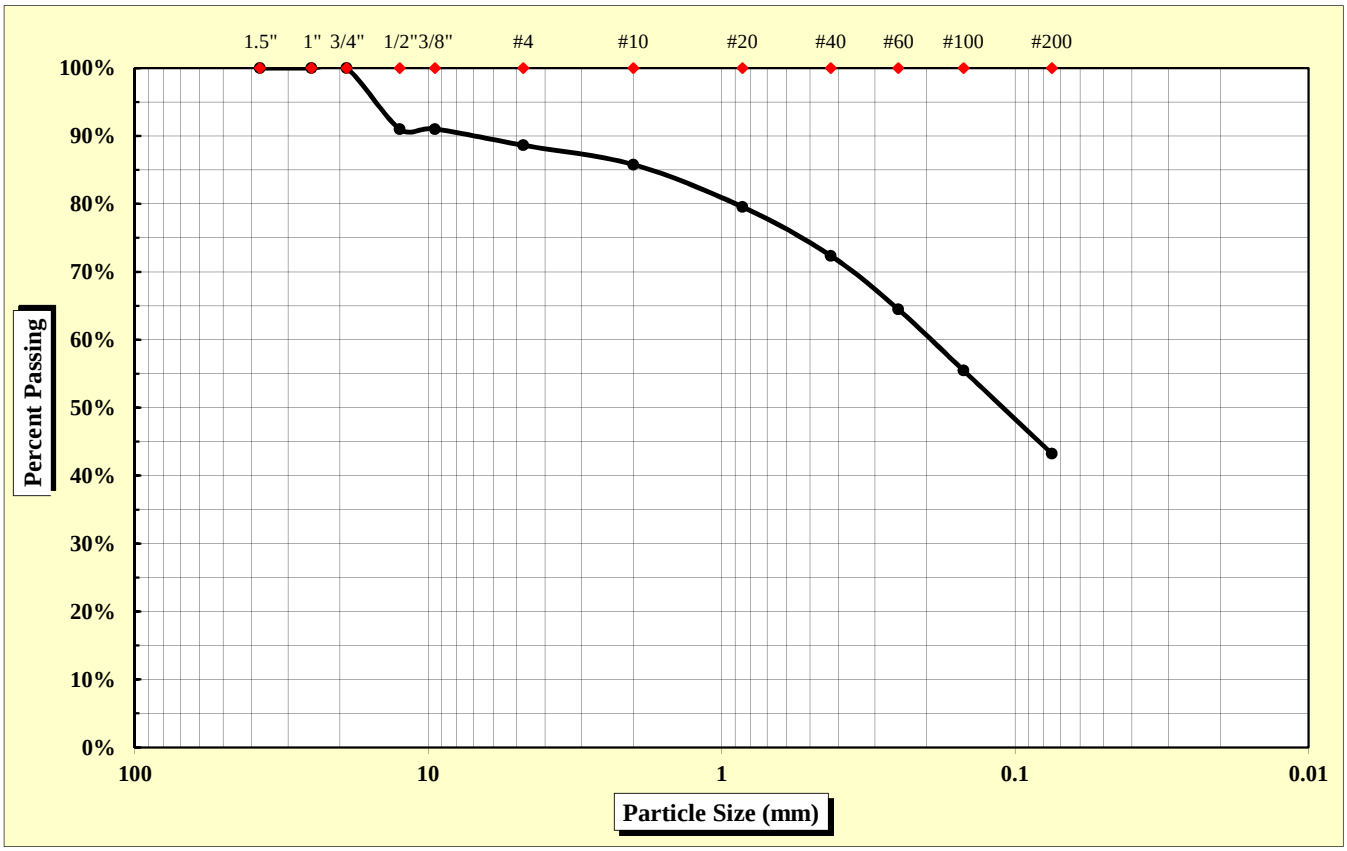
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red yellow black, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	14.2%	Fine Sand	29.1%
		Coarse Sand	13.4%	Silt & Clay	43.2%
Liquid Limit	47	Plastic Limit	35	Plastic Index	12
		Moisture Content	20.6%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

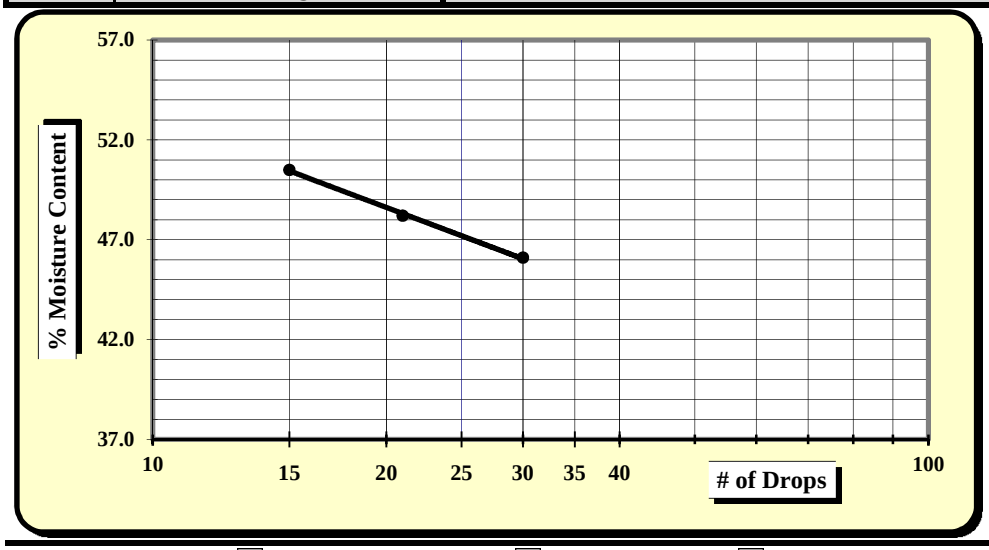
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red yellow black, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	602	Liquid Limit						Plastic Limit		
	Tare #:	235	37	3				229		
A	Tare Weight	20.78	20.73	20.73				20.73		
B	Wet Soil Weight + A	32.72	30.69	31.13				28.86		
C	Dry Soil Weight + A	28.95	27.45	27.64				26.75		
D	Water Weight (B-C)	3.77	3.24	3.49				2.11		
E	Dry Soil Weight (C-A)	8.17	6.72	6.91				6.02		
F	% Moisture (D/E)*100	46.1%	48.2%	50.5%				35.0%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**35**
Plastic Index	**12**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

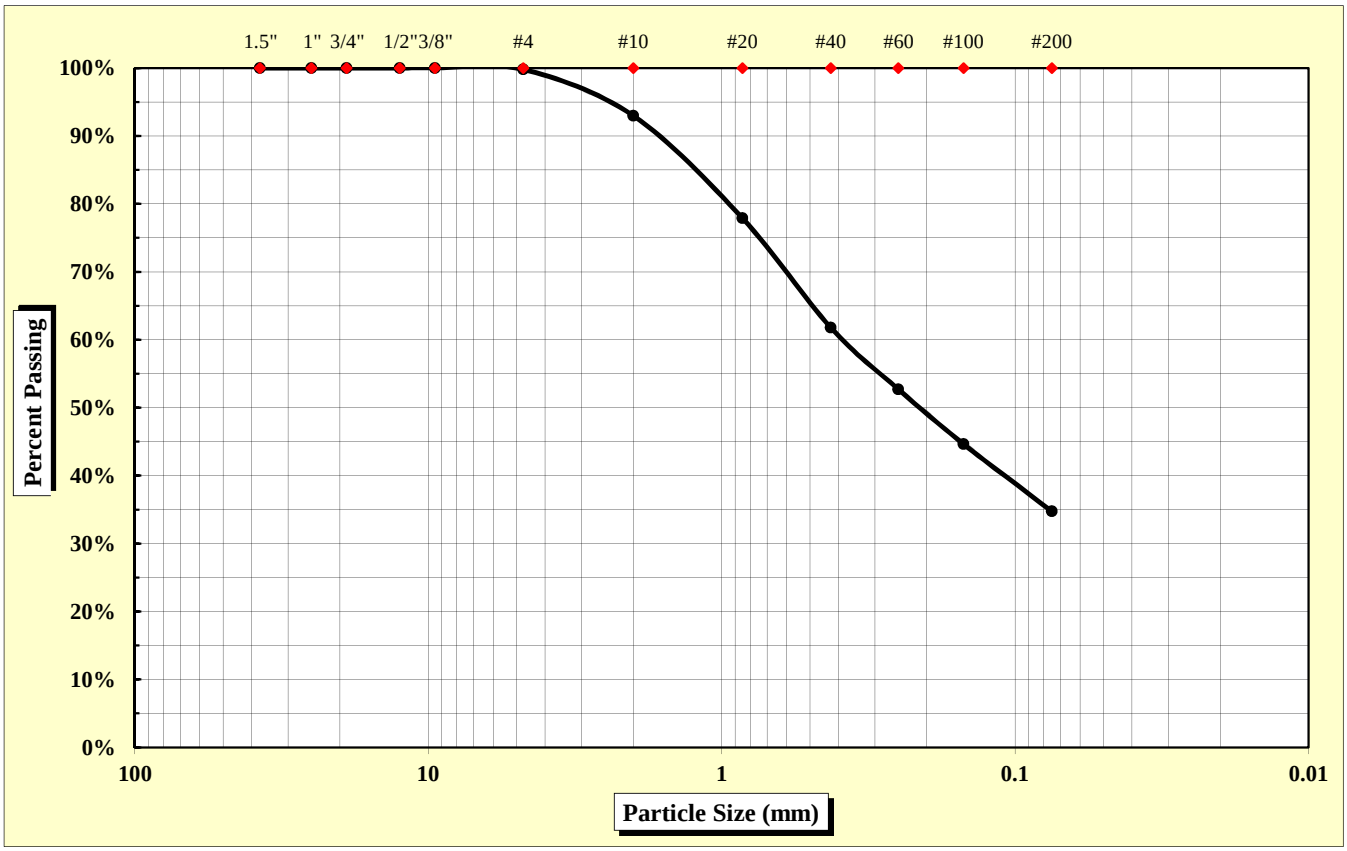
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Brown black white red, fine to medium, slightly micaceous, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	7.0%	Fine Sand	27.0%
		Coarse Sand	31.2%	Silt & Clay	34.8%
Liquid Limit	44	Plastic Limit	37	Plastic Index	7
		Moisture Content	23.7%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

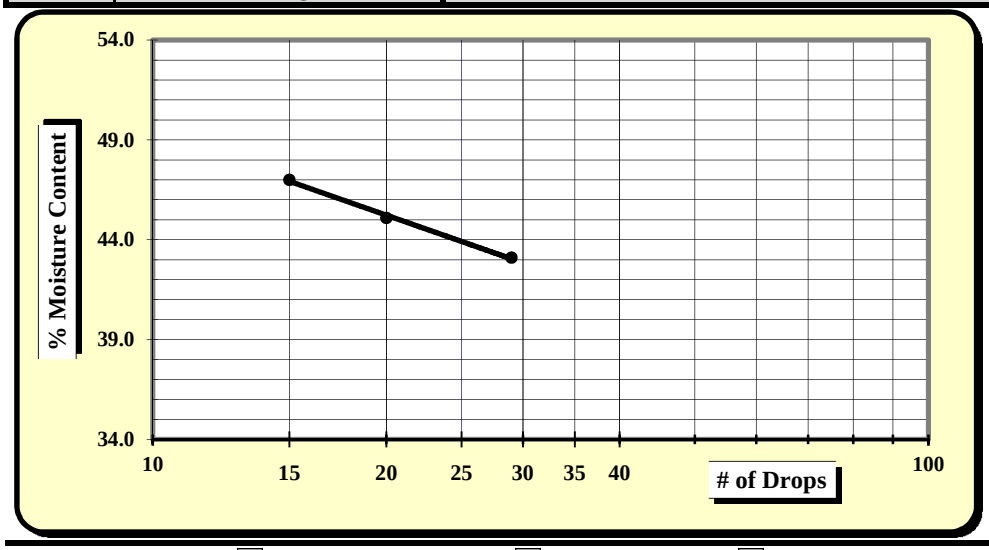
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-5	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'

Sample Description: Brown black white red, fine to medium, slightly micaceous, silty SAND (SM) [A-2-5]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	601	Liquid Limit						Plastic Limit		
	Tare #:	206	212	23				134		
A	Tare Weight	20.92	20.84	20.66				20.67		
B	Wet Soil Weight + A	35.10	31.30	33.70				31.33		
C	Dry Soil Weight + A	30.83	28.05	29.53				28.43		
D	Water Weight (B-C)	4.27	3.25	4.17				2.90		
E	Dry Soil Weight (C-A)	9.91	7.21	8.87				7.76		
F	% Moisture (D/E)*100	43.1%	45.1%	47.0%				37.4%		
N	# OF DROPS	29	20	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**37**
Plastic Index	**7**
Group Symbol	**SM / A-2-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

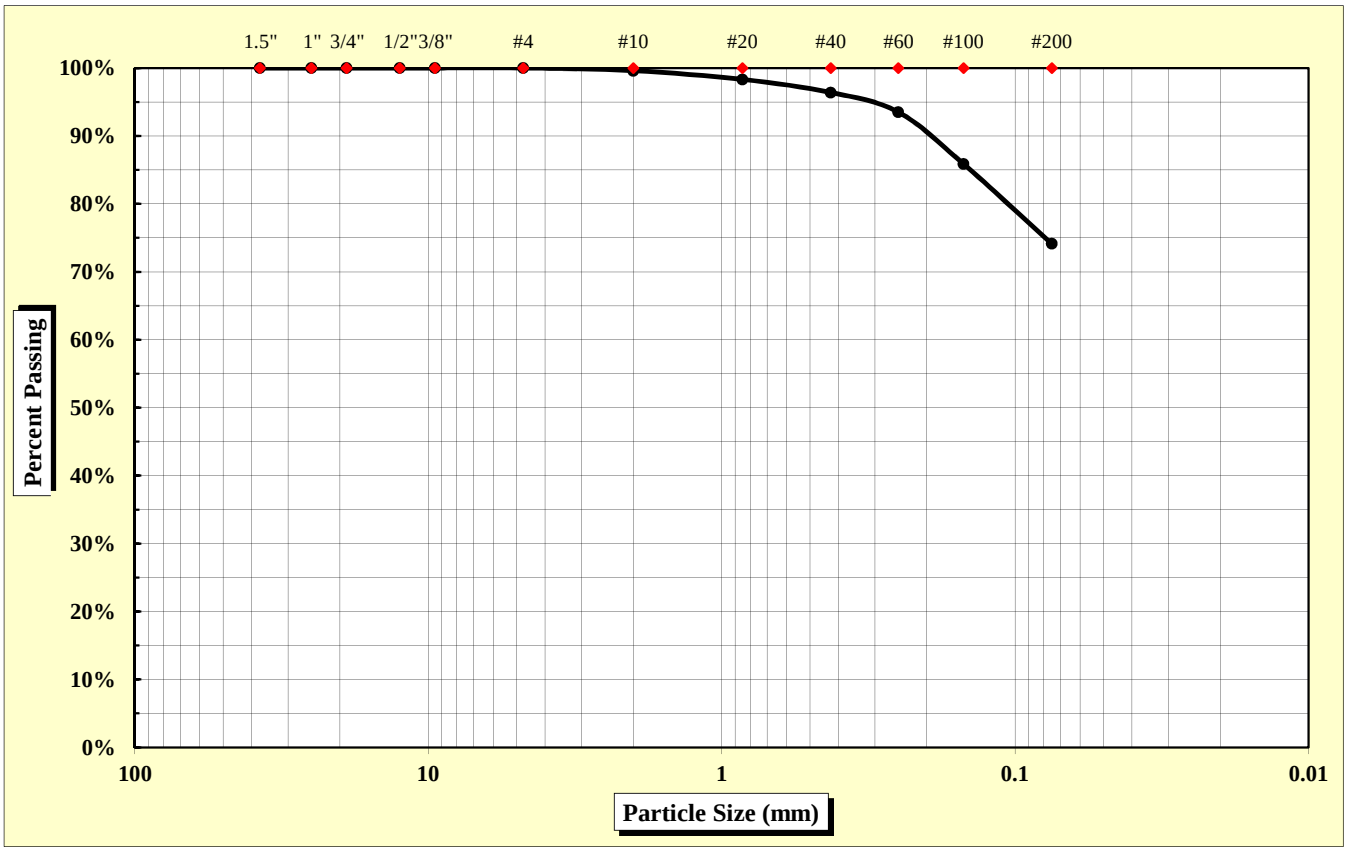
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-6	Sample #:	230	Sample Date:	10/12/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 10'
Sample Description:	Red brown, fine, trace mica, ELASTIC SILT with sand (MH) [A-7-5 (17)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.4%	Fine Sand	22.3%
		Coarse Sand	3.2%	Silt & Clay	74.1%
Liquid Limit	54	Plastic Limit	33	Plastic Index	21
		Moisture Content	30.8%	Group Index	17

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

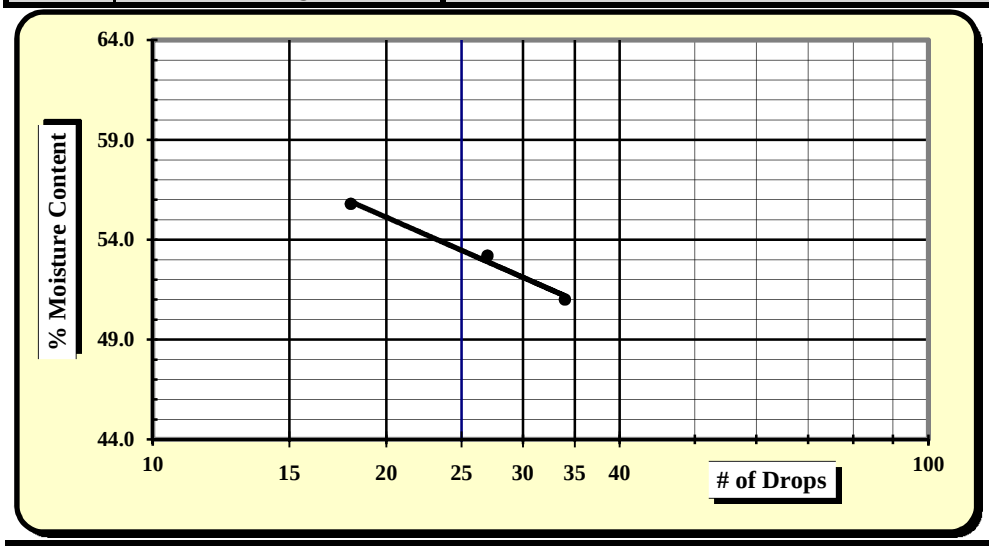
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-6	Sample #:	230	Sample Date:	10/12/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 10'

Sample Description: Red brown, fine, trace mica, ELASTIC SILT with sand (MH) [A-7-5 (17)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.76	15.58	16.92				12.23		
B	Wet Soil Weight + A	37.31	37.16	36.64				20.78		
C	Dry Soil Weight + A	30.03	29.67	29.58				18.68		
D	Water Weight (B-C)	7.28	7.49	7.06				2.10		
E	Dry Soil Weight (C-A)	14.27	14.09	12.66				6.45		
F	% Moisture (D/E)*100	51.0%	53.2%	55.8%				32.6%		
N	# OF DROPS	34	27	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**33**
Plastic Index	**21**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 74.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

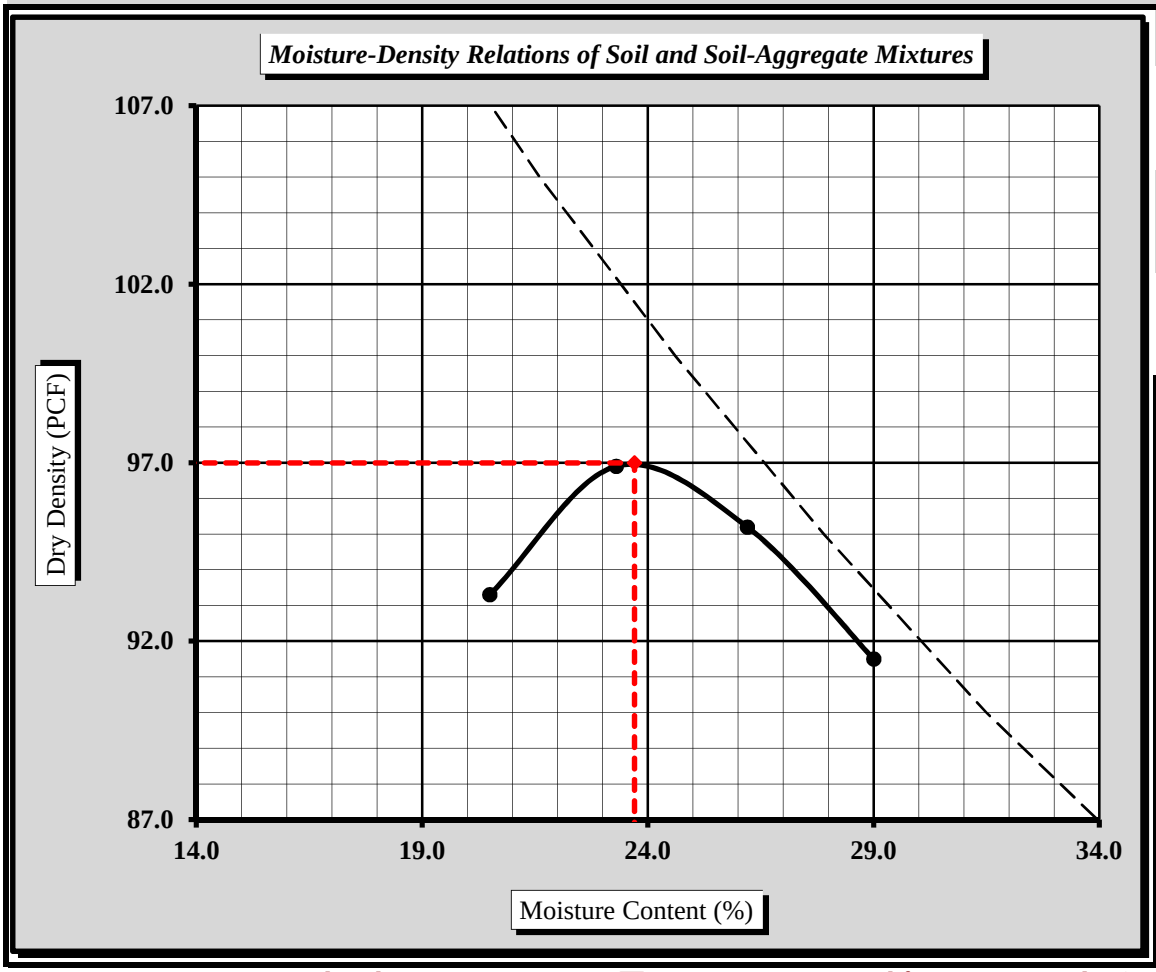
S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-6	Sample #:	230	Sample Date:	10/12/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 10'

Sample Description: Red brown, fine, trace mica, ELASTIC SILT with sand (MH) [A-7-5 (17)]

Maximum Dry Density 97.0 PCF. Optimum Moisture Content 23.7%

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	30.8%
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	54
Plastic Limit	33
Plastic Index	21

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.6%
#40	96.4%
#60	93.5%
#100	85.9%
#200	74.1%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/19/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

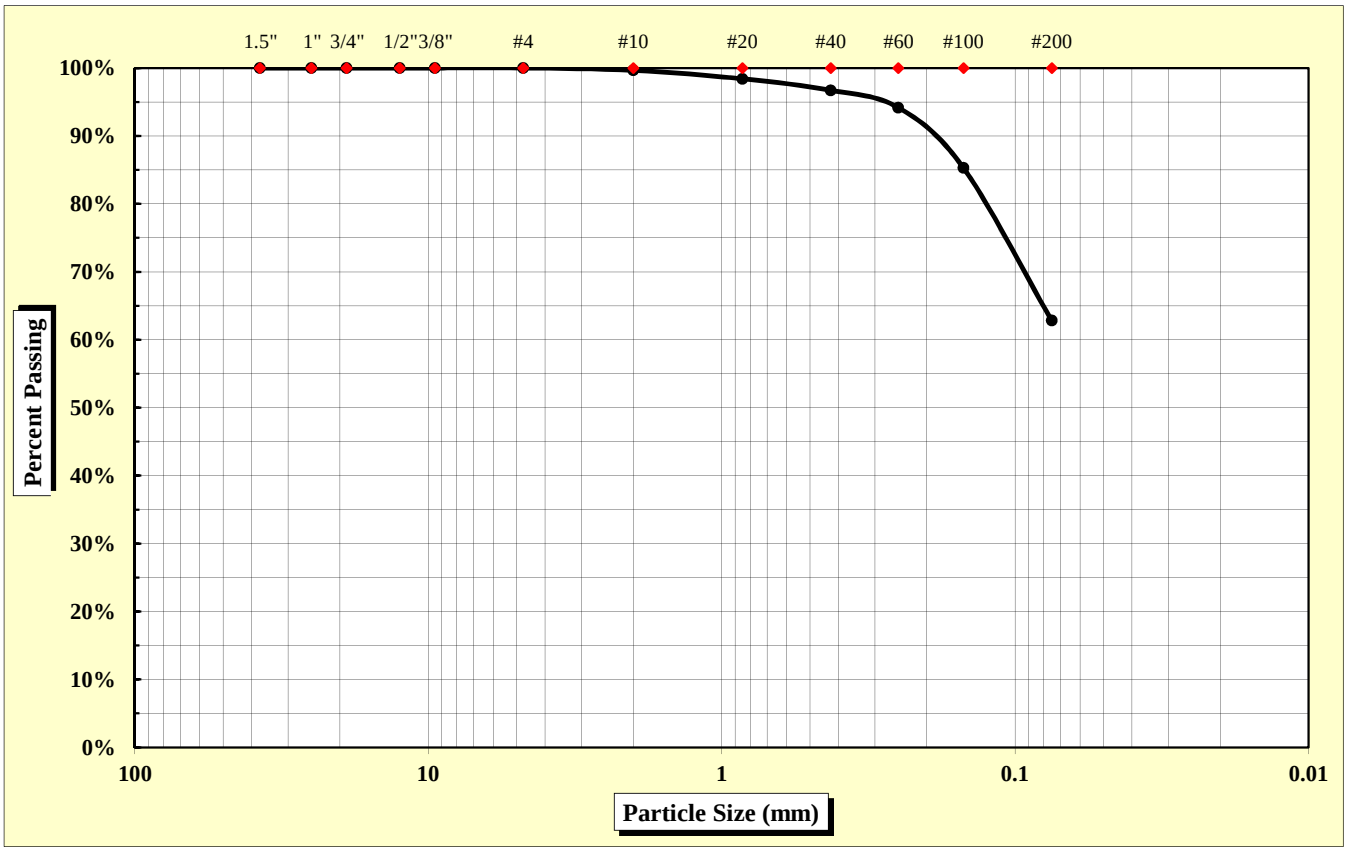
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-6	Sample #:	230	Sample Date:	10/12/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red tan brown, fine, trace mica, sandy SILT (ML) [A-5 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	33.9%
		Coarse Sand	2.9%	Silt & Clay	62.8%
Liquid Limit	45	Plastic Limit	35	Plastic Index	10
		Moisture Content	31.4%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

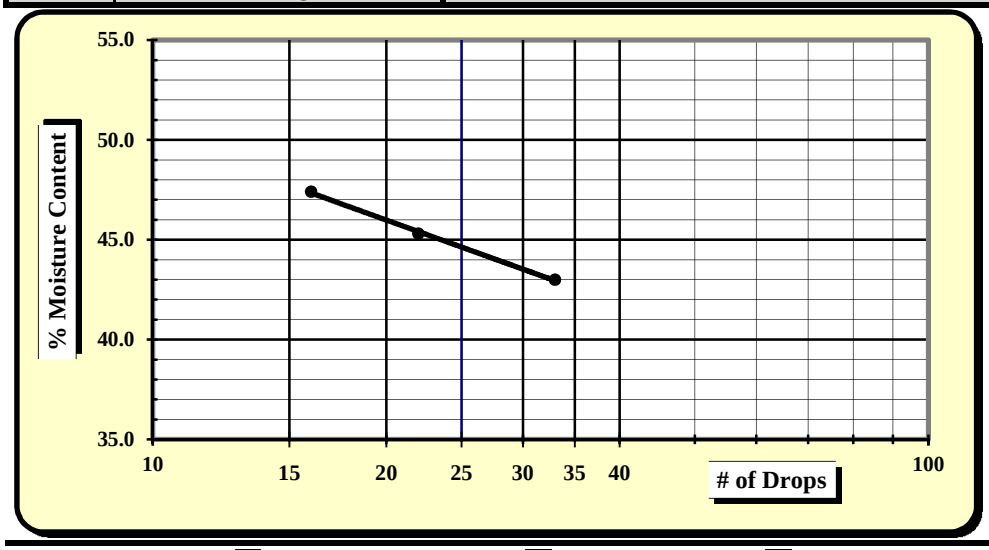
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-6	Sample #:	230	Sample Date:	10/12/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red tan brown, fine, trace mica, sandy SILT (ML) [A-5 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.30	16.53				12.11		
B	Wet Soil Weight + A	36.86	36.32	35.51				20.33		
C	Dry Soil Weight + A	30.71	29.77	29.41				18.20		
D	Water Weight (B-C)	6.15	6.55	6.10				2.13		
E	Dry Soil Weight (C-A)	14.31	14.47	12.88				6.09		
F	% Moisture (D/E)*100	43.0%	45.3%	47.4%				35.0%		
N	# OF DROPS	33	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**35**
Plastic Index	**10**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

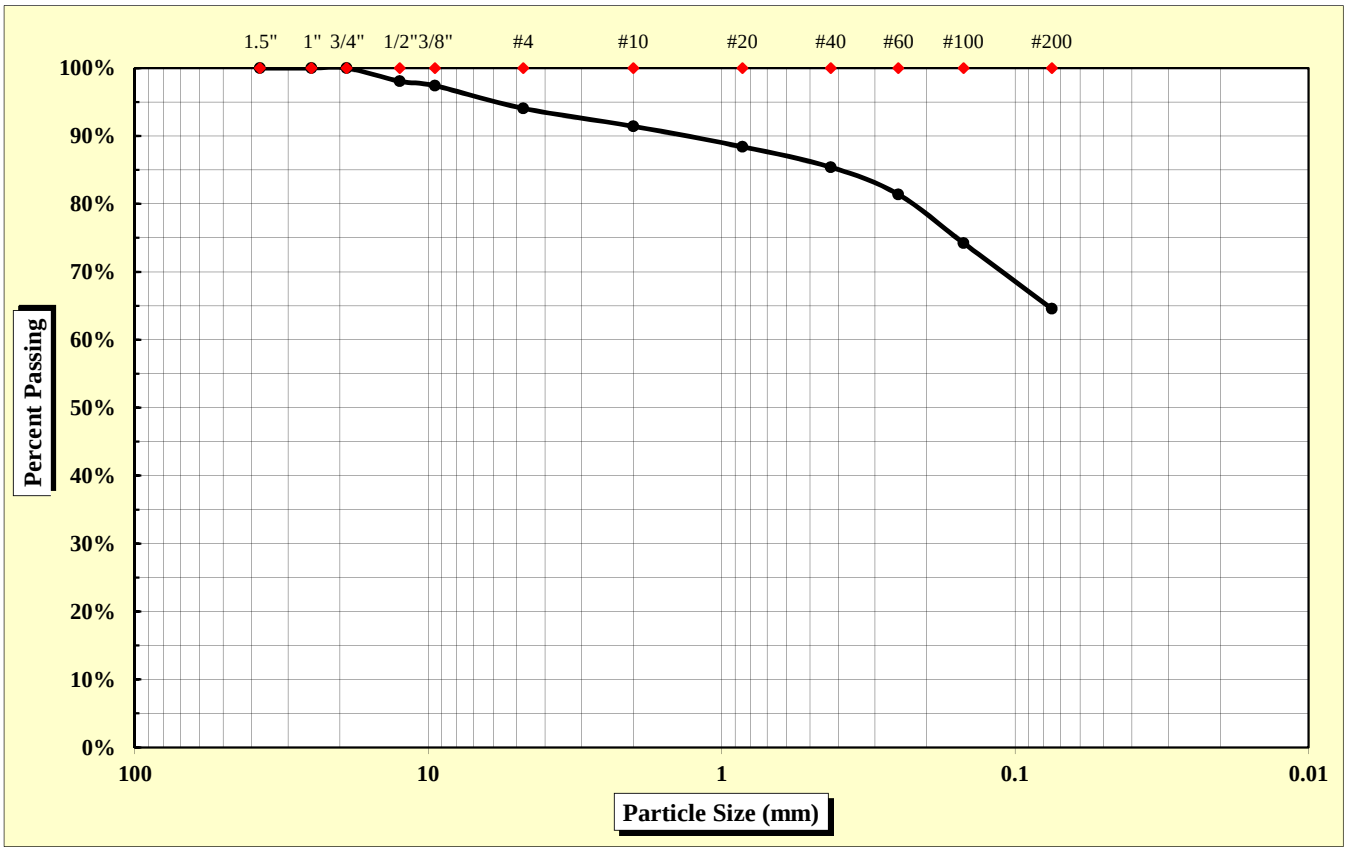
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Brown red, fine, sandy LEAN CLAY (CL) [A-7-6 (13)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	8.6%	Fine Sand	20.8%
		Coarse Sand	6.0%	Silt & Clay	64.6%
Liquid Limit	46	Plastic Limit	23	Plastic Index	23
		Moisture Content	24.0%	Group Index	13

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

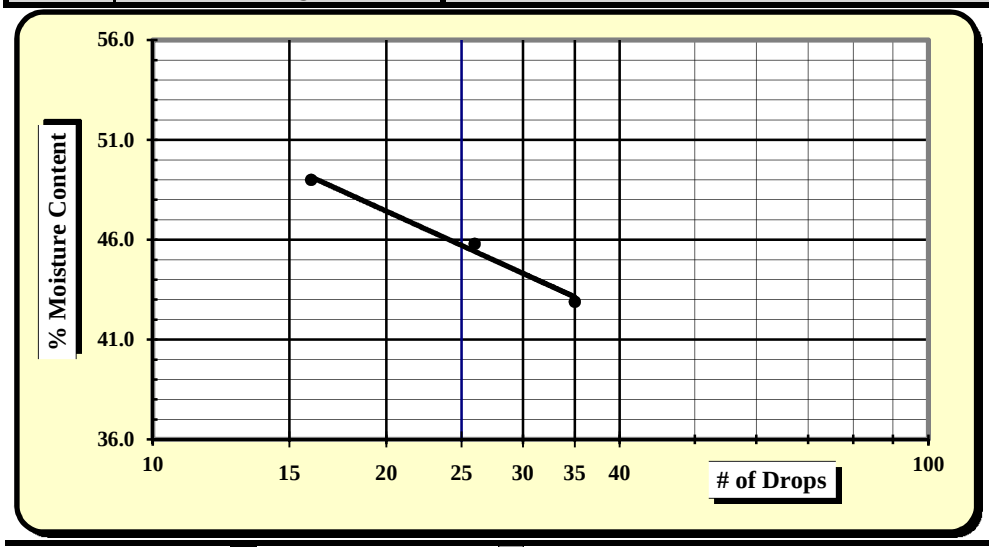
Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Brown red, fine, sandy LEAN CLAY (CL) [A-7-6 (13)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.94	16.64	16.78				12.26		
B	Wet Soil Weight + A	38.14	40.32	39.59				20.95		
C	Dry Soil Weight + A	31.48	32.88	32.09				19.34		
D	Water Weight (B-C)	6.66	7.44	7.50				1.61		
E	Dry Soil Weight (C-A)	15.54	16.24	15.31				7.08		
F	% Moisture (D/E)*100	42.9%	45.8%	49.0%				22.7%		
N	# OF DROPS	35	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**23**
Plastic Index	**23**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/30/15	Brian Vaughan, P.E.	11/30/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-126-T267-1
Revision No. 0
Revision Date: 07/28/11

Moisture, Ash, and Organic Content

AASHTO T 267

S&ME *Quality Assurance*

Project #: **1426-14-161** Report Date: 11/24/15
Project Name: **I-85 Widening MM80-96** Test Date(s): 11/20 - 11/24/15
Client Name: Infrastructure Consulting & Engineering
Client Address: 1021 Briargate Circle Columbia, South Carolina 29210

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown red sandy CLAY (CL)				

Equipment: Balance (GP1/G1): S&ME ID# **7537** *0.01 g.Readability, 500g. Minimum Capacity*
Oven: S&ME ID# **7313** Muffle Furnace: S&ME ID# **7312**

Moisture Content Determination

Oven Temperature: **110 ± 5 °C**

		Tare #	
t	Tare Weight	grams	
a	Mass of **As-Received** Specimen + Tare Wt.	grams	
b	Mass of Oven Dry Specimen + Tare Wt.	grams	
w	Water Weight	(a-b)	
A	Mass of As-Received Specimen	(a-t)	
B	Mass of Oven Dry Specimen	(b-t)	
	% Moisture Content as a % of As Received or Total Mass	(w/A)*100	
	% Moisture Content as a % of Oven-dried Mass	(w/B)*100	**N/A**

Ash Content and Organic Content Determination

Muffle Furnace Temperature: **455 ± 10 °C**

		Tare #	1
t	Tare Weight	grams	143.10
b	Mass of Oven Dry Specimen + Tare Wt.	grams	183.02
c	Ash Weight + Tare Wt.	grams	179.82
C	Ash Weight	c-t	36.72
B	Mass of Oven Dry Specimen	(b-t)	39.92
D	***% Ash Content***	(C/B)*100	**92.0%**
	% Organic Content	100-D	**8.0%**

Remarks: **Organic Content representative sample taken from material passing the 2.00 mm (#10) sieve**

References: AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition

Technician Name: Matt Jacobs NICET Lab Level III 118202
Certification #

Technical Responsibility: Brian Vaughan, P.E. Brian Vaughan Location Coordinator
Signature *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

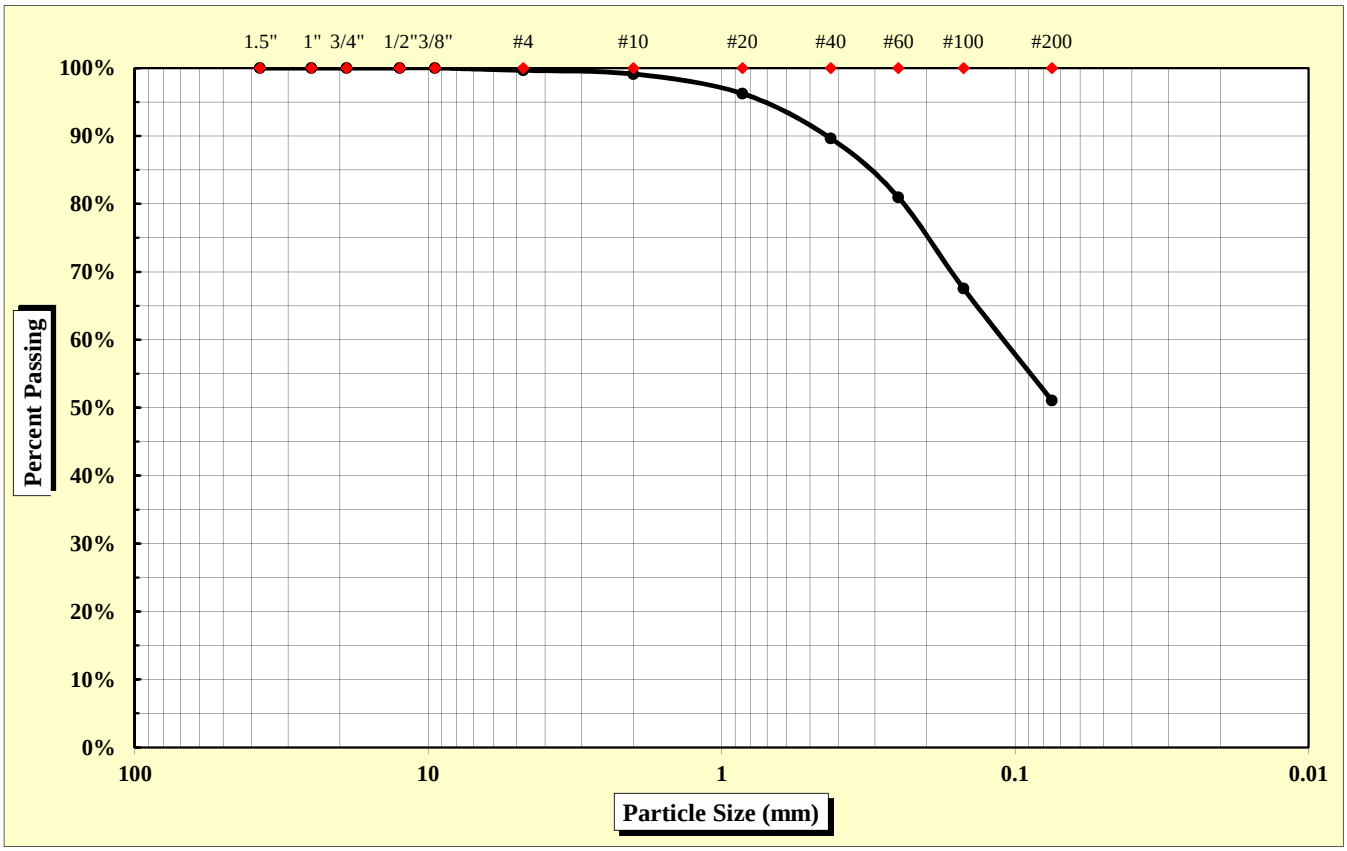
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Tan red orange, fine, sandy LEAN CLAY (CL) [A-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.9%	Fine Sand	38.6%
		Coarse Sand	9.5%	Silt & Clay	51.1%
Liquid Limit	35	Plastic Limit	20	Plastic Index	15
		Moisture Content	20.0%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

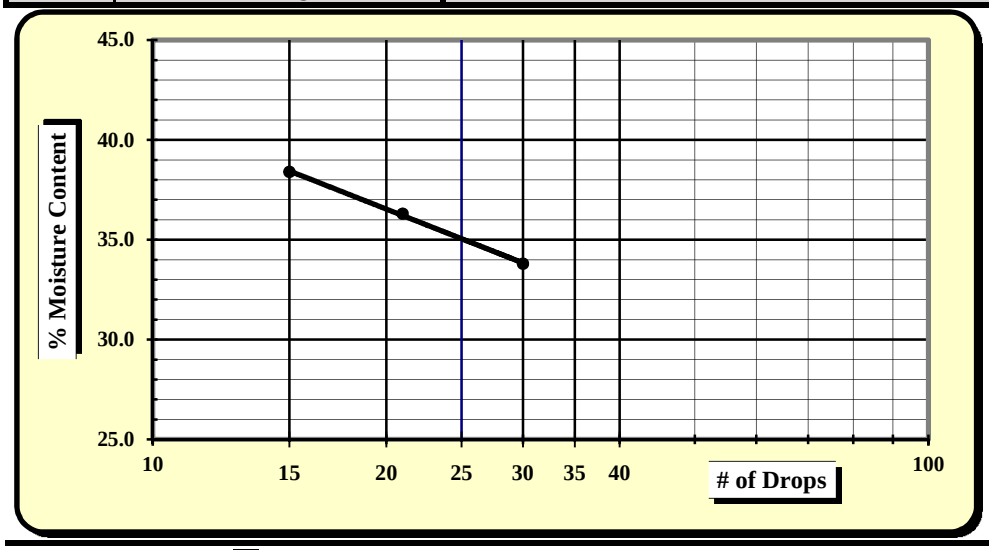
Project #:	**1426-14-161**	Report Date:	11/30/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/28/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Tan red orange, fine, sandy LEAN CLAY (CL) [A-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.65	16.66	15.98				12.10		
B	Wet Soil Weight + A	39.30	39.04	38.47				20.64		
C	Dry Soil Weight + A	33.58	33.08	32.23				19.21		
D	Water Weight (B-C)	5.72	5.96	6.24				1.43		
E	Dry Soil Weight (C-A)	16.93	16.42	16.25				7.11		
F	% Moisture (D/E)*100	33.8%	36.3%	38.4%				20.1%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**20.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**20**
Plastic Index	**15**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/30/15	Brian Vaughan, P.E.	11/30/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

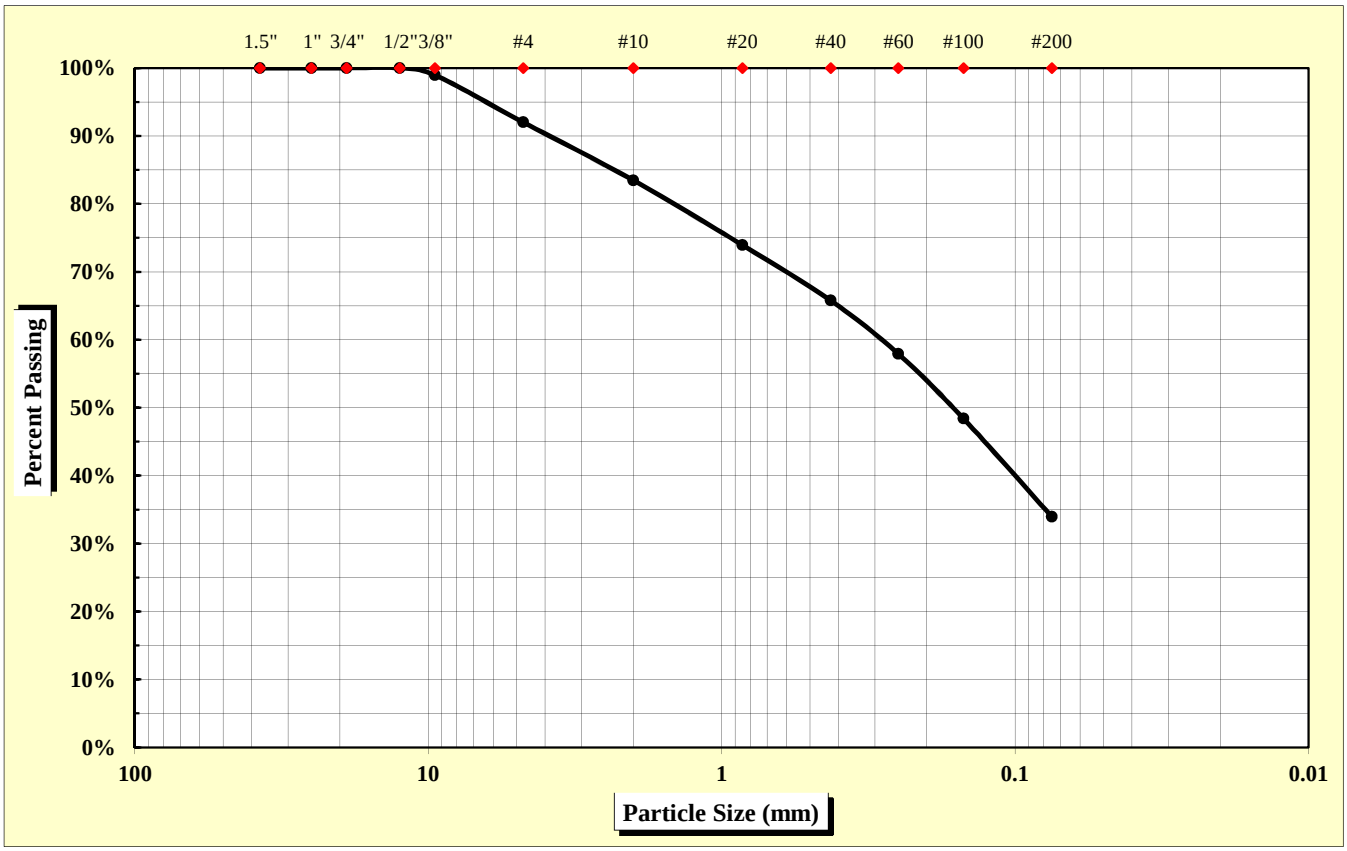
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Dark brown, fine to coarse, micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	16.5%	Fine Sand	31.8%
		Coarse Sand	17.7%	Silt & Clay	34.0%
Liquid Limit	33	Plastic Limit	31	Plastic Index	2
		Moisture Content	20.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

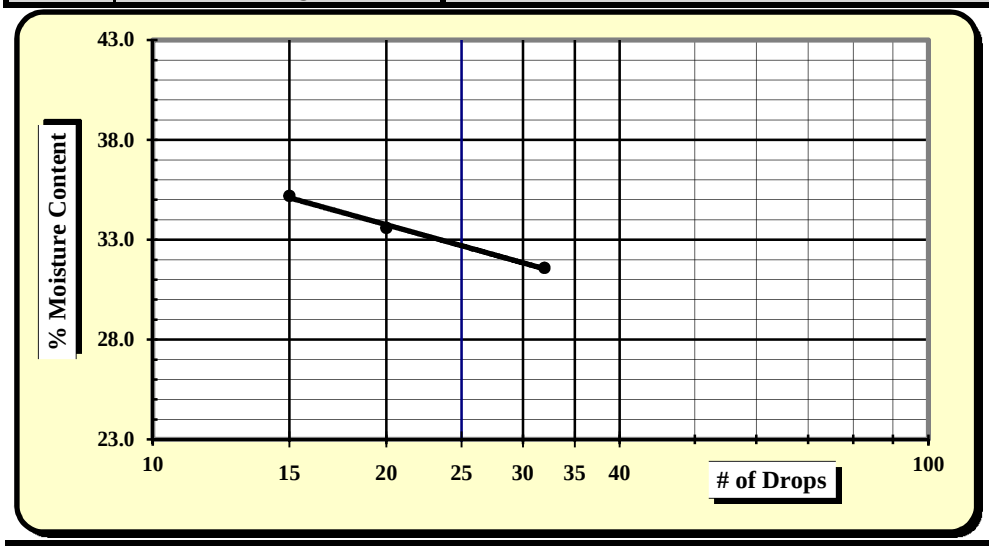
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-7	Sample #:	230	Sample Date:	10/23/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Dark brown, fine to coarse, micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.86	16.81				12.30		
B	Wet Soil Weight + A	37.43	39.61	38.22				21.17		
C	Dry Soil Weight + A	32.45	33.89	32.65				19.09		
D	Water Weight (B-C)	4.98	5.72	5.57				2.08		
E	Dry Soil Weight (C-A)	15.74	17.03	15.84				6.79		
F	% Moisture (D/E)*100	31.6%	33.6%	35.2%				30.6%		
N	# OF DROPS	32	20	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**33**
Plastic Limit	**31**
Plastic Index	**2**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

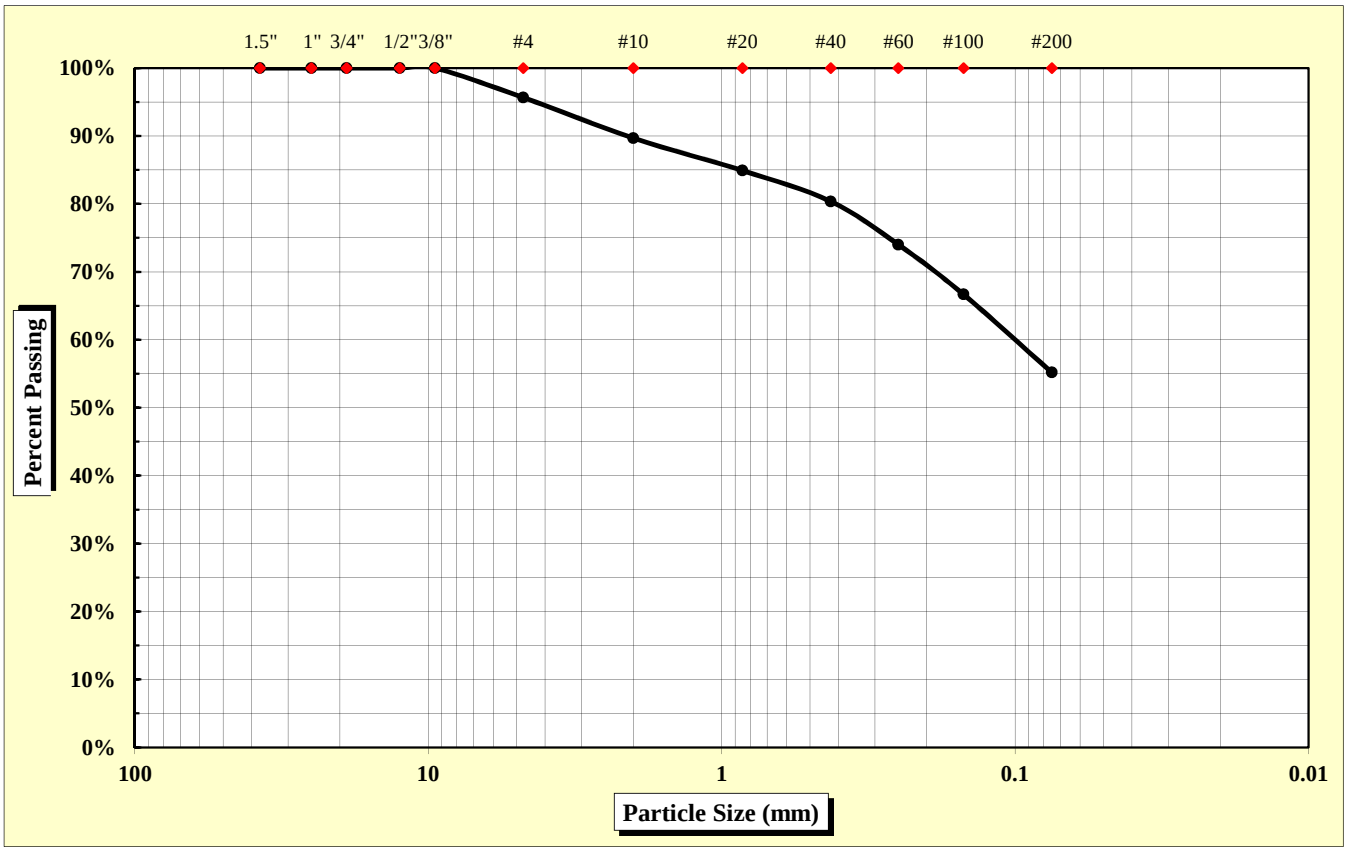
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown red, coarse to fine, sandy LEAN CLAY (CL) [A-7-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	10.3%	Fine Sand	25.2%
		Coarse Sand	9.3%	Silt & Clay	55.2%
Liquid Limit	44	Plastic Limit	22	Plastic Index	22
		Moisture Content	24.8%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

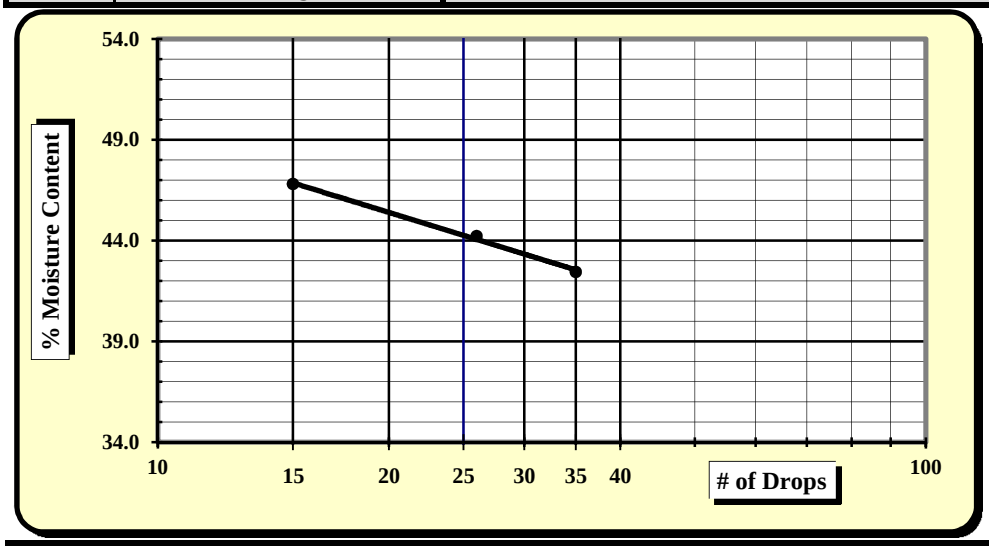
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown red, coarse to fine, sandy LEAN CLAY (CL) [A-7-6 (9)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	18	6	3				1		
A	Tare Weight	13.07	11.01	12.98				12.85		
B	Wet Soil Weight + A	24.48	23.73	25.40				21.35		
C	Dry Soil Weight + A	21.08	19.83	21.44				19.81		
D	Water Weight (B-C)	3.40	3.90	3.96				1.54		
E	Dry Soil Weight (C-A)	8.01	8.82	8.46				6.96		
F	% Moisture (D/E)*100	42.4%	44.2%	46.8%				22.1%		
N	# OF DROPS	35	26	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**22**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

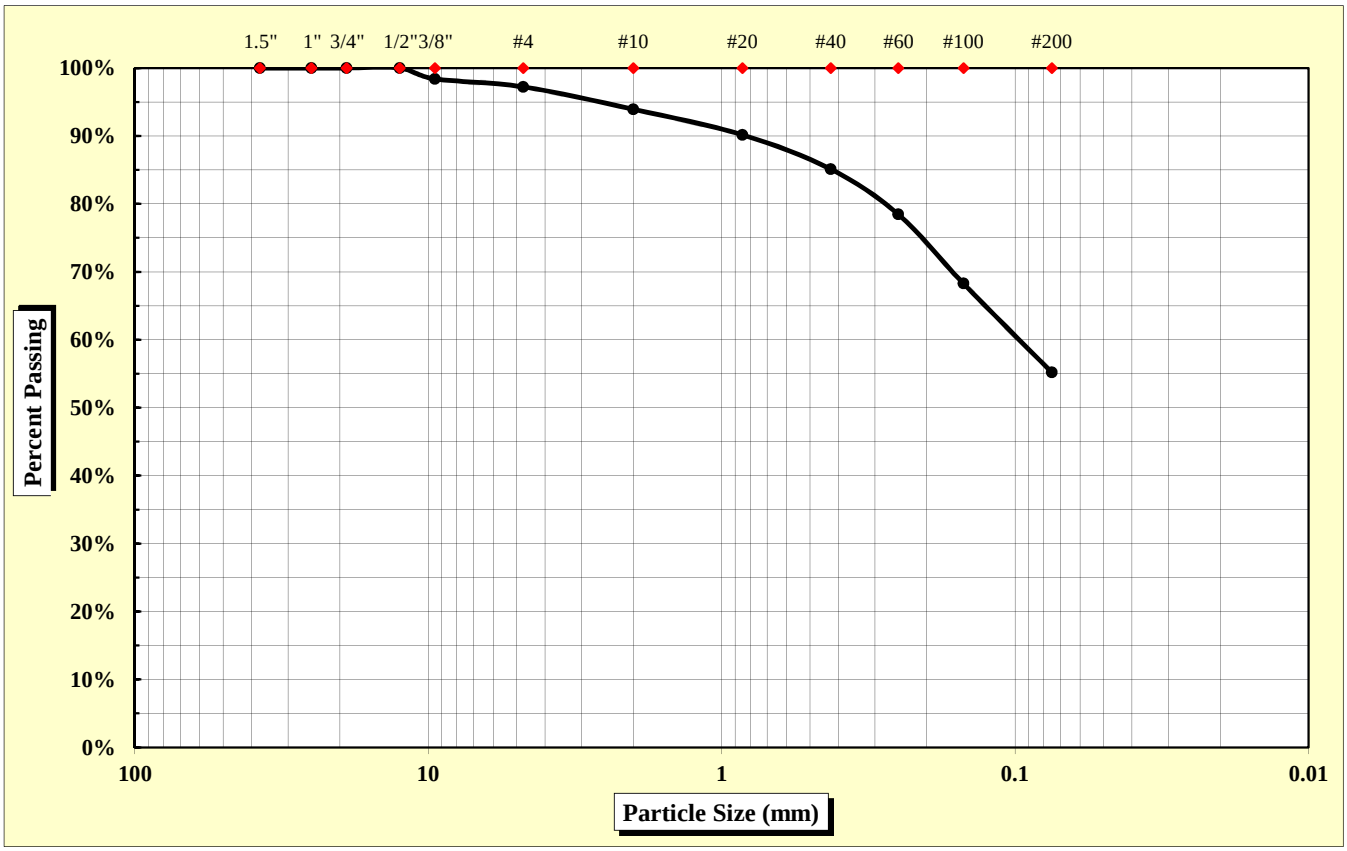
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Tan orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	6.1%	Fine Sand	29.9%
		Coarse Sand	8.8%	Silt & Clay	55.2%
Liquid Limit	45	Plastic Limit	26	Plastic Index	19
		Moisture Content	25.8%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

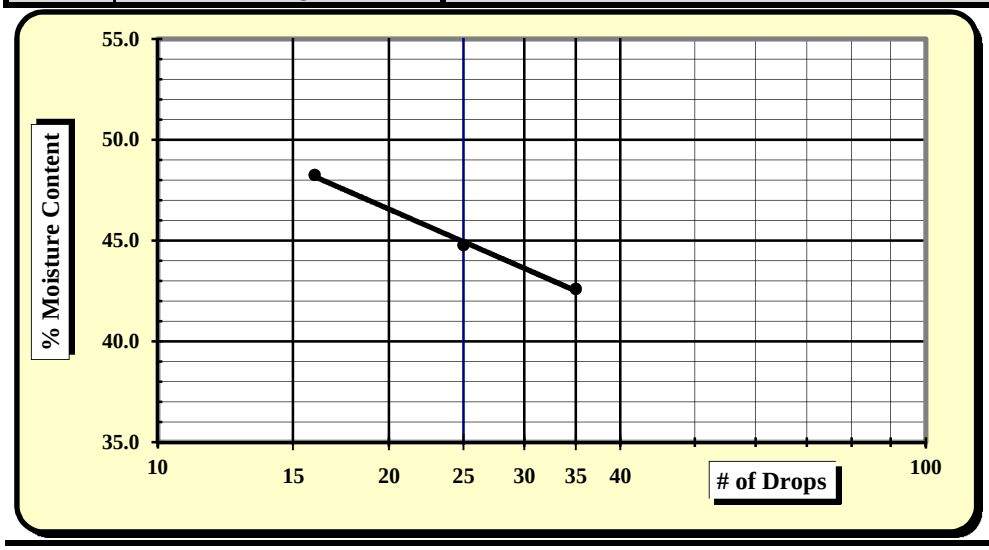
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Tan orange brown, fine, sandy LEAN CLAY (CL) [A-7-6 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	4	12	809				3		
A	Tare Weight	13.04	13.02	16.69				15.30		
B	Wet Soil Weight + A	25.29	23.69	28.55				25.16		
C	Dry Soil Weight + A	21.63	20.39	24.69				23.13		
D	Water Weight (B-C)	3.66	3.30	3.86				2.03		
E	Dry Soil Weight (C-A)	8.59	7.37	8.00				7.83		
F	% Moisture (D/E)*100	42.6%	44.8%	48.3%				25.9%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.9%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**26**
Plastic Index	**19**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

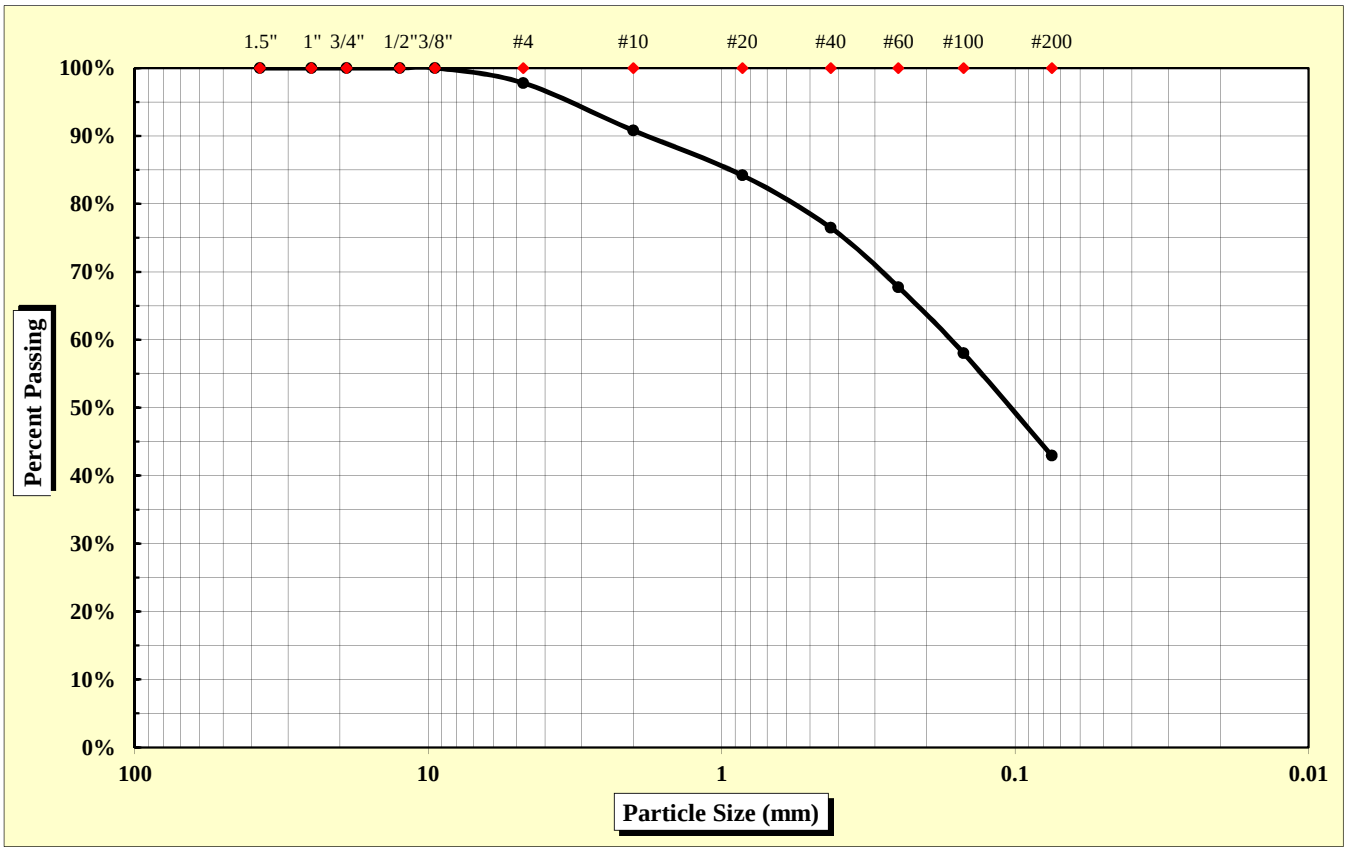
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Gray orange brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	9.2%	Fine Sand	33.5%
		Coarse Sand	14.3%	Silt & Clay	42.9%
Liquid Limit	30	Plastic Limit	26	Plastic Index	4
		Moisture Content	15.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

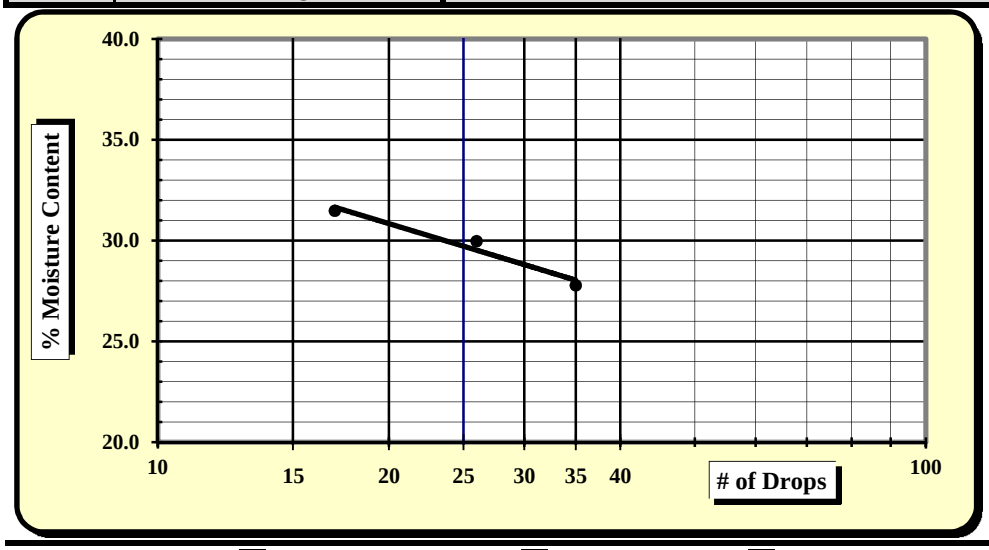
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Gray orange brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	806	21	27				5		
A	Tare Weight	16.58	12.94	12.97				10.97		
B	Wet Soil Weight + A	29.00	26.21	26.88				20.34		
C	Dry Soil Weight + A	26.30	23.15	23.55				18.38		
D	Water Weight (B-C)	2.70	3.06	3.33				1.96		
E	Dry Soil Weight (C-A)	9.72	10.21	10.58				7.41		
F	% Moisture (D/E)*100	27.8%	30.0%	31.5%				26.5%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**26**
Plastic Index	**4**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

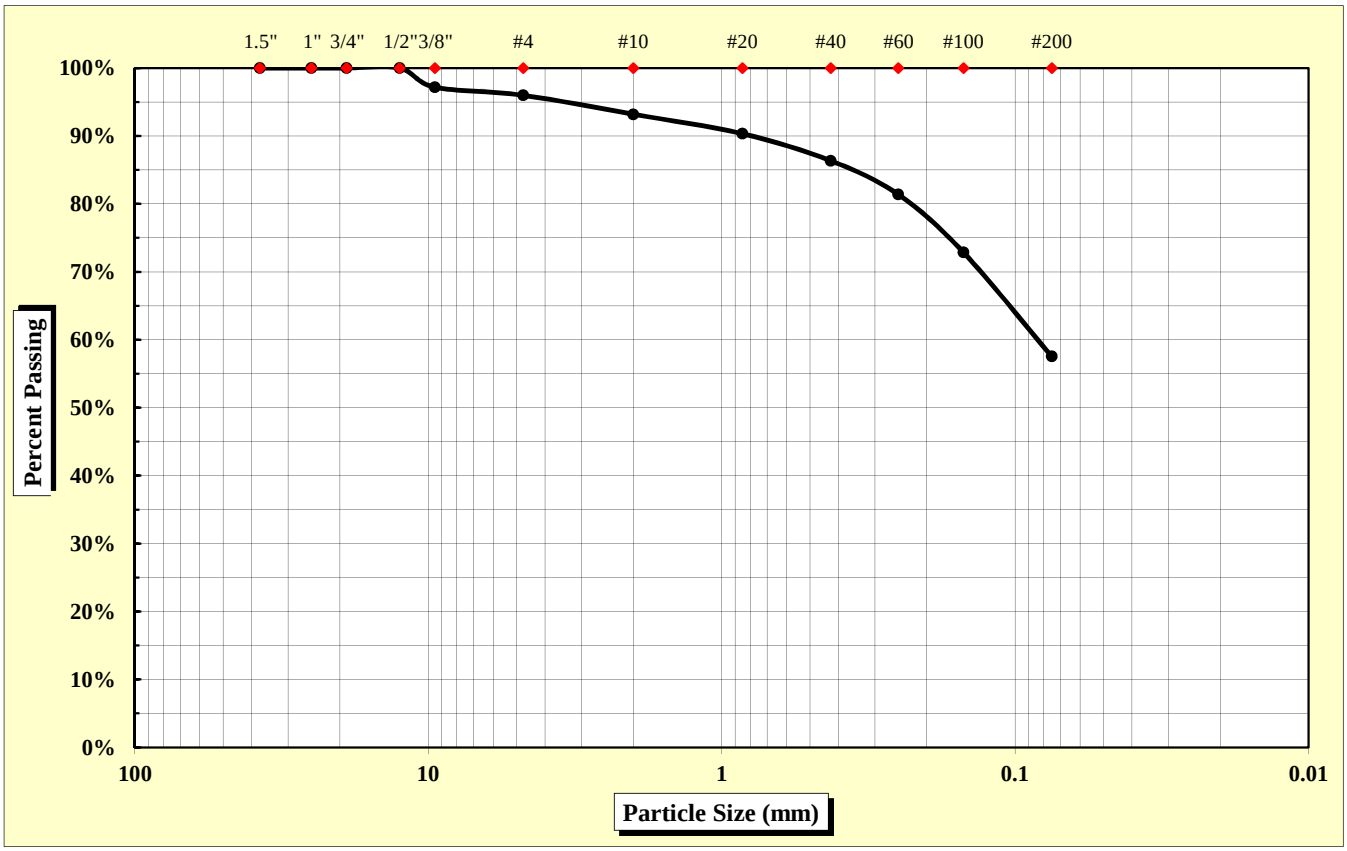
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-8	Sample #:	230	Sample Date:	10/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Tan orange brown, fine, trace mica, sandy SILT (ML) [A-4 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	6.8%	Fine Sand	28.8%
		Coarse Sand	6.8%	Silt & Clay	57.5%
Liquid Limit	36	Plastic Limit	26	Plastic Index	10
		Moisture Content	26.5%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

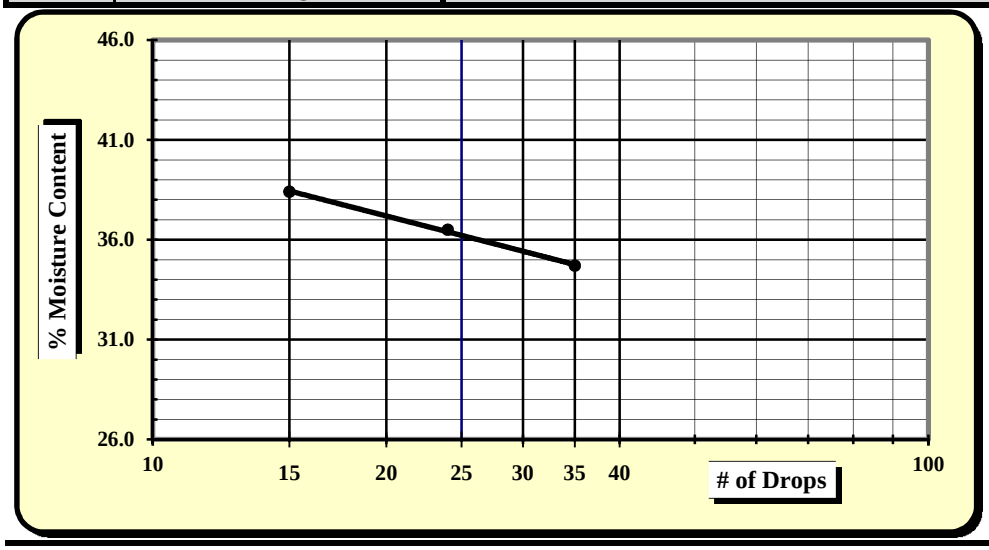
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-8	Sample #:	230	Sample Date:	10/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Tan orange brown, fine, trace mica, sandy SILT (ML) [A-4 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.72	16.68	15.72				12.16		
B	Wet Soil Weight + A	39.14	39.32	38.60				21.37		
C	Dry Soil Weight + A	33.37	33.27	32.25				19.46		
D	Water Weight (B-C)	5.77	6.05	6.35				1.91		
E	Dry Soil Weight (C-A)	16.65	16.59	16.53				7.30		
F	% Moisture (D/E)*100	34.7%	36.5%	38.4%				26.2%		
N	# OF DROPS	35	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**26**
Plastic Index	**10**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

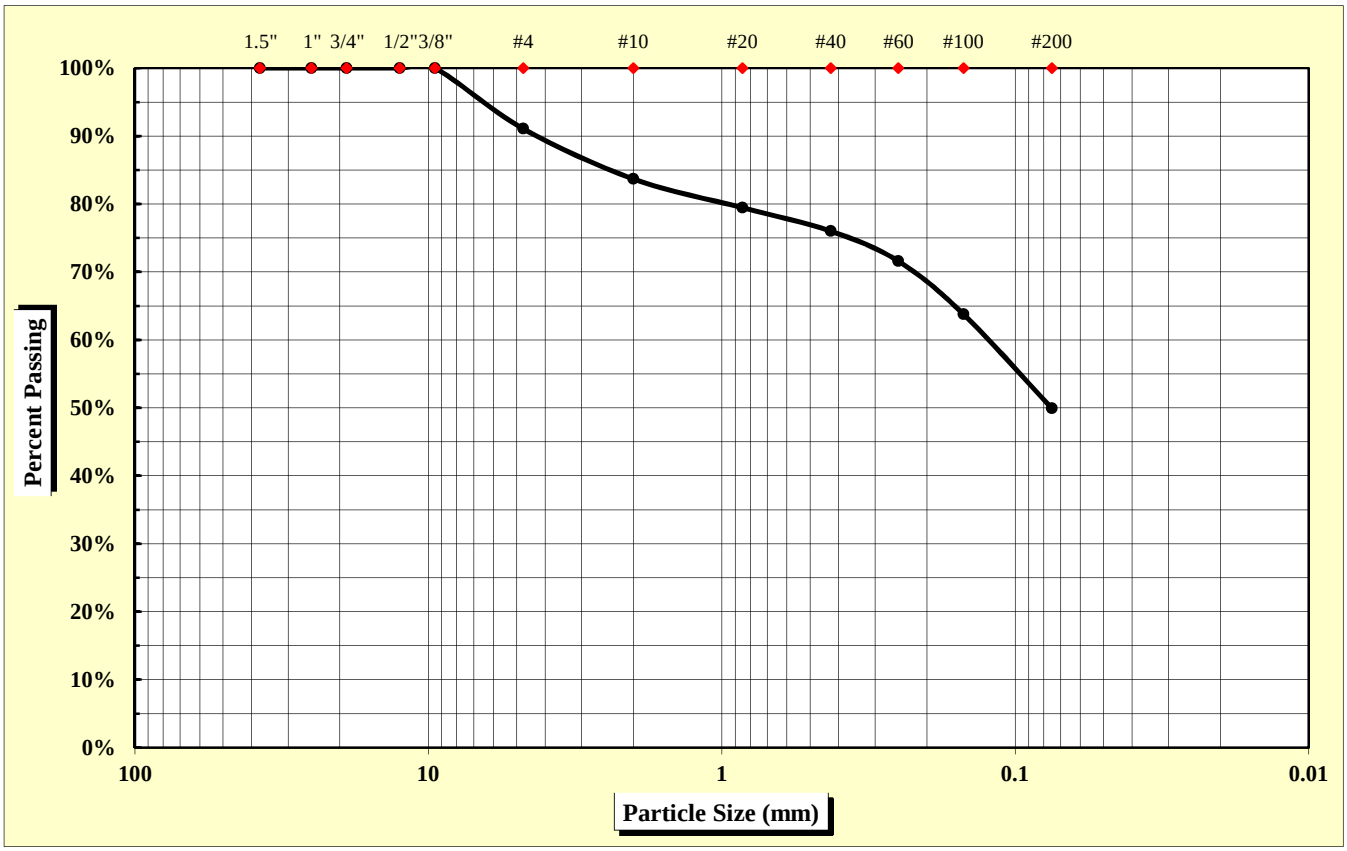
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/10 - 11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-8	Sample #:	230	Sample Date:	10/12/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Light brown red, fine, micaceous, silty SAND (SM) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	16.3%	Fine Sand	26.1%
		Coarse Sand	7.7%	Silt & Clay	49.9%
Liquid Limit	34	Plastic Limit	26	Plastic Index	8
		Moisture Content	21.5%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

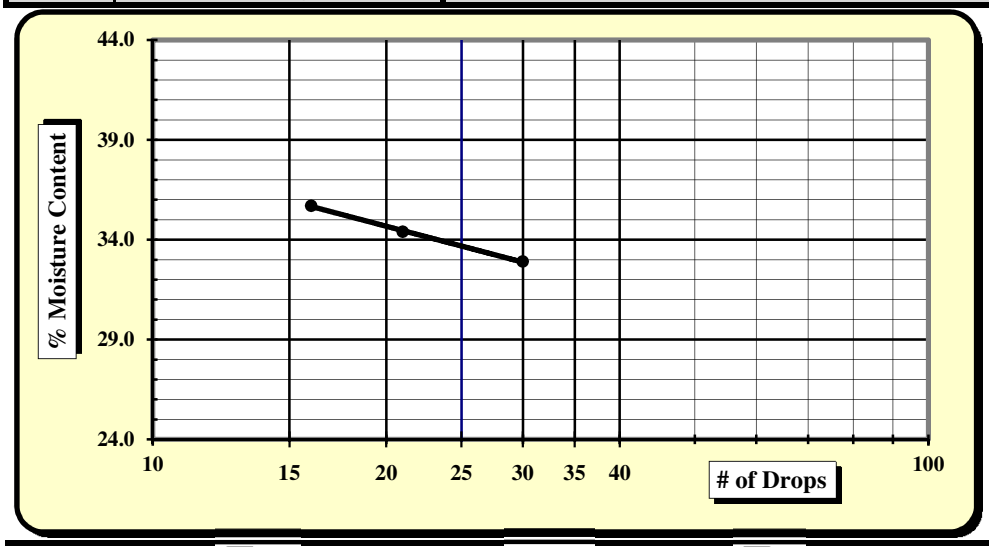
Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/20/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-8	Sample #:	230	Sample Date:	10/12/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Light brown red, fine, micaceous, silty SAND (SM) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.29	16.53				12.11		
B	Wet Soil Weight + A	40.74	38.29	39.18				20.13		
C	Dry Soil Weight + A	34.72	32.40	33.22				18.49		
D	Water Weight (B-C)	6.02	5.89	5.96				1.64		
E	Dry Soil Weight (C-A)	18.32	17.11	16.69				6.38		
F	% Moisture (D/E)*100	32.9%	34.4%	35.7%				25.7%		
N	# OF DROPS	30	21	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**26**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/24/15	Brian Vaughan, P.E.	11/24/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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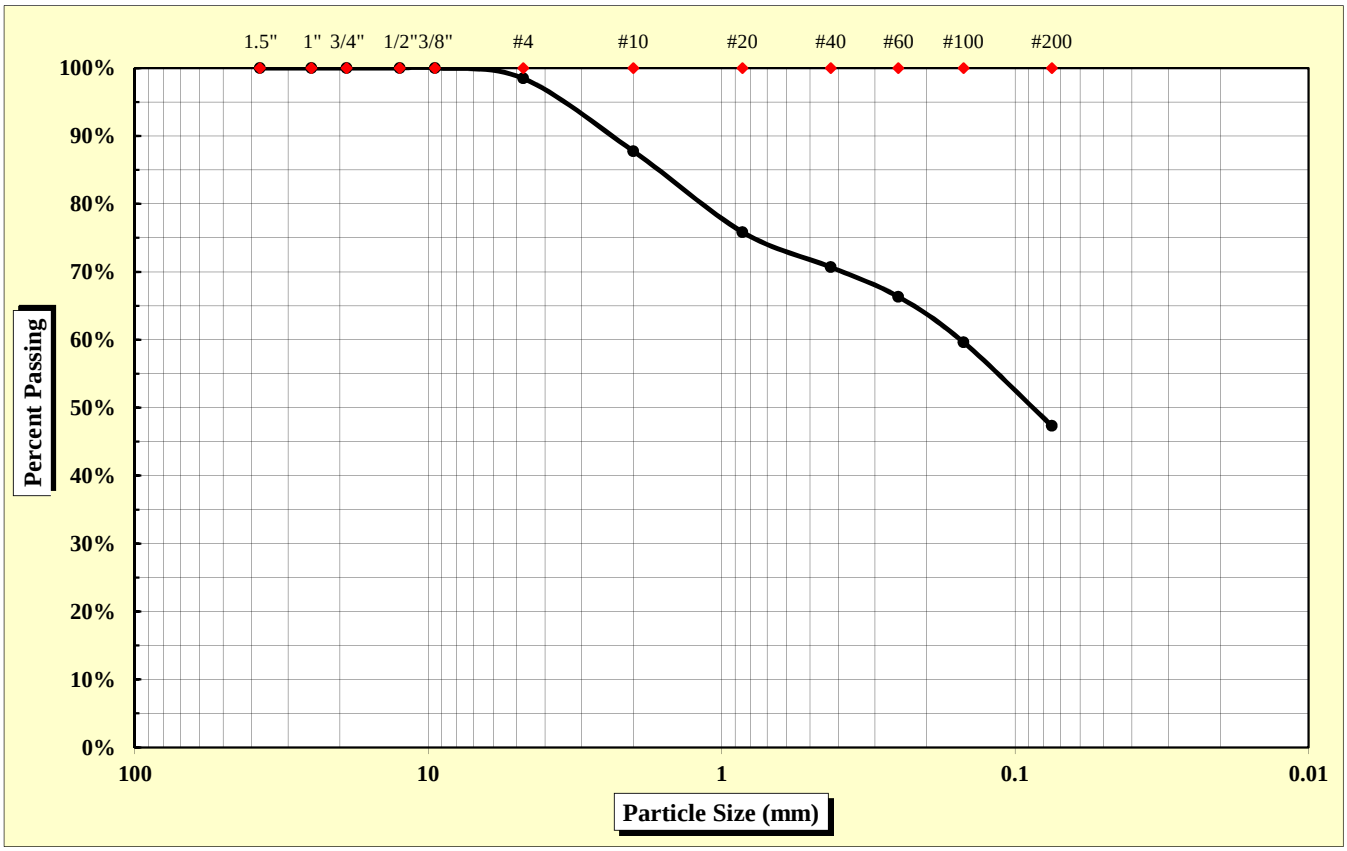
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/4/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-9	Sample #:	230	Sample Date:	10/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Brown gray red, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	12.2%	Fine Sand	23.4%
		Coarse Sand	17.1%	Silt & Clay	47.3%
Liquid Limit	32	Plastic Limit	27	Plastic Index	5
		Moisture Content	23.8%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

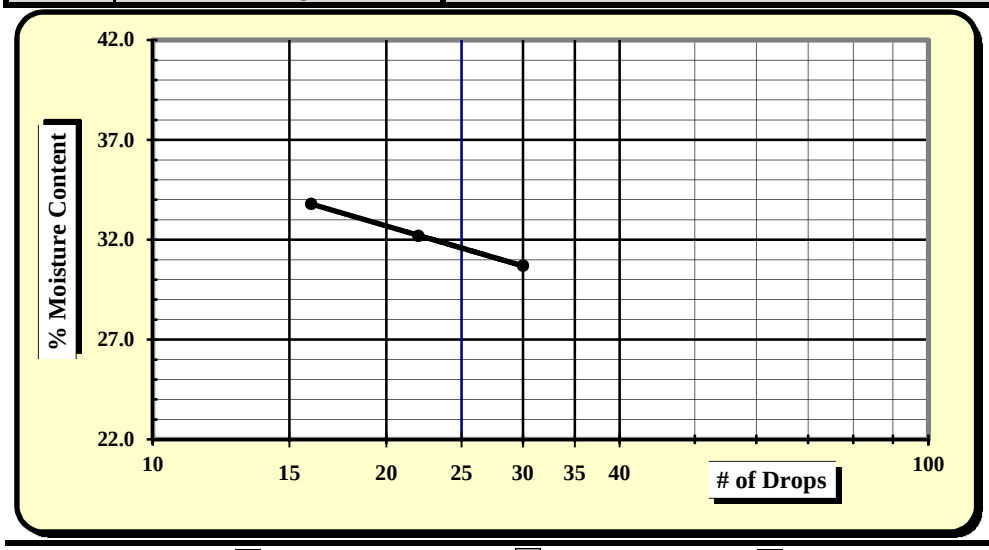
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-9	Sample #:	230	Sample Date:	10/12/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Brown gray red, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.49	17.00				11.59		
B	Wet Soil Weight + A	40.81	39.50	39.16				20.40		
C	Dry Soil Weight + A	35.09	33.89	33.56				18.53		
D	Water Weight (B-C)	5.72	5.61	5.60				1.87		
E	Dry Soil Weight (C-A)	18.64	17.40	16.56				6.94		
F	% Moisture (D/E)*100	30.7%	32.2%	33.8%				26.9%		
N	# OF DROPS	30	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**32**
Plastic Limit	**27**
Plastic Index	**5**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

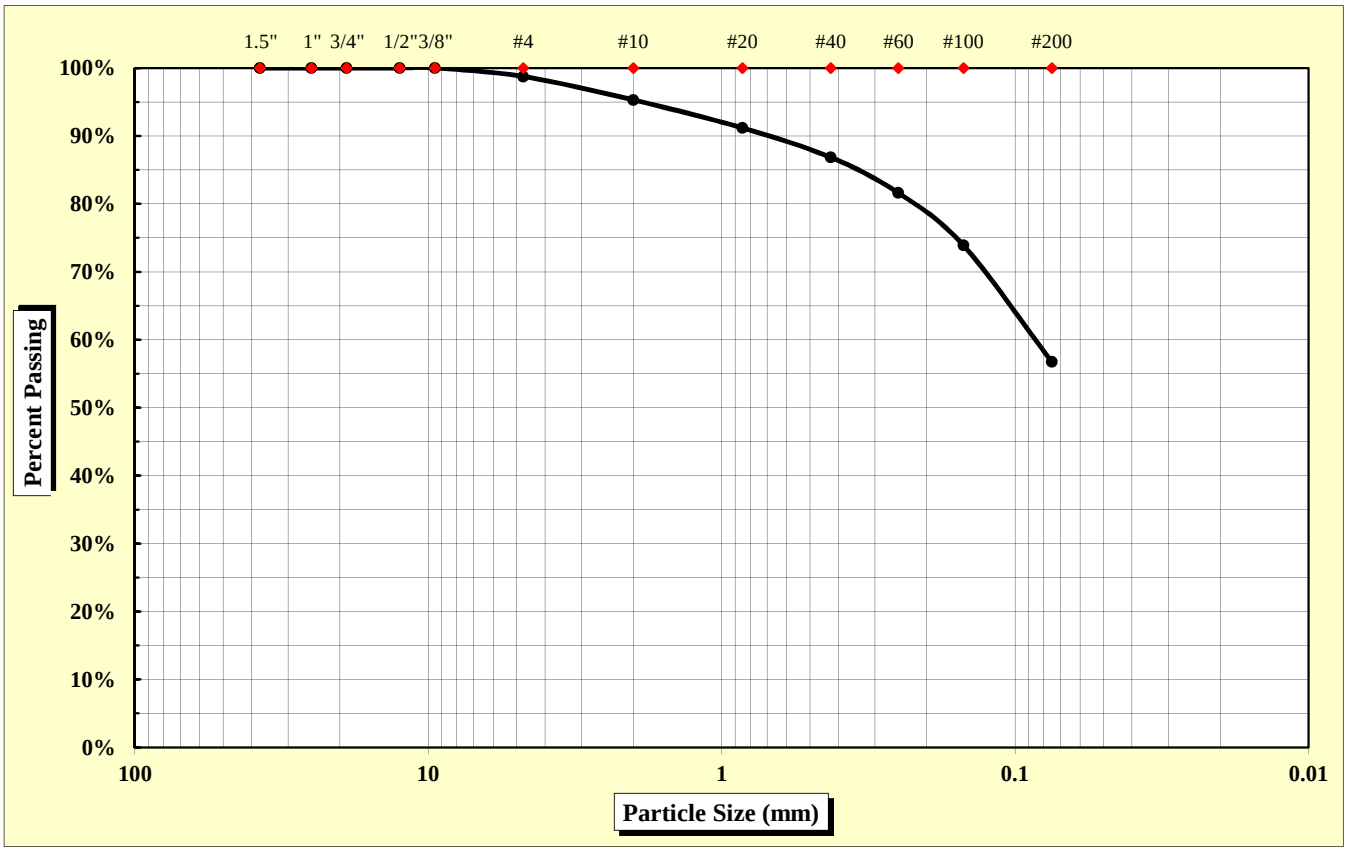
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-9	Sample #:	241	Sample Date:	10/12/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown yellow gray, fine to medium, sandy SILT (ML) [A-4 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.7%	Fine Sand	30.1%
		Coarse Sand	8.4%	Silt & Clay	56.8%
Liquid Limit	37	Plastic Limit	28	Plastic Index	9
		Moisture Content	25.9%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

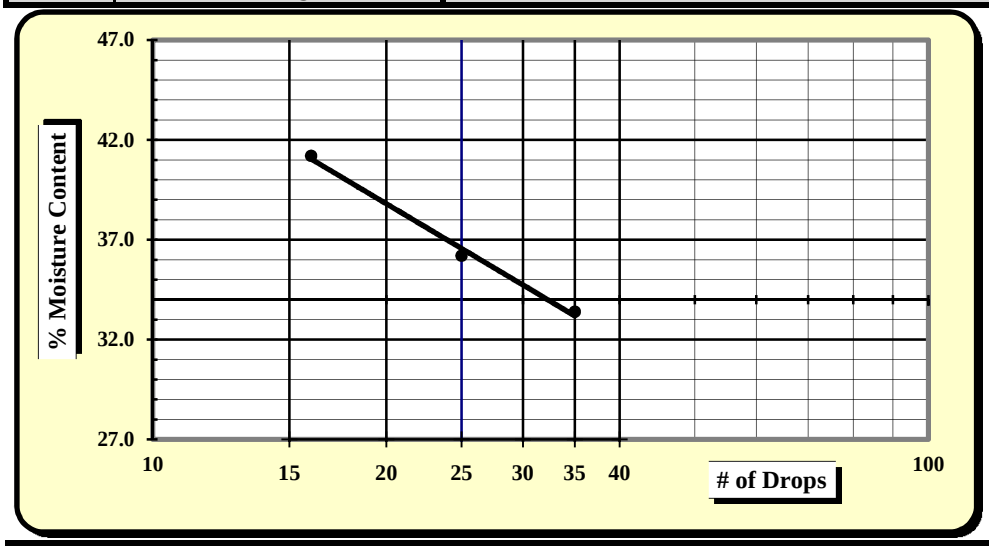
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-9	Sample #:	241	Sample Date:	10/12/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Brown yellow gray, fine to medium, sandy SILT (ML) [A-4 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.70	26.51	26.39				25.98		
B	Wet Soil Weight + A	45.72	45.89	40.95				37.74		
C	Dry Soil Weight + A	40.96	40.74	36.70				35.17		
D	Water Weight (B-C)	4.76	5.15	4.25				2.57		
E	Dry Soil Weight (C-A)	14.26	14.23	10.31				9.19		
F	% Moisture (D/E)*100	33.4%	36.2%	41.2%				28.0%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**28**
Plastic Index	**9**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

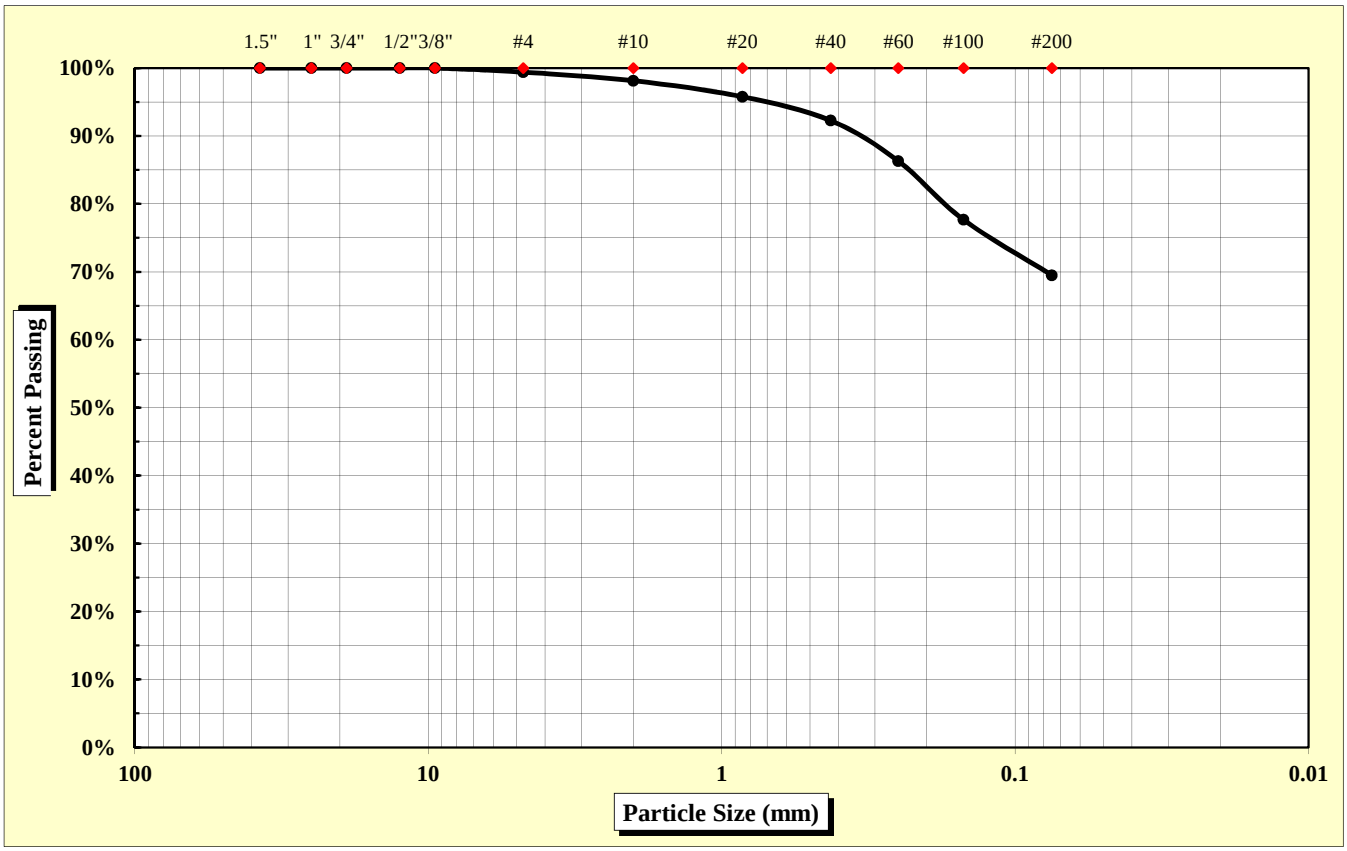
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-10	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red orange brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (20)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.9%	Fine Sand	22.8%
		Coarse Sand	5.9%	Silt & Clay	69.5%
Liquid Limit	58	Plastic Limit	31	Plastic Index	27
		Moisture Content	31.1%	Group Index	20

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

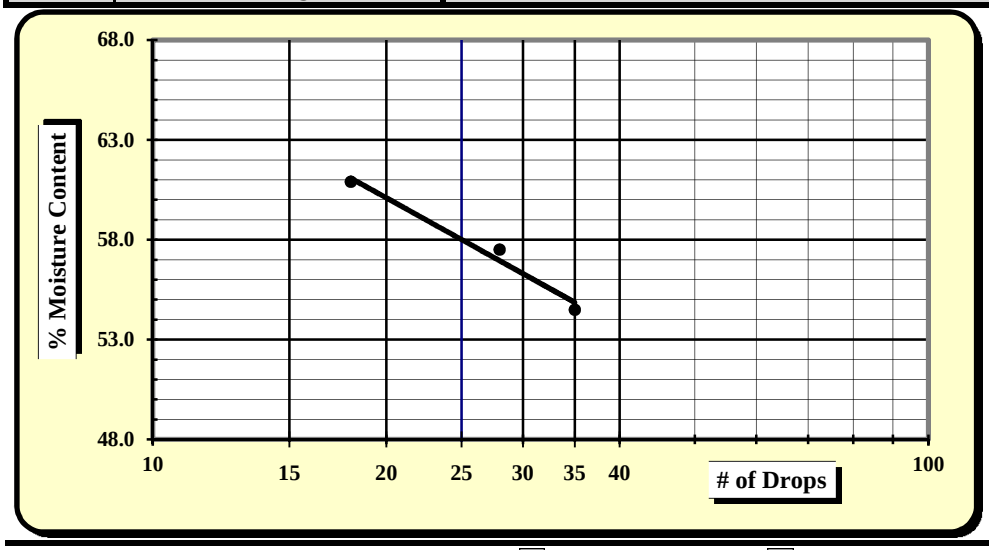
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-10	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red orange brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (20)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.95	16.66	16.78				12.26		
B	Wet Soil Weight + A	36.07	36.60	35.22				21.11		
C	Dry Soil Weight + A	28.97	29.32	28.24				19.00		
D	Water Weight (B-C)	7.10	7.28	6.98				2.11		
E	Dry Soil Weight (C-A)	13.02	12.66	11.46				6.74		
F	% Moisture (D/E)*100	54.5%	57.5%	60.9%				31.3%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**31**
Plastic Index	**27**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 69.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

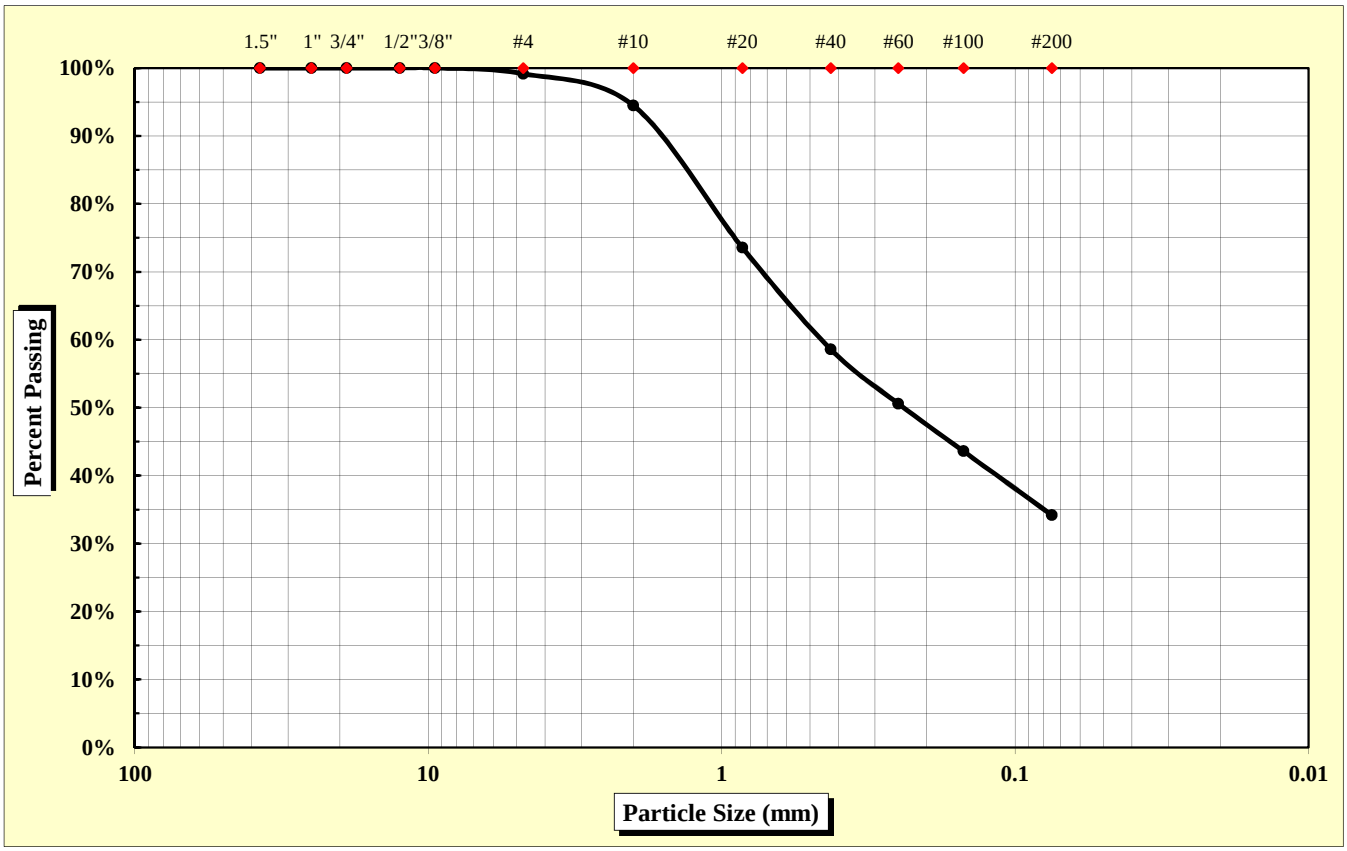
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-10	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red brown, fine to medium, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	5.5%	Fine Sand	24.4%
		Coarse Sand	35.9%	Silt & Clay	34.2%
Liquid Limit	38	Plastic Limit	33	Plastic Index	5
		Moisture Content	23.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

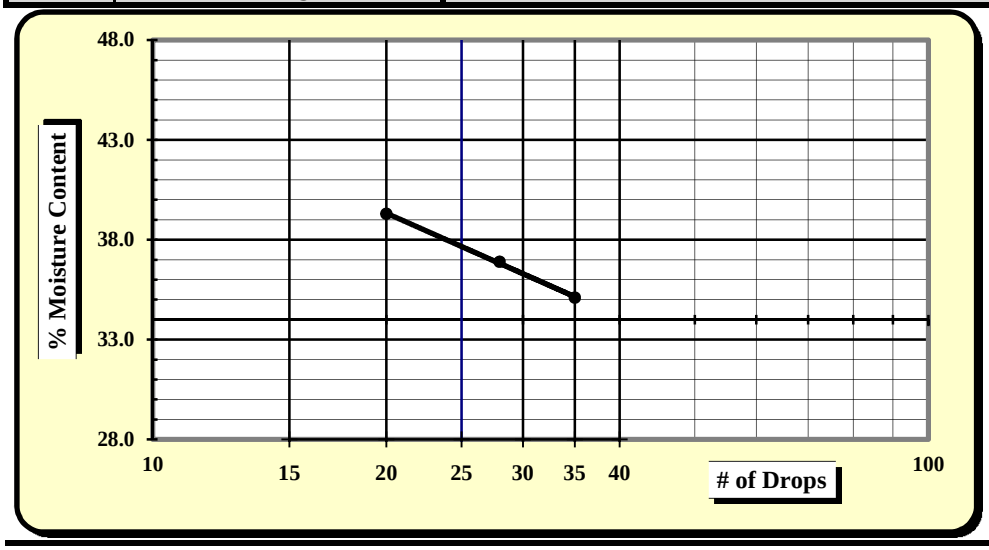
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-10	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red brown, fine to medium, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.99	27.79	26.28				27.35		
B	Wet Soil Weight + A	43.26	43.19	44.44				38.01		
C	Dry Soil Weight + A	39.03	39.04	39.32				35.37		
D	Water Weight (B-C)	4.23	4.15	5.12				2.64		
E	Dry Soil Weight (C-A)	12.04	11.25	13.04				8.02		
F	% Moisture (D/E)*100	35.1%	36.9%	39.3%				32.9%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**33**
Plastic Index	**5**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

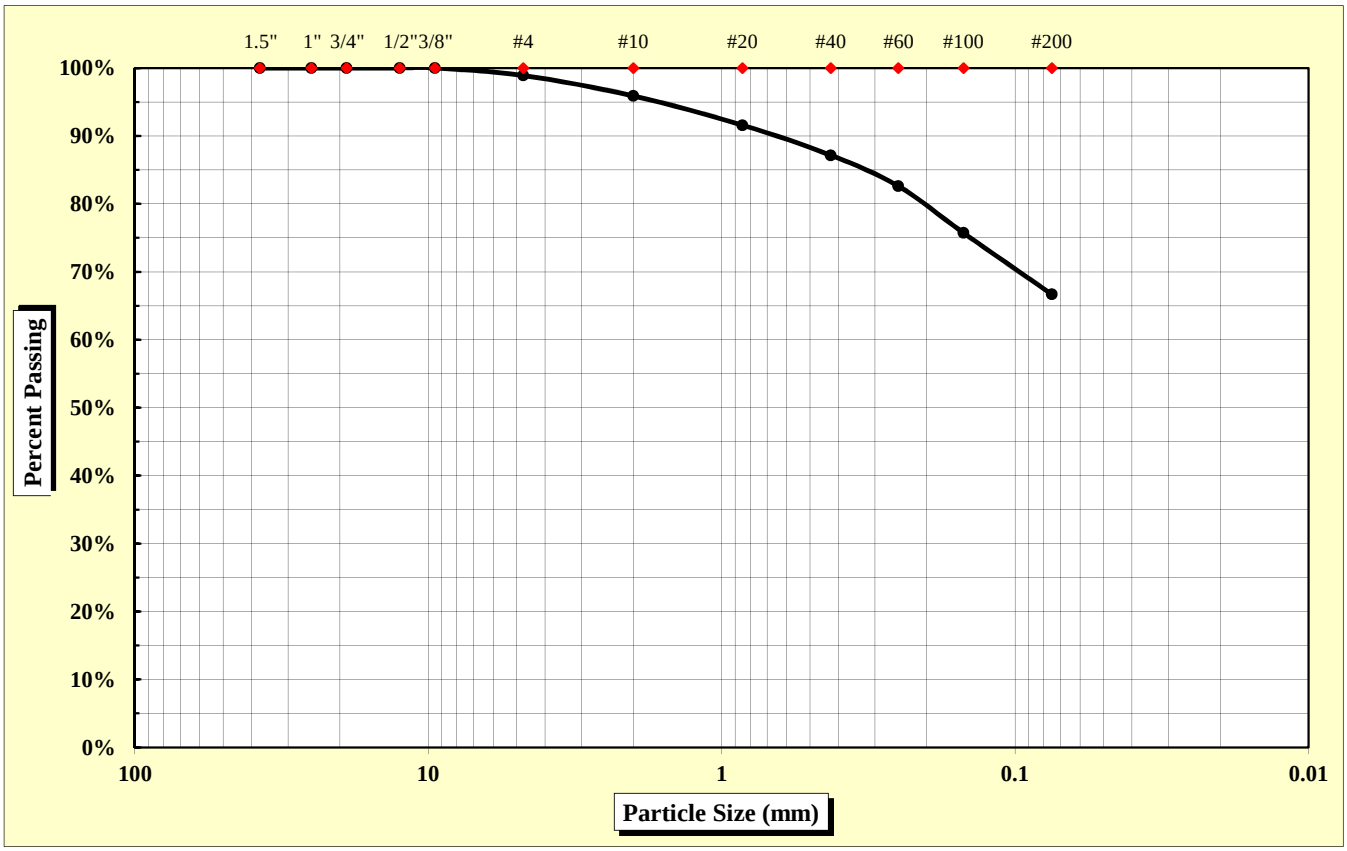
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, fine, sandy LEAN CLAY (CL) [A-7-6 (13)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.1%	Fine Sand	20.5%
		Coarse Sand	8.7%	Silt & Clay	66.7%
Liquid Limit	47	Plastic Limit	26	Plastic Index	21
		Moisture Content	24.2%	Group Index	13

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

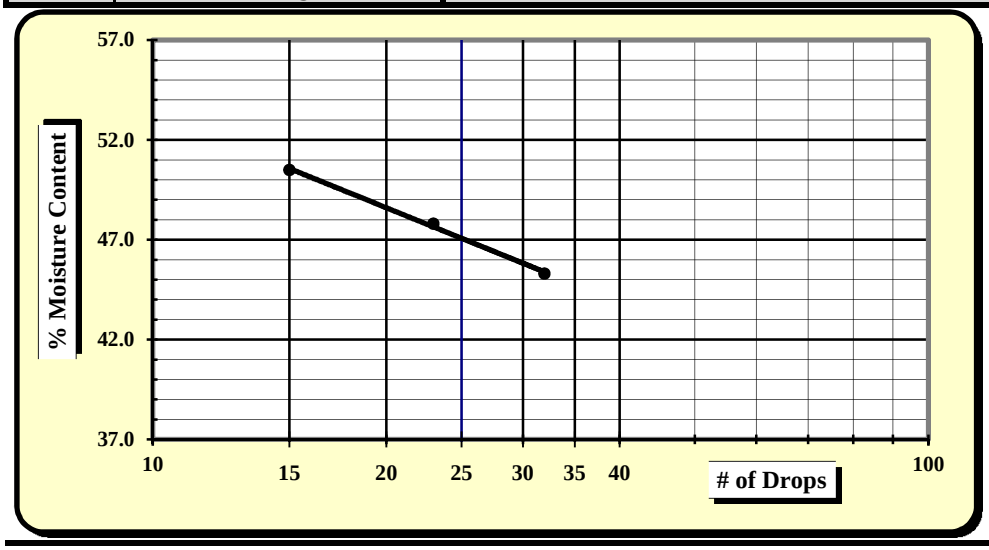
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, fine, sandy LEAN CLAY (CL) [A-7-6 (13)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.65	16.67	15.98				12.10		
B	Wet Soil Weight + A	38.40	38.50	37.61				21.36		
C	Dry Soil Weight + A	31.62	31.44	30.35				19.48		
D	Water Weight (B-C)	6.78	7.06	7.26				1.88		
E	Dry Soil Weight (C-A)	14.97	14.77	14.37				7.38		
F	% Moisture (D/E)*100	45.3%	47.8%	50.5%				25.5%		
N	# OF DROPS	32	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**26**
Plastic Index	**21**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 66.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

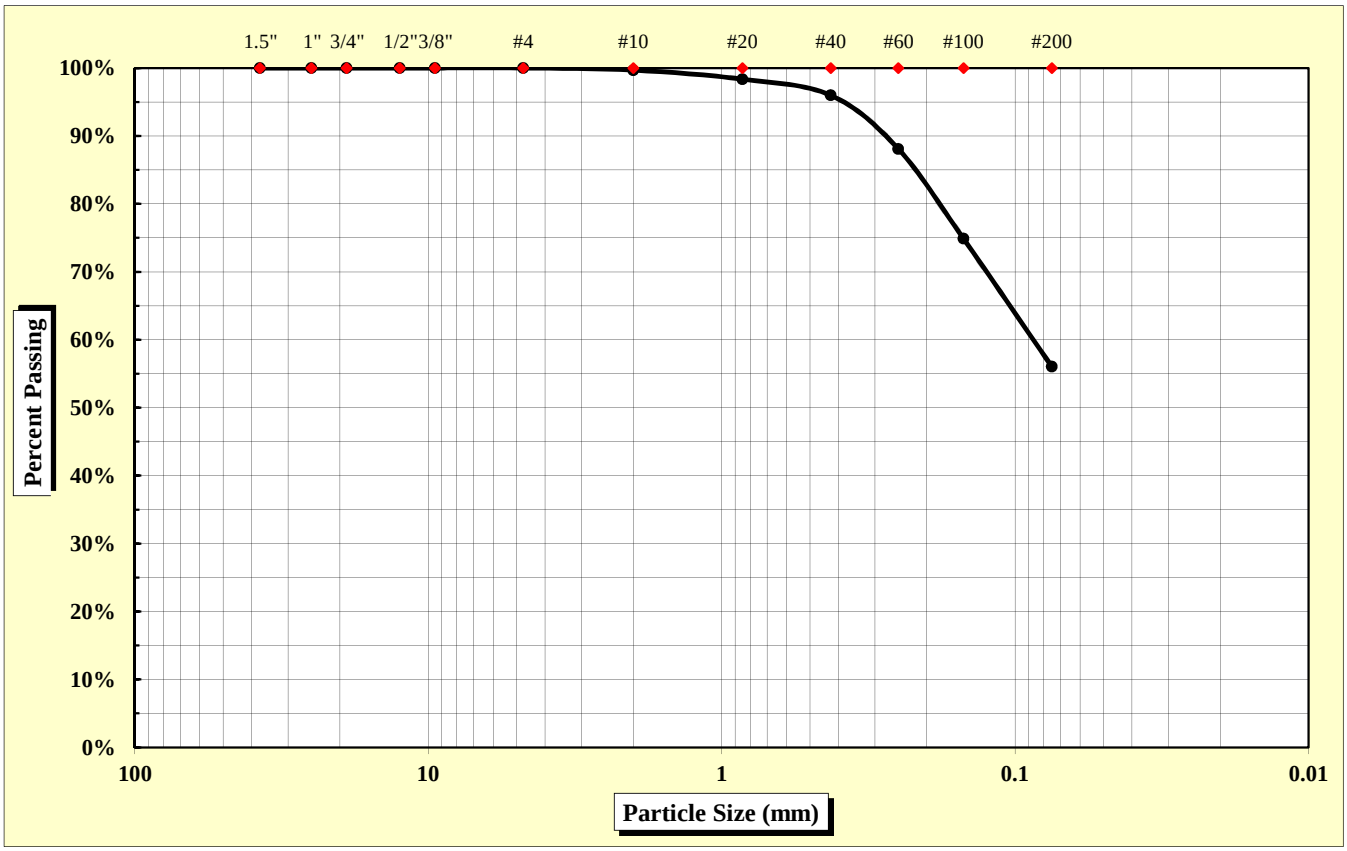
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	241	Sample Date:	10/12/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red yellow, fine, sandy SILT (ML) [A-7-5 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	39.9%
		Coarse Sand	3.7%	Silt & Clay	56.1%
Liquid Limit	47	Plastic Limit	35	Plastic Index	12
		Moisture Content	34.1%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

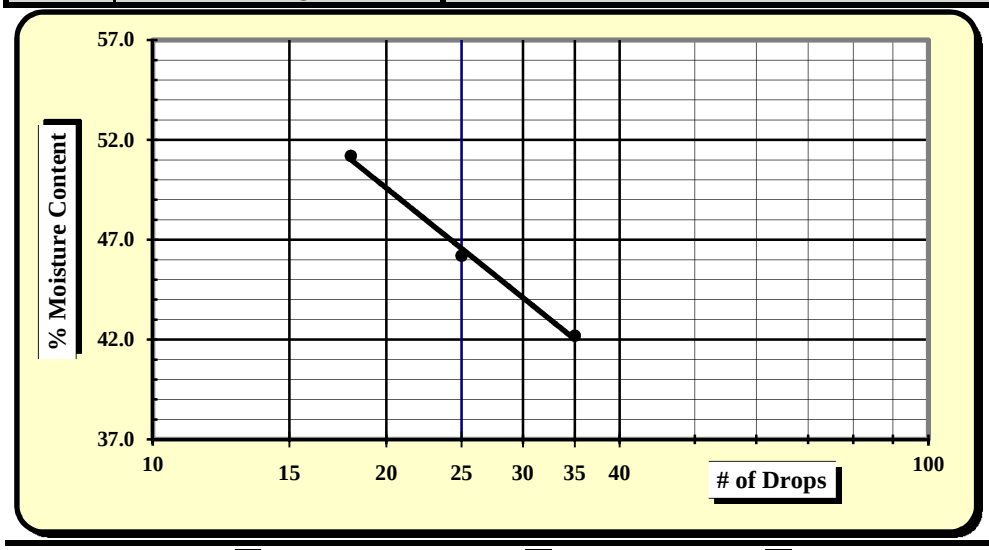
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	241	Sample Date:	10/12/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Red yellow, fine, sandy SILT (ML) [A-7-5 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.88	26.82	26.68				26.67		
B	Wet Soil Weight + A	44.60	44.99	40.05				37.94		
C	Dry Soil Weight + A	39.34	39.25	35.52				35.05		
D	Water Weight (B-C)	5.26	5.74	4.53				2.89		
E	Dry Soil Weight (C-A)	12.46	12.43	8.84				8.38		
F	% Moisture (D/E)*100	42.2%	46.2%	51.2%				34.5%		
N	# OF DROPS	35	25	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**35**
Plastic Index	**12**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

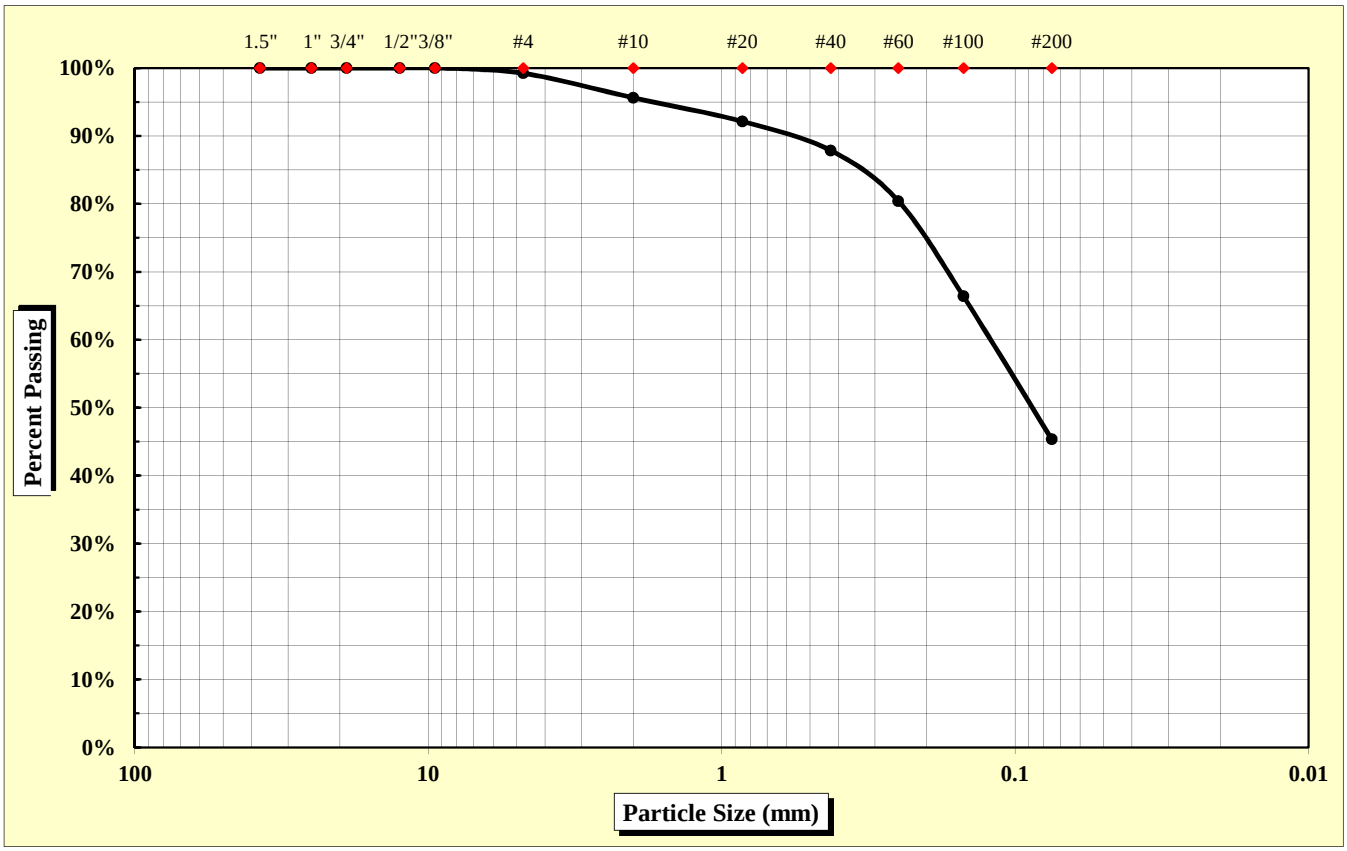
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-9	Type:	Split-spoon	Depth:	28.5 - 30'
Sample Description:	Brown, fine, trace mica, silty SAND (SM) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.4%	Fine Sand	42.5%
		Coarse Sand	7.8%	Silt & Clay	45.4%
Liquid Limit	42	Plastic Limit	33	Plastic Index	9
		Moisture Content	30.0%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

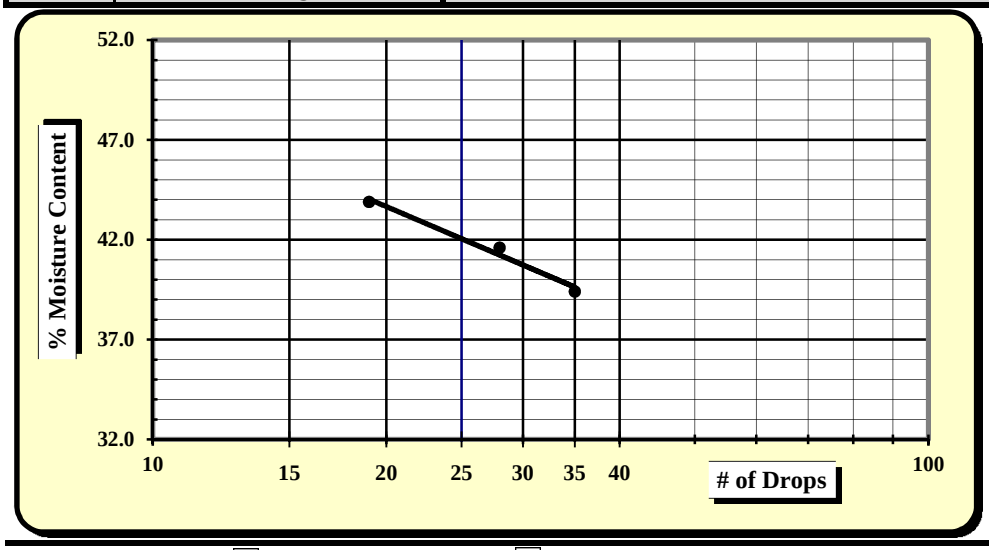
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-9	Type:	Split-spoon	Depth:	28.5 - 30'

Sample Description: Brown, fine, trace mica, silty SAND (SM) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.87	16.81				12.29		
B	Wet Soil Weight + A	38.43	37.02	36.70				20.87		
C	Dry Soil Weight + A	32.29	31.10	30.63				18.74		
D	Water Weight (B-C)	6.14	5.92	6.07				2.13		
E	Dry Soil Weight (C-A)	15.58	14.23	13.82				6.45		
F	% Moisture (D/E)*100	39.4%	41.6%	43.9%				33.0%		
N	# OF DROPS	35	28	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**33**
Plastic Index	**9**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

