



Geotechnical Baseline Report (GBR), Revision 1
Connector Road Bridge over Interstate 77 and Community Road
Interstate 77 Exit 26 – Scout Interchange
Blythewood, Richland County, South Carolina
SCDOT Project ID P042443
S&ME Project No. 23610178A

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February 5, 2024



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Attention: Mrs. Jennifer Farino, P.E.

Reference: **Geotechnical Baseline Report (GBR), Revision 1**
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Interstate 77 Exit 26 – Scout Interchange
Blythewood, Richland County, South Carolina
SCDOT Project ID P042443
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Dear Mrs. Farino:

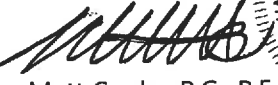
The purpose of this Geotechnical Baseline Report (GBR) is to provide the design/build team information that may be used in preliminary design and bidding for construction of the bridge and roadway embankments associated with the proposed Connector Road bridge over Interstate 77 and Community Road portion of the overall Interstate 77 Exit 26 – Scout Interchange project, in Blythewood, Richland County, South Carolina. Our services were performed in general accordance with the *Subcontract for Professional Services* between RS&H and S&ME dated May 1, 2023, including the associated scope of services for geotechnical investigations in general accordance with the SCDOT *Geotechnical Design Manual* (GDM), dated January 2022.

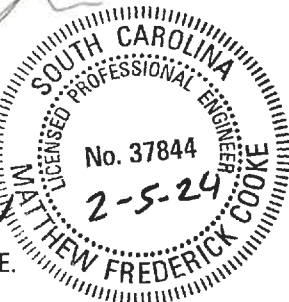
We look forward to continuing our geotechnical engineering services on this important project. Please contact us at (803) 561-9024 if you have questions or need additional information regarding this report.

Sincerely,

S&ME, Inc.


John P. Lewis, P.E.
Project Engineer


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1.0 Introduction

This report summarizes the results of the geotechnical investigation conducted to date for the proposed Connector Road bridge over Interstate 77 and Community Road portion of the I-77 Exit 26 – Scout Interchange project. The general location of the interchange is shown on the *Site Location Plan*, attached as Figure 1 in Appendix I. Our scope of work relevant to the bridge and bridge embankment portions of the project included:

- Visits to the site by geotechnical personnel,
- Coordinating clearing activities for drill rig access,
- Coordinating coring and drilling activities,
- Performing geotechnical and geophysical subsurface investigations,
- Conducting laboratory testing,
- Reviewing available geologic and geotechnical-related data,
- Requesting ADRS curves provided by SCDOT,
- Preparing this report conforming to Section 21 of the GDM.

Project design parameters and computations generally follow those described in the relevant sections of the South Carolina Department of Transportation (SCDOT) *Geotechnical Design Manual (GDM)*, except where specifically described otherwise in the report text.

2.0 Project Description

Our understanding of the project is based on review of the following plans, provided by RS&H:

- ◆ Microstation file: P042443_DSN_LCS.dgn, dated June 12, 2023
- ◆ Google Earth kmz file: P042443_DSN_ALT03_LCS.kmz, dated September 11, 2023
- ◆ *Conceptual Roadway Plans Alternate 3*, prepared by RS&H, dated August 30, 2023
- ◆ *Conceptual I-77 Interchange and Connection Roads Construct Bridge on Connector Road over I-77 and Community Road, Conceptual Bridge Plans*, prepared by RS&H, dated December 11, 2023.

From our review of the provided information, we understand the Connector Road bridge over I-77 and Community Road will consist of an approximately 360-foot long, four-span structure supported on two end bents and three interior bents (spanning from Bent 1 through Bent 5), with an up to 100-foot wide extension to the south between Bent 1 and 3 to accommodate the on-ramp that will be supported by one additional interior bent and an additional end bent. Driven steel H-piles are planned for support of the end bents and drilled shafts are planned for support of the interior bents. Due to the roughly 20 to 30 feet of fill required to raise the roadway alignment above I-77 and Community Road, mechanically stabilized earth (MSE) retaining walls will support the bridge abutment embankments at end bents. The finished roadway configuration of the bridge will consist of three, 12-foot wide westbound lanes, two, 14-foot wide left turn lanes, two, 12-foot wide eastbound lanes, with one a dual-purpose right turn lane to on-ramp, a 12-foot wide eastbound right turn lane to on-ramp and two, 12-foot wide southbound lanes associated with the on-ramp, with appropriate shoulders and barrier walls.



3.0 Existing Conditions

The proposed Connector Road bridge will cross over I-77 and re-aligned Community Road near mile marker 25.7, roughly 1.5 miles north of the existing interchange of I-77 with US Highway 21 (Wilson Boulevard) and roughly 1.6 miles south of the existing interchange of I-77 with Blythewood Road. The approximate location of the proposed bridge crossing is shown on the *Site Location Plan*, Figure 1 in Appendix I.

At the time of our exploration, the planned alignment, from west to east, was observed to consist of portions of Community Road and I-77, including grassed shoulders and medians, as well as undeveloped woodlands.

The existing Community Road right-of-way in this area consisted of a two-lane, asphalt-paved road with grassed shoulders. Beyond the shoulder to the west and east was a grassed drainage ditch and varying woodlands. The existing I-77 right-of-way in this area consisted of a four-lane, separated asphalt-paved highway with asphalt paved shoulders. The median area is grassed and a drainage ditch was observed near the center of the median. Beyond the shoulders to the west and east was a grassed drainage ditch followed by varying woodlands.

The topographic survey map published by the United States Geological Survey (USGS) was reviewed for ground surface features at the project location. From our review of the Blythewood, South Carolina historical topographic quadrangle map, the site is generally situated along the crest of a ridge. Two unnamed tributaries of Beasley Creek are shown to cross beneath Interstate 77 roughly 2,100 feet south and 3,200 feet north of the bridge site.

4.0 Subsurface Exploration Procedures

As requested, representatives of S&ME were present at the above-referenced site between September 28 and November 16, 2023, to conduct field activities for the project. The exploration included the following:

- Twenty-seven (27) Standard Penetration Test (SPT) borings – EB-1C through EB-6C, IB-1C through IB-11C, W-1 through W-8, EM-1, and EM-2,
- Two (2) undisturbed samples – conducted at offset Boring W-2UD, and,
- One (1) Down-Hole Shear Wave Velocity Test – conducted in Boring EB-1C.

Boring designations reflect the purpose of the borings, as follows:

Table 4-1 – Boring Summary

Purpose	Boring No.
End Bents	EB-1C through EB-6C
Interior Bents	IB-1C through IB-11C
Bridge Embankments	EM-1 and EM-2
Retaining Walls	W-1 through W-8

The boring locations were initially established in the field by representatives of S&ME at the locations submitted to and approved by SCDOT using our hand-held sub-meter GPS unit. Borings were performed in reasonable



proximity to marked location stakes unless they are offset because of slopes, ditches, overhead power, or other obstructions. Subsequent to drilling and abandonment, boring coordinates and elevations were surveyed by CES Group Engineers, LLC (CES) under subcontract to RS&H. A summary of testing locations, including coordinates, elevation, alignment, station and offset are presented in Table 1, *Test Location Summary*, in Appendix II. Surveyed coordinates are tabulated in decimal degree latitude and longitude as well as South Carolina State Plan northing and easting. The coordinates and elevations of the borings tabulated in this report and indicated on the boring records may be considered accurate to the degree of surveying accuracy used by the surveyor.

The following sections summarize the general outline of each test. The field testing data are organized into appendices of this report as follows:

- ◆ Appendix III – Soil Test Boring Records
- ◆ Appendix IV – Down-Hole Shear Wave Velocity Test Results
- ◆ Appendix V – SPT Hammer Energy Reports

4.1 Encroachment Permit

S&ME applied for encroachment along the SCDOT right-of-way along Interstate 77 on June 27, 2023, and received the approved encroachment permit No. 269263 on July 25, 2023. S&ME applied for encroachment along the SCDOT right-of-way along Community Road on June 27, 2023, and received the approved encroachment permit No. 269262 on July 25, 2023.

4.2 Traffic Control

Traffic control for the project was provided by Area Wide Protective (AWP), under subcontract to S&ME, for borings within the existing shoulders of Community Road and along the existing shoulders and median of I-77. Traffic control was performed in accordance with applicable SCDOT Standard Drawings.

4.3 Site Clearing

Clearing was performed by Palmetto State Land Management, under subcontract to S&ME, using a skid steer-mounted forestry grinder to create drill rig access pathways to several of the boring locations located in wooded areas. Trails of approximately 12 to 15 feet wide were cleared with trees chipped in-place. No attempt was made to stack or remove downed trees from the site. Care was taken to limit site disturbance during this process.

4.4 Standard Penetration Test (SPT) Borings

Twenty-seven (27) soil test borings with SPT sampling were performed for the project using four (4) drill rigs during the exploration, as follows.

Table 4-2 – S&ME Drilling Equipment Summary

Rig Make/Model	Serial No.	Carrier Type	Average SPT Energy
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			Transfer Ratio (ETR), %
CME-550X	290593	ATV	91.6%
CME-550X	299403	ATV	91.0%
Diedrich D-50	316	Track	96.8%
CME-550X	293193	ATV	87.6%

SPT hammer energy measurements with a Pile Driving Analyzer (PDA) were performed by S&ME at off-site locations for the drill rigs used on the project in general accordance with ASTM D4633 *Standard Test Method for Energy Measurement for Dynamic Penetrometers*. The SPT Energy test results are provided in Appendix V. 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 boring records in Appendix III.

Soil test borings with SPT sampling were performed using mud rotary drilling techniques. The borings were extended to termination or drill bit refusal depths ranging from 39.4 to 100 feet below the existing ground surface.

Table 4-3 – SPT Boring Summary

Boring No.	Purpose
EB-1C	End Bent 1 Westbound
EB-2C	End Bent 1 Eastbound
EB-3C	End Bent 5 Westbound
EB-4C	End Bent 5 Eastbound
EB-5C	End Bent 6 Southbound (On-Ramp)
EB-6C	End Bent 6 Southbound (On-Ramp)
EM-1	Western Roadway Embankment Eastbound
EM-2	Eastern Roadway Embankment Westbound
IB-1C	Interior Bent 4 Westbound
IB-2C	Interior Bent 4 Eastbound
IB-3C	Interior Bent 4 Eastbound
IB-4C	Interior Bent 3 Westbound
IB-5C	Interior Bent 3 Westbound
IB-6C	Interior Bent 3 Eastbound
IB-7C	Interior Bent 2 Westbound
IB-8C	Interior Bent 2 Westbound
IB-9C	Interior Bent 2 Eastbound (On-Ramp)



Boring No.	Purpose
IB-10C	Interior Bent 7 Southbound (On-Ramp)
IB-11C	Interior Bent 7 Southbound (On-Ramp)
W-1	MSE Abutment Retaining Wall No. 2 North
W-2	MSE Abutment Retaining Wall No. 2 North
W-3	MSE Abutment Retaining Wall No. 2 South
W-4	MSE Abutment Retaining Wall No. 2 South
W-5	MSE Abutment Retaining Wall No. 1 North
W-6	MSE Abutment Retaining Wall No. 1 North
W-7	MSE Abutment Retaining Wall No. 1 South
W-8	MSE Abutment Retaining Wall No. 1 South

Soil sampling and penetration testing were performed in general accordance with ASTM D1586 *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*. SPT was performed in each boring continuously in the upper 10 feet in each end bent, interior bent, abutment wall and embankment boring, followed by approximate 5-foot centers, thereafter. The split-barrel sampler was opened at the drill site and sloughed material was identified and separated from the recovered sample. The recovered sample was visually described and classified by S&ME's rig geologist or engineer. A selected portion of the sample was placed in a sealed moisture-proof container. Where materials changed over the sample drive length, a sample of each material was retained. The containers were labeled and transported to the S&ME Columbia Office at the end of each workday.

Water level measurements were attempted immediately after completion of drilling and, where feasible, were repeated after a period of roughly 24 hours. We note that due to the use of drilling fluid additives in mud rotary borings, the water level readings recorded in the soil borings may not accurately reflect the ground water conditions at the site. Ground water readings were conducted in general accordance with ASTM D4750 *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)*.

After ground water measurements were complete, the borings were backfilled with bentonite chips, auger cuttings or clean fill to within 20 feet of the existing ground surface then abandoned with Portland cement/bentonite grout to the existing ground surface. Grout quantities were recorded, and grout logs are available upon request.

4.5 Undisturbed Samples (Shelby Tubes)

Two (2) relatively undisturbed (UD) samples, or Shelby Tubes, were attempted and recovered at boring location W-2UD located along the northern portion of the MSE Abutment retaining wall No. 2. Sampling was performed in general accordance with ASTM D1587 *Standard Practice for Thin-Walled Tube Sampling of Fine Grained Soils for Geotechnical Purposes*. Shelby tube sample depths were selected by S&ME upon review of the companion SPT log and assigned accordingly.

Shelby Tubes provide sufficiently intact samples for quantitative laboratory testing. Samples were obtained by pushing a 3-inch outer diameter, 16-gauge, steel tube into the soil at the desired sampling intervals in a borehole adjacent to the original SPT location. The tube, together with the encased soil, was carefully removed from the ground and length of the recovered soil measured. The ends of the tube were sealed with microcrystalline wax and labeled with applicable project information before being transported to our laboratory. Shelby tube samples were transported and stored in general accordance with ASTM D4220 for Group C samples.

4.6 Shear Wave Velocity Test by Downhole Method

Upon completion of drilling activities for bridge boring EB-1C, flush-threaded schedule 40 PVC casing was installed, and the annulus grouted in place using a cement/bentonite grout mixture to support shear wave velocity testing.

On October 30, 2023, we performed a downhole seismic survey within boring EB-1C in general accordance with ASTM D7400 *Standard Test Methods for Downhole Seismic Testing*, using a Geometrics seismograph and 14 Hz downhole triaxial geophone. Energy for the seismic survey was generated by a 16-pound sledgehammer striking the end of a wooden plank. Seismic velocities were obtained to a depth of about 97 feet using recorded depth intervals of 3 feet. Data analysis was conducted using the OYO Corporation's SeisImagerTM/SW software (PickwinTM) and the resulting shear wave velocity profile for EB-1C is presented in Appendix IV. After completion of downhole shear wave velocity testing, the top of the PVC casing was cut flush with the ground surface and tremie grouted to the ground surface.

Geophysical Limitations

Regardless of the thoroughness of a geophysical survey, there is always a possibility that actual conditions may not match the interpretations. The results should be considered accurate only to the degree implied by the method used and the method's limitations and data coverage. In addition, site activity (e.g., heavy traffic, etc.) and overhead powerlines can cause noise/interference in downhole seismic data sets.

5.0 Classification of Recovered Soil Samples

Recovered split-spoon samples were initially classified in general accordance with ASTM D2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Method)*. After laboratory testing was completed, provisional field classifications were revised as necessary to provide a soil description that generally follows the terminology given by ASTM D2487 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* and AASHTO M145 *Recommended Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes*.

Interpreted subsurface conditions encountered by the SPT borings are shown on the boring records in Appendix III. These records were compiled in gINT using standard SCDOT template. Interpreted subsurface profiles are provided for the bridge alignment (Figure 3), MSE wall No.1 alignment (Figure 4) and MSE wall No. 2 alignment (Figure 5) in Appendix I. These records represent our interpretation of the subsurface conditions based on the test data. Stratification lines on the boring records represent approximate boundaries between soil types; however, the actual transition may be gradual, and the thicknesses of the strata will vary across the site. The soil samples

will be retained at our laboratory for a period of seven years, or until completion of substructure installation, whichever is earlier.

6.0 Laboratory Physical Tests

Index property testing consisting of Atterberg limits, particle-size distribution, percent finer #200 sieve, and natural moisture content tests were performed on split-spoon samples and undisturbed samples to assist in classifying the soils. Additionally, corrosion series (pH, chloride, sulfate, and resistivity) testing was performed on selected split-spoon samples. Finally, unit weight and consolidated undrained triaxial shear testing were performed on undisturbed samples.

Table 6-1 – Laboratory Testing Table

Test Type	Quantity
Atterberg limits	52
Particle-size distribution	25
Percent-finer 200 sieve	51
Natural moisture content	76
Corrosion Series	6
Unit Weight	1
Consolidated undrained triaxial shear	1

Testing was performed in general accordance with ASTM, AASHTO, or SC state test procedures as follows:

- Atterberg limits – ASTM D4318
- Particle-size distribution – ASTM D6913
- Percent-finer 200 sieve – ASTM D1140
- Natural moisture content – ASTM D2216
- Corrosion Series:
 - pH – AASHTO T289
 - Chloride – AASHTO T291
 - Sulfate – AASHTO T290
 - Resistivity – AASHTO T288
- Unit Weight – ASTM D2166
- Consolidated undrained triaxial shear – ASTM D4767

Tables summarizing the laboratory test results are provided after this report as follows:

- gINT Summary of Laboratory Test Results,
- Table 2: Undisturbed Samples – Laboratory Classification & Shear Strength Testing Summary

The laboratory test data sheets are organized into appendices of this report as summarized below:



- Appendix VI – Laboratory Test Data Sheets – Split Spoon Samples (includes gINT Index Properties vs. Depth, Grain Size Distribution, and Atterberg Limits Results)
- Appendix VII – Laboratory Test Data Sheets – Corrosion Series Testing
- Appendix VIII – Laboratory Test Data Sheets – Undisturbed Samples

Electronic data files, including gINT project files are included as Appendix X.

7.0 Subsurface Conditions

Assessment of the geotechnical conditions included review of available topographic, geologic and soils maps for relevant information.

7.1 Area Geology

From our review of the *Geologic Map of the Blythewood Quadrangle, Richland and Fairfield Counties, South Carolina 1962*, prepared by the South Carolina Geological Survey, the site maps as being location along the fall-line separating the Coastal Plain and Piedmont physiographic providences of South Carolina.

The site maps as lying within the White Sand Hills Physiographic Region of the Upper Coastal Plain of South Carolina. The White Sand Hills form the most inland portion of the Coastal Plain and are underlain by mostly sandy Upper Cretaceous age sediments of the Cape Fear and Eutaw formations. These soils were eroded from a range of mountains in the northwest portion of the state approximately 65,000,000 years ago and laid down in their present positions as fan deposits, where they have weathered in place. In the Columbia metropolitan area these sediments rest unconformably on top of the underlying late-Proterozoic age Piedmont rocks of the Persimmon Fork formation at depths of between 20 and 120 feet. Massive, buff, or tan kaolin beds are prevalent throughout the sequence, alternating with coarse-grained water-bearing sands and gravels which become increasingly prevalent near the base of the formation. Soil layers exhibit considerable lateral and vertical discontinuity. In many areas groundwater is relatively shallow and supports heavy forest cover. Fresh soil exposures are typically white, but become pink, purple, or rusty orange with weathering. Iron-oxide cemented sandstone beds are common. In the local area, Coastal Plain sediments have been deeply eroded, exposing underlying Piedmont residuum and weathered rock in some of the deeper swales and depressions.

The underlying Piedmont residuum consists of soils weathered in place from the parent crystalline bedrock material. Residual soils of the Carolina Piedmont consist of stiff or very stiff micaceous silts and clays, grading to firm sands with depth. These soils have been completely weathered in place from the parent bedrock material, and consist, mostly of fine grained schists and phyllites of the Carolina Slate Belt. There are a number of volcanic intrusive sills or dikes comprised of diabase, where hard rock lies within a few feet of the surface. Elsewhere the soil residuum retains nearly all of the relict rock foliation or bedding structure below a depth of a few feet. Soil strength derives largely from relict intermolecular bonding and remolded materials generally exhibit lower shear strength than do undisturbed samples. Piedmont soils are normally consolidated to slightly over-consolidated.

The term *partially weathered rock (PWR)* is applied to very dense micaceous sands or silty sands of the Carolina Piedmont, which register SPT N-values in excess of 100 blows per foot. PWR generally varies widely within even small areas owing to minute differences in the chemical properties of the parent bedrock, which results in widely



varying rates of weathering. Isolated lenses or seams of PWR often are present within Piedmont Residuum well above the overall PWR level within a given area. PWR is considered excellent bearing material for foundations and is relatively incompressible except in highly stressed deep foundations.

Subsequent geologic processes may mask the contact between the Piedmont and Coastal Plain over localized areas. Over geologic time erosion of the Coastal Plain and Piedmont sediments has occurred from higher elevations, with the eroded materials deposited as Quaternary-aged alluvial sediments along streams, rivers, and their associated floodplains. In most cases the recent alluvial sediments are soft and compressible since they have never been consolidated under loads in excess of their own weight.

It appears that portions of the natural geological profile of the site have been modified by past grading activities that appear to have resulted in the placement of fill and the disturbance of the near surface soils. Please keep in mind that fill and disturbed soils can vary in composition and consistency, and the engineering characteristics of these soils can be difficult to predict. There is no specific correlation between the degree of compaction of the existing fill or the amount of disturbance of the near surface soils from the results of standard penetration testing. However, a qualitative assessment of existing fill and the disturbed soils can often be made based on visual observation of these materials sampled in the borings/test pits and the general magnitude of the standard penetration test values and difficulty of excavation.

7.2 Soil and Rock Stratification

The generalized subsurface conditions at the site are described below. Interpreted subsurface cross-sectional profiles are attached as Figures 3 through 5 in Appendix I. The discussed subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring records included in Appendix III should be reviewed for specific information at each boring location. The depth and thickness of the subsurface strata indicated on the boring records was estimated based on the drill cuttings and the samples recovered. The transition between materials may be more gradual than indicated on the boring records. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. Variations may occur and should be expected at locations remote from the boring. The stratification lines were used for our analytical purposes and, unless specifically stated otherwise, should not be used as the basis for design or construction cost estimates.

A summary of the stratification across the project area is provided below.

Table 7-1 – Soil Stratification Table

Geotechnical Strata Designation	USCS Soil Class	Average Depth Interval Range (ft)	Elevation Interval Range (ft MSL)	Range of Raw SPT N-values (bpf)
Existing Fill	SM, SC, CL	0 to 6	466.3 to 447.8	3 to 32
Alluvium (boring W-2 only)	SC	4 to 10	447.8 to 441.8	3
Upper Cretaceous Coastal Plain	SP-SM, SM, SC, ML, CL, CH	0 to 28	462.0 to 435.1	4 to 50/2"



Piedmont Residuum	GM, ML, CL, MH	23 to 98	445.6 to 416.8	17 to 85
Partially Weathered Rock	ML	13 to 100	440.6 to 354.8	50/5" to 50/1"

7.2.1 *Surface Material*

Surface material, in the form of topsoil, was encountered at the existing ground surface at most soil boring locations. Existing topsoil thicknesses typically ranged from roughly ½ to 6 inches.

7.2.2 *Existing Fill*

Existing fill was encountered along the alignment in the vicinity of existing Community Road and I-77 Southbound (interior bents 2, 3 and 7, end bent 6, and MSE wall No. 2) to depths ranging from less than 1 foot to about 6 feet. Existing fill consisted of silty sands (SM), clayey sands (SC), and sandy lean clays (CL).

Recovered samples were dry to moist to the touch and were varying hues of brown, red, yellow, gray, and white. SPT N-values ranged from 3 to 32 blows per foot (bpf), indicating very loose to dense relative densities in sandy soils and very stiff consistency in clayey soils.

7.2.3 *Alluvium*

Alluvium was encountered at boring W-2 to a depth of roughly 10 feet below the existing ground surface. The alluvial deposits consisted of clayey sands (SC) and contained organics and fine gravels.

Recovered samples were dry to wet to the touch and were varying hues of gray. SPT N-values ranged of 3 bpf, indicating very loose relative densities.

7.2.4 *Upper Cretaceous Coastal Plain Deposits*

Coastal Plain deposits were encountered across the project area to depths ranging from roughly 9½ feet to 28½ feet below the existing ground surface. Coastal Plain deposits consisted of sands with varying amounts of fines (SP-SM, SM and SC) and low to high plasticity fines with varying amounts of sands (ML, CL and CH).

Recovered samples were dry to moist to the touch and were varying hues of olive, brown, red, yellow, gray, and white, pink, and black. SPT N-values ranged from 4 to 50/2" bpf, indicating very loose to very dense relative densities in sandy soils and soft to very hard consistencies in clayey and silty soils. Higher penetration resistances within the Coastal Plain deposits are likely due to the presence of gravels and/or cemented layers.

7.2.5 *Piedmont Residuum*

Beneath the native Coastal Plain deposits, the borings across the project area encountered Piedmont residual soils to depths ranging from roughly 13½ to 100 feet below the existing ground surface. Piedmont residuum consisted of low to high plasticity fines with varying amounts of sands (ML, CL and MH) with isolated silty gravel with some low plasticity fines (GM).



Recovered samples were dry to moist to the touch and were white, red, yellow, pink, brown, green, gray, and olive in color. SPT N-values ranged from 17 to 85 bpf, indicating medium dense to very dense relative densities in sandy soils and very stiff to very hard consistencies in silty and clayey soils.

7.2.6 Partially Weathered Rock (PWR)

Partially weathered rock (PWR) was predominately encountered lowermost beneath the Piedmont residuum soils to the termination depths of our borings. Intermittent seams of residuum soils also were encountered within the PWR layer. PWR is defined as a very dense or very hard residual material exhibiting SPT N-values in excess of 100 bpf.

Recovered samples of PWR consisted mostly of silts with varying amounts of sands (ML). Split-spoon samples were dry to wet to the touch and were yellow, pink, white, brown, black, olive, red, green, gray, and blue in color.

7.2.7 Ground Water

Observation of ground water in the borings was not possible at time of drilling due to the mud rotary drilling techniques used to advance the boreholes. Depth to ground water was measured in most boreholes at least 24 hours after completion of drilling. These measured ground water depths ranged from about 9 to 30 feet below the existing ground surface (approximate elevation +436 feet to +451 feet). Depth to ground water was not reported at 24 hours in borings EB-1C and EB-6C.

7.3 Shear Wave Velocity Measurement

Shear wave velocity measurements were made using DHSW methods within the cased borehole of EB-1C. The shear wave velocity profile depicted resolves into vertical intervals of roughly 3 feet. Velocity measurements were obtained to a depth of about 97 feet below the existing ground surface. A best-fit profile determined from the scatter of the data may be expressed as a shear wave velocity ranging from about 1,000 feet per second (fps) within the upper 5 feet, then increasing to about 2,750 fps around roughly 17 feet to 20 feet, then decreasing to values ranging between 2,100 and 2,600 fps to a depth of roughly 40 feet, then increasing to values ranging between about 3,000 fps to about 3,600 fps to a depth of roughly 65 feet and then between 2,740 fps to about 3,200 fps to near termination.

8.0 Seismic Design

8.1 Acceleration Design Response Spectrum (ADRS)

The results of the DHSW testing at this bridge, as well as testing conducted at the Ramp BA bridge over I-77, and US-21 bridge over Norfolk Southern Railroad were provided to the SCDOT Design/Build RPG for the purposes of establishing seismic design parameters for the overall project. The 3-Point Acceleration Design Response Spectrum (ADRS) provided by the SCDOT for the I-77 Exit 26 Project is included in Appendix IX. The overpass bridge was provided to have a bridge Operational Classification (OC) of "II" (OC II). The bridge embankment, defined as the portion of the approach embankment including the front slope plus 3.25 times the backwall height measured from the end of the approach slab, would extend approximately 33 feet beyond the end of approach



slab, or roughly 53 feet beyond the end bents on each abutment based on the Conceptual Bridge Plans. Roadway embankments beyond the bridge embankment do not require seismic hazard analyses.

The SCDOT Geotechnical Design Section provided pseudo spectral accelerations (PSA) for the Safety Evaluation Earthquake (SEE) (3% probability of exceedance in 75 years) and the Functional Evaluation Earthquake (FEE) (15% probability of exceedance in 75 years). These values were provided for the geologically realistic condition, 5% critical damping, and the peak ground acceleration (PGA) at the B-C boundary. The 3-point method was utilized to generate the ADRS curves provided in Appendix IX. The design parameters derived from these curves are detailed in the table below.

Table 8-1 – Seismic Design Parameters

Seismic Design Parameter	Acceleration (g)
PGA ^{-FEE}	0.20
SDS ^{-FEE}	0.32
SD1 ^{-FEE}	0.06
PGA ^{-SEE}	0.41
SDS ^{-SEE}	0.77
SD1 ^{-SEE}	0.16

Seismic Design Category (SDC) designation of a structure from A to D determines the level of analysis and detailing required. SDC is determined by the bridge operational classification (OC) and the design spectral response acceleration for the SEE event at the one-second period. The long period acceleration SD1^{-SEE} is < 0.30 g. Per Table 3.5 of the SCDOT *Seismic Design Specifications for Highway Bridges (2008)*, Seismic Design Category (SDC) based on these parameters for an OC Level II structure is A.

8.2 Preliminary Seismic Evaluation

In order to evaluate the need for ground improvement, the potential for soil liquefaction and soil strength loss (SSL) were examined for sand-like cyclic liquefaction potential and clay-like cyclic softening utilizing screening procedures outlined in GDM Chapter 13. This methodology was used to determine lateral displacement and one-dimensional reconsolidation settlement of liquefied soils due to seismic loads. Soils above the water table, which includes portions of the existing fill, alluvium, Coastal Plain deposits and Piedmont, were considered as unsaturated and non-susceptible. Due to the geologic age, density and consistency of the Coastal Plain deposits, Piedmont residual soils and partially weathered rock (PWR), these soils were also considered non-susceptible.

Very loose alluvial clayey sands located below the water table were encountered in boring W-2 only. This boring was located in the vicinity of the northern portion of the planned abutment retaining wall at End Bent 5, offset approximately 40 feet east from the face of the wall. These alluvial soils due to their relatively young geologic age and relative density will likely be susceptible to sand-like liquefaction and resulting volumetric compaction. As the boring was offset somewhat from the planned wall, additional subsurface data may be necessary in this area to further explore the vertical and lateral extent of the alluvial deposits. With the exception of the isolated retaining wall area above, SSL does not appear to be a credible hazard with respect to the proposed bridge construction.



9.0 Design and Construction Considerations

Chapter 21 of the SCDOT GDM provides that the GBR should provide limited (preliminary) geotechnical information on a D/B project, thus permitting the contractor to bid on the project with a certain degree of knowledge and acceptable risk. The preliminary design and construction considerations submitted herein are based, in part, upon data obtained from our field exploration and laboratory testing program. Subsurface conditions across the site will vary, as will grading and construction details. Additional geotechnical exploration and analysis may be required to provide detailed analysis and recommendations for the project.

9.1 Drilled Deep Foundations

Drilled shaft foundations are possible for support of the bridge interior bents. We anticipate that drilled shafts for the bridge could range from 36 to 60 inches in diameter. Due to the subsurface conditions encountered, we anticipate that the drilled shafts will be socketed into the underlying PWR to provide the required axial and lateral resistance.

Bedrock was not encountered at the boring locations for this portion of the project. Therefore, difficult drilling and deeper penetration into the PWR may be required to achieve proper bearing and lateral stability for the bridge foundations. Individual shafts may encounter ledges, boulders or seams of relatively hard rock within the PWR zone overlying competent bedrock, which may require special measures to permit advancement to the required bearing.

Due to the ground water conditions encountered in our borings, we anticipate drilled shafts will be installed using the wet method of construction with casing described in SCDOT Standard Specification Section 712.4.5. Steel casing should be advanced and seated into the top of PWR or rock to provide an effective seal. If an effective seal is established, the drilled shaft contractor may be able to effectively dewater the hole and maintain the stable bottom until concrete is placed. However, if the casing penetrates to less competent material and an effective seal is not obtained, or if the competent material does not extend over the entire base of the drilled shaft, it is likely that the water head in the deeper shafts will cause severe softening and necessitate additional depth of drilling to reach a stable bottom. In this case, wet construction installation methods using a drilling slurry as described in SCDOT Standard Specification Section 712.4.5 may be required to stabilize the hole and allow placement of concrete.

The overburden soil materials consisting of the existing fill, Coastal Plain deposits and Piedmont residual soils can typically be excavated with a conventional earth auger. PWR or very poor to poor quality rock will necessitate use of a rock auger advanced by a large foundation drilling rig. Contractor should be required to provide augering equipment with adequate torque and power to install drilled shafts through very dense PWR and very poor to poor quality rock using augers with hardened tungsten carbide bits. The speed of excavation depends upon the type of material being penetrated, size of foundation element and size of the drilling rig. Individual shafts may encounter ledges, boulders or seams of relatively hard rock within the partially weathered rock zone overlying competent bedrock. Specialized drilling equipment may be required due to the observed PWR consistencies, depending on required penetration depths. This may include, but not be limited to rock augers, core barrels, or rotary percussion drilling equipment.



Ground water control is important during construction of drilled shafts. Due to the observed ground water along the bridge alignment, ranging from roughly 9 to 30 feet below the existing ground surface, it may be necessary to use telescoping casing installation methods to achieve the planned casing tip elevations.

9.1.1 Resistance Criteria

Axial resistance will likely govern the geotechnical foundation design and be developed in end bearing in the underlying PWR, as well as side resistance in the uncased portion of the shaft. Development of lateral resistance of the drilled shafts should be achievable in the Piedmont residuum and underlying PWR.

9.2 Driven Deep Foundations

Driven steel H-pile foundations are typically preferred for end bent support by SCDOT. Piles are anticipated to bear on/within very dense/very hard PWR. Driven steel H-piles are advantageous due primarily to their relative cost and ease for pile splicing and cutting. Piles are commonly paid for on an "in-place" basis and no charge is made for the length of steel cut off. The principal disadvantage associated with steel H-piles are their relatively small tip areas, which can result in very small end bearing resistance in residual soils since formation of a soil plug cannot be counted on in all cases to help with end bearing capacity development, hence piles will need to extend to sufficient depth to bear on/within PWR or rock. Nominal pile resistance will be essentially the allowable stress of the steel pile cross sectional area in this case.

9.2.1 Driving Considerations

The contractor should take care not to overdrive or overstress the piles during driving. Prior to installing piles, a wave equation analysis should be performed to evaluate whether the Contractor's proposed driving system (i.e., hammer type and size) is capable of efficiently driving the piles to the desired depths without damaging the piles, and to establish driving criteria. Per the GDM, practical refusal is defined as 5 blows per quarter ($\frac{1}{4}$) inch or 20 blows per inch. Steel pile compressive stresses during driving should not exceed 0.9 times the yield strength of the steel section during driving. Because the PWR and argillite bedrock is anticipated to be very hard, we recommend that the piles be equipped with driving points or shoes to protect the pile from damage during driving. Due to the presence of very dense gravelly or cemented layers within the Coastal Plain deposits on both the east and west sides of the bridge, pre-drilling and/or penetration aids may be needed to facilitate pile installation.

9.2.2 Resistance Criteria

Axial resistance will likely govern the geotechnical foundation design and be developed in end bearing on the underlying PWR with some contribution from skin friction in the soils above the pile tip elevation. Development of lateral resistance of the pile foundations should be achievable in the Coastal Plain soils, Piedmont residuum and underlying PWR, however, adequate depth for lateral resistance may require pre-drilling and/or penetration aids as previously discussed.



9.3 Roadway Embankments

Fill embankments of up to approximately 29 feet in height supported by MSE walls at the abutments will be required to achieve planned grades. Fill slope areas should be prepared, and fill materials placed, in accordance with the SCDOT *Standard Specifications for Highway Construction*.

9.3.1 Undercutting/Surface Stabilization

The majority of the split-spoon samples obtained just below the ground surface were typically classified as silty and clayey soils ranging from A-2-4 to A-6 using the AASHTO classification system which typically provide a suitable subgrade for fill placement. Select penetration resistances in the upper 2 to 4 feet indicated very loose to loose conditions in the sandy soils. Therefore, some stabilization of the near surface sandy soils may be required prior to fill placement. This can typically be accomplished with a vibratory roller and is standard practice under the SCDOT *Standard Specifications for Highway Construction*.

9.3.2 Imported Fill/Borrow

As the site is located in Blythewood, Richland County, South Carolina, Group B, per Section 203.2.1.8 of the SCDOT *Standard Specifications for Highway Construction*, would apply to borrow soils allowed for use as fill.

9.3.3 Slope Stability

Although planned slopes are typically shown at 2H:1V to 3H:1V on the conceptual plans, global stability of both cut and fill slopes will need to be evaluated as part of design development by the successful team due to the height of the slopes. Per SCDOT GDM, embankments constructed within the limits of the bridge embankment must be designed and evaluated under both service and extreme event limit states, while the remaining roadway embankments will only require service limit state evaluation.

9.3.4 Compression and Settlement

Since portions of the alignment will have fill heights in excess of 29 feet, long term differential settlements resulting from even minor volume changes in the fill (measured in percent of fill height) could be substantial and must be accounted for in design. Therefore, the performance objectives of the GDM and project team should consider the potential for these settlements in evaluation efforts.

Immediate settlements include self-weight compression of the fill mass during and immediately following fill placement. Typically, in sandy alluvial soils, Upper Cretaceous Coastal Plain deposits and Piedmont residuum, these settlements are built out during placement of successive lifts and do not contribute substantially to post construction settlement. However, depending on sequence of construction of end bent piles, MSE walls or other ERS structures self-weight compression may be applicable to downdrag calculations or to wall settlements. Contractor design submittals will need to address how initial compression of soils placed around structures will be accommodated.

In most areas explored, a majority of settlements are anticipated to occur during construction, prior to paving operations, because soils providing support for the new fill consist of mostly existing sandy alluvial and Coastal



Plain deposits with layers of very stiff to hard silts and clays. Compression due to consolidation under these conditions is anticipated to be rapid and indistinguishable from immediate settlement. Therefore, it is not expected that post construction settlements will exceed performance objectives. Compression/consolidation testing was not performed at this time, therefore, depending on the performance objectives, additional testing consisting of, but not necessarily limited to, laboratory consolidation testing or in-situ testing by cone penetration or flat-blade dilatometer soundings may be required by the D/B Contractor.

9.4 Earth Retaining Structures

As discussed, MSE retaining walls are planned at the following locations:

- MSE Wall No. 1 – Connector Road Bridge western embankment along Community Road at roughly Station 146+34,
- MSE Wall No. 2 – Connector Road Bridges eastern embankment along I-77 Northbound at roughly Station 149+69, and
- MSE Wall No. 3 – CONRPC Entrance Ramp embankment at roughly Station 1730+34.

Per the GDM, earth retaining structures must be designed and evaluated for internal and external stability. Abutment walls at the end bents of the overpass must be designed for internal stability and external stability, including bearing capacity, overturning, sliding and global stability, under service and extreme event limit states. MSE walls at the bridge abutments will have end bent deep foundations within the reinforced zone, therefore, construction sequencing and protection of the reinforcement around the piles should be considered. Deep foundations installed prior to MSE wall fill placement may be subjected to downdrag forces caused by immediate and consolidation settlements.

9.5 Vibration Monitoring Assessment

Per the requirements of Table 24-6 of the GDM, it does not appear that vibration monitoring will be required. The planned bridge, retaining wall, and bridge embankment construction does not appear to be located within the distances from potential receptors that would require monitoring.

9.6 Corrosion Potential Results

Corrosion series testing was performed to determine the potential for material deterioration of the proposed foundations. Six (6) composite samples were taken from selected recovered samples of Borings EB-2C, EB-3C, EB-5C, IB-1C, IB-7C, and IB-11C to perform pH, resistivity, sulfate, and chloride geochemical tests. These borings are representative of end and interior bents along the alignment. The samples were selected based on their proximity to the estimated soil/pile/ground water interface elevation.

Table 9-1 – Summary of Corrosion Series Testing

Sample	Depth (feet)	Minimum Resistivity (ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)	pH
EB-2C (SS-8)	23.5-25	56,950	21.7	49.3	6.9



EB-3C (SS-6)	13.5-15	34,840	30.6	77.1	6.0
EB-5C (SS-10)	33.5-35	67,000	27.2	62.9	7.0
IB-1C (SS-6)	13.5-15	40,200	43.1	105.7	5.7
IB-7C (SS-7)	18.5-20	67,000	25.4	75.7	5.6
IB-11C (SS-7)	18.5-20	58,290	26.5	59.9	6.8

The complete laboratory testing results of the corrosion series testing are provided in Appendix VII.

Section 7.18 of the GDM provides guidance on determining corrosion potential or aggressiveness. The following soil conditions from GDM Table 7-34 suggest aggressive conditions:

- pH less than 5.5;
- Sulfate concentrations greater than 1,000 ppm (mg/kg); and
- Resistivity less than 2,000 ohm-cm.

Therefore, the site appears to be non-aggressive for foundations. However, interpretation of the data and corrosion protection of structural components shall be reviewed and provided by the structural engineer during the design phase of the project.

10.0 Closing

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

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

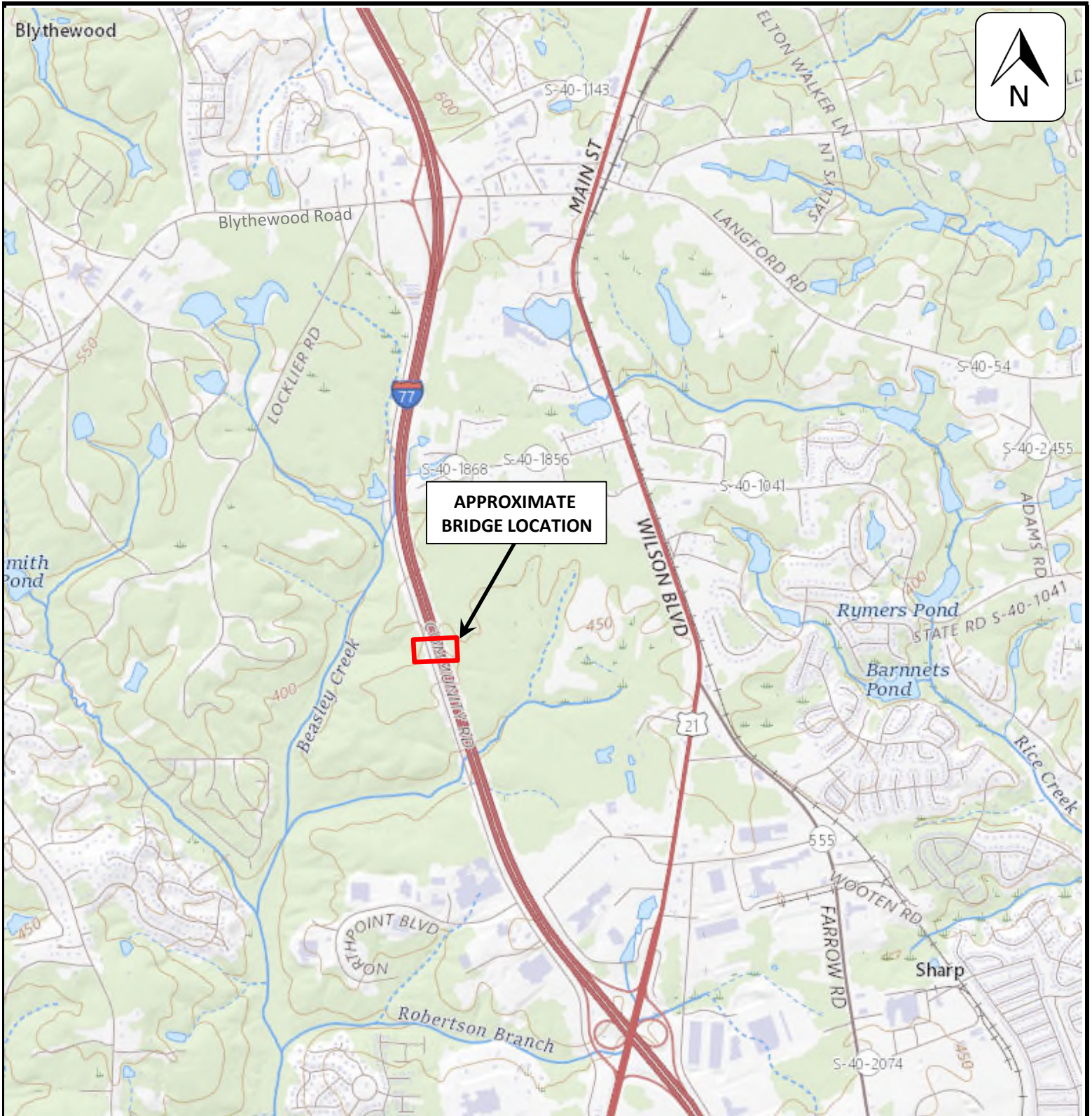
S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are



contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Appendices

Appendix I – Figures



SOURCE: USGS National Map



SITE LOCATION PLAN

JOB NAME: Connector Road Bridge over I-77
I-77 Exit 26 Interchange

CITY, STATE: Blythewood, Richland County, South Carolina

S&ME PROJECT NO.: 23610178A

FIGURE NO.

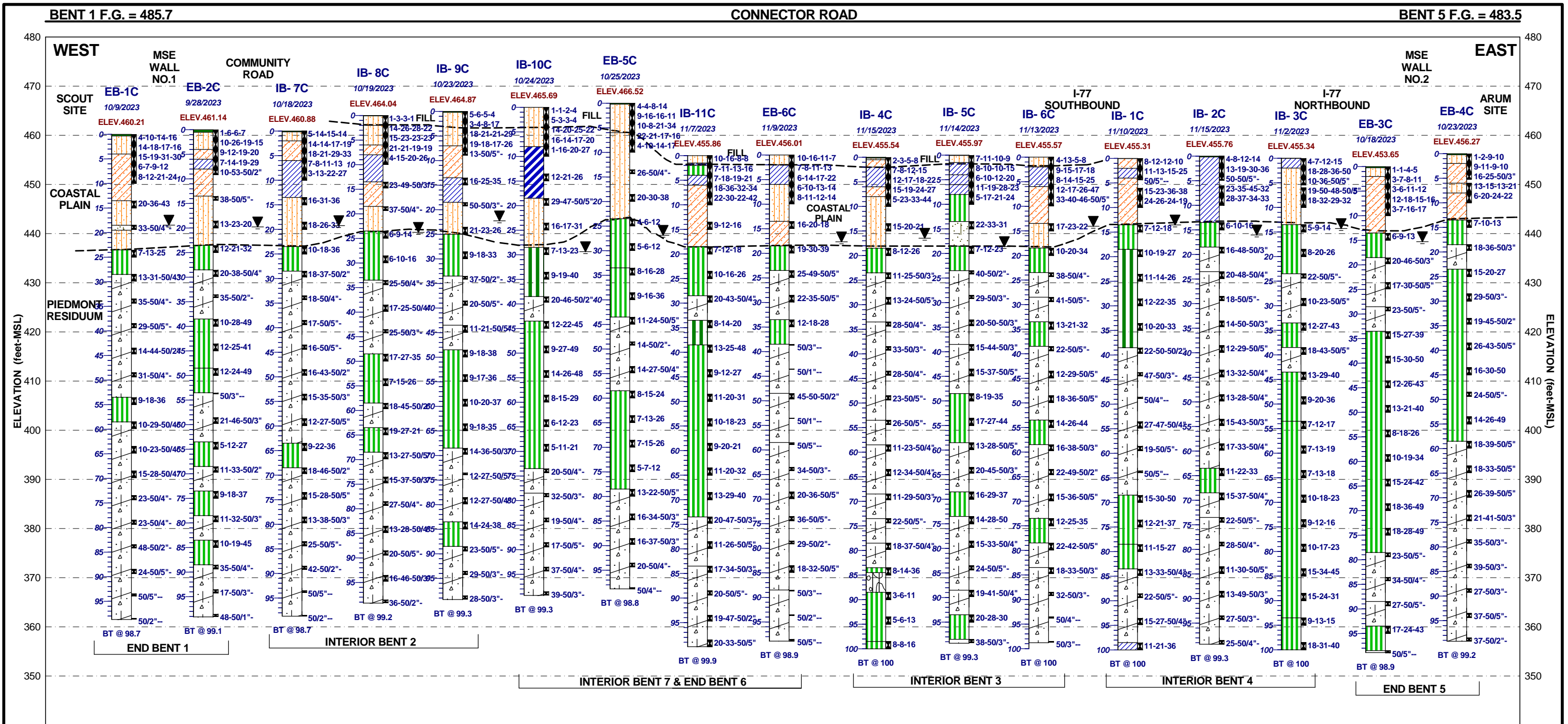
1

SCALE: NTS

CHECKED BY: JPL

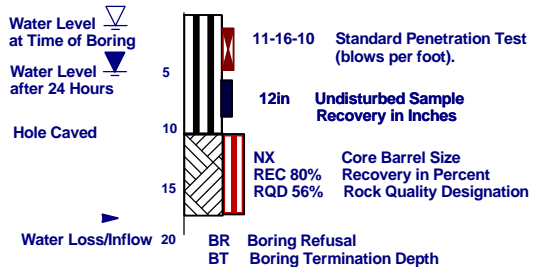
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DRAWN BY: HMS

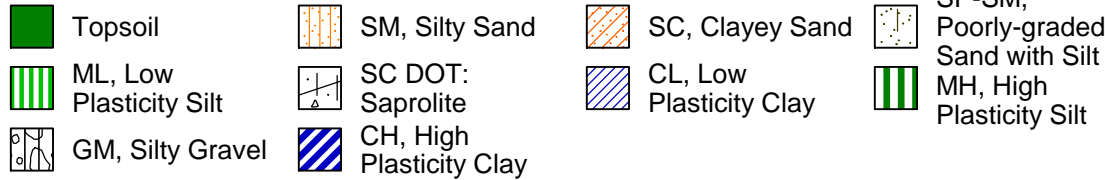


SOIL TEST BORINGS

B-3 Boring Number
123.0 Elevation at GS



LEGEND OF MATERIAL GRAPHICS FOR SOIL TEST BORINGS



SUBSURFACE PROFILE

PROJECT: Connector Road Bridge over I-77

LOCATION: Blythewood, Richland County, SC

FIGURE: 3

JOB NO: P042443-B01

S&ME 23610178A

DATE:

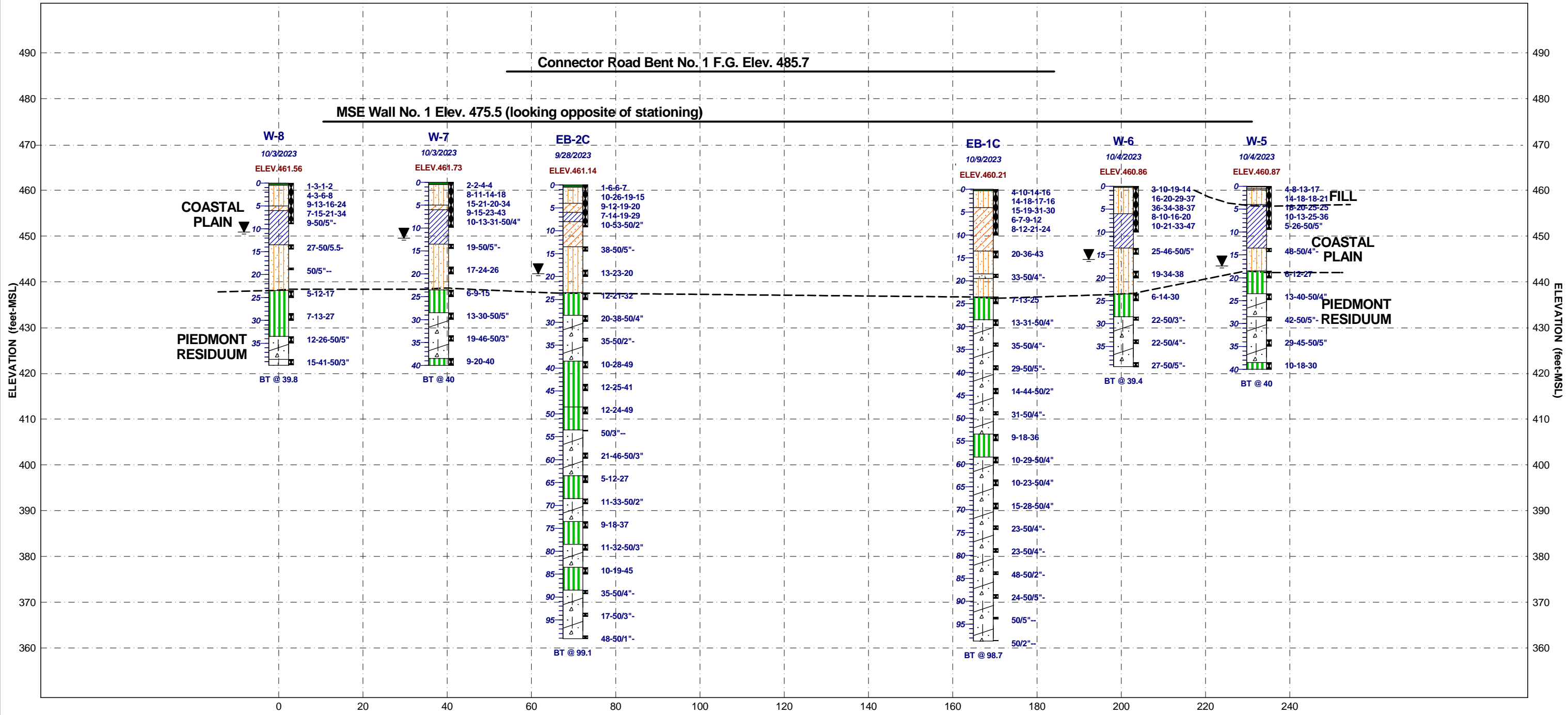
January 2024



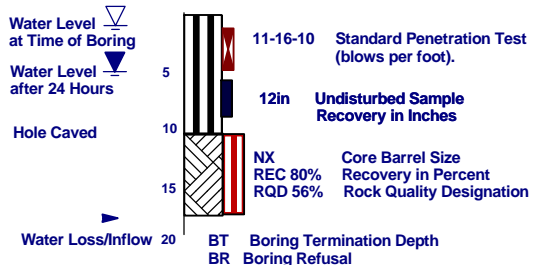
The depicted stratigraphy is shown for illustrative purposes only and is not warranted. Separations between different strata may be gradual and likely vary considerably from those shown. Profiles between nearby borings have been estimated using reasonable engineering care and judgment. The actual subsurface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

SOUTH

NORTH



SOIL TEST BORINGS



LEGEND OF MATERIAL GRAPHICS FOR SOIL TEST BORINGS

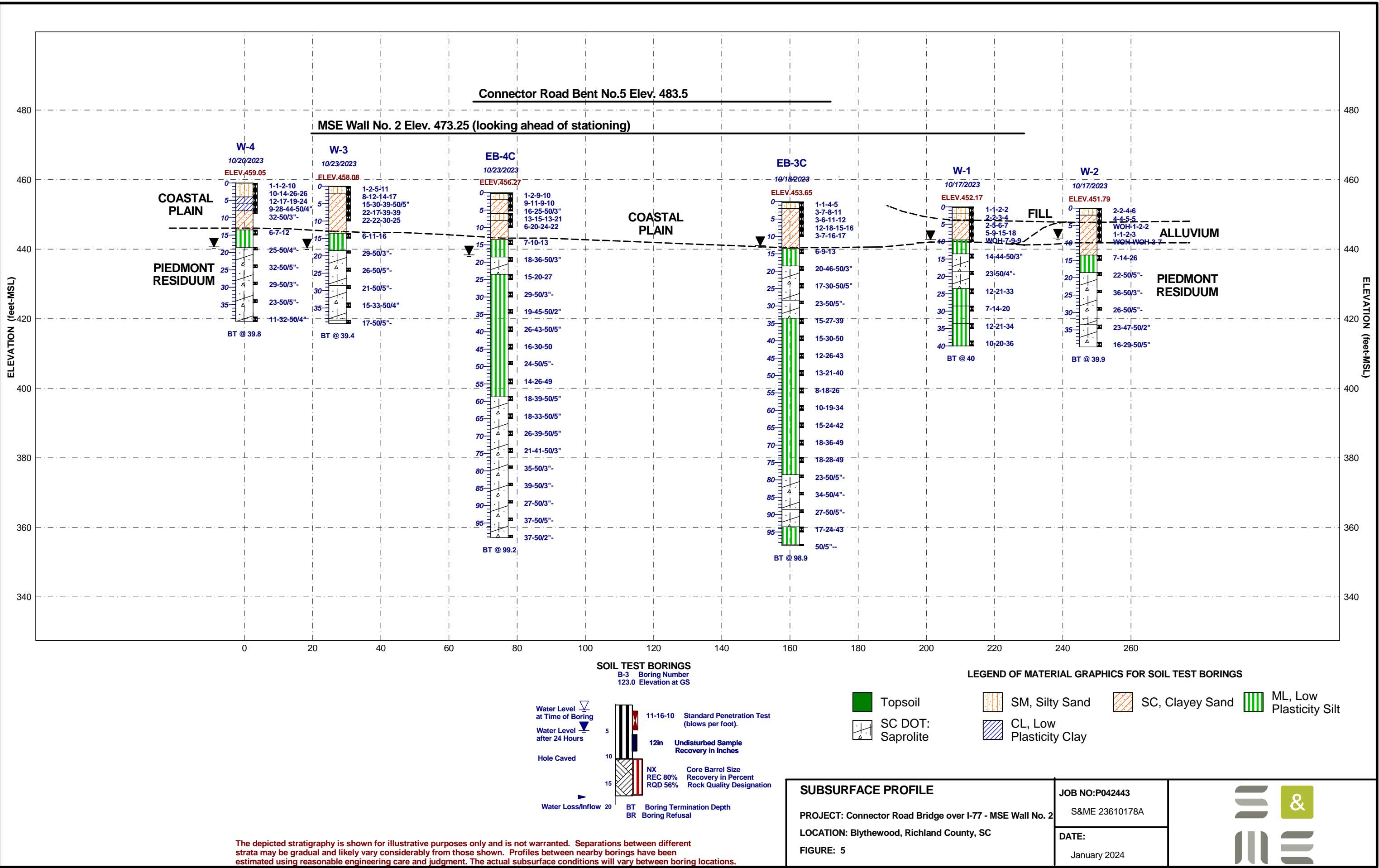
- Topsoil
- ML, Low Plasticity Silt
- SM, Silty Sand
- SC DOT: Saprolite
- SC, Clayey Sand
- CL, Low Plasticity Clay
- SP-SM, Poorly-graded Sand with Silt

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.

SUBSURFACE PROFILE
PROJECT: Connector Road Bridge over I-77 - MSE Wall No.1
LOCATION: Blythewood, Richland County, SC
FIGURE: 4

JOB NO: P042443
S&ME 23610178A
DATE:
January 2024





Appendix II – Tables



Table 1: Boring Location Summary

Test ID	SC State Plane Northing (ft.)	SC State Plane Easting (ft.)	Latitude (degrees)	Longitude (degrees)	Elevation (ft-NAVD88)	Alignment	Station	Offset (ft)
EB-1C	857824.4801	2004705.038	34.19106	-80.98444	460.2	Connector Rd	146+03.10	-41.8
EB-2C	857707.6487	2004740.711	34.19074	-80.98432	461.1	Connector Rd	146+01.12	80.3
EB-3C	857947.6434	2005087.268	34.19140	-80.98318	453.7	Connector Rd	150+04.68	-41.5
EB-4C	857866.9345	2005115.233	34.19118	-80.98308	456.3	Connector Rd	150+06.47	43.9
EB-5C	857679.1745	2004878.973	34.19067	-80.98387	466.5	Connector Rd	147+23.93	149.9
EB-6C	857693.9224	2004919.687	34.19071	-80.98373	456.0	Connector Rd	147+67.20	148.4
EM- 1	857728.4249	2004659.089	34.19080	-80.98459	458.6	Connector Rd	145+29.84	35.5
EM- 2	857955.704	2005144.865	34.19143	-80.98299	452.4	Connector Rd	150+61.97	-31.4
IB- 1C	857902.4187	2004958.401	34.19128	-80.98360	455.3	Connector Rd	148+68.15	-38.1
IB- 2C	857857.2285	2004973.005	34.19115	-80.98355	455.8	Connector Rd	148+68.15	9.4
IB- 3C	857810.7103	2004988.218	34.19103	-80.98350	455.3	Connector Rd	148+68.32	58.4
IB- 4C	857887.3402	2004858.218	34.19124	-80.98393	455.5	Connector Rd	147+68.19	-54.5
IB- 5C	857842.3156	2004872.049	34.19111	-80.98389	456.0	Connector Rd	147+67.50	-7.4
IB- 6C	857801.726	2004886.164	34.19100	-80.98384	455.6	Connector Rd	147+68.45	35.5
IB- 7C	857865.5314	2004809.165	34.19118	-80.98410	460.9	Connector Rd	147+14.80	-48.9
IB- 8C	857812.477	2004828.854	34.19103	-80.98403	464.0	Connector Rd	147+17.23	7.7
IB- 9C	857765.6801	2004846.023	34.19090	-80.98397	464.9	Connector Rd	147+19.17	57.5
IB-10C	857722.9571	2004860.803	34.19079	-80.98393	465.7	Connector Rd	147+20.10	102.7
IB-11C	857727.5795	2004909.586	34.19080	-80.98376	455.9	Connector Rd	147+67.94	113.3
W- 1	857995.7737	2005073.872	34.19154	-80.98322	452.2	Connector Rd	150+06.74	-91.4
W- 2	858033.7625	2005069.856	34.19164	-80.98323	451.8	Connector Rd	150+14.60	-128.8
W- 3	857823.3911	2005134.903	34.19106	-80.98302	458.1	Connector Rd	150+11.80	91.4
W- 4	857796.1012	2005139.3	34.19099	-80.98300	459.1	Connector Rd	150+07.59	118.7
W- 5	857888.4762	2004685.494	34.19124	-80.98450	460.9	Connector Rd	146+04.18	-108.7
W- 6	857856.3829	2004693.853	34.19115	-80.98448	460.9	Connector Rd	146+02.27	-75.6
W- 7	857686.7333	2004746.157	34.19069	-80.98430	461.7	Connector Rd	145+99.87	101.9
W- 8	857670.9937	2004751.725	34.19064	-80.98429	461.6	Connector Rd	146+00.33	118.6

Notes: As-built coordinates and elevation provided by CES.
NA = NOT AVAILABLE



Table 2: Undisturbed Samples - Laboratory Classification, Unit Weight, & Shear Strength Testing Summary

Boring Number	Sample Number	Sample Depth (ft)	Test Type	Atterberg Limits		Percent Finer #200 (%)	Organic Matter Content (%)	USCS	AASHTO	Specific Gravity	Test Specimen Number	Initial Dry Unit Weight (pcf)	Initial Moisture Content (%)	Shear Strength Parameters			
				LL	PI									Total		Effective	
														c (ksf)	ϕ (degrees)	c' (ksf)	ϕ' (degrees)
W-2	UD-1	5-7	ASTM D4767	25	12	29.2	TNP	SC	A-2-6(0)	2.65	1	113.7	5.1	0.297	21	0	34
											2	117.7	6.9				
											3	109.3	6.5				
W-2	UD-2	7-9	ASTM D7263	18	4	42.6	TNP	SC-SM	A-4(0)	TNP	N/A	115.3	14.0	TNP	TNP	TNP	TNP

NP = Non-plastic

TNP = Test Not Performed



SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 3

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
EB-1C	0.0				4.75	27		2.0			
EB-1C	4.0				0.075	34		11.4			
EB-1C	23.5	44	33	11	0.075	87	ML	25.0			
EB-2C	0.0				4.75	20		4.1			
EB-2C	4.0	40	22	18	0.075	34	SC	12.9			
EB-2C	6.0	40	22	18	0.075	79	CL	23.2			
EB-2C	18.5	NP	NP	NP	0.075	20	SM	12.0			
EB-3C	0.0				4.75	36		8.1			
EB-3C	4.0	31	13	18	0.075	40	SC	13.2			
EB-3C	8.0	27	13	14	0.075	21	SC	13.5			
EB-3C	33.5	35	29	6	0.075	81	ML	26.4			
EB-3C	78.5	35	31	4	0.075	67	ML	23.9			
EB-3C	93.5	38	28	10	0.075	70	ML	23.3			
EB-4C	0.0				9.5	32		2.8			
EB-4C	6.0	37	26	11	0.075	44	SM	14.6			
EB-4C	8.0				0.075	29		15.3			
EB-4C	13.5	41	37	4	0.075	89	ML	28.7			
EB-5C	0.0				4.75	29		2.2			
EB-5C	6.0	NP	NP	NP	9.5	27	SM	10.0			
EB-5C	8.0	NP	NP	NP	9.5	39	SM	14.2			
EB-5C	23.5	49	41	8	0.075	93	ML	30.4			
EB-6C	0.0	NP	NP	NP	0.075	19	SM	4.5			
EB-6C	4.0	42	23	19	0.075	84	CL	19.1			
EB-6C	13.5	24	18	6	0.075	20	SC-SM	11.9			
EM- 1	0.0				4.75	18		1.5			
EM- 1	4.0				0.075	31		7.2			
EM- 1	8.0	36	25	11	0.075	88	ML	13.6			
EM- 2	0.0	NP	NP	NP	0.075	39	SM	9.5			
EM- 2	6.0	28	18	10	0.075	24	SC	13.3			
EM- 2	13.5	44	33	11	0.075	86	ML	26.4			
IB- 1C	0.0	34	16	18	0.075	45	SC	9.5			
IB- 1C	6.0	36	18	18	0.075	20	SC	10.2			
IB- 1C	18.5	58	38	20	0.075	59	MH	26.2			
IB- 2C	2.0	38	18	20	0.075	56	CL	13.5			
IB- 2C	13.5	46	30	16	0.075	83	ML	32.2			
IB- 3C	0.0	32	18	14	0.075	63	CL	10.9			
IB- 3C	8.0	NP	NP	NP	0.075	24	SM	14.7			
IB- 3C	13.5	46	36	10	0.075	81	ML	36.8			
IB- 4C	2.0	37	19	18	0.075	64	CL	13.5			
IB- 4C	8.0	NP	NP	NP	0.075	22	SM	9.9			
IB- 4C	18.5	44	32	12	0.075	66	ML	24.5			
IB- 4C	88.5	45	35	10	0.075	76	ML	31.2			
IB- 5C	2.0	41	19	22	0.075	65	CL	14.1			

LAB SUMMARY 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24



SUMMARY OF LABORATORY RESULTS

PAGE 2 OF 3

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
IB- 5C	4.0	35	19	16	0.075	79	CL	16.6			
IB- 5C	13.5				0.075	11		12.3			
IB- 6C	0.0	NP	NP	NP	0.075	12		5.7			
IB- 6C	2.0	30	16	14	0.075	65	CL	8.8			
IB- 6C	6.0	37	17	20	0.075	41	SC	13.2			
IB- 7C	0.0				4.75	29		3.3			
IB- 7C	4.0	46	26	20	0.075	36	SC	13.0			
IB- 7C	8.0	37	18	19	0.075	79	CL	14.0			
IB- 7C	13.5				4.75	27		11.5			
IB- 7C	28.5	44	33	11	0.075	73	ML	25.3			
IB- 7C	63.5	39	33	6	0.075	79	ML	27.6			
IB- 8C	0.0				9.5	18		2.5			
IB- 8C	6.0	36	18	18	0.075	47	SC	13.8			
IB- 8C	8.0	37	16	21	0.075	76	CL	13.6			
IB- 8C	13.5	26	15	11	0.075	48	SC	12.1			
IB- 8C	23.5	42	32	10	0.075	80	ML	27.5			
IB- 8C	48.5	49	32	17	0.075	69	ML	29.0			
IB- 9C	0.0	NP	NP	NP	9.5	18	SM	2.0			
IB- 9C	8.0				0.075	27		12.6			
IB- 9C	13.5	30	17	13	0.075	67	CL	11.1			
IB-10C	0.0	NP	NP	NP	9.5	20	SM	2.6			
IB-10C	2.0				0.075	18		2.9			
IB-10C	8.0	50	27	23	0.075	52	CH	16.1			
IB-10C	18.5				0.075	22		10.1			
IB-10C	28.5	62	45	17	0.075	90	MH	28.6			
IB-11C	0.0	NP	NP	NP	9.5	19	SM	4.1			
IB-11C	2.0	42	28	14	0.075	69	ML	15.2			
IB-11C	6.0	29	18	11	0.075	38	SC	10.6			
IB-11C	33.5	67	46	21	0.075	71	MH	35.7			
W- 1	0.0				9.5	36		11.9			
W- 1	4.0	31	15	16	0.075	34	SC	13.8			
W- 1	23.5	38	28	10	0.075	63	ML	22.8			
W- 2	0.0				9.5	35		12.5			
W- 2	4.0	32	16	16	0.075	32	SC	16.9			
W- 2	8.0	32	14	18	0.075	18	SC	17.5			
W- 3	0.0				9.5	30		2.6			
W- 3	4.0	33	18	15	0.075	41	SC	14.1			
W- 3	8.0	29	17	12	0.075	32	SC	14.4			
W- 4	0.0				9.5	30		2.3			
W- 4	4.0	42	21	21	0.075	58	CL	15.7			
W- 4	8.0	33	17	16	0.075	35	SC	11.7			
W- 5	2.0				4.75	39		3.2			
W- 5	4.0	44	23	21	0.075	51	CL	10.5			

LAB SUMMARY 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24



SUMMARY OF LABORATORY RESULTS

PAGE 3 OF 3

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
W- 5	13.5	NP	NP	NP	4.75	22	SM	10.1			
W- 6	0.0	NP	NP	NP	4.75	29	SM	2.1			
W- 6	6.0	34	18	16	0.075	85	CL	13.7			
W- 6	8.0	29	18	11	0.075	83	CL	11.9			
W- 6	13.5				9.5	22		8.9			
W- 7	0.0				4.75	19		2.0			
W- 7	6.0	34	18	16	0.075	84	CL	16.1			
W- 7	13.5				4.75	33		10.1			
W- 8	0.0				9.5	28		4.9			
W- 8	5.0	45	22	23	0.075	35	SC	16.7			
W- 8	6.0	33	19	14	0.075	81	CL	9.7			



PROJECT ID 23610178A

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

Borehole	Core Run Number	Core Run Top Depth	REC (%)	RQD (%)	q _u (psi)	Poisson's Ratio	Secant Modulus (ksi)	Unit Weight (pcf)	RMR	GSI
EB-1RB1	RC-1	52.5	47	0						
EB-1RB1	RC-2	57.0	88	65						
EB-1RB1	RC-3	62.0	100	25	2738	0.94	1080	151	23	15
IB-1RB1	RC-1	49.9	75	30	2786	0.82	770	153	23	5
IB-1RB1	RC-2	54.2	68	8						
IB-1RB1	RC-3	59.2	88	26						
IB-1RB1	RC-4	64.2	86	52	5644	0.21	6180	169	36	25
IB-1RB1	RC-5	69.2	83	8						

Appendix III – Soil Test Boring Records

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)



Fill



Asphalt



Concrete



Topsoil



Gravel



Sand



Silt



Clay



Organic



Silty Sand



Clayey Sand



Sandy Silt



Clayey Silt



Sandy Clay



Silty Clay



Partially Weathered Rock



Cored Rock

WATER LEVELS

(Shown in Water Level Column)

▽ = Water Level At Termination of Boring

▼ = Water Level Taken After 24 Hours

◀ = Loss of Drilling Water

HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY

Very Soft

Soft

Firm

Stiff

Very Stiff

Hard

Very Hard

STD. PENETRATION RESISTANCE BLOWS/FOOT

0 to 2

3 to 4

5 to 8

9 to 15

16 to 30

31 to 50

Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY

Very Loose

Loose

Medium Dense

Dense

Very Dense

STD. PENETRATION RESISTANCE BLOWS/FOOT

0 to 4

5 to 10

11 to 30

31 to 50

Over 50

TERMS

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

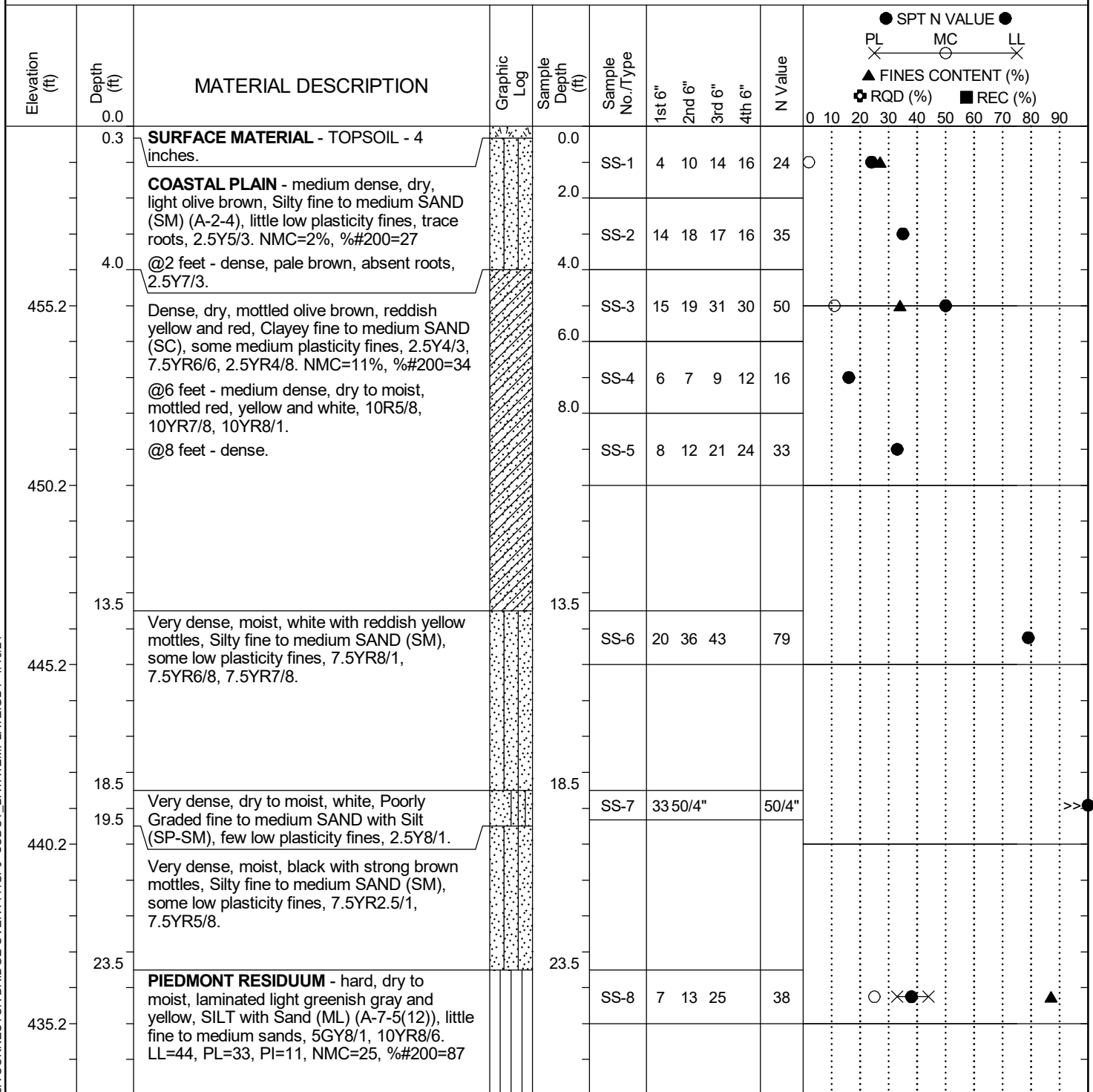
REC - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

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



SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland		Boring No.:	EB-1C		
Site Description:	I-77 Exit 26 Phase I							Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+03.10		Offset:	-41.8		Alignment:	Proposed	
Elev.:	460.2 ft		Latitude:	34.191064703		Longitude:	-80.98444034		Date Started:	10/9/2023	
Total Depth:	98.7 ft		Soil Depth:	98.7 ft		Core Depth:	N/A ft		Date Completed:	10/10/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	91.6%	
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	NE



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-1C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 146+03.10		Offset: -41.8		Alignment: Proposed		
Elev.: 460.2 ft		Latitude: 34.191064703		Longitude: -80.98444034		Date Started: 10/9/2023		
Total Depth: 98.7 ft		Soil Depth: 98.7 ft		Core Depth: N/A ft		Date Completed: 10/10/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: NE		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
430.2	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, laminated yellow, Sandy SILT (ML), some fine sands, 2.5Y8/6, 2.5Y7/6.		28.5	SS-9	13	31	50/4"		50/4"										
425.2		@33.5 feet - mottled yellow, pale brown and white, 2.5Y7/8, 2.5Y7/3, 2.5Y8/1.		33.5	SS-10	35	50/4"			50/4"										
420.2		@38.5 feet - mottled very pale brown and yellow, 10YR8/2, 2.5Y8/6.		38.5	SS-11	29	50/5"			50/5"										
415.2		@43.5 feet - dry, laminated pale yellow, very pale brown and gray, 5Y8/2, 10YR7/3, 10YR6/1.		43.5	SS-12	14	44	50/2"		50/2"										
410.2		@48.5 feet - dry to moist, laminated yellow, olive yellow, light brown and white, 2.5Y7/6, 2.5Y6/6, 7.5YR6/3.		48.5	SS-13	31	50/4"			50/4"										
	53.5	PIEDMONT RESIDUUM - very hard, dry.		53.5																

LEGEND

Continued Next Page

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

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-1C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 146+03.10		Offset: -41.8		Alignment: Proposed		
Elev.: 460.2 ft		Latitude: 34.191064703		Longitude: -80.98444034		Date Started: 10/9/2023		
Total Depth: 98.7 ft		Soil Depth: 98.7 ft		Core Depth: N/A ft		Date Completed: 10/10/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: NE		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
405.2	58.5	mottled white, red and reddish yellow, Sandy SILT (ML), some fine sands, 2.5Y8/1, 10R4/8, 5YR7/8.			SS-14	9	18	36		54										
400.2		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, mottled pinkish white, strong brown and white, Sandy SILT (ML), some fine sands, 7.5YR8/2, 7.5YR8/1, 7.5YR5/6.		58.5	SS-15	10	29 50/4"			50/4"										>>●
395.2		@63.5 feet - laminated weak red, pinkish white and strong brown, 5R5/3, 7.5YR8/3, 7.5YR5/6.		63.5	SS-16	10	23 50/4"			50/4"										>>●
	68.5																			
390.2		@68.5 feet - laminated very pale brown, yellowish brown and gray, 10YR8/2, 10YR5/6, 10YR6/1.		68.5	SS-17	15	28 50/4"			50/4"										>>●
	73.5																			
385.2		@73.5 feet - dry to moist, laminated very pale brown and white with brownish yellow mottles, 10YR8/2, 10YR8/1, 10YR6/8.		73.5	SS-18	23 50/4"				50/4"										>>●
	78.5																			
380.2		@78.5 feet - laminated strong brown, light reddish brown and white, 7.5YR5/6, 5YR6/4, 5YR8/1.		78.5	SS-19	23 50/4"				50/4"										>>●

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-1C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+03.10		Offset:	-41.8		Alignment:	Proposed	
Elev.:	460.2 ft		Latitude:	34.191064703		Longitude:	-80.98444034		Date Started:	10/9/2023	
Total Depth:	98.7 ft		Soil Depth:	98.7 ft		Core Depth:	N/A ft		Date Completed:	10/10/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	NE

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
375.2		@83.5 feet - laminated pale red, weak red, white and yellow, trace fine to coarse weathered rock fragments (quartz), 10R6/4, 10R4/4, 10YR8/1, 10YR7/7.		83.5	SS-20	48	50/2"		50/2"		>>●
370.2		@88.5 feet - laminated dark reddish gray and white with red and grayish green mottles, 10R4/1, 10R4/6, 10R8/1, 5G4/2.		88.5	SS-21	24	50/5"		50/5"		>>●
365.2		@93.5 feet - laminated light grayish green, yellow and pale brown, 5GY6/2, 2.5Y7/8, 2.5Y8/3.		93.5	SS-22	50	5/5"		50/5"		>>●
360.2	98.7	@98.5 feet - greenish gray, 10BG6/1. Boring Terminated at 98.7 feet.		98.5	SS-23	50	2"		50/2"		>>●

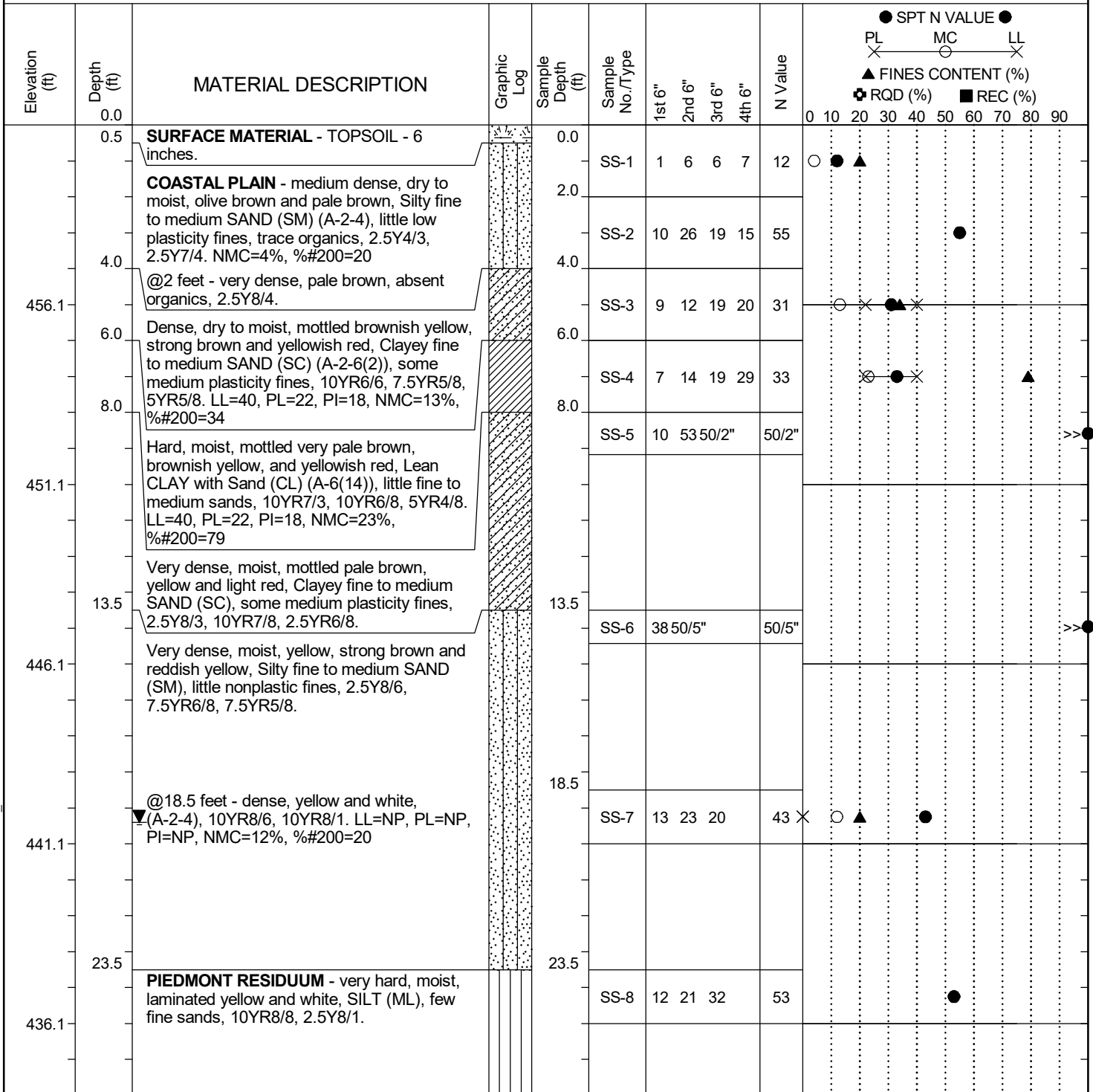
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SAMPLER TYPE			DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"		HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings		CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube		DC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

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-2C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 146+01.12		Offset: 80.3		Alignment: Proposed		
Elev.: 461.1 ft		Latitude: 34.190743666		Longitude: -80.984322444		Date Started: 9/28/2023		
Total Depth: 99.1 ft		Soil Depth: 99.1 ft		Core Depth: N/A ft		Date Completed: 10/2/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 19.4 ft		



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-2C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 146+01.12		Offset: 80.3		Alignment: Proposed		
Elev.: 461.1 ft		Latitude: 34.190743666		Longitude: -80.984322444		Date Started: 9/28/2023		
Total Depth: 99.1 ft		Soil Depth: 99.1 ft		Core Depth: N/A ft		Date Completed: 10/2/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 19.4 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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431.1	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated brownish yellow and pale brown, Sandy SILT (ML), some fine to medium sands, 10YR6/8, 2.5Y8/4, 2.5Y8/2.		28.5	SS-9	20	38	50/4"		50/4"																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

LEGEND

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

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)			County: Richland		Boring No.: EB-2C		
Site Description: I-77 Exit 26 Phase I		Route: Connector Rd					
Eng./Geo.: E. Eastabrooks		Boring Location: 146+01.12		Offset: 80.3		Alignment: Proposed	
Elev.: 461.1 ft		Latitude: 34.190743666		Longitude: -80.984322444		Date Started: 9/28/2023	
Total Depth: 99.1 ft		Soil Depth: 99.1 ft		Core Depth: N/A ft		Date Completed: 10/2/2023	
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%	
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 19.4 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
406.1		very hard, dry to moist, yellowish brown with white laminations, very dark bluish gray mottles, Sandy SILT (ML), some fine to coarse sands, 10YR5/8, 10YR8/1, 5PB3/1.									
401.1		@58.5 feet - yellowish brown with white laminations, some fine to medium sands, 10YR5/8, 10YR8/1.		58.5	SS-15	21	46	50/3"		50/3"	>>●
396.1		PIEDMONT RESIDUUM - hard, dry to moist, reddish brown with white laminations, SILT with Sand (ML), little fine to medium sands, 2.5YR4/4, 2.5YR8/1.		63.5	SS-16	5	12	27		39	●
391.1		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, brown with yellow, white and black laminations, SILT with Sand (ML), little fine to medium sands, 7.5YR5/4, 10YR8/8, 7.5YR2.5/1		68.5	SS-17	11	33	50/2"		50/2"	>>●
386.1		PIEDMONT RESIDUUM - very hard, moist, light brownish gray with yellow, white and black laminations, SILT with Sand (ML), little fine to medium sands, 2.5Y6/2, 2.5Y8/6, 2.5Y8/1, 2.5Y2.5/1.		73.5	SS-18	9	18	37		55	●
381.1		PARTIALLY WEATHERED ROCK (PWR) - very hard, moist, dark yellowish brown with very pale brown laminations, SILT with Sand (ML), little fine to medium sands, 10YR4/4, 10YR7/4.		78.5	SS-19	11	32	50/3"		50/3"	>>●

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-2C			
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd			
Eng./Geo.:	E. Eastabrooks		Boring Location:		146+01.12		Offset:	80.3		Alignment:	Proposed		
Elev.:	461.1 ft		Latitude:	34.190743666		Longitude:	-80.984322444		Date Started:		9/28/2023		
Total Depth:		99.1 ft		Soil Depth:		99.1 ft		Core Depth:		N/A ft			
								Date Completed:		10/2/2023			
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic		Energy Ratio:	91.6%
Core Size:		N/A		Driller:		L. Shrader		Groundwater:		TOB		N/A	24HR
													19.4 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
376.1	83.5	PIEDMONT RESIDUUM - very hard, dry to moist, laminated reddish brown, dark grayish olive, white, SILT with Sand (ML), little fine to medium sands, 5YR4/4, 5YR8/1, 10Y4/2.		83.5	SS-20	10	19	45		64	●
371.1	88.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, laminated olive gray, white and light red, SILT with Sand (ML), little fine to coarse sands, 5Y5/2, 2.5YR8/1, 2.5YR6/6.		88.5	SS-21	35 50/4"				50/4"	>>●
366.1	93.5	@93.5 feet - laminated gray and white, 5Y6/1, 5Y8/1.		93.5	SS-22	17 50/3"				50/3"	>>●
361.1	98.5	@98.5 feet - dark gray with white laminations, 5Y4/1, 5Y8/1.		98.5	SS-23	48 50/1"				50/1"	>>●
		Boring Terminated at 99.1 feet.									