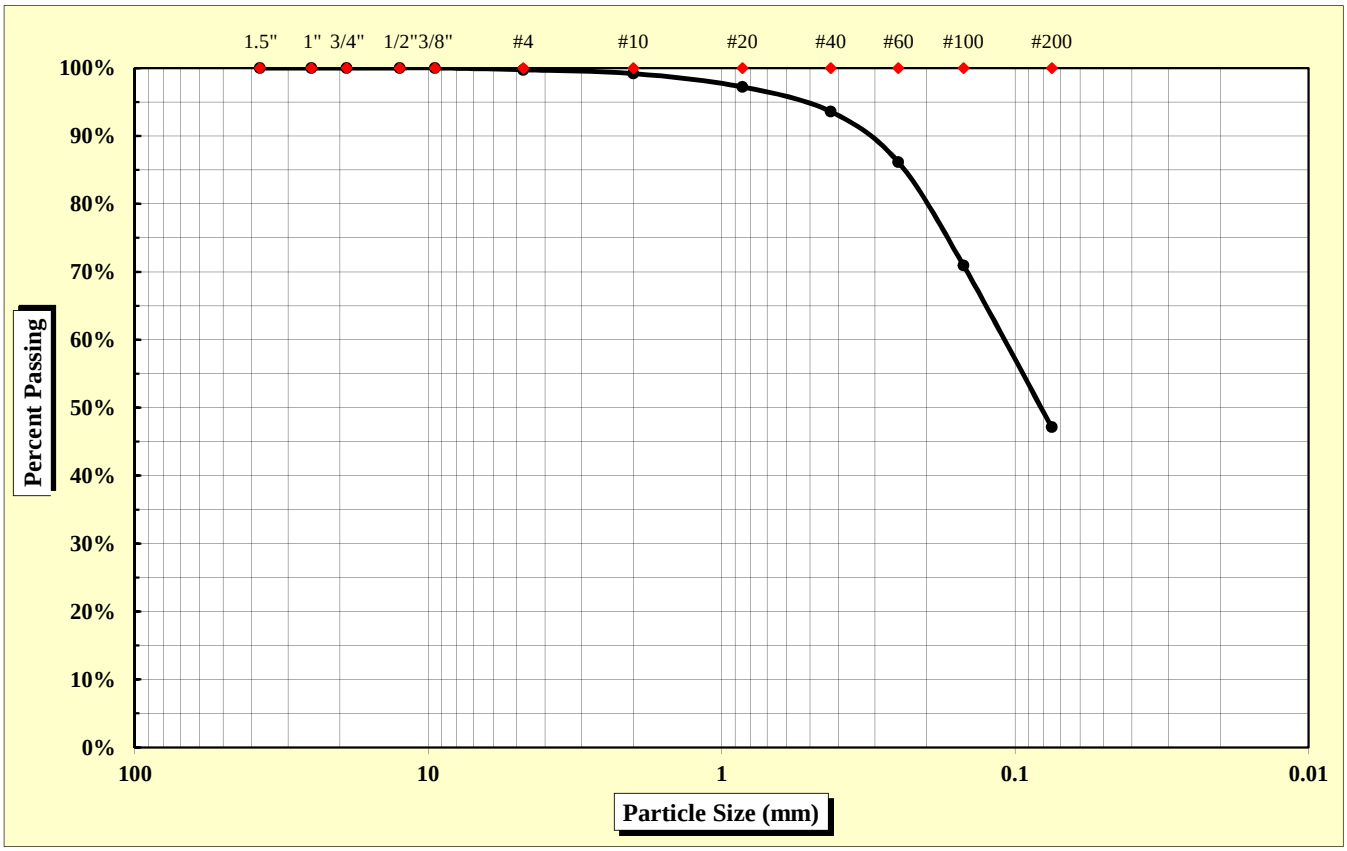
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/30 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-10	Type:	Split-spoon	Depth:	33.5 - 35'
Sample Description:	Brown, fine, trace mica, silty SAND (SM) [A-7-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.8%	Fine Sand	46.5%
		Coarse Sand	5.6%	Silt & Clay	47.1%
Liquid Limit	44	Plastic Limit	32	Plastic Index	12
		Moisture Content	30.0%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

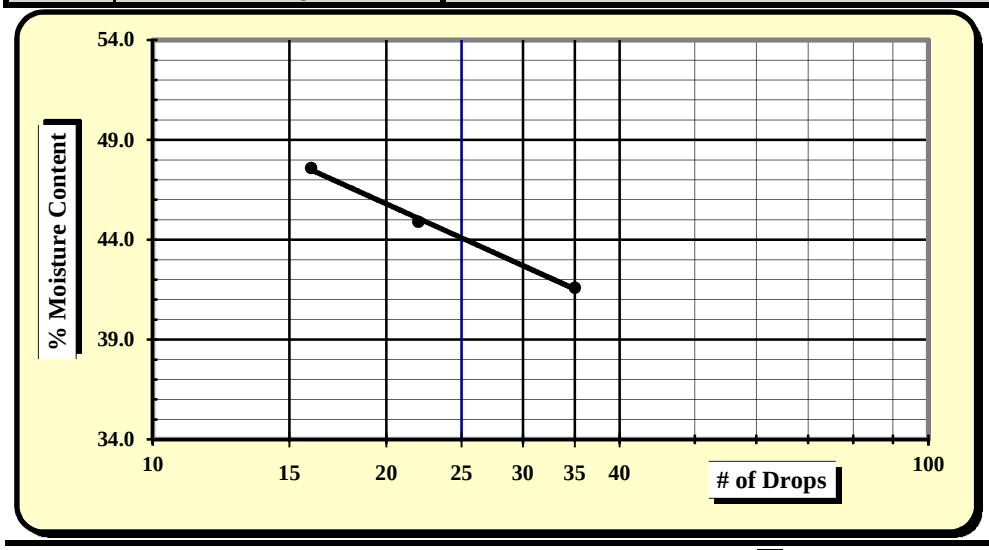
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-11	Sample #:	230	Sample Date:	10/12/15
Location:	SS-10	Type:	Split-spoon	Depth:	33.5 - 35'

Sample Description: Brown, fine, trace mica, silty SAND (SM) [A-7-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.85	16.76	15.92				12.00		
B	Wet Soil Weight + A	38.45	37.51	37.16				20.67		
C	Dry Soil Weight + A	32.10	31.08	30.31				18.57		
D	Water Weight (B-C)	6.35	6.43	6.85				2.10		
E	Dry Soil Weight (C-A)	15.25	14.32	14.39				6.57		
F	% Moisture (D/E)*100	41.6%	44.9%	47.6%				32.0%		
N	# OF DROPS	35	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**32**
Plastic Index	**12**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

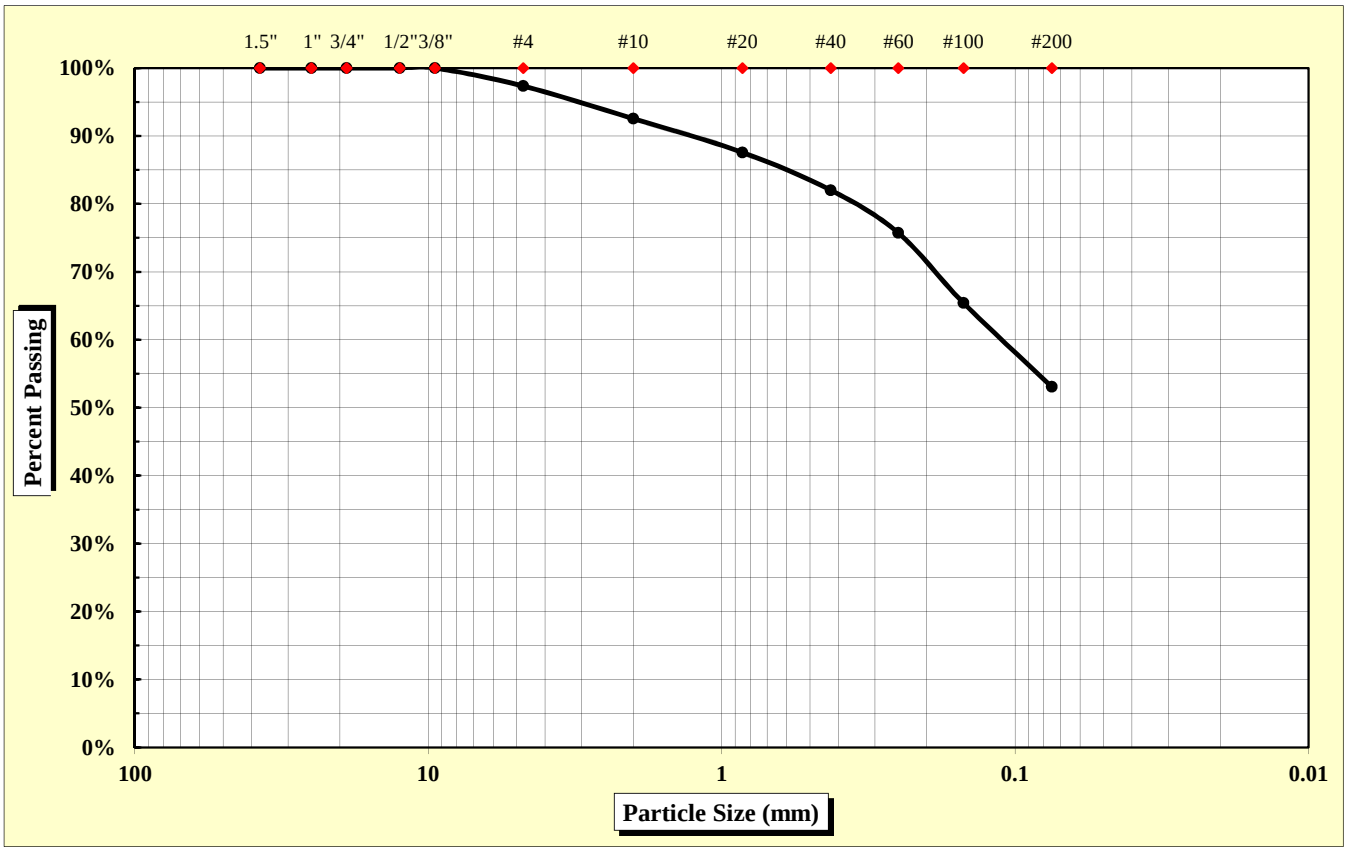
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-12	Sample #:	230	Sample Date:	10/13/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red orange brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	7.5%	Fine Sand	28.9%
		Coarse Sand	10.5%	Silt & Clay	53.1%
Liquid Limit	44	Plastic Limit	23	Plastic Index	21
		Moisture Content	20.2%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

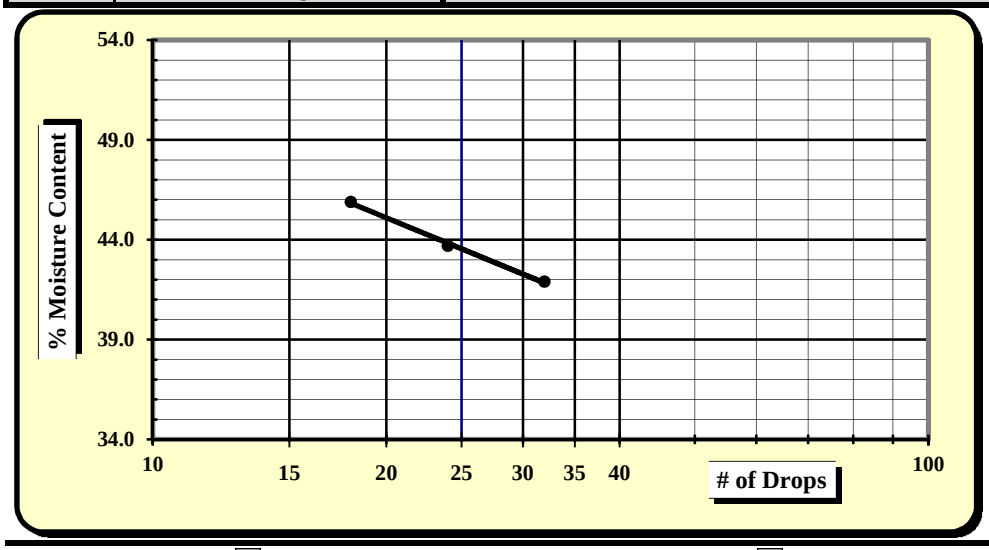
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-12	Sample #:	230	Sample Date:	10/13/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red orange brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.78	15.58	16.92				12.24		
B	Wet Soil Weight + A	38.66	37.42	37.71				21.27		
C	Dry Soil Weight + A	31.90	30.78	31.17				19.56		
D	Water Weight (B-C)	6.76	6.64	6.54				1.71		
E	Dry Soil Weight (C-A)	16.12	15.20	14.25				7.32		
F	% Moisture (D/E)*100	41.9%	43.7%	45.9%				23.4%		
N	# OF DROPS	32	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**23**
Plastic Index	**21**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

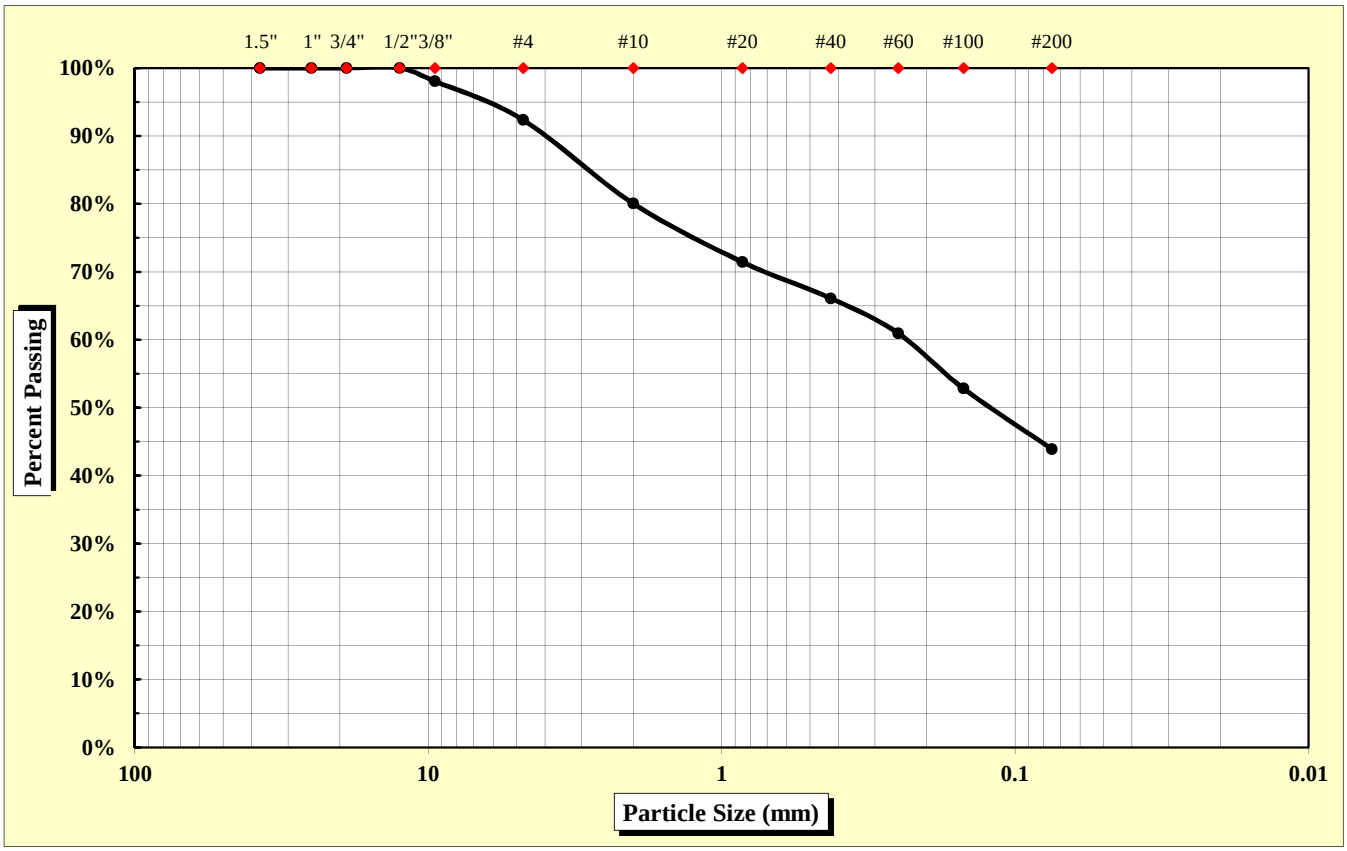
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-12	Sample #:	241	Sample Date:	10/13/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Red yellow, coarse to fine, clayey SAND (SC) [A-7-6 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	19.9%	Fine Sand	22.2%
		Coarse Sand	13.9%	Silt & Clay	43.9%
Liquid Limit	55	Plastic Limit	29	Plastic Index	26
		Moisture Content	19.6%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

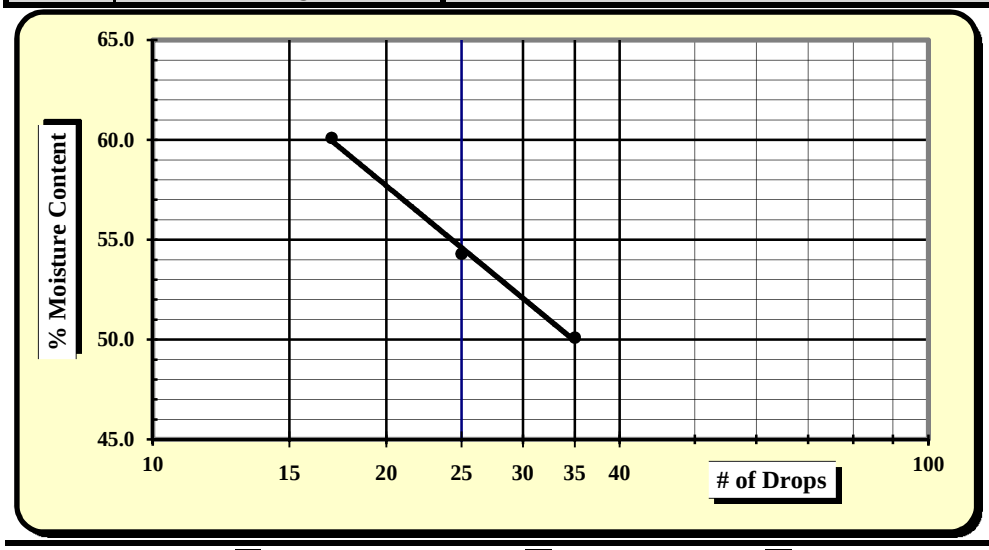
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-12	Sample #:	241	Sample Date:	10/13/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'

Sample Description: Red yellow, coarse to fine, clayey SAND (SC) [A-7-6 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.78	26.70	27.65				26.59		
B	Wet Soil Weight + A	44.28	44.03	43.32				37.65		
C	Dry Soil Weight + A	38.44	37.93	37.44				35.16		
D	Water Weight (B-C)	5.84	6.10	5.88				2.49		
E	Dry Soil Weight (C-A)	11.66	11.23	9.79				8.57		
F	% Moisture (D/E)*100	50.1%	54.3%	60.1%				29.1%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**29**
Plastic Index	**26**
Group Symbol	**SC / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

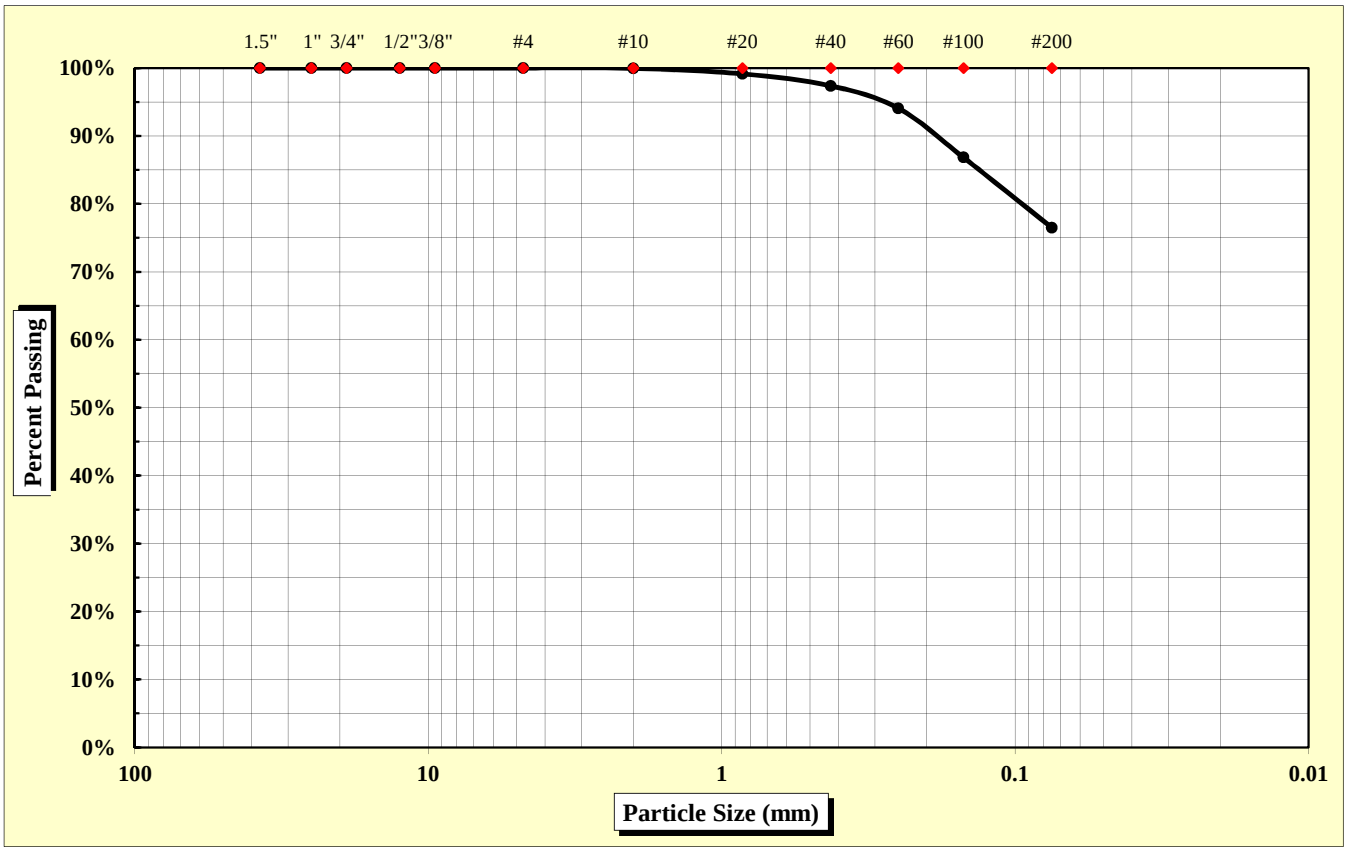
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-13	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (24)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	20.9%
		Coarse Sand	2.6%	Silt & Clay	76.5%
Liquid Limit	64	Plastic Limit	37	Plastic Index	27
		Moisture Content	24.4%	Group Index	24

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

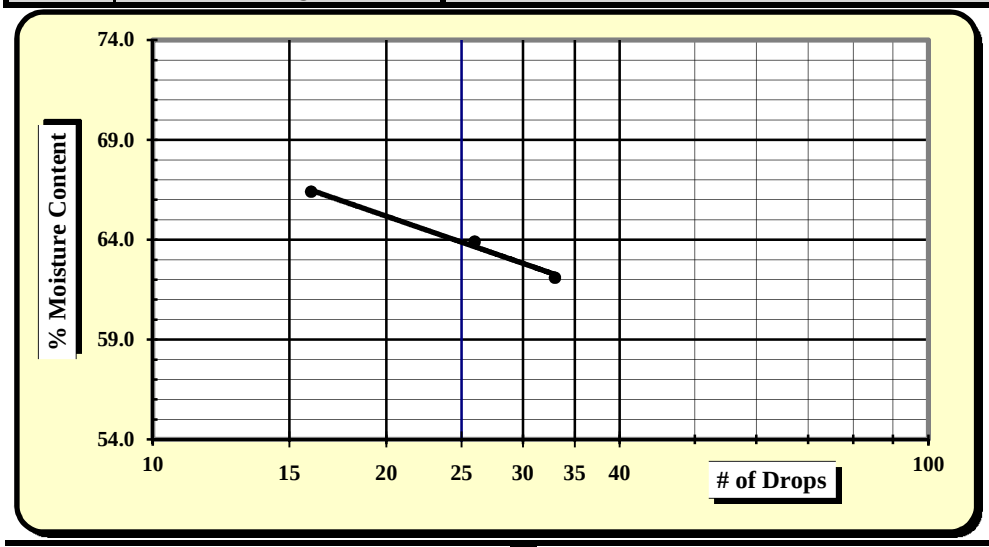
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-13	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (24)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.80	15.69	15.94				11.16		
B	Wet Soil Weight + A	36.57	36.18	35.59				19.60		
C	Dry Soil Weight + A	28.61	28.19	27.75				17.31		
D	Water Weight (B-C)	7.96	7.99	7.84				2.29		
E	Dry Soil Weight (C-A)	12.81	12.50	11.81				6.15		
F	% Moisture (D/E)*100	62.1%	63.9%	66.4%				37.2%		
N	# OF DROPS	33	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.2%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**64**
Plastic Limit	**37**
Plastic Index	**27**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 76.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

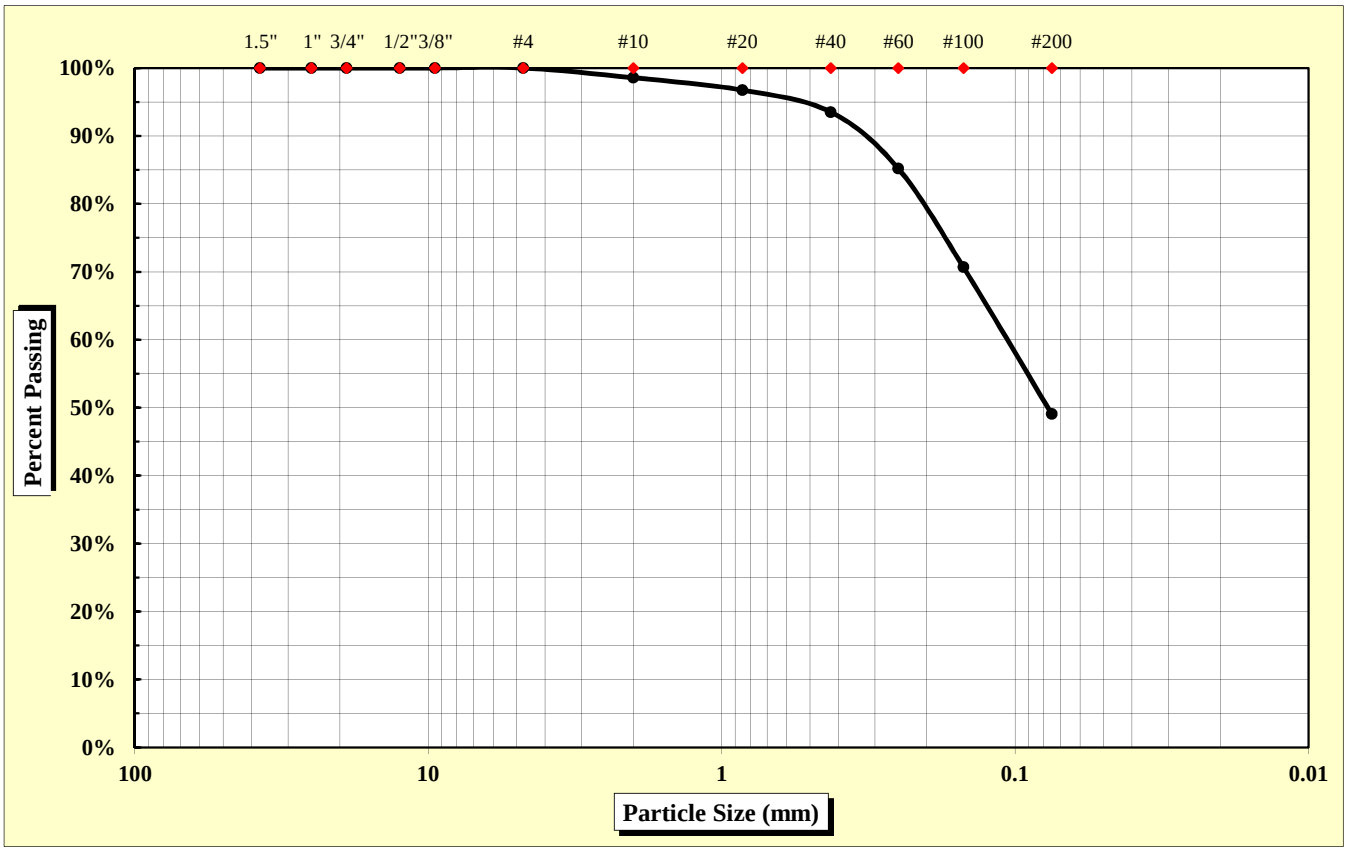
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-13	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Light red brown, fine, silty SAND (SM) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.4%	Fine Sand	44.5%
		Coarse Sand	5.0%	Silt & Clay	49.1%
Liquid Limit	51	Plastic Limit	42	Plastic Index	9
		Moisture Content	25.7%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

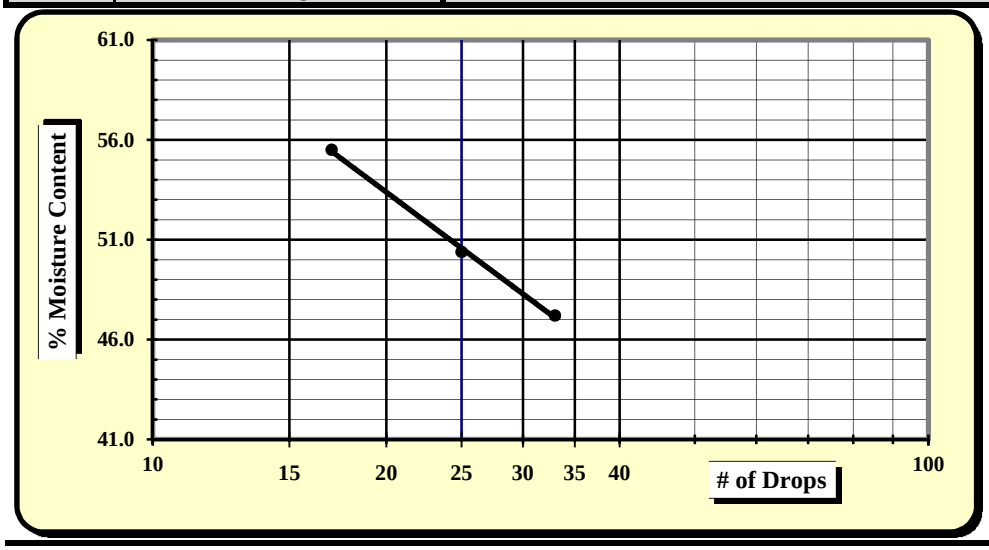
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-13	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Light red brown, fine, silty SAND (SM) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	18	19				20		
A	Tare Weight	26.71	26.85	26.70				26.87		
B	Wet Soil Weight + A	42.86	42.97	42.86				36.39		
C	Dry Soil Weight + A	37.68	37.57	37.09				33.58		
D	Water Weight (B-C)	5.18	5.40	5.77				2.81		
E	Dry Soil Weight (C-A)	10.97	10.72	10.39				6.71		
F	% Moisture (D/E)*100	47.2%	50.4%	55.5%				41.9%		
N	# OF DROPS	33	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**41.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**51**
Plastic Limit	**42**
Plastic Index	**9**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

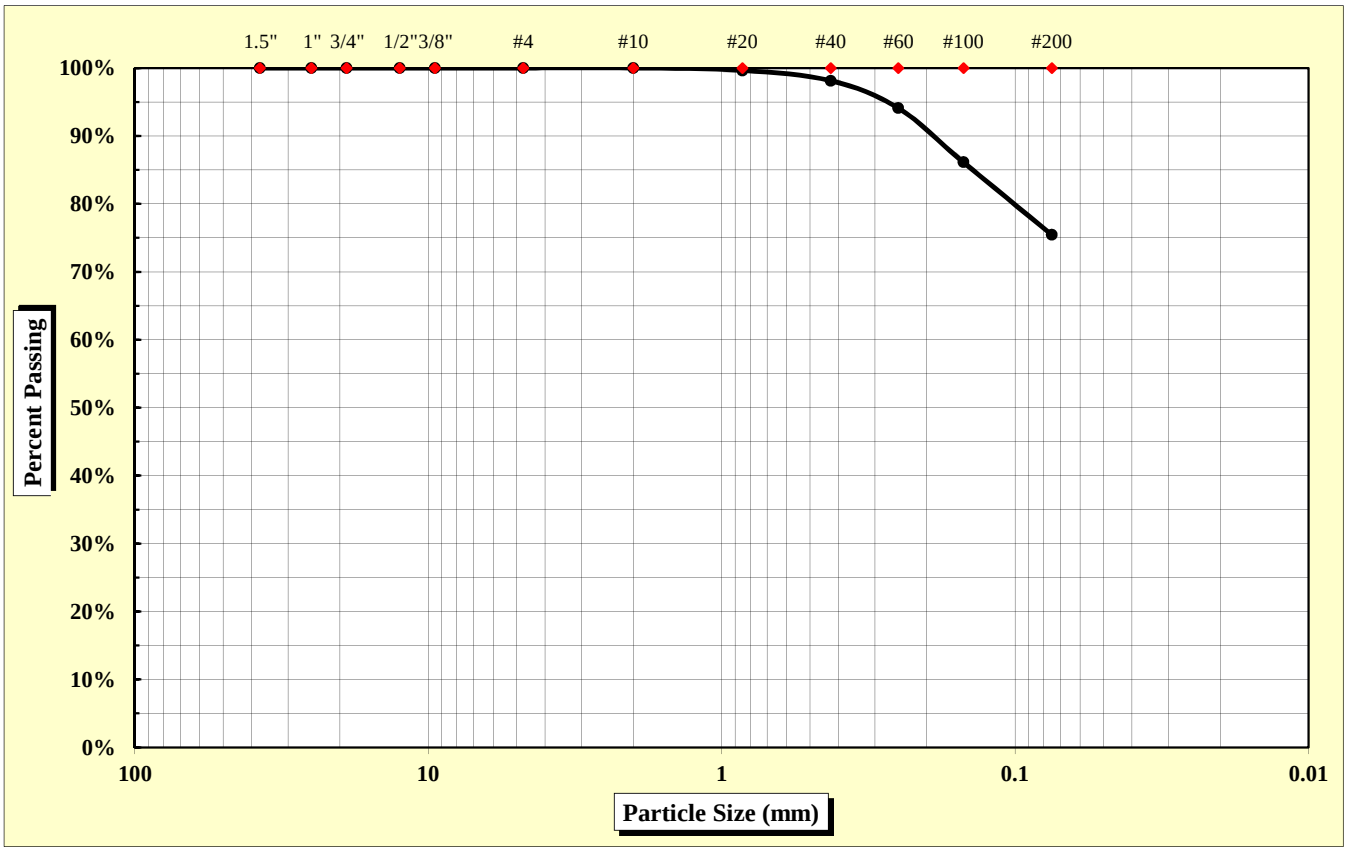
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-14	Sample #:	230	Sample Date:	10/23/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (22)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.85 mm	Gravel	0.0%	Fine Sand	22.7%
		Coarse Sand	1.9%	Silt & Clay	75.4%
Liquid Limit	67	Plastic Limit	43	Plastic Index	24
		Moisture Content	32.8%	Group Index	22

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

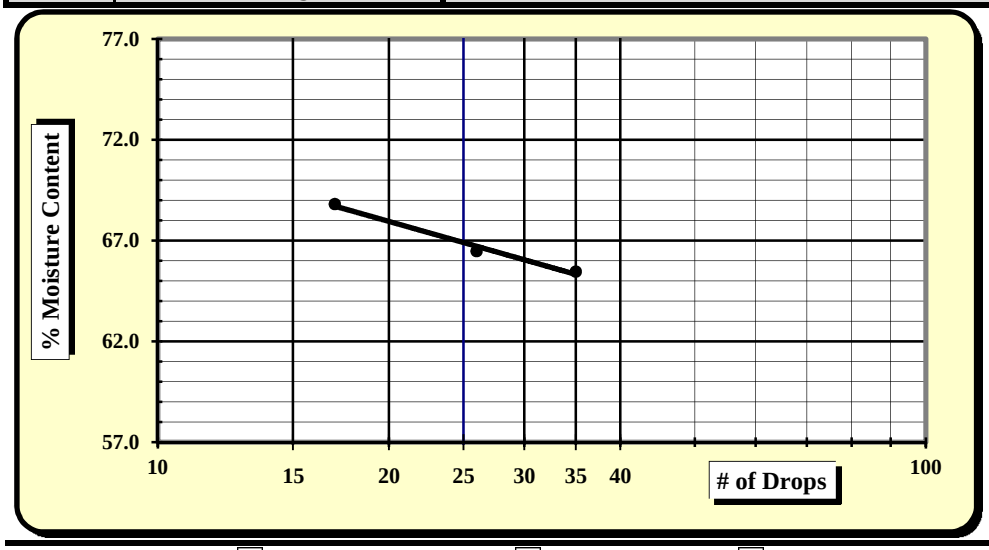
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-14	Sample #:	230	Sample Date:	10/23/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (22)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	5	28				4		
A	Tare Weight	13.06	12.47	13.07				13.05		
B	Wet Soil Weight + A	25.95	24.39	24.60				22.56		
C	Dry Soil Weight + A	20.85	19.63	19.90				19.72		
D	Water Weight (B-C)	5.10	4.76	4.70				2.84		
E	Dry Soil Weight (C-A)	7.79	7.16	6.83				6.67		
F	% Moisture (D/E)*100	65.5%	66.5%	68.8%				42.6%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**42.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**67**
Plastic Limit	**43**
Plastic Index	**24**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 75.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/18/15	Brian Vaughan, P.E.	11/18/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

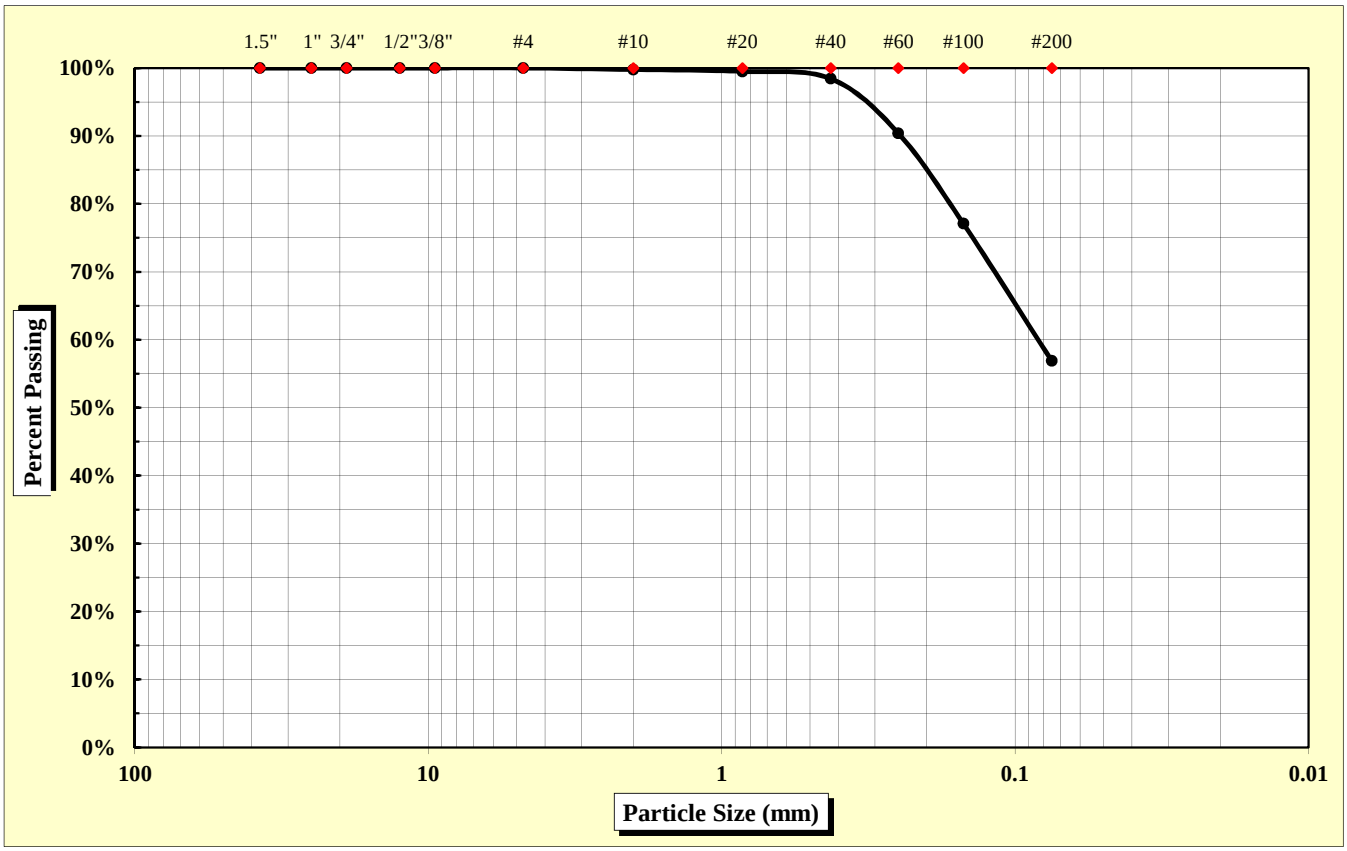
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-14	Sample #:	230	Sample Date:	10/23/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'
Sample Description:	Red brown, fine, trace mica, sandy ELASTIC SILT (MH) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	41.5%
		Coarse Sand	1.3%	Silt & Clay	56.9%
Liquid Limit	60	Plastic Limit	46	Plastic Index	14
		Moisture Content	36.6%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

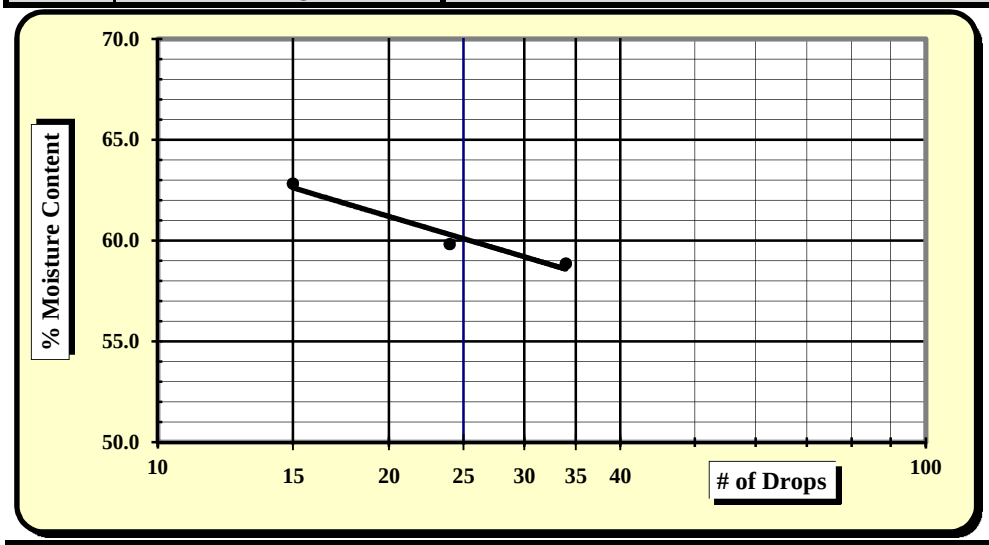
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-14	Sample #:	230	Sample Date:	10/23/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'
Sample Description:	Red brown, fine, trace mica, sandy ELASTIC SILT (MH) [A-7-5 (8)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	10	24	55				15		
A	Tare Weight	12.97	13.07	15.21				12.43		
B	Wet Soil Weight + A	24.36	25.60	27.21				22.25		
C	Dry Soil Weight + A	20.14	20.91	22.58				19.14		
D	Water Weight (B-C)	4.22	4.69	4.63				3.11		
E	Dry Soil Weight (C-A)	7.17	7.84	7.37				6.71		
F	% Moisture (D/E)*100	58.9%	59.8%	62.8%				46.3%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**46.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**60**
Plastic Limit	**46**
Plastic Index	**14**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/18/15	Brian Vaughan, P.E.	11/18/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

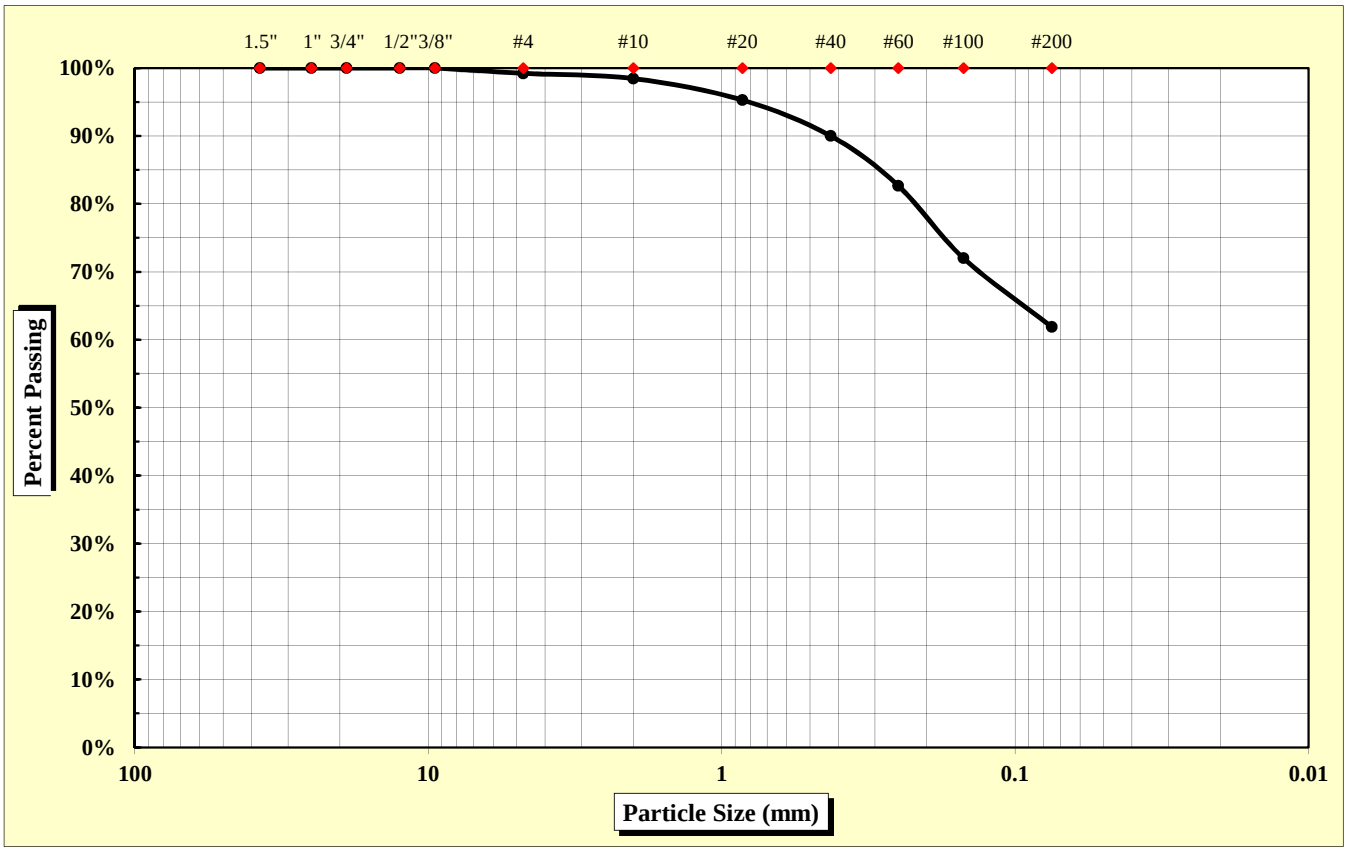
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-15	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Orange red brown, fine, sandy FAT CLAY (CH) [A-7-6 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.6%	Fine Sand	28.1%
		Coarse Sand	8.4%	Silt & Clay	61.9%
Liquid Limit	52	Plastic Limit	28	Plastic Index	24
		Moisture Content	27.5%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

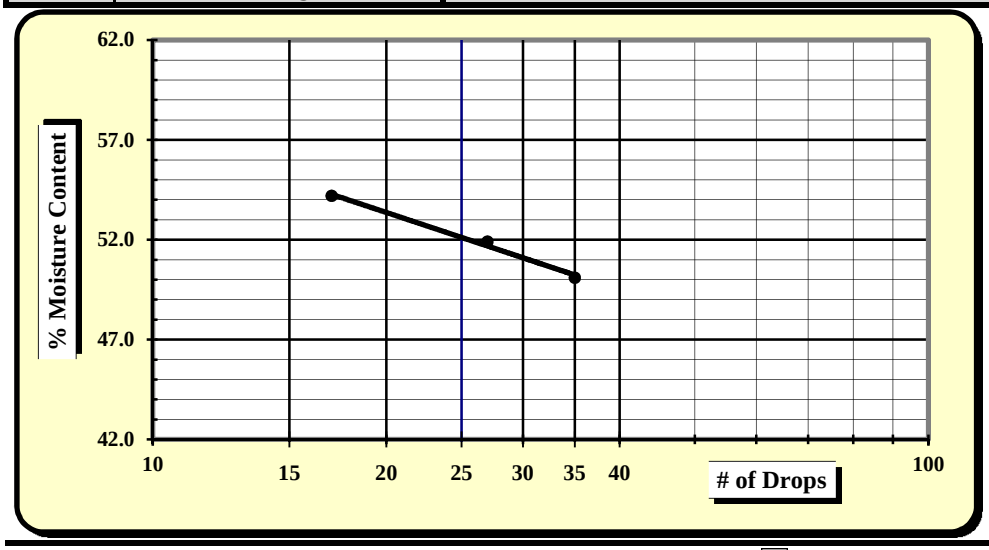
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-15	Sample #:	230	Sample Date:	10/13/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Orange red brown, fine, sandy FAT CLAY (CH) [A-7-6 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.91	16.92	16.78				12.10		
B	Wet Soil Weight + A	37.94	38.04	37.36				21.38		
C	Dry Soil Weight + A	30.92	30.82	30.13				19.33		
D	Water Weight (B-C)	7.02	7.22	7.23				2.05		
E	Dry Soil Weight (C-A)	14.01	13.90	13.35				7.23		
F	% Moisture (D/E)*100	50.1%	51.9%	54.2%				28.4%		
N	# OF DROPS	35	27	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**28**
Plastic Index	**24**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 61.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

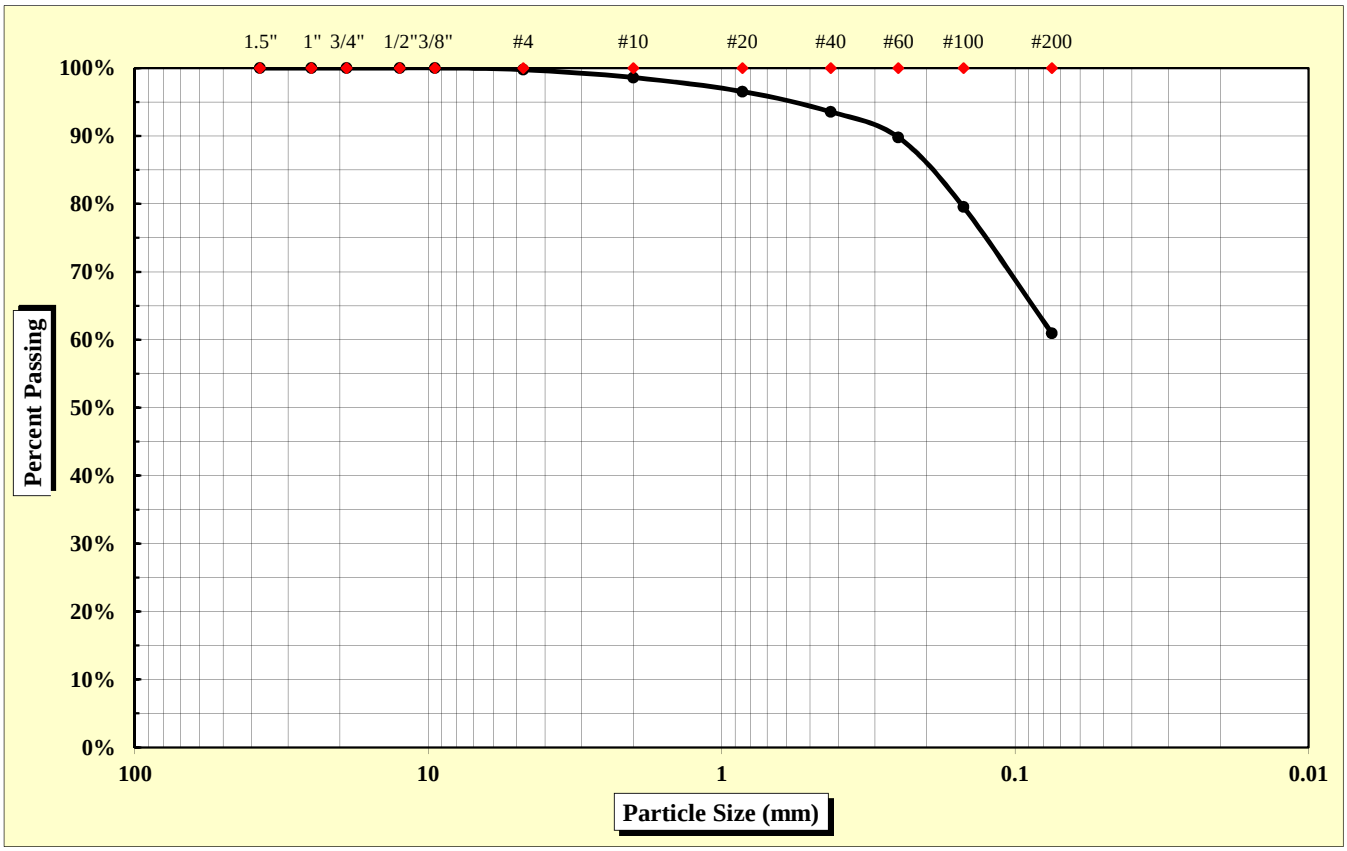
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-15	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Dark red brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.4%	Fine Sand	32.6%
		Coarse Sand	5.0%	Silt & Clay	61.0%
Liquid Limit	63	Plastic Limit	51	Plastic Index	12
		Moisture Content	35.4%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

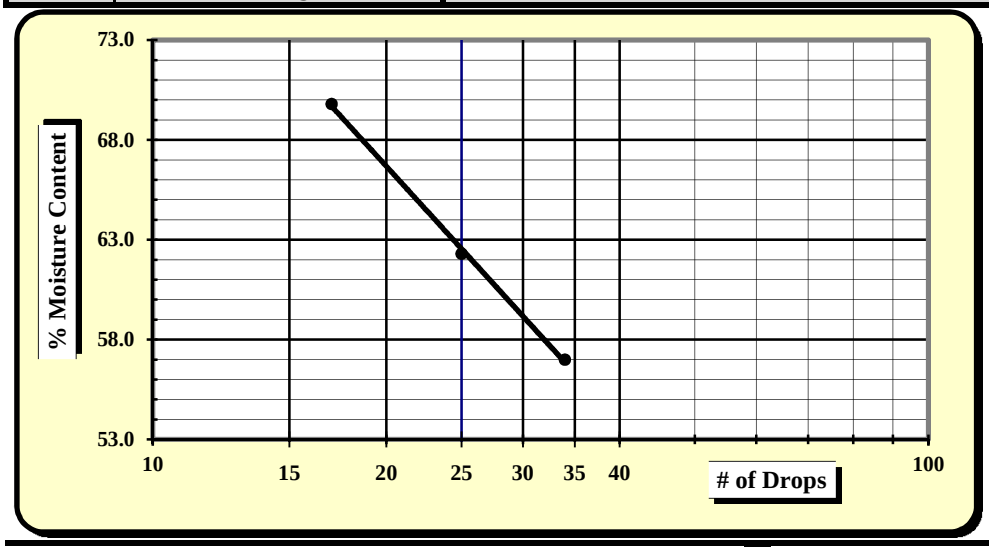
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/02/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-15	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Dark red brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	25	26	27				28		
A	Tare Weight	26.81	27.39	27.03				26.85		
B	Wet Soil Weight + A	44.79	43.91	43.91				35.87		
C	Dry Soil Weight + A	38.26	37.57	36.97				32.81		
D	Water Weight (B-C)	6.53	6.34	6.94				3.06		
E	Dry Soil Weight (C-A)	11.45	10.18	9.94				5.96		
F	% Moisture (D/E)*100	57.0%	62.3%	69.8%				51.3%		
N	# OF DROPS	34	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**51.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**63**
Plastic Limit	**51**
Plastic Index	**12**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 61.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

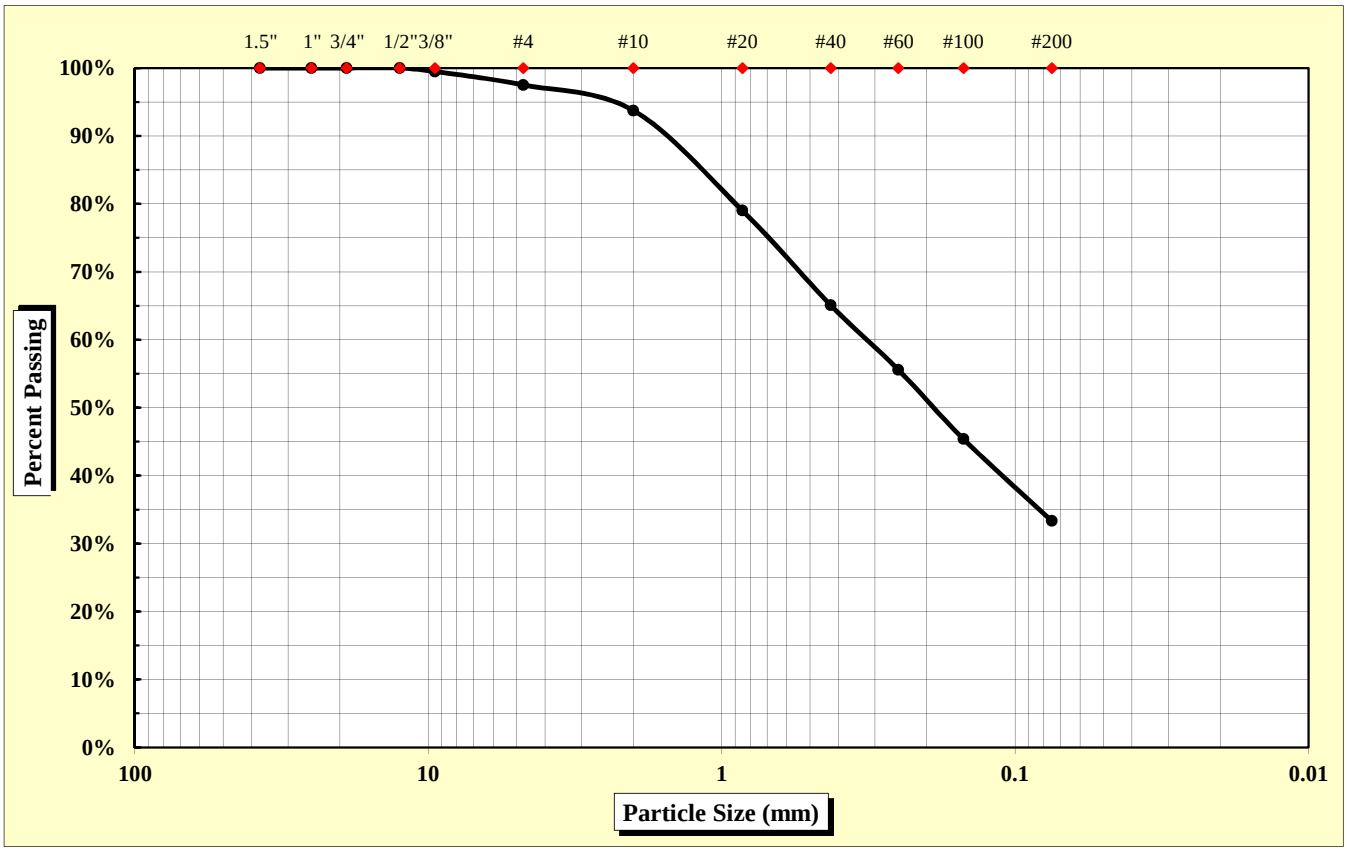
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red orange brown, medium to fine, slightly micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.2%	Fine Sand	31.8%
		Coarse Sand	28.7%	Silt & Clay	33.3%
Liquid Limit	37	Plastic Limit	29	Plastic Index	8
		Moisture Content	16.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

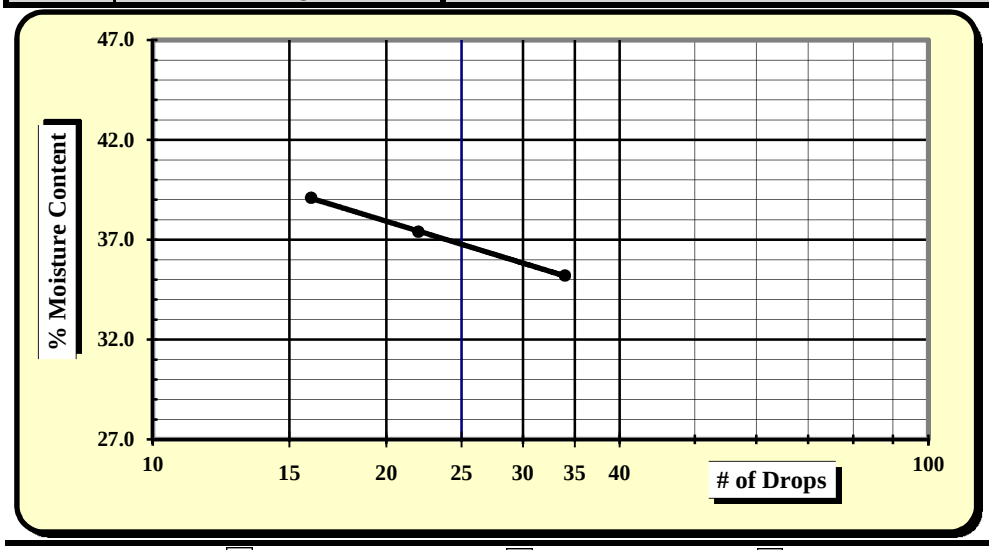
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Red orange brown, medium to fine, slightly micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.83	16.76	15.92				12.00		
B	Wet Soil Weight + A	38.93	38.08	37.26				20.28		
C	Dry Soil Weight + A	33.18	32.28	31.26				18.40		
D	Water Weight (B-C)	5.75	5.80	6.00				1.88		
E	Dry Soil Weight (C-A)	16.35	15.52	15.34				6.40		
F	% Moisture (D/E)*100	35.2%	37.4%	39.1%				29.4%		
N	# OF DROPS	34	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**29**
Plastic Index	**8**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

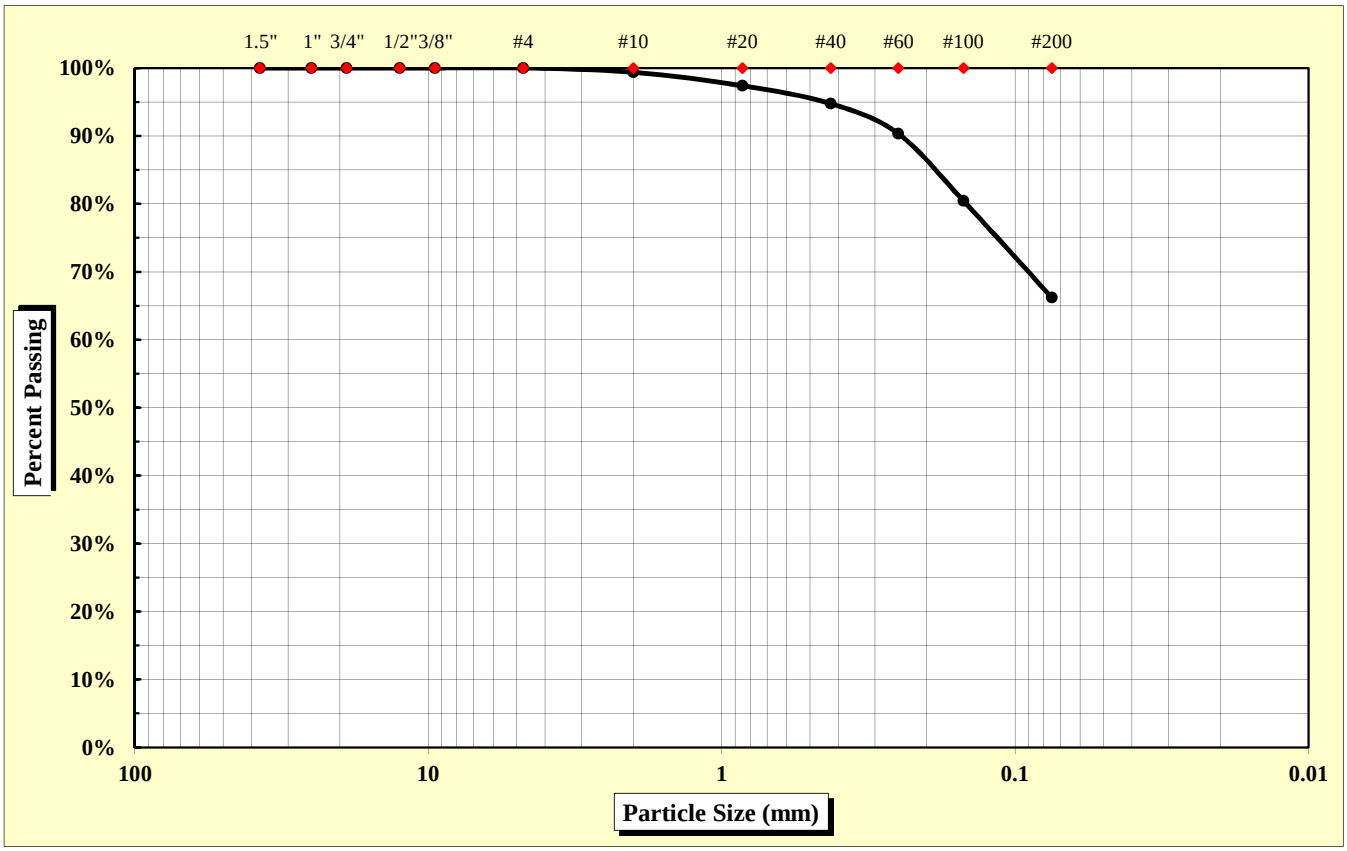
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red brown, fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (13)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.6%	Fine Sand	28.5%
		Coarse Sand	4.6%	Silt & Clay	66.2%
Liquid Limit	60	Plastic Limit	43	Plastic Index	17
		Moisture Content	38.9%	Group Index	13

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

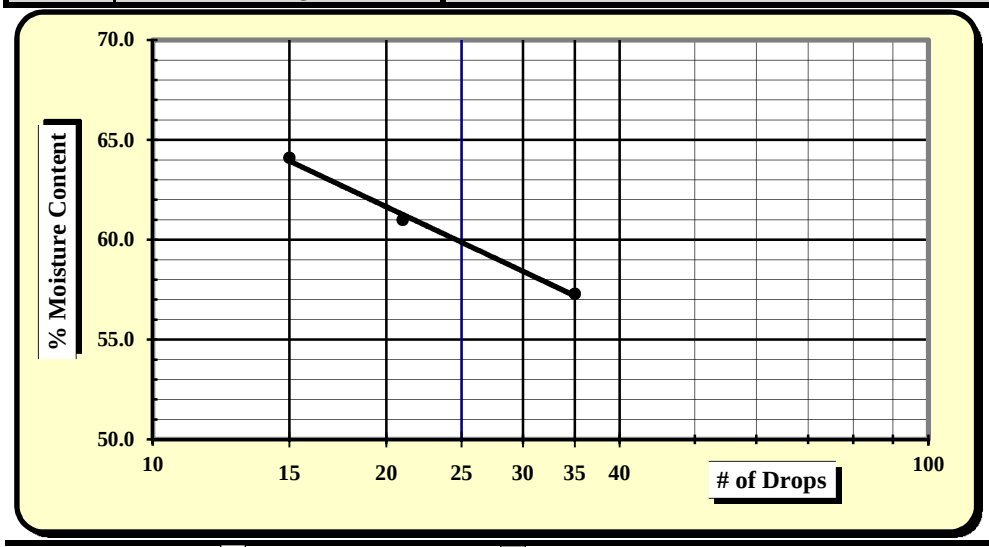
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red brown, fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (13)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-4	Z-5	Z-6				9		
A	Tare Weight	15.77	15.58	16.92				12.23		
B	Wet Soil Weight + A	34.32	36.20	35.79				21.13		
C	Dry Soil Weight + A	27.56	28.39	28.42				18.44		
D	Water Weight (B-C)	6.76	7.81	7.37				2.69		
E	Dry Soil Weight (C-A)	11.79	12.81	11.50				6.21		
F	% Moisture (D/E)*100	57.3%	61.0%	64.1%				43.3%		
N	# OF DROPS	35	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**43.3%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**60**
Plastic Limit	**43**
Plastic Index	**17**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 66.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

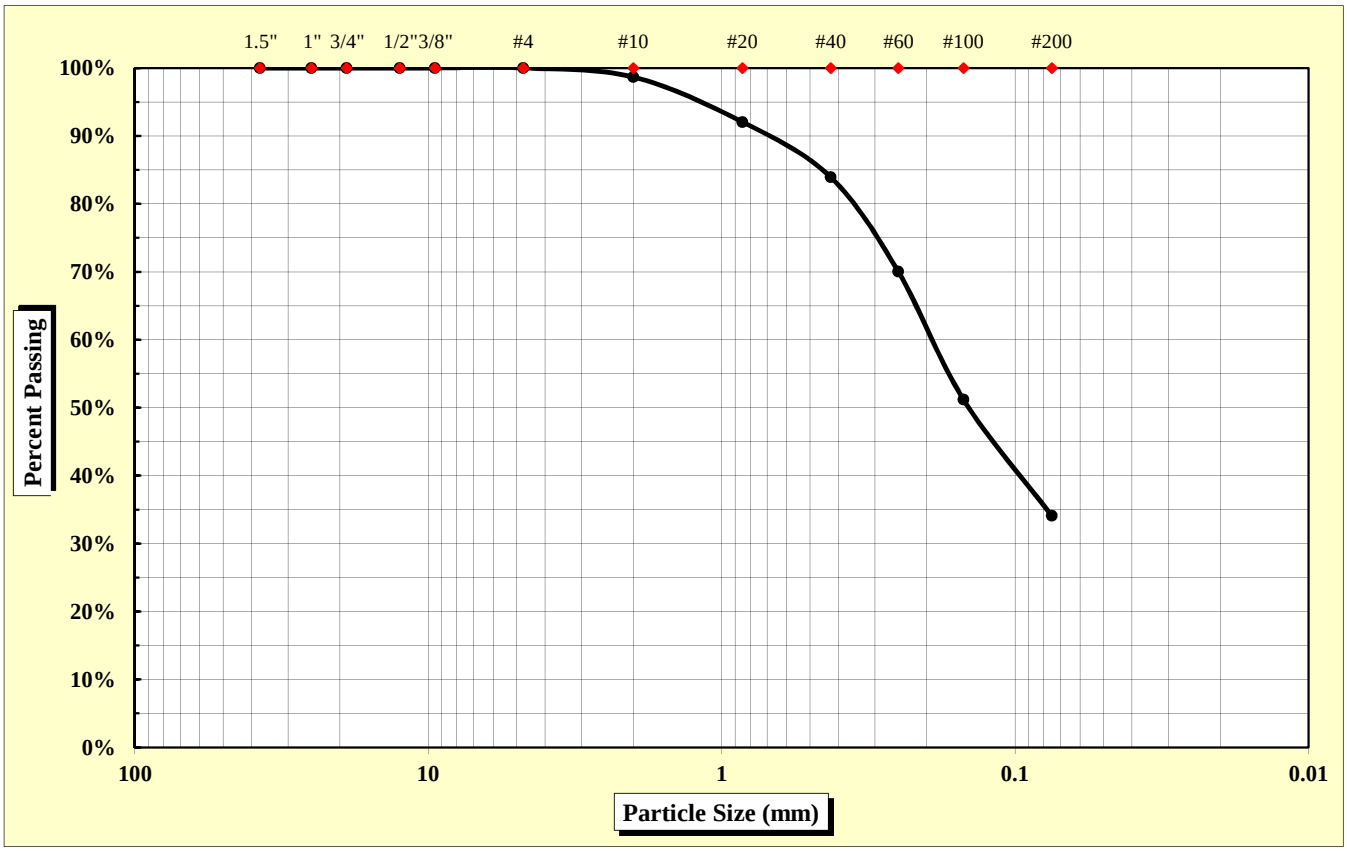
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'
Sample Description:	Brown yellow orange, medium to fine, micaceous, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.3%	Fine Sand	49.8%
		Coarse Sand	14.7%	Silt & Clay	34.1%
Liquid Limit	51	Plastic Limit	46	Plastic Index	5
		Moisture Content	47.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

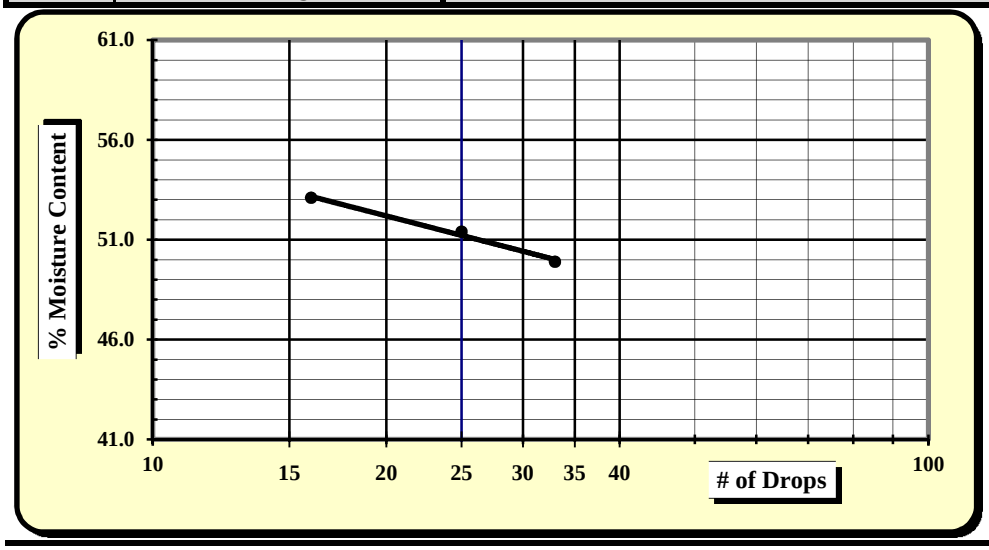
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-16	Sample #:	230	Sample Date:	10/21/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'

Sample Description: Brown yellow orange, medium to fine, micaceous, silty SAND (SM) [A-2-5]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-7	P-8	P-9				12		
A	Tare Weight	15.79	15.68	15.94				11.16		
B	Wet Soil Weight + A	38.01	37.43	38.27				20.11		
C	Dry Soil Weight + A	30.61	30.05	30.53				17.30		
D	Water Weight (B-C)	7.40	7.38	7.74				2.81		
E	Dry Soil Weight (C-A)	14.82	14.37	14.59				6.14		
F	% Moisture (D/E)*100	49.9%	51.4%	53.1%				45.8%		
N	# OF DROPS	33	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**45.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**51**
Plastic Limit	**46**
Plastic Index	**5**
Group Symbol	**SM / A-2-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

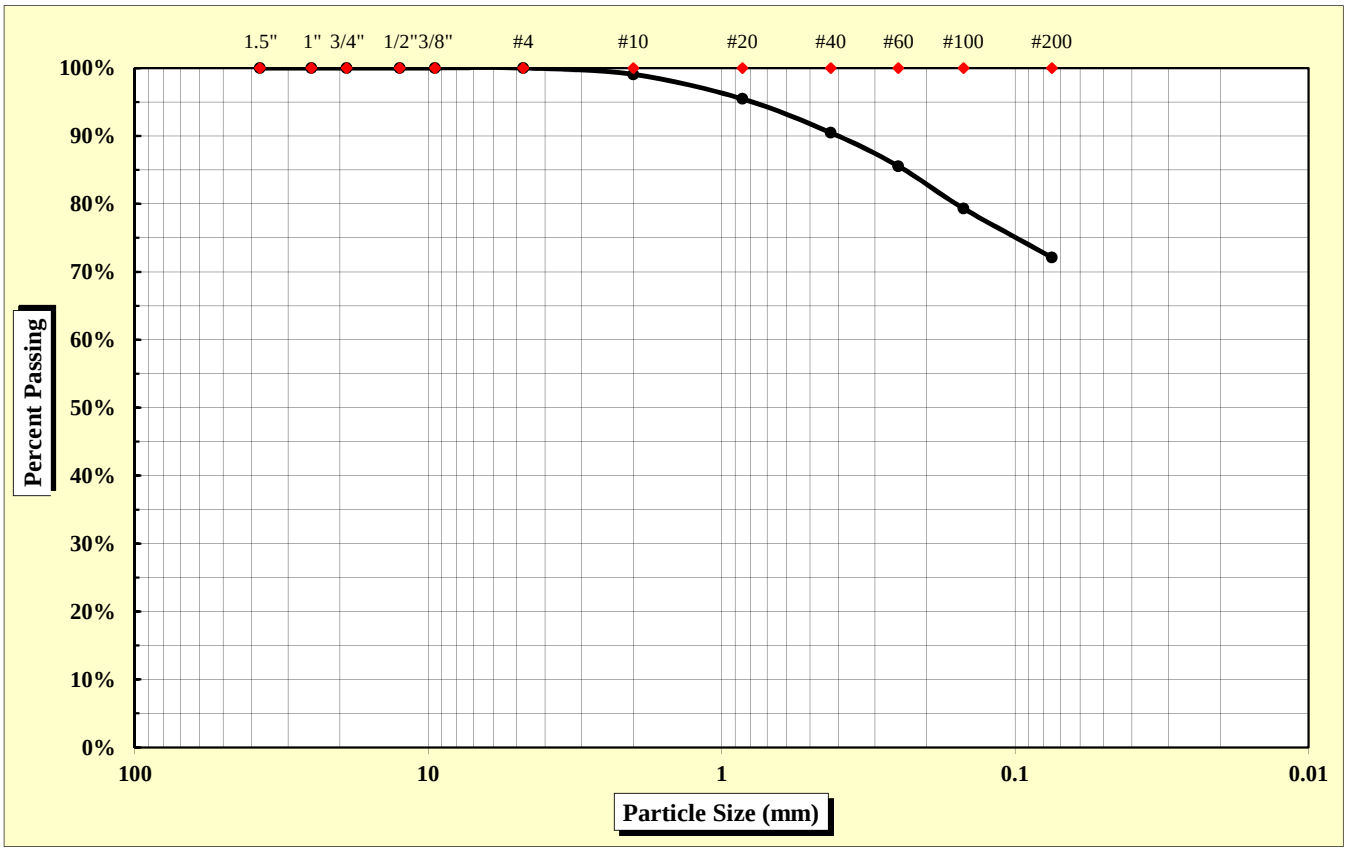
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, fine, FAT CLAY with sand (CH) [A-7-6 (19)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.9%	Fine Sand	18.3%
		Coarse Sand	8.6%	Silt & Clay	72.1%
Liquid Limit	53	Plastic Limit	27	Plastic Index	26
		Moisture Content	25.6%	Group Index	19

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

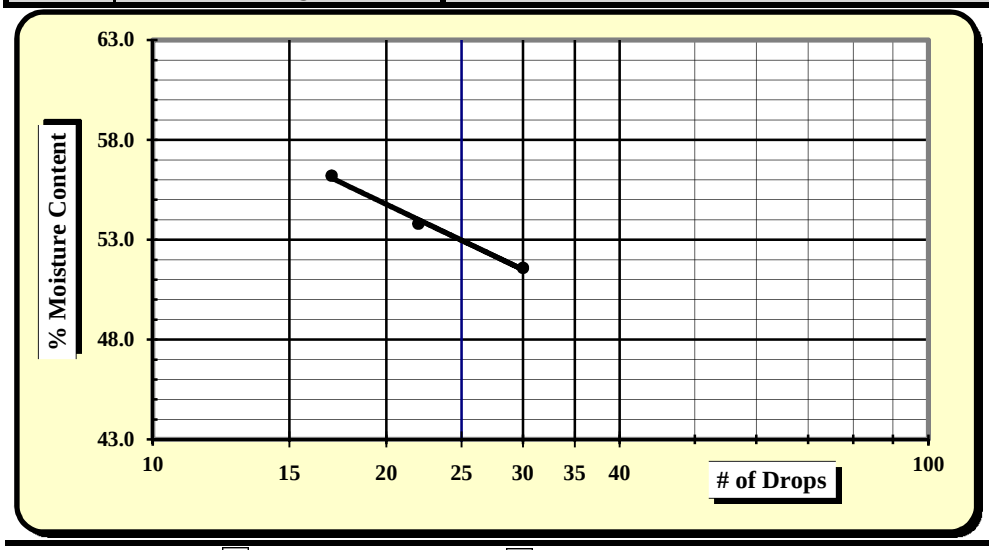
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, fine, FAT CLAY with sand (CH) [A-7-6 (19)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.91	16.92	16.79				12.10		
B	Wet Soil Weight + A	38.60	40.04	39.12				20.96		
C	Dry Soil Weight + A	31.22	31.95	31.09				19.10		
D	Water Weight (B-C)	7.38	8.09	8.03				1.86		
E	Dry Soil Weight (C-A)	14.31	15.03	14.30				7.00		
F	% Moisture (D/E)*100	51.6%	53.8%	56.2%				26.6%		
N	# OF DROPS	30	22	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**53**
Plastic Limit	**27**
Plastic Index	**26**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 72.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

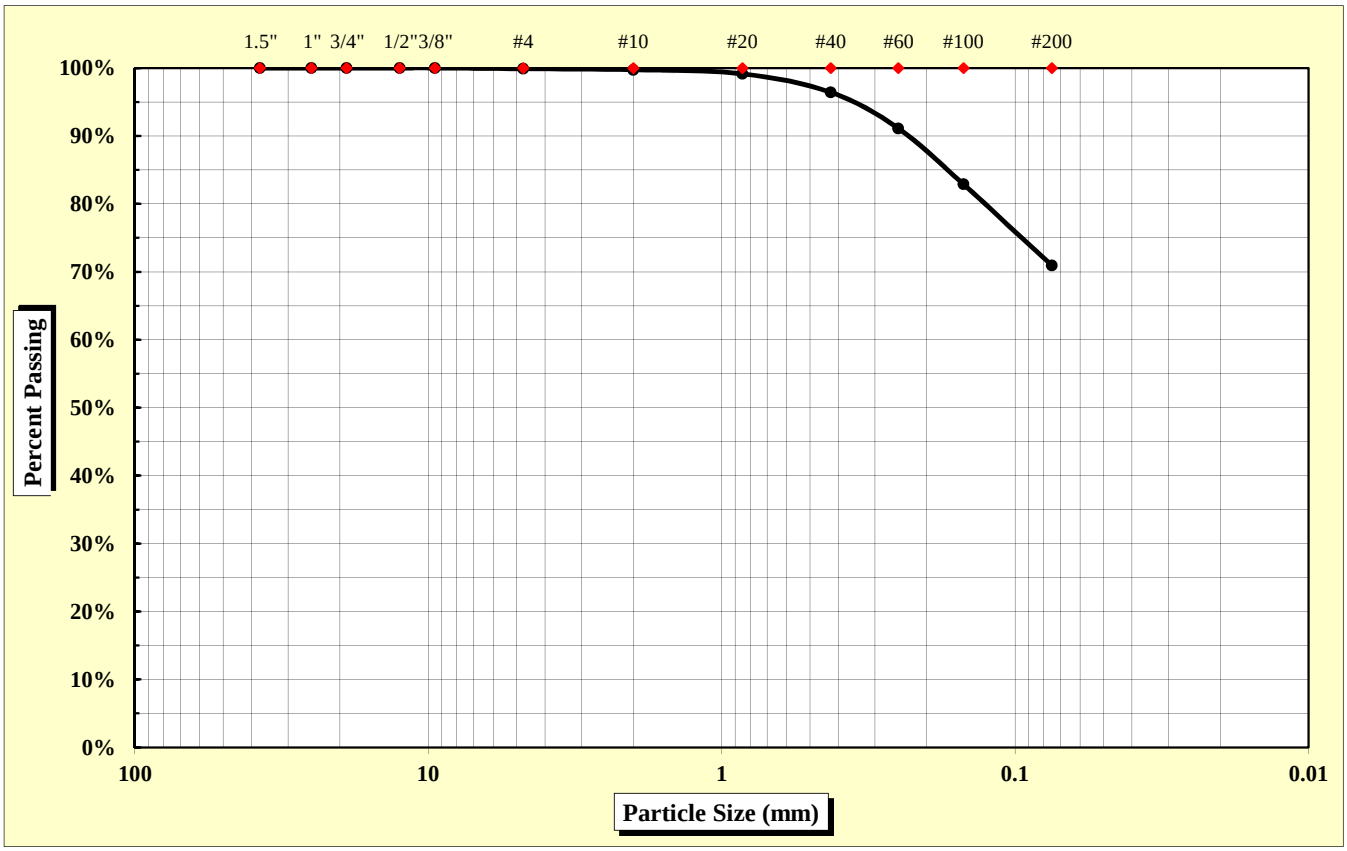
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red brown, fine, SILT with sand (ML) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.3%	Fine Sand	25.5%
		Coarse Sand	3.3%	Silt & Clay	70.9%
Liquid Limit	46	Plastic Limit	32	Plastic Index	14
		Moisture Content	35.7%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

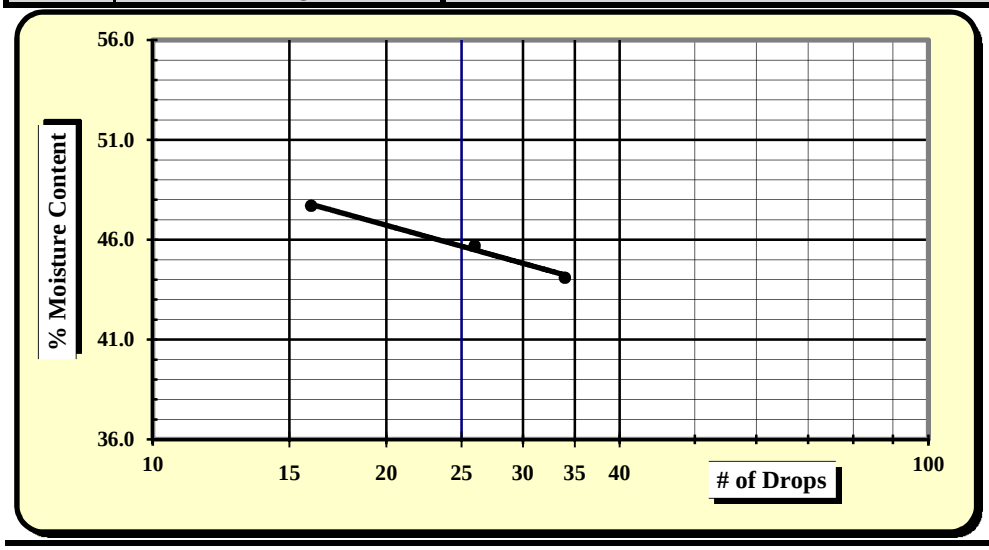
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red brown, fine, SILT with sand (ML) [A-7-5 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-7	Z-8	Z-9				17		
A	Tare Weight	16.75	15.75	16.75				12.12		
B	Wet Soil Weight + A	40.73	37.79	38.54				20.20		
C	Dry Soil Weight + A	33.39	30.88	31.50				18.23		
D	Water Weight (B-C)	7.34	6.91	7.04				1.97		
E	Dry Soil Weight (C-A)	16.64	15.13	14.75				6.11		
F	% Moisture (D/E)*100	44.1%	45.7%	47.7%				32.2%		
N	# OF DROPS	34	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**32**
Plastic Index	**14**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 70.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

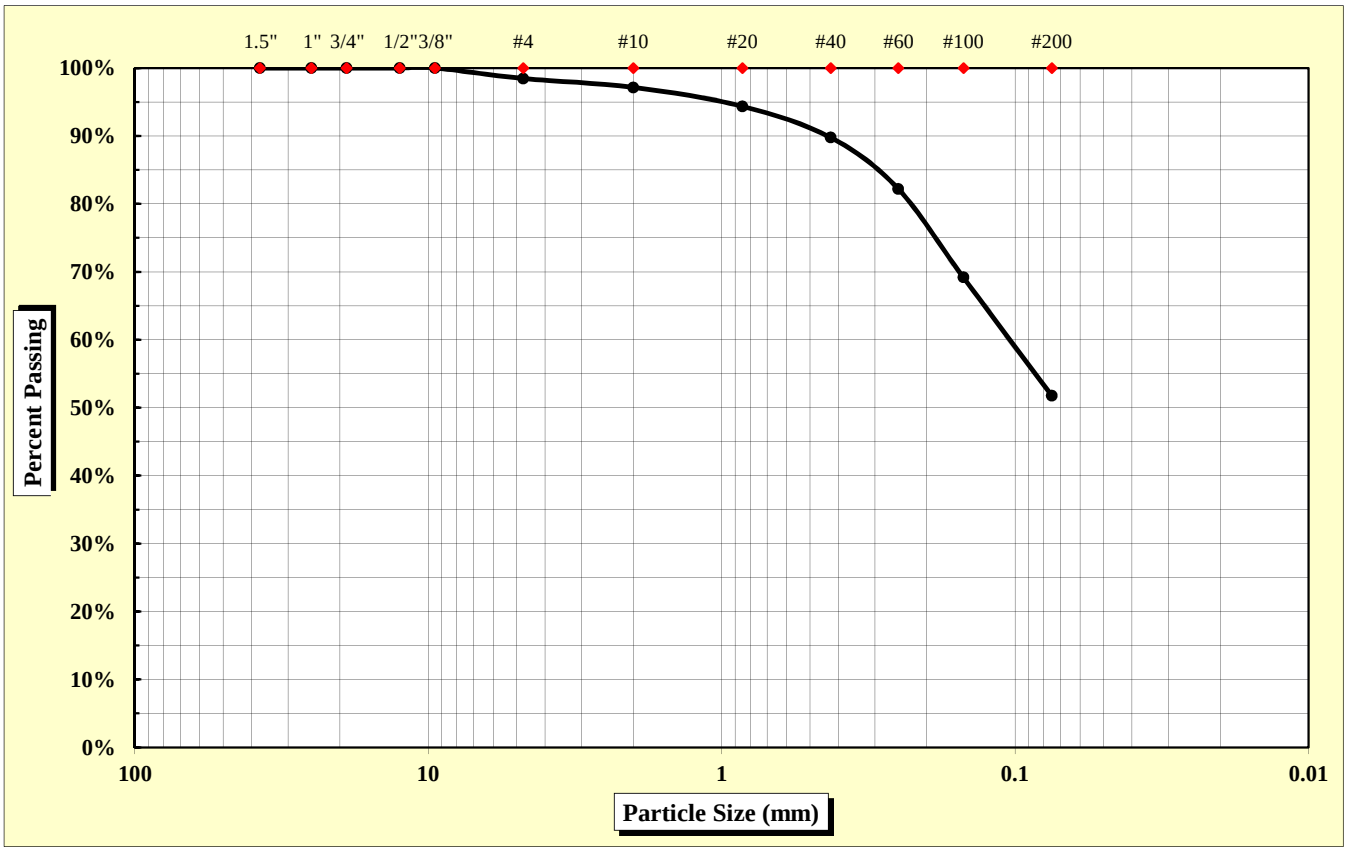
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Brown red, fine, slightly micaceous, sandy SILT (ML) [A-7-5 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	2.8%	Fine Sand	38.0%
		Coarse Sand	7.4%	Silt & Clay	51.8%
Liquid Limit	46	Plastic Limit	35	Plastic Index	11
		Moisture Content	46.1%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

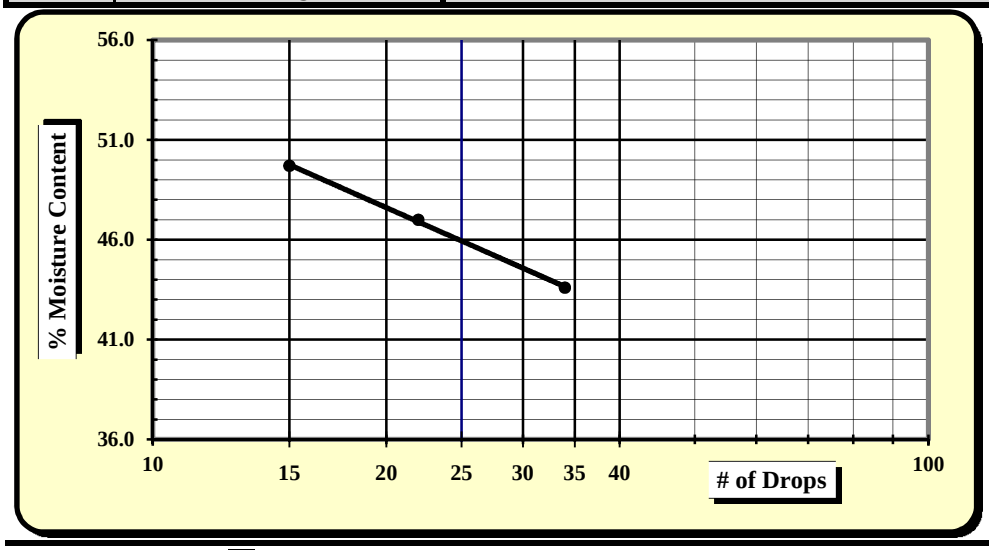
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-17	Sample #:	230	Sample Date:	10/23/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Brown red, fine, slightly micaceous, sandy SILT (ML) [A-7-5 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.29	16.53				12.11		
B	Wet Soil Weight + A	39.32	38.07	38.41				20.15		
C	Dry Soil Weight + A	32.36	30.79	31.15				18.05		
D	Water Weight (B-C)	6.96	7.28	7.26				2.10		
E	Dry Soil Weight (C-A)	15.96	15.50	14.62				5.94		
F	% Moisture (D/E)*100	43.6%	47.0%	49.7%				35.4%		
N	# OF DROPS	34	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**35**
Plastic Index	**11**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

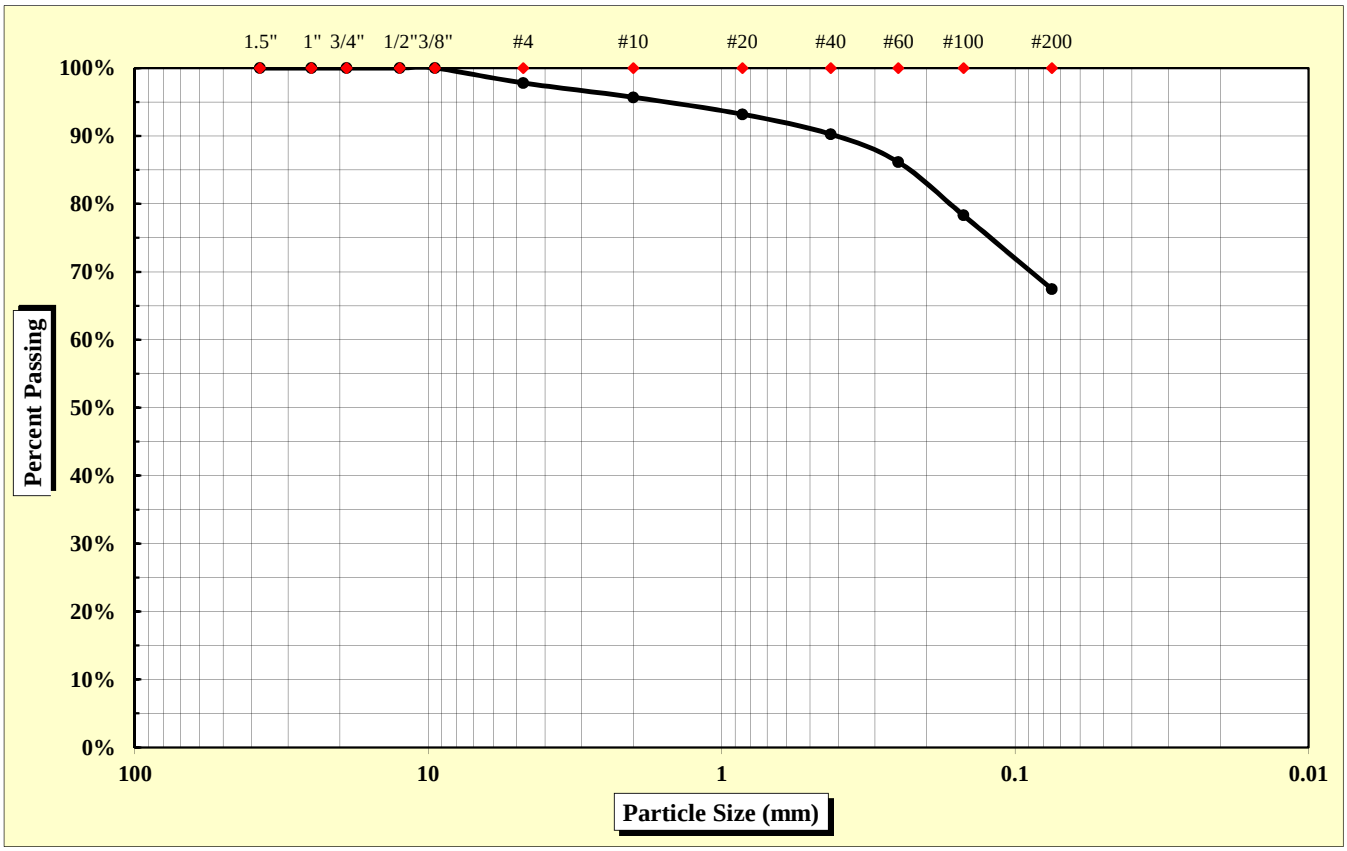
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-18	Sample #:	230	Sample Date:	10/23/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.3%	Fine Sand	22.8%
		Coarse Sand	5.4%	Silt & Clay	67.5%
Liquid Limit	54	Plastic Limit	34	Plastic Index	20
		Moisture Content	28.9%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

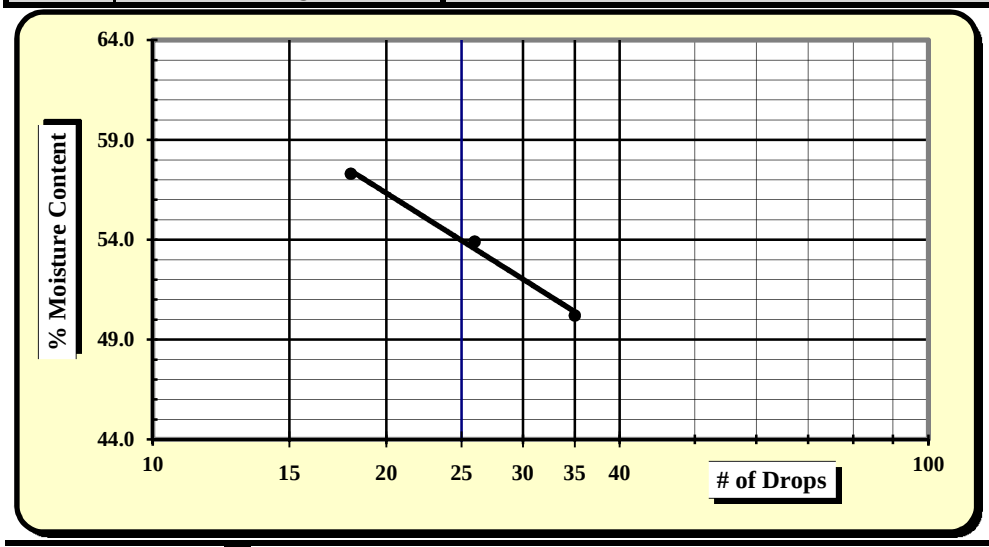
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-18	Sample #:	230	Sample Date:	10/23/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, fine, slighty micaceous, sandy ELASTIC SILT (MH) [A-7-5 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.67	15.73				12.16		
B	Wet Soil Weight + A	38.48	38.73	37.86				20.30		
C	Dry Soil Weight + A	31.20	31.00	29.80				18.22		
D	Water Weight (B-C)	7.28	7.73	8.06				2.08		
E	Dry Soil Weight (C-A)	14.49	14.33	14.07				6.06		
F	% Moisture (D/E)*100	50.2%	53.9%	57.3%				34.3%		
N	# OF DROPS	35	26	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**34**
Plastic Index	**20**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

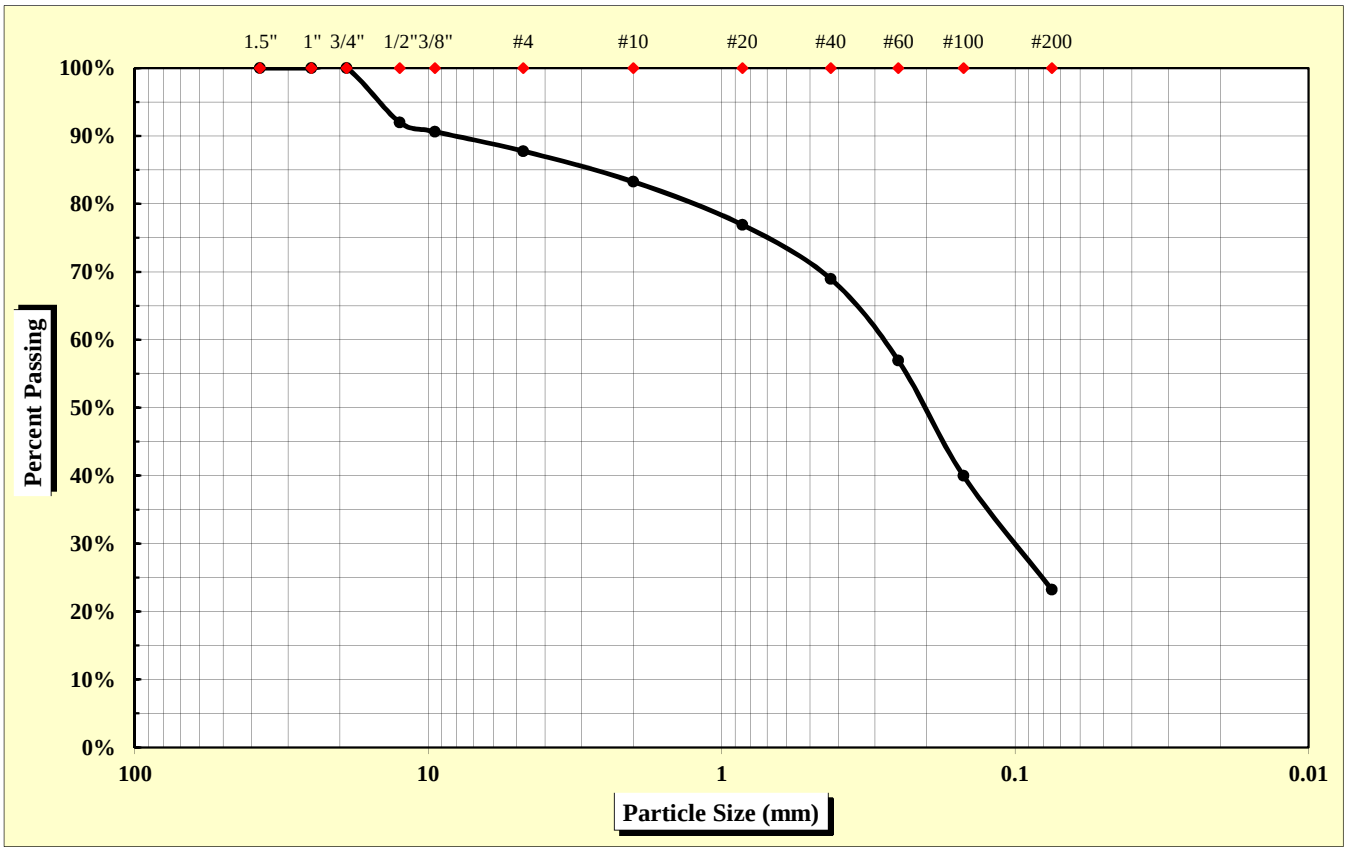
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-18	Sample #:	230	Sample Date:	10/23/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Brown, medium to fine, micaceous, silty SAND, with some gravel (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	16.7%	Fine Sand	45.7%
		Coarse Sand	14.3%	Silt & Clay	23.2%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	17.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

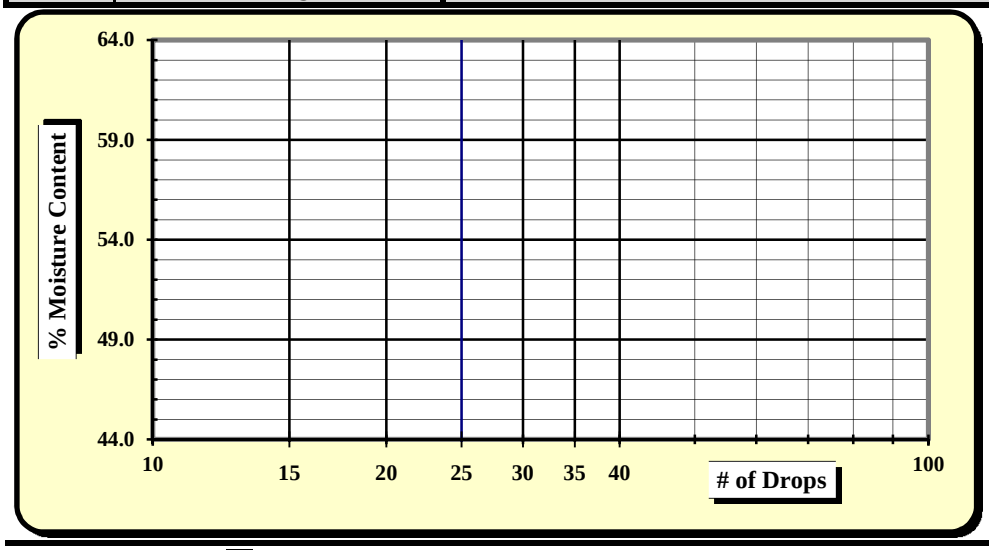
Project #:	**1426-14-161**	Report Date:	12/1/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-18	Sample #:	230	Sample Date:	10/23/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Brown, medium to fine, micaceous, silty SAND, with some gravel (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 23.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/1/15	Brian Vaughan, P.E.	12/1/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

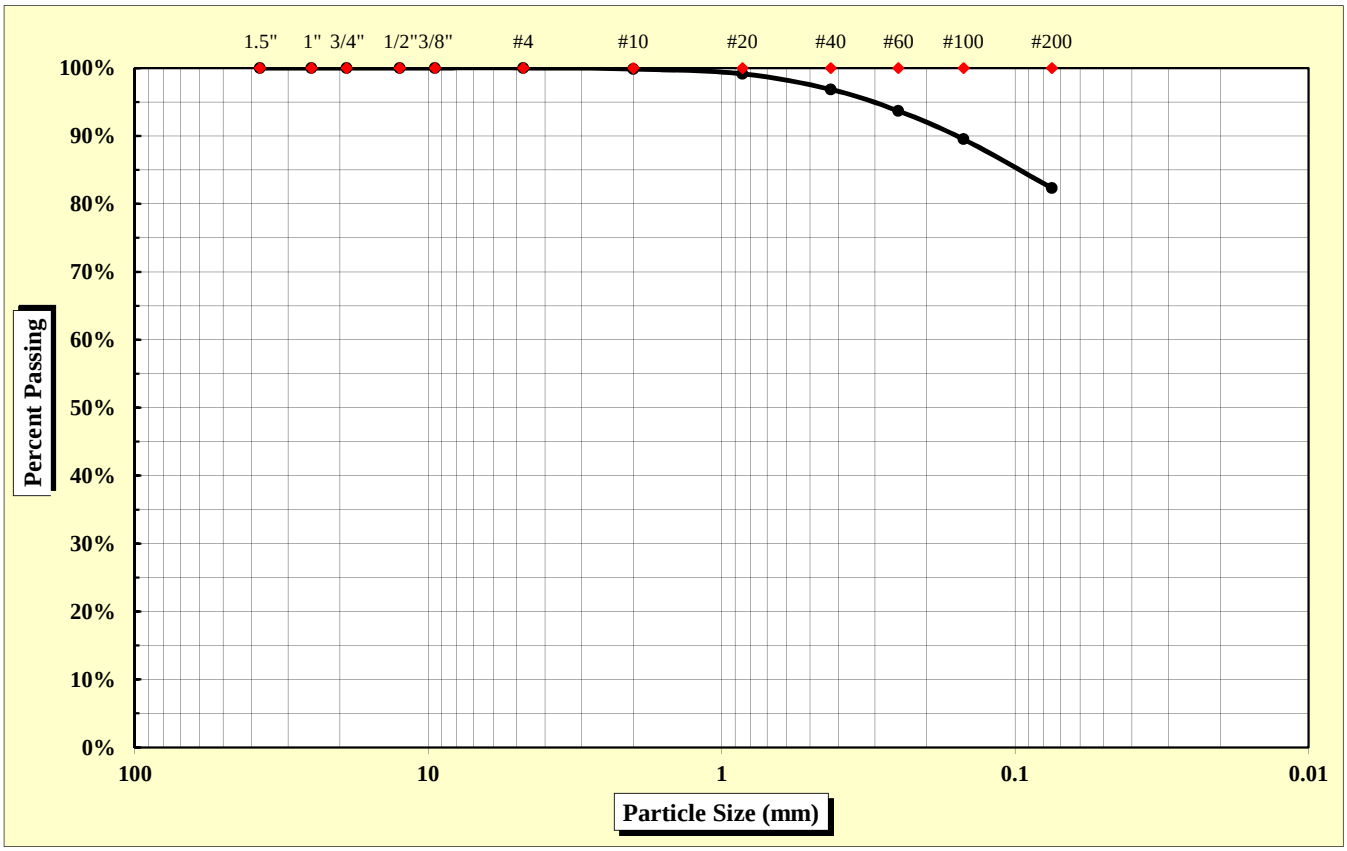
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red white, fine, ELASTIC SILT with sand (MH) [A-7-5 (36)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	14.5%
		Coarse Sand	3.0%	Silt & Clay	82.4%
Liquid Limit	74	Plastic Limit	36	Plastic Index	38
		Moisture Content	30.5%	Group Index	36

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

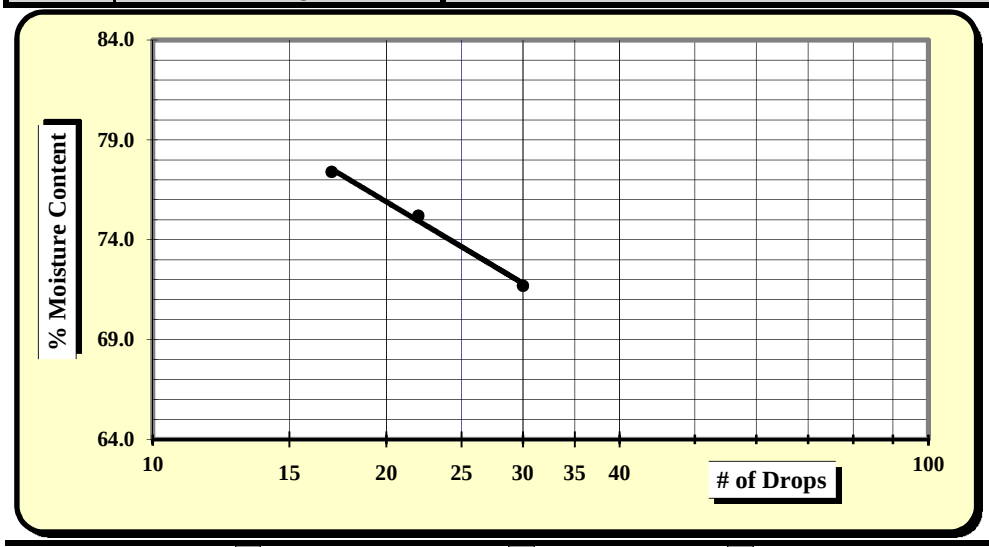
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red white, fine, ELASTIC SILT with sand (MH) [A-7-5 (36)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	604	Liquid Limit						Plastic Limit		
	Tare #:	43	17	209				16		
A	Tare Weight	20.71	20.62	21.11				20.64		
B	Wet Soil Weight + A	29.33	29.03	30.05				29.70		
C	Dry Soil Weight + A	25.73	25.42	26.15				27.31		
D	Water Weight (B-C)	3.60	3.61	3.90				2.39		
E	Dry Soil Weight (C-A)	5.02	4.80	5.04				6.67		
F	% Moisture (D/E)*100	71.7%	75.2%	77.4%				35.8%		
N	# OF DROPS	30	22	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**74**
Plastic Limit	**36**
Plastic Index	**38**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 82.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

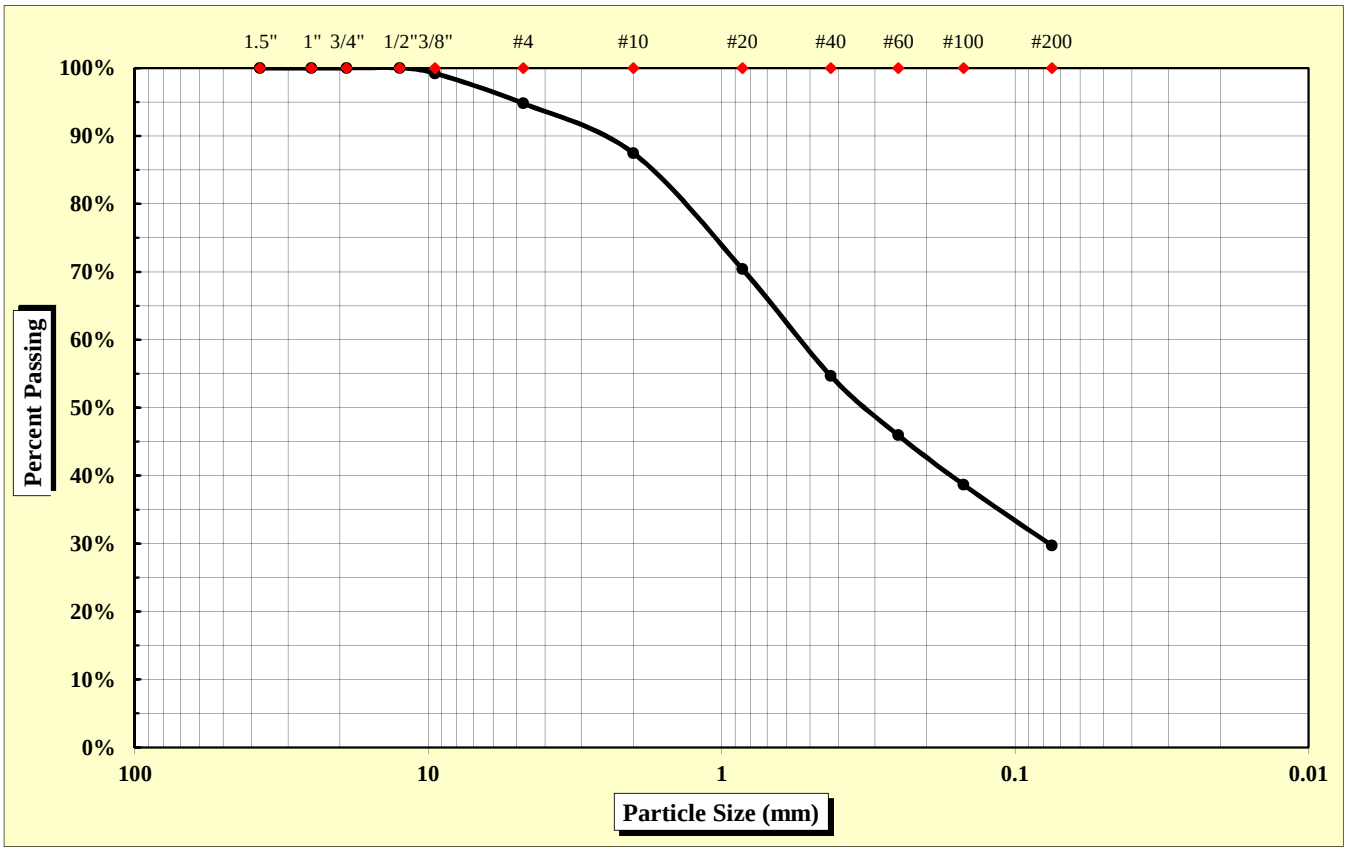
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM-80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red white, fine to medium, silty SAND (SM) [A-2-7 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	12.5%	Fine Sand	25.0%
		Coarse Sand	32.8%	Silt & Clay	29.7%
Liquid Limit	47	Plastic Limit	32	Plastic Index	15
		Moisture Content	16.9%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

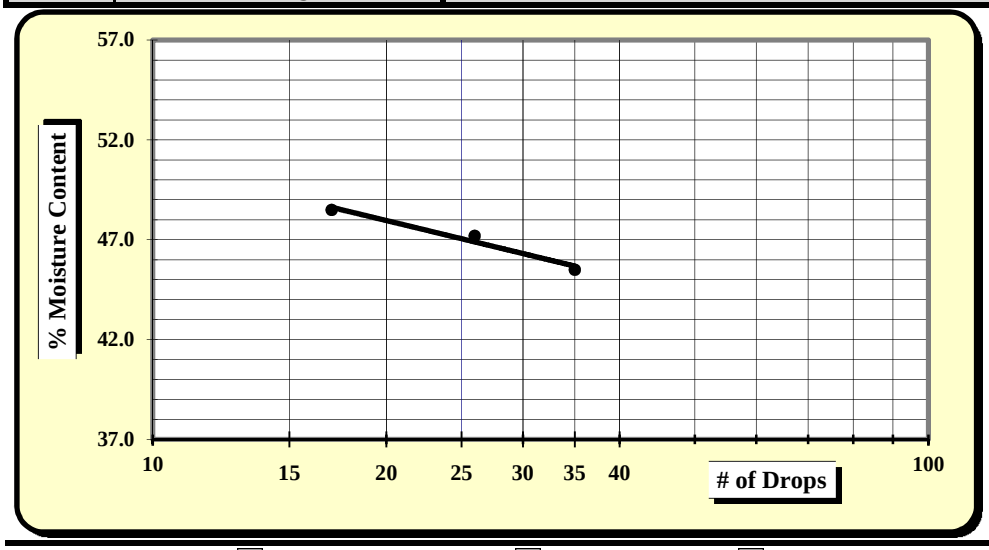
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red white, fine to medium, silty SAND (SM) [A-2-7 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	610	Liquid Limit						Plastic Limit		
	Tare #:	246	212	37				15		
A	Tare Weight	20.70	20.85	20.73				20.74		
B	Wet Soil Weight + A	30.96	31.20	30.53				29.81		
C	Dry Soil Weight + A	27.75	27.88	27.33				27.61		
D	Water Weight (B-C)	3.21	3.32	3.20				2.20		
E	Dry Soil Weight (C-A)	7.05	7.03	6.60				6.87		
F	% Moisture (D/E)*100	45.5%	47.2%	48.5%				32.0%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**32**
Plastic Index	**15**
Group Symbol	**SM / A-2-7**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

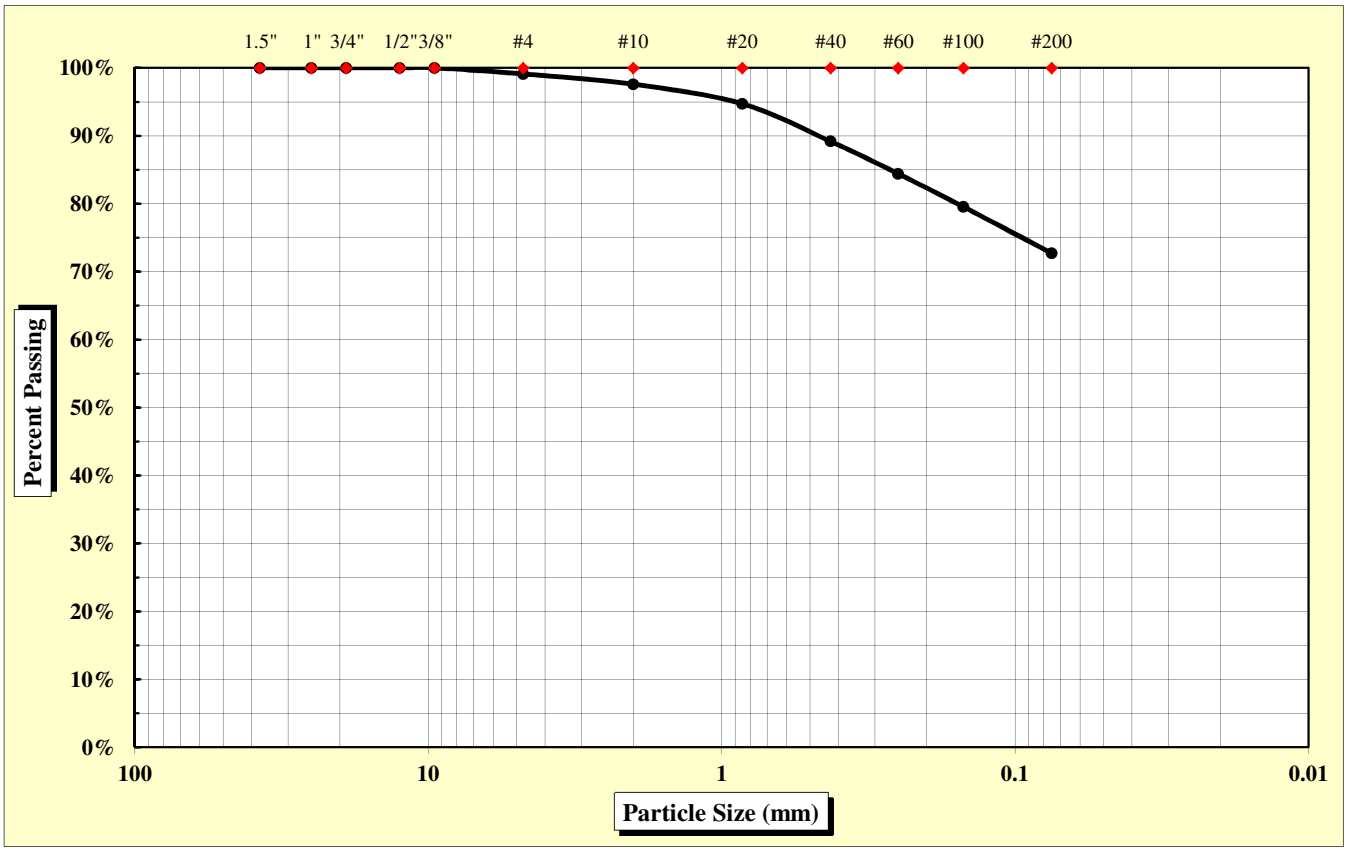
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Red white, fine, LEAN CLAY with sand (CL) [A-7-6 (15)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.4%	Fine Sand	16.5%
		Coarse Sand	8.4%	Silt & Clay	72.7%
Liquid Limit	46	Plastic Limit	26	Plastic Index	20
		Moisture Content	28.0%	Group Index	15

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

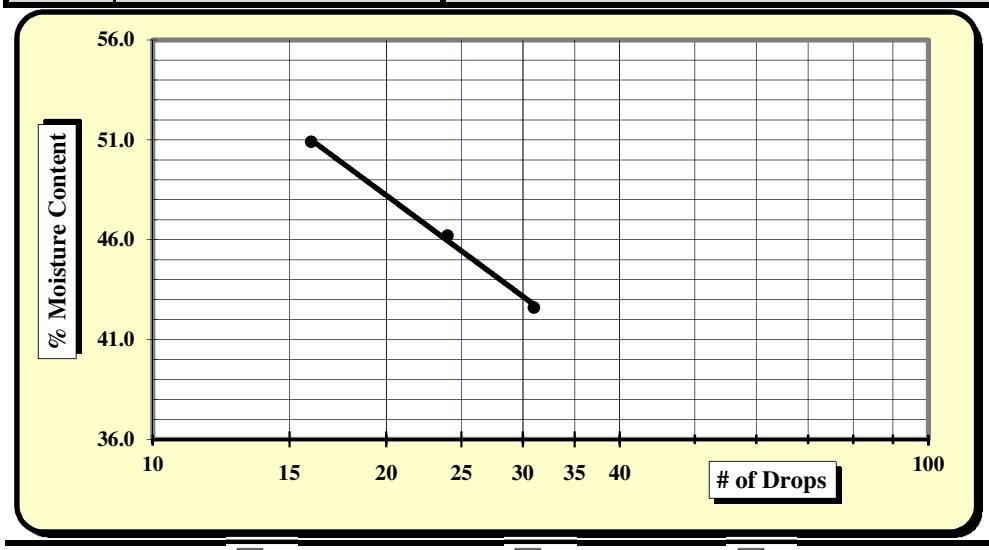
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/2015
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Red white, fine, LEAN CLAY with sand (CL) [A-7-6 (15)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	605	Liquid Limit						Plastic Limit		
	Tare #:	13	245	217				8		
A	Tare Weight	20.72	20.77	20.84				20.57		
B	Wet Soil Weight + A	30.60	29.73	33.03				29.41		
C	Dry Soil Weight + A	27.65	26.90	28.92				27.58		
D	Water Weight (B-C)	2.95	2.83	4.11				1.83		
E	Dry Soil Weight (C-A)	6.93	6.13	8.08				7.01		
F	% Moisture (D/E)*100	42.6%	46.2%	50.9%				26.1%		
N	# OF DROPS	31	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**26**
Plastic Index	**20**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 72.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Columbia 134 Suber Road Columbia, SC 29210

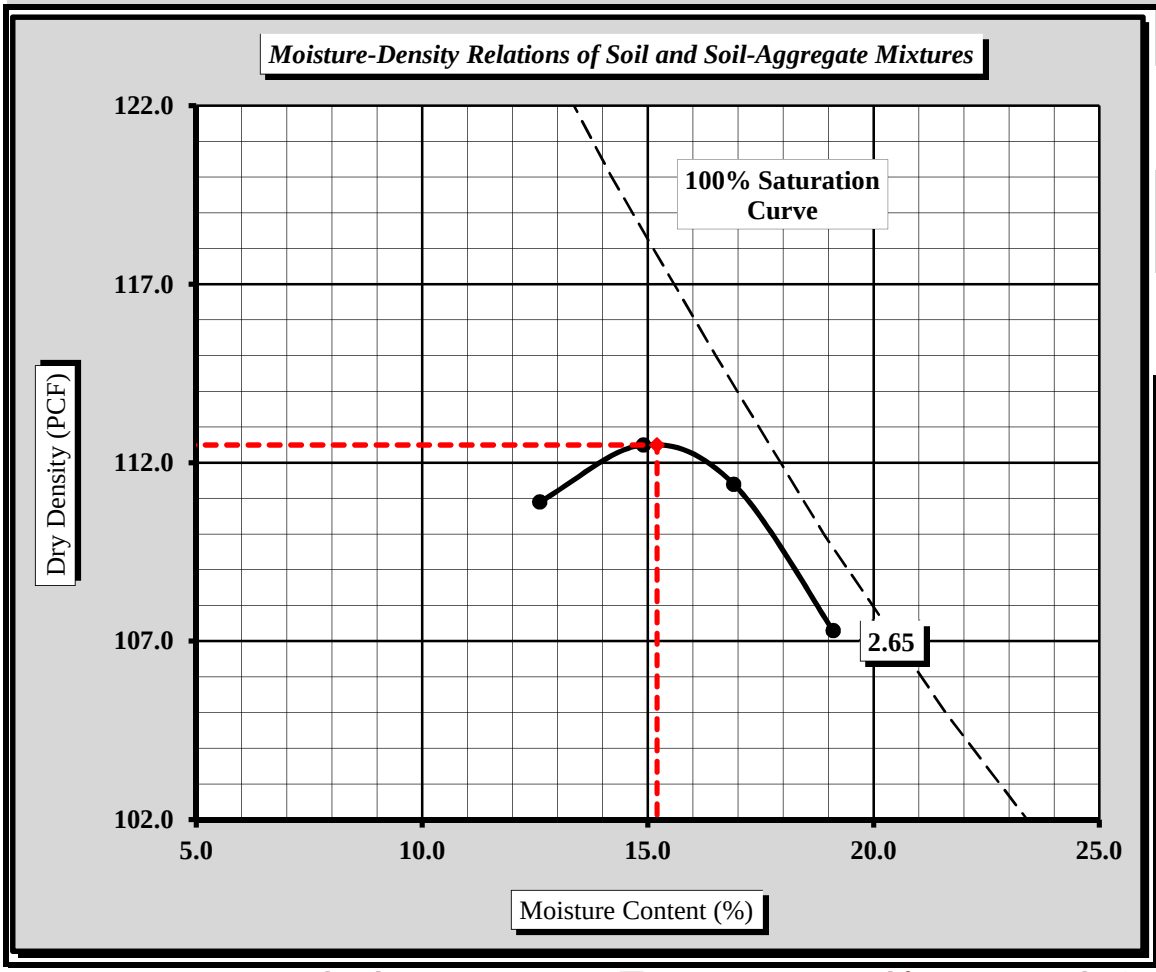
S&ME Project #:	**1426-14-161**	Report Date:	11/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-19	Sample #:	230	Sample Date:	10/26/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Red white, fine, LEAN CLAY with sand (CL) [A-7-6 (15)]

Maximum Dry Density 112.5 PCF. **Optimum Moisture Content 15.2%**

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	**28.0%**
Specific Gravity of Soil (T 100)	**2.650**
Liquid Limit	**46**
Plastic Limit	**26**
Plastic Index	**20**

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	99.1%
#10	97.6%
#40	89.2%
#60	84.4%
#100	79.6%
#200	72.7%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

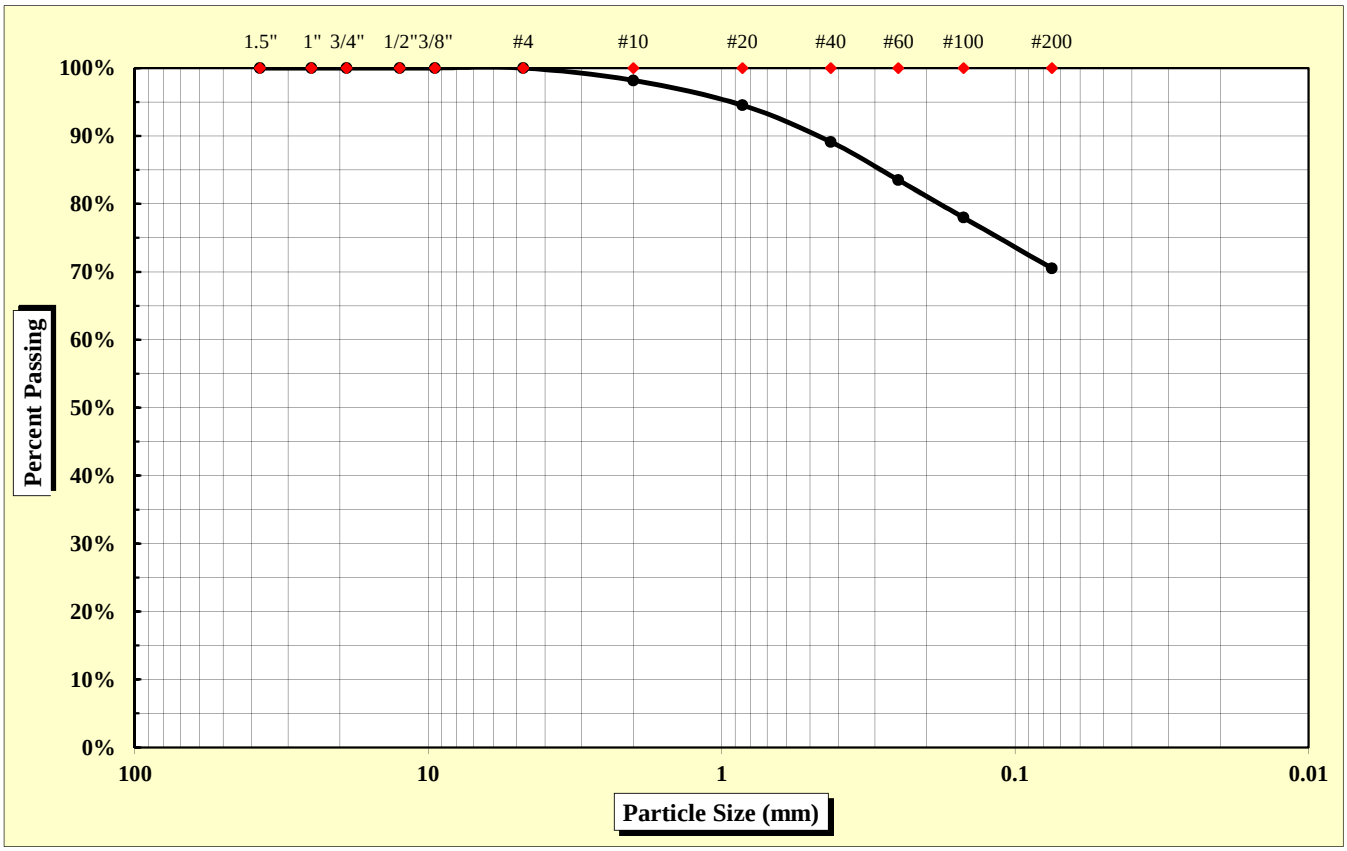
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-20	Sample #:	241	Sample Date:	10/14/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	3 - 7'
Sample Description:	Red, fine, FAT CLAY with sand (CH) [A-7-6 (20)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.8%	Fine Sand	18.6%
		Coarse Sand	9.0%	Silt & Clay	70.5%
Liquid Limit	57	Plastic Limit	29	Plastic Index	28
		Moisture Content	23.9%	Group Index	20

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

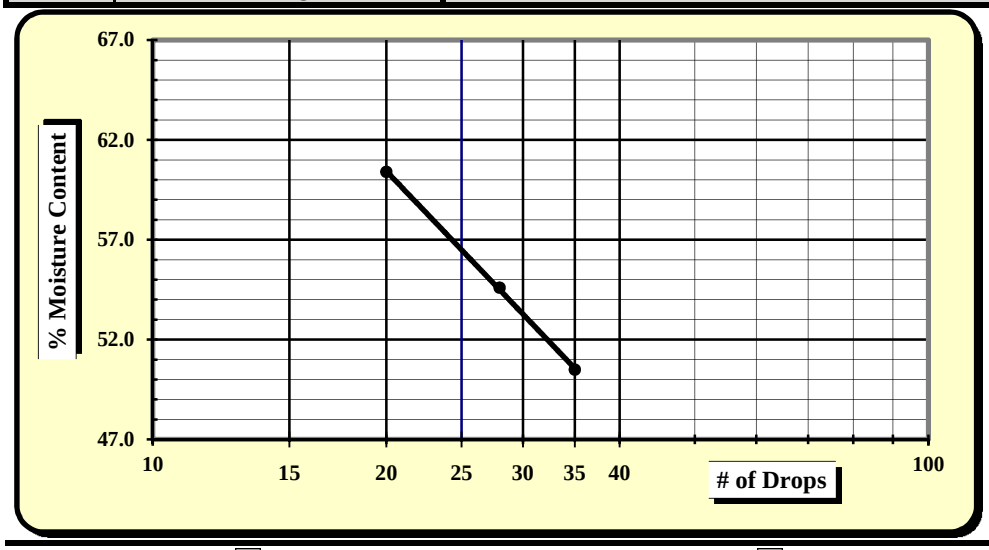
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-20	Sample #:	241	Sample Date:	10/14/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	3 - 7'

Sample Description: Red, fine, FAT CLAY with sand (CH) [A-7-6 (20)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.70	26.50	26.37				25.98		
B	Wet Soil Weight + A	43.56	42.44	42.17				37.45		
C	Dry Soil Weight + A	37.90	36.81	36.22				34.88		
D	Water Weight (B-C)	5.66	5.63	5.95				2.57		
E	Dry Soil Weight (C-A)	11.20	10.31	9.85				8.90		
F	% Moisture (D/E)*100	50.5%	54.6%	60.4%				28.9%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**57**
Plastic Limit	**29**
Plastic Index	**28**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 70.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

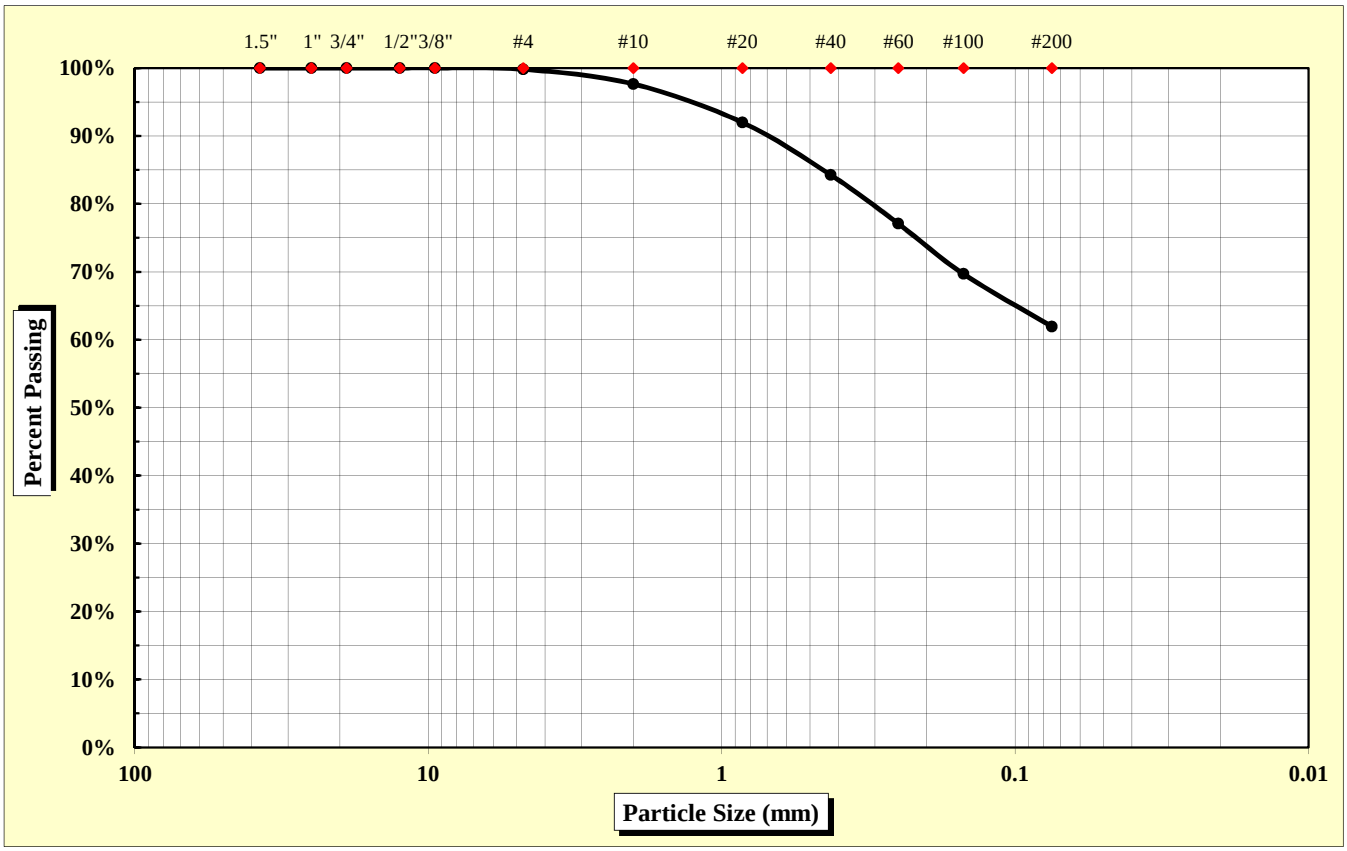
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/5/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-20	Sample #:	230	Sample Date:	10/14/15
Location:	SS-4	Type:	Split-spoon	Depth:	7 - 9'
Sample Description:	Red brown, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.3%	Fine Sand	22.3%
		Coarse Sand	13.4%	Silt & Clay	62.0%
Liquid Limit	52	Plastic Limit	33	Plastic Index	19
		Moisture Content	21.6%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

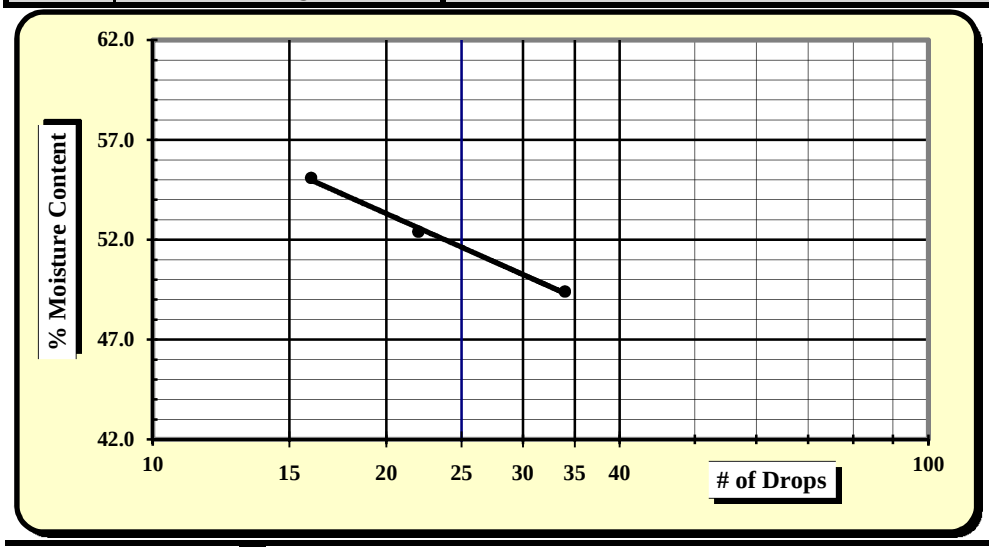
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-20	Sample #:	230	Sample Date:	10/14/15
Location:	SS-4	Type:	Split-spoon	Depth:	7 - 9'

Sample Description: Red brown, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.39	15.29	16.53				12.11		
B	Wet Soil Weight + A	38.29	38.02	37.24				20.76		
C	Dry Soil Weight + A	31.05	30.20	29.88				18.62		
D	Water Weight (B-C)	7.24	7.82	7.36				2.14		
E	Dry Soil Weight (C-A)	14.66	14.91	13.35				6.51		
F	% Moisture (D/E)*100	49.4%	52.4%	55.1%				32.9%		
N	# OF DROPS	34	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**52**
Plastic Limit	**33**
Plastic Index	**19**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

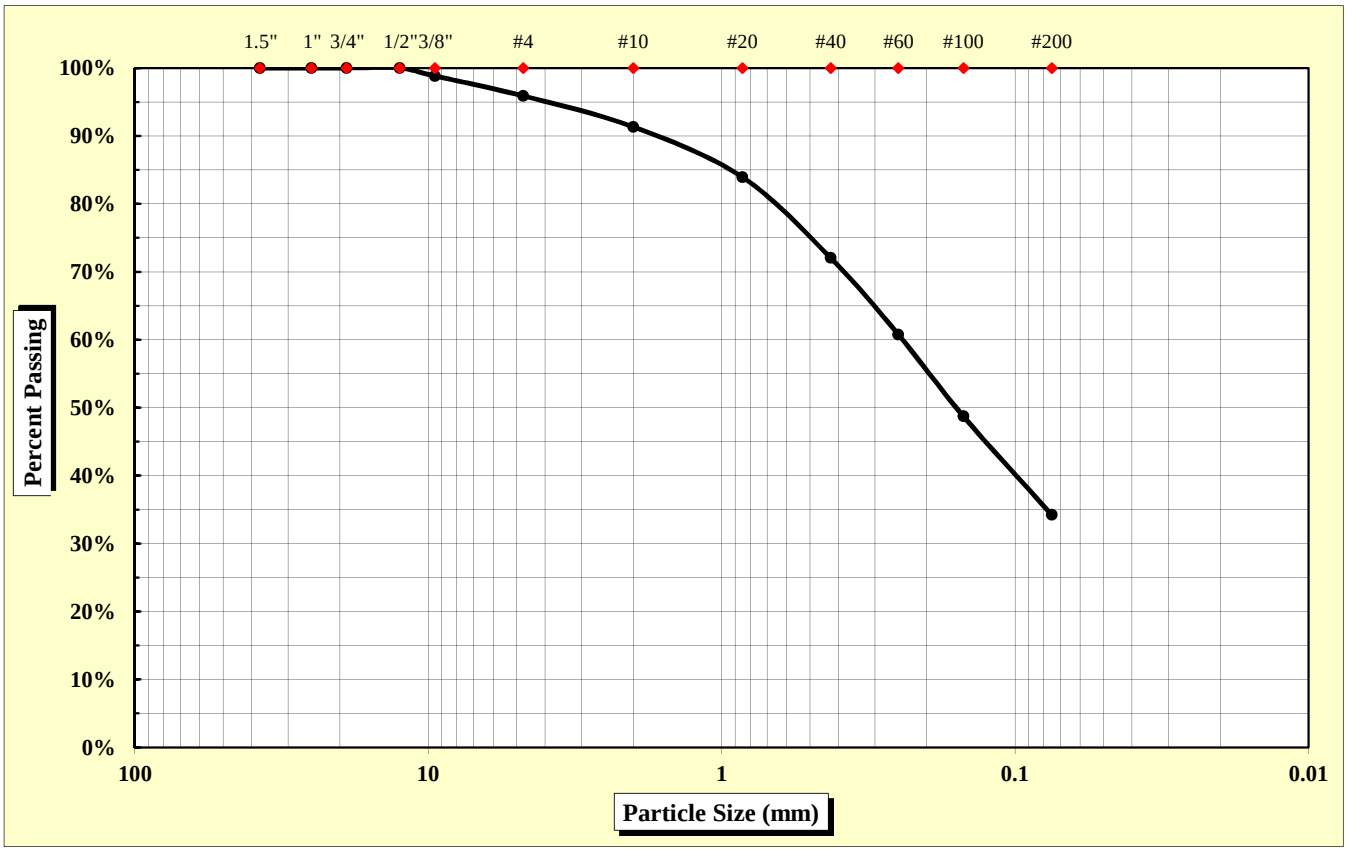
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-21	Sample #:	241	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0.7 - 4.7'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	8.7%	Fine Sand	37.8%
		Coarse Sand	19.3%	Silt & Clay	34.2%
Liquid Limit	29	Plastic Limit	25	Plastic Index	4
		Moisture Content	17.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

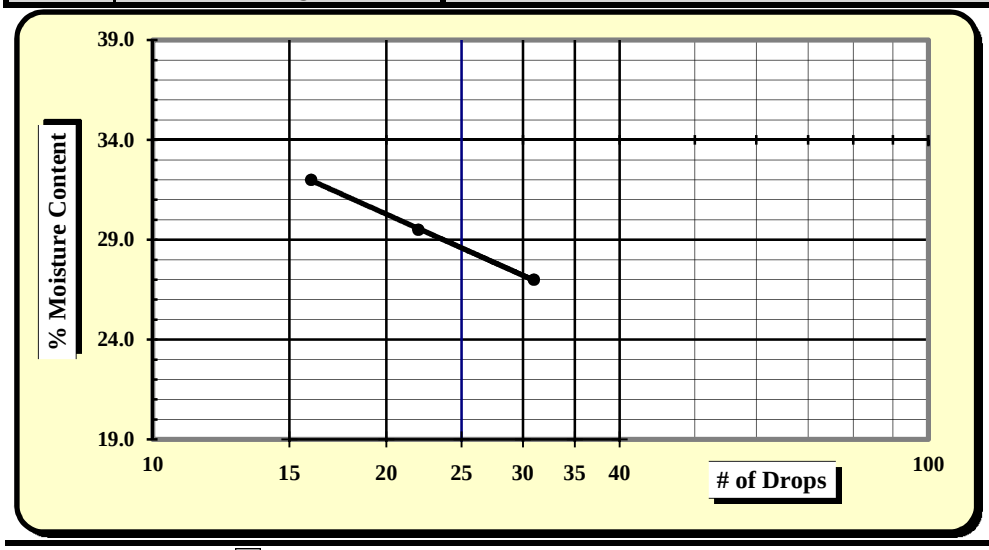
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-21	Sample #:	241	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0.7 - 4.7'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.99	27.79	26.29				27.36		
B	Wet Soil Weight + A	46.40	48.43	44.65				38.08		
C	Dry Soil Weight + A	42.27	43.73	40.20				35.95		
D	Water Weight (B-C)	4.13	4.70	4.45				2.13		
E	Dry Soil Weight (C-A)	15.28	15.94	13.91				8.59		
F	% Moisture (D/E)*100	27.0%	29.5%	32.0%				24.8%		
N	# OF DROPS	31	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**29**
Plastic Limit	**25**
Plastic Index	**4**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

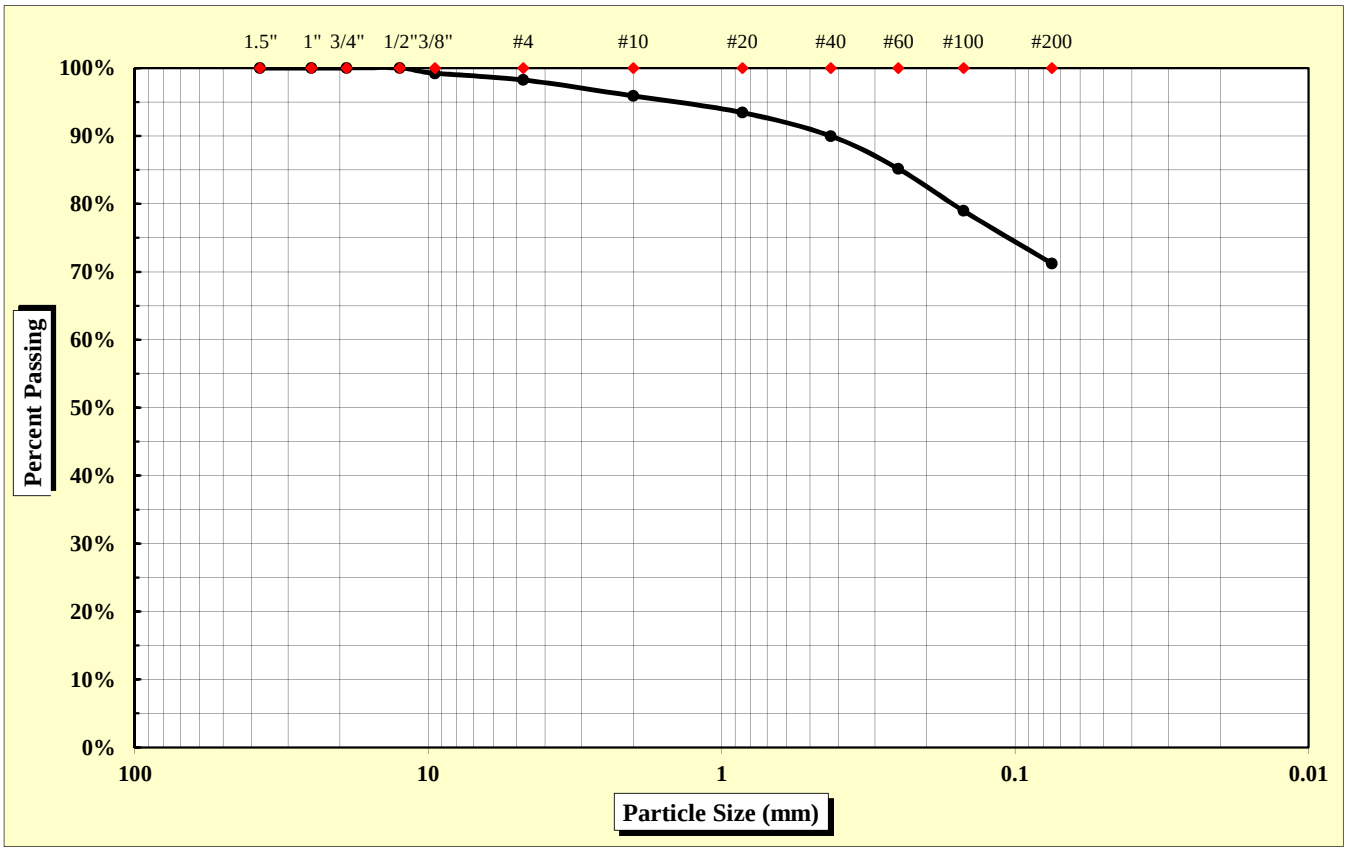
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-21	Sample #:	230	Sample Date:	10/14/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.7 - 6.7'
Sample Description:	Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (20)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.1%	Fine Sand	18.8%
		Coarse Sand	5.9%	Silt & Clay	71.2%
Liquid Limit	58	Plastic Limit	31	Plastic Index	27
		Moisture Content	24.4%	Group Index	20

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

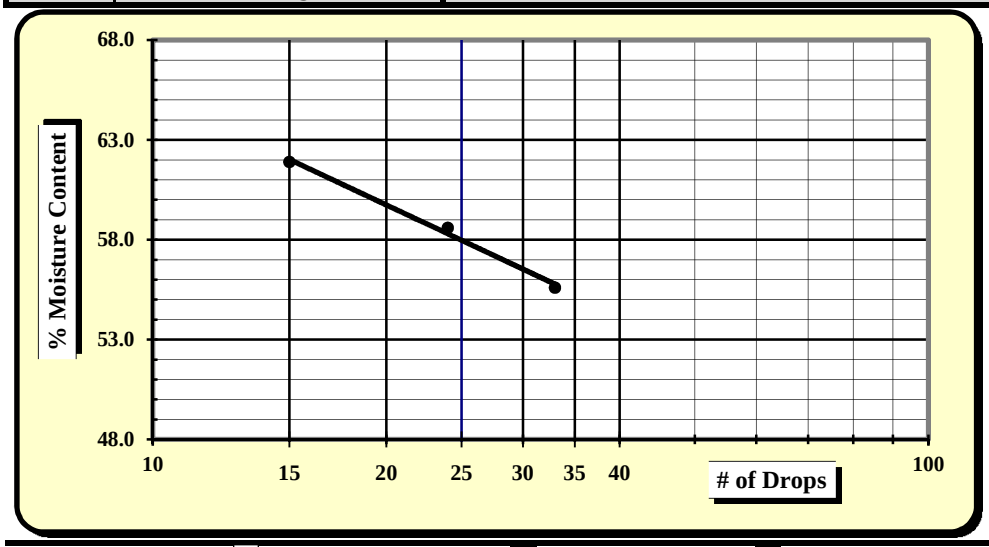
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-21	Sample #:	230	Sample Date:	10/14/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.7 - 6.7'

Sample Description: Red brown, fine, ELASTIC SILT with sand (MH) [A-7-5 (20)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.67	15.72				12.15		
B	Wet Soil Weight + A	40.07	37.94	38.70				20.46		
C	Dry Soil Weight + A	31.72	30.08	29.91				18.52		
D	Water Weight (B-C)	8.35	7.86	8.79				1.94		
E	Dry Soil Weight (C-A)	15.01	13.41	14.19				6.37		
F	% Moisture (D/E)*100	55.6%	58.6%	61.9%				30.5%		
N	# OF DROPS	33	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**31**
Plastic Index	**27**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 71.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

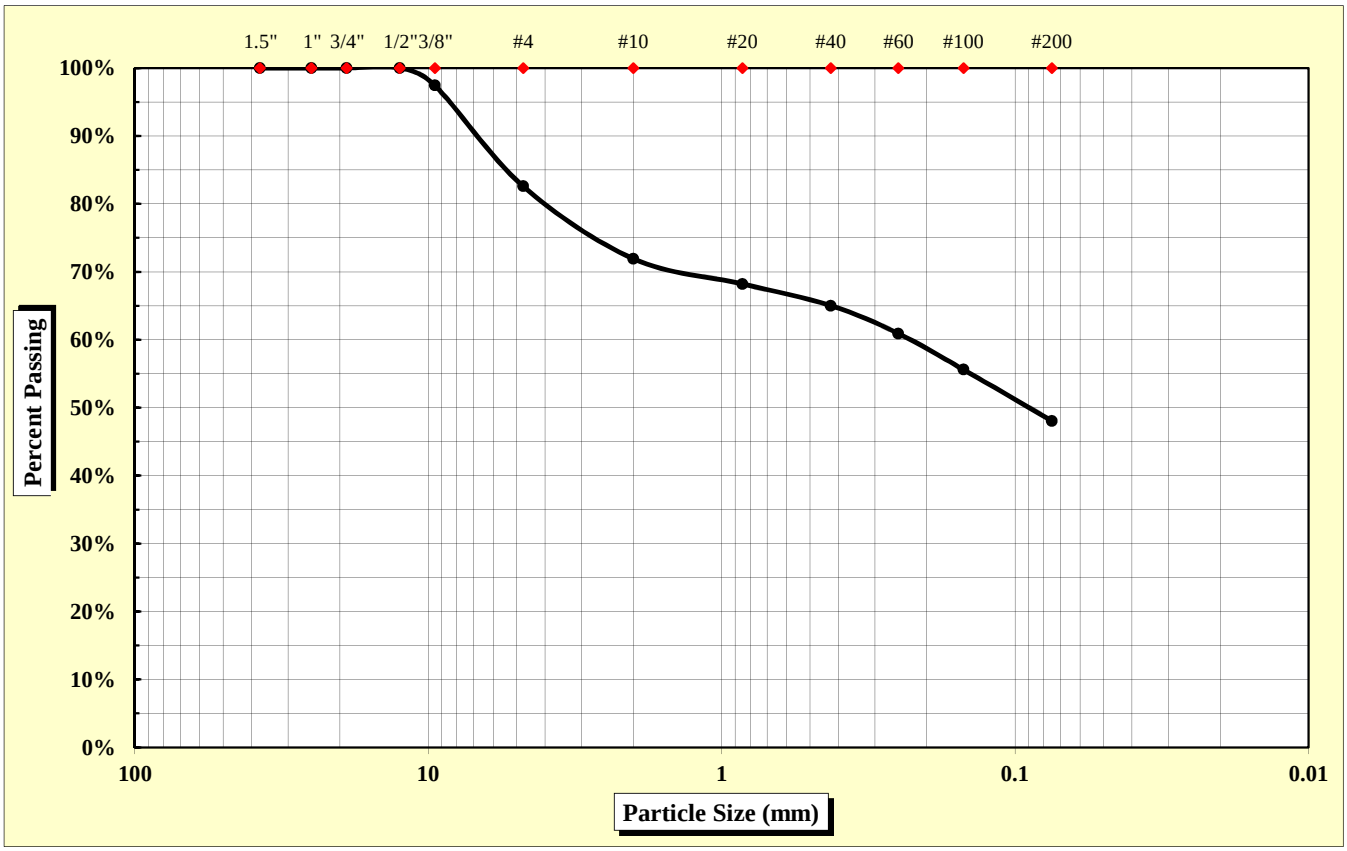
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-22	Sample #:	218	Sample Date:	10/9/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, fine to coarse, clayey SAND with gravel (SC) [A-6 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	28.1%	Fine Sand	17.0%
		Coarse Sand	6.9%	Silt & Clay	48.1%
Liquid Limit	36	Plastic Limit	20	Plastic Index	16
		Moisture Content	19.1%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

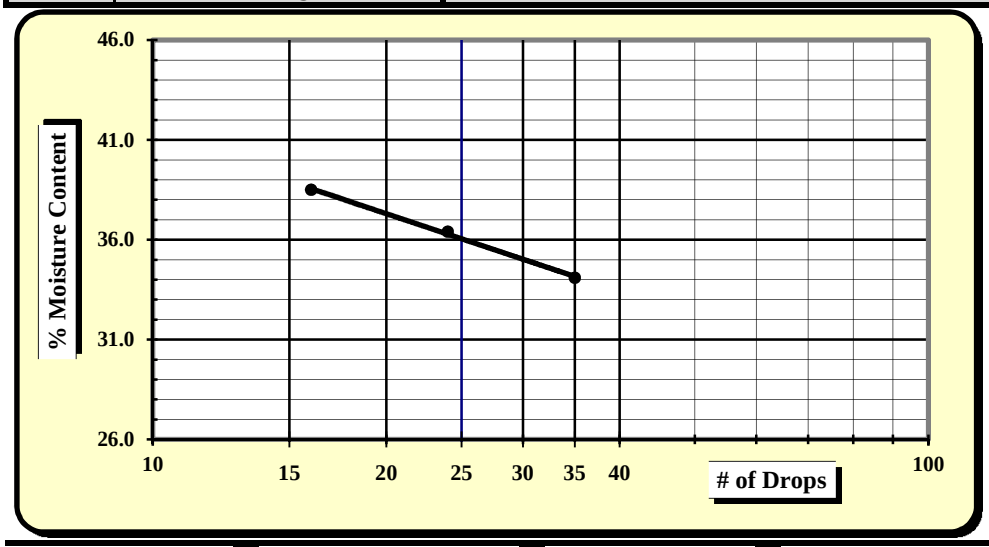
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-22	Sample #:	218	Sample Date:	10/9/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, fine to coarse, clayey SAND with gravel (SC) [A-6 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-7	Z-8	Z-9				17		
A	Tare Weight	16.76	15.75	16.77				12.11		
B	Wet Soil Weight + A	35.70	36.72	36.49				20.91		
C	Dry Soil Weight + A	30.88	31.12	31.01				19.45		
D	Water Weight (B-C)	4.82	5.60	5.48				1.46		
E	Dry Soil Weight (C-A)	14.12	15.37	14.24				7.34		
F	% Moisture (D/E)*100	34.1%	36.4%	38.5%				19.9%		
N	# OF DROPS	35	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**20**
Plastic Index	**16**
Group Symbol	**SC / A-6**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 48.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

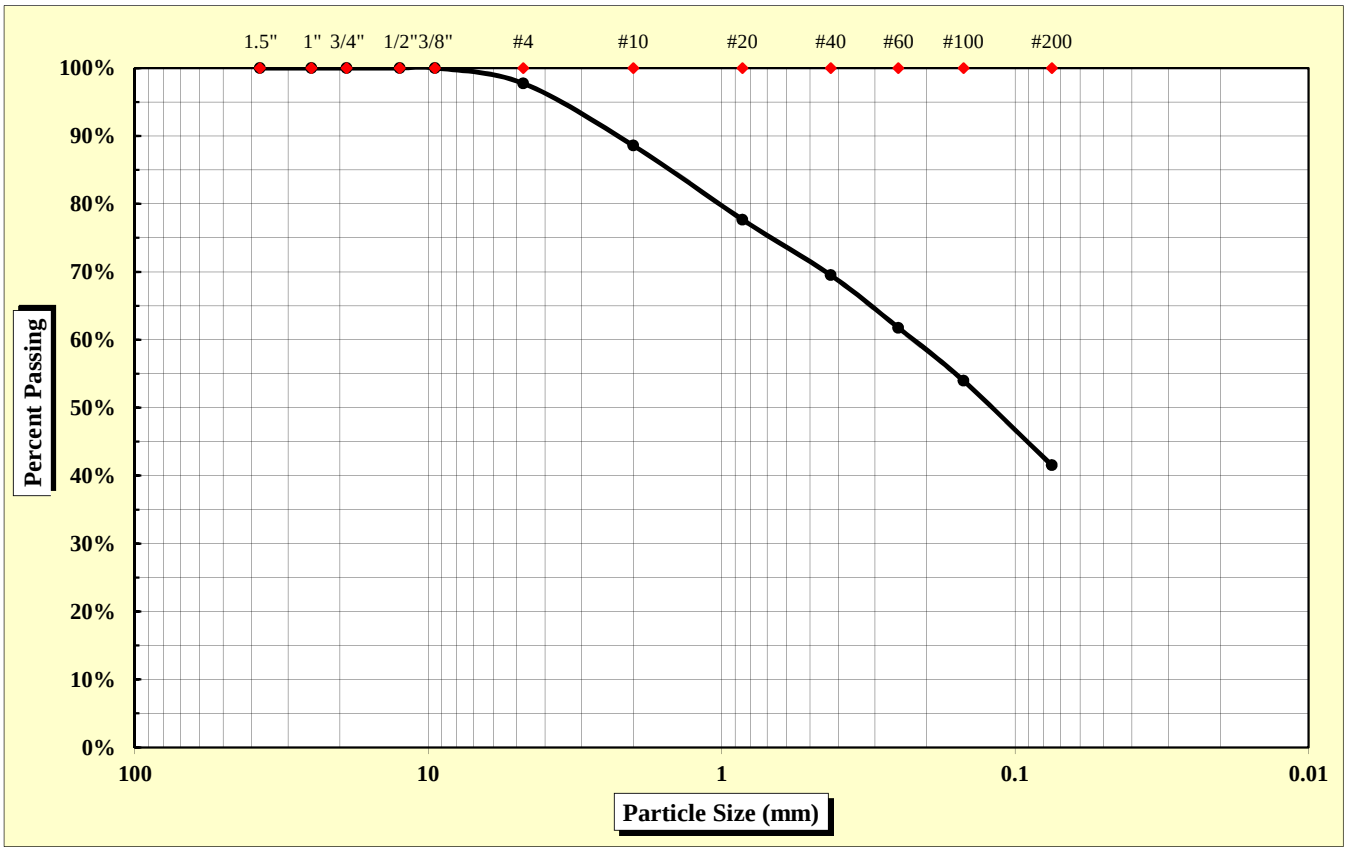
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-22	Sample #:	241	Sample Date:	10/09/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Brown red, fine to coarse, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	11.4%	Fine Sand	28.0%
		Coarse Sand	19.1%	Silt & Clay	41.5%
Liquid Limit	29	Plastic Limit	23	Plastic Index	6
		Moisture Content	19.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

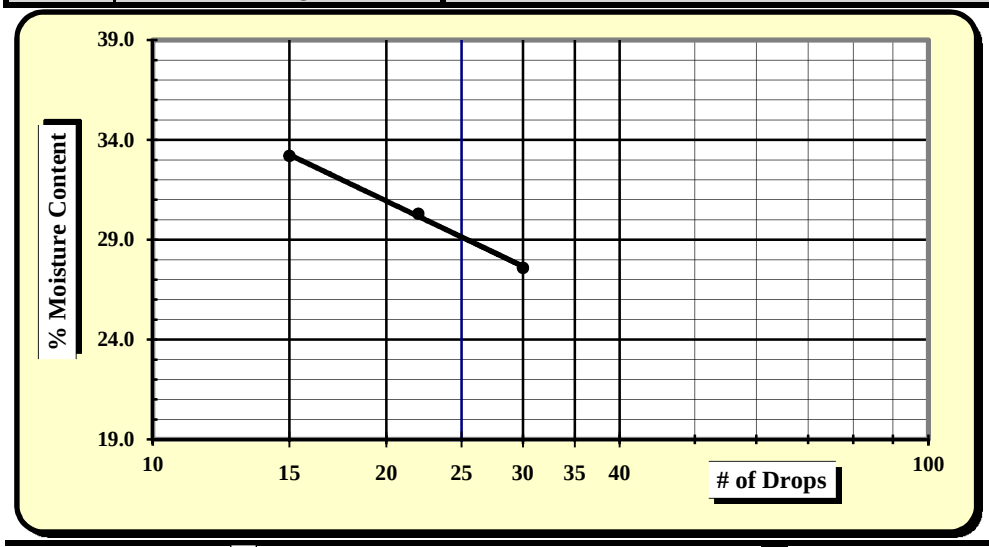
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-22	Sample #:	241	Sample Date:	10/09/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Brown red, fine to coarse, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.88	26.81	26.67				26.67		
B	Wet Soil Weight + A	45.38	46.74	46.78				39.63		
C	Dry Soil Weight + A	41.38	42.11	41.77				37.24		
D	Water Weight (B-C)	4.00	4.63	5.01				2.39		
E	Dry Soil Weight (C-A)	14.50	15.30	15.10				10.57		
F	% Moisture (D/E)*100	27.6%	30.3%	33.2%				22.6%		
N	# OF DROPS	30	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**29**
Plastic Limit	**23**
Plastic Index	**6**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

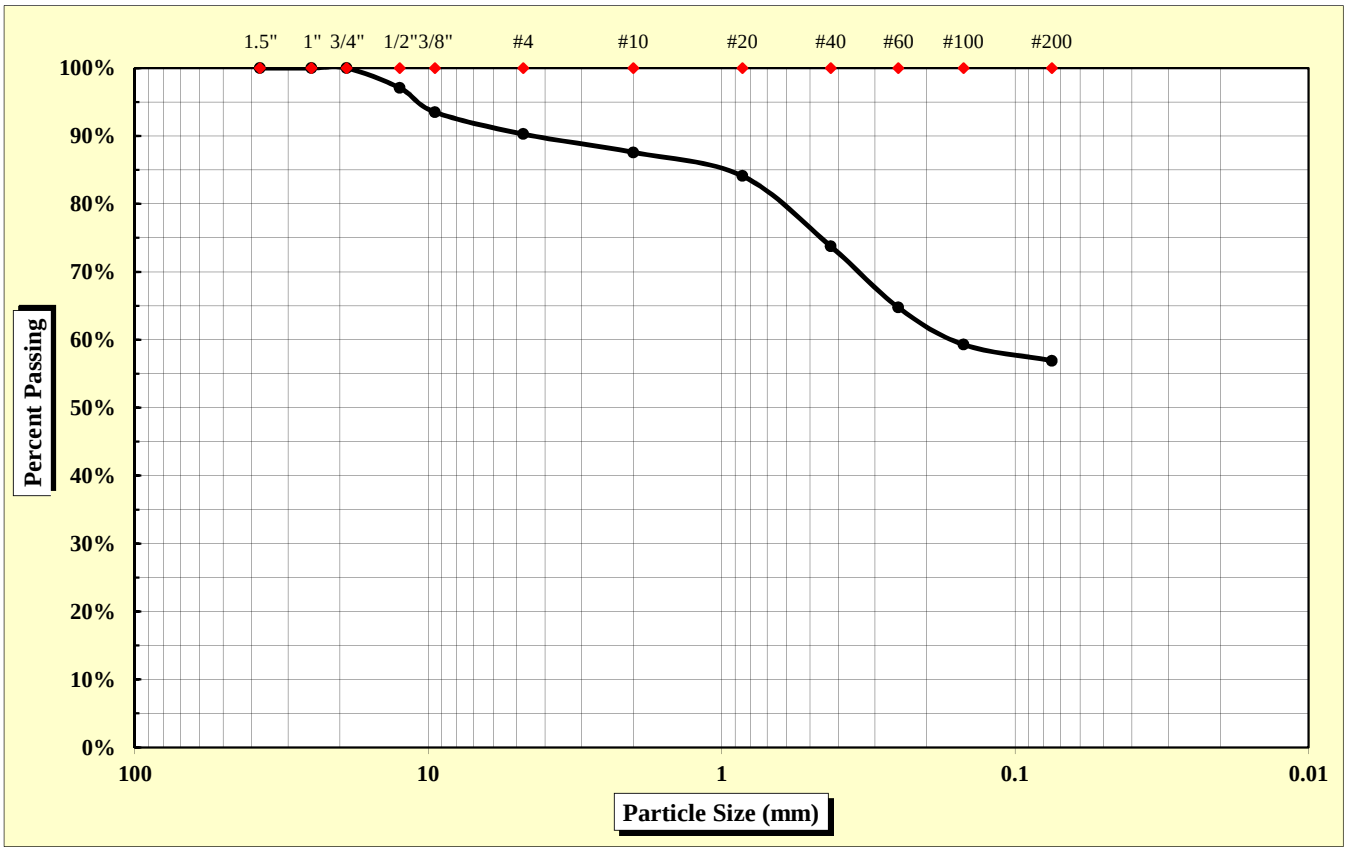
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-23	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-2	Type:	Split-spoon	Depth:	2.8 - 4.8'
Sample Description:	Red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (15)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	12.4%	Fine Sand	16.8%
		Coarse Sand	13.8%	Silt & Clay	56.9%
Liquid Limit	61	Plastic Limit	31	Plastic Index	30
		Moisture Content	21.8%	Group Index	15

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

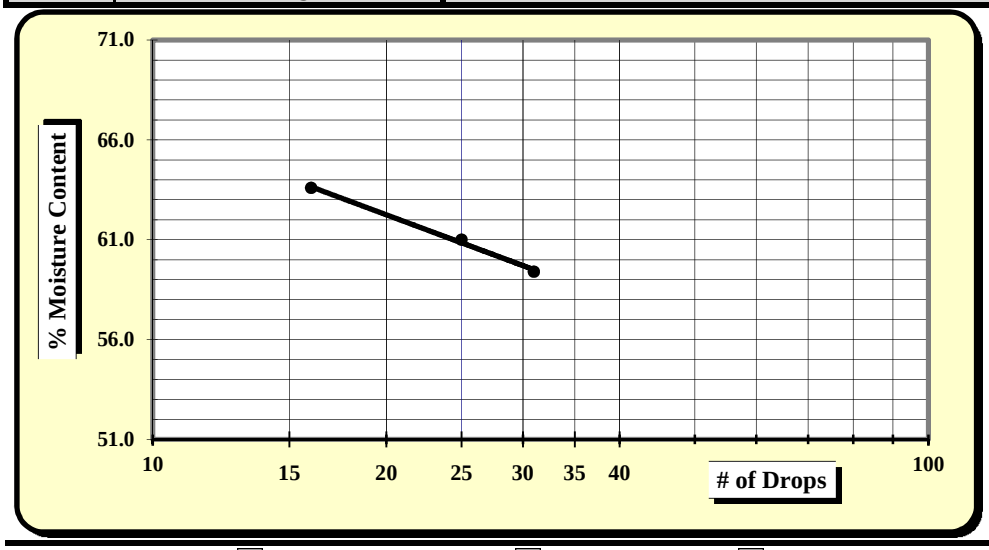
Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-23	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-2	Type:	Split-spoon	Depth:	2.8 - 4.8'

Sample Description: Red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (15)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	603	Liquid Limit						Plastic Limit		
	Tare #:	15	23	6				17		
A	Tare Weight	20.72	20.67	20.54				20.58		
B	Wet Soil Weight + A	28.74	28.19	28.23				28.69		
C	Dry Soil Weight + A	25.75	25.34	25.24				26.78		
D	Water Weight (B-C)	2.99	2.85	2.99				1.91		
E	Dry Soil Weight (C-A)	5.03	4.67	4.70				6.20		
F	% Moisture (D/E)*100	59.4%	61.0%	63.6%				30.8%		
N	# OF DROPS	31	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**61**
Plastic Limit	**31**
Plastic Index	**30**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

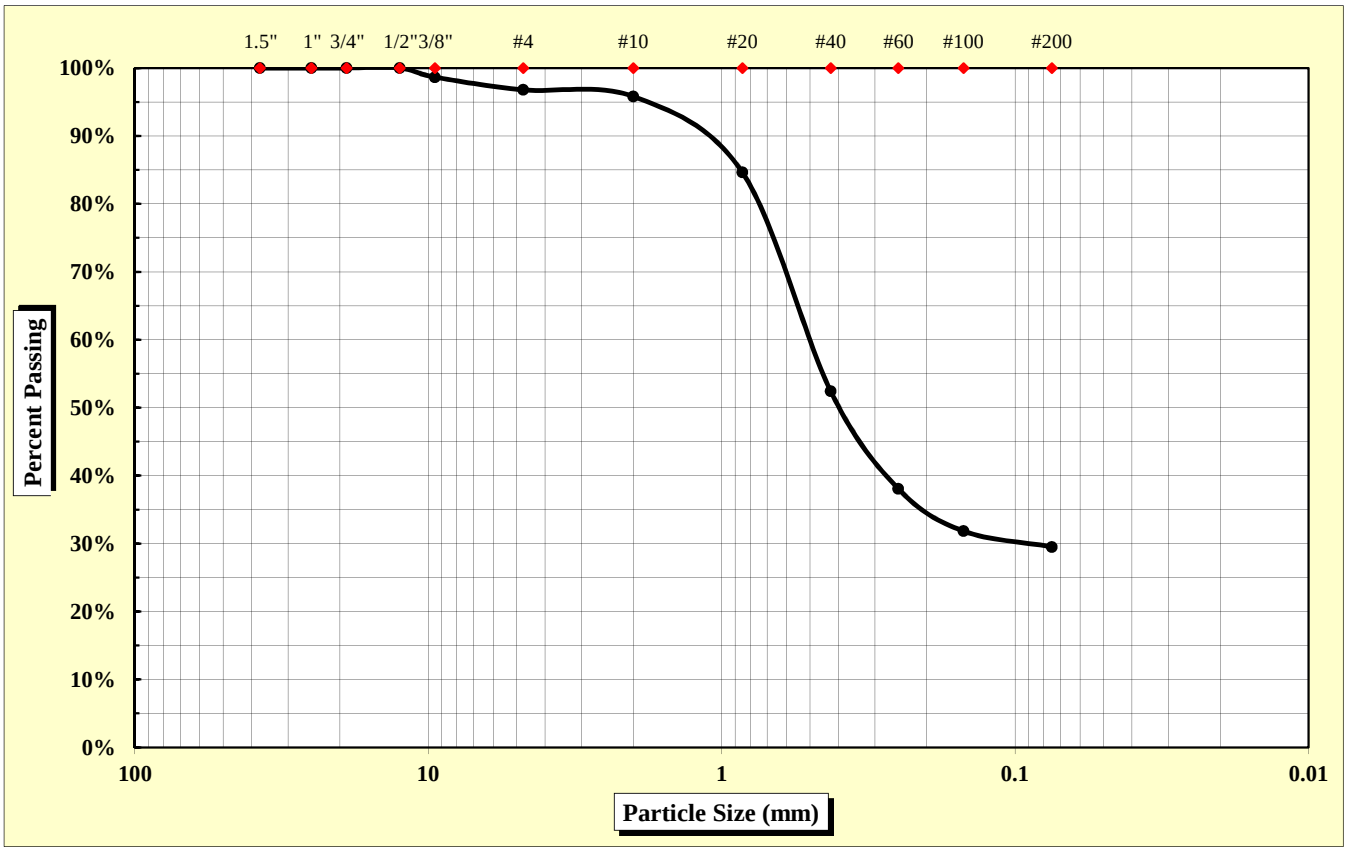
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-23	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Pink yellow tan, fine to medium, silty SAND (SM) [A-2]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	4.2%	Fine Sand	22.9%
		Coarse Sand	43.4%	Silt & Clay	29.5%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	20.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

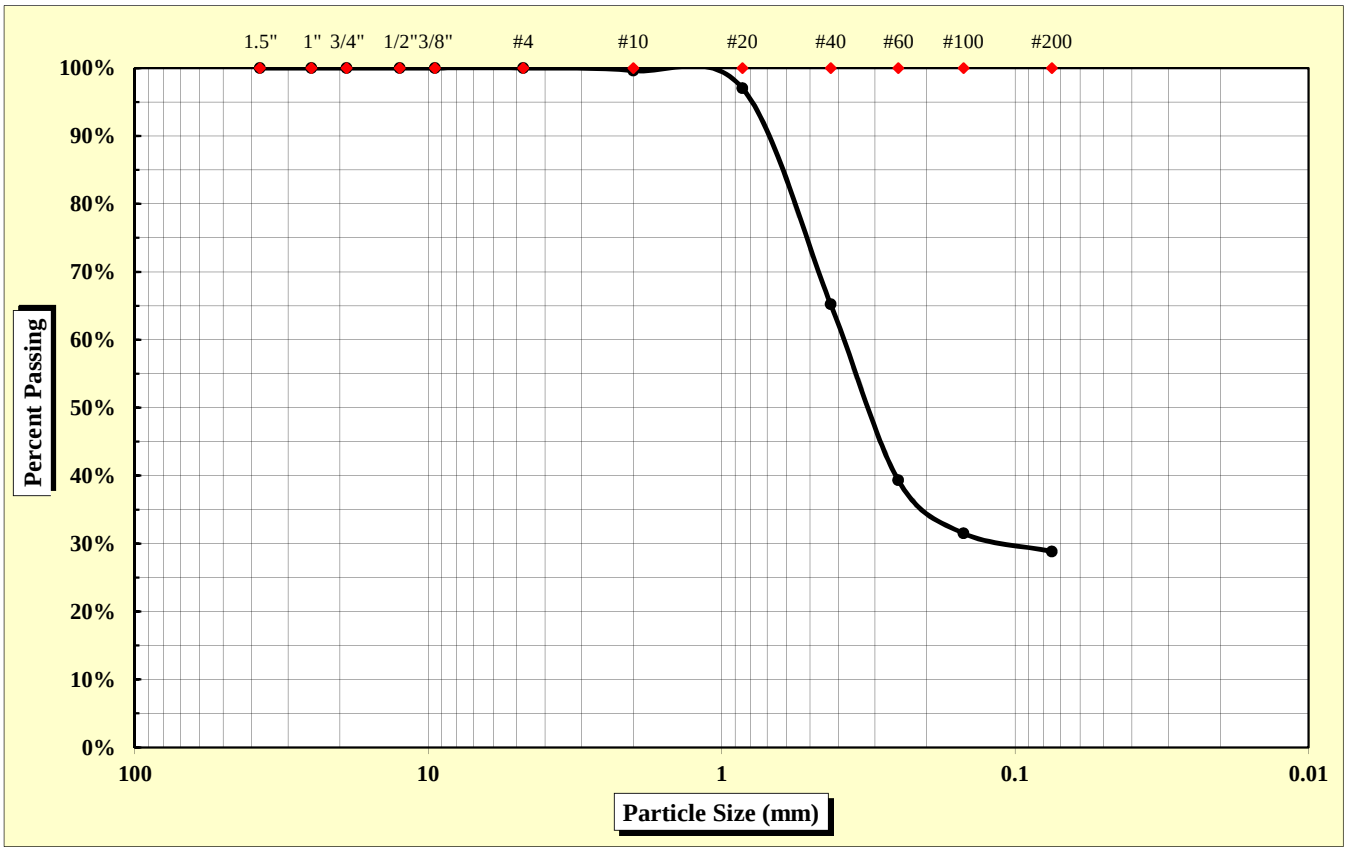
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-23	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-7	Type:	Split-spoon	Depth:	18.5 - 20'
Sample Description:	Pink yellow white, medium to fine, silty SAND (SM) [A-2]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.4%	Fine Sand	36.4%
		Coarse Sand	34.4%	Silt & Clay	28.9%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	21.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

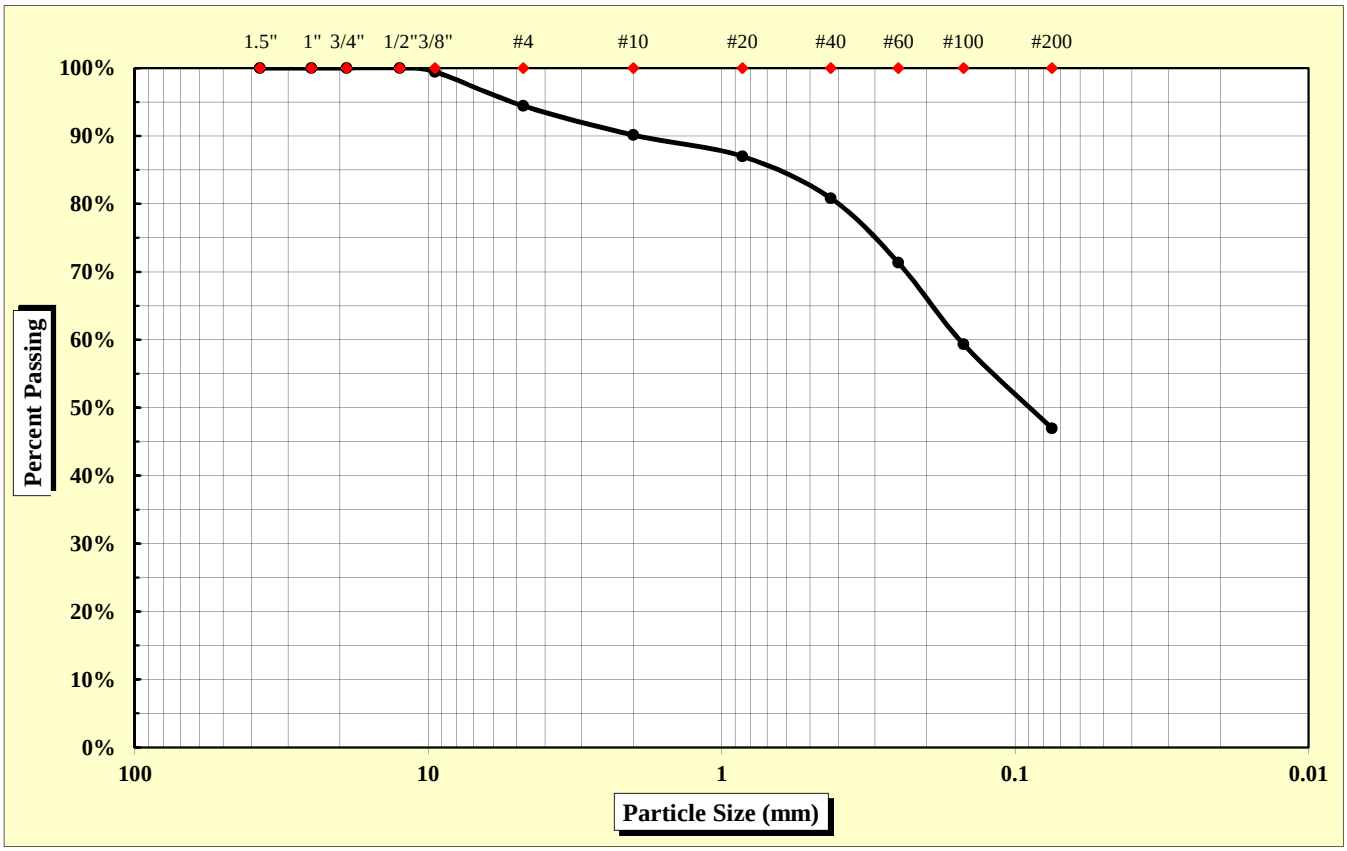
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-24	Sample #:	230	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.3 - 2.3'
Sample Description:	Red brown, fine, clayey SAND (SC) [A-6 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	9.9%	Fine Sand	33.9%
		Coarse Sand	9.3%	Silt & Clay	47.0%
Liquid Limit	28	Plastic Limit	17	Plastic Index	11
		Moisture Content	14.2%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

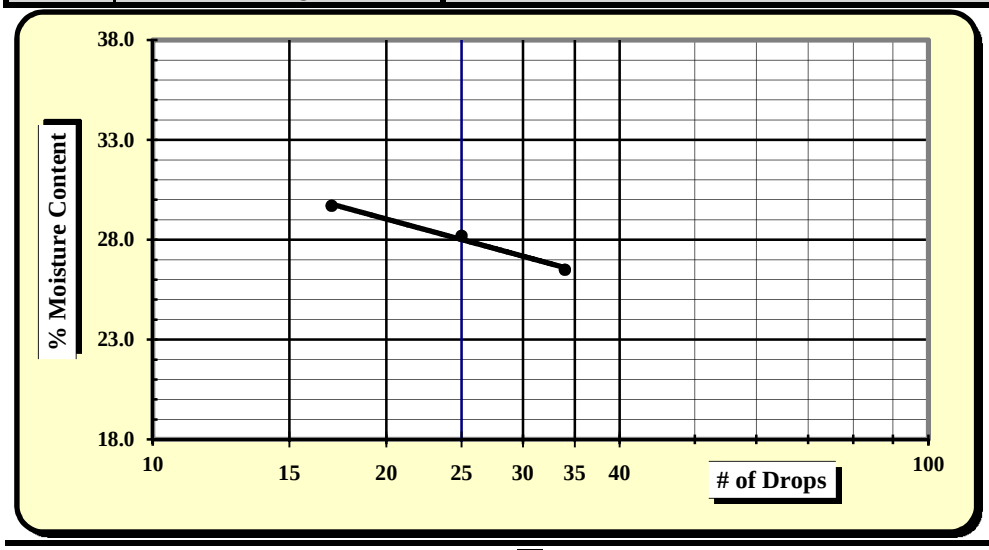
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-24	Sample #:	230	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.3 - 2.3'

Sample Description: Red brown, fine, clayey SAND (SC) [A-6 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.50	16.99				11.59		
B	Wet Soil Weight + A	40.84	41.04	40.22				19.83		
C	Dry Soil Weight + A	35.73	35.64	34.90				18.61		
D	Water Weight (B-C)	5.11	5.40	5.32				1.22		
E	Dry Soil Weight (C-A)	19.28	19.14	17.91				7.02		
F	% Moisture (D/E)*100	26.5%	28.2%	29.7%				17.4%		
N	# OF DROPS	34	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.4%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**28**
Plastic Limit	**17**
Plastic Index	**11**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

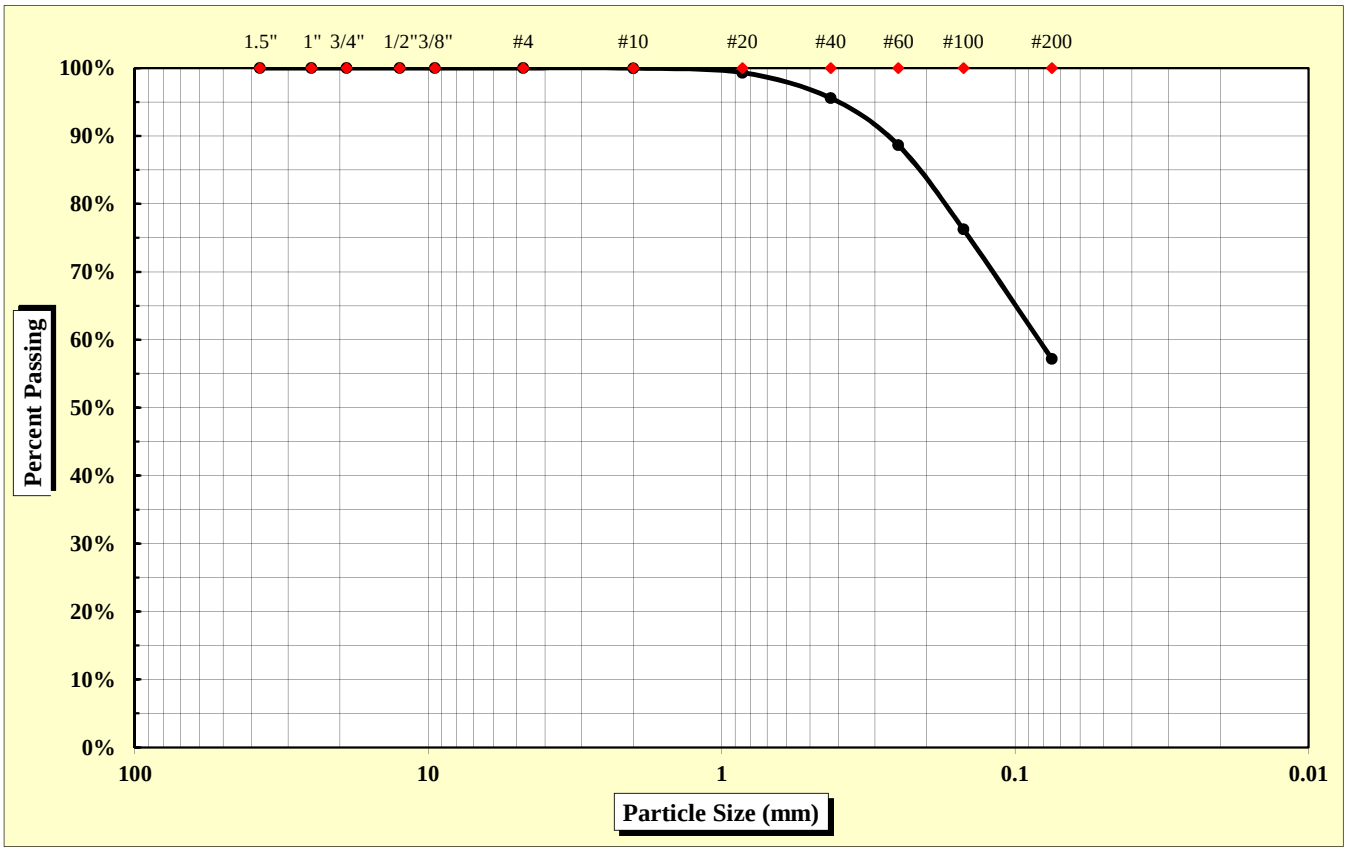
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-24	Sample #:	241	Sample Date:	10/15/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2.3 - 6.3'
Sample Description:	Red yellow, fine, sandy ELASTIC SILT (MH) [A-7-5 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	0.85 mm	Gravel	0.0%	Fine Sand	38.4%
		Coarse Sand	4.4%	Silt & Clay	57.2%
Liquid Limit	53	Plastic Limit	41	Plastic Index	12
		Moisture Content	28.6%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

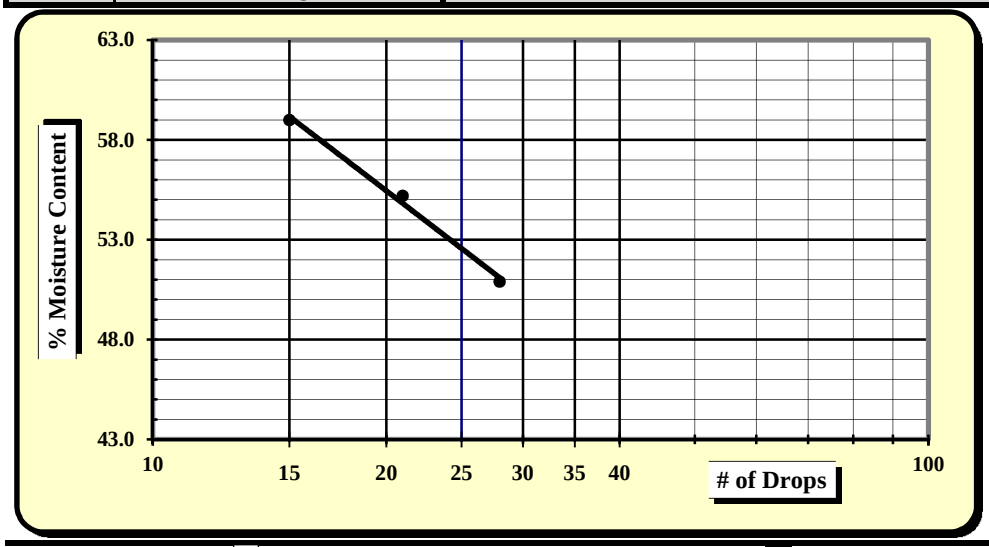
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-24	Sample #:	241	Sample Date:	10/15/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2.3 - 6.3'

Sample Description: Red yellow, fine, sandy ELASTIC SILT (MH) [A-7-5 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.77	26.70	27.66				26.60		
B	Wet Soil Weight + A	47.16	42.62	41.43				36.17		
C	Dry Soil Weight + A	40.28	36.96	36.32				33.37		
D	Water Weight (B-C)	6.88	5.66	5.11				2.80		
E	Dry Soil Weight (C-A)	13.51	10.26	8.66				6.77		
F	% Moisture (D/E)*100	50.9%	55.2%	59.0%				41.4%		
N	# OF DROPS	28	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**41.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**53**
Plastic Limit	**41**
Plastic Index	**12**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

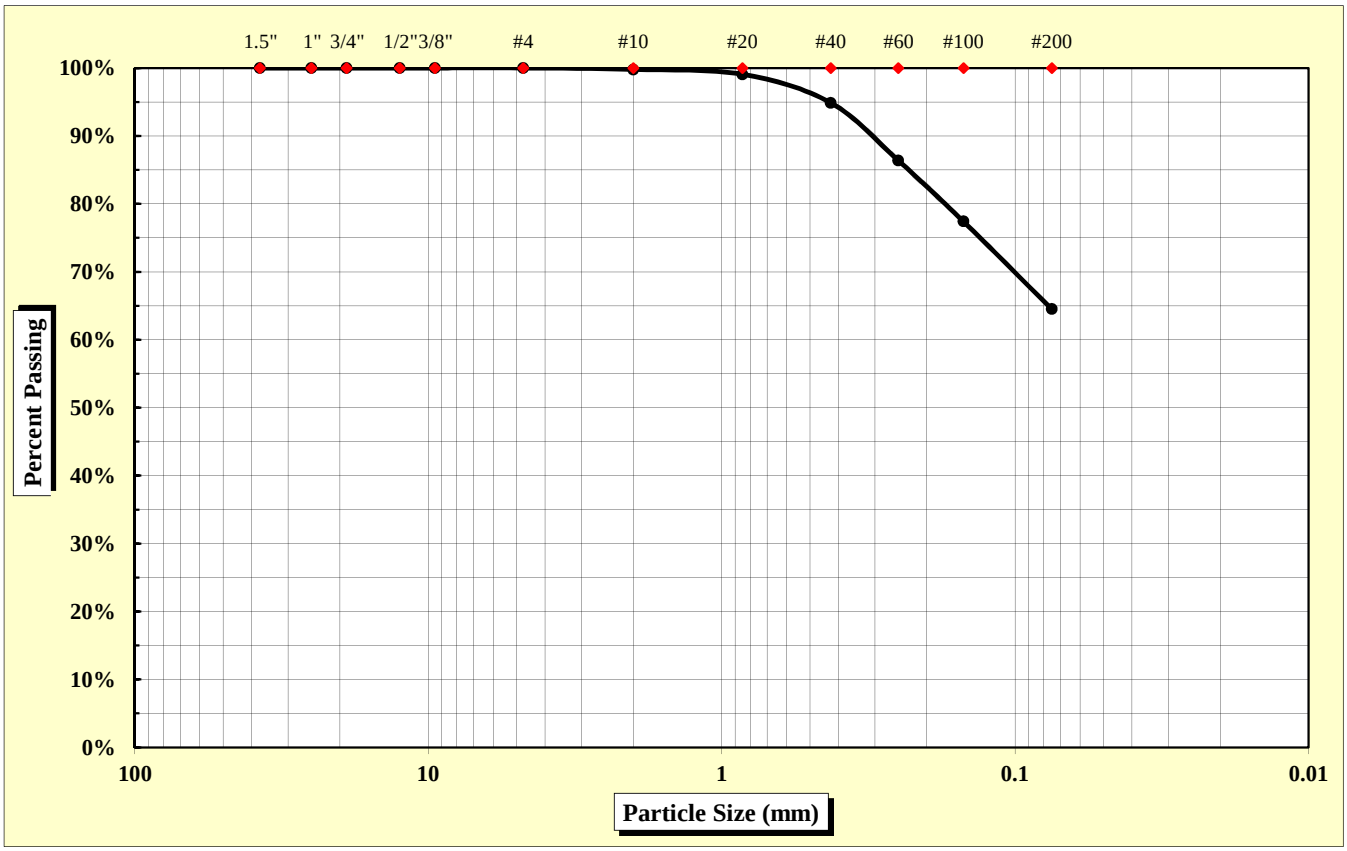
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-25	Sample #:	241	Sample Date:	10/09/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Light red, fine, sandy SILT (ML) [A-7-6 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	30.4%
		Coarse Sand	4.9%	Silt & Clay	64.5%
Liquid Limit	47	Plastic Limit	29	Plastic Index	18
		Moisture Content	21.5%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

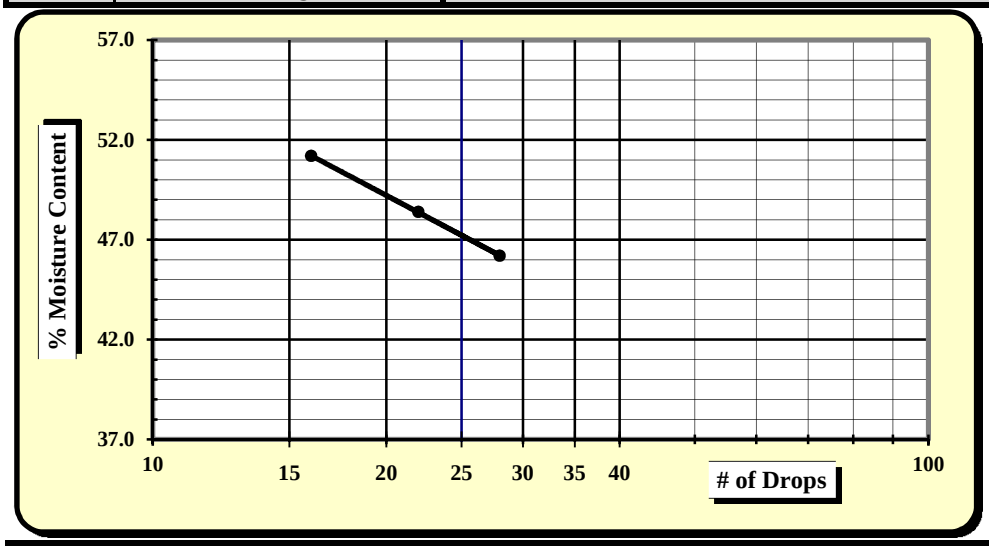
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-25	Sample #:	241	Sample Date:	10/09/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Light red, fine, sandy SILT (ML) [A-7-6 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	18	19				20		
A	Tare Weight	26.72	26.85	26.71				26.85		
B	Wet Soil Weight + A	40.71	41.04	42.96				39.03		
C	Dry Soil Weight + A	36.29	36.41	37.46				36.26		
D	Water Weight (B-C)	4.42	4.63	5.50				2.77		
E	Dry Soil Weight (C-A)	9.57	9.56	10.75				9.41		
F	% Moisture (D/E)*100	46.2%	48.4%	51.2%				29.4%		
N	# OF DROPS	28	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**29**
Plastic Index	**18**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

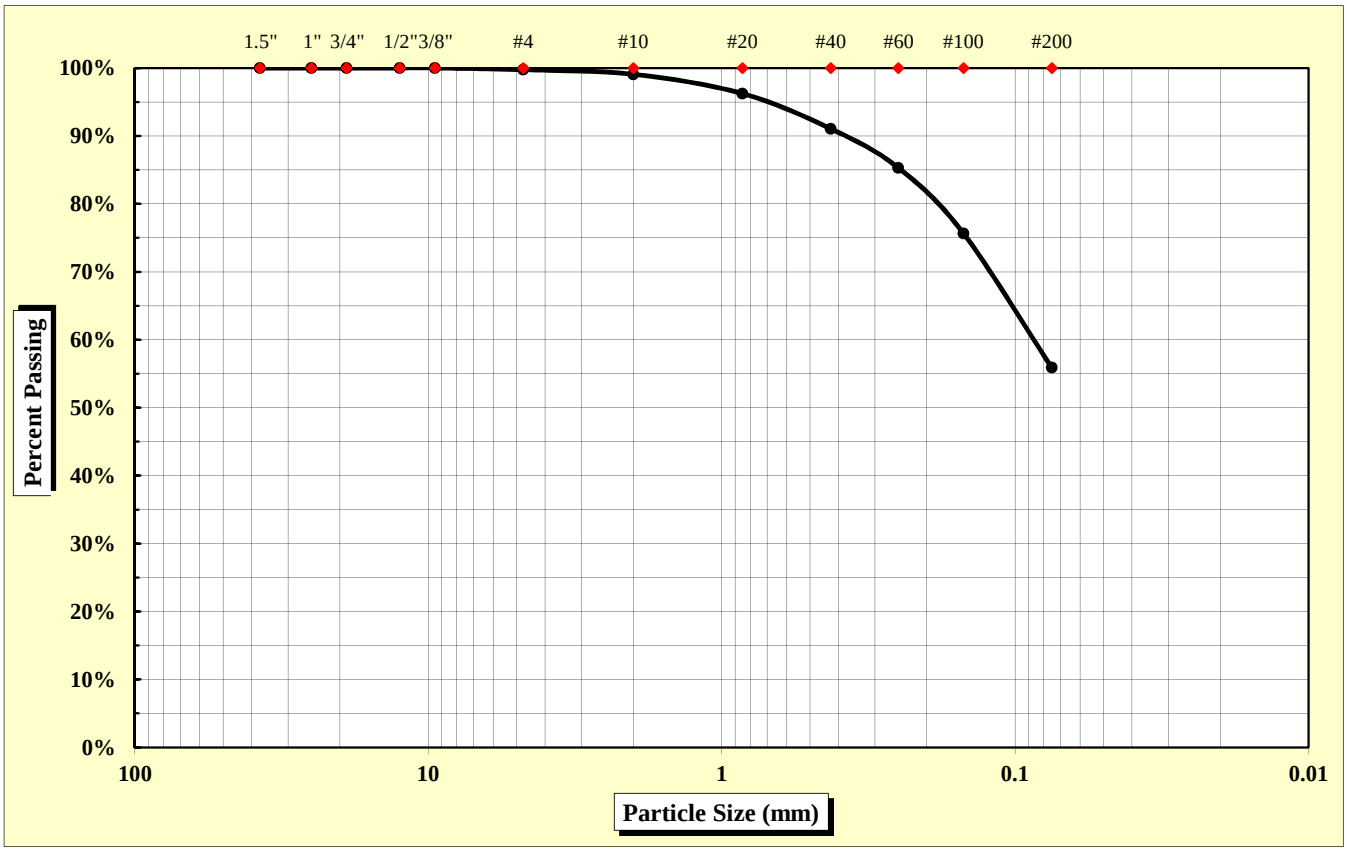
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-25	Sample #:	218	Sample Date:	10/9/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Plum red brown, fine, trace mica, sandy SILT (ML)				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.9%	Fine Sand	35.2%
		Coarse Sand	8.0%	Silt & Clay	55.9%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	37.0%	Group Index	N/A

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

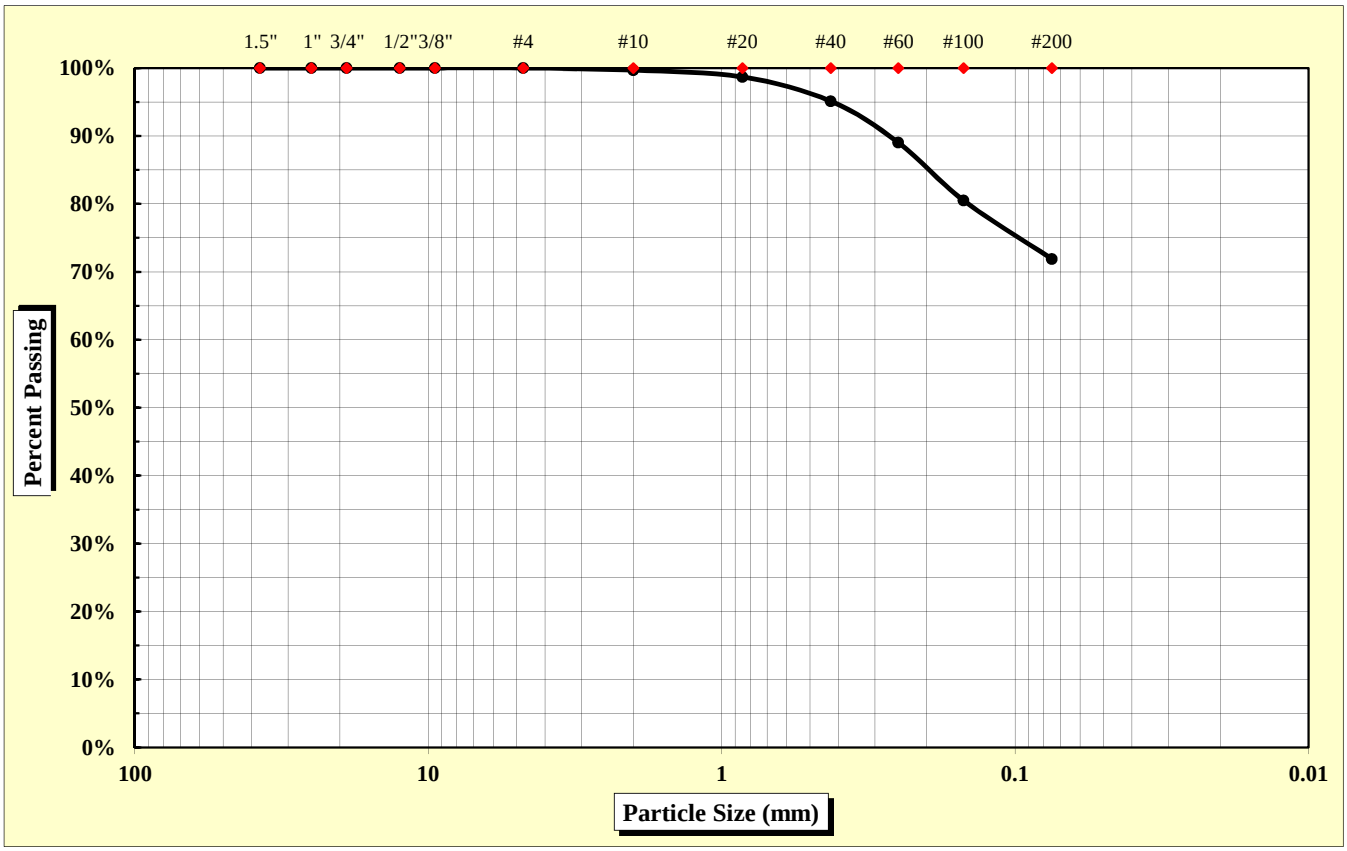
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-26	Sample #:	241	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red, fine, FAT CLAY with sand (CH) [A-7-6 (22)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	23.2%
		Coarse Sand	4.6%	Silt & Clay	71.9%
Liquid Limit	57	Plastic Limit	27	Plastic Index	30
		Moisture Content	26.5%	Group Index	22

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

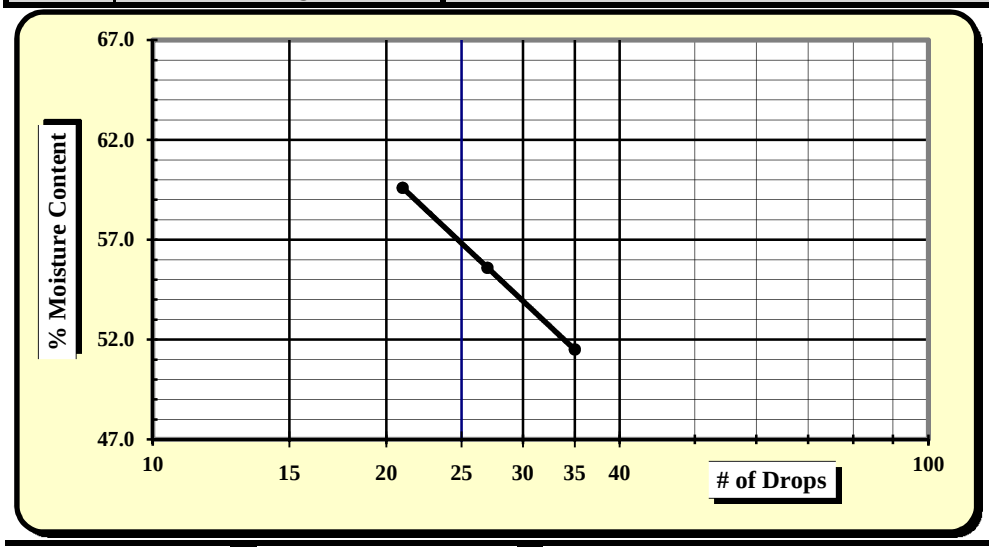
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-26	Sample #:	241	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red, fine, FAT CLAY with sand (CH) [A-7-6 (22)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	22	23				24		
A	Tare Weight	28.16	25.71	27.28				26.00		
B	Wet Soil Weight + A	44.11	42.69	43.46				36.99		
C	Dry Soil Weight + A	38.69	36.62	37.42				34.66		
D	Water Weight (B-C)	5.42	6.07	6.04				2.33		
E	Dry Soil Weight (C-A)	10.53	10.91	10.14				8.66		
F	% Moisture (D/E)*100	51.5%	55.6%	59.6%				26.9%		
N	# OF DROPS	35	27	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**57**
Plastic Limit	**27**
Plastic Index	**30**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 71.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

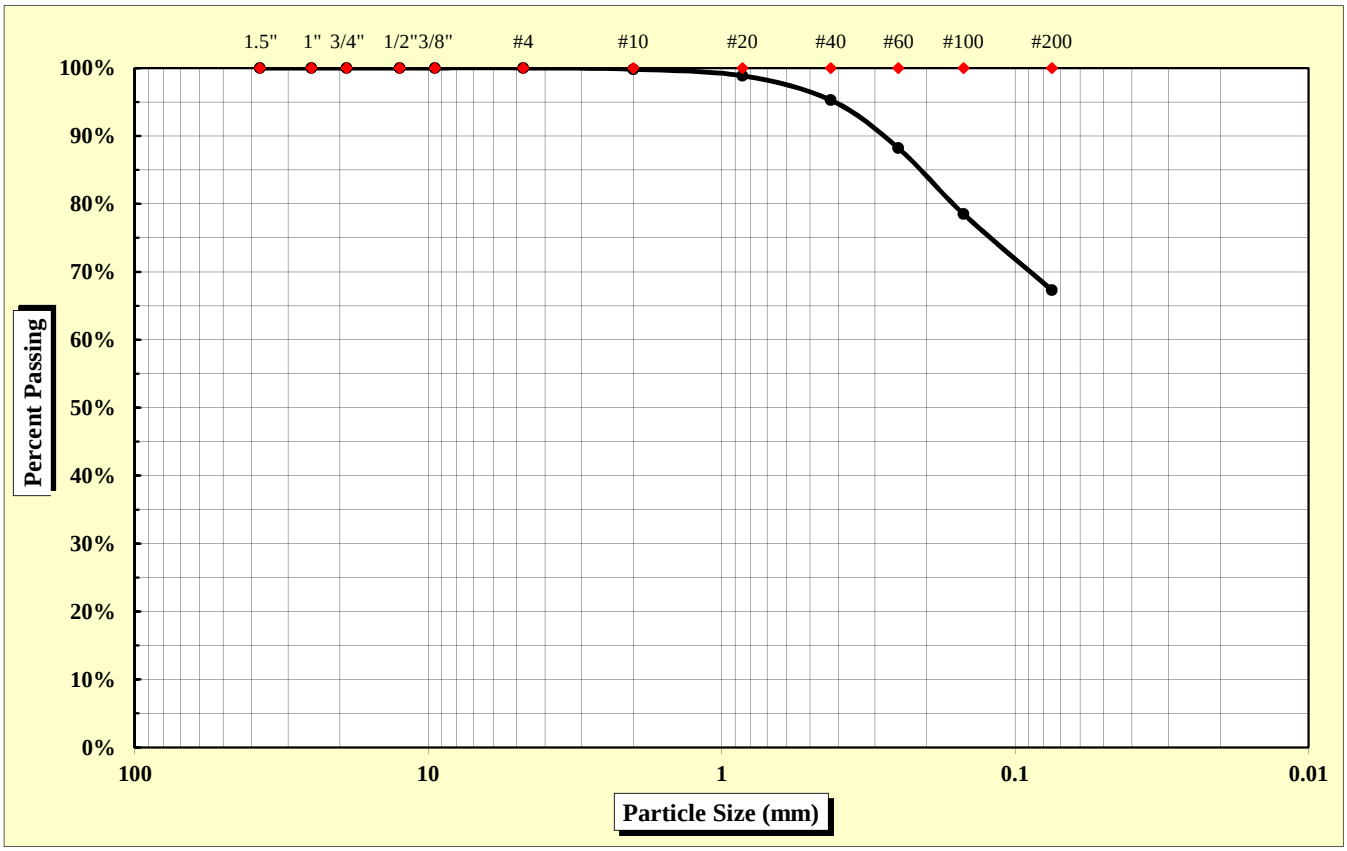
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-26	Sample #:	230	Sample Date:	10/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Red orange, fine, sandy SILT (ML) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	28.0%
		Coarse Sand	4.5%	Silt & Clay	67.3%
Liquid Limit	49	Plastic Limit	33	Plastic Index	16
		Moisture Content	24.8%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

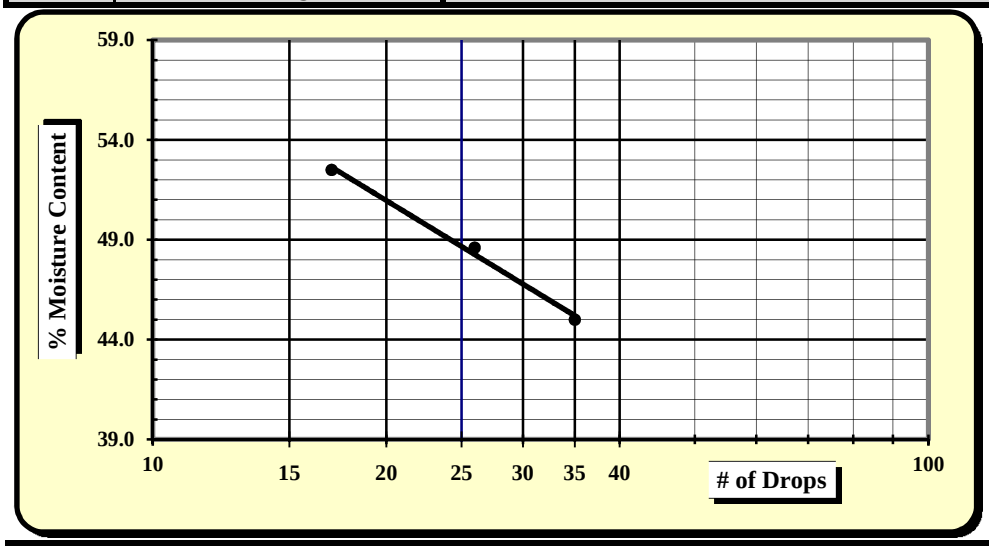
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/17/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-26	Sample #:	230	Sample Date:	10/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Red orange, fine, sandy SILT (ML) [A-7-5 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.95	16.66	16.77				12.26		
B	Wet Soil Weight + A	40.12	39.28	38.82				21.23		
C	Dry Soil Weight + A	32.62	31.88	31.23				18.99		
D	Water Weight (B-C)	7.50	7.40	7.59				2.24		
E	Dry Soil Weight (C-A)	16.67	15.22	14.46				6.73		
F	% Moisture (D/E)*100	45.0%	48.6%	52.5%				33.3%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**49**
Plastic Limit	**33**
Plastic Index	**16**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

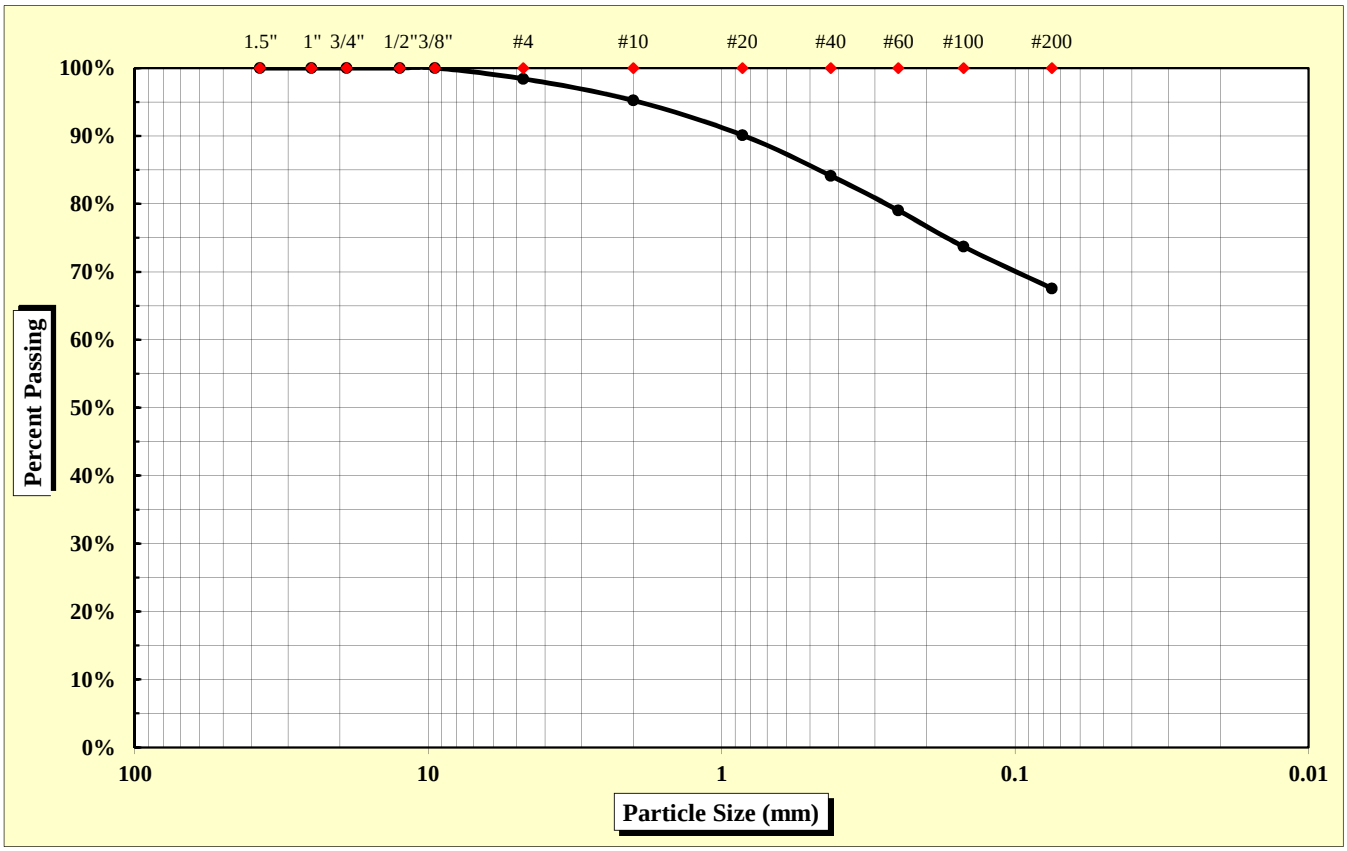
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-27	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, medium to fine, trace mica, sandy FAT CLAY (CH) [A-7-6 (18)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.8%	Fine Sand	16.6%
		Coarse Sand	11.1%	Silt & Clay	67.6%
Liquid Limit	56	Plastic Limit	29	Plastic Index	27
		Moisture Content	25.5%	Group Index	18

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

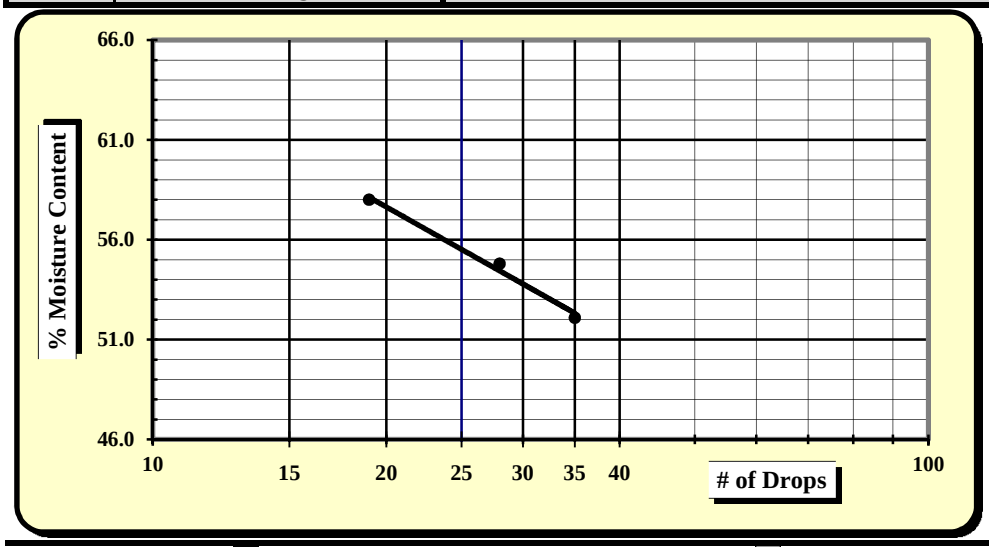
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-27	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, medium to fine, trace mica, sandy FAT CLAY (CH) [A-7-6 (18)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.65	16.66	15.98				12.09		
B	Wet Soil Weight + A	35.79	37.50	36.92				20.69		
C	Dry Soil Weight + A	29.23	30.12	29.23				18.77		
D	Water Weight (B-C)	6.56	7.38	7.69				1.92		
E	Dry Soil Weight (C-A)	12.58	13.46	13.25				6.68		
F	% Moisture (D/E)*100	52.1%	54.8%	58.0%				28.7%		
N	# OF DROPS	35	28	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**56**
Plastic Limit	**29**
Plastic Index	**27**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-126-T267-1
Revision No. 0
Revision Date: 07/28/11

Moisture, Ash, and Organic Content

AASHTO T 267

S&ME *Quality Assurance*

Project #: **1426-14-161** Report Date: 12/04/15
Project Name: **I-85 Widening MM80-96** Test Date(s): 12/03 - 12/04/15
Client Name: Infrastructure Consulting & Engineering
Client Address: 1021 Briargate Circle Columbia, South Carolina 29210

Boring #:	R-27	Sample #:	241	Sample Date:	10/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Brown red silty SAND (SM)

Equipment: Balance (GP1/G1): S&ME ID# **13942** *0.01 g.Readability, 500g. Minimum Capacity*
Oven: S&ME ID# **13978** Muffle Furnace: S&ME ID# **23123**

Moisture Content Determination

Oven Temperature: **110 ± 5 °C**

		Tare #	
t	Tare Weight *(Dish plus Aluminum Foil Cover)*	grams	
a	Mass of **As-Received** Specimen + Tare Wt.	grams	
b	Mass of Oven Dry Specimen + Tare Wt.	grams	
w	Water Weight	(a-b)	
A	Mass of As-Received Specimen	(a-t)	
B	Mass of Oven Dry Specimen	(b-t)	
	% Moisture Content as a % of As Received or Total Mass	(w/A)*100	
	% Moisture Content as a % of Oven-dried Mass	(w/B)*100	**N/A**

Ash Content and Organic Content Determination

Muffle Furnace Temperature: **455 ± 10 °C**

		Tare #	5
t	Tare Weight *(Dish plus Aluminum Foil Cover)*	grams	77.69
b	Mass of Oven Dry Specimen + Tare Wt.	grams	128.55
c	Ash Weight + Tare Wt.	grams	127.47
C	Ash Weight	c-t	49.78
B	Mass of Oven Dry Specimen	(b-t)	50.86
D	***% Ash Content***	(C/B)*100	**97.9%**
	% Organic Content	100-D	**2.1%**

Remarks: **Organic Content representative sample taken from material passing the 2.00 mm (#10) sieve**

References: AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition

Technician Name: Benjamin Kovaleski NICET Lab Level III 117226
Certification #

Technical Responsibility: Brian Vaughan, P.E. Brian Vaughan *Signature* Location Coordinator *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

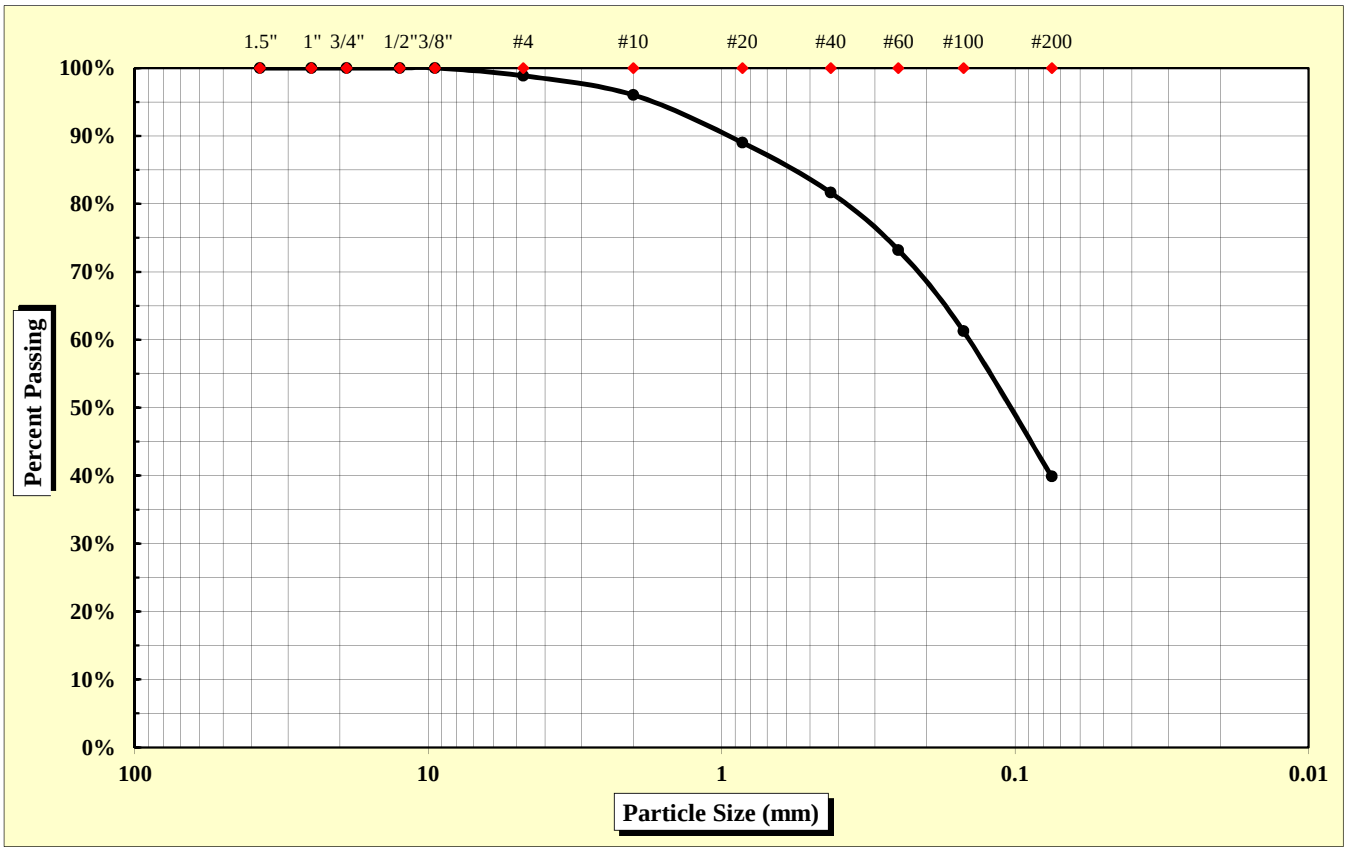
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-27	Sample #:	241	Sample Date:	10/12/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.0%	Fine Sand	41.8%
		Coarse Sand	14.4%	Silt & Clay	39.9%
Liquid Limit	47	Plastic Limit	40	Plastic Index	7
		Moisture Content	24.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

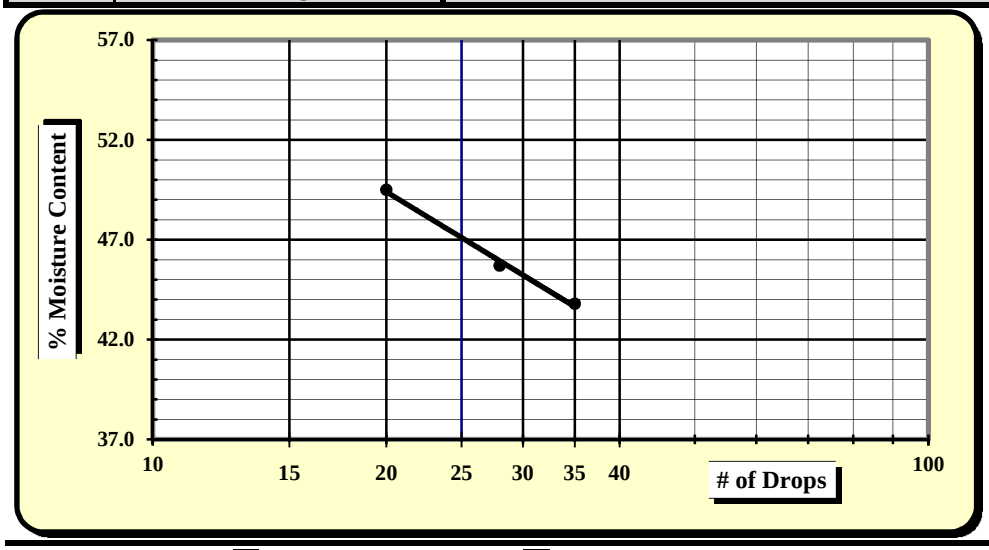
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-27	Sample #:	241	Sample Date:	10/12/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-5 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.70	26.50	26.38				25.98		
B	Wet Soil Weight + A	40.50	41.48	43.44				35.37		
C	Dry Soil Weight + A	36.30	36.78	37.79				32.67		
D	Water Weight (B-C)	4.20	4.70	5.65				2.70		
E	Dry Soil Weight (C-A)	9.60	10.28	11.41				6.69		
F	% Moisture (D/E)*100	43.8%	45.7%	49.5%				40.4%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**40**
Plastic Index	**7**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

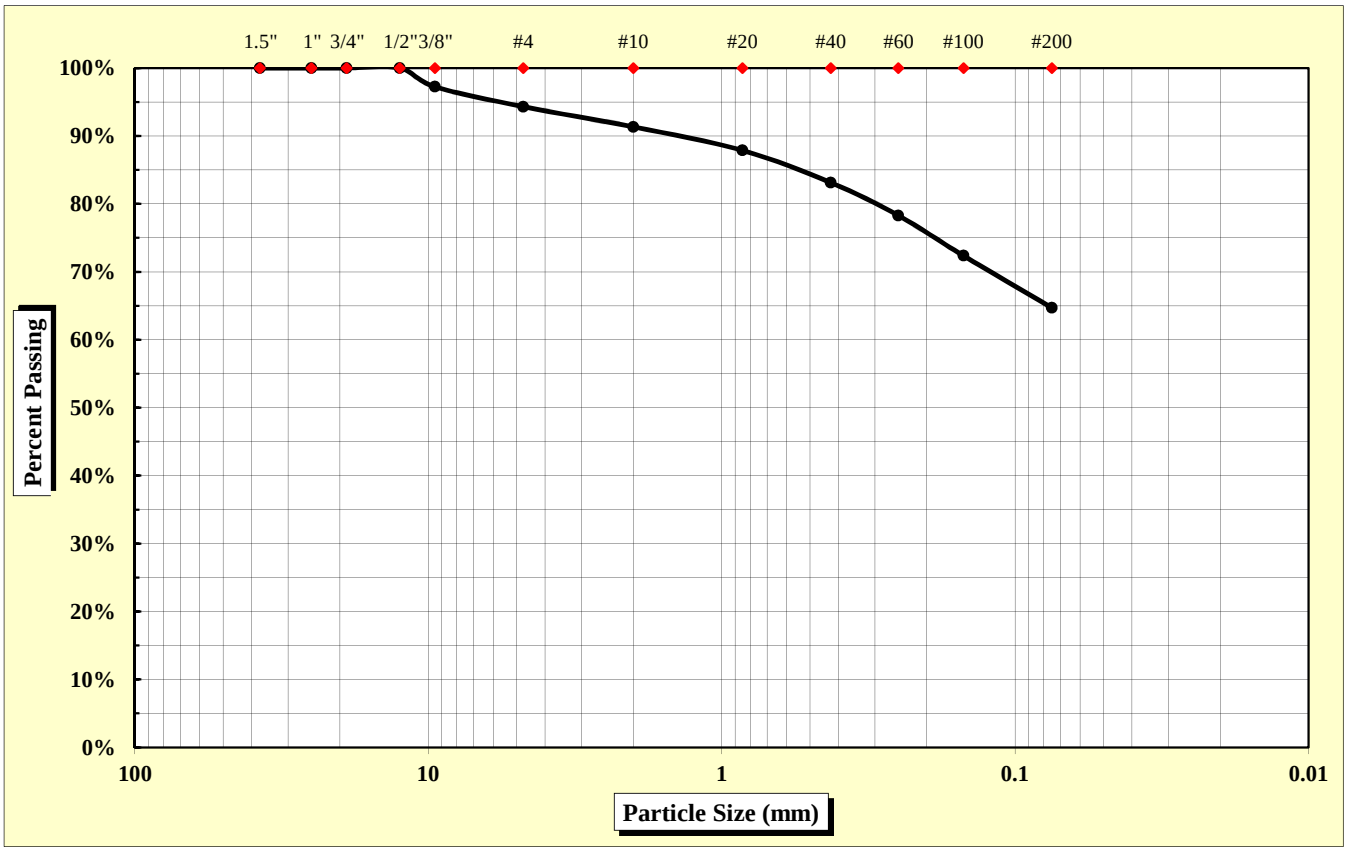
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-28	Sample #:	241	Sample Date:	10/08/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, fine, sandy FAT CLAY (CH) [A-7-6 (17)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	8.7%	Fine Sand	18.4%
		Coarse Sand	8.2%	Silt & Clay	64.7%
Liquid Limit	55	Plastic Limit	28	Plastic Index	27
		Moisture Content	27.0%	Group Index	17

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

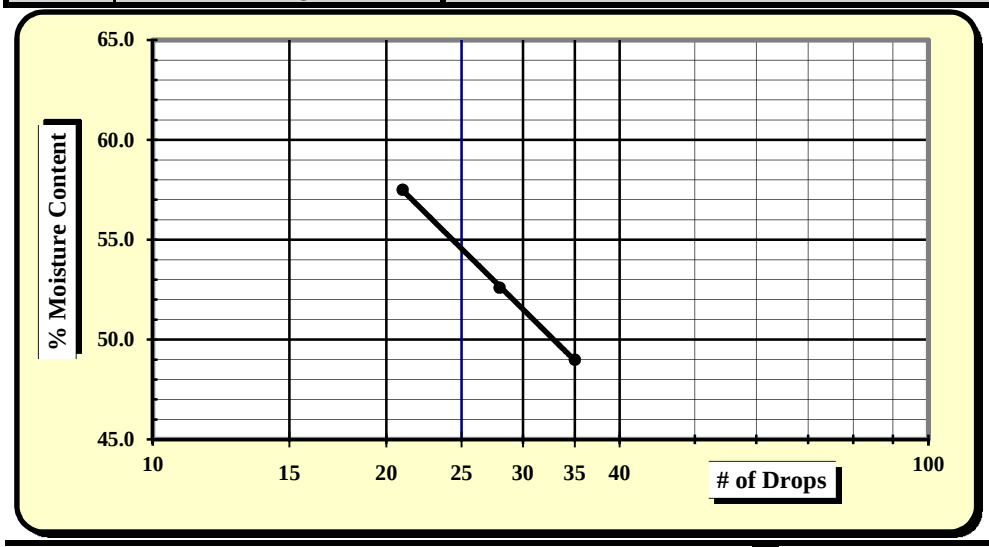
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-28	Sample #:	241	Sample Date:	10/08/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, fine, sandy FAT CLAY (CH) [A-7-6 (17)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.98	27.79	26.29				27.35		
B	Wet Soil Weight + A	43.65	42.70	42.73				35.88		
C	Dry Soil Weight + A	38.17	37.56	36.73				34.04		
D	Water Weight (B-C)	5.48	5.14	6.00				1.84		
E	Dry Soil Weight (C-A)	11.19	9.77	10.44				6.69		
F	% Moisture (D/E)*100	49.0%	52.6%	57.5%				27.5%		
N	# OF DROPS	35	28	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**28**
Plastic Index	**27**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

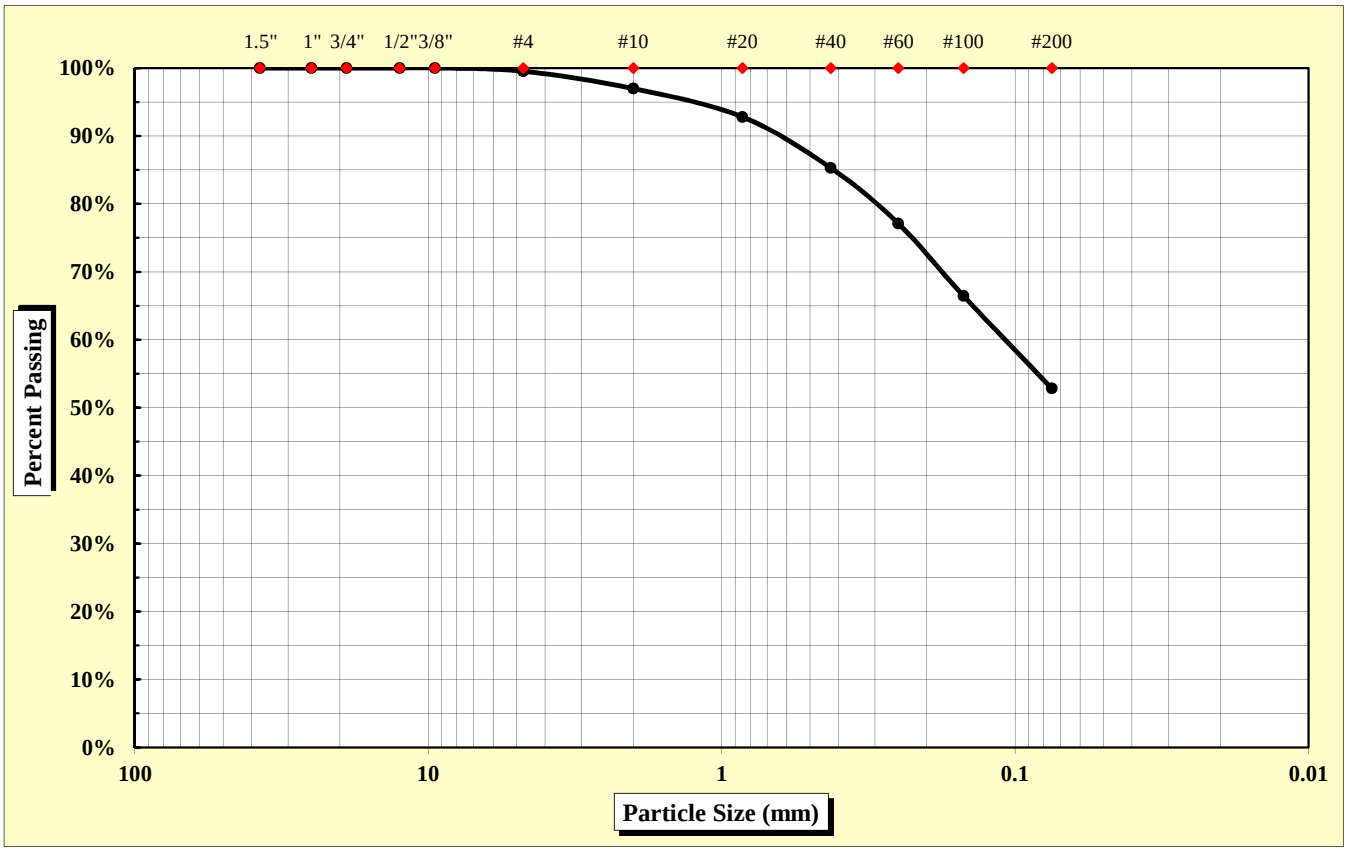
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-28	Sample #:	218	Sample Date:	10/8/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red orange brown, medium to fine, trace mica, sandy SILT (ML) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.0%	Fine Sand	32.5%
		Coarse Sand	11.7%	Silt & Clay	52.8%
Liquid Limit	42	Plastic Limit	28	Plastic Index	14
		Moisture Content	21.2%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

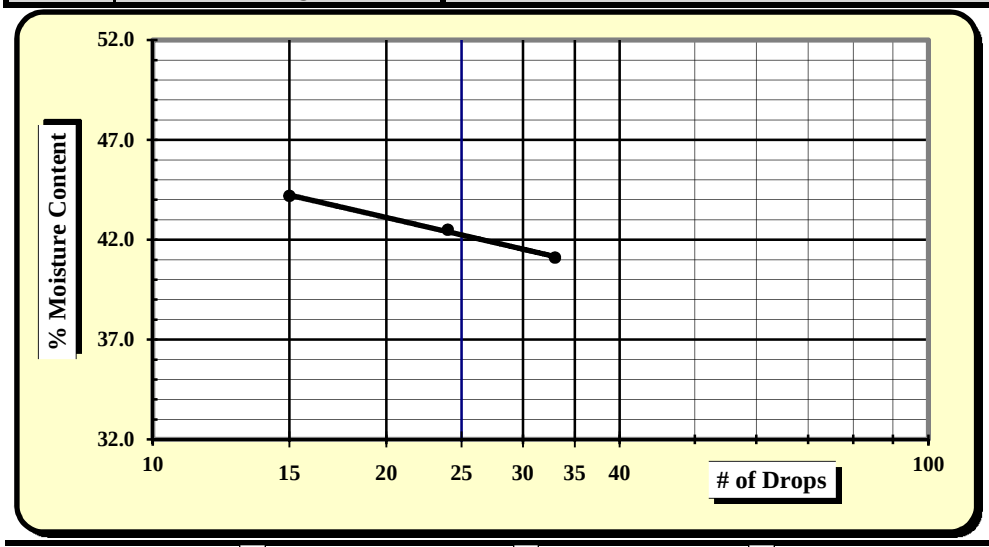
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-28	Sample #:	218	Sample Date:	10/8/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red orange brown, medium to fine, trace mica, sandy SILT (ML) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				18		
A	Tare Weight	16.40	15.30	16.53				12.11		
B	Wet Soil Weight + A	38.35	38.42	37.84				21.00		
C	Dry Soil Weight + A	31.96	31.52	31.31				19.07		
D	Water Weight (B-C)	6.39	6.90	6.53				1.93		
E	Dry Soil Weight (C-A)	15.56	16.22	14.78				6.96		
F	% Moisture (D/E)*100	41.1%	42.5%	44.2%				27.7%		
N	# OF DROPS	33	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**28**
Plastic Index	**14**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

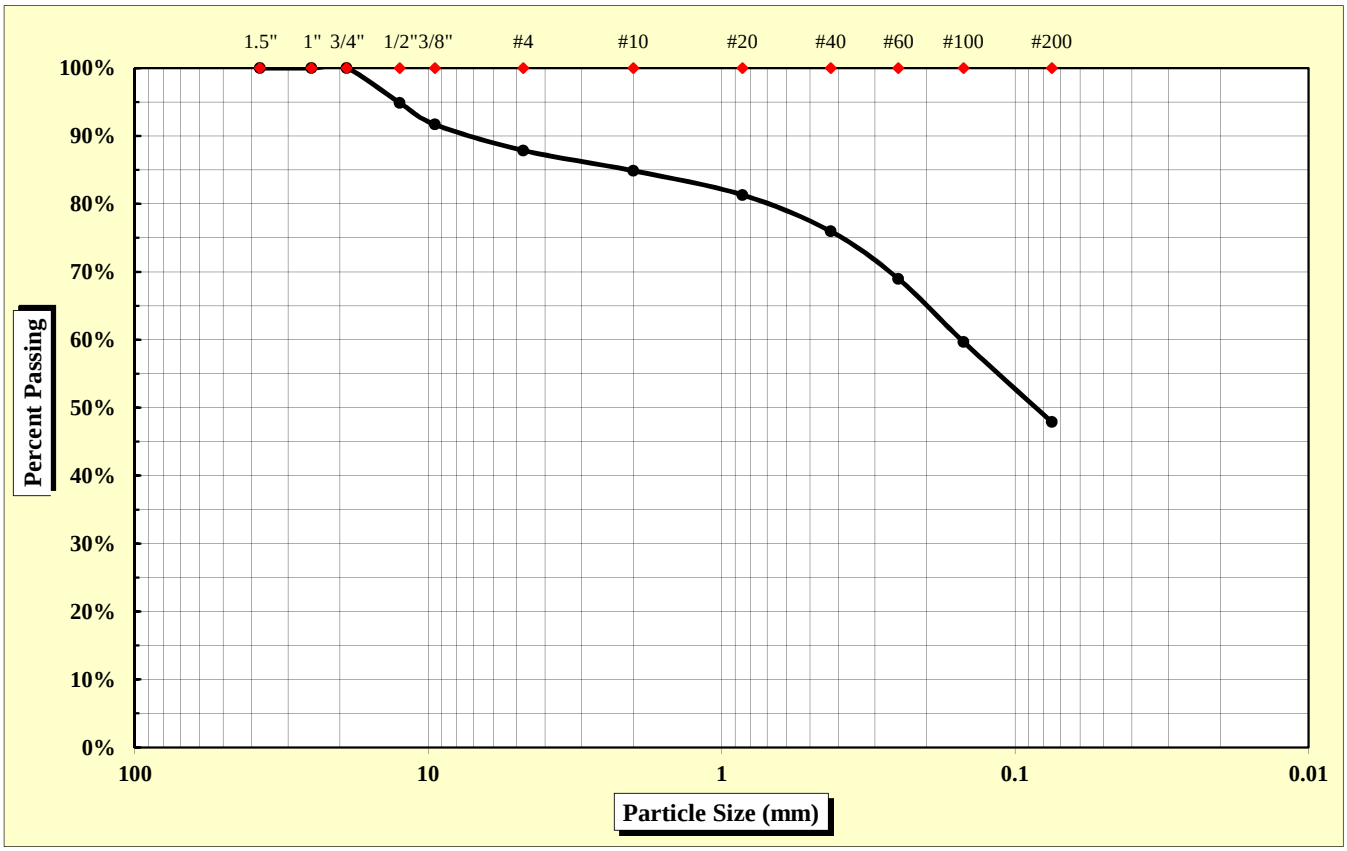
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Brown red, fine to coarse, clayey SAND with gravel (SC) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	15.1%	Fine Sand	28.1%
		Coarse Sand	8.9%	Silt & Clay	47.9%
Liquid Limit	36	Plastic Limit	23	Plastic Index	13
		Moisture Content	19.6%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

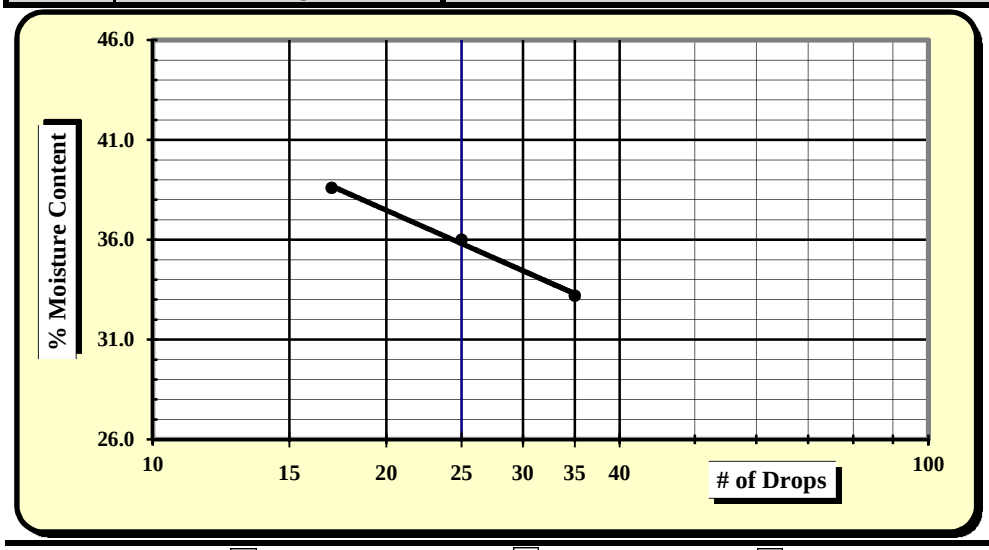
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Brown red, fine to coarse, clayey SAND with gravel (SC) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.86	16.81				12.29		
B	Wet Soil Weight + A	39.94	38.95	38.60				20.37		
C	Dry Soil Weight + A	34.15	33.10	32.53				18.88		
D	Water Weight (B-C)	5.79	5.85	6.07				1.49		
E	Dry Soil Weight (C-A)	17.44	16.24	15.72				6.59		
F	% Moisture (D/E)*100	33.2%	36.0%	38.6%				22.6%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**23**
Plastic Index	**13**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

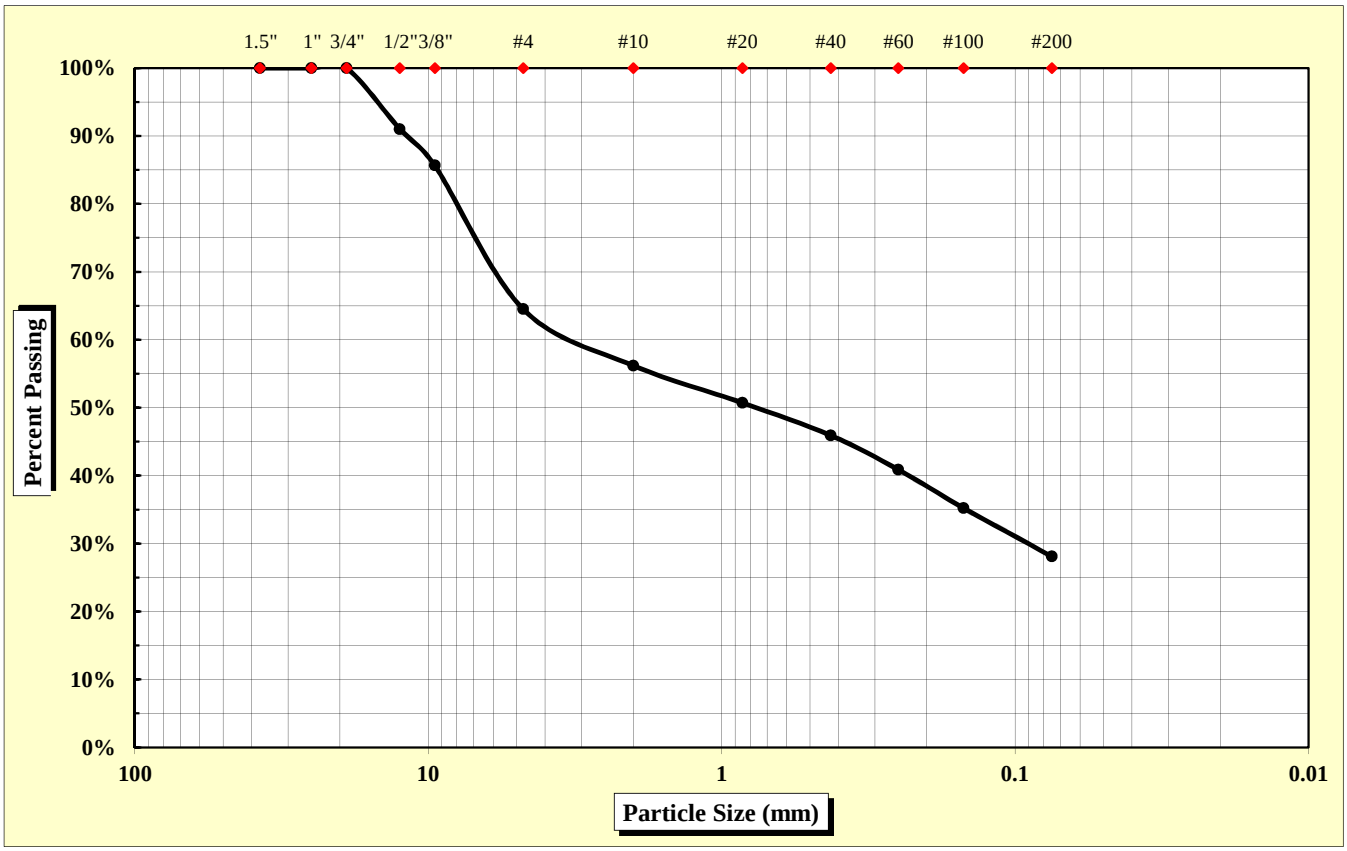
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/2 - 11/6/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Brown red, medium to fine, clayey SAND with gravel (SC) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	43.8%	Fine Sand	17.8%
		Coarse Sand	10.3%	Silt & Clay	28.1%
Liquid Limit	31	Plastic Limit	23	Plastic Index	8
		Moisture Content	15.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