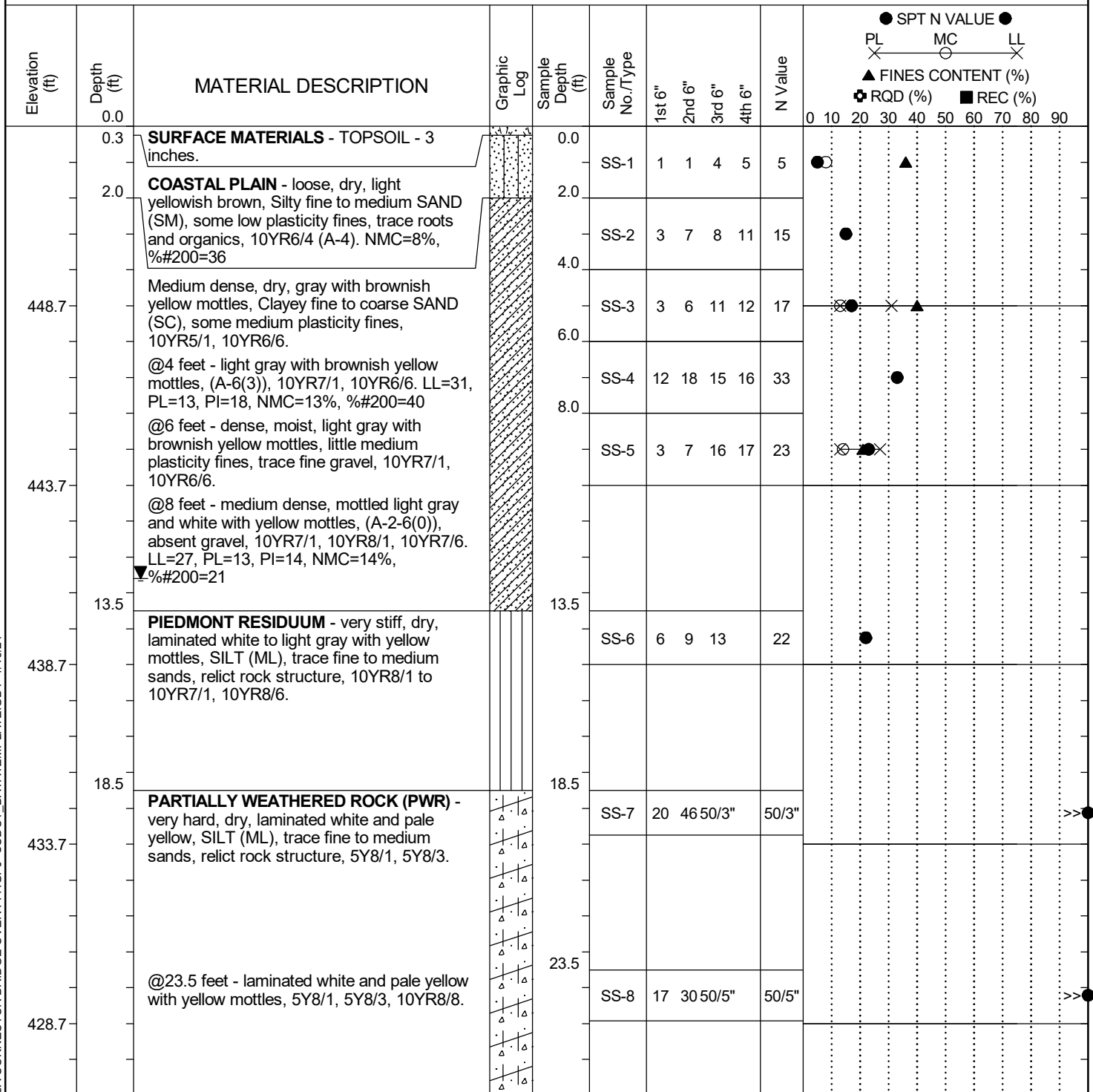
LEGEND

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-3C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Zelaya		Boring Location:	150+04.68		Offset:	-41.5		Alignment:	Proposed		
Elev.:	453.7 ft		Latitude:	34.191402959		Longitude:	-80.98317639		Date Started:	10/18/2023		
Total Depth:	98.9 ft		Soil Depth:	98.9 ft		Core Depth:	N/A ft		Date Completed:	10/19/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	12.6 ft	



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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	EB-3C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	Z. Yelaya	Boring Location:	150+04.68	Offset:	-41.5
Elev.:	453.7 ft	Latitude:	34.191402959	Longitude:	-80.98317639
Date Started:	10/18/2023	Date Completed:	10/19/2023		
Total Depth:	98.9 ft	Soil Depth:	98.9 ft	Core Depth:	N/A ft
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	87.6%				
Core Size:	N/A	Driller:	S. Eubanks	Groundwater:	TOB N/A
24HR	12.6 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL MC LL X X X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) 0 10 20 30 40 50 60 70 80 90 </div>
423.7	28.5	Very hard, dry, laminated white and light gray, SILT (ML), few fine to medium sands, relict rock structure, 5Y8/1, 10YR7/1.		28.5	SS-9	23	50/5"			50/5"	>>●
418.7	33.5	PIEDMONT RESIDUUM - very hard, dry, laminated white and light gray, SILT with Sand (ML) (A-4(5)), little fine to medium sands, relict rock structure, 5Y8/1, 10YR7/1. LL=35, PL=29, PI=6, NMC=26%, %200=81		33.5	SS-10	15	27	39		66	○ X ● ▲
413.7		@38.5 feet - laminated white and greenish gray, trace fine sands, 5Y8/1, 5GY6/1.		38.5	SS-11	15	30	50		80	●
408.7				43.5	SS-12	12	26	43		69	●
403.7		@48.5 feet - trace fine to medium sands.		48.5	SS-13	13	21	40		61	●
		@53.5 feet - hard, laminated light gray, very		53.5							

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-3C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 150+04.68		Offset: -41.5		Alignment: Proposed		
Elev.: 453.7 ft		Latitude: 34.191402959		Longitude: -80.98317639		Date Started: 10/18/2023		
Total Depth: 98.9 ft		Soil Depth: 98.9 ft		Core Depth: N/A ft		Date Completed: 10/19/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: 12.6 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
398.7		pale brown, and weak red, 10YR7/1, 10YR7/3, 7.5R4/2.			SS-14	8	18	26		44										
		@58.5 feet - very hard, laminated very pale brown, light gray, and weak red, 10YR7/3, 10YR7/1, 7.5R4/2.		58.5																
393.7					SS-15	10	19	34		53										
		@63.5 feet - laminated light gray and very pale brown with weak red mottles, 10YR7/1, 10YR7/2, 7.5R4/2 to 7.5R4/4.		63.5																
388.7					SS-16	15	24	42		66										
		@68.5 feet - laminated very pale brown and light gray, 10YR7/3 to 10YR7/4, 10YR7/1.		68.5																
383.7					SS-17	18	36	49		85										
		@73.5 feet - laminated very pale brown and weak red with light gray mottles, 10YR7/3 to 10YR7/5, 7.5R4/2 to 7.5R4/4, 10YR7/1.		73.5																
378.7					SS-18	18	28	49		77										
	78.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated very pale brown and light reddish brown with yellow mottles, Sandy SILT (ML) (A-4(2)), some fine to medium sands, relict rock structure.		78.5	SS-19	23 50/5"				50/5"										
373.7																				

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-3C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Zelaya		Boring Location:	150+04.68		Offset:	-41.5		Alignment:	Proposed		
Elev.:	453.7 ft		Latitude:	34.191402959		Longitude:	-80.98317639		Date Started:	10/18/2023		
Total Depth:	98.9 ft		Soil Depth:	98.9 ft		Core Depth:	N/A ft		Date Completed:	10/19/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	12.6 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
368.7	83.5	10YR7/3 to 10YR7/4, 2.5YR7/3, 10YR7/6. LL=35, PL=31, PI=4, NMC=24%, %200=67 @83.5 feet - laminated light brown and very pale brown, 7.5YR6/4, 10YR7/3 to 10YR7/4.		83.5	SS-20	34	50/4"		50/4"		>>●
363.7	88.5	Very hard, dry, laminated brownish yellow and very pale brown, SILT with Sand (ML), little fine to coarse sands, few fine quartz vein rock fragments, relict rock structure, 10YR7/4, 10YR6/6 to 10YR6/8.		88.5	SS-21	27	50/5"		50/5"		>>●
358.7	93.5	PIEDMONT RESIDUUM - very hard, dry, laminated greenish gray and light gray, Sandy SILT (ML) (A-4(7)), some fine sands, relict rock structure, 5GY6/1, 7/N. LL=38, PL=28, PI=10, NMC=23%, %200=70		93.5	SS-22	17	24	43		67	○××●
353.7	98.5 98.9	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated greenish gray and light gray, SILT with Sand (ML), little fine to medium sands, relict rock structure, 10GY5/1, 7/N. Boring Terminated at 98.9 feet.		98.5	SS-23	50/5"			50/5"		>>●

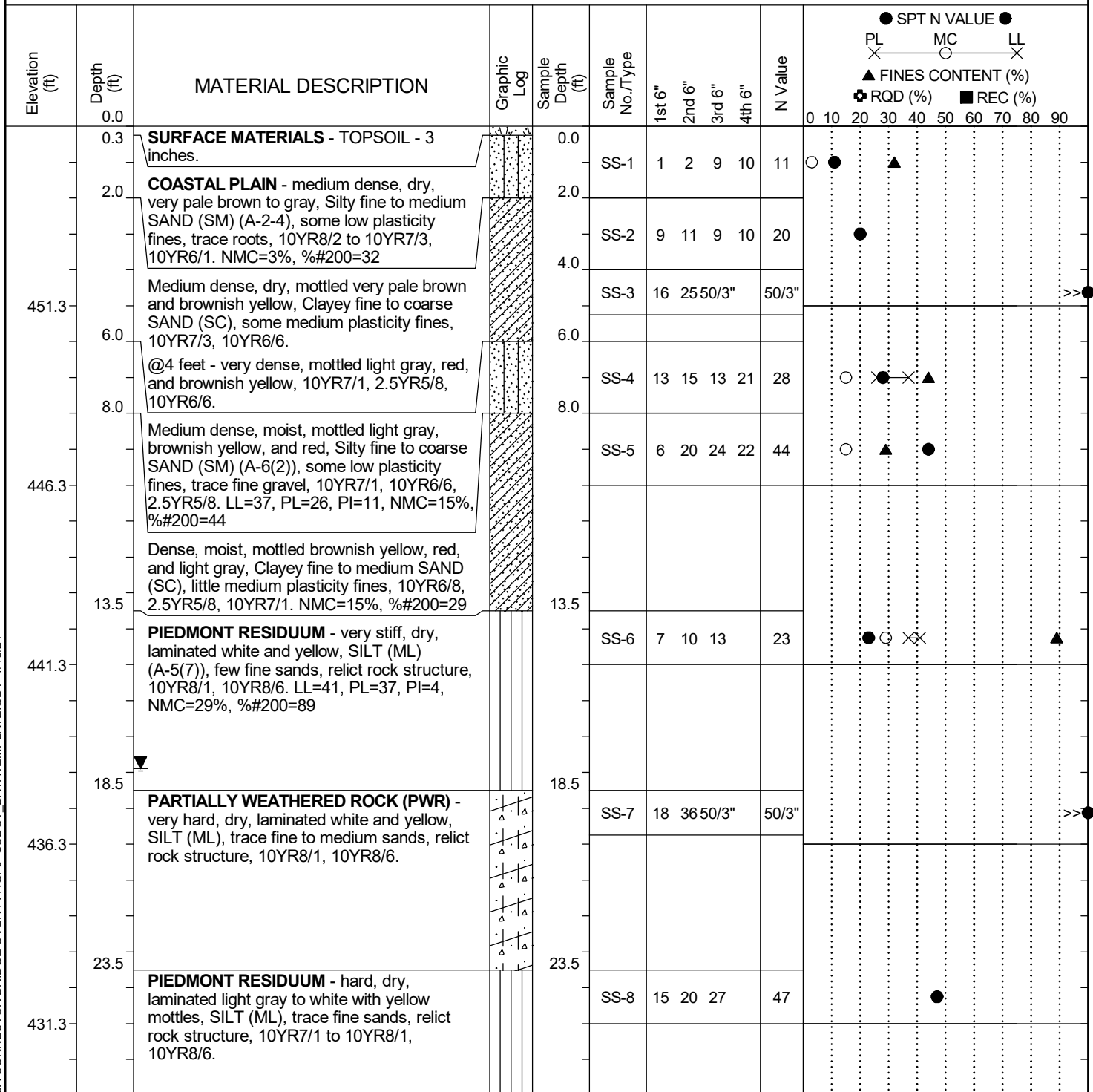
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SAMPLER TYPE			DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC -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

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-4C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	Z. Zelaya		Boring Location:		150+06.47		Offset:	43.9		Alignment:	Proposed
Elev.:	456.3 ft		Latitude:		34.191181179		Longitude:	-80.98308396		Date Started:	10/23/2023
Total Depth:		99.2 ft		Soil Depth:		99.2 ft		Core Depth:		N/A ft	
Date Completed:		10/24/2023									
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)	
Liner Used:			Y (N)								
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic	
Energy Ratio:		87.6%									
Core Size:		N/A		Driller:		S. Eubanks		Groundwater:		TOB N/A	
24HR		17.9 ft									



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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-4C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	Z. Zelaya		Boring Location:	150+06.47		Offset:	43.9		Alignment:	Proposed	
Elev.:	456.3 ft		Latitude:	34.191181179		Longitude:	-80.98308396		Date Started:	10/23/2023	
Total Depth:	99.2 ft		Soil Depth:	99.2 ft		Core Depth:	N/A ft		Date Completed:	10/24/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	17.9 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
426.3		@28.5 feet - very hard, laminated light gray and very pale brown, few fine to medium sands, 10YR7/1, 10YR7/3.		28.5	SS-9	29	50/3"		50/3"											
421.3		@33.5 feet - laminated very pale brown and light gray, 10YR7/3, 10YR7/1.		33.5	SS-10	19	45	50/2"	50/2"											
416.3		@38.5 feet - laminated light reddish brown and light gray with brownish yellow mottles, 2.5YR6/3, 10YR7/1, 10YR6/6.		38.5	SS-11	26	43	50/5"	50/5"											
411.3				43.5	SS-12	16	30	50	80											
406.3		@48.5 feet - laminated gray to light gray with reddish yellow mottles, 10YR6/1 to 10YR7/1, 7.5YR7/6.		48.5	SS-13	24	50/5"		50/5"											
		@53.5 feet - laminated pink and light gray.		53.5																

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-4C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 150+06.47		Offset: 43.9		Alignment: Proposed		
Elev.: 456.3 ft		Latitude: 34.191181179		Longitude: -80.98308396		Date Started: 10/23/2023		
Total Depth: 99.2 ft		Soil Depth: 99.2 ft		Core Depth: N/A ft		Date Completed: 10/24/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: 17.9 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
401.3		trace fine sands, relict rock structure, 5YR7/4, 10YR7/1.			SS-14	14	26	49		75										
	58.5			58.5																
396.3		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated pale red and light gray, SILT (ML), trace fine sands, relict rock structure, 10R6/4, 10YR7/1.			SS-15	18	39	50	5"	50/5"										>>●
		@63.5 feet - laminated pale red, light gray, and weak red, 10R6/4, 10YR7/1, 5R5/4.		63.5																>>●
391.3					SS-16	18	33	50	5"	50/5"										>>●
		@68.5 feet - laminated very pale brown to light gray and weak red, few fine to medium sands, 10YR8/2 to 10YR7/1, 5R5/4.		68.5																>>●
386.3					SS-17	26	39	50	5"	50/5"										>>●
		@73.5 feet - laminated brownish yellow and light gray, 10YR6/6 to 10YR6/8, 10YR7/1.		73.5																>>●
381.3					SS-18	21	41	50	3"	50/3"										>>●
		@78.5 feet - laminated brownish yellow and very pale brown, 10YR6/6 to 10YR6/8, 10YR7/4.		78.5																>>●
376.3					SS-19	35	50	3"		50/3"										>>●

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-4C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 150+06.47		Offset: 43.9		Alignment: Proposed		
Elev.: 456.3 ft		Latitude: 34.191181179		Longitude: -80.98308396		Date Started: 10/23/2023		
Total Depth: 99.2 ft		Soil Depth: 99.2 ft		Core Depth: N/A ft		Date Completed: 10/24/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR 17.9 ft		

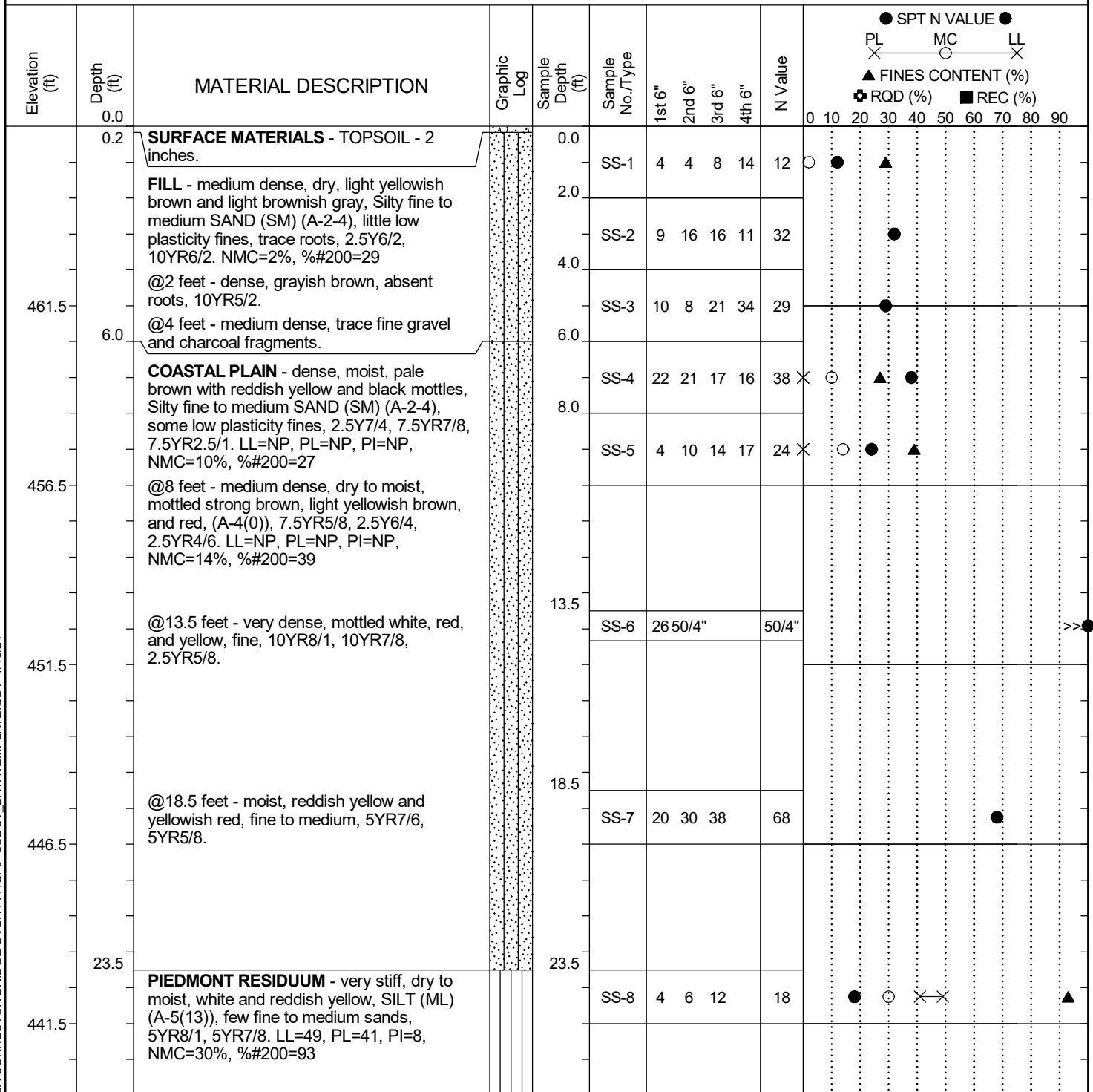
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
371.3		@83.5 feet - trace fine sands.		83.5	SS-20	39	50/3"		50/3"											
366.3		@88.5 feet - laminated brownish yellow and very pale brown with dark brown mottles, fine to medium, 10YR6/8, 10YR7/4, 10YR3/3.		88.5	SS-21	27	50/3"		50/3"											
361.3		@93.5 feet - laminated greenish gray and brownish yellow with dark brown mottles, few fine to coarse rock fragments, trace fine to coarse sands, 5G6/1, 10YR6/8.		93.5	SS-22	37	50/5"		50/5"											
356.3	99.2	@98.5 feet - laminated grayish green and light gray, absent rock fragments, few fine to medium sands, trace pyrite, 5G5/2, 7/N. Boring Terminated at 99.2 feet.		98.5	SS-23	37	50/2"		50/2"											
351.3																				

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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	EB-5C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	147+23.93	Offset:	149.9
Elev.:	466.5 ft	Latitude:	34.190665368	Longitude:	-80.98386528
Date Started:	10/25/2023				
Total Depth:	98.8 ft	Soil Depth:	98.8 ft	Core Depth:	N/A ft
Date Completed:	10/26/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	30.2 ft				



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-5C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+23.93		Offset: 149.9		Alignment: Proposed		
Elev.: 466.5 ft		Latitude: 34.190665368		Longitude: -80.98386528		Date Started: 10/25/2023		
Total Depth: 98.8 ft		Soil Depth: 98.8 ft		Core Depth: N/A ft		Date Completed: 10/26/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 30.2 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
436.5	28.5	@28.5 feet - laminated white and reddish yellow, 5YR8/1, 5YR7/8.			SS-9	5	6	12		18	●
431.5	33.5	Hard, dry, pale brown and yellow, Sandy SILT (ML), some fine to medium sands, 2.5Y8/3, 2.5Y7/6.			SS-10	8	16	28		44	●
426.5	38.5	@38.5 feet - very hard, laminated pale brown and yellow, 2.5Y8/4, 10YR7/8.			SS-11	9	16	36		52	●
421.5	43.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, yellow, Sandy SILT (ML), some fine to medium sands, 10YR7/8, 10YR8/6.			SS-12	11	24	50/5"		50/5"	>>●
416.5	48.5	@48.5 feet - laminated red, white, and pale brown, 10R4/6, 10R4/8, 2.5Y8/3.			SS-13	14	50/2"			50/2"	>>●
	53.5	@53.5 feet - laminated weak red, white, and									

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-5C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+23.93		Offset: 149.9		Alignment: Proposed		
Elev.: 466.5 ft		Latitude: 34.190665368		Longitude: -80.98386528		Date Started: 10/25/2023		
Total Depth: 98.8 ft		Soil Depth: 98.8 ft		Core Depth: N/A ft		Date Completed: 10/26/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 30.2 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
411.5		strong brown, 7.5R4/3, 7.5YR5/6, 7.5YR8/1.			SS-14	14	27	50	4"	50/4"										
	58.5			58.5																
406.5		PIEDMONT RESIDUUM - hard, dry, mottled weak red and white, Sandy SILT (ML), some fine sands, 5R4/3, 5R8/1.			SS-15	8	15	24		39										
401.5				63.5																
					SS-16	7	13	26		39										
		@68.5 feet - mottled weak red, reddish gray, and white, 5R4/3, 5R6/1, 5R8/1.		68.5																
396.5					SS-17	7	15	26		41										
		@73.5 feet - very stiff.		73.5																
391.5					SS-18	5	7	12		19										
	78.5			78.5																
386.5		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, mottled dusky red, pale olive, and white, Sandy SILT (ML), some fine to medium sands, 5R3/2, 5Y6/4, 5Y8/1.			SS-19	13	22	50	5"	50/5"										

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EB-5C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+23.93		Offset:	149.9		Alignment:	Proposed	
Elev.:	466.5 ft		Latitude:	34.190665368		Longitude:	-80.98386528		Date Started:	10/25/2023	
Total Depth:	98.8 ft		Soil Depth:	98.8 ft		Core Depth:	N/A ft		Date Completed:	10/26/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	30.2 ft

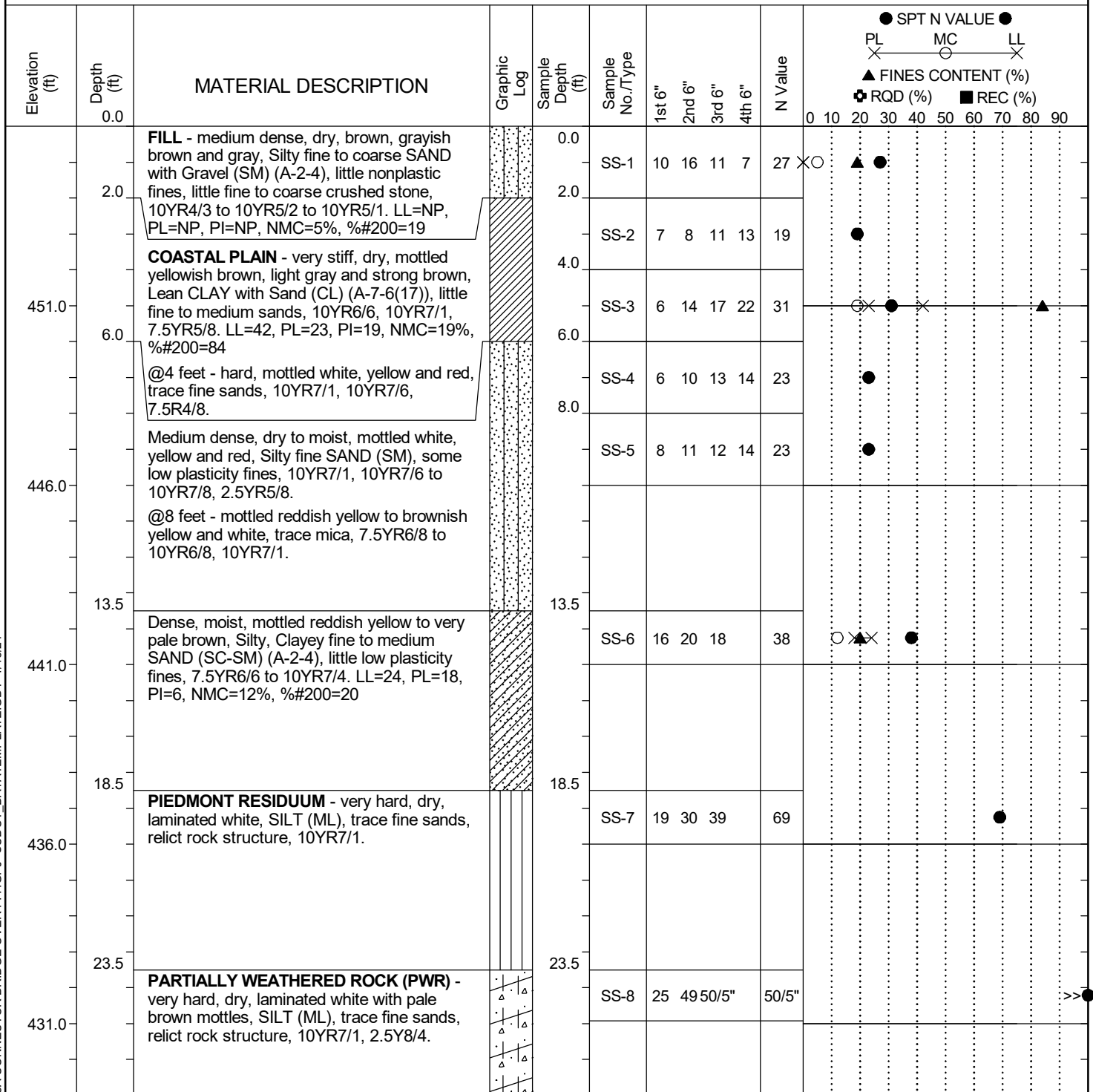
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL MC LL X X X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
381.5		@83.5 feet - yellowish brown with reddish yellow and white mottles, 10YR5/4, 5YR7/8, 10YR8/1.		83.5	SS-20	16	34	50/3"		50/3"										
376.5		@88.5 feet - laminated light olive brown, brownish yellow, and white, trace mica, 2.5Y5/6, 10YR6/8, 10YR8/1.		88.5	SS-21	16	37	50/3"		50/3"										
371.5		@93.5 feet - laminated brownish yellow, olive yellow, and light olive brown, absent mica, 2.5Y6/6, 10YR6/8, 2.5Y5/4.		93.5	SS-22	20	50/4"			50/4"										
366.5	98.8	@98.5 feet - laminated light yellowish brown, brownish yellow, and white, 10YR6/4, 10YR6/8, 10YR8/1. Boring Terminated at 98.8 feet.		98.5	SS-23	50/4"				50/4"										
361.5																				

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-6C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Yelaya		Boring Location: 147+67.20		Offset: 148.4		Alignment: Proposed		
Elev.: 456.0 ft		Latitude: 34.190705874		Longitude: -80.98373065		Date Started: 11/9/2023		
Total Depth: 98.9 ft		Soil Depth: 98.9 ft		Core Depth: N/A ft		Date Completed: 11/9/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: NE		



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:			P042443 (S&ME 23610178A)				County:		Richland		Boring No.:		EB-6C				
Site Description:			I-77 Exit 26 Phase I								Route:		Connector Rd				
Eng./Geo.:			Z. Yelaya		Boring Location:		147+67.20		Offset:		148.4		Alignment:		Proposed		
Elev.:		456.0 ft		Latitude:		34.190705874		Longitude:		-80.98373065		Date Started:		11/9/2023			
Total Depth:		98.9 ft		Soil Depth:		98.9 ft		Core Depth:		N/A ft		Date Completed:		11/9/2023			
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)		Liner Used:		Y (N)			
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic		Energy Ratio:		87.6%			
Core Size:		N/A		Driller:		S. Eubanks		Groundwater:		TOB		N/A		24HR		NE	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
426.0		@28.5 feet - laminated yellow and white, trace fine to medium sands, 10YR8/6, 2.5Y8/1.		28.5	SS-9	22	35	50/5"		50/5"										
421.0	33.5	PIEDMONT RESIDUUM - hard, dry, laminated yellow and white, SILT (ML), trace fine sands, relict rock structure, 10YR8/6, 2.5Y8/1.		33.5	SS-10	12	18	28		46										
416.0	38.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated yellow and white, SILT (ML), trace fine sands, relict rock structure, 10YR8/6, 2.5Y8/1.		38.5	SS-11	50/3"				50/3"										
411.0	43.5	@43.5 feet - few fine to medium sands.		43.5	SS-12	50/1"				50/1"										
406.0	48.5	Very hard, dry, laminated yellow and very pale brown, SILT with Sand (ML), little fine to medium sands, relict rock structure, 10YR7/6, 10YR8/4.		48.5	SS-13	45	50	50/2"		50/2"										
	53.5			53.5	SS-14	50/1"				50/1"										

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EB-6C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 147+67.20		Offset: 148.4		Alignment: Proposed		
Elev.: 456.0 ft		Latitude: 34.190705874		Longitude: -80.98373065		Date Started: 11/9/2023		
Total Depth: 98.9 ft		Soil Depth: 98.9 ft		Core Depth: N/A ft		Date Completed: 11/9/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: NE		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
401.0	58.5	Very hard, dry, laminated weak red and white, SILT (ML), few fine sands, relict rock structure, 5R4/4, 5R8/1.		58.5	SS-15	50/5"				50/5"	>>●									
396.0				63.5	SS-16	34 50/3"				50/3"	>>●									
391.0				68.5	SS-17	20 36 50/5"				50/5"	>>●									
386.0				73.5	SS-18	36 50/5"				50/5"	>>●									
381.0				78.5	SS-19	29 50/2"				50/2"	>>●									
376.0		@78.5 feet - laminated dark red to dusky red, few fine to coarse sands, 5R3/6 to 5R3/4.																		

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:			P042443 (S&ME 23610178A)				County:		Richland			Boring No.:		EB-6C			
Site Description:			I-77 Exit 26 Phase I									Route:		Connector Rd			
Eng./Geo.:			Z. Zelaya		Boring Location:			147+67.20		Offset:		148.4		Alignment:		Proposed	
Elev.:		456.0 ft		Latitude:		34.190705874		Longitude:		-80.98373065		Date Started:			11/9/2023		
Total Depth:		98.9 ft		Soil Depth:		98.9 ft		Core Depth:		N/A ft		Date Completed:			11/9/2023		
Bore Hole Diameter (in):				4		Sampler Configuration			Liner Required:		Y (N)		Liner Used:		Y (N)		
Drill Machine:		CME-550X			Drill Method:		RW		Hammer Type:		Automatic			Energy Ratio:		87.6%	
Core Size:		N/A			Driller:		S. Eubanks			Groundwater:		TOB N/A		24HR		NE	

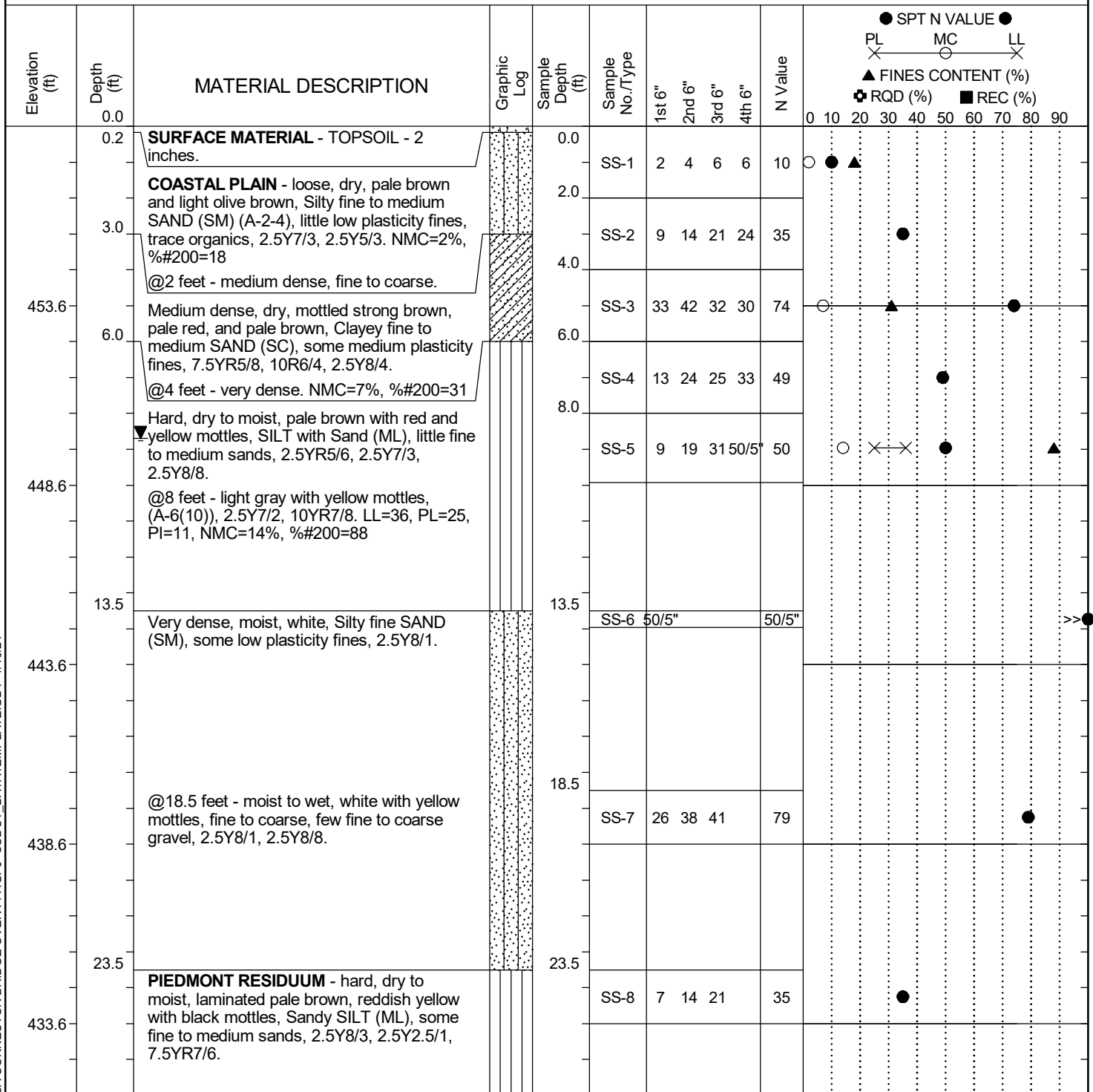
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
371.0		@83.5 feet - trace fine sands.		83.5	SS-20	18	32	50/5"		50/5"	>>●
366.0	88.5	Very hard, dry, laminated weak red and reddish brown, SILT with Sand (ML), little fine to medium sands, relict rock structure, 5R4/3, 2.5YR4/3.		88.5	SS-21	50/3"				50/3"	>>●
361.0		@93.5 feet - No Recovery.		93.5	SS-22	50/2"				50/2"	>>●
356.0	98.9	@98.5 feet - laminated dark gray and white with yellow mottles, 10YR4/1, 10YR8/1, 2.5Y8/6. Boring Terminated at 98.9 feet.		98.5	SS-23	50/5"				50/5"	>>●
351.0											

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EM- 1	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:		145+29.84		Offset:	35.5		Alignment:	Proposed
Elev.:	458.6 ft		Latitude:	34.190800788		Longitude:	-80.984592326		Date Started:		10/3/2023
Total Depth:	38.8 ft		Soil Depth:	38.8 ft		Core Depth:	N/A ft		Date Completed:		10/3/2023
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	8.7 ft



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	EM- 1	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:		145+29.84		Offset:	35.5		Alignment:	Proposed
Elev.:	458.6 ft		Latitude:	34.190800788		Longitude:	-80.984592326		Date Started:		10/3/2023
Total Depth:		38.8 ft		Soil Depth:		38.8 ft		Core Depth:		N/A ft	
								Date Completed:		10/3/2023	
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)	
										Liner Used:	
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic	
										Energy Ratio:	
Core Size:		N/A		Driller:		L. Shrader		Groundwater:		TOB	
										N/A	
										24HR	
										8.7 ft	

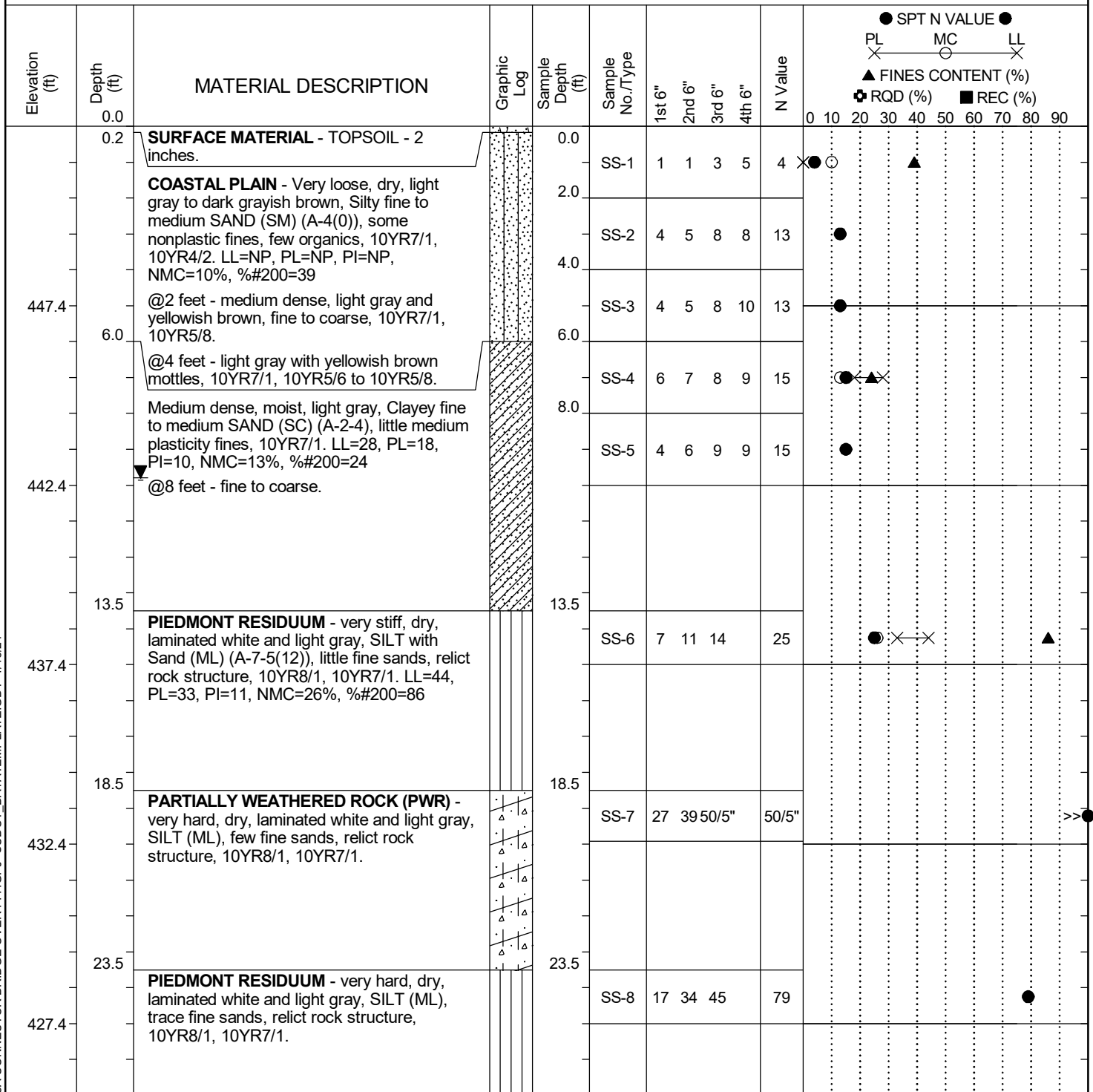
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
428.6	33.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, moist, laminated pale brown and reddish yellow, Sandy SILT (ML), some fine to medium sands, 2.5Y8/4, 7.5YR7/6.		28.5	SS-9	6	14	33		47	●
423.6	33.5			33.5	SS-10	50/5"				50/5"	>>●
418.6	38.8	@38.5 feet - laminated pale brown, yellow, and light reddish brown, 2.5Y8/4, 2.5Y8/8, 2.5YR6/3. Boring Terminated at 38.8 feet.		38.5	SS-11	50/3"				50/3"	>>●
413.6											
408.6											

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EM- 2		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Yelaya		Boring Location: 150+61.97		Offset: -31.4		Alignment: Proposed		
Elev.: 452.4 ft		Latitude: 34.19142508		Longitude: -80.98298593		Date Started: 10/2/2023		
Total Depth: 40 ft		Soil Depth: 40 ft		Core Depth: N/A ft		Date Completed: 10/2/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: 9.8 ft		



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: EM- 2		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 150+61.97		Offset: -31.4		Alignment: Proposed		
Elev.: 452.4 ft		Latitude: 34.19142508		Longitude: -80.98298593		Date Started: 10/2/2023		
Total Depth: 40 ft		Soil Depth: 40 ft		Core Depth: N/A ft		Date Completed: 10/2/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR 9.8 ft		

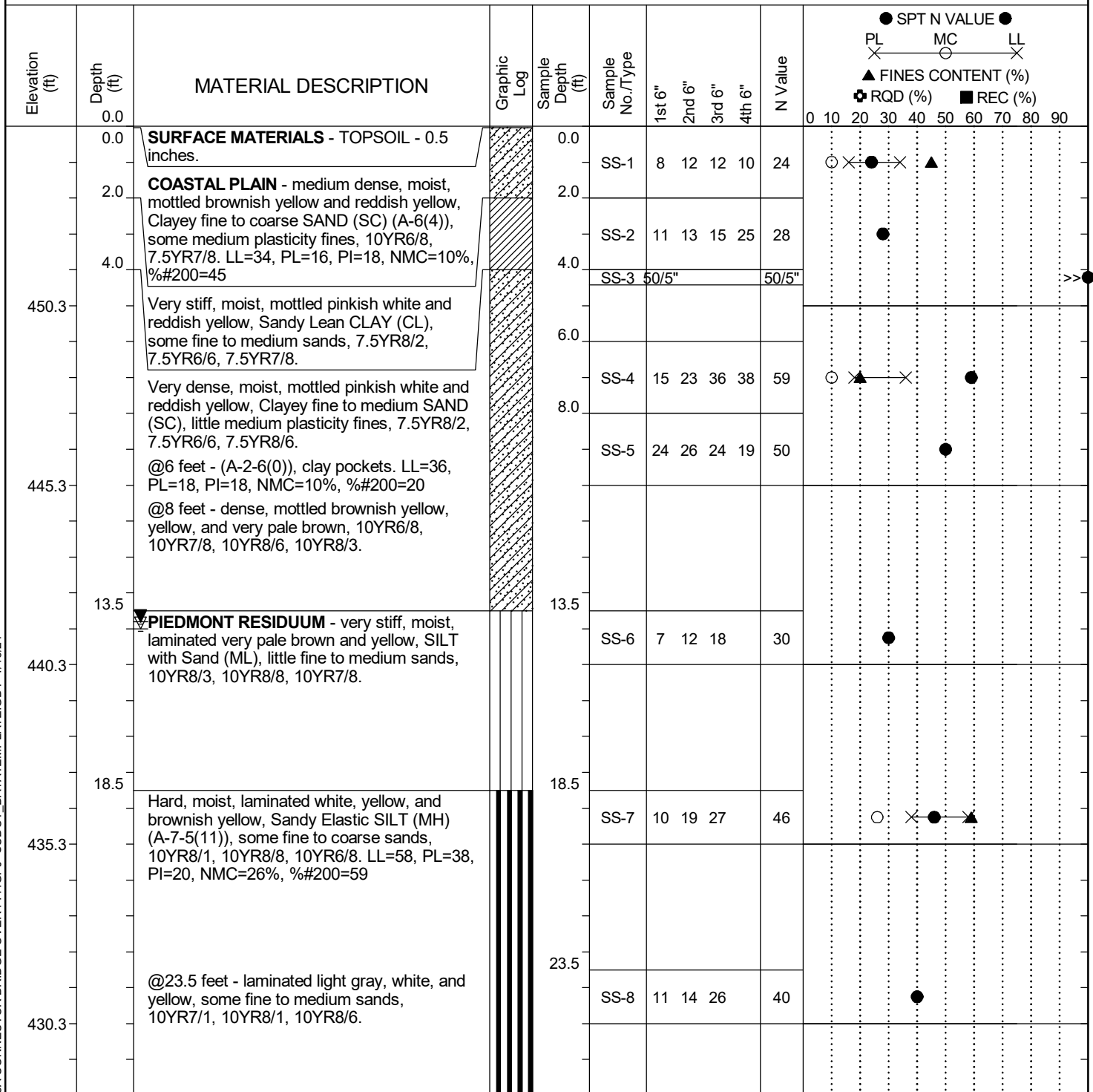
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
422.4		@28.5 feet - laminated white and pale yellow, 5Y8/1, 5Y8/2.		28.5	SS-9	8	22	39		61	●
417.4		@33.5 feet - hard, laminated light gray and white, 5Y7/1, 5Y8/1.		33.5	SS-10	10	15	25		40	●
412.4	40.0	@38.5 feet - very hard, laminated gray to light gray, 5Y6/1 to 5Y7/1.		38.5	SS-11	11	21	35		56	●
		Boring Terminated at 40 feet.									
407.4											
402.4											

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 1C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.15		Offset:	-38.1		Alignment:	Proposed		
Elev.:	455.3 ft		Latitude:	34.19127875		Longitude:	-80.98360253		Date Started:	11/10/2023		
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/10/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	D-50		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	96.8%	
Core Size:	N/A		Driller:	F. Crane		Groundwater:	TOB	N/A		24HR	13.8 ft	



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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 1C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.15		Offset:	-38.1		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.19127875		Longitude:	-80.98360253		Date Started:	11/10/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/10/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	D-50		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	96.8%
Core Size:	N/A		Driller:	F. Crane		Groundwater:	TOB	N/A		24HR	13.8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
425.3		@28.5 feet - very hard, laminated pink, white, and light gray, 7.5YR8/3, 7.5YR8/1, 7.5YR7/1.		28.5	SS-9	12	22	35		57	●
420.3		@33.5 feet - some fine to coarse sands.		33.5	SS-10	10	20	33		53	●
415.3	38.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, moist, laminated light gray and reddish yellow, Sandy SILT (ML), some fine to medium sands, 7.5YR7/1, 7.5YR7/8, 7.5YR8/6.		38.5	SS-11	22	50	50/2"		50/2"	>>●
410.3		@43.5 feet - some fine to coarse sands, trace fine weathered rock fragments.		43.5	SS-12	47	50/3"			50/3"	>>●
405.3		@48.5 feet - reddish yellow and white, some fine to medium sands, absent weathered rock fragments, 7.5YR8/6, 7.5YR8/1.		48.5	SS-13	50/4"				50/4"	>>●
		@53.5 feet - laminated light gray and reddish		53.5							

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 1C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.15		Offset:	-38.1		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.19127875		Longitude:	-80.98360253		Date Started:	11/10/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/10/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	D-50		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	96.8%
Core Size:	N/A		Driller:	F. Crane		Groundwater:	TOB	N/A		24HR	13.8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
400.3		yellow, 7.5YR7/1, 7.5YR8/6, 7.5YR7/6.			SS-14	27	47	50	4"	50/4"										
		@58.5 feet - laminated reddish yellow and light gray, 7.5YR8/6, 7.5YR7/6, 7.5YR7/1.		58.5	SS-15	19	50	5"		50/5"										
395.3																				
		@63.5 feet - laminated reddish yellow and light gray, some fine to coarse sands, trace fine to coarse quartz rock fragments, 7.5YR6/6, 7.5YR6/8, 7.5YR7/1.		63.5	SS-16	50	5"			50/5"										
390.3																				
	68.5	PIEDMONT RESIDUUM - very hard, moist, laminated reddish yellow, pinkish white, yellowish red, and reddish brown, Sandy SILT (ML), some fine to coarse sands, trace fine quartz rock fragments, 5YR7/6, 5YR8/2, 5YR5/8, 5YR5/4.		68.5	SS-17	15	30	50		80										
385.3																				
		@73.5 feet - light olive brown and olive yellow, some fine to medium sands,		73.5	SS-18	12	21	37		58										
380.3																				
	78.5	Hard, moist, bluish gray and light bluish gray, SILT with Sand (ML), little fine to coarse sands, 10B5/1, 10B8/1.		78.5	SS-19	11	15	27		42										
375.3																				

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 1C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.15		Offset:	-38.1		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.19127875		Longitude:	-80.98360253		Date Started:	11/10/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/10/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	D-50		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	96.8%
Core Size:	N/A		Driller:	F. Crane		Groundwater:	TOB	N/A		24HR	13.8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL MC LL X X X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) 0 10 20 30 40 50 60 70 80 90 </div>									
370.3	83.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, moist, laminated light bluish gray and bluish gray, SILT with Sand (ML), little fine to coarse sands, 10B8/1, 5B6/1.		83.5	SS-20	13	33	50	4"	50/4"	>>●									
365.3	88.5			88.5	SS-21	22	50	5"		50/5"	>>●									
360.3	93.5			93.5	SS-22	15	27	50	4"	50/4"	>>●									
355.3	98.5	PIEDMONT RESIDUUM - very hard, moist, greenish gray and light greenish gray, Lean CLAY with Sand (CL), little fine to medium sands, 5BG6/1, 10BG8/1.		98.5	SS-23	11	21	36		57	●									
	100.0	Boring Terminated at 100 feet.																		

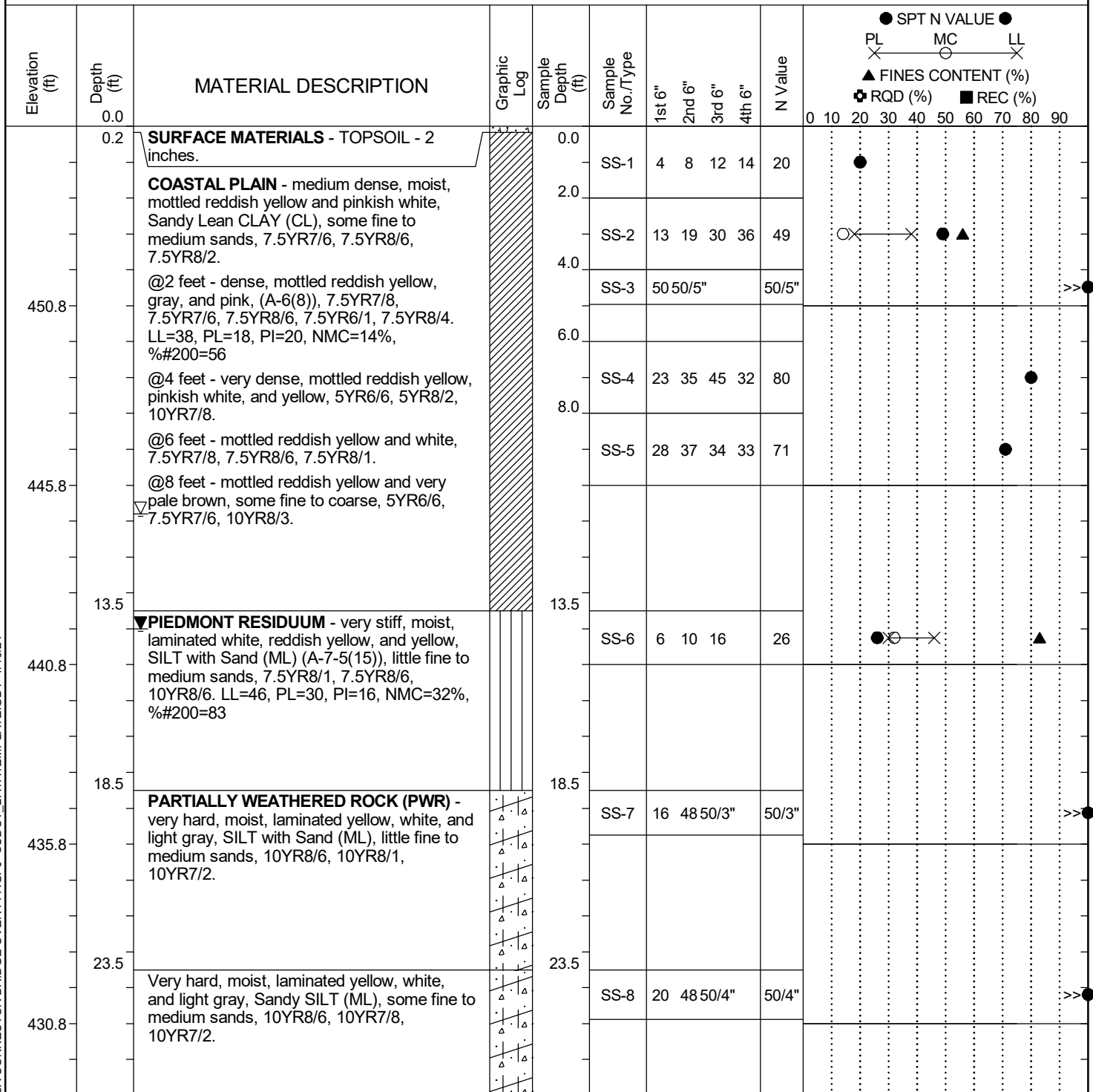
LEGEND

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

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 2C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:		148+68.15		Offset:	9.4		Alignment:	Proposed
Elev.:	455.8 ft		Latitude:	34.191154573		Longitude:	-80.98355426		Date Started:		11/15/2023
Total Depth:		99.3 ft		Soil Depth:		99.3 ft		Core Depth:		N/A ft	
								Date Completed:		11/15/2023	
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)	
										Liner Used:	
Drill Machine:		D-50		Drill Method:		RW		Hammer Type:		Automatic	
										Energy Ratio:	
Core Size:		N/A		Driller:		F. Crane		Groundwater:		TOB	
										N/A	
										24HR	
										14 ft	



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 2C			
Site Description:		I-77 Exit 26 Phase I					Route:	Connector Rd	
Eng./Geo.: H. Skerkis		Boring Location:		148+68.15		Offset:	9.4	Alignment:	Proposed
Elev.:	455.8 ft	Latitude:	34.191154573	Longitude:	-80.98355426	Date Started:		11/15/2023	
Total Depth:		99.3 ft	Soil Depth:	99.3 ft	Core Depth:	N/A ft	Date Completed:		11/15/2023
Bore Hole Diameter (in):		4	Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:		D-50	Drill Method:	RW	Hammer Type:		Automatic	Energy Ratio:	96.8%
Core Size:		N/A	Driller:	F. Crane	Groundwater:	TOB	N/A	24HR	14 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
425.8				28.5	SS-9	18	50	5"	50/5"											
420.8		@33.5 feet - laminated reddish yellow, white, and light gray, 7.5YR8/6, 7.5YR8/1, 10YR7/2.		33.5	SS-10	14	50	50/3"	50/3"											
415.8		@38.5 feet - laminated reddish yellow, yellow, white, and light gray, 7.5YR8/6, 10YR7/8, 10YR8/1, 10YR7/2.		38.5	SS-11	12	29	50/5"	50/5"											
410.8		@43.5 feet - laminated pink, white, yellow, and light gray, 5YR8/3, 5YR8/1, 10YR7/8, 10YR7/2.		43.5	SS-12	13	32	50/4"	50/4"											
405.8				48.5	SS-13	13	28	50/4"	50/4"											
				53.5																

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		

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 2C					
Site Description:		I-77 Exit 26 Phase I					Route:	Connector Rd			
Eng./Geo.: H. Skerkis		Boring Location:		148+68.15		Offset:	9.4	Alignment:	Proposed		
Elev.:	455.8 ft	Latitude:	34.191154573	Longitude:	-80.98355426	Date Started:		11/15/2023			
Total Depth:	99.3 ft	Soil Depth:	99.3 ft	Core Depth:	N/A ft	Date Completed:		11/15/2023			
Bore Hole Diameter (in):		4	Sampler Configuration		Liner Required:	Y	Ⓝ	Liner Used:	Y	Ⓝ	
Drill Machine:		D-50	Drill Method:		RW	Hammer Type:		Automatic	Energy Ratio:	96.8%	
Core Size:		N/A	Driller:		F. Crane	Groundwater:		TOB	N/A	24HR	14 ft

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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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 2C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: H. Skerkis		Boring Location: 148+68.15		Offset: 9.4		Alignment: Proposed		
Elev.: 455.8 ft		Latitude: 34.191154573		Longitude: -80.98355426		Date Started: 11/15/2023		
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed: 11/15/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: D-50		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 96.8%		
Core Size: N/A		Driller: F. Crane		Groundwater: TOB N/A		24HR: 14 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
370.8		@83.5 feet - light bluish gray and bluish gray, trace mica, 5B8/1, 5B6/1.		83.5	SS-20	11	30	50/5"		50/5"										
365.8				88.5	SS-21	13	49	50/3"		50/3"										
360.8		@93.5 feet - bluish gray and light bluish gray, absent mica, 5B6/1, 5B8/1, 10B8/1.		93.5	SS-22	27	50/3"			50/3"										
355.8	99.3	Boring Terminated at 99.3 feet.		98.5	SS-23	25	50/4"			50/4"										
350.8																				

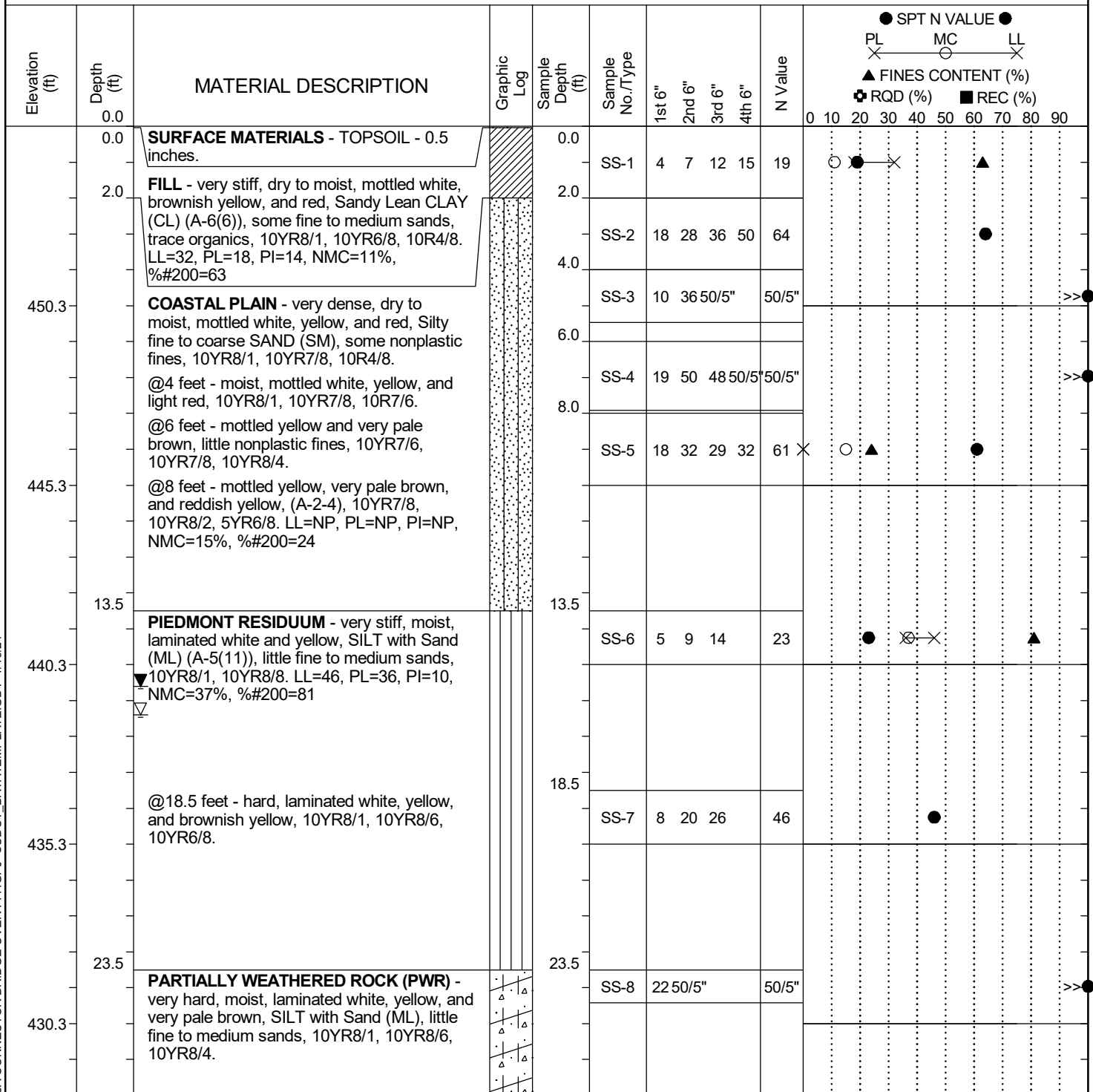
LEGEND

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 3C		
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd		
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.32		Offset:	58.4		Alignment:	Proposed		
Elev.:	455.3 ft		Latitude:	34.191026746		Longitude:	-80.98350398		Date Started:	11/2/2023		
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/2/2023		
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.0%	
Core Size:	N/A		Driller:	T. Shearin		Groundwater:	TOB	N/A		24HR	15.6 ft	



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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 3C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.32		Offset:	58.4		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.191026746		Longitude:	-80.98350398		Date Started:	11/2/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/2/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.0%
Core Size:	N/A		Driller:	T. Shearin		Groundwater:	TOB	N/A		24HR	15.6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
425.3		@28.5 feet - laminated yellow, white, and very pale brown, little fine to coarse sands, 10YR8/6, 10YR8/1, 10YR8/4.		28.5	SS-9	10	23	50/5"		50/5"										
420.3	33.5	PIEDMONT RESIDUUM - very hard, moist, laminated yellow, white, and very pale brown, SILT with Sand (ML), little fine to medium sands, 10YR7/6, 10YR8/1, 10YR8/4.		33.5	SS-10	12	27	43		70										
415.3	38.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, moist, laminated reddish yellow, pinkish white, and brownish yellow, SILT with Sand (ML), little fine to medium sands, 5YR7/6, 5YR6/6, 5YR8/2, 10YR6/8.		38.5	SS-11	18	43	50/5"		50/5"										
410.3	43.5	PIEDMONT RESIDUUM - very hard, moist, laminated pale red and yellow, Sandy SILT (ML), some fine to coarse sands, trace fine rock fragments, 10R6/3, 10R7/4, 10YR7/8.		43.5	SS-12	13	29	40		69										
405.3		@48.5 feet - laminated brownish yellow, yellow, and very pale brown, some fine to medium sands, absent rock fragments, 10YR6/6, 10YR7/8, 10YR8/4.		48.5	SS-13	9	20	36		56										
	53.5	Very stiff, moist, laminated very pale brown.		53.5																

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 3C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.32		Offset:	58.4		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.191026746		Longitude:	-80.98350398		Date Started:	11/2/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/2/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.0%
Core Size:	N/A		Driller:	T. Shearin		Groundwater:	TOB	N/A		24HR	15.6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>
400.3		yellow, and white, SILT with Sand (ML), little fine to medium sands, 10YR8/4, 10YR8/1, 10YR8/6.			SS-14	7	12	17		29	●
		@58.5 feet - hard, laminated yellow, 10YR7/8, 10YR8/8, 10YR8/6.		58.5							
395.3					SS-15	7	13	19		32	●
				63.5							
390.3					SS-16	7	13	18		31	●
		@68.5 feet - laminated yellow, brownish yellow, and dark yellowish brown, little fine to coarse sands, trace fine rock fragments, 10YR7/8, 10YR6/8, 10YR4/6.		68.5							
385.3					SS-17	10	18	23		41	●
		@73.5 feet - very stiff, laminated light grayish green, light gray, and very dark grayish green, little fine to medium sands, absent rock fragments, trace pyrite, 5GY6/2, 5Y6/2, 5GY3/2.		73.5							
380.3					SS-18	9	12	16		28	●
		@78.5 feet - hard, laminated grayish green, light grayish green, and white, absent pyrite, absent rock fragments, 5GY5/2, 5GY6/2, 5Y8/1.		78.5							
375.3					SS-19	10	17	23		40	●

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 3C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	H. Skerkis		Boring Location:	148+68.32		Offset:	58.4		Alignment:	Proposed	
Elev.:	455.3 ft		Latitude:	34.191026746		Longitude:	-80.98350398		Date Started:	11/2/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/2/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.0%
Core Size:	N/A		Driller:	T. Shearin		Groundwater:	TOB	N/A		24HR	15.6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type					N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
						1st 6"	2nd 6"	3rd 6"	4th 6"		0	10	20	30	40	50	60	70	80	90
370.3		@83.5 feet - very hard, trace mica, trace fine rock fragments.		83.5																
					SS-20	15	34	45		79										
365.3		@88.5 feet - laminated grayish green, dusky red, weak red, and very dusky red, micaceous, absent rock fragments, 5GY5/2, 10R3/3, 10R5/2, 10R2.5/2.		88.5																
					SS-21	15	24	31		55										
360.3		Very stiff, moist, laminated grayish green, greenish gray, and weak red, Sandy SILT (ML), some fine to medium sands, trace mica, relict rock structure, 5GY6/2, 5GY5/2, 10R5/4.		93.5																
					SS-22	9	13	15		28										
355.3		@98.5 feet - very hard, laminated grayish green and light grayish green, 5GY5/2, 5GY6/2.		98.5																
					SS-23	18	31	40		71										
350.3		Boring Terminated at 100 feet.																		

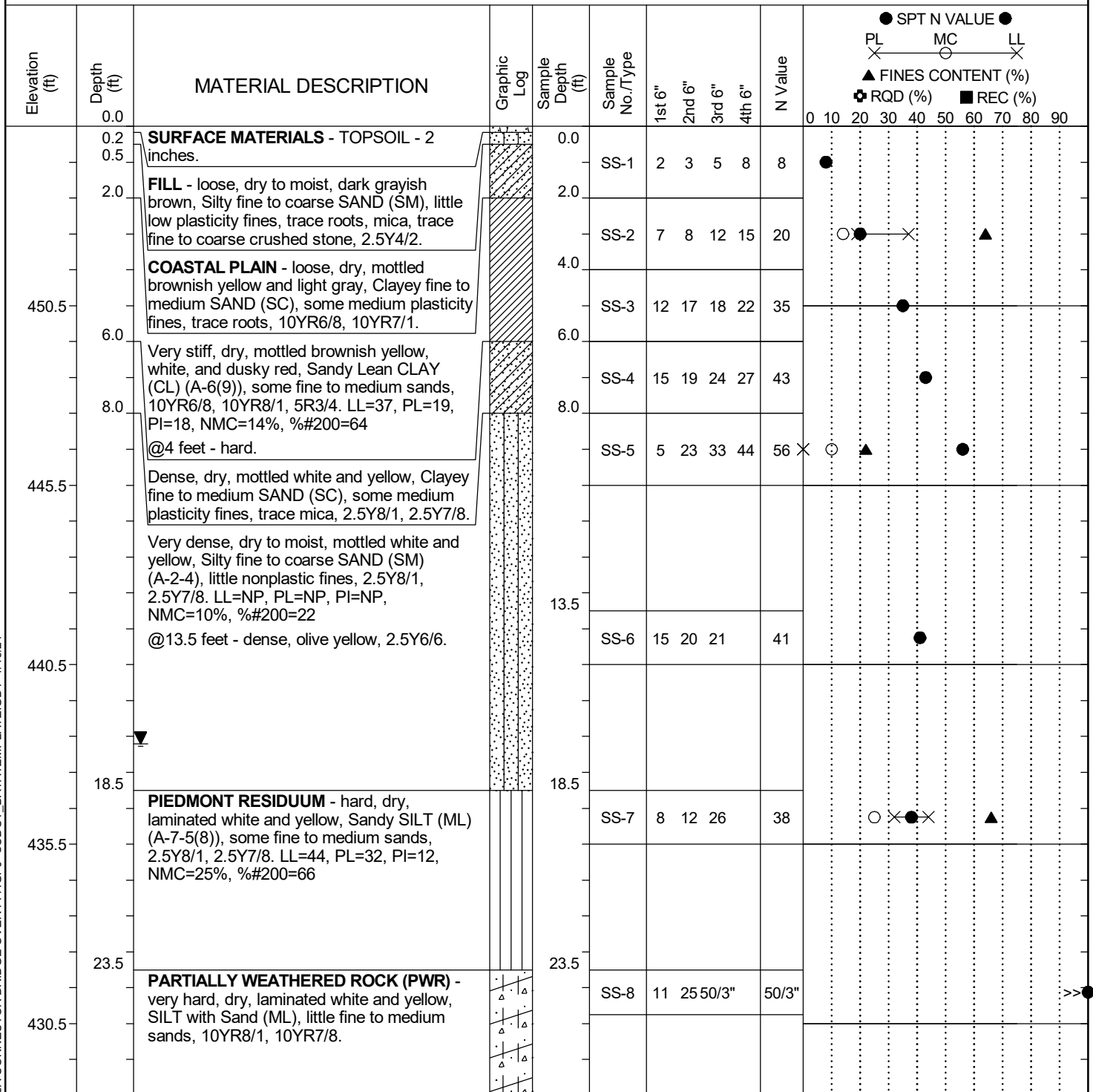
LEGEND

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 4C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+68.19		Offset:	-54.5		Alignment:	Proposed		
Elev.:	455.5 ft		Latitude:	34.191237361		Longitude:	-80.9839338		Date Started:	11/15/2023		
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/16/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%	
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	17.2 ft	



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 4C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+68.19		Offset: -54.5		Alignment: Proposed		
Elev.: 455.5 ft		Latitude: 34.191237361		Longitude: -80.9839338		Date Started: 11/15/2023		
Total Depth: 100 ft		Soil Depth: 100 ft		Core Depth: N/A ft		Date Completed: 11/16/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 17.2 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC ○ LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
425.5	33.5	Very hard, dry, laminated white and yellow, Sandy SILT (ML), some fine to coarse sands, relict rock structure, 10YR8/1, 10YR8/8. @38.5 feet - laminated white, light gray, and yellow, 2.5Y8/1, 2.5Y7/2, 2.5Y7/8.		28.5	SS-9	13	24	50/5"		50/5"	>>●
420.5				33.5	SS-10	28	50/4"			50/4"	>>●
415.5				38.5	SS-11	33	50/3"			50/3"	>>●
410.5				43.5	SS-12	28	50/4"			50/4"	>>●
405.5				48.5	SS-13	23	50/5"			50/5"	>>●
53.5	53.5	Very dense, dry, light gray, very pale brown.		53.5							>>●

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 4C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+68.19		Offset: -54.5		Alignment: Proposed		
Elev.: 455.5 ft		Latitude: 34.191237361		Longitude: -80.9839338		Date Started: 11/15/2023		
Total Depth: 100 ft		Soil Depth: 100 ft		Core Depth: N/A ft		Date Completed: 11/16/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 17.2 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
400.5	58.5	and yellow, Silty fine to coarse SAND (SM), some low plasticity fines, trace fine weathered rock fragments, 2.5Y7/2, 2.5Y7/4, 2.5Y7/8.		58.5	SS-14	26	50/5"			50/5"	
395.5		Very hard, dry, reddish gray and yellowish brown, SILT (ML), few fine to coarse sands, 10YR5/4, 10R6/1.			SS-15	11	23	50/4"		50/4"	>>●
390.5		@63.5 feet - reddish gray and brownish yellow, 10YR6/6, 10R5/1.		63.5	SS-16	12	34	50/4"		50/4"	>>●
385.5	68.5	Very hard, dry, laminated dark reddish gray and yellowish brown, Sandy SILT (ML), some fine to coarse sands, 2.5YR4/1, 10YR5/8.		68.5	SS-17	11	29	50/3"		50/3"	>>●
380.5	73.5	Very dense, dry, olive yellow and dark gray, Silty fine to coarse SAND (SM), some low plasticity fines, 2.5Y6/8, 2.5Y4/1.		73.5	SS-18	22	50/5"			50/5"	>>●
375.5	78.5	Very hard, dry, greenish gray and pale olive, Sandy SILT (ML), some fine to medium sands, trace pyrite, 10G6/1, 2.5Y6/4.		78.5	SS-19	18	37	50/4"		50/4"	>>●

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 4C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+68.19		Offset:	-54.5		Alignment:	Proposed	
Elev.:	455.5 ft		Latitude:	34.19123736		Longitude:	-80.9839338		Date Started:	11/15/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/16/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	17.2 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>
370.5	83.5	PIEDMONT RESIDUUM - very hard, dry, laminated greenish gray and grayish green, SILT with Sand (ML), little fine to medium sands, 5G5/1, 5G5/2. Very dense, wet, grayish green, Silty fine to coarse GRAVEL (GM), some low plasticity fines, 5G4/2.		83.5							
	84.5				SS-20	8	14	36		50	
365.5	88.5	Very stiff, dry to moist, greenish gray and grayish green, SILT with Sand (ML) (A-5(9)), little fine to coarse sands, trace fine rock fragments, 5G5/1, 5G8/2. LL=45, PL=35, PI=10, NMC=31%, %200=76		88.5							
					SS-21	3	6	11		17	
360.5	93.5			93.5							
					SS-22	5	6	13		19	
355.5	98.5	Very stiff, dry, greenish gray, SILT (ML), few fine to coarse sands, 5G5/1.		98.5							
					SS-23	8	8	16		24	
350.5	100.0	Boring Terminated at 100 feet.									