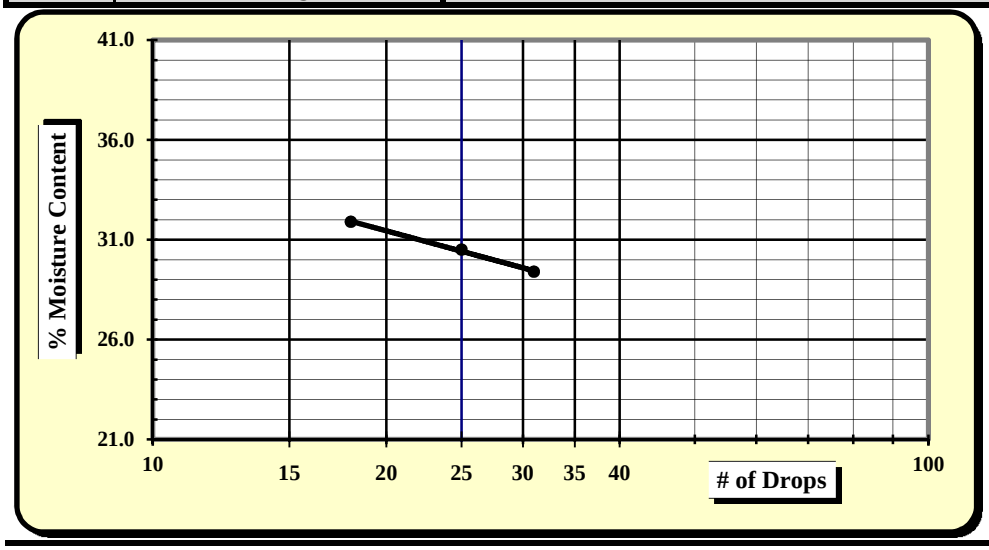
Project #:	**1426-14-161**	Report Date:	11/19/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Brown red, medium to fine, clayey SAND with gravel (SC) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-4	Y-5	Y-6				7		
A	Tare Weight	16.83	16.74	15.92				12.00		
B	Wet Soil Weight + A	41.32	40.33	40.50				22.05		
C	Dry Soil Weight + A	35.76	34.82	34.56				20.15		
D	Water Weight (B-C)	5.56	5.51	5.94				1.90		
E	Dry Soil Weight (C-A)	18.93	18.08	18.64				8.15		
F	% Moisture (D/E)*100	29.4%	30.5%	31.9%				23.3%		
N	# OF DROPS	31	25	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**31**
Plastic Limit	**23**
Plastic Index	**8**
Group Symbol	**SC / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 28.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/19/15	Brian Vaughan, P.E.	11/19/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

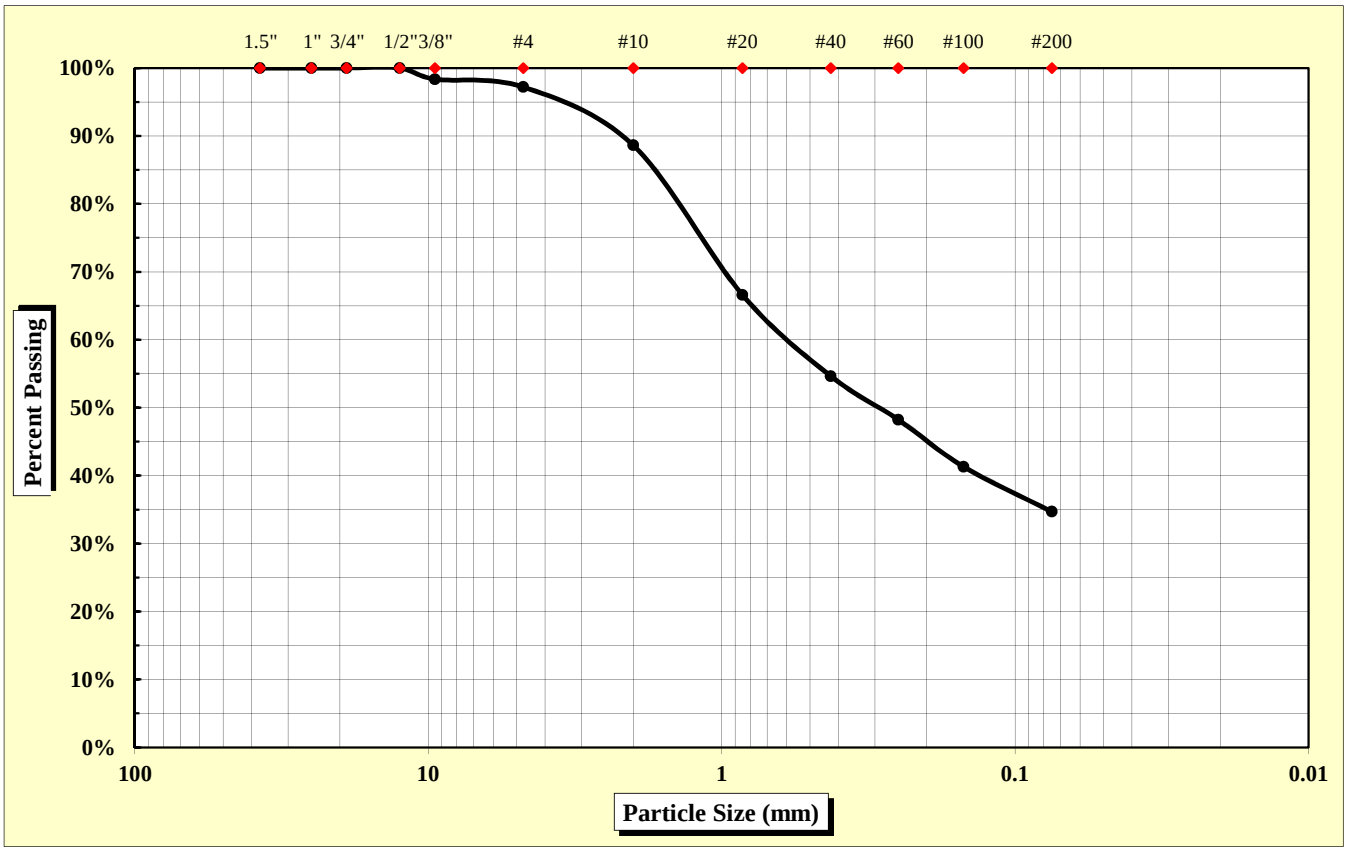
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-8	Type:	Split-spoon	Depth:	23.5 - 25'
Sample Description:	Gray white, fine to medium, trace mica, silty SAND (SM) [A-2-7 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	11.4%	Fine Sand	20.0%
		Coarse Sand	34.0%	Silt & Clay	34.7%
Liquid Limit	51	Plastic Limit	39	Plastic Index	12
		Moisture Content	28.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

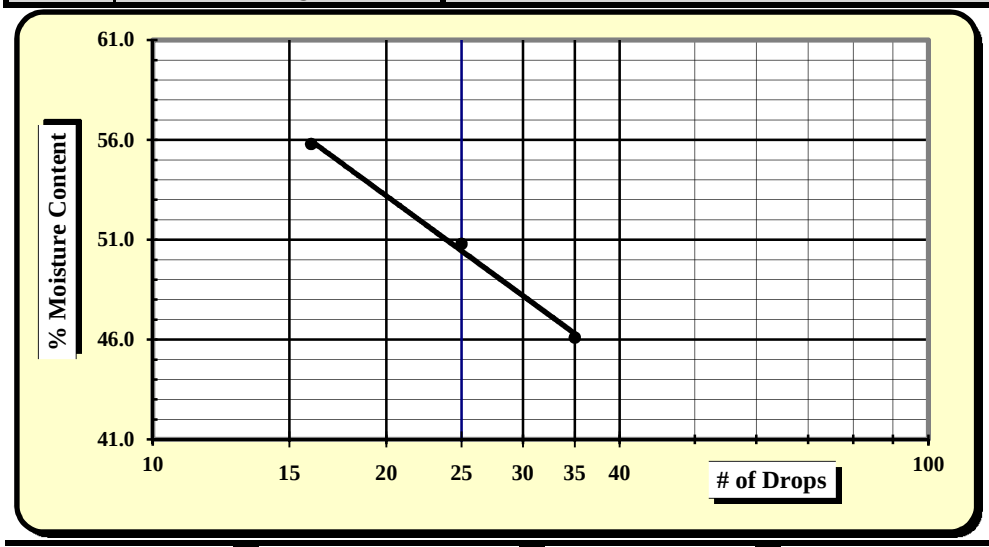
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-29	Sample #:	230	Sample Date:	10/12/15
Location:	SS-8	Type:	Split-spoon	Depth:	23.5 - 25'

Sample Description: Gray white, fine to medium, trace mica, silty SAND (SM) [A-2-7 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.73	26.53	26.37				25.98		
B	Wet Soil Weight + A	41.84	42.62	45.45				35.75		
C	Dry Soil Weight + A	37.07	37.20	38.62				32.99		
D	Water Weight (B-C)	4.77	5.42	6.83				2.76		
E	Dry Soil Weight (C-A)	10.34	10.67	12.25				7.01		
F	% Moisture (D/E)*100	46.1%	50.8%	55.8%				39.4%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**39.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**51**
Plastic Limit	**39**
Plastic Index	**12**
Group Symbol	**SM / A-2-7**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 34.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

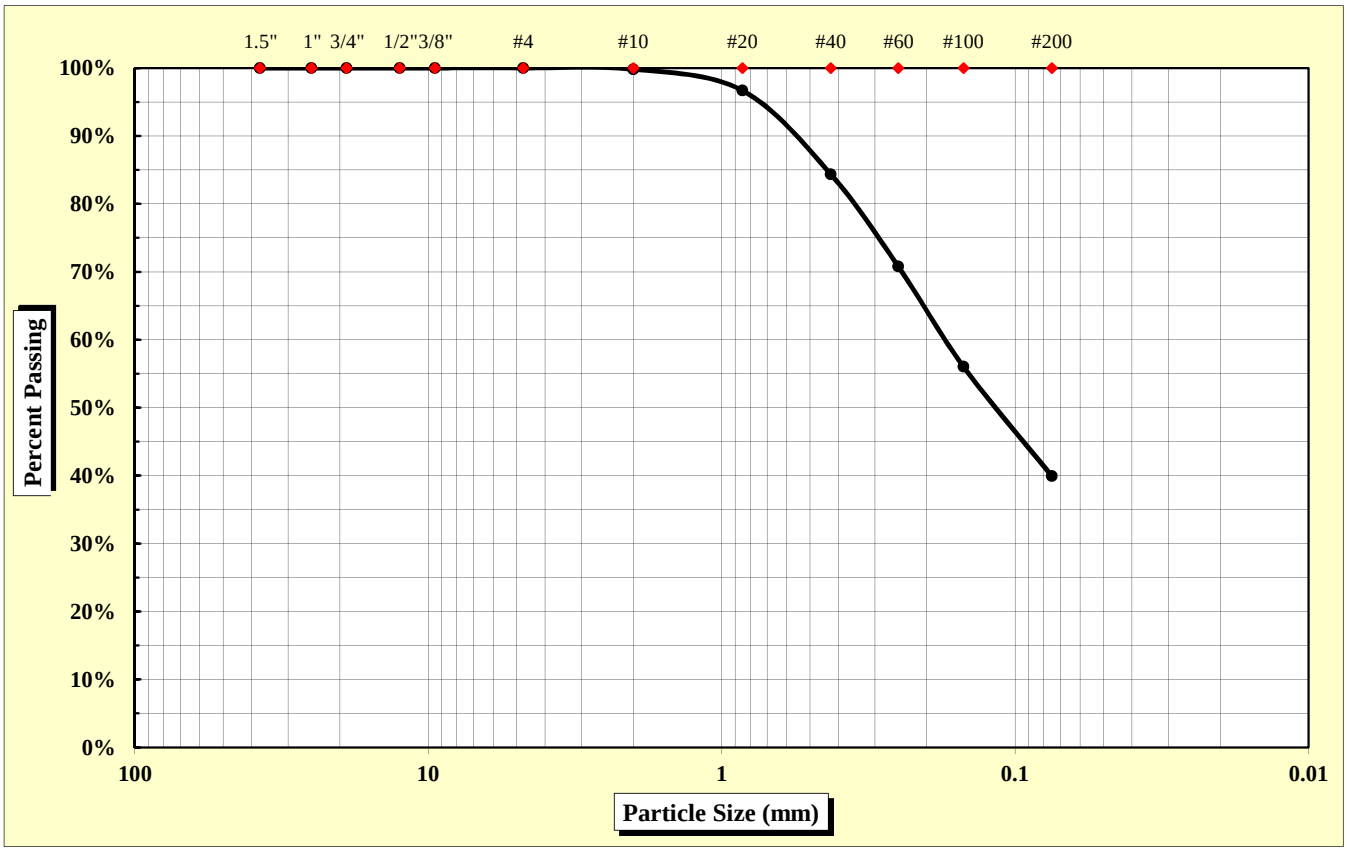
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-30	Sample #:	218	Sample Date:	10/9/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Brown, medium to fine, trace mica, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	44.4%
		Coarse Sand	15.4%	Silt & Clay	40.0%
Liquid Limit	41	Plastic Limit	35	Plastic Index	6
		Moisture Content	20.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

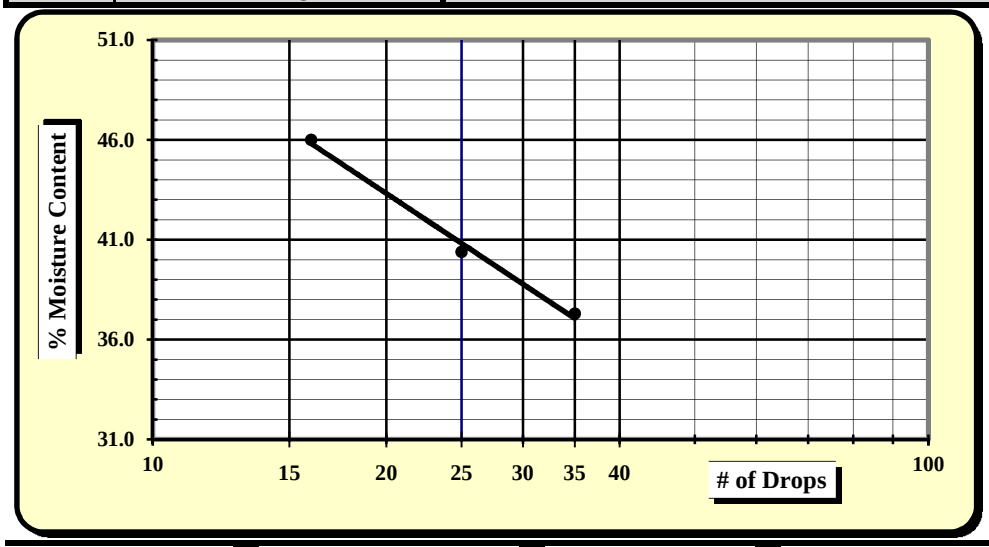
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-30	Sample #:	218	Sample Date:	10/09/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Brown, medium to fine, trace mica, silty SAND (SM) [A-5 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.72	26.51	26.37				25.99		
B	Wet Soil Weight + A	42.23	43.40	43.55				36.04		
C	Dry Soil Weight + A	38.02	38.54	38.14				33.44		
D	Water Weight (B-C)	4.21	4.86	5.41				2.60		
E	Dry Soil Weight (C-A)	11.30	12.03	11.77				7.45		
F	% Moisture (D/E)*100	37.3%	40.4%	46.0%				34.9%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**35**
Plastic Index	**6**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 40.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

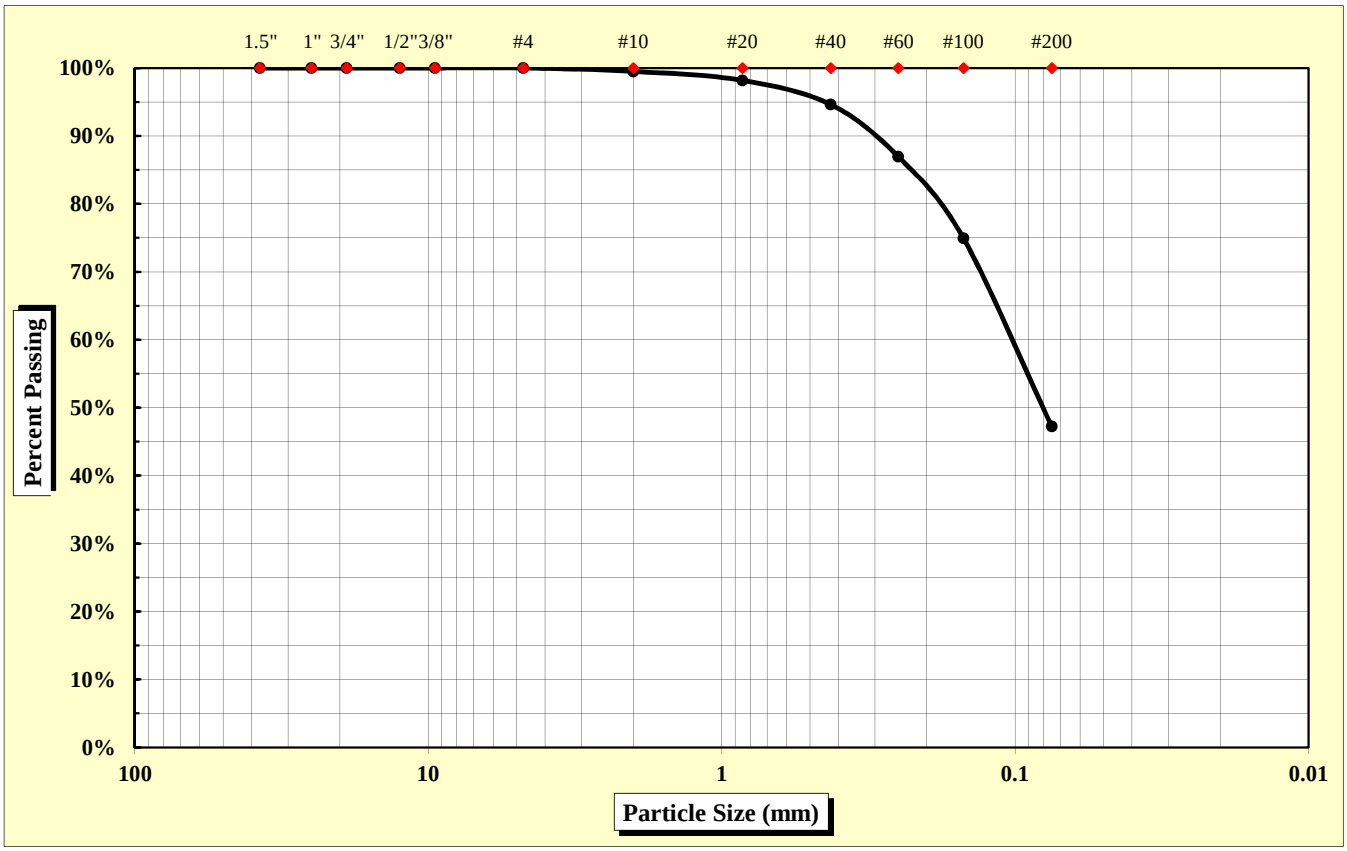
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-30	Sample #:	241	Sample Date:	10/09/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Brown red, fine, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.5%	Fine Sand	47.4%
		Coarse Sand	4.9%	Silt & Clay	47.2%
Liquid Limit	40	Plastic Limit	34	Plastic Index	6
		Moisture Content	18.2%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

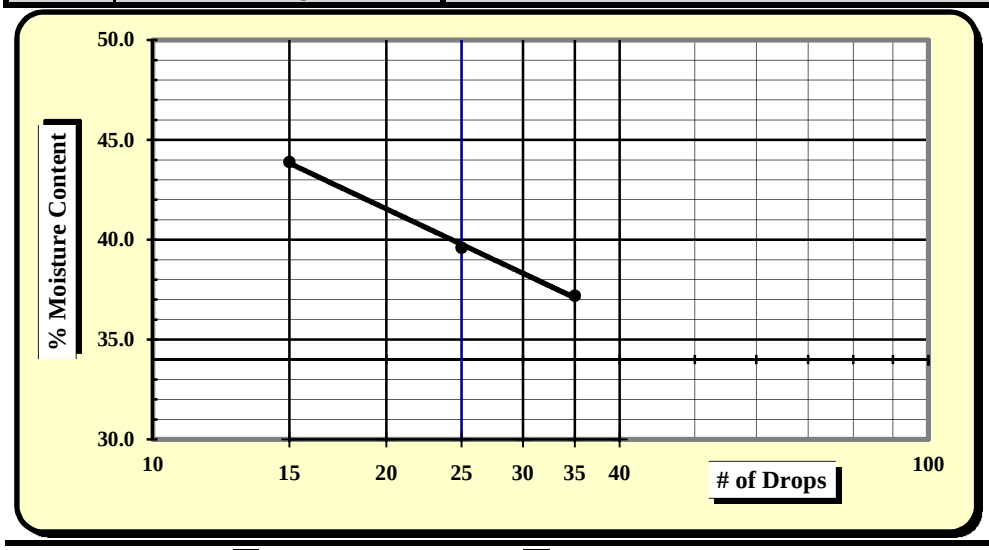
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-30	Sample #:	241	Sample Date:	10/09/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Brown red, fine, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	12				11		
A	Tare Weight	26.89	26.83	26.66				26.68		
B	Wet Soil Weight + A	46.35	42.97	46.27				37.62		
C	Dry Soil Weight + A	41.07	38.39	40.29				34.87		
D	Water Weight (B-C)	5.28	4.58	5.98				2.75		
E	Dry Soil Weight (C-A)	14.18	11.56	13.63				8.19		
F	% Moisture (D/E)*100	37.2%	39.6%	43.9%				33.6%		
N	# OF DROPS	35	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**34**
Plastic Index	**6**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

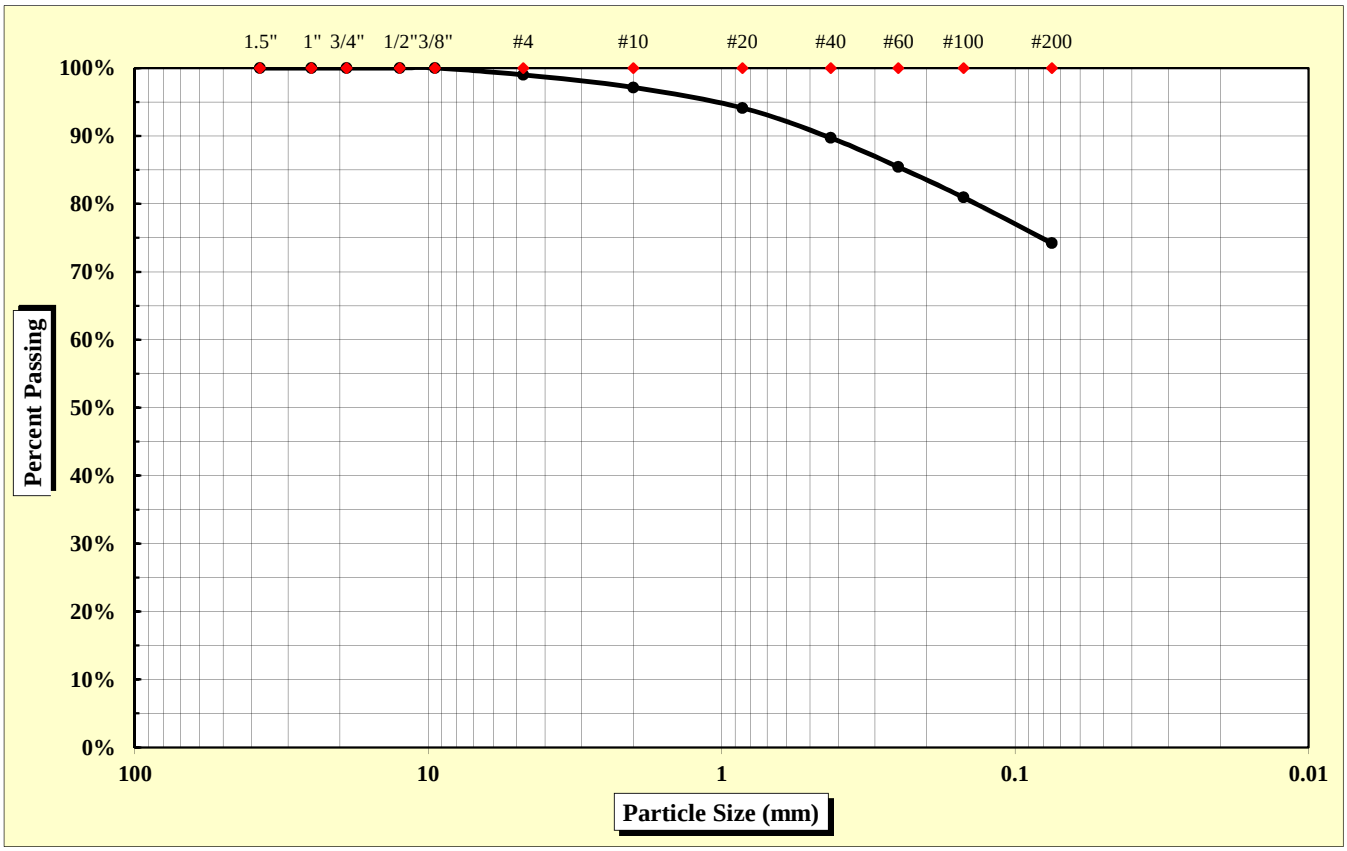
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-31	Sample #:	218	Sample Date:	10/09/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red, fine, FAT CLAY with sand (CH) [A-7-6 (21)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.9%	Fine Sand	15.5%
		Coarse Sand	7.4%	Silt & Clay	74.2%
Liquid Limit	55	Plastic Limit	28	Plastic Index	27
		Moisture Content	24.8%	Group Index	21

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

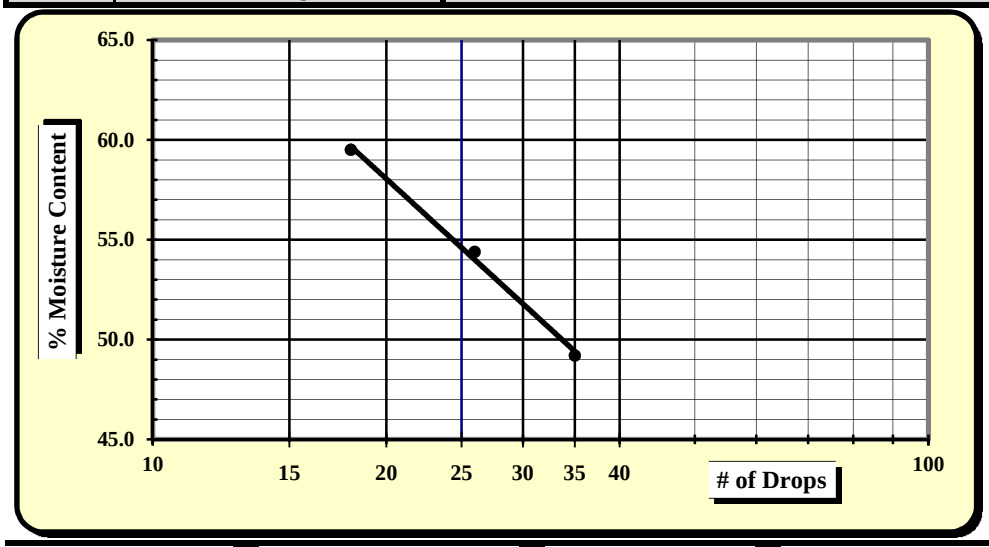
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-31	Sample #:	218	Sample Date:	10/09/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red, fine, FAT CLAY with sand (CH) [A-7-6 (21)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	36	37	38				39		
A	Tare Weight	25.69	26.23	26.31				25.94		
B	Wet Soil Weight + A	43.33	41.98	41.70				38.05		
C	Dry Soil Weight + A	37.51	36.43	35.96				35.44		
D	Water Weight (B-C)	5.82	5.55	5.74				2.61		
E	Dry Soil Weight (C-A)	11.82	10.20	9.65				9.50		
F	% Moisture (D/E)*100	49.2%	54.4%	59.5%				27.5%		
N	# OF DROPS	35	26	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**28**
Plastic Index	**27**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 74.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

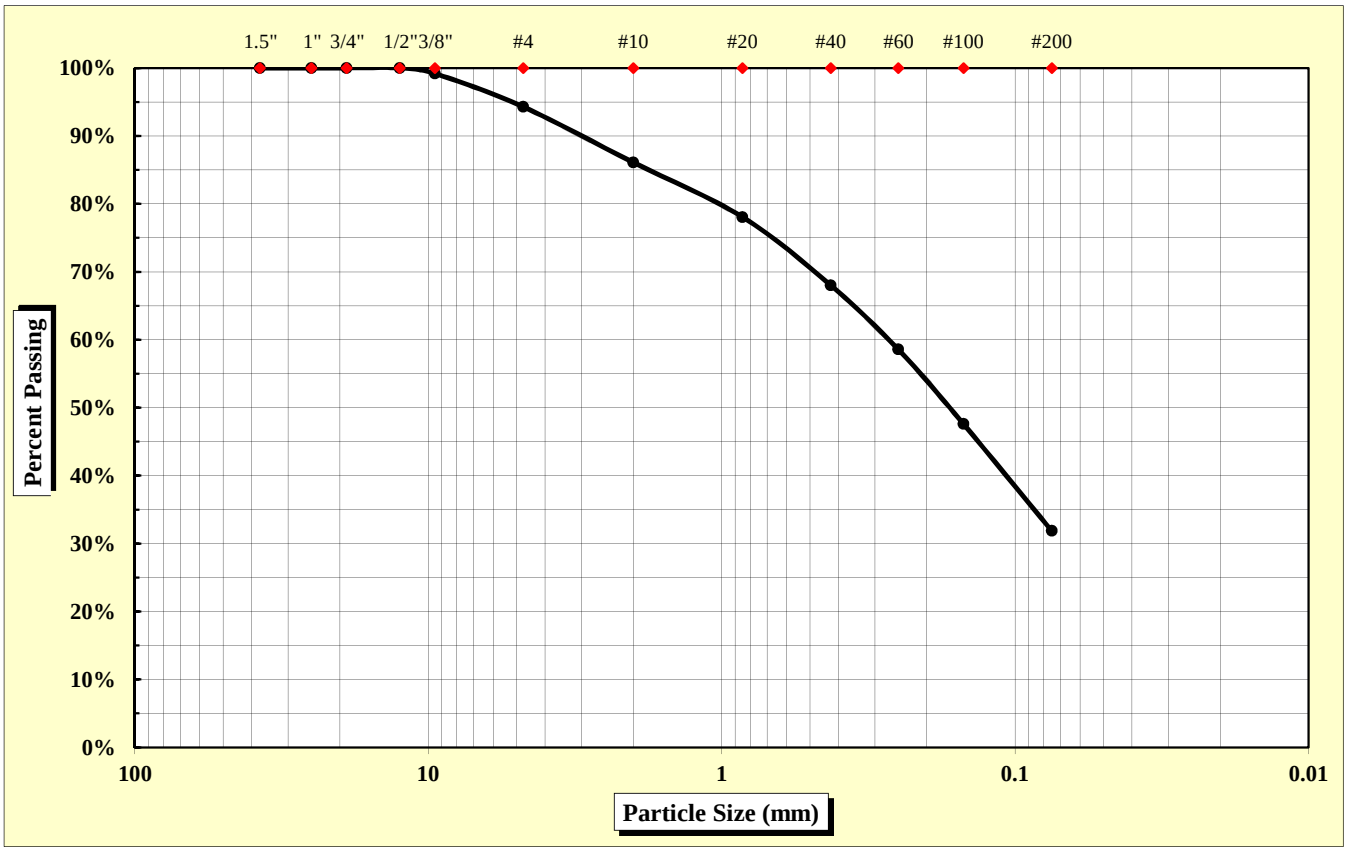
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-31	Sample #:	218	Sample Date:	10/09/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Brown, medium to fine, trace mica, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	13.9%	Fine Sand	36.1%
		Coarse Sand	18.1%	Silt & Clay	31.9%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	9.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

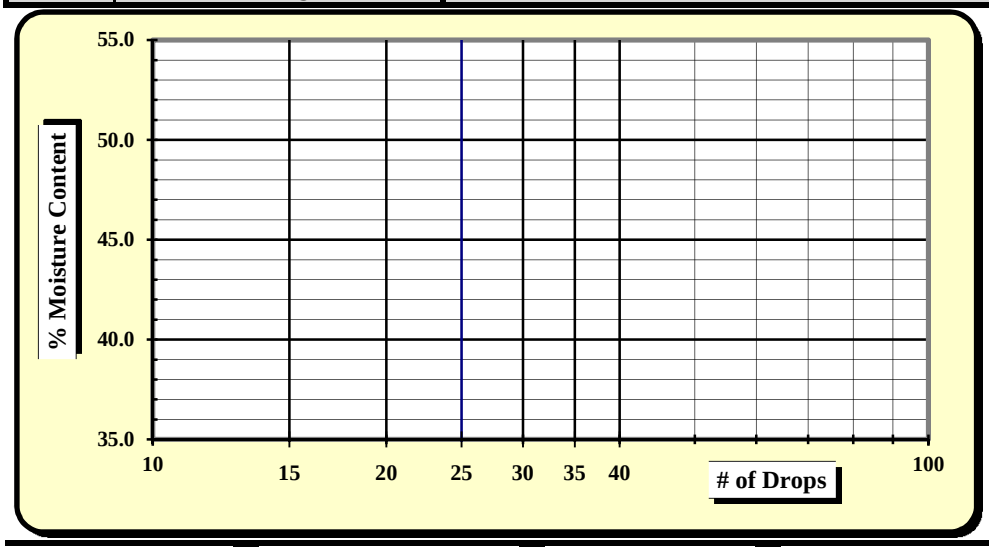
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-31	Sample #:	218	Sample Date:	10/09/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Brown, medium to fine, trace mica, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 31.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

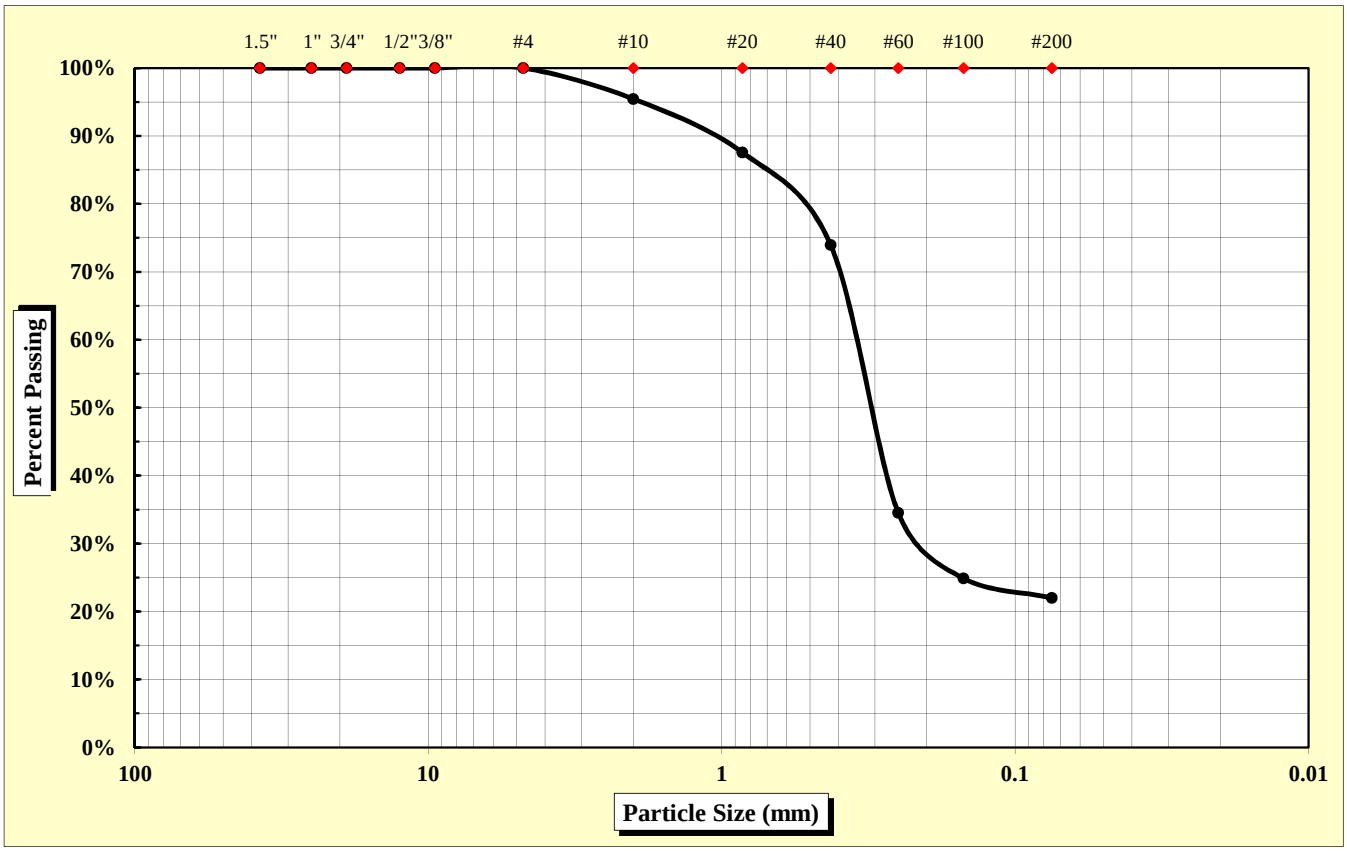
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-32	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-1	Type:	Split-spoon	Depth:	0.7 - 2.7'
Sample Description:	Yellow, medium to fine, trace mica, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.5%	Fine Sand	51.9%
		Coarse Sand	21.5%	Silt & Clay	22.0%
Liquid Limit	45	Plastic Limit	40	Plastic Index	5
		Moisture Content	25.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

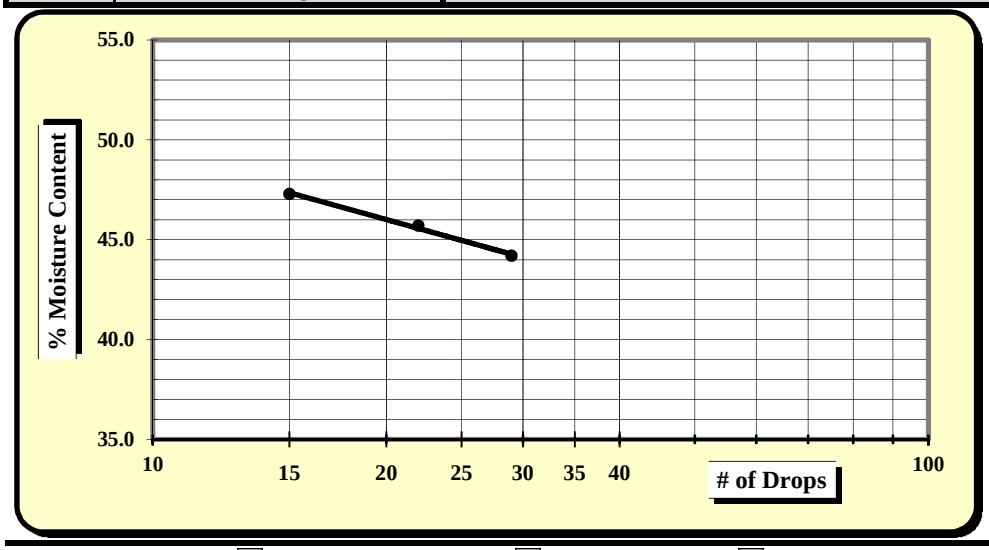
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-32	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-1	Type:	Split-spoon	Depth:	0.7 - 2.7'
Sample Description:	Yellow, medium to fine, trace mica, silty SAND (SM) [A-2-5]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	611	Liquid Limit						Plastic Limit		
	Tare #:	30	211	219				229		
A	Tare Weight	20.78	20.84	20.81				20.71		
B	Wet Soil Weight + A	31.26	32.26	30.80				29.17		
C	Dry Soil Weight + A	28.05	28.68	27.59				26.77		
D	Water Weight (B-C)	3.21	3.58	3.21				2.40		
E	Dry Soil Weight (C-A)	7.27	7.84	6.78				6.06		
F	% Moisture (D/E)*100	44.2%	45.7%	47.3%				39.6%		
N	# OF DROPS	29	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**39.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**40**
Plastic Index	**5**
Group Symbol	**SM / A-2-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 22.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

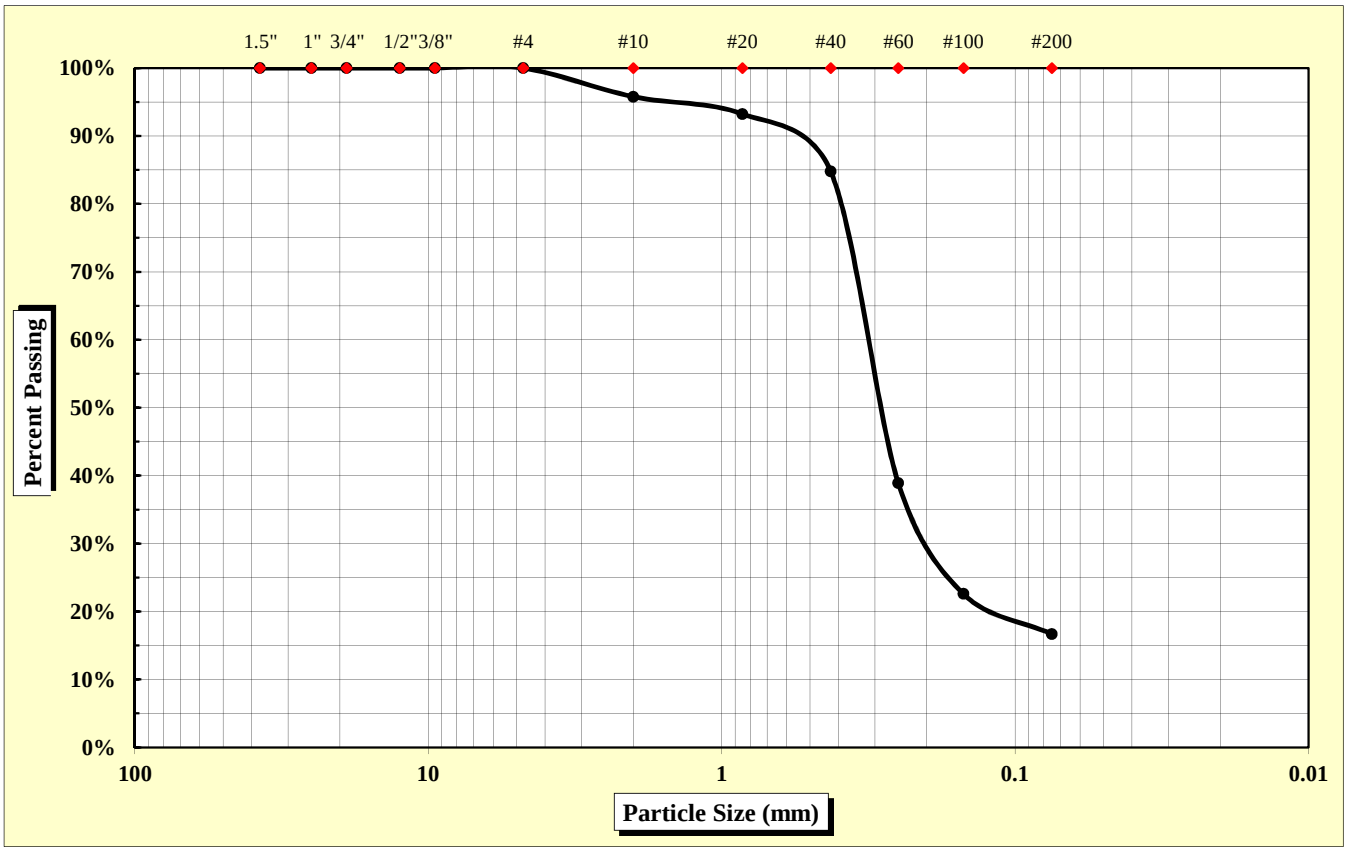
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-32	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Yellow, medium to fine, trace mica, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.2%	Fine Sand	68.1%
		Coarse Sand	11.0%	Silt & Clay	16.7%
Liquid Limit	57	Plastic Limit	47	Plastic Index	10
		Moisture Content	19.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

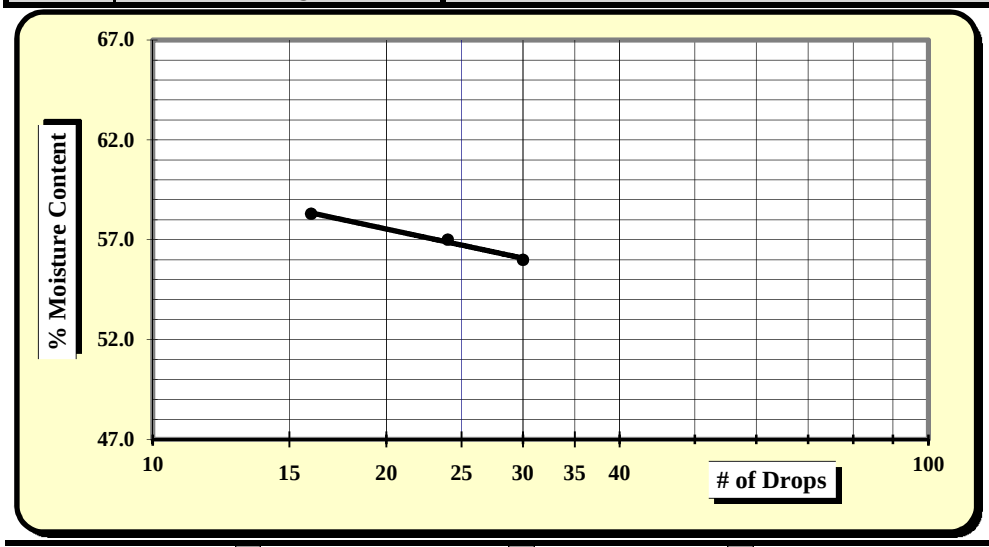
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-32	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Yellow, medium to fine, trace mica, silty SAND (SM) [A-2-5]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	600	Liquid Limit						Plastic Limit		
	Tare #:	222	201	37				227		
A	Tare Weight	20.85	20.88	20.73				20.87		
B	Wet Soil Weight + A	30.32	31.10	32.03				29.00		
C	Dry Soil Weight + A	26.92	27.39	27.87				26.39		
D	Water Weight (B-C)	3.40	3.71	4.16				2.61		
E	Dry Soil Weight (C-A)	6.07	6.51	7.14				5.52		
F	% Moisture (D/E)*100	56.0%	57.0%	58.3%				47.3%		
N	# OF DROPS	30	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**47.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**57**
Plastic Limit	**47**
Plastic Index	**10**
Group Symbol	**SM / A-2-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 16.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

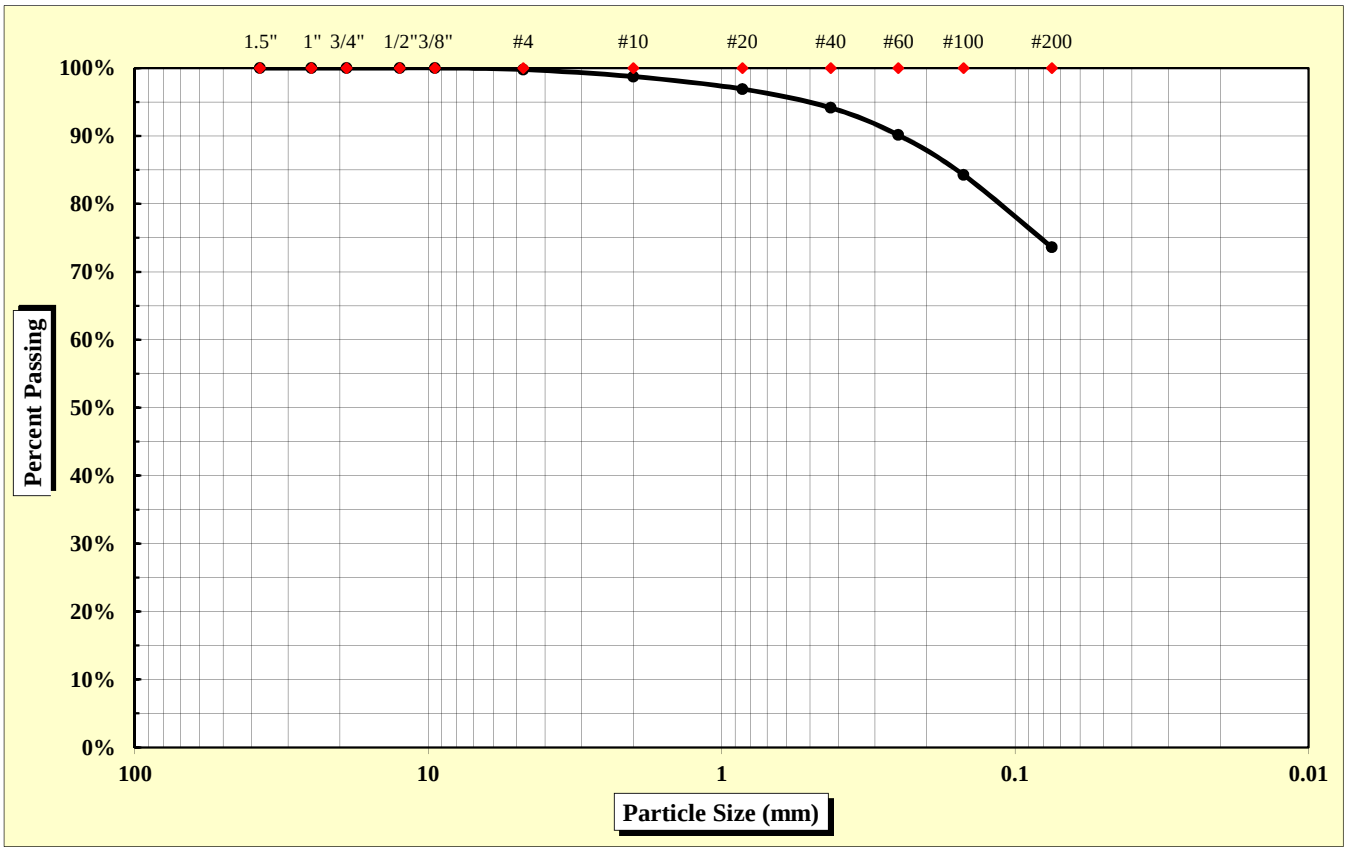
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red, fine, slightly micaceous, ELASTIC SILT with sand (MH) [A-7-5 (18)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.3%	Fine Sand	20.5%
		Coarse Sand	4.6%	Silt & Clay	73.6%
Liquid Limit	60	Plastic Limit	39	Plastic Index	21
		Moisture Content	29.5%	Group Index	18

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

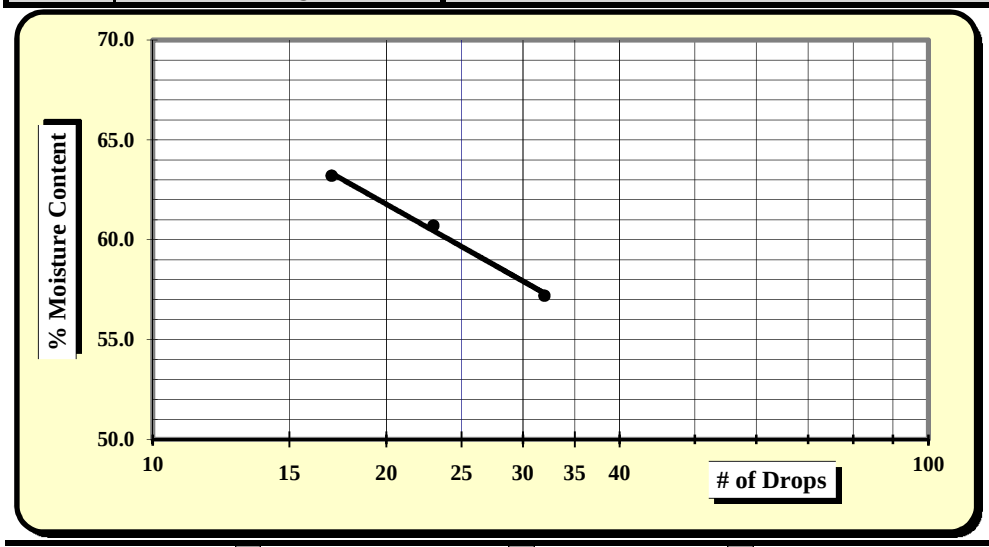
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red, fine, slightly micaceous, ELASTIC SILT with sand (MH) [A-7-5

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	603	Liquid Limit						Plastic Limit		
	Tare #:	206	217	23				235		
A	Tare Weight	20.94	20.84	20.69				20.79		
B	Wet Soil Weight + A	31.05	29.89	27.97				29.75		
C	Dry Soil Weight + A	27.37	26.47	25.15				27.26		
D	Water Weight (B-C)	3.68	3.42	2.82				2.49		
E	Dry Soil Weight (C-A)	6.43	5.63	4.46				6.47		
F	% Moisture (D/E)*100	57.2%	60.7%	63.2%				38.5%		
N	# OF DROPS	32	23	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**60**
Plastic Limit	**39**
Plastic Index	**21**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 73.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

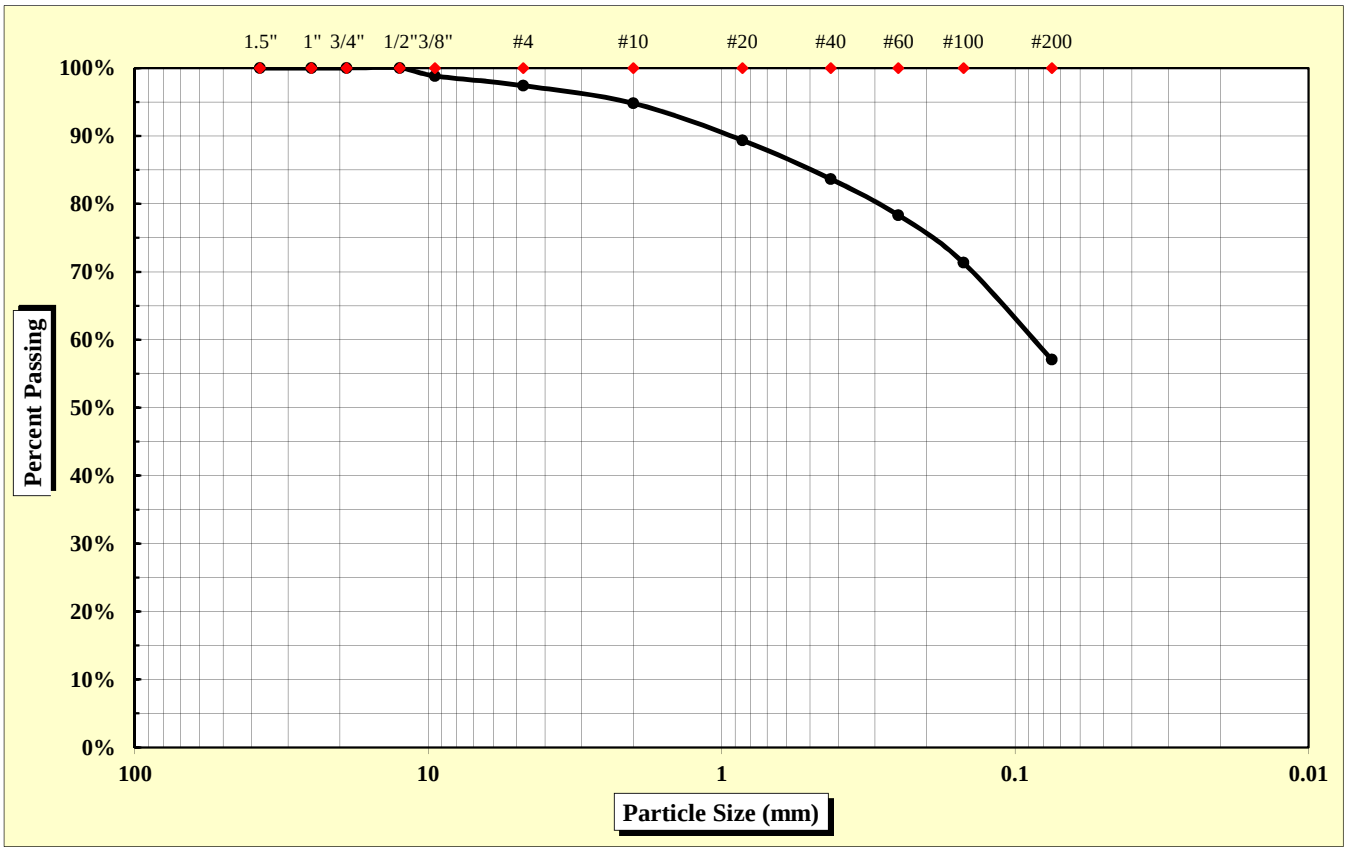
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Tan red yellow, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	5.2%	Fine Sand	26.6%
		Coarse Sand	11.2%	Silt & Clay	57.1%
Liquid Limit	59	Plastic Limit	39	Plastic Index	20
		Moisture Content	24.3%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

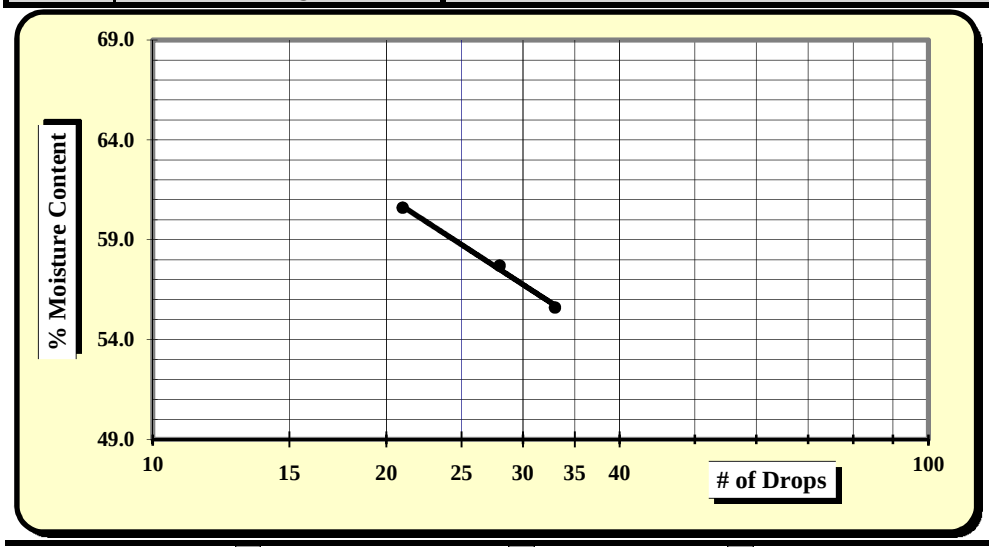
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'

Sample Description: Tan red yellow, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	611	Liquid Limit						Plastic Limit		
	Tare #:	17	8	242				35		
A	Tare Weight	20.59	20.58	20.76				20.72		
B	Wet Soil Weight + A	29.69	28.53	29.19				29.32		
C	Dry Soil Weight + A	26.44	25.62	26.01				26.93		
D	Water Weight (B-C)	3.25	2.91	3.18				2.39		
E	Dry Soil Weight (C-A)	5.85	5.04	5.25				6.21		
F	% Moisture (D/E)*100	55.6%	57.7%	60.6%				38.5%		
N	# OF DROPS	33	28	21				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**59**
Plastic Limit	**39**
Plastic Index	**20**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

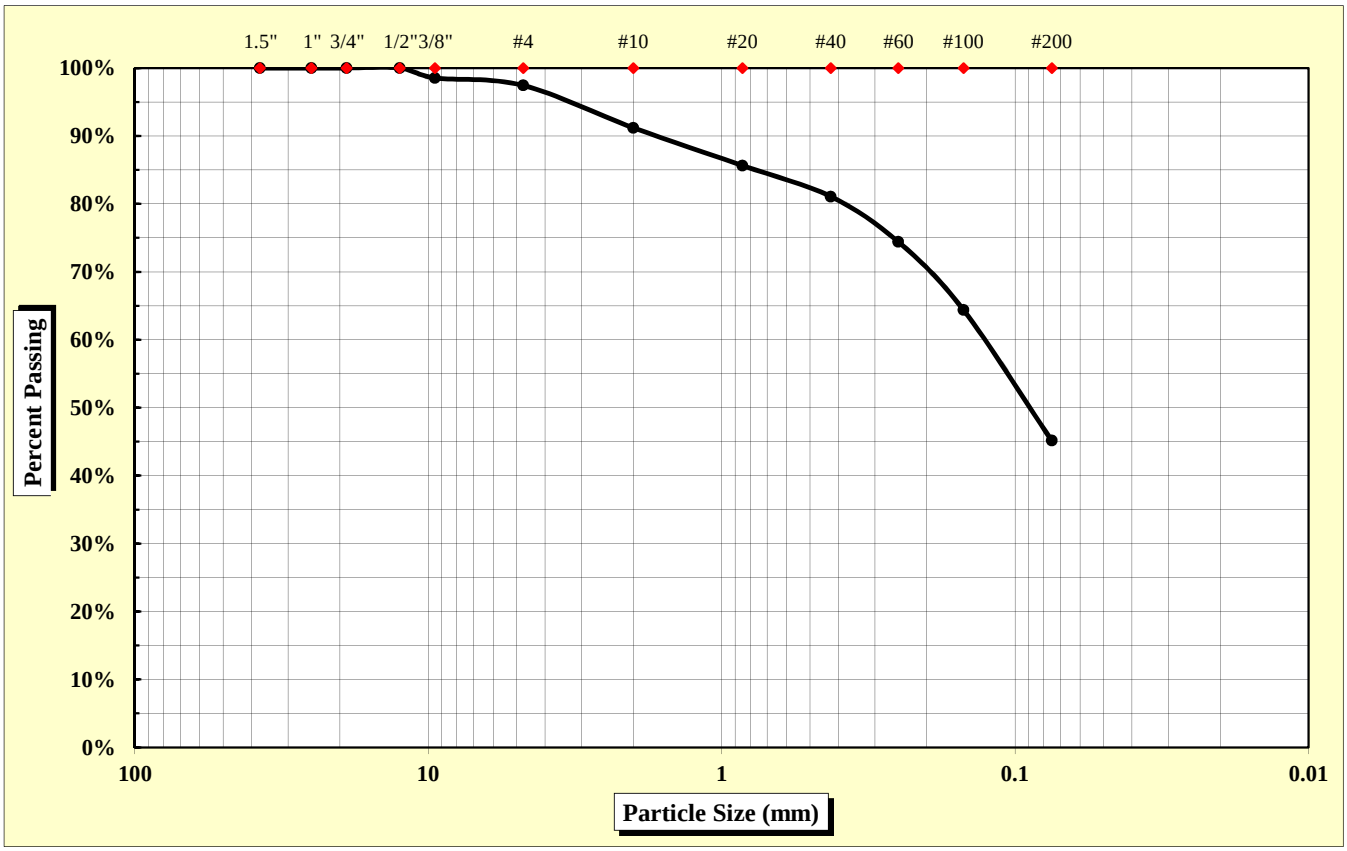
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'
Sample Description:	Brown red yellow, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	8.8%	Fine Sand	35.9%
		Coarse Sand	10.1%	Silt & Clay	45.2%
Liquid Limit	47	Plastic Limit	34	Plastic Index	13
		Moisture Content	21.6%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

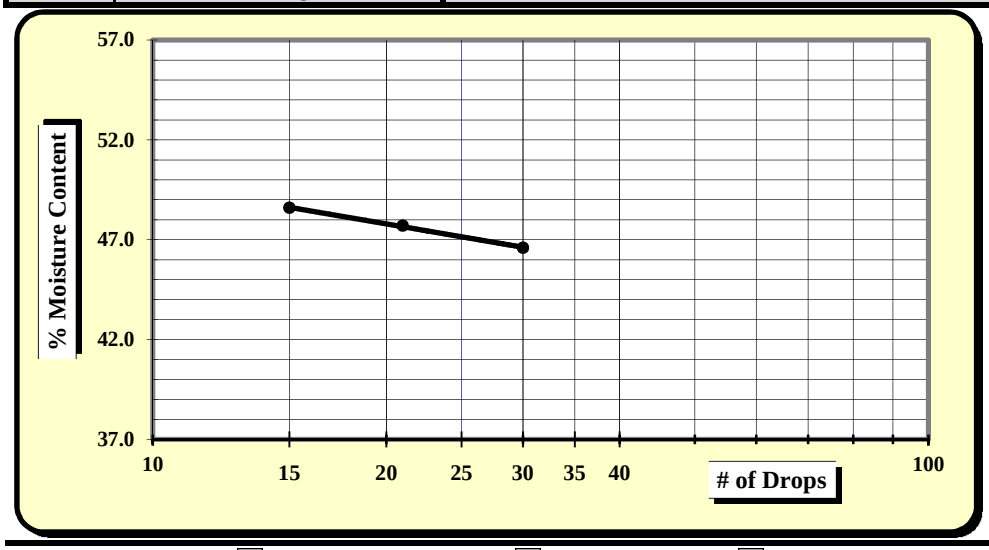
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'

Sample Description: Brown red yellow, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	600	Liquid Limit						Plastic Limit		
	Tare #:	229	45	16				134		
A	Tare Weight	20.73	20.73	20.62				41.40		
B	Wet Soil Weight + A	31.08	29.40	27.16				54.42		
C	Dry Soil Weight + A	27.79	26.60	25.02				51.11		
D	Water Weight (B-C)	3.29	2.80	2.14				3.31		
E	Dry Soil Weight (C-A)	7.06	5.87	4.40				9.71		
F	% Moisture (D/E)*100	46.6%	47.7%	48.6%				34.1%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**34**
Plastic Index	**13**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

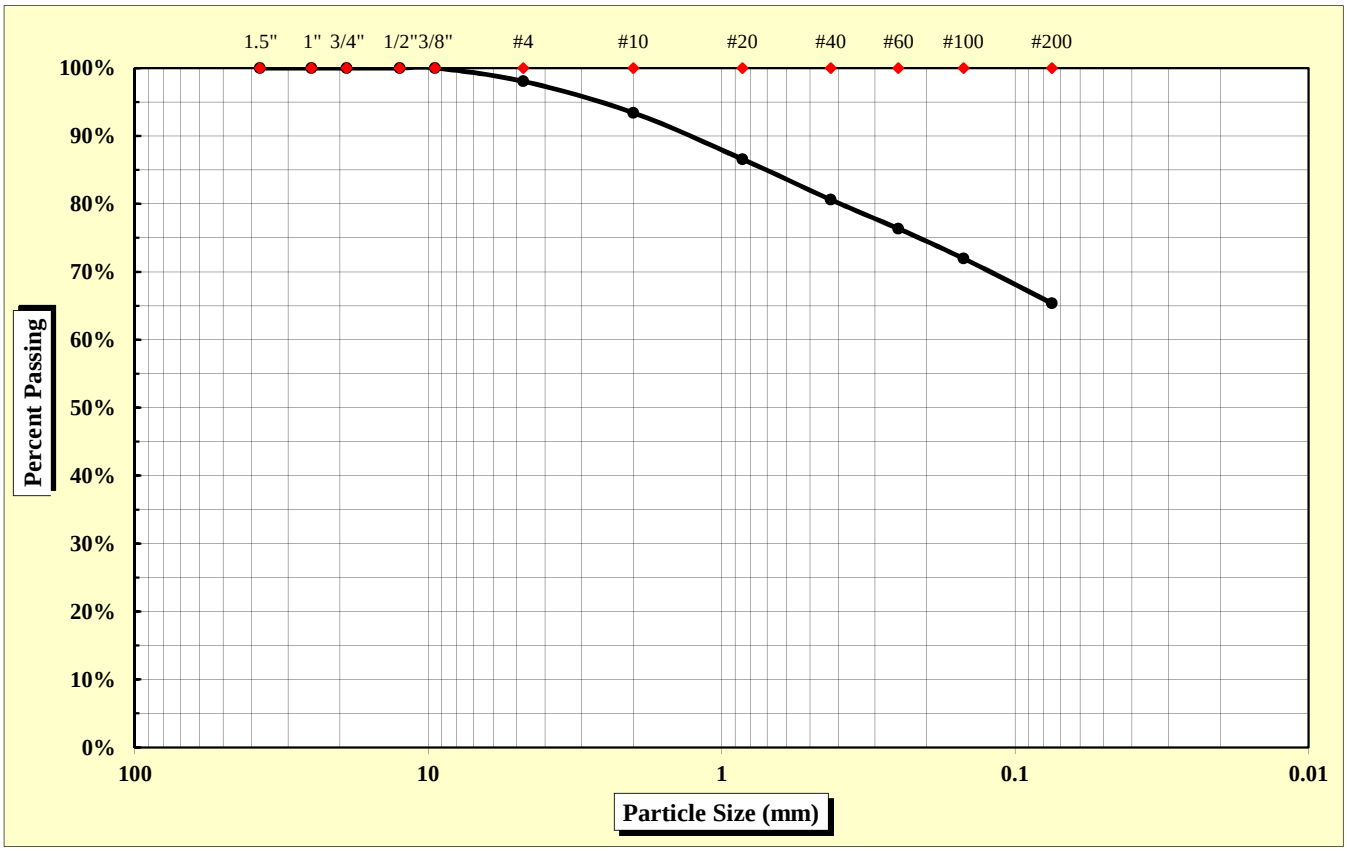
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/6 - 11/12/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Brown red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (20)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.6%	Fine Sand	15.2%
		Coarse Sand	12.8%	Silt & Clay	65.4%
Liquid Limit	66	Plastic Limit	36	Plastic Index	30
		Moisture Content	23.0%	Group Index	20

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

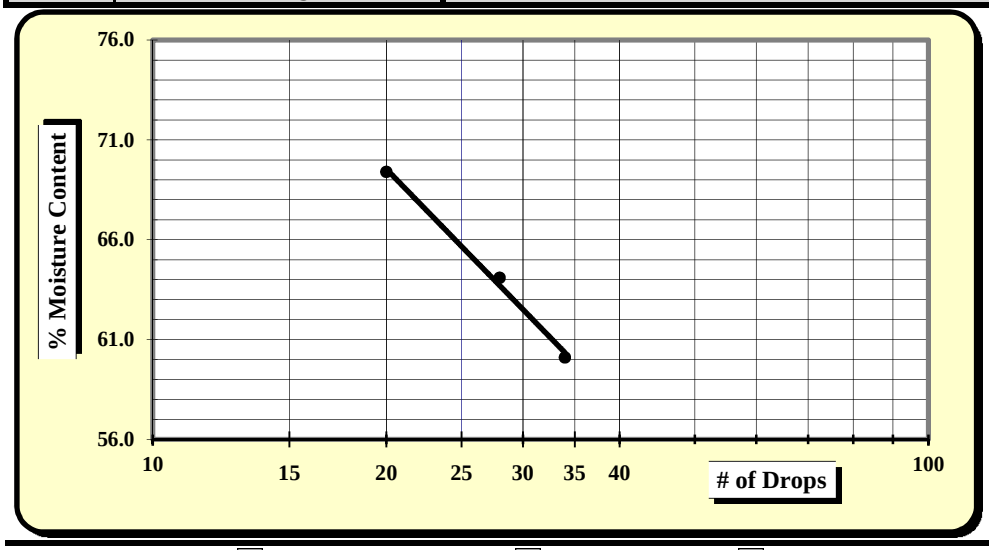
Project #:	**1426-14-161**	Report Date:	11/12/2015
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/2015
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (20)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	609	Liquid Limit						Plastic Limit		
	Tare #:	44	226	100				204		
A	Tare Weight	20.71	20.92	20.67				41.55		
B	Wet Soil Weight + A	28.30	28.01	28.21				55.48		
C	Dry Soil Weight + A	25.45	25.24	25.12				51.79		
D	Water Weight (B-C)	2.85	2.77	3.09				3.69		
E	Dry Soil Weight (C-A)	4.74	4.32	4.45				10.24		
F	% Moisture (D/E)*100	60.1%	64.1%	69.4%				36.0%		
N	# OF DROPS	34	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**36.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**66**
Plastic Limit	**36**
Plastic Index	**30**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 65.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/12/2015	Brian Vaughan, P.E.	11/12/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Columbia 134 Suber Road Columbia, SC 29210

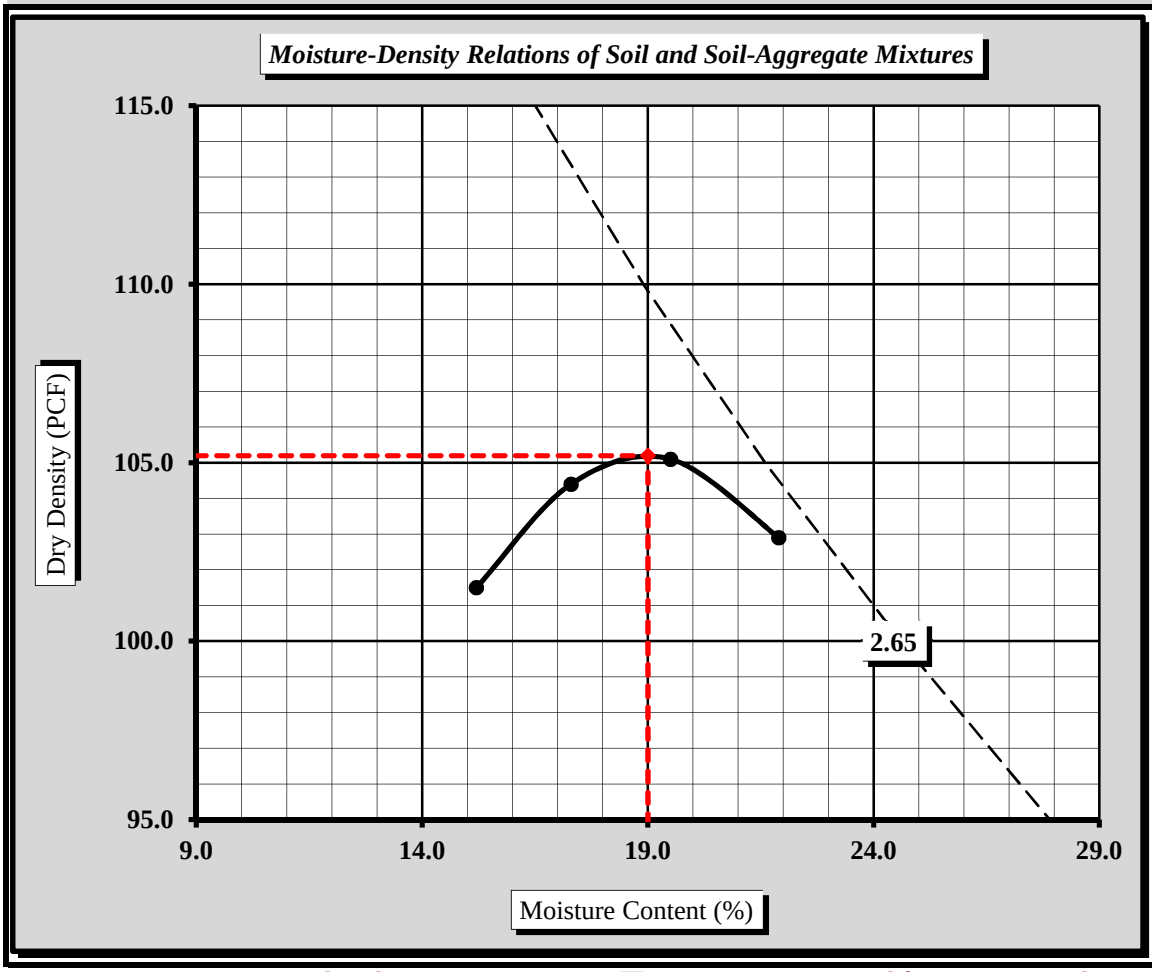
S&ME Project #:	**1426-14-161**	Report Date:	11/12/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/6 - 11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-33	Sample #:	230	Sample Date:	10/26/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (20)]

Maximum Dry Density 105.2 PCF. **Optimum Moisture Content 19.0%**

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	23.0%
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	66
Plastic Limit	36
Plastic Index	30

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.1%
#10	93.4%
#40	80.6%
#60	76.4%
#100	72.6%
#200	65.4%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/12/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

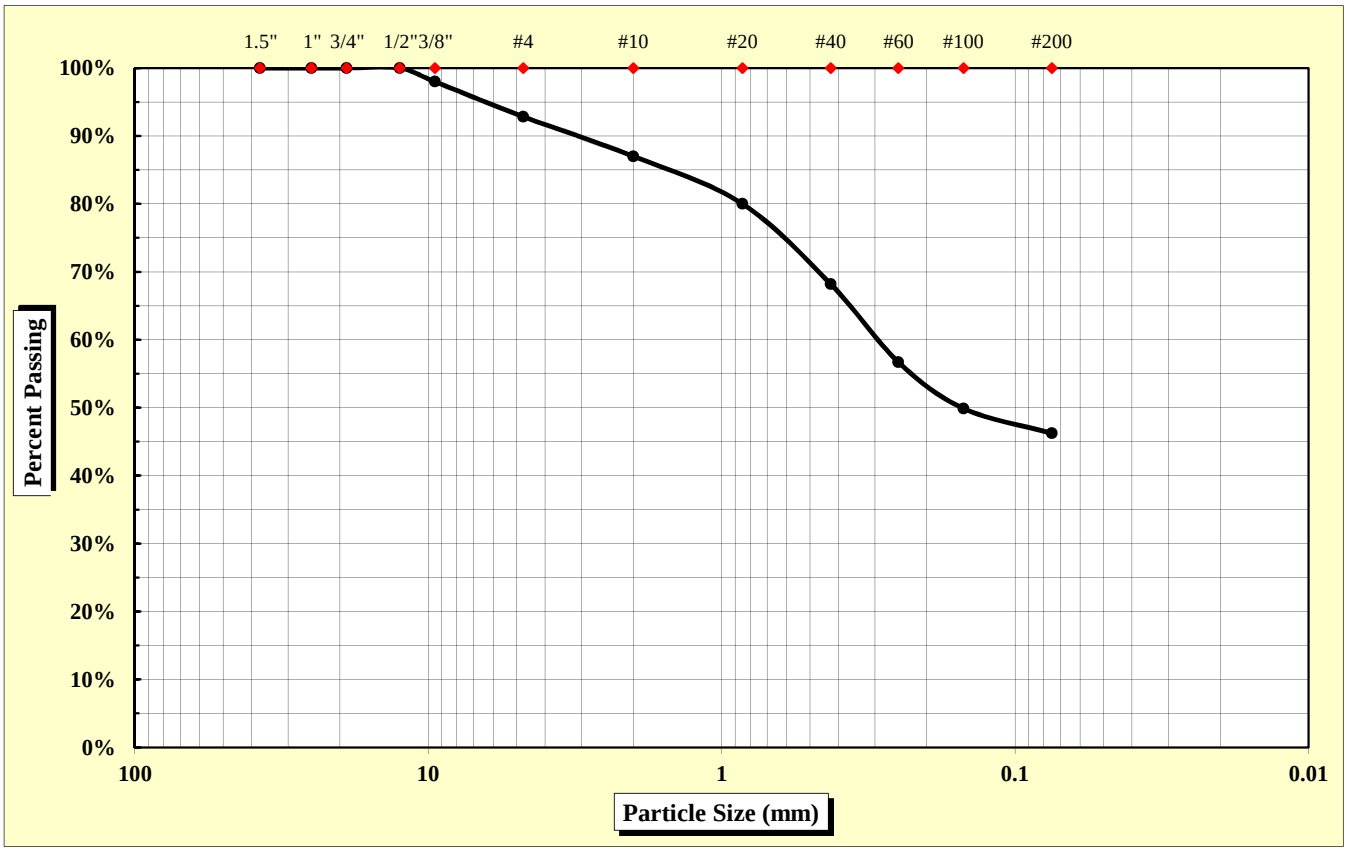
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-4	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Red, medium to fine, clayey SAND (SC) [A-7-6 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	13.0%	Fine Sand	22.0%
		Coarse Sand	18.8%	Silt & Clay	46.2%
Liquid Limit	43	Plastic Limit	22	Plastic Index	21
		Moisture Content	21.2%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

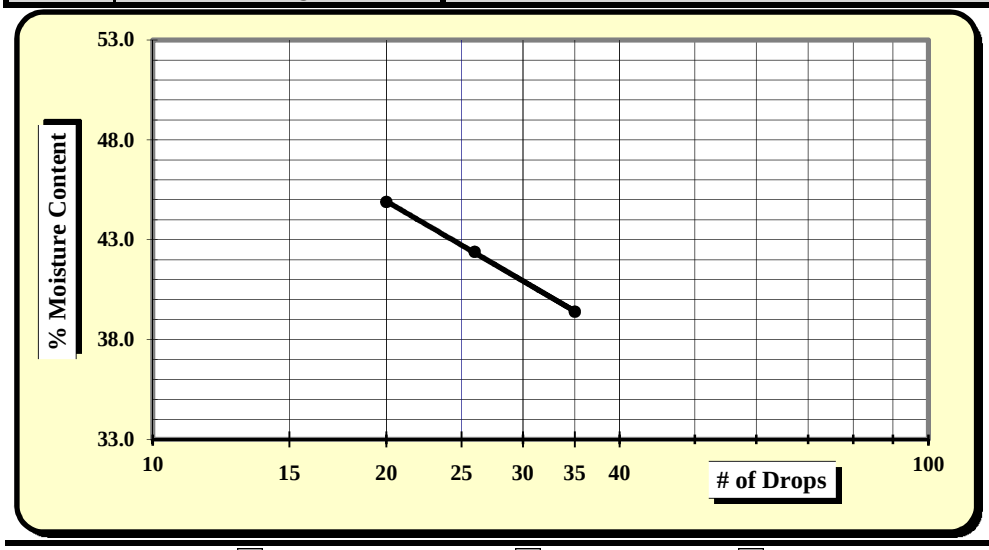
Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-4	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'

Sample Description: Red, medium to fine, clayey SAND (SC) [A-7-6 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	607	Liquid Limit						Plastic Limit		
	Tare #:	16	19	100				35		
A	Tare Weight	20.61	20.46	20.68				20.72		
B	Wet Soil Weight + A	28.39	29.16	28.94				29.36		
C	Dry Soil Weight + A	26.19	26.57	26.38				27.83		
D	Water Weight (B-C)	2.20	2.59	2.56				1.53		
E	Dry Soil Weight (C-A)	5.58	6.11	5.70				7.11		
F	% Moisture (D/E)*100	39.4%	42.4%	44.9%				21.5%		
N	# OF DROPS	35	26	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**22**
Plastic Index	**21**
Group Symbol	**SC / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 46.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-D1140-3
Revision No. 0
Revision Date: 10/26/07

Laboratory Determination of Moisture Content & Material Finer than the #200 Sieve

S&ME

AASHTO T 265 / ASTM D 1140

Quality Assurance

S&ME, Inc. - Columbia 134 Suber Road Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/5/15
Project Name:	I-85 Widening MM80-96	Test Date(s):	10/19 - 11/3/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-4	Sample #:	230	Sample Date:	10/16/15
Location:	SS-10	Type:	Split-spoon	Depth:	33.5 - 3.5'

Sample Description: Red brown, silty clayey SAND (SC-SM) [A-2-4]

Method: A ☐ **B** ☑ Soaked ☑ Soak Time 16 hrs.

Sample Identification	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Tare Wt. + Dry Wt. after Wash	Water Wt.	Percent Moisture	% Passing #200
Boring #, Sample #, Depth		grams	grams	grams	grams	%	%
C-4, SS-10	132.27	185.80	175.37	160.90	10.43	**24.2%**	**33.6%**
(33.5 - 35')							
Liquid Limit = 27							
Plastic Limit = 21							
Plastic Index = 6							

Balance ID. ***17866*** *Calibration Date:* ***8/4/15*** *#200 Sieve* ***25761*** *Calibration Date:* ***7/6/15***

Notes / Deviations / References: ASTM D 1140: Amount of Material in Soil Finer Than the No. 200 (75-um) Sieve

Method B uses a deflocculating agent such as Sodium Hexametaphosphate while soaking the specimen for at least 2 hours.

AASHTO T 265: Laboratory Determination of Moisture Content of Soils

Matthew Wolfe		NICET Soils Level III 123218	11/5/15
Technician Name		*Certification Type/No.*	*Date*
Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/5/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

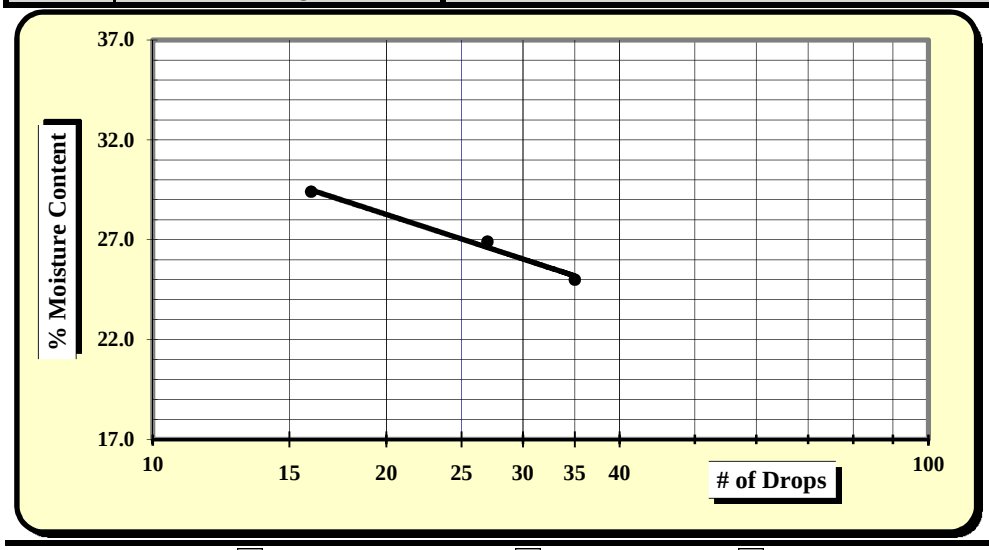
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/5/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-4	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-10	Type:	Split-spoon	Depth:	33.5 - 35'
Sample Description:	Red brown, silty clayey SAND (SC-SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	605	Liquid Limit						Plastic Limit		
	Tare #:	44	8	134				17		
A	Tare Weight	20.70	20.56	20.69				20.60		
B	Wet Soil Weight + A	34.64	31.27	31.66				28.71		
C	Dry Soil Weight + A	31.85	29.00	29.17				27.29		
D	Water Weight (B-C)	2.79	2.27	2.49				1.42		
E	Dry Soil Weight (C-A)	11.15	8.44	8.48				6.69		
F	% Moisture (D/E)*100	25.0%	26.9%	29.4%				21.2%		
N	# OF DROPS	35	27	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**27**
Plastic Limit	**21**
Plastic Index	**6**
Group Symbol	SC-SM / A-2-4
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/5/2015	Brian Vaughan, P.E.	11/5/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

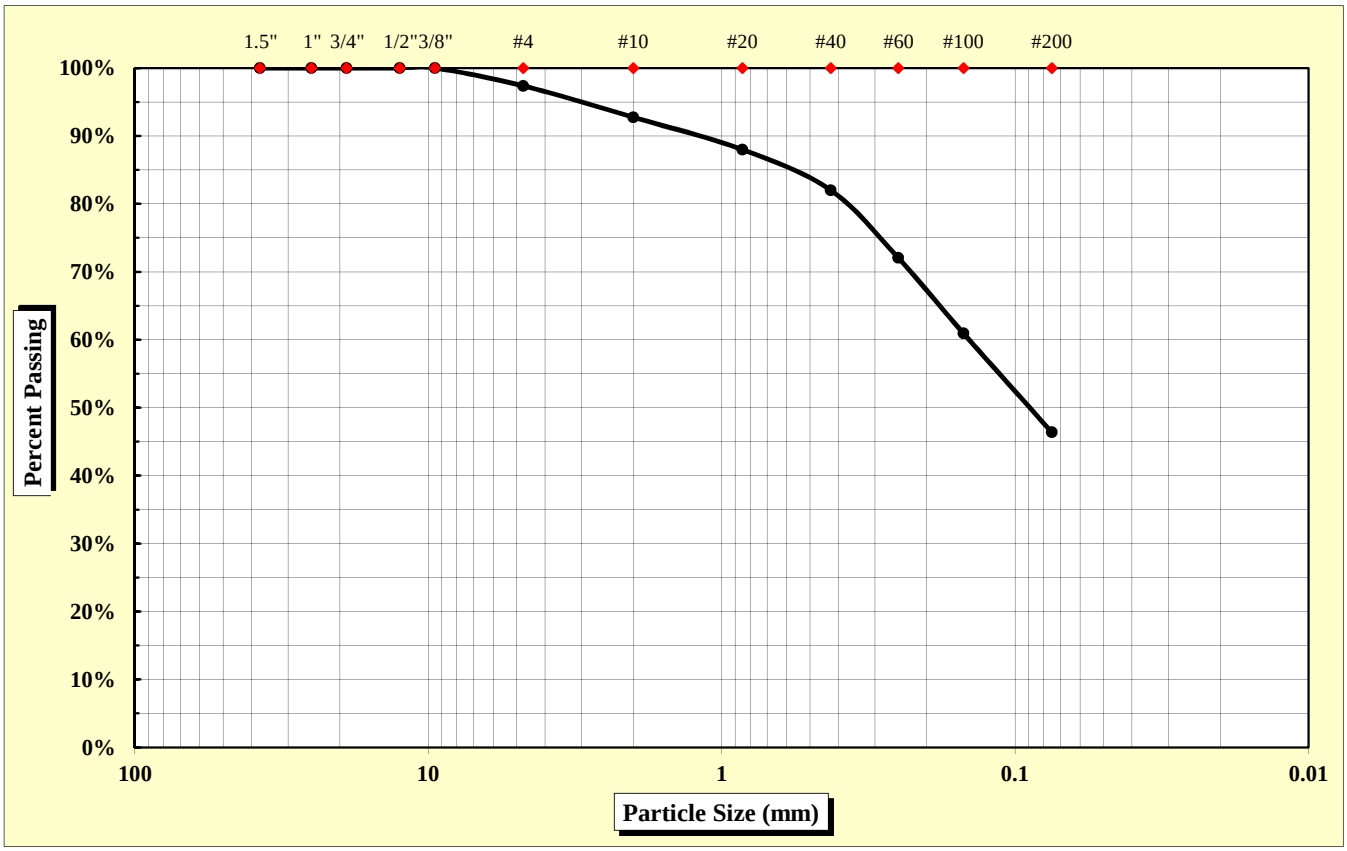
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-34	Sample #:	230	Sample Date:	10/21/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Tan brown, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	7.2%	Fine Sand	35.6%
		Coarse Sand	10.7%	Silt & Clay	46.4%
Liquid Limit	35	Plastic Limit	30	Plastic Index	5
		Moisture Content	20.4%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

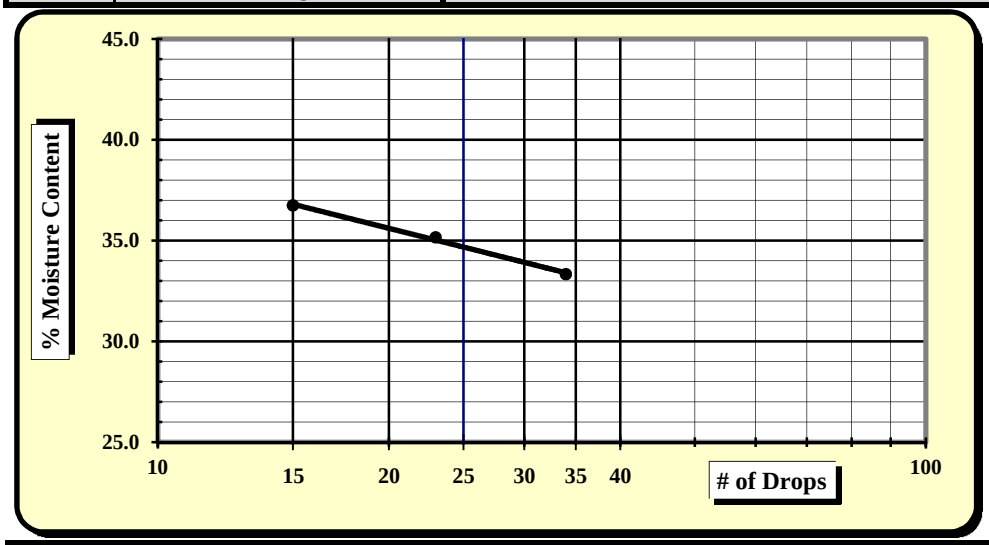
Project #:	**1426-14-161**	Report Date:	11/18/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-34	Sample #:	230	Sample Date:	10/21/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Tan brown, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	27	26	29				16		
A	Tare Weight	12.98	12.90	12.99				13.06		
B	Wet Soil Weight + A	25.70	25.24	25.42				22.70		
C	Dry Soil Weight + A	22.52	22.03	22.08				20.45		
D	Water Weight (B-C)	3.18	3.21	3.34				2.25		
E	Dry Soil Weight (C-A)	9.54	9.13	9.09				7.39		
F	% Moisture (D/E)*100	33.3%	35.2%	36.7%				30.4%		
N	# OF DROPS	34	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**30**
Plastic Index	**5**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 46.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/18/15	Brian Vaughan, P.E.	11/18/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

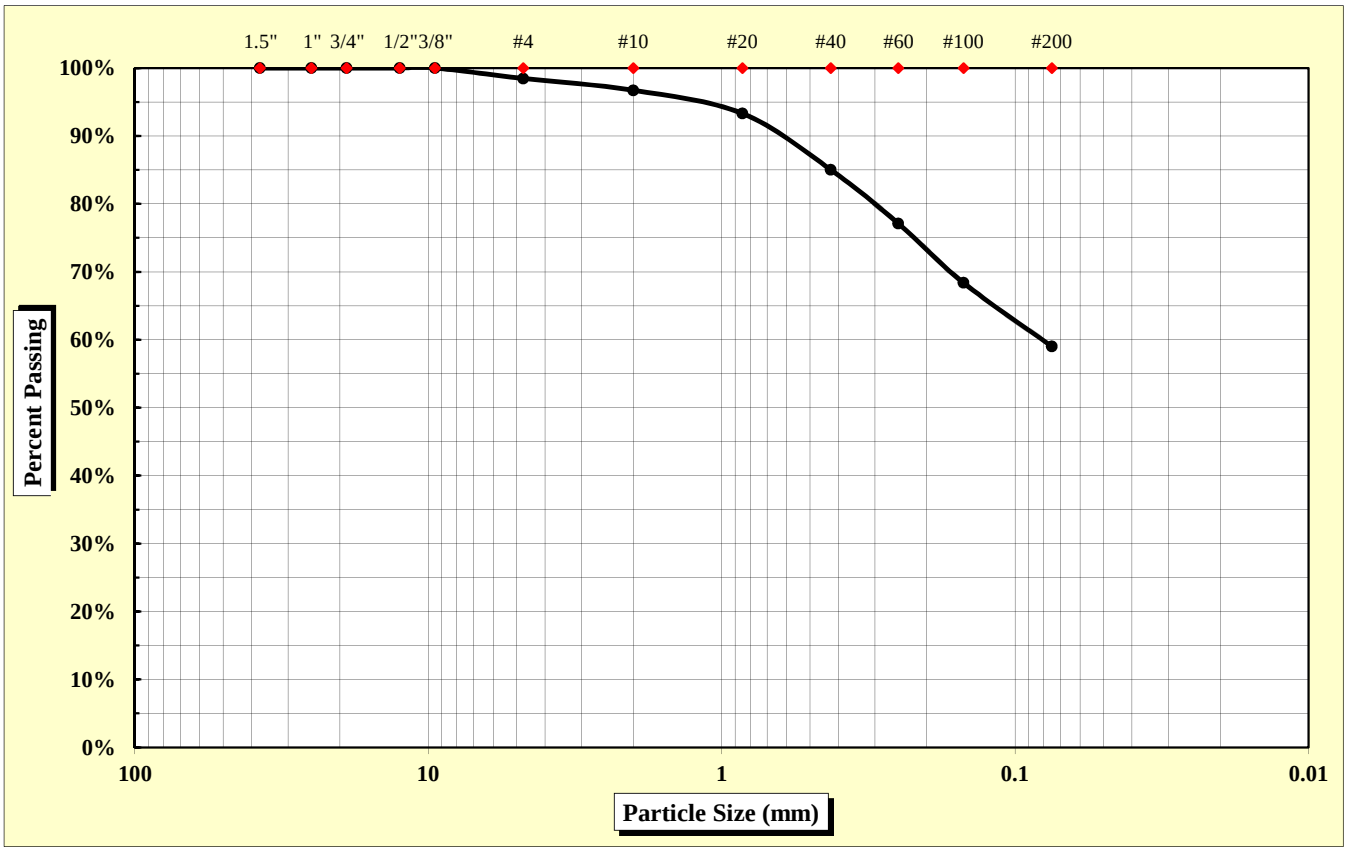
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/30 - 12/04/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-35	Sample #:	241	Sample Date:	10/16/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.1 - 3.1'
Sample Description:	Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.3%	Fine Sand	26.0%
		Coarse Sand	11.7%	Silt & Clay	59.0%
Liquid Limit	40	Plastic Limit	20	Plastic Index	20
		Moisture Content	22.6%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

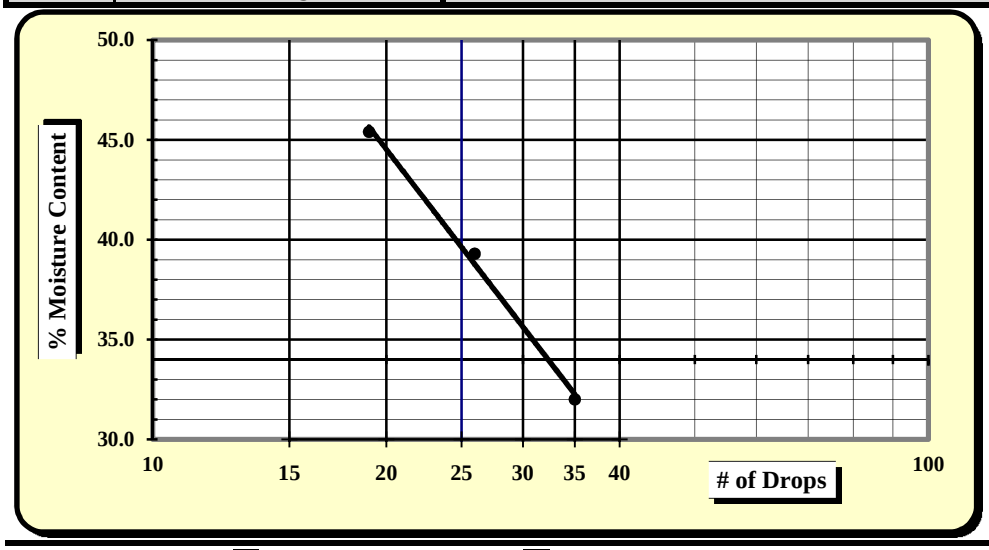
Project #:	**1426-14-161**	Report Date:	12/04/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/03/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-35	Sample #:	241	Sample Date:	10/16/15
Location:	SS-1	Type:	Split-spoon	Depth:	1.1 - 3.1'

Sample Description: Brown, medium to fine, sandy LEAN CLAY (CL) [A-6 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.76	26.70	27.67				26.59		
B	Wet Soil Weight + A	42.65	45.15	44.29				37.42		
C	Dry Soil Weight + A	38.80	38.25	39.10				35.64		
D	Water Weight (B-C)	3.85	6.90	5.19				1.78		
E	Dry Soil Weight (C-A)	12.04	11.55	11.43				9.05		
F	% Moisture (D/E)*100	32.0%	39.3%	45.4%				19.7%		
N	# OF DROPS	35	26	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**19.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**20**
Plastic Index	**20**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 59.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	12/04/15	Brian Vaughan, P.E.	12/04/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

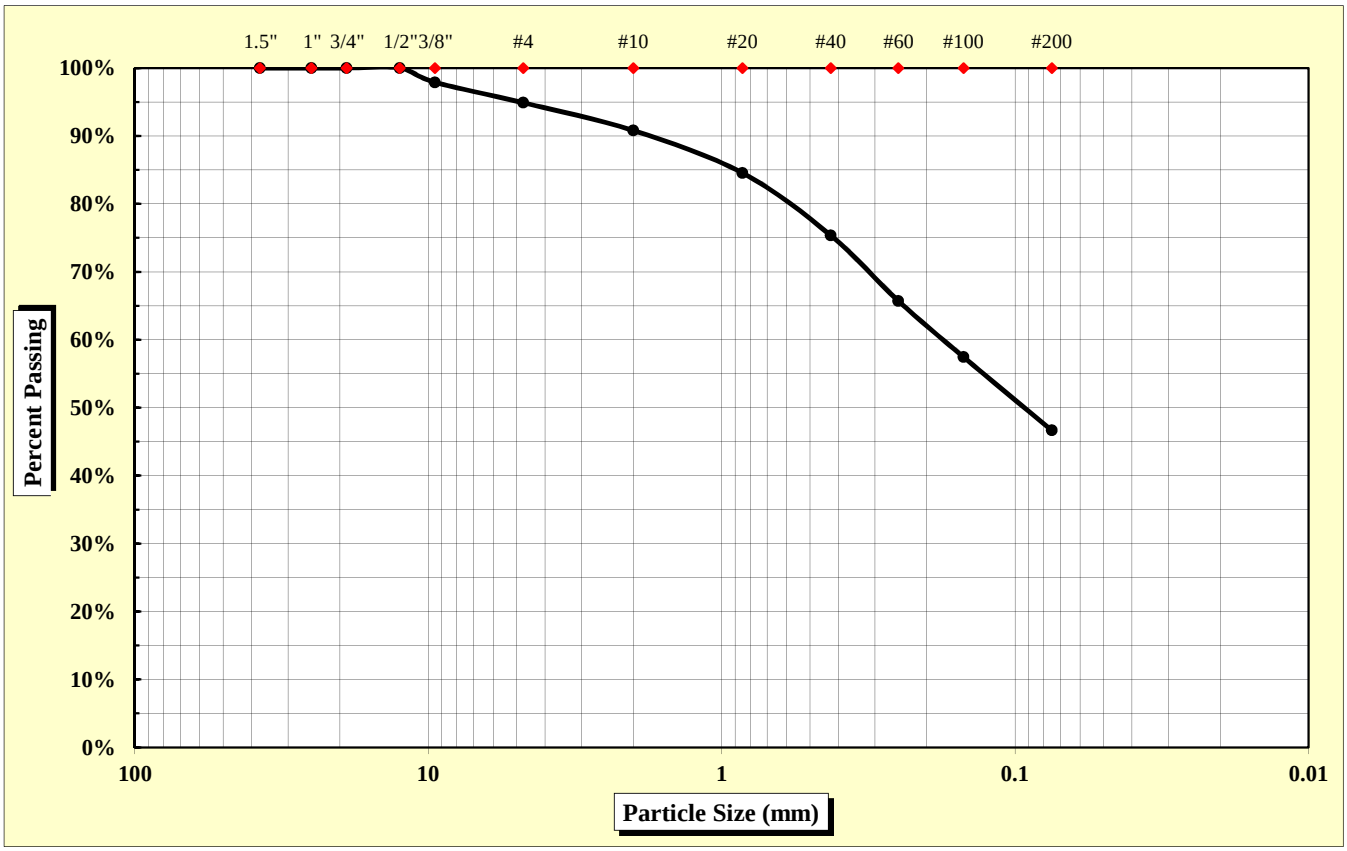
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-35	Sample #:	230	Sample Date:	10/16/15
Location:	SS-3	Type:	Split-spoon	Depth:	5.1 - 7.1'
Sample Description:	Brown red, medium to fine, trace mica, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	9.2%	Fine Sand	28.7%
		Coarse Sand	15.4%	Silt & Clay	46.7%
Liquid Limit	36	Plastic Limit	30	Plastic Index	6
		Moisture Content	22.0%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

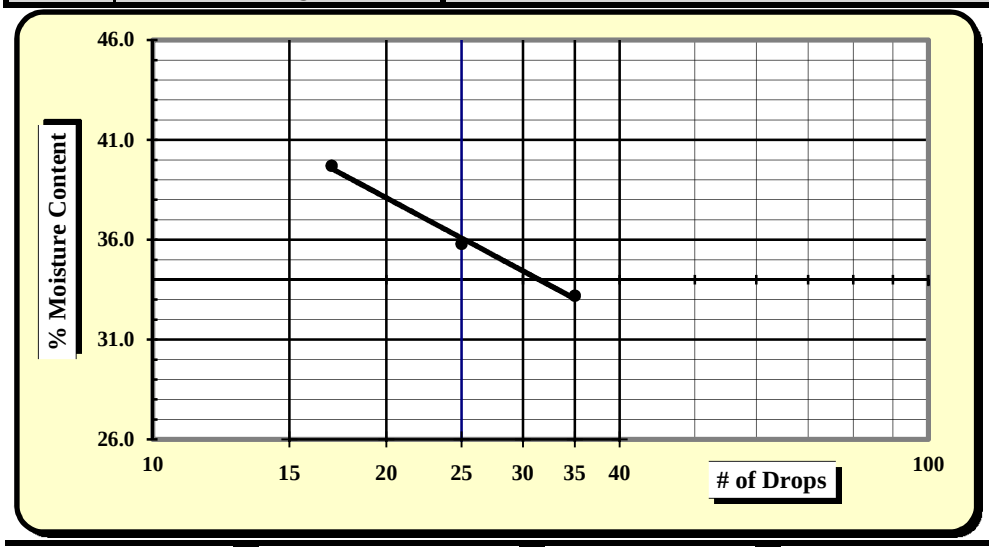
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/10/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-35	Sample #:	230	Sample Date:	10/16/15
Location:	SS-3	Type:	Split-spoon	Depth:	5.1 - 7.1'

Sample Description: Brown red, medium to fine, trace mica, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.98	27.79	26.29				27.37		
B	Wet Soil Weight + A	45.57	49.89	43.46				35.79		
C	Dry Soil Weight + A	40.94	44.06	38.58				33.85		
D	Water Weight (B-C)	4.63	5.83	4.88				1.94		
E	Dry Soil Weight (C-A)	13.96	16.27	12.29				6.48		
F	% Moisture (D/E)*100	33.2%	35.8%	39.7%				29.9%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**30**
Plastic Index	**6**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 46.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

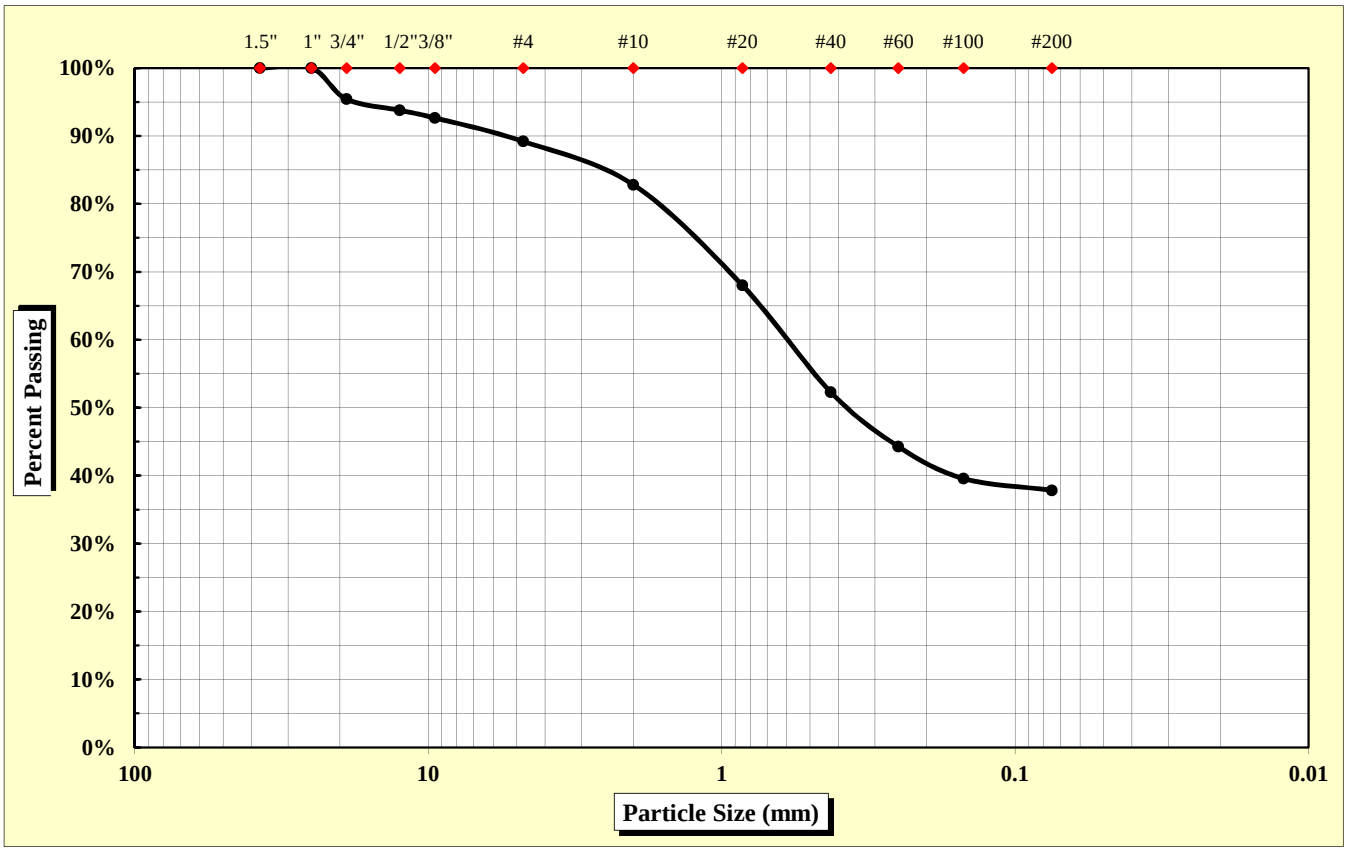
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-36	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-1	Type:	Split-spoon	Depth:	1 - 3'
Sample Description:	Brown gray, fine to medium, clayey SAND (SC) [A-6]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	17.2%	Fine Sand	14.5%
		Coarse Sand	30.5%	Silt & Clay	37.8%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	17.6%	Group Index	N/A

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

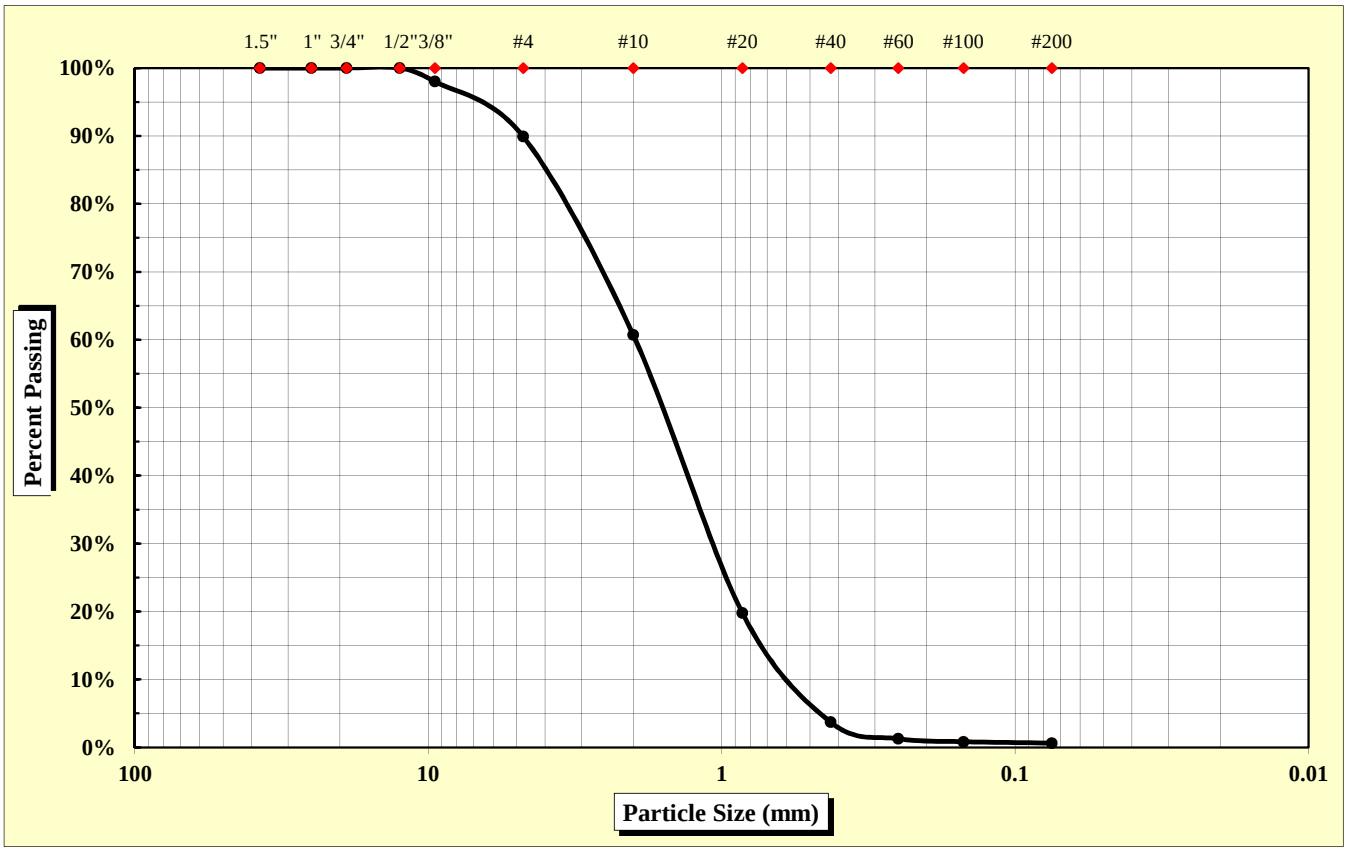
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-36	Sample #:	230	Sample Date:	10/15/2015
Location:	SS-2	Type:	Split-spoon	Depth:	3 - 5'
Sample Description:	Orange, medium to coarse, poorly graded SAND, with trace gravel (SP) [A-1-b]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	39.3%	Fine Sand	3.1%
		Coarse Sand	57.0%	Silt & Clay	0.6%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	14.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-126-T267-1
Revision No. 0
Revision Date: 07/28/11

Moisture, Ash, and Organic Content

AASHTO T 267

S&ME *Quality Assurance*

Project #: **1426-14-161** Report Date: 11/24/15
Project Name: **I-85 Widening MM80-96** Test Date(s): 11/20 - 11/24/15
Client Name: Infrastructure Consulting & Engineering
Client Address: 1021 Briargate Circle Columbia, South Carolina 29210

Boring #:	RW-36	Sample #:	241	Sample Date:	10/15/15
Location:	SS-3	Type:	Split-spoon	Depth:	5 - 7'
Sample Description:	Olive brown gray clayey SAND (SC)				

Equipment: Balance (GP1/G1): S&ME ID# **7537** *0.01 g.Readability, 500g. Minimum Capacity*
Oven: S&ME ID# **7313** Muffle Furnace: S&ME ID# **7312**

Moisture Content Determination

Oven Temperature: **110 ± 5 °C**

		Tare #	
t	Tare Weight	grams	
a	Mass of **As-Received** Specimen + Tare Wt.	grams	
b	Mass of Oven Dry Specimen + Tare Wt.	grams	
w	Water Weight	(a-b)	
A	Mass of As-Received Specimen	(a-t)	
B	Mass of Oven Dry Specimen	(b-t)	
	% Moisture Content as a % of As Received or Total Mass	(w/A)*100	
	% Moisture Content as a % of Oven-dried Mass	(w/B)*100	**N/A**

Ash Content and Organic Content Determination

Muffle Furnace Temperature: **455 ± 10 °C**

		Tare #	2
t	Tare Weight	grams	119.18
b	Mass of Oven Dry Specimen + Tare Wt.	grams	159.06
c	Ash Weight + Tare Wt.	grams	158.19
C	Ash Weight	c-t	39.01
B	Mass of Oven Dry Specimen	(b-t)	39.88
D	***% Ash Content***	(C/B)*100	**97.8%**
	% Organic Content	100-D	**2.2%**

Remarks: **Organic Content representative sample taken from material passing the 2.00 mm (#10) sieve**

References: AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition

Technician Name: Matt Jacobs NICET Lab Level III 118202
Certification #

Technical Responsibility: Brian Vaughan, P.E. Brian Vaughan Location Coordinator
Signature *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

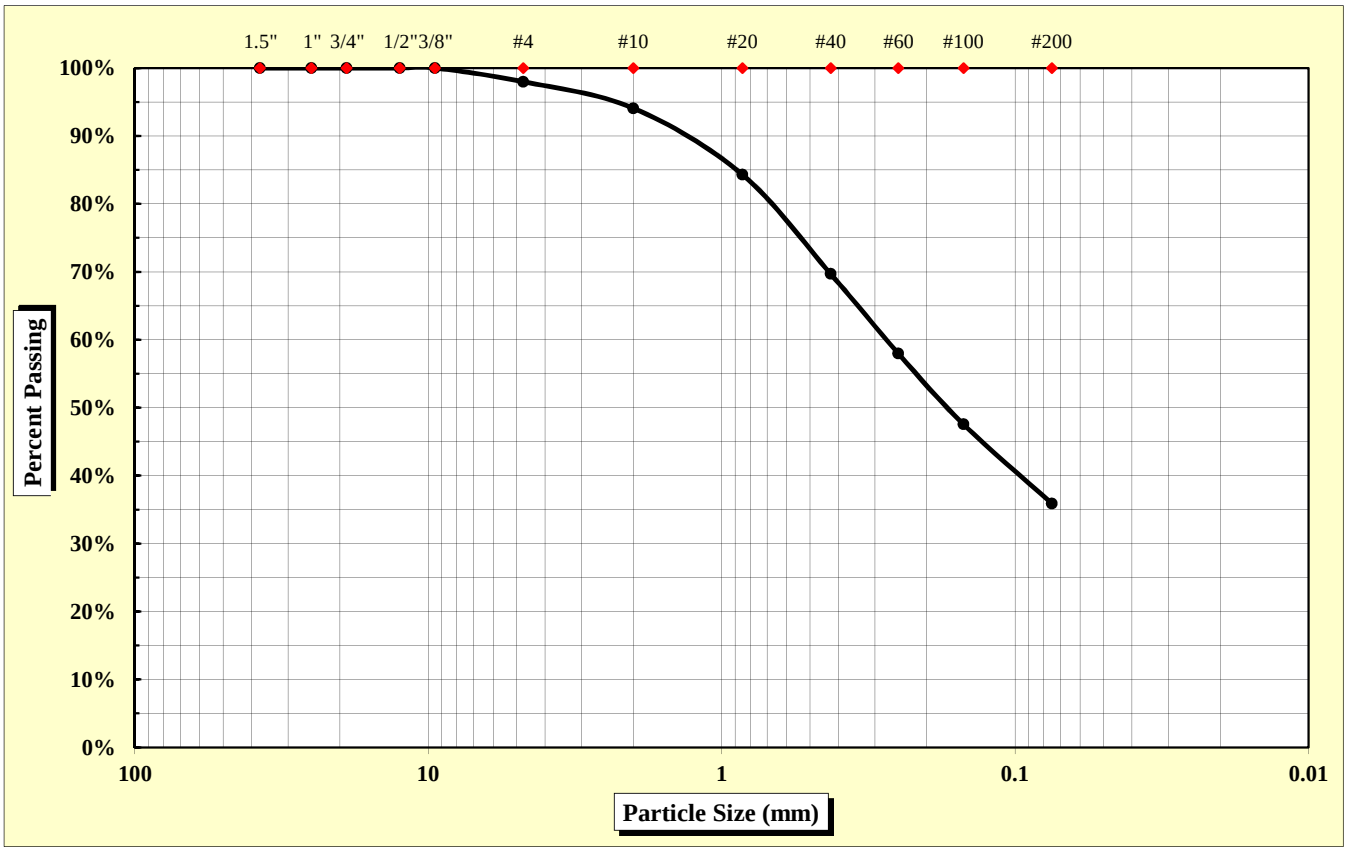
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/19 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-36	Sample #:	241	Sample Date:	10/15/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	9 - 15'
Sample Description:	Brown, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.9%	Fine Sand	33.8%
		Coarse Sand	24.4%	Silt & Clay	35.9%
Liquid Limit	35	Plastic Limit	25	Plastic Index	10
		Moisture Content	15.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

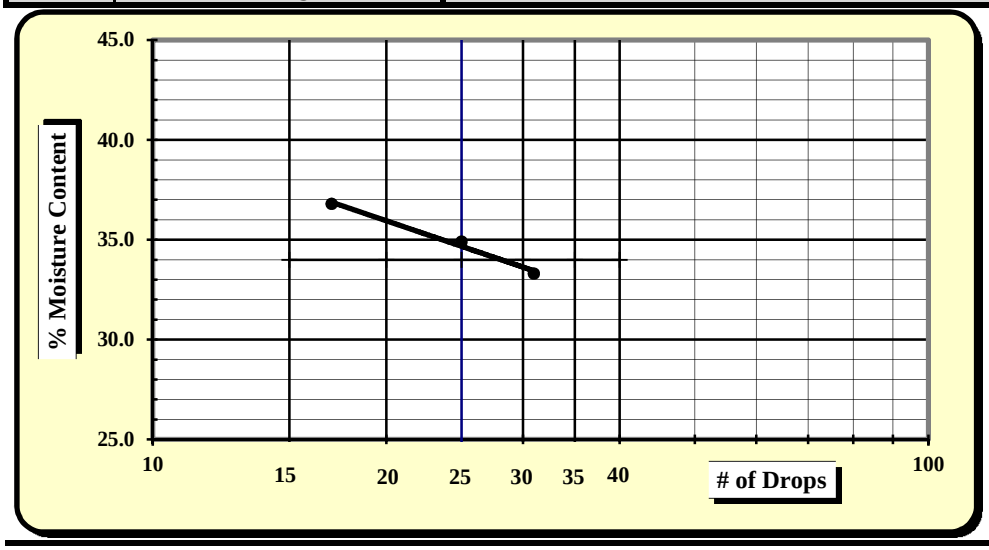
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-36	Sample #:	241	Sample Date:	10/15/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	9 - 15'

Sample Description: Brown, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	998	J3	103				106		
A	Tare Weight	12.22	12.47	12.45				12.08		
B	Wet Soil Weight + A	20.71	21.13	23.64				20.28		
C	Dry Soil Weight + A	18.59	18.89	20.63				18.64		
D	Water Weight (B-C)	2.12	2.24	3.01				1.64		
E	Dry Soil Weight (C-A)	6.37	6.42	8.18				6.56		
F	% Moisture (D/E)*100	33.3%	34.9%	36.8%				25.0%		
N	# OF DROPS	31	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**25**
Plastic Index	**10**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 35.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

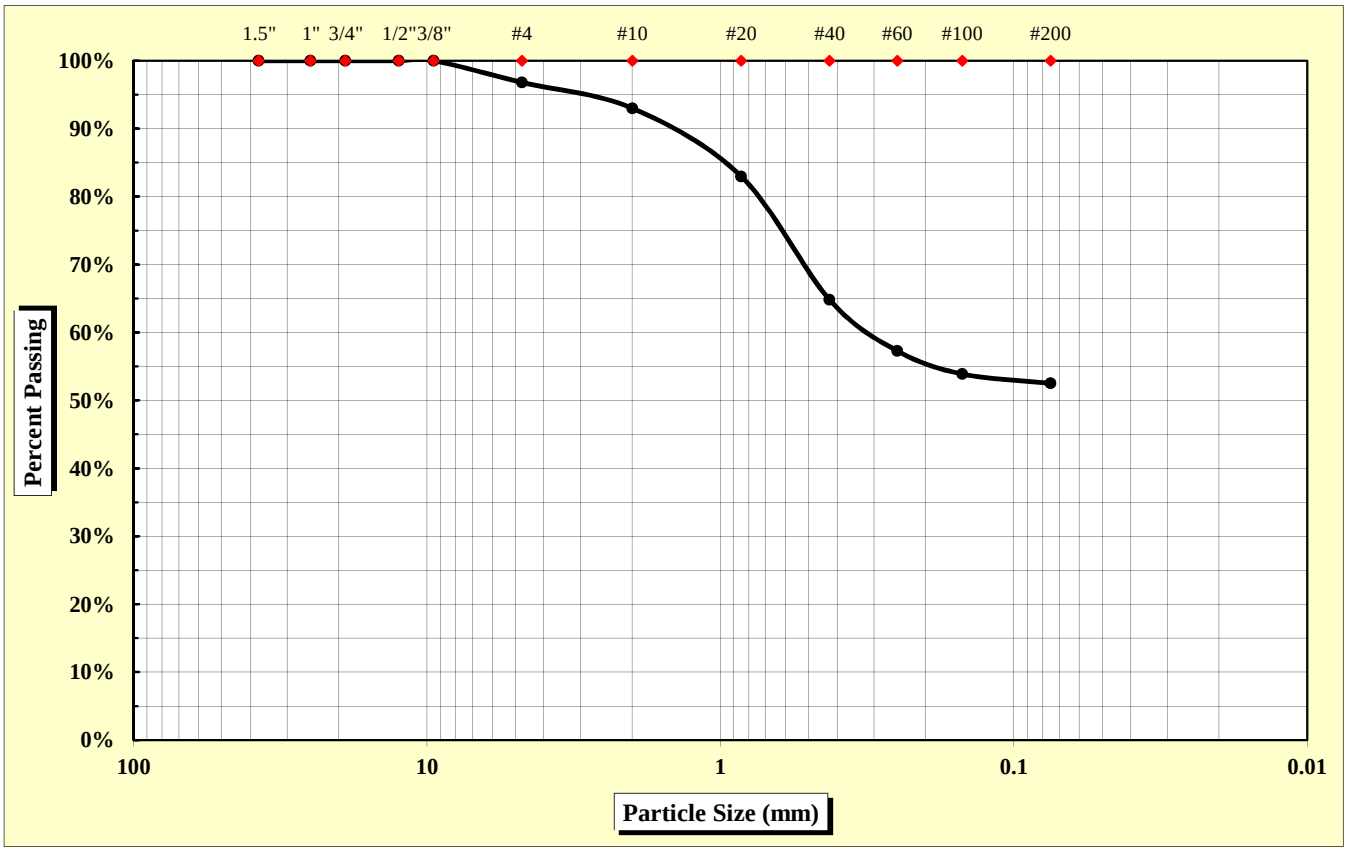
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-7	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'
Sample Description:	Red brown, fine to medium, sandy ELASTIC SILT (MH) [A-7-5 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	7.0%	Fine Sand	12.3%
		Coarse Sand	28.2%	Silt & Clay	52.5%
Liquid Limit	55	Plastic Limit	34	Plastic Index	21
		Moisture Content	23.2%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