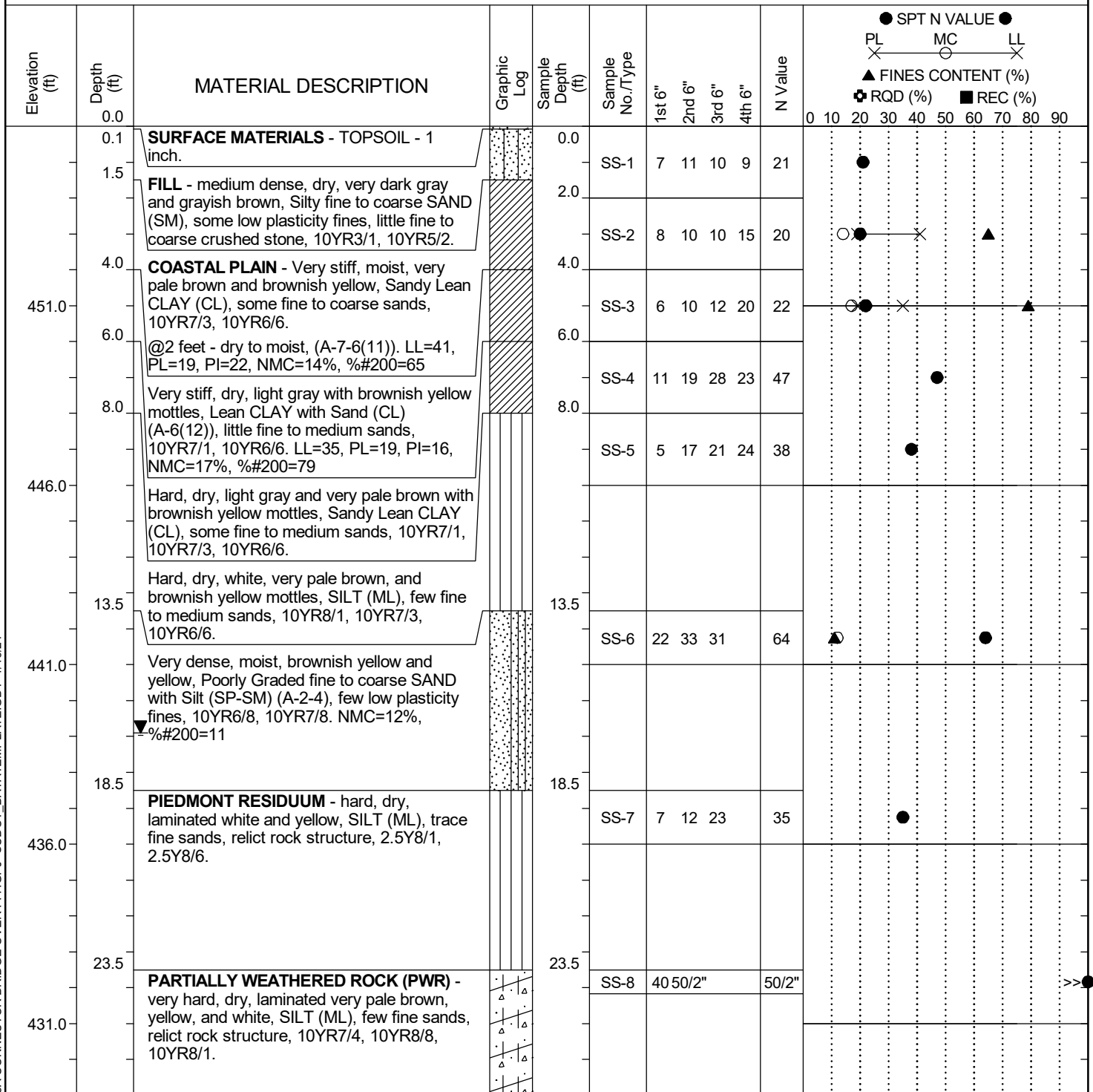
LEGEND

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 5C			
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd		
Eng./Geo.: Z. Yelaya		Boring Location:		147+67.50		Offset: -7.4		Alignment: Proposed	
Elev.: 456.0 ft		Latitude: 34.19111364		Longitude: -80.98388809		Date Started:		11/14/2023	
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed:		11/14/2023	
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio:		87.6%	
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR:		16.9 ft	



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 5C			
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd		
Eng./Geo.: Z. Zelaya		Boring Location:		147+67.50		Offset: -7.4		Alignment: Proposed	
Elev.: 456.0 ft		Latitude: 34.19111364		Longitude: -80.98388809		Date Started:		11/14/2023	
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed:		11/14/2023	
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio:		87.6%	
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR:		16.9 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%)											
											0	10	20	30	40	50	60	70	80	90		
426.0		@33.5 feet - few fine to medium sands.		28.5	SS-9	29	50/3"			50/3"												>>●
421.0				33.5	SS-10	20	50	50/3"		50/3"												>>●
416.0	38.5	Very hard, dry, laminated pink and brownish yellow, SILT (ML), trace fine sands, relict rock structure, 5YR7/4, 10YR6/6.		38.5	SS-11	15	44	50/3"		50/3"												>>●
411.0				43.5	SS-12	15	37	50/5"		50/5"												>>●
406.0	48.5	PIEDMONT RESIDUUM - very hard, dry, laminated pink, brownish yellow, and very pale brown, SILT (ML), trace fine sands, 5YR7/4, 10YR6/6, 10YR7/3.		48.5	SS-13	8	19	35		54												●
				53.5																		

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 5C			
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd		
Eng./Geo.: Z. Zelaya		Boring Location:		147+67.50		Offset: -7.4		Alignment: Proposed	
Elev.: 456.0 ft		Latitude: 34.19111364		Longitude: -80.98388809		Date Started:		11/14/2023	
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed:		11/14/2023	
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio:		87.6%	
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB		N/A		24HR 16.9 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
401.0					SS-14	17	27	44		71										
	58.5			58.5																
396.0		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated brownish yellow, very pale brown, and pink, SILT (ML), few fine sands, relict rock structure, 10YR6/6, 10YR7/3, 5YR7/4.			SS-15	13	28 50/5"			50/5"										>>●
		@63.5 feet - laminated brownish yellow to yellow, 10YR6/8, 10YR7/8.		63.5																>>●
391.0					SS-16	20	45 50/3"			50/3"										
	68.5			68.5																
386.0		PIEDMONT RESIDUUM - very hard, dry, laminated brownish yellow to yellow and pink, SILT with Sand (ML), little fine to coarse sands, trace fine to coarse quartz vein rock fragments, relict rock structure, 10YR6/8 to 10YR7/8, 5YR7/4.			SS-17	16	29	37		66										
	73.5			73.5																
381.0		Very hard, dry, laminated light olive brown to olive brown, SILT (ML), trace fine sands, relict rock structure, 2.5Y5/4 to 2.5Y4/4.			SS-18	14	28	50		78										
	78.5			78.5																
376.0		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated olive yellow and light gray, SILT (ML), trace fine sands, relict rock structure, 2.5Y6/6 to 2.5Y6/8, 2.5Y7/1.			SS-19	15	33 50/4"			50/4"										>>●

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 5C			
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd		
Eng./Geo.: Z. Zelaya		Boring Location:		147+67.50		Offset: -7.4		Alignment: Proposed	
Elev.: 456.0 ft		Latitude: 34.19111364		Longitude: -80.98388809		Date Started:		11/14/2023	
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed:		11/14/2023	
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio:		87.6%	
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR:		16.9 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
371.0	83.5	@83.5 feet - laminated light olive brown to olive brown, 2.5Y5/4 to 2.5Y4/4.		83.5	SS-20	24	50/5"			50/5"										
366.0	88.5	Very hard, dry, laminated gray to dark gray, SILT (ML), few fine to medium sands, relict rock structure, 5Y5/1 to 5Y4/1.		88.5	SS-21	19	41	50/4"		50/4"										
361.0	93.5	PIEDMONT RESIDUUM - very hard, dry, laminated gray to dark gray, SILT (ML), trace fine to medium sands, pyrite, relict rock structure, 5Y5/1 to 5Y4/1.		93.5	SS-22	20	28	30		58										
356.0	98.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated gray to dark gray, SILT (ML), few fine to medium sands, trace pyrite, relict rock structure, 5Y5/1 to 5Y4/1.		98.5	SS-23	38	50/3"			50/3"										
	99.3	Boring Terminated at 99.3 feet.																		

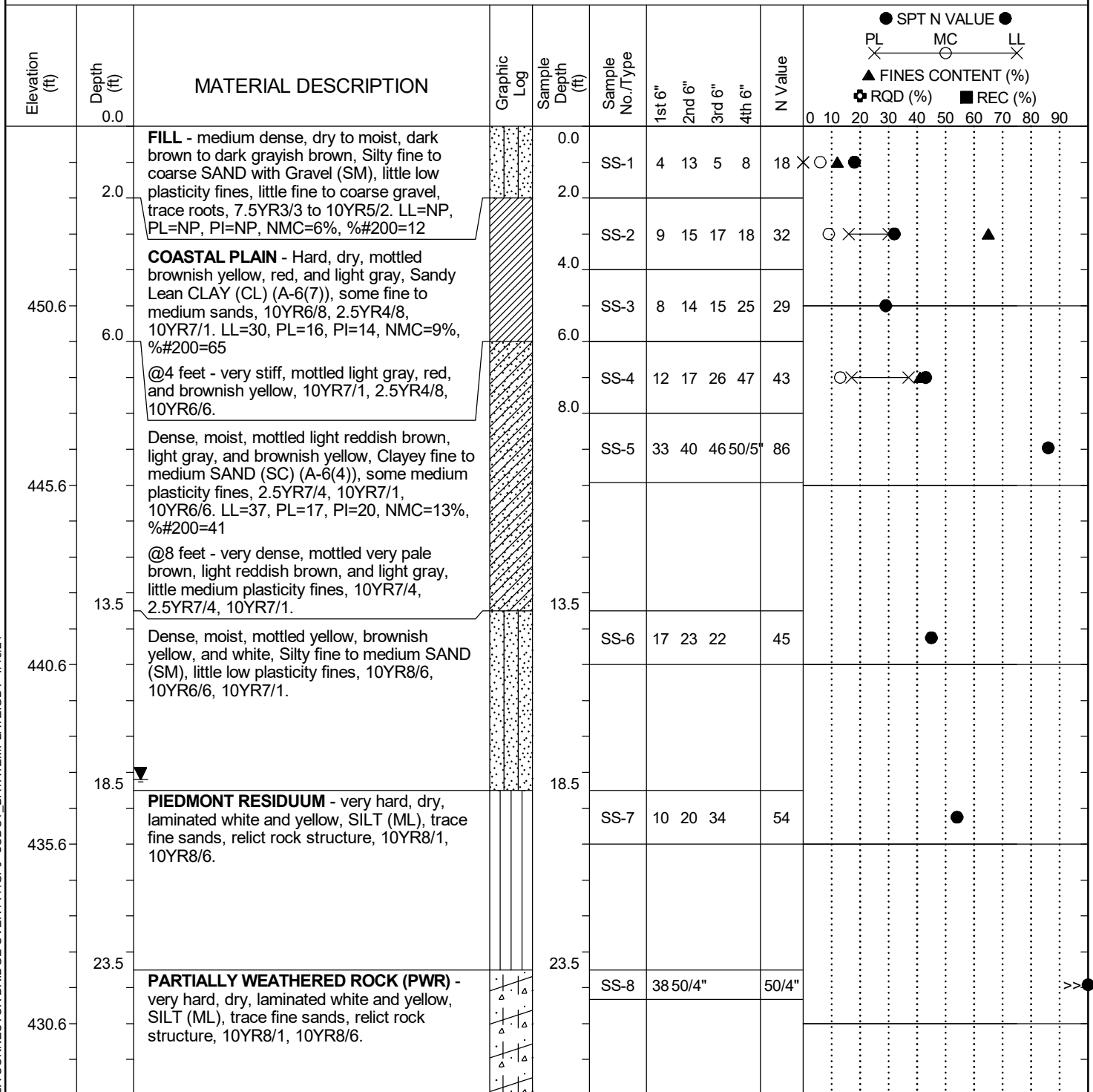
LEGEND

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 6C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Yelaya		Boring Location:	147+68.45		Offset:	35.5		Alignment:	Proposed		
Elev.:	455.6 ft		Latitude:	34.191002104		Longitude:	-80.98384144		Date Started:	11/13/2023		
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/13/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	18.2 ft	



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 6C						
Site Description:		I-77 Exit 26 Phase I					Route:	Connector Rd				
Eng./Geo.: Z. Yelaya		Boring Location:		147+68.45		Offset:	35.5	Alignment:	Proposed			
Elev.:	455.6 ft	Latitude:	34.191002104		Longitude:	-80.98384144		Date Started:	11/13/2023			
Total Depth:		100 ft	Soil Depth:	100 ft	Core Depth:	N/A ft		Date Completed:	11/13/2023			
Bore Hole Diameter (in):		4	Sampler Configuration		Liner Required:		Y (N)	Liner Used:	Y (N)			
Drill Machine:		CME-550X	Drill Method:		RW	Hammer Type:		Automatic	Energy Ratio:	87.6%		
Core Size:		N/A		Driller:		S. Eubanks		Groundwater:	TOB	N/A	24HR	18.2 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
425.6	28.5	Very hard, dry, laminated white, very pale brown, and yellow, SILT (ML), few fine sands, relict rock structure, 10YR8/1, 10YR8/3, 10YR8/6.		28.5	SS-9	41	50/5"			50/5"										
420.6	33.5	PIEDMONT RESIDUUM - very hard, dry, laminated very pale brown, brownish yellow, and weak red, SILT (ML), few fine sands, relict rock structure, 10YR8/3, 10YR6/6, 10R4/4.		33.5	SS-10	13	21	32		53										
415.6	38.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated very pale brown, pale red, and brownish yellow, SILT (ML), trace fine to medium sands, relict rock structure, 10YR7/3, 10R6/2, 10YR6/6.		38.5	SS-11	22	50/5"			50/5"										
410.6	43.5			43.5	SS-12	12	29	50/5"		50/5"										
405.6	48.5	@48.5 feet - laminated very pale brown, white, and pale red, 10YR7/3, 10YR8/1, 10R6/2.		48.5	SS-13	18	36	50/5"		50/5"										
	53.5	PIEDMONT RESIDUUM - very hard, dry.		53.5																

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 6C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	Z. Zelaya		Boring Location:	147+68.45		Offset:	35.5		Alignment:	Proposed	
Elev.:	455.6 ft		Latitude:	34.191002104		Longitude:	-80.98384144		Date Started:	11/13/2023	
Total Depth:	100 ft		Soil Depth:	100 ft		Core Depth:	N/A ft		Date Completed:	11/13/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	18.2 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
400.6		laminated very pale brown and brownish yellow, SILT (ML), trace fine sands, relict rock structure, 10YR7/3, 10YR6/6.			SS-14	14	26	44		70	
	58.5										
395.6		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated brownish yellow and very pale brown, SILT (ML), trace fine to medium sands, relict rock structure, 10YR6/6, 10YR7/3.		58.5	SS-15	16	38	50/3"		50/3"	>>●
390.6		@63.5 feet - laminated brownish yellow to yellowish brown, 10YR6/8 to 10YR5/8.		63.5	SS-16	22	49	50/2"		50/2"	>>●
385.6				68.5	SS-17	15	36	50/5"		50/5"	>>●
380.6	73.5	PIEDMONT RESIDUUM - very hard, dry, laminated yellowish brown to dark yellowish brown, SILT with Sand (ML), little fine to medium sands, relict rock structure, 10YR5/6 to 10YR6/8, 10YR4/4.		73.5	SS-18	12	25	35		60	●
375.6	78.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated olive yellow to yellowish brown, SILT (ML), few fine sands, relict rocks structure, 2.5Y6/6, 10YR5/8.		78.5	SS-19	22	42	50/5"		50/5"	>>●

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 6C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 147+68.45		Offset: 35.5		Alignment: Proposed		
Elev.: 455.6 ft		Latitude: 34.191002104		Longitude: -80.98384144		Date Started: 11/13/2023		
Total Depth: 100 ft		Soil Depth: 100 ft		Core Depth: N/A ft		Date Completed: 11/13/2023		
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR: 18.2 ft		

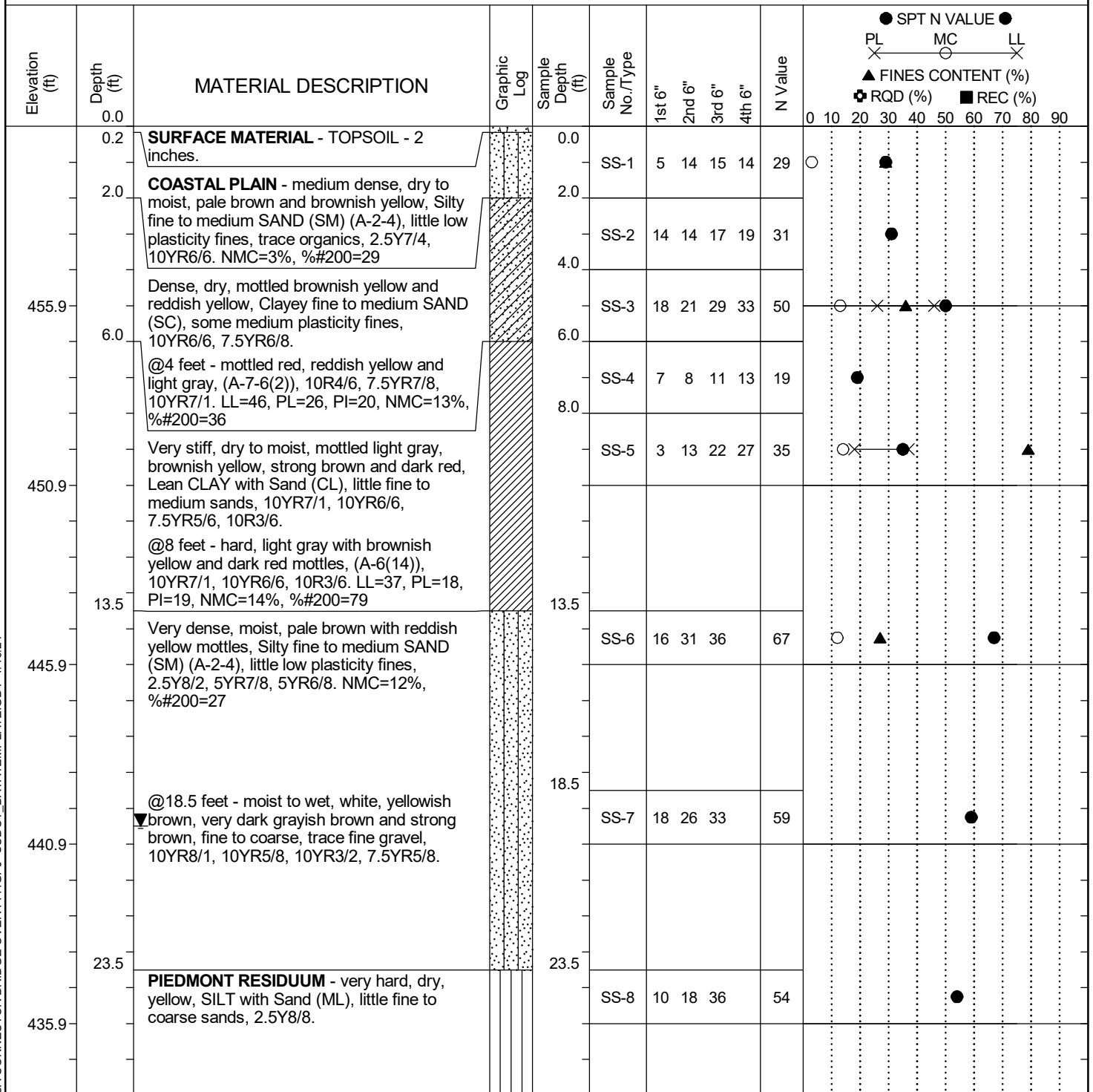
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
370.6	83.5	Very hard, dry, laminated gray to dark gray, SILT with Sand (ML), little fine to medium sands, trace pyrite, relict rock structure, 2.5Y5/1 to 2.5Y4/1.		83.5	SS-20	18	33	50/3"		50/3"	>>●									
365.6				88.5	SS-21			32	50/3"	50/3"	>>●									
360.6				93.5	SS-22			50/4"		50/4"	>>●									
355.6	98.8			98.5	SS-23			50/3"		50/3"	>>●									
		@93.5 feet - little fine to coarse sands.																		
		@98.5 feet - trace fine to coarse rock fragments.																		
		Boring Terminated at 98.8 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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 7C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+14.80		Offset: -48.9		Alignment: Proposed		
Elev.: 460.9 ft		Latitude: 34.191177457		Longitude: -80.98409601		Date Started: 10/18/2023		
Total Depth: 98.7 ft		Soil Depth: 98.7 ft		Core Depth: N/A ft		Date Completed: 10/18/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 19.5 ft		



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 7C			
Site Description:		I-77 Exit 26 Phase I					Route:	Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location:		147+14.80		Offset:	-48.9	Alignment:	Proposed
Elev.: 460.9 ft	Latitude:	34.191177457		Longitude:	-80.98409601		Date Started:		10/18/2023
Total Depth:	98.7 ft	Soil Depth:	98.7 ft	Core Depth:	N/A ft		Date Completed:		10/18/2023
Bore Hole Diameter (in): 4		Sampler Configuration			Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine:	CME-550X	Drill Method: RW		Hammer Type: Automatic		Energy Ratio:		91.6%	
Core Size:	N/A	Driller:	L. Shrader		Groundwater: TOB	N/A		24HR	19.5 ft

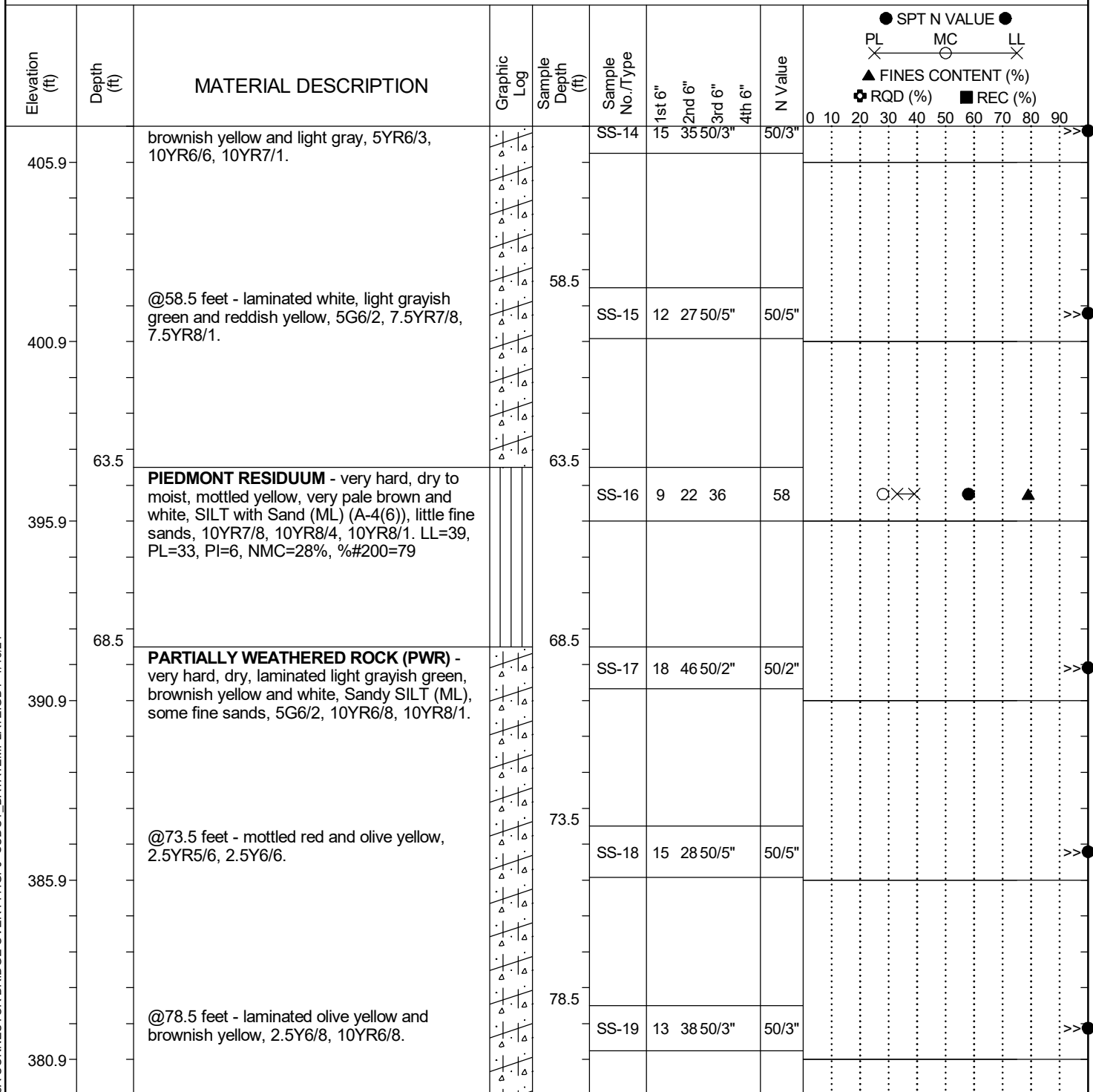
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) + RQD (%) ■ REC (%)
430.9	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, white with olive yellow and pale brown mottles, SILT with Sand (ML) (A-7-5(9)), little fine to coarse sands, 2.5Y8/1, 2.5Y6/8, 2.5Y8/4. LL=44, PL=33, PI=11, NMC=25%, %200=73 @33.5 feet - laminated pale brown and white, 2.5Y8/4, 2.5Y8/1. @43.5 feet - laminated very pale brown and white, 10YR7/4, 10YR8/1. @48.5 feet - laminated pink, very pale brown and white, 7.5YR7/4, 10YR8/4, 10YR8/1. @53.5 feet - laminated light reddish brown.		28.5	SS-9	18	37 50/2"			50/2"	○ × — × ▲ >>●
425.9				33.5	SS-10	18	50/4"			50/4"	>>●
420.9				38.5	SS-11	17	50/5"			50/5"	>>●
415.9				43.5	SS-12	16	50/5"			50/5"	>>●
410.9				48.5	SS-13	16	43 50/2"			50/2"	>>●
				53.5							

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	

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 7C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+14.80		Offset: -48.9		Alignment: Proposed		
Elev.: 460.9 ft		Latitude: 34.191177457		Longitude: -80.98409601		Date Started: 10/18/2023		
Total Depth: 98.7 ft		Soil Depth: 98.7 ft		Core Depth: N/A ft		Date Completed: 10/18/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR 19.5 ft		



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 7C	
Site Description: I-77 Exit 26 Phase I		Route: Connector Rd					
Eng./Geo.: E. Eastabrooks		Boring Location: 147+14.80		Offset: -48.9		Alignment: Proposed	
Elev.: 460.9 ft		Latitude: 34.191177457		Longitude: -80.98409601		Date Started: 10/18/2023	
Total Depth: 98.7 ft		Soil Depth: 98.7 ft		Core Depth: N/A ft		Date Completed: 10/18/2023	
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%	
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 19.5 ft	

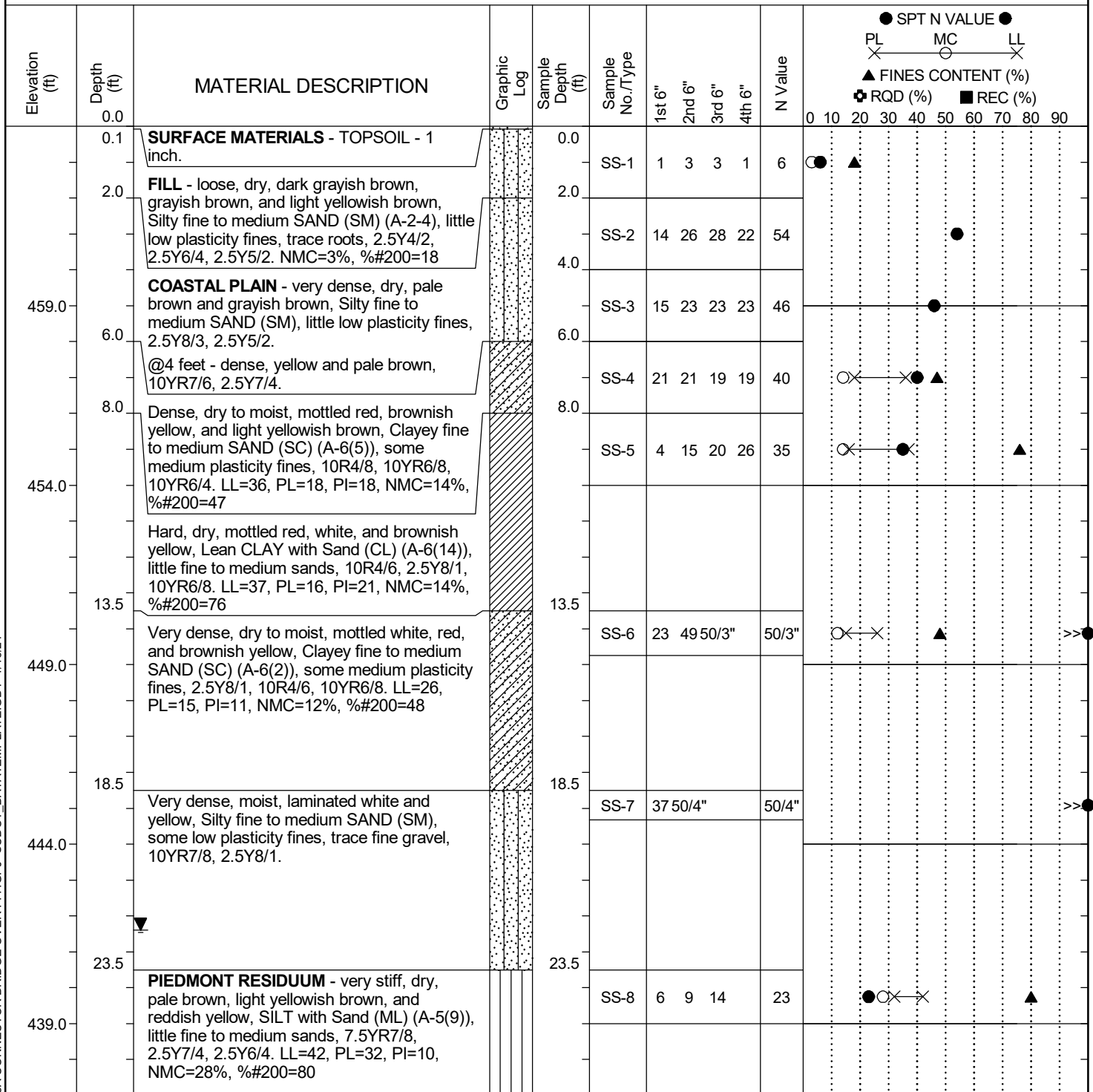
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div>● SPT N VALUE ●</div> <div>PL X MC O LL X</div> <div>▲ FINES CONTENT (%)</div> <div>⊕ RQD (%) ■ REC (%)</div> <div>0 10 20 30 40 50 60 70 80 90</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
375.9		@83.5 feet - laminated olive yellow and olive, 2.5Y6/6, 5Y5/4.		83.5	SS-20	25	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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	IB- 8C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	147+17.23	Offset:	7.7
Elev.:	464.0 ft	Latitude:	34.19103167	Longitude:	-80.98403094
Date Started:	10/19/23				
Total Depth:	99.2 ft	Soil Depth:	99.2 ft	Core Depth:	N/A ft
Date Completed:	10/19/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	22.4 ft				



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 8C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+17.23		Offset:	7.7		Alignment:	Proposed	
Elev.:	464.0 ft		Latitude:	34.19103167		Longitude:	-80.98403094		Date Started:	10/19/23	
Total Depth:	99.2 ft		Soil Depth:	99.2 ft		Core Depth:	N/A ft		Date Completed:	10/19/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	22.4 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
434.0		@28.5 feet - laminated pale yellow, light gray, and gray, 5Y8/2, 5Y7/2, 5YR5/1.		28.5	SS-9	6	10	16		26										
429.0	33.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated reddish yellow, pale brown, gray, and white, Sandy SILT (ML), some fine to medium sands, 7.5YR7/8, 2.5Y8/4, 2.5Y6/1, 2.5Y8/1.		33.5	SS-10	25 50/4"				50/4"										>>●
424.0		@38.5 feet - laminated pink, reddish yellow, and white, 7.5YR8/4, 7.5YR6/8, 7.5YR8/1.		38.5	SS-11	17	25 50/4"			50/4"										>>●
419.0		@43.5 feet - laminated pink and brownish yellow, 5YR7/4, 10YR6/8.		43.5	SS-12	25 50/3"				50/3"										>>●
414.0	48.5	PIEDMONT RESIDUUM - very hard, dry, reddish yellow, pink, and white, Sandy SILT (ML) (A-7-5(12)), some fine to medium sands, 7.5YR6/8, 7.5YR8/1, 10YR6/8. LL=49, PL=32, PI=17, NMC=29%, %200=69		48.5	SS-13	17	27	35		62										⊕ — ⊕ ● ▲
		@53.5 feet - hard, dry to moist, laminated		53.5																

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 8C	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+17.23		Offset:	7.7		Alignment:	Proposed	
Elev.:	464.0 ft		Latitude:	34.19103167		Longitude:	-80.98403094		Date Started:	10/19/23	
Total Depth:	99.2 ft		Soil Depth:	99.2 ft		Core Depth:	N/A ft		Date Completed:	10/19/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	22.4 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
409.0		pink, brownish yellow, and pale brown, 5YR7/3, 10YR6/8, 2.5Y8/4.			SS-14	7	15	26		41										
	58.5			58.5																
404.0		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, laminated pale red, reddish gray, and white, Sandy SILT (ML), some fine sands, 5Y6/2, 5R6/1, 5R7/2, 5R8/1.			SS-15	18	45	50/2"		50/2"										>>●
	63.5			63.5																
399.0		PIEDMONT RESIDUUM - hard, dry to moist, mottled white, dark reddish brown, and yellow, Sandy SILT (ML), some fine to coarse sands, few fine to coarse quartz vein weathered rock fragments, 2.5YR8/1, 2.5YR3/3, 10YR7/8.			SS-16	19	27	21		48										
	68.5			68.5																
394.0		PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, pale brown with olive yellow and pink mottles, Sandy SILT (ML), some fine sands, 2.5Y7/4, 2.5Y6/8, 7.5YR8/4.			SS-17	13	27	50/5"		50/5"										>>●
	73.5	@73.5 feet - laminated olive yellow and very pale brown, 2.5Y6/6, 10YR7/4.			SS-18	15	37	50/3"		50/3"										>>●
389.0																				
	78.5	@78.5 feet - mottled brownish yellow and dark brown, 10YR6/6, 10YR3/3.			SS-19	27	50/4"			50/4"										>>●
384.0																				

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 8C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+17.23		Offset:	7.7		Alignment:	Proposed	
Elev.:	464.0 ft		Latitude:	34.19103167		Longitude:	-80.98403094		Date Started:	10/19/23	
Total Depth:	99.2 ft		Soil Depth:	99.2 ft		Core Depth:	N/A ft		Date Completed:	10/19/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	22.4 ft

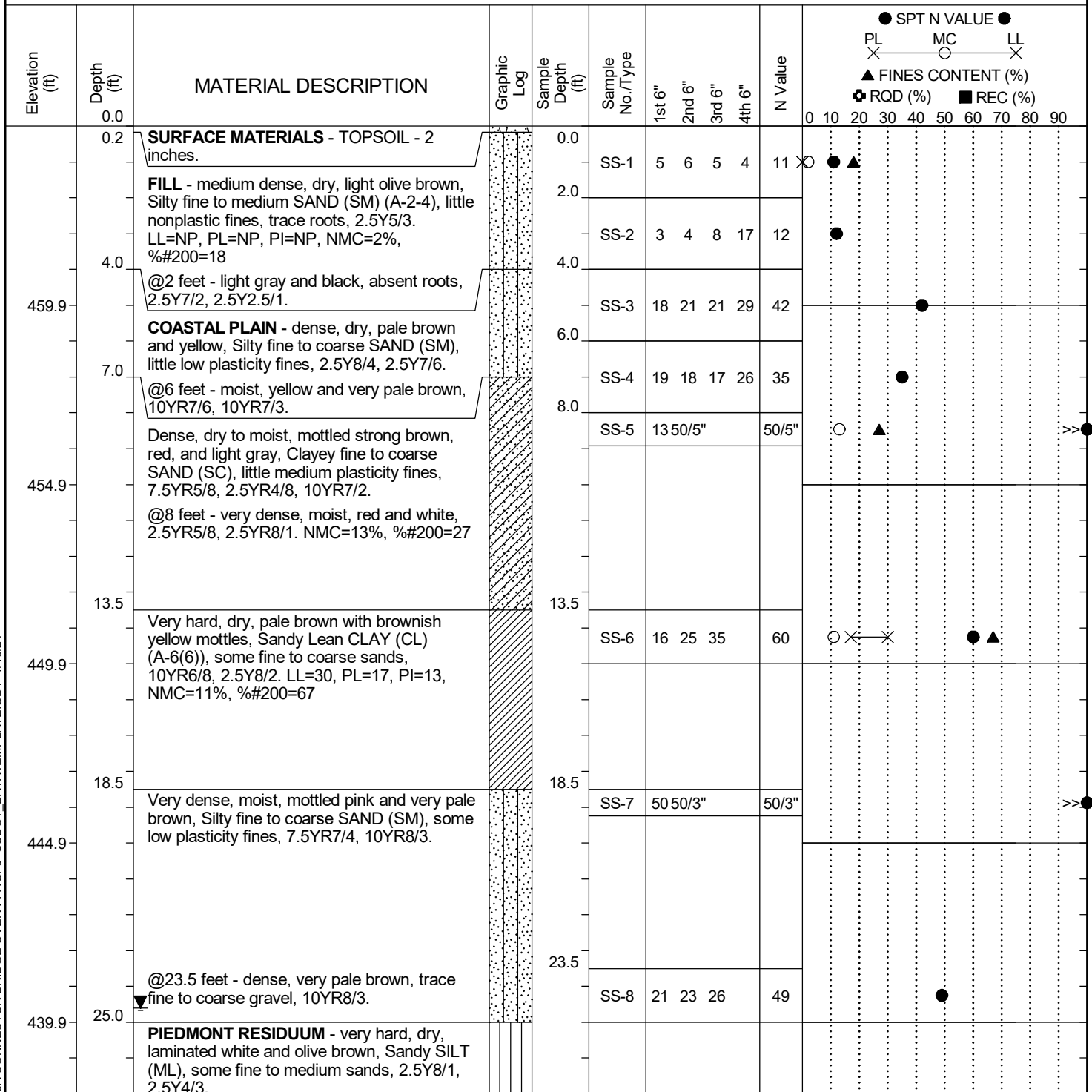
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
379.0				83.5	SS-20	13	28	50/4"		50/4"	>>●
374.0		@88.5 feet - laminated light grayish olive and yellow, 10Y6/2, 2.5Y8/8.		88.5	SS-21	20	50/5"			50/5"	>>●
369.0		@93.5 feet - laminated greenish gray, 10GY6/1.		93.5	SS-22	16	46	50/3"		50/3"	>>●
364.0	99.2	@98.5 feet - greenish gray, trace pyrite, 5BG5/1. Boring Terminated at 99.2 feet.		98.5	SS-23	36	50/2"			50/2"	>>●
359.0											

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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	IB- 9C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	147+19.17	Offset:	57.5
Elev.:	464.9 ft	Latitude:	34.190903077	Longitude:	-80.98397419
Date Started:	10/23/2023				
Total Depth:	99.3 ft	Soil Depth:	99.3 ft	Core Depth:	N/A ft
Date Completed:	10/24/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	24.6 ft				



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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 9C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+19.17		Offset: 57.5		Alignment: Proposed		
Elev.: 464.9 ft		Latitude: 34.190903077		Longitude: -80.98397419		Date Started: 10/23/2023		
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed: 10/24/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 24.6 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
434.9	33.5	PARTIALLY WEATHERED ROCK (PWR) - very dense, dry, laminated pale brown, brownish yellow, and dark gray, Silty fine to coarse SAND (SM), some low plasticity fines, trace fine weathered rock fragments, 2.5Y8/4, 10YR6/8. @38.5 feet - laminated very pale brown and white, fine to medium, absent weathered rock fragments, 10YR7/4, 10YR8/1.		28.5	SS-9	9	18	33		51										
429.9				33.5	SS-10	37 50/2"				50/2"										>>●
424.9				38.5	SS-11	20 50/5"				50/5"										>>●
419.9				43.5	SS-12	11	21 50/5"			50/5"										>>●
414.9	48.5	PIEDMONT RESIDUUM - very hard, dry to moist, laminated reddish yellow and white, Sandy SILT (ML), some fine to medium sands, 5YR6/6, 5YR8/1.		48.5	SS-13	9	18	38		56										
		@53.5 feet - laminated pink and white.		53.5																

LEGEND

Continued Next Page

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

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB- 9C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+19.17		Offset: 57.5		Alignment: Proposed		
Elev.: 464.9 ft		Latitude: 34.190903077		Longitude: -80.98397419		Date Started: 10/23/2023		
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed: 10/24/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 24.6 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
409.9		5YR7/4, 5YR8/1.			SS-14	9	17	36		53										
		@58.5 feet - laminated very pale brown and pink, 10YR8/4, 5YR7/4.		58.5																
404.9					SS-15	10	20	37		57										
		@63.5 feet - laminated reddish yellow, white, and yellow, 5YR7/6, 5YR8/1, 10YR8/8.		63.5																
399.9					SS-16	9	18	35		53										
	68.5			68.5																
		PARTIALLY WEATHERED ROCK (PWR) - very dense, dry, laminated yellow and reddish yellow, Silty fine to medium SAND (SM), some low plasticity fines, 10YR7/8, 7.5YR7/6.			SS-17	14	36 50/3"			50/3"										>>●
394.9																				
		@73.5 feet - laminated yellowish red and white, 5YR5/6, 5YR8/1.		73.5																>>●
					SS-18	12	27 50/5"			50/5"										
389.9																				
		@78.5 feet - laminated yellow and white, 10YR7/8, 10YR8/1.		78.5																>>●
					SS-19	12	27 50/4"			50/4"										
384.9																				

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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB- 9C			
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd			
Eng./Geo.:	E. Eastabrooks		Boring Location:		147+19.17		Offset:	57.5		Alignment:	Proposed		
Elev.:	464.9 ft		Latitude:		34.190903077		Longitude:		-80.98397419		Date Started:	10/23/2023	
Total Depth:		99.3 ft		Soil Depth:		99.3 ft		Core Depth:		N/A ft		Date Completed:	10/24/2023
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)		Liner Used:	Y (N)
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic		Energy Ratio:	91.6%
Core Size:		N/A		Driller:		L. Shrader		Groundwater:		TOB N/A		24HR	24.6 ft

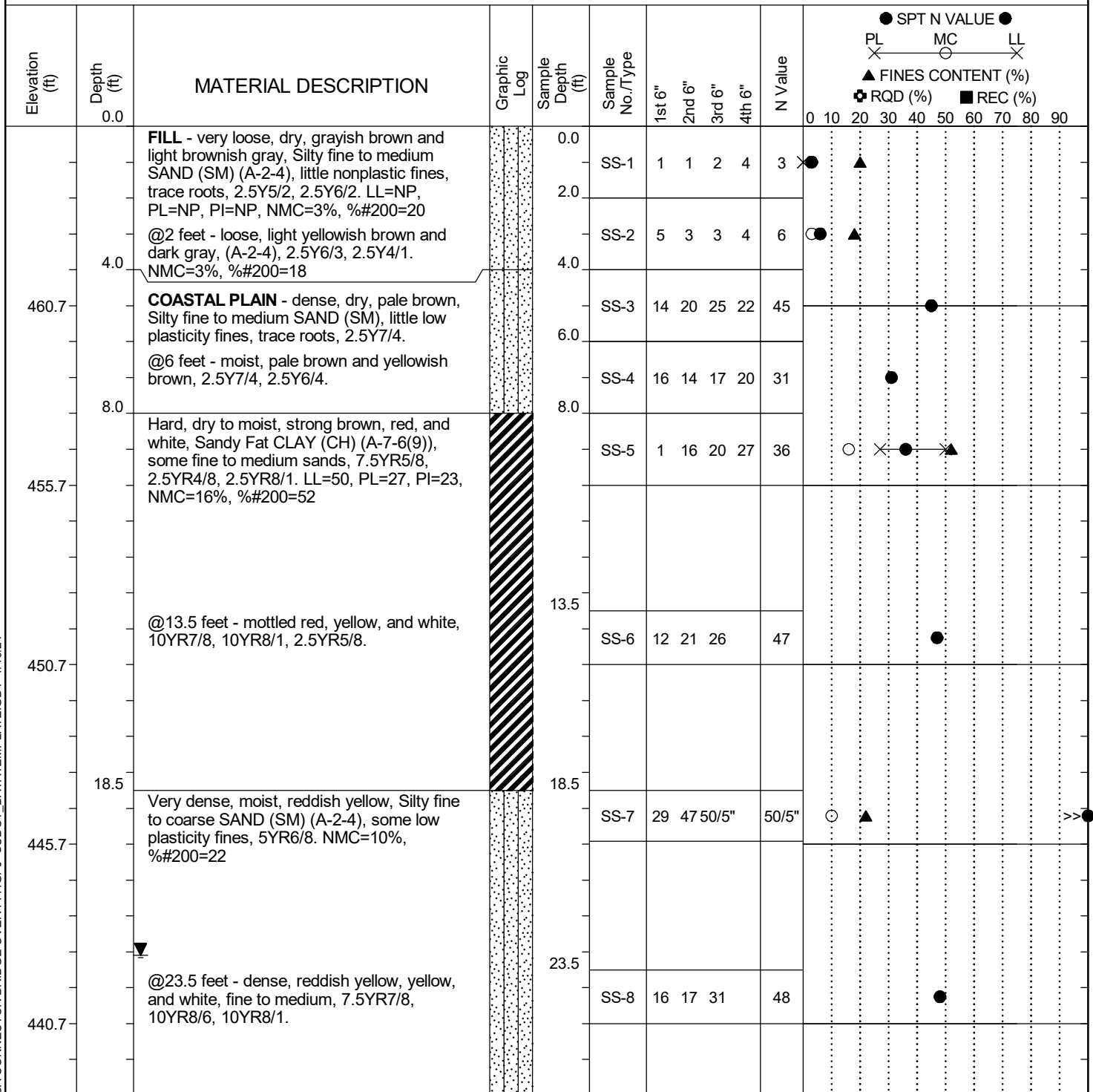
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL MC LL X X X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
379.9	83.5	PIEDMONT RESIDUUM - very hard, dry, laminated brownish yellow, white, and pale brown with black mottles, Sandy SILT (ML), some fine to medium sands, 10YR6/8, 10YR8/1, 10YR6/3, 10YR2/1.		83.5	SS-20	14	24	38		62	●
374.9	88.5			88.5	SS-21	23 50/5"				50/5"	>>●
369.9	93.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated brownish yellow and white, Sandy SILT (ML), some fine to medium sands, 10YR6/8, 10YR8/1.		93.5	SS-22	29 50/3"				50/3"	>>●
364.9	98.5			98.5	SS-23	28 50/3"				50/3"	>>●
359.9	99.3	@98.5 feet - laminated yellow, very pale brown, and olive yellow, 10YR8/8, 10YR7/4, 2.5Y6/8. Boring Terminated at 99.3 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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	IB-10C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	147+20.10	Offset:	102.7
Elev.:	465.7 ft	Latitude:	34.190785679	Longitude:	-80.98392534
Date Started:	10/24/2023				
Total Depth:	99.3 ft	Soil Depth:	99.3 ft	Core Depth:	N/A ft
Date Completed:	10/25/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	23.1 ft				



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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB-10C		
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks		Boring Location:	147+20.10		Offset:	102.7		Alignment:	Proposed		
Elev.:	465.7 ft		Latitude:	34.190785679		Longitude:	-80.98392534		Date Started:	10/24/2023		
Total Depth:	99.3 ft		Soil Depth:	99.3 ft		Core Depth:	N/A ft		Date Completed:	10/25/2023		
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%	
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	23.1 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
435.7	28.5	PIEDMONT RESIDUUM - hard, dry, mottled yellow, pale brown, and yellowish brown, Elastic SILT (MH) (A-7-5(22)), few fine to medium sands, trace coarse rock fragments, 10YR8/8, 10YR6/8, 2.5Y8/2. LL=62, PL=45, PI=17, NMC=29%, %200=90 @33.5 feet - very hard, yellow and brownish yellow, 10YR7/8, 10YR6/8.		28.5	SS-9	7	13	23		36	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
430.7	33.5			33.5	SS-10	9	19	40		59	
425.7	38.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, brownish yellow and pink, Sandy SILT (ML), some fine to medium sands, 7.5YR7/4, 10YR6/8.		38.5	SS-11	20	46	50/2"		50/2"	>>●
420.7	43.5	PIEDMONT RESIDUUM - very hard, dry, weak red, dark red, and yellow, Sandy SILT (ML), some fine sands, 5R4/3, 5R3/6, 10YR8/8.		43.5	SS-12	12	22	45		67	
415.7	48.5	@48.5 feet - laminated weak red, dark red, and reddish yellow, 5R5/3, 5R2.5/6, 7.5YR6/6.		48.5	SS-13	9	27	49		76	
	53.5	@53.5 feet - laminated brownish yellow and		53.5							

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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	IB-10C
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	147+20.10	Offset:	102.7
Elev.:	465.7 ft	Latitude:	34.190785679	Longitude:	-80.98392534
Date Started:	10/24/2023				
Total Depth:	99.3 ft	Soil Depth:	99.3 ft	Core Depth:	N/A ft
Date Completed:	10/25/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	23.1 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
410.7		white with dusky red mottles, few fine to coarse quartz weathered rock fragments, 10YR6/8, 10YR8/1, 10R3/4.			SS-14	14	26	48		74	●
405.7		@58.5 feet - hard, moist, laminated weak red, dusky red, and white, 10R4/4, 10R3/4, 10R8/1.		58.5	SS-15	8	15	29		44	●
400.7		@63.5 feet - dry, laminated dusky red and white, 10R3/4, 10R8/1.		63.5	SS-16	6	12	23		35	●
395.7				68.5	SS-17	5	11	21		32	●
73.5		PARTIALLY WEATHERED ROCK (PWR) - very dense, moist to wet, reddish yellow, yellow, and grayish green, Silty fine quartz GRAVEL with Sand (GM), some low plasticity fines, little fine to coarse sands, 7.5YR7/8, 7.5YR6/8, 10YR8/8, 5GY5/2.		73.5	SS-18	20	50/4"			50/4"	>>●
390.7											
78.5		Very hard, dry, brownish yellow, Sandy SILT (ML), some fine sands, 10YR6/8.		78.5	SS-19	32	50/3"			50/3"	>>●
385.7											

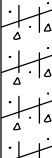
LEGEND

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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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB-10C		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: E. Eastabrooks		Boring Location: 147+20.10		Offset: 102.7		Alignment: Proposed		
Elev.: 465.7 ft		Latitude: 34.190785679		Longitude: -80.98392534		Date Started: 10/24/2023		
Total Depth: 99.3 ft		Soil Depth: 99.3 ft		Core Depth: N/A ft		Date Completed: 10/25/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 91.6%		
Core Size: N/A		Driller: L. Shrader		Groundwater: TOB N/A		24HR: 23.1 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type					N Value	<div>● SPT N VALUE ●</div> <div>PL X MC O LL X</div> <div>▲ FINES CONTENT (%)</div> <div>⊕ RQD (%) ■ REC (%)</div> <div>0 10 20 30 40 50 60 70 80 90</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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380.7		@83.5 feet - laminated yellowish brown and white, 10YR5/6, 10YR8/1.		83.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

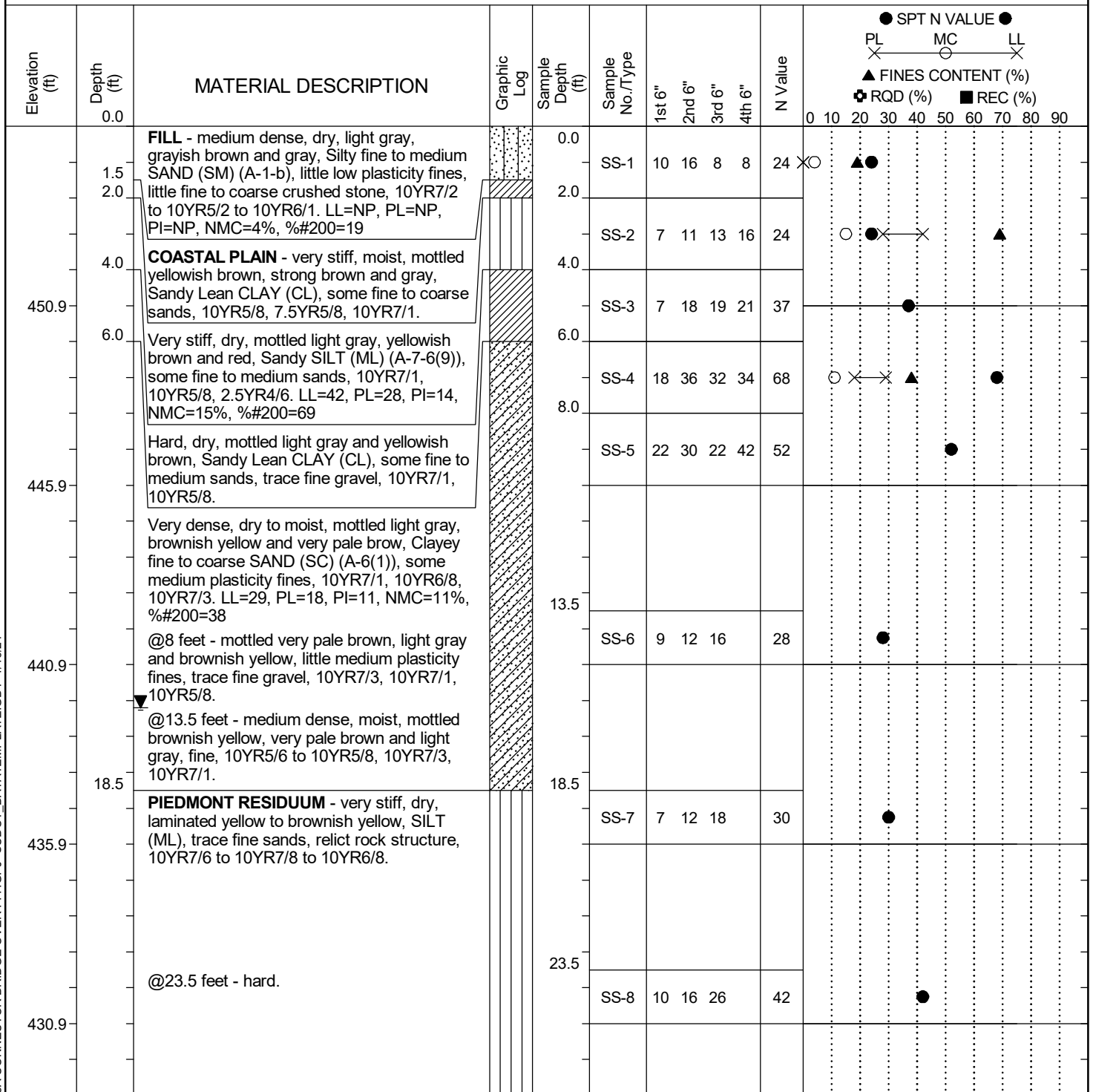
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SAMPLER TYPE			DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"		HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings		CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube		DC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

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB-11C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	Z. Yelaya		Boring Location:	147+67.94		Offset:	113.3		Alignment:	Proposed	
Elev.:	455.9 ft		Latitude:	34.190798359		Longitude:	-80.98376403		Date Started:	11/7/2023	
Total Depth:	99.9 ft		Soil Depth:	99.9 ft		Core Depth:	N/A ft		Date Completed:	11/7/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	16.2 ft



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB-11C		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Yelaya		Boring Location:	147+67.94		Offset:	113.3		Alignment:	Proposed		
Elev.:	455.9 ft		Latitude:	34.190798359		Longitude:	-80.98376403		Date Started:	11/7/2023		
Total Depth:	99.9 ft		Soil Depth:	99.9 ft		Core Depth:	N/A ft		Date Completed:	11/7/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	16.2 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
425.9	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated yellow and very pale brown, SILT (ML), few fine to coarse sands, relict rock structure, 10YR7/6 to 10YR8/6 to 10YR7/8, 10YR7/3.		28.5	SS-9	20	43	50/4"	50/4"		
420.9	33.5	PIEDMONT RESIDUUM - hard, dry, laminated pale red to weak red and yellowish brown, Elastic SILT with Sand (MH) (A-7-5(18)), little fine to coarse sands, relict rock structure, 5R6/2 to 5R5/2, 10YR5/8. LL=67, PL=46, PI=21, NMC=36%, %200=71		33.5	SS-10	8	14	20	34		
415.9	38.5	Very hard, dry, laminated pale red to weak red and strong brown, SILT (ML), trace fine to medium sands, relict rock structure, 5R6/2 to 5R5/2, 7.5YR5/8.		38.5	SS-11	13	25	48	73		
410.9	43.5	@43.5 feet - hard, laminated yellowish brown and pale red to weak red, 10YR5/8, 5R6/2 to 5R5/2.		43.5	SS-12	9	12	27	39		
405.9	48.5	@48.5 feet - very hard, laminated yellowish brown and weak red, trace fine to coarse sands, trace fine rock fragments (quartz vein), 10YR5/8, 7.5R4/3.		48.5	SS-13	11	20	31	51		
	53.5	@53.5 feet - hard, laminated weak red to		53.5							

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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: IB-11C			
Site Description:		I-77 Exit 26 Phase I					Route:	Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location:		147+67.94		Offset:	113.3	Alignment:	Proposed
Elev.:	455.9 ft	Latitude:	34.190798359	Longitude:	-80.98376403	Date Started:		11/7/2023	
Total Depth:		99.9 ft	Soil Depth:	99.9 ft	Core Depth:	N/A ft	Date Completed:		11/7/2023
Bore Hole Diameter (in):		4	Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:		CME-550X	Drill Method:	RW	Hammer Type:		Automatic	Energy Ratio:	87.6%
Core Size:		N/A	Driller:	S. Eubanks	Groundwater:	TOB	N/A	24HR	16.2 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
400.9		dusky red, with white mottles, trace fine to medium sands, 7.5R4/3 to 7.5R3/3, 7.5R8/1.			SS-14	10	18	23		41	
		@58.5 feet - laminated dusky red to weak red, trace fine sands, 7.5R3/3 to 7.5R4/3.		58.5	SS-15	9	20	21		41	
395.9											
		@63.5 feet - very hard, laminated yellowish red and yellowish brown, 5YR4/6, 10YR5/8.		63.5	SS-16	11	20	32		52	
390.9											
		@68.5 feet - laminated yellowish brown to dark yellowish brown, 10YR5/8 to 10YR4/6 to 10YR3/6.		68.5	SS-17	13	29	40		69	
385.9											
	73.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated yellowish brown, SILT (ML), trace fine to medium sands, relict rock structure, 10YR5/8 to 10YR5/6.		73.5	SS-18	20	47	50/3"		50/3"	>>●
380.9											
		@78.5 feet - laminated yellowish brown, yellow and white, 10YR5/8 to 10YR7/6 to 10YR8/1.		78.5	SS-19	11	26	50/5"		50/5"	>>●
375.9											

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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	IB-11C	
Site Description:		I-77 Exit 26 Phase I							Route:	Connector Rd	
Eng./Geo.:	Z. Zelaya		Boring Location:	147+67.94		Offset:	113.3		Alignment:	Proposed	
Elev.:	455.9 ft		Latitude:	34.190798359		Longitude:	-80.98376403		Date Started:	11/7/2023	
Total Depth:	99.9 ft		Soil Depth:	99.9 ft		Core Depth:	N/A ft		Date Completed:	11/7/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	16.2 ft

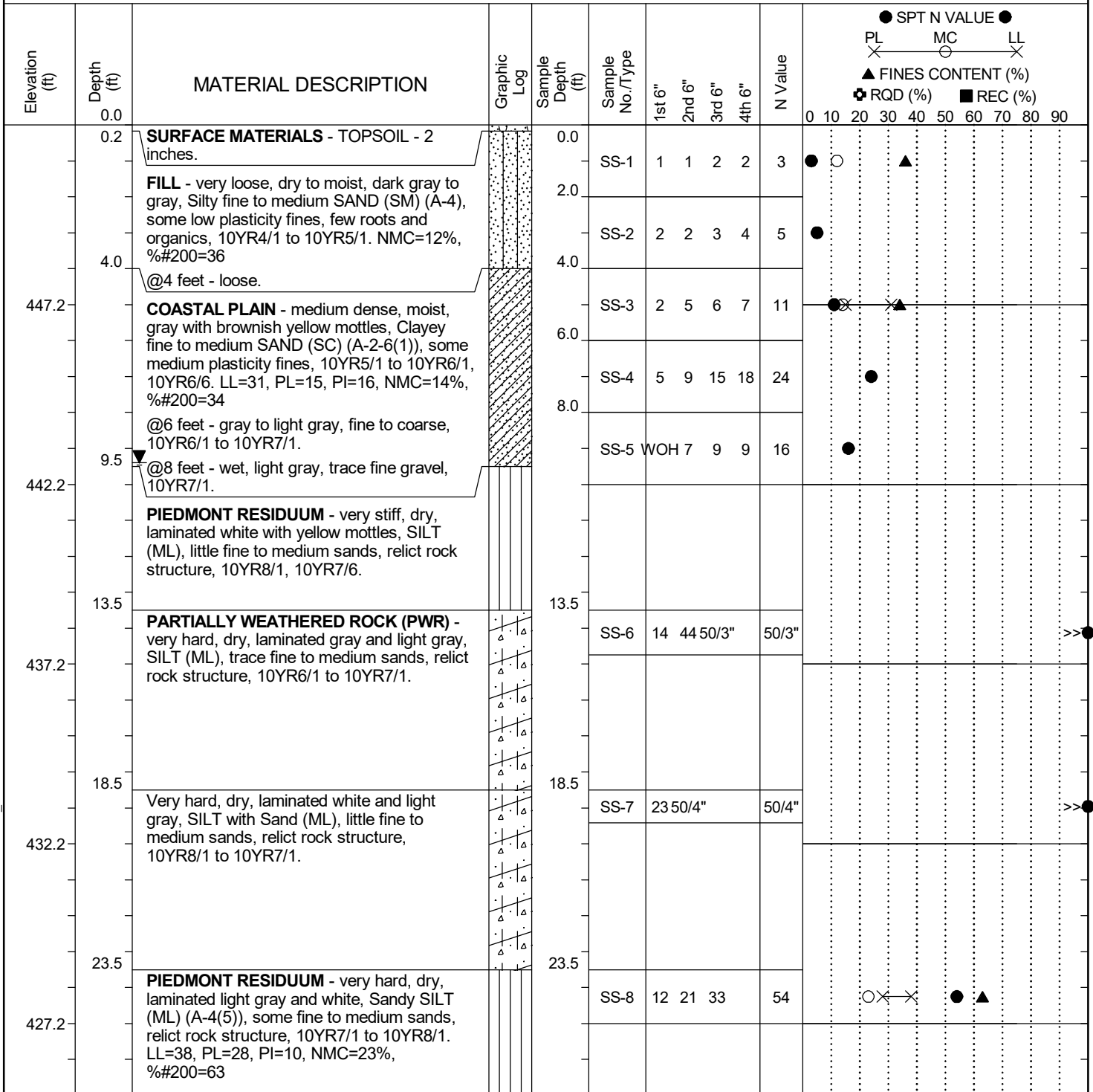
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type					N Value	● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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370.9	83.5	Very hard, dry, laminated weak red to dusky red with yellowish brown, SILT with Sand (ML), little fine to medium sands, relict rock structure, 7.5R4/3 to 7.5R3/3, 10YR5/8.		83.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

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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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	W- 1
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	Z. Yelaya	Boring Location:	150+06.74	Offset:	-91.4
Elev.:	452.2 ft	Latitude:	34.191535214	Longitude:	-80.98322066
Date Started:	10/17/2023				
Total Depth:	40 ft	Soil Depth:	40 ft	Core Depth:	N/A ft
Date Completed:	10/17/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	87.6%				
Core Size:	N/A	Driller:	S. Eubanks	Groundwater:	TOB N/A
24HR	9.4 ft				



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:			P042443 (S&ME 23610178A)				County:		Richland			Boring No.:		W- 1			
Site Description:			I-77 Exit 26 Phase I									Route:		Connector Rd			
Eng./Geo.:			Z. Zelaya		Boring Location:		150+06.74		Offset:		-91.4		Alignment:		Proposed		
Elev.:		452.2 ft		Latitude:		34.191535214		Longitude:		-80.98322066		Date Started:		10/17/2023			
Total Depth:		40 ft		Soil Depth:		40 ft		Core Depth:		N/A ft		Date Completed:		10/17/2023			
Bore Hole Diameter (in):			4		Sampler Configuration			Liner Required:		Y (N)		Liner Used:		Y (N)			
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic			Energy Ratio:		87.6%		
Core Size:		N/A		Driller:		S. Eubanks		Groundwater:		TOB		N/A		24HR		9.4 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
422.2	28.5	Hard, dry to moist, laminated gray and greenish gray with dark gray mottles, SILT with Sand (ML), little fine to coarse sands, trace fine quartz rock fragments, 6/N to 6/10Y, 10YR4/1.		28.5	SS-9	7	14	20		34	●
417.2	33.5	Very hard, dry, laminated gray and light greenish gray, SILT (ML), few fine to medium sands, relict rock structure, 10YR6/1, 7/10Y.		33.5	SS-10	12	21	34		55	●
412.2	40.0	@38.5 feet - laminated gray and light gray, few fine sands, 10YR6/1 to 10YR7/1. Boring Terminated at 40 feet.		38.5	SS-11	10	20	36		56	●
407.2											
402.2											

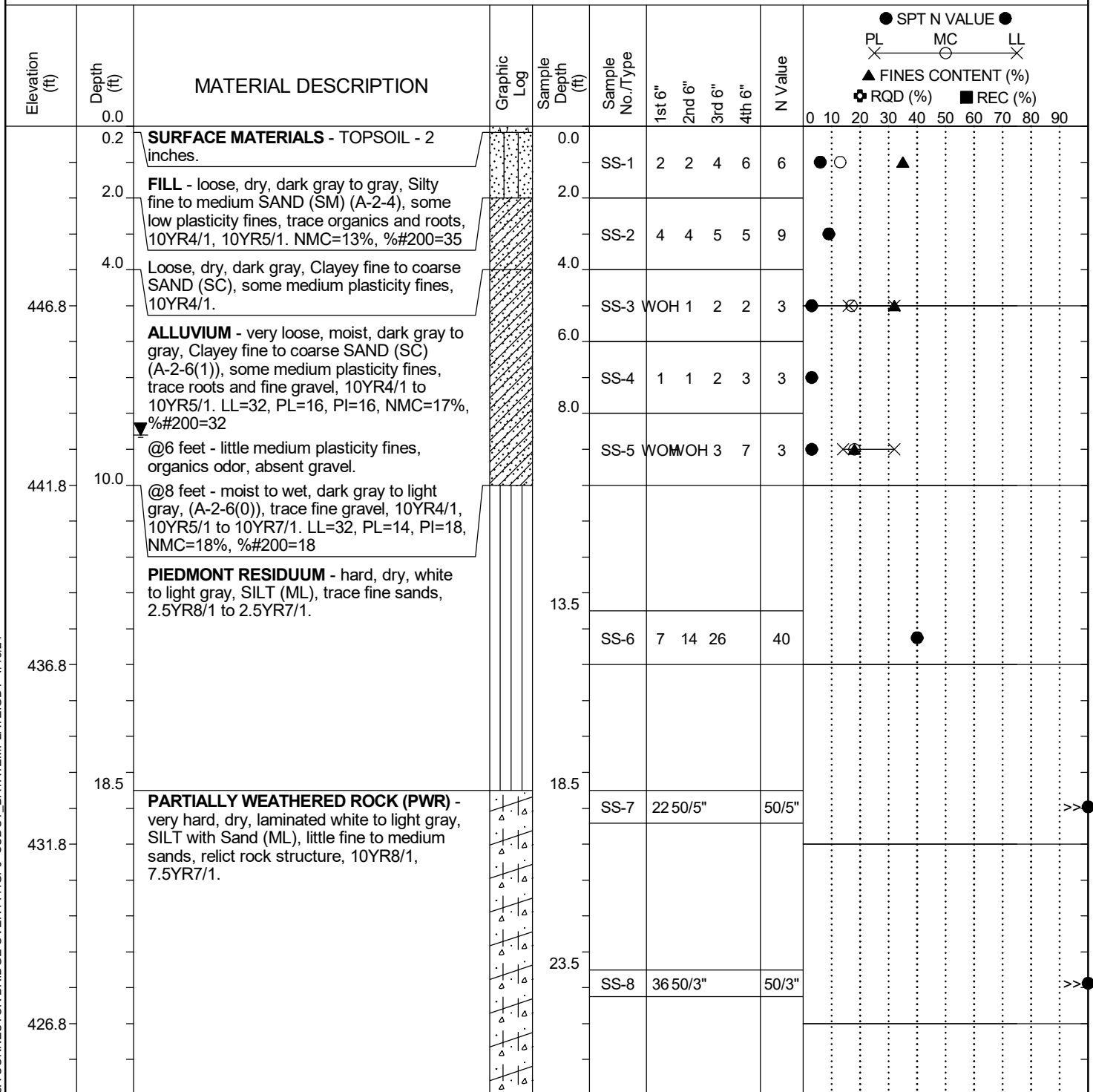
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SAMPLER TYPE			DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"		HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings		CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube		DC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

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 2	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	Z. Yelaya		Boring Location:	150+14.60		Offset:	-128.8		Alignment:	Proposed	
Elev.:	451.8 ft		Latitude:	34.191639599		Longitude:	-80.98323392		Date Started:	10/17/2023	
Total Depth:	39.9 ft		Soil Depth:	39.9 ft		Core Depth:	N/A ft		Date Completed:	10/17/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	8.6 ft



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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 2		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Zelaya		Boring Location:	150+14.60		Offset:	-128.8		Alignment:	Proposed		
Elev.:	451.8 ft		Latitude:	34.191639599		Longitude:	-80.98323392		Date Started:	10/17/2023		
Total Depth:	39.9 ft		Soil Depth:	39.9 ft		Core Depth:	N/A ft		Date Completed:	10/17/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	8.6 ft	

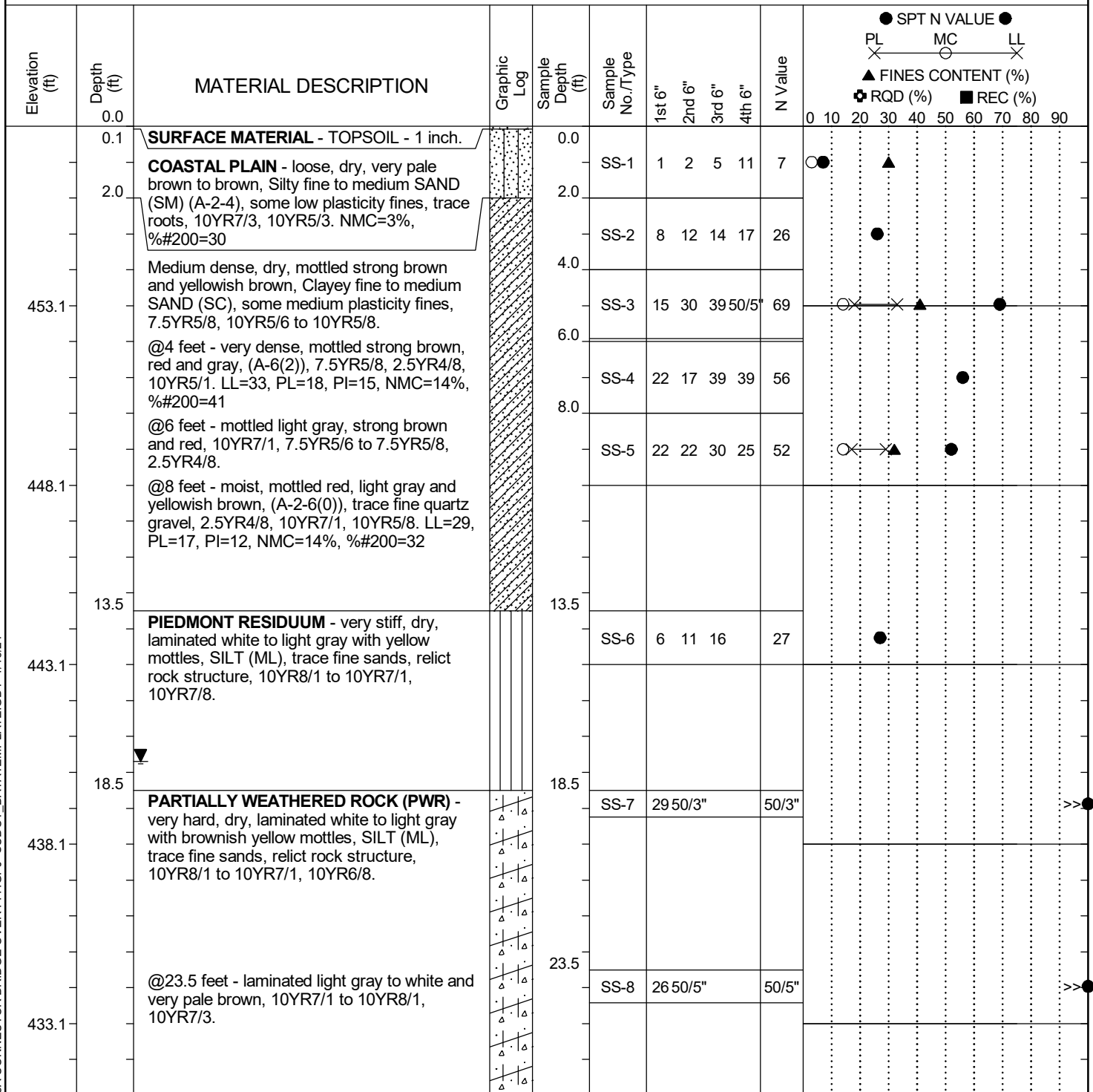
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>									
421.8	33.5	@28.5 feet - laminated white to light gray with gray mottles, 10YR8/1 to 10YR7/1, 10YR5/1 to 10YR6/1.		28.5	SS-9	26	50/5"			50/5"	>>●									
416.8	33.5	Very hard, dry, laminated white to light gray, SILT (ML), few fine sands, relict rock structure, 10YR8/1 to 10YR7/1.		33.5	SS-10	23	47	50/2"		50/2"	>>●									
411.8	39.9	@38.5 feet - laminated light gray and white, 10YR7/1, 10YR8/1.		38.5	SS-11	16	29	50/5"		50/5"	>>●									
		Boring Terminated at 39.9 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:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 3		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Zelaya		Boring Location:	150+11.80		Offset:	91.4		Alignment:	Proposed		
Elev.:	458.1 ft		Latitude:	34.191061525		Longitude:	-80.98301895		Date Started:	10/23/2023		
Total Depth:	39.4 ft		Soil Depth:	39.4 ft		Core Depth:	N/A ft		Date Completed:	10/23/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	17.7 ft	



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 3		
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd		
Eng./Geo.:	Z. Zelaya		Boring Location:	150+11.80		Offset:	91.4		Alignment:	Proposed		
Elev.:	458.1 ft		Latitude:	34.191061525		Longitude:	-80.98301895		Date Started:	10/23/2023		
Total Depth:	39.4 ft		Soil Depth:	39.4 ft		Core Depth:	N/A ft		Date Completed:	10/23/2023		
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)		
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	87.6%	
Core Size:	N/A		Driller:	S. Eubanks		Groundwater:	TOB	N/A		24HR	17.7 ft	

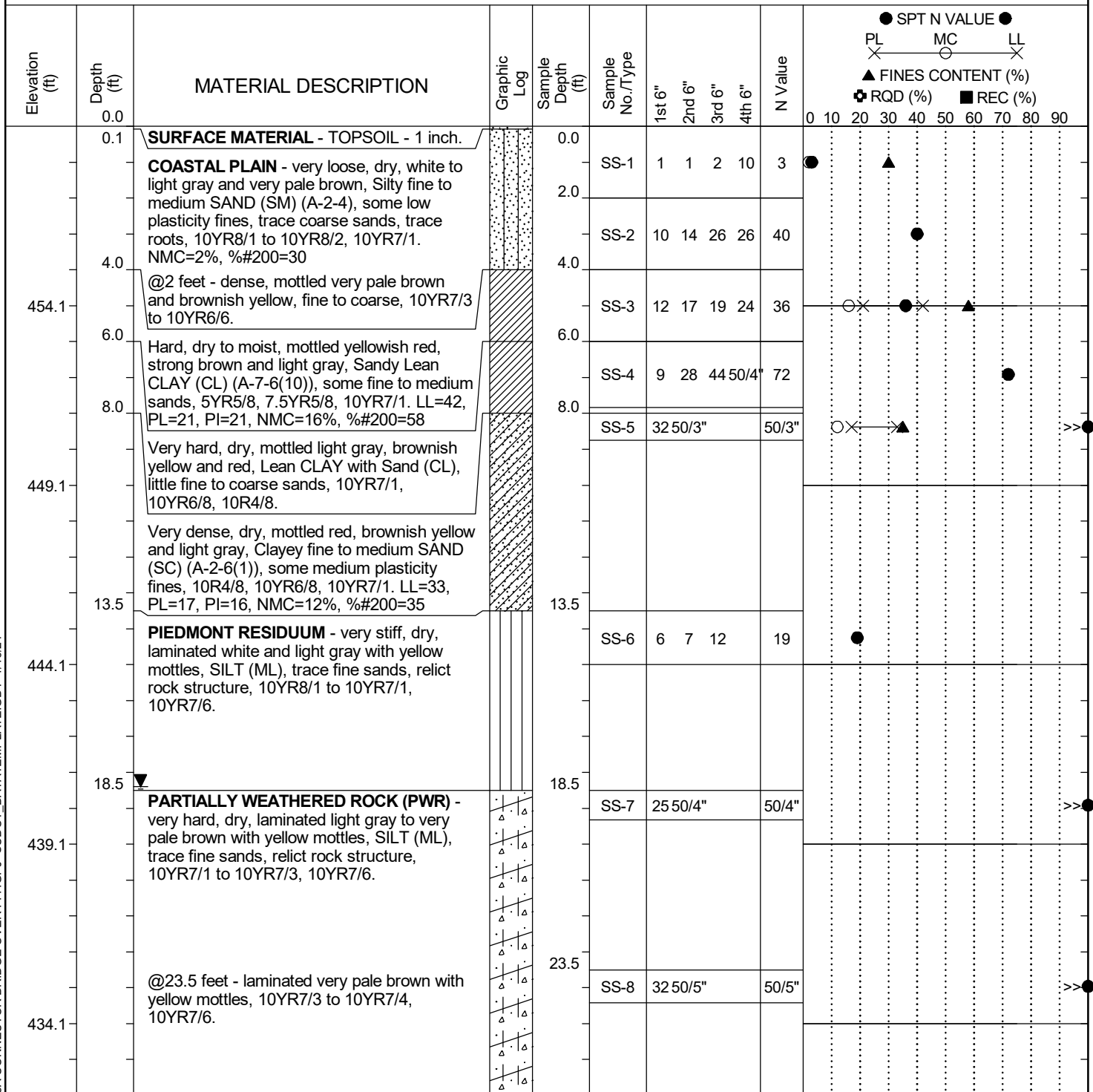
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC ○ LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
428.1	28.5	Very hard, dry, laminated white to light gray with very pale brown, SILT (ML), few fine to medium sands, relict rock structure, 10YR8/1 to 10YR7/1, 10YR7/3.		28.5	SS-9	21	50/5"			50/5"	>>●
423.1	33.5	@33.5 feet - laminated very pale brown with white mottles, 10YR7/4, 10YR8/1.		33.5	SS-10	15	33	50/4"		50/4"	>>●
418.1	38.5	Very hard, dry to moist, laminated weak red and very pale brown with yellowish brown mottles, SILT with Sand (ML), little fine to coarse sands, trace fine rock fragments (quartz vein), 7.5R5/3 to 7.5R5/4, 10YR7/3 to 10YR7/4, 10YR5/8.		38.5	SS-11	17	50/5"			50/5"	>>●
	39.4	Boring Terminated at 39.4 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: P042443 (S&ME 23610178A)				County: Richland		Boring No.: W- 4		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Yelaya		Boring Location: 150+07.59		Offset: 118.7		Alignment: Proposed		
Elev.: 459.1 ft		Latitude: 34.190986537		Longitude: -80.98300442		Date Started: 10/20/2023		
Total Depth: 39.8 ft		Soil Depth: 39.8 ft		Core Depth: N/A ft		Date Completed: 10/20/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR 18.4 ft		



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		

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID: P042443 (S&ME 23610178A)				County: Richland		Boring No.: W- 4		
Site Description:		I-77 Exit 26 Phase I					Route: Connector Rd	
Eng./Geo.: Z. Zelaya		Boring Location: 150+07.59		Offset: 118.7		Alignment: Proposed		
Elev.: 459.1 ft		Latitude: 34.190986537		Longitude: -80.98300442		Date Started: 10/20/2023		
Total Depth: 39.8 ft		Soil Depth: 39.8 ft		Core Depth: N/A ft		Date Completed: 10/20/2023		
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)		
Drill Machine: CME-550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 87.6%		
Core Size: N/A		Driller: S. Eubanks		Groundwater: TOB N/A		24HR 18.4 ft		

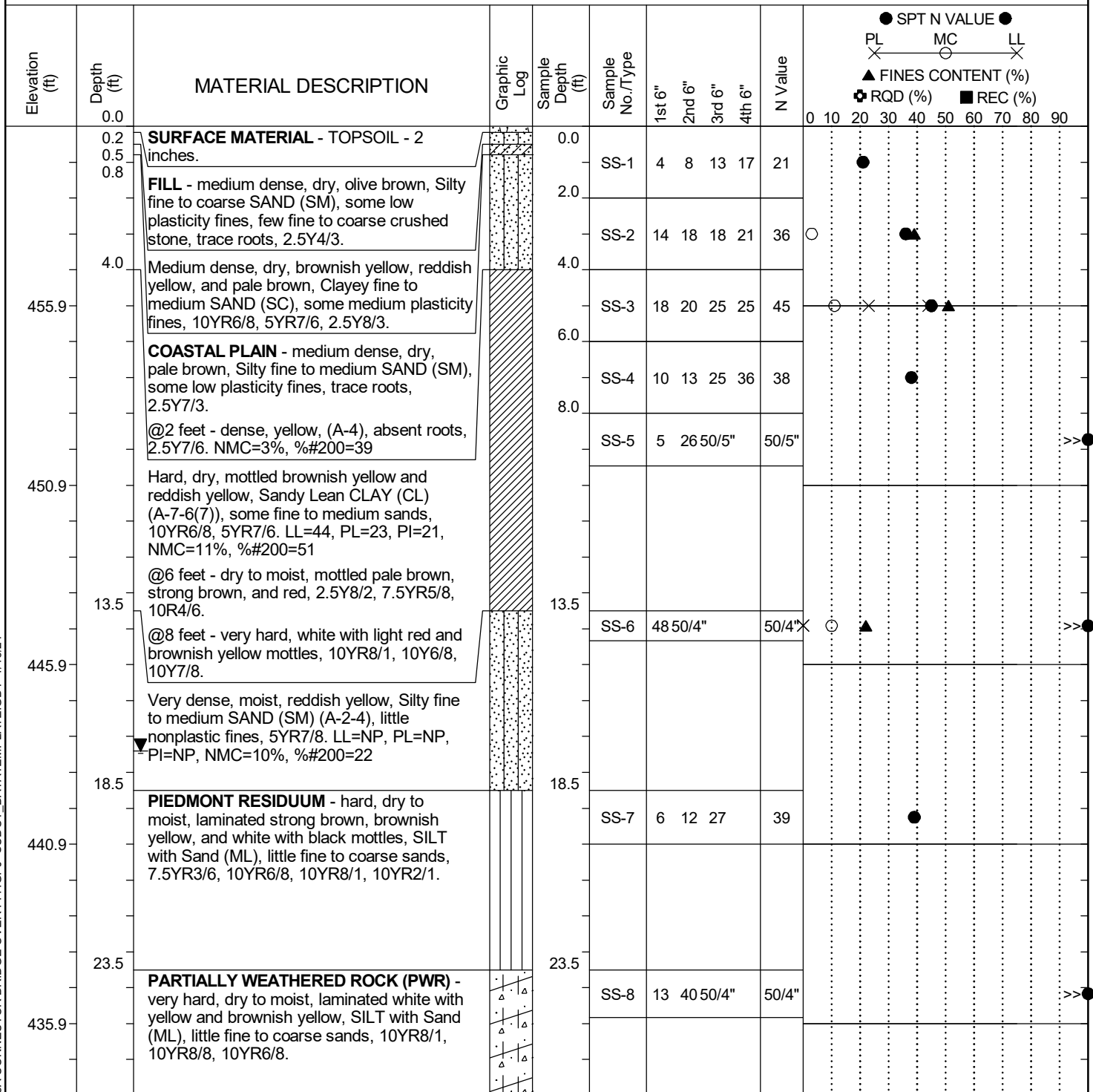
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
429.1				28.5	SS-9	29	50/3"			50/3"																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

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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:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	W- 5
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	146+04.18	Offset:	-108.7
Elev.:	460.9 ft	Latitude:	34.191240555	Longitude:	-80.984504934
Date Started:	10/4/2023				
Total Depth:	40 ft	Soil Depth:	40 ft	Core Depth:	N/A ft
Date Completed:	10/4/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	17.4 ft				



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:	P042443 (S&ME 23610178A)				County:	Richland		Boring No.:	W- 5		
Site Description:		I-77 Exit 26 Phase I						Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+04.18		Offset:	-108.7		Alignment:	Proposed	
Elev.:	460.9 ft		Latitude:	34.191240555		Longitude:	-80.984504934		Date Started:	10/4/2023	
Total Depth:	40 ft		Soil Depth:	40 ft		Core Depth:	N/A ft		Date Completed:	10/4/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	91.6%	
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	17.4 ft

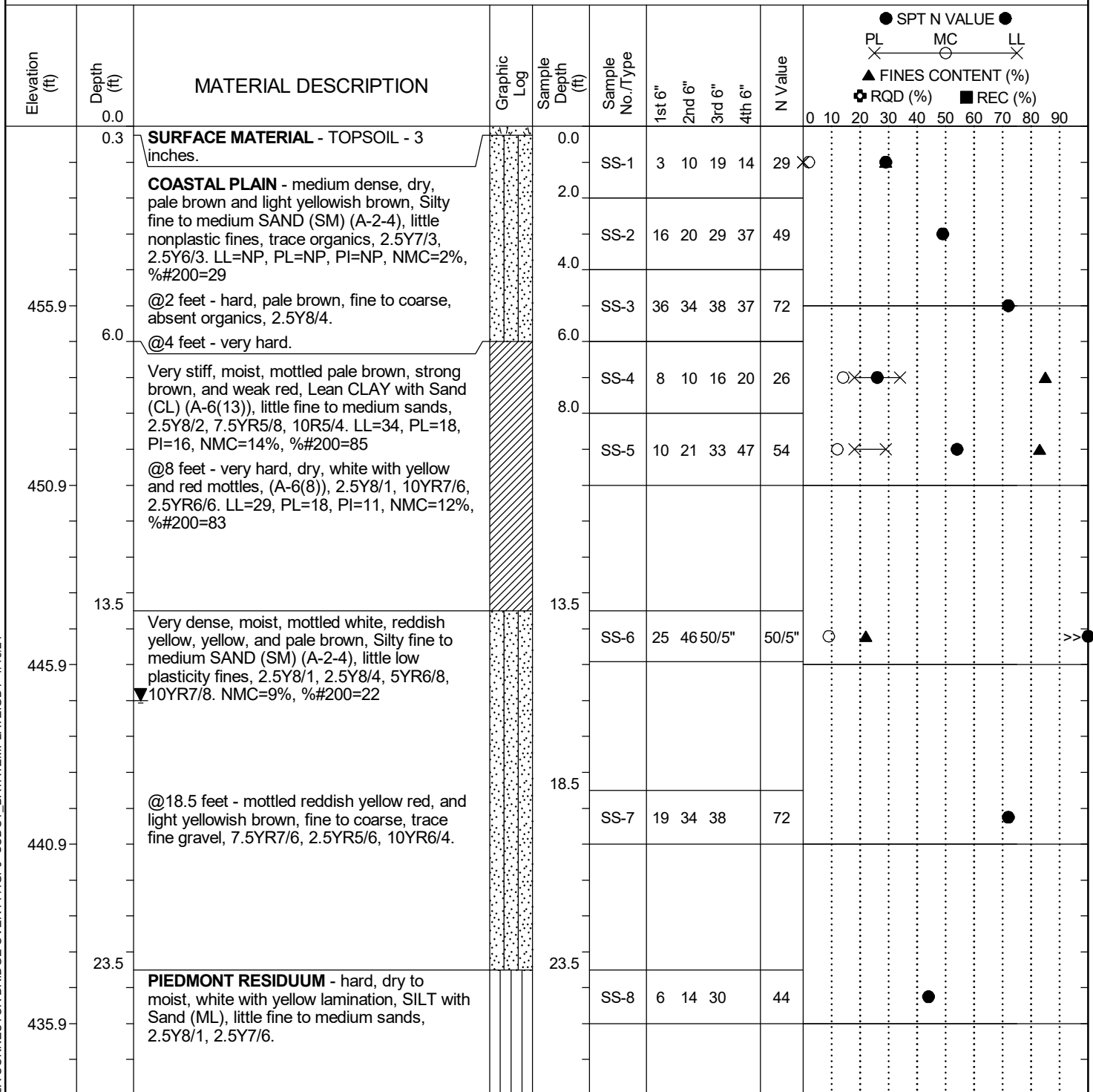
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%)											
											0	10	20	30	40	50	60	70	80	90		
430.9	28.5	Very hard, dry to moist, laminated pale brown, light gray, and yellow, Sandy SILT (ML), some fine to medium sands, 2.5Y8/4, 2.5Y7/1, 10YR8/8.		28.5	SS-9	42	50/5"			50/5"												>>●
425.9				33.5	SS-10	29	45	50/5"		50/5"												>>●
420.9	38.5	PIEDMONT RESIDUUM - hard, dry to moist, laminated yellow, white, and pale brown, Sandy SILT (ML), some fine sands, 10YR8/8, 2.5Y8/1, 2.5Y8/3. Boring Terminated at 40 feet.		38.5	SS-11	10	18	30		48												●
415.9																						
410.9																						

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:	P042443 (S&ME 23610178A)				County:	Richland		Boring No.:	W- 6		
Site Description:		I-77 Exit 26 Phase I						Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+02.27		Offset:	-75.6		Alignment:	Proposed	
Elev.:	460.9 ft		Latitude:	34.191152368		Longitude:	-80.984477309		Date Started:	10/4/2023	
Total Depth:	39.4 ft		Soil Depth:	39.4 ft		Core Depth:	N/A ft		Date Completed:	10/4/2023	
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	91.6%	
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	16 ft



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland		Boring No.:	W- 6			
Site Description:		I-77 Exit 26 Phase I						Route:	Connector Rd			
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+02.27		Offset:	-75.6		Alignment:	Proposed		
Elev.:	460.9 ft		Latitude:	34.191152368		Longitude:	-80.984477309		Date Started:	10/4/2023		
Total Depth:	39.4 ft		Soil Depth:	39.4 ft		Core Depth:	N/A ft		Date Completed:	10/4/2023		
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:		CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	91.6%	
Core Size:		N/A		Driller:	L. Shrader		Groundwater:	TOB N/A		24HR	16 ft	

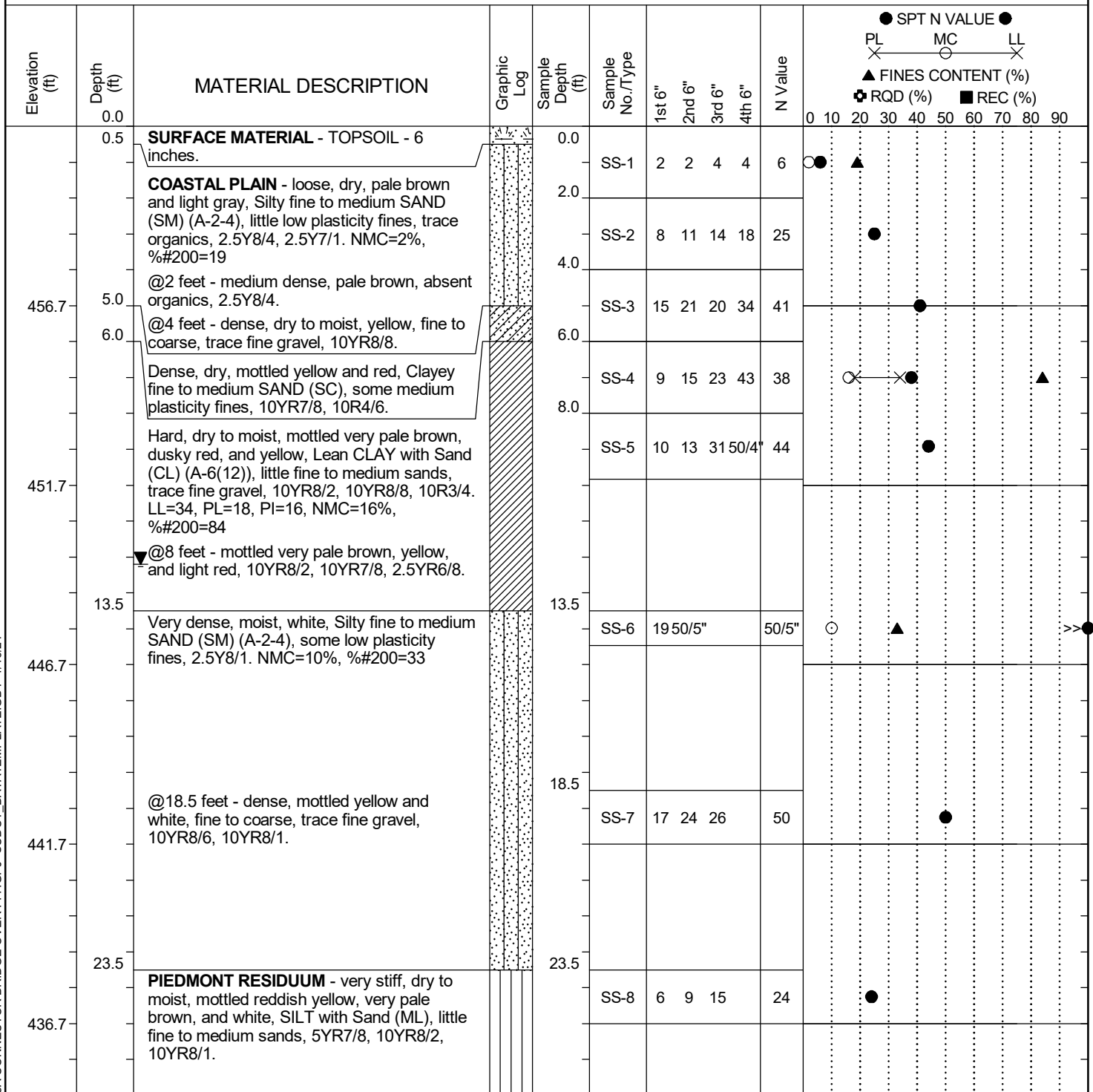
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC ○ LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
430.9	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry to moist, laminated white, pale brown, and light greenish gray, Sandy SILT (ML), some fine to medium sands, 2.5Y8/1, 2.5Y8/3, 10GY8/1. @33.5 feet - laminated light greenish gray, 5GY8/1, 10Y8/1. @38.5 feet - laminated light greenish gray, pale yellow, and white, 10Y8/1, 5Y8/3, 5Y8/1. Boring Terminated at 39.4 feet.		28.5	SS-9	22	50/3"			50/3"	>>●
425.9				33.5	SS-10	22	50/4"			50/4"	>>●
420.9	39.4			38.5	SS-11	27	50/5"			50/5"	>>●
415.9											
410.9											

LEGEND

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

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 7	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	145+99.87		Offset:	101.9		Alignment:	Proposed	
Elev.:	461.7 ft		Latitude:	34.190686194		Longitude:	-80.984304447		Date Started:	10/3/2023	
Total Depth:	40 ft		Soil Depth:	40 ft		Core Depth:	N/A ft		Date Completed:	10/3/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	12.2 ft



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	

SC.DOT 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)				County:	Richland			Boring No.:	W- 7	
Site Description:	I-77 Exit 26 Phase I								Route:	Connector Rd	
Eng./Geo.:	E. Eastabrooks		Boring Location:	145+99.87		Offset:	101.9		Alignment:	Proposed	
Elev.:	461.7 ft		Latitude:	34.190686194		Longitude:	-80.984304447		Date Started:	10/3/2023	
Total Depth:	40 ft		Soil Depth:	40 ft		Core Depth:	N/A ft		Date Completed:	10/3/2023	
Bore Hole Diameter (in):	4		Sampler Configuration			Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic			Energy Ratio:	91.6%
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	12.2 ft

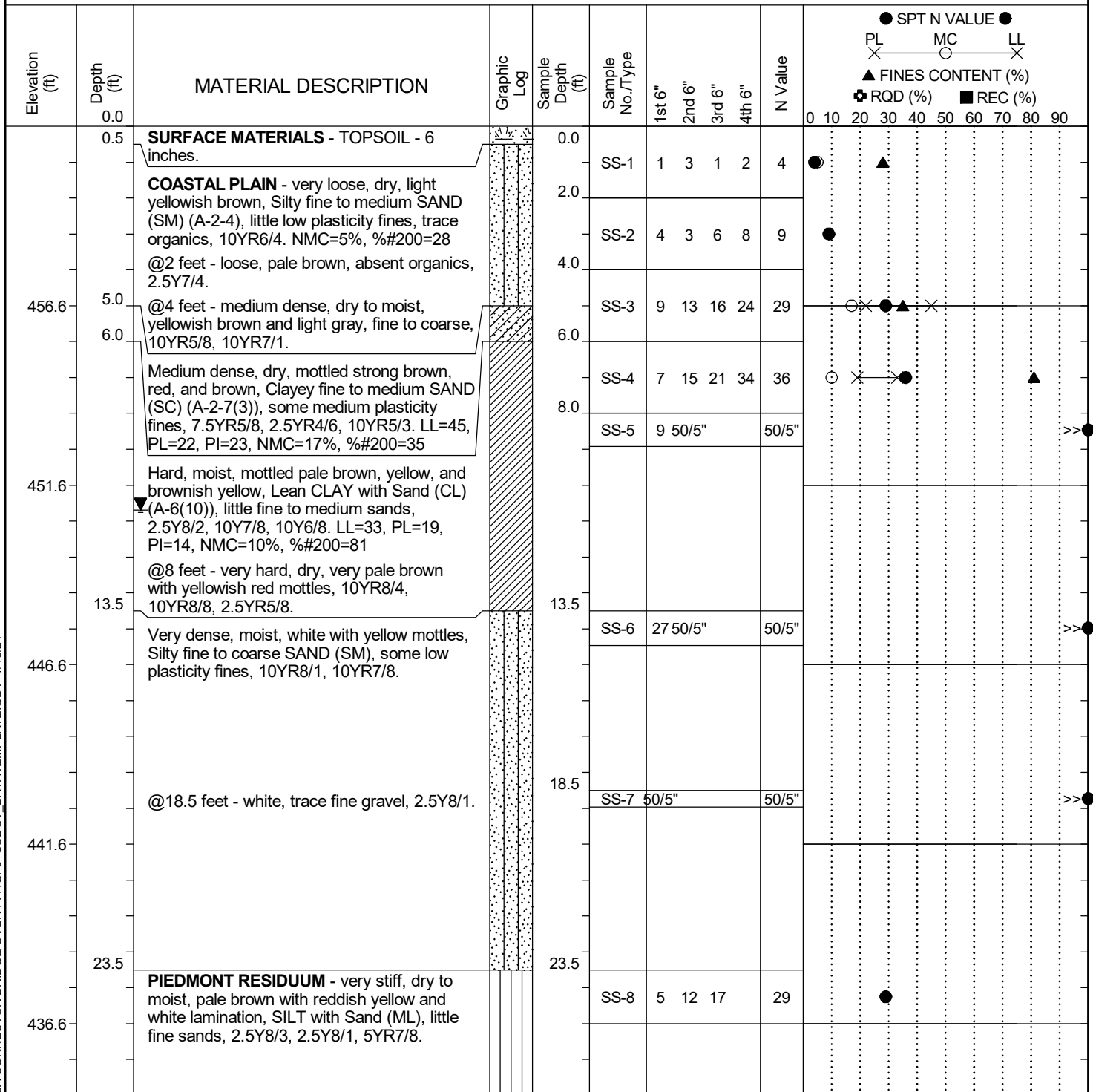
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>
431.7	28.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated yellow, very pale brown, and white, Sandy SILT (ML), some fine to medium sands, 10YR7/8, 10YR8/4, 10YR8/1. @33.5 feet - dry to moist, laminated yellow and white, 10YR7/6, 10YR8/1.		28.5	SS-9	13	30	50/5"		50/5"	>>●
426.7	33.5			33.5	SS-10	19	46	50/3"		50/3"	>>●
421.7	38.5			38.5	SS-11	9	20	40		60	●
	40.0	PIEDMONT RESIDUUM - very hard, dry to moist, mottled yellow and white, Sandy SILT (ML), some fine to medium sands, 10YR7/6, 10YR8/1. Boring Terminated at 40 feet.									
416.7											
411.7											

LEGEND

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

SCDOT Soil Test Log

Project ID:	P042443 (S&ME 23610178A)	County:	Richland	Boring No.:	W- 8
Site Description:	I-77 Exit 26 Phase I	Route:	Connector Rd		
Eng./Geo.:	E. Eastabrooks	Boring Location:	146+00.33	Offset:	118.6
Elev.:	461.6 ft	Latitude:	34.190642943	Longitude:	-80.984286044
Date Started:	10/3/2023				
Total Depth:	39.8 ft	Soil Depth:	39.8 ft	Core Depth:	N/A ft
Date Completed:	10/3/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	91.6%				
Core Size:	N/A	Driller:	L. Shrader	Groundwater:	TOB N/A
24HR	10.7 ft				



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:	P042443 (S&ME 23610178A)				County:	Richland		Boring No.:	W- 8			
Site Description:		I-77 Exit 26 Phase I						Route:	Connector Rd			
Eng./Geo.:	E. Eastabrooks		Boring Location:	146+00.33		Offset:	118.6		Alignment:	Proposed		
Elev.:	461.6 ft		Latitude:	34.190642943		Longitude:	-80.984286044		Date Started:	10/3/2023		
Total Depth:	39.8 ft		Soil Depth:	39.8 ft		Core Depth:	N/A ft		Date Completed:	10/3/2023		
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)	
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	91.6%		
Core Size:	N/A		Driller:	L. Shrader		Groundwater:	TOB	N/A		24HR	10.7 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) </div>									
431.6	28.5	@28.5 feet - hard, dry to moist, very pale brown with reddish yellow lamination, 10YR8/3, 7.5YR7/8.		28.5	SS-9	7	13	27		40										
426.6	33.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, laminated very pale brown and yellow, Sandy SILT (ML), some fine sands, 10YR8/4, 10YR7/8.		33.5	SS-10	12	26 50/5"			50/5"										>>●
421.6	38.5	Very hard, dry, laminated yellow, pale brown, and black, SILT with Sand (ML), little fine sands, 10YR8/8, 2.5Y8/4, 2.5Y2.5/1.		38.5	SS-11	15	41 50/3"			50/3"										>>●
	39.8	@39.3 feet - laminated bluish gray, yellow, and white, 5B3/1, 2.5Y8/8, 2.5Y8/1. Boring Terminated at 39.8 feet.																		
416.6																				
411.6																				

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 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT_DATATEMPLATE.GDT 1/16/24

Appendix IV– Downhole Shear Wave Velocity Test Results



Shear Wave Velocity Calculations

I-77 Exit 26 Phase I
Blythwood, South Carolina

Sounding ID: EB-1C

S&ME Project Number: **23610178A**

Casing Stickup: 2.50 Feet

Source Offset: 8.00 Feet

Date: 30-Oct-23

Rig: CME-550X

Test Depth (feet)	Geophone Depth (feet)	Waveform Ray Path (feet)	Incremental Distance (feet)	S-WAVE			Interval Depth (feet)	d_i/v_{si}	Poissons
				Characteristic Arrival Time (seconds)	Incremental Time Interval (seconds)	Interval Velocity (ft/s)			
0.50	0.50	8.02	8.02	0.0090					
3.50	3.50	8.73	0.72	0.0097	0.0007	1072.3	2.00	0.00187	0.24
6.50	6.50	10.31	1.58	0.0105	0.0009	1784.1	5.00	0.00168	0.10
9.50	9.50	12.42	2.11	0.0116	0.0010	2047.8	8.00	0.00146	0.07
12.50	12.50	14.84	2.42	0.0127	0.0011	2109.2	11.00	0.00142	0.28
15.50	15.50	17.44	2.60	0.0138	0.0011	2418.9	14.00	0.00124	0.28
18.50	18.50	20.16	2.71	0.0148	0.0010	2730.1	17.00	0.00110	0.16
21.50	21.50	22.94	2.78	0.0158	0.0010	2755.0	20.00	0.00109	0.11
24.50	24.50	25.77	2.83	0.0170	0.0012	2388.4	23.00	0.00126	0.33
27.50	27.50	28.64	2.87	0.0182	0.0012	2475.2	26.00	0.00121	0.33
30.50	30.50	31.53	2.89	0.0195	0.0014	2108.7	29.00	0.00142	0.43
33.50	33.50	34.44	2.91	0.0209	0.0014	2149.5	32.00	0.00140	0.44
36.50	36.50	37.37	2.92	0.0221	0.0012	2465.6	35.00	0.00122	0.43
39.50	39.50	40.30	2.94	0.0232	0.0011	2600.8	38.00	0.00115	0.43
42.50	42.50	43.25	2.94	0.0241	0.0009	3141.0	41.00	0.00096	0.39
45.50	45.50	46.20	2.95	0.0250	0.0009	3421.6	44.00	0.00088	0.38
48.50	48.50	49.16	2.96	0.0259	0.0009	3160.8	47.00	0.00095	0.36
51.50	51.50	52.12	2.96	0.0268	0.0008	3601.0	50.00	0.00083	0.20
54.50	54.50	55.08	2.97	0.0276	0.0009	3370.8	53.00	0.00089	0.26
57.50	57.50	58.05	2.97	0.0286	0.0010	3070.6	56.00	0.00098	0.37
60.50	60.50	61.03	2.97	0.0295	0.0009	3345.9	59.00	0.00090	0.37
63.50	63.50	64.00	2.98	0.0304	0.0009	3325.1	62.00	0.00090	0.33
66.50	66.50	66.98	2.98	0.0312	0.0009	3441.3	65.00	0.00087	0.26
69.50	69.50	69.96	2.98	0.0323	0.0010	2884.1	68.00	0.00104	0.30
72.50	72.50	72.94	2.98	0.0332	0.0009	3180.2	71.00	0.00094	0.26
75.50	75.50	75.92	2.98	0.0342	0.0010	2887.2	74.00	0.00104	0.35
78.50	78.50	78.91	2.98	0.0352	0.0009	3189.1	77.00	0.00094	0.35
81.50	81.50	81.89	2.99	0.0363	0.0011	2738.6	80.00	0.00110	0.41
84.50	84.50	84.88	2.99	0.0373	0.0011	2778.7	83.00	0.00108	0.42
87.50	87.50	87.86	2.99	0.0384	0.0010	2926.6	86.00	0.00103	0.42
90.50	90.50	90.85	2.99	0.0394	0.0010	2927.4	89.00	0.00102	0.43
93.50	93.50	93.84	2.99	0.0404	0.0010	3037.3	92.00	0.00099	0.43
96.50	96.50	96.83	2.99	0.0414	0.0010	2935.6	95.00	0.00102	0.43



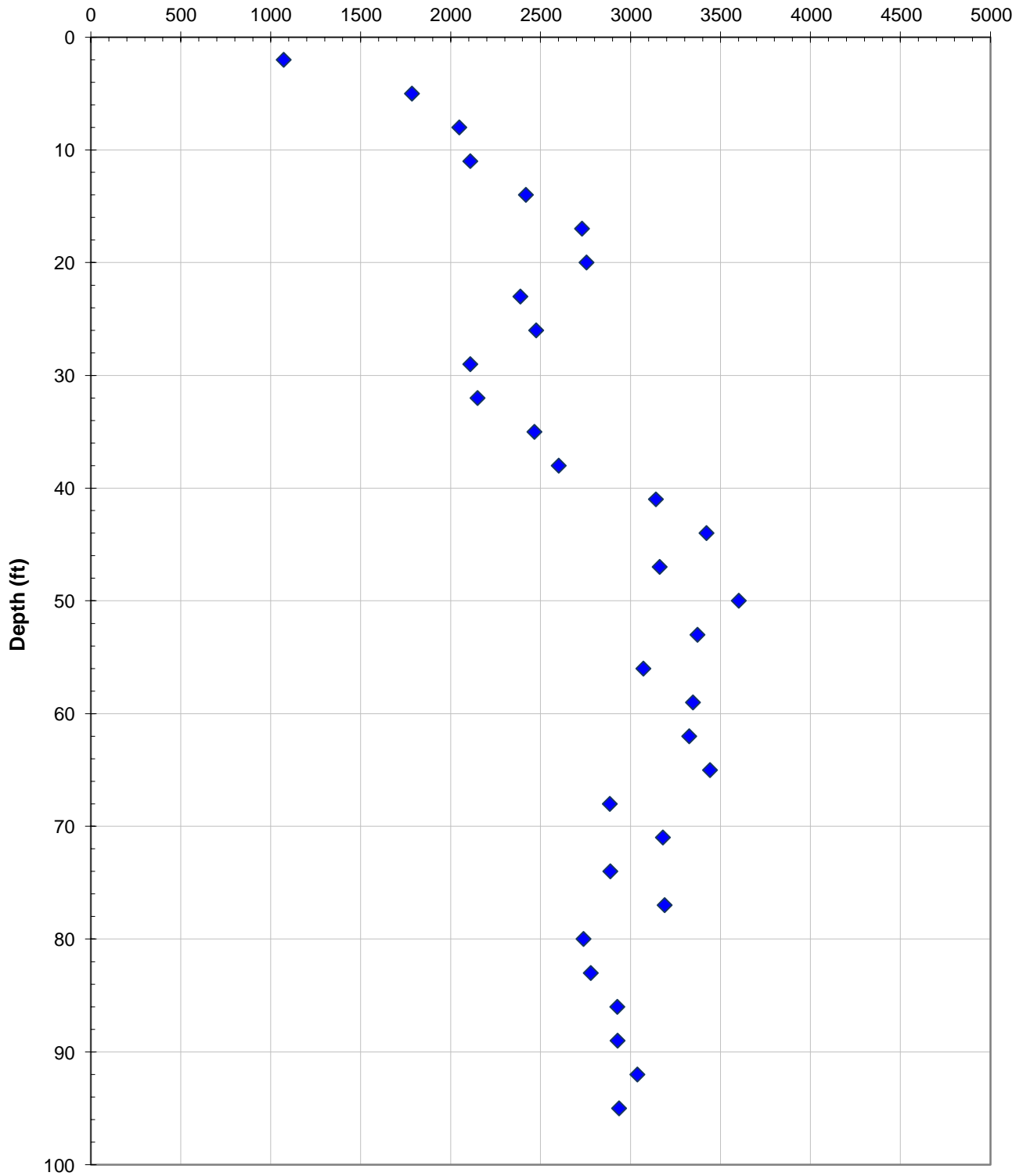
Shear Wave Velocity Profile EB-1C

I-77 Exit 26 Phase-I

Blythwood, South Carolina

S&ME Project: 23610178A

Shear Wave Velocity, V_s (ft/sec)



Appendix V – SPT Hammer Energy Measurements



Report of SPT Energy Measurements
S&ME CME-550X ATV
(Serial No. 290593)
Blythewood, South Carolina

PREPARED FOR:

**North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699**

PREPARED BY:

**S&ME, Inc.
8848 Red Oak Boulevard, Suite A
Charlotte, North Carolina 28217**

December 27, 2023



December 27, 2023

North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699

Attention: Mr. Greg Bodenheimer, P.E.

Cc: Ms. Cheryl A. Youngblood, L.G.
Ms. Christina M. Bruinsma, L.G.

Reference: **Report of SPT Energy Measurements**
S&ME CME-550X ATV (Serial No. 290593)
Blythewood, South Carolina
NC PE Firm License No. F-0176

Dear Mr. Bodenheimer:

We have completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer used with our CME-550X ATV-mounted drill rig (Serial No. 290593). This service was performed by Mr. Joseph Williamson, P.E. of our firm on November 17, 2023, in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit's requirements. Review of the data quality and analyses was performed by Mr. Williamson. A copy of the Certificate of Proficiency issued by Pile Dynamics based on the Dynamic Measurement and Analysis Proficiency Test for Mr. Williamson is included in Appendix I. The testing procedures, equipment used during testing, and detailed results are presented in this report.

1.0 Dynamic Testing Methodology

Testing was performed using a model PAX (Serial No. 3726L) Pile Driving Analyzer TM (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K4664 and K4665) bolted to a 2.0-foot long AWJ drill rod (Serial No. 203) internally instrumented with two strain transducers. Calibration sheets for the accelerometers and the instrumented rod are included in Appendix II. The instrumented AWJ drill rod has a cross-sectional area of 1.22 square inches and an outside diameter of approximately 1¾ inches. Therefore, we calculate the inside diameter to be approximately 1¼ inches at the gauge location. The accelerometers and strain gauges, which are diametrically opposed near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real time for each blow.



2.0 Testing and Observations

S&ME personnel were on site November 17, 2023, to observe and perform high-strain dynamic testing during SPT sampling on the CME-550X ATV-mounted drill rig operated by Larry Shrader of S&ME. The measurements were taken during drilling of a test hole adjacent to a previous soil test boring at an S&ME project site in Blythewood, South Carolina. SPT energy measurements were recorded during four sampling intervals that generally met the NCDOT testing requirements. Two of the samples do not specifically meet the required N-value or rod length interval. However, analysis of the test data indicates the data from these samples generally agrees with the two samples that do meet the testing requirements. Preliminary test results were shared with Mr. Bodenheimer on December 19, 2023 for review. Mr. Bodenheimer agreed that, collectively the four samples provide an appropriate evaluation of the hammer energy transfer. The information presented in the tables below summarizes the equipment and tooling used during the SPT energy measurements. The SPT Energy Evaluation Form and the Soil Test Boring Log from the adjacent boring are included in Appendix III.

Table 2-1: Drill Rig Information

Manufacturer	CME
Model	550X
Serial Number	290593
Operator	L. Shrader
Carrier	ATV

Table 2-2: Hammer Information

Model / Type	CME / Auto
Serial Number	290593
Typical Drop Height (inches)	30
Typical Ram Weight (pounds)	140
Ram Serial Number	N/A



Table 2-3: Drilling and Instrumented Rod Information

Instrumented Rod Type	AWJ (Serial No. 203)
OD (inches) ¹	1¾
ID (inches) ²	1¼
Cross-Sectional Area (in ²) ³	1.22
Total Instrumented Rod Length (feet) ¹	2.0
Length Below Gages (feet) ¹	0.7
Typical Rod Lengths (feet)	5
Split-Spoon Length (feet) ¹	2.85

3.0 Dynamic Testing Results

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.55 ft to the drill rod length at each sample depth. The SPT Energy Measurement Data Summary tables in Appendix IV present the test data from every hammer blow at each sampling interval, along with representative force and velocity traces for each test interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e. the blows that determine the N-value) are considered when computing the average measurement values of each test interval.

The reported blow counts obtained by the drill rig personnel, a summary of the test data, and average computed hammer energy and transfer ratio values are provided in Table 3-1. Based on the test data, the automatic hammer on the CME-550X operated at an average rate of about 59 blows per minute (bpm) during dynamic testing. The measured average transferred hammer energy (EFV) of the four sample intervals tested ranged from 316 to 326 ft-lbs, which corresponds to Energy Transfer Ratio (ETR) values of 90.3 to 93.2%, respectively. Plots and tables of the following are also included in the Appendix and present the test data with depth for each test interval:

- Penetration vs. BLC⁴
- Penetration vs. CSX⁷
- ETR vs. Rod Length
- Penetration vs. FMX⁵
- Penetration vs. VMX⁸
- Average ETR vs. Rod Length
- Penetration vs. EFV⁶
- Penetration vs. ETR⁹

¹ Measured with engineer's tape measure.

² Calculated using measured OD and Area from instrument rod calibration record.

³ From instrument rod calibration record.

⁴ BLC - Blow Count per 6-in. increment

⁵ FMX - Maximum Compressive Force

⁶ EFV - Maximum Transferred Energy

⁷ CSX - Maximum Compressive Stress

⁸ VMX - Maximum Velocity

⁹ ETR - Energy Transfer Ratio - Ratio of Calculated Energy to Theoretical Energy of 140 lb hammer falling 30 inches



Table 3-1: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description (Piedmont Residual)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	48.5 – 50.0	50.0	53.55	6-8-13 / 21	SANDY SILT	58.6	316	90.3
2	53.5 – 55.0	55.0	58.55	6-11-17 / 28	SANDY SILT	58.7	326	93.2
3	56.0 – 57.5	57.5	60.55	7-9-17 / 26	SANDY SILT	58.6	320	91.3
4	58.5 – 60.0	60.0	63.55	15-27-44 / 71	SANDY SILT	58.8	320	91.4
Overall Average						58.7	321	91.6

The overall average transferred hammer energy for the automatic hammer on the CME-550X ATV-mounted drill rig (SN 290593) was 321 foot-pounds, with an average ETR of 91.6%.

4.0 Limitations of Report

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



5.0 Closing

S&ME appreciates the opportunity to provide this report to the North Carolina Department of Transportation, Geotechnical Engineering Unit. Please let us know if you have any questions concerning this report.

Sincerely,

S&ME, Inc.

Joseph R. Williamson, P.E.
Project Manager
N.C. Registration No. 42168

A handwritten signature in black ink, appearing to read 'G. Canivan', is positioned above the printed name of Gregory J. Canivan.

Gregory J. Canivan, P.E.
Technical Principal

Appendices:

- Appendix I - Certificates of Proficiency
- Appendix II - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix III - SPT Energy Evaluation Form (Field Log)
- Appendix IV - CME-550X ATV (SN 290593) SPT Energy Measurements Summary Plots and Tables

Appendices

Appendix I- Certificate of Proficiency



This documents that
Joseph Williamson
S&ME, Inc.

has on March 16, 2022 achieved the rank of

MASTER

on the **Dynamic Measurement and Analysis Proficiency Test.**

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended that individuals at the Master level seek to attain Expert level through additional study within eight years of the date of this document***

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate. This certificate can be verified at www.PDAproficiencytest.com.

Frank T. Peters, Executive Director
Pile Driving Contractors Association



Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 3251

Appendix II - Calibration Sheets

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 17Aug2023

Serial No: K4664 Temperature: 77.6 °F

Model: PR Humidity: 51%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

376.6 mv/5000g
(75.3 μ v/g)
 R^2 : 0.999955 [Chip programmed]

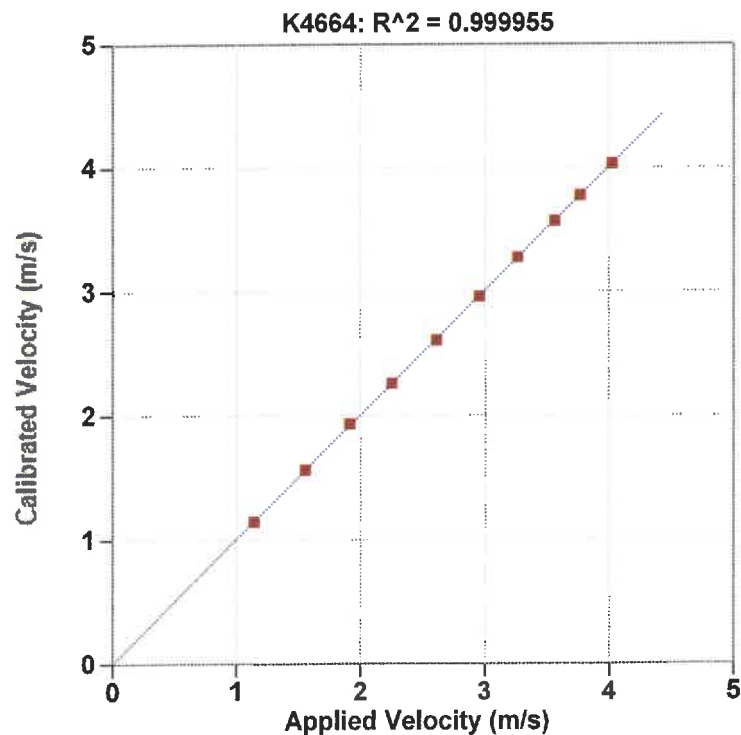
Ref Acc 1: 72505! Cal on: 24Mar2022
1035 g's/volt

Ref Acc 2: 72517! Cal on: 24Mar2022
1049 g's/volt

Operator: William Johnson


Signed

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).



Reference Velocity	S/N K4664 Velocity
m/s	m/s
1.146	1.143
1.560	1.559
1.915	1.932
2.255	2.258
2.612	2.606
2.962	2.958
3.270	3.273
3.569	3.566
3.772	3.773
4.030	4.027
Maximum Acceleration: 879 g's	

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 17Aug2023

Serial No: K4665 Temperature: 77.6 °F

Model: PR Humidity: 51%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

375.3 mv/5000g
(75.1 μ v/g)
R²: 0.999957 [Chip programmed]

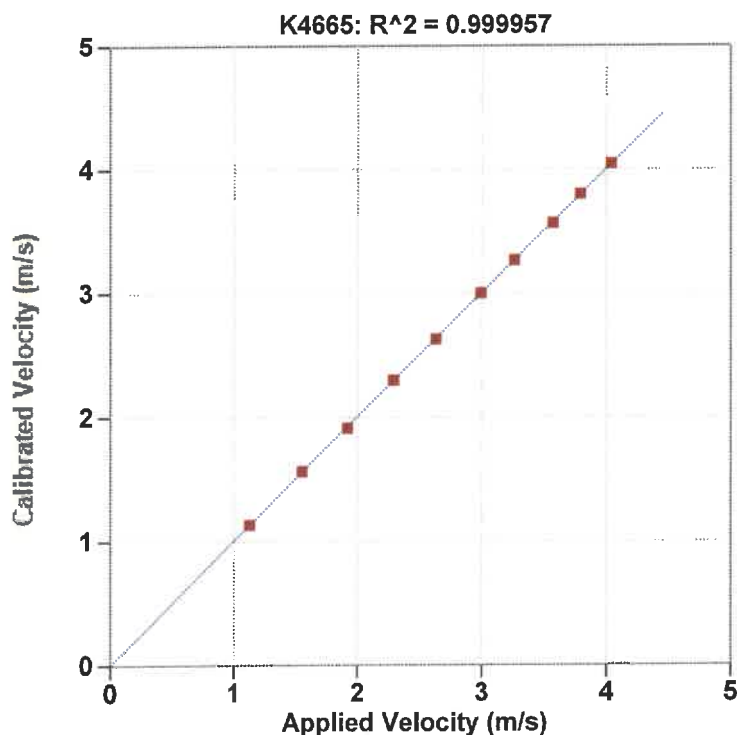
Ref Acc 1: 72505! Cal on: 24Mar2022
1035 g's/volt

Ref Acc 2: 72517! Cal on: 24Mar2022
1049 g's/volt

Operator: William Johnson


Signed

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).

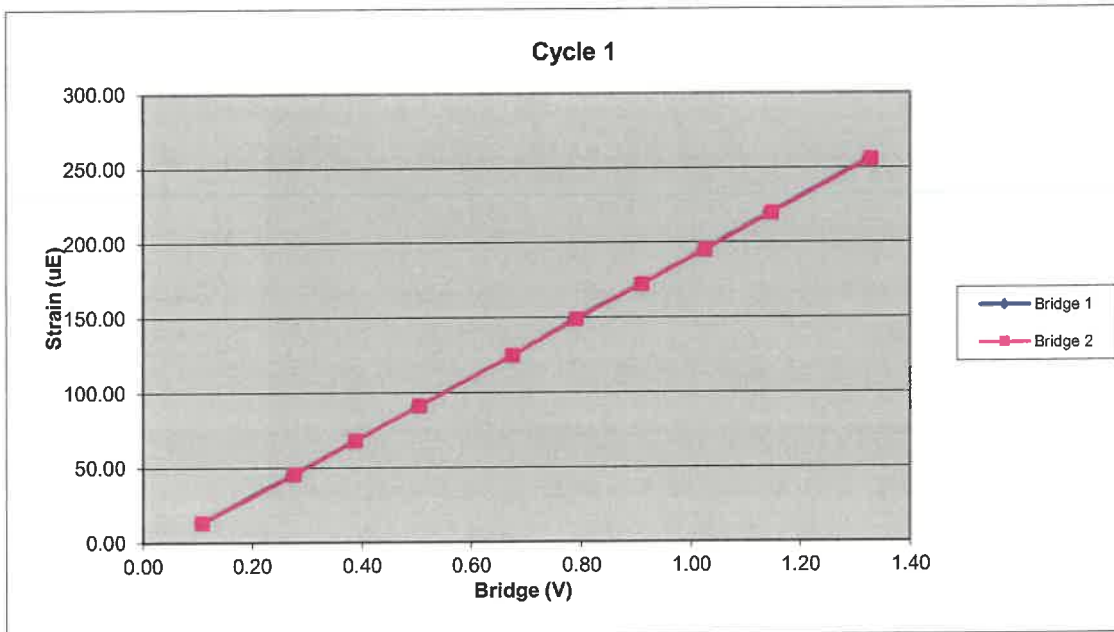


Reference Velocity	S/N K4665 Velocity
m/s	m/s
1.129	1.131
1.555	1.560
1.922	1.910
2.291	2.295
2.633	2.627
2.994	2.999
3.262	3.264
3.573	3.564
3.791	3.797
4.038	4.041
Maximum Acceleration: 880 g's	

203AWJ		Cycle 1		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	819.88	13.18	0.11	0.11
3	2100.72	45.33	0.27	0.28
4	2947.11	68.12	0.39	0.39
5	3827.72	90.98	0.50	0.51
6	5122.01	124.83	0.67	0.68
7	5996.48	148.92	0.79	0.79
8	6896.87	172.25	0.91	0.91
9	7771.24	195.27	1.02	1.03
10	8694.53	219.87	1.15	1.15
11	10075.00	255.83	1.33	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7576.32	Force Calibration (lb/V)	7575.14
Offset	14.17	Offset	2.97
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E/V}$)	199.46	Strain Calibration ($\mu\text{E/V}$)	199.43
Offset	-9.00	Offset	-9.29
Correlation	0.999979	Correlation	0.999982

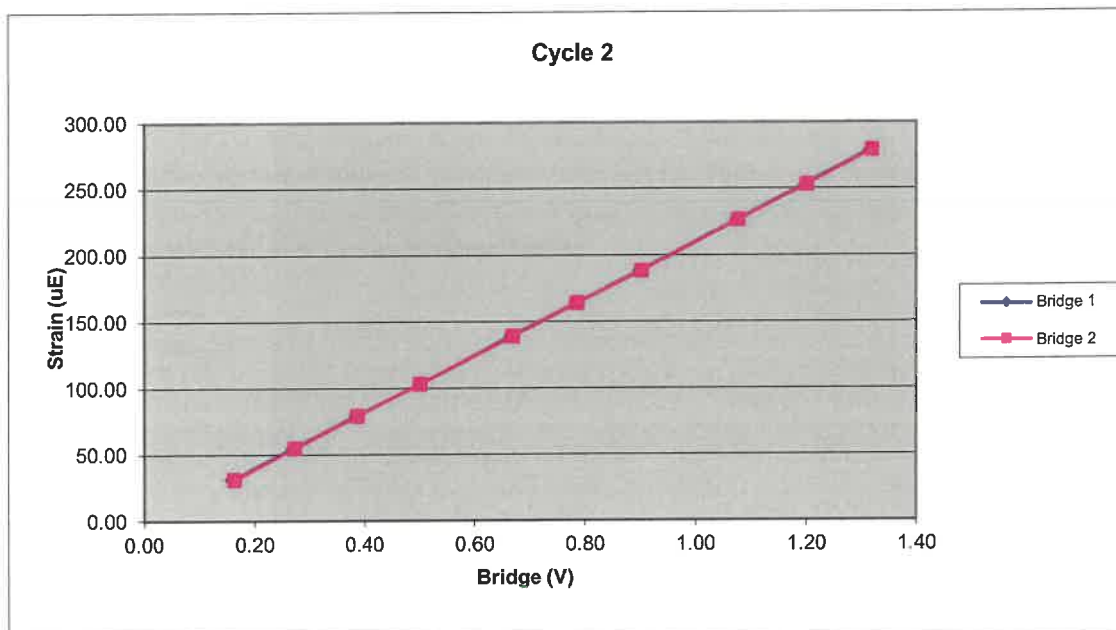
Force Strain Calibration	
EA (Kips)	37982.46
Offset	356.04
Correlation	0.999980



203AWJ		Cycle 2		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1217.00	30.72	0.16	0.16
3	2060.56	54.45	0.27	0.27
4	2939.22	78.94	0.39	0.39
5	3811.73	102.81	0.50	0.50
6	5082.83	138.71	0.67	0.67
7	5976.20	163.65	0.78	0.79
8	6861.10	187.95	0.90	0.90
9	8194.67	226.13	1.08	1.08
10	9130.84	252.84	1.20	1.20
11	10039.52	278.74	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7616.13	Force Calibration (lb/V)	7615.56
Offset	1.43	Offset	-11.88
Correlation	0.999999	Correlation	0.999997
Strain Calibration (μ E/V)	213.80	Strain Calibration (μ E/V)	213.79
Offset	-3.74	Offset	-4.12
Correlation	0.999987	Correlation	0.999990

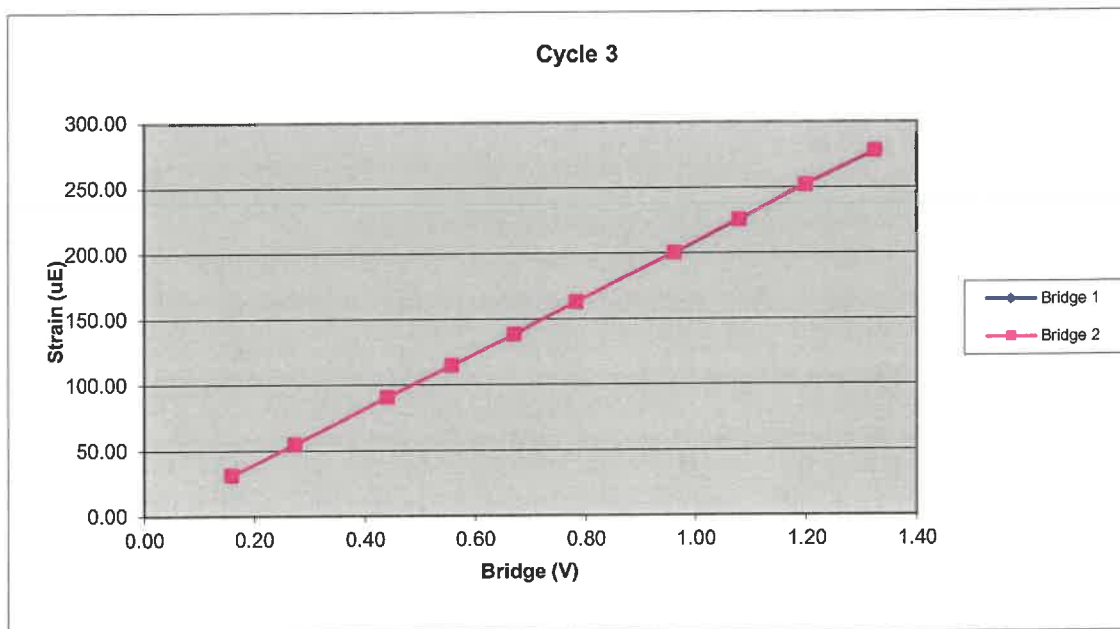
Force Strain Calibration	
EA (Kips)	35621.25
Offset	134.95
Correlation	0.999985



203AWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1216.12	31.38	0.16	0.16
3	2078.01	54.75	0.27	0.27
4	3348.13	90.71	0.44	0.44
5	4248.62	114.98	0.56	0.56
6	5110.90	138.68	0.67	0.67
7	5966.16	163.47	0.78	0.78
8	7338.73	200.80	0.96	0.96
9	8226.55	225.96	1.08	1.08
10	9144.10	252.26	1.20	1.20
11	10093.62	278.03	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7621.84	Force Calibration (lb/V)	7635.13
Offset	-0.64	Offset	-3.95
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E}/\text{V}$)	212.12	Strain Calibration ($\mu\text{E}/\text{V}$)	212.49
Offset	-2.91	Offset	-3.01
Correlation	0.999979	Correlation	0.999985

Force Strain Calibration	
EA (Kips)	35930.12
Offset	104.27
Correlation	0.999985



Bridge Excitation (V) 5
Shunt Resistor (ohm) 60.4k

Calibration Factors	203AWJ		
Bridge 1 ($\mu\text{E/V}$)	208.46	Bridge 2 ($\mu\text{E/V}$)	208.57
EA Factor (Kips)	36511.28	Area (in^2)	1.22

Calibrated by: Sean Boney
Calibrated Date: 8/24/2023

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

Appendix III – Field Log



SPT Energy Evaluation Form

Project: I-77 EXIST Z6 PHASE I
Project No.: 23610178A
Boring No.: TEST HOLE A

Date: 11/17/23
Weather: CLEAR 70°
Drill Rod Type: 5' LONG AWS

On-site Personnel

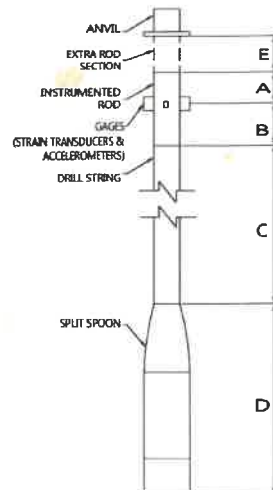
Drilling Company: SIME
Rig Operator: L. SPRADLER
Engr/Geologist: N/A
Client Rep.: N/A
Analyzer Oper.: S. WILLIAMSON

Rig/Hammer Info

Drill Rig Make/Model: CME-550X
Carrier Type: ATV
Rig Serial No.: 290593 (R-49)
Hammer Type/Model: AUTO / CME
Hammer Serial No.:
Hammer Drop System: CHAIN DRIVE
Lubrication Condition: PER MANUFACTURER RECS.
Manufacturer Recommended
Operation Rate (bpm): 50-55
Typical Drop Height (in.): 30
Typical Hammer Weight (lbs): 140
Anvil Dimension (in.): 12
Drilling Method: 2" 4" HSA
Drop Height in Tolerance (y/n): Y

Rod Info

(A) + (B) Instr. Rod Length: 7.0 ft
(B) Instr. Rod Length
below Gages: 0.7 ft
(D) Spoon Length: 2.85 ft
(E) Rod Length Above
Instr. Rod (if applicable): 0 ft
(B)+(C)+(D) (LE) -
Length Below Gages: (C) + 3.55 ft
Instr. Rod S/N: 203 AWS
Instr. Rod Outside Dia.: 1.75 in.
Instr. Rod Area: 1.22 in²
PDA Make/Model: PDS / PAX
PDA Serial No.: 37332
Calib. Pulse Test (y/n): Y



Gage Info

	Gage	Serial No.	Calibration No.
Accel.	A3	R 4664	376.6
	A4	E 4665	375.3
Strain	F3	203 AWS-1	208.46
	F4	203 AWS-2	208.57

Date of Test	Test Depth Increment (ft to ft)	Test Time Start / Stop (military)	Length of Drill String (ft) (C)	(LE) Length below Gages (ft) (B) + (C) + (D)	Avg. Meas. Hammer Rate (BPM)	SPT Blow Counts						AASHTO / USCS Classification
						Total Blows by PDA	6"	12"	18"	N-Value	Extra Blows	
11/17/23	38.5-40.0	11:01	39	42.55			25	26	50+	100+		
	43.5-45	11:19	45	48.55		97	14	35	50/63	100+		
	48.5-50.0	11:34	50	53.55		27	6	8	13	21	0	
	53.5-55.0	11:48	55	58.55		34	6	11	17	28	0	
	56.0-57.5	12:05	57	60.55		33	7	9	17	26	0	
	58.5-60.0	12:18	60	63.55		86	15	27	44	71	0	

Notes: FL SPIKING ON FIRST SAMPLE, SWAPPED OUT PIGTAIL. ALSO SEVERAL BAD ISOLUS RECORDED B/PDA
" ELAST SAMPLE.

NOTE: (1) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. verticality, weather, or lubrication between trials). (2) Note any changes in rod diameter along drill string and record locations of short rod sections.

Joseph William
Prepared By (print/signature)

11/17/23

Date

[illegible]

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:	23610178A	County:	Richland	Boring No.:	EB-1W
Site Description:	I-77 Exit 26 Phase I			Route:	US-21
Eng./Geo.:	S. Melecosky	Boring Location:		Offset:	
Elev.:	445.3 ft	Latitude:	34.18986277	Longitude:	-80.97066934
Date Started:	7/19/2023				
Total Depth:	89.6 ft	Soil Depth:	71.6 ft	Core Depth:	18 ft
Date Completed:	7/21/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW/RC	Hammer Type:	Automatic
Energy Ratio:	81.6%				
Core Size:	NQ	Driller:	S. Gowan	Groundwater:	TOB NA
24HR	NA				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL MC LL X—X—X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%)
415.3	33.5			28.5	SS-9	50/3"				50/3"	>>●
410.3		PARTIALLY WEATHERED ROCK (PWR) - very hard, moist to wet, reddish yellow with pinkish white, SILT with Sand (ML), little fine to medium sands, 5YR7/8, 5YR8/2.		33.5	SS-10	20	33	50/4"		50/4"	>>●
405.3		@38.5 feet - reddish yellow with pinkish white and pale yellow, 5YR7/8, 5YR8/2, 2.5Y8/2.		38.5	SS-11	17	36	50/3"		50/3"	>>●
400.3	43.5	PIEDMONT RESIDUUM - very stiff, moist, reddish yellow with pale yellow, Sandy elastic SILT (MH) (A-7-5(23)), some fine to medium sands, trace fine rock fragments, 5YR7/8, 2.5Y8/2. LL=76, PL=50, PI=26, NMC=31%, %200=71		43.5	SS-12	5	8	11		19	● ○ X—▲ X
395.3		@48.5 feet - stiff.		48.5	SS-13	4	6	8		14	● ○ ▲
		@53.5 feet - hard, strong brown with light		53.5							

LEGEND

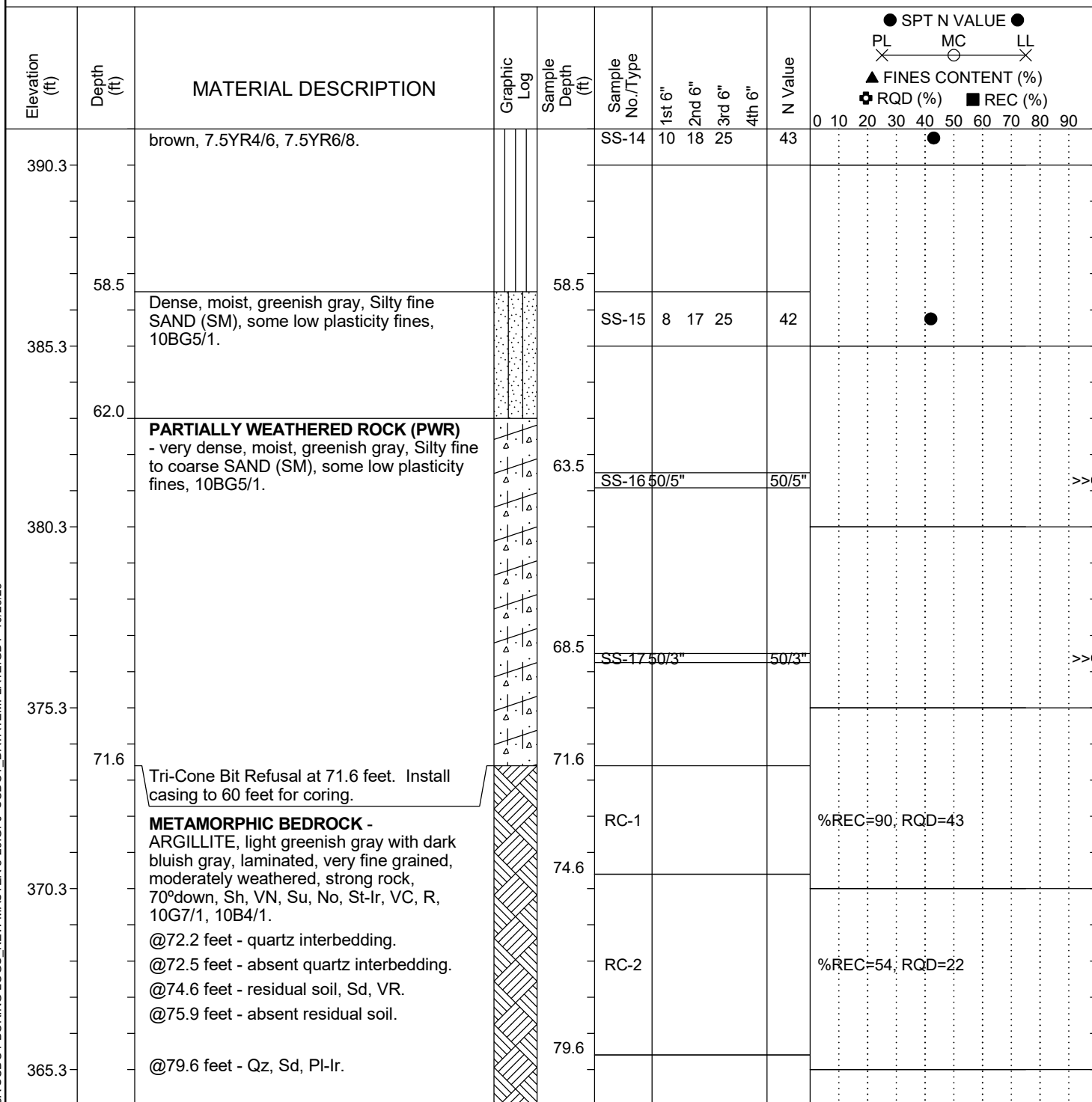
Continued Next Page

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	

SC DOT 23610178A SCDOT BORING LOGS, NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

SCDOT Soil Test Log

Project ID:	23610178A	County:	Richland	Boring No.:	EB-1W
Site Description:	I-77 Exit 26 Phase I	Route:	US-21		
Eng./Geo.:	S. Melecosky	Boring Location:		Offset:	
Elev.:	445.3 ft	Latitude:	34.18986277	Longitude:	-80.97066934
Date Started:	7/19/2023				
Total Depth:	89.6 ft	Soil Depth:	71.6 ft	Core Depth:	18 ft
Date Completed:	7/21/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW/RC	Hammer Type:	Automatic
Energy Ratio:	81.6%				
Core Size:	NQ	Driller:	S. Gowan	Groundwater:	TOB NA
24HR:	NA				



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	

SC DOT 23610178A SCDOT BORING LOGS, NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

SCDOT Soil Test Log

Project ID:	23610178A	County:	Richland	Boring No.:	EB-1W
Site Description:	I-77 Exit 26 Phase I	Route:	US-21		
Eng./Geo.:	S. Melecosky	Boring Location:		Offset:	
Elev.:	445.3 ft	Latitude:	34.18986277	Longitude:	-80.97066934
Date Started:	7/19/2023				
Total Depth:	89.6 ft	Soil Depth:	71.6 ft	Core Depth:	18 ft
Date Completed:	7/21/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW/RC	Hammer Type:	Automatic
Energy Ratio:	81.6%				
Core Size:	NQ	Driller:	S. Gowan	Groundwater:	TOB NA
24HR	NA				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%)
360.3		@84.6 feet - No, PI-Wa.		84.6	RC-3						%REC=100, RQD=64
		@86.6-87.7 feet - light greenish gray, absent laminations, 10G7/1.			RC-4						%REC=100, RQD=54
355.3	89.6	Boring Terminated at 89.6 feet.									
350.3											
345.3											
340.3											

LEGEND

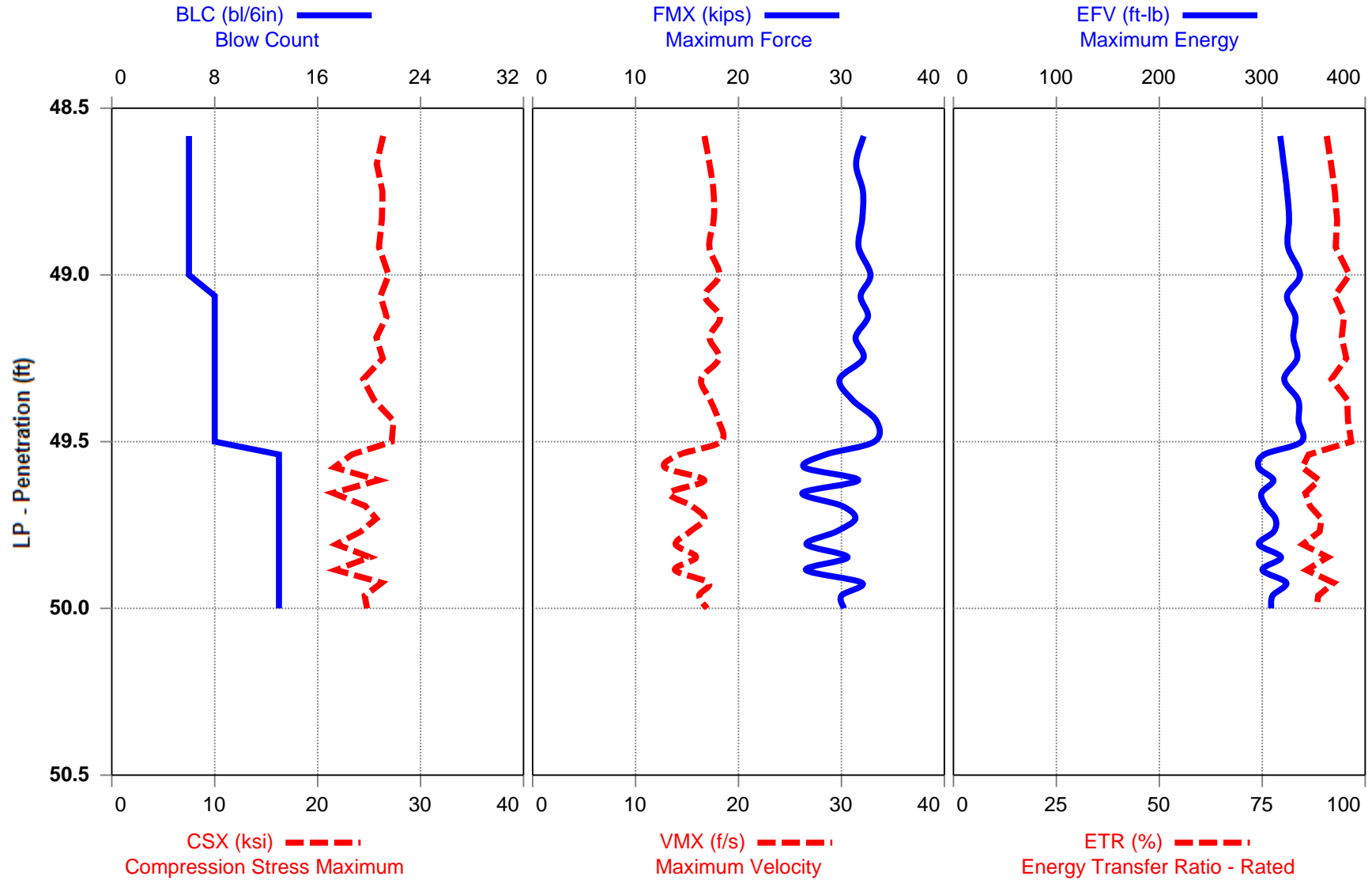
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC DOT 23610178A SCDOT BORING LOGS, NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

Appendix IV – SPT Energy Measurement Plots and Tables



CME-550X SN 290593 - 48.5-50.0 FEET
TEST HOLE A

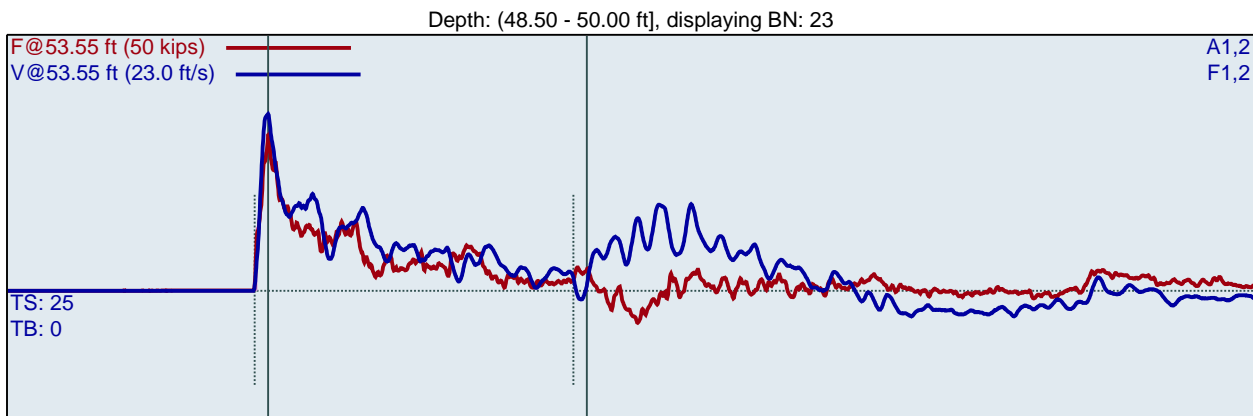


CME-550X SN 290593
JRW
TEST HOLE A

48.5-50.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 53.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	48.58	6	1.9	32	16.7	1.00	26.4	1.00	317	90.6
2	48.67	6	58.6	31	17.2	1.03	25.7	1.01	321	91.7
3	48.75	6	58.1	32	17.6	1.00	26.3	1.00	324	92.6
4	48.83	6	58.6	32	17.6	1.00	26.2	1.00	326	93.1
5	48.92	6	57.9	32	17.2	1.00	26.0	1.00	325	92.8
6	49.00	6	58.8	33	18.1	1.00	26.9	1.00	337	96.2
7	49.06	8	58.1	32	16.8	0.76	26.1	0.75	324	92.5
8	49.13	8	59.0	33	18.2	0.75	26.7	0.75	332	94.8
9	49.19	8	58.1	31	17.2	0.78	25.7	0.75	330	94.3
10	49.25	8	58.7	32	18.1	0.78	26.3	0.75	334	95.4
11	49.31	8	58.5	30	16.4	0.81	24.4	0.75	321	91.8
12	49.38	8	58.9	31	17.3	0.75	25.5	0.75	335	95.7
13	49.44	8	58.5	33	18.1	0.77	27.4	0.75	335	95.8
14	49.50	8	58.7	33	18.3	0.77	27.2	0.75	338	96.6
15	49.54	13	58.6	28	14.3	0.55	23.3	0.47	302	86.3
16	49.58	13	58.5	26	12.8	0.57	21.6	0.46	296	84.7
17	49.62	13	59.0	32	16.7	0.52	25.9	0.46	311	88.8
18	49.65	13	58.4	26	13.3	0.55	21.5	0.46	299	85.4
19	49.69	13	58.8	30	15.4	0.51	24.6	0.46	303	86.5
20	49.73	13	58.8	31	16.7	0.54	25.7	0.46	313	89.3
21	49.77	13	58.3	30	15.3	0.55	24.2	0.46	311	88.9
22	49.81	13	59.0	27	13.9	0.52	21.8	0.46	297	84.8
23	49.85	13	58.3	31	15.9	0.55	25.1	0.46	318	90.9
24	49.88	13	59.1	27	13.8	0.52	21.8	0.46	300	85.7
25	49.92	13	58.3	32	17.1	0.55	26.2	0.46	323	92.3
26	49.96	13	58.8	30	16.2	0.52	24.6	0.46	310	88.6
27	50.00	13	58.3	30	16.9	0.51	24.8	0.46	309	88.1

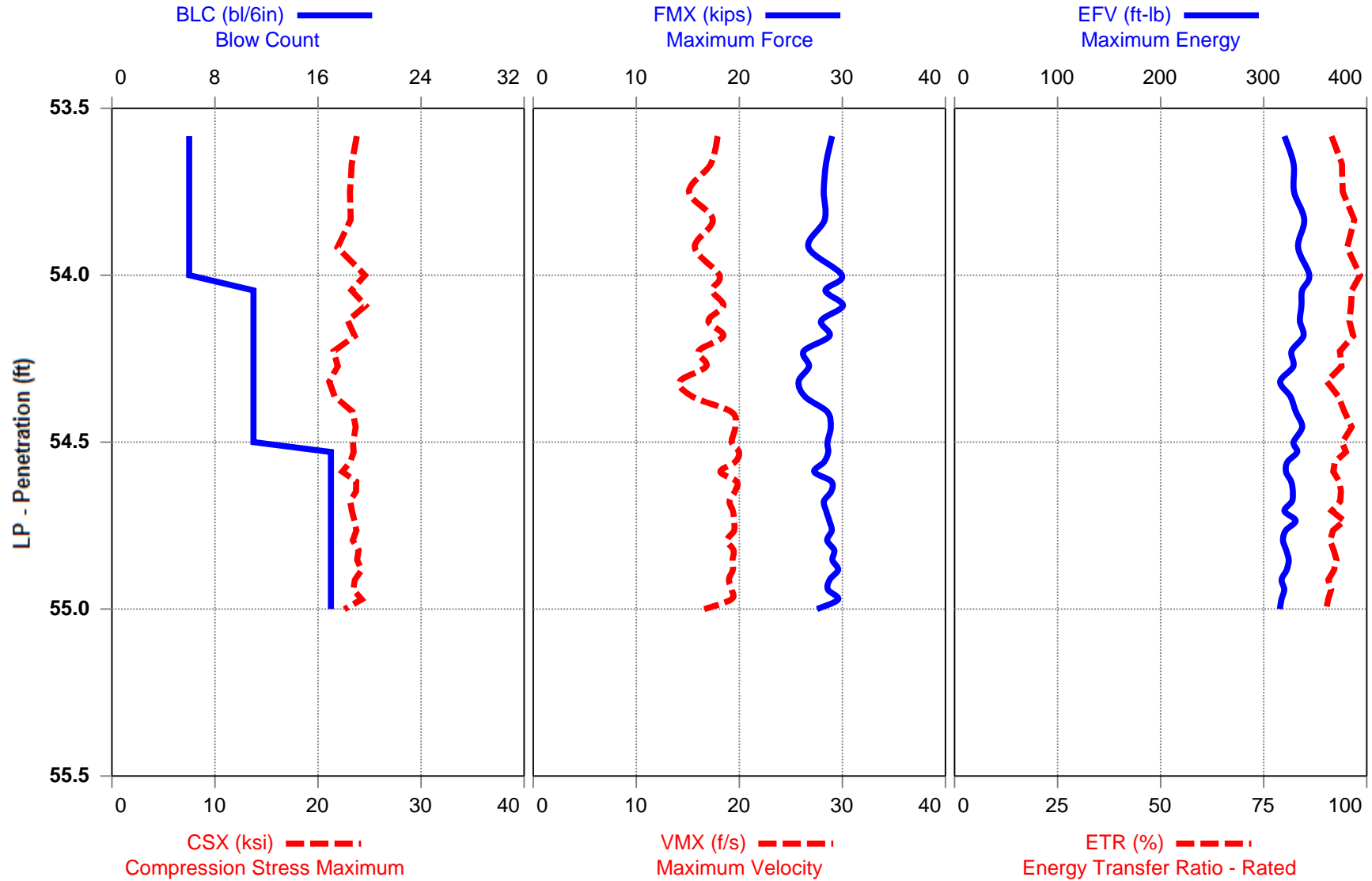
Average	58.6	30	16.1	0.63	24.8	0.57	316	90.3
Std Dev	0.3	2	1.6	0.12	1.8	0.14	14	3.9
Maximum	59.1	33	18.3	0.81	27.4	0.75	338	96.6
Minimum	58.1	26	12.8	0.51	21.5	0.46	296	84.7

N-value: 21

Sample Interval Time: 26.58 seconds.



CME-550X SN 290593 - 53.5-55.0 FEET
TEST HOLE A

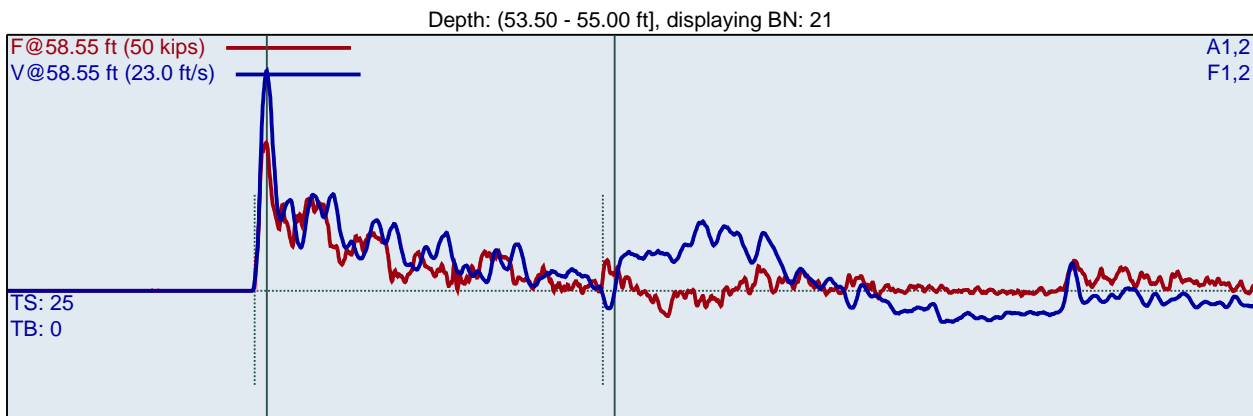


CME-550X SN 290593
JRW
TEST HOLE A

48.5-50.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 58.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

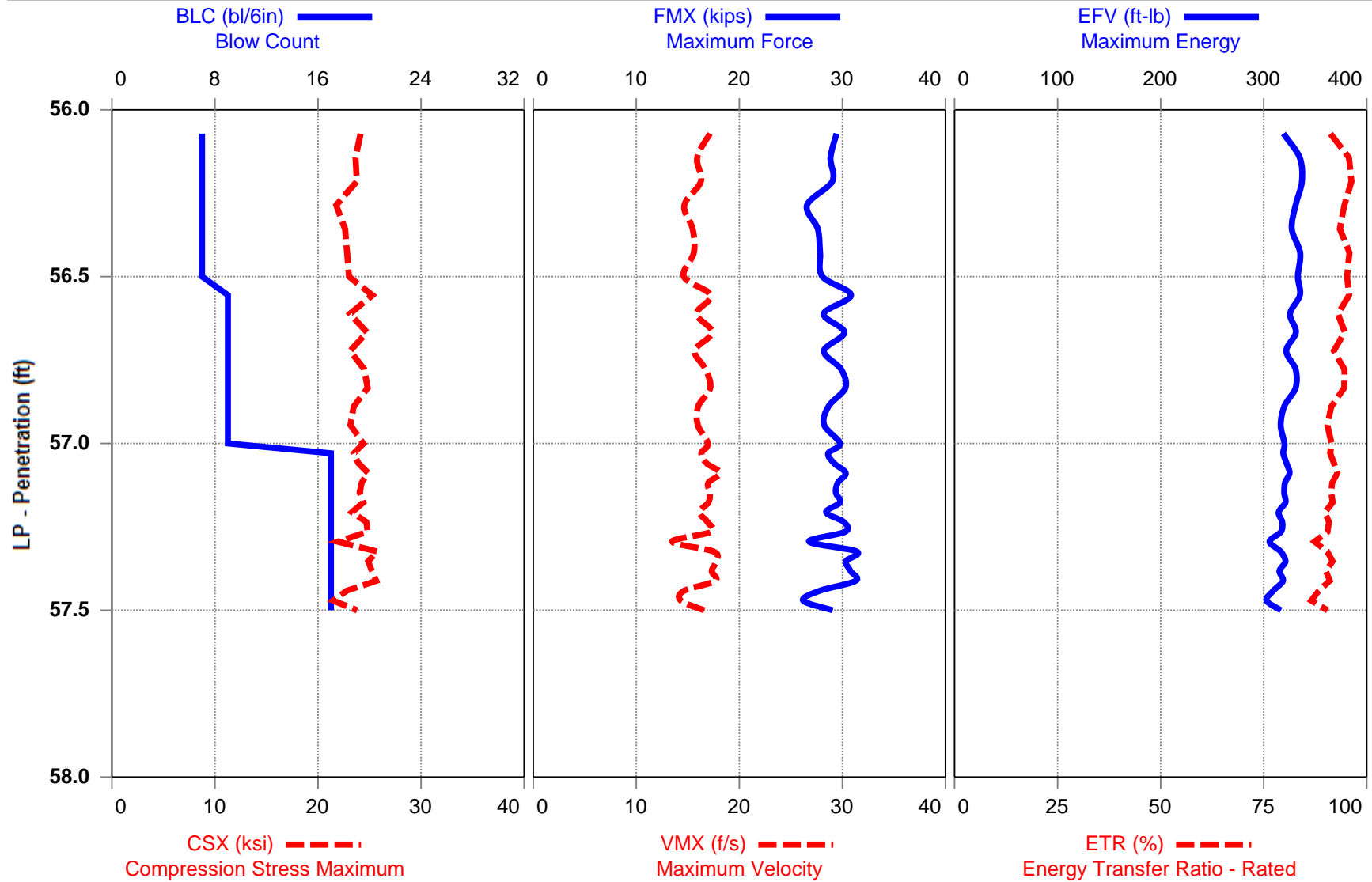
BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	53.58	6	1.9	29	17.9	1.15	23.8	1.01	320	91.4
2	53.67	6	58.7	28	17.2	1.01	23.3	1.00	329	94.0
3	53.75	6	58.6	28	15.1	1.01	23.1	1.00	329	94.1
4	53.83	6	58.5	28	17.4	1.00	23.2	1.00	339	96.9
5	53.92	6	58.4	27	15.7	1.01	21.9	1.00	333	95.2
6	54.00	6	58.9	30	18.1	1.00	24.6	1.00	344	98.3
7	54.05	11	58.2	28	17.4	0.78	23.2	0.55	337	96.3
8	54.09	11	59.3	30	18.5	0.68	24.6	0.55	337	96.2
9	54.14	11	58.4	28	17.0	0.67	22.9	0.54	335	95.7
10	54.18	11	58.9	29	18.4	0.65	23.6	0.55	338	96.7
11	54.23	11	58.6	26	16.0	0.62	21.5	0.55	327	93.4
12	54.27	11	58.9	27	16.8	0.61	21.9	0.54	329	93.9
13	54.32	11	58.9	26	14.2	0.60	21.1	0.55	316	90.3
14	54.36	11	58.7	26	15.5	0.63	21.6	0.54	326	93.1
15	54.41	11	58.9	29	19.2	0.61	23.4	0.54	331	94.6
16	54.45	11	58.5	29	19.6	0.60	23.7	0.55	337	96.3
17	54.50	11	59.1	29	19.3	0.60	23.4	0.54	329	94.0
18	54.53	17	58.6	29	20.0	0.53	23.5	0.35	332	94.9
19	54.56	17	59.0	28	19.6	0.53	23.1	0.35	323	92.2
20	54.59	17	58.6	27	18.2	0.53	22.4	0.35	322	91.9
21	54.62	17	58.6	29	19.7	0.51	23.7	0.35	327	93.3
22	54.65	17	58.9	29	19.6	0.52	23.7	0.35	328	93.7
23	54.68	17	58.6	28	19.0	0.51	23.1	0.35	327	93.5
24	54.71	17	59.2	28	19.4	0.50	23.3	0.35	320	91.5
25	54.74	17	58.4	29	19.5	0.51	23.5	0.35	331	94.6
26	54.76	17	59.1	29	19.5	0.50	23.7	0.35	321	91.8
27	54.79	17	58.4	29	18.8	0.49	23.4	0.35	319	91.0
28	54.82	17	58.9	29	19.4	0.48	23.9	0.35	322	91.9
29	54.85	17	58.7	29	19.3	0.49	23.8	0.35	324	92.6
30	54.88	17	58.5	30	19.4	0.48	24.2	0.35	322	92.1
31	54.91	17	58.9	29	19.0	0.48	23.6	0.35	317	90.6

32	54.94	17	58.5	29	19.3	0.48	23.4	0.35	320	91.4
33	54.97	17	59.1	30	19.2	0.47	24.2	0.35	317	90.6
34	55.00	17	58.4	28	16.6	0.48	22.6	0.35	316	90.2
Average			58.7	28	18.5	0.55	23.2	0.43	326	93.2
Std Dev			0.3	1	1.5	0.08	0.8	0.09	7	1.9
Maximum			59.3	30	20.0	0.78	24.6	0.55	338	96.7
Minimum			58.2	26	14.2	0.47	21.1	0.35	316	90.2
N-value: 28										

Sample Interval Time: 33.66 seconds.