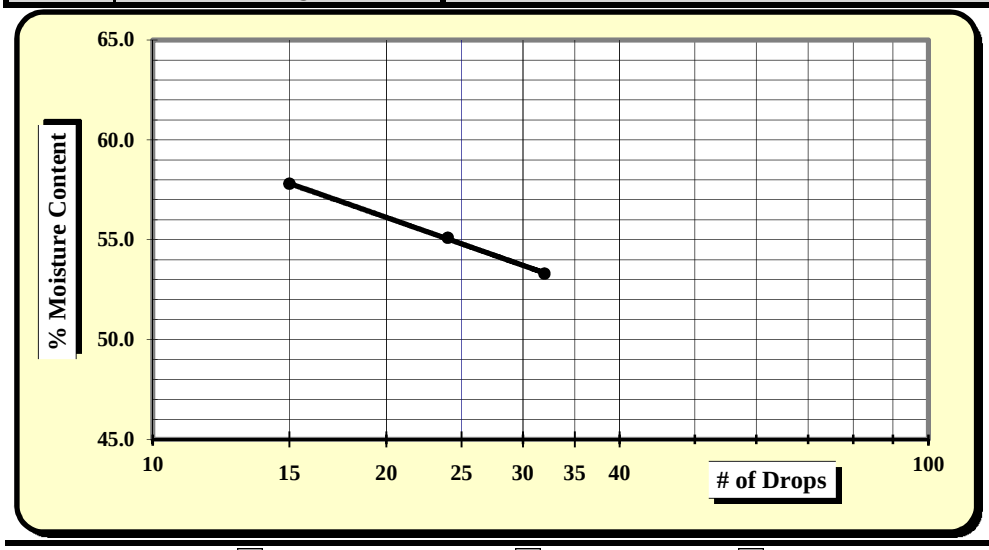
Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/5/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-7	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'

Sample Description: Red brown, fine to medium, sandy ELASTIC SILT (MH) [A-7-5 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	10	Liquid Limit						Plastic Limit		
	Tare #:	246	3	23				4		
A	Tare Weight	20.71	20.73	20.68				20.52		
B	Wet Soil Weight + A	30.84	30.41	28.95				28.57		
C	Dry Soil Weight + A	27.32	26.97	25.92				26.55		
D	Water Weight (B-C)	3.52	3.44	3.03				2.02		
E	Dry Soil Weight (C-A)	6.61	6.24	5.24				6.03		
F	% Moisture (D/E)*100	53.3%	55.1%	57.8%				33.5%		
N	# OF DROPS	32	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**34**
Plastic Index	**21**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/5/2015	Brian Vaughan, P.E.	11/5/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

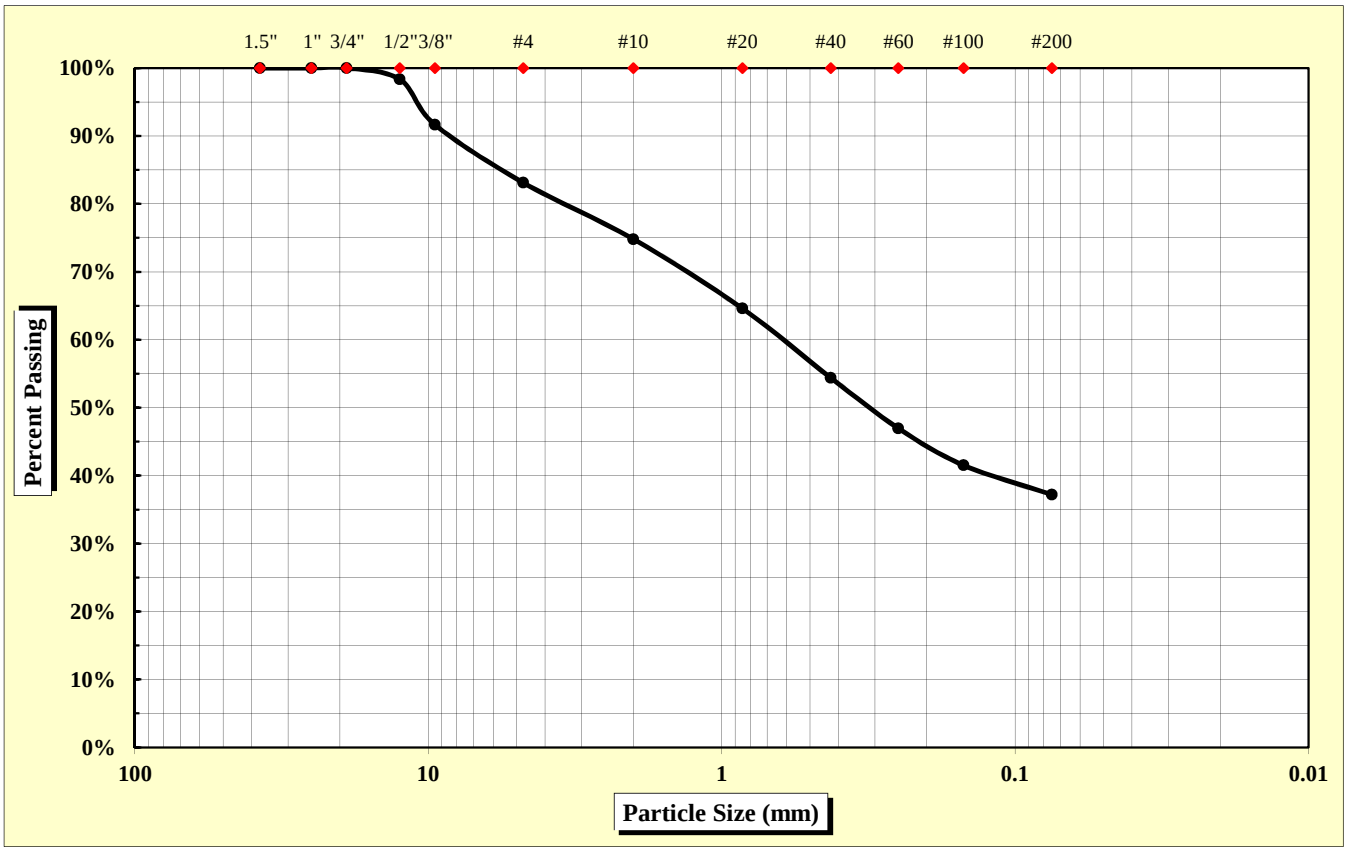
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-7	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	8.8 - 10.8'
Sample Description:	Brown yellow red, trace mica, clayey SAND w/ gravel (SC) [A-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	19.00 mm	Gravel	25.2%	Fine Sand	17.2%
		Coarse Sand	20.4%	Silt & Clay	37.2%
Liquid Limit	36	Plastic Limit	21	Plastic Index	15
		Moisture Content	19.4%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

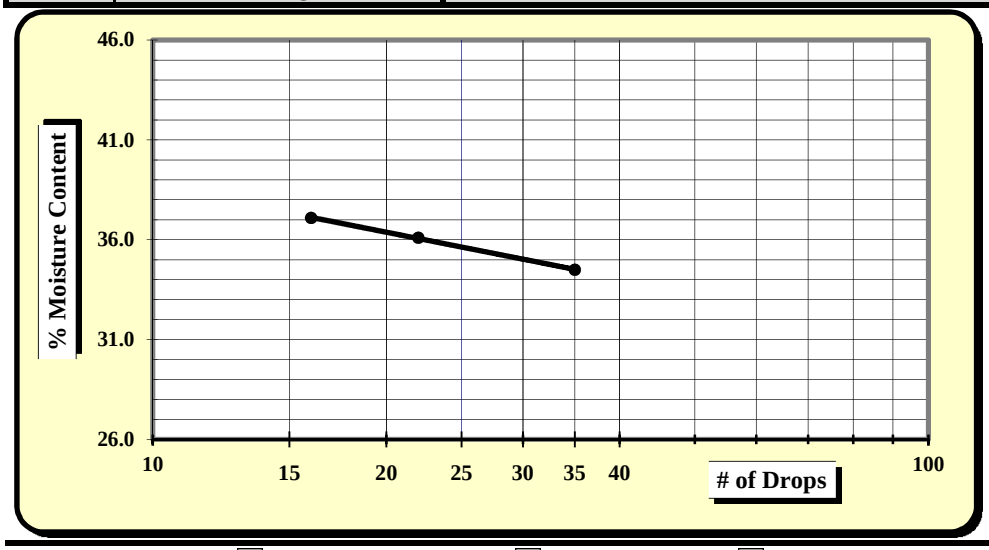
Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/5/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-7	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	8.8 - 10.8'

Sample Description: Brown yellow red, fine to medium, trace mica, clayey SAND w/ gravel (SC) [A-6 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	12	Liquid Limit						Plastic Limit		
	Tare #:	30	15	6				227		
A	Tare Weight	20.78	20.73	20.53				20.87		
B	Wet Soil Weight + A	30.48	28.39	28.95				28.97		
C	Dry Soil Weight + A	27.99	26.36	26.67				27.56		
D	Water Weight (B-C)	2.49	2.03	2.28				1.41		
E	Dry Soil Weight (C-A)	7.21	5.63	6.14				6.69		
F	% Moisture (D/E)*100	34.5%	36.1%	37.1%				21.1%		
N	# OF DROPS	35	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**21**
Plastic Index	**15**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 37.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/5/2015	Brian Vaughan, P.E.	11/5/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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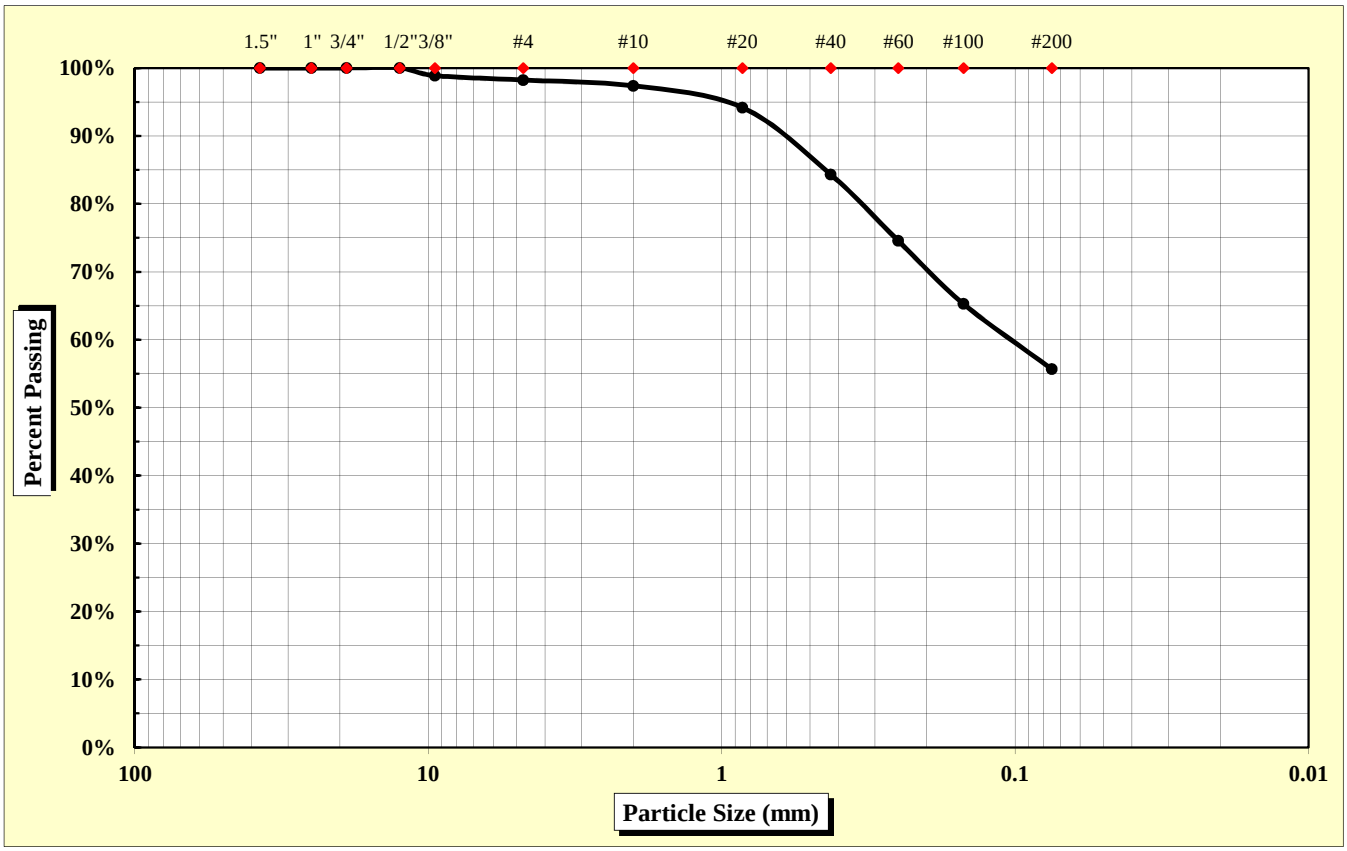
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2.5 - 6.5'
Sample Description:	Orange red tan, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (10)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	2.6%	Fine Sand	28.6%
		Coarse Sand	13.1%	Silt & Clay	55.7%
Liquid Limit	47	Plastic Limit	25	Plastic Index	22
		Moisture Content	20.6%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

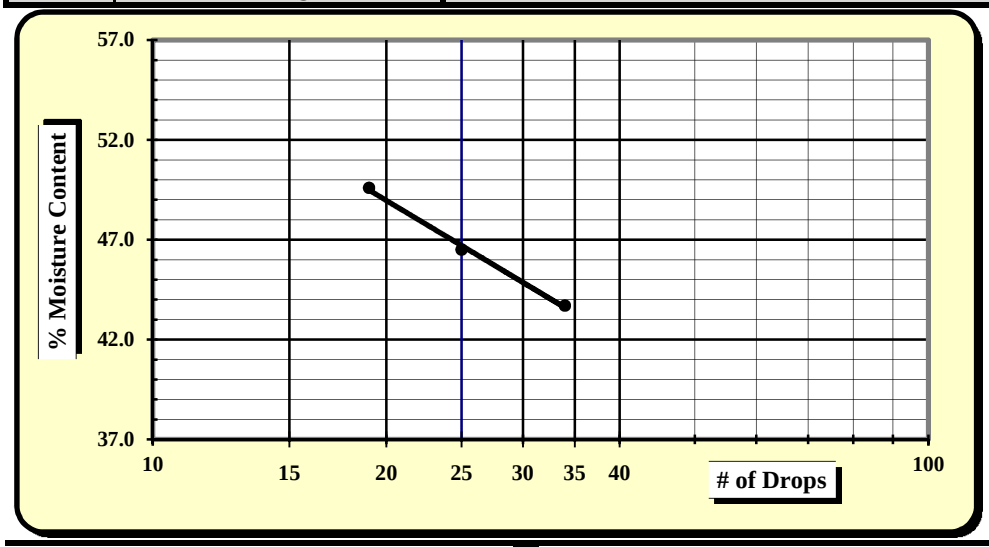
Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2.5 - 6.5'

Sample Description: Orange red tan, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (10)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-7	Z-8	Z-9				17		
A	Tare Weight	16.75	15.76	16.75				12.11		
B	Wet Soil Weight + A	38.09	36.89	37.97				22.53		
C	Dry Soil Weight + A	31.60	30.18	30.93				20.42		
D	Water Weight (B-C)	6.49	6.71	7.04				2.11		
E	Dry Soil Weight (C-A)	14.85	14.42	14.18				8.31		
F	% Moisture (D/E)*100	43.7%	46.5%	49.6%				25.4%		
N	# OF DROPS	34	25	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**25**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/27/15	Brian Vaughan, P.E.	11/27/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

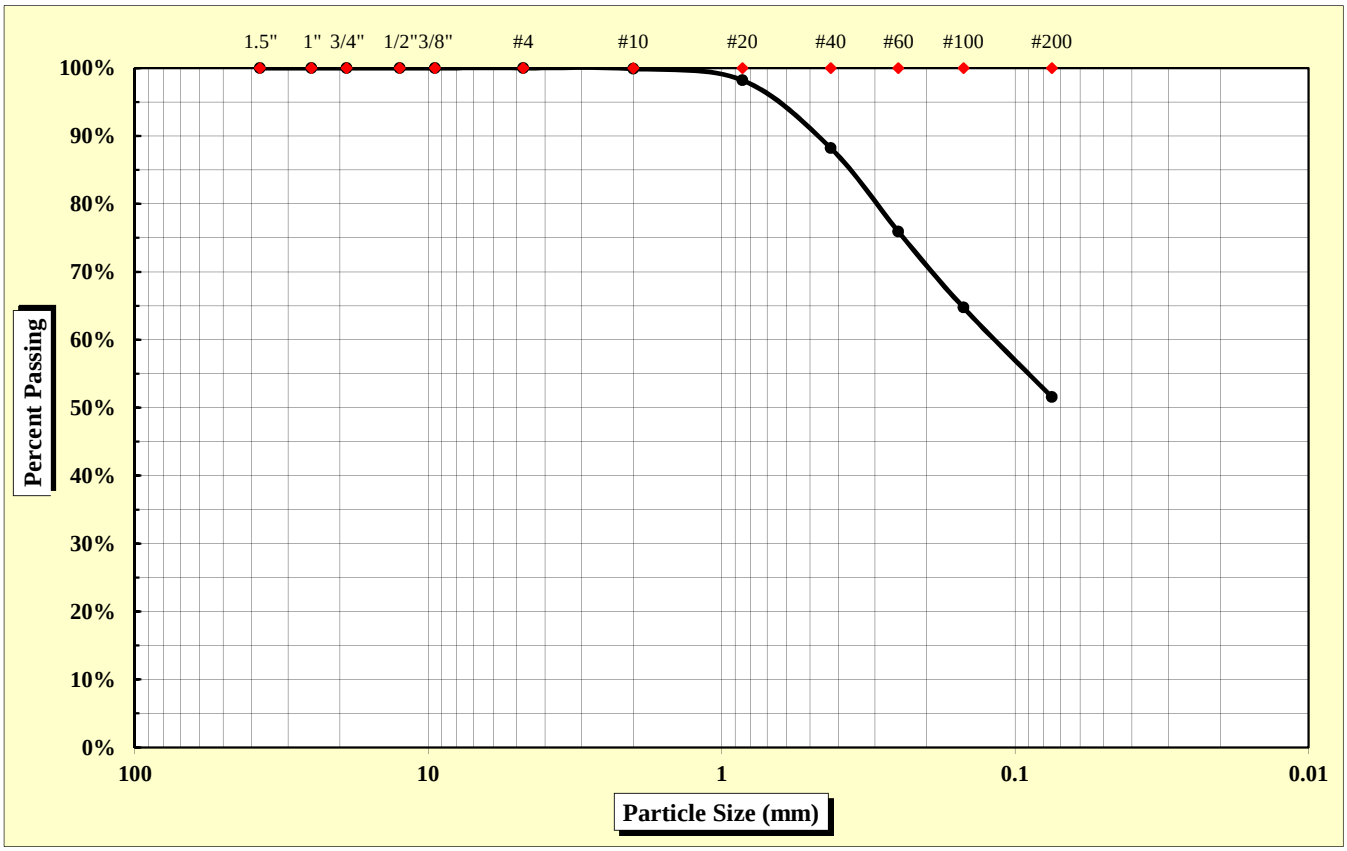
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Yellow tan orange, medium to fine, sandy SILT (ML) [A-6 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	36.6%
		Coarse Sand	11.7%	Silt & Clay	51.6%
Liquid Limit	38	Plastic Limit	27	Plastic Index	11
		Moisture Content	33.9%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

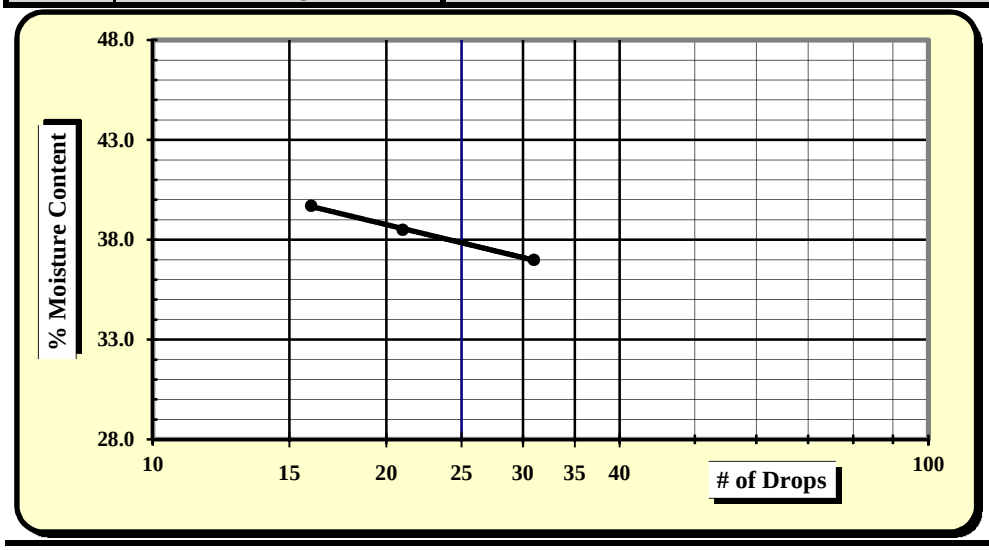
Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-1	Sample #:	230	Sample Date:	10/22/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Yellow tan orange, medium to fine, sandy SILT (ML) [A-6 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.29	16.53				12.11		
B	Wet Soil Weight + A	39.17	38.60	38.38				20.57		
C	Dry Soil Weight + A	33.02	32.12	32.17				18.75		
D	Water Weight (B-C)	6.15	6.48	6.21				1.82		
E	Dry Soil Weight (C-A)	16.62	16.83	15.64				6.64		
F	% Moisture (D/E)*100	37.0%	38.5%	39.7%				27.4%		
N	# OF DROPS	31	21	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**27**
Plastic Index	**11**
Group Symbol	**ML / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/27/15	Brian Vaughan, P.E.	11/27/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

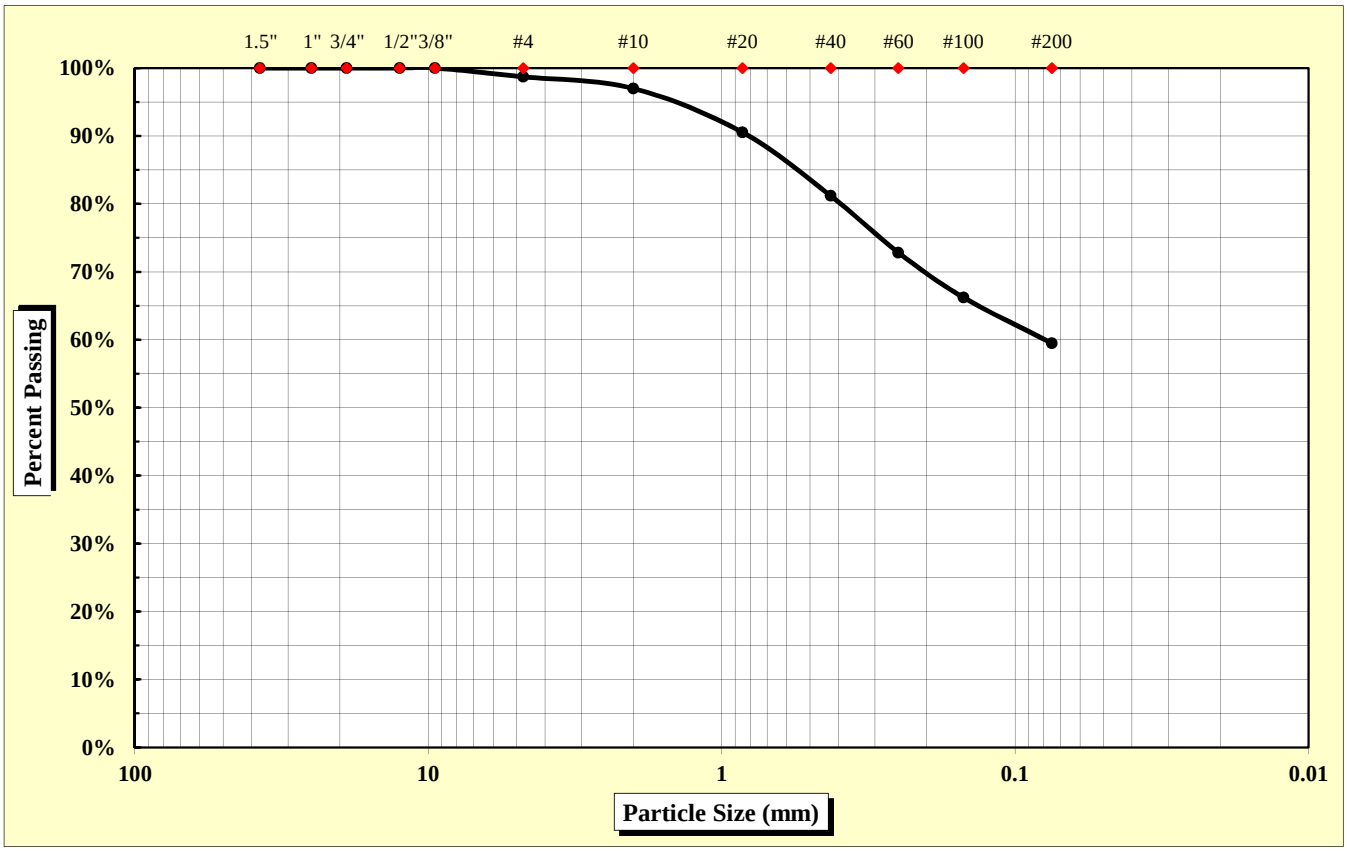
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-37	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Brown red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.0%	Fine Sand	21.7%
		Coarse Sand	15.8%	Silt & Clay	59.5%
Liquid Limit	44	Plastic Limit	22	Plastic Index	22
		Moisture Content	22.6%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

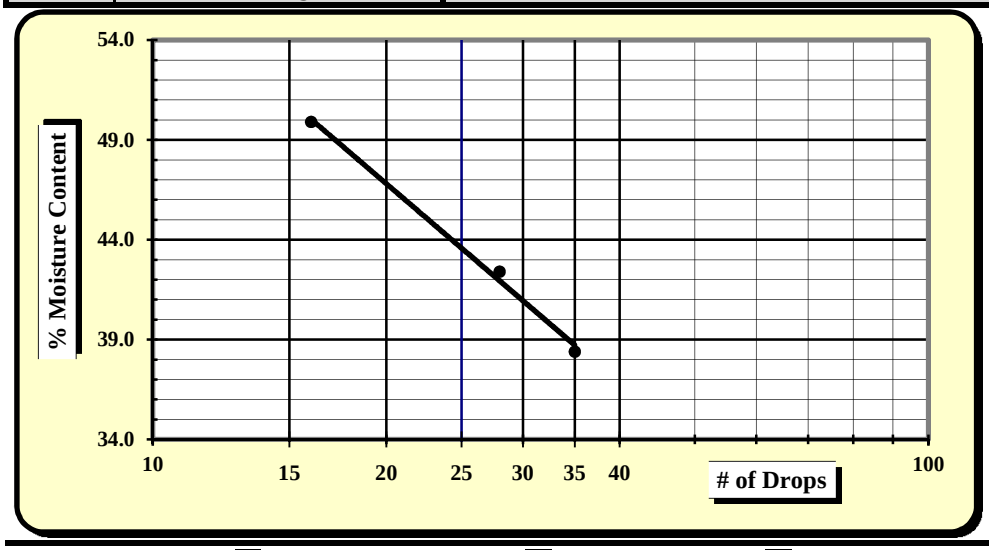
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-37	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	35	40	41				42		
A	Tare Weight	26.98	26.30	28.75				28.65		
B	Wet Soil Weight + A	48.26	42.45	43.78				42.56		
C	Dry Soil Weight + A	42.36	37.64	38.78				40.04		
D	Water Weight (B-C)	5.90	4.81	5.00				2.52		
E	Dry Soil Weight (C-A)	15.38	11.34	10.03				11.39		
F	% Moisture (D/E)*100	38.4%	42.4%	49.9%				22.1%		
N	# OF DROPS	35	28	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**22**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 59.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

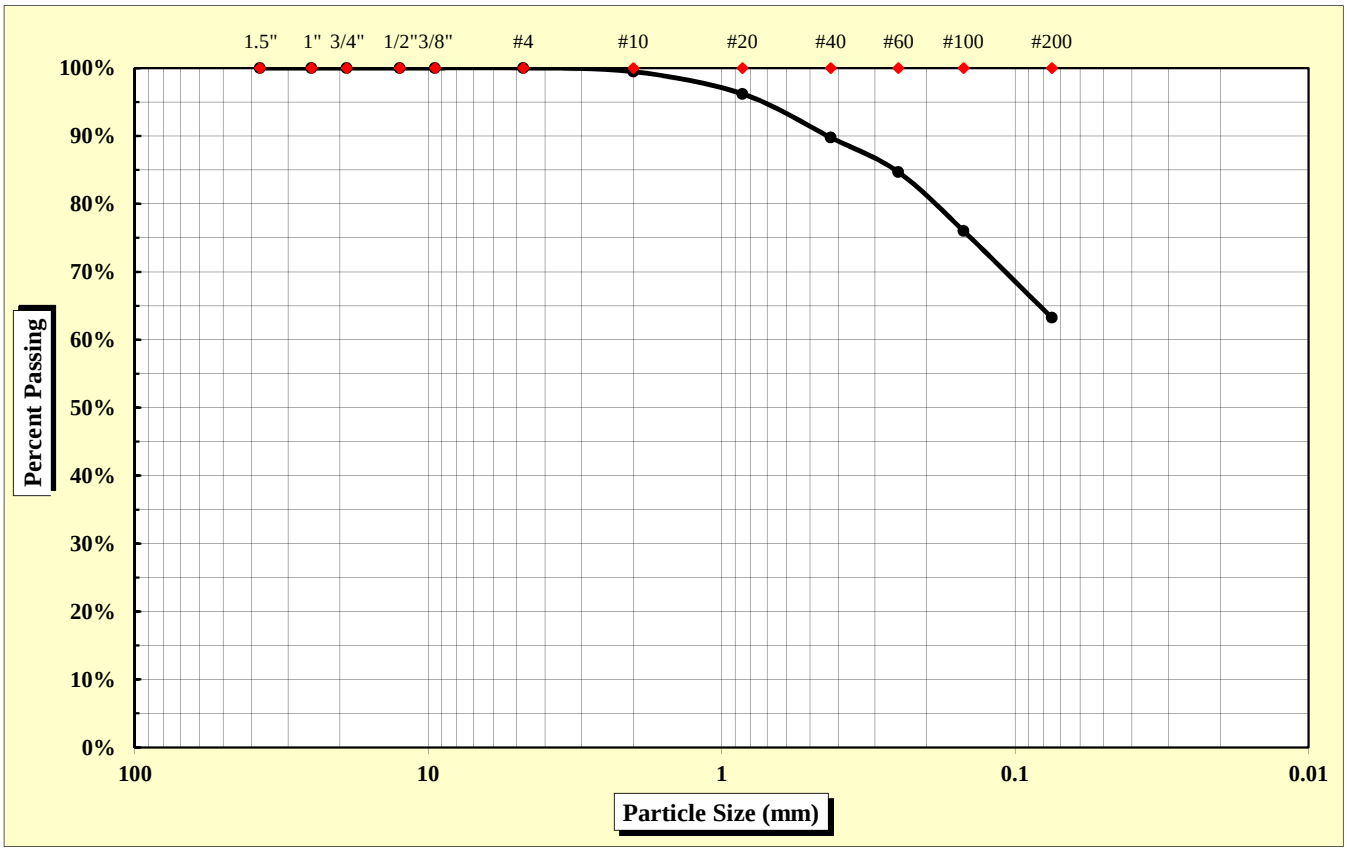
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-37	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Brown red, medium to fine, sandy ELASTIC SILT (MH) [A-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.5%	Fine Sand	26.5%
		Coarse Sand	9.7%	Silt & Clay	63.3%
Liquid Limit	55	Plastic Limit	45	Plastic Index	10
		Moisture Content	27.9%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

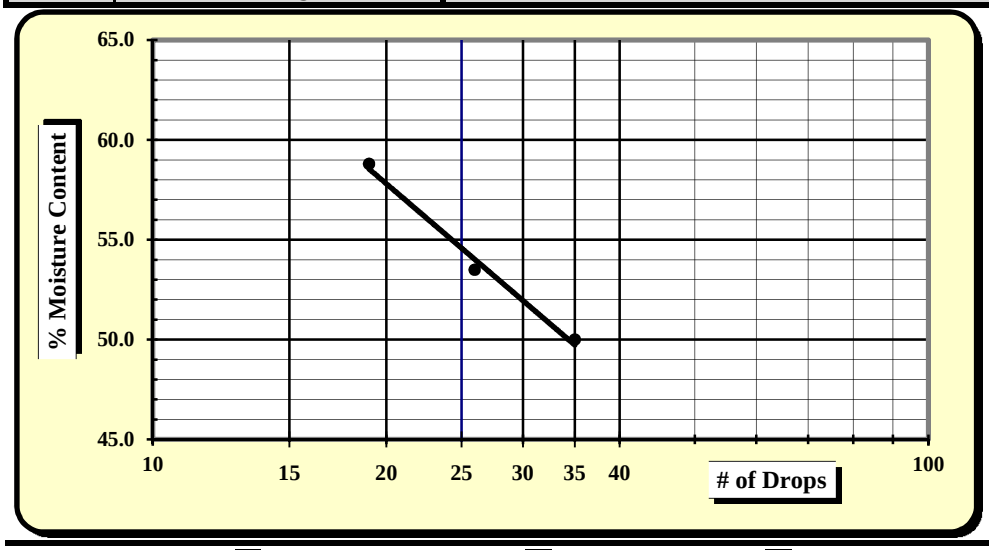
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-37	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Brown red, medium to fine, sandy ELASTIC SILT (MH) [A-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	43	44	45				46		
A	Tare Weight	28.40	25.79	25.12				27.59		
B	Wet Soil Weight + A	47.05	42.01	44.29				37.89		
C	Dry Soil Weight + A	40.83	36.36	37.19				34.72		
D	Water Weight (B-C)	6.22	5.65	7.10				3.17		
E	Dry Soil Weight (C-A)	12.43	10.57	12.07				7.13		
F	% Moisture (D/E)*100	50.0%	53.5%	58.8%				44.5%		
N	# OF DROPS	35	26	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**44.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**45**
Plastic Index	**10**
Group Symbol	**MH / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 63.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

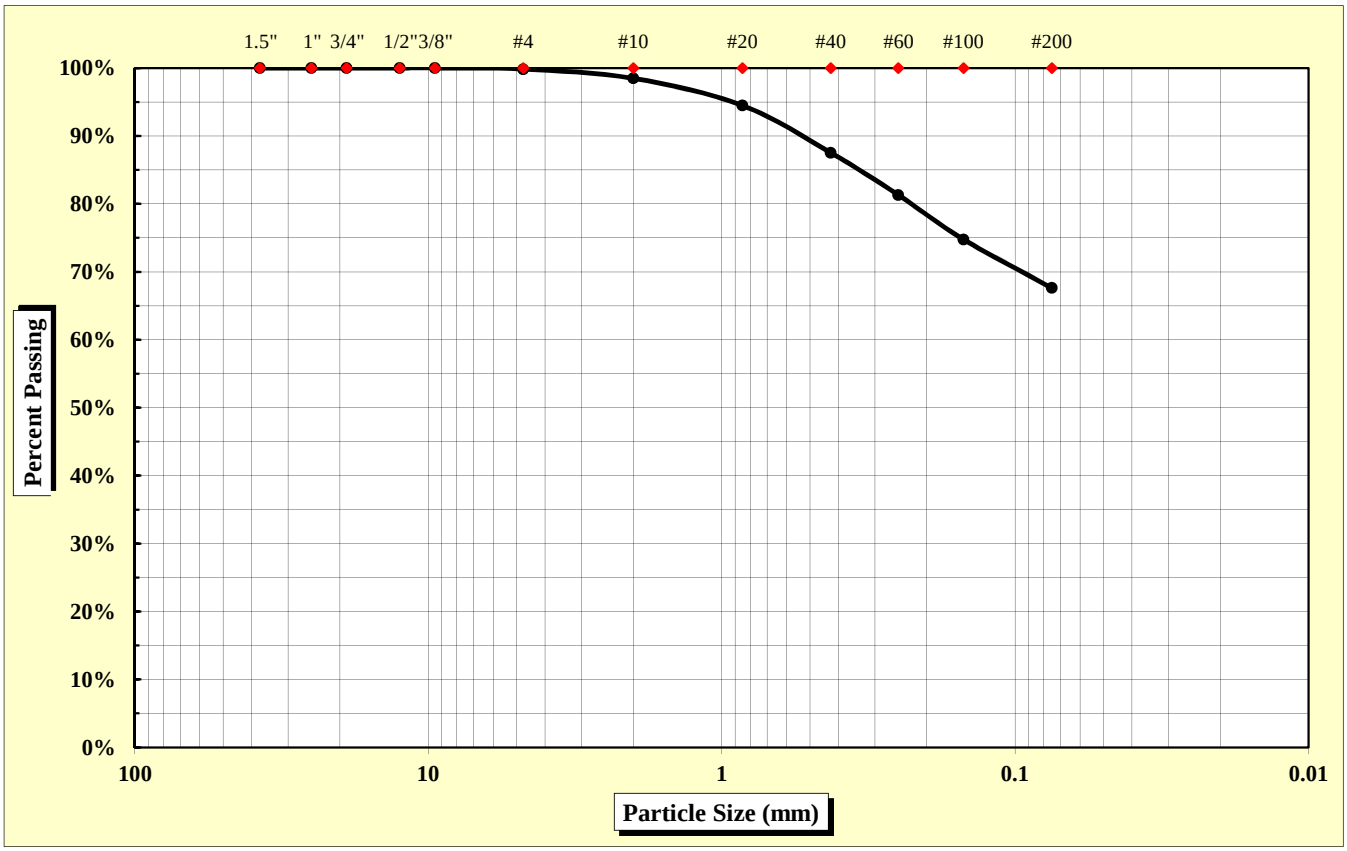
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-38	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.8 - 2.8'
Sample Description:	Red brown, medium to fine, trace mica, sandy LEAN CLAY (CL) [A-7-6 (15)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.5%	Fine Sand	19.9%
		Coarse Sand	10.9%	Silt & Clay	67.6%
Liquid Limit	48	Plastic Limit	25	Plastic Index	23
		Moisture Content	26.7%	Group Index	15

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

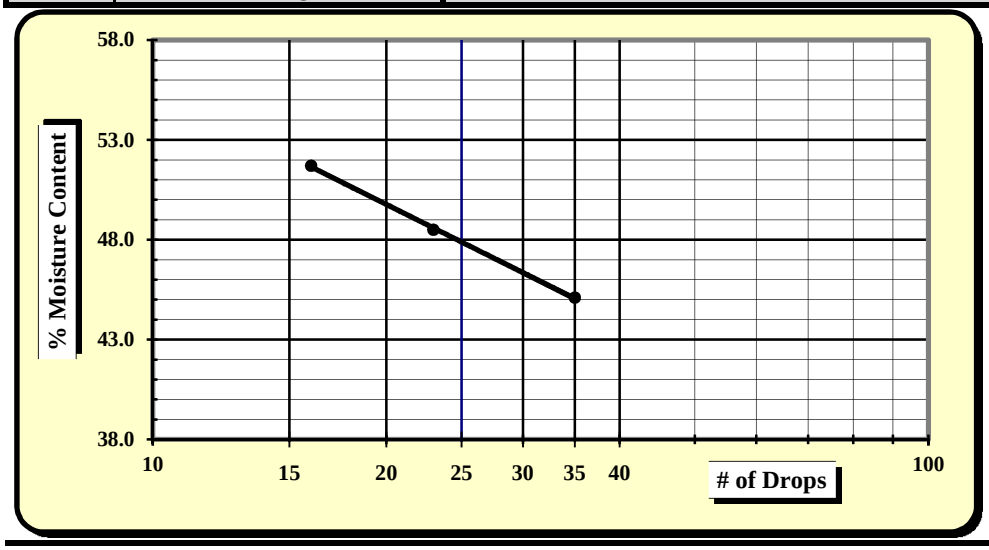
Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-38	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1	Type:	Split-spoon	Depth:	0.8 - 2.8'

Sample Description: Red brown, medium to fine, trace mica, sandy LEAN CLAY (CL) [A-7-6 (15)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-1	P-2	P-3				1		
A	Tare Weight	16.40	15.29	16.53				12.11		
B	Wet Soil Weight + A	36.03	36.90	36.61				20.91		
C	Dry Soil Weight + A	29.93	29.84	29.77				19.13		
D	Water Weight (B-C)	6.10	7.06	6.84				1.78		
E	Dry Soil Weight (C-A)	13.53	14.55	13.24				7.02		
F	% Moisture (D/E)*100	45.1%	48.5%	51.7%				25.4%		
N	# OF DROPS	35	23	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**25**
Plastic Index	**23**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

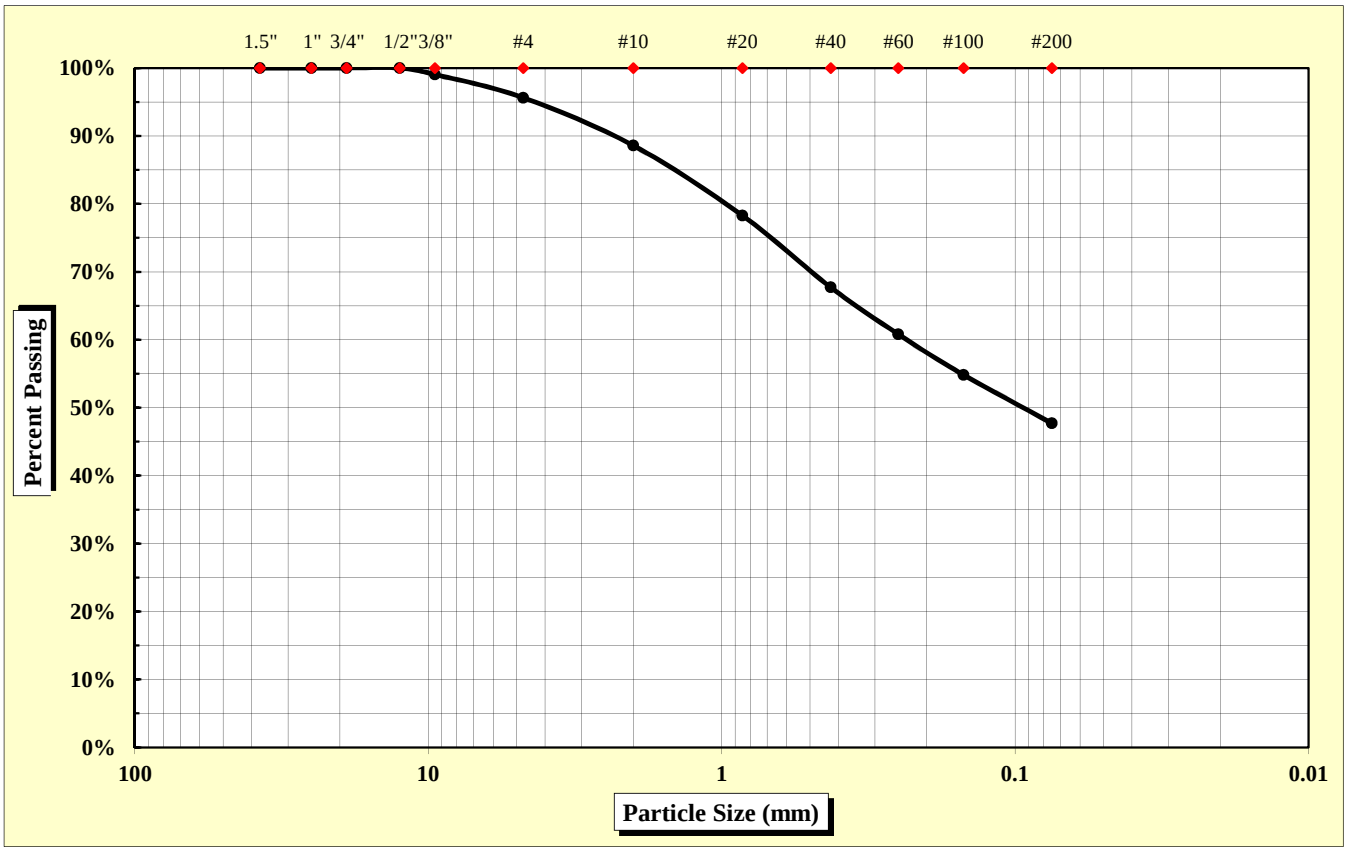
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-38	Sample #:	230	Sample Date:	10/19/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'
Sample Description:	Red orange brown, fine to medium, clayey SAND (SC) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	11.4%	Fine Sand	20.0%
		Coarse Sand	20.9%	Silt & Clay	47.7%
Liquid Limit	41	Plastic Limit	25	Plastic Index	16
		Moisture Content	23.4%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

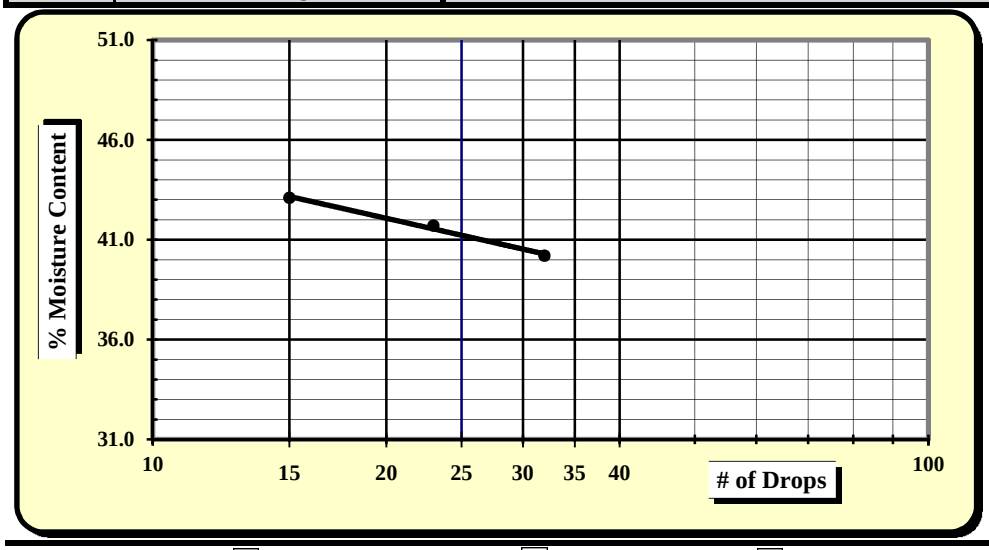
Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-38	Sample #:	230	Sample Date:	10/19/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'

Sample Description: Red orange brown, fine to medium, clayey SAND (SC) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.67	15.73				12.16		
B	Wet Soil Weight + A	38.73	38.52	38.06				21.33		
C	Dry Soil Weight + A	32.42	32.09	31.33				19.48		
D	Water Weight (B-C)	6.31	6.43	6.73				1.85		
E	Dry Soil Weight (C-A)	15.71	15.42	15.60				7.32		
F	% Moisture (D/E)*100	40.2%	41.7%	43.1%				25.3%		
N	# OF DROPS	32	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**25.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**25**
Plastic Index	**16**
Group Symbol	**SC / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

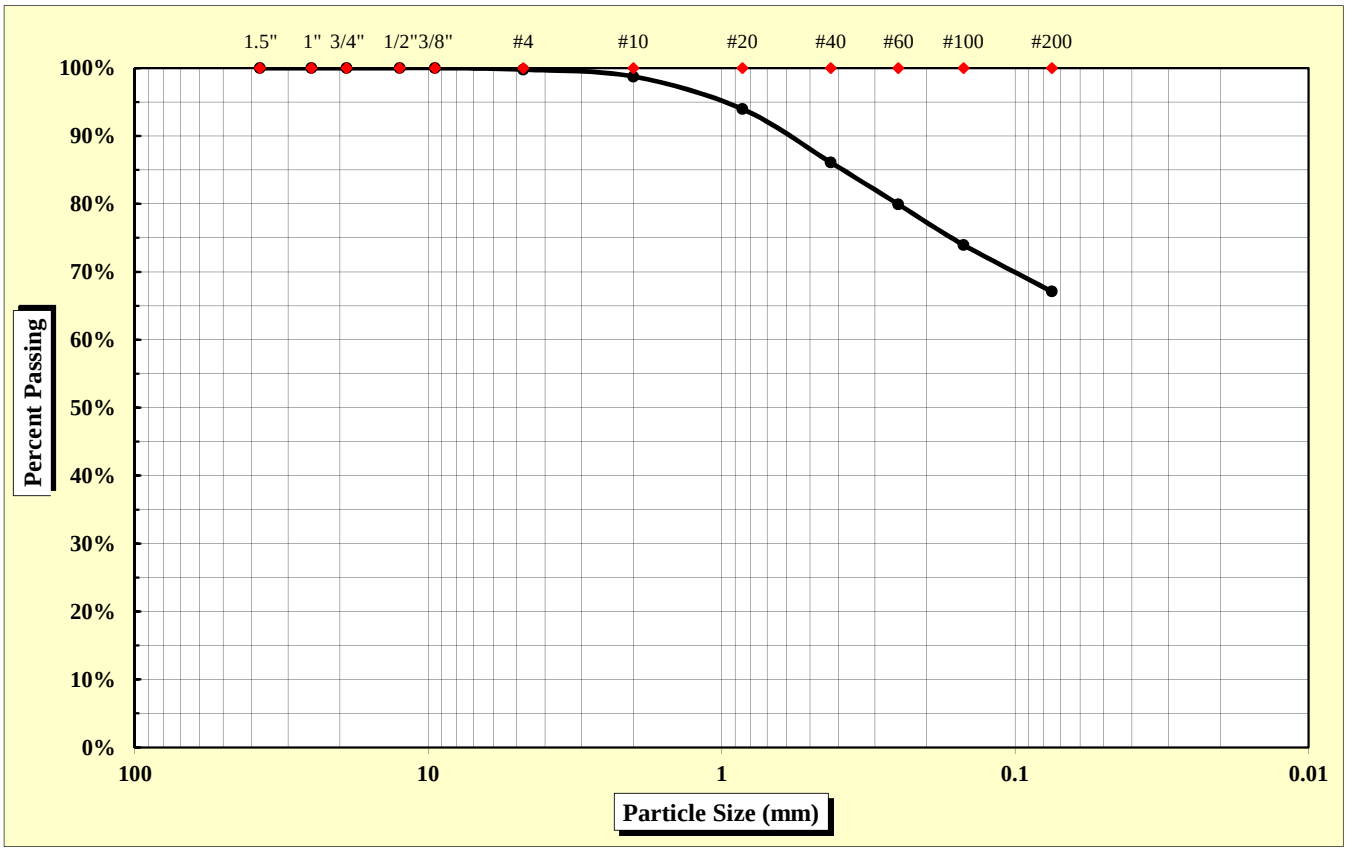
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-39	Sample #:	230	Sample Date:	10/22/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (15)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.2%	Fine Sand	19.0%
		Coarse Sand	12.6%	Silt & Clay	67.1%
Liquid Limit	48	Plastic Limit	24	Plastic Index	24
		Moisture Content	24.2%	Group Index	15

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

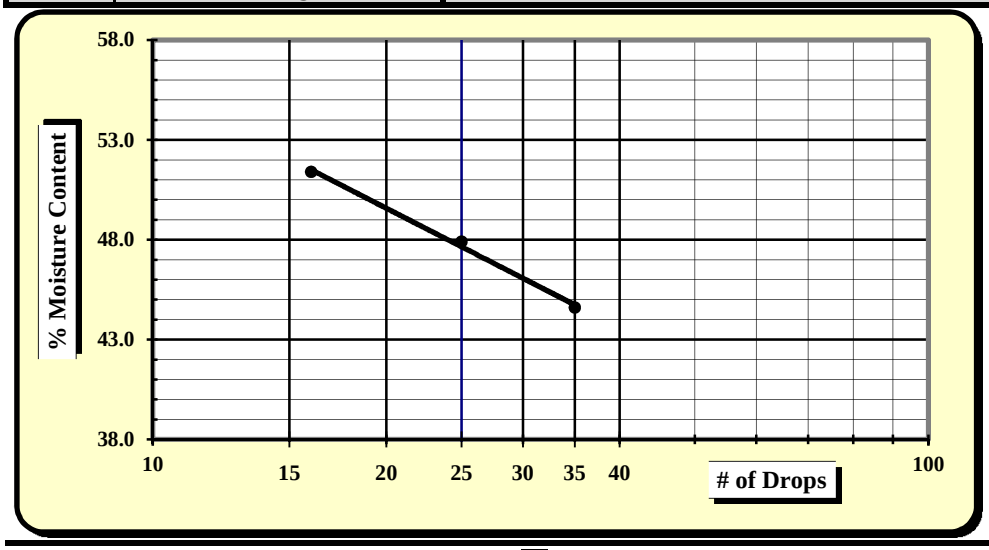
Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-39	Sample #:	230	Sample Date:	10/22/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (15)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.49	17.00				11.59		
B	Wet Soil Weight + A	36.74	37.06	36.12				20.40		
C	Dry Soil Weight + A	30.48	30.40	29.63				18.70		
D	Water Weight (B-C)	6.26	6.66	6.49				1.70		
E	Dry Soil Weight (C-A)	14.03	13.91	12.63				7.11		
F	% Moisture (D/E)*100	44.6%	47.9%	51.4%				23.9%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**24**
Plastic Index	**24**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 67.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

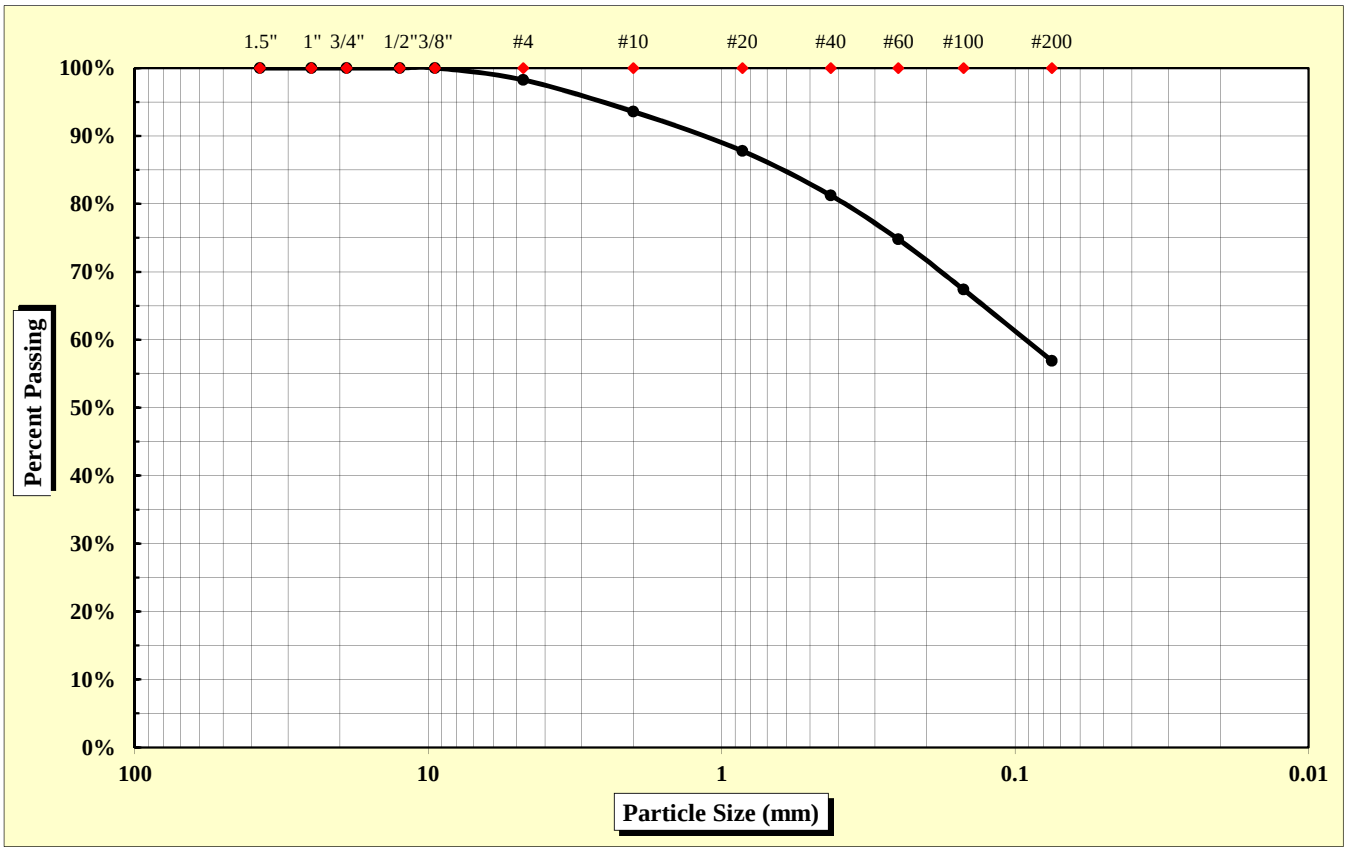
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-39	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Light red orange brown, medium to fine, micaceous, sandy SILT (ML) [A-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.4%	Fine Sand	24.3%
		Coarse Sand	12.3%	Silt & Clay	56.9%
Liquid Limit	45	Plastic Limit	35	Plastic Index	10
		Moisture Content	23.3%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

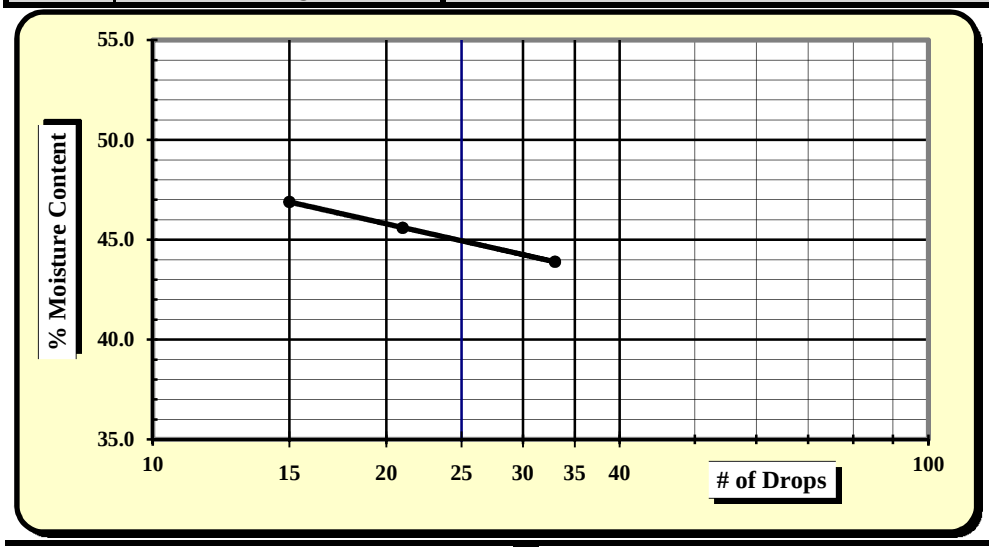
Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-39	Sample #:	230	Sample Date:	10/22/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Light red orange brown, medium to fine, micaceous, sandy SILT (ML) [A-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.94	16.65	16.78				12.26		
B	Wet Soil Weight + A	38.78	38.56	37.92				21.38		
C	Dry Soil Weight + A	31.81	31.70	31.17				19.04		
D	Water Weight (B-C)	6.97	6.86	6.75				2.34		
E	Dry Soil Weight (C-A)	15.87	15.05	14.39				6.78		
F	% Moisture (D/E)*100	43.9%	45.6%	46.9%				34.5%		
N	# OF DROPS	33	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**35**
Plastic Index	**10**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

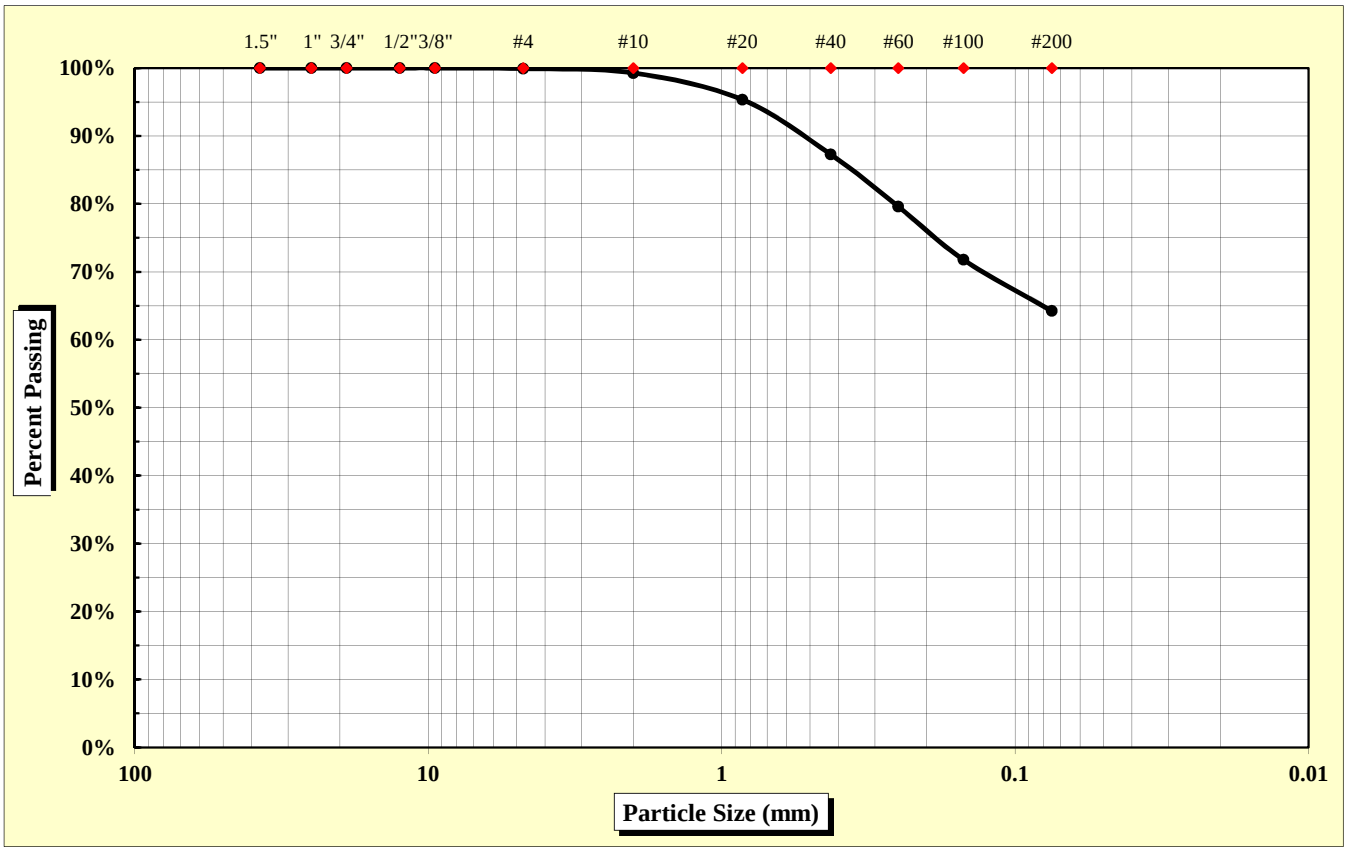
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-40	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1.3 - 5.3'
Sample Description:	Red brown, medium to fine, sandy FAT CLAY (CH) [A-7-6 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.7%	Fine Sand	23.1%
		Coarse Sand	12.0%	Silt & Clay	64.2%
Liquid Limit	50	Plastic Limit	27	Plastic Index	23
		Moisture Content	23.0%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

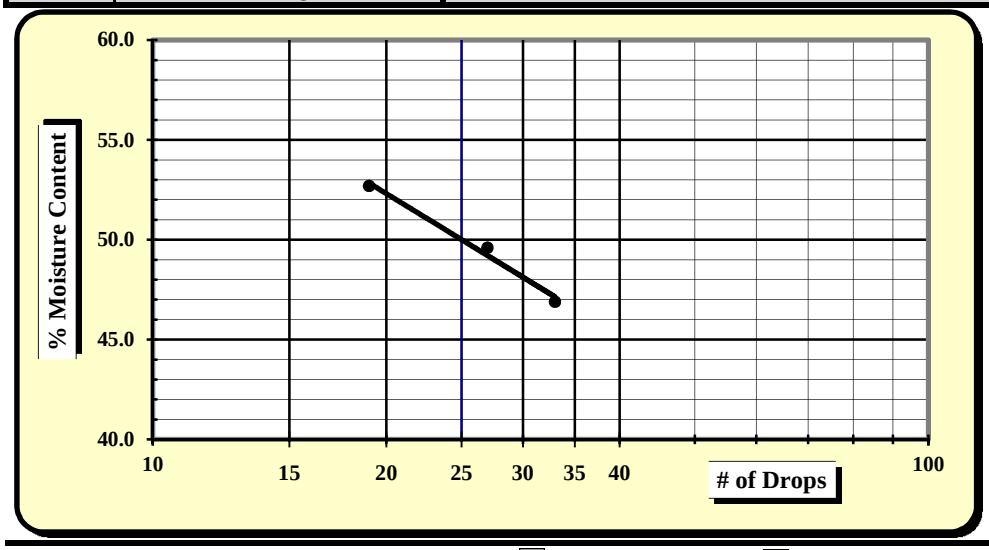
Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-40	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	1.3 - 5.3'

Sample Description: Red brown, medium to fine, sandy FAT CLAY (CH) [A-7-6 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.63	16.65	15.97				12.10		
B	Wet Soil Weight + A	36.90	36.53	37.18				21.11		
C	Dry Soil Weight + A	30.43	29.94	29.86				19.17		
D	Water Weight (B-C)	6.47	6.59	7.32				1.94		
E	Dry Soil Weight (C-A)	13.80	13.29	13.89				7.07		
F	% Moisture (D/E)*100	46.9%	49.6%	52.7%				27.4%		
N	# OF DROPS	33	27	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**50**
Plastic Limit	**27**
Plastic Index	**23**
Group Symbol	**CH / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

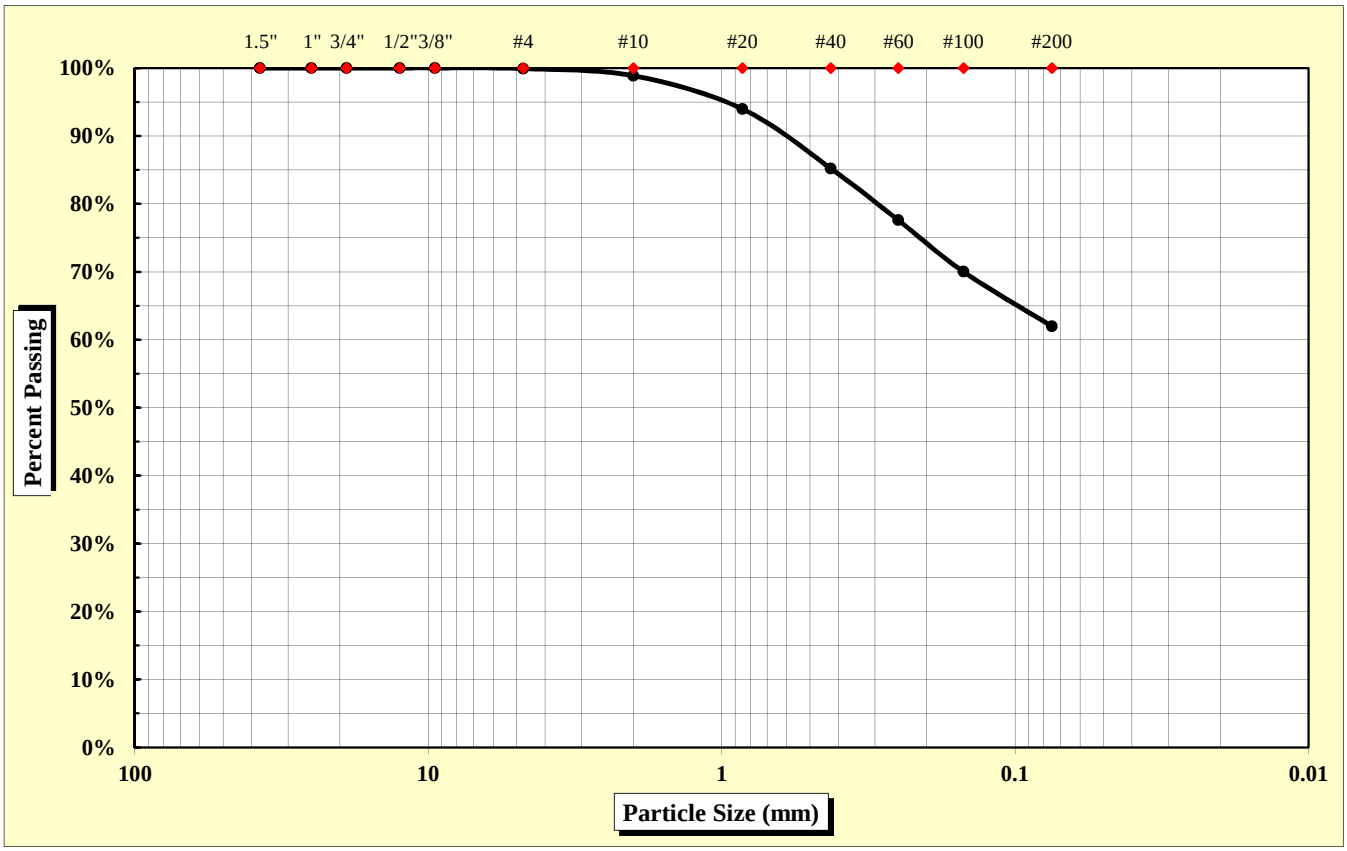
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/20 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-40	Sample #:	230	Sample Date:	10/19/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	7.3 - 11.3'
Sample Description:	Red brown, medium to fine, sandy SILT (ML) [A-7-5 (10)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.1%	Fine Sand	23.2%
		Coarse Sand	13.6%	Silt & Clay	62.0%
Liquid Limit	48	Plastic Limit	30	Plastic Index	18
		Moisture Content	23.4%	Group Index	10

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

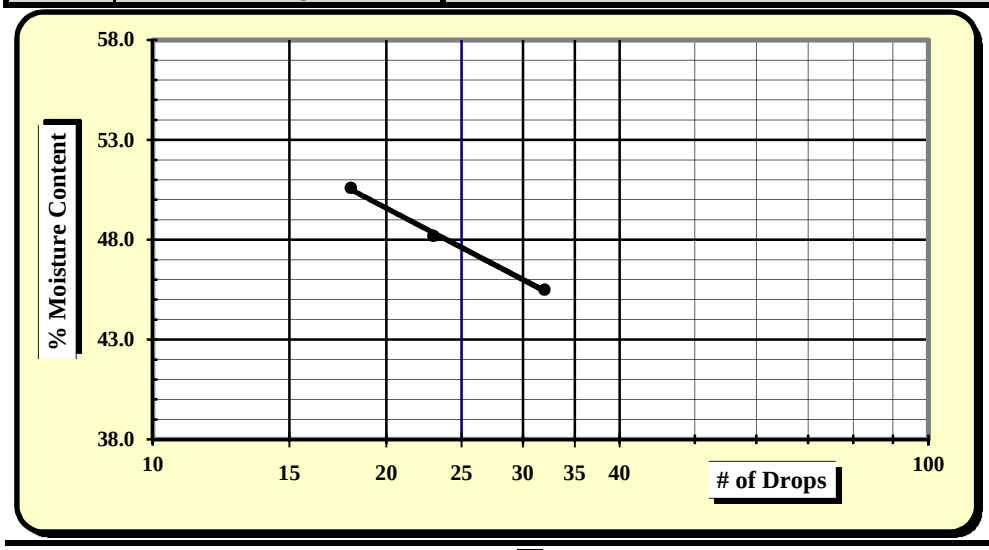
S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

Project #:	**1426-14-161**	Report Date:	12/2/15
Project Name:	I-85 Widening MM80-96	Test Date:	12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-40	Sample #:	230	Sample Date:	10/19/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	7.3 - 11.3'
Sample Description:	Red brown, medium to fine, sandy SILT (ML) [A-7-5 (10)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.70	16.86	16.81				12.29		
B	Wet Soil Weight + A	38.46	39.76	39.40				22.17		
C	Dry Soil Weight + A	31.66	32.31	31.81				19.89		
D	Water Weight (B-C)	6.80	7.45	7.59				2.28		
E	Dry Soil Weight (C-A)	14.96	15.45	15.00				7.60		
F	% Moisture (D/E)*100	45.5%	48.2%	50.6%				30.0%		
N	# OF DROPS	32	23	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.0%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**30**
Plastic Index	**18**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 62.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	12/2/15	Brian Vaughan, P.E.	12/2/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

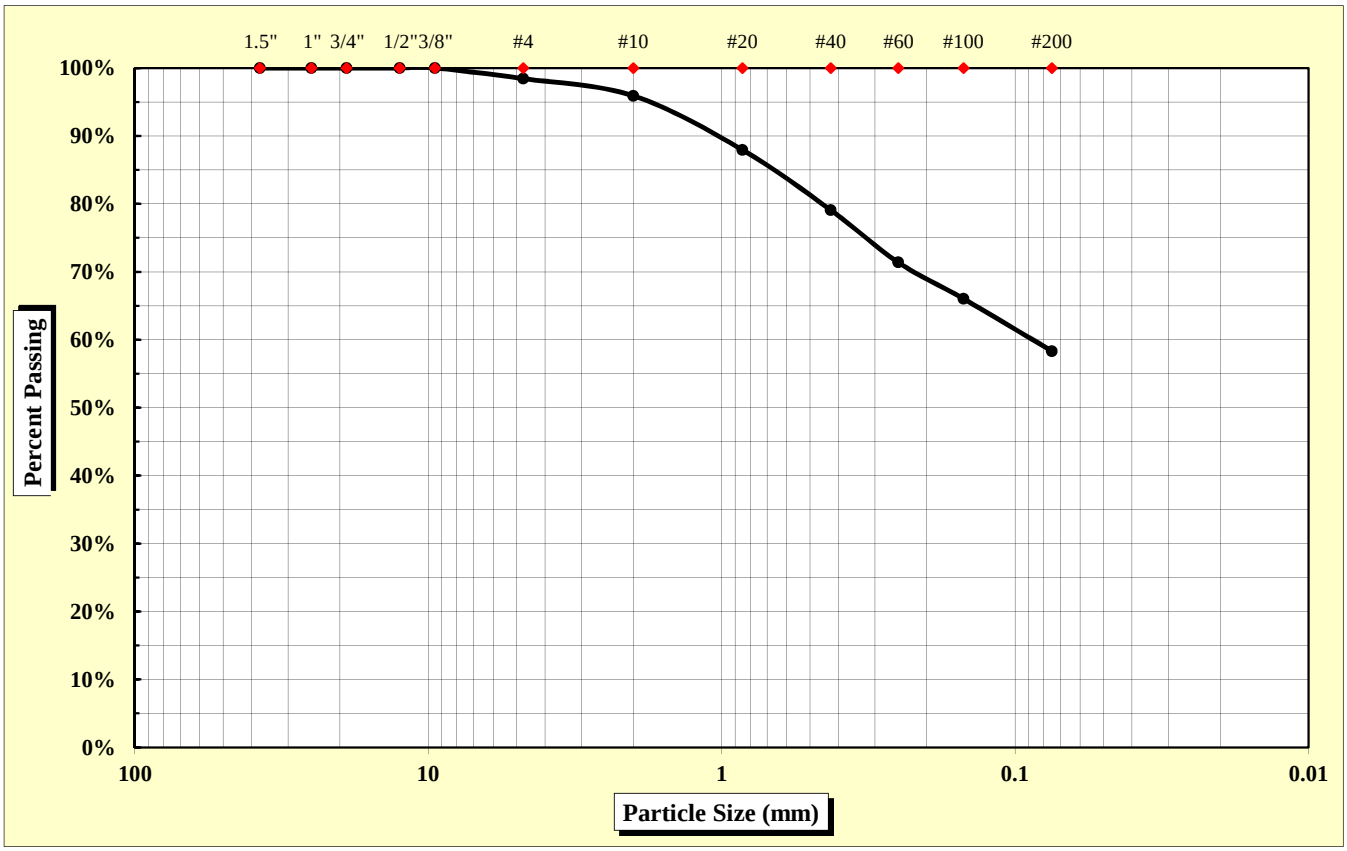
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, medium to fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.1%	Fine Sand	20.7%
		Coarse Sand	16.8%	Silt & Clay	58.3%
Liquid Limit	54	Plastic Limit	37	Plastic Index	17
		Moisture Content	27.6%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

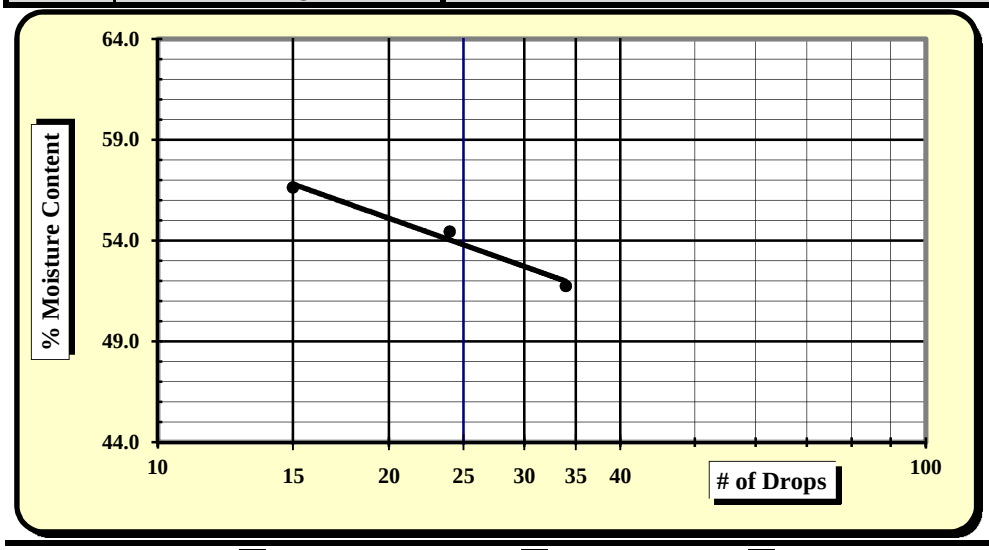
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, medium to fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (9)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	55	812				15		
A	Tare Weight	15.30	15.23	16.72				12.45		
B	Wet Soil Weight + A	28.32	27.23	28.53				23.50		
C	Dry Soil Weight + A	23.88	23.00	24.26				20.52		
D	Water Weight (B-C)	4.44	4.23	4.27				2.98		
E	Dry Soil Weight (C-A)	8.58	7.77	7.54				8.07		
F	% Moisture (D/E)*100	51.7%	54.4%	56.6%				36.9%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**36.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**37**
Plastic Index	**17**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 58.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

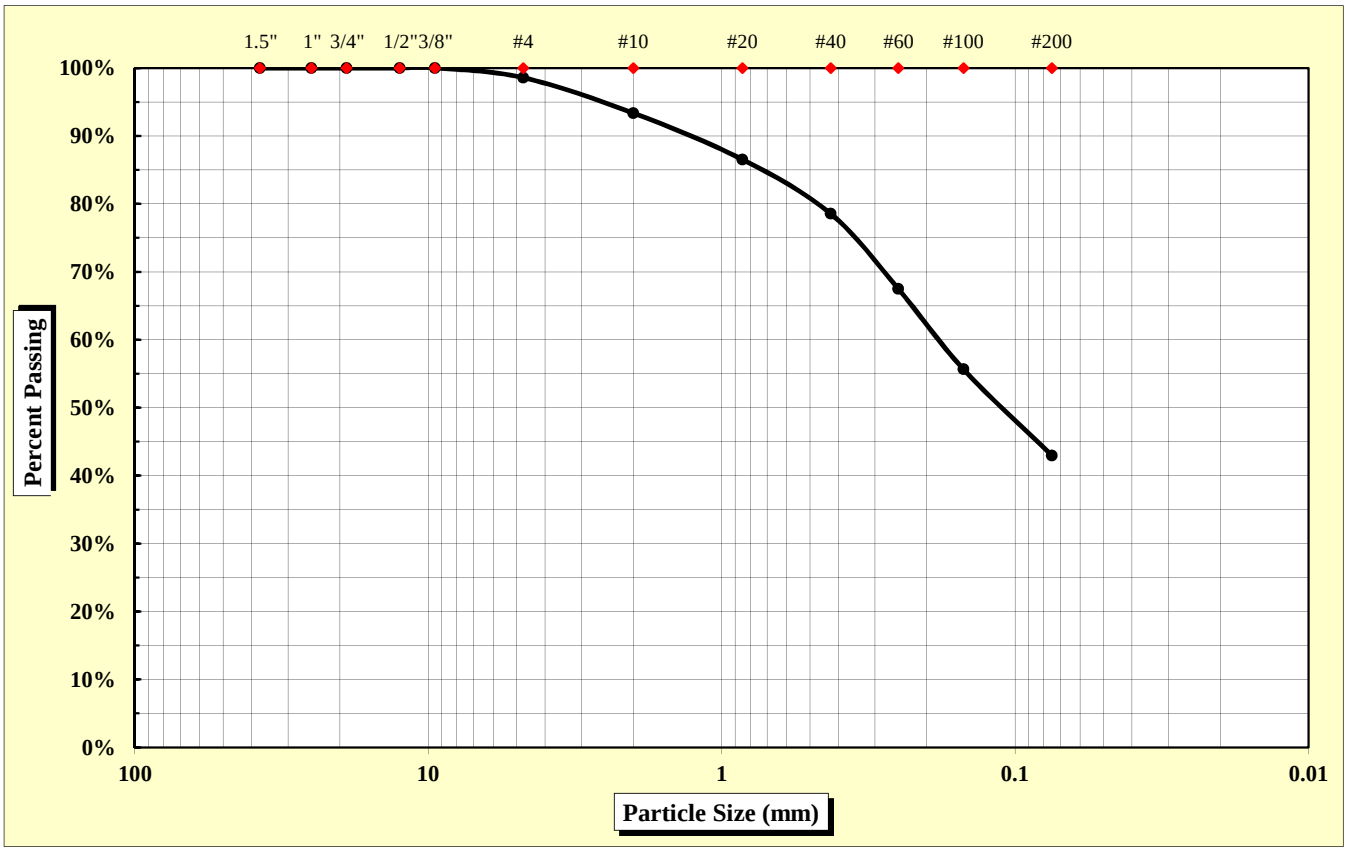
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Brown, medium to fine, micaceous, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.6%	Fine Sand	35.6%
		Coarse Sand	14.8%	Silt & Clay	43.0%
Liquid Limit	46	Plastic Limit	41	Plastic Index	5
		Moisture Content	23.8%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

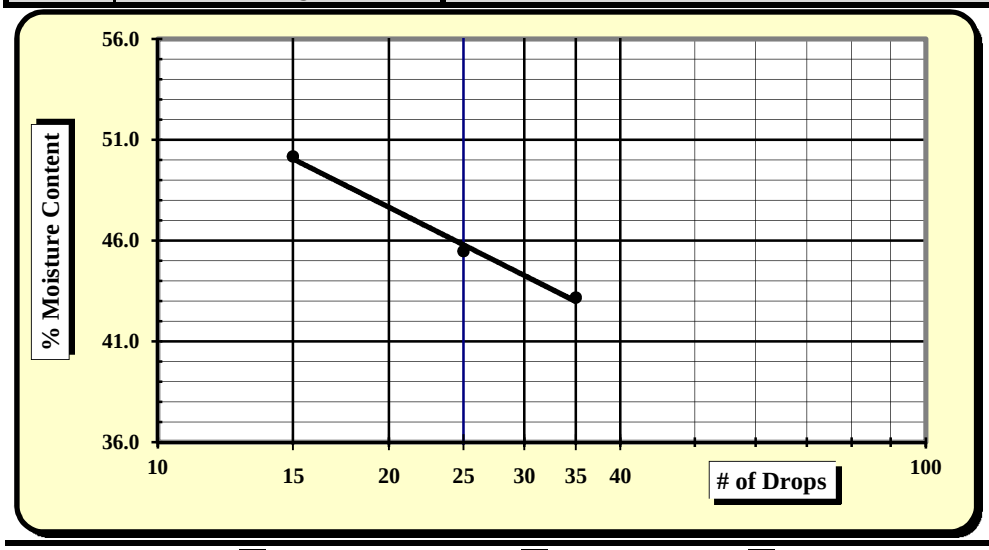
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Brown, medium to fine, micaceous, silty SAND (SM) [A-5 (0)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	3	5	808				2		
A	Tare Weight	15.31	10.99	16.69				11.09		
B	Wet Soil Weight + A	26.95	24.20	29.65				20.74		
C	Dry Soil Weight + A	23.44	20.07	25.32				17.93		
D	Water Weight (B-C)	3.51	4.13	4.33				2.81		
E	Dry Soil Weight (C-A)	8.13	9.08	8.63				6.84		
F	% Moisture (D/E)*100	43.2%	45.5%	50.2%				41.1%		
N	# OF DROPS	35	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**41.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**41**
Plastic Index	**5**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

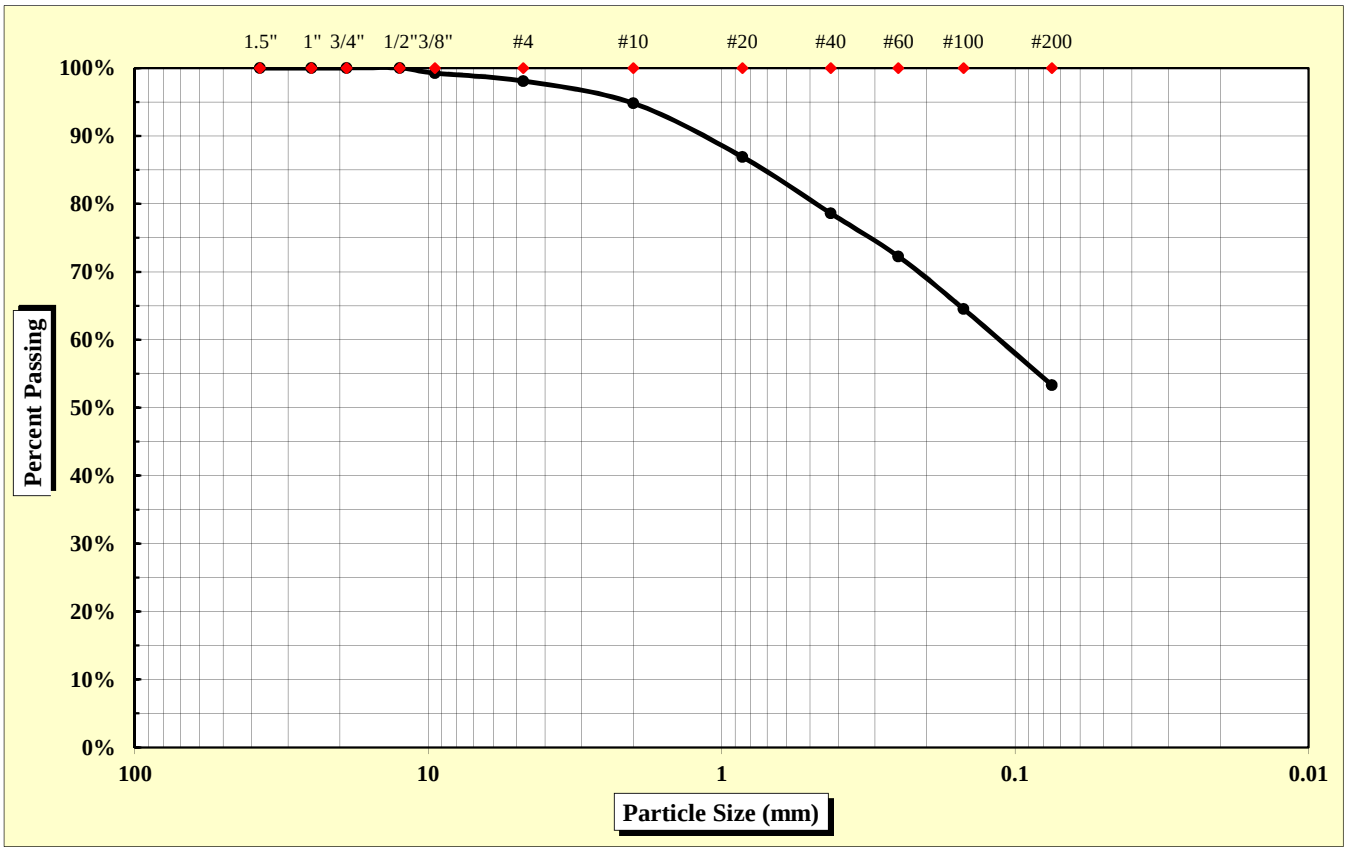
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Brown, medium to fine, micaceous, sandy SILT (ML) [A-7-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.2%	Fine Sand	25.3%
		Coarse Sand	16.2%	Silt & Clay	53.3%
Liquid Limit	47	Plastic Limit	36	Plastic Index	11
		Moisture Content	35.4%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

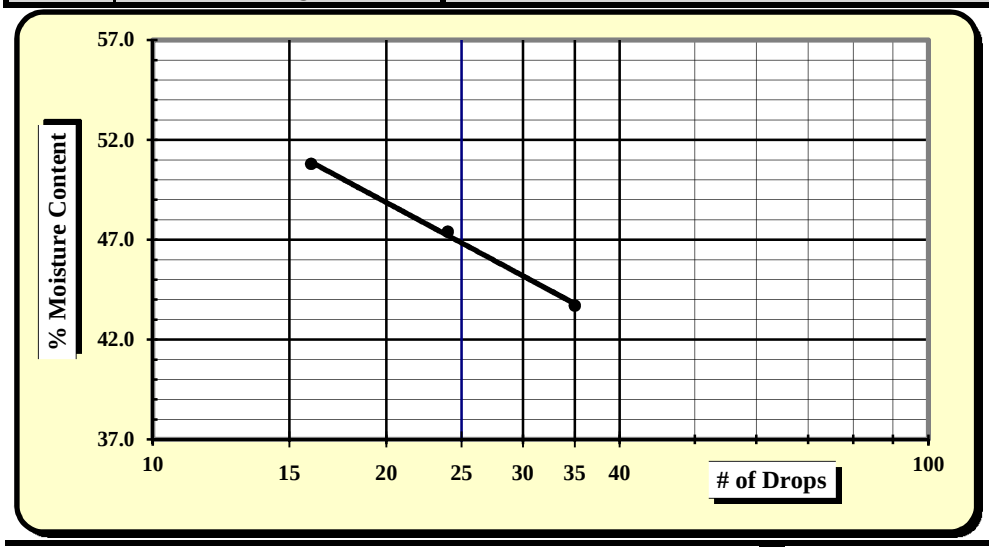
Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/20/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown, medium to fine, micaceous, sandy SILT (ML) [A-7-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-1	Q-2	Q-3				2		
A	Tare Weight	16.71	16.67	15.73				12.16		
B	Wet Soil Weight + A	39.17	39.16	38.56				19.55		
C	Dry Soil Weight + A	32.34	31.93	30.87				17.61		
D	Water Weight (B-C)	6.83	7.23	7.69				1.94		
E	Dry Soil Weight (C-A)	15.63	15.26	15.14				5.45		
F	% Moisture (D/E)*100	43.7%	47.4%	50.8%				35.6%		
N	# OF DROPS	35	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**36**
Plastic Index	**11**
Group Symbol	**ML / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 53.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/24/15	Brian Vaughan, P.E.	11/24/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

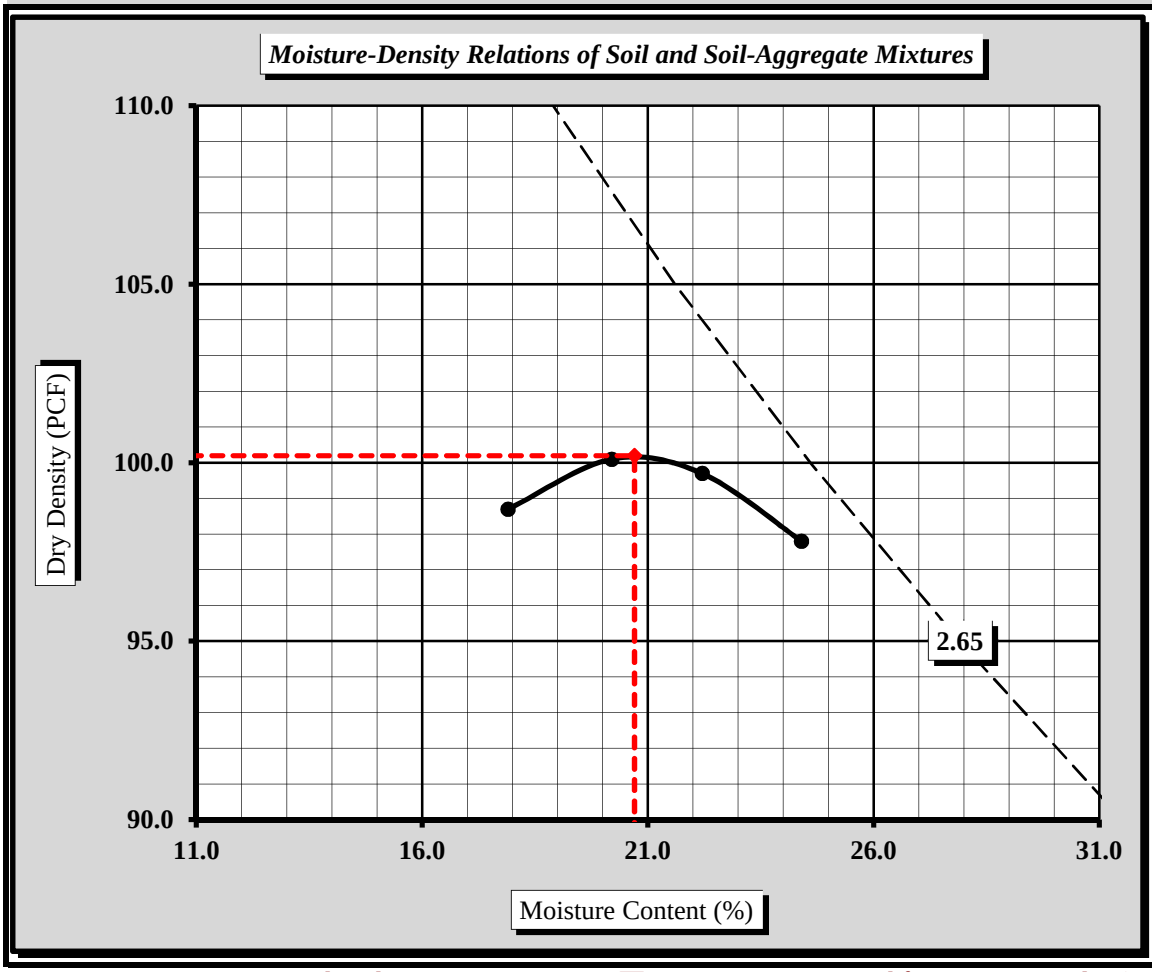
S&ME Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-41	Sample #:	230	Sample Date:	10/19/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown, medium to fine, micaceous, sandy SILT (ML) [A-7-5 (5)]

Maximum Dry Density 100.2 PCF. Optimum Moisture Content 20.7%

AASHTO T 99 - - Method A



Soil Properties

Natural Moisture Content	**35.4%**
Specific Gravity of Soil (T 100)	**2.650**
Liquid Limit	**47**
Plastic Limit	**36**
Plastic Index	**11**

% Passing

1/2"	100.0%
3/8"	99.2%
#4	98.1%
#10	94.8%
#40	78.6%
#60	72.3%
#100	64.6%
#200	53.3%

Oversize Fraction

Bulk Gravity
% Moisture
% Oversize
MDD
Opt. MC

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/24/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

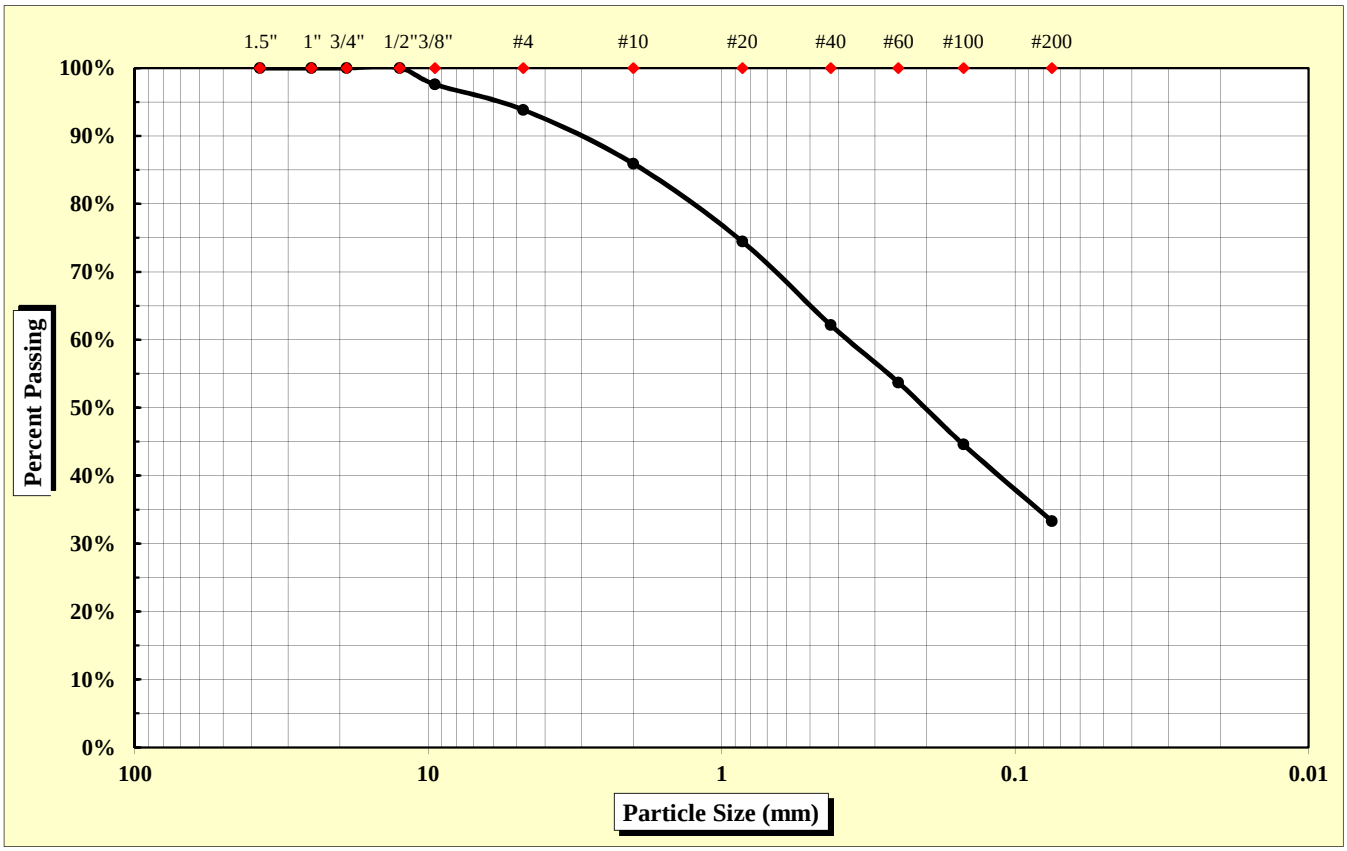
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-42	Sample #:	230	Sample Date:	10/16/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Brown, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	14.1%	Fine Sand	28.8%
		Coarse Sand	23.8%	Silt & Clay	33.3%
Liquid Limit	35	Plastic Limit	29	Plastic Index	6
		Moisture Content	13.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

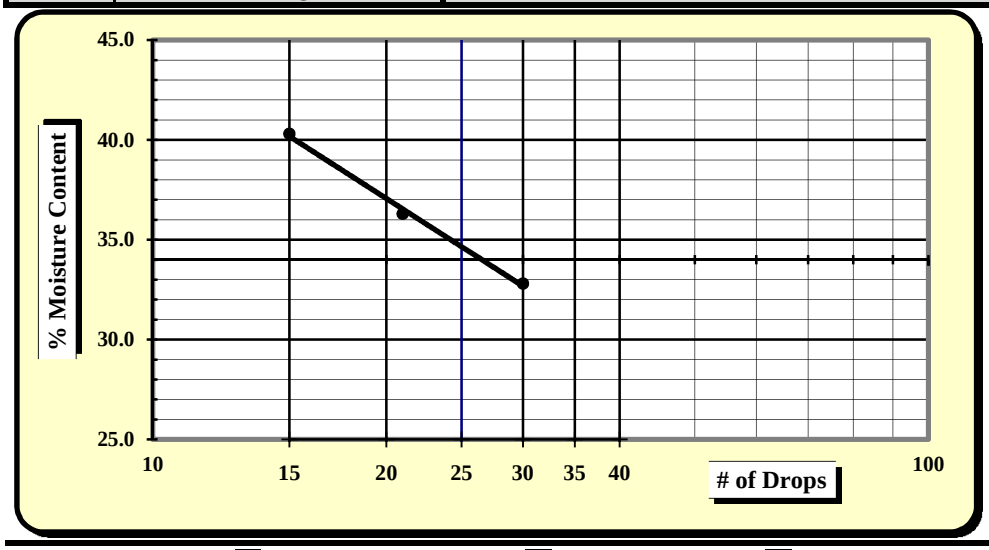
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-42	Sample #:	230	Sample Date:	10/16/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Brown, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.90	26.82	26.69				26.68		
B	Wet Soil Weight + A	43.50	44.94	41.73				36.28		
C	Dry Soil Weight + A	39.40	40.11	37.41				34.10		
D	Water Weight (B-C)	4.10	4.83	4.32				2.18		
E	Dry Soil Weight (C-A)	12.50	13.29	10.72				7.42		
F	% Moisture (D/E)*100	32.8%	36.3%	40.3%				29.4%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**29**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

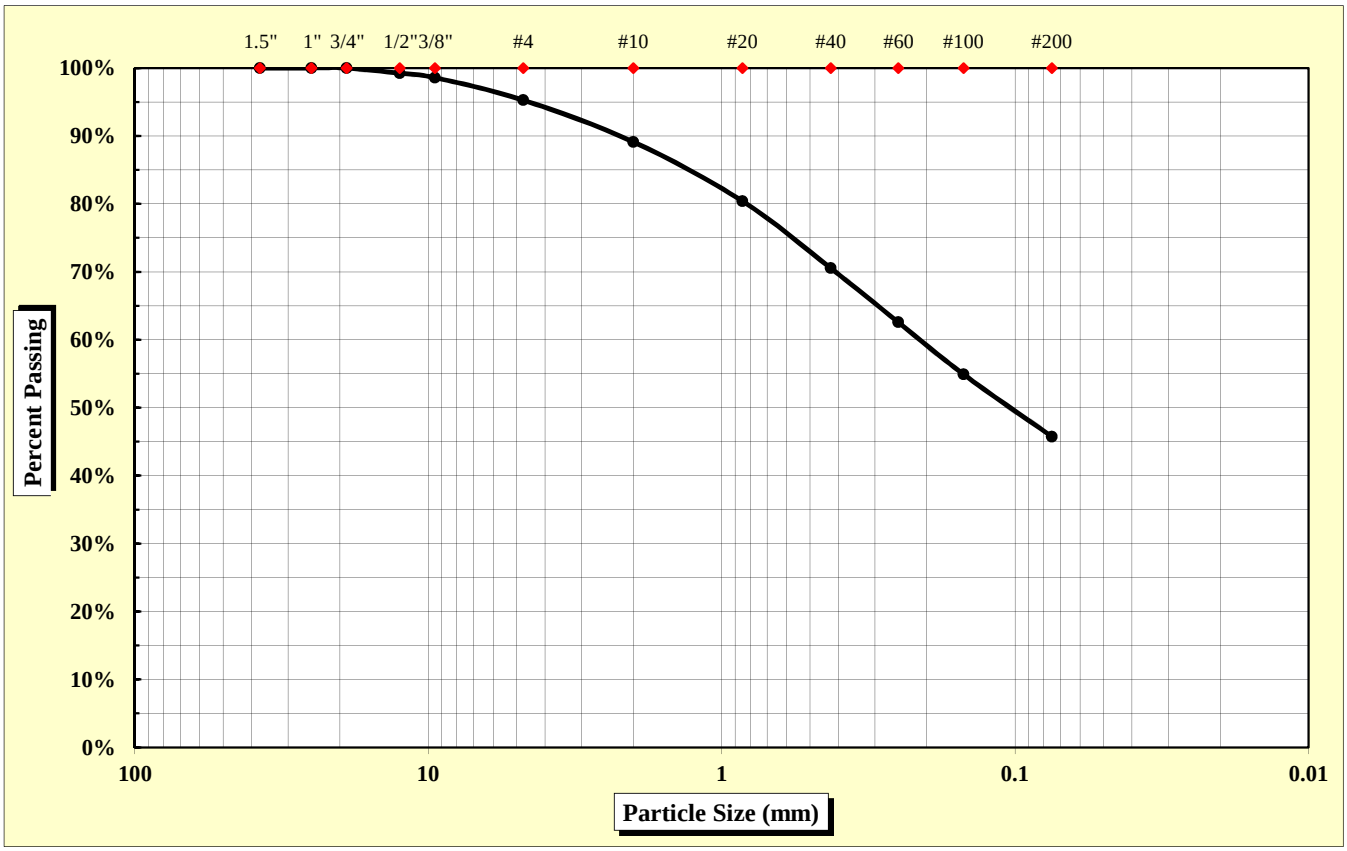
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-42	Sample #:	230	Sample Date:	10/16/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Brown, medium to fine, micaceous, silty SAND (SM) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	10.9%	Fine Sand	24.8%
		Coarse Sand	18.6%	Silt & Clay	45.7%
Liquid Limit	33	Plastic Limit	24	Plastic Index	9
		Moisture Content	13.7%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

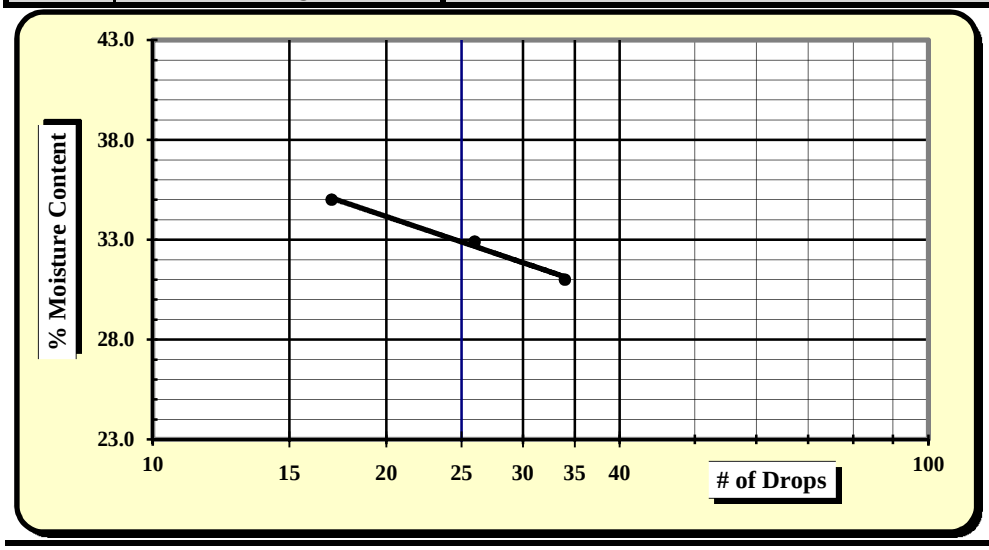
Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-42	Sample #:	230	Sample Date:	10/16/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown, medium to fine, micaceous, silty SAND (SM) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Y-1	Y-2	Y-3				3		
A	Tare Weight	16.45	16.49	16.99				11.59		
B	Wet Soil Weight + A	37.05	37.80	38.22				19.91		
C	Dry Soil Weight + A	32.18	32.52	32.72				18.30		
D	Water Weight (B-C)	4.87	5.28	5.50				1.61		
E	Dry Soil Weight (C-A)	15.73	16.03	15.73				6.71		
F	% Moisture (D/E)*100	31.0%	32.9%	35.0%				24.0%		
N	# OF DROPS	34	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**24.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**33**
Plastic Limit	**24**
Plastic Index	**9**
Group Symbol	**SM / A-4**
Multipoint Method	☐
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/24/15	Brian Vaughan, P.E.	11/24/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

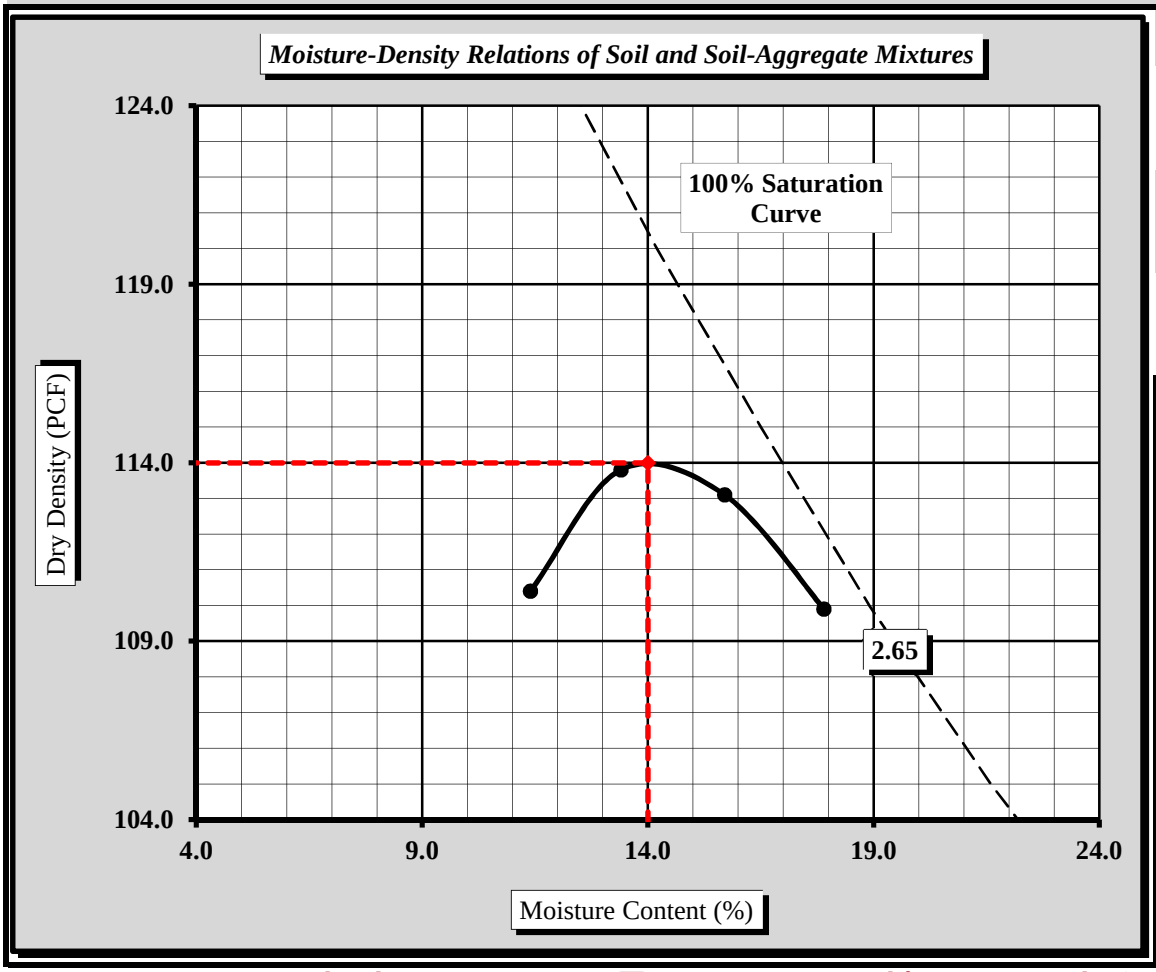
S&ME Project #:	**1426-14-161**	Report Date:	11/24/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-42	Sample #:	230	Sample Date:	10/16/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown, medium to fine, micaceous, silty SAND (SM) [A-4 (2)]

Maximum Dry Density 114.0 PCF. Optimum Moisture Content 14.0%

AASHTO T 99 - - Method A



Soil Properties

Natural Moisture Content	**13.7%**
Specific Gravity of Soil (T 100)	**2.650**
Liquid Limit	**33**
Plastic Limit	**24**
Plastic Index	**9**

% Passing

1/2"	99.2%
3/8"	98.6%
#4	95.3%
#10	89.1%
#40	70.5%
#60	62.6%
#100	54.9%
#200	45.7%

Oversize Fraction

Bulk Gravity
% Moisture
% Oversize
MDD
Opt. MC

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/24/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

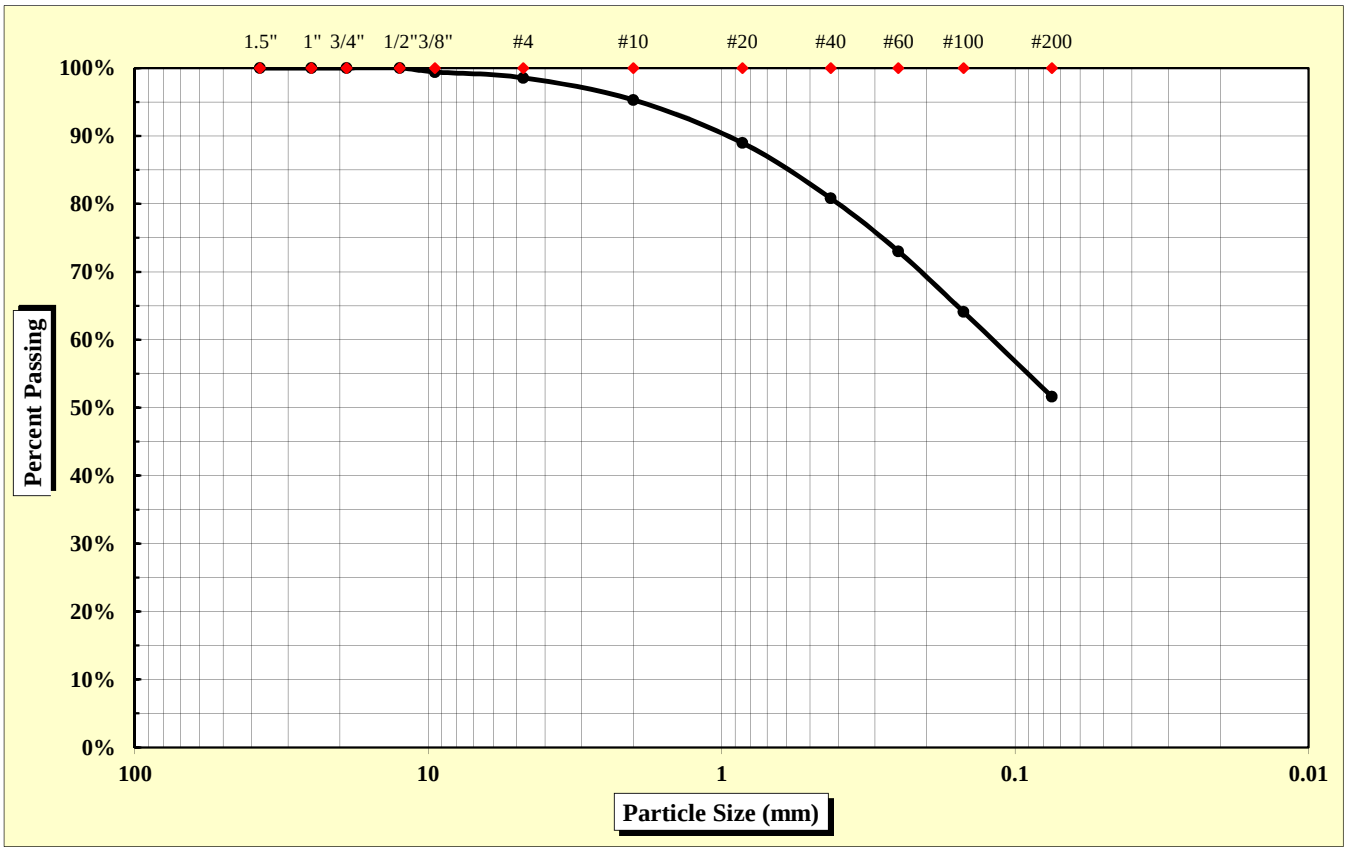
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/23 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-9	Sample #:	241	Sample Date:	10/16/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Red brown, medium to fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	4.7%	Fine Sand	29.2%
		Coarse Sand	14.5%	Silt & Clay	51.6%
Liquid Limit	54	Plastic Limit	35	Plastic Index	19
		Moisture Content	21.7%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

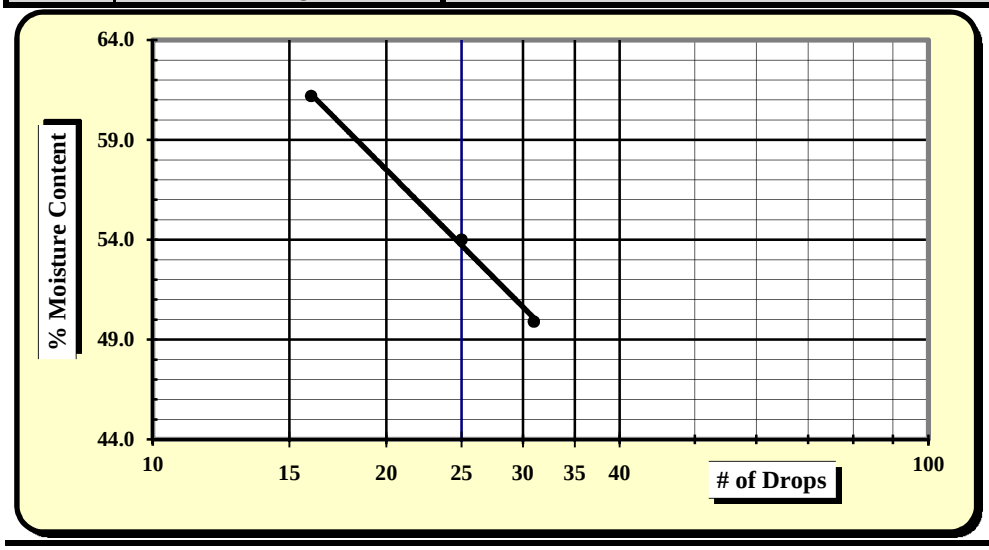
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-9	Sample #:	241	Sample Date:	10/16/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Red brown, medium to fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	3A	xx1	15				J5		
A	Tare Weight	15.00	12.26	15.14				12.11		
B	Wet Soil Weight + A	25.42	21.10	22.36				20.14		
C	Dry Soil Weight + A	21.95	18.00	19.62				18.04		
D	Water Weight (B-C)	3.47	3.10	2.74				2.10		
E	Dry Soil Weight (C-A)	6.95	5.74	4.48				5.93		
F	% Moisture (D/E)*100	49.9%	54.0%	61.2%				35.4%		
N	# OF DROPS	31	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**35**
Plastic Index	**19**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

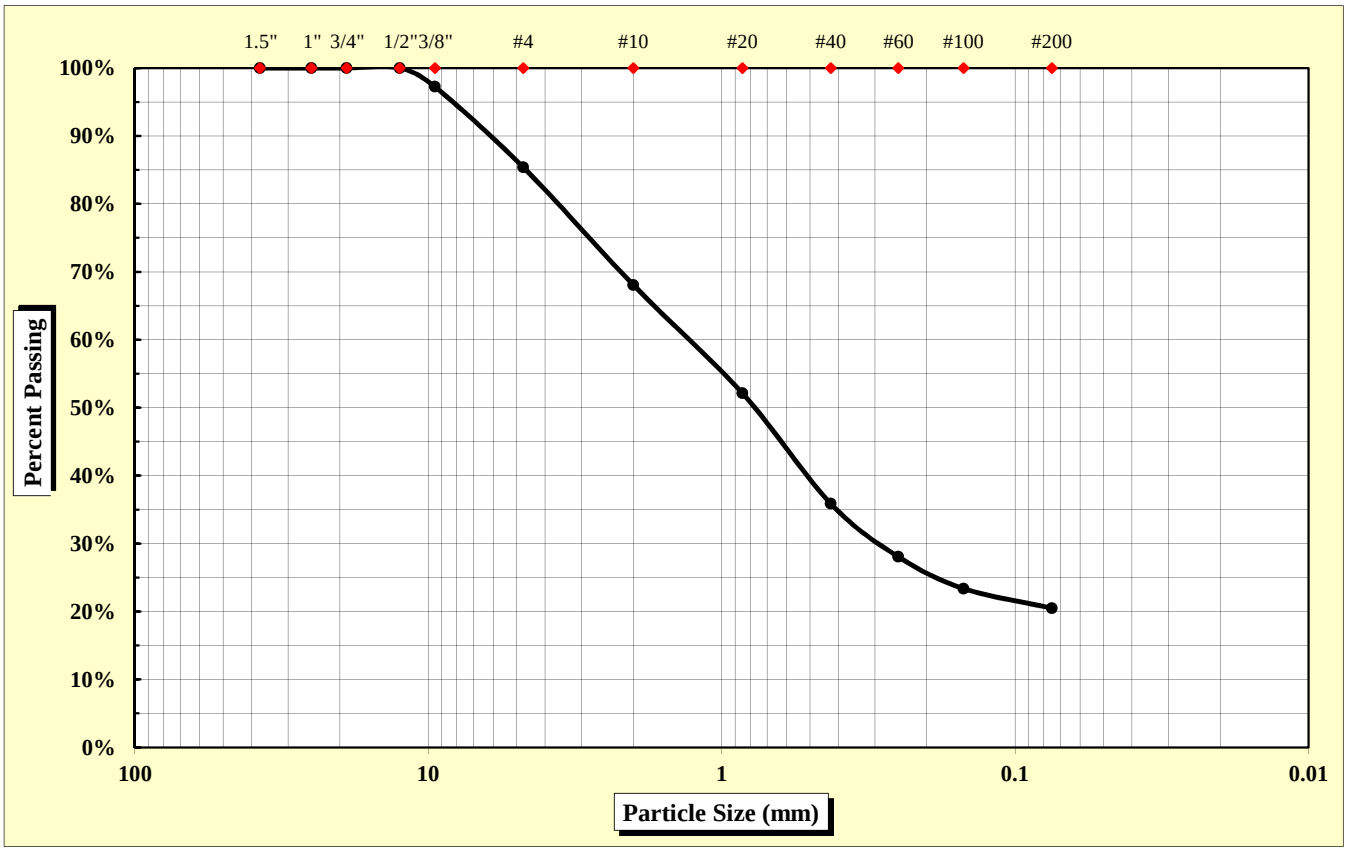
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-9	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red white, fine to coarse, clayey SAND, with gravel (SC) [A-2-6 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	31.9%	Fine Sand	15.4%
		Coarse Sand	32.2%	Silt & Clay	20.5%
Liquid Limit	40	Plastic Limit	21	Plastic Index	19
		Moisture Content	31.7%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

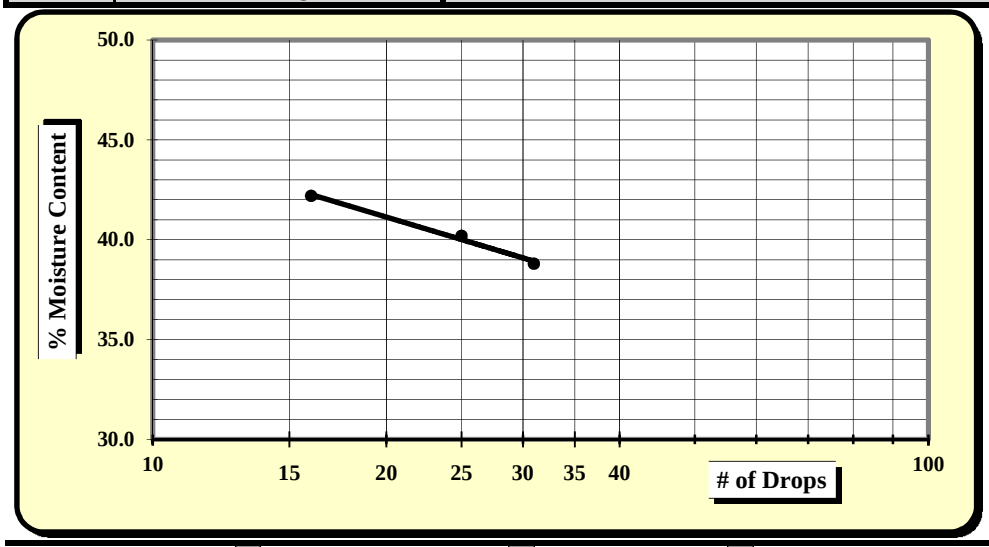
Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/5/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-9	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red white, fine to coarse, clayey SAND, with gravel (SC) [A-2-6 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	5	Liquid Limit						Plastic Limit		
	Tare #:	24	219	217				227		
A	Tare Weight	20.74	20.82	20.84				20.87		
B	Wet Soil Weight + A	33.30	34.81	31.92				28.97		
C	Dry Soil Weight + A	29.79	30.80	28.63				27.56		
D	Water Weight (B-C)	3.51	4.01	3.29				1.41		
E	Dry Soil Weight (C-A)	9.05	9.98	7.79				6.69		
F	% Moisture (D/E)*100	38.8%	40.2%	42.2%				21.1%		
N	# OF DROPS	31	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**21**
Plastic Index	**19**
Group Symbol	**SC / A-2-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 20.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/5/2015	Brian Vaughan, P.E.	11/5/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

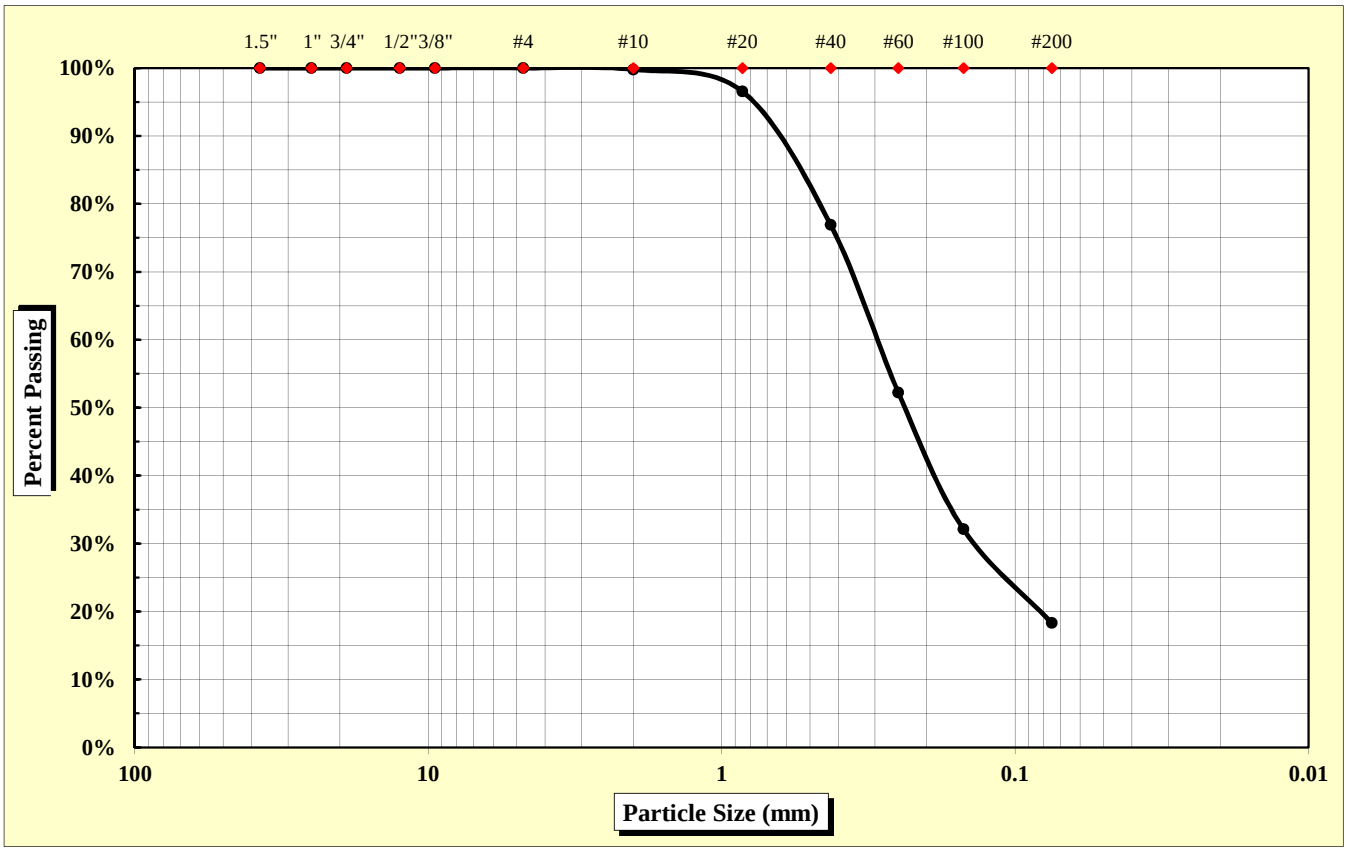
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-9	Sample #:	241	Sample Date:	10/16/15
Location:	SS-7	Type:	Split-spoon	Depth:	18.5 - 20'
Sample Description:	Light brown, medium to fine, slightly micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	58.6%
		Coarse Sand	22.9%	Silt & Clay	18.3%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	20.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

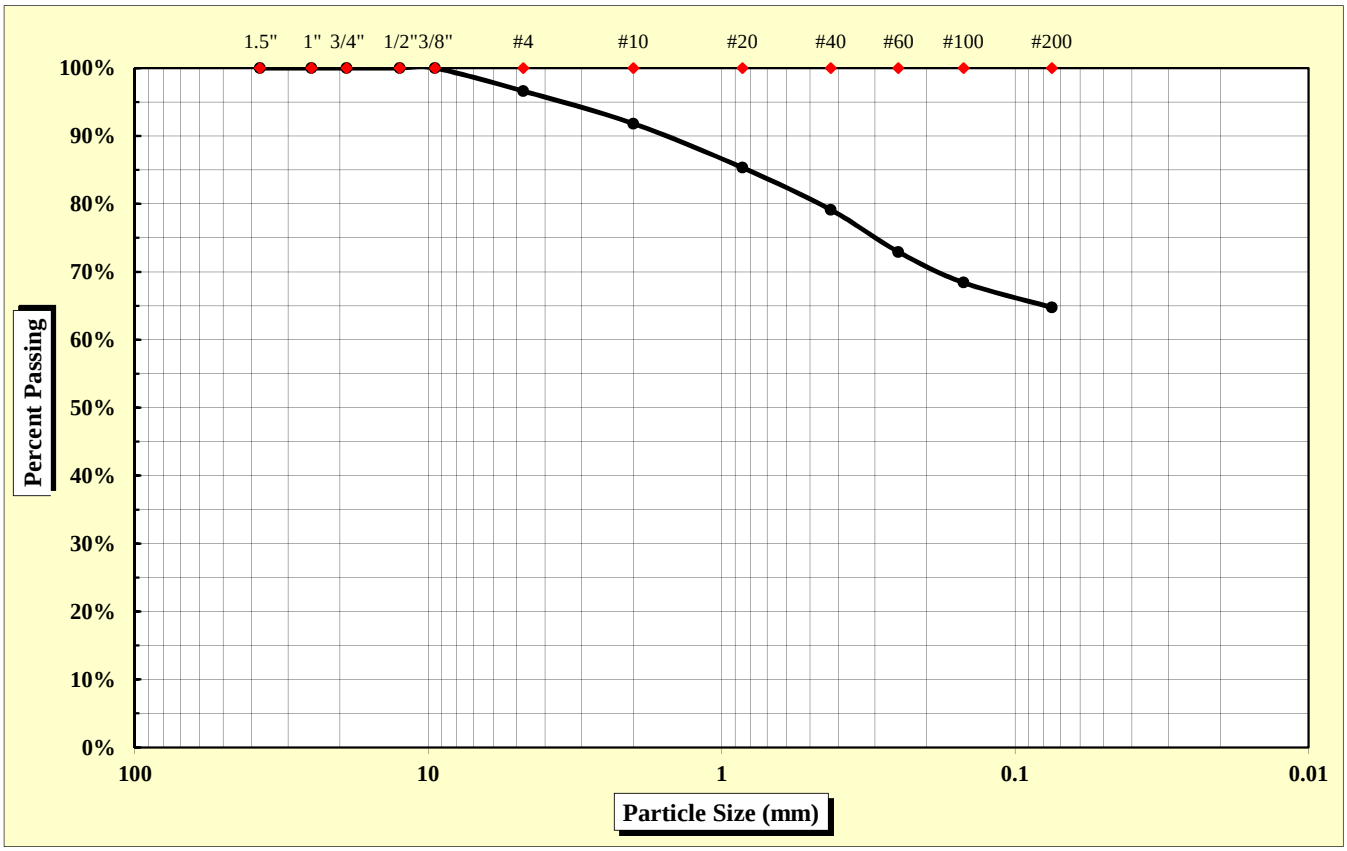
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-10	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	9 - 11'
Sample Description:	Red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (16)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	8.2%	Fine Sand	14.4%
		Coarse Sand	12.7%	Silt & Clay	64.8%
Liquid Limit	60	Plastic Limit	37	Plastic Index	23
		Moisture Content	30.5%	Group Index	16

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

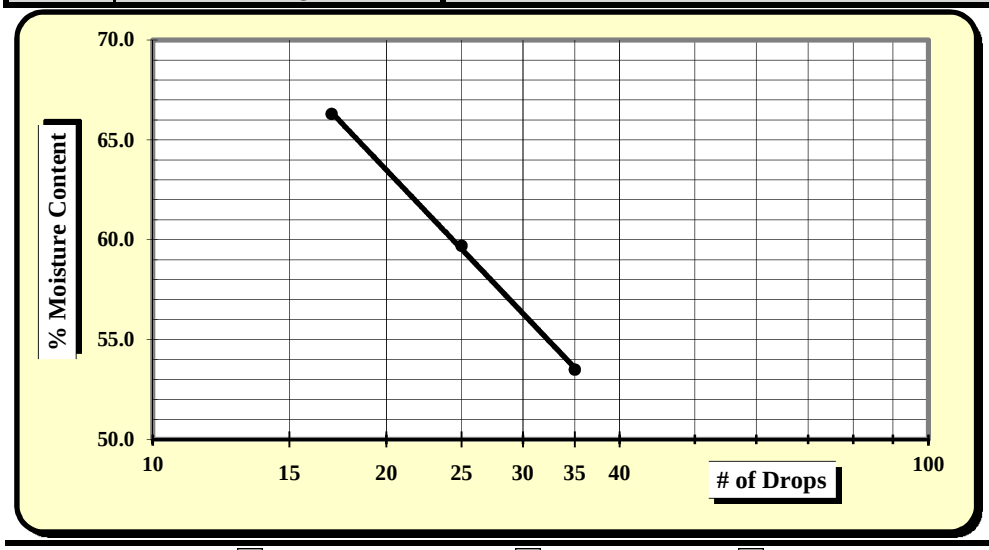
Project #:	**1426-14-161**	Report Date:	11/5/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/5/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-10	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-5	Type:	Split-spoon	Depth:	9 - 11'

Sample Description: Red, medium to fine, sandy ELASTIC SILT (MH) [A-7-5 (16)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	30	Liquid Limit						Plastic Limit		
	Tare #:	211	43	9				37		
A	Tare Weight	20.84	20.68	20.74				20.73		
B	Wet Soil Weight + A	29.36	30.23	30.57				29.66		
C	Dry Soil Weight + A	26.39	26.66	26.65				27.25		
D	Water Weight (B-C)	2.97	3.57	3.92				2.41		
E	Dry Soil Weight (C-A)	5.55	5.98	5.91				6.52		
F	% Moisture (D/E)*100	53.5%	59.7%	66.3%				37.0%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**60**
Plastic Limit	**37**
Plastic Index	**23**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/5/2015	Brian Vaughan, P.E.	11/5/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

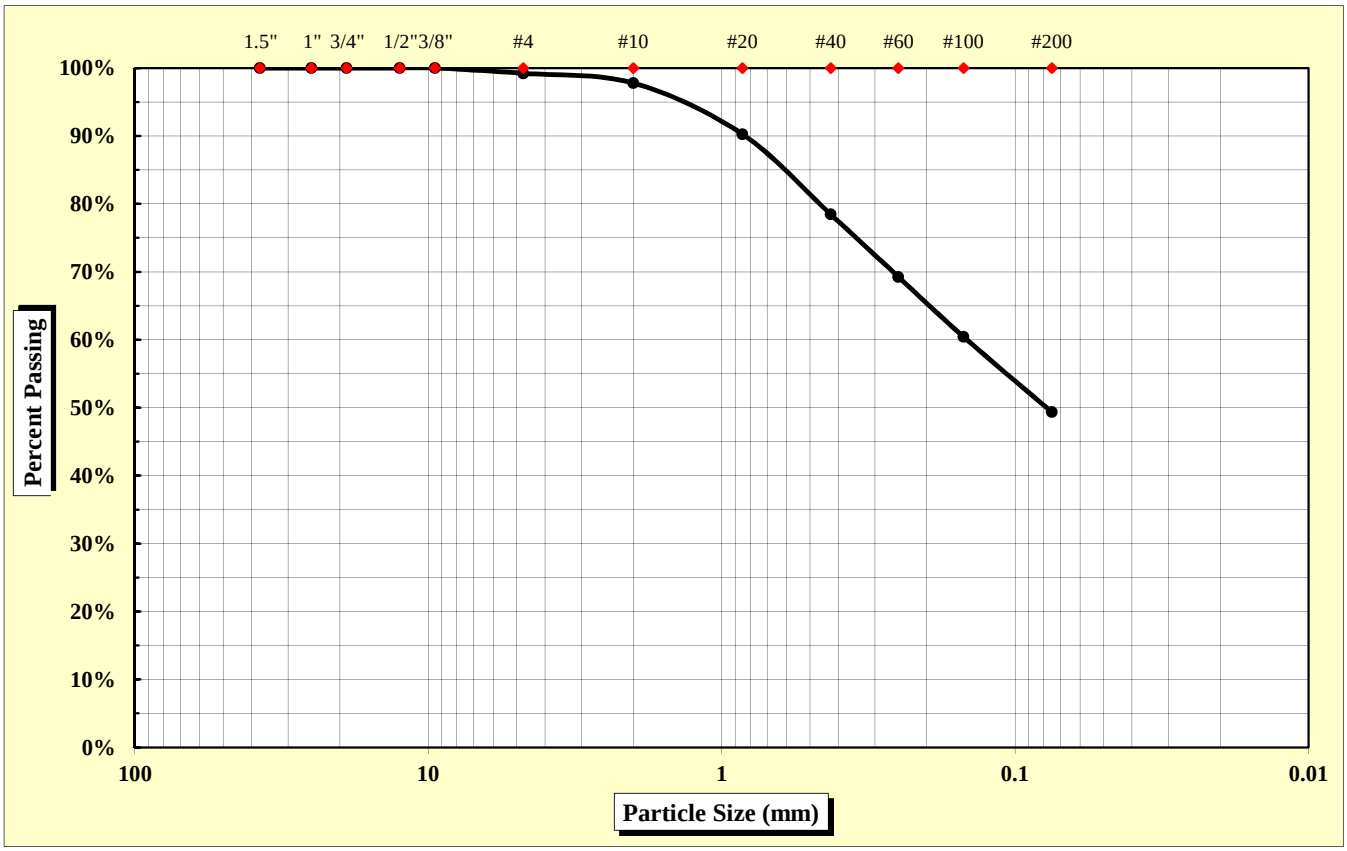
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-10	Sample #:	241	Sample Date:	10/16/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Red brown, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.2%	Fine Sand	29.1%
		Coarse Sand	19.3%	Silt & Clay	49.4%
Liquid Limit	54	Plastic Limit	33	Plastic Index	21
		Moisture Content	24.7%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

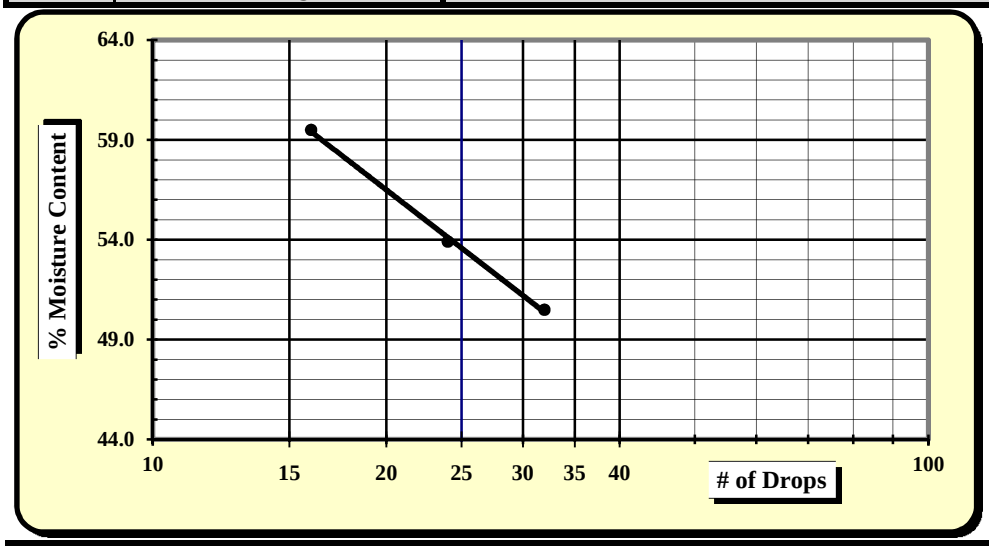
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	C-10	Sample #:	241	Sample Date:	10/16/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Red brown, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	106	xx6	103				504		
A	Tare Weight	12.12	12.08	12.41				12.50		
B	Wet Soil Weight + A	20.46	21.39	20.18				20.51		
C	Dry Soil Weight + A	17.66	18.13	17.28				18.51		
D	Water Weight (B-C)	2.80	3.26	2.90				2.00		
E	Dry Soil Weight (C-A)	5.54	6.05	4.87				6.01		
F	% Moisture (D/E)*100	50.5%	53.9%	59.5%				33.3%		
N	# OF DROPS	32	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**54**
Plastic Limit	**33**
Plastic Index	**21**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 49.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

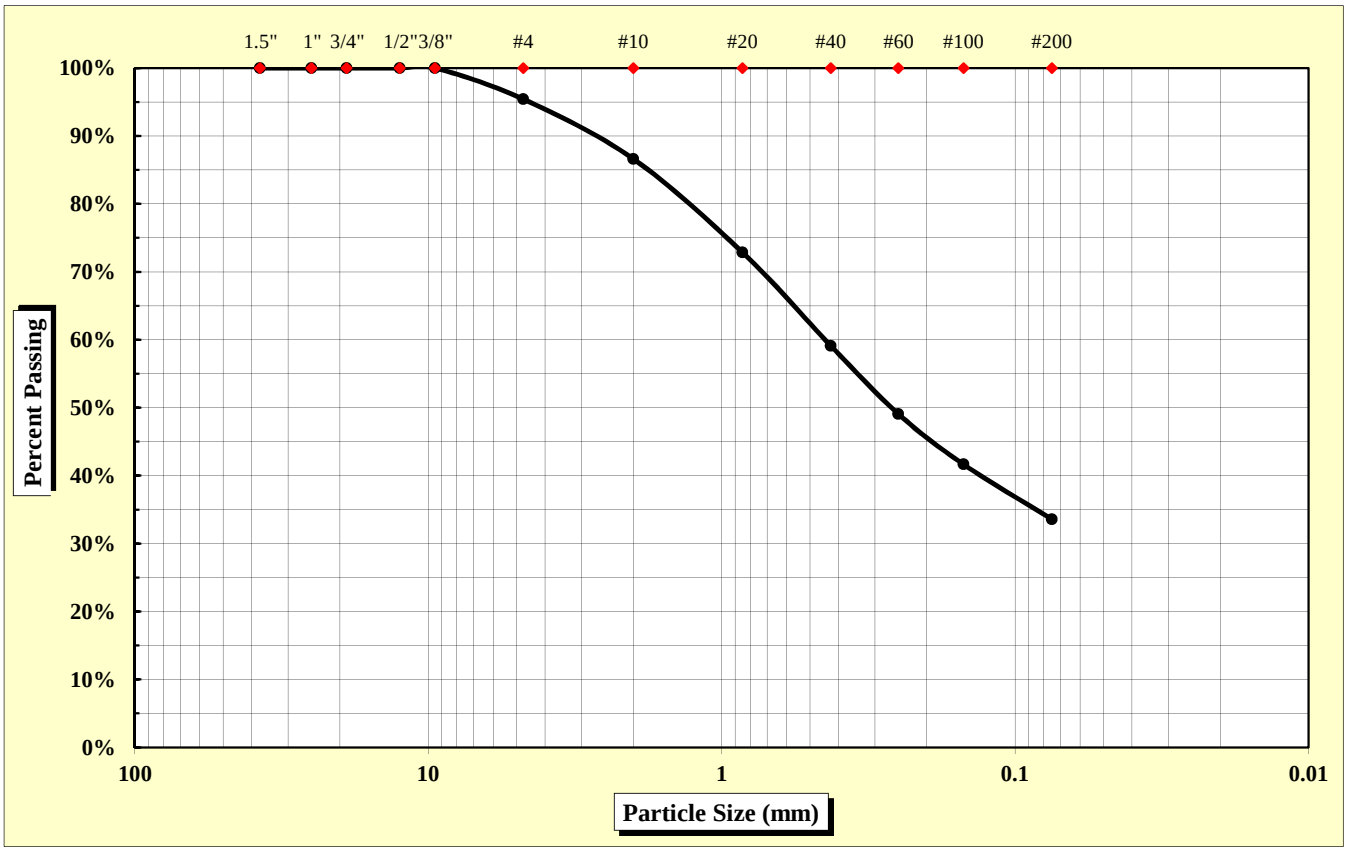
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-43	Sample #:	230	Sample Date:	10/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red brown, fine to medium, trace mica, silty SAND (SM) [A-2-6 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	13.4%	Fine Sand	25.6%
		Coarse Sand	27.5%	Silt & Clay	33.6%
Liquid Limit	39	Plastic Limit	28	Plastic Index	11
		Moisture Content	16.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

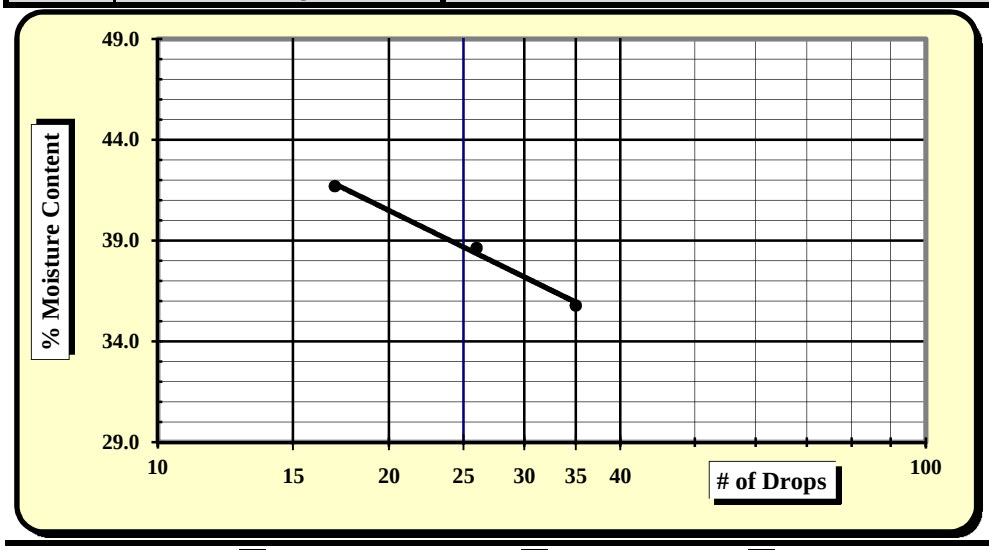
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-43	Sample #:	230	Sample Date:	10/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red brown, fine to medium, trace mica, silty SAND (SM) [A-2-6 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	807	12	806				29		
A	Tare Weight	16.72	12.94	16.57				12.99		
B	Wet Soil Weight + A	29.85	25.75	30.06				22.10		
C	Dry Soil Weight + A	26.39	22.18	26.09				20.11		
D	Water Weight (B-C)	3.46	3.57	3.97				1.99		
E	Dry Soil Weight (C-A)	9.67	9.24	9.52				7.12		
F	% Moisture (D/E)*100	35.8%	38.6%	41.7%				27.9%		
N	# OF DROPS	35	26	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**39**
Plastic Limit	**28**
Plastic Index	**11**
Group Symbol	**SM / A-2-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

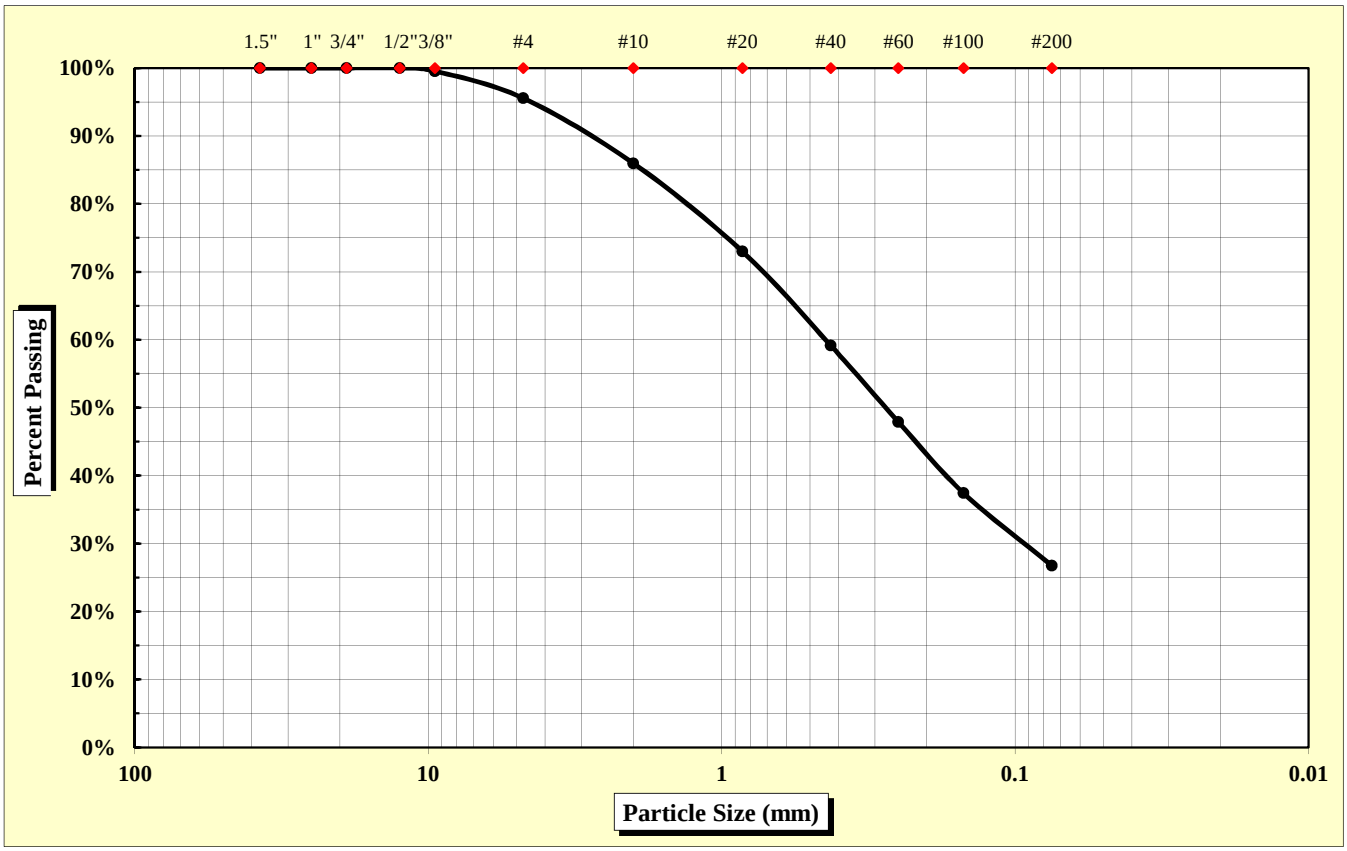
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-43	Sample #:	230	Sample Date:	10/20/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Tan brown, fine to coarse, trace mica, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	14.0%	Fine Sand	32.4%
		Coarse Sand	26.8%	Silt & Clay	26.8%
Liquid Limit	30	Plastic Limit	29	Plastic Index	1
		Moisture Content	10.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

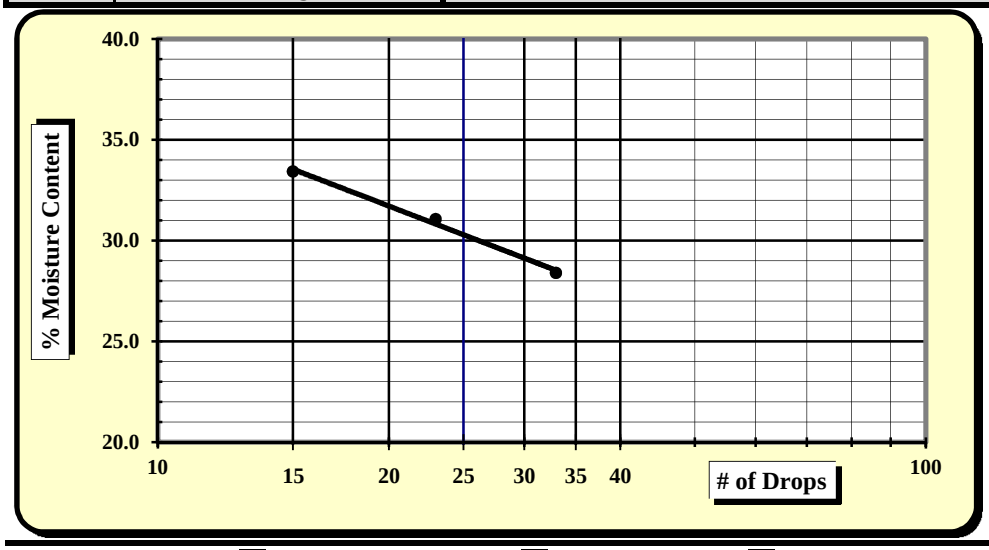
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-43	Sample #:	230	Sample Date:	10/20/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'

Sample Description: Tan brown, fine to coarse, trace mica, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	803	12	21				4		
A	Tare Weight	16.69	11.13	12.98				13.04		
B	Wet Soil Weight + A	27.95	25.98	26.71				23.23		
C	Dry Soil Weight + A	25.46	22.46	23.27				20.93		
D	Water Weight (B-C)	2.49	3.52	3.44				2.30		
E	Dry Soil Weight (C-A)	8.77	11.33	10.29				7.89		
F	% Moisture (D/E)*100	28.4%	31.1%	33.4%				29.2%		
N	# OF DROPS	33	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**29**
Plastic Index	**1**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 26.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

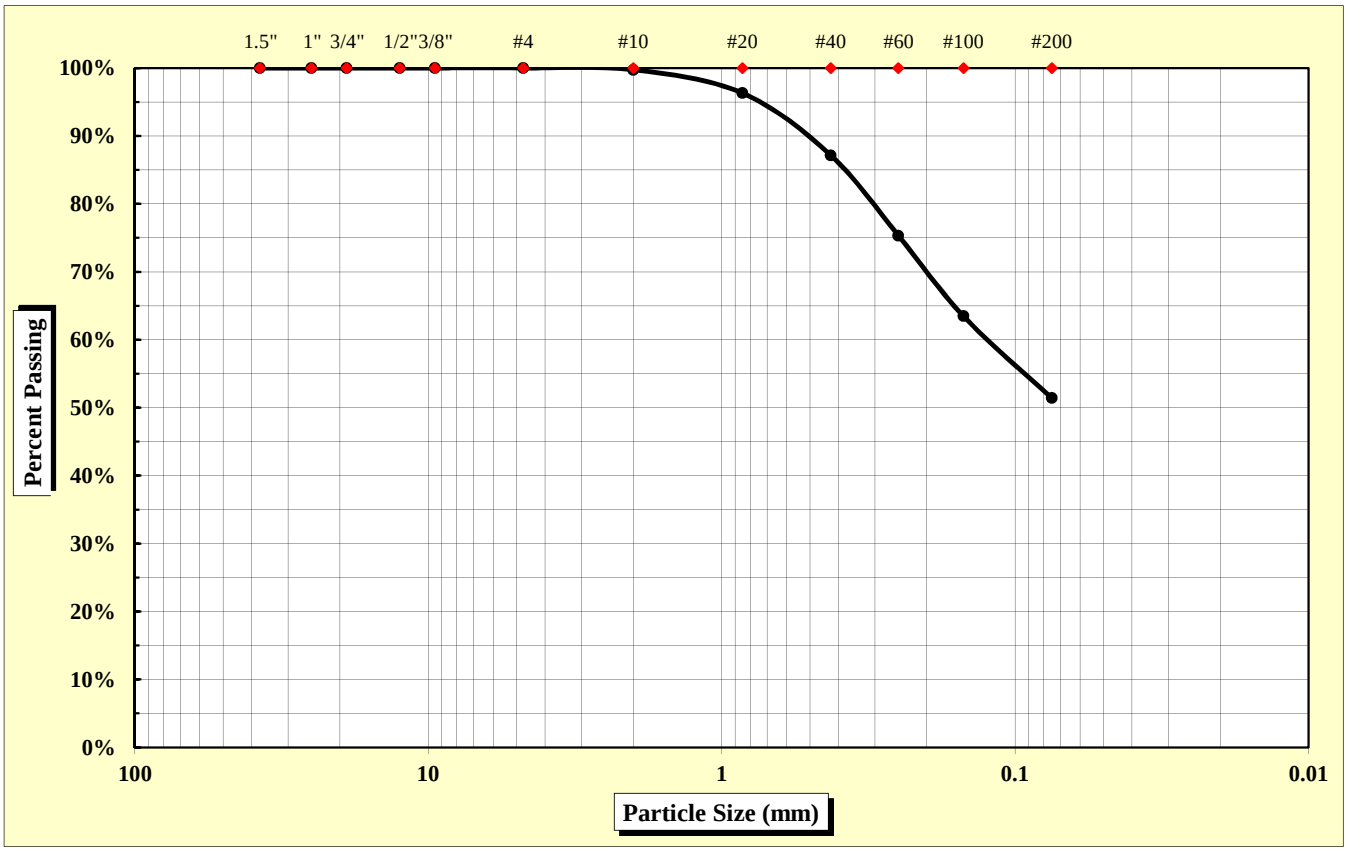
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	N/A
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Tan brown, medium to fine, trace mica, sandy ELASTIC SILT (MH) [A-5 (4)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	35.7%
		Coarse Sand	12.6%	Silt & Clay	51.4%
Liquid Limit	59	Plastic Limit	51	Plastic Index	8
		Moisture Content	25.7%	Group Index	4

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

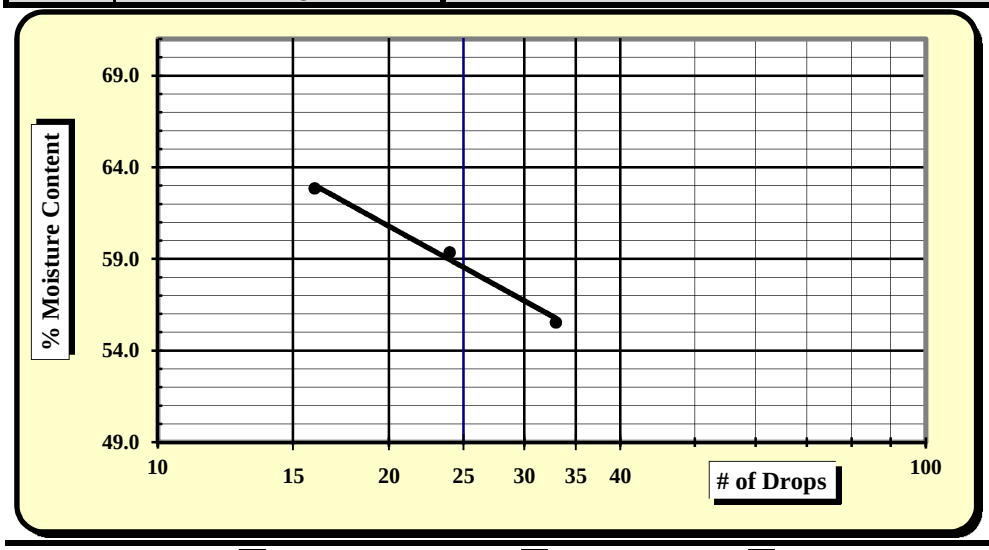
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	N/A
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Tan brown, medium to fine, trace mica, sandy ELASTIC SILT (MH) [A-5 (4)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	7	23				9		
A	Tare Weight	12.97	15.31	13.05				13.06		
B	Wet Soil Weight + A	23.92	27.07	24.14				21.63		
C	Dry Soil Weight + A	20.01	22.69	19.86				18.73		
D	Water Weight (B-C)	3.91	4.38	4.28				2.90		
E	Dry Soil Weight (C-A)	7.04	7.38	6.81				5.67		
F	% Moisture (D/E)*100	55.5%	59.3%	62.8%				51.1%		
N	# OF DROPS	33	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**51.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**59**
Plastic Limit	**51**
Plastic Index	**8**
Group Symbol	**MH / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

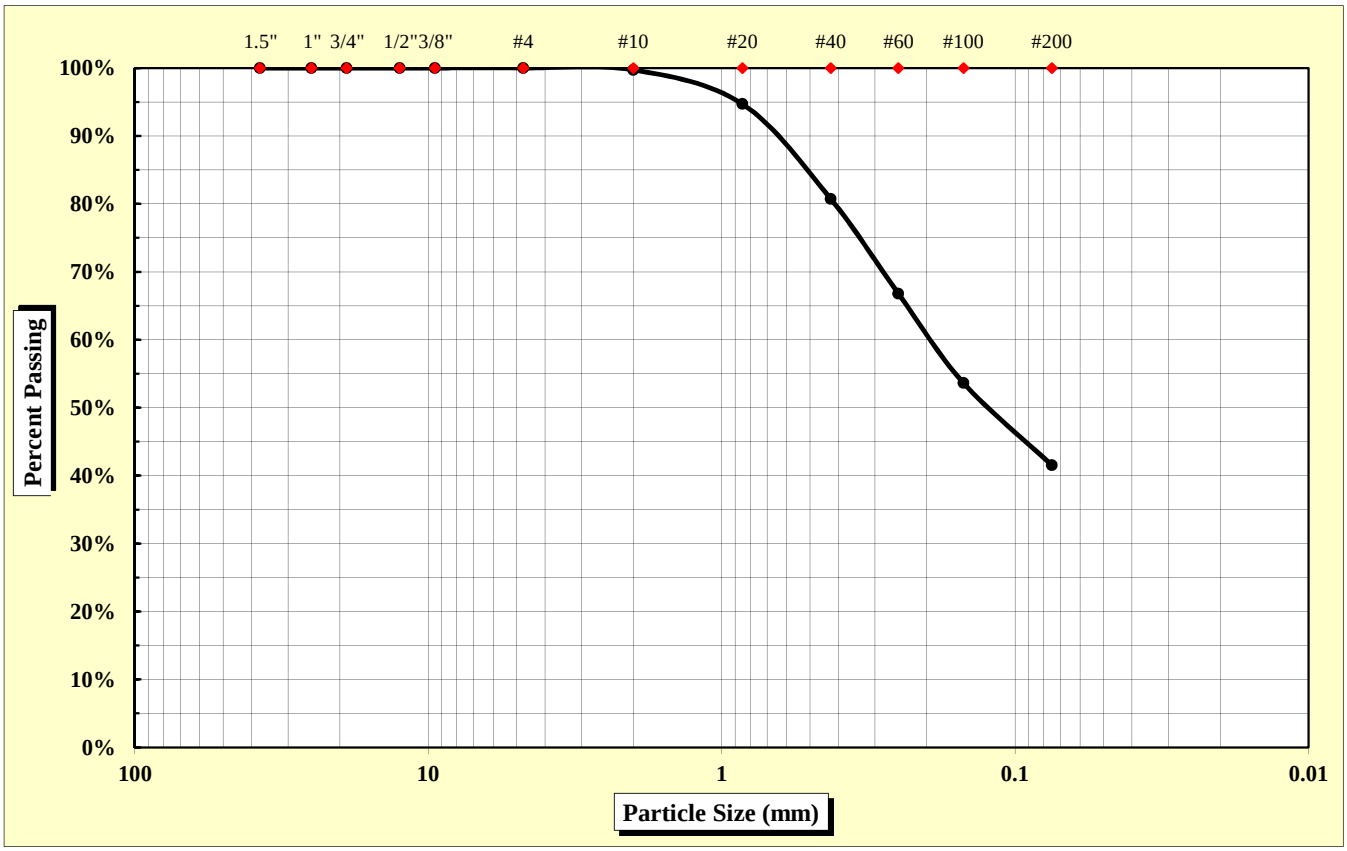
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	10/20/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'
Sample Description:	Tan brown, medium to fine, slightly micaceous, silty SAND (SM) [A-5 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	39.2%
		Coarse Sand	19.0%	Silt & Clay	41.6%
Liquid Limit	57	Plastic Limit	52	Plastic Index	5
		Moisture Content	20.7%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

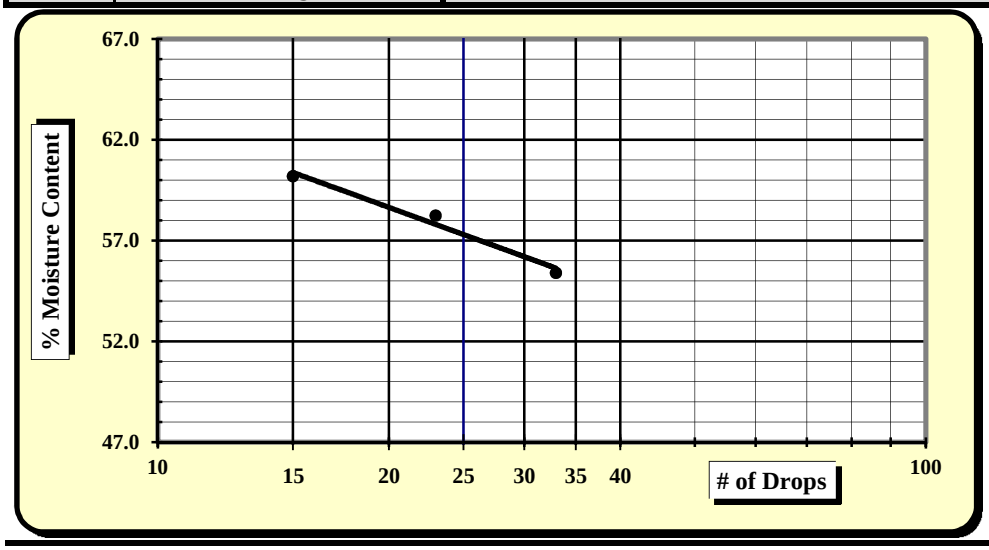
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	10/20/15
Location:	SS-5/6	Type:	Split-spoon	Depth:	8 - 15'

Sample Description: Tan brown, medium to fine, slightly micaceous, silty SAND (SM) [A-5 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	6	25	10				20		
A	Tare Weight	11.02	12.92	10.99				12.94		
B	Wet Soil Weight + A	23.25	25.99	23.10				22.50		
C	Dry Soil Weight + A	18.89	21.18	18.55				19.24		
D	Water Weight (B-C)	4.36	4.81	4.55				3.26		
E	Dry Soil Weight (C-A)	7.87	8.26	7.56				6.30		
F	% Moisture (D/E)*100	55.4%	58.2%	60.2%				51.7%		
N	# OF DROPS	33	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**51.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**57**
Plastic Limit	**52**
Plastic Index	**5**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

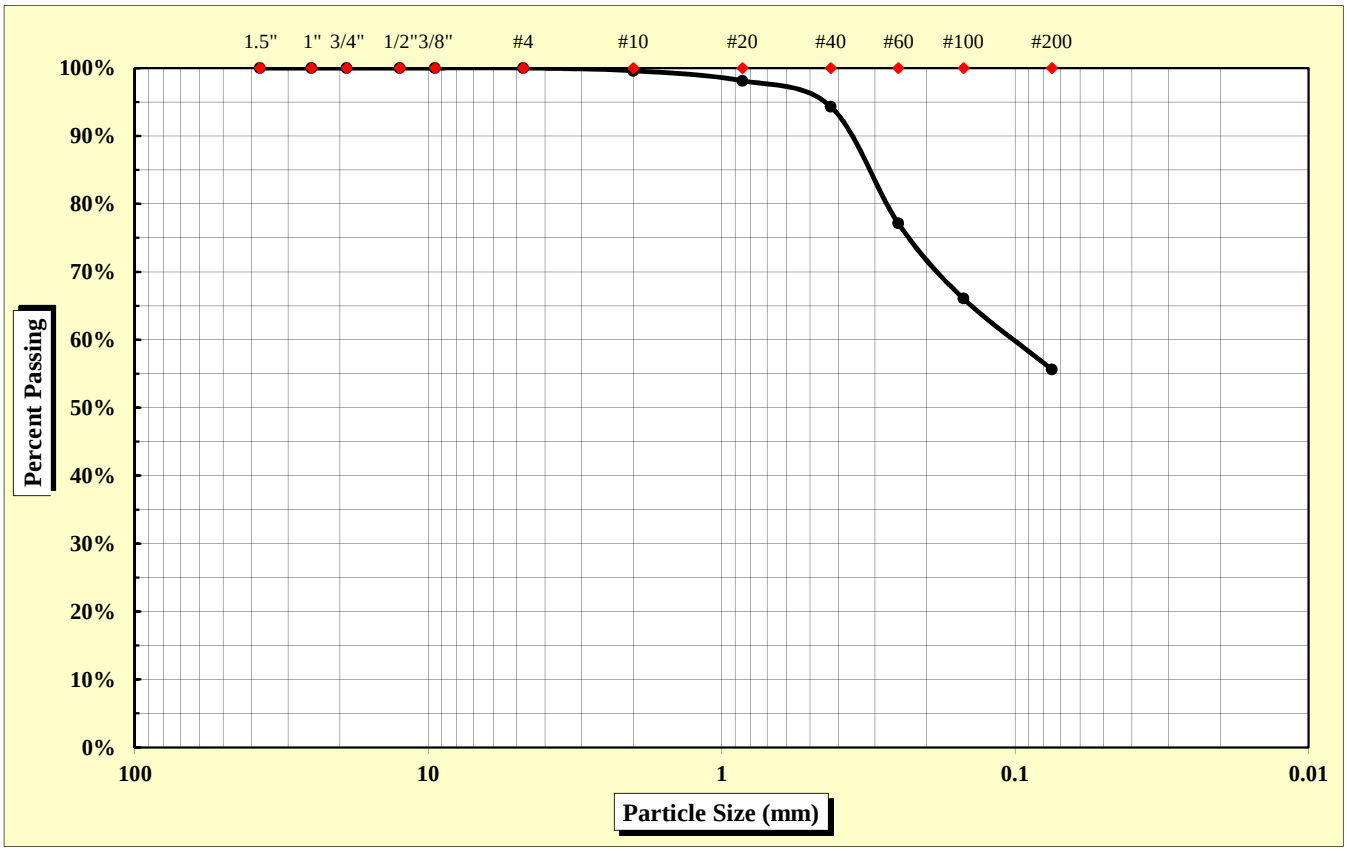
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	10/20/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'
Sample Description:	Tan brown, fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-5 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.4%	Fine Sand	38.7%
		Coarse Sand	5.3%	Silt & Clay	55.7%
Liquid Limit	68	Plastic Limit	63	Plastic Index	5
		Moisture Content	44.5%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

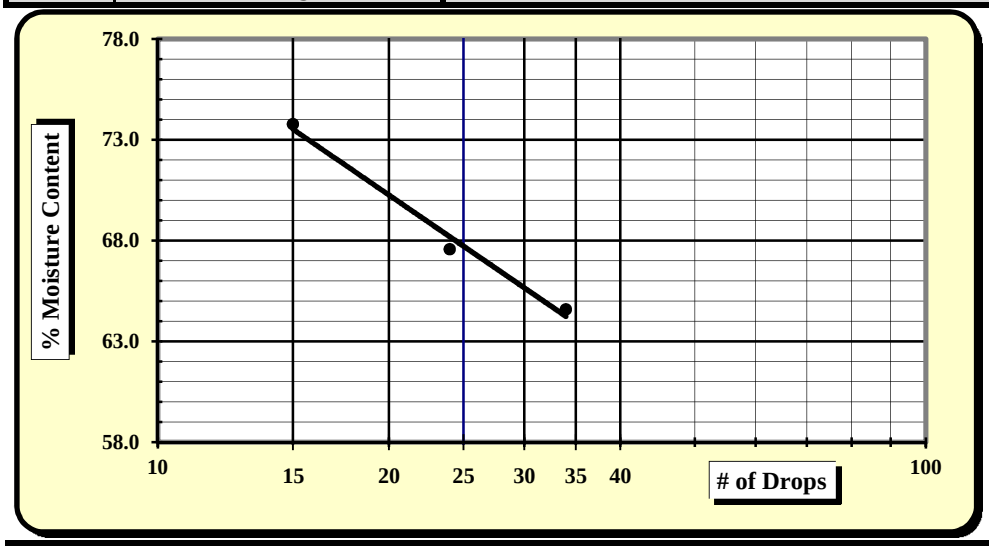
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-44	Sample #:	230	Sample Date:	10/20/15
Location:	SS-7/8	Type:	Split-spoon	Depth:	18.5 - 25'

Sample Description: Tan brown, fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-5 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	22	6	13				14		
A	Tare Weight	12.95	13.03	12.84				12.90		
B	Wet Soil Weight + A	24.85	25.28	25.70				21.87		
C	Dry Soil Weight + A	20.18	20.34	20.24				18.41		
D	Water Weight (B-C)	4.67	4.94	5.46				3.46		
E	Dry Soil Weight (C-A)	7.23	7.31	7.40				5.51		
F	% Moisture (D/E)*100	64.6%	67.6%	73.8%				62.8%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**62.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**68**
Plastic Limit	**63**
Plastic Index	**5**
Group Symbol	**MH / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

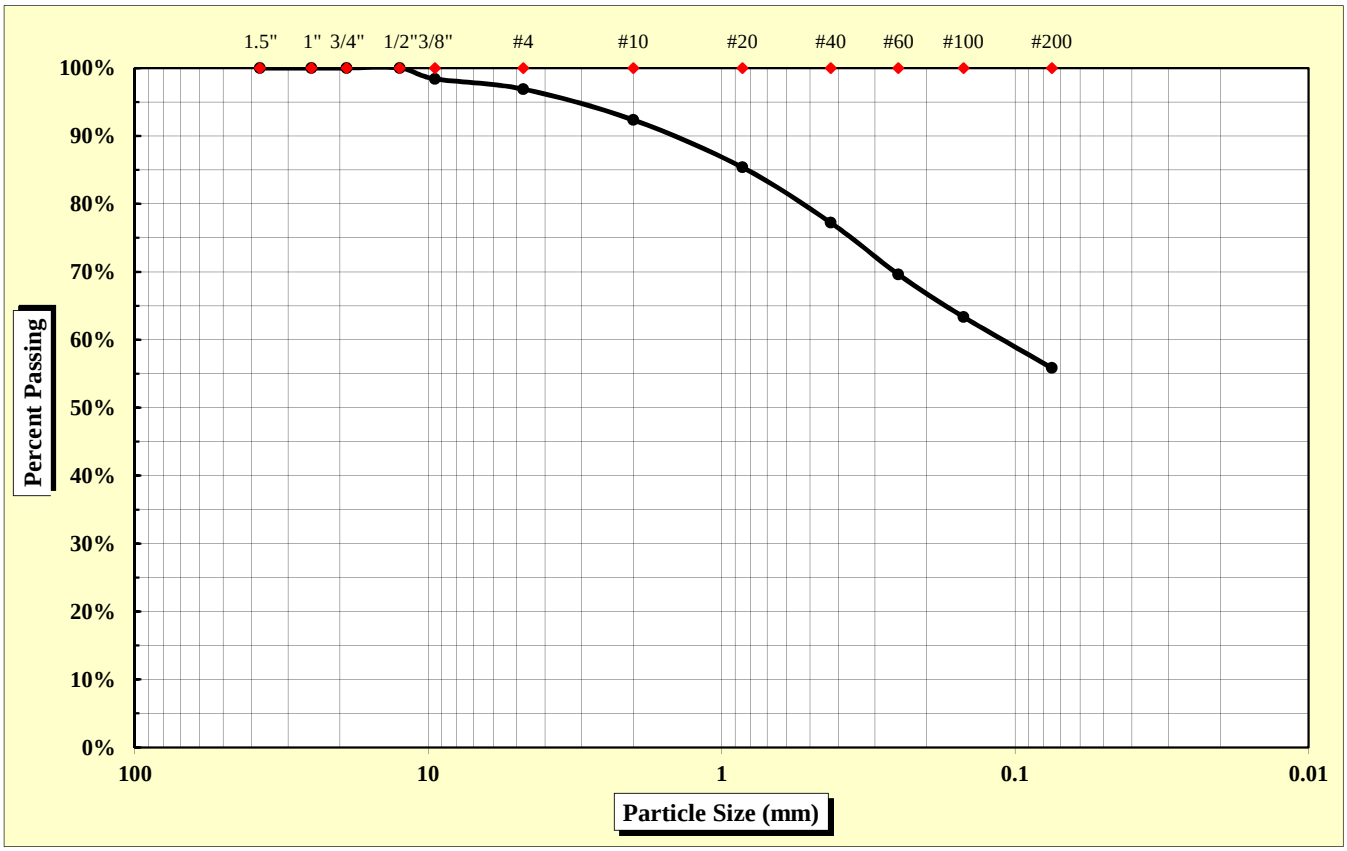
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-45	Sample #:	230	Sample Date:	10/14/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	7.6%	Fine Sand	21.4%
		Coarse Sand	15.1%	Silt & Clay	55.9%
Liquid Limit	46	Plastic Limit	22	Plastic Index	24
		Moisture Content	19.4%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

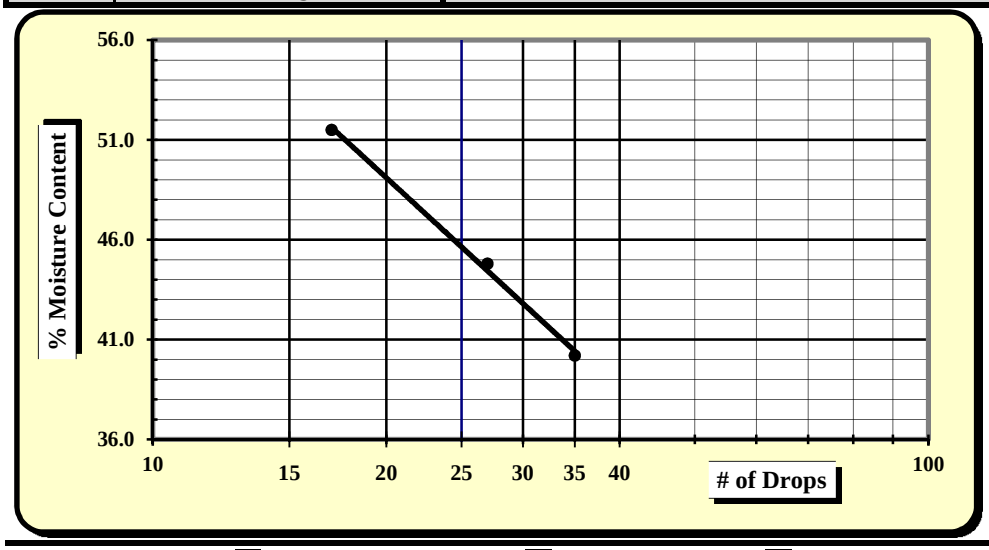
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-45	Sample #:	230	Sample Date:	10/14/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.76	26.62	27.66				26.60		
B	Wet Soil Weight + A	43.42	43.98	43.95				37.71		
C	Dry Soil Weight + A	38.64	38.61	38.41				35.68		
D	Water Weight (B-C)	4.78	5.37	5.54				2.03		
E	Dry Soil Weight (C-A)	11.88	11.99	10.75				9.08		
F	% Moisture (D/E)*100	40.2%	44.8%	51.5%				22.4%		
N	# OF DROPS	35	27	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**22.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**46**
Plastic Limit	**22**
Plastic Index	**24**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 55.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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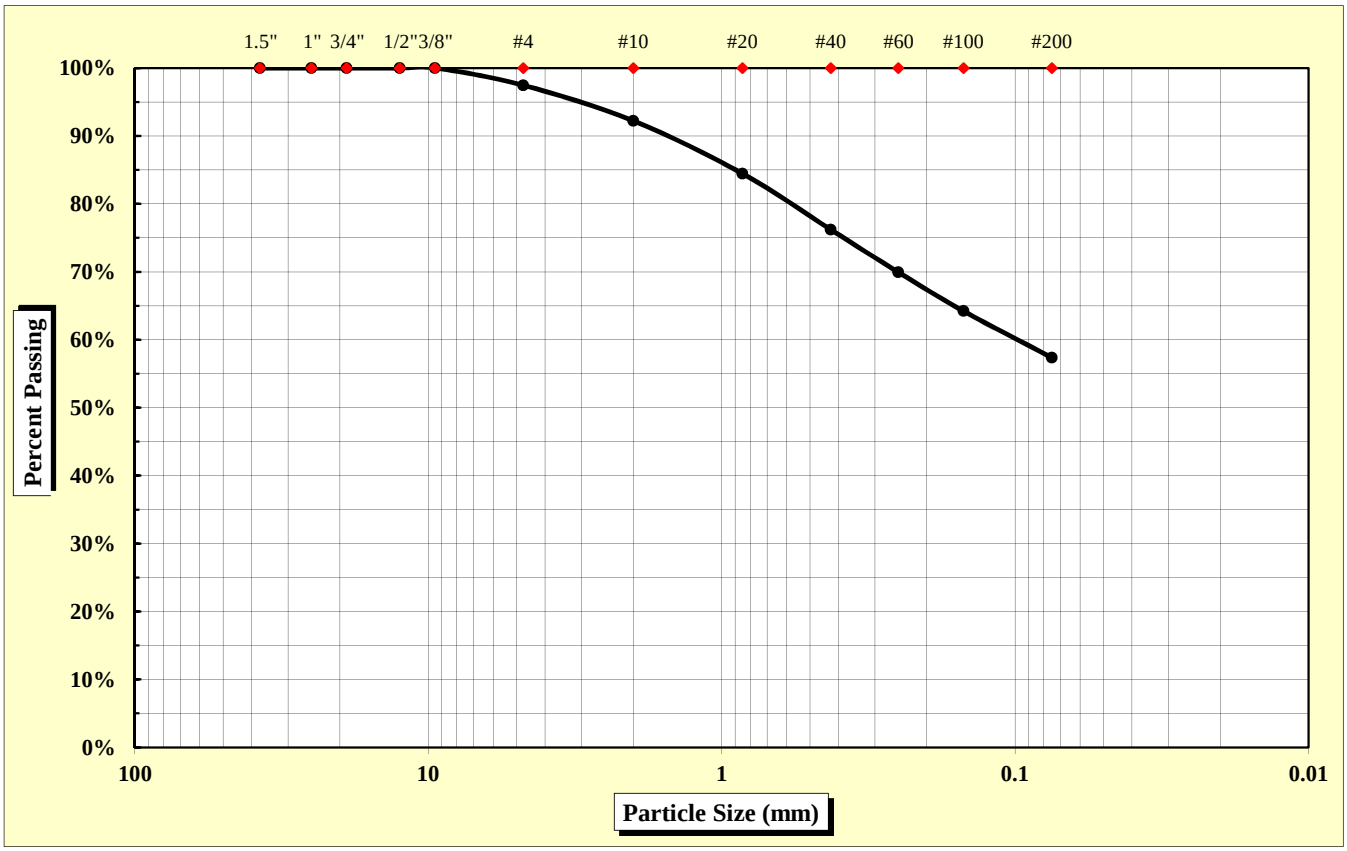
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-45	Sample #:	241	Sample Date:	10/14/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'
Sample Description:	Red brown, medium to fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	7.8%	Fine Sand	18.9%
		Coarse Sand	16.0%	Silt & Clay	57.4%
Liquid Limit	53	Plastic Limit	31	Plastic Index	22
		Moisture Content	23.1%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

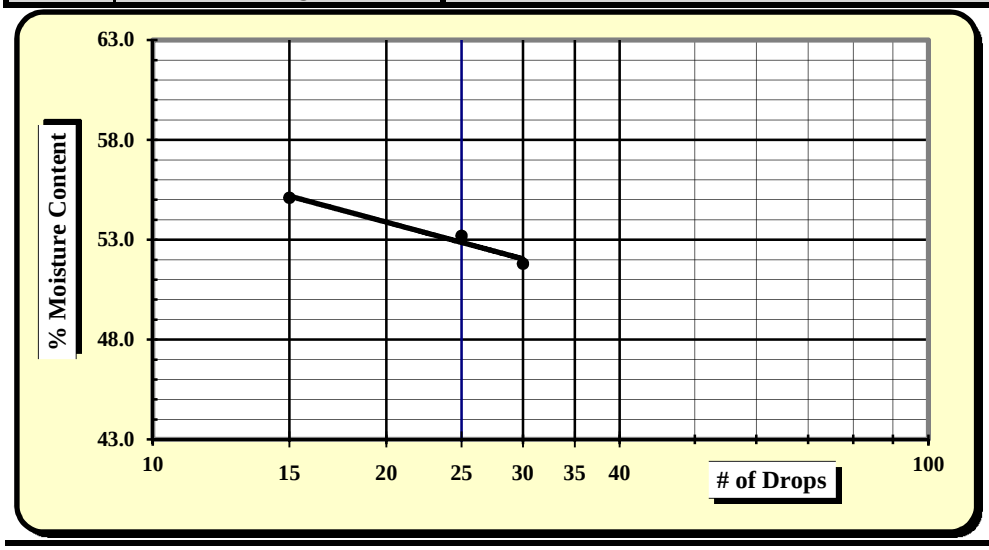
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 11/27/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-45	Sample #:	241	Sample Date:	10/14/15
Location:	SS-3/4	Type:	Split-spoon	Depth:	4 - 8'

Sample Description: Red brown, medium to fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (11)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	J3	J1	998				507		
A	Tare Weight	12.45	12.06	12.21				12.14		
B	Wet Soil Weight + A	19.69	19.17	20.12				20.15		
C	Dry Soil Weight + A	17.22	16.70	17.31				18.28		
D	Water Weight (B-C)	2.47	2.47	2.81				1.87		
E	Dry Soil Weight (C-A)	4.77	4.64	5.10				6.14		
F	% Moisture (D/E)*100	51.8%	53.2%	55.1%				30.5%		
N	# OF DROPS	30	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.5%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**53**
Plastic Limit	**31**
Plastic Index	**22**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 57.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

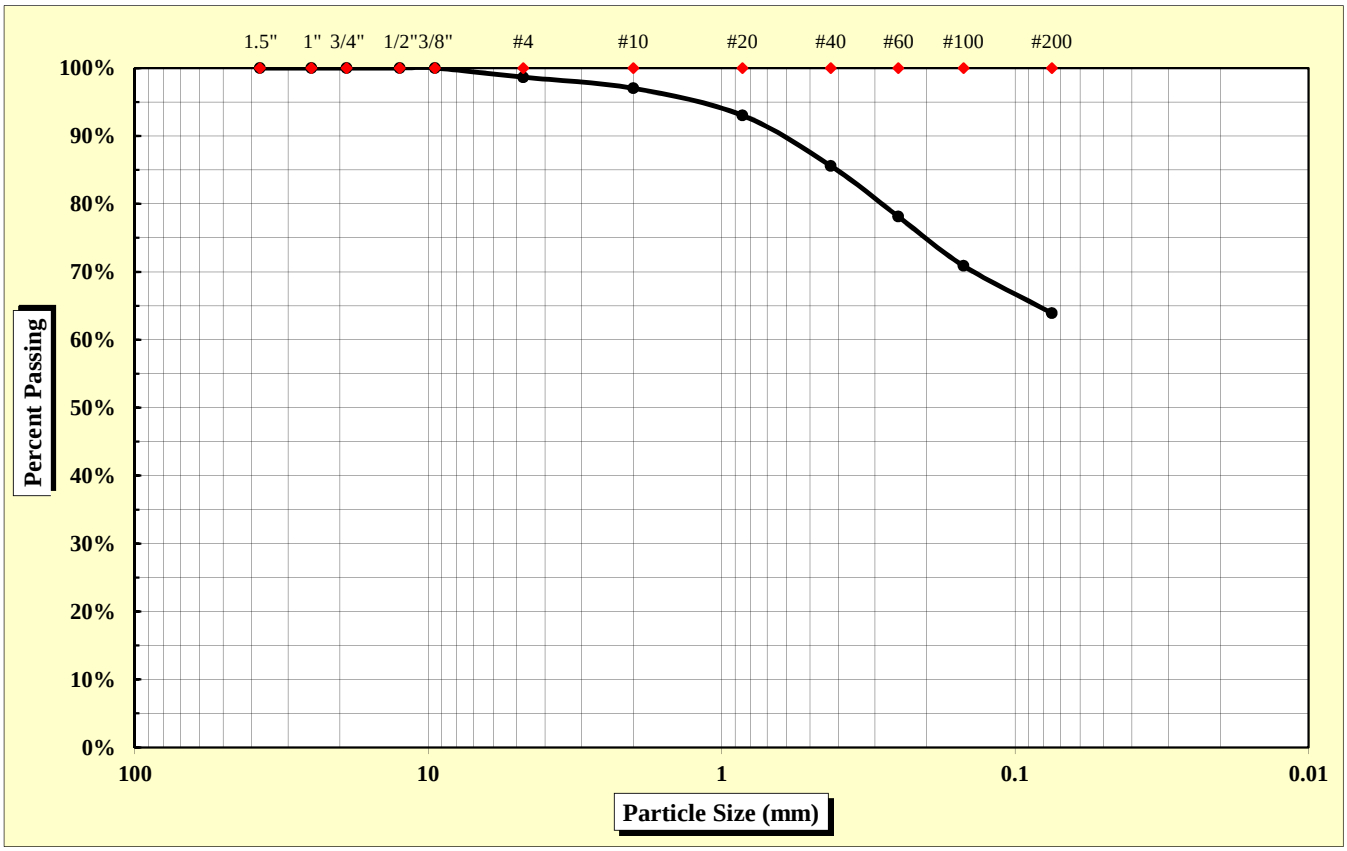
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-46	Sample #:	230	Sample Date:	10/20/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, medium to fine, trace mica, sandy LEAN CLAY (CL) [A-6 (8)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.0%	Fine Sand	21.7%
		Coarse Sand	11.4%	Silt & Clay	63.9%
Liquid Limit	37	Plastic Limit	21	Plastic Index	16
		Moisture Content	20.3%	Group Index	8

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

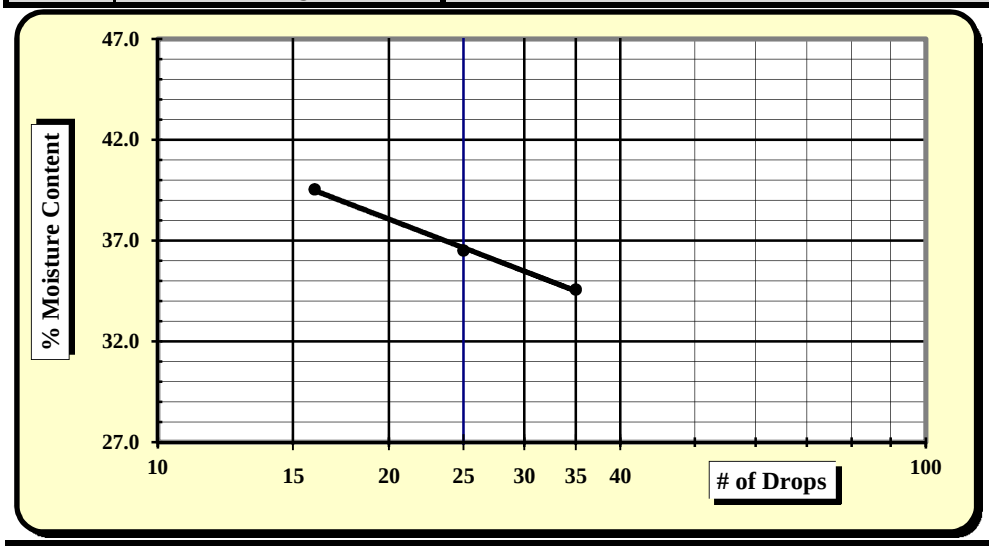
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-46	Sample #:	230	Sample Date:	10/20/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, medium to fine, trace mica, sandy LEAN CLAY (CL) [A-6 (8)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	809	18	28				802		
A	Tare Weight	16.70	13.01	13.09				16.73		
B	Wet Soil Weight + A	30.01	26.47	25.97				26.72		
C	Dry Soil Weight + A	26.59	22.87	22.32				24.96		
D	Water Weight (B-C)	3.42	3.60	3.65				1.76		
E	Dry Soil Weight (C-A)	9.89	9.86	9.23				8.23		
F	% Moisture (D/E)*100	34.6%	36.5%	39.5%				21.4%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**21**
Plastic Index	**16**
Group Symbol	**CL / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 63.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

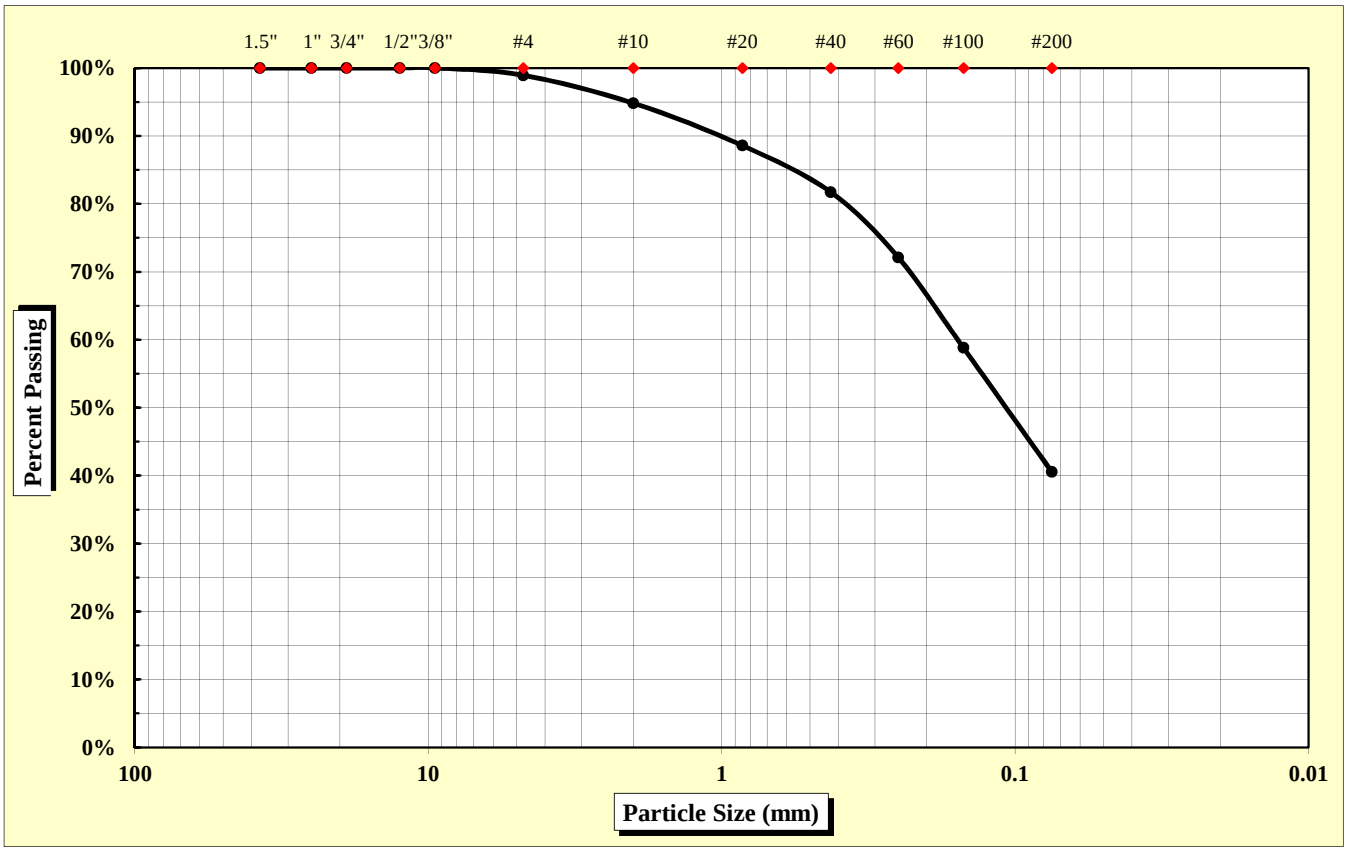
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-46	Sample #:	230	Sample Date:	10/20/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Red brown, medium to fine, slightly micaceous, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.2%	Fine Sand	41.2%
		Coarse Sand	13.1%	Silt & Clay	40.6%
Liquid Limit	45	Plastic Limit	41	Plastic Index	4
		Moisture Content	24.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

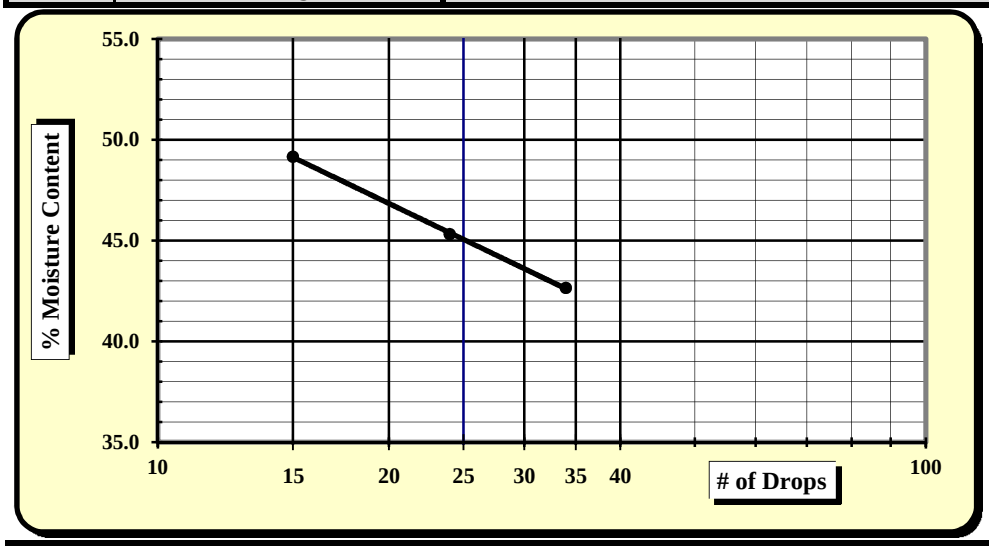
Project #:	**1426-14-161**	Report Date:	11/20/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-46	Sample #:	230	Sample Date:	10/20/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Red brown, medium to fine, slightly micaceous, silty SAND (SM) [A-5 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	16	5	8				10		
A	Tare Weight	13.06	12.47	13.06				13.01		
B	Wet Soil Weight + A	25.00	26.58	26.47				22.27		
C	Dry Soil Weight + A	21.43	22.18	22.05				19.59		
D	Water Weight (B-C)	3.57	4.40	4.42				2.68		
E	Dry Soil Weight (C-A)	8.37	9.71	8.99				6.58		
F	% Moisture (D/E)*100	42.7%	45.3%	49.2%				40.7%		
N	# OF DROPS	34	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**45**
Plastic Limit	**41**
Plastic Index	**4**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 40.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/20/15	Brian Vaughan, P.E.	11/20/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

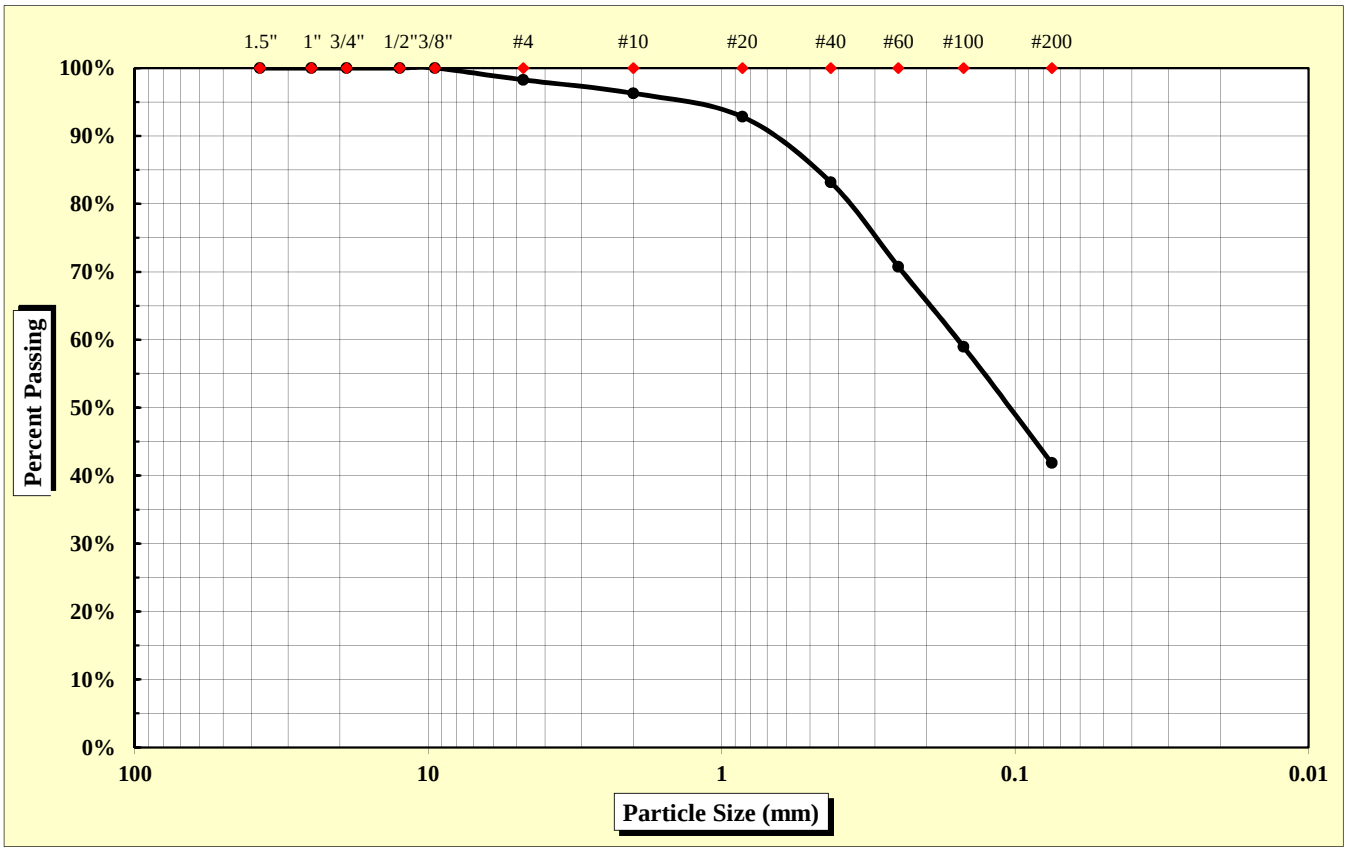
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-47	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Tan brown, medium to fine, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.7%	Fine Sand	41.3%
		Coarse Sand	13.1%	Silt & Clay	41.9%
Liquid Limit	34	Plastic Limit	30	Plastic Index	4
		Moisture Content	12.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

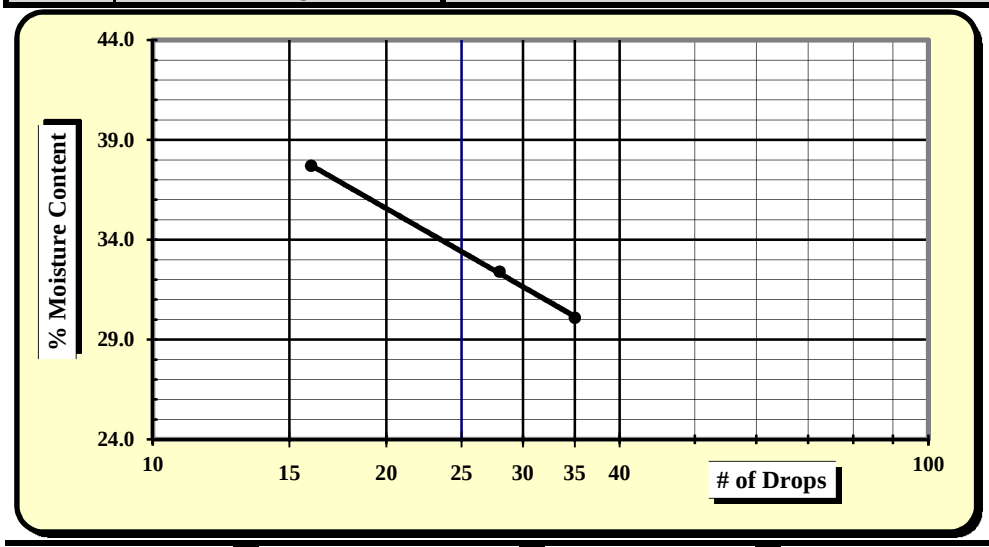
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-47	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Tan brown, medium to fine, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	6	7				8		
A	Tare Weight	26.98	27.79	26.30				27.36		
B	Wet Soil Weight + A	43.45	47.62	46.22				39.00		
C	Dry Soil Weight + A	39.64	42.77	40.77				36.30		
D	Water Weight (B-C)	3.81	4.85	5.45				2.70		
E	Dry Soil Weight (C-A)	12.66	14.98	14.47				8.94		
F	% Moisture (D/E)*100	30.1%	32.4%	37.7%				30.2%		
N	# OF DROPS	35	28	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**34**
Plastic Limit	**30**
Plastic Index	**4**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 41.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

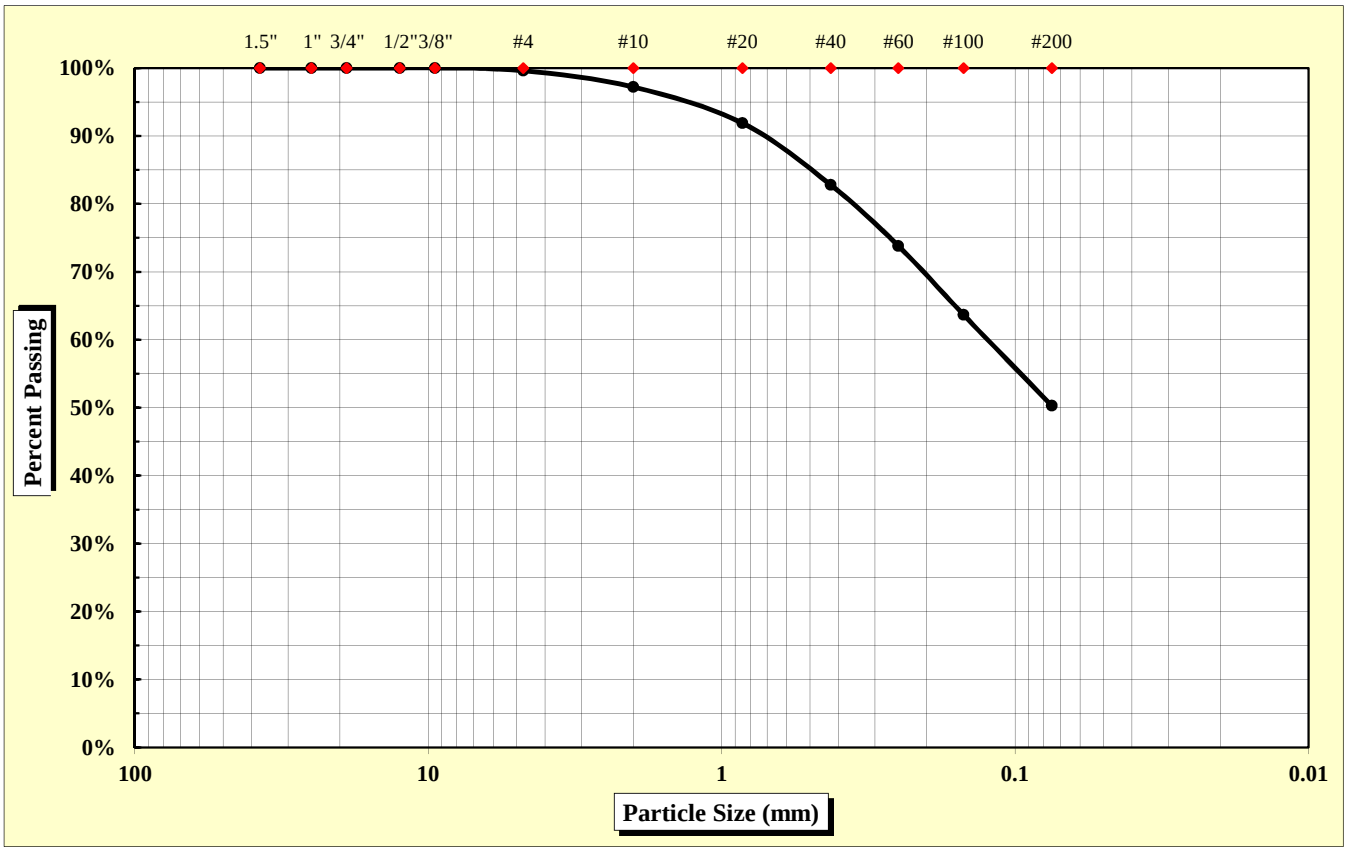
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-47	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Tan brown, medium to fine, sandy SILT (ML) [A-4 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.8%	Fine Sand	32.5%
		Coarse Sand	14.4%	Silt & Clay	50.3%
Liquid Limit	37	Plastic Limit	27	Plastic Index	10
		Moisture Content	16.9%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

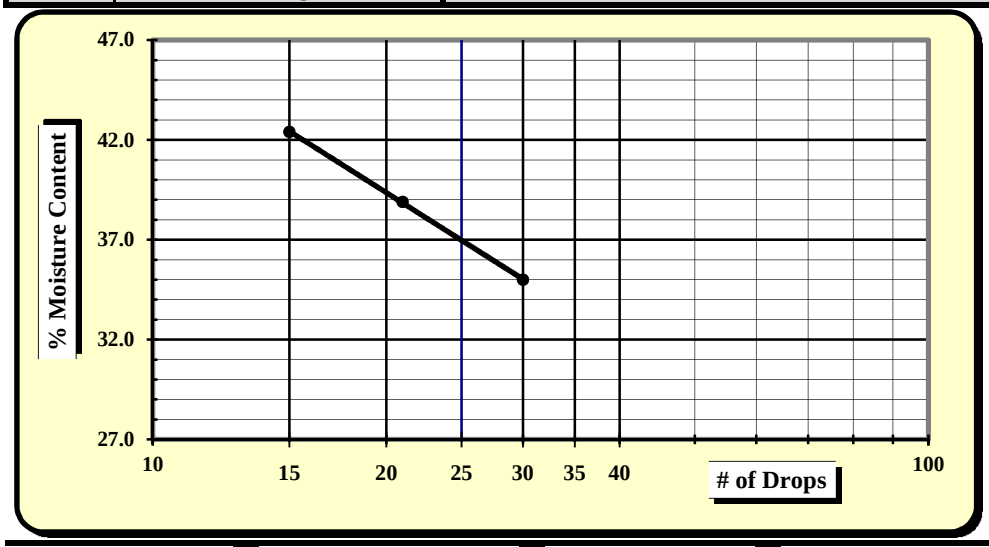
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-47	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Tan brown, medium to fine, sandy SILT (ML) [A-4 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	9	10	11				12		
A	Tare Weight	26.89	26.82	26.68				26.69		
B	Wet Soil Weight + A	47.79	46.18	44.52				38.81		
C	Dry Soil Weight + A	42.37	40.76	39.21				36.21		
D	Water Weight (B-C)	5.42	5.42	5.31				2.60		
E	Dry Soil Weight (C-A)	15.48	13.94	12.53				9.52		
F	% Moisture (D/E)*100	35.0%	38.9%	42.4%				27.3%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**27**
Plastic Index	**10**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

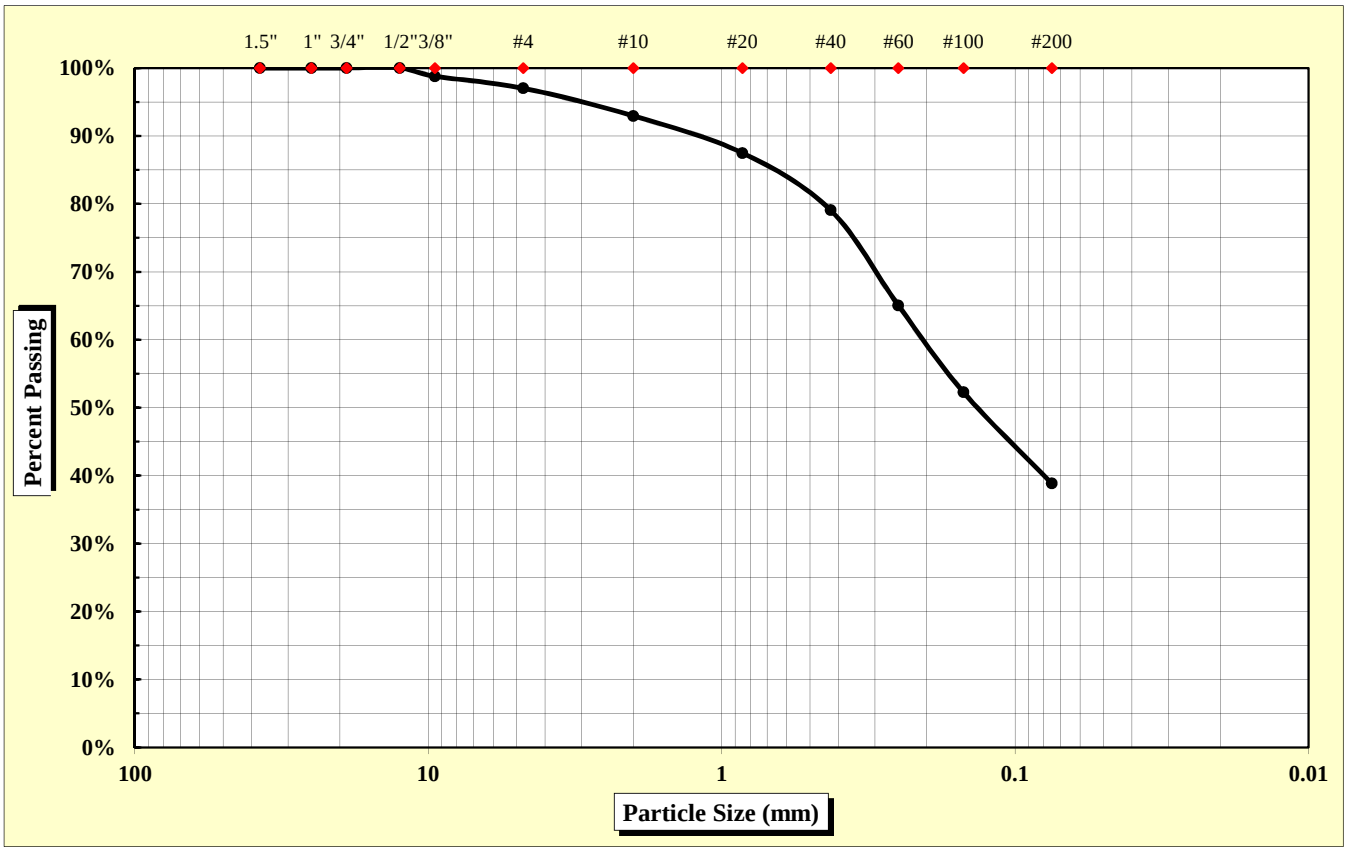
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-48	Sample #:	230	Sample Date:	10/19/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	3.4 - 7.4'
Sample Description:	Brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	7.0%	Fine Sand	40.2%
		Coarse Sand	13.9%	Silt & Clay	38.9%
Liquid Limit	35	Plastic Limit	33	Plastic Index	2
		Moisture Content	16.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

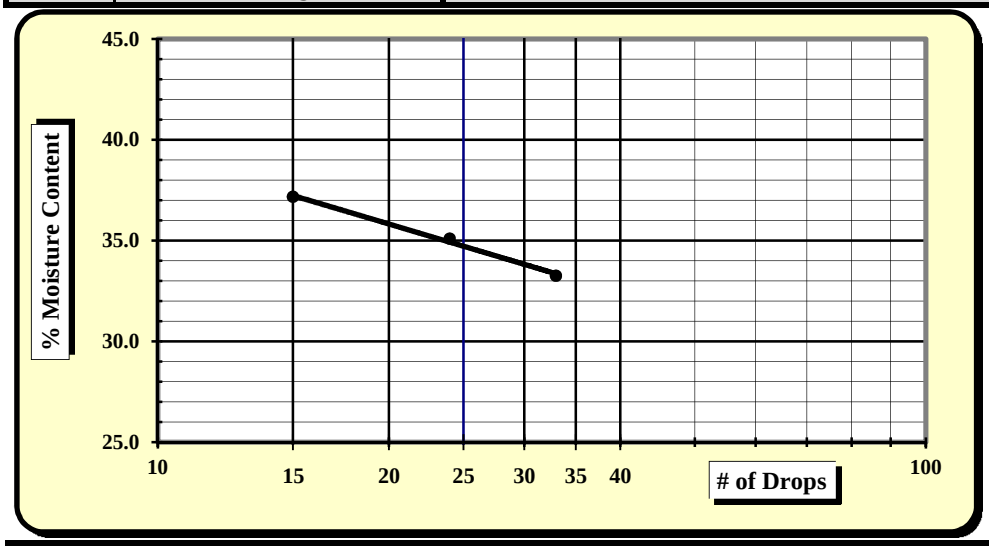
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-48	Sample #:	230	Sample Date:	10/19/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	3.4 - 7.4'

Sample Description: Brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	27	26	3				24		
A	Tare Weight	12.99	12.92	13.00				13.08		
B	Wet Soil Weight + A	24.29	25.70	27.54				22.29		
C	Dry Soil Weight + A	21.47	22.38	23.60				20.00		
D	Water Weight (B-C)	2.82	3.32	3.94				2.29		
E	Dry Soil Weight (C-A)	8.48	9.46	10.60				6.92		
F	% Moisture (D/E)*100	33.3%	35.1%	37.2%				33.1%		
N	# OF DROPS	33	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**33**
Plastic Index	**2**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 38.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

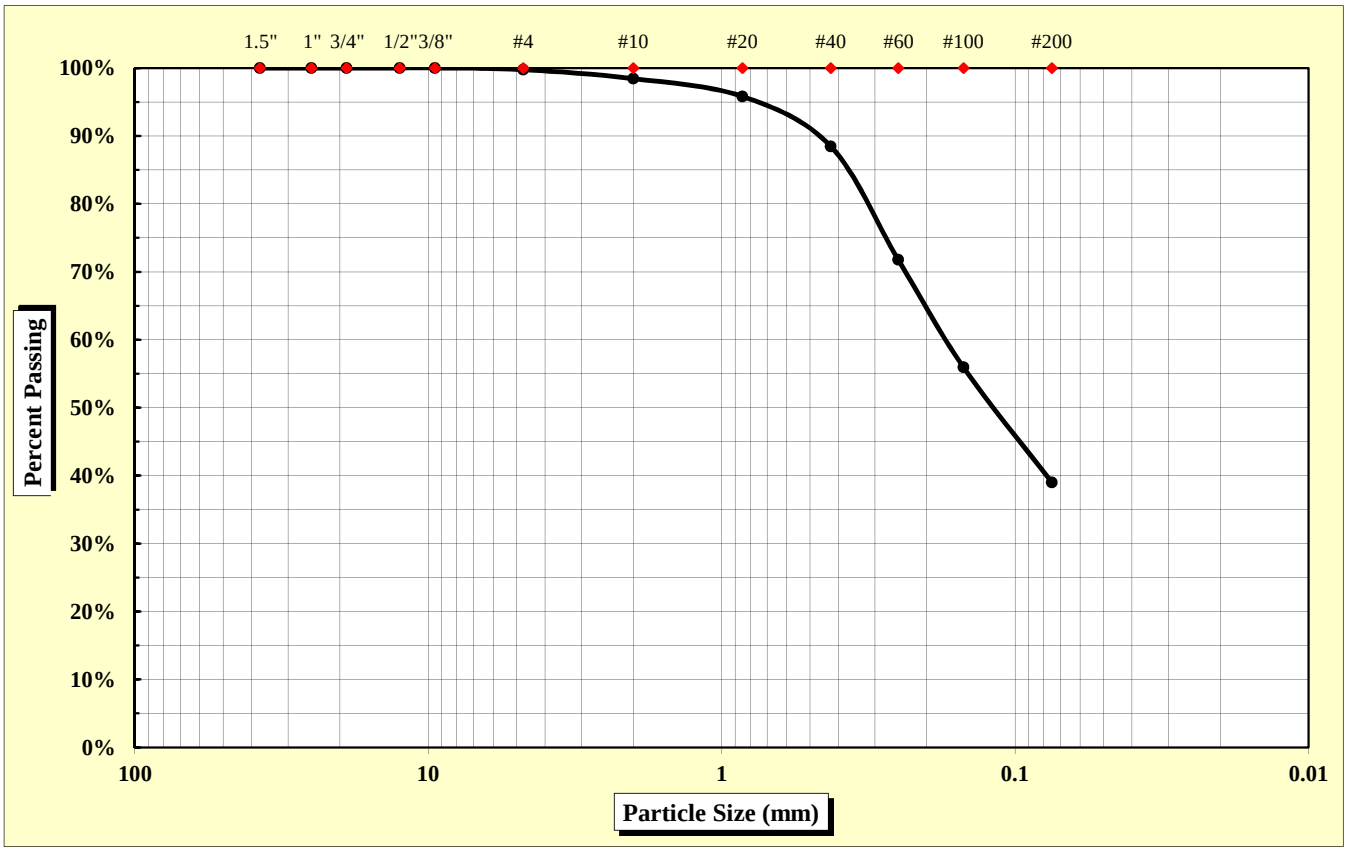
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-48	Sample #:	230	Sample Date:	10/19/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	7.4 - 11.4'
Sample Description:	Brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.6%	Fine Sand	49.5%
		Coarse Sand	10.0%	Silt & Clay	39.0%
Liquid Limit	30	Plastic Limit	29	Plastic Index	1
		Moisture Content	16.0%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

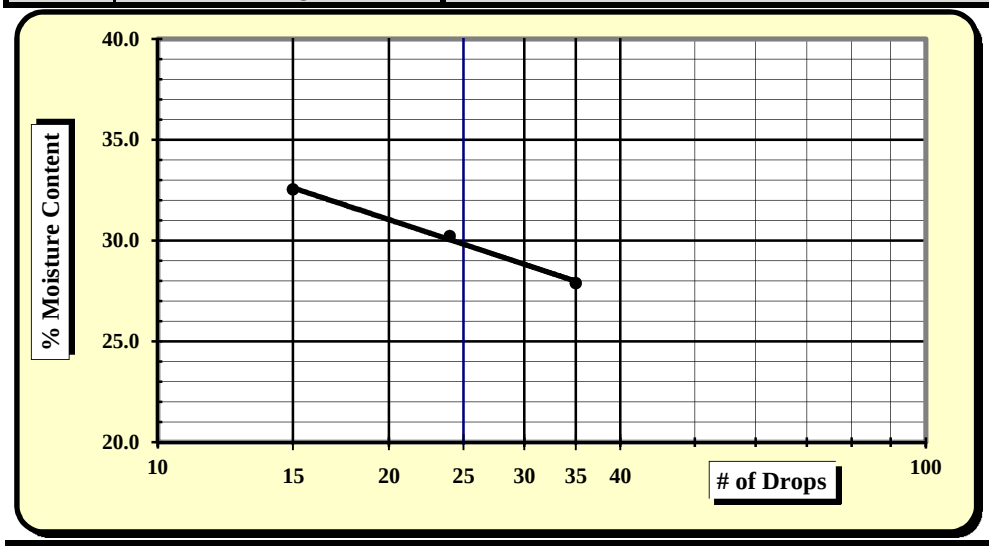
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-48	Sample #:	230	Sample Date:	10/19/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	7.4 - 11.4'

Sample Description: Brown, medium to fine, slightly micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	810	13	2				17		
A	Tare Weight	16.63	13.07	12.98				12.95		
B	Wet Soil Weight + A	28.60	27.33	27.36				22.08		
C	Dry Soil Weight + A	25.99	24.02	23.83				20.04		
D	Water Weight (B-C)	2.61	3.31	3.53				2.04		
E	Dry Soil Weight (C-A)	9.36	10.95	10.85				7.09		
F	% Moisture (D/E)*100	27.9%	30.2%	32.5%				28.8%		
N	# OF DROPS	35	24	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**28.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**29**
Plastic Index	**1**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

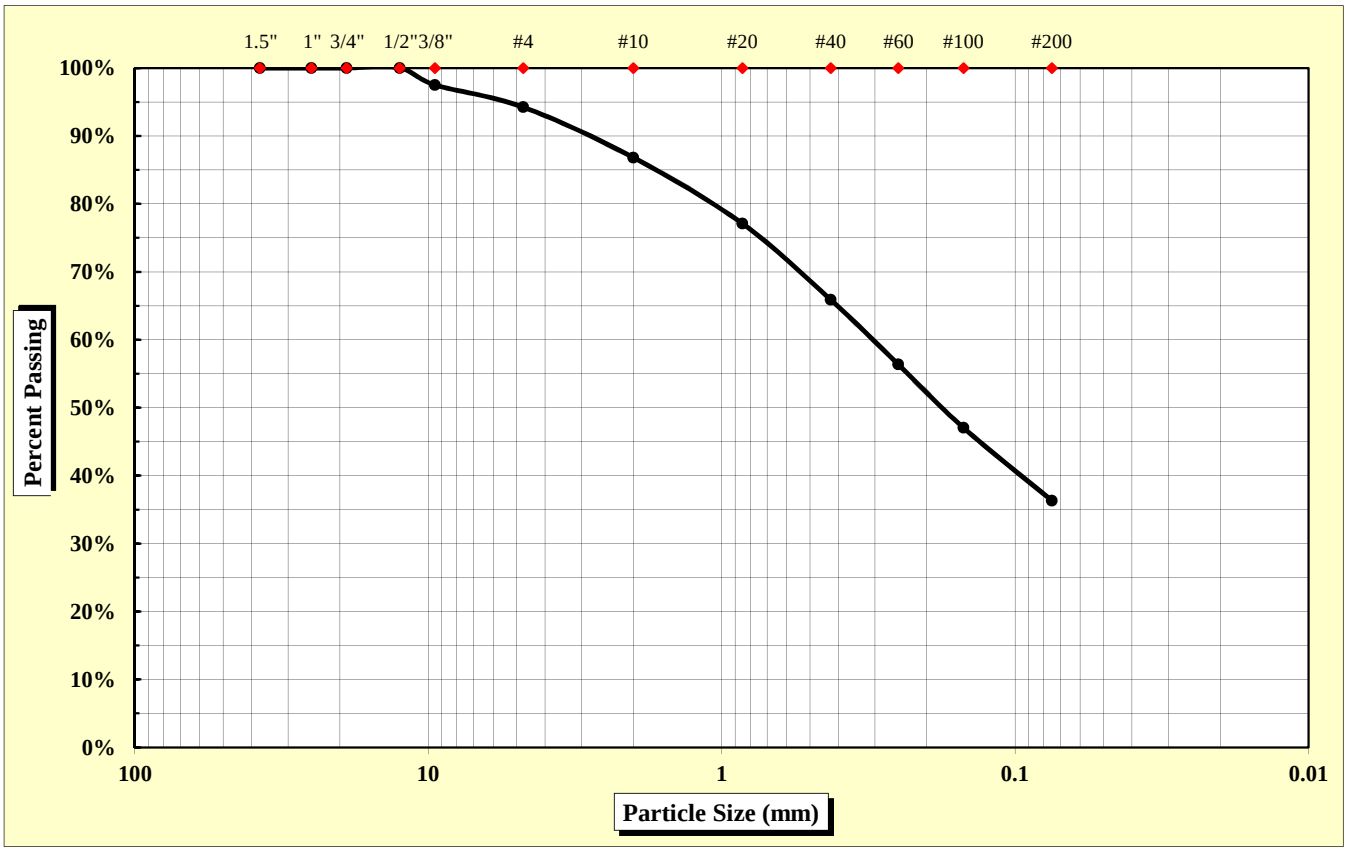
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-49	Sample #:	241	Sample Date:	10/15/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	13.2%	Fine Sand	29.5%
		Coarse Sand	20.9%	Silt & Clay	36.3%
Liquid Limit	50	Plastic Limit	35	Plastic Index	15
		Moisture Content	16.9%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

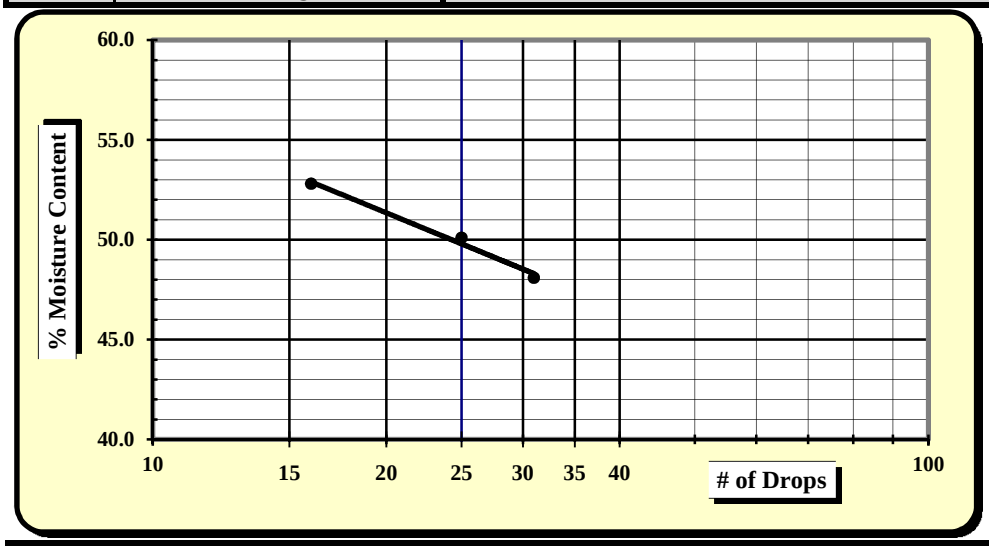
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-49	Sample #:	241	Sample Date:	10/15/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, medium to fine, slighlty micaceous, silty SAND (SM) [A-7-5 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	15	16	XX6				XX5		
A	Tare Weight	14.99	15.17	12.12				12.12		
B	Wet Soil Weight + A	22.84	21.46	18.92				20.28		
C	Dry Soil Weight + A	20.29	19.36	16.57				18.17		
D	Water Weight (B-C)	2.55	2.10	2.35				2.11		
E	Dry Soil Weight (C-A)	5.30	4.19	4.45				6.05		
F	% Moisture (D/E)*100	48.1%	50.1%	52.8%				34.9%		
N	# OF DROPS	31	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**34.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**50**
Plastic Limit	**35**
Plastic Index	**15**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 36.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

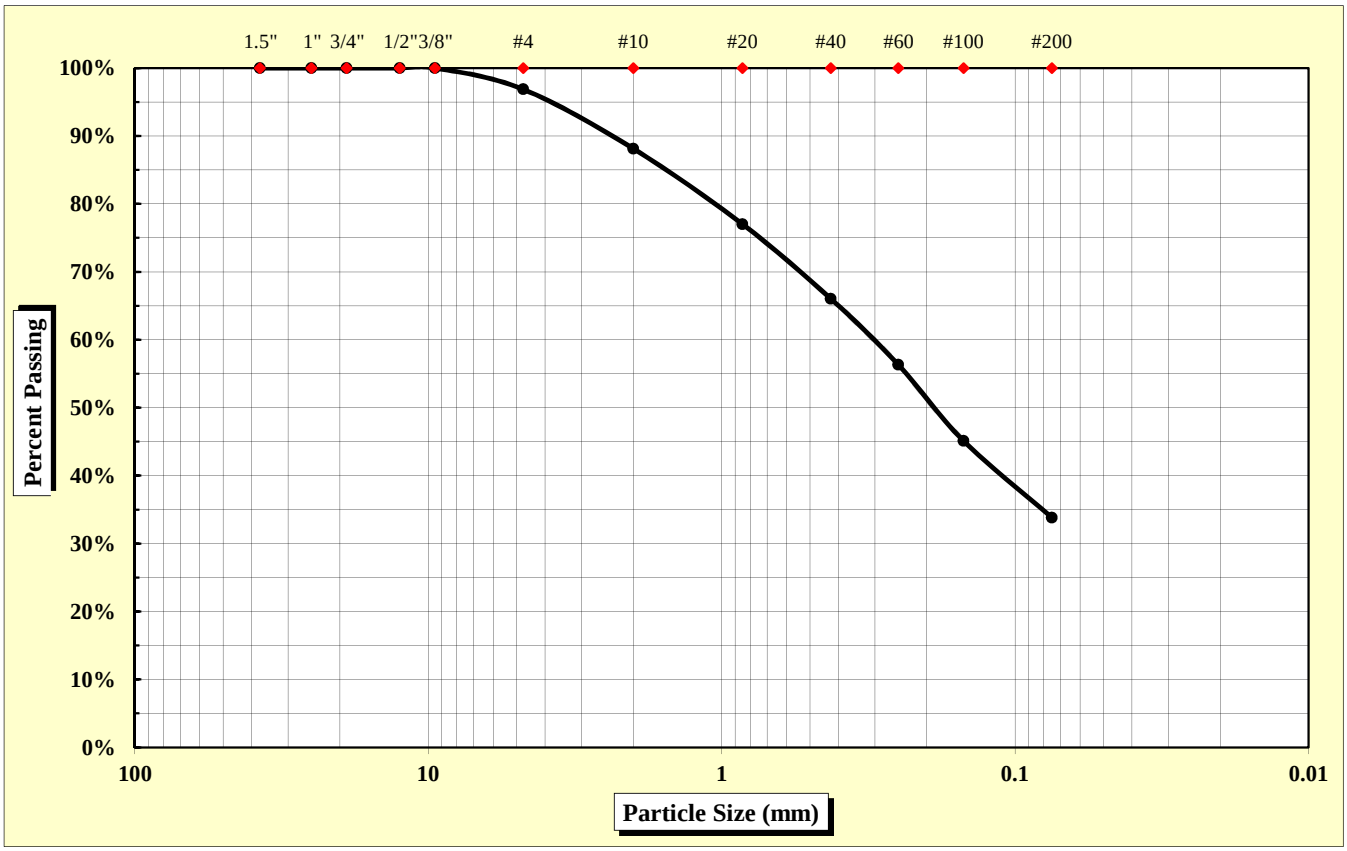
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-49	Sample #:	230	Sample Date:	10/15/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	11.9%	Fine Sand	32.2%
		Coarse Sand	22.1%	Silt & Clay	33.8%
Liquid Limit	40	Plastic Limit	31	Plastic Index	9
		Moisture Content	24.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

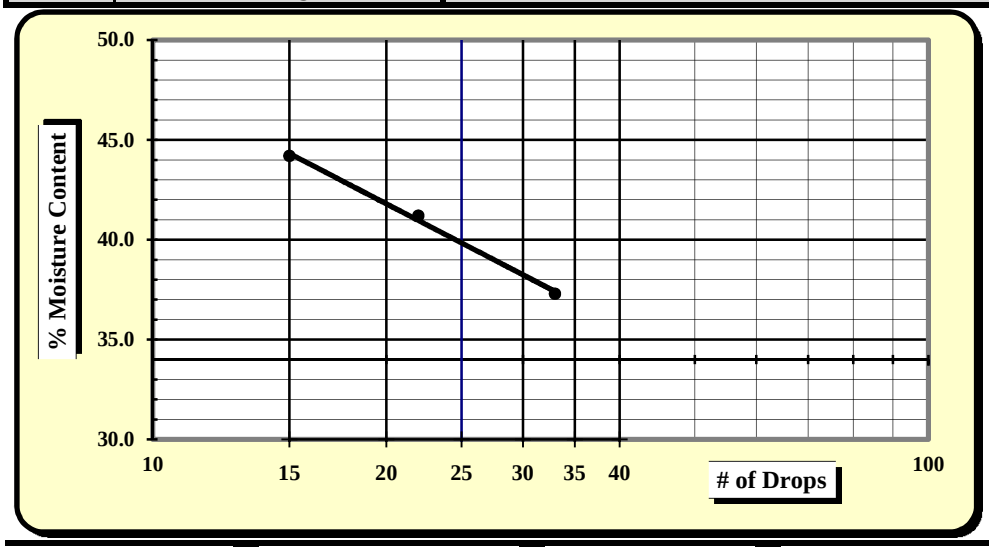
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-49	Sample #:	230	Sample Date:	10/15/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	18	19				20		
A	Tare Weight	26.73	26.86	26.71				26.87		
B	Wet Soil Weight + A	43.01	43.29	43.49				35.00		
C	Dry Soil Weight + A	38.59	38.50	38.35				33.08		
D	Water Weight (B-C)	4.42	4.79	5.14				1.92		
E	Dry Soil Weight (C-A)	11.86	11.64	11.64				6.21		
F	% Moisture (D/E)*100	37.3%	41.2%	44.2%				30.9%		
N	# OF DROPS	33	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**40**
Plastic Limit	**31**
Plastic Index	**9**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 33.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

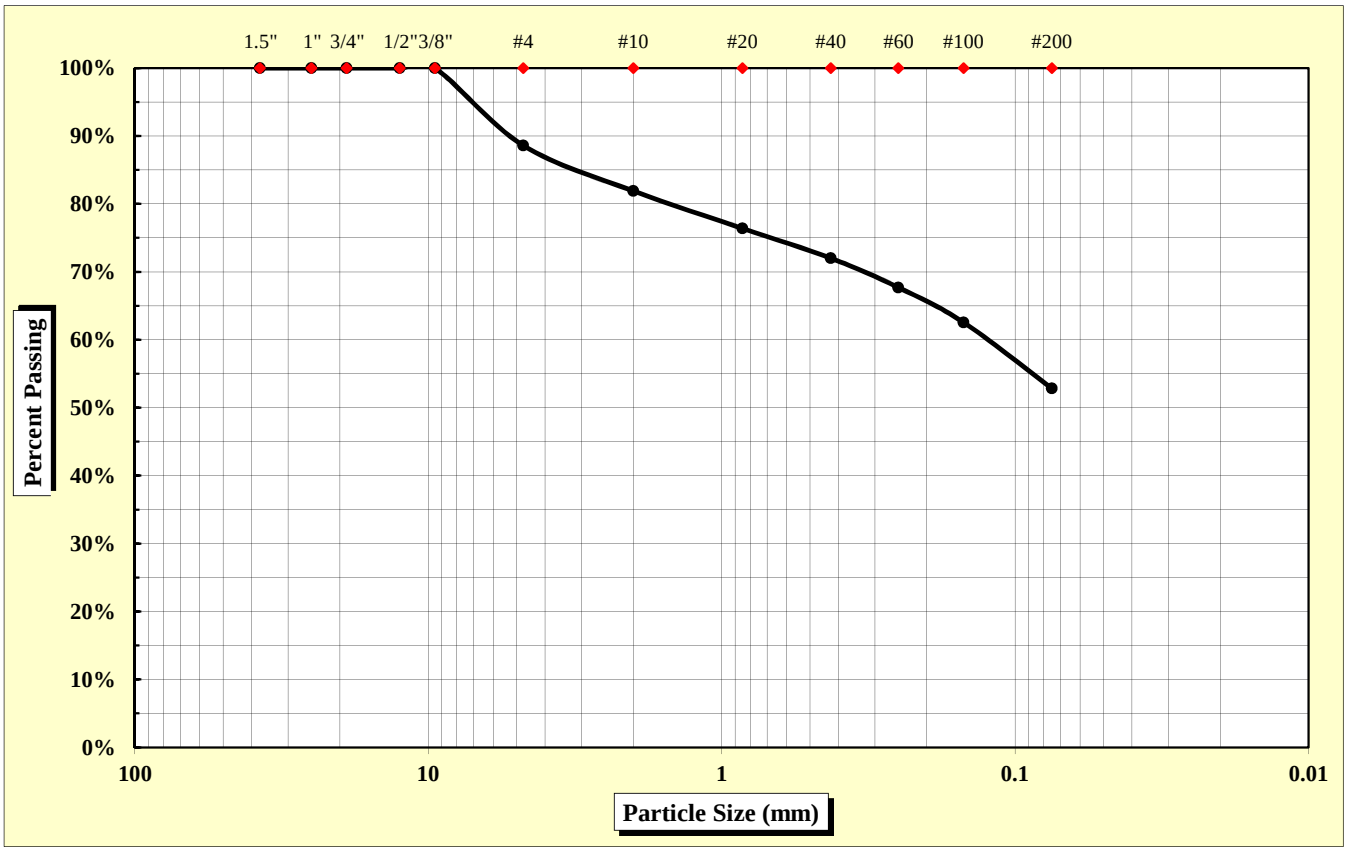
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-50	Sample #:	230	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Tan brown red, medium to fine, sandy SILT (ML) [A-7-6 (5)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	18.1%	Fine Sand	19.1%
		Coarse Sand	9.9%	Silt & Clay	52.9%
Liquid Limit	41	Plastic Limit	27	Plastic Index	14
		Moisture Content	21.2%	Group Index	5

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

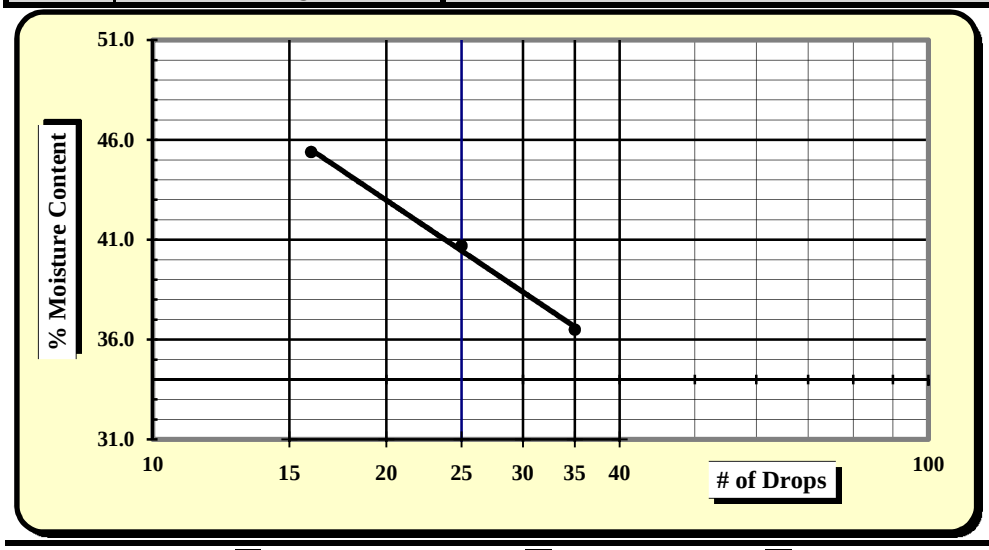
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-50	Sample #:	230	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Tan brown red, medium to fine, sandy SILT (ML) [A-7-6 (5)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	22	23				24		
A	Tare Weight	28.13	25.72	27.29				26.02		
B	Wet Soil Weight + A	38.86	40.70	40.84				36.04		
C	Dry Soil Weight + A	35.99	36.37	36.61				33.91		
D	Water Weight (B-C)	2.87	4.33	4.23				2.13		
E	Dry Soil Weight (C-A)	7.86	10.65	9.32				7.89		
F	% Moisture (D/E)*100	36.5%	40.7%	45.4%				27.0%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**27**
Plastic Index	**14**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 52.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

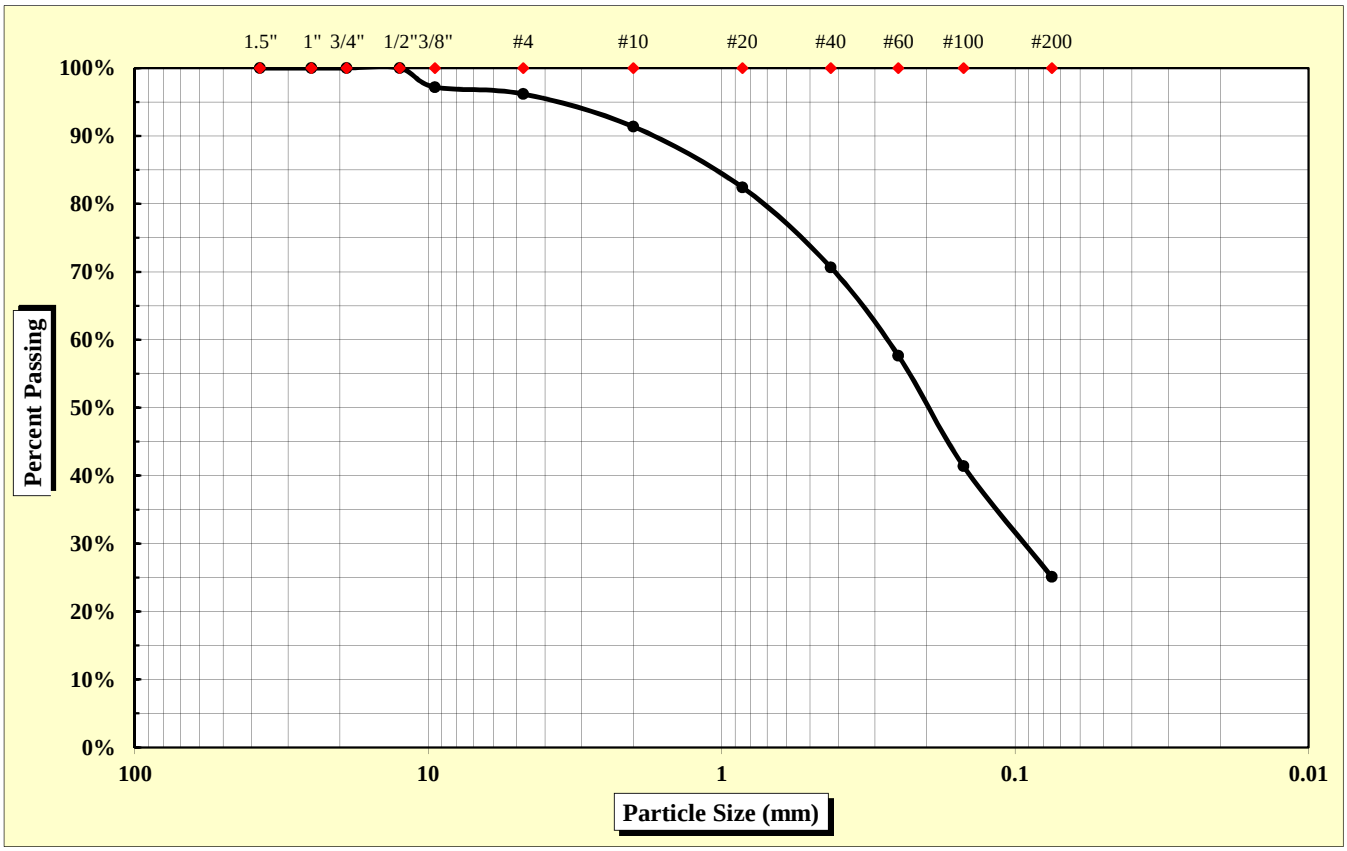
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-50	Sample #:	241	Sample Date:	10/15/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Brown, medium to fine, micaceous, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	8.6%	Fine Sand	45.6%
		Coarse Sand	20.7%	Silt & Clay	25.1%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	29.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

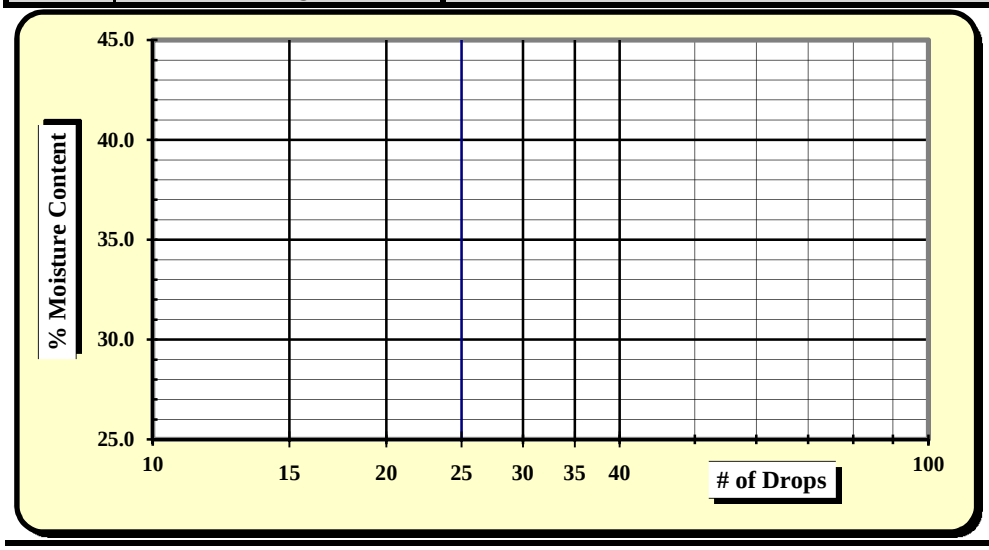
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-50	Sample #:	241	Sample Date:	10/15/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Brown, medium to fine, micaceous, silty SAND (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 25.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