CME-550X SN 290593 - 56.0-57.5 FEET
TEST HOLE A

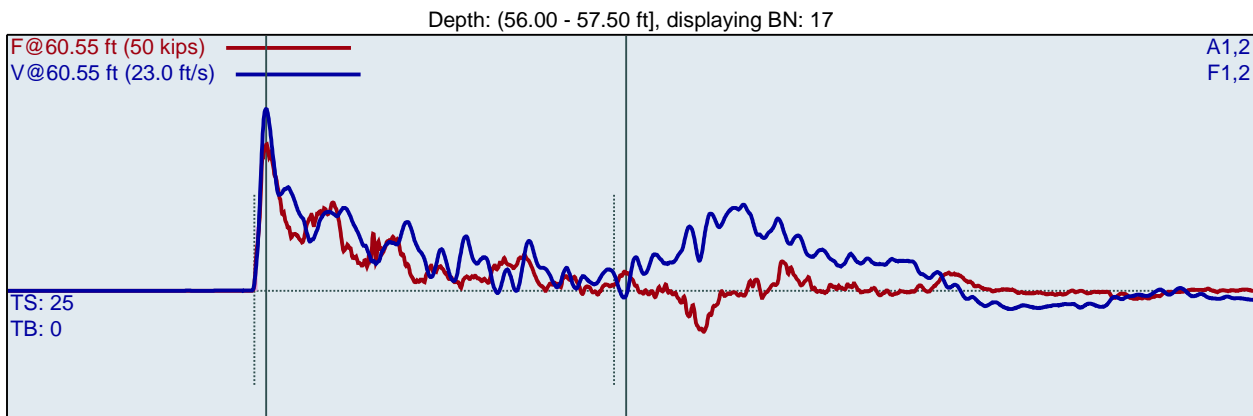


CME-550X SN 290593
JRW
TEST HOLE A

48.5-50.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 60.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

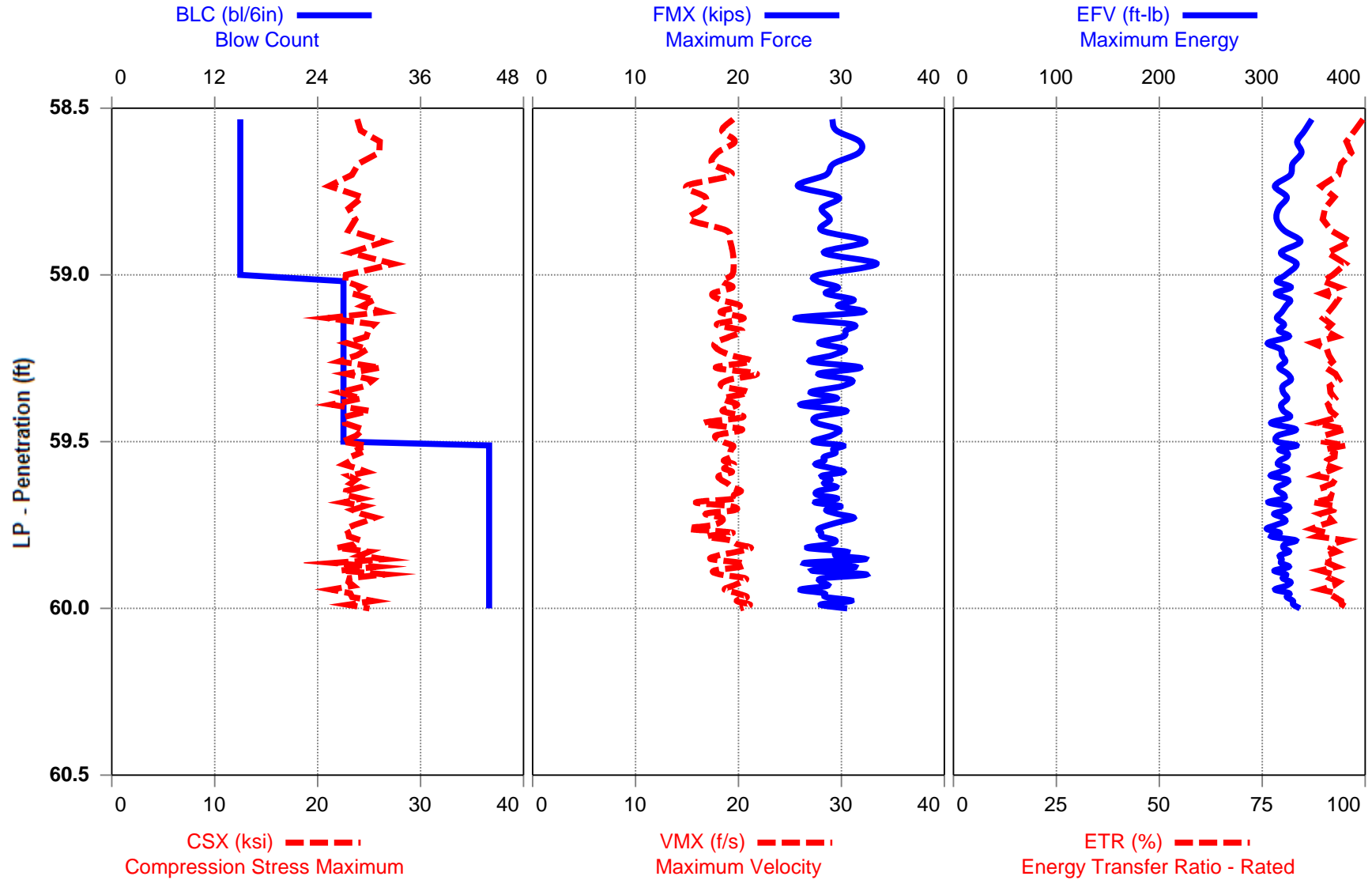
BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	56.07	7	1.9	29	17.1	1.01	24.1	0.86	319	91.1
2	56.14	7	58.0	29	15.9	0.87	23.6	0.86	335	95.6
3	56.21	7	58.3	29	16.3	0.87	23.8	0.86	337	96.3
4	56.29	7	58.3	27	14.7	0.89	21.8	0.86	331	94.5
5	56.36	7	58.8	28	15.5	0.88	22.6	0.86	327	93.4
6	56.43	7	58.3	28	15.6	0.88	22.8	0.86	335	95.8
7	56.50	7	58.6	28	14.6	0.87	23.0	0.86	333	95.2
8	56.56	9	58.4	31	17.2	0.75	25.3	0.66	335	95.7
9	56.61	9	58.9	28	15.8	0.73	23.1	0.67	325	93.0
10	56.67	9	58.3	30	17.3	0.75	24.7	0.66	331	94.6
11	56.72	9	58.8	28	15.7	0.74	23.1	0.67	322	92.0
12	56.78	9	58.3	30	16.7	0.76	24.5	0.67	331	94.6
13	56.83	9	58.6	30	17.2	0.75	24.8	0.67	331	94.5
14	56.89	9	58.7	29	16.0	0.74	23.5	0.67	320	91.4
15	56.94	9	58.4	28	16.0	0.73	23.1	0.67	316	90.4
16	57.00	9	58.8	30	16.9	0.67	24.4	0.67	320	91.4
17	57.03	17	58.5	29	16.3	0.63	23.5	0.36	319	91.1
18	57.06	17	58.8	29	16.8	0.61	23.9	0.35	322	92.0
19	57.09	17	58.4	30	18.1	0.60	24.9	0.35	325	92.9
20	57.12	17	58.9	30	17.0	0.57	24.2	0.35	321	91.6
21	57.15	17	58.5	29	17.1	0.56	24.1	0.36	320	91.4
22	57.18	17	58.8	30	17.0	0.55	24.4	0.35	321	91.7
23	57.21	17	58.7	28	16.1	0.50	23.3	0.35	314	89.8
24	57.24	17	58.7	30	16.9	0.49	24.7	0.35	318	90.8
25	57.26	17	58.9	30	17.3	0.48	24.8	0.35	317	90.5
26	57.29	17	58.5	27	13.5	0.48	21.9	0.35	306	87.3
27	57.32	17	59.1	31	17.5	0.47	25.7	0.35	316	90.4
28	57.35	17	58.3	30	17.7	0.46	24.9	0.35	321	91.7
29	57.38	17	58.9	31	17.3	0.46	25.2	0.35	315	90.1
30	57.41	17	58.6	31	17.6	0.46	25.6	0.35	318	91.0
31	57.44	17	58.5	28	14.6	0.45	22.8	0.36	309	88.3

32	57.47	17	58.7	26	14.3	0.45	21.5	0.35	303	86.5
33	57.50	17	58.7	29	16.6	0.45	23.8	0.35	317	90.5
Average			58.6	29	16.6	0.59	24.1	0.46	320	91.3
Std Dev			0.2	1	1.1	0.12	1.1	0.15	7	2.1
Maximum			59.1	31	18.1	0.76	25.7	0.67	335	95.7
Minimum			58.3	26	13.5	0.45	21.5	0.35	303	86.5
N-value: 26										

Sample Interval Time: 32.73 seconds.



CME-550X SN 290593 - 58.5-60.0 FEET
TEST HOLE A

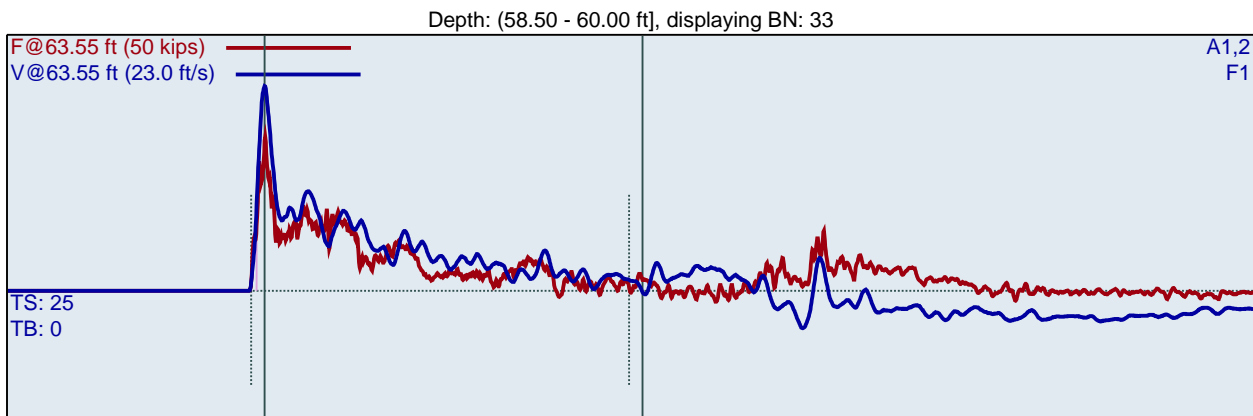


CME-550X SN 290593
JRW
TEST HOLE A

48.5-50.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 63.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	58.53	15	1.9	29	19.5	0.82	23.9	0.40	348	99.4
2	58.57	15	58.1	29	18.4	0.63	24.2	0.40	341	97.5
3	58.60	15	58.8	32	19.6	0.57	26.0	0.40	334	95.4
4	58.63	15	58.4	32	17.9	0.58	26.0	0.40	338	96.6
5	58.67	15	59.0	29	17.4	0.56	24.0	0.40	329	94.1
6	58.70	15	59.1	28	19.3	0.54	23.3	0.40	327	93.5
7	58.73	15	58.3	26	15.0	0.53	21.1	0.40	312	89.2
8	58.77	15	59.2	30	16.8	0.52	24.4	0.40	324	92.5
9	58.80	15	58.4	28	16.6	0.52	23.0	0.40	316	90.2
10	58.83	15	59.4	29	15.2	0.51	23.7	0.40	314	89.7
11	58.87	15	58.4	28	18.8	0.49	23.0	0.40	321	91.7
12	58.90	15	58.9	32	19.2	0.50	26.5	0.40	337	96.3
13	58.93	15	59.1	28	19.4	0.48	23.2	0.40	318	90.9
14	58.97	15	58.7	33	19.5	0.48	27.4	0.40	333	95.2
15	59.00	15	59.2	28	19.4	0.49	22.7	0.40	322	92.1
16	59.02	27	58.3	28	18.4	0.48	22.7	0.22	314	89.8
17	59.04	27	59.4	30	19.4	0.48	24.3	0.22	328	93.6
18	59.06	27	58.2	29	17.5	0.47	23.4	0.22	313	89.5
19	59.07	27	59.1	31	18.2	0.48	25.5	0.22	327	93.3
20	59.09	27	58.7	30	20.1	0.46	24.3	0.22	323	92.3
21	59.11	27	59.0	32	18.2	0.46	26.3	0.22	319	91.1
22	59.13	27	58.7	26	20.5	0.44	21.0	0.22	314	89.7
23	59.15	27	58.7	31	17.9	0.45	25.5	0.22	321	91.7
24	59.17	27	59.1	30	20.3	0.44	24.9	0.22	316	90.3
25	59.19	27	58.4	30	19.1	0.46	24.7	0.22	326	93.0
26	59.20	27	58.9	28	17.7	0.43	22.8	0.22	305	87.2
27	59.22	27	58.7	30	18.0	0.44	24.8	0.22	317	90.7
28	59.24	27	58.9	29	19.3	0.43	23.8	0.22	319	91.2
29	59.26	27	58.6	27	21.2	0.44	22.1	0.22	322	92.1
30	59.28	27	59.0	32	17.8	0.41	26.1	0.22	316	90.4
31	59.30	27	58.5	28	21.8	0.42	22.8	0.22	324	92.7

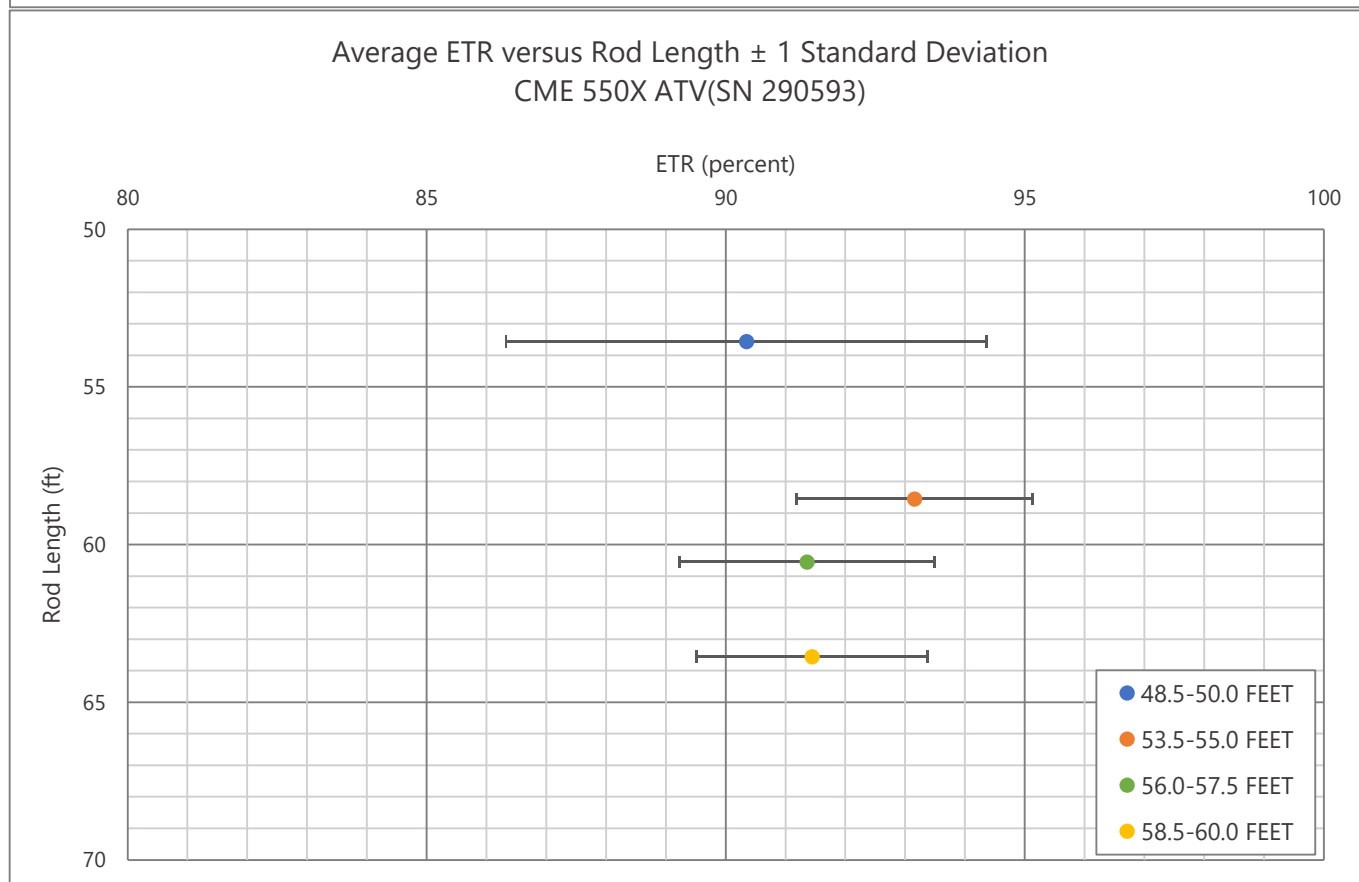
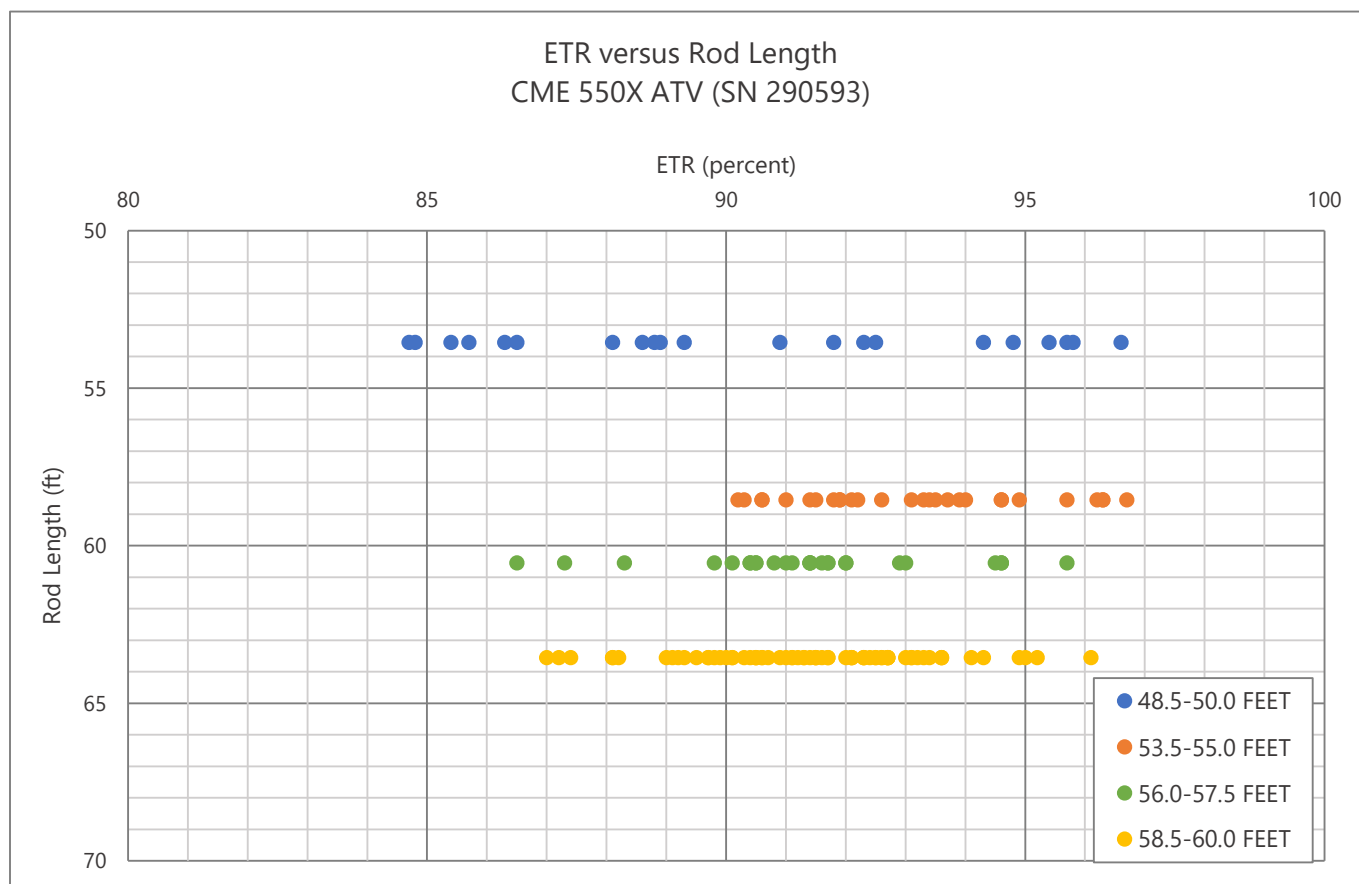
32	59.31	27	58.7	31	19.1	0.40	25.4	0.23	328	93.6
33	59.33	27	59.0	30	18.4	0.40	24.6	0.23	320	91.3
34	59.35	27	58.5	27	21.0	0.39	22.1	0.22	320	91.5
35	59.37	27	58.9	30	18.5	0.39	24.2	0.22	324	92.6
36	59.39	27	58.6	26	19.9	0.39	21.3	0.22	318	91.0
37	59.41	27	59.2	30	18.4	0.38	25.0	0.22	320	91.5
38	59.43	27	58.3	28	20.4	0.38	22.6	0.22	327	93.4
39	59.44	27	59.1	28	16.6	0.38	22.7	0.22	308	88.1
40	59.46	27	58.7	30	20.3	0.39	24.4	0.22	333	95.0
41	59.48	27	58.8	29	17.8	0.38	23.8	0.22	315	90.1
42	59.50	27	59.2	27	18.5	0.39	22.4	0.23	315	89.9
43	59.51	44	58.6	30	19.5	0.40	24.7	0.13	333	95.2
44	59.52	44	59.2	29	19.3	0.38	23.9	0.14	317	90.5
45	59.53	44	58.2	29	19.2	0.38	24.1	0.14	324	92.6
46	59.55	44	59.2	28	19.3	0.38	23.2	0.13	324	92.5
47	59.56	44	58.5	28	18.6	0.38	23.2	0.14	317	90.6
48	59.57	44	58.9	27	19.6	0.38	22.5	0.13	315	90.1
49	59.58	44	58.9	29	18.6	0.39	23.8	0.14	324	92.7
50	59.59	44	58.6	30	19.4	0.38	24.8	0.14	317	90.5
51	59.60	44	59.0	28	18.1	0.38	23.0	0.14	308	88.1
52	59.61	44	58.6	29	18.3	0.39	23.7	0.14	324	92.7
53	59.63	44	58.9	28	18.9	0.39	23.2	0.14	322	92.1
54	59.64	44	58.3	30	19.4	0.37	24.2	0.14	314	89.7
55	59.65	44	59.0	28	20.2	0.37	22.8	0.14	315	90.0
56	59.66	44	58.2	28	19.6	0.38	22.7	0.14	321	91.7
57	59.67	44	59.0	30	19.7	0.38	24.2	0.14	320	91.5
58	59.68	44	58.7	27	15.9	0.37	22.5	0.14	306	87.4
59	59.69	44	58.7	30	19.2	0.38	24.5	0.14	325	92.7
60	59.70	44	59.1	29	19.7	0.38	23.4	0.14	323	92.4
61	59.72	44	58.4	30	16.8	0.37	24.2	0.14	311	89.0
62	59.73	44	59.1	31	18.3	0.38	25.6	0.14	319	91.3
63	59.74	44	58.4	30	18.4	0.37	24.6	0.13	322	92.1
64	59.75	44	58.9	29	17.4	0.38	23.5	0.14	313	89.3
65	59.76	44	58.6	28	15.2	0.37	22.8	0.14	304	87.0
66	59.77	44	58.9	28	19.4	0.37	23.0	0.14	317	90.5
67	59.78	44	58.6	28	16.9	0.38	23.0	0.14	309	88.2
68	59.80	44	58.6	29	19.2	0.38	24.1	0.13	332	94.9
69	59.81	44	58.9	29	19.8	0.37	23.7	0.14	322	92.0
70	59.82	44	58.6	27	21.2	0.38	21.9	0.14	321	91.6
71	59.83	44	59.0	31	19.9	0.38	25.0	0.14	326	93.1
72	59.84	44	58.4	29	18.0	0.38	24.1	0.14	317	90.6
73	59.85	44	59.3	32	17.4	0.38	26.5	0.14	319	91.1
74	59.86	44	58.4	26	20.3	0.37	21.6	0.14	318	90.9
75	59.88	44	59.1	31	20.2	0.38	25.7	0.14	326	93.1
76	59.89	44	58.6	27	17.6	0.38	22.2	0.14	312	89.1
77	59.90	44	58.6	32	18.2	0.38	26.6	0.14	323	92.3
78	59.91	44	58.8	28	20.6	0.37	23.1	0.13	320	91.4
79	59.92	44	58.5	28	20.3	0.38	23.0	0.14	327	93.6
80	59.93	44	59.1	29	19.4	0.38	23.5	0.14	323	92.3
81	59.94	44	58.4	26	18.7	0.37	21.3	0.13	312	89.2
82	59.95	44	59.1	28	19.9	0.38	23.2	0.14	326	93.2
83	59.97	44	58.5	28	20.8	0.37	23.4	0.14	324	92.5
84	59.98	44	58.7	31	19.8	0.37	25.4	0.14	330	94.1
85	59.99	44	58.8	28	21.1	0.39	22.9	0.13	330	94.3
86	60.00	44	58.7	31	20.2	0.39	25.1	0.14	337	96.1
Average			58.8	29	19.0	0.40	23.8	0.17	320	91.4
Std Dev			0.3	2	1.3	0.03	1.3	0.04	7	1.9
Maximum			59.4	32	21.8	0.48	26.6	0.23	337	96.1
Minimum			58.2	26	15.2	0.37	21.0	0.13	304	87.0
N-value: 71										

Sample Interval Time: 86.68 seconds.

Summary of SPT Test Results

Project: CME-550X SN 290593, Test Date: 11/17/2023

BPM: Blows/Minute											CSX: Compression Stress Maximum		
FMX: Maximum Force											DFN: Final Displacement		
VMX: Maximum Velocity											EFV: Maximum Energy		
DMX: Maximum Displacement											ETR: Energy Transfer Ratio - Rated		
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
53.55	48.50	50.00	6-8-13	21	32	58.6	30	16.1	0.63	24.8	0.57	316	90.3
58.55	53.50	55.00	6-11-17	28	42	58.7	28	18.5	0.55	23.2	0.43	326	93.2
60.55	56.00	57.50	7-9-17	26	39	58.6	29	16.6	0.59	24.1	0.46	320	91.3
63.55	58.50	60.00	15-27-44	71	108	58.8	29	19.0	0.40	23.8	0.17	320	91.4
Overall Average Values:						58.7	29	18.1	0.49	23.9	0.33	321	91.6
Standard Deviation:						0.3	2	1.8	0.12	1.3	0.19	9	2.5
Overall Maximum Value:						59.4	33	21.8	0.81	27.4	0.75	338	96.7
Overall Minimum Value:						58.1	26	12.8	0.37	21.0	0.13	296	84.7





Report of SPT Energy Measurements
S&ME CME-550X ATV Rig
(Serial No. 293193)
Blythewood, South Carolina

PREPARED FOR:

**North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699**

PREPARED BY:

**S&ME, Inc.
8848 Red Oak Boulevard, Suite A
Charlotte, North Carolina 28217**

December 27, 2023



December 27, 2023

North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699

Attention: Mr. Greg Bodenheimer, P.E.

Cc: Ms. Cheryl A. Youngblood, L.G.
Ms. Christina M. Bruinsma, L.G.

Reference: **Report of SPT Energy Measurements**
S&ME CME-550X ATV Rig (Serial No. 293193)
Blythewood, South Carolina
NC PE Firm License No. F-0176

Dear Mr. Bodenheimer:

We have completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer used with our CME-550X ATV-mounted drill rig (Serial No. 293193). This service was performed by Mr. Joseph Williamson, P.E. of our firm on November 17, 2023, in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit's requirements. Review of the data quality and analyses was performed by Mr. Williamson. A copy of the Certificate of Proficiency issued by Pile Dynamics based on the Dynamic Measurement and Analysis Proficiency Test for Mr. Williamson is included in Appendix I. The testing procedures, equipment used during testing, and detailed results are presented in this report.

1.0 Dynamic Testing Methodology

Testing was performed using a model PAX (Serial No. 3726L) Pile Driving Analyzer TM (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K4664 and K4665) bolted to a 2.0-foot long AWJ drill rod (Serial No. 203) internally instrumented with two strain transducers. Calibration sheets for the accelerometers and the instrumented rod are included in Appendix II. The instrumented AWJ drill rod has a cross-sectional area of 1.22 square inches and an outside diameter of approximately 1¾ inches. Therefore, we calculate the inside diameter to be approximately 1¼ inches at the gauge location. The accelerometers and strain gauges, which are diametrically opposed near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real time for each blow.



2.0 Testing and Observations

S&ME personnel were on site November 17, 2023, to observe and perform high-strain dynamic testing during SPT sampling on the CME-550X ATV-mounted drill rig operated by Sam Eubanks of S&ME. The measurements were taken during drilling of a test hole adjacent to a previous soil test boring at an S&ME project site in Blythewood, South Carolina. SPT energy measurements were recorded during three sampling intervals that met the NCDOT required blow count criteria. The information presented in the tables below summarizes the equipment and tooling used during the SPT energy measurements. The SPT Energy Evaluation Form and the Soil Test Boring Log from the adjacent boring are included in Appendix III.

Table 2-1: Drill Rig Information

Manufacturer	CME
Model	550X
Serial Number	293193
Operator	S. Eubanks
Carrier	ATV

Table 2-2: Hammer Information

Model / Type	CME / Auto
Serial Number	293193
Typical Drop Height (inches)	30
Typical Ram Weight (pounds)	140
Ram Serial Number	N/A

Table 2-3: Drilling and Instrumented Rod Information

Instrumented Rod Type	AWJ (Serial No. 203)
OD (inches) ¹	1¾
ID (inches) ²	1¼
Cross-Sectional Area (in ²) ³	1.22
Total Instrumented Rod Length (feet) ¹	2.0
Length Below Gages (feet) ¹	0.7
Typical Rod Lengths (feet)	5
Split-Spoon Length (feet) ¹	2.85

¹ Measured with engineer's tape measure.

² Calculated using measured OD and Area from instrument rod calibration record.

³ From instrument rod calibration record.



3.0 Dynamic Testing Results

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.55 ft to the drill rod length at each sample depth. The SPT Energy Measurement Data Summary tables in Appendix IV present the test data from every hammer blow at each sampling interval, along with representative force and velocity traces for each test interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e. the blows that determine the N-value) are considered when computing the average measurement values of each test interval.

The reported blow counts obtained by the drill rig personnel, a summary of the test data, and average computed hammer energy and transfer ratio values are provided in Table 3-1. Based on the test data, the automatic hammer on the CME-550X operated at an average rate of about 55 blows per minute (bpm) during dynamic testing. The measured average transferred hammer energy (EFV) of the three sample intervals ranged from 301 to 312 ft-lbs, which corresponds to Energy Transfer Ratio (ETR) values of 86.1 to 89.3%, respectively. Plots and tables of the following are also included in Appendix III and present the test data with depth for each test interval:

- Penetration vs. BLC⁴
- Penetration vs. CSX⁷
- ETR vs. Rod Length
- Penetration vs. FMX⁵
- Penetration vs. VMX⁸
- Average ETR vs. Rod Length
- Penetration vs. EFV⁶
- Penetration vs. ETR⁹

Table 3-1: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	43.5 – 45.0	45	48.55	8-15-20 / 35	Elastic SILT	55.2	304	86.9
2	48.5 – 50.0	50	53.55	5-7-11 / 18	Elastic SILT	55.2	301	86.1
3	53.5 – 55.0	55	58.55	8-14-18 / 32	Elastic SILT	55.0	312	89.3
Overall Average						55.1	307	87.6

The overall average transferred hammer energy for the automatic hammer on the CME-550X ATV-mounted drill rig (SN 293193) was 307 foot-pounds, with an average ETR of 87.6%.

⁴ BLC - Blow Count per 6-in. increment

⁵ FMX - Maximum Compressive Force

⁶ EFV - Maximum Transferred Energy

⁷ CSX - Maximum Compressive Stress

⁸ VMX - Maximum Velocity

⁹ ETR - Energy Transfer Ratio - Ratio of Calculated Energy to Theoretical Energy of 140 lb hammer falling 30 inches



4.0 Limitations of Report

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

5.0 Closing

S&ME appreciates the opportunity to provide this report to the North Carolina Department of Transportation, Geotechnical Engineering Unit. Please let us know if you have any questions concerning this report.

Sincerely,

S&ME, Inc.

Joseph R. Williamson, P.E.
Project Manager
N.C. Registration No. 42168

A handwritten signature in black ink, appearing to read 'G. Canivan'.

Gregory J. Canivan, P.E.
Technical Principal

Appendices:

- Appendix I - Certificate of Proficiency
- Appendix II - Accelerometer and Instrumented Rod Calibration Sheets
- Appendix III - SPT Energy Evaluation Form (Field Log)
- Appendix IV - CME-550X ATV (SN 293193) SPT Energy Measurement Summary Plots and Tables

Appendix I- Certificate of Proficiency



This documents that
Joseph Williamson
S&ME, Inc.

has on March 16, 2022 achieved the rank of

MASTER

on the **Dynamic Measurement and Analysis Proficiency Test.**

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended that individuals at the Master level seek to attain Expert level through additional study within eight years of the date of this document***

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate. This certificate can be verified at www.PDAproficiencytest.com.

Frank T. Peters, Executive Director
Pile Driving Contractors Association



Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 3251

Appendix II - Calibration Sheets

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 17Aug2023

Serial No: K4664 Temperature: 77.6 °F

Model: PR Humidity: 51%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

376.6 mv/5000g
(75.3 μ v/g)
 R^2 : 0.999955 [Chip programmed]

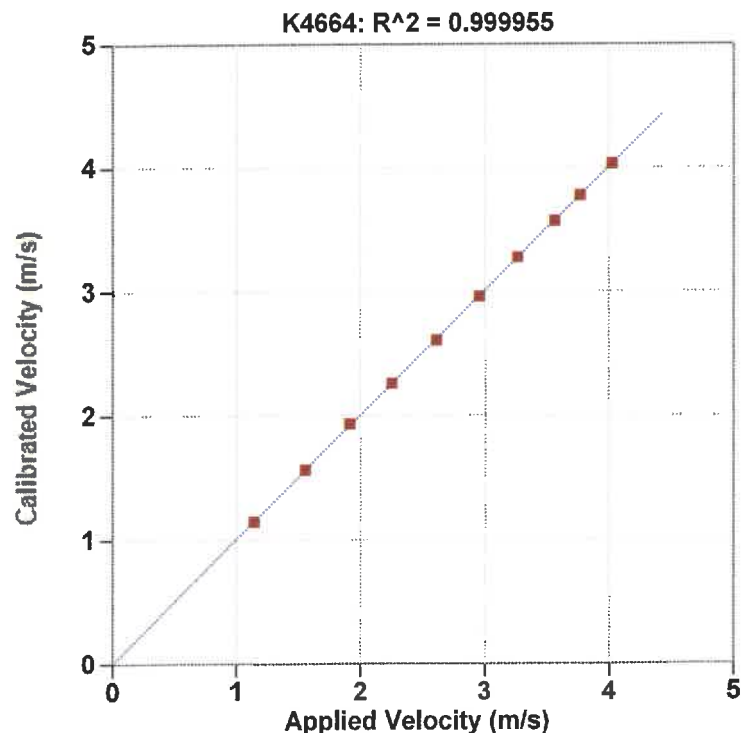
Ref Acc 1: 72505! Cal on: 24Mar2022
1035 g's/volt

Ref Acc 2: 72517! Cal on: 24Mar2022
1049 g's/volt

Operator: William Johnson


Signed

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).



Reference Velocity	S/N K4664 Velocity
m/s	m/s
1.146	1.143
1.560	1.559
1.915	1.932
2.255	2.258
2.612	2.606
2.962	2.958
3.270	3.273
3.569	3.566
3.772	3.773
4.030	4.027

Maximum Acceleration: 879 g's

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 17Aug2023

Serial No: K4665 Temperature: 77.6 °F

Model: PR Humidity: 51%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

375.3 mv/5000g
(75.1 μ v/g)
R²: 0.999957 [Chip programmed]

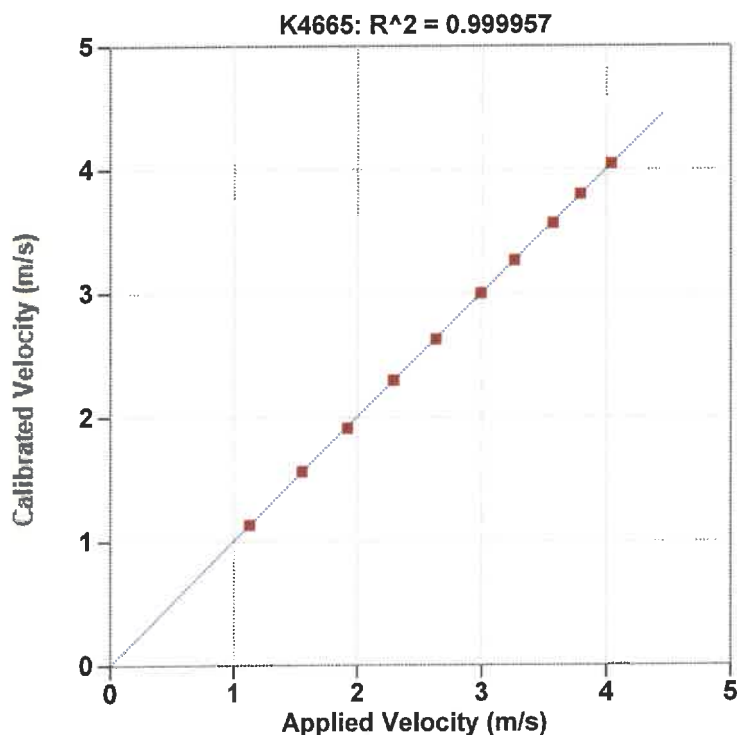
Ref Acc 1: 72505! Cal on: 24Mar2022
1035 g's/volt

Ref Acc 2: 72517! Cal on: 24Mar2022
1049 g's/volt

Operator: William Johnson


Signed

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).



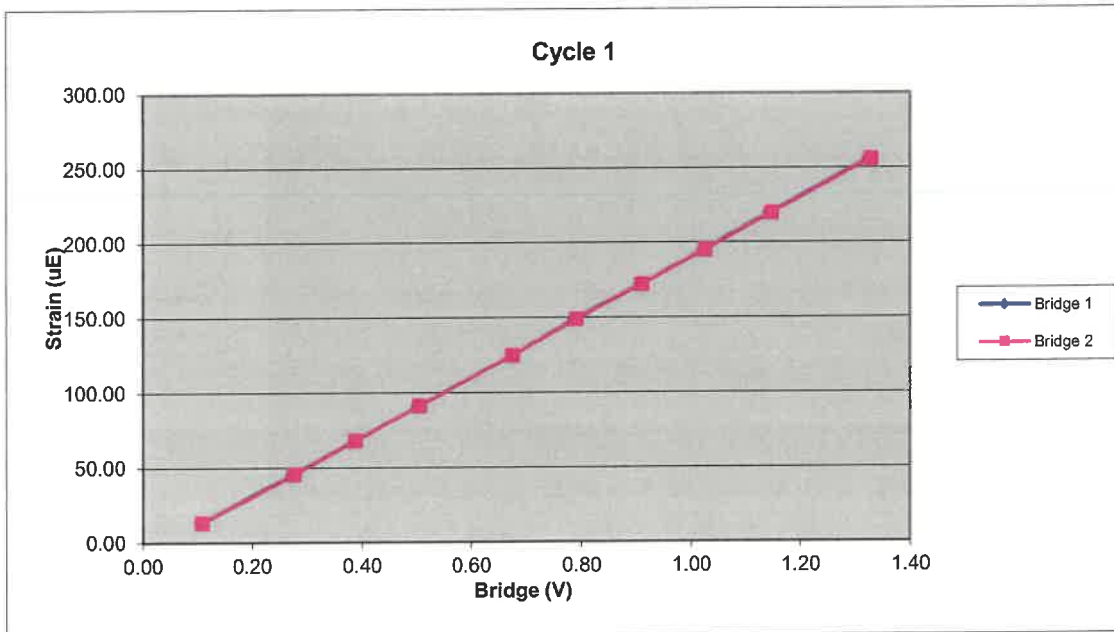
Reference Velocity	S/N K4665 Velocity
m/s	m/s
1.129	1.131
1.555	1.560
1.922	1.910
2.291	2.295
2.633	2.627
2.994	2.999
3.262	3.264
3.573	3.564
3.791	3.797
4.038	4.041

Maximum Acceleration: 880 g's

203AWJ		Cycle 1		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	819.88	13.18	0.11	0.11
3	2100.72	45.33	0.27	0.28
4	2947.11	68.12	0.39	0.39
5	3827.72	90.98	0.50	0.51
6	5122.01	124.83	0.67	0.68
7	5996.48	148.92	0.79	0.79
8	6896.87	172.25	0.91	0.91
9	7771.24	195.27	1.02	1.03
10	8694.53	219.87	1.15	1.15
11	10075.00	255.83	1.33	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7576.32	Force Calibration (lb/V)	7575.14
Offset	14.17	Offset	2.97
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E/V}$)	199.46	Strain Calibration ($\mu\text{E/V}$)	199.43
Offset	-9.00	Offset	-9.29
Correlation	0.999979	Correlation	0.999982

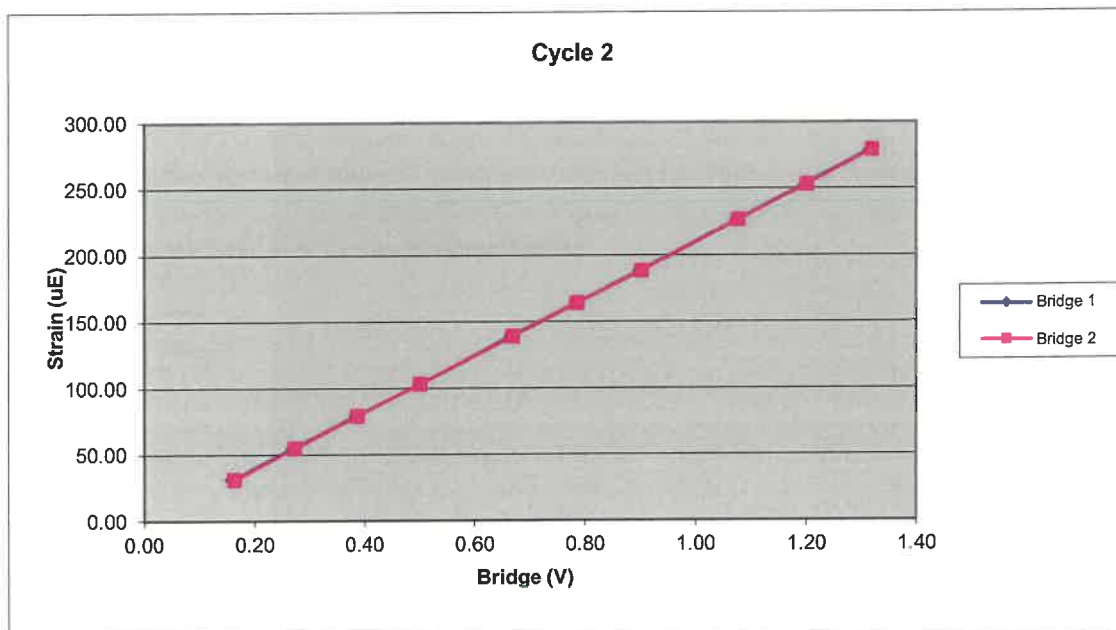
Force Strain Calibration	
EA (Kips)	37982.46
Offset	356.04
Correlation	0.999980



203AWJ		Cycle 2		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1217.00	30.72	0.16	0.16
3	2060.56	54.45	0.27	0.27
4	2939.22	78.94	0.39	0.39
5	3811.73	102.81	0.50	0.50
6	5082.83	138.71	0.67	0.67
7	5976.20	163.65	0.78	0.79
8	6861.10	187.95	0.90	0.90
9	8194.67	226.13	1.08	1.08
10	9130.84	252.84	1.20	1.20
11	10039.52	278.74	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7616.13	Force Calibration (lb/V)	7615.56
Offset	1.43	Offset	-11.88
Correlation	0.999999	Correlation	0.999997
Strain Calibration (μ E/V)	213.80	Strain Calibration (μ E/V)	213.79
Offset	-3.74	Offset	-4.12
Correlation	0.999987	Correlation	0.999990

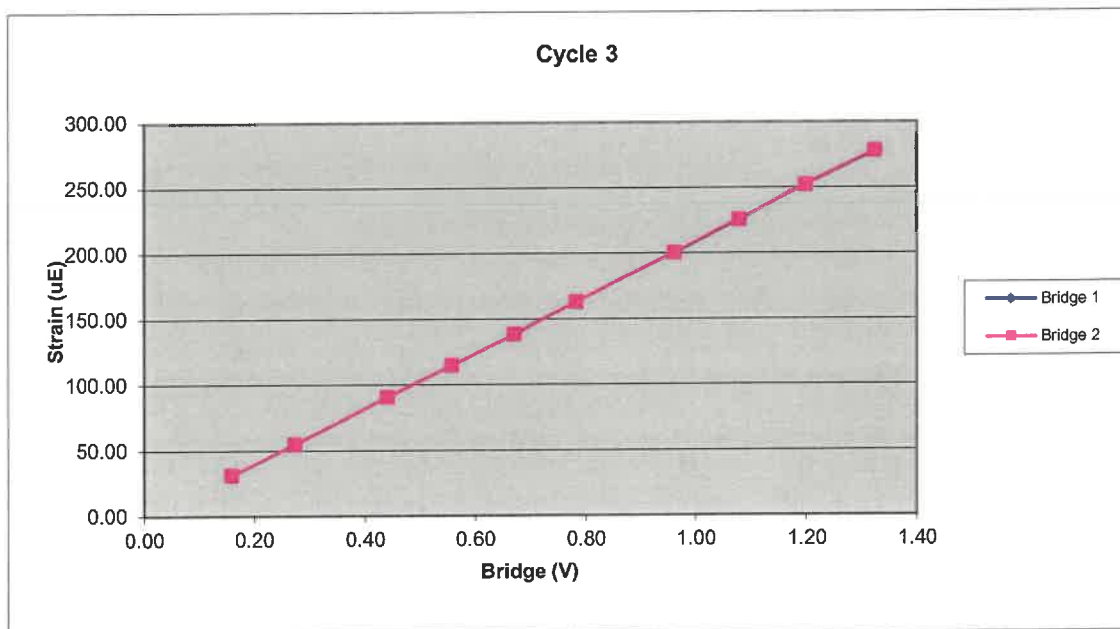
Force Strain Calibration	
EA (Kips)	35621.25
Offset	134.95
Correlation	0.999985



203AWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1216.12	31.38	0.16	0.16
3	2078.01	54.75	0.27	0.27
4	3348.13	90.71	0.44	0.44
5	4248.62	114.98	0.56	0.56
6	5110.90	138.68	0.67	0.67
7	5966.16	163.47	0.78	0.78
8	7338.73	200.80	0.96	0.96
9	8226.55	225.96	1.08	1.08
10	9144.10	252.26	1.20	1.20
11	10093.62	278.03	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7621.84	Force Calibration (lb/V)	7635.13
Offset	-0.64	Offset	-3.95
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E}/\text{V}$)	212.12	Strain Calibration ($\mu\text{E}/\text{V}$)	212.49
Offset	-2.91	Offset	-3.01
Correlation	0.999979	Correlation	0.999985

Force Strain Calibration	
EA (Kips)	35930.12
Offset	104.27
Correlation	0.999985



Bridge Excitation (V) 5
Shunt Resistor (ohm) 60.4k

Calibration Factors	203AWJ		
Bridge 1 ($\mu\text{E/V}$)	208.46	Bridge 2 ($\mu\text{E/V}$)	208.57
EA Factor (Kips)	36511.28	Area (in^2)	1.22

Calibrated by:



Calibrated Date:

8/24/2023

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

Appendix III – Field Log



SPT Energy Evaluation Form

Project: I-77 EXIT 26 PHASE I
Project No.: 23610178A
Boring No.: TEST HOLE B

Date: 11/17/23
Weather: CLFAR 70°
Drill Rod Type: 5' LONG AWS

On-site Personnel

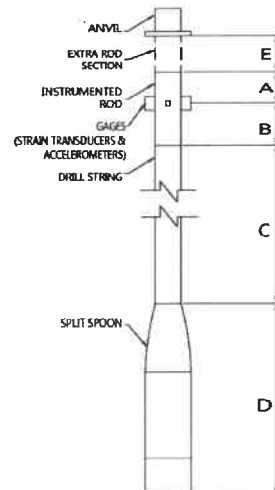
Drilling Company: SIME
Rig Operator: S. EUBANKS
Engr/Geologist: N/A
Client Rep.: N/A
Analyzer Oper.: S. WILLIAMSON

Rig/Hammer Info

Drill Rig Make/Model: CME-SSOX
Carrier Type: ATV
Rig Serial No.: 293193 (R-46)
Hammer Type/Model: AUTO/CME
Hammer Serial No.: N/A
Hammer Drop System: CHAIN DRIVE
Lubrication Condition: PER MAN. RECS.
Manufacturer Recommended
Operation Rate (bpm): 50-55
Typical Drop Height (in.): 30
Typical Hammer Weight (lbs): 140
Anvil Dimension (in.): 12
Drilling Method: MUD ROTARY w/ 2-1/16" DRAB
Drop Height in Tolerance (y/n): Y

Rod Info

(A) + (B) Instr. Rod Length: 2.0 ft
(B) Instr. Rod Length
below Gages: 0.7 ft
(D) Spoon Length: 2.85 ft
(E) Rod Length Above
Instr. Rod (if applicable): 0 ft
(B) + (C) + (D) (LE) -
Length Below Gages: (C) + 3.55 ft
Instr. Rod S/N: 203AWS
Instr. Rod Outside Dia.: 1.75 in.
Instr. Rod Area: 1.22 in²
PDA Make/Model: PDS/PAX
PDA Serial No.: 3733 L
Calib. Pulse Test (y/n): Y



Gage Info

	Gage	Serial No.	Calibration No.
Accel.	A3	K4664	376.6
	A4	K4665	375.3
Strain	F3	203AWS-1	208.46
	F4	203AWS-2	208.57

Date of Test	Test Depth Increment (ft to ft)	Test Time Start / Stop (military)	Length of Drill String (ft) (C)	(LE) Length below Gages (ft) (B) + (C) + (D)	Avg. Meas. Hammer Rate (BPM)	SPT Blow Counts						AASHTO / USCS Classification
						Total Blows by PDA	6"	12"	18"	N-Value	Extra Blows	
11/17/23	38.5-40.0	10:46	40	43.55		93	15	28	50	78	0	
	43.5-45.0	11:11	45	48.55		43	8	15	20	35	0	
	48.5-50.0	11:24	50	53.55		23	5	7	11	18	0	
	53.5-55.0	11:38	55	58.55		40	8	14	18	32	0	
	58.5-60.0	11:55	60	63.55		86	15	32	39	71	0	

Notes: FL SPIKING ON FIRST SAMPLE. SWAPPED PIG TAIL.

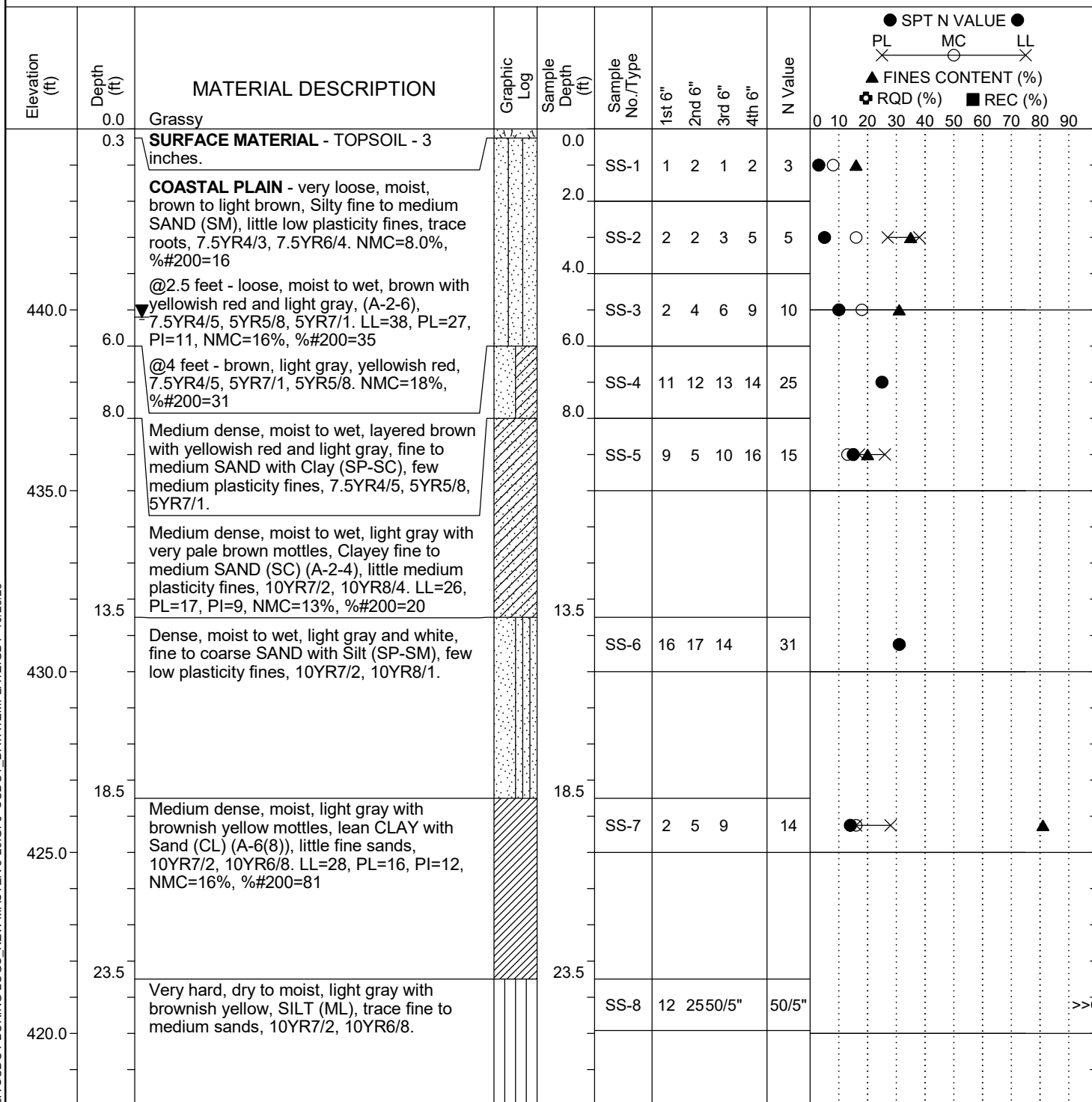
NOTE: (1) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. verticality, weather, or lubrication between trials). (2) Note any changes in rod diameter along drill string and record locations of short rod sections.

Prepared By (print/signature) Joseph Williamson

Date 11/17/23

SCDOT Soil Test Log

Project ID:	23610178A	County:	Richland	Boring No.:	EB-2W
Site Description:	I-77 Exit 26 Phase I			Route:	US-21
Eng./Geo.:	Z. Yelaya	Boring Location:		Offset:	
Elev.:	445.0 ft	Latitude:	34.18975869	Longitude:	-80.97072615
Date Started:	7/24/2023				
Total Depth:	98.8 ft	Soil Depth:	98.8 ft	Core Depth:	N/A ft
Date Completed:	7/25/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	81.6%				
Core Size:	N/A	Driller:	S. Gowan	Groundwater:	TOB NA
24HR	5.2 ft				



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	

SC DOT 23610178A SCDOT BORING LOGS, NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

SCDOT Soil Test Log

Project ID:	23610178A	County:	Richland	Boring No.:	EB-2W
Site Description:	I-77 Exit 26 Phase I			Route:	US-21
Eng./Geo.:	Z. Yelaya	Boring Location:		Offset:	
Elev.:	445.0 ft	Latitude:	34.18975869	Longitude:	-80.97072615
Date Started:	7/24/2023				
Total Depth:	98.8 ft	Soil Depth:	98.8 ft	Core Depth:	N/A ft
Date Completed:	7/25/2023				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)				
Drill Machine:	CME-550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	81.6%				
Core Size:	N/A	Driller:	S. Gowan	Groundwater:	TOB NA
24HR	5.2 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%)
415.0	28.5	Very dense, moist to wet, light gray with brownish yellow mottles, Clayey fine to coarse SAND (SC), some medium plasticity fines, 10YR7/2, 10YR6/8.		28.5	SS-9	29	33	50		83	●
410.0	33.5	PIEDMONT RESIDUUM - very hard, dry to moist, laminated yellow with white and very pale brown layers, elastic SILT (MH), few fine to medium sands, 10YR8/6, 10YR8/1, 10YR8/3.		33.5	SS-10	13	26	48		74	●
405.0	38.5	@38.5 feet - hard, dry, relict rock structure.		38.5	SS-11	9	14	20		34	●
400.0	43.5	@43.5 feet - very stiff, laminated brownish yellow with white mottles and very pale brown, (A-7-5(31)), 10YR6/8, 10YR8/1, 10YR8/3. LL=72, PL=47, PI=25, NMC=35%, %200=89		43.5	SS-12	4	7	12		19	● O X X ▲
395.0	48.5	@48.5 feet - laminated red, strong brown and brownish yellow, 2.5YR4/6, 7.5YR5/8, 10YR6/8.		48.5	SS-13	7	10	14		24	●
	53.5	@53.5 feet - dry to moist, few fine to coarse		53.5							

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	

SC DOT 23610178A SCDOT BORING LOGS, NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

SCDOT Soil Test Log

Project ID:		23610178A				County:		Richland		Boring No.:		EB-2W	
Site Description:		I-77 Exit 26 Phase I								Route:		US-21	
Eng./Geo.:		Z. Zelaya		Boring Location:			Offset:		Alignment:		Proposed		
Elev.:	445.0 ft	Latitude:	34.18975869	Longitude:	-80.97072615		Date Started:		7/24/2023				
Total Depth:		98.8 ft	Soil Depth:	98.8 ft	Core Depth:		N/A ft		Date Completed:		7/25/2023		
Bore Hole Diameter (in):		4	Sampler Configuration			Liner Required:		Y (N)		Liner Used:		Y (N)	
Drill Machine:		CME-550X		Drill Method:		RW		Hammer Type:		Automatic		Energy Ratio:	81.6%
Core Size:	N/A		Driller:	S. Gowan		Groundwater:		TOB	NA		24HR	5.2 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC X LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%)
		sands.			SS-14	7	10	14		24	●
390.0											
	58.5	PARTIALLY WEATHERED ROCK (PWR) - very hard, dry, brownish yellow and strong brown laminated, SILT with Sand (ML), few fine to coarse sands, trace fine rock fragments, relict rock structure, 10YR6/8, 7.5YR5/8.		58.5	SS-15	4950/3"				50/3"	>>●
385.0											
		@63.5 feet - brownish yellow, gray and dark gray laminated, trace fine to coarse rock fragments, 10YR6/8, 7.5YR6/1, 7.5YR4/1.		63.5	SS-16	22	2950/5"			50/5"	>>●
380.0											
	68.5	Very hard, dry, laminated very dark gray, very dark greenish gray and yellowish brown, Sandy SILT (ML), some fine to medium sands, trace fine rock fragments, 10YR3/1, GLEY3/1, 10YR5/4.		68.5	SS-17	3950/4"				50/4"	>>●
375.0											
	73.5	Very hard, dry, dark greenish gray with dark gray and white mottles, Sandy SILT with gravel (ML), some fine to medium sands, little fine gravel, 10Y4/1, 4/N, 10YR8/1.		73.5	SS-18	3650/5"				50/5"	>>●
370.0											
				78.5	SS-19	50/3"				50/3"	>>●
365.0											

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	

SC DOT 23610178A SCDOT BORING LOGS_NEW MASTER 8-29.GPJ SCDOT_DATATEMPLATE.GDT 10/23/23

SCDOT Soil Test Log

Project ID:	23610178A				County:	Richland		Boring No.:	EB-2W		
Site Description:	I-77 Exit 26 Phase I							Route:	US-21		
Eng./Geo.:	Z. Zelaya		Boring Location:				Offset:			Alignment:	Proposed
Elev.:	445.0 ft		Latitude:	34.18975869		Longitude:	-80.97072615		Date Started:		7/24/2023
Total Depth:	98.8 ft		Soil Depth:	98.8 ft		Core Depth:	N/A ft		Date Completed:		7/25/2023
Bore Hole Diameter (in):			4		Sampler Configuration		Liner Required:	Y (N)		Liner Used:	Y (N)
Drill Machine:	CME-550X		Drill Method:	RW		Hammer Type:	Automatic		Energy Ratio:	81.6%	
Core Size:	N/A		Driller:	S. Gowan		Groundwater:	TOB	NA		24HR	5.2 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL — MC — LL X — X — X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) </div>
360.0				83.5	SS-20	50/5"				50/5"	>>●
355.0		@88.5 feet - little fine to coarse rock fragments.		88.5	SS-21	50/5"				50/5"	>>●
350.0				93.5	SS-22	50/2"				50/2"	>>●
345.0	98.5 98.8	Very dense, dry to moist, dark greenish gray with dark gray and white, Silty fine to coarse SAND with gravel (SM), little fine gravel, 10Y4/1, 4/N, 10YR8/1. Boring Terminated at 98.8 feet.		98.5	SS-23	50/3"				50/3"	>>●

LEGEND

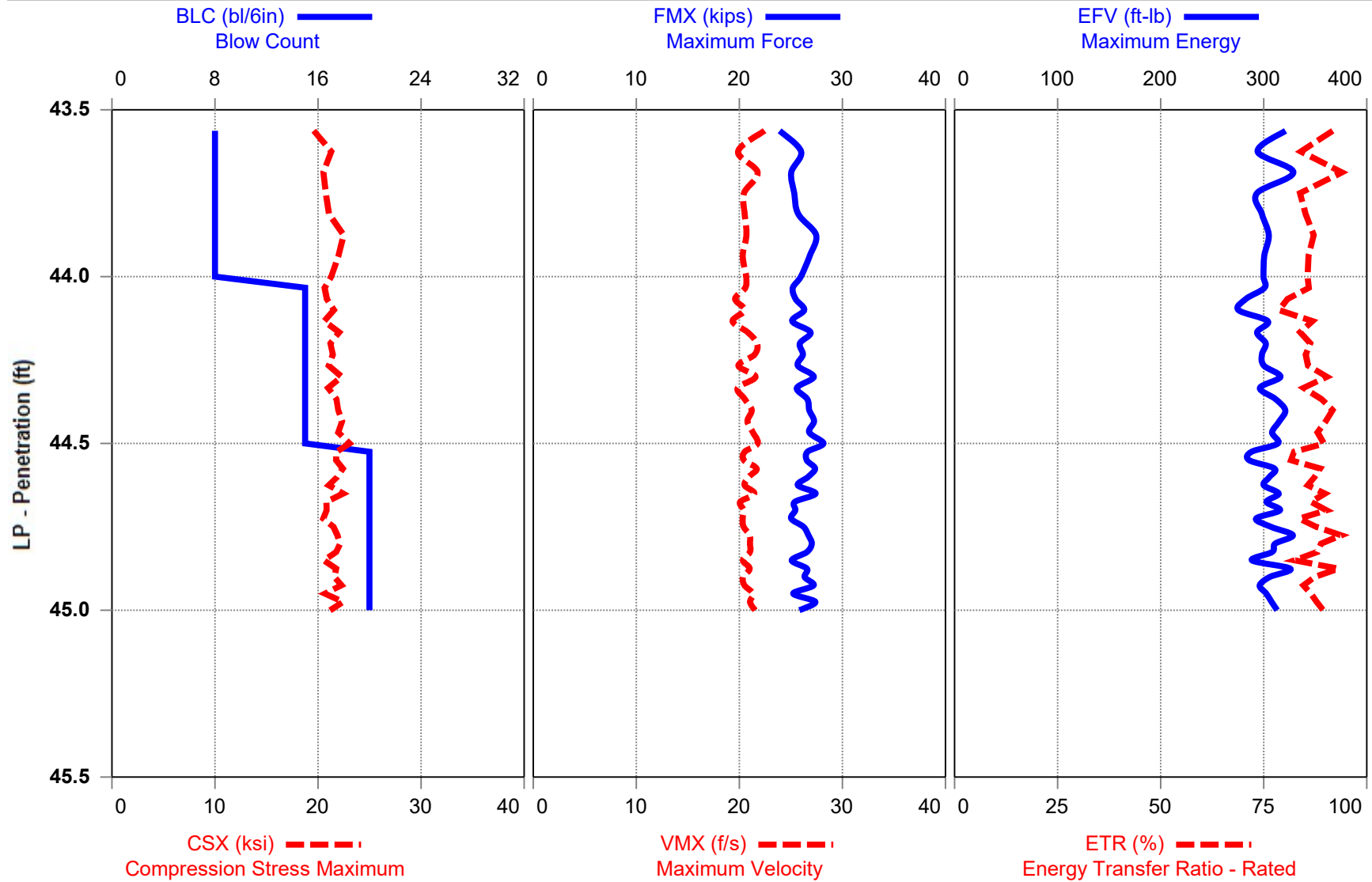
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_23610178A_SCDOT BORING LOGS_NEW MASTER 8-29.GPJ_SCDOT_DATATEMPLATE.GDT_10/23/23

Appendix IV – SPT Energy Measurement Plots and Tables



CME-550X SN 293193 - 43.5-45.0 FEET
TEST HOLE B

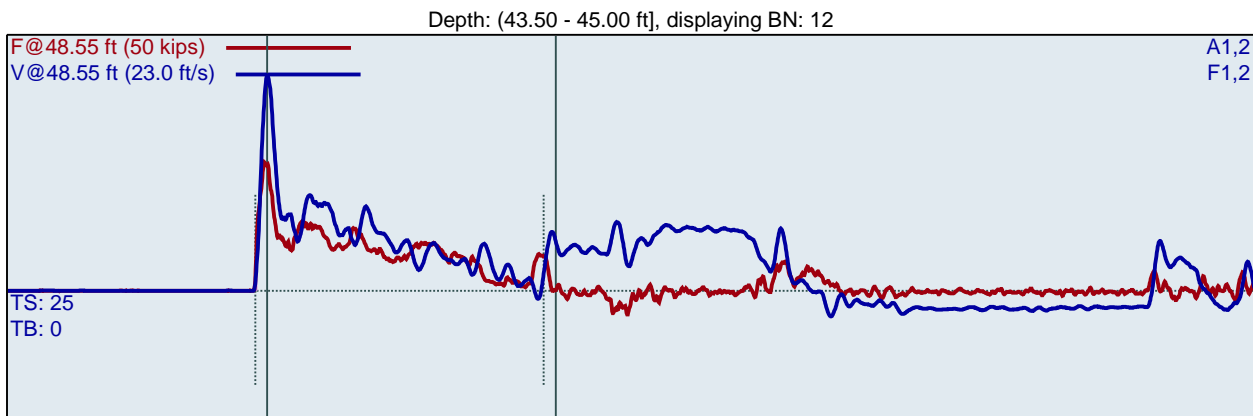


CME-550X SN 293193
JRW
TEST HOLE B

43.5-45.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 48.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

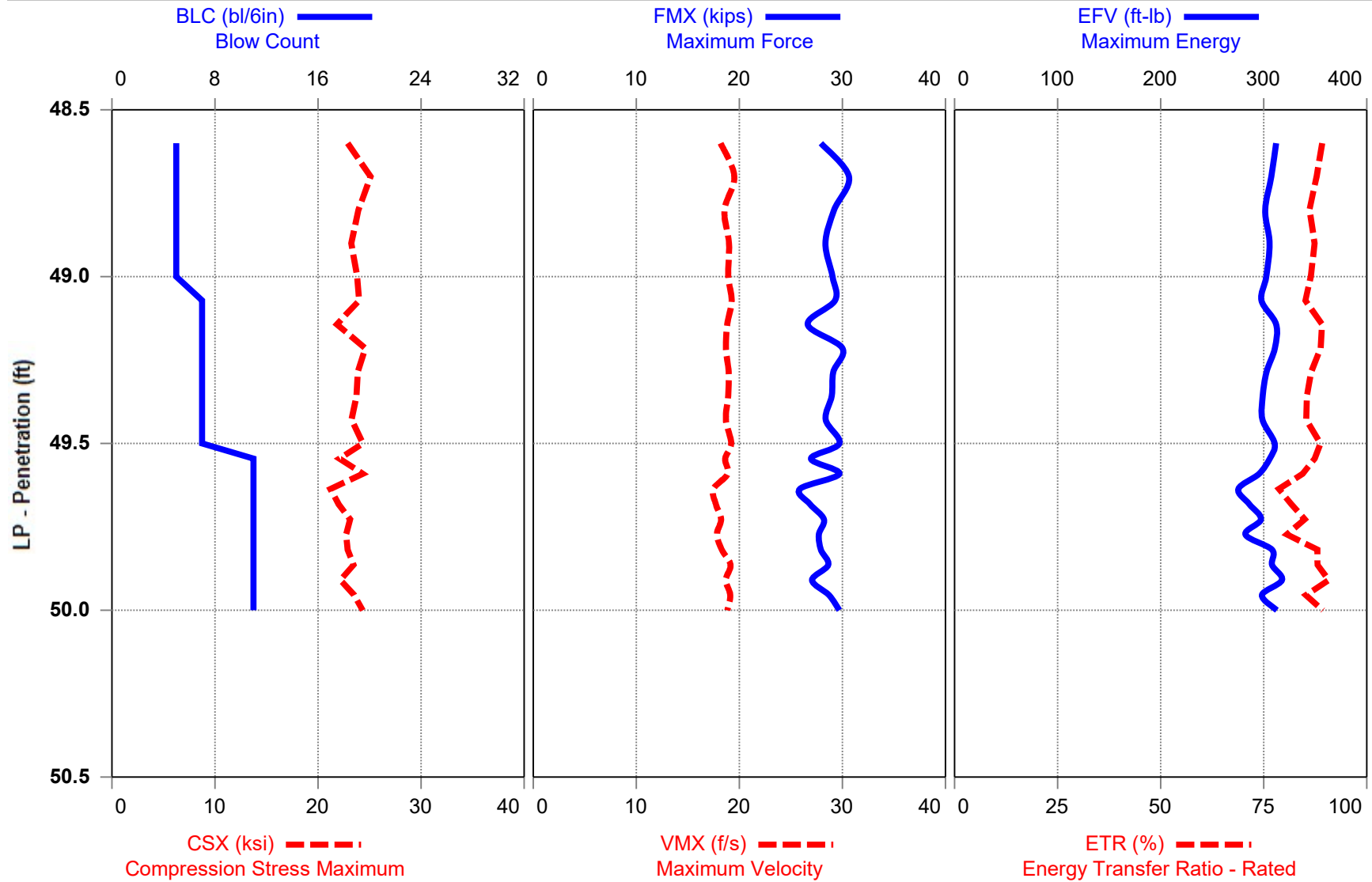
BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	43.56	8	1.9	24	22.4	0.96	19.6	0.75	321	91.7
2	43.63	8	56.0	26	19.9	0.75	21.3	0.75	294	84.0
3	43.69	8	55.4	25	21.8	0.91	20.5	0.75	329	93.9
4	43.75	8	55.5	25	20.4	0.75	20.8	0.75	293	83.8
5	43.81	8	55.6	26	20.5	0.75	21.1	0.75	298	85.2
6	43.88	8	55.4	27	20.7	0.75	22.5	0.75	305	87.1
7	43.94	8	55.6	27	20.3	0.75	22.0	0.75	300	85.8
8	44.00	8	55.1	26	20.7	0.75	21.3	0.75	300	85.6
9	44.03	15	55.7	25	20.6	0.64	20.6	0.40	301	85.9
10	44.07	15	55.1	25	19.6	0.54	20.9	0.40	283	80.8
11	44.10	15	57.1	26	20.5	0.50	21.6	0.40	275	78.7
12	44.13	15	55.5	25	19.3	0.60	20.6	0.40	304	86.8
13	44.17	15	53.9	27	20.8	0.52	22.1	0.40	293	83.8
14	44.20	15	55.3	26	21.7	0.53	21.2	0.40	302	86.3
15	44.23	15	55.5	26	21.5	0.50	21.4	0.40	298	85.2
16	44.27	15	55.3	26	19.9	0.51	21.1	0.40	300	85.7
17	44.30	15	55.3	27	21.6	0.48	22.3	0.40	316	90.3
18	44.33	15	55.4	26	19.8	0.46	21.0	0.40	296	84.6
19	44.37	15	57.2	27	20.5	0.46	21.8	0.40	311	89.0
20	44.40	15	53.8	27	21.2	0.45	22.0	0.40	321	91.7
21	44.43	15	55.2	27	20.8	0.44	22.3	0.40	315	90.0
22	44.47	15	55.1	27	21.3	0.46	22.0	0.40	308	88.0
23	44.50	15	55.1	28	21.8	0.42	23.1	0.40	314	89.6
24	44.53	20	55.2	27	20.5	0.38	21.8	0.30	288	82.3
25	44.55	20	55.2	27	20.4	0.37	21.8	0.30	286	81.6
26	44.58	20	54.9	27	21.7	0.41	22.4	0.30	310	88.7
27	44.60	20	55.1	27	20.9	0.40	21.9	0.30	306	87.3

28	44.63	20	55.0	26	20.5	0.39	21.0	0.30	300	85.7
29	44.65	20	55.1	27	21.5	0.42	22.4	0.30	314	89.8
30	44.68	20	55.0	25	20.1	0.40	20.8	0.30	303	86.4
31	44.70	20	55.1	25	20.4	0.43	20.8	0.30	316	90.2
32	44.73	20	54.9	25	20.3	0.39	20.5	0.30	293	83.6
33	44.75	20	55.0	26	20.4	0.41	21.5	0.30	307	87.8
34	44.78	20	55.0	27	21.0	0.44	21.9	0.30	328	93.8
35	44.80	20	55.1	27	21.0	0.41	22.1	0.30	311	88.9
36	44.83	20	54.9	27	21.0	0.40	21.8	0.30	308	88.0
37	44.85	20	56.5	25	20.3	0.39	20.6	0.30	289	82.4
38	44.88	20	53.9	27	21.0	0.44	21.8	0.30	326	93.1
39	44.90	20	54.9	26	20.3	0.41	21.6	0.30	306	87.3
40	44.93	20	54.8	27	20.5	0.38	22.3	0.30	296	84.6
41	44.95	20	56.4	25	21.3	0.41	20.7	0.30	302	86.4
42	44.98	20	53.6	27	21.0	0.39	22.4	0.30	307	87.9
43	45.00	20	54.9	26	21.5	0.41	21.2	0.30	313	89.4
Average			55.2	26	20.8	0.45	21.6	0.34	304	86.9
Std Dev			0.8	1	0.6	0.06	0.7	0.05	12	3.3
Maximum			57.2	28	21.8	0.64	23.1	0.40	328	93.8
Minimum			53.6	25	19.3	0.37	20.5	0.30	275	78.7
N-value: 35										

Sample Interval Time: 45.56 seconds.



CME-550X SN 293193 - 48.5-50.0 FEET
TEST HOLE B

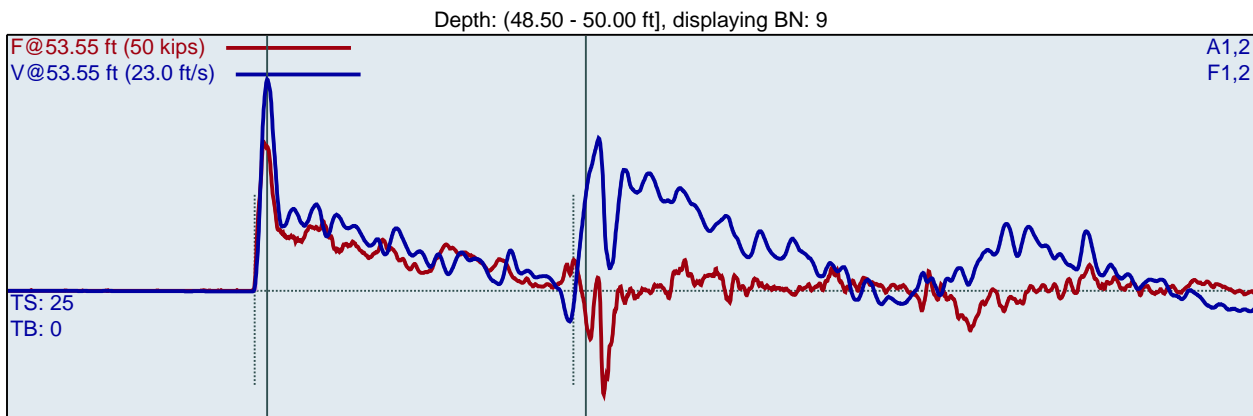


CME-550X SN 293193
JRW
TEST HOLE B

43.5-45.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 53.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

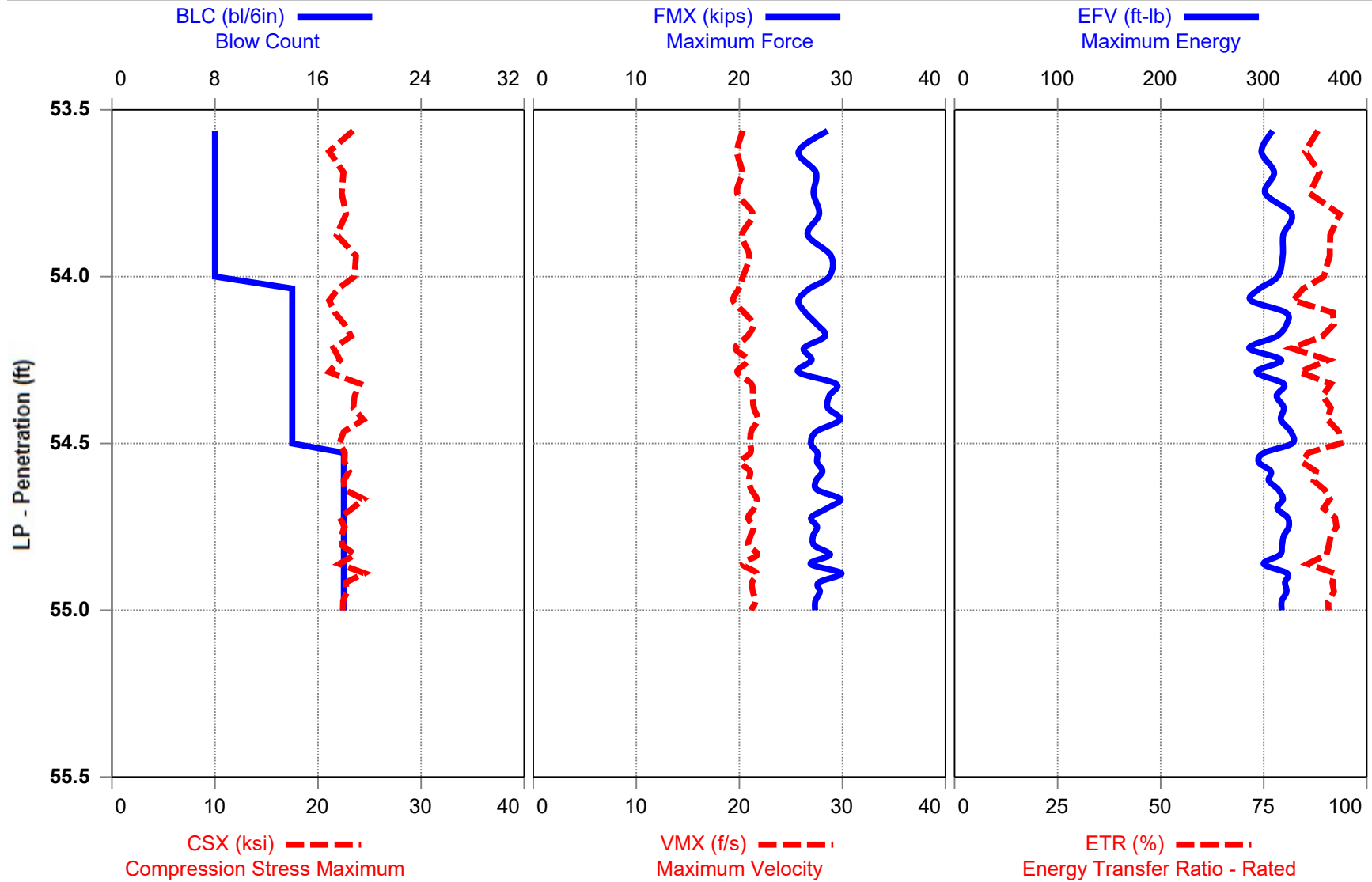
BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	48.60	5	1.9	28	18.2	1.65	22.9	1.20	312	89.2
2	48.70	5	56.2	31	19.5	1.20	25.1	1.20	307	87.8
3	48.80	5	55.4	29	18.6	1.20	23.9	1.20	301	86.1
4	48.90	5	55.1	28	19.0	1.20	23.2	1.20	306	87.3
5	49.00	5	55.2	29	18.9	1.20	23.8	1.20	302	86.4
6	49.07	7	55.1	31	19.3	0.94	25.4	0.86	303	86.7
7	49.14	7	55.2	27	18.8	0.99	21.8	0.86	312	89.2
8	49.21	7	55.4	30	18.7	0.94	24.6	0.86	311	88.8
9	49.29	7	55.1	29	19.0	0.86	23.9	0.86	303	86.5
10	49.36	7	55.2	29	18.9	0.86	23.7	0.86	299	85.4
11	49.43	7	55.1	28	18.7	0.86	23.3	0.86	299	85.3
12	49.50	7	55.6	30	19.2	0.86	24.4	0.86	311	88.7
13	49.55	11	55.1	27	18.6	0.84	22.1	0.55	306	87.3
14	49.59	11	55.0	30	18.9	0.66	24.3	0.54	295	84.4
15	49.64	11	56.4	26	17.5	0.56	21.2	0.54	275	78.6
16	49.68	11	55.4	27	17.7	0.55	22.0	0.55	286	81.7
17	49.73	11	53.9	28	18.2	0.55	23.1	0.55	297	84.9
18	49.77	11	56.7	28	17.8	0.55	22.7	0.55	282	80.6
19	49.82	11	54.0	28	18.3	0.56	22.9	0.55	308	88.0
20	49.86	11	55.2	29	19.1	0.55	23.5	0.55	308	88.0
21	49.91	11	55.1	27	18.7	0.57	22.2	0.55	318	90.7
22	49.95	11	56.8	29	19.1	0.55	23.5	0.55	298	85.2
23	50.00	11	53.6	30	18.8	0.57	24.3	0.55	313	89.3
Average			55.2	28	18.6	0.71	23.3	0.67	301	86.1
Std Dev			0.8	1	0.5	0.17	1.1	0.15	11	3.1
Maximum			56.8	31	19.3	0.99	25.4	0.86	318	90.7
Minimum			53.6	26	17.5	0.55	21.2	0.54	275	78.6

N-value: 18

Sample Interval Time: 23.95 seconds.