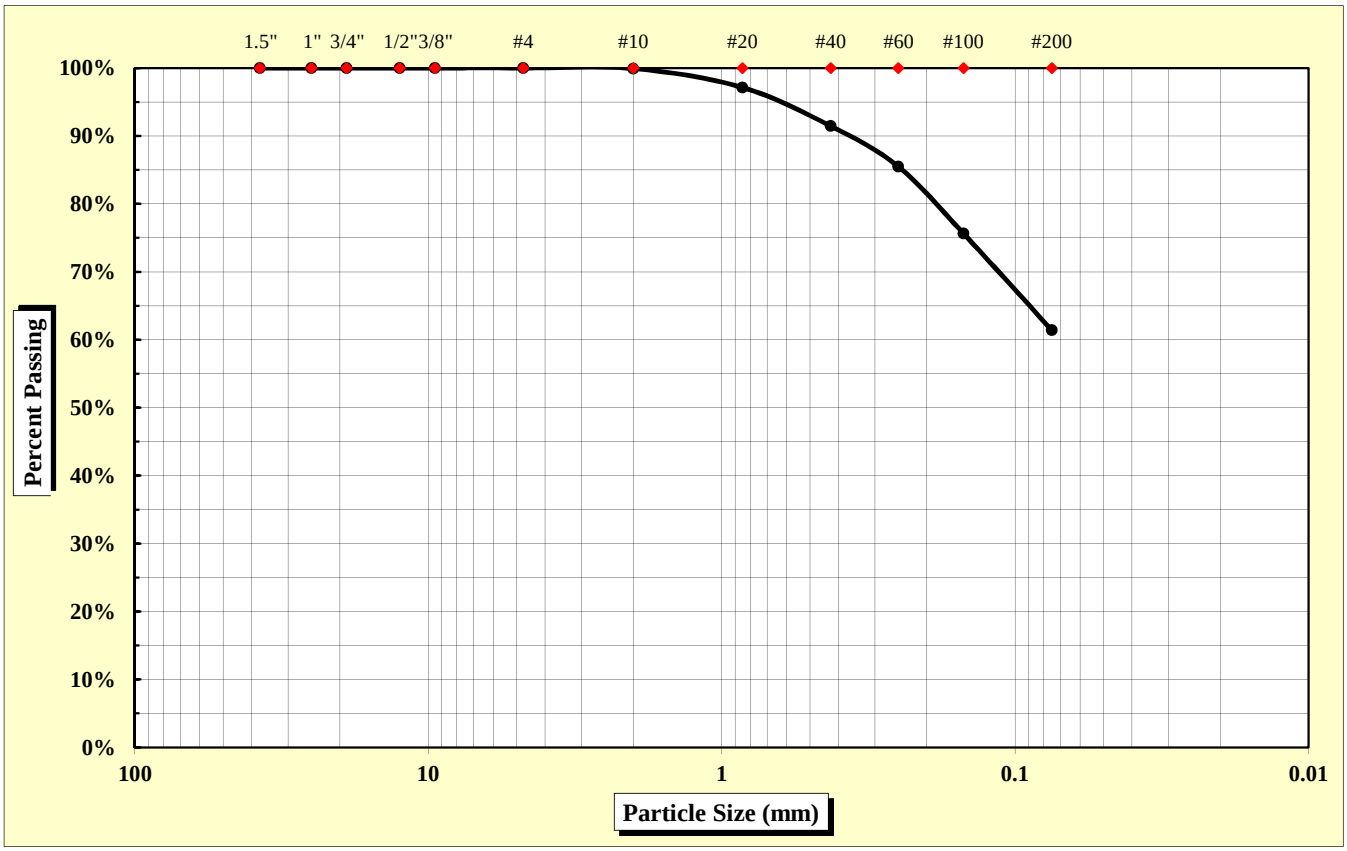
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-51	Sample #:	241	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (22)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.1%	Fine Sand	30.0%
		Coarse Sand	8.5%	Silt & Clay	61.4%
Liquid Limit	75	Plastic Limit	38	Plastic Index	37
		Moisture Content	34.6%	Group Index	22

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

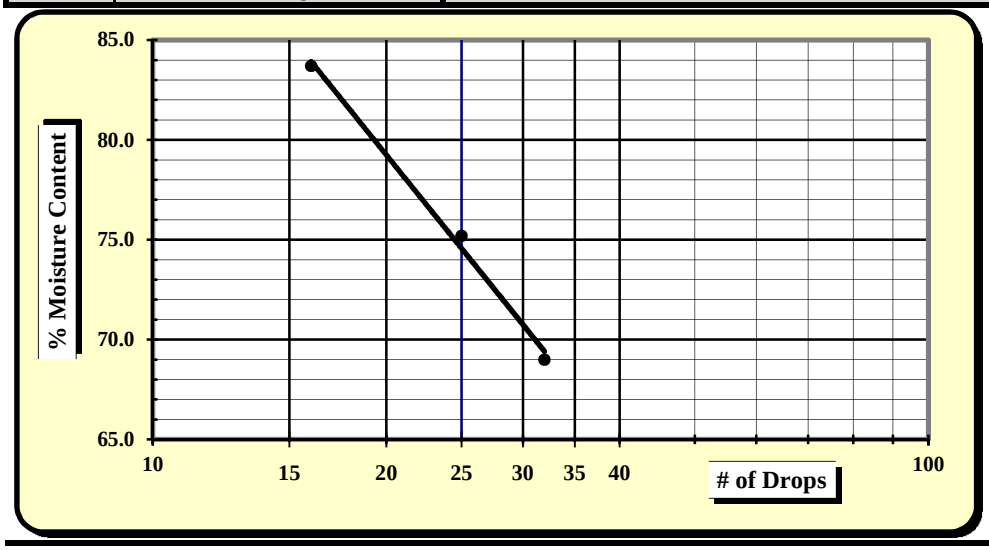
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-51	Sample #:	241	Sample Date:	10/15/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Red brown, fine, micaceous, sandy ELASTIC SILT (MH) [A-7-5 (22)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	xx4	xx6	103				504		
A	Tare Weight	12.09	12.09	12.36				12.52		
B	Wet Soil Weight + A	19.61	20.34	20.48				20.54		
C	Dry Soil Weight + A	16.54	16.80	16.78				18.33		
D	Water Weight (B-C)	3.07	3.54	3.70				2.21		
E	Dry Soil Weight (C-A)	4.45	4.71	4.42				5.81		
F	% Moisture (D/E)*100	69.0%	75.2%	83.7%				38.0%		
N	# OF DROPS	32	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**38.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**75**
Plastic Limit	**38**
Plastic Index	**37**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 61.4%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

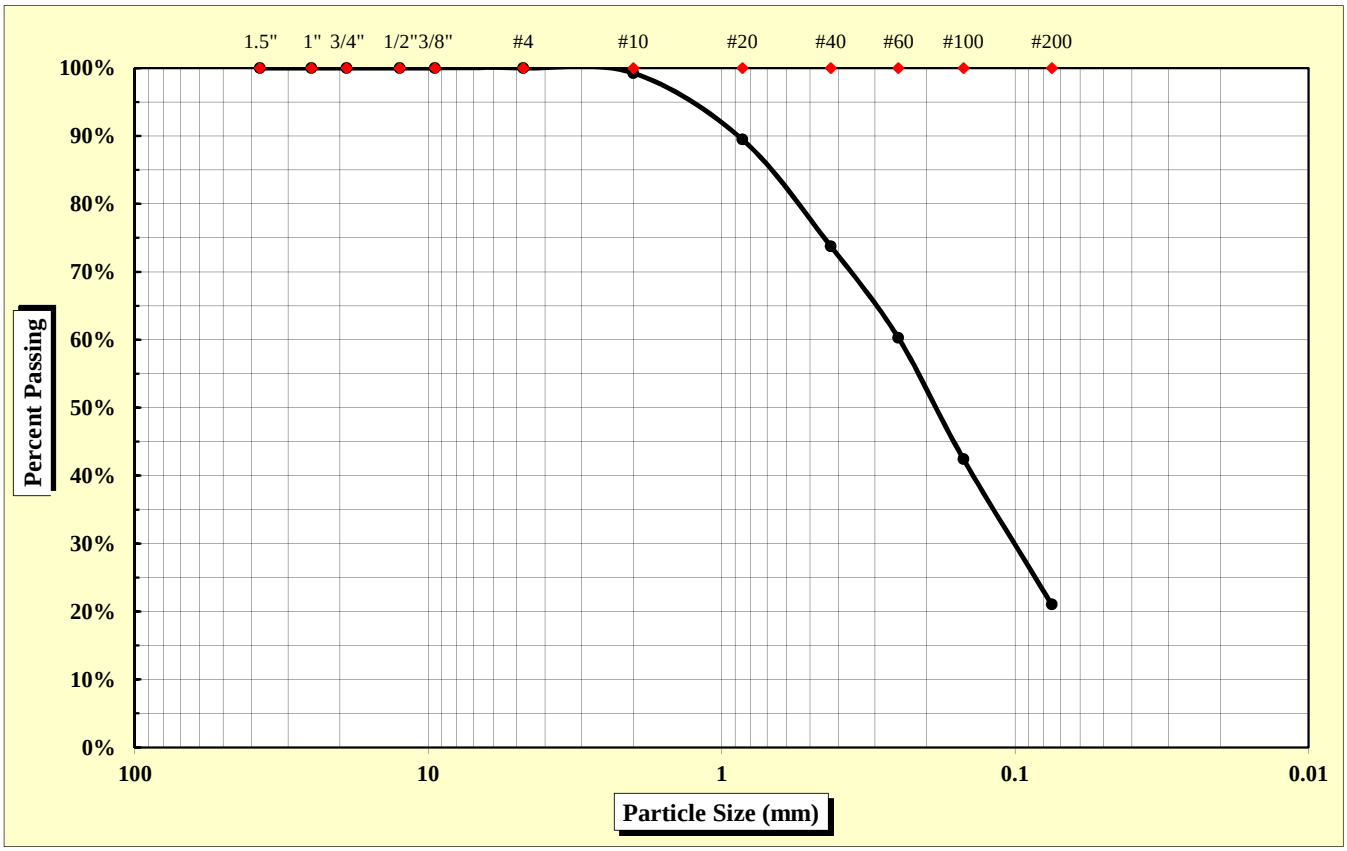
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-51	Sample #:	230	Sample Date:	10/15/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6 '
Sample Description:	Dark brown red, medium to fine, trace mica, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.7%	Fine Sand	52.7%
		Coarse Sand	25.5%	Silt & Clay	21.1%
Liquid Limit	42	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	21.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

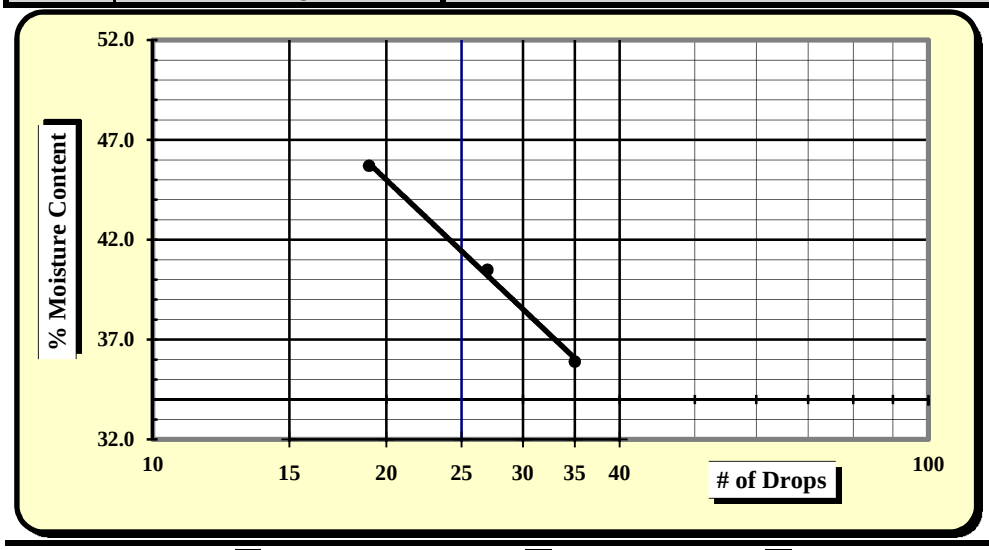
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-51	Sample #:	230	Sample Date:	10/15/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Dark brown red, medium to fine, trace mica, silty SAND (SM) [A-2-5]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	25	26	27						
A	Tare Weight	26.80	27.39	27.03						
B	Wet Soil Weight + A	38.66	41.88	43.66						
C	Dry Soil Weight + A	35.53	37.70	38.44						
D	Water Weight (B-C)	3.13	4.18	5.22						
E	Dry Soil Weight (C-A)	8.73	10.31	11.41						
F	% Moisture (D/E)*100	35.9%	40.5%	45.7%						
N	# OF DROPS	35	27	19				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	**42**
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-2-5**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 21.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

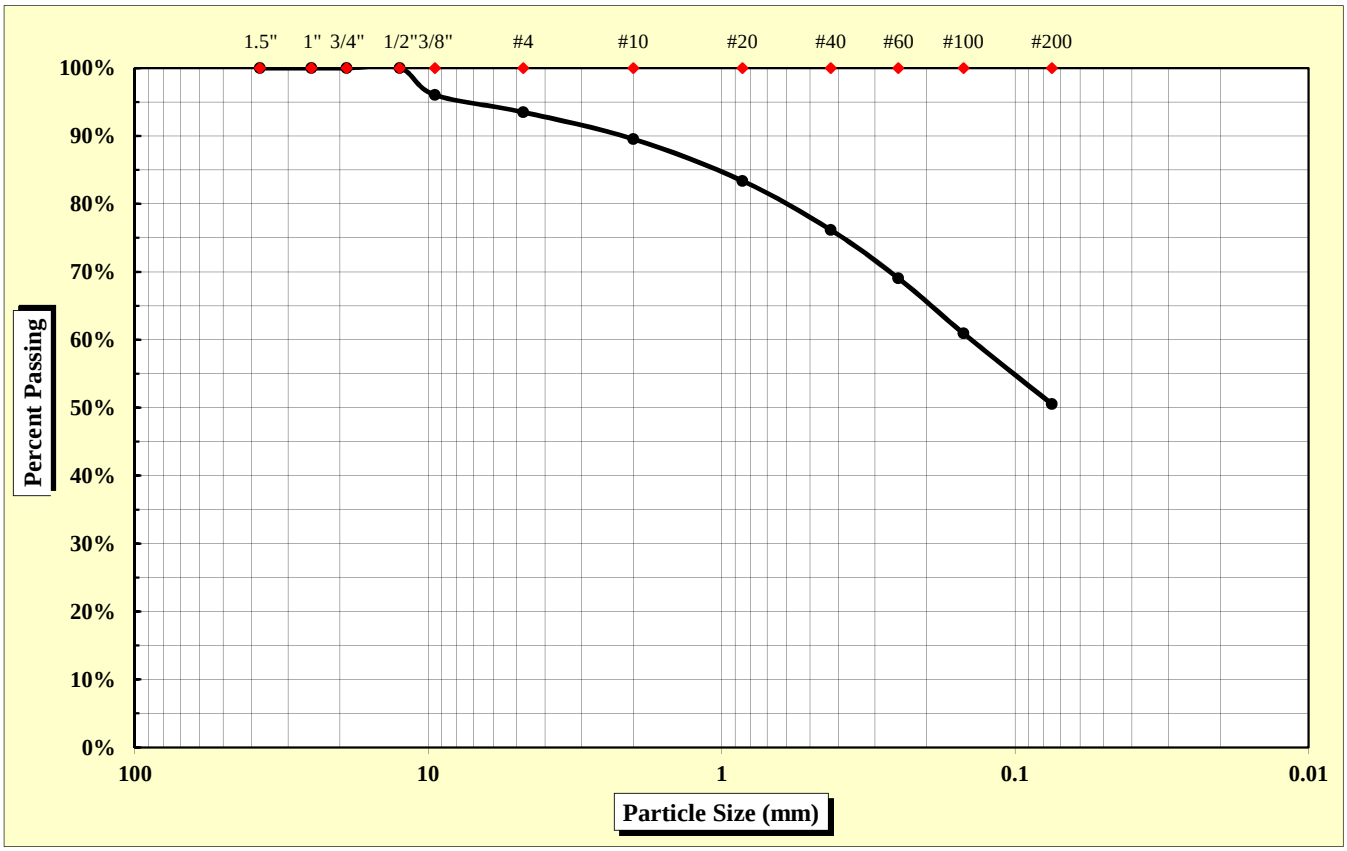
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-52	Sample #:	241	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red orange brown, medium to fine, slightly micaceous, sandy SILT (ML) [A-7-6 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	10.5%	Fine Sand	25.6%
		Coarse Sand	13.4%	Silt & Clay	50.5%
Liquid Limit	48	Plastic Limit	28	Plastic Index	20
		Moisture Content	23.3%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

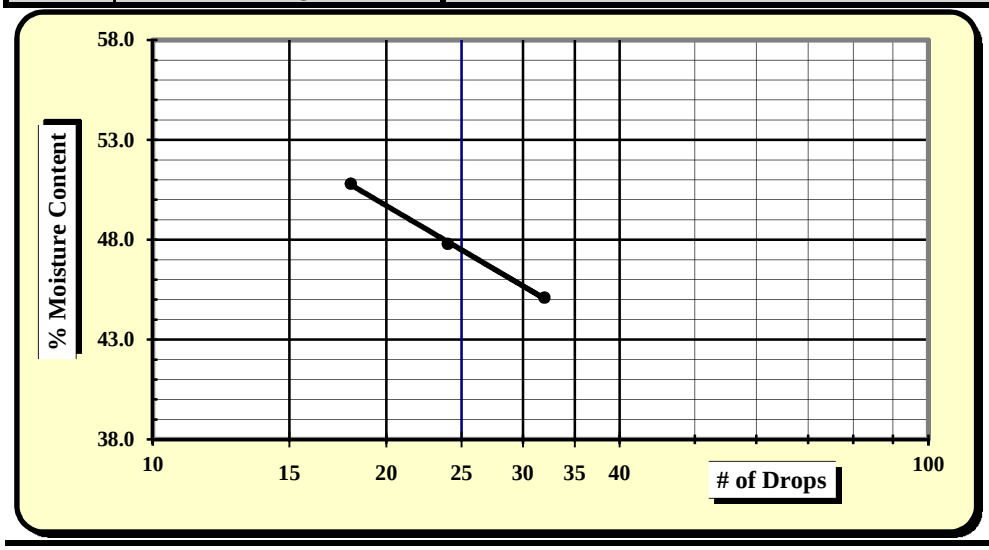
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-52	Sample #:	241	Sample Date:	10/14/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red orange brown, medium to fine, slightly micaceous, sandy SILT (ML) [A-7-6 (7)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	106	xx5	107				503		
A	Tare Weight	12.02	12.11	12.09				12.20		
B	Wet Soil Weight + A	20.52	18.97	21.88				20.20		
C	Dry Soil Weight + A	17.88	16.75	18.58				18.47		
D	Water Weight (B-C)	2.64	2.22	3.30				1.73		
E	Dry Soil Weight (C-A)	5.86	4.64	6.49				6.27		
F	% Moisture (D/E)*100	45.1%	47.8%	50.8%				27.6%		
N	# OF DROPS	32	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**27.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**48**
Plastic Limit	**28**
Plastic Index	**20**
Group Symbol	**ML / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
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Revision Date: 11/17/11

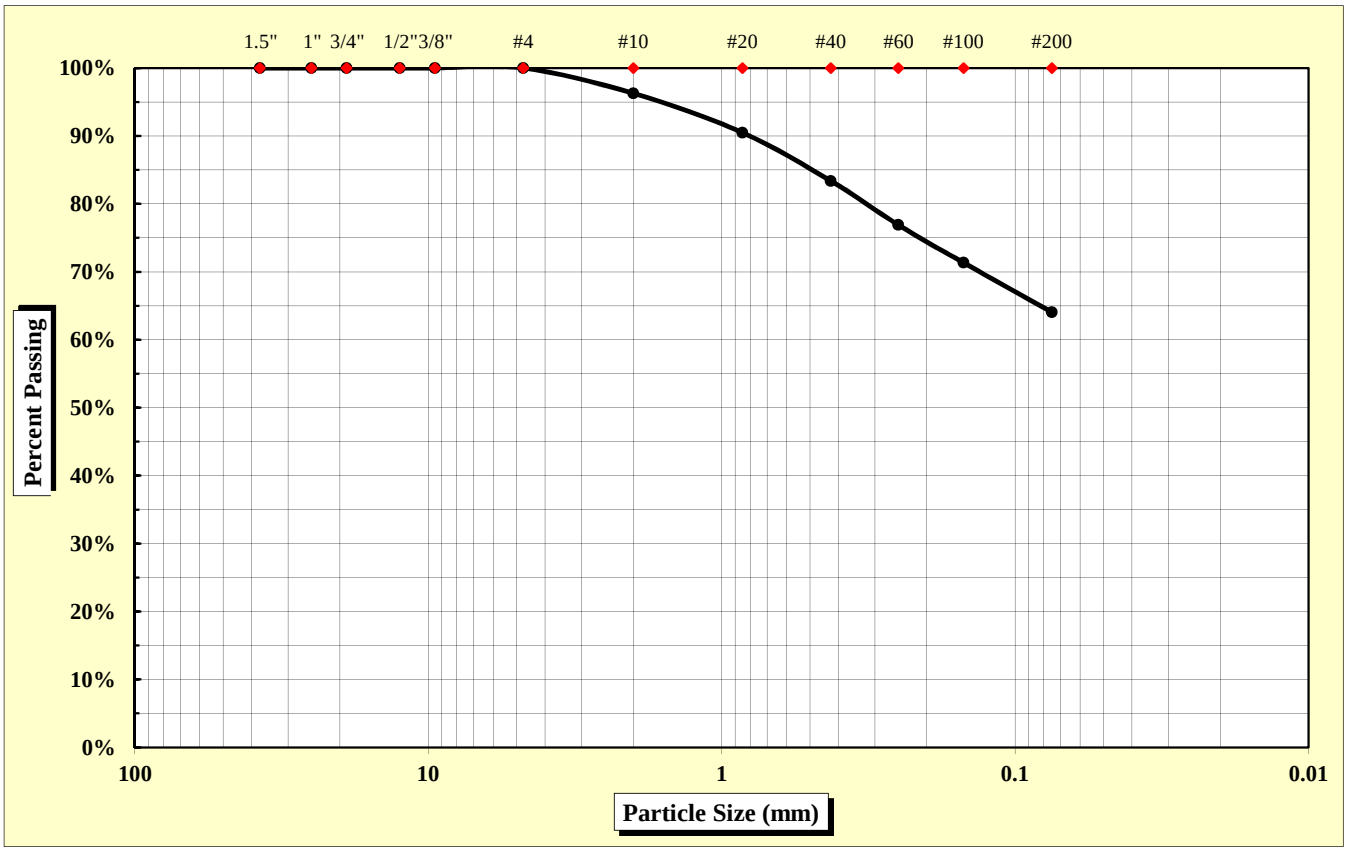
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-52	Sample #:	230	Sample Date:	10/14/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (14)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.7%	Fine Sand	19.3%
		Coarse Sand	12.9%	Silt & Clay	64.1%
Liquid Limit	47	Plastic Limit	23	Plastic Index	24
		Moisture Content	20.2%	Group Index	14

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

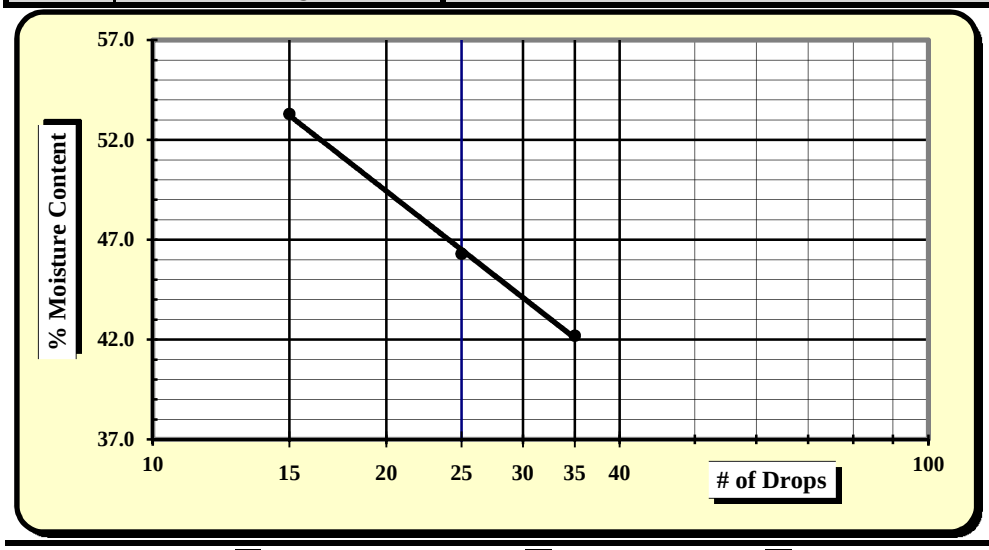
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-52	Sample #:	230	Sample Date:	10/14/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Red brown, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (14)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	28	29	30				31		
A	Tare Weight	26.87	27.03	27.38				28.63		
B	Wet Soil Weight + A	40.25	43.09	41.65				40.19		
C	Dry Soil Weight + A	36.28	38.01	36.69				38.00		
D	Water Weight (B-C)	3.97	5.08	4.96				2.19		
E	Dry Soil Weight (C-A)	9.41	10.98	9.31				9.37		
F	% Moisture (D/E)*100	42.2%	46.3%	53.3%				23.4%		
N	# OF DROPS	35	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**47**
Plastic Limit	**23**
Plastic Index	**24**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 64.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

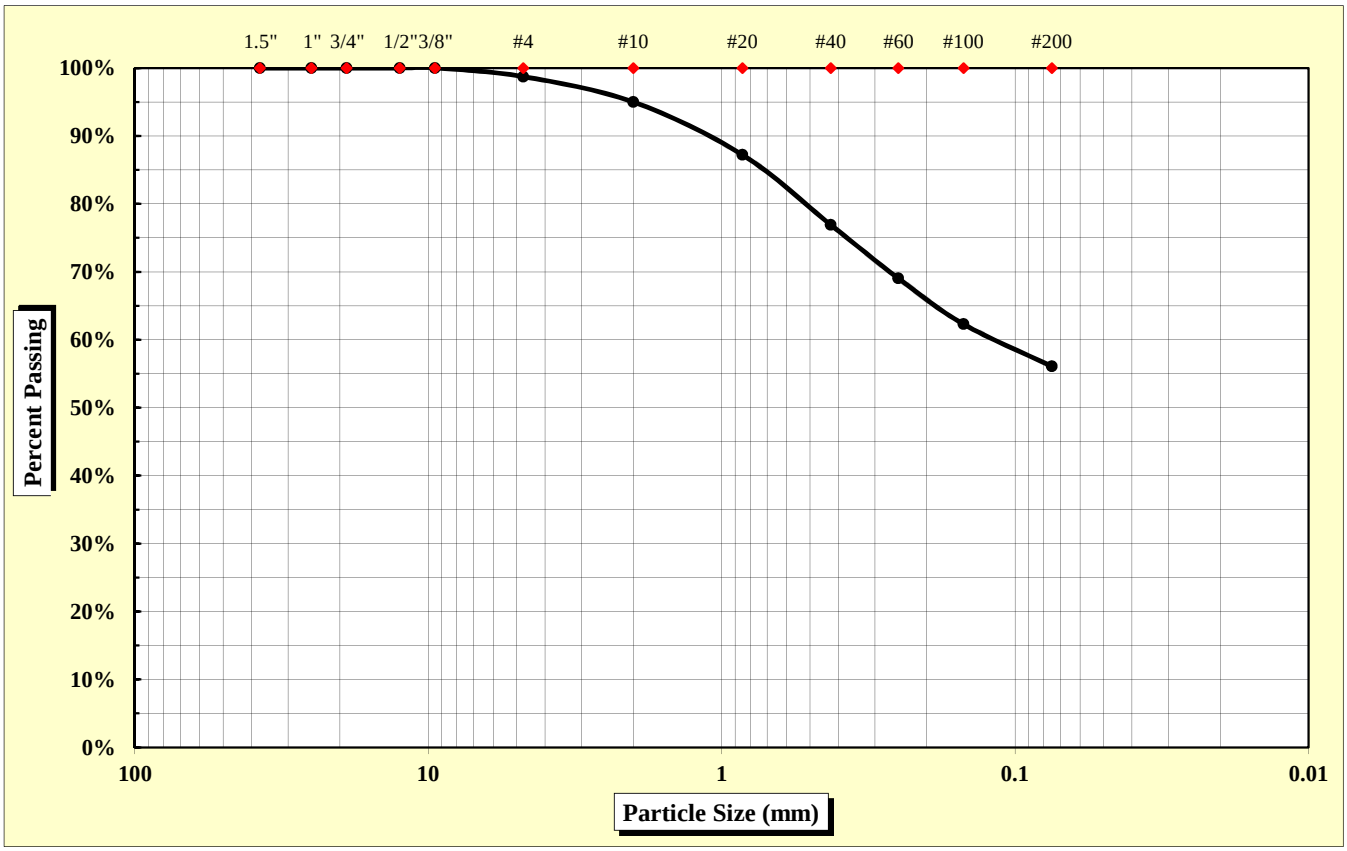
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Brown red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (9)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	5.0%	Fine Sand	20.8%
		Coarse Sand	18.1%	Silt & Clay	56.1%
Liquid Limit	43	Plastic Limit	21	Plastic Index	22
		Moisture Content	18.9%	Group Index	9

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

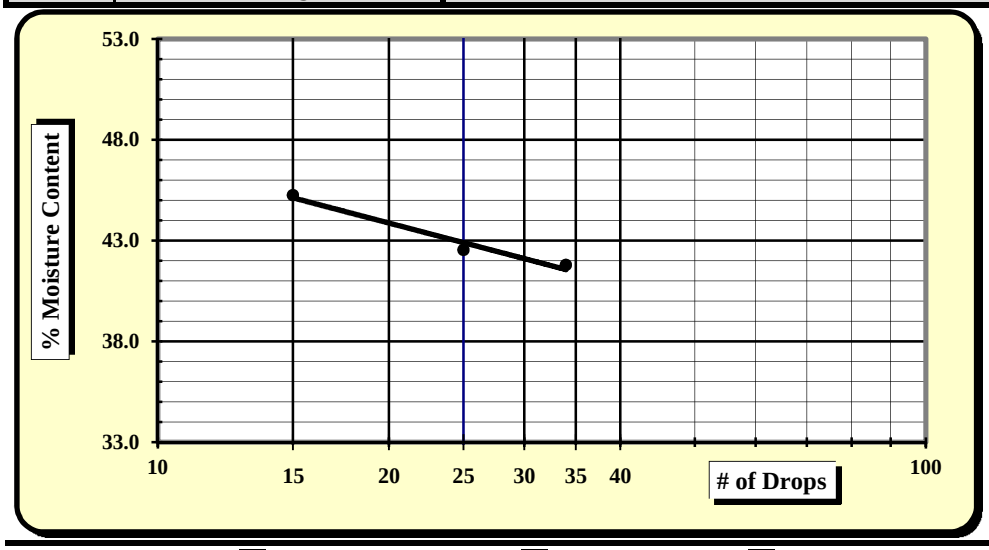
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'

Sample Description: Brown red, medium to fine, sandy LEAN CLAY (CL) [A-7-6 (9)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	19	803	807				7		
A	Tare Weight	13.18	16.71	16.72				15.29		
B	Wet Soil Weight + A	25.53	27.50	28.98				24.93		
C	Dry Soil Weight + A	21.89	24.28	25.16				23.23		
D	Water Weight (B-C)	3.64	3.22	3.82				1.70		
E	Dry Soil Weight (C-A)	8.71	7.57	8.44				7.94		
F	% Moisture (D/E)*100	41.8%	42.5%	45.3%				21.4%		
N	# OF DROPS	34	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**21.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**21**
Plastic Index	**22**
Group Symbol	**CL / A-7-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 56.1%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

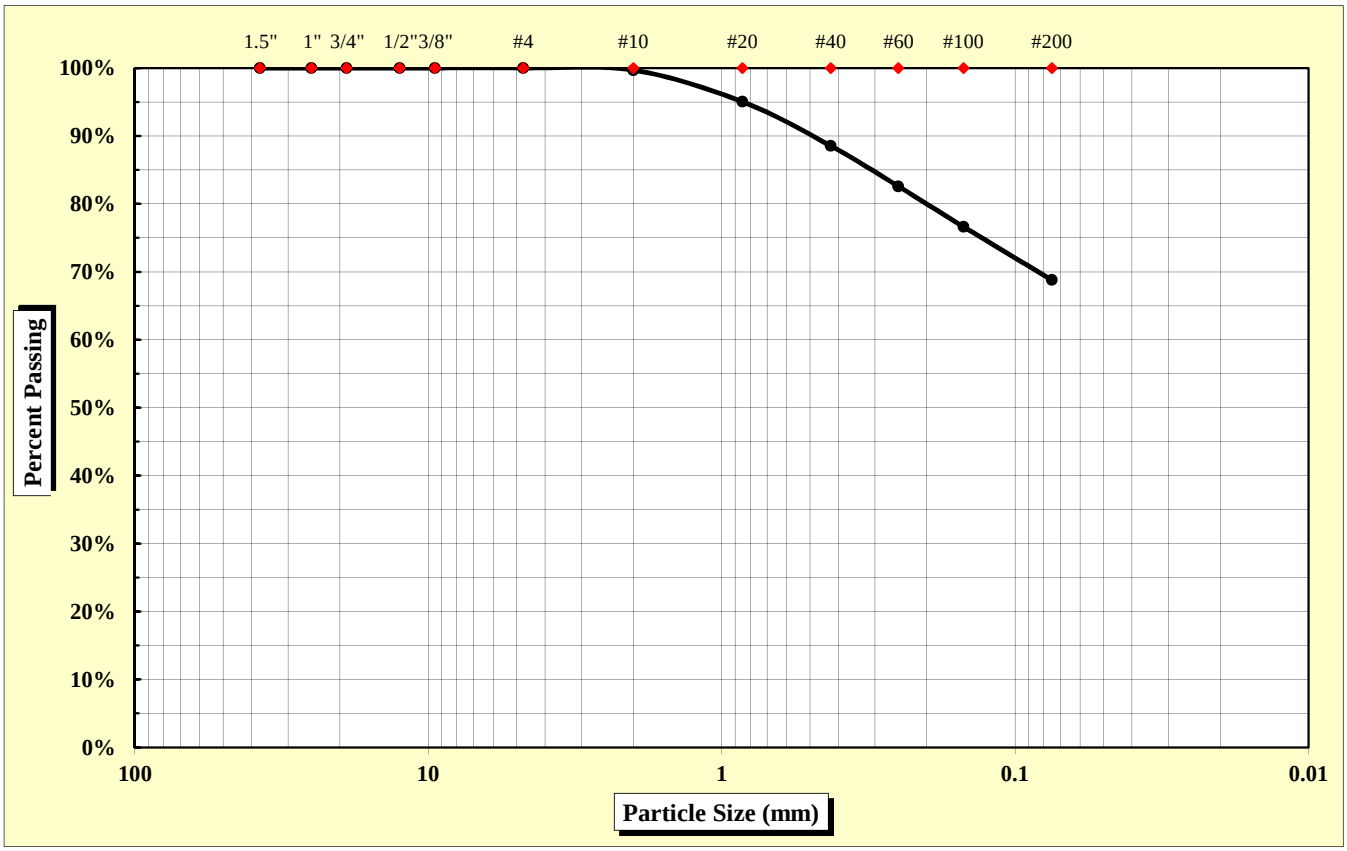
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red brown, medium to fine, trace mica, sandy ELASTIC SILT (MH) [A-7-5 (24)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.3%	Fine Sand	19.7%
		Coarse Sand	11.1%	Silt & Clay	68.8%
Liquid Limit	69	Plastic Limit	37	Plastic Index	32
		Moisture Content	31.1%	Group Index	24

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

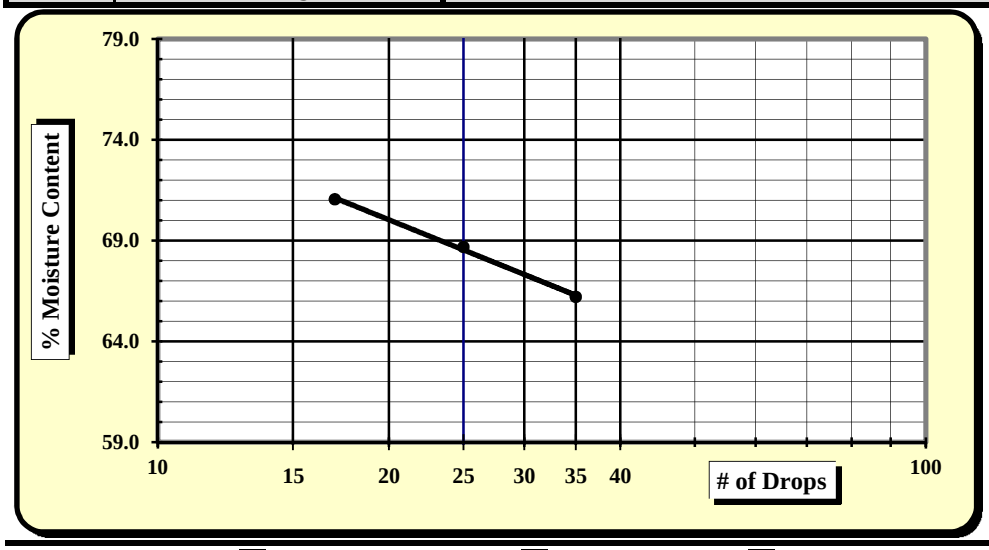
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red brown, medium to fine, trace mica, sandy ELASTIC SILT (MH) [A-7-5 (24)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	5	10	812				26		
A	Tare Weight	12.47	12.98	16.70				12.91		
B	Wet Soil Weight + A	24.67	24.40	29.05				21.64		
C	Dry Soil Weight + A	19.81	19.75	23.92				19.27		
D	Water Weight (B-C)	4.86	4.65	5.13				2.37		
E	Dry Soil Weight (C-A)	7.34	6.77	7.22				6.36		
F	% Moisture (D/E)*100	66.2%	68.7%	71.1%				37.3%		
N	# OF DROPS	35	25	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**37.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**69**
Plastic Limit	**37**
Plastic Index	**32**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 68.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

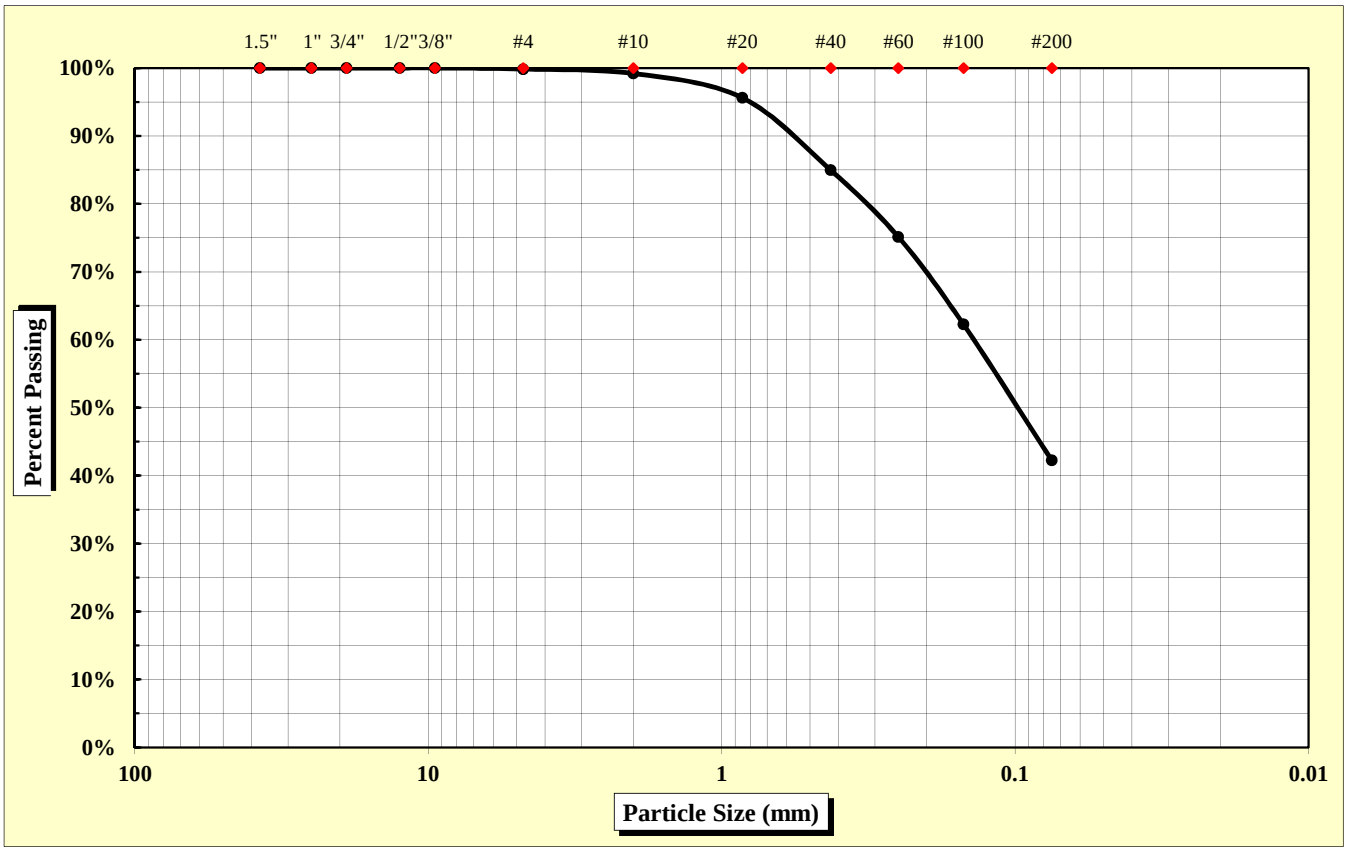
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red brown, medium to fine, micaceous, silty SAND (SM) [A-5 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	0.8%	Fine Sand	42.7%
		Coarse Sand	14.2%	Silt & Clay	42.3%
Liquid Limit	51	Plastic Limit	49	Plastic Index	2
		Moisture Content	23.5%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

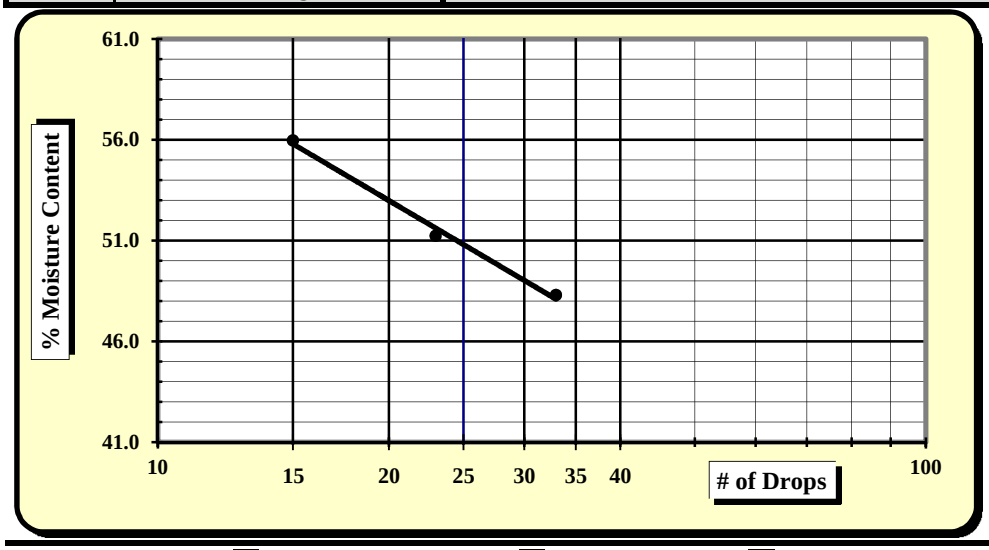
S&ME, Inc. - Raleigh 3201 Spring Forest Road Raleigh, NC 27616

Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12 - 11/18/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-53	Sample #:	230	Sample Date:	10/20/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Red brown, medium to fine, micaceous, silty SAND (SM) [A-5 (0)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	20977	2/16/2015	Grooving tool	01801	5/12/2015
LL Apparatus	01803	6/9/2015			
Oven	01454	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	24	6	8				10		
A	Tare Weight	13.01	13.01	13.08				11.00		
B	Wet Soil Weight + A	24.40	27.09	26.01				20.25		
C	Dry Soil Weight + A	20.69	22.32	21.37				17.19		
D	Water Weight (B-C)	3.71	4.77	4.64				3.06		
E	Dry Soil Weight (C-A)	7.68	9.31	8.29				6.19		
F	% Moisture (D/E)*100	48.3%	51.2%	56.0%				49.4%		
N	# OF DROPS	33	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**49.4%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**51**
Plastic Limit	**49**
Plastic Index	**2**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.3%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Mal Krajan	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

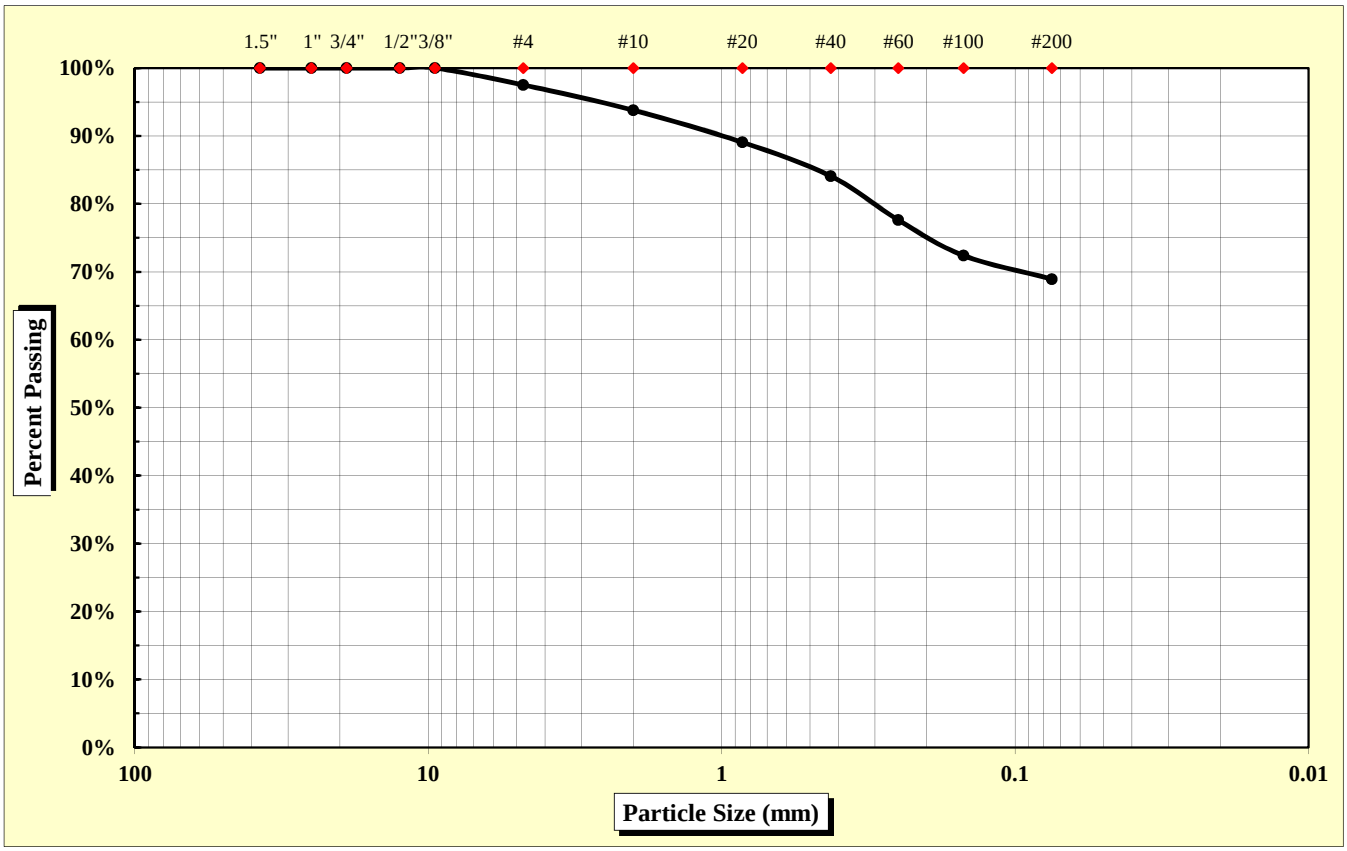
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/13/2015
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Orange brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.2%	Fine Sand	15.2%
		Coarse Sand	9.7%	Silt & Clay	68.9%
Liquid Limit	55	Plastic Limit	42	Plastic Index	13
		Moisture Content	37.3%	Group Index	11

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

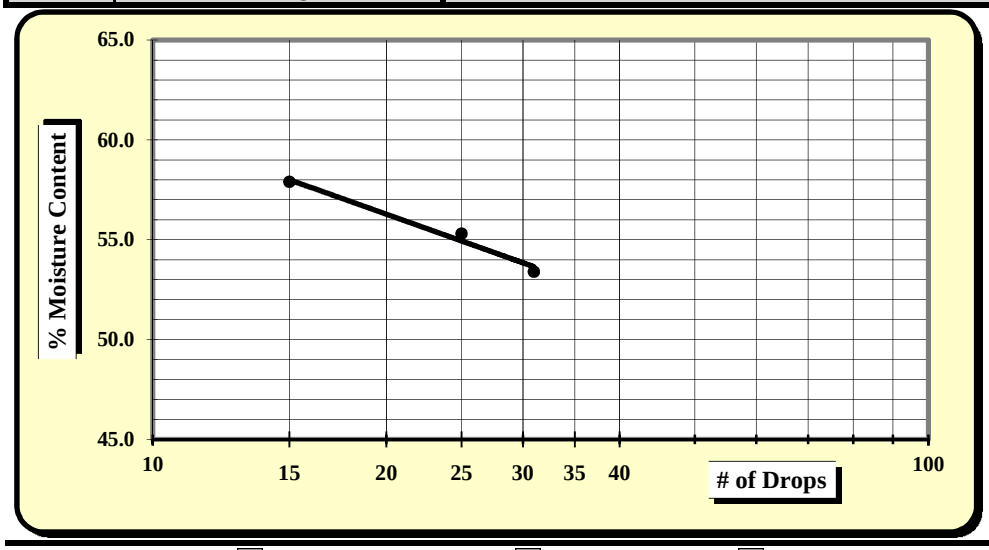
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/13/2015
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Orange brown, fine, sandy ELASTIC SILT (MH) [A-7-5 (11)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	602	Liquid Limit						Plastic Limit		
	Tare #:	206	235	24				226		
A	Tare Weight	20.91	20.77	20.74				20.93		
B	Wet Soil Weight + A	30.68	30.82	30.45				29.59		
C	Dry Soil Weight + A	27.28	27.24	26.89				27.04		
D	Water Weight (B-C)	3.40	3.58	3.56				2.55		
E	Dry Soil Weight (C-A)	6.37	6.47	6.15				6.11		
F	% Moisture (D/E)*100	53.4%	55.3%	57.9%				41.7%		
N	# OF DROPS	31	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**41.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**42**
Plastic Index	**13**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 68.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

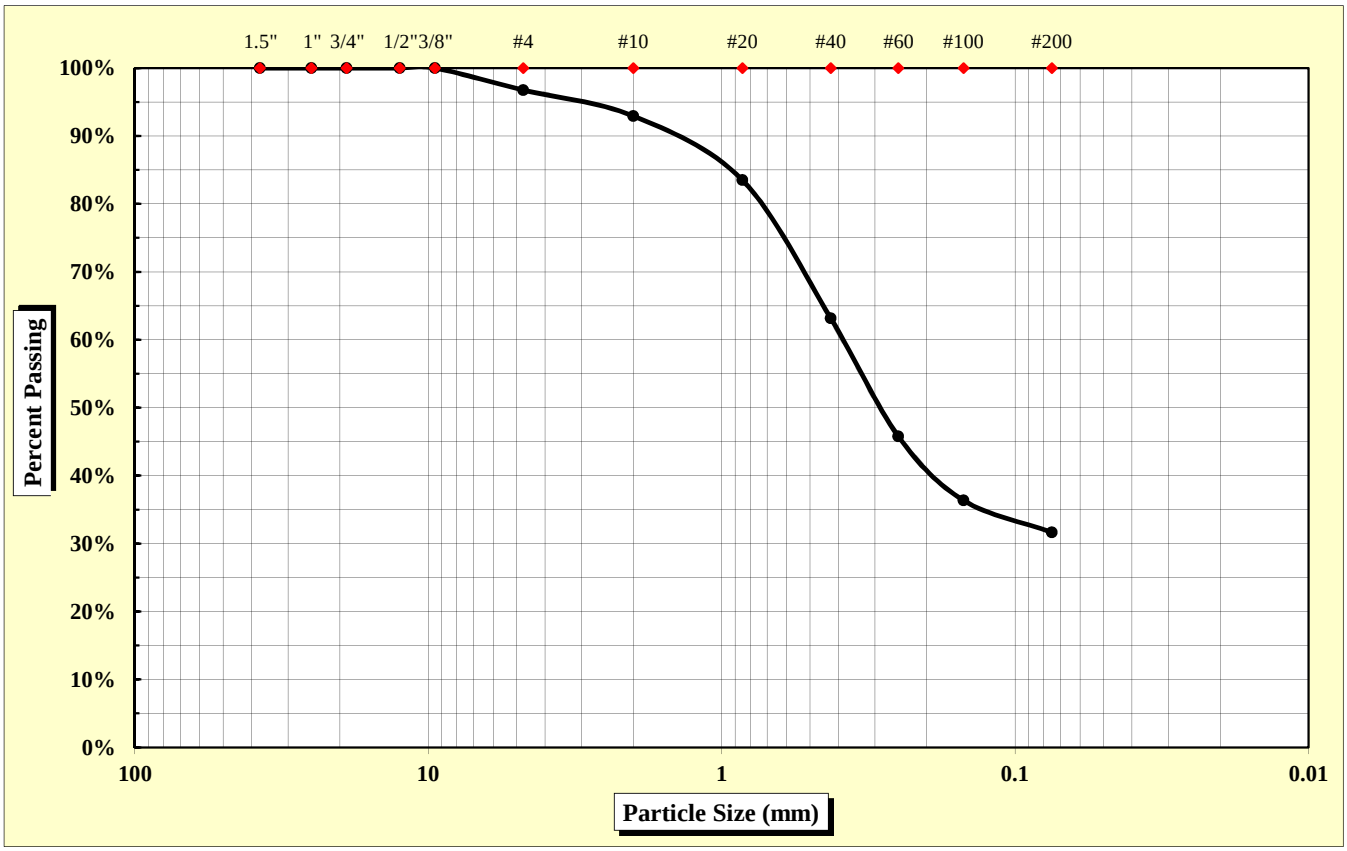
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/13/2015
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Brown orange, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	7.1%	Fine Sand	31.5%
		Coarse Sand	29.7%	Silt & Clay	31.7%
Liquid Limit	38	Plastic Limit	32	Plastic Index	6
		Moisture Content	31.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

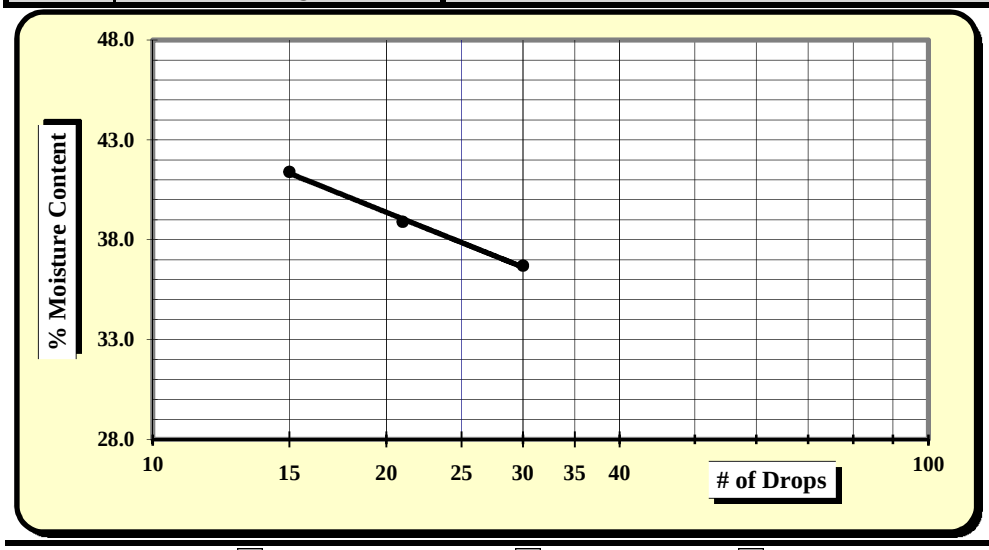
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/13/2015
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Brown orange, medium to fine, silty SAND (SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	604	Liquid Limit						Plastic Limit		
	Tare #:	8	246	44				134		
A	Tare Weight	20.55	20.69	20.72				20.68		
B	Wet Soil Weight + A	34.64	32.44	31.55				29.14		
C	Dry Soil Weight + A	30.86	29.15	28.38				27.08		
D	Water Weight (B-C)	3.78	3.29	3.17				2.06		
E	Dry Soil Weight (C-A)	10.31	8.46	7.66				6.40		
F	% Moisture (D/E)*100	36.7%	38.9%	41.4%				32.2%		
N	# OF DROPS	30	21	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.2%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**32**
Plastic Index	**6**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 31.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

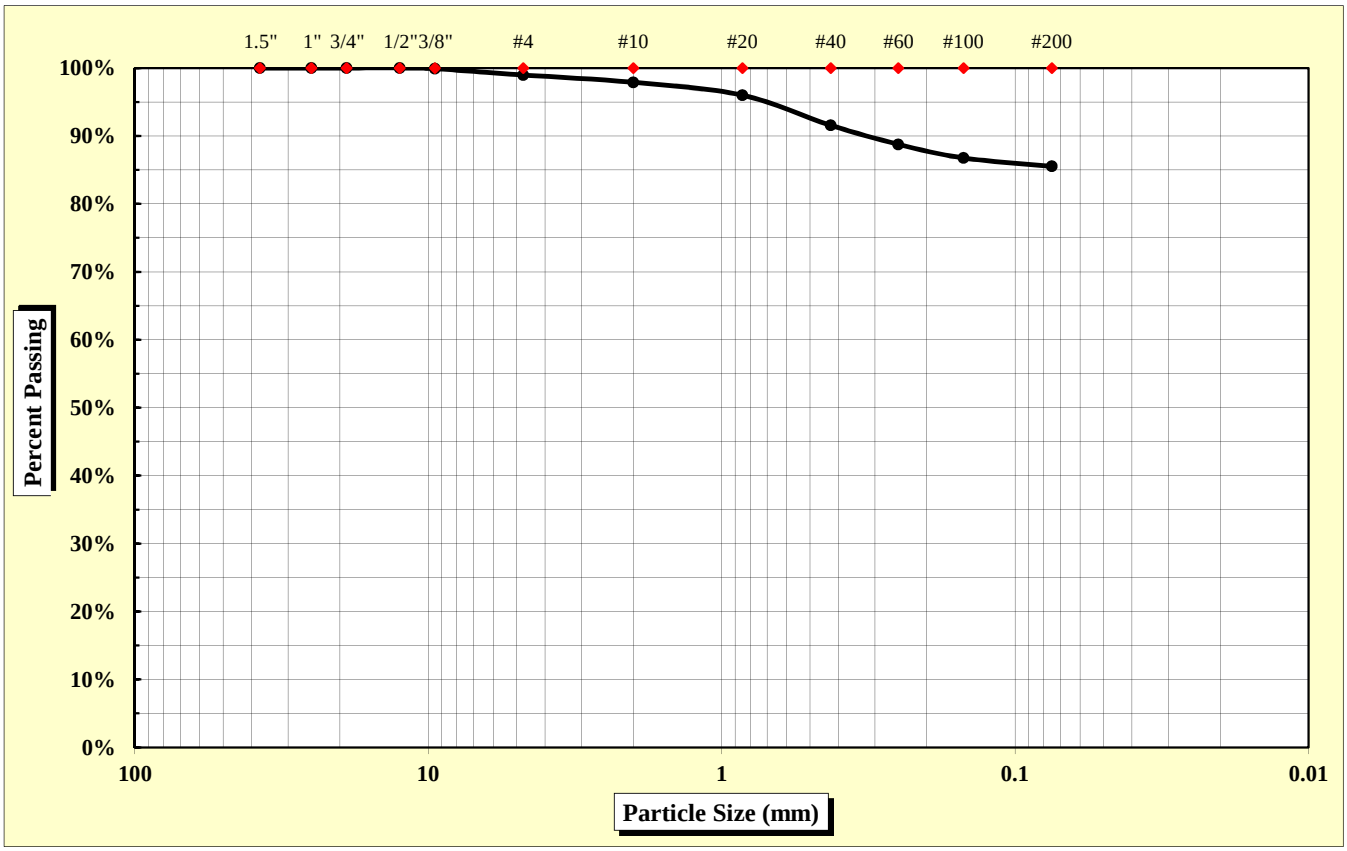
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/13/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Red, ELASTIC SILT (MH) [A-7-5 (26)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	2.1%	Fine Sand	6.1%
		Coarse Sand	6.3%	Silt & Clay	85.5%
Liquid Limit	56	Plastic Limit	30	Plastic Index	26
		Moisture Content	9.0%	Group Index	26

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

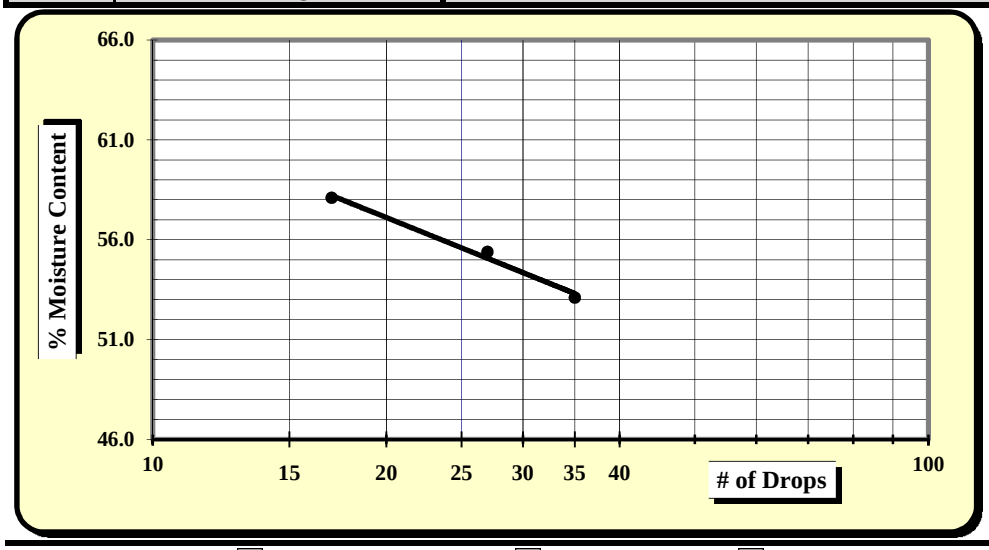
S&ME, Inc. - Columbia 134 Suber Road, Columbia, SC 29210

Project #:	**1426-14-161**	Report Date:	11/3/2015
Project Name:	I-85 Widening MM80-96	Test Date:	10/19 - 11/3/2015
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-54	Sample #:	230	Sample Date:	10/16/2015
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Red, ELASTIC SILT (MH) [A-7-5 (26)]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	15425	8/4/2015	Grooving tool	28406	2/18/2015
LL Apparatus	25789	7/7/2015			
Oven	25722	3/20/2015			

Pan #	609	Liquid Limit						Plastic Limit		
	Tare #:	43	9	4				212		
A	Tare Weight	20.70	20.74	20.49				20.85		
B	Wet Soil Weight + A	29.84	29.27	28.71				28.94		
C	Dry Soil Weight + A	26.67	26.23	25.69				27.07		
D	Water Weight (B-C)	3.17	3.04	3.02				1.87		
E	Dry Soil Weight (C-A)	5.97	5.49	5.20				6.22		
F	% Moisture (D/E)*100	53.1%	55.4%	58.1%				30.1%		
N	# OF DROPS	35	27	17				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**30.1%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**56**
Plastic Limit	**30**
Plastic Index	**26**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 85.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matthew Wolfe	11/3/2015	Brian Vaughan, P.E.	11/3/2015
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

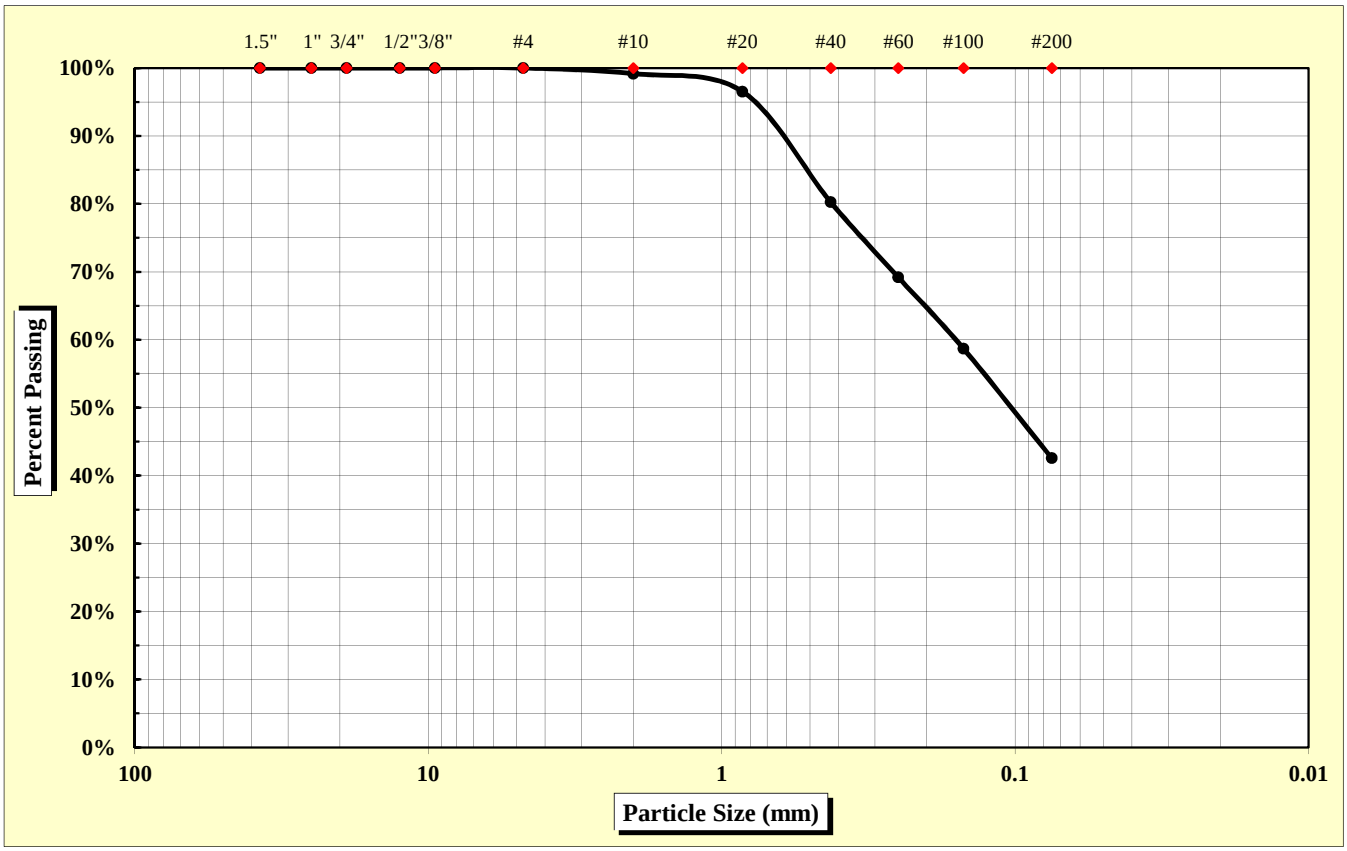
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME *Quality Assurance*

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-55	Sample #:	241	Sample Date:	10/13/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'
Sample Description:	Tan yellow black, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.8%	Fine Sand	37.7%
		Coarse Sand	18.9%	Silt & Clay	42.6%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	21.7%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ *Quality Assurance*

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

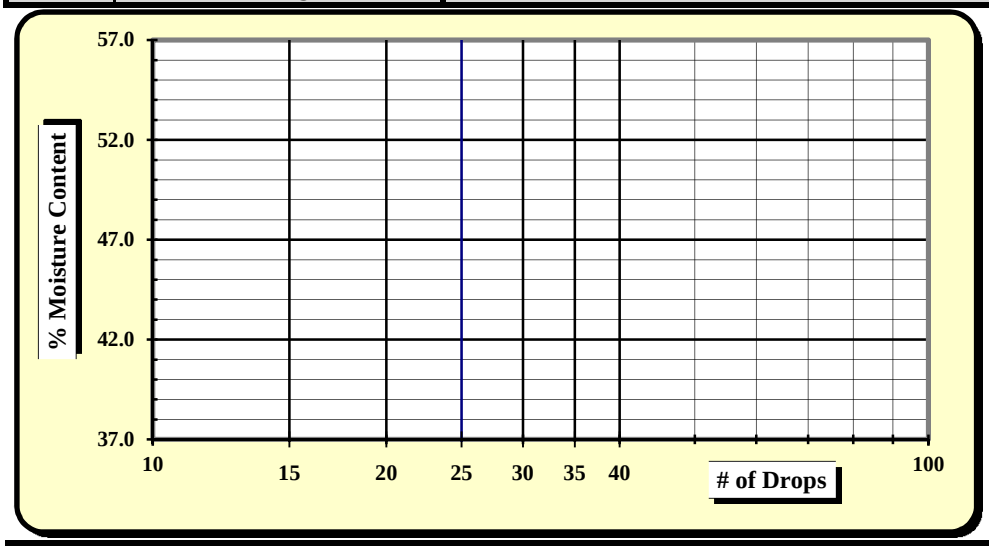
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-55	Sample #:	241	Sample Date:	10/13/15
Location:	SS-2/3	Type:	Split-spoon	Depth:	2 - 6'

Sample Description: Tan yellow black, medium to fine, trace mica, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

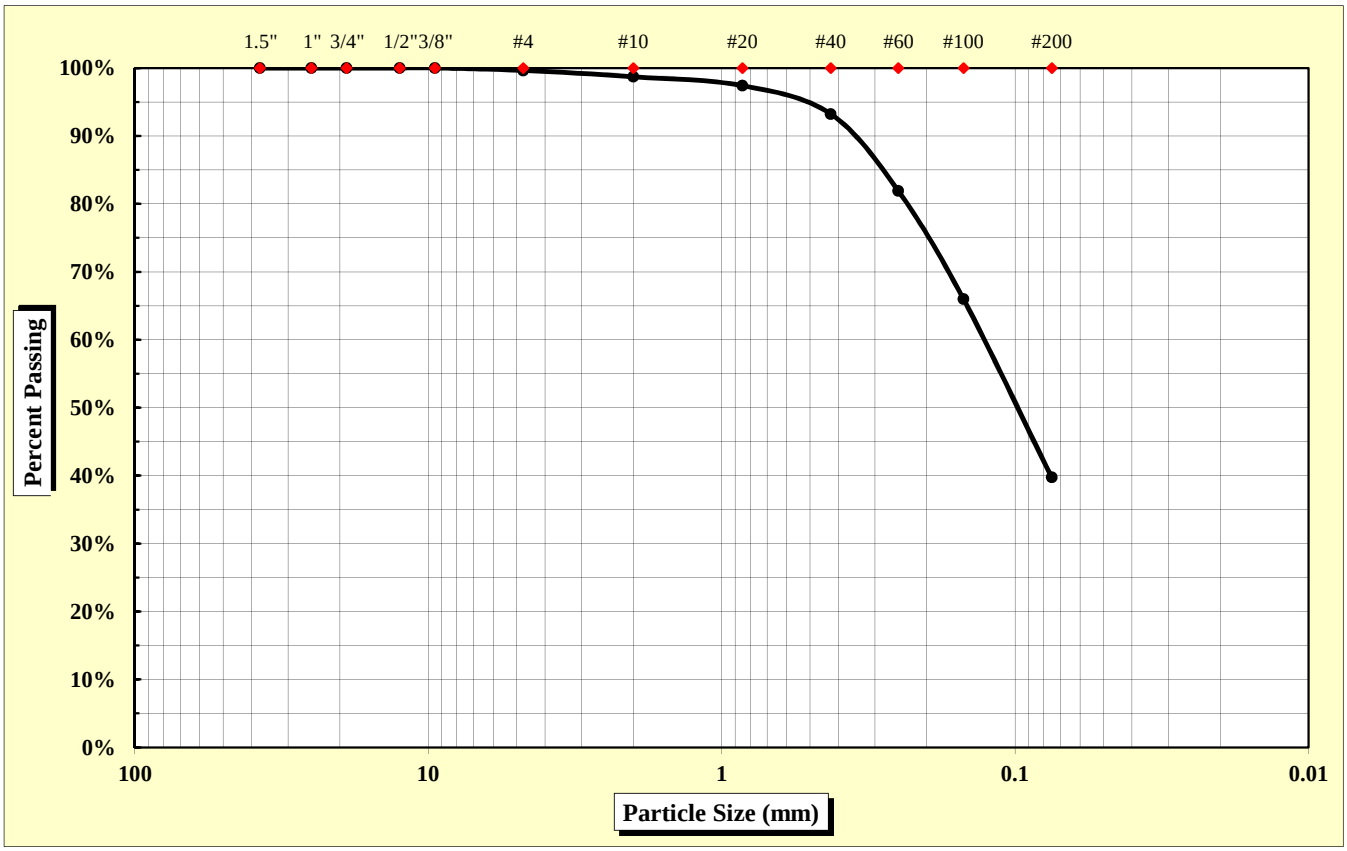
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-55	Sample #:	230	Sample Date:	10/13/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'
Sample Description:	Gray brown red, fine, trace mica, silty SAND (SM) [A-5 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.3%	Fine Sand	53.5%
		Coarse Sand	5.5%	Silt & Clay	39.7%
Liquid Limit	41	Plastic Limit	33	Plastic Index	8
		Moisture Content	31.9%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

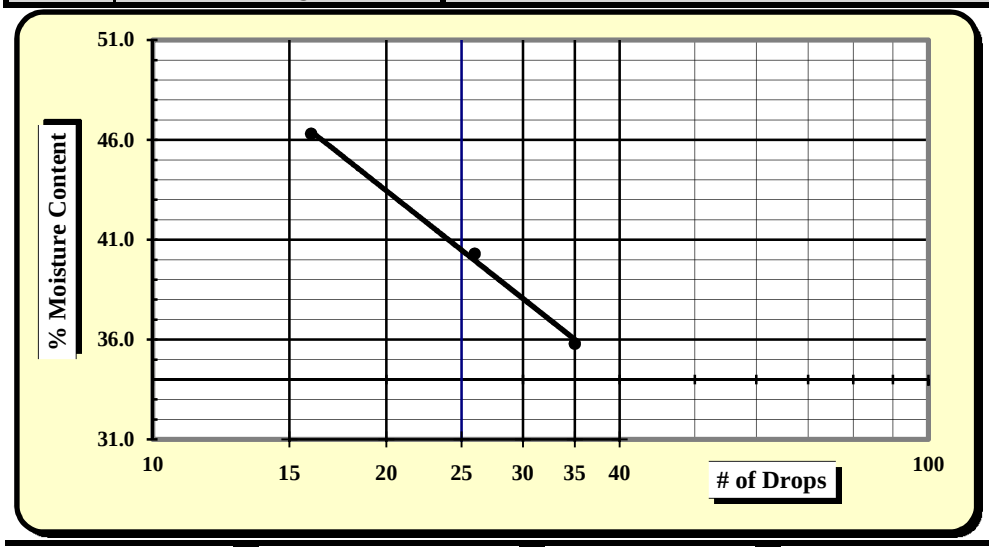
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-55	Sample #:	230	Sample Date:	10/13/15
Location:	SS-5	Type:	Split-spoon	Depth:	8 - 10'

Sample Description: Gray brown red, fine, trace mica, silty SAND (SM) [A-5 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	32	33	34				35		
A	Tare Weight	27.65	26.71	28.30				26.99		
B	Wet Soil Weight + A	41.47	41.46	42.75				35.78		
C	Dry Soil Weight + A	37.83	37.22	38.18				33.62		
D	Water Weight (B-C)	3.64	4.24	4.57				2.16		
E	Dry Soil Weight (C-A)	10.18	10.51	9.88				6.63		
F	% Moisture (D/E)*100	35.8%	40.3%	46.3%				32.6%		
N	# OF DROPS	35	26	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.6%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**41**
Plastic Limit	**33**
Plastic Index	**8**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 39.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

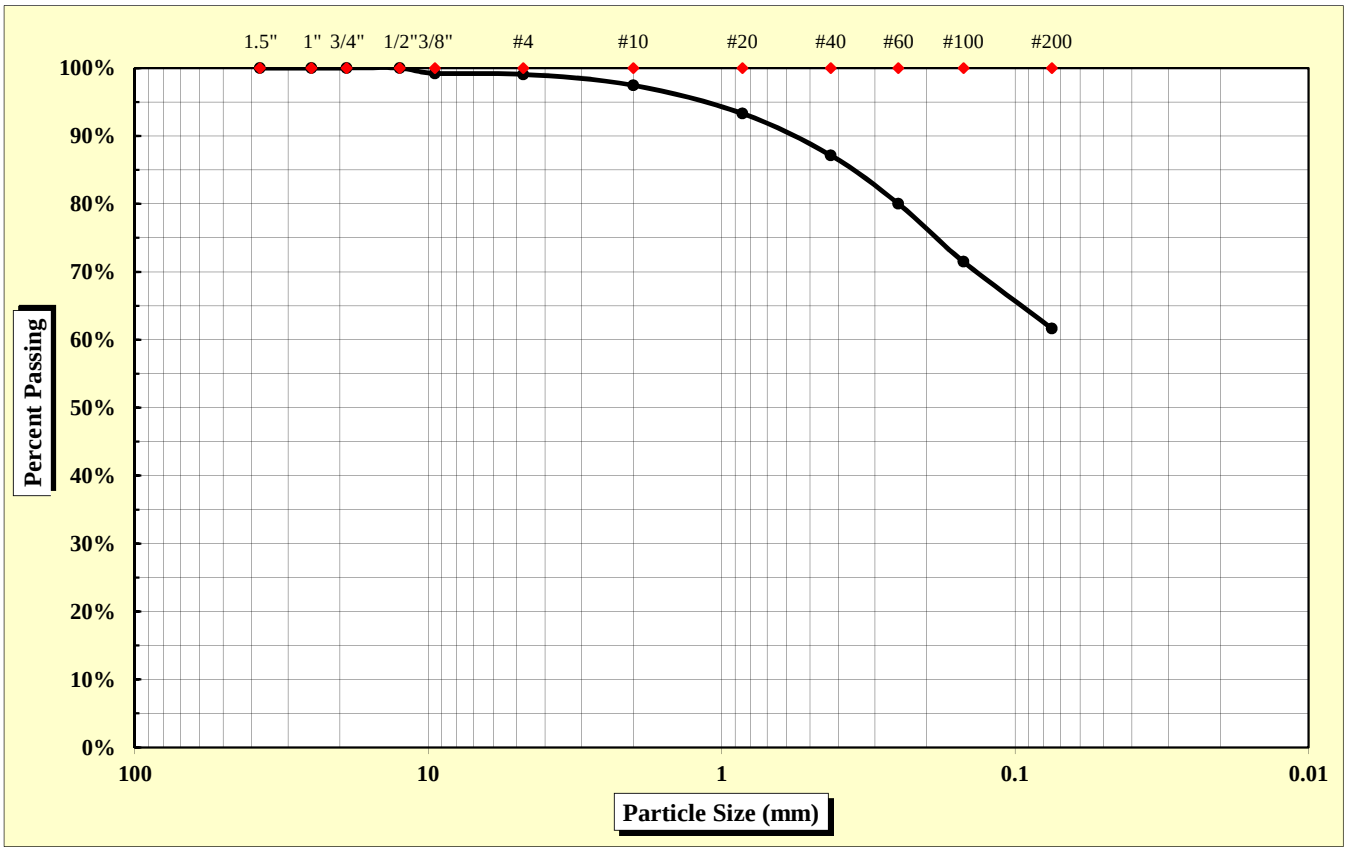
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-56	Sample #:	241	Sample Date:	10/13/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'
Sample Description:	Red brown, medium to fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (16)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	2.5%	Fine Sand	25.5%
		Coarse Sand	10.3%	Silt & Clay	61.7%
Liquid Limit	58	Plastic Limit	31	Plastic Index	27
		Moisture Content	20.8%	Group Index	16

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator (Position)

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

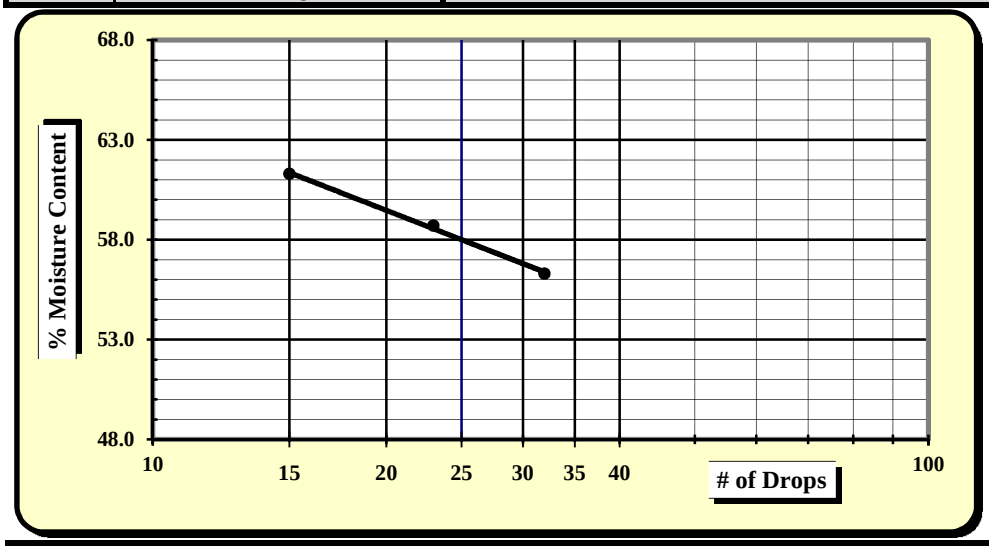
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-56	Sample #:	241	Sample Date:	10/13/15
Location:	SS-1/2	Type:	Split-spoon	Depth:	0 - 4'

Sample Description: Red brown, medium to fine, slightly micaceous, sandy ELASTIC SILT (MH) [A-7-5 (16)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	J3	xx5	100				107		
A	Tare Weight	12.45	12.12	12.05				12.11		
B	Wet Soil Weight + A	20.06	20.45	18.76				20.12		
C	Dry Soil Weight + A	17.32	17.37	16.21				18.21		
D	Water Weight (B-C)	2.74	3.08	2.55				1.91		
E	Dry Soil Weight (C-A)	4.87	5.25	4.16				6.10		
F	% Moisture (D/E)*100	56.3%	58.7%	61.3%				31.3%		
N	# OF DROPS	32	23	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**31**
Plastic Index	**27**
Group Symbol	**MH / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 61.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

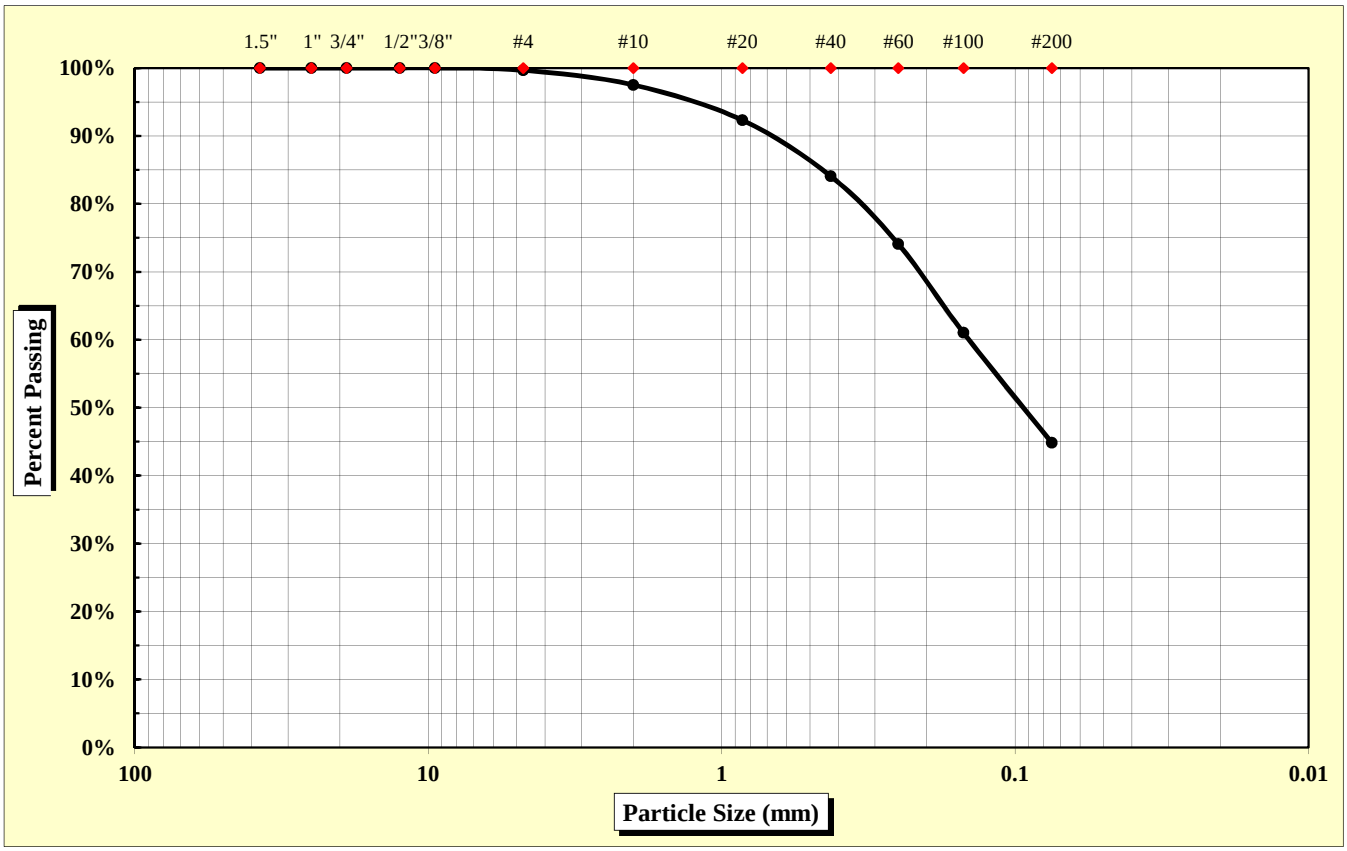
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-56	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'
Sample Description:	Light brown, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (7)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.5%	Fine Sand	39.2%
		Coarse Sand	13.4%	Silt & Clay	44.9%
Liquid Limit	55	Plastic Limit	32	Plastic Index	23
		Moisture Content	19.9%	Group Index	7

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

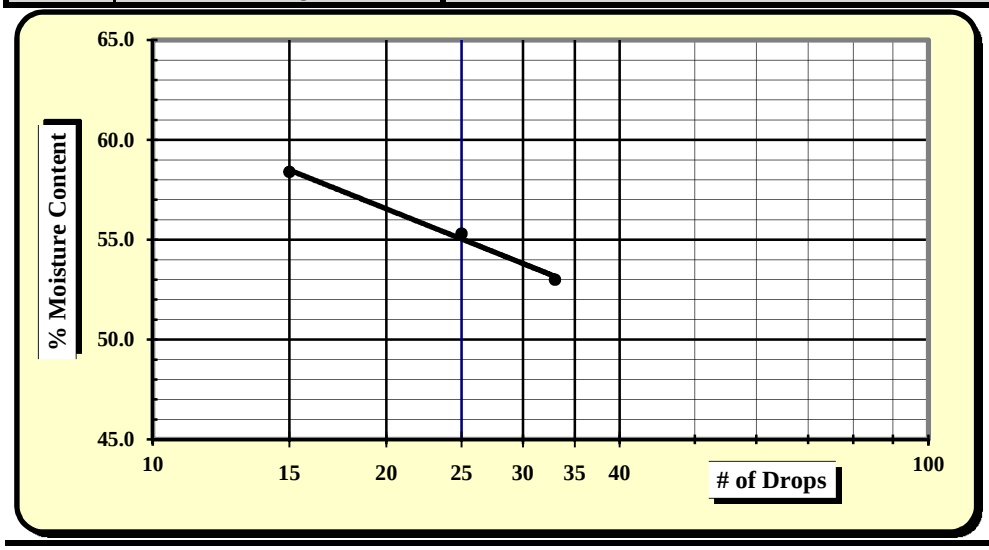
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 11/30/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-56	Sample #:	241	Sample Date:	10/13/15
Location:	SS-4/5	Type:	Split-spoon	Depth:	6 - 10'

Sample Description: Light brown, medium to fine, slightly micaceous, silty SAND (SM) [A-7-5 (7)

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	J1	507	998				xx4		
A	Tare Weight	12.10	12.14	12.23				12.09		
B	Wet Soil Weight + A	23.36	20.09	21.02				20.10		
C	Dry Soil Weight + A	19.46	17.26	17.78				18.17		
D	Water Weight (B-C)	3.90	2.83	3.24				1.93		
E	Dry Soil Weight (C-A)	7.36	5.12	5.55				6.08		
F	% Moisture (D/E)*100	53.0%	55.3%	58.4%				31.7%		
N	# OF DROPS	33	25	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**55**
Plastic Limit	**32**
Plastic Index	**23**
Group Symbol	**SM / A-7-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 44.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

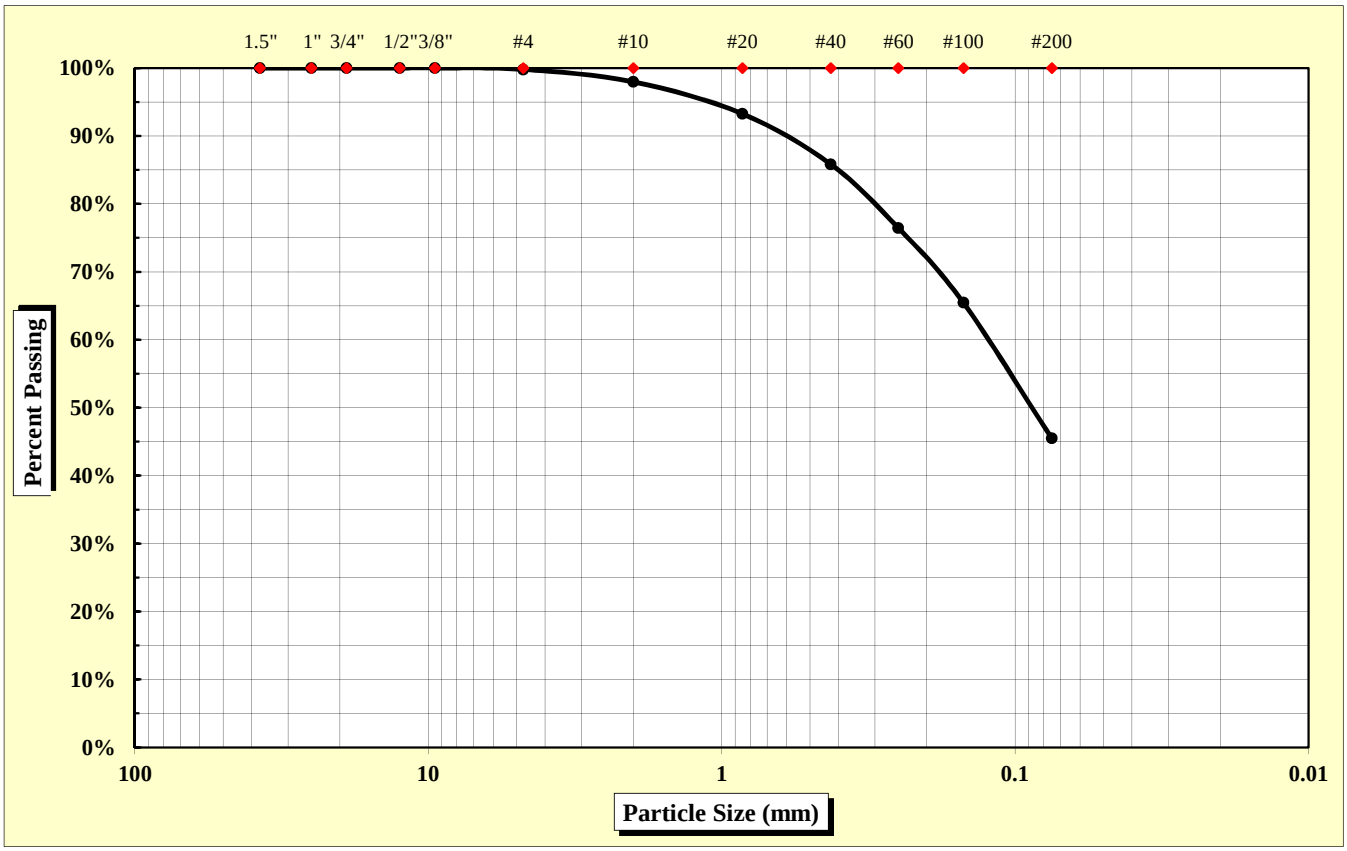
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'
Sample Description:	Tan brown, medium to fine, trace mica, silty SAND (SM) [A-5 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	2.0%	Fine Sand	40.3%
		Coarse Sand	12.1%	Silt & Clay	45.5%
Liquid Limit	42	Plastic Limit	33	Plastic Index	9
		Moisture Content	17.7%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

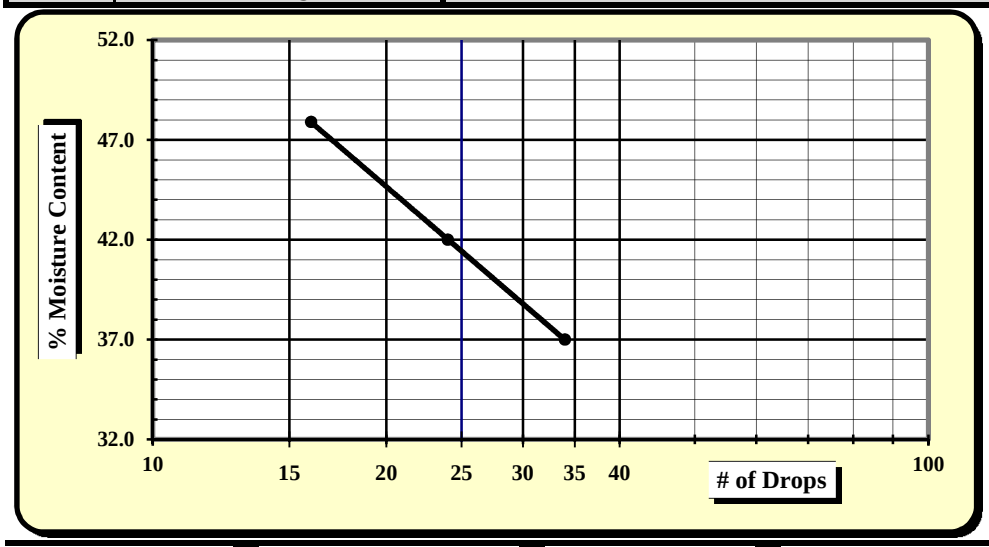
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	218	Sample Date:	10/05/15
Location:	SS-3	Type:	Split-spoon	Depth:	4.8 - 6.8'

Sample Description: Tan brown, medium to fine, trace mica, silty SAND (SM) [A-5 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	13	14	15				16		
A	Tare Weight	26.78	26.70	27.66				26.60		
B	Wet Soil Weight + A	45.44	43.56	42.63				38.04		
C	Dry Soil Weight + A	40.40	38.57	37.78				35.22		
D	Water Weight (B-C)	5.04	4.99	4.85				2.82		
E	Dry Soil Weight (C-A)	13.62	11.87	10.12				8.62		
F	% Moisture (D/E)*100	37.0%	42.0%	47.9%				32.7%		
N	# OF DROPS	34	24	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**32.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**42**
Plastic Limit	**33**
Plastic Index	**9**
Group Symbol	**SM / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 45.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

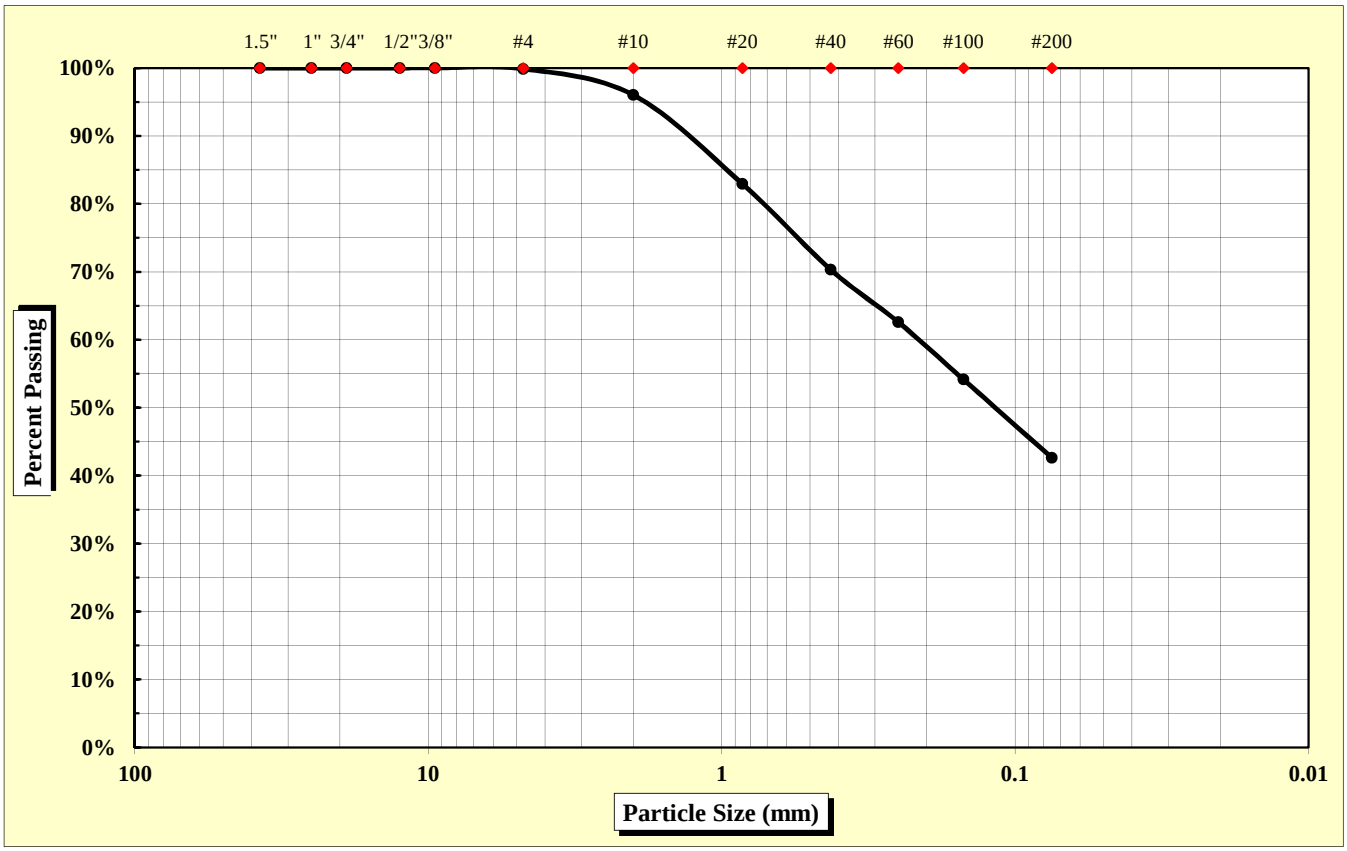
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.8 - 10.8'
Sample Description:	Tan white, medium to fine, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	4.0%	Fine Sand	27.7%
		Coarse Sand	25.7%	Silt & Clay	42.6%
Liquid Limit	39	Plastic Limit	32	Plastic Index	7
		Moisture Content	15.0%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

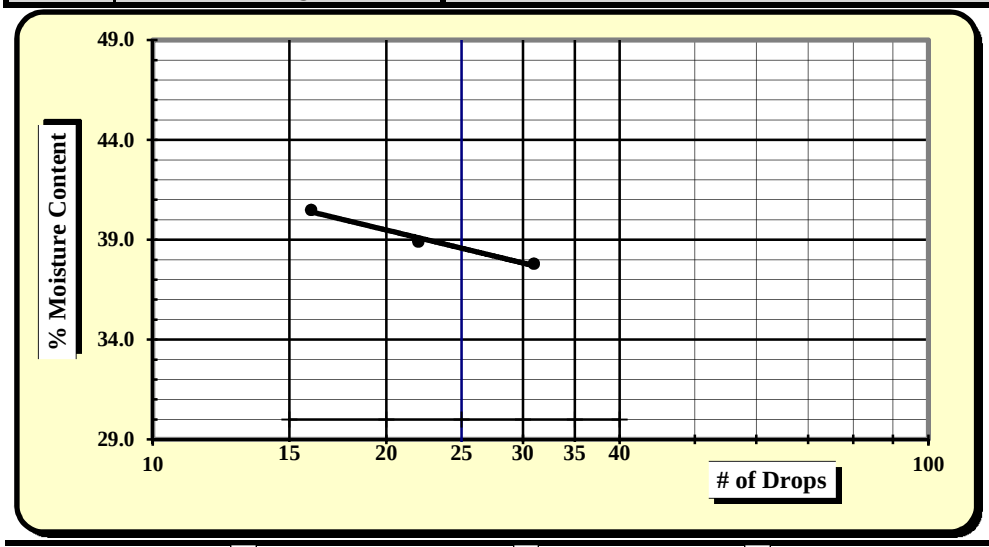
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	218	Sample Date:	10/05/15
Location:	SS-5	Type:	Split-spoon	Depth:	8.8 - 10.8'

Sample Description: Tan white, medium to fine, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	17	18	19				20		
A	Tare Weight	26.71	26.86	26.73				26.88		
B	Wet Soil Weight + A	46.14	44.65	47.45				38.10		
C	Dry Soil Weight + A	40.81	39.67	41.48				35.39		
D	Water Weight (B-C)	5.33	4.98	5.97				2.71		
E	Dry Soil Weight (C-A)	14.10	12.81	14.75				8.51		
F	% Moisture (D/E)*100	37.8%	38.9%	40.5%				31.8%		
N	# OF DROPS	31	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**31.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**39**
Plastic Limit	**32**
Plastic Index	**7**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 42.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

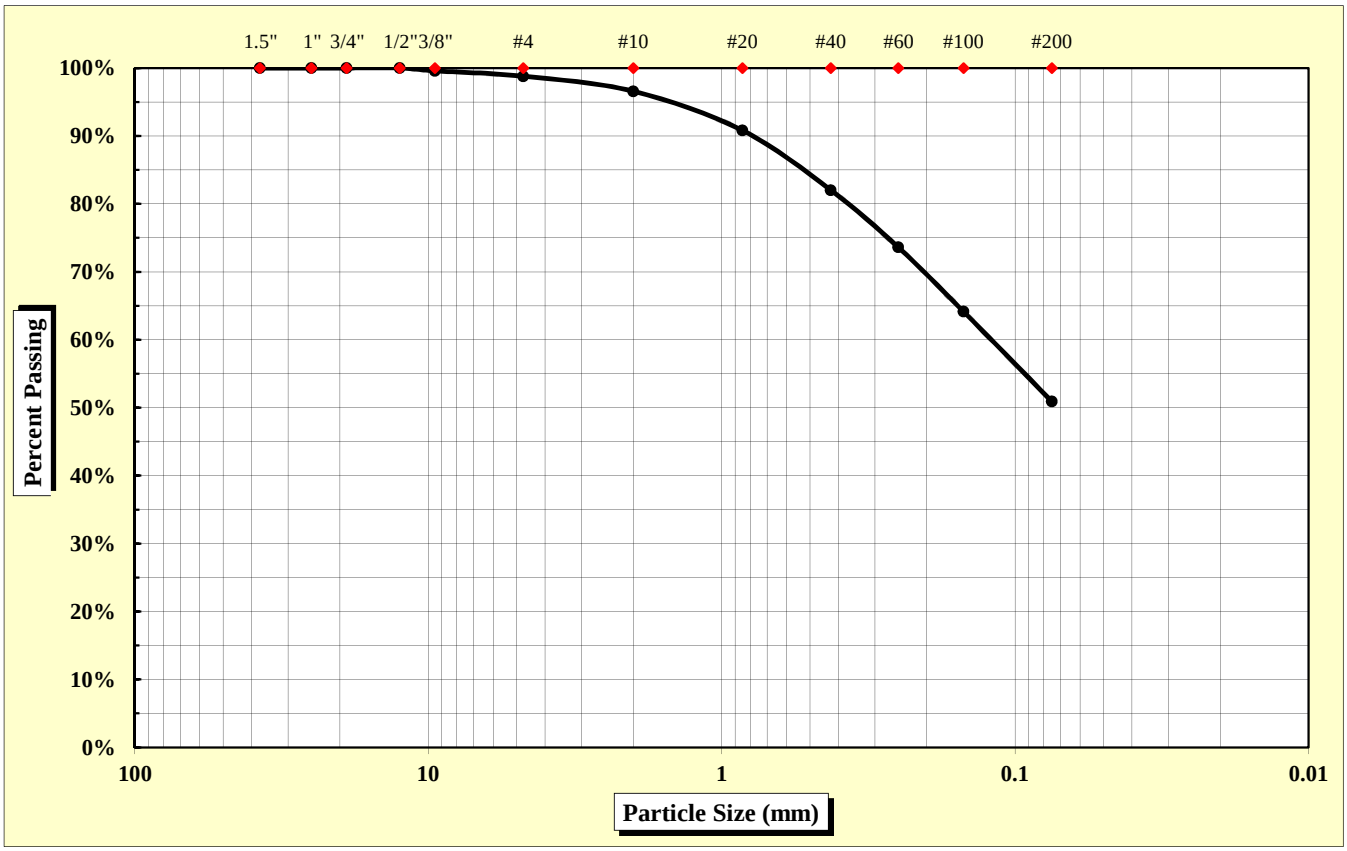
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 20'
Sample Description:	Light brown, medium to fine, micaceous, sandy SILT (ML) [A-4 (2)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	3.4%	Fine Sand	31.1%
		Coarse Sand	14.5%	Silt & Clay	50.9%
Liquid Limit	38	Plastic Limit	30	Plastic Index	8
		Moisture Content	16.7%	Group Index	2

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

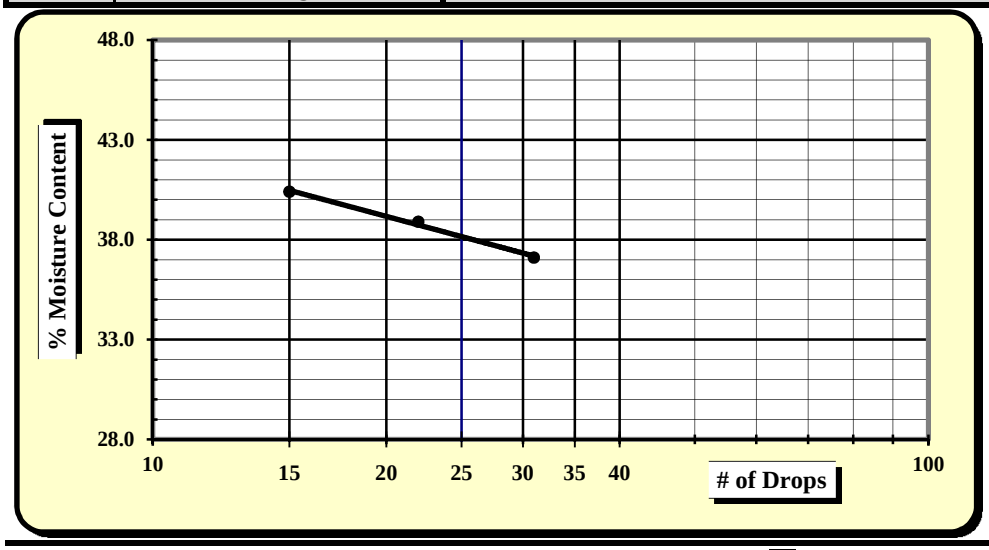
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 20'

Sample Description: Light brown, medium to fine, micaceous, sandy SILT (ML) [A-4 (2)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Z-1	Z-2	Z-3				4		
A	Tare Weight	15.94	16.65	16.77				12.27		
B	Wet Soil Weight + A	38.45	38.92	38.26				21.49		
C	Dry Soil Weight + A	32.36	32.68	32.08				19.37		
D	Water Weight (B-C)	6.09	6.24	6.18				2.12		
E	Dry Soil Weight (C-A)	16.42	16.03	15.31				7.10		
F	% Moisture (D/E)*100	37.1%	38.9%	40.4%				29.9%		
N	# OF DROPS	31	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.9%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**30**
Plastic Index	**8**
Group Symbol	**ML / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 50.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

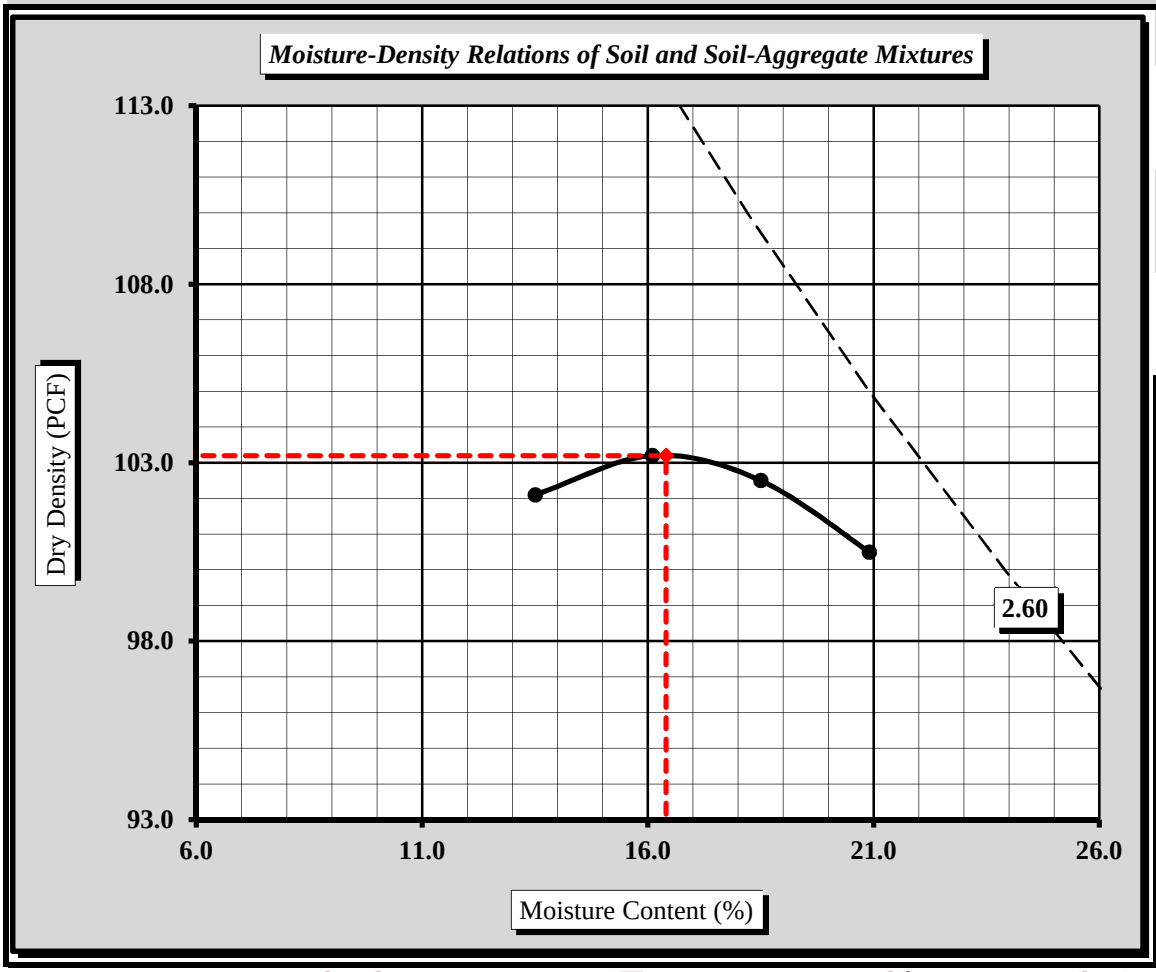
S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-57	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 20'

Sample Description: Light brown, medium to fine, micaceous, sandy SILT (ML) [A-4 (2)]

Maximum Dry Density 103.2 PCF. Optimum Moisture Content 16.4%

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	**16.7%**
Specific Gravity of Soil (T 100)	**2.600**
Liquid Limit	**38**
Plastic Limit	**30**
Plastic Index	**8**

% Passing	
1/2"	100.0%
3/8"	99.6%
#4	98.8%
#10	96.6%
#40	82.0%
#60	73.6%
#100	64.2%
#200	50.9%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/25/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

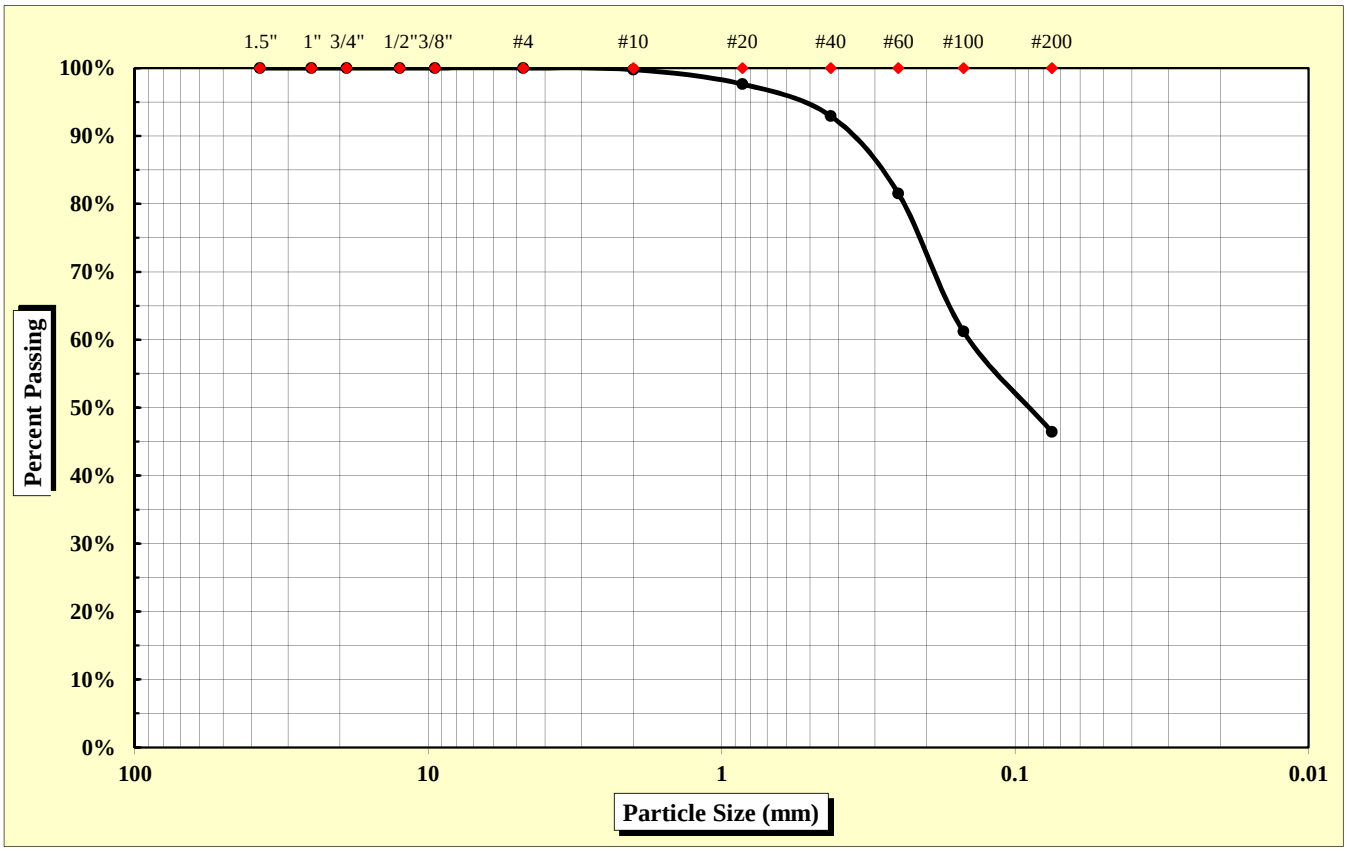
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-58	Sample #:	230	Sample Date:	10/15/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Red brown, fine, trace mica, silty SAND (SM) [A-7-5 (6)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	46.4%
		Coarse Sand	6.8%	Silt & Clay	46.5%
Liquid Limit	58	Plastic Limit	40	Plastic Index	18
		Moisture Content	34.3%	Group Index	6

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

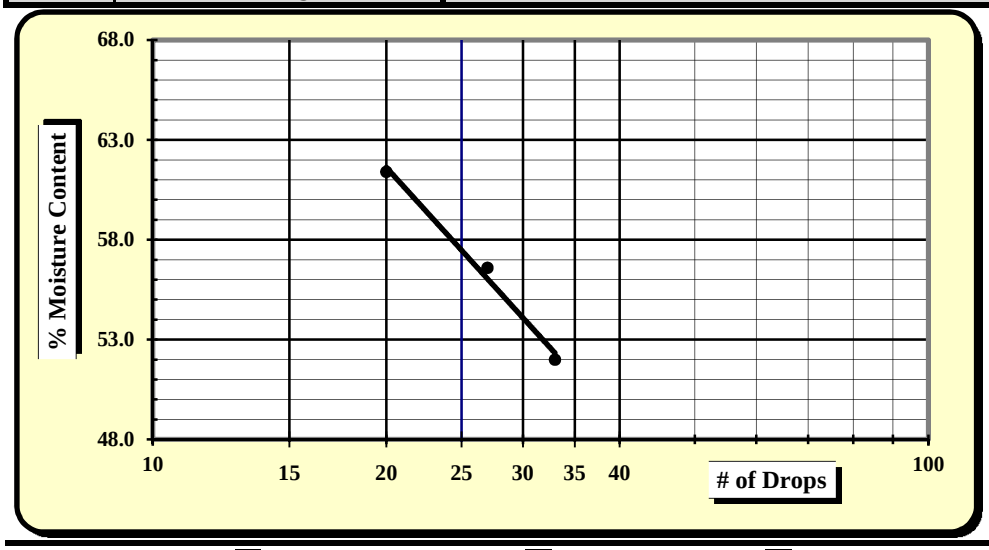
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-58	Sample #:	230	Sample Date:	10/15/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'

Sample Description: Red brown, fine, trace mica, silty SAND (SM) [A-7-5 (6)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	36	37	38				39		
A	Tare Weight	25.69	26.22	26.30				25.92		
B	Wet Soil Weight + A	40.56	39.55	37.92				35.48		
C	Dry Soil Weight + A	35.47	34.73	33.50				32.75		
D	Water Weight (B-C)	5.09	4.82	4.42				2.73		
E	Dry Soil Weight (C-A)	9.78	8.51	7.20				6.83		
F	% Moisture (D/E)*100	52.0%	56.6%	61.4%				40.0%		
N	# OF DROPS	33	27	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**40.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**58**
Plastic Limit	**40**
Plastic Index	**18**
Group Symbol	**SM / A-7-5**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 46.5%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

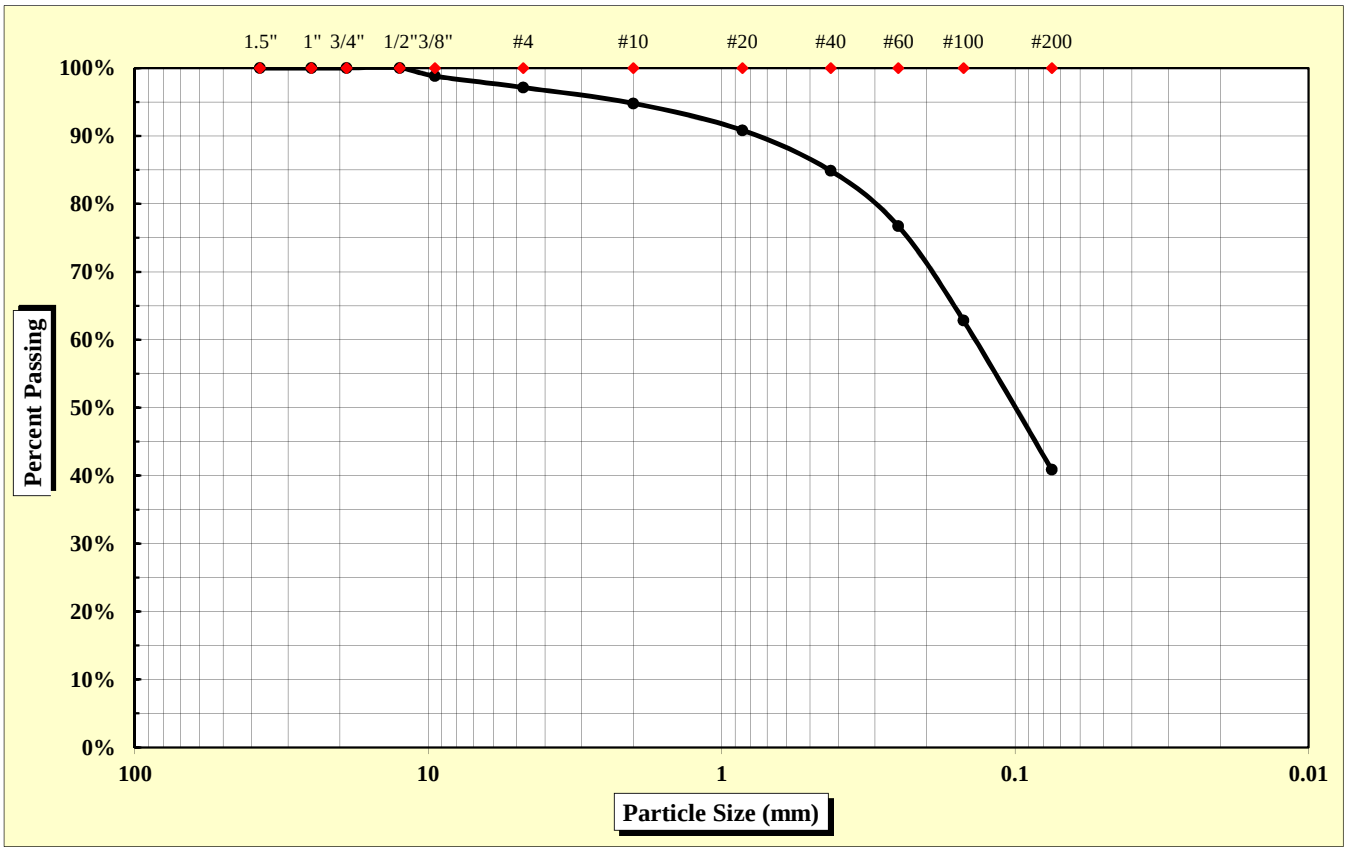
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/18 - 11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-58	Sample #:	241	Sample Date:	10/15/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'
Sample Description:	Red brown, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	5.2%	Fine Sand	44.0%
		Coarse Sand	9.9%	Silt & Clay	40.9%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	23.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Augusta 1732 Wylds Road Augusta, GA 30909

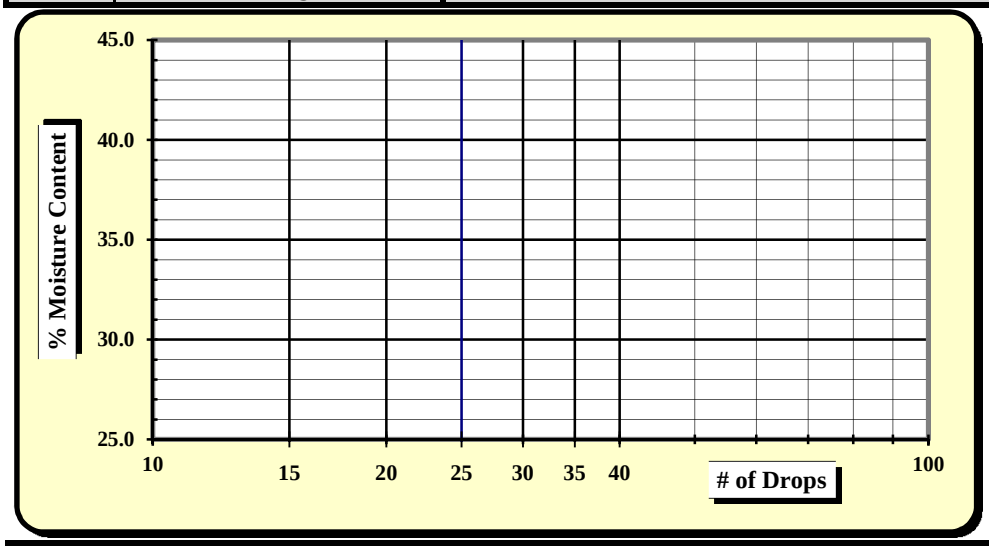
Project #:	**1426-14-161**	Report Date:	12/4/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24 - 12/1/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-58	Sample #:	241	Sample Date:	10/15/15
Location:	SS-6/7	Type:	Split-spoon	Depth:	13.5 - 20'

Sample Description: Red brown, medium to fine, micaceous, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	25422	5/6/2015	Grooving tool	25846	9/3/2015
LL Apparatus	25429	9/2/2015			
Oven	25829	9/3/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 40.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Alaina Bodie	12/4/15	Brian Vaughan, P.E.	12/4/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