CME-550X SN 293193 - 53.5-55.0 FEET
TEST HOLE B



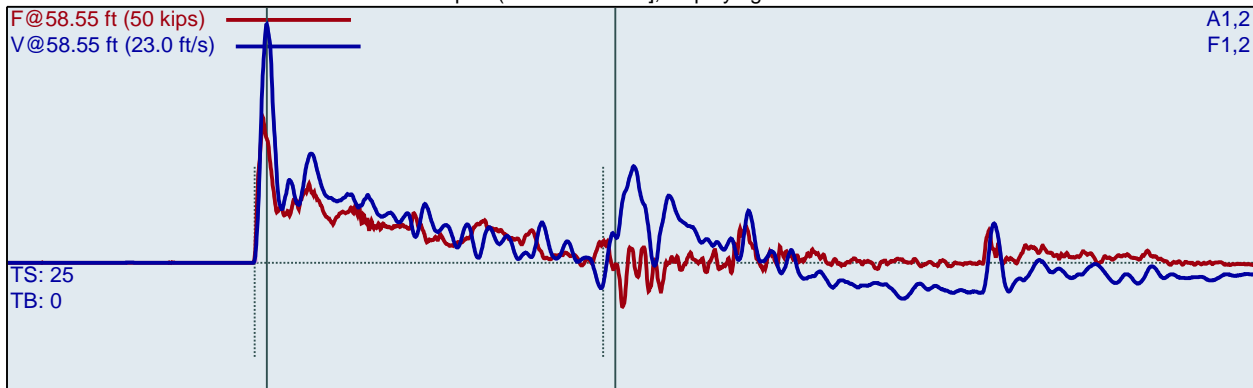
CME-550X SN 293193
JRW
TEST HOLE B

43.5-45.0 FEET
Interval start: 11/17/2023

AR: 1.22 in²
LE: 58.55 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi

Depth: (53.50 - 55.00 ft), displaying BN: 29



F1 : [203 AWJ-1] 208.46 PDICAL (1) FF1
F2 : [203 AWJ-2] 208.57 PDICAL (1) FF1

A1 (PR): [K4664] 376.6 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 375.3 mv/6.4v/5000g (1) VF1

BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	53.56	8	1.9	29	20.3	1.10	23.4	0.75	308	88.1
2	53.63	8	56.4	26	19.8	0.89	21.1	0.75	298	85.0
3	53.69	8	55.0	27	20.3	0.83	22.5	0.75	310	88.5
4	53.75	8	55.5	27	19.8	0.77	22.3	0.75	301	86.1
5	53.81	8	55.0	28	21.3	0.75	22.7	0.75	327	93.4
6	53.88	8	55.3	27	20.3	0.75	21.8	0.75	319	91.1
7	53.94	8	55.1	29	21.0	0.75	23.7	0.75	318	91.0
8	54.00	8	55.2	29	20.3	0.76	23.5	0.75	313	89.6
9	54.04	14	55.3	27	19.9	0.56	22.0	0.43	296	84.6
10	54.07	14	56.9	26	19.4	0.55	21.1	0.43	287	82.1
11	54.11	14	53.3	26	20.5	0.58	21.6	0.43	321	91.7
12	54.14	14	55.5	28	21.3	0.55	22.6	0.43	322	92.0
13	54.18	14	55.1	28	20.8	0.53	23.2	0.43	312	89.2
14	54.21	14	56.6	26	19.6	0.51	21.5	0.43	286	81.7
15	54.25	14	53.6	27	20.8	0.53	22.1	0.43	317	90.6
16	54.29	14	56.7	26	19.8	0.50	21.1	0.43	293	83.7
17	54.32	14	53.9	29	21.2	0.51	24.1	0.43	319	91.3
18	54.36	14	54.7	29	21.3	0.47	23.5	0.43	313	89.3
19	54.39	14	55.1	29	21.4	0.49	23.4	0.43	319	91.3
20	54.43	14	55.2	30	21.8	0.47	24.4	0.43	317	90.5
21	54.46	14	54.9	30	21.1	0.47	24.2	0.43	319	91.2
22	54.50	14	55.1	29	21.1	0.48	23.8	0.43	320	91.3
23	54.53	18	56.6	28	21.1	0.45	22.6	0.33	300	85.8
24	54.56	18	53.5	28	20.1	0.45	22.6	0.33	295	84.3
25	54.58	18	55.1	28	21.0	0.46	23.0	0.33	307	87.7
26	54.61	18	55.1	27	20.9	0.44	22.5	0.33	305	87.1
27	54.64	18	55.0	28	21.2	0.46	22.6	0.33	314	89.8
28	54.67	18	55.1	30	21.7	0.47	24.4	0.33	319	91.0
29	54.69	18	55.1	28	21.4	0.46	23.3	0.33	313	89.5
30	54.72	18	54.8	27	20.9	0.48	22.1	0.33	323	92.3
31	54.75	18	55.1	28	21.4	0.48	22.6	0.33	324	92.6

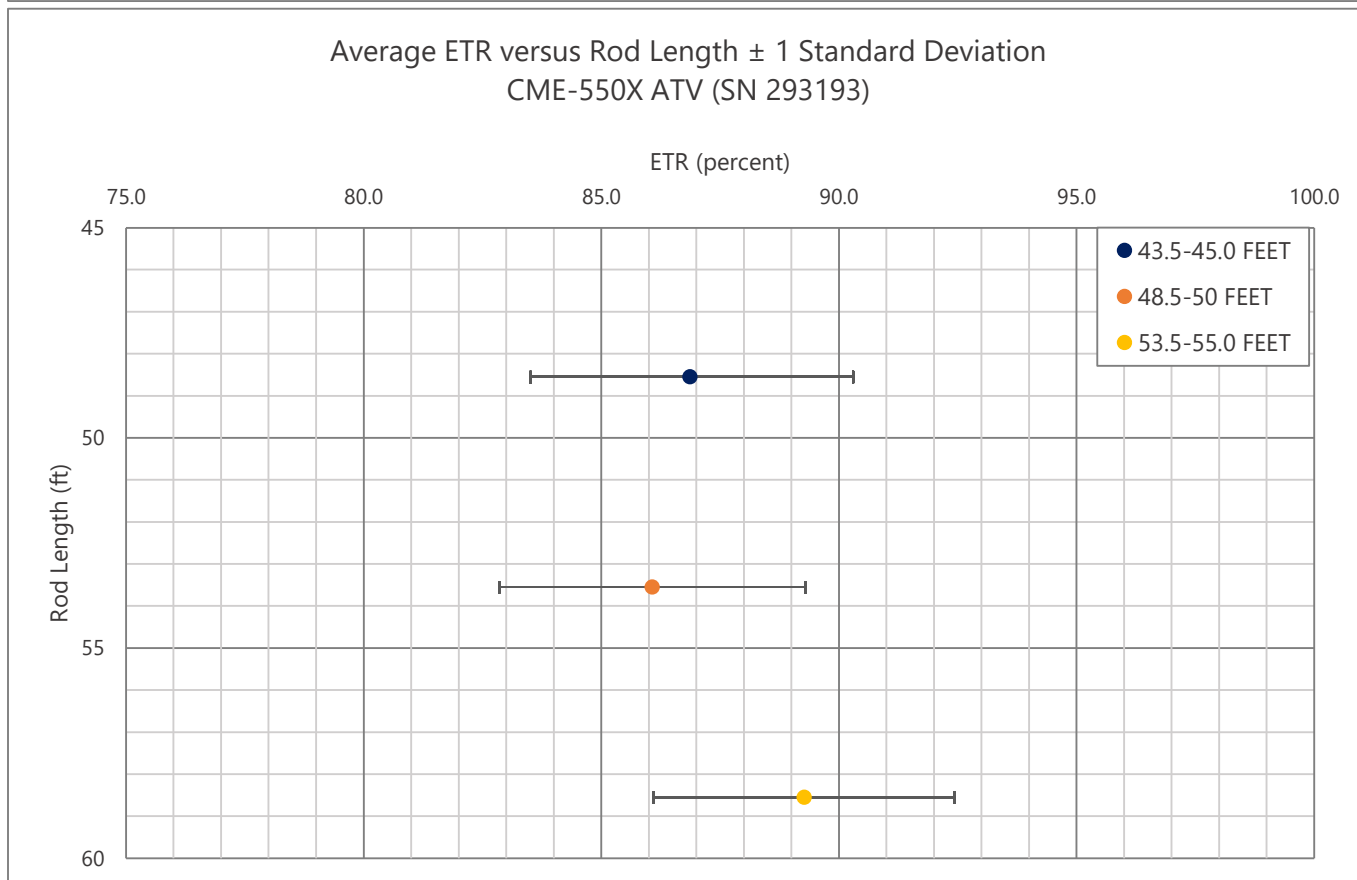
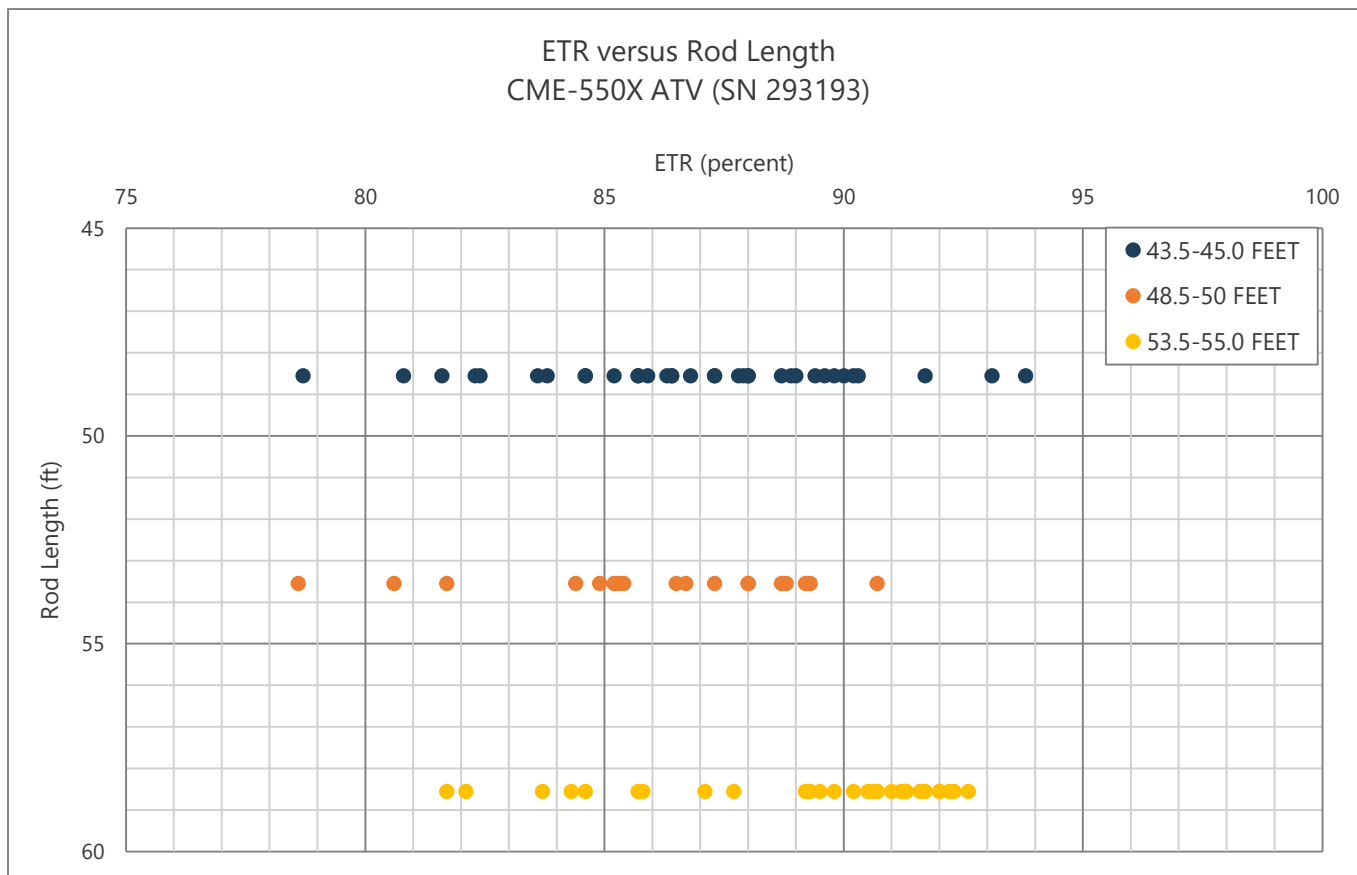
32	54.78	18	55.1	27	21.1	0.46	22.3	0.33	319	91.2
33	54.81	18	54.9	29	20.9	0.45	23.8	0.33	321	91.6
34	54.83	18	55.0	29	21.7	0.46	23.6	0.33	316	90.2
35	54.86	18	55.0	27	20.3	0.42	22.1	0.33	300	85.7
36	54.89	18	54.9	30	21.7	0.44	24.5	0.33	323	92.2
37	54.92	18	55.1	28	21.2	0.44	22.7	0.33	321	91.6
38	54.94	18	54.7	28	21.3	0.42	22.8	0.33	322	92.0
39	54.97	18	54.8	27	21.6	0.41	22.4	0.33	317	90.7
40	55.00	18	54.6	27	21.1	0.42	22.4	0.33	317	90.7
Average			55.0	28	21.0	0.48	22.8	0.38	312	89.3
Std Dev			0.8	1	0.6	0.04	0.9	0.05	11	3.1
Maximum			56.9	30	21.8	0.58	24.5	0.43	324	92.6
Minimum			53.3	26	19.4	0.41	21.1	0.33	286	81.7
N-value: 32										

Sample Interval Time: 42.36 seconds.

Summary of SPT Test Results

Project: CME-550X SN 293193, Test Date: 11/17/2023

BPM: Blows/Minute											CSX: Compression Stress Maximum		
FMX: Maximum Force											DFN: Final Displacement		
VMX: Maximum Velocity											EFV: Maximum Energy		
DMX: Maximum Displacement											ETR: Energy Transfer Ratio - Rated		
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
48.55	43.50	45.00	8-15-20	35	51	55.2	26	20.8	0.45	21.6	0.34	304	86.9
53.55	48.50	50.00	5-7-11	18	26	55.2	28	18.6	0.71	23.3	0.67	301	86.1
58.55	53.50	55.00	8-14-18	32	46	55.0	28	21.0	0.48	22.8	0.38	312	89.3
Overall Average Values:						55.1	27	20.4	0.51	22.4	0.42	307	87.6
Standard Deviation:						0.8	1	1.1	0.14	1.1	0.15	12	3.5
Overall Maximum Value:						57.2	31	21.8	0.99	25.4	0.86	328	93.8
Overall Minimum Value:						53.3	25	17.5	0.37	20.5	0.30	275	78.6





Report of SPT Energy Measurements
S&ME CME-750X ATV (Serial No. 322938)
Columbia, South Carolina
S&ME Project No. 1535-22-200

PREPARED FOR:

**North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699**

PREPARED BY:

**S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273**

December 23, 2022



December 23, 2022

North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699

Attention: Mr. Greg Bodenheimer, P.E.

Cc: Ms. Cheryl A. Youngblood, L.G.
Ms. Christina M. Bruinsma, L.G.

Reference: **Report of SPT Energy Measurements**
S&ME CME-750X ATV (Serial No. 322938)
Columbia, South Carolina
S&ME Project No. 1535-22-200
NC PE Firm License No. F-0176

Dear Mr. Bodenheimer:

We have completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer used with our CME-750X ATV-mounted drill rig (Serial No. 322938). This service was performed by Mr. Joseph Williamson, P.E. of our firm on November 10, 2022, in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit's requirements. Review of the data quality and analyses was performed by Mr. Williamson. A copy of the Certificate of Proficiency issued by Pile Dynamics based on the Dynamic Measurement and Analysis Proficiency Test for Mr. Williamson is included in Appendix I. The testing procedures, equipment used during testing, and detailed results are presented in this report.

1.0 Dynamic Testing Methodology

Testing was performed using a model PAX (Serial No. 3733L) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K4664 and K4665) bolted to a 2.0-foot long AWJ drill rod (Serial No. 203) internally instrumented with two strain transducers. Calibration sheets for the accelerometers and the instrumented rod are included in Appendix II. The instrumented AWJ drill rod has a cross-sectional area of 1.19 square inches and an outside diameter of approximately 1.75 inches. Therefore, we calculate the inside diameter to be approximately 1.25 inches at the gauge location. The accelerometers and strain gauges, which are diametrically opposed near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real time for each blow.



2.0 Testing and Observations

S&ME personnel were on site November 10, 2022, to observe and perform high-strain dynamic testing during SPT sampling on the CME-750X ATV-mounted drill rig operated by Sam Gowan of S&ME. The measurements were taken during drilling and sampling of a soil test boring performed on an S&ME project site in Columbia, South Carolina. SPT energy measurements presented herein were recorded during three sampling intervals that satisfied the NCDOT required blow count criteria. The information presented in the tables below summarizes the equipment and tooling used during the SPT energy measurements. The Boring Log and SPT Energy Evaluation Form is included in Appendix III.

Table 2-1: Drill Rig Information

Manufacturer	CME
Model	750X
Serial Number	322938
Operator	S. Gowan
Carrier	ATV

Table 2-2: Hammer Information

Model / Type	CME / Auto
Typical Drop Height (inches)	30
Typical Ram Weight (pounds)	140

Table 2-3: Drilling and Instrumented Rod Information

Drill Rod Type	AWJ
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in²)	1.19
Typical Lengths (feet)	5
Instrumented Rod Type	AWJ (Serial No. 203)
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in²)	1.19
Total Instrumented Rod Length (feet)	2.0
Length Below Gages (feet)	0.8
Split-Spoon Length (feet)	2.85



3.0 Dynamic Testing Results

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.65 ft to the drill rod length at each sample depth. The SPT Energy Measurement Data Summary tables in Appendix IV present the test data from every hammer blow at each sampling interval, along with representative force and velocity traces for each test interval. Within some of the strain gauge (F2) records, electrical noise or “spikes” relatively late in the record (i.e., after 2L/c) were observed. However, hammer impacts were relatively uniform and any bending appeared to be minor. Therefore, data collected from the F2 channel was excluded from the calculations when this phenomenon was observed. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e. the blows that determine the N-value) are considered when computing the average measurement values of each test interval.

The reported blow counts obtained by the drill rig personnel, a summary of the test data, and average computed hammer energy and transfer ratio values are provided in Table 3-1. Based on the test data, the automatic hammer on the CME-750X operated at an average rate of about 53 blows per minute (bpm) during dynamic testing. The measured average transferred hammer energy (EFV) of the three sample intervals tested ranged from 281 to 291 ft-lbs, which corresponds to Energy Transfer Ratio (ETR) values of 80.4 to 83.2%, respectively, based on an assumed maximum energy of 350 ft-lbs. Plots and tables of the following are also included in the Appendix and present the test data with depth for each test interval:

- Penetration vs. BLC¹
- Penetration vs. FMX²
- Penetration vs. EFV³
- Penetration vs. CSX⁴
- Penetration vs. VMX⁵
- Penetration vs. ETR⁶
- ETR vs. Rod Length
- Average ETR vs. Rod Length

¹ BLC - Blow Count per 6-in. increment

² FMX - Maximum Compressive Force

³ EFV – Maximum Transferred Energy

⁴ CSX – Maximum Compressive Stress

⁵ VMX – Maximum Velocity

⁶ ETR – Energy Transfer Ratio – Ratio of Calculated Energy to Theoretical Energy of 140 lb hammer falling 30 inches



Table 3-1: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	43.5 – 45	45	48.65	3-4-4 / 8	Poorly Graded Sand with Silt ^A	53.4	291	83.2
2	48.5 – 50	50	53.65	8-19-27 / 46	Lean Clay ^{CP}	53.2	287	82.0
3	53.5 – 55	55	58.65	6-11-12 / 23	Silty Sand & Sandy Lean Clay ^{CP}	53.3	281	80.4
Overall Average						53.2	286	81.6

^A – Alluvium Soil Deposit; ^{CP} – Coastal Plain Soil Deposit

The overall average transferred hammer energy for the automatic hammer on the CME-750X ATV-mounted drill rig was 286 foot-pounds, with an average ETR of 81.6%.

4.0 Limitations of Report

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



5.0 Closing

S&ME appreciates the opportunity to provide this report to the North Carolina Department of Transportation, Geotechnical Engineering Unit. Please let us know if you have any questions concerning this report.

Sincerely,

S&ME, Inc.

A handwritten signature in black ink, appearing to read 'G. Canivan', is positioned above the printed name of Gregory J. Canivan.

Joseph R. Williamson, P.E.
Project Manager
N.C. Registration No. 42168

Gregory J. Canivan, P.E.
Technical Principal

Appendices:

- Appendix I - Certificate of Proficiency
- Appendix II - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix III – Boring Log B-2 and SPT Energy Evaluation Form (Field Log)
- Appendix IV - CME-750X ATV (SN 322938) SPT Energy Measurements Summary Plots and Tables

Appendices

Appendix I



This documents that
Joseph Williamson
S&ME, Inc.

has on March 16, 2022 achieved the rank of

MASTER

on the **Dynamic Measurement and Analysis Proficiency Test.**

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended that individuals at the Master level seek to attain Expert level through additional study within eight years of the date of this document***

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate. This certificate can be verified at www.PDAproficiencytest.com.

Frank T. Peters, Executive Director
Pile Driving Contractors Association



Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 3251

Appendix II



Quality Assurance for Deep Foundations

PDI Certificate of Calibration

PDI Accelerometer Calibration

Model PR-K Serial # K4664

Cal Date: OCT 16, 2021

Cal Due : OCT 15, 2023

Temperature: 72 deg. F

Humidity 65 %

Calibrated at
Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, OH 44139

Manufactured by Pile Dynamics, Inc.

Procedure used: PDA Accelerometer Calibration Procedure 2016-6, Revision 20160422

Equipment was found to be

X in tolerance As Received

_____ out of tolerance As Received

X in tolerance As Returned

_____ out of tolerance As Returned

PDI Calibration: 380 mv/5000g

Calibration Standards Utilized
Hopkinson Bar Force Calibration F2, verified on July 28, 2021

PDI HopBar DOS PAK, serial number 1273K, verified on July 19, 2021

Calibration performed by: William Johnson
William Johnson, Technician

Reviewed by: Robert Sprenger
Robert Sprenger, Production Manager

Accelerometer CC-5 Issued 20160426

QBTA: ON [ALT-F1/BB=60]

Pile Dynamics, Inc.

TG F2 DPF

Pile Dynamics
1999-03-17 20:50FS —
10BN 1441
SL 940/ 3440/ 2PJ:
PN: HOPBARA 4 -- US
F 2 3.3LE 39.6 ft
AR 1.7 in2
EM 30000 Ksi
SP 0.492 K/ft3
WS 16815 ft/s
WC 17032 ft/sJC 0.40
FM 1.00
VM 1.00EA/C 30.3 Ks/ft
UN KIPS*0.1
FR 20000 MB 90DL -31
UT -1 IP 0.00
PK 1 TM-PEAKF1/2 500/ 213
F3/4 213/ 213
A1/2 999/ 999
A3/4 999/ 380TS 12
TB 8.0E B PD: K4664
T1 9.4 2L/C 4.7VA 1000 VE 1024 LP 0.00 ft
LI 1.0

ACCEPT SQ-OFF FL-OFF PR-OFF

ACCEPT



ACCELEROMETER CALIBRATION

N.I.S.T. Traceable

SERIAL NUMBER: K4664

CALIBRATION FACTOR: .076 %

PAK (*5000): 380 DATE: 10/16/2021

PDA OPERATOR: W. H. H. H.

<-AT:PIEZORESISTIVE

OP: WILL Iver:5.011

AT:PIEZOELECTRIC->

Smart Sensor

Programmed By: WJ

CRC Value 4898



Quality Assurance for Deep Foundations

PDI Certificate of Calibration

PDI Accelerometer Calibration

Model PR-1K Serial # 1K4665

Cal Date: AUG 10, 2021

Cal Due : AUG 9, 2023

Temperature: 72 deg. F

Humidity 70 %

Calibrated at
Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, OH 44139

Manufactured by Pile Dynamics, Inc.

Procedure used: PDA Accelerometer Calibration Procedure 2016-6, Revision 20160422

Equipment was found to be

X in tolerance As Received

_____ out of tolerance As Received

X in tolerance As Returned

_____ out of tolerance As Returned

PDI Calibration: 365 mv/5000g

Calibration Standards Utilized
Hopkinson Bar Force Calibration F2, verified on July 28, 2021

PDI HopBar DOS PAK, serial number 1273K, verified on July 19, 2021

Calibration performed by: William Johnson
William Johnson, Technician

Reviewed by: Bob Sprenger
Bob Sprenger, production Manager

Accelerometer CC-5 Issued 20160426

QBTA: ON [ALT-F1/BB=60]

Pile Dynamics, Inc.

TG F2 DPF

Pile Dynamics
1999-01-07 21:09FS —
10BN
SL66
805/

3440/ 99

PJ:

PN: HOPBAR

A 4
F 2-- US
3.3LE 39.6 ft
AR 1.7 in2
EM 30000 Ksi
SP 0.492 K/ft3
WS 16815 ft/s
WC 16851 ft/sJC 0.40
FM 1.00
UM 1.00EA/C 30.3 Ks/ft
UN KIPS*0.1
FR 20000 MB 90DL -44
UT -1 IP 0.00
PK 1 TM-PEAKF1/2 500/ 213
F3/4 213/ 213
A1/2 999/ 999
A3/4 999/ 365TS 12
TB 8.0E B
T1 9.6PD: K4665
2L/C 4.7

VA 1000

UE 1024

LP 0.00 ft
LI 1.0

ACCEPT SQ-OFF FL-OFF PR-OFF

ACCEPT

VMX= 4.9 FMX= 75 AMX= 169
EMX= 0.3 MEX= 147 FUP= 0.98

ACCELEROMETER CALIBRATION

N.I.S.T. Traceable

SERIAL NUMBER:

K4665

CALIBRATION FACTOR:

.073 %/6

PAK (*5000):

365

DATE:

8/10/2021

PDA OPERATOR:

Willie Jh

<-AT:PIEZORESISTIVE

OP: WILL [ver:5.01]

AT:PIEZOELECTRIC->

Smart Sensor

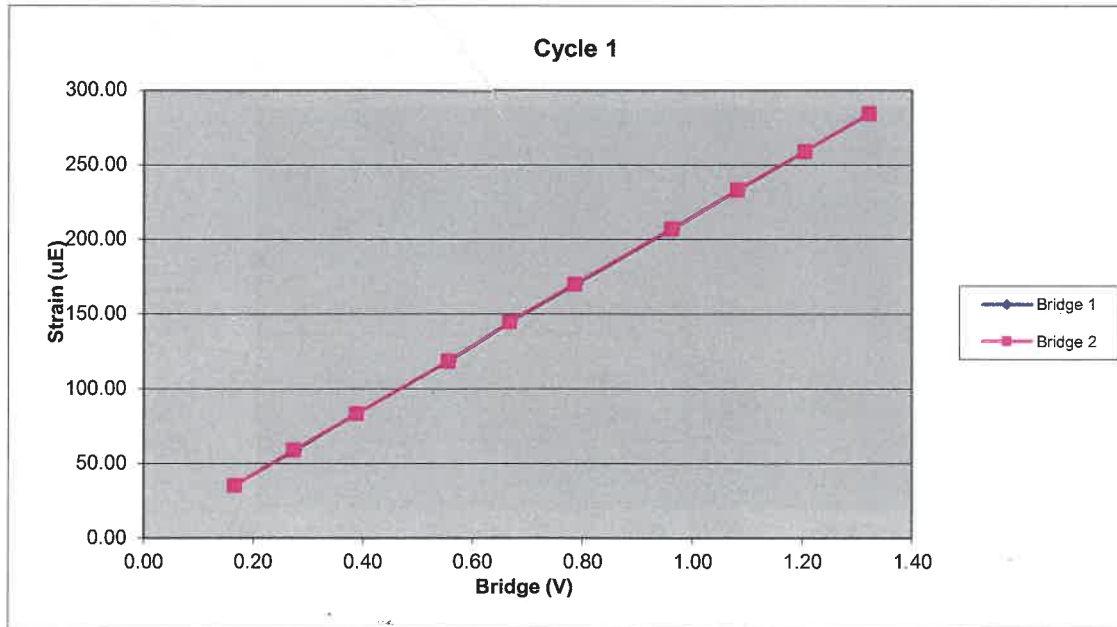
Programmed By: WJ

CRC Value C59F

203AWJ		Cycle 1		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1246.03	34.91	0.17	0.17
3	2081.11	58.65	0.28	0.27
4	2941.63	83.02	0.39	0.39
5	4214.76	118.53	0.56	0.56
6	5056.27	144.80	0.67	0.67
7	5965.04	170.09	0.79	0.79
8	7294.42	207.16	0.96	0.96
9	8206.79	233.22	1.08	1.08
10	9138.76	259.03	1.21	1.20
11	10040.70	284.32	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7599.69	Force Calibration (lb/V)	7601.86
Offset	-24.15	Offset	-17.41
Correlation	0.999998	Correlation	0.999998
Strain Calibration (μ E/V)	215.94	Strain Calibration (μ E/V)	216.00
Offset	-0.96	Offset	-0.77
Correlation	0.999977	Correlation	0.999970

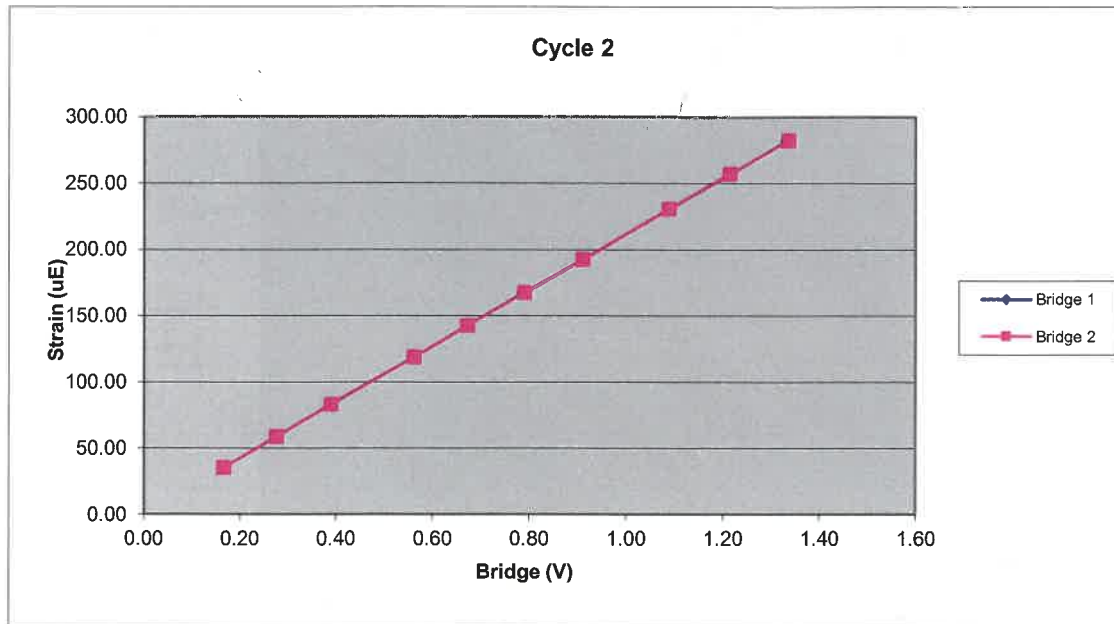
Force Strain Calibration	
EA (Kips)	35191.11
Offset	10.07
Correlation	0.999966



203AWJ		Cycle 2		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1258.51	34.91	0.17	0.17
3	2095.24	58.34	0.28	0.28
4	2959.17	82.77	0.39	0.39
5	4259.41	118.34	0.56	0.56
6	5099.16	142.25	0.67	0.67
7	6003.44	167.19	0.79	0.79
8	6914.94	192.10	0.91	0.91
9	8280.29	230.44	1.09	1.09
10	9224.63	256.64	1.22	1.21
11	10143.64	281.95	1.33	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7599.73	Force Calibration (lb/V)	7596.59
Offset	-6.06	Offset	-5.65
Correlation	0.999998	Correlation	0.999998
Strain Calibration ($\mu\text{E/V}$)	211.24	Strain Calibration ($\mu\text{E/V}$)	211.15
Offset	0.01	Offset	0.02
Correlation	0.999992	Correlation	0.999991

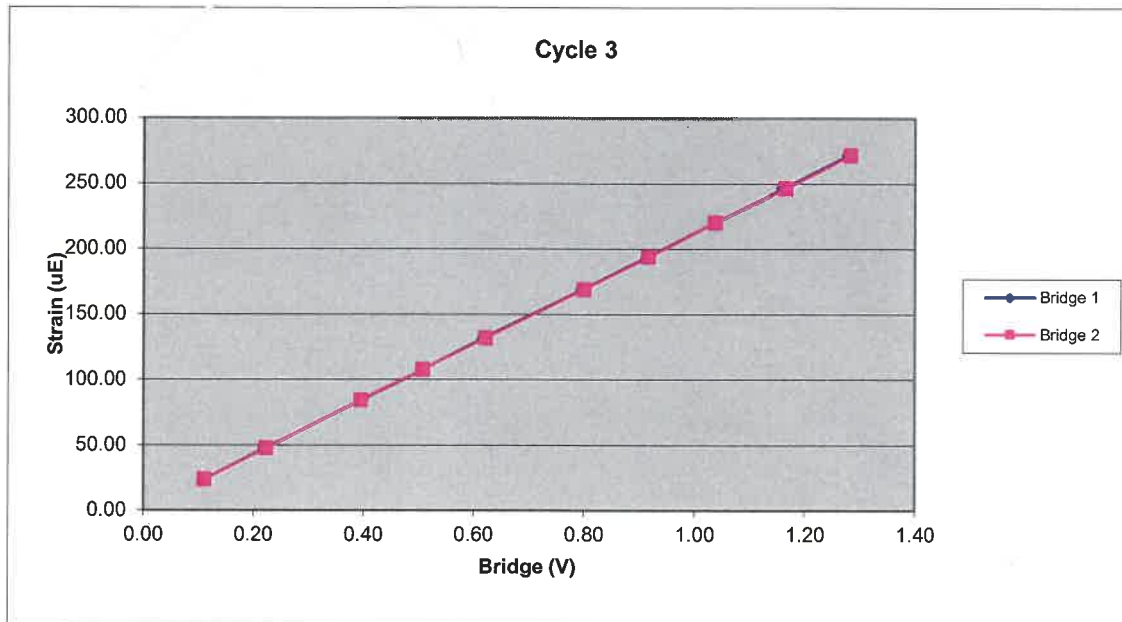
Force Strain Calibration	
EA (Kips)	35976.99
Offset	-6.36
Correlation	0.999996



203AWJ		Cycle 3		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	846.19	23.53	0.11	0.11
3	1695.30	47.55	0.22	0.22
4	3007.23	84.21	0.40	0.40
5	3855.56	107.72	0.51	0.51
6	4714.72	131.93	0.62	0.62
7	6082.40	169.34	0.80	0.80
8	6969.72	194.06	0.92	0.92
9	7881.90	220.26	1.04	1.04
10	8834.83	246.28	1.16	1.17
11	9750.91	271.69	1.28	1.28

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7615.81	Force Calibration (lb/V)	7596.50
Offset	-9.63	Offset	-6.69
Correlation	0.999996	Correlation	0.999998
Strain Calibration (μ E/V)	212.11	Strain Calibration (μ E/V)	211.57
Offset	0.00	Offset	0.08
Correlation	0.999995	Correlation	0.999995

Force Strain Calibration	
EA (Kips)	35905.21
Offset	-9.52
Correlation	0.999994



Bridge Excitation (V) 5
Shunt Resistor (ohm) 60.4k

Calibration Factors	203AWJ		
Bridge 1 ($\mu\text{E/V}$)	213.10	Bridge 2 ($\mu\text{E/V}$)	212.91
EA Factor (Kips)	35691.10	Area (in^2)	1.19

Calibrated by:



Calibrated Date:

3/25/2021

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

Appendix III

PROJECT: 12th St. Extension - Ph III West Columbia, SC S&ME Project No. 22610494				BORING LOG B-2					
DATE DRILLED: 11/10/22		ELEVATION: 141.0 ft		NOTES: As-Drilled Northing/Easting Coordinates, and Elevation surveyed by Survey One.					
DRILL RIG: CME 750		BORING DEPTH: 60.0 ft							
DRILLER: S Gowan		WATER LEVEL: 5.4' 24 hr							
HAMMER TYPE: Auto		LOGGED BY: M. Cooke							
SAMPLING METHOD: Split spoon				NORTHING: 746269		EASTING: 1989870			
DRILLING METHOD: Mud Rotary									
DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN # 2nd 6in / REC 3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS 10 20 30 6080	N VALUE
		SURFACE MATERIALS- TOPSOIL - 4 inches							
		ALLUVIUM - CONGAREE RIVER FLOODPLAIN - CLAYEY SAND (SC) - mostly fine to medium sand, some high plasticity fines, moist, gray, loose.			SS-1		3 2 4		6
5		FAT CLAY (CH) - mostly high plasticity fines, trace fine to medium sands, light gray, moist, stiff.		136.0	SS-2		3 4 5		9
		CLAYEY SAND (SC) - mostly fine to medium sands, some high plasticity fines, wet, gray, loose.			SS-3		3 1 4		5
10		ORGANIC SOIL (OH) - mostly high plasticity organic fines, trace fine to medium sands, very dark brown to black, moist to wet, very soft.		131.0	SS-4	WOH	WOH	WOH	WOH
15		LEAN CLAY (CL) - mostly medium plasticity fines, trace fine to medium sands, gray, moist, firm		126.0	SS-5		2 3 3		6
20		FAT CLAY (CH) - mostly high plasticity fines, trace fine to medium sands, dark gray, wet, soft.		121.0	SS-6	WOH	WOH	3	3
25		CLAYEY SAND (SC) - mostly fine sands, some high plasticity fines, light gray, wet, very loose.	HC	116.0	SS-7	WOH	WOH	2	2
30		POORLY GRADED SAND WITH SILT (SP-SM) - mostly fine to medium sand, few non plastic fines, trace fine subrounded quartz gravels, light gray to white, wet, very loose.		111.0	SS-8		2 1 2		3
					SS-9		7 7 5		12

NOTES:

1. THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
2. BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.
3. STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.



PROJECT: 12th St. Extension - Ph III West Columbia, SC S&ME Project No. 22610494				BORING LOG B-2					
DATE DRILLED: 11/10/22		ELEVATION: 141.0 ft		NOTES: As-Drilled Northing/Easting Coordinates, and Elevation surveyed by Survey One.					
DRILL RIG: CME 750		BORING DEPTH: 60.0 ft							
DRILLER: S Gowan		WATER LEVEL: 5.4' 24 hr							
HAMMER TYPE: Auto		LOGGED BY: M. Cooke							
SAMPLING METHOD: Split spoon				NORTHING: 746269		EASTING: 1989870			
DRILLING METHOD: Mud Rotary									
DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN # 2nd 6in / REC 3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS	N VALUE
		SILTY SAND WITH GRAVEL (SM) - mostly fine to coarse sands, subrounded gravels, low plasticity fines, reddish-brown, wet, medium dense. (continued)							
40		POORLY GRADED SAND WITH SILT (SP-SM) - mostly fine to coarse sands, few low plasticity fines, few coarse subrounded quartz gravels, light brown, wet, loose.		101.0	SS-10		6 5 4		9
45				96.0	SS-11		3 4 4		8
50		COASTAL PLAIN- LEAN CLAY (CL) - mostly medium pasticity fines, trace fine sands, gray and light brown, moist, hard.		91.0	SS-12		8 19 27		46
55		SILTY SAND (SM) - mostly fine to medium sand, little low plasticity fines, light gray and purple, wet, medium dense.		86.0	SS-13		6 11 12		23
		SANDY LEAN CLAY (CL) - mostly medium plasticity fines, some fine to medium sand, light gray and pink, moist, very hard.							
60		Boring terminated at 60 ft		81.0	SS-14		15 25 33		58

NOTES:

- THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
- BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.
- STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
- WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.





SPT Energy Evaluation Form

Project: ANNUAL SPT ENERGY MEASUREMENT
Project No.: 1535-22-200
Boring No.: B-2

Date: 11/10/2022
Weather: OVERCAST 60's
Drill Rod Type: 5-FT LONG AWJ

On-site Personnel

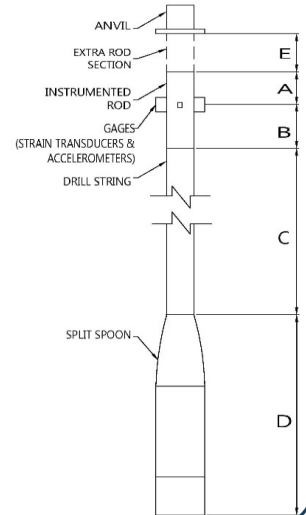
Drilling Company: S&ME
Rig Operator: S. GOWAN
Engr/Geologist: N/A
Client Rep.: N/A
Analyzer Oper.: J. WILLIAMSON

Rig/Hammer Info

Drill Rig Make/Model: CME-750X
Carrier Type: ATV
Rig Serial No.: 322938
Hammer Type/Model: CME / AUTO
Hammer Serial No.: N/A
Hammer Drop System: CHAIN DRIVE
Lubrication Condition: PER MANUFACTURERS RECS
Manufacturer Recommended
Operation Rate (bpm): 50-55
Typical Drop Height (in.): 30
Typical Hammer Weight (lbs): 140
Anvil Dimension (in.): 12
Drilling Method: MUD ROTARY w/ 2-7/8" DRAG BIT
Drop Height in Tolerance (y/n): YES

Rod Info

(A) + (B) Instr. Rod Length: 2.0 ft
(B) Instr. Rod Length
below Gages: 0.8 ft
(D) Spoon Length: 2.85 ft
(E) Rod Length Above
Instr. Rod (if applicable): - ft
(B)+(C)+(D) (LE) -
Length Below Gauges (C) +3.65 ft
Instr. Rod S/N: 203AWJ
Instr. Rod Outside Dia.: 1.75 in.
Instr. Rod Area: 1.19 in²
PDA Make/Model: PDI / PAX
PDA Serial No.: 3733L
Calib. Pulse Test (y/n): YES



Gage Info

Gage		Serial No.	Calibration No.
Accel.	A1	K4664	380.0
	A2	K4665	365.0
Strain	F1	203AWJ-1	213.10
	F2	203AWJ-2	212.91

Date of Test	Test Depth Increment (ft to ft)	Test Time Start / Stop (military)	Length of Drill String (ft) (C)	(LE) Length below Gages (ft) (B) + (C) + (D)	Avg. Meas. Hammer Rate (BPM)	SPT Blow Counts						AASHTO / USCS Classification
						Total Blows by PDA	6"	12"	18"	N-Value	Extra Blows	
11/10/2022	28.5 - 30	10:21	30	33.65	53	5	2	1	2	3	0	SP-SM
	33.5 - 35	10:28	35	38.65	53	18	7	7	5	12	0	SM
	38.5 - 40	10:36	40	43.65	53	17	6	5	4	9	0	SP-SM
	43.5 - 45	10:56	45	48.65	53	11	3	4	4	8	0	SP-SM
	48.5 - 50	11:07	50	53.65	53	56	8	19	27	46	2	CL
	53.5 - 55	11:18	55	58.65	53	29	6	11	12	23	0	SM
	58.5 - 60	11:28	60	63.65	53	73	15	25	33	58	0	CL

Notes: 33.5-35 ft - PDA missed 1 blow plus 1 bad blow = 2 missed blows.

38.5 - 40 ft - Bad Data from PDA. Switched pig tail & main cable & reconfigured wire attachments.

F2 gauge spiking after 2L/c in various blows in all data sets.

NOTE: (1) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. veritcality, weather, or lubrication between trials). (2) Note any changes in rod diameter along drill string and record locations of short rod sections.

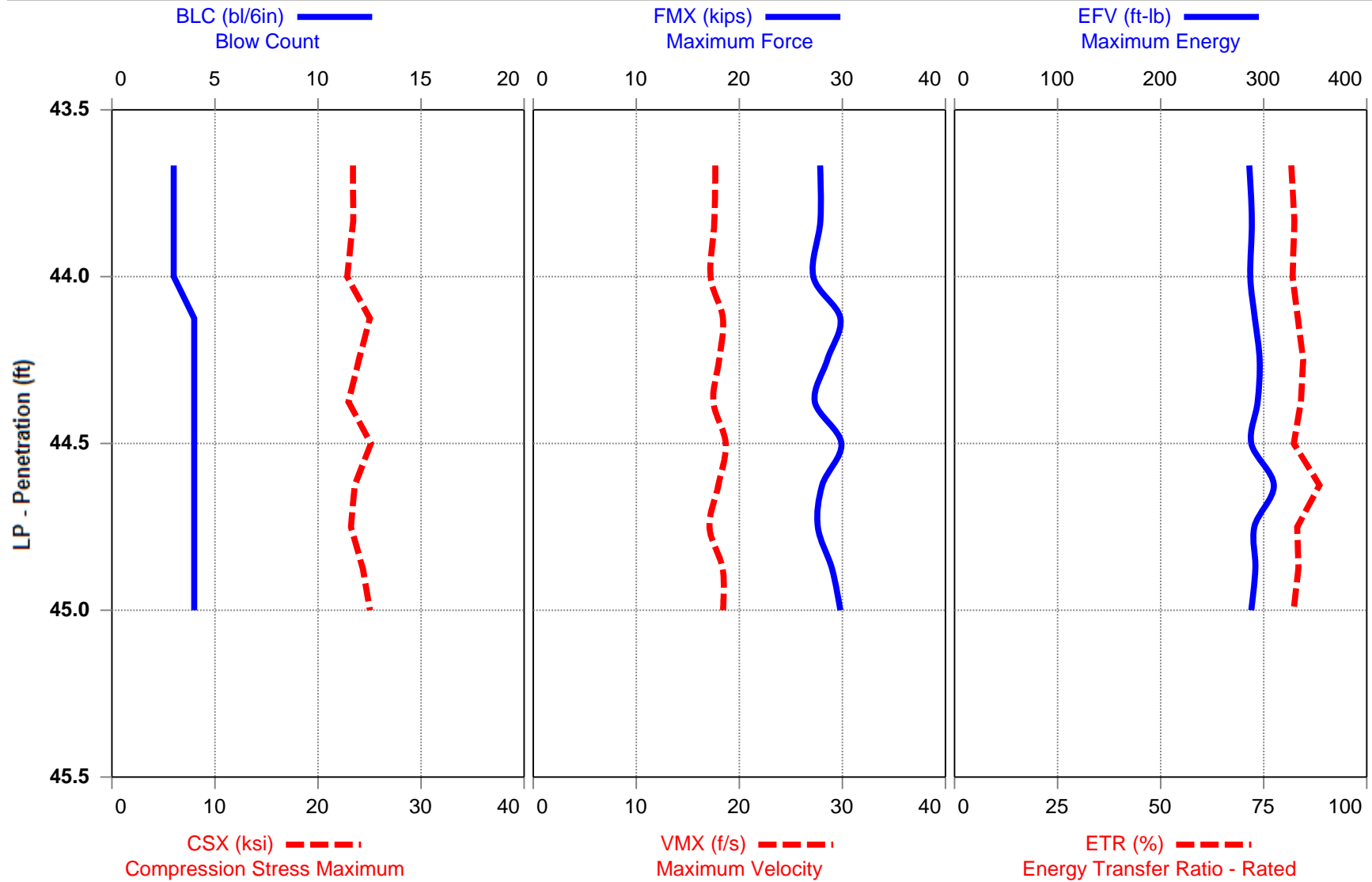
Joseph Williamson
Prepared By (print/signature)

11/10/2022
Date

Appendix IV



CME-750X (SN 322938) - 43.5-45.0 FEET
B-2

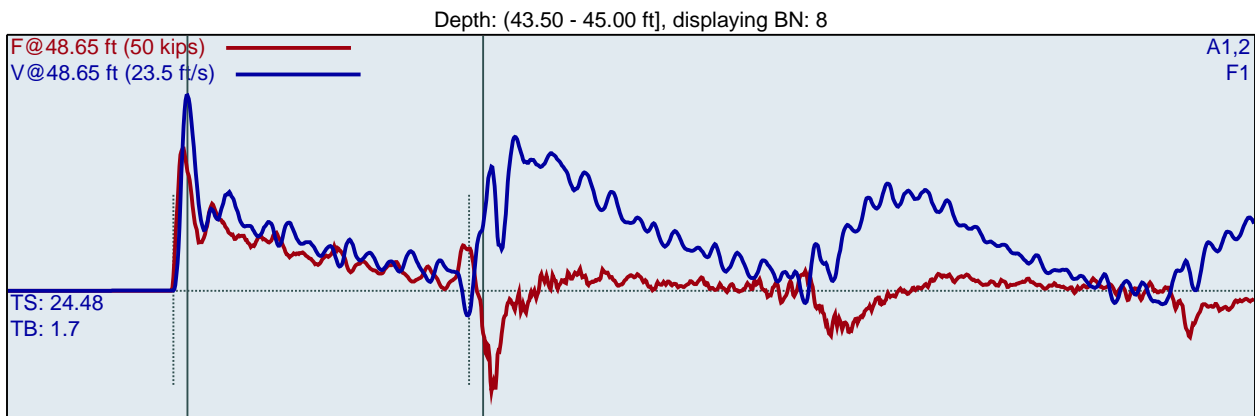


CME-750X (SN 322938)
JRW
B-2

Annual Energy Measurements
Interval start: 11/10/2022

AR: 1.19 in²
LE: 48.65 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F1 : [203 AWJ-1] 213.1 PDICAL (1) FF1
F2 : [203 AWJ-2] 212.91 PDICAL (1) FF1

A1 (PR): [K4664] 380 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 365 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

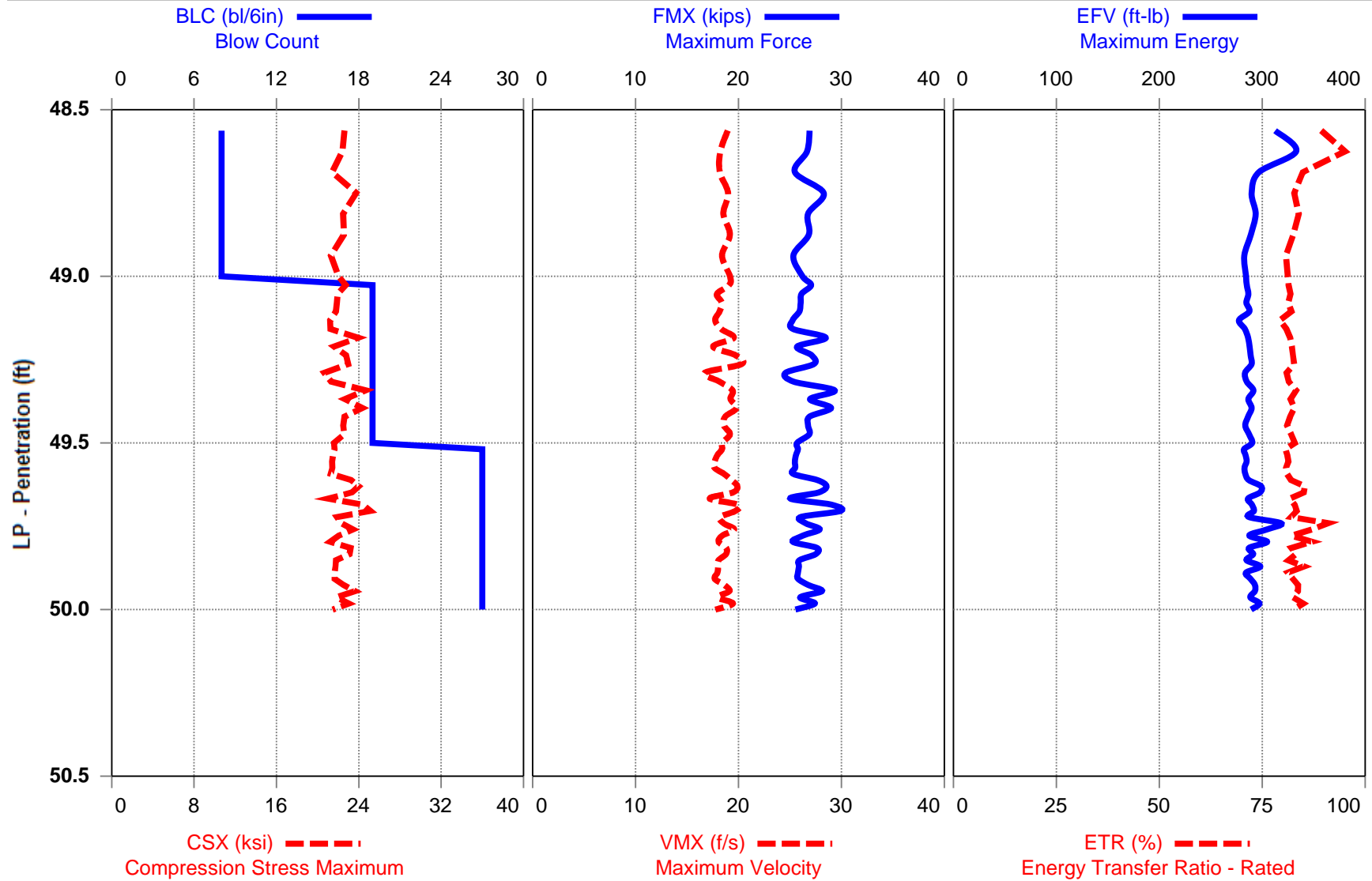
BL#	LP	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
	ft	/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
1	43.67	3	1.9	28	17.7	2.00	23.4	2.00	286	81.7
2	43.83	3	53.5	28	17.6	2.00	23.4	2.00	288	82.4
3	44.00	3	53.7	27	17.2	2.00	22.8	2.00	287	82.0
4	44.13	4	53.5	29	18.4	1.67	24.5	1.50	291	83.3
5	44.25	4	53.2	29	18.0	1.54	24.0	1.50	296	84.6
6	44.38	4	53.3	27	17.5	1.50	23.0	1.50	294	84.0
7	44.50	4	53.6	29	18.7	1.50	24.6	1.50	288	82.4
8	44.63	4	53.4	28	18.0	1.52	23.4	1.50	291	83.2
9	44.75	4	53.2	27	17.1	1.77	22.9	1.50	290	82.8
10	44.88	4	53.3	29	18.4	1.60	24.4	1.50	292	83.4
11	45.00	4	53.4	30	18.4	1.50	25.0	1.50	288	82.2
Average			53.4	29	18.1	1.58	24.0	1.50	291	83.2
Std Dev			0.1	1	0.5	0.09	0.8	0.00	3	0.7
Maximum			53.6	30	18.7	1.77	25.0	1.50	296	84.6
Minimum			53.2	27	17.1	1.50	22.9	1.50	288	82.2

N-value: 8

Sample Interval Time: 11.22 seconds.



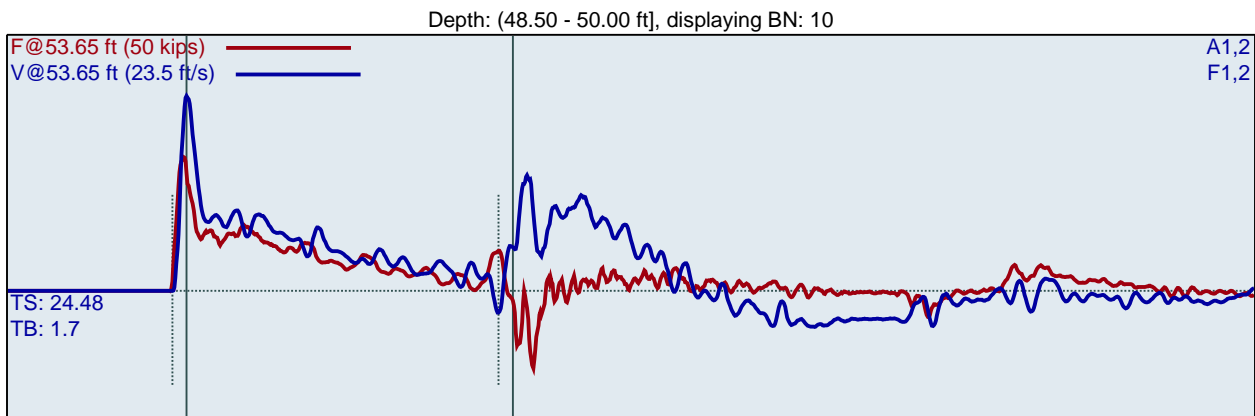
CME-750X (SN 322938) - 48.5-50.0 FEET
B-2



CME-750X (SN 322938)
JRW
B-2

Annual Energy Measurements
Interval start: 11/10/2022

AR: 1.19 in² SP: 0.492 k/ft³
LE: 53.65 ft EM: 30000 ksi
WS: 16807.9 ft/s



F1 : [203 AWJ-1] 213.1 PDICAL (1) FF1

A1 (PR): [K4664] 380 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 365 mv/6.4v/5000g (1) VF1

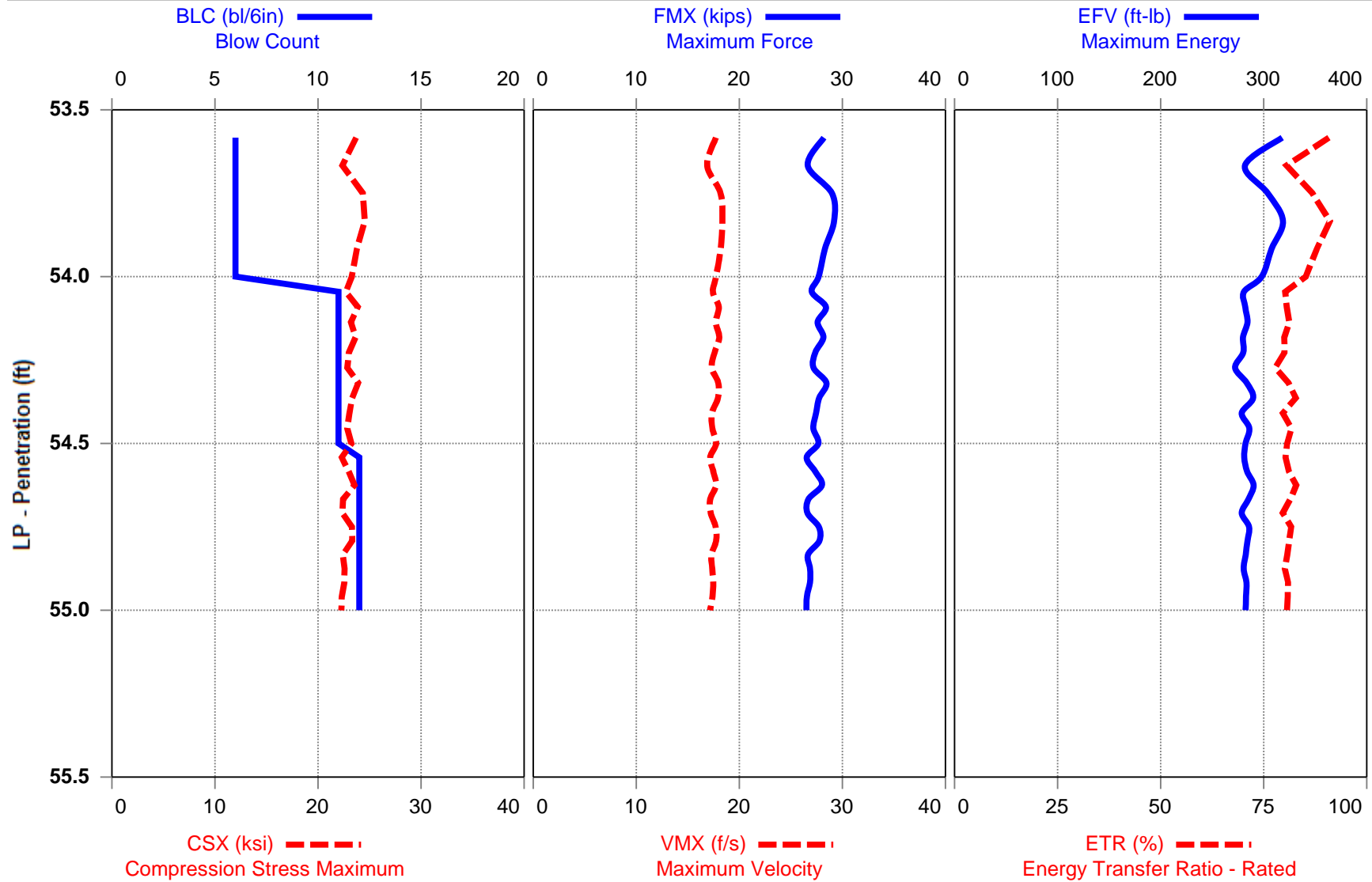
BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	48.56	8	1.9	27	19.0	1.18	22.6	0.75	296	84.5
2	48.63	8	42.7	27	18.2	0.99	22.3	0.75	290	82.7
3	48.69	8	54.0	25	18.2	0.79	21.3	0.75	282	80.5
4	48.75	8	53.3	28	19.0	0.75	23.2	0.75	291	83.1
5	48.81	8	53.5	26	18.5	0.75	22.3	0.75	290	82.9
6	48.88	8	53.3	27	19.2	0.75	22.3	0.75	287	81.9
7	48.94	8	53.5	25	18.4	0.75	21.1	0.75	283	80.8
8	49.00	8	53.5	26	19.2	0.75	21.9	0.75	284	81.2
9	49.03	19	53.2	27	19.1	0.56	22.5	0.32	286	81.7
10	49.05	19	53.6	26	17.9	0.56	22.0	0.32	286	81.8
11	49.08	19	53.2	26	18.4	0.54	21.8	0.32	285	81.4
12	49.11	19	53.3	26	18.2	0.54	21.6	0.32	288	82.2
13	49.13	19	53.8	25	17.7	0.52	21.2	0.32	277	79.2
14	49.16	19	53.2	25	18.3	0.51	21.2	0.32	283	80.8
15	49.18	19	53.4	28	19.5	0.50	23.7	0.32	283	81.0
16	49.21	19	53.1	24	17.5	0.51	20.6	0.32	287	81.9
17	49.24	19	53.1	27	19.7	0.51	22.7	0.32	288	82.2
18	49.26	19	53.1	28	20.3	0.49	23.1	0.32	289	82.5
19	49.29	19	53.0	24	16.7	0.49	20.2	0.32	283	80.9
20	49.32	19	53.2	25	18.1	0.48	21.1	0.32	285	81.5
21	49.34	19	53.1	29	19.4	0.48	24.3	0.32	292	83.3
22	49.37	19	52.8	27	19.2	0.46	22.4	0.32	287	82.0
23	49.39	19	53.8	29	19.8	0.46	24.0	0.32	290	82.9
24	49.42	19	53.2	27	18.7	0.45	22.6	0.32	287	81.9
25	49.45	19	53.1	27	18.6	0.44	22.5	0.32	284	81.0
26	49.47	19	53.0	27	19.2	0.44	22.5	0.32	286	81.8
27	49.50	19	53.3	26	18.4	0.44	22.0	0.32	289	82.7
28	49.52	27	53.1	26	18.4	0.42	21.5	0.22	282	80.6
29	49.54	27	52.9	26	17.9	0.43	21.4	0.22	284	81.2
30	49.56	27	53.4	25	17.7	0.43	21.2	0.22	285	81.5
31	49.57	27	53.1	25	17.7	0.42	21.3	0.22	283	80.9

32	49.59	27	52.9	25	18.6	0.41	21.2	0.22	283	80.8
33	49.61	27	53.2	27	19.3	0.41	23.1	0.22	286	81.7
34	49.63	27	52.9	28	19.9	0.41	23.8	0.22	287	82.0
35	49.65	27	53.3	28	19.5	0.43	23.2	0.22	291	83.3
36	49.67	27	53.1	25	17.2	0.41	20.9	0.22	286	81.7
37	49.69	27	53.2	29	20.0	0.41	24.0	0.22	289	82.7
38	49.70	27	52.9	30	19.7	0.41	24.9	0.22	291	83.3
39	49.72	27	53.2	26	18.2	0.41	22.1	0.22	287	82.0
40	49.74	27	53.2	27	18.5	0.41	22.6	0.22	290	82.9
41	49.76	27	53.2	28	19.6	0.41	23.4	0.22	289	82.5
42	49.78	27	53.0	26	18.4	0.41	22.3	0.22	287	82.1
43	49.80	27	53.2	25	18.1	0.40	21.4	0.22	286	81.6
44	49.81	27	53.1	28	18.8	0.39	23.4	0.22	286	81.7
45	49.83	27	52.9	28	18.8	0.40	23.3	0.22	290	82.8
46	49.85	27	53.2	26	18.1	0.39	21.8	0.22	285	81.3
47	49.87	27	53.1	26	18.0	0.39	21.6	0.22	288	82.2
48	49.89	27	53.2	26	17.9	0.39	21.6	0.22	285	81.3
49	49.91	27	52.9	26	17.7	0.39	21.5	0.22	288	82.3
50	49.93	27	53.1	27	18.6	0.39	23.0	0.22	291	83.2
51	49.94	27	52.9	28	19.1	0.39	23.6	0.22	292	83.4
52	49.96	27	53.1	26	18.0	0.38	21.8	0.22	288	82.3
53	49.98	27	53.2	27	19.5	0.40	23.1	0.22	294	84.1
54	50.00	27	53.2	25	17.8	0.39	21.4	0.22	288	82.3
Average			53.2	27	18.6	0.44	22.3	0.26	287	82.0
Std Dev			0.2	1	0.8	0.05	1.1	0.05	3	0.9
Maximum			53.8	30	20.3	0.56	24.9	0.32	294	84.1
Minimum			52.8	24	16.7	0.38	20.2	0.22	277	79.2
N-value: 46										

Sample Interval Time: 59.96 seconds.



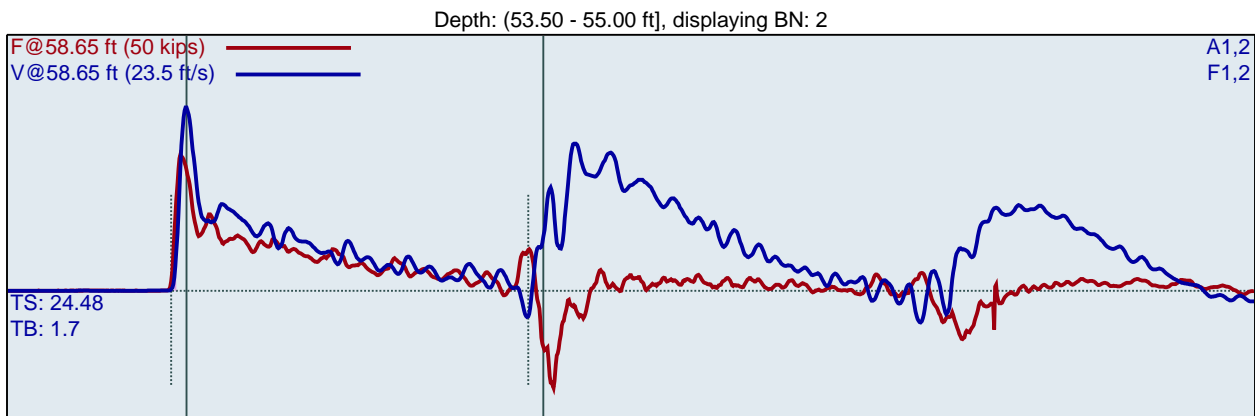
CME-750X (SN 322938) - 53.5-55.0 FEET
B-2



CME-750X (SN 322938)
JRW
B-2

Annual Energy Measurements
Interval start: 11/10/2022

AR: 1.19 in² SP: 0.492 k/ft³
LE: 58.65 ft EM: 30000 ksi
WS: 16807.9 ft/s



F1 : [203 AWJ-1] 213.1 PDICAL (1) FF1

A1 (PR): [K4664] 380 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 365 mv/6.4v/5000g (1) VF1

BL#	LP ft	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	53.58	6	1.9	28	17.7	1.41	23.4	1.00	296	84.6
2	53.67	6	55.5	27	16.9	1.15	22.4	1.00	282	80.5
3	53.75	6	53.3	28	18.2	1.00	23.8	1.00	288	82.2
4	53.83	6	53.2	28	18.3	1.00	23.9	1.00	289	82.7
5	53.92	6	53.4	28	18.2	1.00	23.5	1.00	287	82.1
6	54.00	6	53.4	28	17.7	1.00	23.2	1.00	291	83.3
7	54.05	11	53.5	27	17.4	0.61	22.6	0.55	281	80.2
8	54.09	11	53.0	29	18.0	0.57	24.1	0.55	280	80.1
9	54.14	11	53.5	28	17.7	0.60	23.1	0.55	283	80.9
10	54.18	11	53.3	28	18.0	0.58	23.9	0.55	278	79.5
11	54.23	11	53.6	27	17.6	0.58	22.9	0.55	277	79.0
12	54.27	11	53.2	27	17.3	0.57	22.5	0.55	271	77.6
13	54.32	11	53.4	28	18.0	0.57	23.3	0.55	282	80.4
14	54.36	11	53.2	27	17.9	0.58	22.5	0.55	283	80.8
15	54.41	11	53.5	27	17.3	0.58	22.4	0.55	278	79.4
16	54.45	11	53.0	27	17.4	0.59	22.3	0.55	284	81.1
17	54.50	11	53.4	27	17.7	0.56	22.8	0.54	281	80.4
18	54.54	12	53.2	26	17.2	0.57	21.9	0.50	281	80.4
19	54.58	12	53.4	27	17.5	0.56	22.6	0.50	283	80.8
20	54.63	12	53.2	27	17.7	0.60	22.9	0.50	290	82.7
21	54.67	12	53.1	26	17.2	0.58	22.2	0.50	285	81.3
22	54.71	12	53.5	26	17.2	0.57	22.1	0.50	279	79.6
23	54.75	12	53.2	27	17.7	0.57	23.0	0.50	284	81.2
24	54.79	12	53.4	27	17.7	0.59	22.9	0.50	284	81.1
25	54.83	12	53.4	26	17.3	0.59	22.1	0.50	282	80.6
26	54.88	12	53.4	26	17.4	0.58	22.2	0.50	280	80.1
27	54.92	12	53.0	27	17.5	0.57	22.4	0.50	282	80.6
28	54.96	12	53.2	26	17.4	0.58	22.1	0.50	282	80.6
29	55.00	12	53.4	27	17.2	0.58	22.3	0.50	281	80.3

Average	53.3	27	17.5	0.58	22.7	0.52	281	80.4
Std Dev	0.2	1	0.3	0.01	0.5	0.02	3	1.0
Maximum	53.6	29	18.0	0.61	24.1	0.55	290	82.7
Minimum	53.0	26	17.2	0.56	21.9	0.50	271	77.6

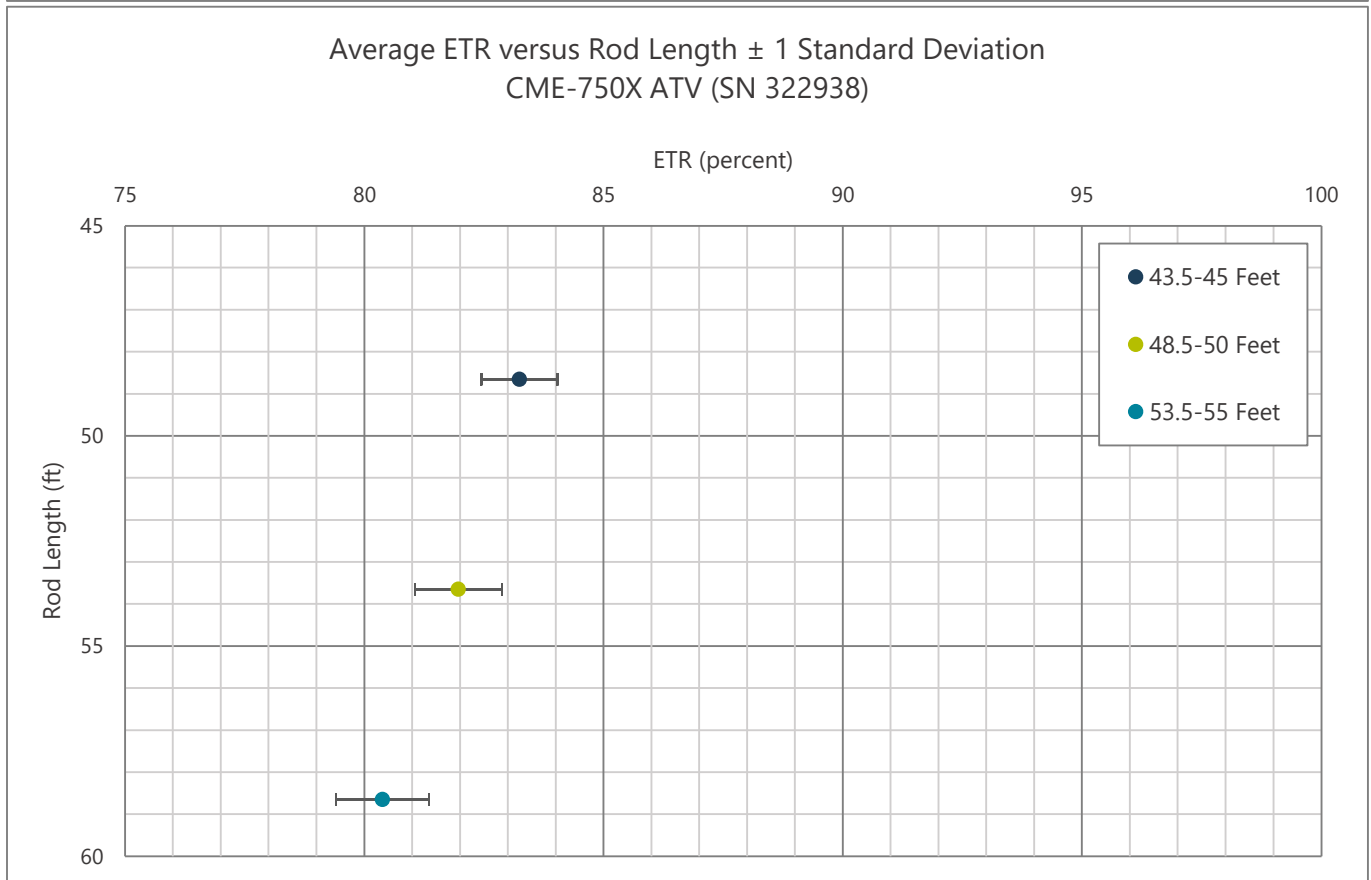
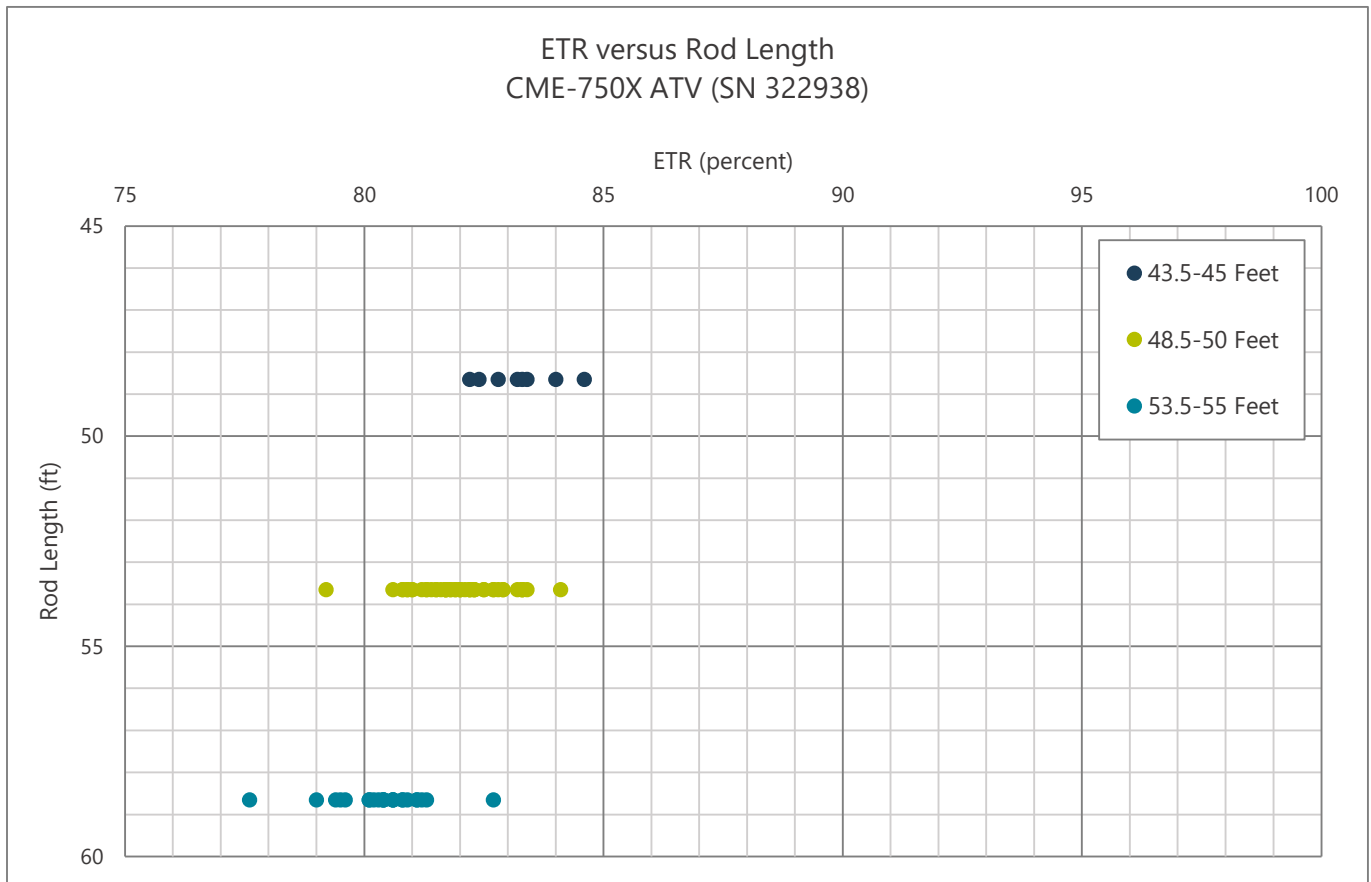
N-value: 23

Sample Interval Time: 31.43 seconds.

Summary of SPT Test Results

Project: CME-750X (SN 322938), Test Date: 11/10/2022

BPM: Blows/Minute						CSX: Compression Stress Maximum							
FMX: Maximum Force						DFN: Final Displacement							
VMX: Maximum Velocity						EFV: Maximum Energy							
DMX: Maximum Displacement						ETR: Energy Transfer Ratio - Rated							
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
48.65	43.50	45.00	3-4-4	8	10	53.4	29	18.1	1.58	24.0	1.50	291	83.2
53.65	48.50	50.00	8-19-27	46	62	53.2	27	18.6	0.44	22.3	0.26	287	82.0
58.65	53.50	55.00	6-11-12	23	31	53.3	27	17.5	0.58	22.7	0.52	281	80.4
Overall Average Values:						53.2	27	18.2	0.60	22.6	0.47	286	81.6
Standard Deviation:						0.2	1	0.8	0.34	1.0	0.37	4	1.3
Overall Maximum Value:						53.8	30	20.3	1.77	25.0	1.50	296	84.6
Overall Minimum Value:						52.8	24	16.7	0.38	20.2	0.22	271	77.6





Memorandum

To: File – S&ME Project No.: 22350835A – TVA CRN Geotechnical Investigation, Oak Ridge, TN

From: Joseph R. Williamson, P.E. (NC & SC) and Jason S. Reeves, P.E. *Jason S. Reeves* 6/14/23

Cc: Julie P. Robertson, P.G. *Joseph Williamson* 6/14/23

Date: June 14, 2023

Subject: Summary of SPT Energy Measurements – S&ME Diedrich D-50 Track (Serial No. 316) – Tested 6/8/23

◆ Purpose

In accordance with the project specifications, we have completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer used with our Diedrich D-50 track-mounted drill rig (Serial No. 316). This testing was performed prior to the beginning of our field exploration services for this project. This service was performed by Mr. Joseph Williamson, P.E. (NC and SC) of S&ME on June 8, 2023, in general accordance with ASTM D4633. Review of the data quality and analyses was performed by Mr. Williamson. A copy of the Certificate of Proficiency issued by Pile Dynamics based on the Dynamic Measurement and Analysis Proficiency Test for Mr. Williamson is included in the attachments. The testing procedures, equipment used during testing, and detailed results are presented in this memorandum.

◆ Dynamic Testing Methodology

Testing was performed using a model PAX (Serial No. 3733L) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K4664 and K4665) bolted to a 2.0-foot long AWJ drill rod (Serial No. 203) internally instrumented with two strain transducers. Calibration sheets for the accelerometers and the instrumented rod are included in the attachments. The instrumented AWJ drill rod has a cross-sectional area of 1.21 square inches (verified during equipment calibration) and an outside diameter of approximately 1- $\frac{7}{8}$ inches. Therefore, we calculate the inside diameter to be approximately 1.23 inches at the gauge location. The accelerometers and strain gauges, which are diametrically opposed near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real time for each blow.



♦ Testing and Observations

S&ME personnel were on site June 8, 2023, to observe and perform high-strain dynamic testing during SPT sampling on the Diedrich D-50 track-mounted drill rig operated by Frank Crane of S&ME. The measurements were taken during drilling and sampling of a test hole (Test Hole 2) at our office in Louisville, Tennessee. SPT energy measurements were recorded during four sample intervals that met the N-value requirements of ASTM D4633. The information presented in the tables below summarizes the equipment and tooling used during the SPT energy measurements. The SPT Energy Evaluation Form is included in the attachments.

Table 1: Drill Rig Information

Manufacturer	Diedrich
Model	D-50
Serial Number	316
Operator	F. Crane
Carrier	Track

Table 2: Hammer Information

Type / Model	Auto / Diedrich
Drop Height from Calibration Record (inches)	30.0
Calibration Hammer Weight (pounds)	139.66

Table 3: Drilling and Instrumented Rod Information

Drill Rod Type	AWJ
OD (inches) ¹	1.75
ID (inches) ¹	1.25
Cross-Sectional Area (in ²) ²	1.18
Typical Lengths (feet)	5
Instrumented Rod Type	AWJ (Serial No. 203)
OD (inches) ³	1-7/8
ID (inches) ⁴	1.23
Cross-Sectional Area (in ²) ⁵	1.21
Total Instrumented Rod Length (feet) ³	2.0
Length Below Gages (feet) ³	0.75
Split-Spoon Length (feet) ³	2.84

¹ Per manufacturer's specifications.

² Calculated using OD and ID from manufacturer's specifications.

³ Measured with engineer's tape measure at top of instrumented rod.

⁴ Calculated using typical drill rod OD and Area from instrument rod calibration record.

⁵ From instrument rod calibration record.



◆ Dynamic Testing Results

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.59 ft to the drill rod length at each sample depth. The SPT Energy Measurement Data Summary tables in the attachments present the test data from every hammer blow at each sampling interval, along with representative force and velocity traces for each test interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e. the blows that determine the N-value) are considered when computing the average measurement values of each test interval.

The reported blow counts obtained by the drill rig personnel, a summary of the test data, and average computed hammer energy and transfer ratio values are provided in Table 4. Based on the test data, the automatic hammer on the Diedrich D-50 operated at an average rate of about 51 blows per minute (bpm) during dynamic testing. The measured average transferred hammer energy (EFV) of the four sample intervals tested ranged from 335 to 344 ft-lbs, which corresponds to Energy Transfer Ratio (ETR) values of 95.7 to 98.2%, respectively, based on a typical theoretical maximum energy of 350 ft-lbs. Plots and tables of the following are also included in the Appendix and present the test data with depth for each test interval:

- Penetration vs. BLC⁶
- Penetration vs. FMX⁷
- Penetration vs. EFV⁸
- Penetration vs. CSX⁹
- Penetration vs. VMX¹⁰
- Penetration vs. ETR¹¹
- ETR vs. Rod Length
- Average ETR vs. Rod Length

Table 4: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description (Residual)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	31.0 – 32.5	32.0	35.59	5-14-19 / 33	Lean Clay	50.2	340	97.2
2	33.5 – 35.0	34.0	37.59	4-11-16 / 27	Lean Clay	50.4	336	96.1
3	36.0 – 37.5	36.0	39.59	7-12-19 / 31	Lean Clay	50.7	344	98.2
4	38.5 – 40.0	39.0	42.59	5-11-17 / 28	Lean Clay	50.7	335	95.7
Overall Average						50.5	339	96.8

The overall average transferred hammer energy for the automatic hammer on the Diedrich D-50 track-mounted drill rig was 339 foot-pounds, with an average ETR of 96.8%.

⁶ BLC - Blow Count per 6-in. increment

⁷ FMX - Maximum Compressive Force

⁸ EFV - Maximum Transferred Energy

⁹ CSX - Maximum Compressive Stress

¹⁰ VMX - Maximum Velocity

¹¹ ETR - Energy Transfer Ratio - Ratio of Calculated Energy to Theoretical Energy of 140 lb hammer falling 30 inches

Attachments

Certificate of Proficiency

Instrumented Rod and Accelerometer Calibration Sheets

SPT Energy Evaluation Form

Diedrich D-50 Track (SN 316) SPT Energy Measurements Summary Plots and Tables



This documents that
Joseph Williamson
S&ME, Inc.

has on March 16, 2022 achieved the rank of

MASTER

on the **Dynamic Measurement and Analysis Proficiency Test.**

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended that individuals at the Master level seek to attain Expert level through additional study within eight years of the date of this document***

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate. This certificate can be verified at www.PDAproficiencytest.com.

Frank T. Peters, Executive Director
Pile Driving Contractors Association



Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 3251

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model PAX

Serial Number: 3733L

was calibrated on 22 May 2023

**using a PDA Calibration Box whose output was calibrated with test equipment
traceable to NIST.**

This certificate is valid for 2 years from above date.



Tested by:



Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA



Quality Assurance for Deep Foundations

*Reviewed
6/5/2023
HJ*

PDI Certificate of Calibration

PDI PDA Model PAX Serial # 3733L

Cal Date: May 19, 2023

Cal Due: May 18, 2025

Temperature: 74 deg. F

Humidity: 43%

Calibrated at:
Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, OH 44139

Manufactured by Pile Dynamics, Inc.

Procedure used: PDA Calibration Procedure 2016-2, Revision 20160422
Actual Measurements: Attach PDA Calibration Data Sheet

Equipment was found to be:

☒ in tolerance As Received

☐ out of tolerance As Received

☒ in tolerance As Returned

☐ out of tolerance As Returned

Calibration Standards Utilized

PDA Cal Box serial 000002, verified on 21June2022.