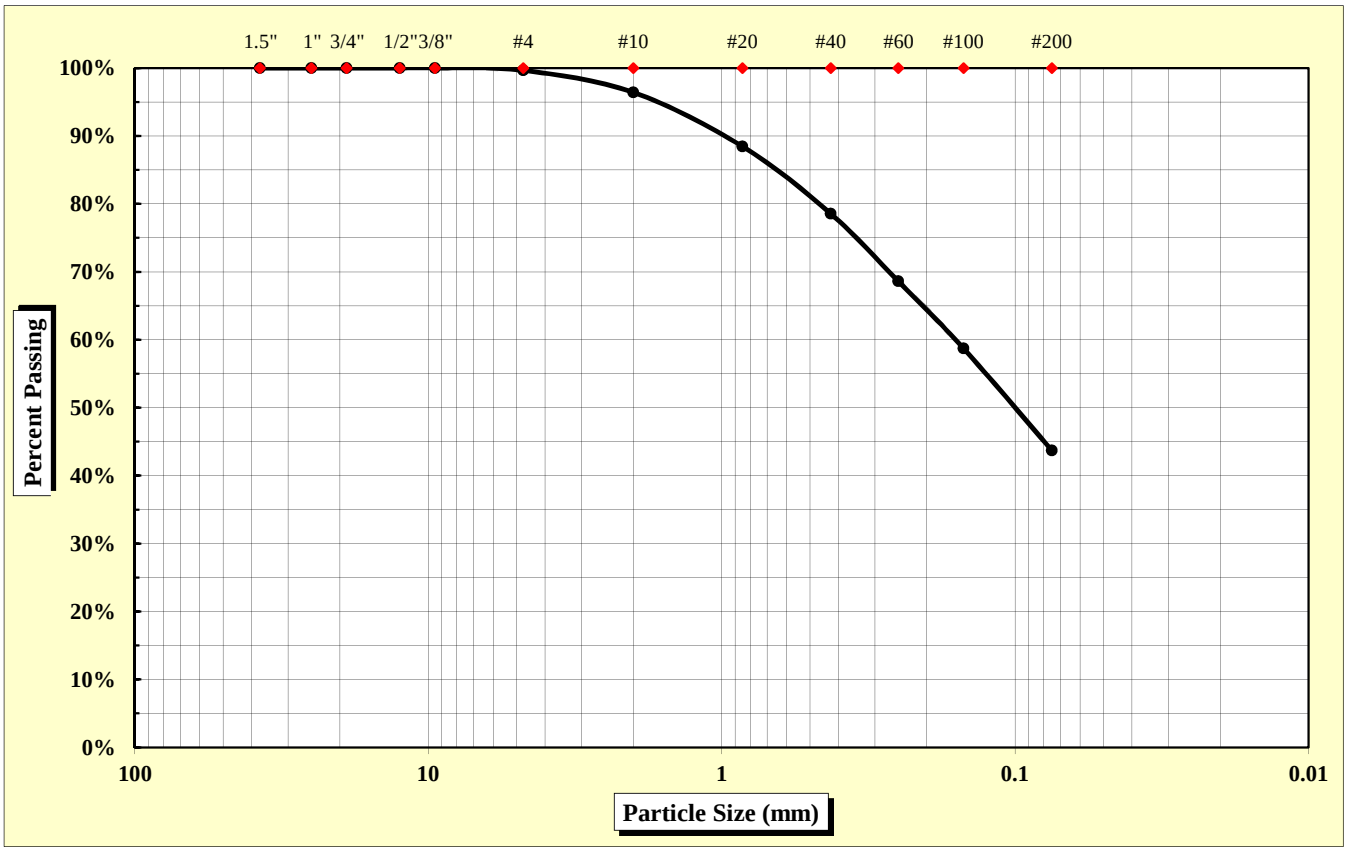
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Tan brown, medium to fine, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	3.6%	Fine Sand	34.8%
		Coarse Sand	17.8%	Silt & Clay	43.7%
Liquid Limit	37	Plastic Limit	30	Plastic Index	7
		Moisture Content	17.1%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

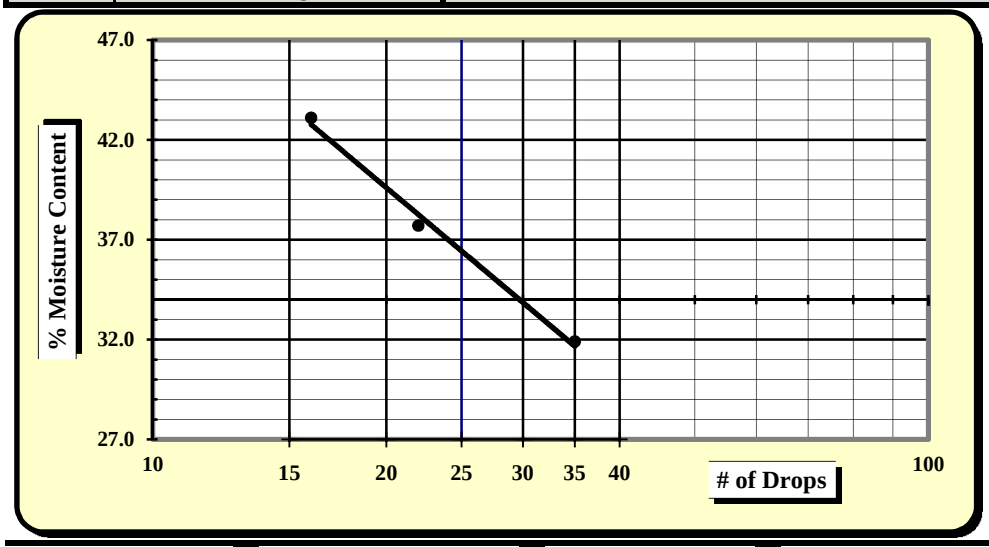
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Tan brown, medium to fine, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	40	41	42				43		
A	Tare Weight	26.29	28.75	28.65				28.40		
B	Wet Soil Weight + A	43.10	41.80	40.47				37.52		
C	Dry Soil Weight + A	39.03	38.23	36.91				35.43		
D	Water Weight (B-C)	4.07	3.57	3.56				2.09		
E	Dry Soil Weight (C-A)	12.74	9.48	8.26				7.03		
F	% Moisture (D/E)*100	31.9%	37.7%	43.1%				29.7%		
N	# OF DROPS	35	22	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.7%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**37**
Plastic Limit	**30**
Plastic Index	**7**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 43.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

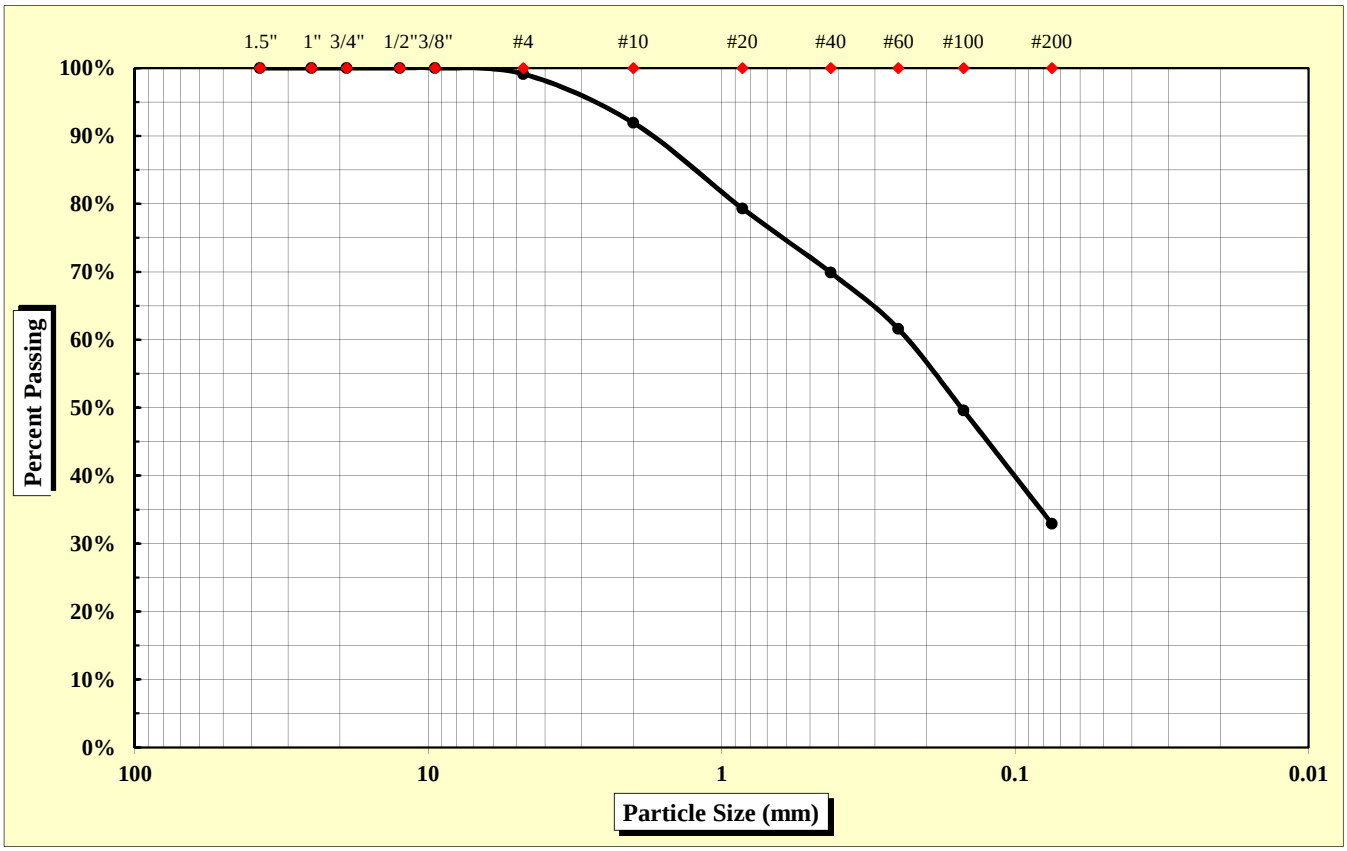
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2-5]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	8.0%	Fine Sand	37.0%
		Coarse Sand	22.1%	Silt & Clay	32.9%
Liquid Limit	43	Plastic Limit	33	Plastic Index	10
		Moisture Content	13.9%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils; AASHTO T 265: Laboratory Determination of Moisture Content of Soils; AASHTO T 89: Determining the Liquid Limit of Soils; AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils; AASHTO T 2: Practice for Sampling Aggregates; AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size; AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

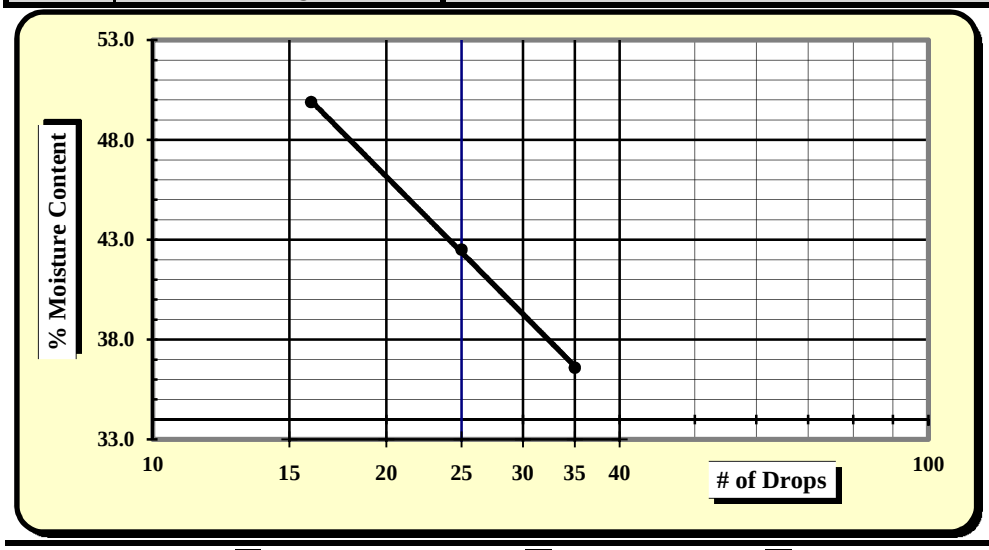
Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	SS-4	Type:	Split-spoon	Depth:	6 - 8'

Sample Description: Brown red, medium to fine, silty SAND (SM) [A-2-5]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	44	45	46				47		
A	Tare Weight	25.79	25.18	27.59				25.86		
B	Wet Soil Weight + A	42.11	39.74	39.00				35.12		
C	Dry Soil Weight + A	37.74	35.40	35.20				32.81		
D	Water Weight (B-C)	4.37	4.34	3.80				2.31		
E	Dry Soil Weight (C-A)	11.95	10.22	7.61				6.95		
F	% Moisture (D/E)*100	36.6%	42.5%	49.9%				33.2%		
N	# OF DROPS	35	25	16				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.2%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**43**
Plastic Limit	**33**
Plastic Index	**10**
Group Symbol	**SM / A-2-5**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 32.9%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

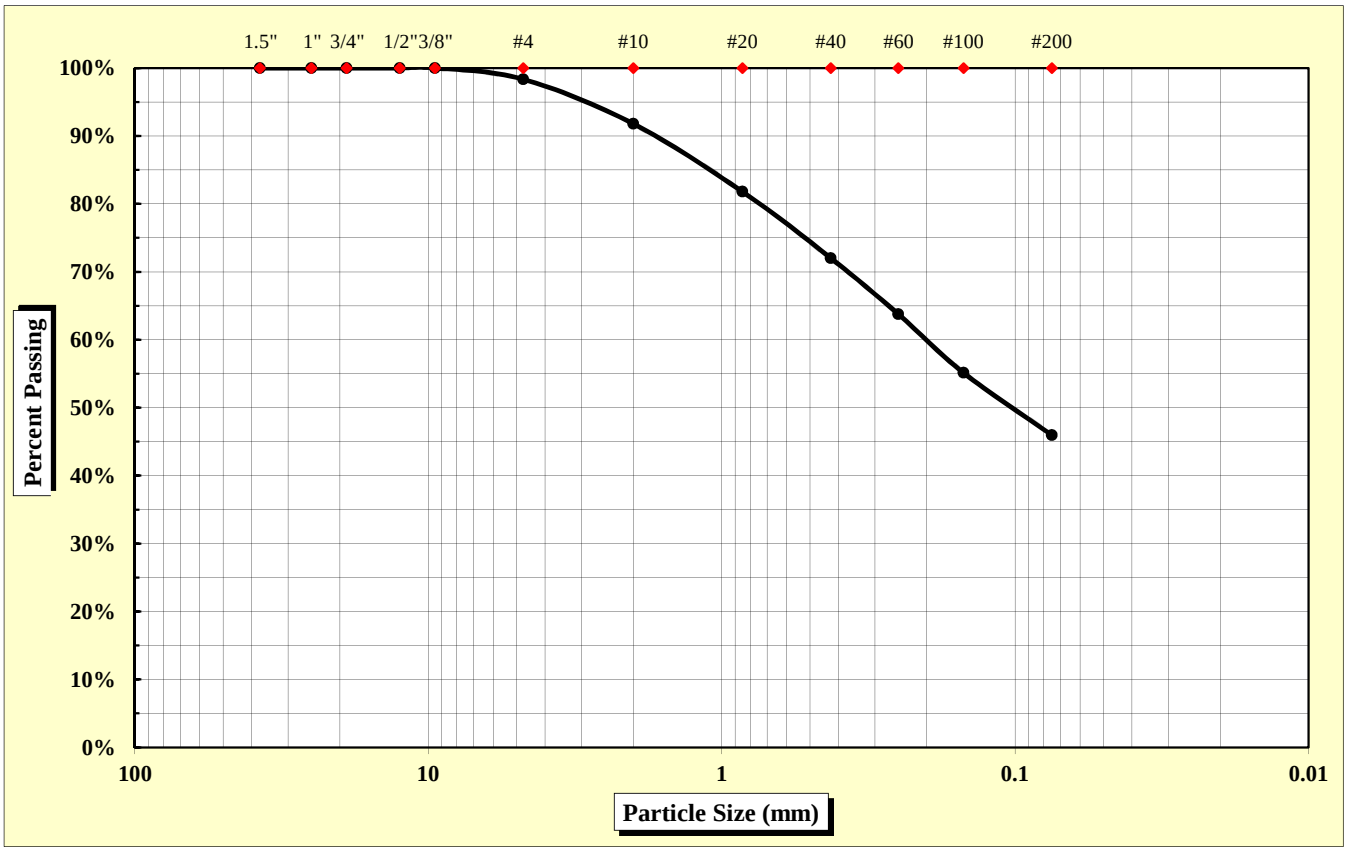
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Red orange brown, medium to fine, clayey SAND (SC) [A-6 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	8.2%	Fine Sand	26.1%
		Coarse Sand	19.8%	Silt & Clay	46.0%
Liquid Limit	38	Plastic Limit	24	Plastic Index	14
		Moisture Content	18.6%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

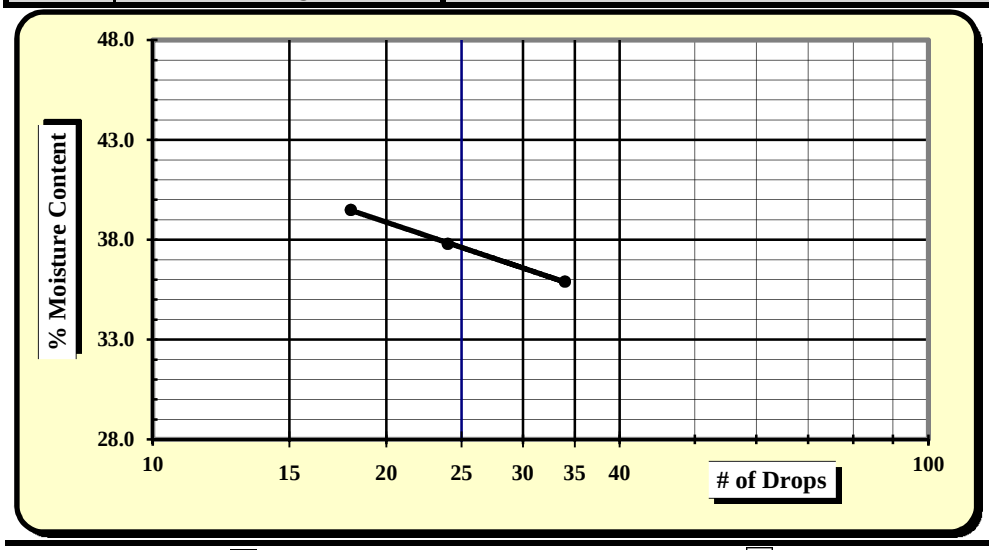
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Red orange brown, medium to fine, clayey SAND (SC) [A-6 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	P-4	P-5	P-6				5		
A	Tare Weight	16.64	16.66	15.97				12.10		
B	Wet Soil Weight + A	38.79	36.43	37.96				21.42		
C	Dry Soil Weight + A	32.94	31.01	31.73				19.63		
D	Water Weight (B-C)	5.85	5.42	6.23				1.79		
E	Dry Soil Weight (C-A)	16.30	14.35	15.76				7.53		
F	% Moisture (D/E)*100	35.9%	37.8%	39.5%				23.8%		
N	# OF DROPS	34	24	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**23.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**24**
Plastic Index	**14**
Group Symbol	**SC / A-6**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 46.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

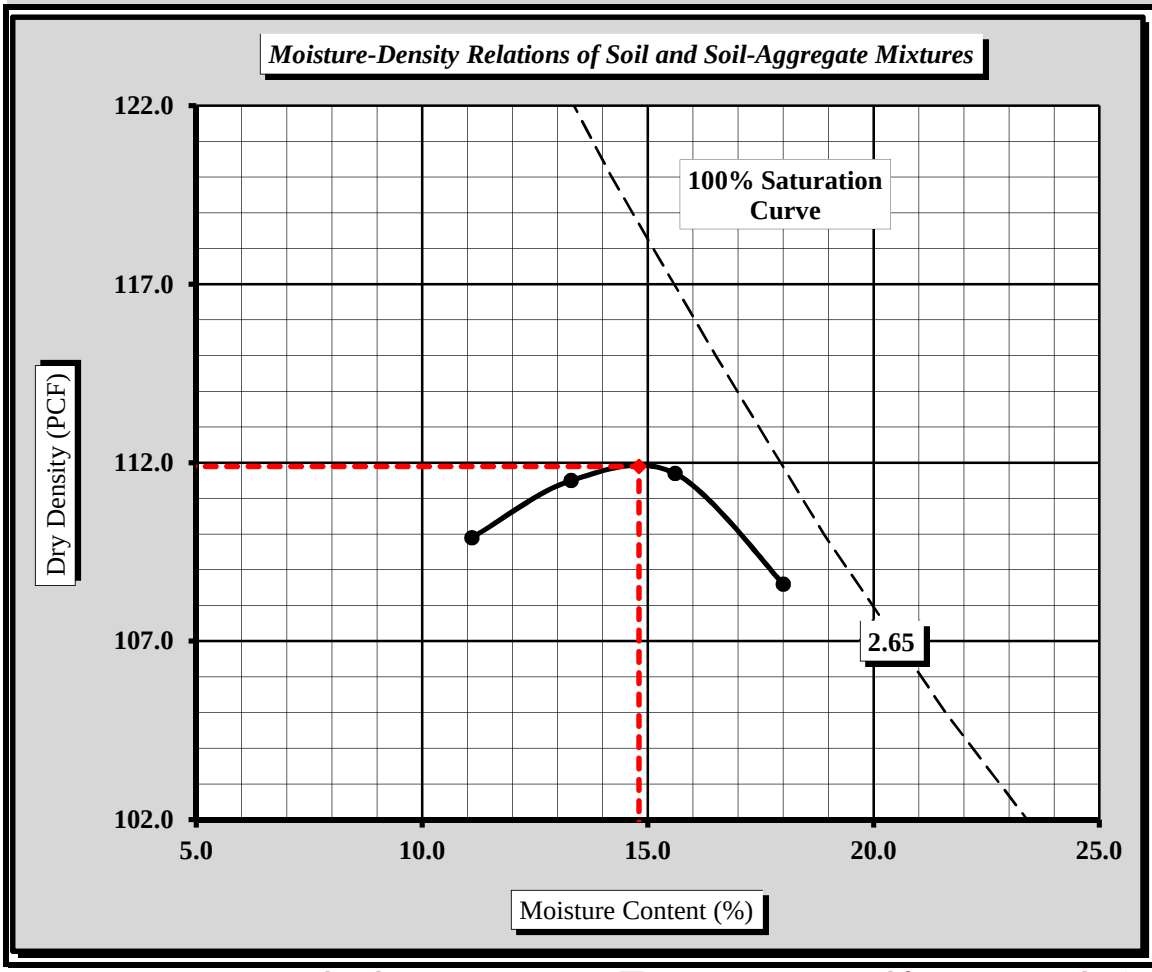
S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/9/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-59	Sample #:	230	Sample Date:	10/15/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Red orange brown, medium to fine, clayey SAND (SC) [A-6 (3)]

Maximum Dry Density 111.9 PCF. Optimum Moisture Content 14.8%

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	18.6%
Specific Gravity of Soil (T 100)	2.650
Liquid Limit	38
Plastic Limit	24
Plastic Index	14

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	98.4%
#10	91.8%
#40	72.0%
#60	63.8%
#100	55.2%
#200	46.0%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/25/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

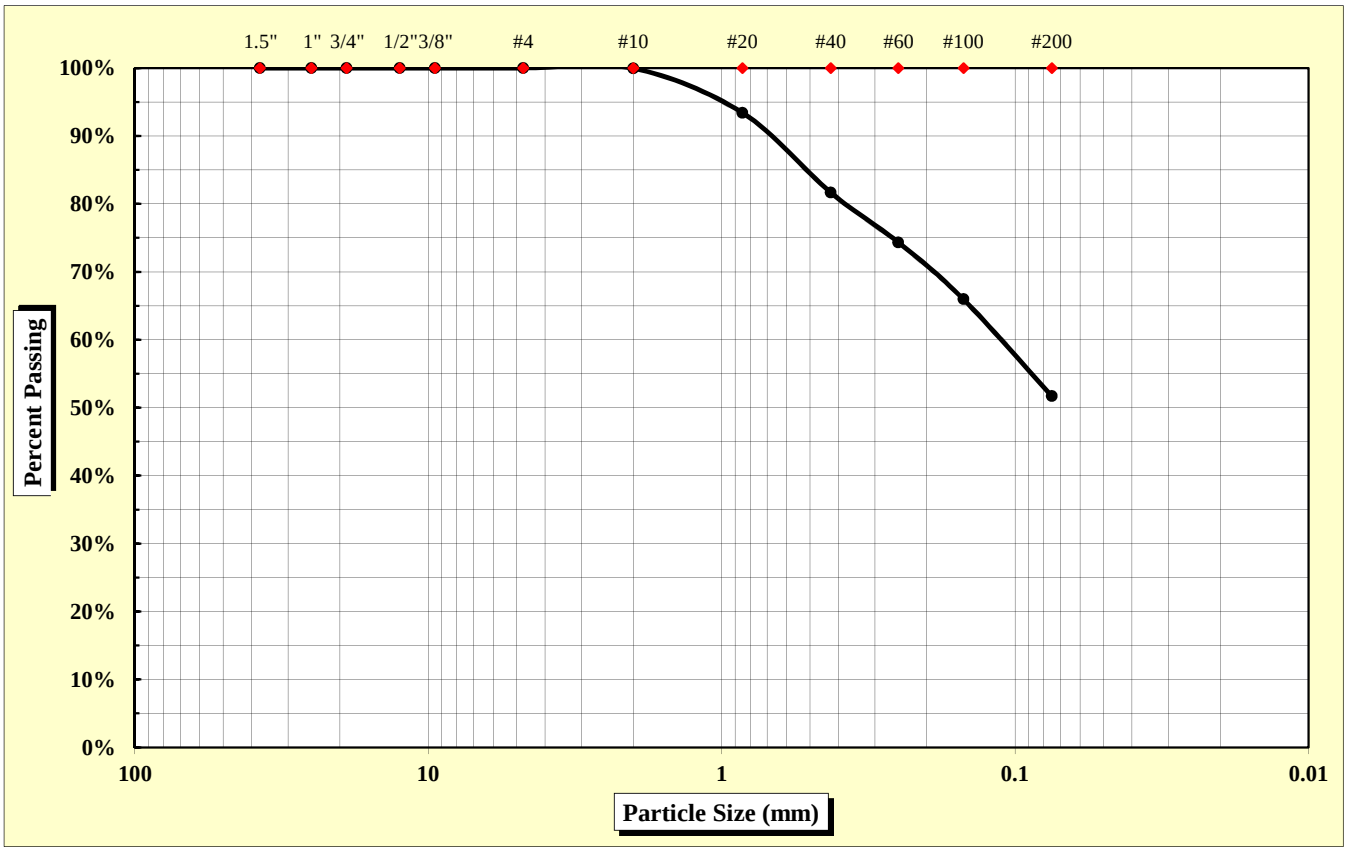
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	218	Sample Date:	10/05/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'
Sample Description:	Red brown, medium to fine, sandy SILT (ML) [A-5 (3)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.0%	Fine Sand	30.0%
		Coarse Sand	18.3%	Silt & Clay	51.7%
Liquid Limit	44	Plastic Limit	35	Plastic Index	9
		Moisture Content	21.9%	Group Index	3

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

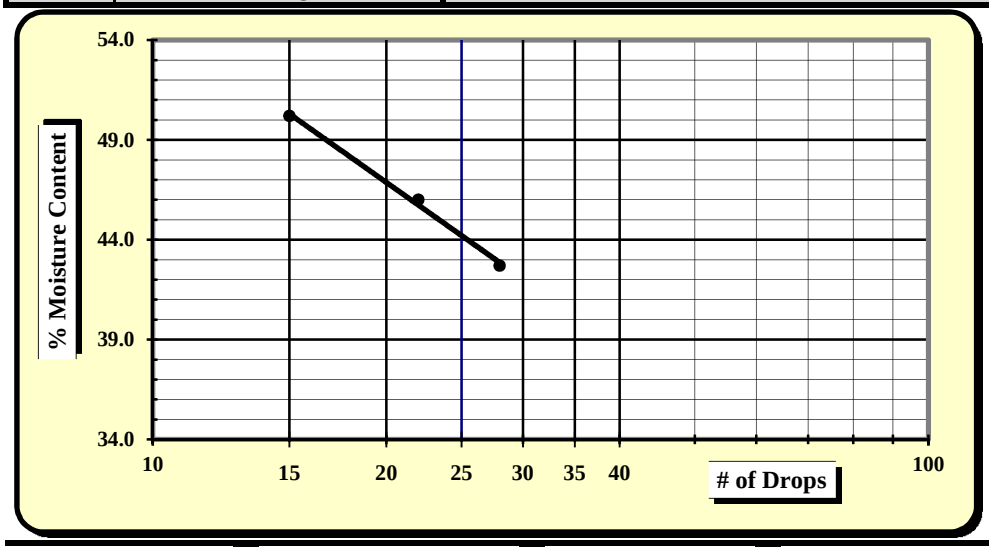
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	218	Sample Date:	10/05/15
Location:	SS-2	Type:	Split-spoon	Depth:	2 - 4'

Sample Description: Red brown, medium to fine, sandy SILT (ML) [A-5 (3)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	21	22	23				24		
A	Tare Weight	28.15	25.71	27.29				26.02		
B	Wet Soil Weight + A	48.76	44.93	44.13				37.28		
C	Dry Soil Weight + A	42.59	38.87	38.50				34.34		
D	Water Weight (B-C)	6.17	6.06	5.63				2.94		
E	Dry Soil Weight (C-A)	14.44	13.16	11.21				8.32		
F	% Moisture (D/E)*100	42.7%	46.0%	50.2%				35.3%		
N	# OF DROPS	28	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**35.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**44**
Plastic Limit	**35**
Plastic Index	**9**
Group Symbol	**ML / A-5**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 51.7%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

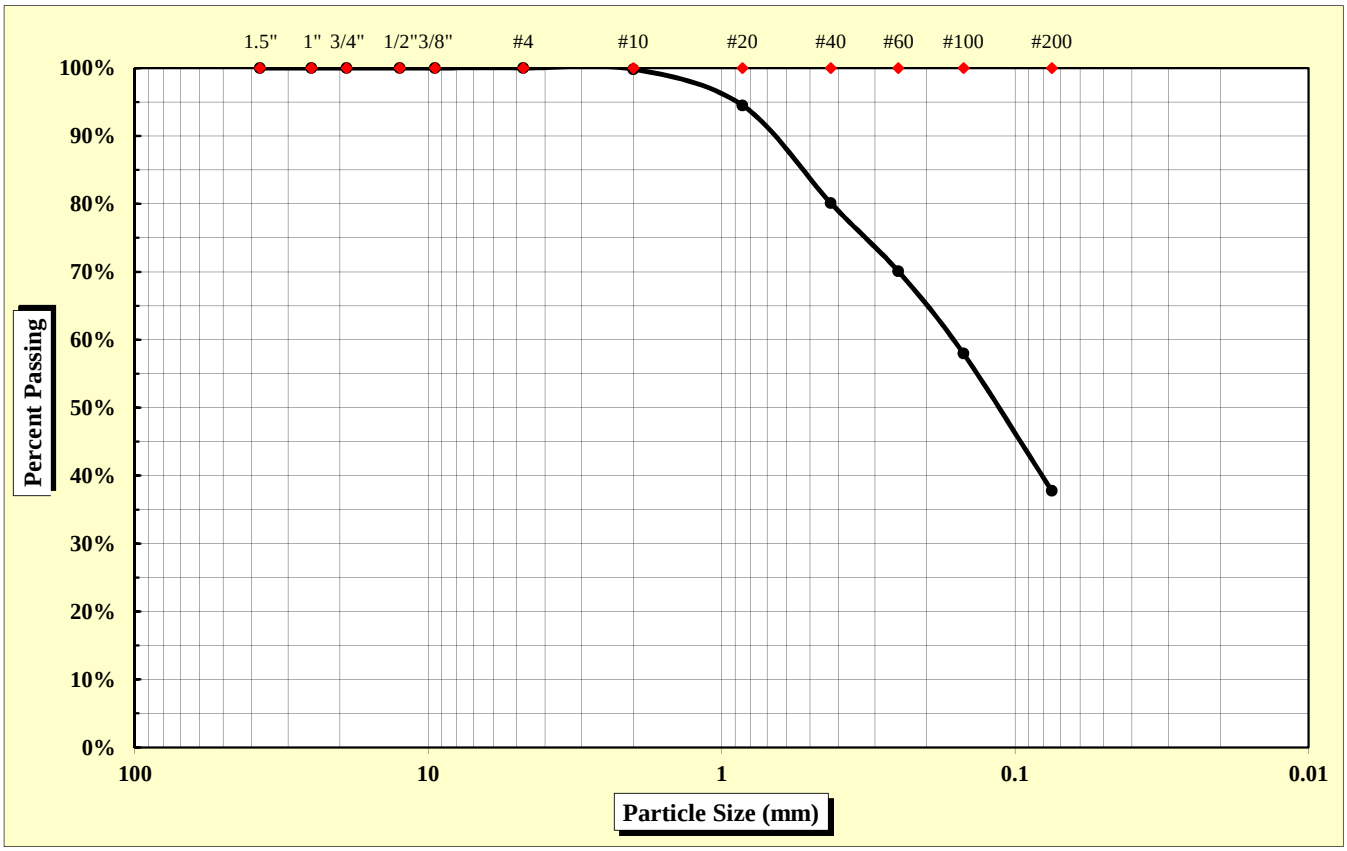
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	10/19 - 10/26/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	218	Sample Date:	10/05/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Tan yellow, medium to fine, silty SAND (SM) [A-4 (0)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	2.00 mm	Gravel	0.2%	Fine Sand	42.4%
		Coarse Sand	19.7%	Silt & Clay	37.8%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	NP
		Moisture Content	11.1%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

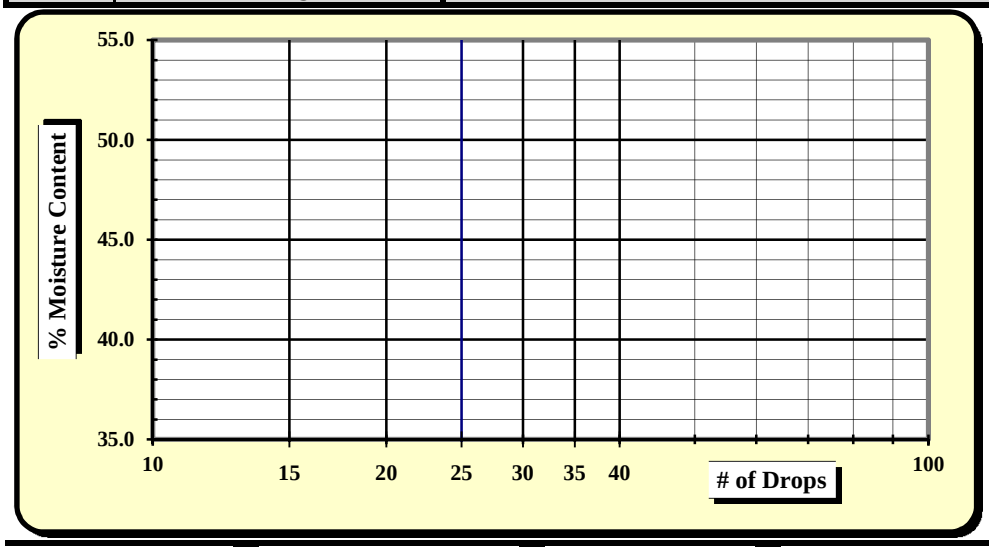
Project #:	**1426-14-161**	Report Date:	10/26/15
Project Name:	I-85 Widening MM80-96	Test Date:	10/23/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	218	Sample Date:	10/05/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'

Sample Description: Tan yellow, medium to fine, silty SAND (SM) [A-4 (0)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2014
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:									
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☒

Liquid Limit	---
Plastic Limit	**NP**
Plastic Index	**NP**
Group Symbol	**SM / A-4**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 37.8%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	10/26/15	Brian Vaughan, P.E.	10/26/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

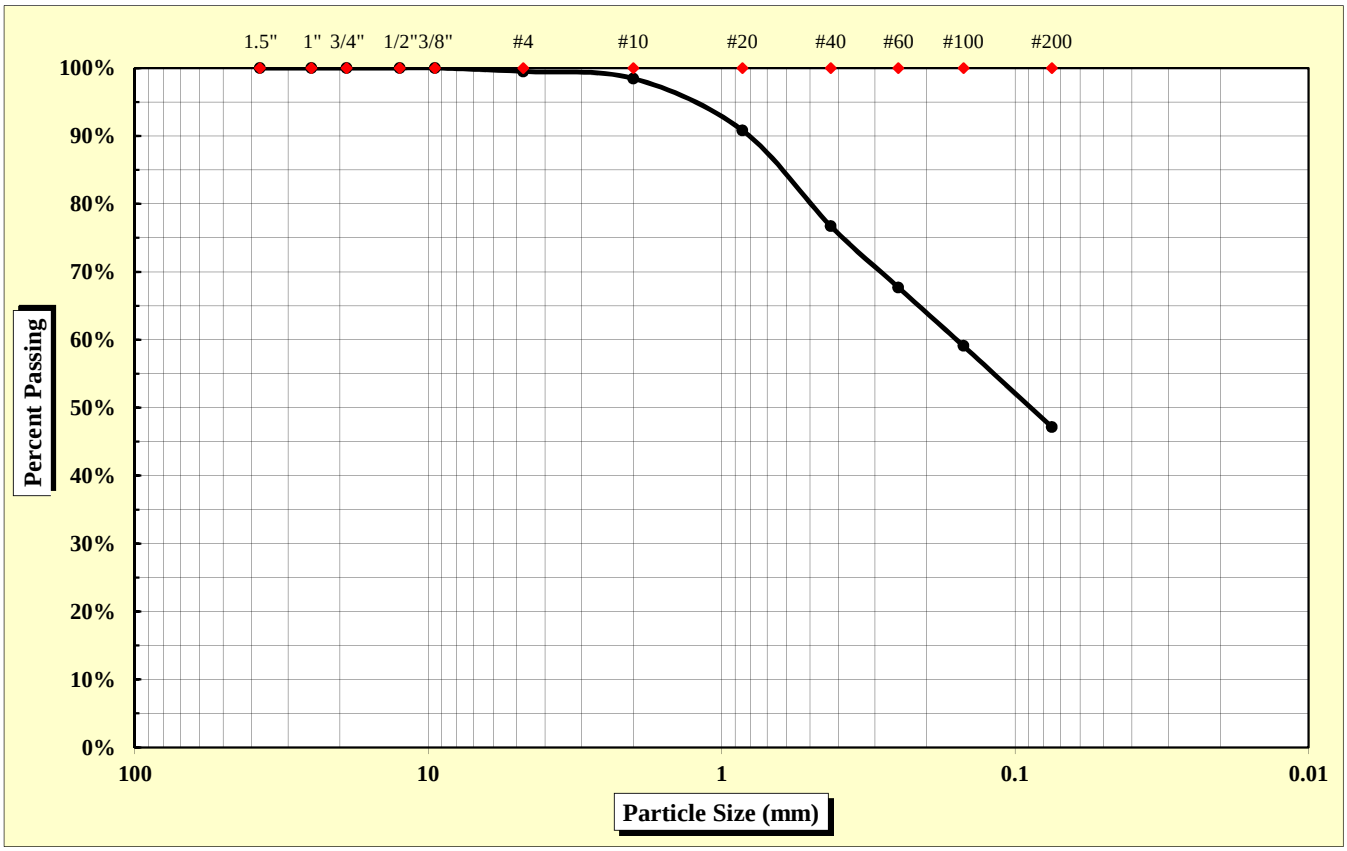
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 25'
Sample Description:	Tan orange red, medium to fine, micaceous, silty SAND (SM) [A-4 (1)]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	4.75 mm	Gravel	1.6%	Fine Sand	29.6%
		Coarse Sand	21.7%	Silt & Clay	47.2%
Liquid Limit	35	Plastic Limit	27	Plastic Index	8
		Moisture Content	12.9%	Group Index	1

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

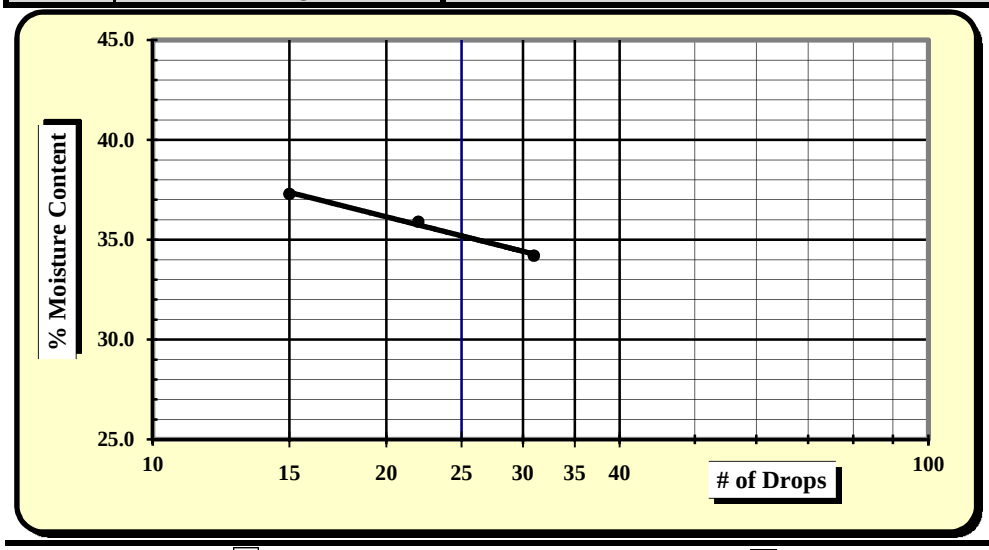
Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/24/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 25'

Sample Description: Tan orange red, medium to fine, micaceous, silty SAND (SM) [A-4 (1)]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-4	Q-5	Q-6				6		
A	Tare Weight	16.71	16.86	16.81				12.29		
B	Wet Soil Weight + A	39.66	38.77	38.49				21.89		
C	Dry Soil Weight + A	33.81	32.98	32.60				19.86		
D	Water Weight (B-C)	5.85	5.79	5.89				2.03		
E	Dry Soil Weight (C-A)	17.10	16.12	15.79				7.57		
F	% Moisture (D/E)*100	34.2%	35.9%	37.3%				26.8%		
N	# OF DROPS	31	22	15				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**26.8%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**35**
Plastic Limit	**27**
Plastic Index	**8**
Group Symbol	**SM / A-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 47.2%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/25/15	Brian Vaughan, P.E.	11/25/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

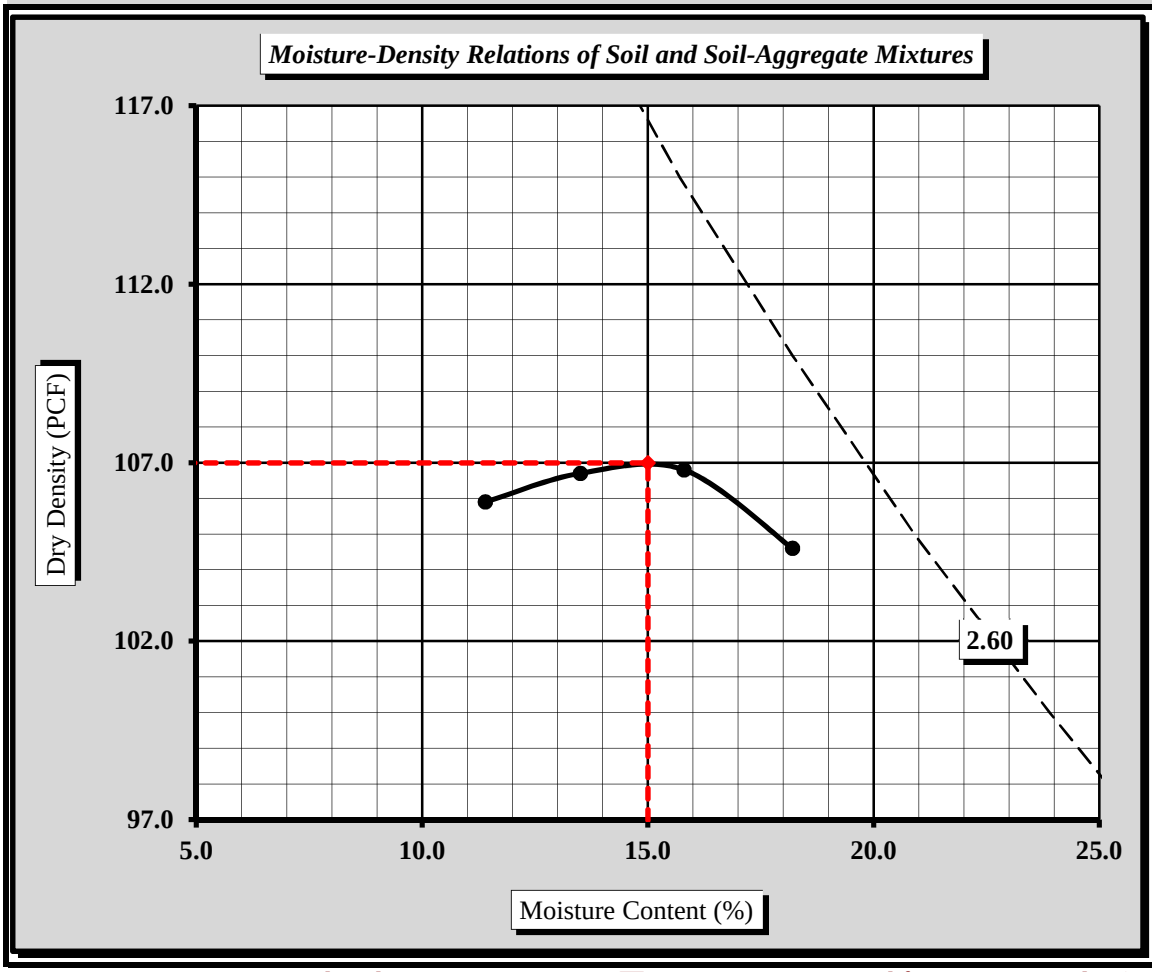
S&ME Project #:	**1426-14-161**	Report Date:	11/25/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	R-60	Sample #:	230	Sample Date:	10/5/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 25'

Sample Description: Tan orange red, medium to fine, micaceous, silty SAND (SM) [A-4 (1)]

Maximum Dry Density 107.0 PCF. **Optimum Moisture Content 15.0%**

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	12.9%
Specific Gravity of Soil (T 100)	2.600
Liquid Limit	35
Plastic Limit	27
Plastic Index	8

% Passing	
1/2"	100.0%
3/8"	100.0%
#4	99.5%
#10	98.4%
#40	76.7%
#60	67.7%
#100	59.1%
#200	47.2%

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

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/25/15
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

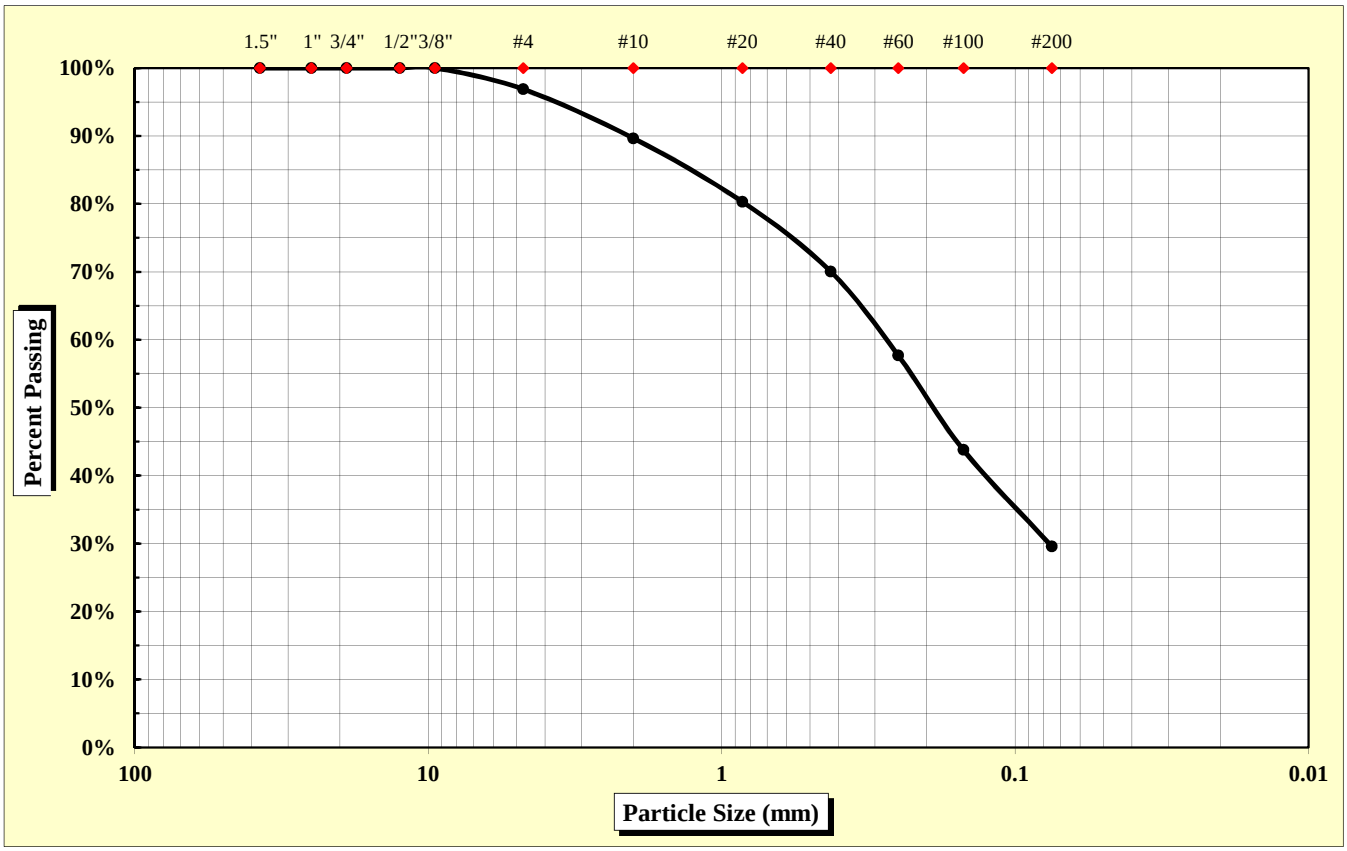
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, medium to fine, silty SAND (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	10.3%	Fine Sand	40.5%
		Coarse Sand	19.6%	Silt & Clay	29.6%
Liquid Limit	38	Plastic Limit	33	Plastic Index	5
		Moisture Content	14.3%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

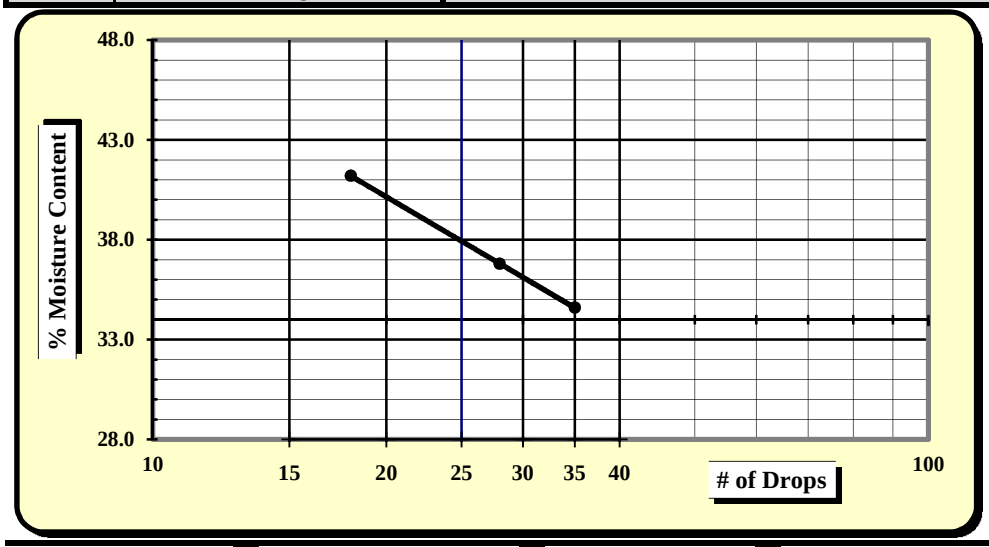
S&ME, Inc. - Greenville 281 Fairforest Way Greenville, SC 29607

Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/12/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	SS-1	Type:	Split-spoon	Depth:	0 - 2'
Sample Description:	Red brown, medium to fine, silty SAND (SM) [A-2-4]				

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	13942	6/16/2015	Grooving tool	23214	11/11/2015
LL Apparatus	23158	2/1/2015			
Oven	13978	10/7/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	1	2	3				4		
A	Tare Weight	26.72	26.51	26.37				25.99		
B	Wet Soil Weight + A	42.85	42.49	45.29				34.31		
C	Dry Soil Weight + A	38.70	38.19	39.77				32.23		
D	Water Weight (B-C)	4.15	4.30	5.52				2.08		
E	Dry Soil Weight (C-A)	11.98	11.68	13.40				6.24		
F	% Moisture (D/E)*100	34.6%	36.8%	41.2%				33.3%		
N	# OF DROPS	35	28	18				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**33.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**33**
Plastic Index	**5**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 29.6%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Benjamin Kovaleski	11/13/15	Brian Vaughan, P.E.	11/13/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

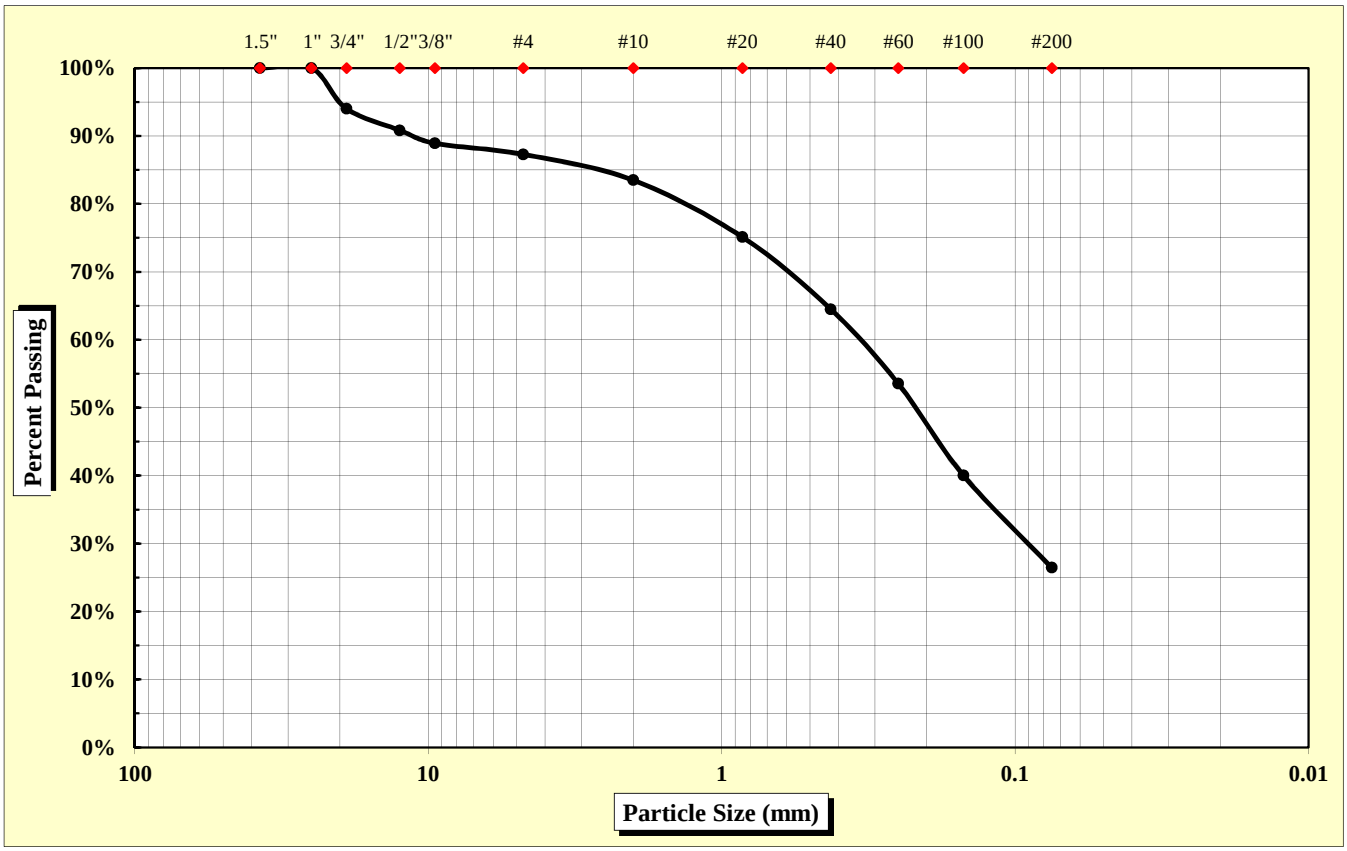
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	SS-3	Type:	Split-spoon	Depth:	4 - 6'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-2]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	25.00 mm	Gravel	16.5%	Fine Sand	38.0%
		Coarse Sand	19.0%	Silt & Clay	26.5%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	9.6%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

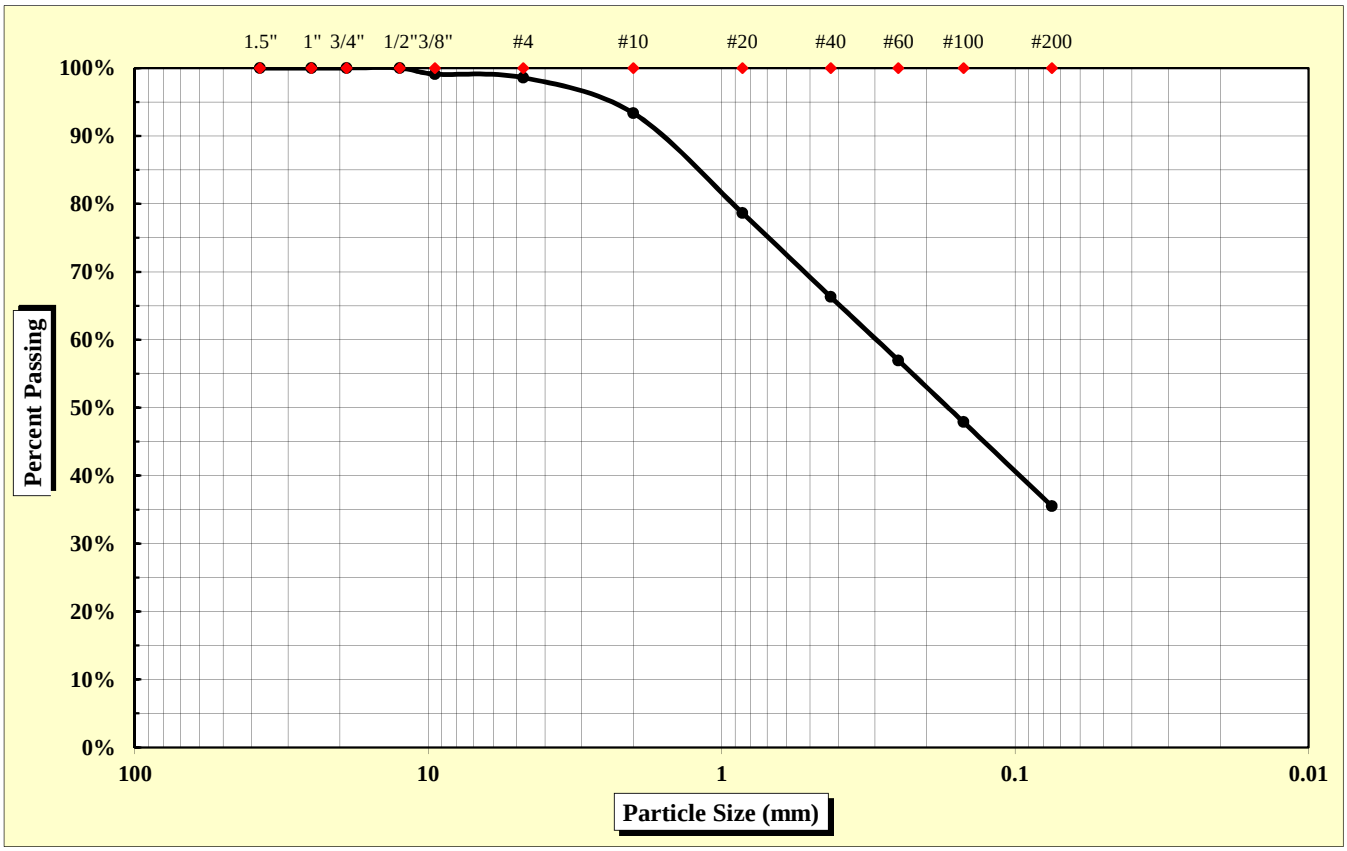
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/13/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/03 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	SS-6	Type:	Split-spoon	Depth:	13.5 - 15'
Sample Description:	Brown red, medium to fine, silty SAND (SM) [A-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	9.50 mm	Gravel	6.6%	Fine Sand	30.8%
		Coarse Sand	27.1%	Silt & Clay	35.5%
Liquid Limit	N/A	Plastic Limit	N/A	Plastic Index	N/A
		Moisture Content	17.9%	Group Index	N/A

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — *Signature* — Location Coordinator — *Position*

Form No: TR-126-T88-WH-1
Revision No. 0
Revision Date: 11/17/11

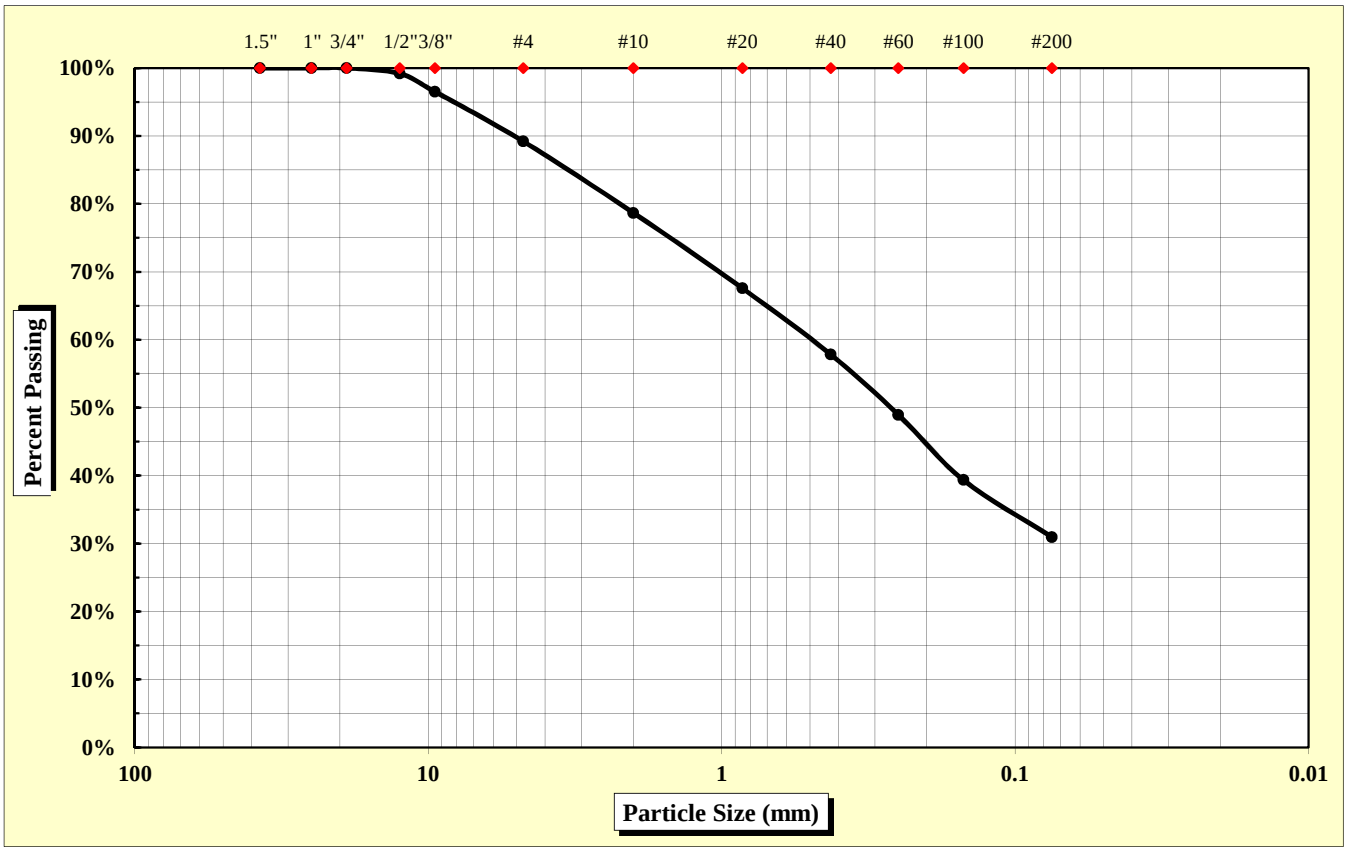
Particle Size Analysis of Soils

AASHTO T 88 (without Hydrometer)

S&ME
Quality Assurance

S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	**I-85 Widening MM80-96**	Test Date(s):	11/9 - 11/13/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'
Sample Description:	Brown red, fine to coarse, slightly micaceous, silty SAND, with some gravel (SM) [A-2-4]				



As Defined by AASHTO		Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.075 and > 0.002 mm
Coarse Sand	< 2.00 mm and > 0.425 mm	Clay	< 0.002 mm

Maximum Particle Size	12.50 mm	Gravel	21.3%	Fine Sand	26.9%
		Coarse Sand	20.8%	Silt & Clay	31.0%
Liquid Limit	38	Plastic Limit	29	Plastic Index	9
		Moisture Content	11.7%	Group Index	0

References: AASHTO T 88: Particle Size Analysis of Soils
AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 89: Determining the Liquid Limit of Soils
AASHTO T 90: Determining the Plastic Limit & Plastics Index of Soils
AASHTO T 2: Practice for Sampling Aggregates
AASHTO T 248: Practice for Reducing Samples of Aggregate to Testing Size
AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility: Brian Vaughan, P.E. — Signature — Location Coordinator — Position

Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

ASTM D 4318 ☐ *AASHTO T 89* ☒ *AASHTO T 90* ☒ ***Quality Assurance***

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

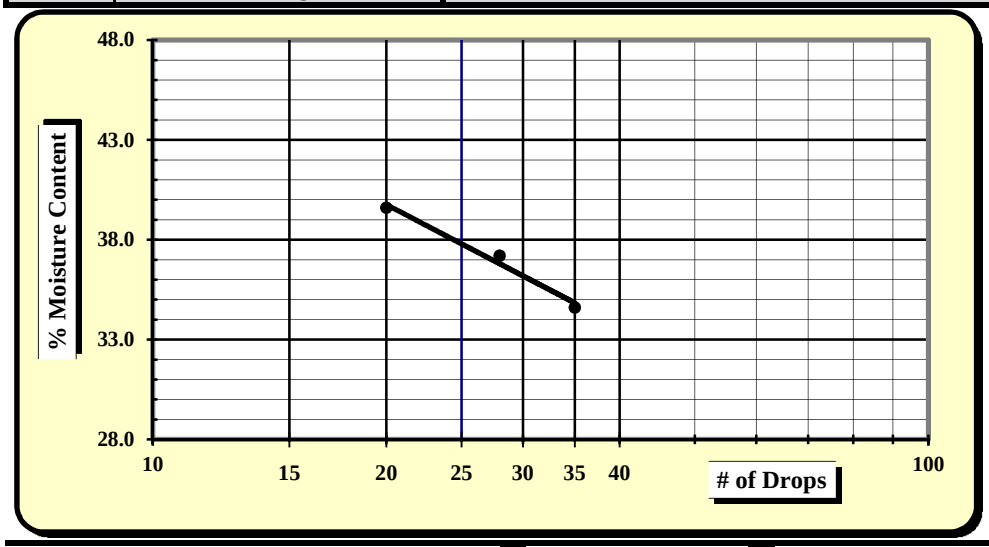
Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/25/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown red, fine to coarse, slightly micaceous, silty SAND, with some gravel (SM) [A-2-4]

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	7537	1/30/2015	Grooving tool	7797	1/30/2015
LL Apparatus	13859	1/30/2015			
Oven	7313	7/30/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	Q-7	Q-8	Q-9				13		
A	Tare Weight	16.91	16.93	16.79				12.10		
B	Wet Soil Weight + A	37.05	38.39	37.98				20.36		
C	Dry Soil Weight + A	31.87	32.57	31.97				18.49		
D	Water Weight (B-C)	5.18	5.82	6.01				1.87		
E	Dry Soil Weight (C-A)	14.96	15.64	15.18				6.39		
F	% Moisture (D/E)*100	34.6%	37.2%	39.6%				29.3%		
N	# OF DROPS	35	28	20				*Moisture Contents determined by AASHTO T 265*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**29.3%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**38**
Plastic Limit	**29**
Plastic Index	**9**
Group Symbol	**SM / A-2-4**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☐ Air Dried ☑ **% Passing #200 Sieve: 31.0%**

Notes / Deviations / References:

AASHTO T 90: Determining the Plastic Limit & Plastic Index of Soils *AASHTO T 89: Determining the Liquid Limit of Soils*

Matt Jacobs	11/27/15	Brian Vaughan, P.E.	11/27/15
Technician Name	*Date*	*Technical Responsibility*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

S&ME, Inc. - Spartanburg 301 Zima Park Drive Spartanburg, SC 29301

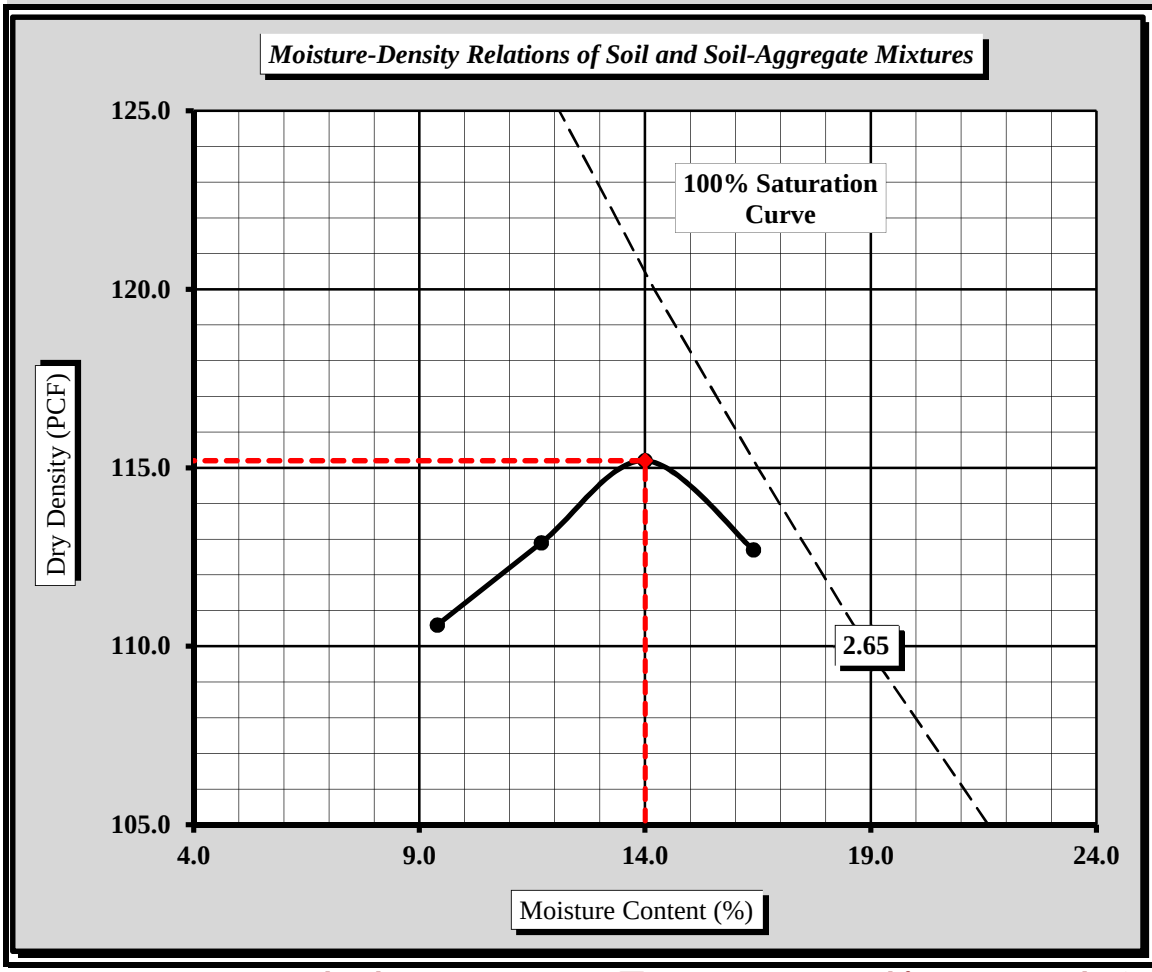
S&ME Project #:	**1426-14-161**	Report Date:	11/27/15
Project Name:	I-85 Widening MM80-96	Test Date:	11/11/15
Client Name:	Infrastructure Consulting & Engineering		
Client Address:	1021 Briargate Circle Columbia, South Carolina 29210		

Boring #:	RW-61	Sample #:	230	Sample Date:	10/14/15
Location:	Bulk	Type:	Bulk	Depth:	0 - 15'

Sample Description: Brown red, fine to coarse, slightly micaceous, silty SAND, with some gravel (SM) [A-2-4]

Maximum Dry Density 115.2 PCF. Optimum Moisture Content 14.0%

AASHTO T 99 - - Method A



Soil Properties	
Natural Moisture Content	**11.7%**
Specific Gravity of Soil (T 100)	**2.650**
Liquid Limit	**38**
Plastic Limit	**29**
Plastic Index	**9**

% Passing	
1/2"	99.2%
3/8"	96.5%
#4	89.2%
#10	78.7%
#40	57.8%
#60	49.0%
#100	39.4%
#200	31.0%

Oversize Fraction	
Bulk Gravity	2.650
% Moisture	6.0%
% Oversize	10.8%
MDD	**119.1**
Opt. MC	**13.0%**

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Coarse Particles (AASHTO T 224) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

AASHTO T 265: Laboratory Determination of Moisture Content of Soils
AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Brian Vaughan, P.E.	Brian Vaughan	Location Coordinator	11/27/15
Technical Responsibility	*Signature*	*Position*	*Date*

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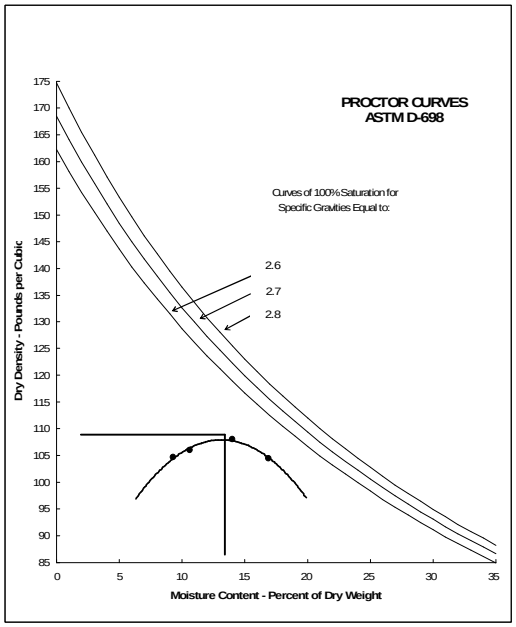
LABORATORY COMPACTION TESTING OF SOIL

LABORATORY COMPACTION TESTING

Soil placed as engineering fill is compacted to a dense state to obtain satisfactory engineering properties. Laboratory compaction tests provide the basis for determining the percent compaction and water content needed to achieve the required engineering properties, and for controlling construction to assure the required compaction and water contents are achieved.

Two alternate procedures are used for determining a moisture-density relationship for soils and granular materials. The determination of which procedure is more appropriate for the specific soils on a site is made by the geotechnical engineer after examination of the recovered bulk samples and considering local practice.

Each approach involves compaction of loose soils into a standard size mold using a specified compactive effort, then weighing back the unit weight of the soil and recording the moisture content.



Typical moisture- density curve indicates maximum dry density and optimum moisture content. Also shown are zero air voids curves for assumed specific gravity values.

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

Compaction Tests of Soils Using Standard Effort

Test procedures generally follow those described by ASTM D 698, "*Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 lbf/ft^3).*"

The relationship between water content and the dry unit weight is determined for soils compacted in either 4 or 6 inch diameter molds with a 5.5 lbf rammer dropped from a height of 12 inches, producing a compactive effort of 12,400 lbf/ft^3. ASTM D 698 provides three alternative procedures depending on material gradation:

Method A
- All material passes No. 4 sieve size
- 4 inch diameter mold
- Shall be used if 20 percent or less by weight is retained on No. 4 sieve

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

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

Compaction Tests of Soils Using Modified Effort

The compactive effort will be greater when using a heavier roller on the site. To attempt to reproduce the effort applied by heavy rollers, a modified procedure applies a greater compactive effort in the laboratory. Test procedures generally follow those described by ASTM D 1557, "*Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lbf/ft^3).*"

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

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

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

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

Correction for Oversize Material

Compaction testing performed using either ASTM D698 or D1557 place limits on the maximum particle size that can be used in the tests. Oversize materials are sieved out of the samples prior to performing moisture-density tests.

Where samples contain greater than 5 percent by weight exceeding the maximum size fraction, unit weight and moisture contents of all data points obtained in Proctor tests using either Standard or Modified effort must be corrected using the procedures outlined in ASTM D 4718, *"Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles."* Where this correction is made test data and report text so states.

LABORATORY CONSOLIDATION TESTING

OEDOMETER (CONSOLIDATION) TESTING

The data from the consolidation test are used to estimate the magnitude and rate of both total and differential settlement of a structure or earthfill. In this test method a saturated soil specimen is restrained laterally by a steel mold and loaded axially with total stress increments. As the specimen consolidates, measurements are made of the change in specimen height and plotted vs. time to determine the relationship between the effective stress and void ratio or strain, and the time rate at which consolidation occurs.

Procedures for determining the magnitude and rate of consolidation of laterally restrained soil generally follow those described in ASTM D 2435-04, *"Standard Test Method for One-Dimensional Consolidation of Soils."*

Sample Preparation and Seating

Undisturbed samples intended for use in consolidation testing are handled as Group C or D samples as described in ASTM D 4220. Extruded samples are each trimmed to a disc 2.5 inches in diameter and 1.0 inches thick as described in Section 9. Each disc is confined in a stainless steel ring and sandwiched between two porous stone plates. After application of a seating load of 100 lb/ft^2 to confine the specimen, the ring is placed in an oedometer and the sample immersed in water to full saturation.

Loading Schedule

Prepared specimens are loaded to the desired stress in accordance with the standard loading schedule described in Section 11.4.1 - 250, 500, 1000, 2000, 4000, 8000, etc. lbf/ft^2 – continuing at a load increment ratio determined by doubling the preceding increment until a maximum load equal to or greater than four times the preconsolidation stress is attained. Exceptions to the loading schedule of Section 11.4.1, or use of an alternate schedule as provided in Section 11.4.3, are noted in the report, if applicable.

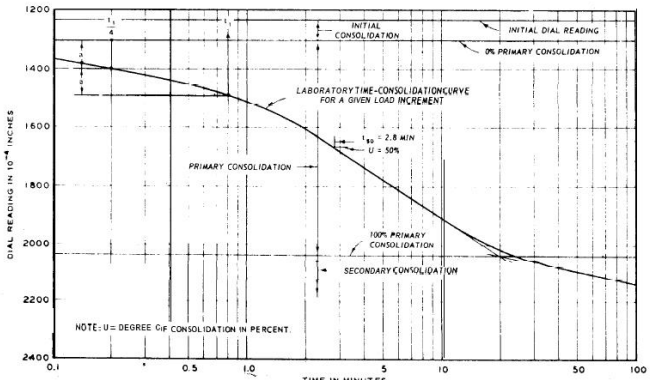
An unload-reload cycle can be imposed to better define the recompression curve in overconsolidated clays. The unload-reload cycle is imposed beginning at the first increment of load that exceeds the preconsolidation stress. Load increments on unload-reload cycles always span at least two decrements of pressure. Each decrement of load is equal to one-fourth of the preceding load when unloading.

The time sequence of readings for each load increment duration follows either Test Method "A" or "B" described in Section 11.5 and indicated on the attached test reports. Deformation of the sample is measured at each time interval using a micrometer dial gage. Measurements continue until sufficient readings are taken to confirm that primary consolidation is complete at each load increment.

Evaluation of secondary compression may be required for some samples. Where this is required longer duration times may be required for load increments above the preconsolidation stress. The laboratory report will describe any non-standard load increment durations.

Data Reduction and Plotting

Time deformation properties are plotted for each load increment using either the log time or square root of time methods described in Section 12.3 and the *coefficient of consolidation* C_v computed. Load deformation properties are plotted in terms of either void ratio at 100 percent consolidation for each loading increment vs. applied load or in terms of percentage strain (of initial sample height) vs. applied load plotted on log scale.



Time-consolidation curve at incremental load – log time method (from USACOE 1102-

The graphical representation of the sample under load was corrected for sample disturbance using the procedures recommended by the Norwegian Geotechnical Institute using the estimated effective vertical stress and the estimated preconsolidation stress.

Interpreted Values

The *preconsolidation stress* p_c of the specimen is estimated from the plot using the Casagrande construction described in Section 12.4.6, using the straight line portion of the virgin compression curve and the point of maximum curvature of the consolidation curve. The overconsolidation ratio (OCR) of the specimen is estimated by comparing the preconsolidation stress to the estimated vertical effective stress acting at the sample depth.

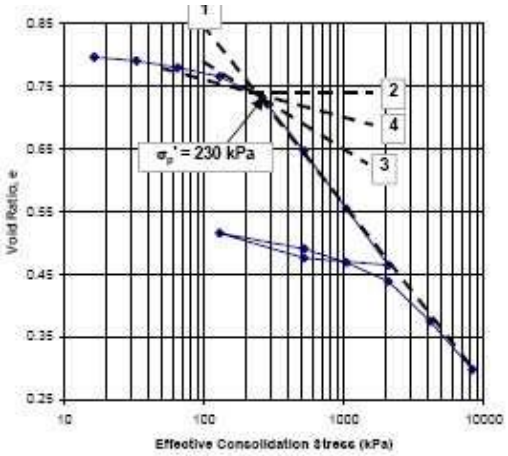


Illustration of Casagrande method to evaluate preconsolidation stress.(FHWA-IF-02-034)

The *compression index* C_c is estimated from the straight line portion of the semilog consolidation curve, above the preconsolidation stress.

The *percent initial consolidation* is determined for each load increment by comparing dial gage deflection immediately upon placement of the load increment (d_0) to the dial gage deflection at 100 percent consolidation for that increment (d_{100}). Percent initial consolidation is typically plotted arithmetically vs. load increment on a log plot.

The slope of the secondary branch of the settlement vs. time curve ($C\alpha$) is related to creep or secondary compression. Typically this trend is considered to be linear vs. the log of time. The secondary compression coefficient was estimated by comparing the deformation at two time intervals at least one log cycle apart.

ASSESSMENT OF UNDISTURBED SAMPLE QUALITY

Nominally undisturbed specimens obtained using thin-walled tube samplers will become disturbed as a result of drilling, sampling, sample extrusion, and trimming. These processes change the effective stress condition in the soil sample. In most cases by the time extrusion of the sample has been completed, significant stress relief has occurred. The specimen is at a higher void ratio than the in-situ condition. A laboratory strength test performed on the specimen would likely have lower strength and a higher compressibility relative to the same soil at the in-situ void ratio.

Use of Consolidation Test Data

The strain to reach the in-situ effective stress (σ'_{vo}) will be greater for the disturbed sample when compared to an undisturbed specimen. The preconsolidation stress is difficult to determine due to rounding of the consolidation curve, generally leading to an under estimation of the reconsolidation stress. The recompression curve for the disturbed sample will have a steeper slope than that of an undisturbed specimen, while the apparent virgin compression curve will likely be flatter.

Assessment of Sample Quality Using Oedometer Test Data – after LaCasse et al (1985)

Range of OCR	Depth Interval (m)	V. Good Test if ε_r < %	Acceptable Test if < ε_r <	Likely Disturbed if ε_r > %
1 – 1.2	0 – 10 10 – 50	3 2	3 – 5 2 - 4	5 4
1.2 – 1.5	0 – 10 10 - 50	2 1	2 - 4 1 - 3	4 3
1.5 - 2	0 – 10 10 – 50	1.5 1.0	1.5-3.5 1 – 2.5	3.5 2.5
2 - 3	0 – 10 10 – 50	1.0 0.75	1 – 3 0.75 - 2	3 2
3 - 8	0 – 10 10 – 50	0.5 0.5	0.5 – 1 0.5 - 1	1 2

Sample disturbance can be estimated in the laboratory where oedometer or triaxial testing is performed, using the procedure by Lacasse et. al. (1985) as a guide. This assessment is based on estimated overconsolidation of the sample before removal, and the degree of strain required for the sample to withstand the in-situ vertical effective stress during initial loading in the oedometer or during the consolidation phase in the triaxial cell.

Since the loading of the sample up to the preconsolidation stress is "elastic," the response of the soil to application of load should be relatively stiff at applied stresses below the preconsolidation stress. So, as the amount of strain required to reach the initial effective stress in the ground increases, this reflects increased likelihood that the sample is actually disturbed.

Sample quality is judged to be "very good", "acceptable", or "likely to be disturbed" depending on the estimated OCR and strain ε exhibited at σ'_{vo}, according to the table shown above. For slightly overconsolidated soils (OCR 2-3), samples could be judged to be "acceptable" if the strain is less than 3 percent when the sample reaches the preconsolidation stress in the oedometer and "very good" if the strain is less than 1 percent.

ELECTRO-CHEMICAL CLASSIFICATION TESTS

Electro chemical classification tests provide the engineer or geologist with quantitative information related to the aggressiveness of the soil conditions and the potential for deterioration of a foundation material. Electro chemical tests include (1) pH; (2) resistivity; (3) sulfate ion content; and (4) chloride ion content.

Soil pH Testing

Soil pH measures the activity of hydrogen ions in a water solution. The pH scale ranges from 0 (very acidic) to 14 (very alkaline or basic). Test methods follow those given by AASHTO T-289-91(2004), *"Determining pH for Soil for Use in Corrosion Testing."*

Moist samples are sieved and pulverized as described in Section 6.2. A 30mg sample is then suspended in distilled water for one hour. A pH meter is first standardized against a buffer solution of known pH, then the probe immersed in the suspended solution and the pH reading recorded. If the pH of the soil is below 4.5 the soil is reported as aggressive.

Field Resistivity Testing

Apparent resistivity of the soil is measured at selected locations by measuring the voltage potential between four equally spaced, in-line direct current electrodes in the Wenner Electrode Arrangement as described in ASTM D 6431, *"Standard Guide for Using the Direct Current Resistivity Method for Subsurface Investigation."* Using the measured voltages, resistivity is estimated using the approach described in "*A Method of Measuring Earth Resistivity*", U. S. Bureau of Standards Bulletin No. 258, by Dr. F. Wenner, in which the average resistivity of the soil to a depth of "A" is given by:

$$r = 191.5 \times AE/I, \text{ where:}$$

r = Average resistivity of soil, ohm-cm
A = Distance between electrodes, cm
E = Measured Voltage, Volts
I = Current, Amperes

Measurements employ a set of four electrodes in a linear array. Measurements at a single location are typically made in two orientations at right angles to one another. The location and orientation of each traverse is indicated in the report or on the boring location plan in the Appendix.

Successive measurements are made by varying the electrode spacing at horizontal intervals of 5, 10, 15, and 20 feet unless otherwise indicated in the report. The depth of measurement is considered roughly equivalent to the electrode spacing

Laboratory Minimum Soil Resistivity

This method is used to determine the soil corrosivity and identify conditions under which corrosion of metals in the soil may be reduced. Test methods follow those described in AASHTO T-288-91(2004), "*Determining Minimum Laboratory Soil Resistivity.*"

Tests are performed on about 1500 grams of air dried material obtained by splitting or quartering recovered samples. Testing is performed on material passing the No. 10 sieve size. Prepared samples are placed in a standard soil box and finger compacted. Resistance of the sample between the electrodes is measured with either an alternating current resistivity meter or a 12-V direct current resistivity meter.

After each test, the sample is removed from the box and moisture content adjusted by addition of distilled water to the soil. The sample is replaced in the box with finger compaction and the test repeated. Testing is preformed on successively higher moisture contents until a minimum resistivity value is recorded, which is reported as the resistivity. The minimum soil resistivity can occur at any soil moisture content.

Soil Corrosivity Versus Resistivity

Soil Corrosivity	Soil Resistivity (ohm-cm)
Very corrosive	0 to 2,000
Corrosive	2,000 to 5,000
Moderately corrosive	5,000 to 10,000
Mildly corrosive	10,000 to 25,000
Relatively less corrosive	25,000 to 50,000
Progressively non-corrosive	50,000 to 100,000

Laboratory Sulfate Ion Content Test

External sulfate can occur when concrete is in contact with sulfate containing water e.g. seawater, swamp water, ground water or sewage water. The often massive formation of gypsum and ettringite formed during the external sulfate attack may cause concrete to crack and scale.

Water soluble sulfate ion content is determined using either Method A or B as described by AASHTO T-290-95(2003), *"Determining Water-Soluble Sulfate Ion Content in Soil*." Soil specimens were first prepared by splitting and quartering representative portions from recovered samples as described in Section 7.2.

Method A, the Gravimetric Method, determines sulfate content by precipitation of barium sulfate from a heated solution of the soil and chemical reagents. Method B, the Turbidimetric Method, relies on a photoelectric colorimeter to determine the turbidity of a barium sulfate suspension after chemical reagents are added. Laboratory test data sheets will indicate the method used.

Laboratory Chloride Ion Content Test

Water soluble chloride ion content is determined using either Method A or B as described by AASHTO T-291-94(2004), *"Determining Water-Soluble chloride Ion Content in Soil*." Soil specimens were first prepared by splitting and quartering representative portions from recovered samples as described in Section 7.2.

Method A, the Mohr Titration Method, determines chloride ion content using silver nitrate in a suspended solution of the soil and distilled water. A reaction between a potassium chromate indicator solution and the silver nitrate produces a red-silver chromate precipitate.

Method B utilizes a pH/mV meter with chloride ion selective electrodes. When inserted into the suspension the meter records the activity of the chloride ions. These readings are compared to a set of calibration curves to determine the ion content in mg/kg.

Interpretation of Soil Corrosive Potential

Tests to characterize the aggressiveness of a soil environment are important for design applications that include metallic elements, especially for ground anchors comprised of high strength steel and for metallic reinforcements in mechanically stabilized earth walls.

If results from these tests indicate chloride ion content greater than 100 ppm or sulfate ion content greater than 200 ppm, then the soil should be considered as **aggressive**. If the pH of the soil is below 4.5 or the resistivity is less than 1000 ohms/cm, the soil is reported as **aggressive**.

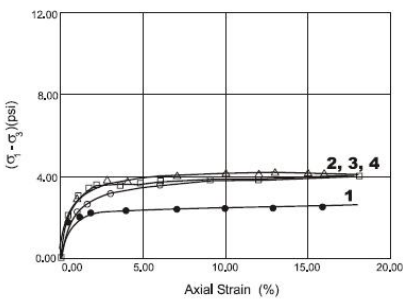
S&ME

UU or "Q" Triaxial Shear Tests of Undisturbed Samples

Undrained strength tests performed using the UU or "Q" test method are described by ASTM D 2850, "*Standard Test Method for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils.*" This test is typically limited to cohesive soils having a permeability slower than 10^{-3} cm/sec, preserved as Group C samples as defined in ASTM D 4220.

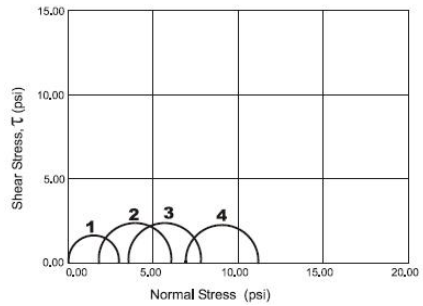
The UU test employs rapid application of both confining and axial stresses without permitting drainage of pore water. This condition simulates rapid loading of the soil during construction before sufficient time is allowed for the soil to consolidate. UU tests are performed on samples at their "as-received" moisture content, so that results may be applied to "construction conditions" in embankment stability analyses.

The extruded sample was encased in a rubber membrane and sealed to the specimen base and cap with rubber O-rings to prevent drainage of the specimen. In most cases UD samples are tested without trimming except for cutting the end surfaces plane and perpendicular to the longitudinal axis of the specimen.



The UU test is performed with the drain valve of the triaxial cell closed during all phases of the test and before the sample has a chance to consolidate (S<100 percent). The chamber is pressurized to the desired confining pressure and the sample allowed to stabilize at least 10 minutes before application of axial load. The sample is loaded axially by compressing the top platen into the sample at a constant rate of approximately one percent strain per minute.

Deformation of the sample and the applied stress is recorded electronically using LVDT strain gages. Failure of the specimens during the tests is defined as the maximum principal stress difference (deviator stress) attained at any point during the test, or as the deviator stress at 15 percent strain, whichever occurs first. Test output is attached in the Appendix and includes a plot of deviator stress vs. applied strain for various load increments, and Mohr Circle plots at various increments of confining stress.



CU or "R" Triaxial Shear Tests of Undisturbed Samples

Shear tests performed using the CU or "R" test method are described by ASTM D 4767, *"Standard Test Method for Consolidated-Undrained Triaxial Compression Test for Cohesive Soils*." This test is typically applicable to Group C samples as defined in ASTM D 4220.

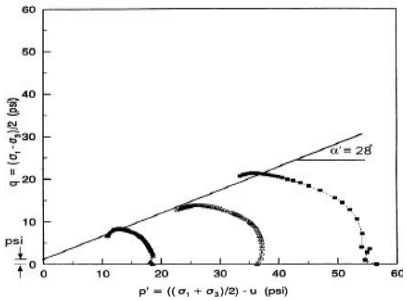
Samples tested using the R test method are isotropically consolidated and sheared in compression without drainage at a constant rate of axial deformation. The measured shear strength can be applied to field conditions where soils that have been fully consolidated under one set of stresses are subjected to a change in stress without time for further consolidation to take place.

Measured pore pressures induced by the change in stress can be used to compute effective stress shear strength, which may be applied to field conditions in which full drainage can occur or to conditions in which pore pressures induced by loading can be estimated.

R test samples are prepared as generally described in Section 6 of ASTM D 4767. Each extruded sample is encased in a rubber membrane and sealed with rubber O-rings to prevent drainage of the specimen. UD samples are typically tested without trimming except for cutting end surfaces plane and perpendicular to the long axis of the specimen. Samples are saturated by back pressuring the pore water to drive the air in the void spaces into solution, after the system was saturated by applying a vacuum to the specimen and dry drainage system as described in section 8.2.

With the drainage valves of the triaxial cell closed, the cell pressure is increased with back pressure constant to confine the specimen. After attaining the desired confining pressure, the drainage ports are opened and the sample fully consolidated to equilibrium before applying axial load.

p-q plot of test results



The fully consolidated sample is loaded axially by compressing the top platen at a constant rate of one percent strain per minute, with drainage ports again closed. Sample deformation and applied stress is recorded electronically using LVDT strain gages and induced pore pressures measured using a stiff electronic pressure transducer.

Failure of the specimens during the tests is defined as the point of maximum effective stress obliquity, the maximum stress difference (deviator stress) attained at any point during the test, or as the deviator stress at 15 percent strain, whichever occurs first. Test output is attached in the Appendix and includes a plot of deviator stress vs. applied strain for various load increments, induced pore pressure vs. applied strain, p'-q' diagram, and Mohr Circle plots at various increments of confining stress.

Triaxial Shear Tests of Remolded Samples

Specimens are prepared in a standard mold by compacting them at predetermined moisture contents to the dry density values prescribed by the geotechnical engineer. Compacted samples are then removed from the mold and the ends of each specimen carved by hand and trimmed as necessary to provide a surface perpendicular to the long axis.

Unconfined Compressive Strength Tests of Undisturbed Cohesive Samples

The unconfined compressive strength of relatively undisturbed cohesive soils is determined generally following the procedures described by ASTM D 2166, "*Standard Test Method for Unconfined Compressive Strength of Cohesive Soil*." Relatively undisturbed Group C samples of cohesive soils are extruded from the sampler and examined as described above.

Representative portions of each sample are split from the extruded material and prepared using the procedures described in Section 6.2 of ASTM D 2166. The ends of the specimen are carved by hand and trimmed as necessary to provide a surface perpendicular to the specimen's long axis, but the ends are not capped.

The prepared sample is placed in a compressive testing machine and the specimen compressed in the platen at a rate of 1 to 2 percent strain per minute. Deformation and loading of the sample are recorded at regular intervals until the load values began to decrease with increasing axial strain, or a total strain of 15 percent of the original sample length is attained.

Sample stress is corrected at each load increment for the change in cross sectional area produced by deformation of the sample using the formula in sections 8.2 and 8.3 of ASTM D 2166.

Unconfined Compressive Strength Tests of Remolded Cohesive Samples

The unconfined compressive strength of remolded cohesive soils is determined generally following the procedures described by ASTM D 2166, "*Standard Test Method for Unconfined Compressive Strength of Cohesive Soil.*" Specimens are prepared either from cohesive soils recovered from split spoon samples obtained as described in ASTM D 1586 and preserved as Group B samples, or from portions of failed undisturbed samples tested in unconfined compression.

Representative portions of remolded samples are prepared using the procedures described in Section 6.3 of ASTM D 2166. The ends of each specimen are carved by hand and trimmed as necessary to provide a surface perpendicular to the specimen's long axis, but the ends are not capped.

The prepared sample is placed in a compressive testing machine and the specimen compressed in the platen at a rate of 1 to 2 percent strain per minute. Deformation and loading of the sample are recorded at regular intervals until the load values began to decrease with increasing axial strain, or a total strain of 15 percent of the original sample length is attained.

Sample stress is corrected at each load increment for the change in cross sectional area produced by deformation of the sample using the formulae in sections 8.2 and 8.3 of ASTM D 2166.

Unconfined Compressive Strength Tests of Compacted Cohesive Samples

The unconfined compressive strength of compacted cohesive soils is determined generally following the procedures described by ASTM D 2166, "*Standard Test Method for Unconfined Compressive Strength of Cohesive Soil."*

Specimens are prepared in a standard mold by compacting them at predetermined moisture contents to the dry density values prescribed by the geotechnical engineer. Compacted samples are then removed from the mold and specimens prepared using the procedures described in Section 6.4 of ASTM D 2166. The ends of each specimen are carved by hand and trimmed as necessary to provide a surface perpendicular to the specimen's long axis, but the ends are not capped.

Each prepared sample is placed in a compressive testing machine and the specimen compressed in the platen at a rate of 1 to 2 percent strain per minute. Deformation and loading of the sample are recorded at regular intervals until the load values began to decrease with increasing axial strain, or a total strain of 15 percent of the original sample length was attained.

Sample stress is corrected at each load increment for the change in cross sectional area produced by deformation of the sample using the formulae in sections 8.2 and 8.3 of ASTM D 2166.

Direct Simple Shear Testing of Undisturbed Samples

Shear tests are performed using the single shearing method described by ASTM D 3080, *"Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions*." This test is typically applicable to both coarse-grained and fine-grained soils preserved as Group C samples as defined in ASTM D 4220, or on remolded or recompacted samples.

Samples are tested by placing the specimen in a direct shear device and consolidating it under a predetermined normal load. The specimen is then sheared along a horizontal plane in the middle of the specimen. Shearing is performed at a slow rate (at least 50 times the estimated time for 50 percent consolidation of the sample) to limit buildup of pore pressures along the failure plane. Since drainage paths in the specimen are short, excess pore pressures are dissipated and the test is considered a drained test.

Failure of the specimens during the tests is defined as the point of maximum stress attained (peak stress) and at 15 to 20 percent strain (residual stress). Test output includes a plot of deviator stress vs. applied strain for various load increments and Mohr Circle plots at various increments of confining stress.

Pocket Penetrometer Tests

A pocket penetrometer is a spring operated device used to roughly estimate compressive strength for classification purposes of selected samples. The device is operated by pushing a 0.25-inch (6.4mm) diameter loading piston into the material being measured, up to a calibration groove machined on the piston 0.25 inches from the end. Strength in tons per sq. ft. or kg per sq. cm. to a maximum of 4.5 is obtained by noting the position of an indicating ring on the scale.

Pocket penetrometers are not individually calibrated. Calibration is on the basis of correlation studies relating the effective spring compression to unconfined compressive strength values determined by other methods.

Pocket Torvane Shear Tests

Pocket torvane devices are simple spring loaded hand-held blades used to estimate consistency of cohesive soills by correlation of torsion of the spring mechanism to compressive strength determined by other methods. Performed on cohesive materials, undisturbed samples, and intact chunks or disturbed samples. Test results are to be regarded with caution. Pocket torvane tests are used mainly for consistency classification and as guide for assigning shear tests.

APPENDIX V

ROCK CORES

Table of Compressive Strength of Intact Rock Cores

Photo Log of Rock Core Test Specimens – Bridge Borings (10)

Form No. TR-126-RC-1
Revision No. 0
Revision Date: 08/10/11

COMPRESSIVE STRENGTH of INTACT ROCK CORES

ASTM D 4543 / D 7012

S&ME
Quality Assurance

Project #: 1426-14-161

Project Name: I-85 Widening MM80-96

Date(s) Tested: 12/8 - 12/9/15

Boring Number	Sample Number	Depth (feet)	Length After Cutting (in.)	Diameter (inches)	Load	Area	L/D Ratio	Compressive Strength (psi)
BR-1	NQ-2	57.5 - 58'	4.63	1.98	57,121	3.08	2.34	18,550
BR-1	NQ-4	67.5 - 68'	4.69	1.98	51,214	3.08	2.37	16,630
BR-2	NQ-3	79 - 79.5'	4.56	1.98	19,762	3.08	2.30	6,420
BR-2	NQ-5	86.5 - 87'	4.56	1.98	19,493	3.08	2.30	6,330
BR-3	NQ-3	79.5 - 80'	4.53	1.97	37,899	3.05	2.30	12,430
BR-3	NQ-4	84.5 - 85'	4.59	1.97	31,193	3.05	2.33	10,230
BR-4	NQ-2	52 - 52.5'	4.31	1.98	9,302	3.08	2.18	3,020
BR-4	NQ-3	58 - 58.5'	4.63	1.98	38,957	3.08	2.34	12,650
BR-5	NQ-1	44.5 - 45'	4.63	1.99	38,326	3.11	2.33	12,320
BR-5	NQ-3	51 - 51.5'	4.59	1.99	48,950	3.11	2.31	15,740
BR-6	NQ-1	29 - 29.5'	4.50	1.99	35,057	3.11	2.26	11,270
BR-6	NQ-3	39.5 - 40'	4.50	1.99	43,670	3.11	2.26	14,040
BR-7	NQ-3	39.5 - 40'	4.44	1.98	6,583	3.08	2.24	2,140
BR-7	NQ-5	49.5 - 50'	4.00	1.99	14,151	3.11	2.01	4,550
BR-8	NQ-1	22 - 22.5'	4.63	1.97	33,752	3.05	2.35	11,070
BR-8	NQ-2	28 - 28.5'	4.63	1.98	22,577	3.08	2.34	7,330
BR-9	NQ-5	66.5 - 67'	4.44	1.99	7,938	3.11	2.23	2,550
BR-9	NQ-5	68 - 68.5'	4.47	1.99	23,577	3.11	2.25	7,580

Notes:

1. For BR-8, two deeper specimens were originally selected for testing from NQ-2 and NQ-4, but both weak samples cracked during cutting/prep. No other core specimens from NQs-3/4/5 were suitable for compressive strength testing, due to insufficient length or low hardness/strength of the samples.
2. For BR-9, three shallower specimens were originally selected for testing from NQs-1/3/4, but the weak samples cracked during cutting/prep. No other core specimens were suitable for compressive strength testing, due to insufficient length or low hardness/strength of the samples.
3. For BR-10, two specimens were selected for testing, but both weak samples cracked during cutting/prep. No other core specimens were suitable for compressive strength testing, due to insufficient length or low hardness/strength of the samples.

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-1

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Dates Cored: September 24 & 28, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-2

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Dates Cored: September 22 & 23, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-3

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Dates Cored: September 28 & 29, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-4
I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Dates Cored: October 7 & 8, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-5
I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: October 7, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-6

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: October 8, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-7

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: October 6, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-8

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: October 6, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-9

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: September 22, 2015

Box 1 of 2

Box 2 of 2

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

Rock Core Photographs
Core Location: Boring BR-10

I-85 Widening Project MM80-MM96
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161
Date Cored: September 23, 2015

Box 1 of 1

APPENDIX VI

SHEAR WAVE VELOCITY TEST DATA

Summary of MASW / MAM Shear Wave Velocity Test Data

MASW / MAM Shear Wave Velocity Profiles (5)

S&ME

301 Zima Park Drive
Spartanburg, SC 29301
864.574.2360

SUMMARY OF MASW/MAM SHEAR WAVE VELOCITY TEST DATA

I-85 Widening MM80-96 - Replacement Bridges Over I-85

WBS No. 88P027114E1.SlB.1, S&ME Project No. 1426-14-161

SW-1, SC-110 Bridge (Battleground Rd., Exit 83)

Depth (ft)	Shear Wave Velocity, (ft/s)
0	514
3	536
6	718
9	890
12	786
16	616
20	566
24	618
28	699
33	799
38	1043
43	1169
49	1529
54	1598
61	1931
67	1937
73	1926
80	2267
87	2236
95	2214
102	2514
110	2514

Avg. Vs_{100} = **1069 ft/s**

SW-2, S-11-131 Bridge (Sunny Slope Dr., MM84.6)

Depth (ft)	Shear Wave Velocity, (ft/s)
0	704
3	763
6	788
10	793
14	783
19	778
24	731
29	686
36	774
42	922
49	1122
57	1378
65	1614
100	1613

Avg. Vs_{100} = **1021 ft/s**

SW-3, S-11-39 Bridge (Macedonia Road, Exit 87)

Depth (ft)	Shear Wave Velocity, (ft/s)
0	699
3	759
5	727
8	692
12	639
15	602
19	609
23	633
27	713
32	859
36	1005
41	1115
46	1235
52	1310
57	1371
63	1412
69	1503
75	1578
82	1699
88	1703
95	1875
102	1891
110	1913
117	2141
141	2172

Avg. Vs_{100} = **1020 ft/s**

SW-4, S-11-82 Bridge (Pleasant Sch. Rd., Exit 95)

Depth (ft)	Shear Wave Velocity, (ft/s)
0	917
3	711
5	621
8	929
11	1150
15	1205
18	1225
22	1323
25	1524
29	1590
34	1921
38	2027
42	2164
47	2055
52	2274
57	2139
62	2290
67	2444
73	2409
78	2658
84	2694
90	2946
97	3021
103	3431
109	3511
116	3920
123	3995
130	4426
137	4505
145	4588
152	4789
175	4876

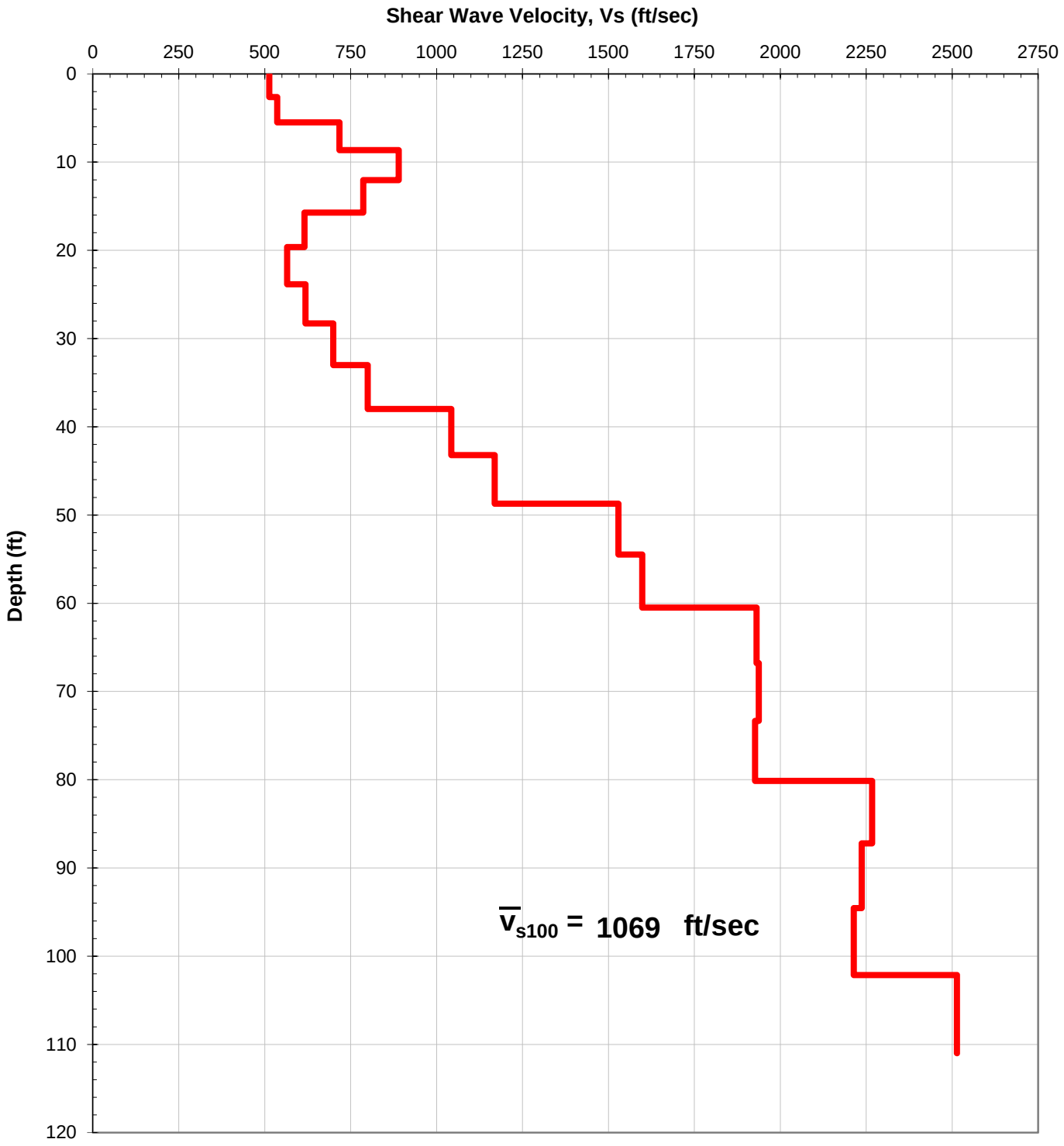
Avg. Vs_{100} = **1678 ft/s**

SW-5, SC-18 Bridge (Shelby Highway, Exit 96)

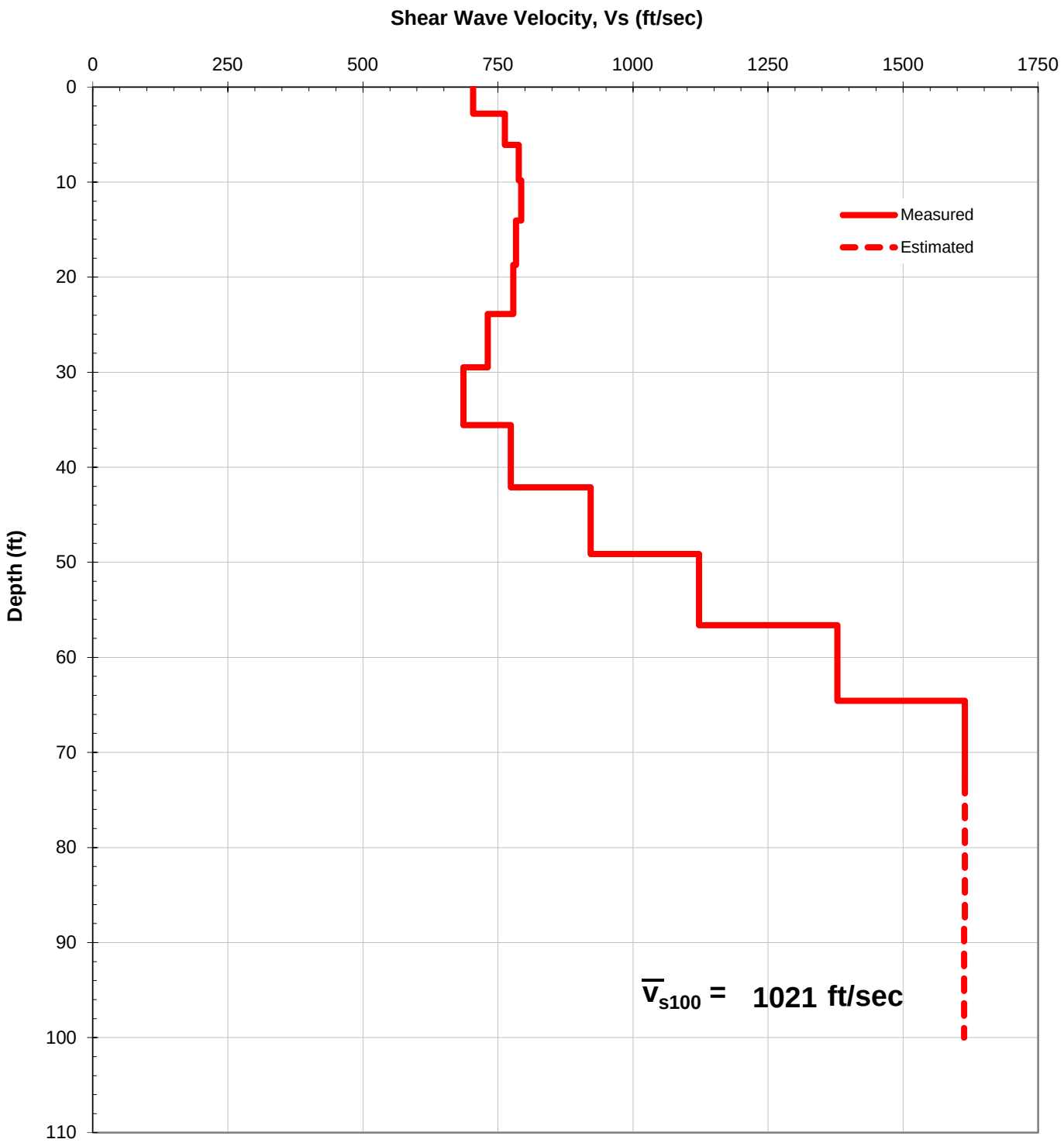
Depth (ft)	Shear Wave Velocity, (ft/s)
0	495
3	521
5	599
8	641
12	676
15	754
19	786
23	813
27	881
31	947
36	1056
41	1111
45	1176
51	1275
56	1321
62	1316
68	1287
74	1315
80	1299
86	1298
93	1603
100	1641
107	1695
115	1766
122	2151
146	2254

Avg. Vs_{100} = **991 ft/s**

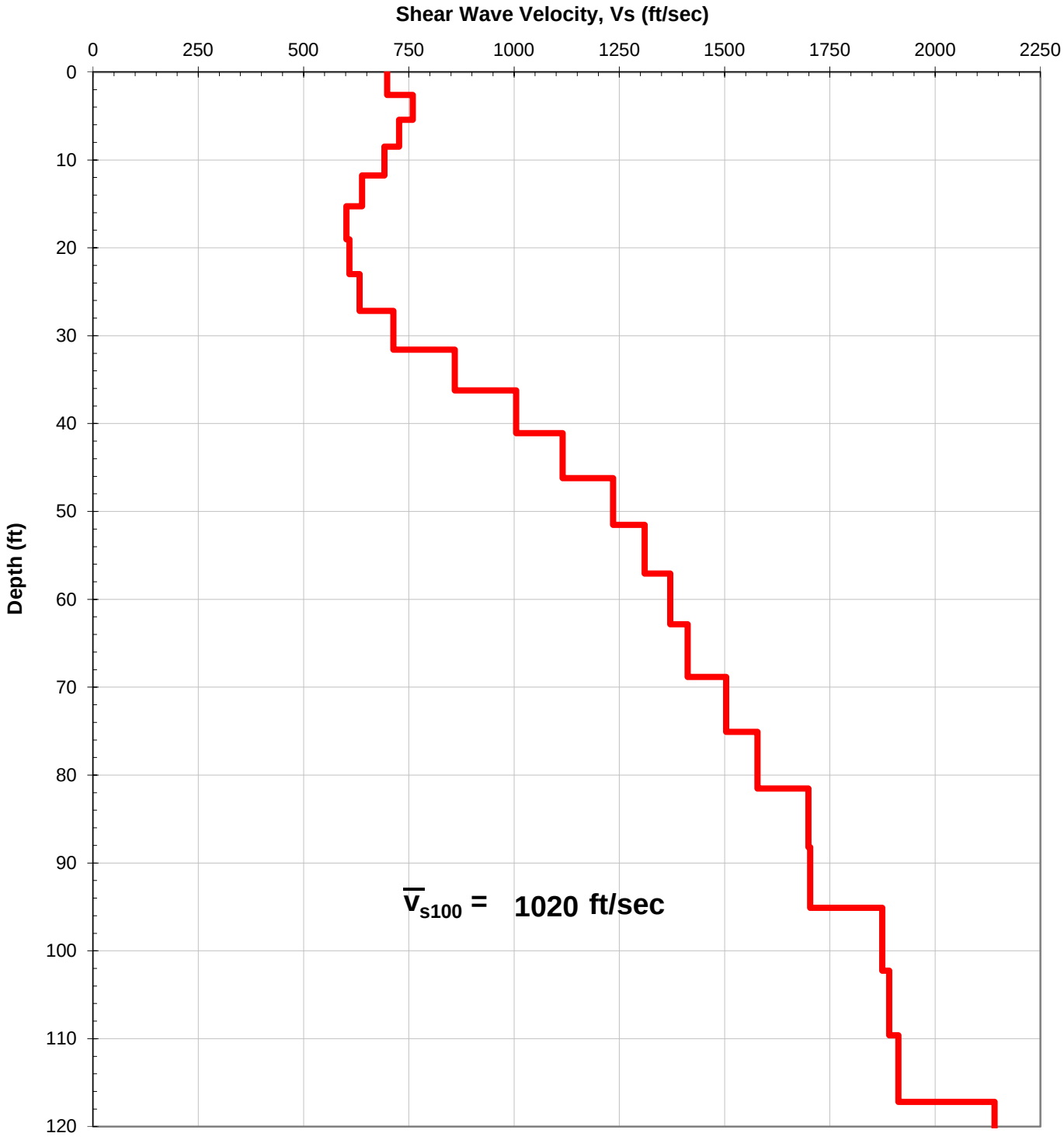
MASW/MAM Shear Wave Velocity Profile *SW-1*
I-85 Widening MM80-96
SC 110 (Battleground Road), Exit 83 - Replacement Bridge Over I-85
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161



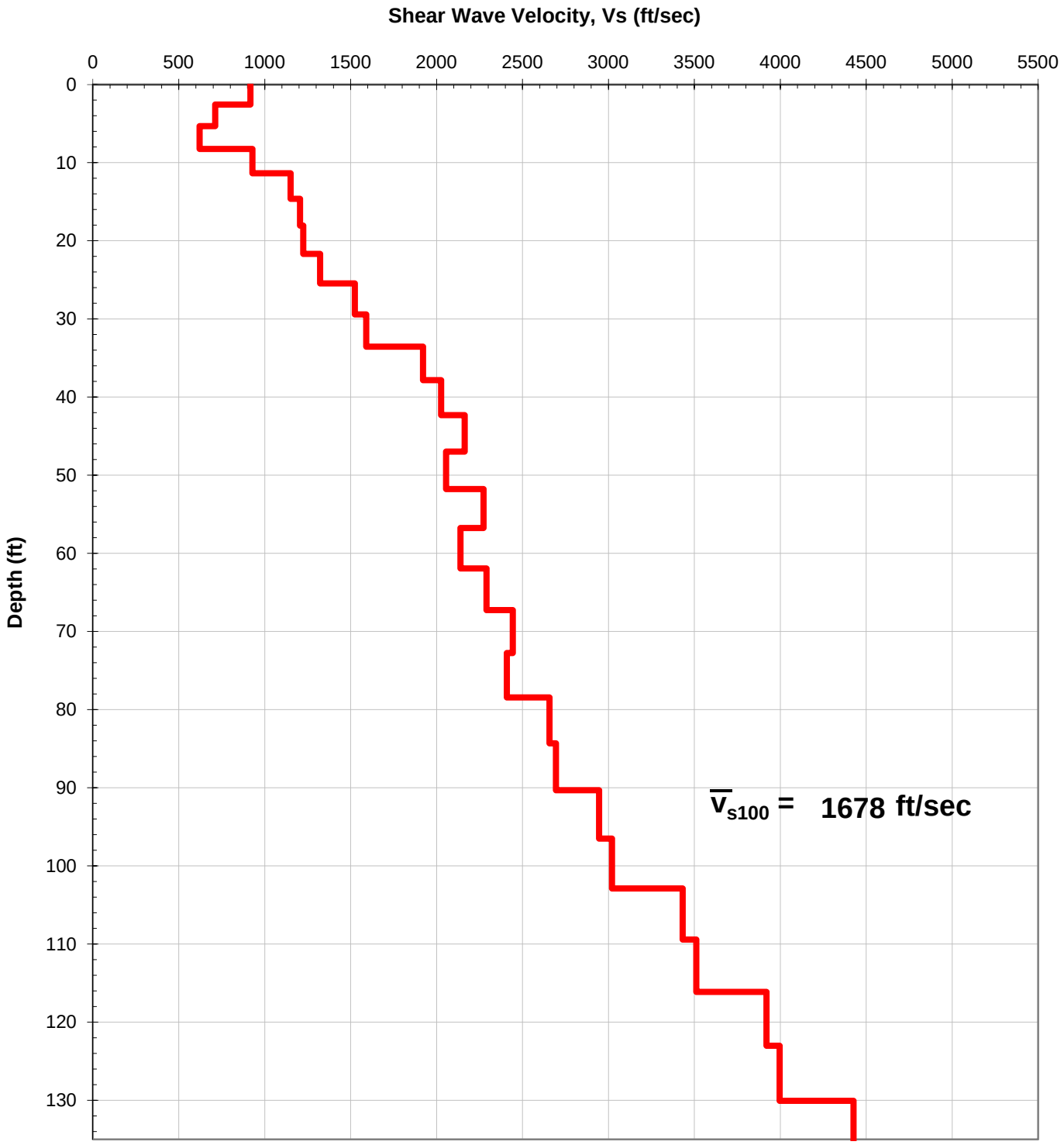
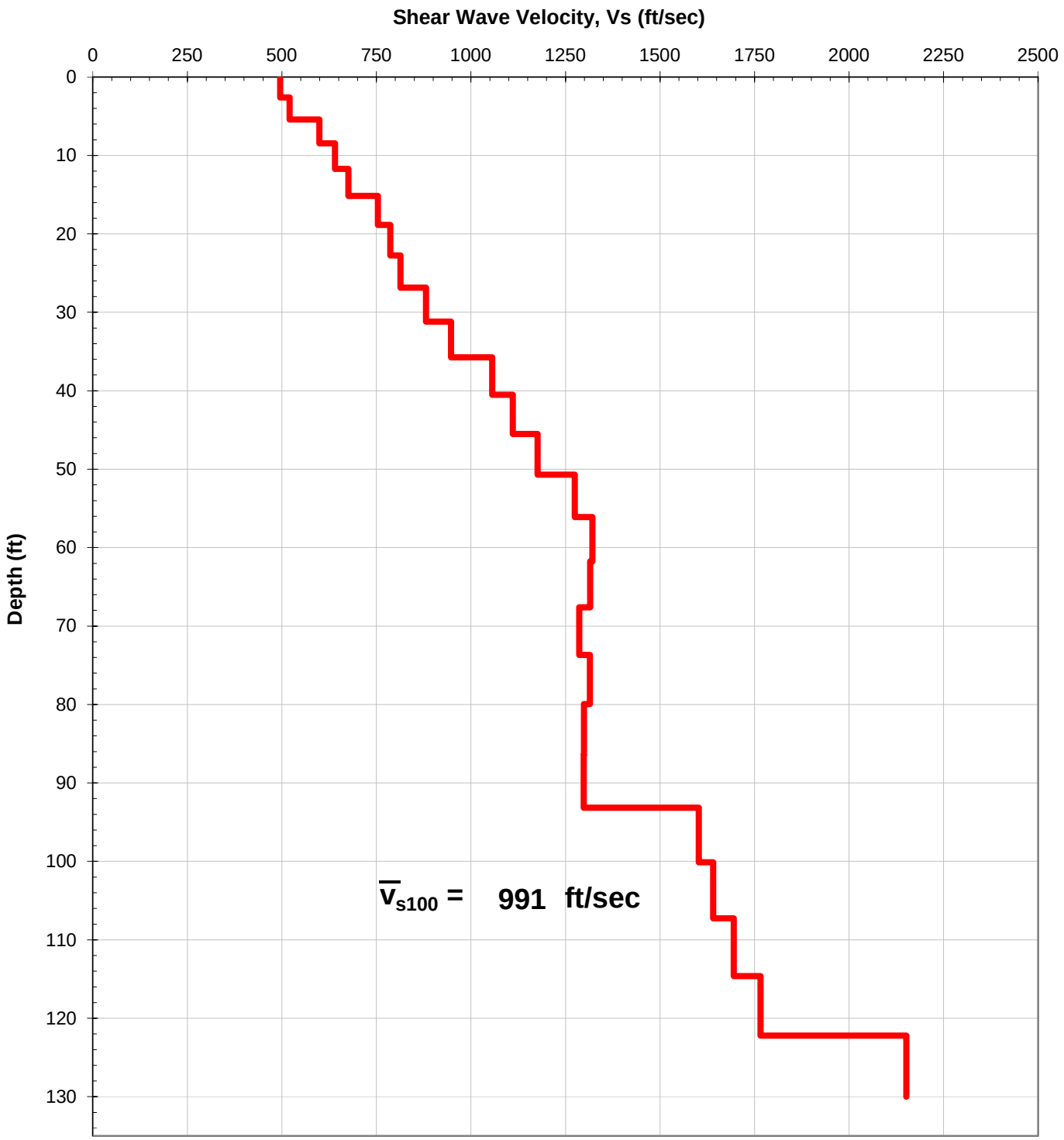
MASW/MAM Shear Wave Velocity Profile *SW-2*
I-85 Widening MM80-96
S-11-131 (Sunny Slope Drive), MM84.6 - Replacement Bridge Over I-85
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161



MASW/MAM Shear Wave Velocity Profile *SW-3*
I-85 Widening MM80-96
S-11-39 (Macedonia Road), Exit 87 - Replacement Bridge Over I-85
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161



MASW/MAM Shear Wave Velocity Profile *SW-4*
I-85 Widening MM80-96
S-11-82 (Pleasant School Road), Exit 95 - Replacement Bridge Over I-85
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161



MASW/MAM Shear Wave Velocity Profile *SW-5*
I-85 Widening MM80-96
SC-18 (Shelby Highway), Exit 96 - Replacement Bridge Over I-85
Spartanburg/Cherokee Counties, South Carolina
S&ME Project No. 1426-14-161