Calibration performed by:

MJ

Marcus Johnson, Technician

Reviewed by:

Bob Sprenger

Bob Sprenger, Product Support Manager

PDA CC-9 Issued 20160422



Quality Assurance for Deep Foundations

PDA Calibration Data Sheet

Revision number 20160422

Use Calibration Procedure Number 2016-2, Revision 20160422

PDI PDA Model PAX Serial # 3733L Cal Date: May 19, 2023

*Reviewed
6/5/2023
[Signature]*

Reference Notes: Connect PDA Cal box to PDA sensor inputs. Set F3 & F4 to 147.5 and A3 & A4 to 1000. PDA to display the quantities FMX, VMX, and EMX. Select metric units. Set ARea = 244 cm². Set EM = 2100 tonnes/cm². Set FREQUENCY to 50000HZ. Record actual value displayed:

Channel 3 (F3 & V3)

Calculation	Expected	Acceptable Range	Measured	Acceptable	Not Acceptable
FMX	378 tonnes	370 to 386	376	X	_____
VMX (PR)	4.21 m/sec.	4.13 to 4.29	4.15	X	_____
EMX (PR)	7.94 tonnes m	7.62 to 8.26	7.83	X	_____

Channel 4 (F4 & V4)

Calculation	Expected	Acceptable Range	Measured	Acceptable	Not Acceptable
FMX	378 tonnes	370 to 386	374	X	_____
VMX (PR)	4.21 m/sec.	4.13 to 4.29	4.13	X	_____
EMX (PR)	7.94 tonnes m	7.62 to 8.26	7.75	X	_____

Calibration performed by:

[Signature]

Marcus Johnson, Technician

Reviewed by:

[Signature]

Bob Sprenger, Product Support Manager

PDA DS-10 Issued 20160422



Quality Assurance for Deep Foundations

*Reviewed
TND
6/5/2023
✓*

PDI Certificate of Calibration

PDI SPT Drill Rod Serial # 203AWJ

Cal Date: May 23, 2023

Cal Due: May 22, 2025

Temperature: 74 deg. F

Humidity 42%

Manufactured by Pile Dynamics, Inc.

Calibrated at: Pile Dynamics, Inc., 30725 Aurora Road, Cleveland, OH 44139

Procedure used: SPT Drill Rod Calibration Procedure 2016-4, Revision 20160422

Calibration Data: Attach SPT Rod Data Sheet DS-17

Equipment was found to be

☒ in tolerance As Received

_____ out of tolerance As Received


☒ in tolerance As Returned

_____ out of tolerance As Returned


Calibration Standards Utilized

1. PDI SPT Calibration Signal Conditioning Unit #000001, verified on 20220909
2. PDI Load Cell #75, Certificate # 22005433-181-00675
3. Capacitec Displacement Sensor #2034, Certificate # 22005433-177-00618
4. Capacitec Displacement Sensor #2040, Certificate # 22005433-177-00618
5. Capacitec Displacement Mainframe #4004-671, Certificate # 22005433-177-00618
7. National Instruments USB-6210 DAQ serial number 159AFDE, Certificate # 22005433-177-00617

Calibration performed by:


Sean Bonner, Technician

Reviewed by:


Robert Sprenger, Product Support Manager

SPT CC-16 Issued 20160425



Quality Assurance for Deep Foundations

SPT Calibration Data Sheet Revision number 20160426
Use Calibration Procedure Number 2016-6, Revision 20160422

SPT Drill Rod Data

Serial Number: 203AWJ ✓ Calibration Date: May 23, 2023

Temperature: 74 Deg F ✓ Humidity: 42%

Calibration performed in accordance with PDI SPT Calibration Procedure 2016-4, Revision 20160422

As Received (circle one): Operational - Malfunctioning - Damaged

Calibration data

Pre-Load: 1. 7226 lbs. 2. 7257 lbs. 3. 7245 lbs.

Total Load: 1. 18750 lbs. 2. 18900 lbs. 3. 18400 lbs.

Common typical theoretical EA values based on SPT Rod Type:
AW: 35400 NW: 43100 or 68100 N3: 70800 BW: 52344


EA Theoretical 35400 EA Measured 35236.75 ✓ Error 0.46%
Within 4% Tolerance: Y / N

Alternative EA verification: Measure wall thickness, calculate area and multiply by 30000.
(Use spreadsheet for calculation)

Calibration values

Channel 1:	As Found: (last cal): 213.1	As Left: 210.82	Within 5% Tolerance: Y / N ✓
Channel 2:	As Found: (last cal): 212.91	As Left: 210.55	Within 5% Tolerance: Y / N ✓
EA:	As Found: (last cal): 35691.1	As Left: 36210.02	Difference: 1.45% ✓

Calibration performed by:


Sean Bonner, Technician

Reviewed by:

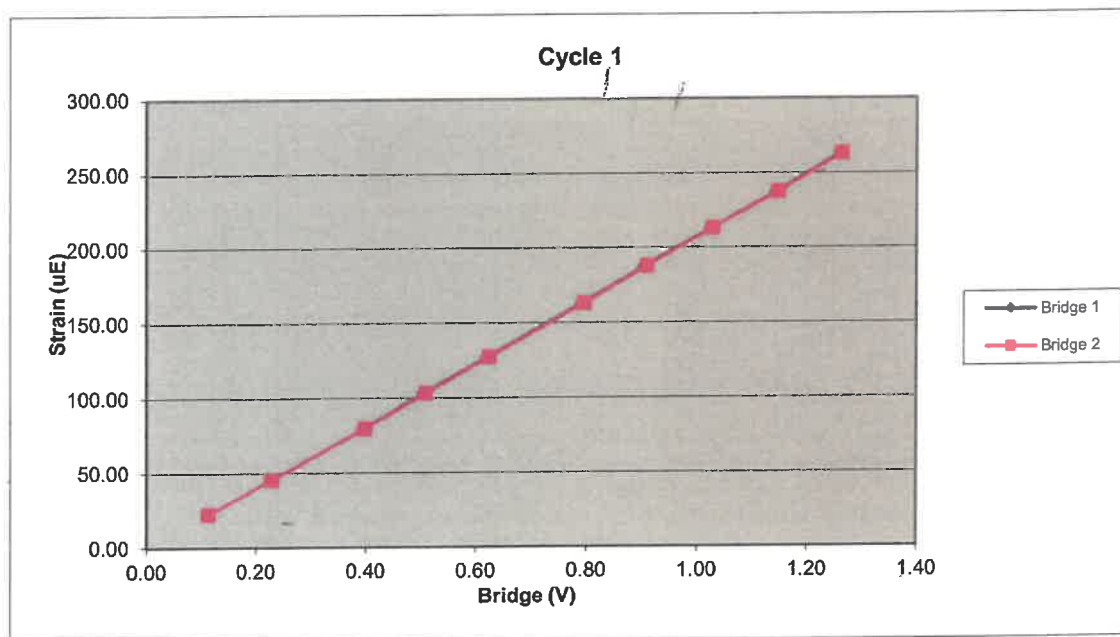

Robert Sprenger, Product Support Manager

SPT DS-17 Issued 20160426

203AWJ		Cycle 1		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	865.79	21.69	0.11	0.11
3	1747.56	44.88	0.23	0.23
4	3032.21	79.18	0.40	0.40
5	3859.50	102.90	0.51	0.51
6	4747.02	127.03	0.62	0.62
7	6064.42	163.03	0.79	0.80
8	6930.50	187.70	0.91	0.91
9	7843.76	212.75	1.03	1.03
10	8759.06	237.12	1.15	1.15
11	9650.58	262.68	1.26	1.26

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7640.67	Force Calibration (lb/V)	7626.60
Offset	3.38	Offset	-0.21
Correlation	0.999999	Correlation	0.999997
Strain Calibration (μ E/V)	209.98	Strain Calibration (μ E/V)	209.60
Offset	-3.04	Offset	-3.14
Correlation	0.999976	Correlation	0.999971

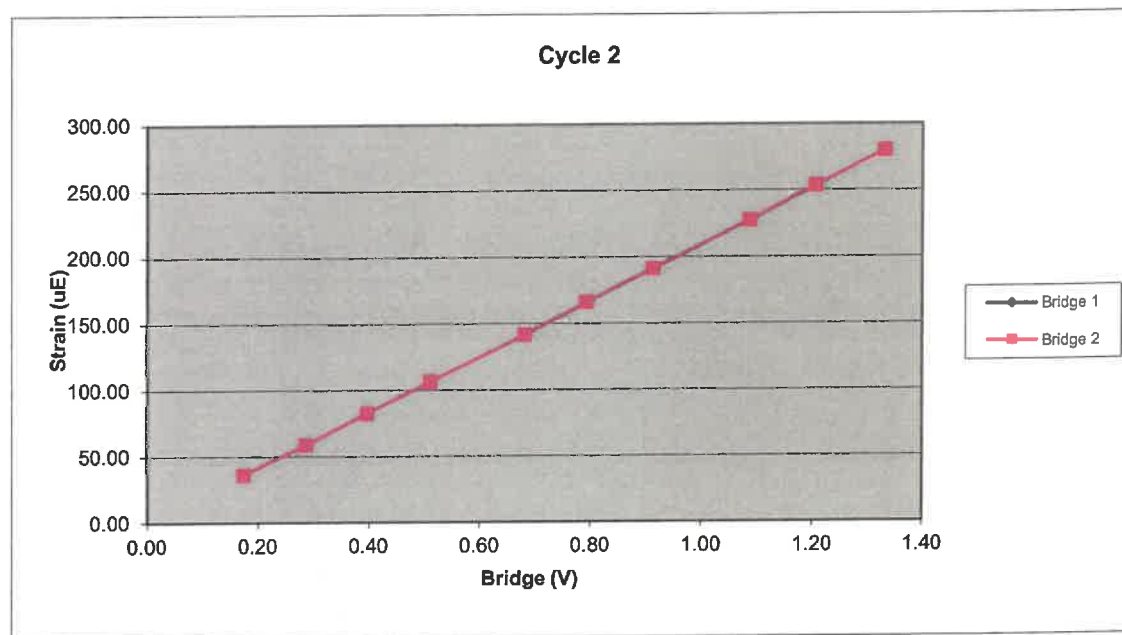
Force Strain Calibration	
EA (Kips)	36385.07
Offset	114.40
Correlation	0.999973



203AWJ		Cycle 2		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1314.77	35.40	0.17	0.17
3	2166.52	58.06	0.28	0.28
4	3009.50	81.68	0.40	0.39
5	3885.33	105.73	0.51	0.51
6	5194.73	140.93	0.68	0.68
7	6053.99	165.43	0.79	0.79
8	6954.28	190.27	0.91	0.91
9	8292.35	226.71	1.09	1.09
10	9204.43	252.85	1.21	1.21
11	10152.30	279.20	1.33	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7627.71	Force Calibration (lb/V)	7632.02
Offset	-7.28	Offset	-3.86
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E/V}$)	210.48	Strain Calibration ($\mu\text{E/V}$)	210.60
Offset	-1.73	Offset	-1.64
Correlation	0.999979	Correlation	0.999984

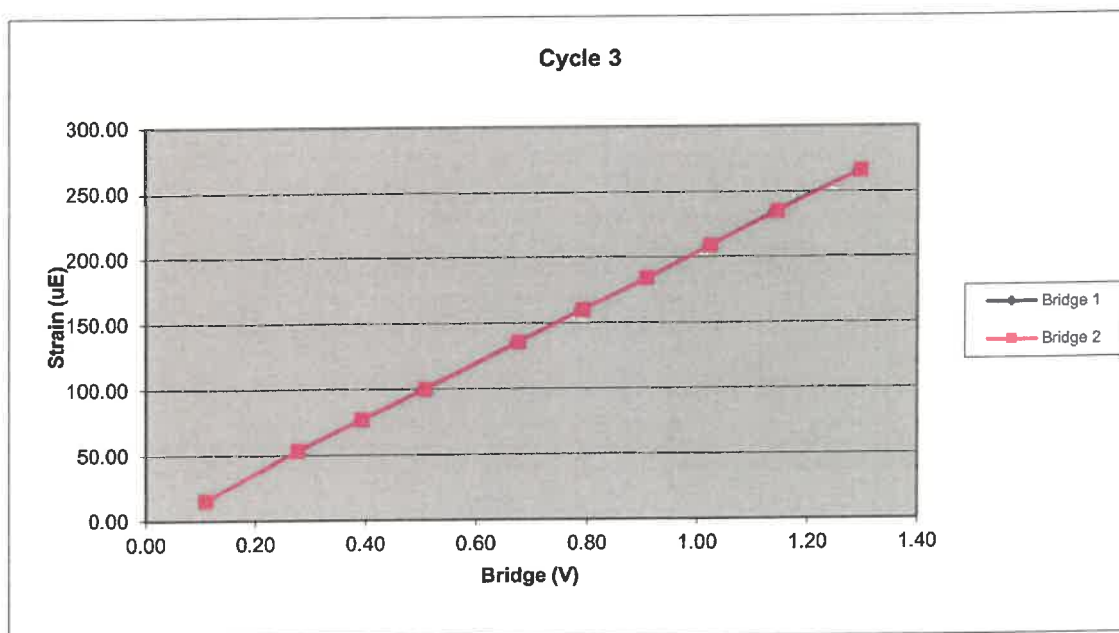
Force Strain Calibration	
EA (Kips)	36237.46
Offset	55.75
Correlation	0.999983



203AWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	816.08	14.67	0.11	0.11
3	2104.72	52.88	0.28	0.28
4	2987.66	76.61	0.39	0.39
5	3851.02	99.83	0.50	0.51
6	5140.54	135.37	0.67	0.67
7	6035.47	159.90	0.79	0.79
8	6921.92	183.83	0.91	0.91
9	7791.12	208.45	1.02	1.02
10	8726.70	234.43	1.14	1.14
11	9881.90	265.78	1.30	1.30

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7634.36	Force Calibration (lb/V)	7626.44
Offset	-0.70	Offset	-7.63
Correlation	0.999997	Correlation	0.999999
Strain Calibration ($\mu\text{E/V}$)	210.43	Strain Calibration ($\mu\text{E/V}$)	210.21
Offset	-6.40	Offset	-6.59
Correlation	0.999951	Correlation	0.999954

Force Strain Calibration	
EA (Kips)	36276.49
Offset	231.85
Correlation	0.999963




Bridge Excitation (V) 5
Shunt Resistor (ohm) 60.4k

Calibration Factors	203AWJ		
Bridge 1 ($\mu\text{E/V}$)	210.30	Bridge 2 ($\mu\text{E/V}$)	210.14
EA Factor (Kips)	36299.67	Area (in^2)	1.21

Calibrated by:

Calibrated Date:



5/23/2023

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.



Quality Assurance for Deep Foundations

PDI Certificate of Calibration

PDI Accelerometer Calibration

Model Kicher Serial # K4664

*Reviewed
6/5/2023
JMK*

Cal Date: 24May2023

Cal Due: 23May2025

Temperature: 73.4 deg. F

Humidity 41%

Calibrated at
Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, OH 44139

Manufactured by Pile Dynamics, Inc.

Procedure used: MAC Accelerometer Calibration Procedure 8G-4 Revision # 20210801

Equipment was found to be:

☒ in tolerance As Received

☐ out of tolerance As Received

☒ in tolerance As Returned

☐ out of tolerance As Returned

PDI Calibration: 371.8 mv/5000g

Calibration Standards Utilized

MAC PDA 8G, serial number 5161 LE, verified on 22 December 2022

Calibration performed by:

William Johnson

William Johnson, Technician

Reviewed by:

Bob Sprenger

Bob Sprenger, Product Support Manager

30725 Aurora Road • Cleveland, Ohio 44139 USA • +1-216-831-6131 • Fax +1-216-831-0916

E-mail: info@pile.com • www.pile.com

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 24May2023

Serial No: K4664 Temperature: 73.4 °C

Model: PR Humidity: 41%

Calibrated on: Channel 3 on 8G 5161 LE

Ref Acc 1: 72517! Cal on: 24Mar2022
1049 g's/volt

Ref Acc 2: 72505! Cal on: 24Mar2022
1035 g's/volt

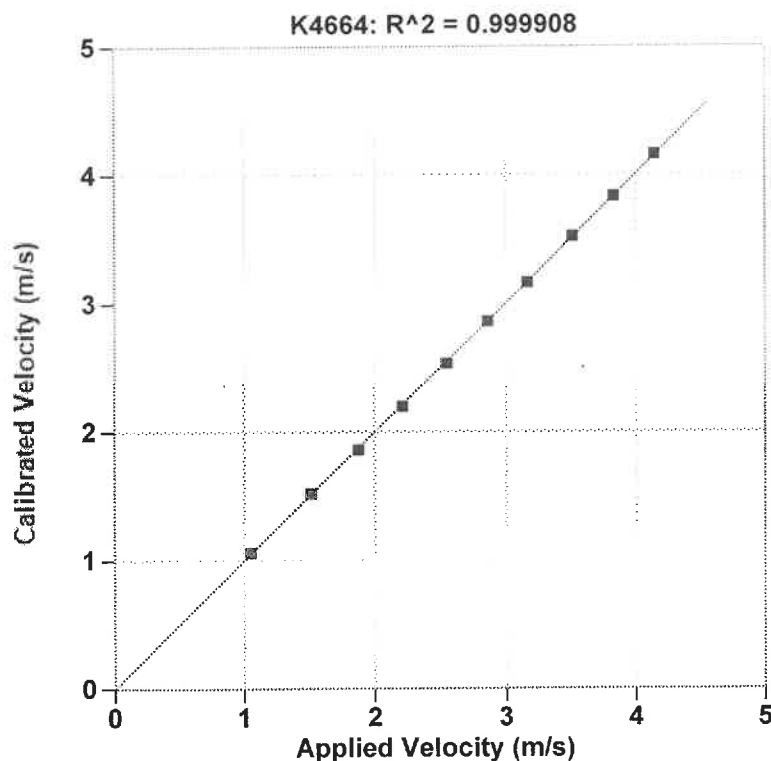
PDA CALIBRATION FACTOR

371.8 mv/5000g
(74.4 μ v/g)
R²: 0.999908 [Chip programmed]

Operator: William Johnson

William Johnson
Signed

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).



Reference Velocity m/s	S/N K4664 Velocity m/s
1.050	1.058
1.517	1.521
1.873	1.860
2.209	2.198
2.548	2.532
2.860	2.859
3.163	3.161
3.512	3.521
3.832	3.832
4.145	4.157

Maximum Acceleration: 913 g's



Quality Assurance for Deep Foundations

PDI Certificate of Calibration

PDI Accelerometer Calibration

Model Kicher Serial # K4665

*Reviewed
JUL
6/5/2023*

Cal Date: 24May2023

Cal Due: 23May2025

Temperature: 73.4 deg. F

Humidity 41%

Calibrated at
Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, OH 44139

Manufactured by Pile Dynamics, Inc.

Procedure used: MAC Accelerometer Calibration Procedure 8G-4 Revision # 20210801

Equipment was found to be:

☒ in tolerance As Received

☐ out of tolerance As Received

☒ in tolerance As Returned

☐ out of tolerance As Returned

PDI Calibration: 371.2 mv/5000g

Calibration Standards Utilized

MAC PDA 8G, serial number 5161 LE, verified on 22 December 2022

Calibration performed by:

William Johnson, Technician

Reviewed by:

Bob Sprenger, Product Support Manager

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 24May2023

Serial No: K4665 Temperature: 73.4 °C

Model: PR Humidity: 41%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

371.2 mv/5000g
(74.2 μ v/g)
R²: 0.999920 [Chip programmed]

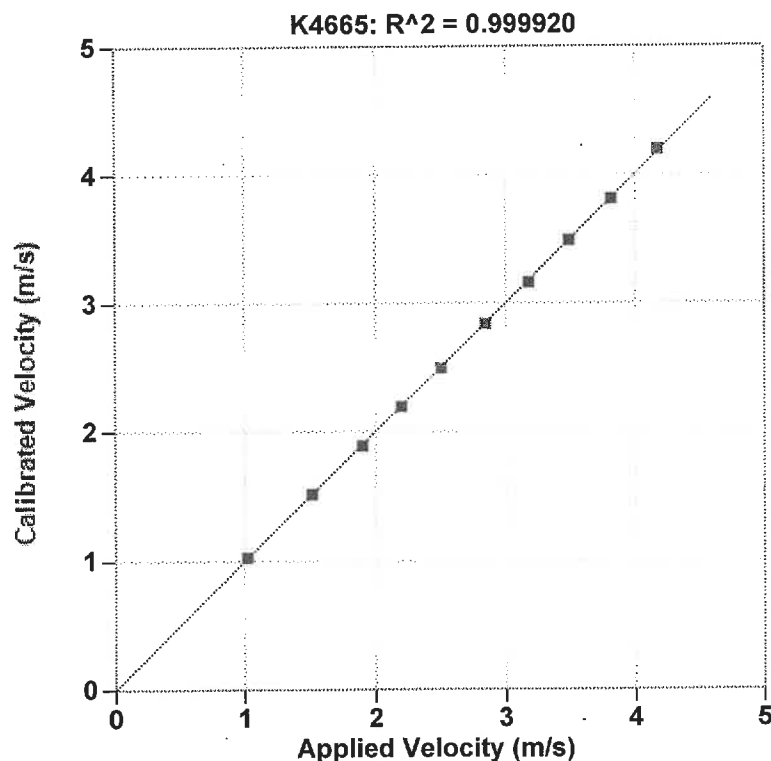
Operator: William Johnson

Ref Acc 1: 72517! Cal on: 24Mar2022
1049 g's/volt

Ref Acc 2: 72505! Cal on: 24Mar2022
1035 g's/volt

Reference accelerometer calibrations are traceable to
the United States National Institute of Standards and
Technology (NIST).

William Johnson
Signed



Reference Velocity m/s	S/N K4665 Velocity m/s
1.019	1.030
1.514	1.517
1.897	1.888
2.196	2.194
2.500	2.495
2.845	2.840
3.176	3.164
3.488	3.490
3.815	3.813
4.176	4.195

Maximum Acceleration: 918 g's

SPT Energy Evaluation Form

Document Control Number: CRN-23-0040-00

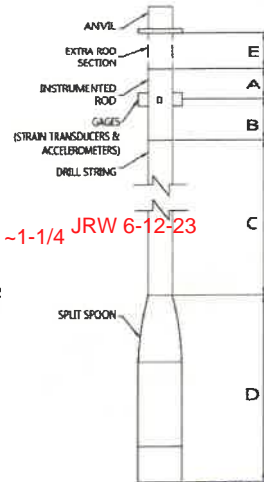
Project: TVA CRN GEOTECHNICAL INV. OAK RIDGE, TN Date (s): 6/8/23
 Project No.: 22350835A Weather: CLEAR 70°
 Boring No.: TEST HOLE 2 Drill Rod Type: 5' LONG AWS

On-site Personnel

Drilling Company: FED SE ME
 Rig Oper./Helper: F. CRANE / A. BLANKENSHIP
 Engr/Geologist: S. BAINES
 PDA Operator: J. WILLIAMSON

Rod Info

(E) Rod Length Above Instr. Rod (if applicable): 0.40 ft
 (A) + (B) Instr. Rod Length: 2.10 ft
 (A + E) Impact to Gages: 2.50 ft
 (B) Instr. Rod Below Gages: 0.75 ft
 (D) Spoon Length: 2.84 ft
 Instr. Rod Inside Dia.: 1-1/8 in. ~1-1/4 JRW 6-12-23
 Instr. Rod Outside Dia.: 1-7/8 in.
 Instr. Rod Area: 1.21 in²
 Instr. Rod S/N: 203 AWS
 PDA Make/Model: POI/PAX
 PDA Serial No.: 3733L
 Calib. Pulse Test (y/n): Y



Rig/Hammer Info

Drill Rig Make/Model: DIEDERICH D-50
 Carrier Type: TRACIL
 Rig Serial No.: 316
 Hammer Type/Model: AUTO / DIEDERICH
 Hammer Serial No.: 316 316 SNW 6/8/23
 Hammer Drop System: CHAIN LIFT / FREE FALL
 Lubrication Condition: GREASED PER MAN. RECS.
 Manufacturer Recommended Operation Rate (bpm): 50-55
 Drop Height from calibration record (in.): 30.0 JRW 6/12/23
 Calibration hammer weight (lbs): 139.66 JRW 6/12/23
 Anvil Dimension (in.) (ft): 2.4 JRW 6/12/23
 Drilling Method: 3-1/4" HSA

Gage Information

Gage	Serial No.	Calibration Date
Accel.	A3	<u>K4664</u>
	A4	<u>L4665</u>
Strain	F3	<u>203 AWS-1</u>
	F4	<u>203 AWS-2</u>

Date of Test	Test Depth Increment (ft)	Test Time Start / Stop (Military)	Length of Drill String (ft)	(LE) Length Below Gages (ft)	Avg. Meas. Rate (BPM)	SPT Blow Counts					Drop Height in Tolerance (y/n)
						6 in.	12 in.	18 in.	extra	N-value	
<u>6/8/23</u>	<u>28.5-30.0</u>	<u>11:57</u>	<u>30</u>	<u>37.59</u>	<u>~50</u>	<u>11</u>	<u>17</u>	<u>21</u>	<u>1</u>	<u>38</u>	<u>Y</u>
	<u>31.0-32.0</u>	<u>12:09</u>	<u>32</u>	<u>35.59</u>	<u>~50</u>	<u>5</u>	<u>14</u>	<u>19</u>	<u>0</u>	<u>33</u>	<u>Y</u>
	<u>33.0-34.0</u>	<u>12:12</u>	<u>34</u>	<u>38.54</u>	<u>~50</u>						
	<u>35.0-36.0</u>	<u>13:12</u>		<u>37.54</u>	<u>~50</u>	<u>4</u>	<u>11</u>	<u>16</u>	<u>0</u>	<u>27</u>	<u>Y</u>
	<u>36.0-37.0</u>	<u>13:22</u>	<u>36</u>	<u>39.59</u>	<u>~50</u>	<u>7</u>	<u>12</u>	<u>19</u>	<u>0</u>	<u>31</u>	<u>Y</u>
	<u>38.5-40.0</u>	<u>13:37</u>	<u>38-39</u>	<u>42.59</u>	<u>~51</u>	<u>5</u>	<u>11</u>	<u>17</u>	<u>0</u>	<u>28</u>	<u>Y</u>

Comments: (1) If there are any nonconformances or deficiencies identified during the testing, immediately pause the drilling and testing activities and notify the Site Manager and describe them in the space below; (2) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. verticality, weather, or lubrication between trials); (3) Note any changes in rod diameter along drill string and record locations of short rod sections; (4) Prepare a sketch or take a picture of the instrumented drill rod assembly and indicate the relative location and orientation of the strain gauges, accelerometers, and LE Datum; (5) Note: Identify all attached pages, including photographs, with the Project No., Boring No., and date.

28.5-30.0 FT SAMPLE - FIRST SEVERAL BLOWS HAD LOW ENERGY (50-60%) REMAINING
BLOWS OF ALL OTHER DATA HAD ENERGY VALUES RANGING FROM APPROX. 85-95%
DRILLER STATED THIS IS LIKELY DUE TO HYDRAULIC FLUID IN HAMMER WARMING UP,
REG ALSO ALSO HAD RECENT MAINTENANCE, SYSTEM COULD HAVE HAD AIR
BUBBLES THAT WORKED ITSELF OUT, EACH SAMPLE CLASSIFIED AS A
LEAN CLAY (CL).
 Note: Measurements shall be made to nearest 0.01 ft or 1/8 in. as applicable.

Prepared By (print/signature): Joseph Williamson
 SPT Energy Lead

Date: 6/13/23

Date

Reviewed By (print/signature): [Signature]
 Site Manager

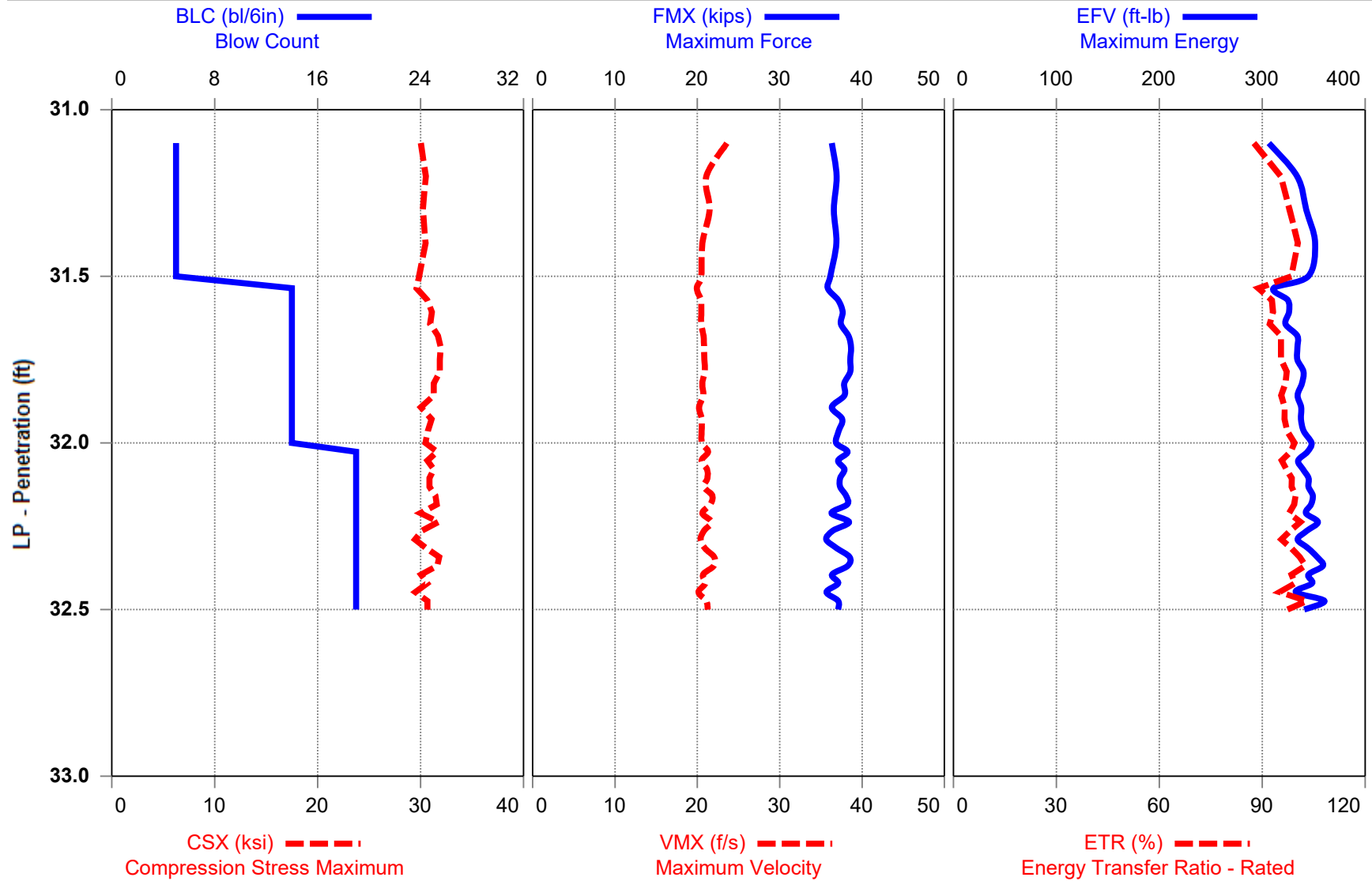
Date: 06/14/2023

Date

JRW
 6/9/23
 See note
 below.



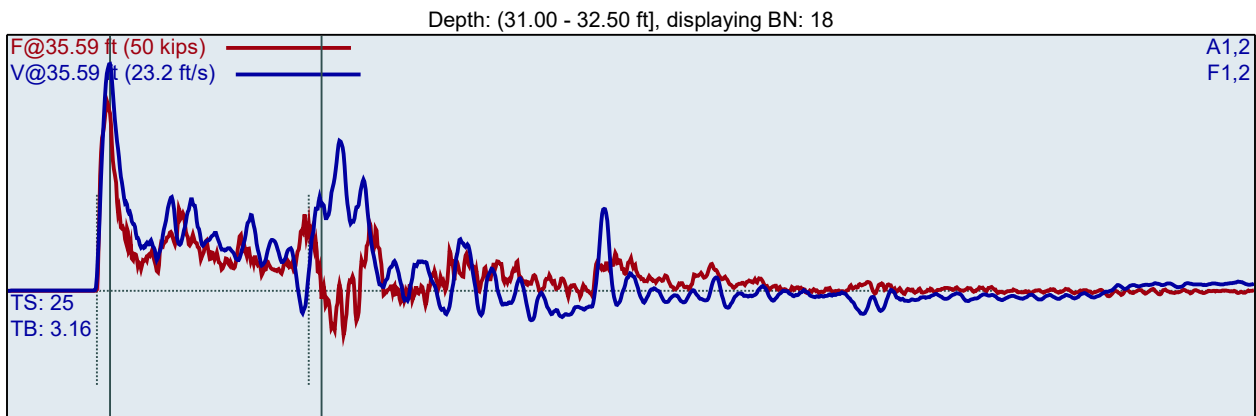
**DIEDRICH D-50 (SN 316) - 31.0-32.5 FEET
TEST HOLE 2**



DIEDRICH D-50 (SN 316)
JRW
TEST HOLE 2

SN 316 SPT Energy Measurements
Interval start: 6/8/2023

AR: 1.21 in² SP: 0.492 k/ft³
LE: 35.59 ft EM: 30000 ksi
WS: 16807.9 ft/s



F1 : [203 AWJ-1] 210.3 PDICAL (1) FF1
F2 : [203 AWJ-2] 210.14 PDICAL (1) FF1

A1 (PR): [K4664] 371.8 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 371.2 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	LP ft	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	5	31.10	1.9	36	23.6	1.88	30.0	1.22	306	87.5
2	5	31.20	49.3	37	21.1	1.24	30.5	1.20	334	95.4
3	5	31.30	49.9	37	21.5	1.22	30.2	1.20	343	97.9
4	5	31.40	50.8	37	20.6	1.20	30.5	1.19	351	100.4
5	5	31.50	51.0	36	20.5	1.20	29.9	1.20	345	98.4
6	14	31.54	50.2	36	19.9	0.63	29.6	0.42	311	88.8
7	14	31.57	50.4	37	20.5	0.57	30.7	0.43	325	92.8
8	14	31.61	50.5	38	20.5	0.53	31.1	0.43	326	93.1
9	14	31.64	50.3	37	20.5	0.50	30.9	0.43	323	92.2
10	14	31.68	50.0	38	20.7	0.51	31.7	0.43	334	95.4
11	14	31.71	50.4	39	20.8	0.47	32.0	0.41	334	95.4
12	14	31.75	50.3	39	20.9	0.44	31.9	0.43	334	95.4
13	14	31.79	50.1	39	20.9	0.46	31.9	0.43	340	97.1
14	14	31.82	50.0	38	20.6	0.46	31.3	0.39	339	96.7
15	14	31.86	50.8	38	20.7	0.45	31.3	0.44	334	95.5
16	14	31.89	50.3	36	20.2	0.46	30.0	0.39	338	96.5
17	14	31.93	51.0	38	20.5	0.44	31.1	0.43	338	96.4
18	14	31.96	49.6	37	20.5	0.44	30.7	0.42	340	97.2
19	14	32.00	50.5	37	20.6	0.46	30.5	0.43	348	99.3
20	19	32.03	50.1	38	21.3	0.41	31.6	0.32	344	98.2
21	19	32.05	50.8	37	20.5	0.41	30.7	0.32	335	95.6
22	19	32.08	49.8	38	21.2	0.42	31.3	0.31	339	97.0
23	19	32.11	50.9	37	21.2	0.42	30.9	0.32	345	98.6
24	19	32.13	49.2	37	20.8	0.44	30.9	0.31	345	98.5
25	19	32.16	50.2	38	21.8	0.40	31.4	0.32	349	99.7
26	19	32.18	50.2	38	21.6	0.40	31.6	0.32	347	99.3
27	19	32.21	50.3	36	20.6	0.41	30.0	0.31	342	97.8

28	19	32.24	49.5	38	21.7	0.40	31.7	0.32	354	101.1
29	19	32.26	50.3	36	20.8	0.41	30.1	0.31	344	98.1
30	19	32.29	50.5	36	20.4	0.39	29.5	0.31	334	95.5
31	19	32.32	49.6	37	20.9	0.40	30.5	0.32	345	98.5
32	19	32.34	50.7	38	22.0	0.40	31.8	0.32	353	100.9
33	19	32.37	49.9	38	22.0	0.40	31.6	0.32	359	102.5
34	19	32.39	50.3	36	20.7	0.39	30.0	0.31	345	98.5
35	19	32.42	50.0	37	21.0	0.38	30.7	0.32	348	99.5
36	19	32.45	50.6	36	20.1	0.37	29.5	0.32	333	95.0
37	19	32.47	49.8	37	21.1	0.40	30.7	0.32	360	102.9
38	19	32.50	49.8	37	21.3	0.36	30.7	0.32	341	97.3
		Average	50.2	37	20.9	0.44	30.9	0.36	340	97.2
		Std Dev	0.4	1	0.5	0.06	0.7	0.05	10	2.9
		Maximum	51.0	39	22.0	0.63	32.0	0.44	360	102.9
		Minimum	49.2	36	19.9	0.36	29.5	0.31	311	88.8
N-value: 33										

Sample Interval Time: 44.14 seconds.



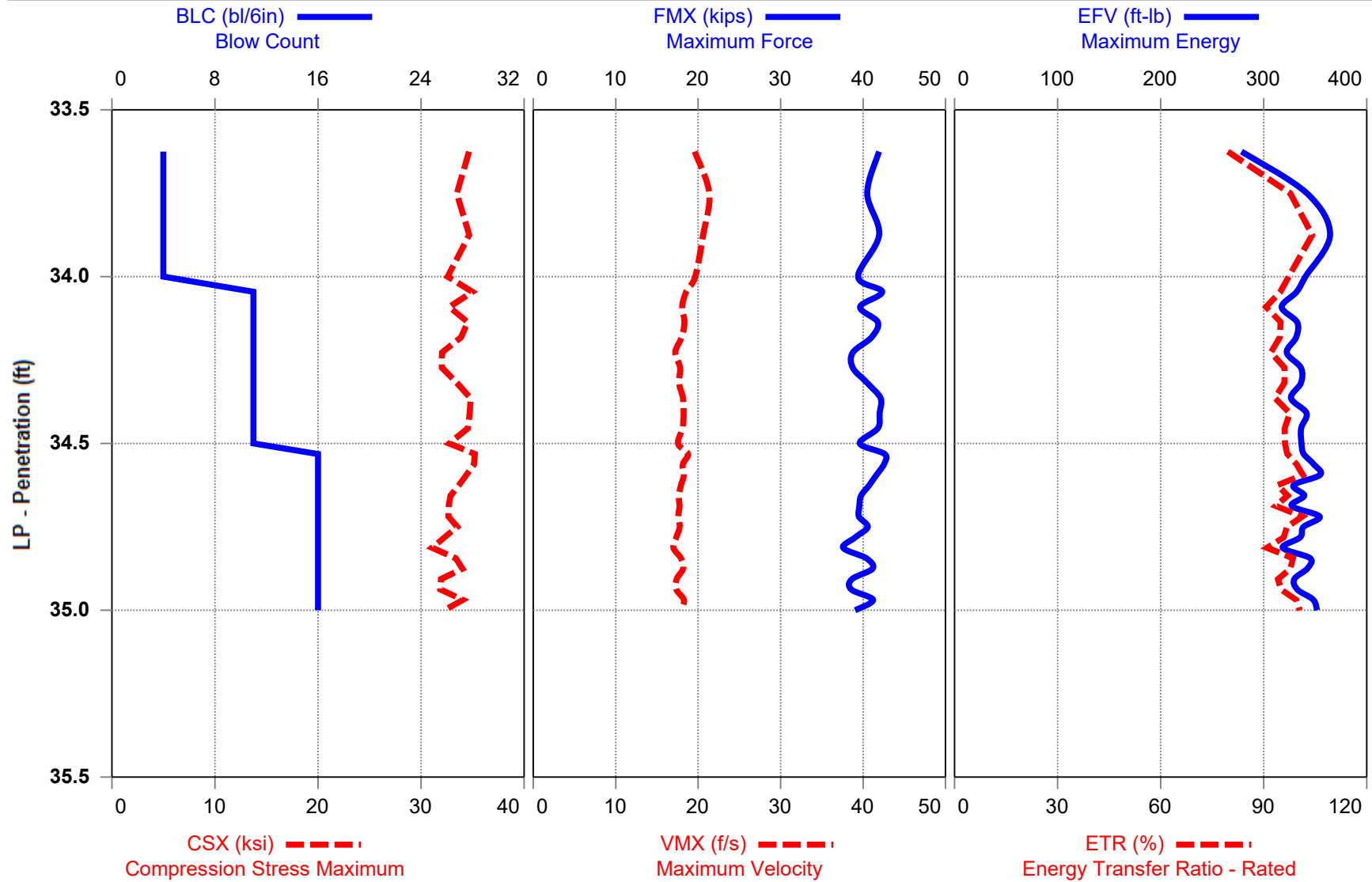
Printed: 13-June-2023

S&ME, Inc. - PDIPLOT2 Ver 2022.1.62.0 - Case Method & iCAP® Results

Test started: 08-June-2023



**DIEDRICH D-50 (SN 316) - 33.5-35.0 FEET
TEST HOLE 2**



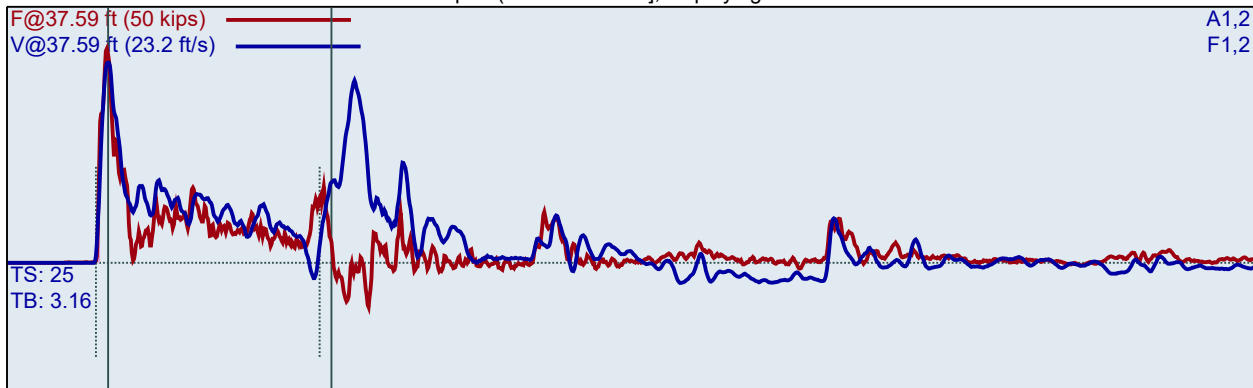
DIEDRICH D-50 (SN 316)
JRW
TEST HOLE 2

SN 316 SPT Energy Measurements
Interval start: 6/8/2023

AR: 1.21 in²
LE: 37.59 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi

Depth: (33.50 - 35.00 ft), displaying BN: 14



F1 : [203 AWJ-1] 210.3 PDICAL (1) FF1
F2 : [203 AWJ-2] 210.14 PDICAL (1) FF1

A1 (PR): [K4664] 371.8 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 371.2 mv/6.4v/5000g (1) VF1

BL#	BC /6"	LP ft	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	4	33.63	1.9	42	19.6	1.65	34.7	1.48	278	79.5
2	4	33.75	50.3	40	21.4	1.50	33.5	1.50	342	97.7
3	4	33.88	51.2	42	20.6	1.50	34.7	1.50	364	104.1
4	4	34.00	50.7	39	19.7	1.50	32.6	1.50	340	97.2
5	11	34.05	50.4	42	18.5	0.64	35.0	0.55	332	94.8
6	11	34.09	50.7	40	18.1	0.64	32.8	0.55	317	90.7
7	11	34.14	50.4	42	18.3	0.63	34.5	0.54	332	94.9
8	11	34.18	50.4	41	18.0	0.63	33.9	0.54	331	94.7
9	11	34.23	51.3	39	17.2	0.64	32.0	0.55	322	92.1
10	11	34.27	49.7	39	17.8	0.61	32.0	0.55	336	96.0
11	11	34.32	50.8	41	17.7	0.58	33.5	0.54	336	96.0
12	11	34.36	50.9	42	18.2	0.56	34.8	0.54	326	93.2
13	11	34.41	50.0	42	18.2	0.57	34.7	0.54	341	97.6
14	11	34.45	50.6	42	18.1	0.55	34.5	0.54	336	96.1
15	11	34.50	51.2	40	17.6	0.62	32.7	0.55	337	96.2
16	16	34.53	49.6	43	18.8	0.52	35.2	0.37	339	96.8
17	16	34.56	50.4	43	18.1	0.54	35.1	0.37	349	99.6
18	16	34.59	50.3	42	18.3	0.53	34.4	0.37	355	101.4
19	16	34.63	50.7	41	17.9	0.45	33.7	0.38	329	94.0
20	16	34.66	50.7	40	17.7	0.49	32.9	0.37	339	96.9
21	16	34.69	50.0	40	17.7	0.45	32.7	0.37	327	93.5
22	16	34.72	50.3	40	17.6	0.49	32.7	0.38	354	101.2
23	16	34.75	50.4	41	17.8	0.48	33.5	0.37	339	96.7
24	16	34.78	50.6	39	17.4	0.48	32.3	0.37	335	95.8
25	16	34.81	51.1	38	17.0	0.46	31.1	0.37	318	91.0
26	16	34.84	50.0	40	17.9	0.49	33.4	0.37	345	98.5
27	16	34.88	50.8	41	18.2	0.47	34.0	0.37	342	97.7
28	16	34.91	50.3	39	17.4	0.43	31.9	0.37	330	94.2
29	16	34.94	49.7	39	17.4	0.42	31.9	0.37	333	95.0
30	16	34.97	50.7	41	18.3	0.44	34.1	0.37	348	99.5
31	16	35.00	50.1	39	18.0	0.44	32.3	0.37	352	100.5

Average	50.4	40	17.9	0.53	33.4	0.44	336	96.1
Std Dev	0.4	1	0.4	0.07	1.2	0.08	10	2.8
Maximum	51.3	43	18.8	0.64	35.2	0.55	355	101.4
Minimum	49.6	38	17.0	0.42	31.1	0.37	317	90.7

N-value: 27

Sample Interval Time: 35.60 seconds.



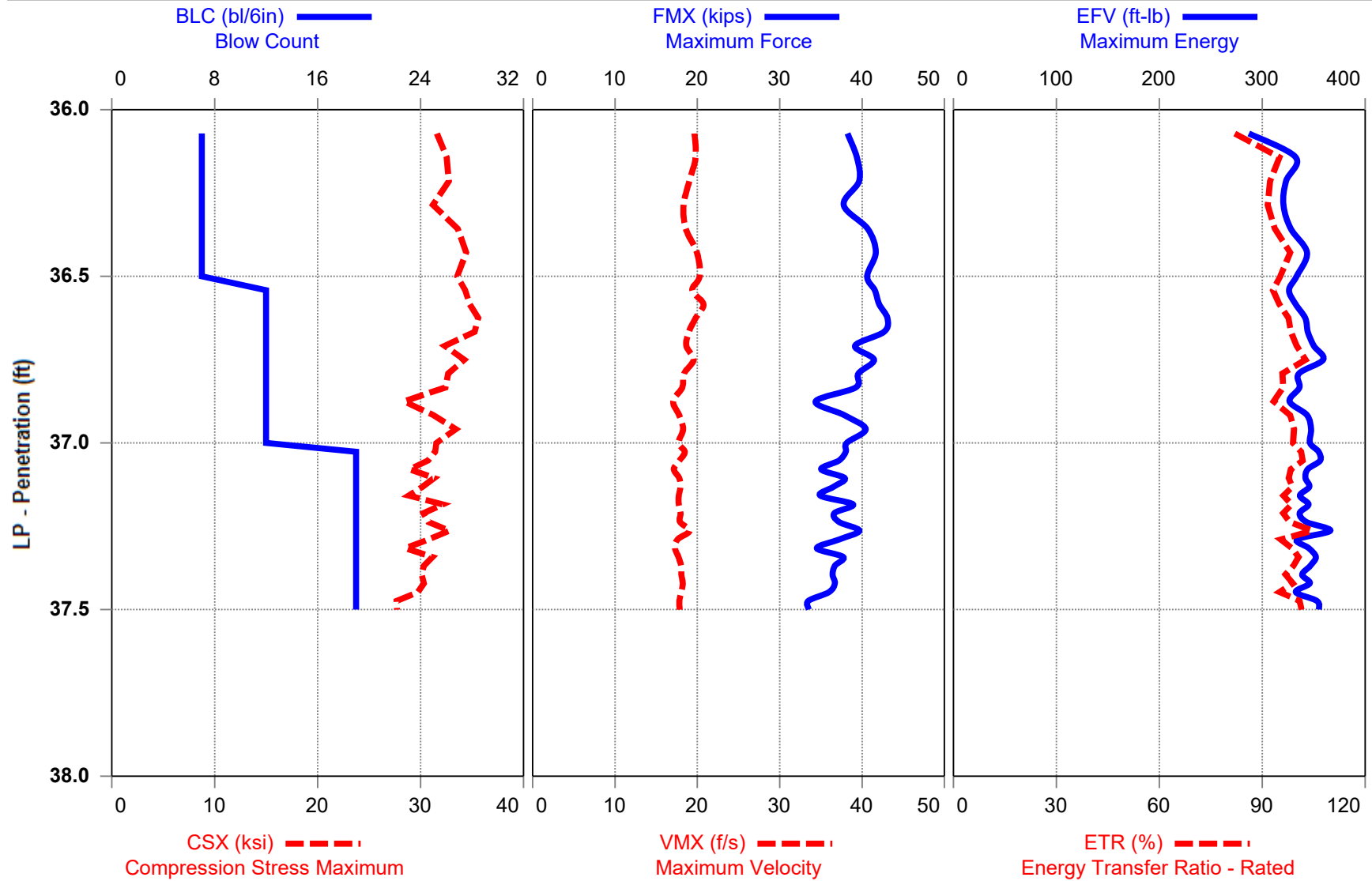
Printed: 13-June-2023

S&ME, Inc. - PDILOT2 Ver 2022.1.62.0 - Case Method & iCAP® Results

Test started: 08-June-2023



**DIEDRICH D-50 (SN 316) - 36.0-37.5 FEET
TEST HOLE 2**



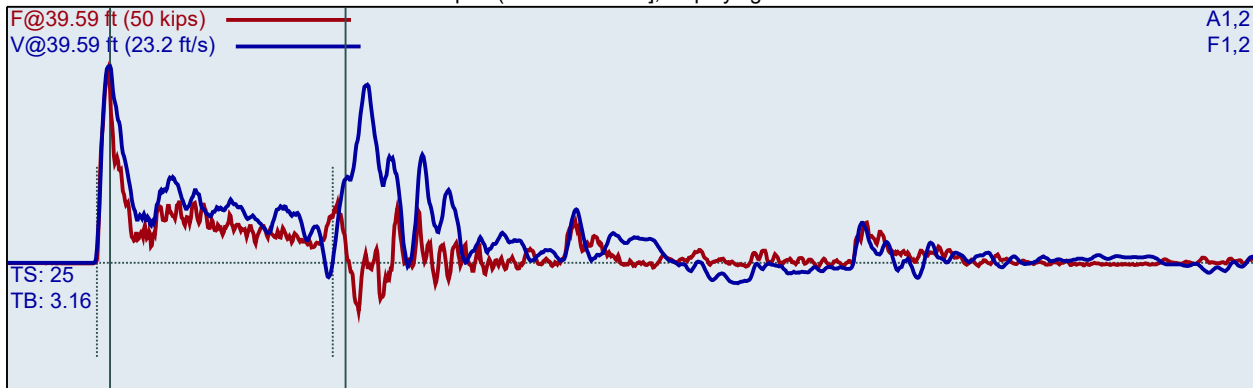
DIEDRICH D-50 (SN 316)
JRW
TEST HOLE 2

SN 316 SPT Energy Measurements
Interval start: 6/8/2023

AR: 1.21 in²
LE: 39.59 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi

Depth: (36.00 - 37.50 ft), displaying BN: 17



F1 : [203 AWJ-1] 210.3 PDICAL (1) FF1
F2 : [203 AWJ-2] 210.14 PDICAL (1) FF1

A1 (PR): [K4664] 371.8 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 371.2 mv/6.4v/5000g (1) VF1

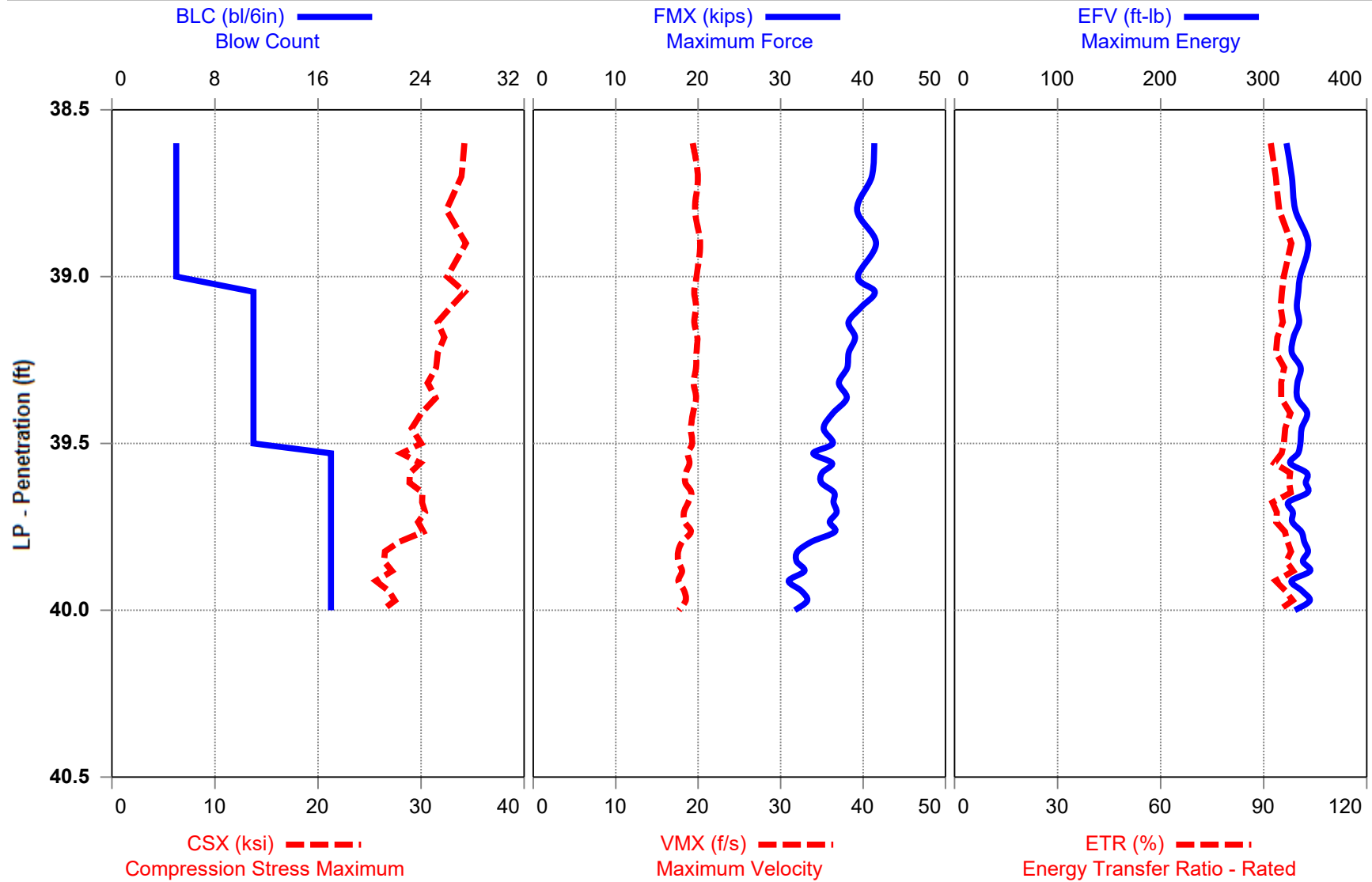
BL#	BC /6"	LP ft	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	7	36.07	1.9	38	19.7	1.10	31.6	0.86	287	82.0
2	7	36.14	50.6	39	19.8	0.97	32.5	0.86	332	95.0
3	7	36.21	51.8	40	19.0	0.88	32.8	0.86	323	92.3
4	7	36.29	49.9	38	18.3	0.87	31.2	0.86	320	91.6
5	7	36.36	50.7	41	18.6	0.86	33.6	0.86	328	93.6
6	7	36.43	50.5	42	20.0	0.86	34.4	0.86	343	98.1
7	7	36.50	50.9	41	20.3	0.86	33.6	0.86	333	95.2
8	12	36.54	50.9	42	19.4	0.63	34.3	0.50	326	93.1
9	12	36.58	50.3	42	20.7	0.71	34.8	0.50	332	94.9
10	12	36.63	50.6	43	19.8	0.74	35.6	0.50	342	97.6
11	12	36.67	50.8	43	19.0	0.72	35.3	0.50	344	98.3
12	12	36.71	50.8	39	18.7	0.70	32.4	0.50	350	100.0
13	12	36.75	49.7	41	19.5	0.68	34.3	0.50	359	102.6
14	12	36.79	51.4	40	18.4	0.65	32.7	0.50	335	95.8
15	12	36.83	51.1	39	18.2	0.68	32.4	0.50	336	96.0
16	12	36.88	50.2	34	17.1	0.58	28.4	0.50	326	93.3
17	12	36.92	50.5	38	17.8	0.64	31.3	0.50	343	98.1
18	12	36.96	50.7	40	18.3	0.57	33.4	0.50	347	99.2
19	12	37.00	51.0	38	17.7	0.62	31.5	0.50	346	98.9
20	19	37.03	50.1	38	18.5	0.55	31.4	0.32	355	101.3
21	19	37.05	51.0	37	17.8	0.54	30.7	0.32	356	101.8
22	19	37.08	51.6	35	17.1	0.58	28.9	0.32	344	98.3
23	19	37.11	50.1	38	17.8	0.51	31.3	0.32	342	97.7
24	19	37.13	50.6	37	18.0	0.53	30.2	0.32	346	98.7
25	19	37.16	50.7	35	17.7	0.49	28.9	0.32	336	96.1
26	19	37.18	50.7	39	17.7	0.48	32.2	0.32	345	98.5
27	19	37.21	51.1	37	18.0	0.45	30.3	0.32	336	96.0
28	19	37.24	50.5	37	17.9	0.46	30.8	0.32	343	98.0
29	19	37.26	49.9	40	19.1	0.50	32.8	0.32	366	104.6
30	19	37.29	51.7	37	17.6	0.44	30.8	0.32	334	95.4
31	19	37.32	50.2	35	17.3	0.46	28.5	0.32	345	98.7

32	19	37.34	50.1	38	17.7	0.47	31.2	0.32	352	100.5
33	19	37.37	51.1	37	18.0	0.44	30.3	0.32	347	99.0
34	19	37.39	50.1	36	18.1	0.38	30.1	0.31	339	96.7
35	19	37.42	51.0	37	18.2	0.45	30.3	0.32	346	98.9
36	19	37.45	50.3	36	18.1	0.38	29.7	0.31	333	95.0
37	19	37.47	50.8	33	17.8	0.54	27.7	0.32	353	100.9
38	19	37.50	51.2	34	17.9	0.53	27.7	0.32	355	101.4
		Average	50.7	38	18.2	0.55	31.3	0.39	344	98.2
		Std Dev	0.5	3	0.8	0.10	2.1	0.09	9	2.6
		Maximum	51.7	43	20.7	0.74	35.6	0.50	366	104.6
		Minimum	49.7	33	17.1	0.38	27.7	0.31	326	93.1
N-value: 31										

Sample Interval Time: 43.73 seconds.



**DIEDRICH D-50 (SN316) - 38.5-40.0 FEET
TEST HOLE 2**



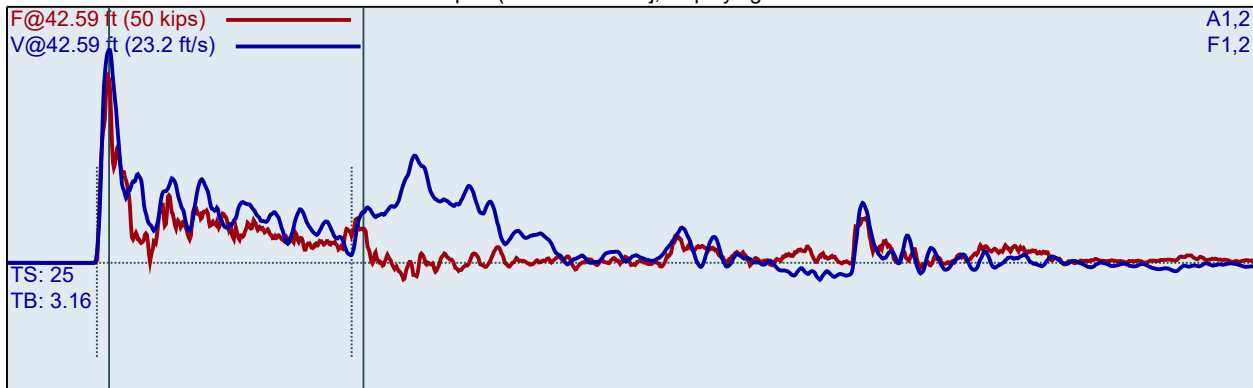
DIEDRICH D-50 (SN 316)
JRW
TEST HOLE 2

SN 316 SPT Energy Measurements
Interval start: 6/8/2023

AR: 1.21 in²
LE: 42.59 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi

Depth: (38.50 - 40.00 ft), displaying BN: 16



F1 : [203 AWJ-1] 210.3 PDICAL (1) FF1
F2 : [203 AWJ-2] 210.14 PDICAL (1) FF1

A1 (PR): [K4664] 371.8 mv/6.4v/5000g (1) VF1
A2 (PR): [K4665] 371.2 mv/6.4v/5000g (1) VF1

BL#	BC /6"	LP ft	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
1	5	38.60	1.9	41	19.4	1.43	34.2	1.20	322	92.0
2	5	38.70	50.6	41	20.0	1.50	33.9	1.20	327	93.5
3	5	38.80	50.4	39	19.6	1.36	32.5	1.20	331	94.5
4	5	38.90	50.4	42	20.2	1.20	34.4	1.20	343	98.0
5	5	39.00	51.7	39	19.8	1.20	32.5	1.20	335	95.8
6	11	39.05	49.9	41	19.5	0.72	34.2	0.53	334	95.3
7	11	39.09	50.6	40	19.8	0.67	32.9	0.54	332	94.9
8	11	39.14	51.3	38	19.5	0.67	31.6	0.55	334	95.5
9	11	39.18	50.8	39	19.9	0.65	32.3	0.55	329	93.9
10	11	39.23	50.6	38	19.8	0.62	31.6	0.54	327	93.5
11	11	39.27	50.7	38	19.7	0.64	31.5	0.55	336	95.9
12	11	39.32	51.4	37	19.5	0.63	30.6	0.54	333	95.0
13	11	39.36	50.5	38	19.7	0.65	31.4	0.54	333	95.0
14	11	39.41	50.5	36	19.4	0.64	30.0	0.55	342	97.7
15	11	39.45	51.0	35	19.1	0.60	29.1	0.53	337	96.2
16	11	39.50	51.0	36	19.3	0.61	30.0	0.55	335	95.8
17	17	39.53	50.7	34	18.7	0.61	28.1	0.36	333	95.2
18	17	39.56	50.8	36	19.0	0.55	29.9	0.35	326	93.0
19	17	39.59	50.8	35	18.5	0.58	28.9	0.38	342	97.6
20	17	39.62	50.3	35	18.5	0.57	28.9	0.34	341	97.4
21	17	39.65	50.7	36	19.2	0.54	30.1	0.36	342	97.8
22	17	39.68	50.8	36	18.8	0.48	30.1	0.36	324	92.5
23	17	39.71	50.6	37	18.3	0.50	30.4	0.35	328	93.8
24	17	39.74	50.4	36	18.4	0.49	29.7	0.36	328	93.6
25	17	39.76	50.0	37	19.1	0.50	30.2	0.35	337	96.2
26	17	39.79	50.8	34	18.1	0.51	27.9	0.36	339	96.9
27	17	39.82	50.8	32	17.6	0.55	26.5	0.35	343	98.0
28	17	39.85	50.5	32	17.6	0.52	26.4	0.35	338	96.5
29	17	39.88	49.8	33	18.0	0.53	27.2	0.35	345	98.6
30	17	39.91	51.1	31	17.6	0.49	25.6	0.35	327	93.4
31	17	39.94	50.5	33	18.3	0.50	26.9	0.36	337	96.3

32	17	39.97	50.3	33	18.5	0.51	27.5	0.35	345	98.4
33	17	40.00	51.3	32	17.7	0.52	26.2	0.35	330	94.3
		Average	50.7	36	18.8	0.57	29.5	0.43	335	95.7
		Std Dev	0.4	3	0.7	0.07	2.1	0.09	6	1.7
		Maximum	51.4	41	19.9	0.72	34.2	0.55	345	98.6
		Minimum	49.8	31	17.6	0.48	25.6	0.34	324	92.5
N-value: 28										

Sample Interval Time: 37.81 seconds.

Summary of SPT Test Results

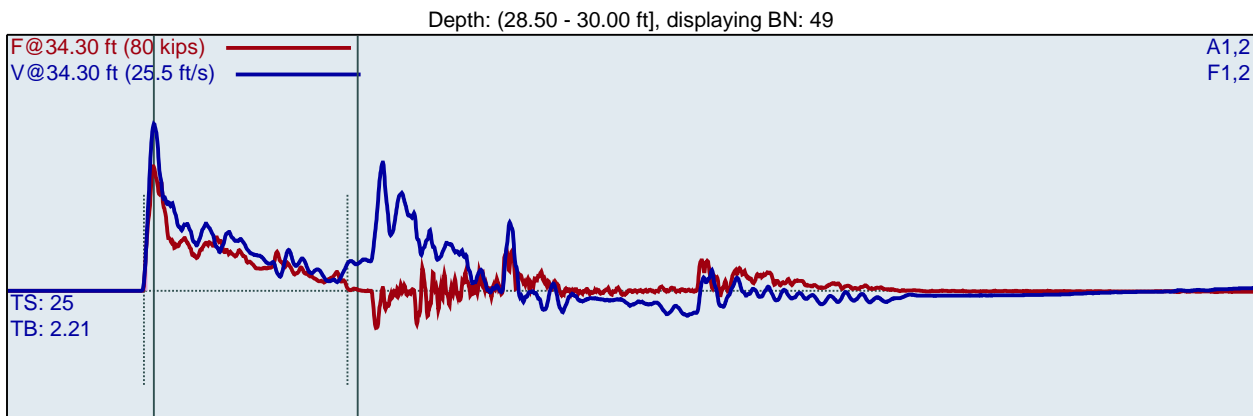
Project: DIEDRICH D-50 (SN 316), Test Date: 6/8/2023

BPM: Blows/Minute										CSX: Compression Stress Maximum			
FMX: Maximum Force										DFN: Final Displacement			
VMX: Maximum Velocity										EFV: Maximum Energy			
DMX: Maximum Displacement										ETR: Energy Transfer Ratio - Rated			
Instr. Length ft	Blows Applied /6"	Start Depth ft	Final Depth ft	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
35.59	5-14-19	31.00	32.50	33	53	50.2	37	20.9	0.44	30.9	0.36	340	97.2
37.59	4-11-16	33.50	35.00	27	43	50.4	40	17.9	0.53	33.4	0.44	336	96.1
39.59	7-12-19	36.00	37.50	31	50	50.7	38	18.2	0.55	31.3	0.39	344	98.2
42.59	5-11-17	38.50	40.00	28	45	50.7	36	18.8	0.57	29.5	0.43	335	95.7
Overall Average Values:						50.5	38	19.0	0.52	31.2	0.40	339	96.8
Standard Deviation:						0.5	3	1.3	0.09	2.1	0.09	10	2.7
Overall Maximum Value:						51.7	43	22.0	0.74	35.6	0.55	366	104.6
Overall Minimum Value:						49.2	31	17.0	0.36	25.6	0.31	311	88.8

CME-550X SN 299403
JRW
TEST HOLE B

ANNUAL ENERGY MEASUREMENTS
Interval start: 1/3/2024

AR: 1.76 in² SP: 0.492 k/ft³
LE: 34.30 ft EM: 30000 ksi
WS: 16807.9 ft/s



F1 : [102 BW-1] 216.4 PDICAL (1) FF1
F2 : [102 BW-2] 217.5 PDICAL (1) FF1

A1 (PR): [K10181] 394.1 mv/6.4v/5000g (1) VF1
A2 (PR): [K10182] 380.7 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
28.54	1	14	1.9	37	18.2	0.76	20.8	0.43	308	88.1
28.57	2	14	59.7	41	18.7	0.65	23.0	0.43	322	91.9
28.61	3	14	56.6	39	17.7	0.59	22.4	0.43	320	91.3
28.64	4	14	56.7	39	17.0	0.56	22.4	0.43	317	90.6
28.68	5	14	56.7	40	17.6	0.55	22.8	0.43	322	92.1
28.71	6	14	56.6	40	17.5	0.56	22.8	0.43	319	91.3
28.75	7	14	56.5	39	16.7	0.59	22.0	0.43	318	90.8
28.79	8	14	56.8	38	15.9	0.55	21.6	0.43	311	88.9
28.82	9	14	56.3	40	17.4	0.55	22.8	0.43	318	90.9
28.86	10	14	56.4	40	17.2	0.53	22.7	0.43	320	91.3
28.89	11	14	56.7	38	16.1	0.52	21.8	0.43	313	89.5
28.93	12	14	56.4	38	15.8	0.51	21.5	0.43	313	89.3
28.96	13	14	56.7	39	16.3	0.47	22.1	0.43	314	89.7
29.00	14	14	56.1	38	16.1	0.47	21.8	0.43	314	89.8
29.03	15	17	56.7	38	15.6	0.48	21.5	0.35	314	89.6
29.06	16	17	56.4	39	16.2	0.48	22.4	0.35	314	89.8
29.09	17	17	56.7	38	16.1	0.48	21.3	0.35	311	88.9
29.12	18	17	56.2	40	16.4	0.47	22.8	0.35	318	90.8
29.15	19	17	56.7	40	16.4	0.45	22.5	0.35	314	89.7
29.18	20	17	56.2	40	16.5	0.46	22.5	0.35	317	90.5
29.21	21	17	56.6	41	16.9	0.46	23.0	0.35	318	90.8
29.24	22	17	56.3	38	16.3	0.45	21.6	0.35	312	89.1
29.26	23	17	56.3	36	15.8	0.44	20.7	0.35	306	87.4
29.29	24	17	56.6	38	16.5	0.45	21.7	0.35	313	89.4
29.32	25	17	56.3	39	16.4	0.44	22.0	0.35	316	90.3
29.35	26	17	56.4	40	16.8	0.44	22.4	0.35	316	90.3
29.38	27	17	56.6	40	16.6	0.44	22.5	0.35	316	90.3

29.41	28	17	55.9	39	16.7	0.45	22.4	0.35	321	91.7
29.44	29	17	56.3	38	16.3	0.43	21.4	0.35	311	88.9
29.47	30	17	56.5	39	16.7	0.43	22.3	0.35	319	91.2
29.50	31	17	56.2	39	16.8	0.43	22.4	0.35	318	90.7
29.53	32	20	56.1	36	15.9	0.43	20.4	0.30	307	87.7
29.55	33	20	56.3	39	16.7	0.43	22.3	0.30	320	91.5
29.58	34	20	56.3	38	16.8	0.43	21.5	0.30	317	90.6
29.60	35	20	56.3	38	16.4	0.43	21.7	0.30	317	90.7
29.63	36	20	55.9	38	16.3	0.41	21.7	0.30	308	88.1
29.65	37	20	56.6	41	17.0	0.43	23.1	0.30	325	92.8
29.68	38	20	55.9	40	16.9	0.41	22.9	0.30	322	92.0
29.70	39	20	56.3	41	17.4	0.42	23.5	0.30	327	93.3
29.73	40	20	56.4	41	17.2	0.42	23.4	0.30	322	91.9
29.75	41	20	56.4	38	16.3	0.42	21.6	0.30	315	89.9
29.78	42	20	56.0	39	16.4	0.41	22.2	0.30	317	90.5
29.80	43	20	56.4	37	15.7	0.42	20.9	0.30	313	89.6
29.83	44	20	56.4	37	15.6	0.41	21.0	0.30	315	90.0
29.85	45	20	55.8	41	17.0	0.42	23.4	0.30	327	93.3
29.88	46	20	56.1	41	17.0	0.43	23.2	0.30	326	93.2
29.90	47	20	56.3	40	16.9	0.41	22.9	0.30	317	90.7
29.93	48	20	56.2	35	14.3	0.40	20.1	0.30	304	86.9
29.95	49	20	56.0	39	16.6	0.41	22.1	0.30	316	90.2
29.98	50	20	56.0	38	16.0	0.41	21.4	0.30	317	90.7
30.00	51	20	56.4	38	16.1	0.41	21.6	0.30	310	88.5
Average			56.3	39	16.4	0.43	22.1	0.32	316	90.3
Std Dev			0.2	1	0.6	0.02	0.8	0.03	5	1.5
Maximum			56.7	41	17.4	0.48	23.5	0.35	327	93.3
Minimum			55.8	35	14.3	0.40	20.1	0.30	304	86.9
N-value: 37										

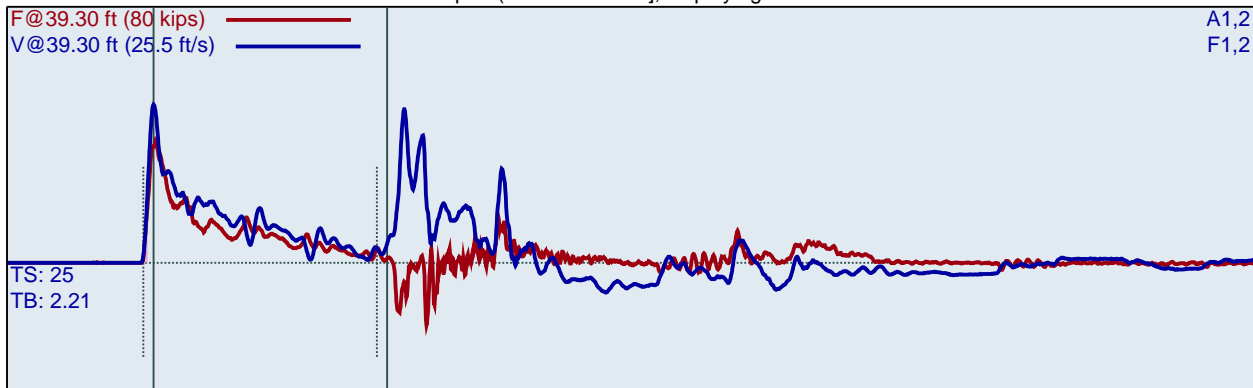
Sample Interval Time: 53.08 seconds.

CME-550X SN 299403
JRW
TEST HOLE B

ANNUAL ENERGY MEASUREMENTS
Interval start: 1/3/2024

AR: 1.76 in² SP: 0.492 k/ft³
LE: 39.30 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (33.50 - 35.00 ft), displaying BN: 36



F1 : [102 BW-1] 216.4 PDICAL (1) FF1
F2 : [102 BW-2] 217.5 PDICAL (1) FF1

A1 (PR): [K10181] 394.1 mv/6.4v/5000g (1) VF1
A2 (PR): [K10182] 380.7 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
33.53	1	17	1.9	38	16.8	0.71	21.4	0.35	319	91.1
33.56	2	17	56.5	36	15.7	0.59	20.2	0.35	308	88.1
33.59	3	17	56.4	38	17.3	0.56	21.8	0.35	320	91.4
33.62	4	17	56.3	40	17.8	0.53	22.6	0.35	329	94.1
33.65	5	17	56.2	38	17.3	0.49	21.6	0.35	315	90.1
33.68	6	17	56.4	40	18.2	0.50	22.5	0.35	329	94.1
33.71	7	17	56.4	41	18.4	0.48	23.3	0.35	333	95.2
33.74	8	17	56.3	38	17.6	0.45	21.7	0.35	319	91.0
33.76	9	17	56.5	40	18.1	0.45	22.8	0.35	327	93.3
33.79	10	17	55.7	39	18.0	0.45	22.2	0.35	324	92.7
33.82	11	17	56.5	37	17.4	0.45	21.1	0.35	319	91.1
33.85	12	17	56.6	40	18.3	0.45	22.8	0.36	326	93.0
33.88	13	17	56.1	41	18.4	0.45	23.2	0.36	329	94.1
33.91	14	17	56.3	41	18.5	0.45	23.4	0.35	332	94.9
33.94	15	17	56.0	39	17.8	0.42	22.2	0.35	316	90.1
33.97	16	17	56.3	38	17.4	0.43	21.7	0.35	323	92.2
34.00	17	17	56.4	39	17.9	0.42	22.1	0.35	321	91.6
34.02	18	21	55.8	38	17.8	0.43	21.7	0.28	323	92.2
34.05	19	21	56.3	38	17.5	0.44	21.6	0.29	319	91.1
34.07	20	21	56.2	38	17.1	0.43	21.7	0.29	319	91.1
34.10	21	21	56.0	37	17.1	0.42	21.1	0.28	309	88.4
34.12	22	21	56.3	35	15.3	0.41	20.0	0.29	305	87.0
34.14	23	21	56.1	36	16.4	0.41	20.2	0.29	303	86.7
34.17	24	21	56.1	37	17.0	0.42	21.3	0.28	313	89.5
34.19	25	21	55.7	39	17.6	0.41	22.0	0.29	321	91.8
34.21	26	21	56.4	39	17.9	0.42	22.1	0.29	324	92.7
34.24	27	21	56.2	38	17.4	0.40	21.6	0.29	312	89.2
34.26	28	21	55.9	37	17.3	0.42	21.1	0.29	319	91.1
34.29	29	21	55.9	41	17.7	0.42	23.2	0.29	329	93.9
34.31	30	21	56.2	40	17.5	0.41	22.7	0.29	322	92.1
34.33	31	21	56.2	42	17.6	0.42	23.7	0.29	326	93.3

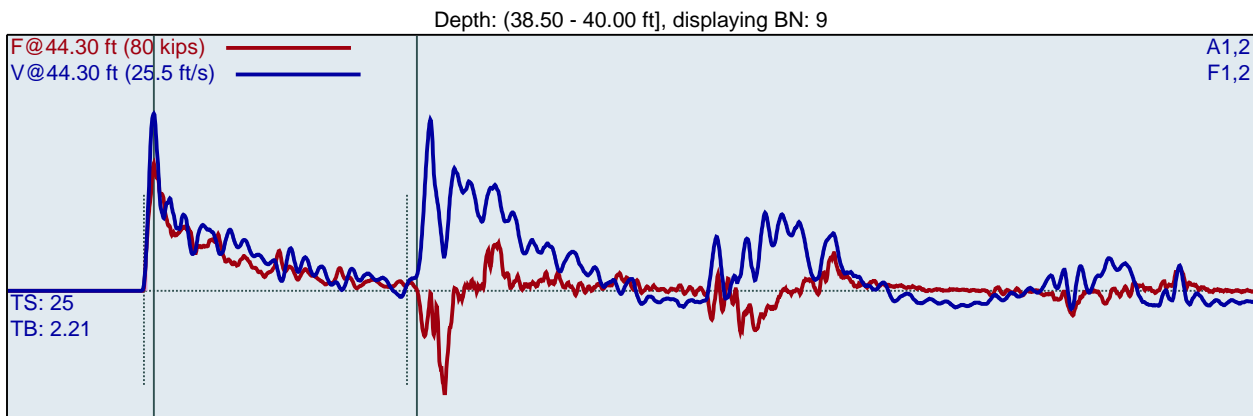
34.36	32	21	56.3	39	16.7	0.42	22.2	0.29	314	89.7
34.38	33	21	56.0	38	16.6	0.41	21.8	0.29	316	90.3
34.40	34	21	56.2	39	16.5	0.41	22.1	0.29	319	91.2
34.43	35	21	56.1	40	17.0	0.41	23.0	0.29	323	92.2
34.45	36	21	55.8	38	15.8	0.41	21.7	0.29	317	90.7
34.48	37	21	56.0	36	16.1	0.40	20.5	0.29	306	87.4
34.50	38	21	56.2	38	15.0	0.41	21.3	0.29	313	89.4
34.52	39	21	55.9	39	16.7	0.41	22.4	0.29	324	92.5
34.55	40	21	56.0	40	17.1	0.41	22.5	0.29	322	91.9
34.57	41	21	56.1	42	17.4	0.41	23.7	0.29	324	92.6
34.60	42	21	56.1	40	17.4	0.41	22.6	0.28	320	91.3
34.62	43	21	56.1	38	16.2	0.40	21.4	0.29	308	88.0
34.64	44	21	55.9	39	15.9	0.41	22.2	0.29	320	91.4
34.67	45	21	56.2	38	16.0	0.40	21.5	0.28	313	89.5
34.69	46	21	56.0	40	17.1	0.41	22.5	0.29	326	93.2
34.71	47	21	56.1	42	17.4	0.39	24.0	0.29	325	92.7
34.74	48	21	55.9	41	17.6	0.41	23.4	0.29	324	92.6
34.76	49	21	55.9	39	16.9	0.41	22.1	0.29	320	91.5
34.79	50	21	56.2	36	15.4	0.41	20.5	0.29	307	87.7
34.81	51	21	56.0	41	17.5	0.42	23.4	0.29	328	93.6
34.83	52	21	55.8	41	17.9	0.41	23.4	0.29	326	93.2
34.86	53	21	56.2	38	16.5	0.40	21.5	0.29	315	90.0
34.88	54	21	55.9	39	17.6	0.41	22.4	0.29	321	91.8
34.90	55	21	56.3	39	17.2	0.41	21.9	0.29	319	91.1
34.93	56	21	56.1	40	17.5	0.41	22.6	0.29	325	92.8
34.95	57	21	56.2	38	17.1	0.41	21.5	0.28	316	90.4
34.98	58	21	55.8	37	16.5	0.41	21.2	0.29	315	90.0
35.00	59	21	56.1	36	16.0	0.40	20.6	0.29	303	86.5
Average			56.1	39	16.9	0.41	22.0	0.29	318	90.8
Std Dev			0.2	2	0.7	0.01	1.0	0.00	7	2.0
Maximum			56.4	42	17.9	0.44	24.0	0.29	329	93.9
Minimum			55.7	35	15.0	0.39	20.0	0.28	303	86.5
N-value: 42										

Sample Interval Time: 61.90 seconds.

CME-550X SN 299403
JRW
TEST HOLE B

ANNUAL ENERGY MEASUREMENTS
Interval start: 1/3/2024

AR: 1.76 in² SP: 0.492 k/ft³
LE: 44.30 ft EM: 30000 ksi
WS: 16807.9 ft/s



F1 : [102 BW-1] 216.4 PDICAL (1) FF1
F2 : [102 BW-2] 217.5 PDICAL (1) FF1

A1 (PR): [K10181] 394.1 mv/6.4v/5000g (1) VF1
A2 (PR): [K10182] 380.7 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
38.58	1	6	1.9	39	17.8	1.21	22.2	1.00	322	91.9
38.67	2	6	56.9	40	17.7	1.07	22.5	1.00	325	92.8
38.75	3	6	57.0	38	17.2	1.02	21.7	1.00	316	90.4
38.83	4	6	57.4	41	18.8	1.05	23.3	1.00	332	95.0
38.92	5	6	57.0	39	17.5	1.04	22.0	1.00	318	90.9
39.00	6	6	57.2	40	18.5	1.01	22.8	1.00	324	92.5
39.04	7	13	57.3	38	17.4	0.78	21.7	0.46	313	89.4
39.08	8	13	57.2	40	17.9	0.72	22.6	0.46	319	91.3
39.12	9	13	57.2	40	17.6	0.65	22.6	0.46	318	90.8
39.15	10	13	57.5	39	17.5	0.62	22.2	0.46	317	90.4
39.19	11	13	57.0	42	18.7	0.58	23.8	0.46	330	94.3
39.23	12	13	57.5	39	17.4	0.54	22.3	0.46	313	89.3
39.27	13	13	57.1	39	17.1	0.52	22.1	0.46	311	89.0
39.31	14	13	57.1	39	16.9	0.50	22.0	0.46	304	87.0
39.35	15	13	57.6	39	17.0	0.48	21.9	0.45	307	87.9
39.38	16	13	56.8	40	17.6	0.50	22.7	0.46	317	90.7
39.42	17	13	57.1	41	18.3	0.49	23.5	0.47	322	92.1
39.46	18	13	57.3	41	17.9	0.49	23.0	0.47	320	91.3
39.50	19	13	57.4	38	16.9	0.49	21.8	0.46	307	87.8
39.54	20	14	57.0	40	17.7	0.47	22.7	0.43	317	90.7
39.57	21	14	57.1	38	16.9	0.49	21.6	0.43	311	88.8
39.61	22	14	57.4	40	17.9	0.47	22.8	0.43	314	89.8
39.64	23	14	57.2	39	16.9	0.45	22.0	0.43	309	88.2
39.68	24	14	57.1	39	17.1	0.52	22.0	0.43	315	89.9
39.71	25	14	57.2	41	18.0	0.49	23.2	0.43	322	91.9
39.75	26	14	57.1	40	17.7	0.48	22.8	0.43	316	90.2
39.79	27	14	57.1	40	17.7	0.49	22.6	0.43	317	90.6
39.82	28	14	57.0	40	17.5	0.51	22.7	0.43	319	91.3
39.86	29	14	57.4	39	17.4	0.47	22.3	0.43	312	89.0
39.89	30	14	57.1	41	18.3	0.50	23.4	0.43	325	92.9
39.93	31	14	56.9	40	17.5	0.48	22.5	0.43	316	90.3

39.96	32	14	57.2	42	18.8	0.48	24.0	0.43	329	94.1
40.00	33	14	57.2	40	17.6	0.44	22.5	0.43	316	90.4
Average			57.2	40	17.6	0.52	22.6	0.44	316	90.3
Std Dev			0.2	1	0.5	0.08	0.6	0.02	6	1.7
Maximum			57.6	42	18.8	0.78	24.0	0.47	330	94.3
Minimum			56.8	38	16.9	0.44	21.6	0.43	304	87.0
N-value: 27										

Sample Interval Time: 33.54 seconds.

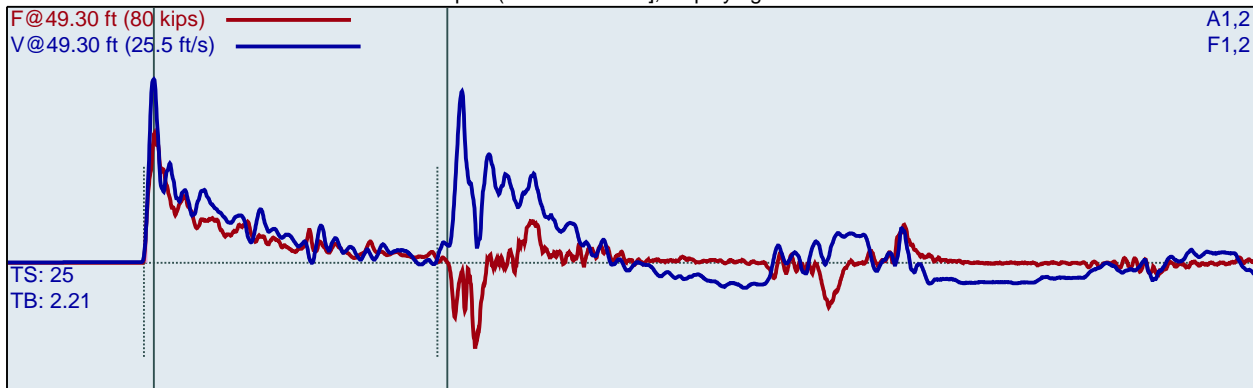
CME-550X SN 299403
JRW
TEST HOLE B

ANNUAL ENERGY MEASUREMENTS
Interval start: 1/3/2024

AR: 1.76 in²
LE: 49.30 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (43.50 - 45.00 ft), displaying BN: 21



F1 : [102 BW-1] 216.4 PDICAL (1) FF1
F2 : [102 BW-2] 217.5 PDICAL (1) FF1

A1 (PR): [K10181] 394.1 mv/6.4v/5000g (1) VF1
A2 (PR): [K10182] 380.7 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
43.54	1	13	1.9	34	15.5	0.73	19.5	0.46	302	86.4
43.58	2	13	57.4	36	15.9	0.62	20.4	0.46	314	89.8
43.62	3	13	57.4	38	16.5	0.57	21.4	0.47	317	90.6
43.65	4	13	57.3	42	18.9	0.54	24.1	0.46	335	95.7
43.69	5	13	57.7	42	19.0	0.53	24.0	0.46	334	95.6
43.73	6	13	57.6	38	17.3	0.50	21.8	0.46	322	92.0
43.77	7	13	57.4	41	18.2	0.50	23.2	0.46	321	91.6
43.81	8	13	57.4	35	16.0	0.50	20.2	0.46	309	88.3
43.85	9	13	57.7	39	17.3	0.49	22.4	0.46	317	90.7
43.88	10	13	57.4	41	18.7	0.50	23.4	0.46	326	93.0
43.92	11	13	57.7	41	18.5	0.49	23.4	0.46	327	93.4
43.96	12	13	57.3	41	18.4	0.49	23.1	0.47	331	94.6
44.00	13	13	57.2	40	18.0	0.48	22.8	0.46	326	93.2
44.03	14	15	57.8	42	19.3	0.51	23.8	0.40	336	95.9
44.07	15	15	57.3	41	19.0	0.49	23.3	0.40	331	94.6
44.10	16	15	57.7	40	18.3	0.48	22.9	0.40	321	91.7
44.13	17	15	57.5	42	18.8	0.49	23.6	0.40	328	93.6
44.17	18	15	57.6	39	17.6	0.48	22.4	0.40	315	89.9
44.20	19	15	57.5	43	19.8	0.50	24.5	0.40	333	95.2
44.23	20	15	57.8	42	19.2	0.49	24.1	0.40	330	94.3
44.27	21	15	57.3	41	18.3	0.47	23.0	0.40	324	92.4
44.30	22	15	57.6	40	17.8	0.47	22.5	0.40	319	91.0
44.33	23	15	57.3	43	19.6	0.50	24.6	0.40	336	95.9
44.37	24	15	57.7	39	17.5	0.47	22.1	0.40	315	90.1
44.40	25	15	57.4	42	19.3	0.47	23.8	0.40	330	94.2
44.43	26	15	57.3	44	19.6	0.49	24.8	0.40	339	96.8
44.47	27	15	57.9	39	17.6	0.45	22.3	0.40	315	89.9
44.50	28	15	57.2	40	18.2	0.45	22.5	0.40	320	91.3
44.53	29	17	57.7	41	18.6	0.47	23.4	0.36	330	94.4
44.56	30	17	57.3	38	17.0	0.44	21.7	0.35	309	88.3
44.59	31	17	57.3	38	17.2	0.45	21.3	0.35	310	88.5

44.62	32	17	57.4	37	17.6	0.45	21.2	0.36	312	89.3
44.65	33	17	57.6	42	19.0	0.48	24.1	0.35	335	95.7
44.68	34	17	57.3	40	18.0	0.45	23.0	0.36	322	92.1
44.71	35	17	57.4	39	17.4	0.45	22.2	0.35	315	89.9
44.74	36	17	57.3	40	18.3	0.46	22.7	0.36	327	93.4
44.76	37	17	57.5	41	18.8	0.47	23.1	0.36	326	93.3
44.79	38	17	57.2	42	19.4	0.48	24.0	0.35	333	95.3
44.82	39	17	57.4	40	18.5	0.47	22.9	0.35	323	92.2
44.85	40	17	57.3	40	18.0	0.47	22.7	0.35	322	91.9
44.88	41	17	57.0	39	17.5	0.45	22.3	0.35	315	90.1
44.91	42	17	57.6	40	17.8	0.47	22.5	0.36	319	91.0
44.94	43	17	57.5	39	17.5	0.46	22.0	0.35	311	88.8
44.97	44	17	57.1	41	18.8	0.50	23.5	0.34	331	94.5
45.00	45	17	18.4	41	18.9	0.50	23.4	0.35	345	98.6
Average			56.2	40	18.4	0.47	23.0	0.38	324	92.6
Std Dev			6.8	2	0.8	0.02	0.9	0.02	9	2.6
Maximum			57.9	44	19.8	0.51	24.8	0.40	345	98.6
Minimum			18.4	37	17.0	0.44	21.2	0.34	309	88.3
N-value: 32										

Sample Interval Time: 48.11 seconds.

Summary of SPT Test Results

Project: CME-550X SN 299403, Test Date: 1/3/2024

BPM: Blows/Minute											CSX: Compression Stress Maximum		
FMX: Maximum Force											DFN: Final Displacement		
VMX: Maximum Velocity											EFV: Maximum Energy		
DMX: Maximum Displacement											ETR: Energy Transfer Ratio - Rated		
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
34.30	28.50	30.00	14-17-20	37	56	56.3	39	16.4	0.43	22.1	0.32	316	90.3
39.30	33.50	35.00	17-21-21	42	63	56.1	39	16.9	0.41	22.0	0.29	318	90.8
44.30	38.50	40.00	6-13-14	27	40	57.2	40	17.6	0.52	22.6	0.44	316	90.3
49.30	43.50	45.00	13-15-17	32	48	56.2	40	18.4	0.47	23.0	0.38	324	92.6
Overall Average Values:						56.4	39	17.2	0.45	22.4	0.35	319	91.0
Standard Deviation:						3.3	2	1.0	0.06	1.0	0.06	8	2.2
Overall Maximum Value:						57.9	44	19.8	0.78	24.8	0.47	345	98.6
Overall Minimum Value:						18.4	35	14.3	0.39	20.0	0.28	303	86.5

Appendix VI – Laboratory Test Data Sheets – Split-Spoon Samples



INDEX PROPERTIES VERSUS DEPTH

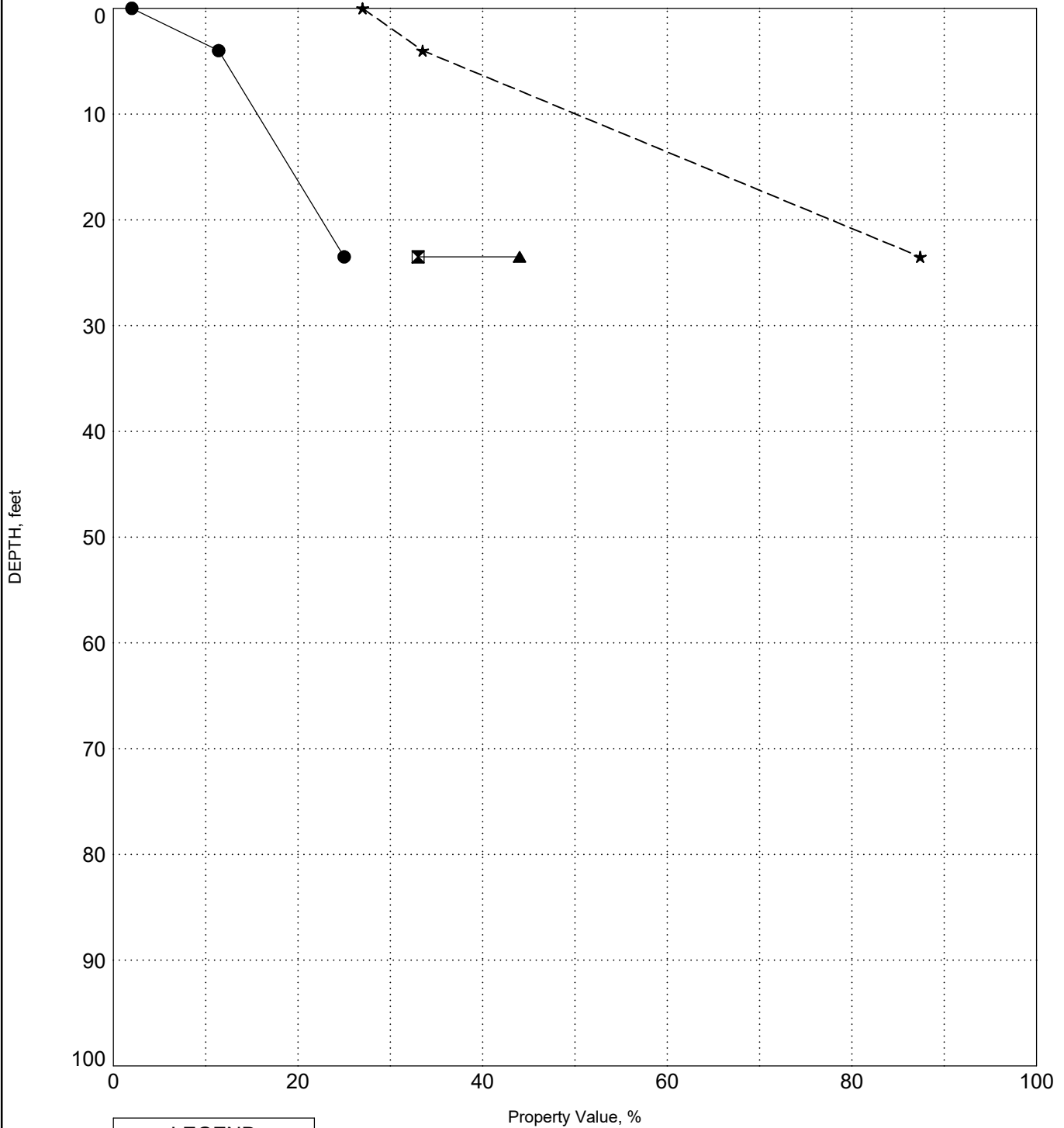
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-1C

SURFACE ELEVATION: 460.2



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

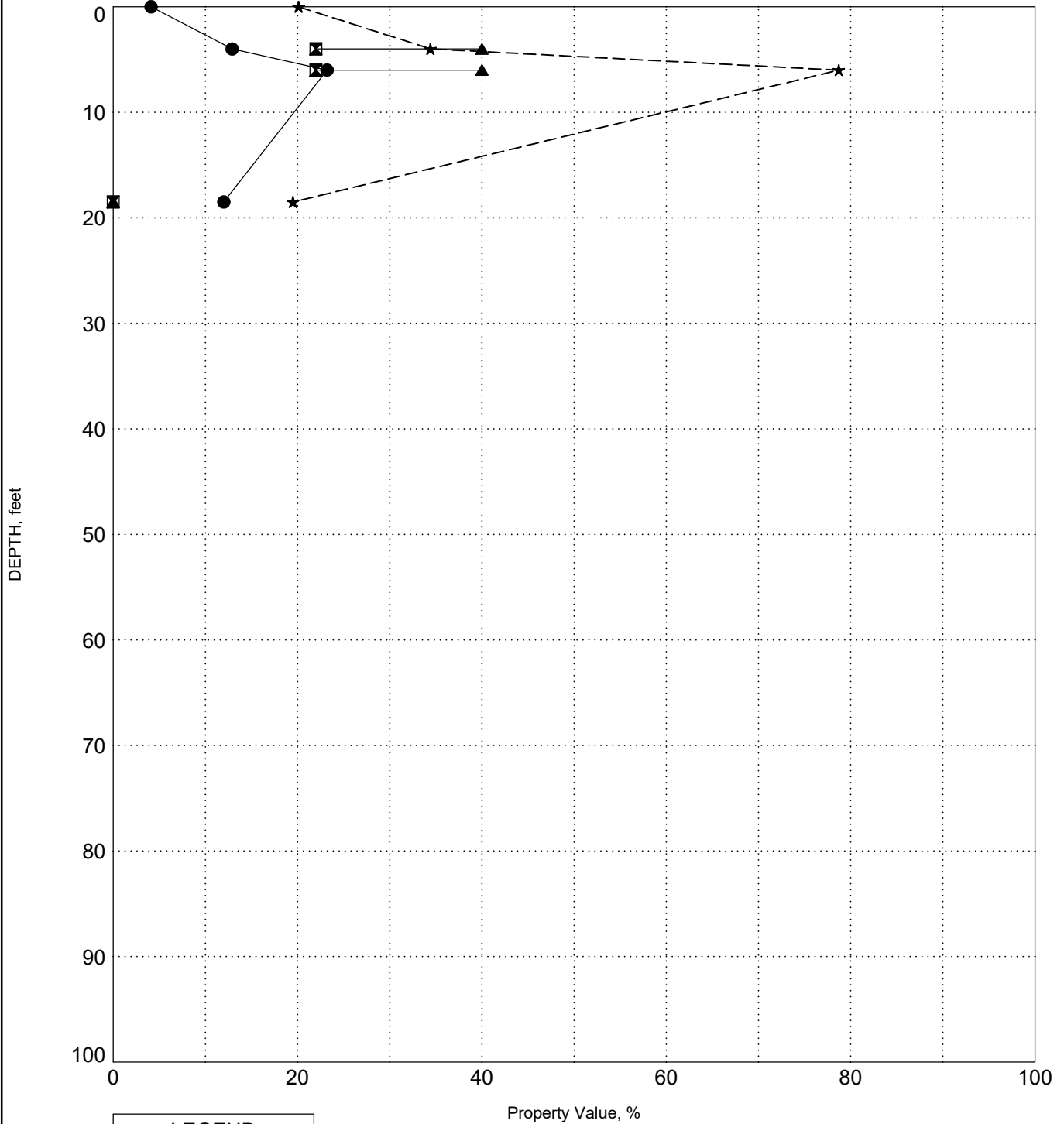
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-2C

SURFACE ELEVATION: 461.1



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

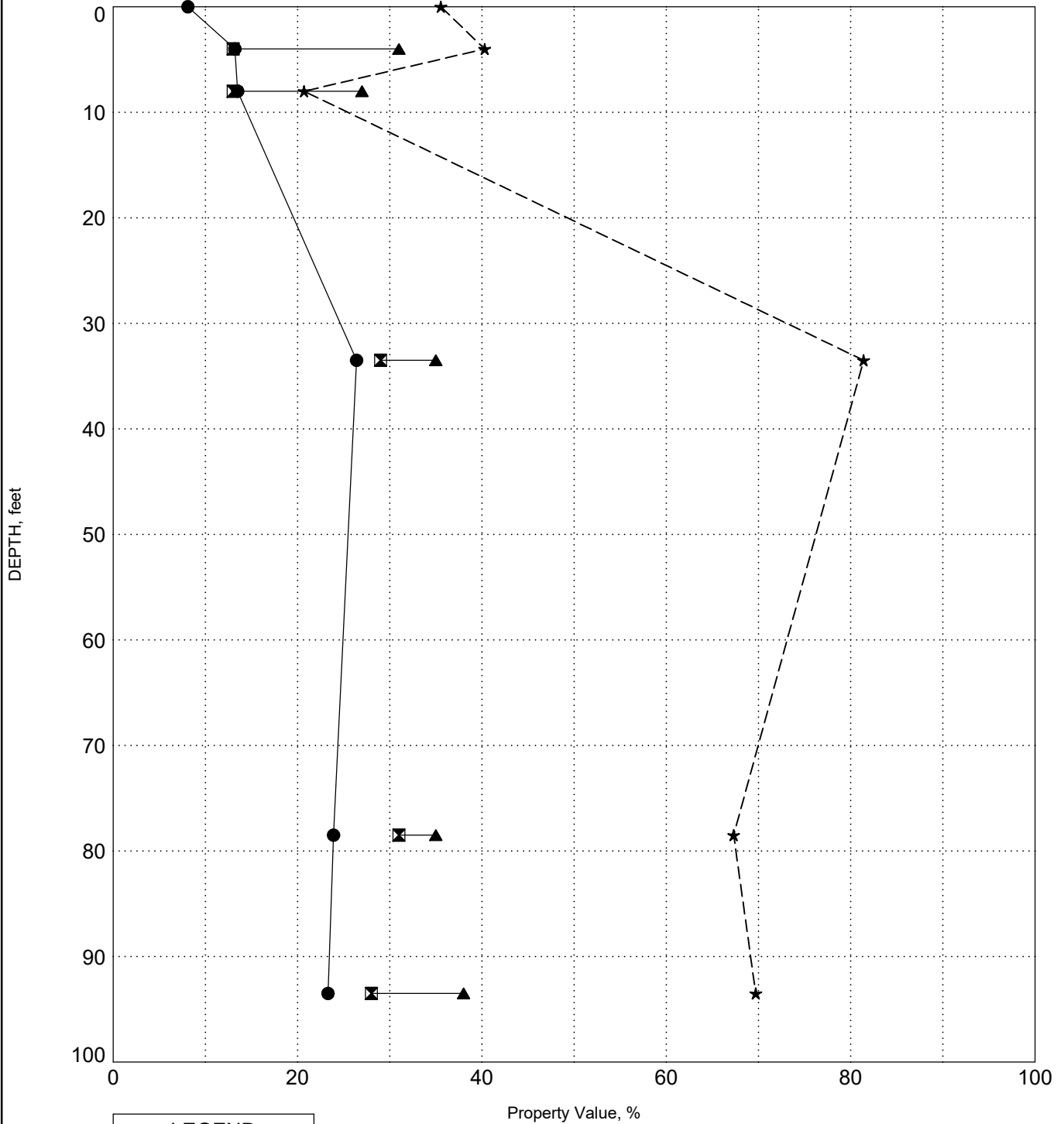
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-3C

SURFACE ELEVATION: 453.7



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

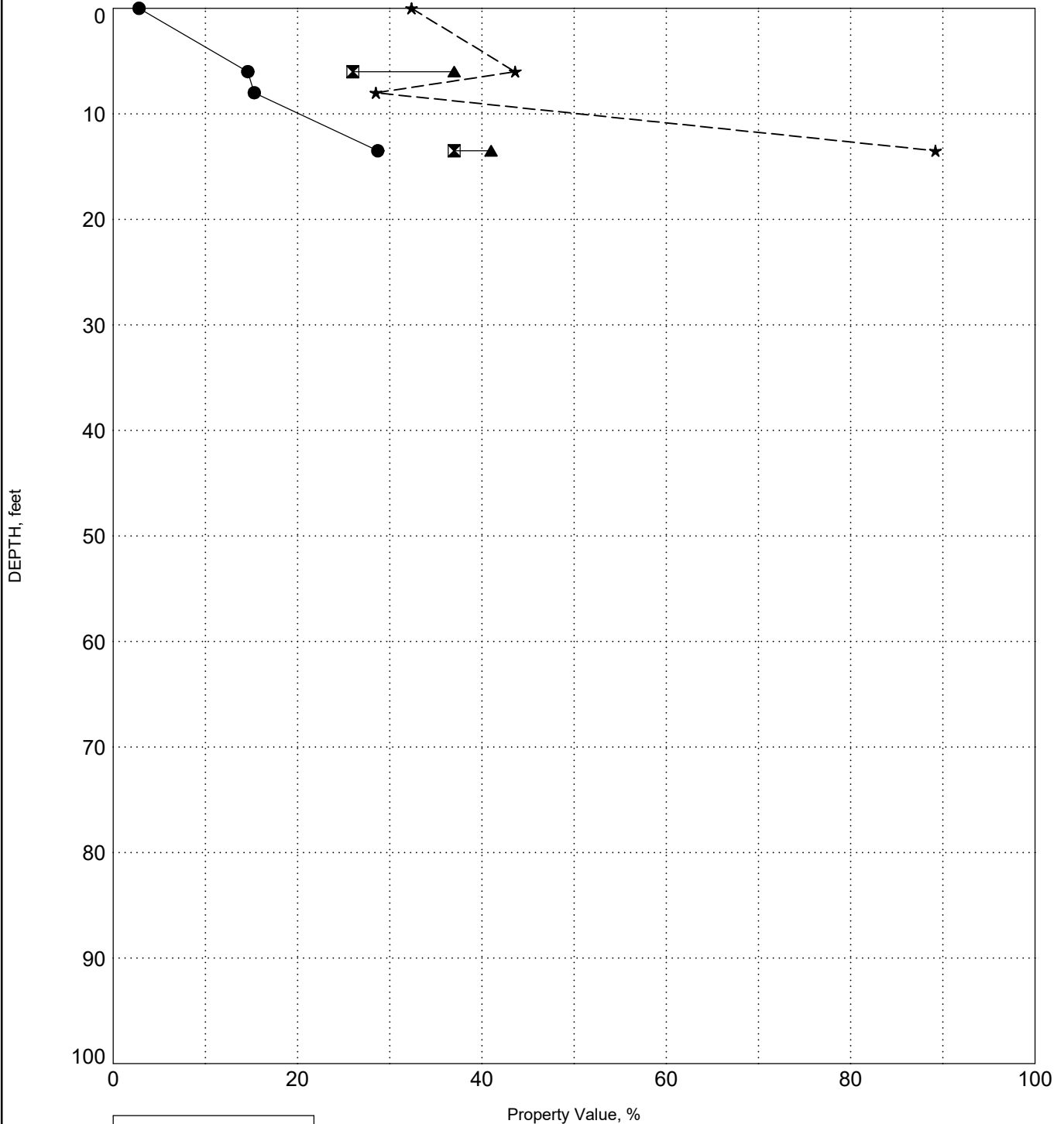
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-4C

SURFACE ELEVATION: 456.3



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

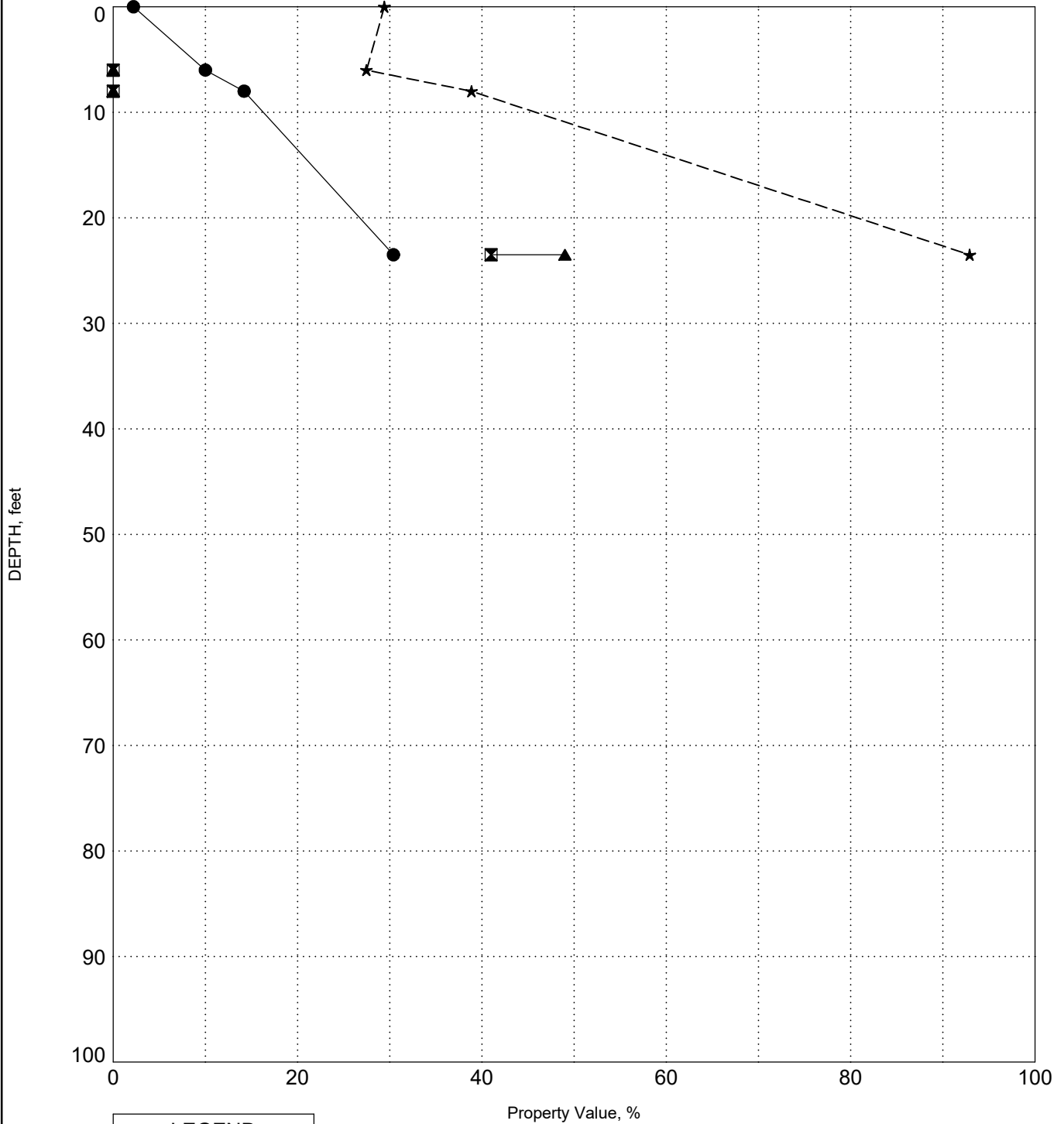
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-5C

SURFACE ELEVATION: 466.5



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

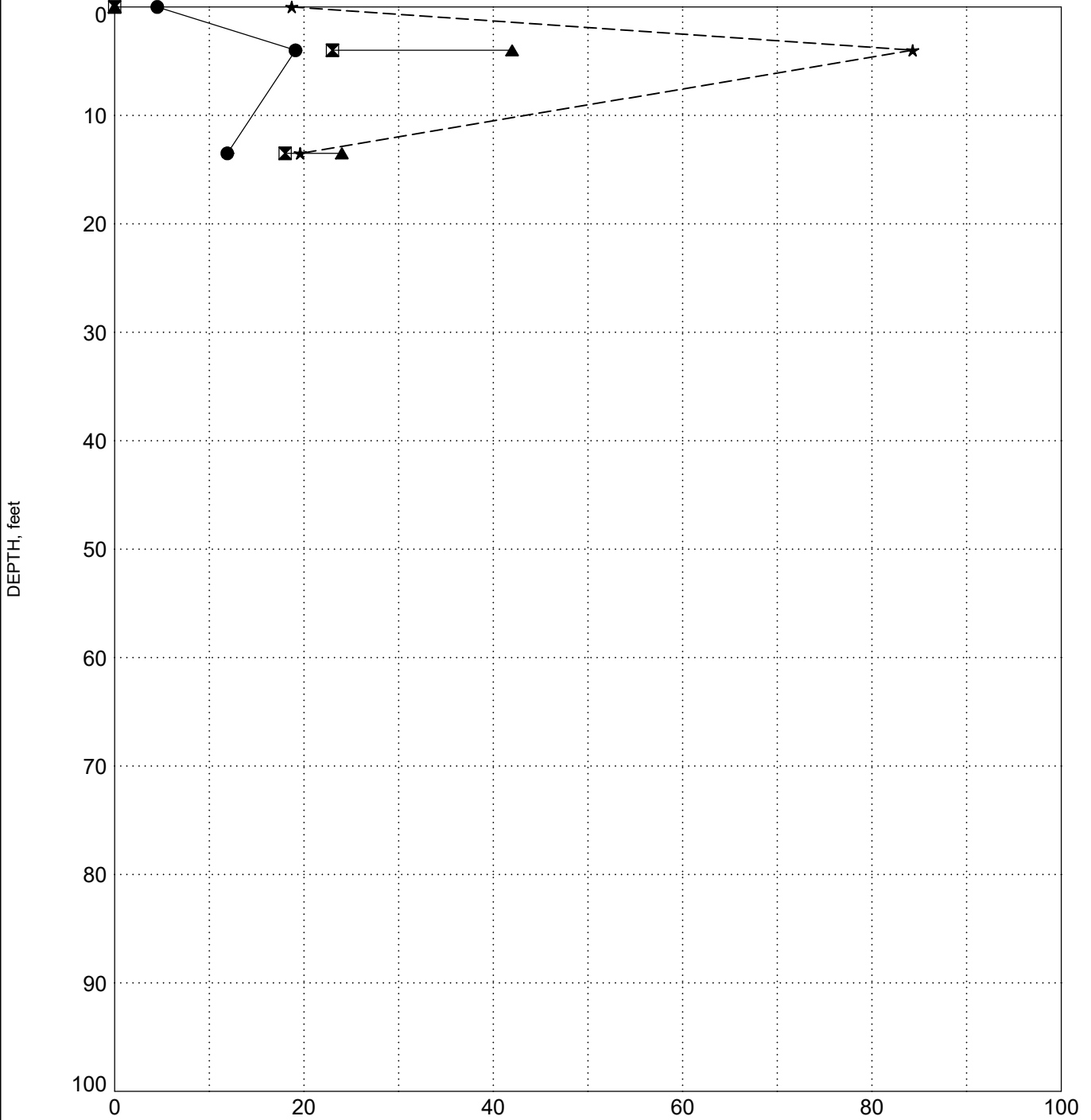
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING EB-6C

SURFACE ELEVATION: 456.0



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

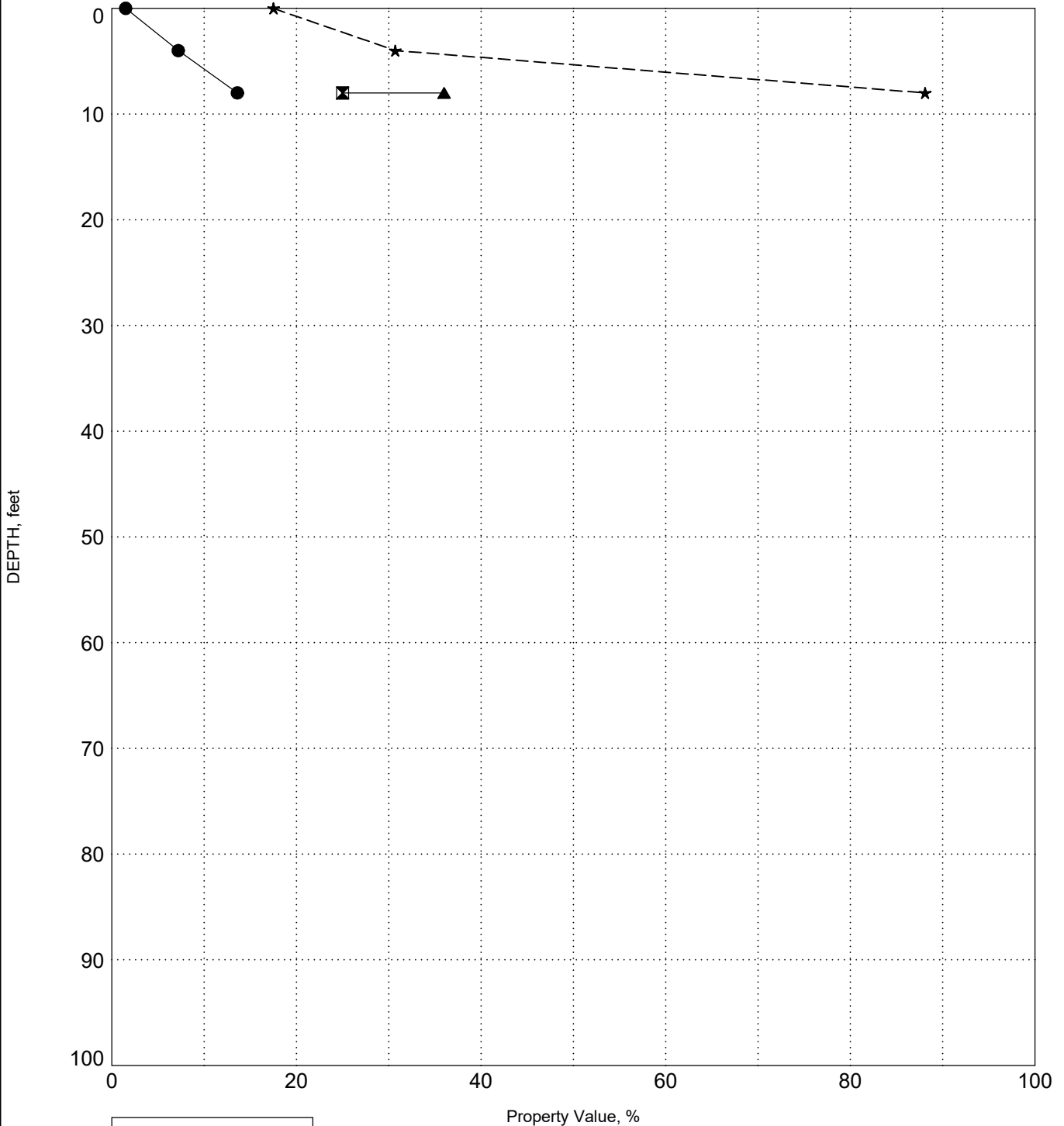
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 458.6

BORING EM- 1



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

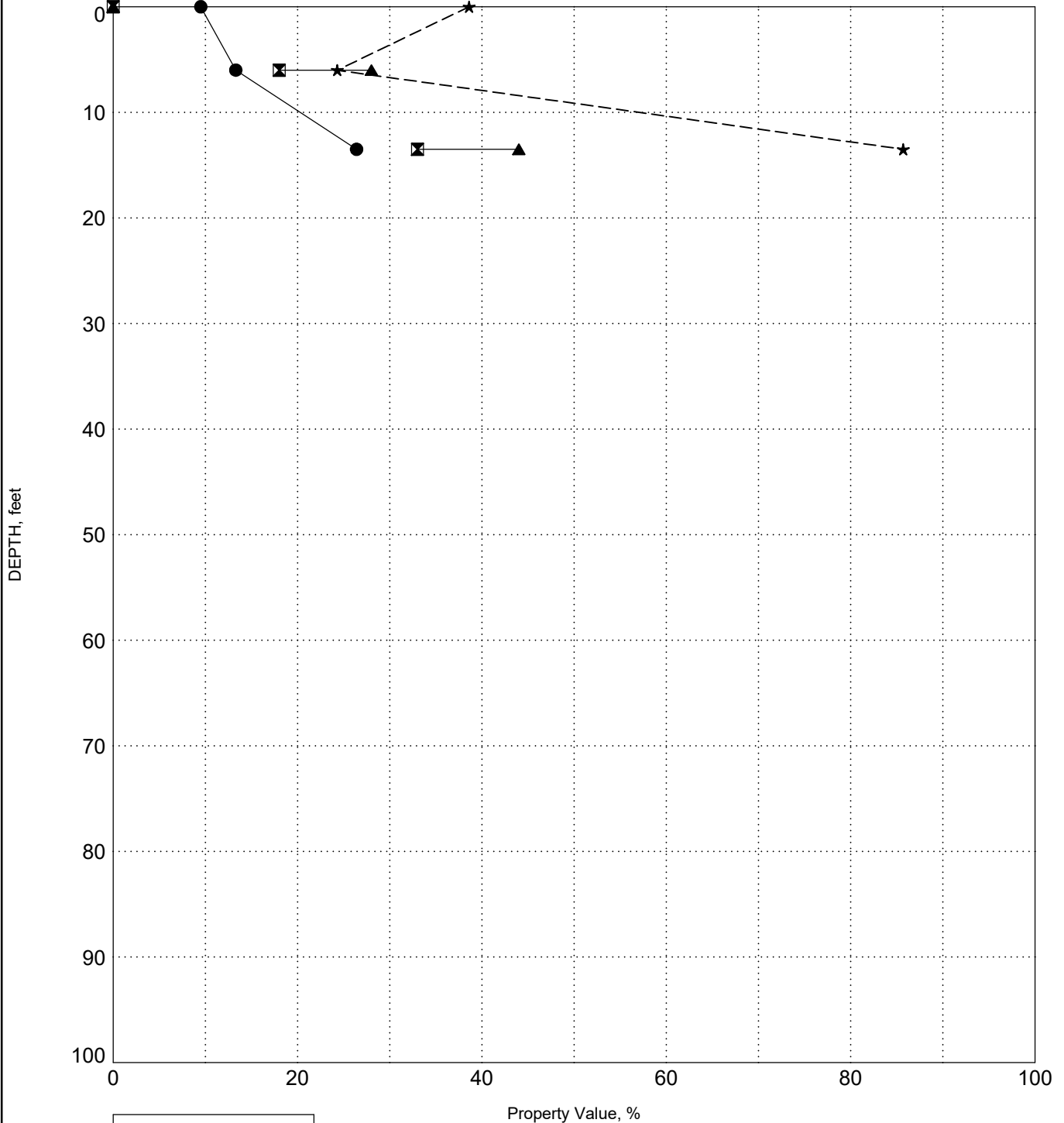
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 452.4

BORING EM- 2



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

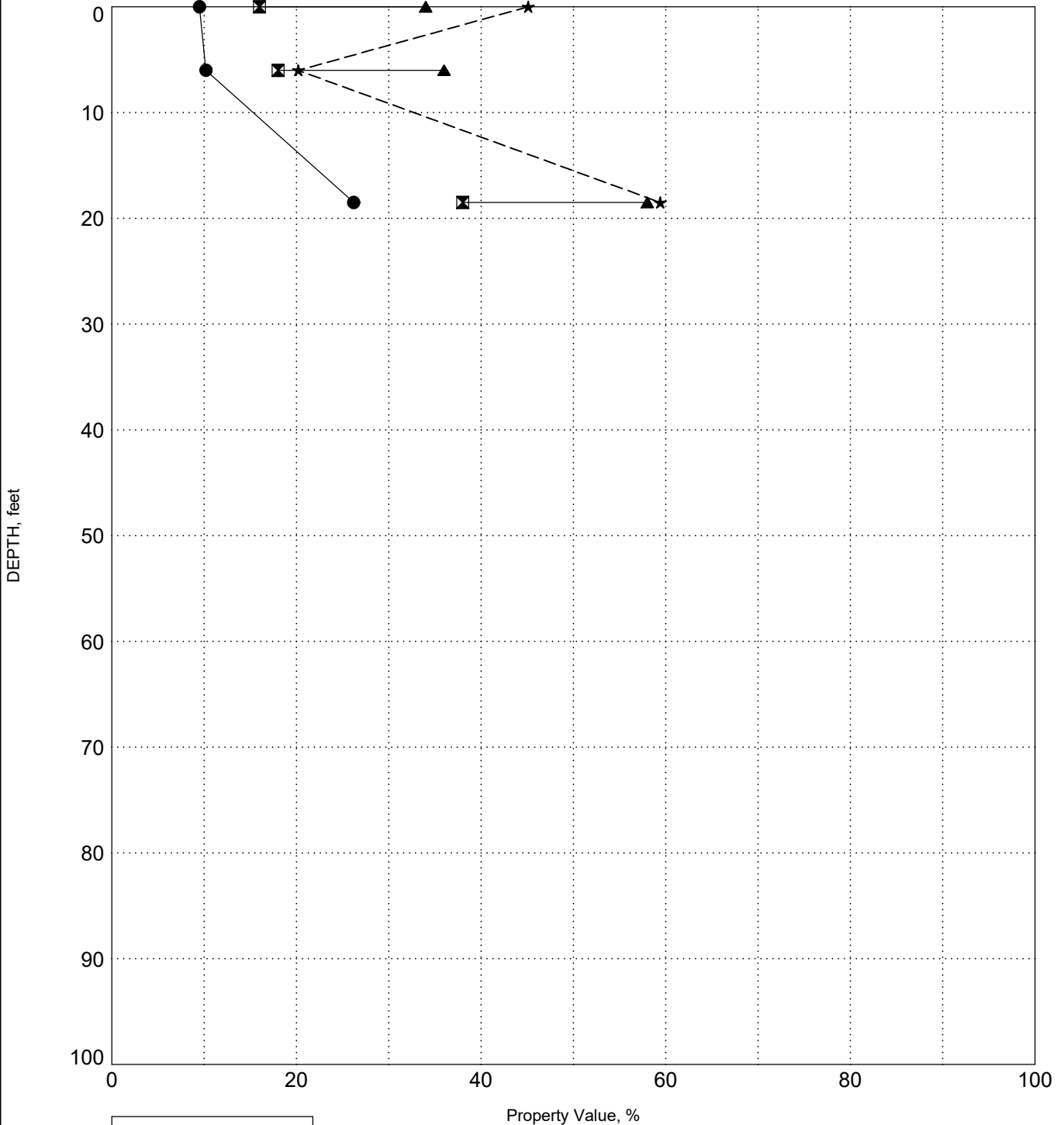
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING IB- 1C

SURFACE ELEVATION: 455.3



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

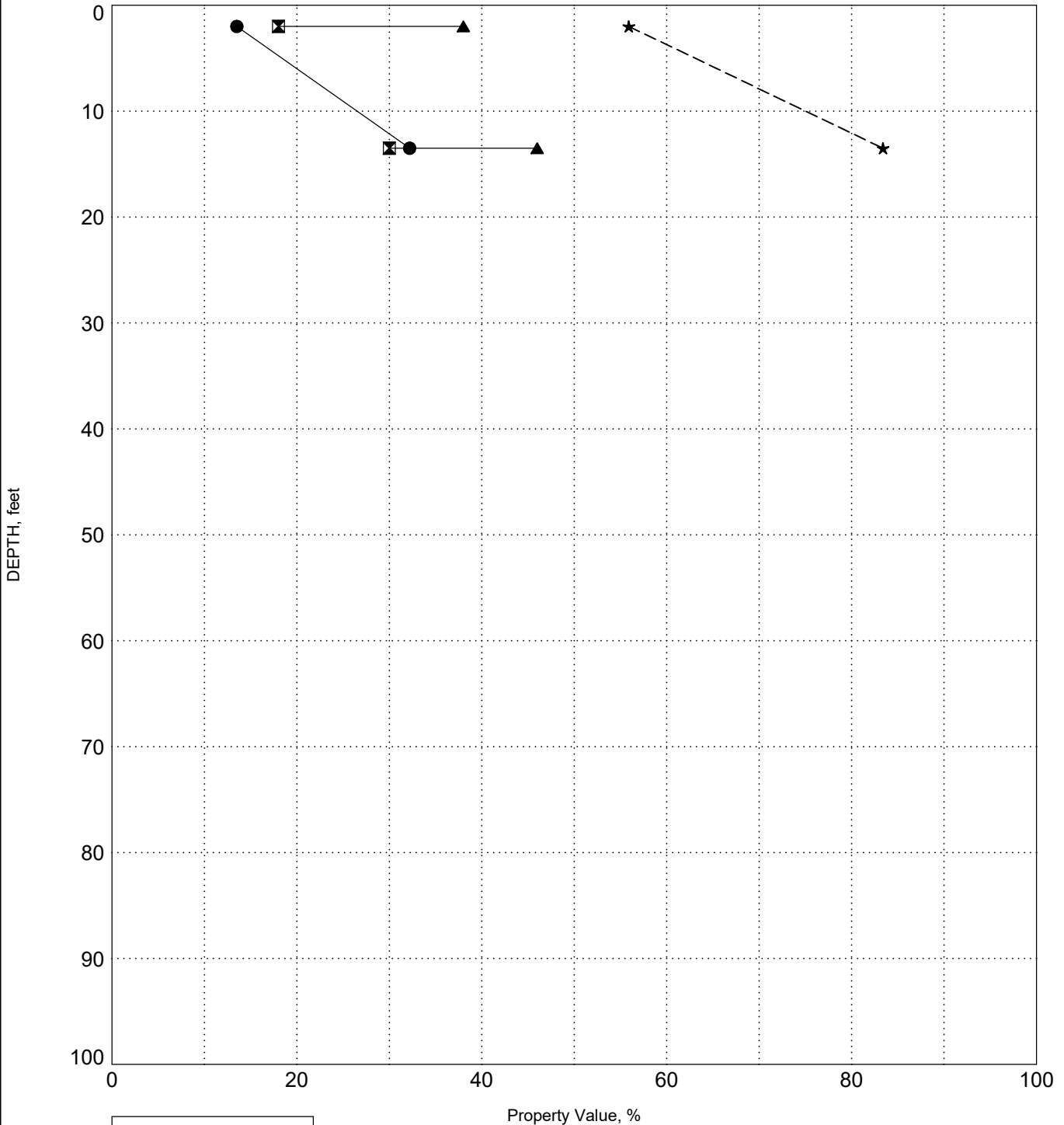
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PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 455.8

BORING IB- 2C



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

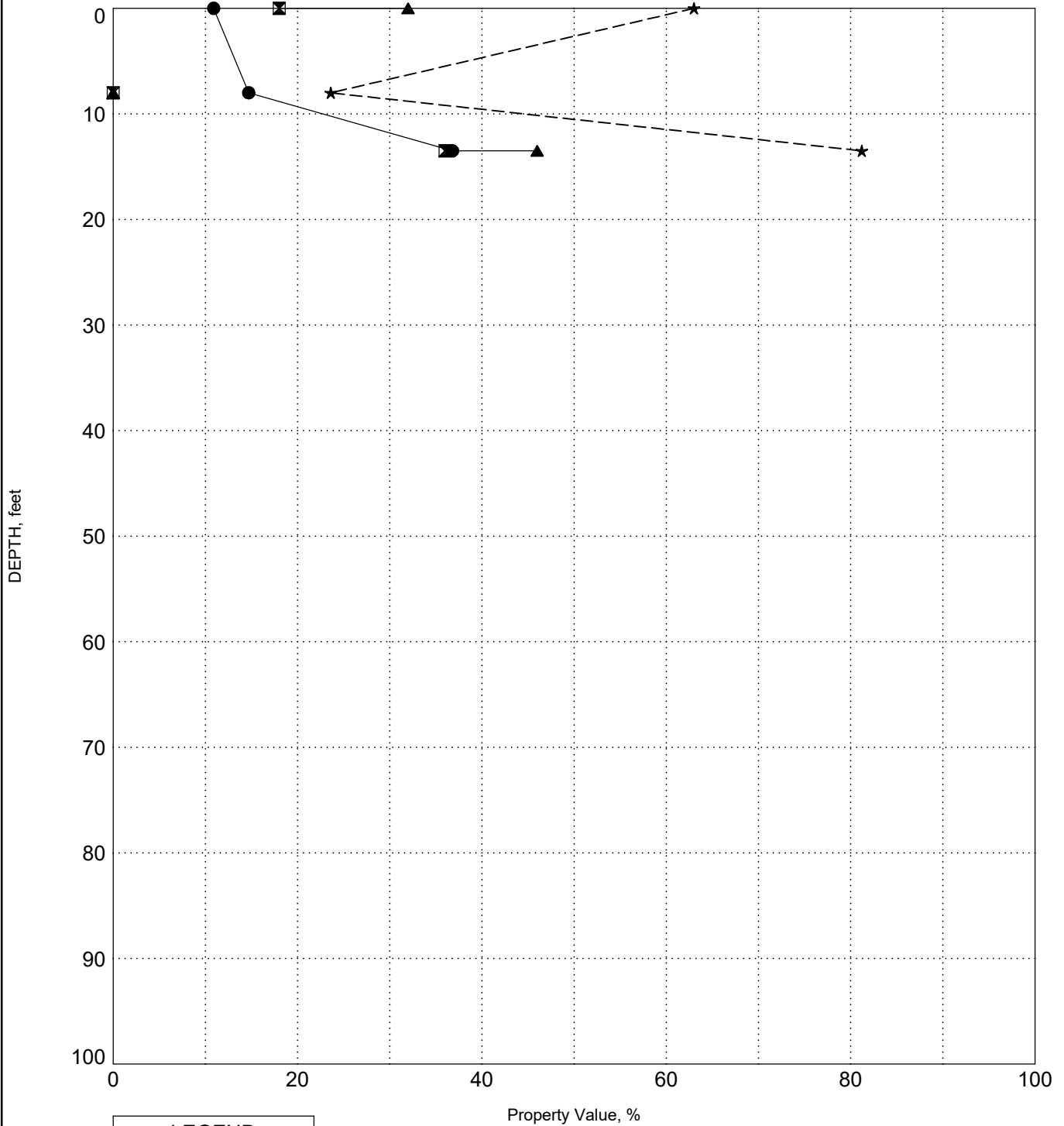
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING IB- 3C

SURFACE ELEVATION: 455.3



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

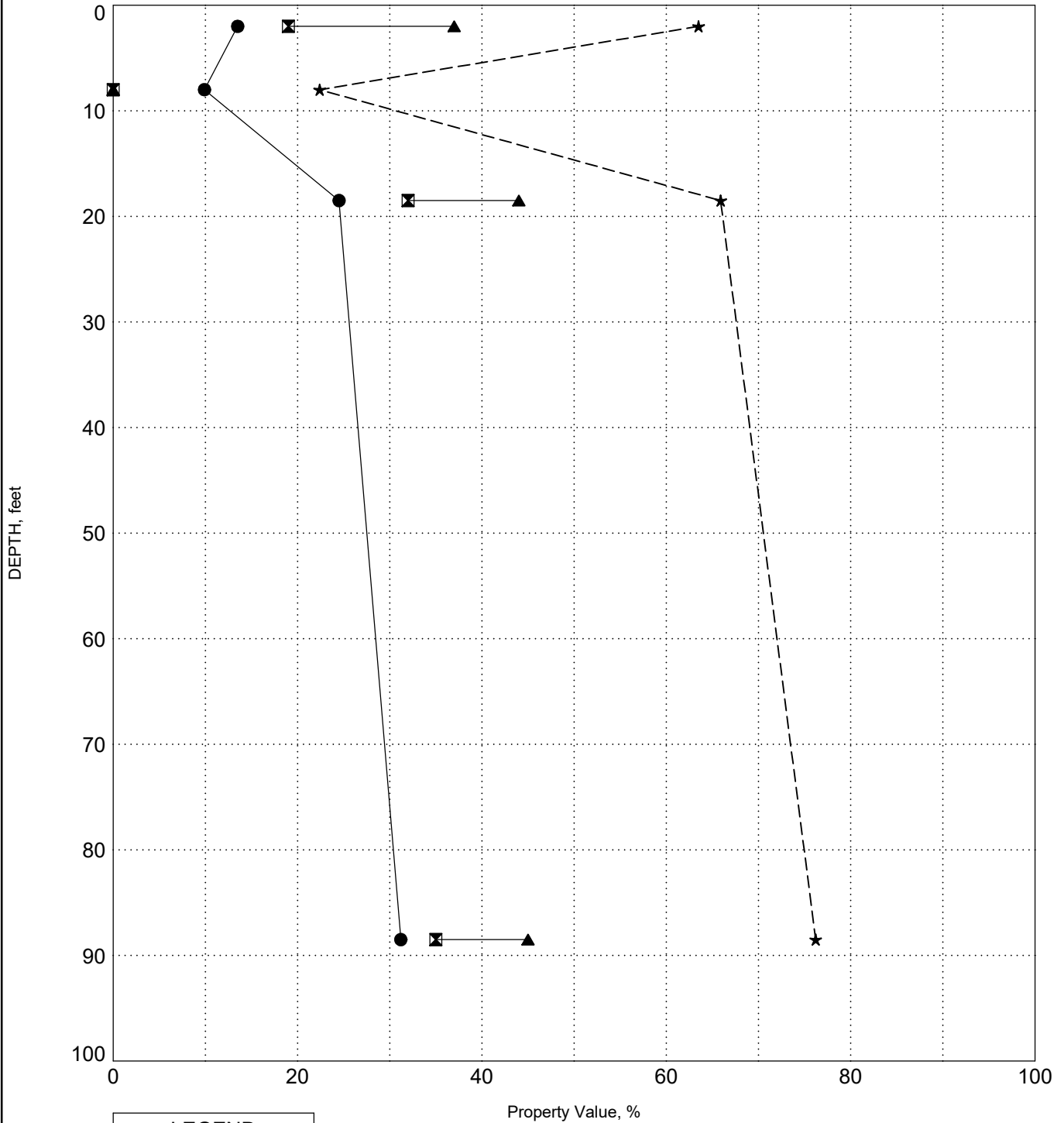
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 455.5

BORING IB- 4C



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

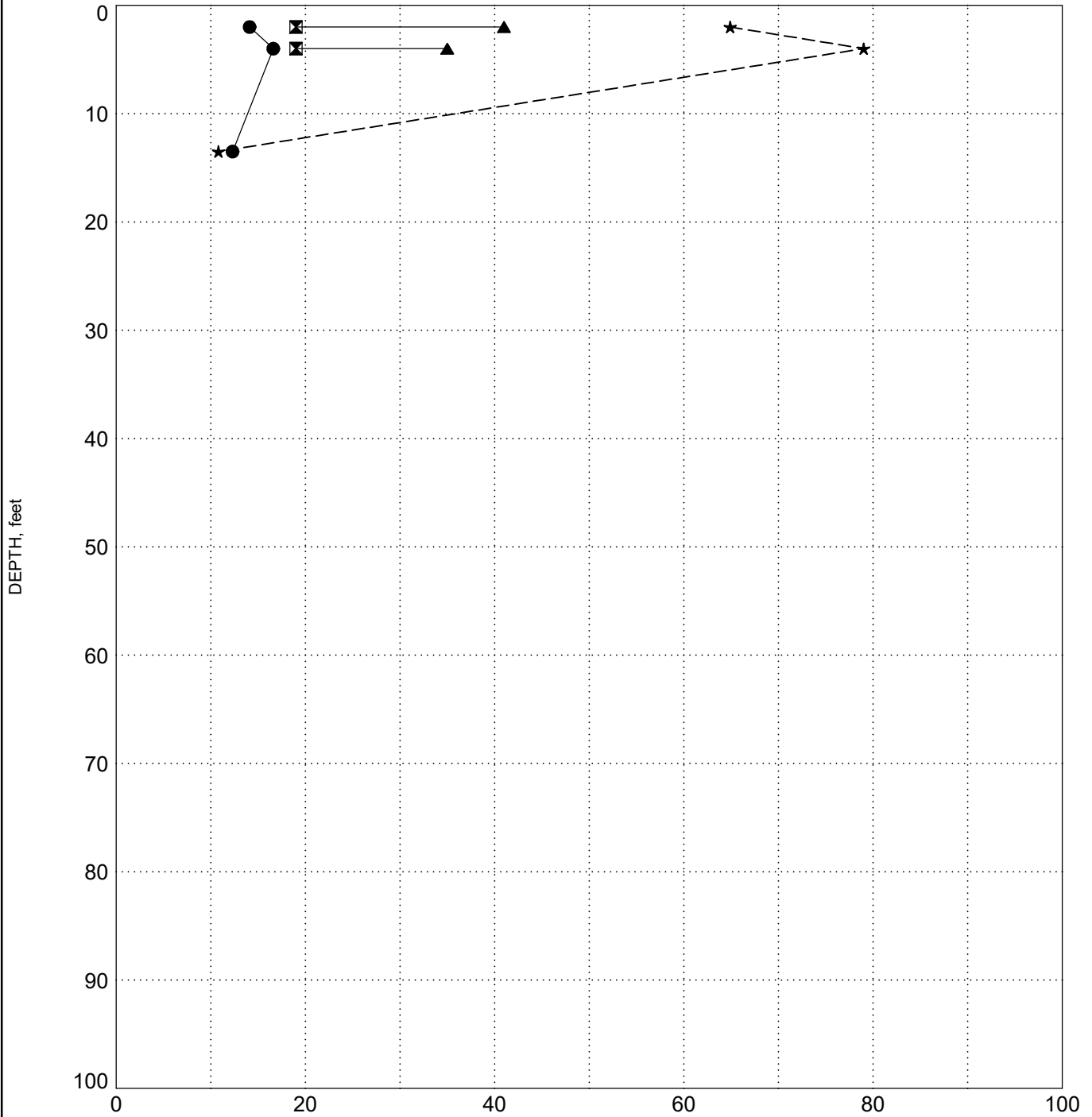
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 456.0

BORING IB- 5C



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

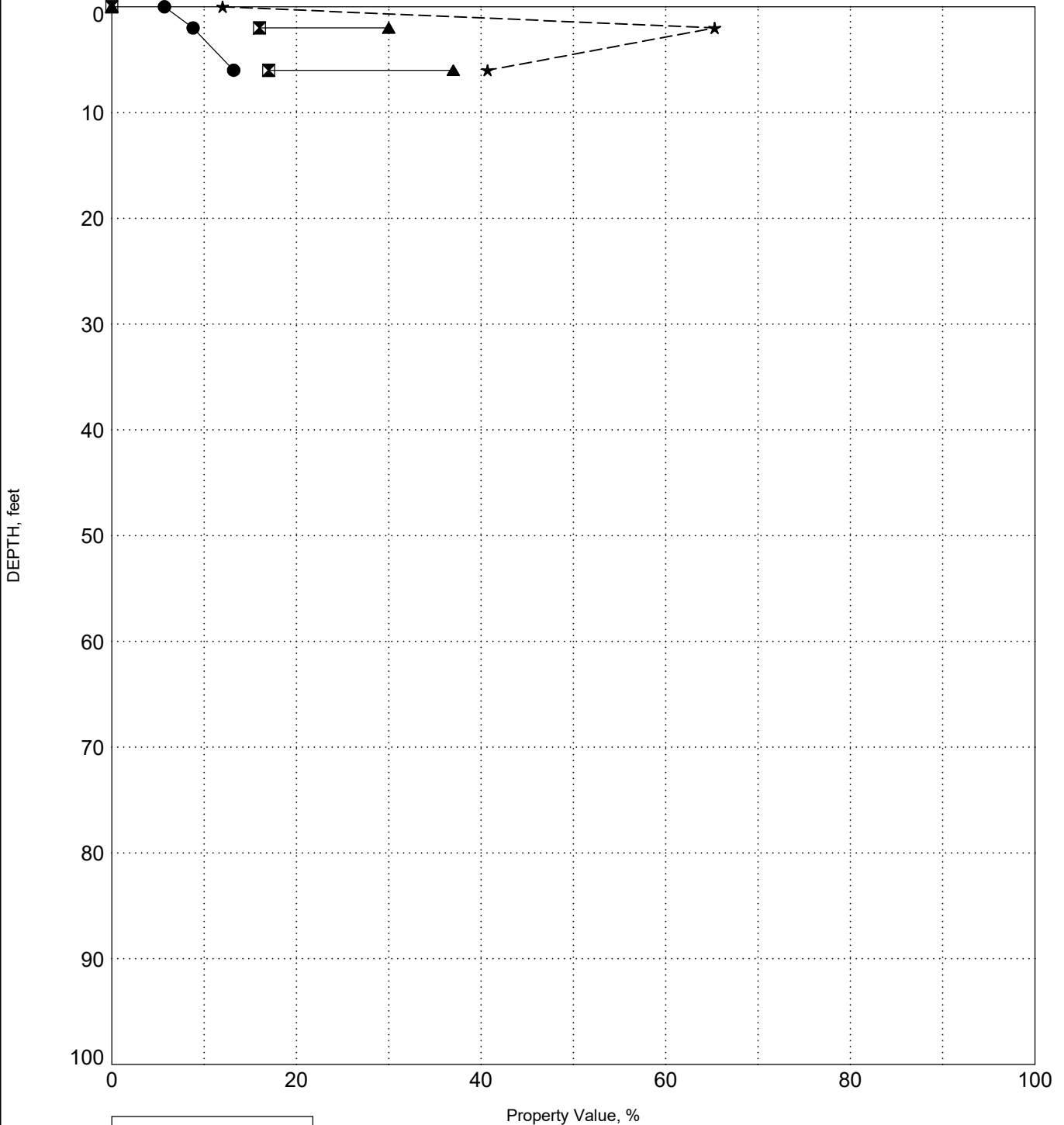
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING IB- 6C

SURFACE ELEVATION: 455.6



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

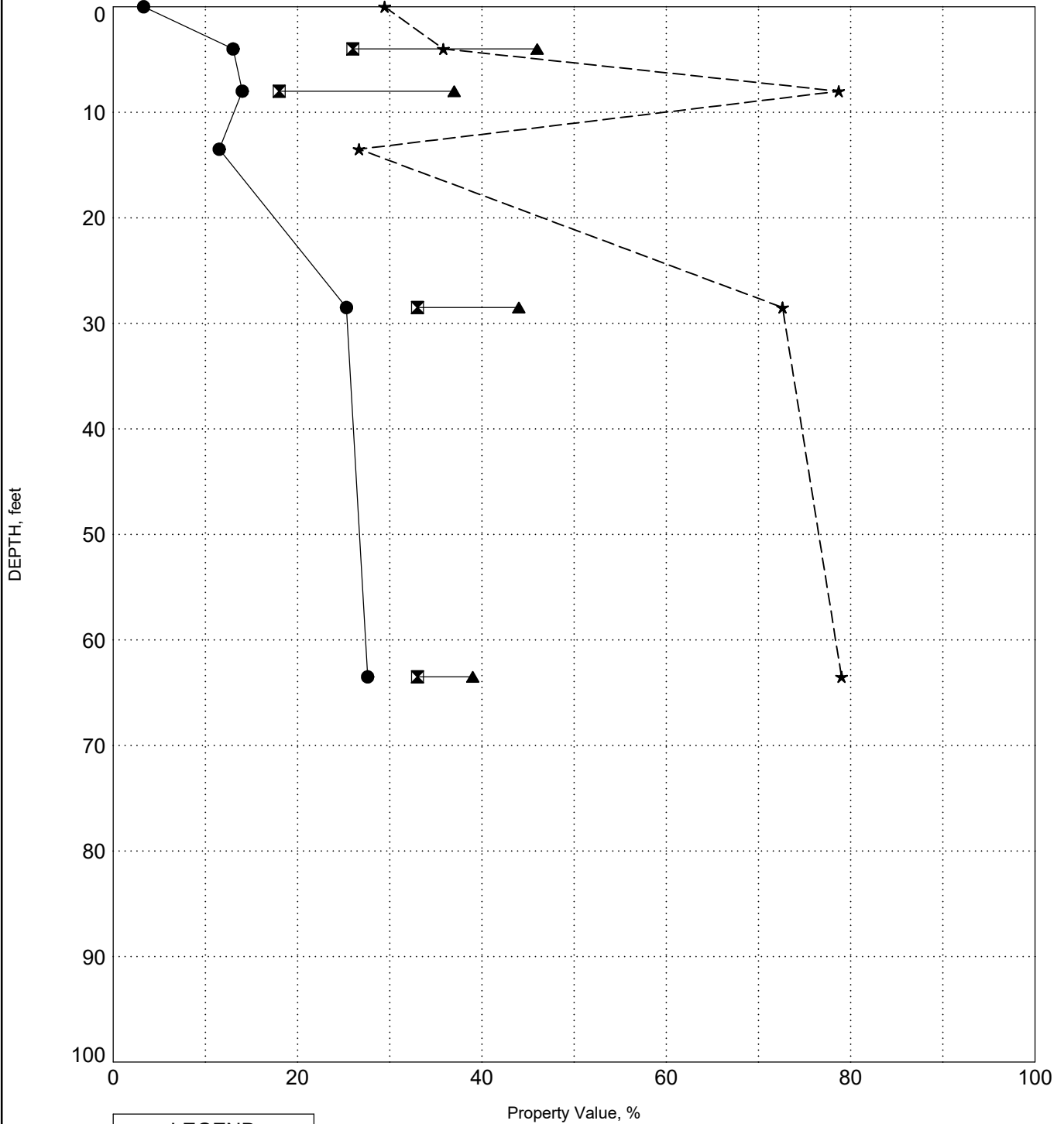
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 460.9

BORING IB- 7C



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

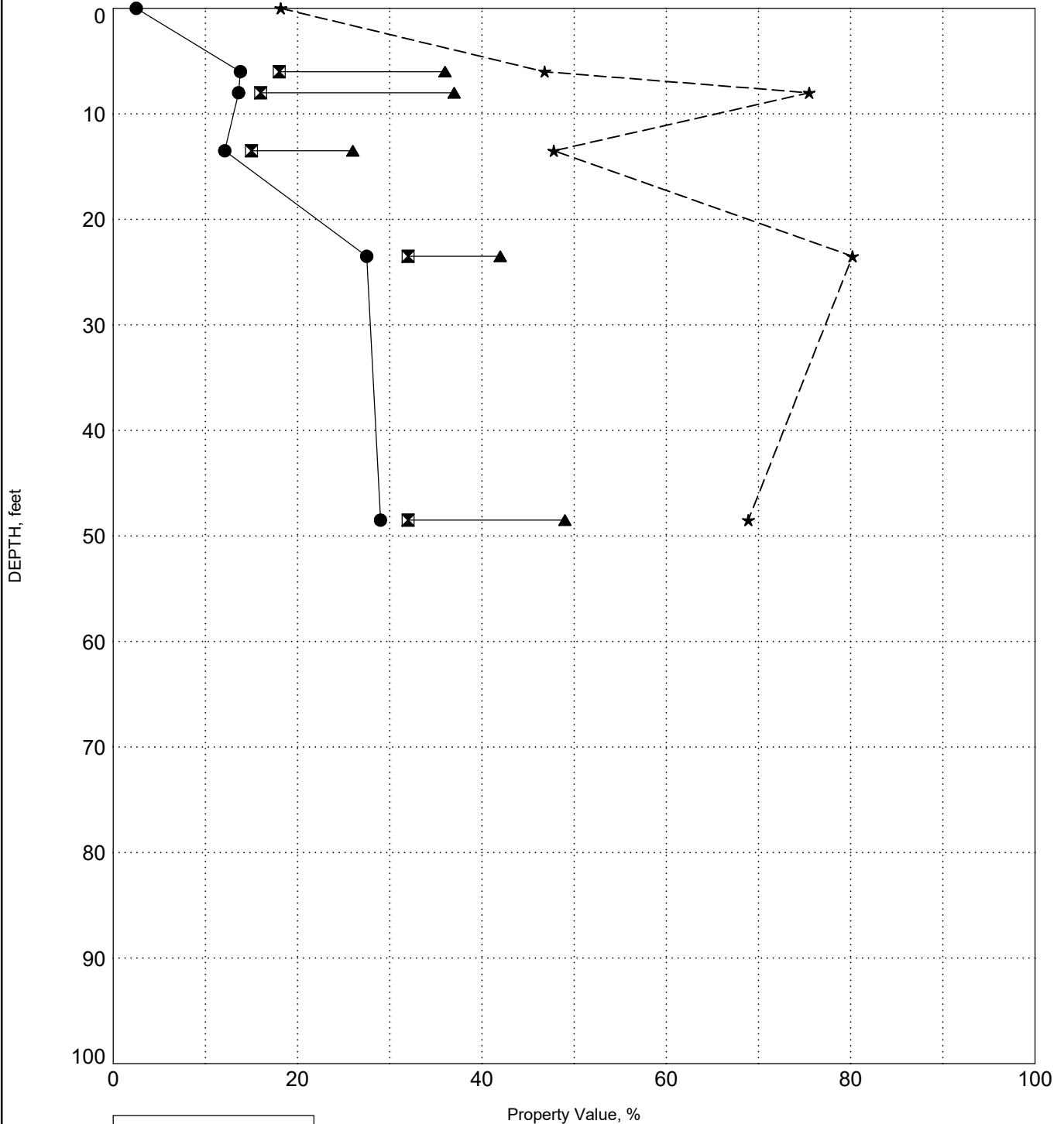
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

BORING IB- 8C

SURFACE ELEVATION: 464.0



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

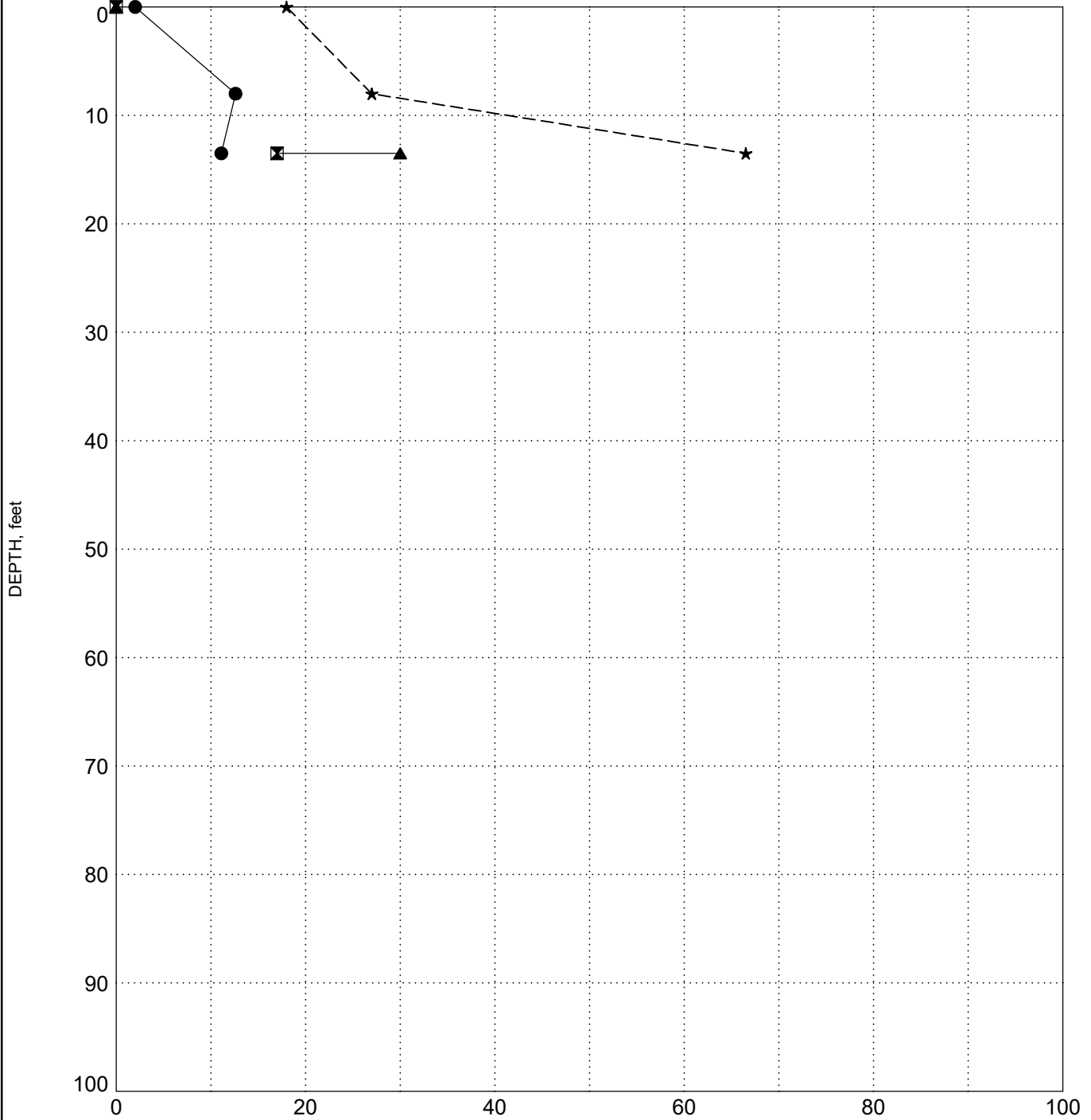
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 464.9

BORING IB- 9C



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

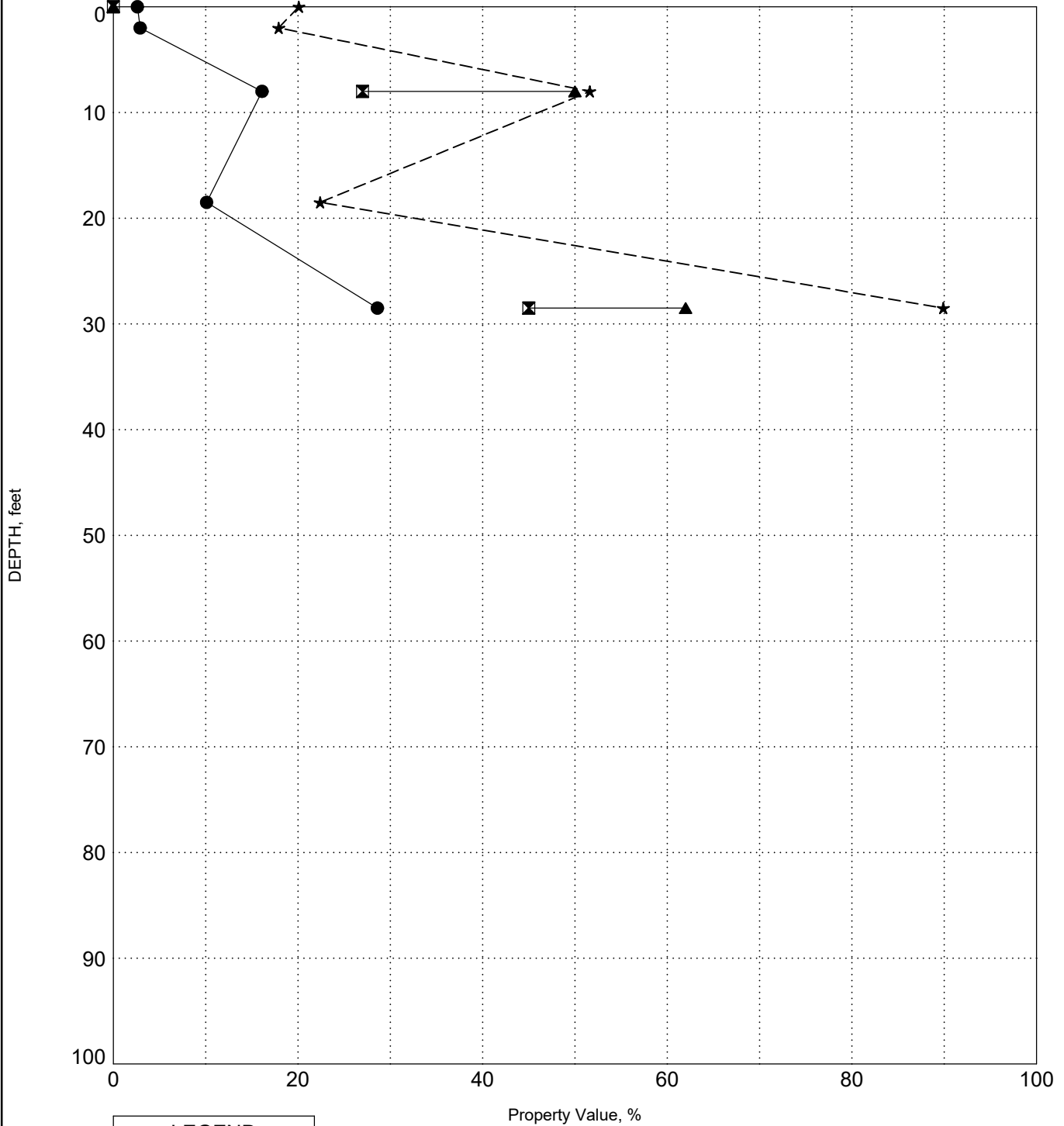
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 465.7

BORING IB-10C



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

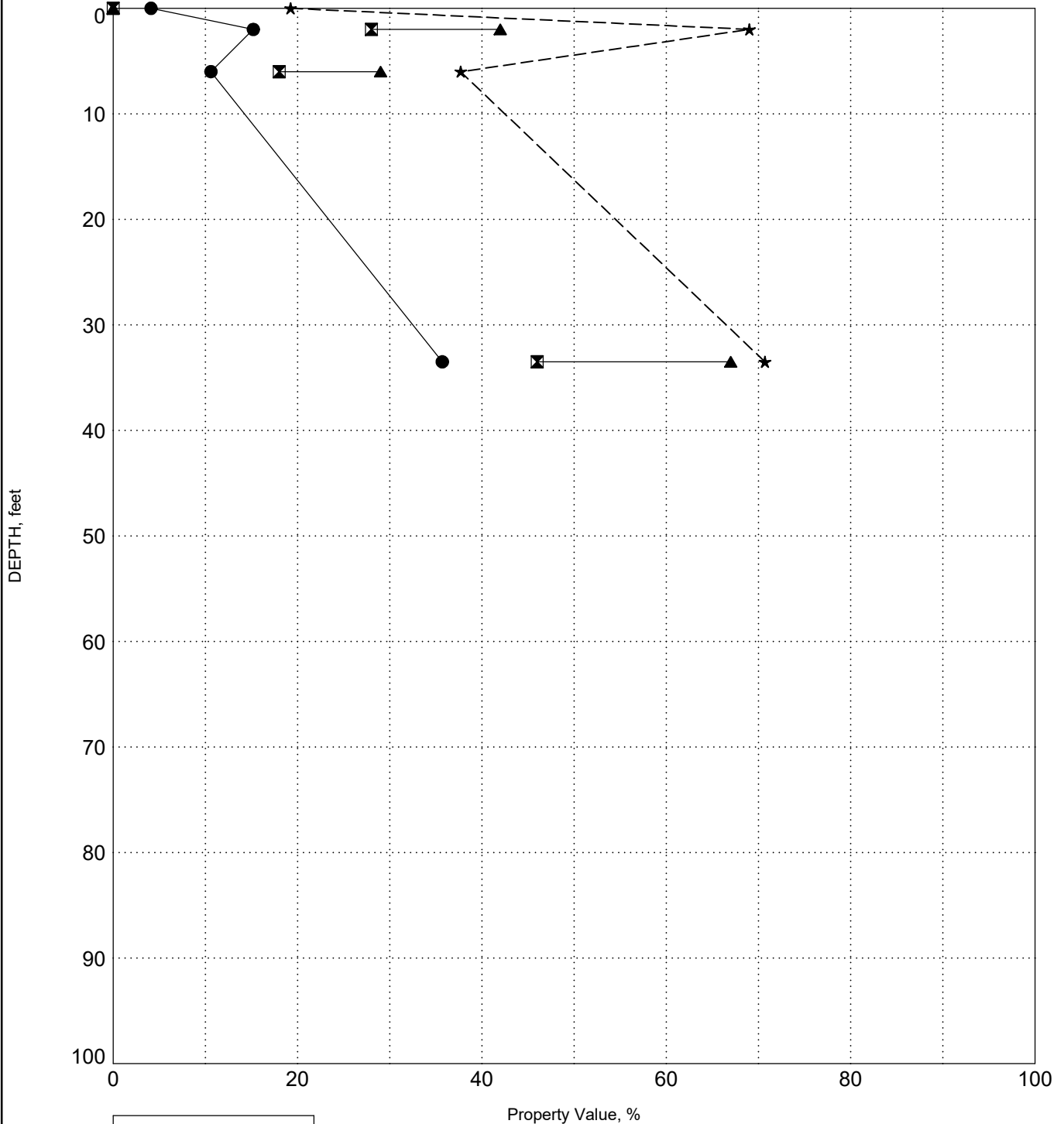
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PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 455.9

BORING IB-11C



LEGEND	
●	Water Content
■	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

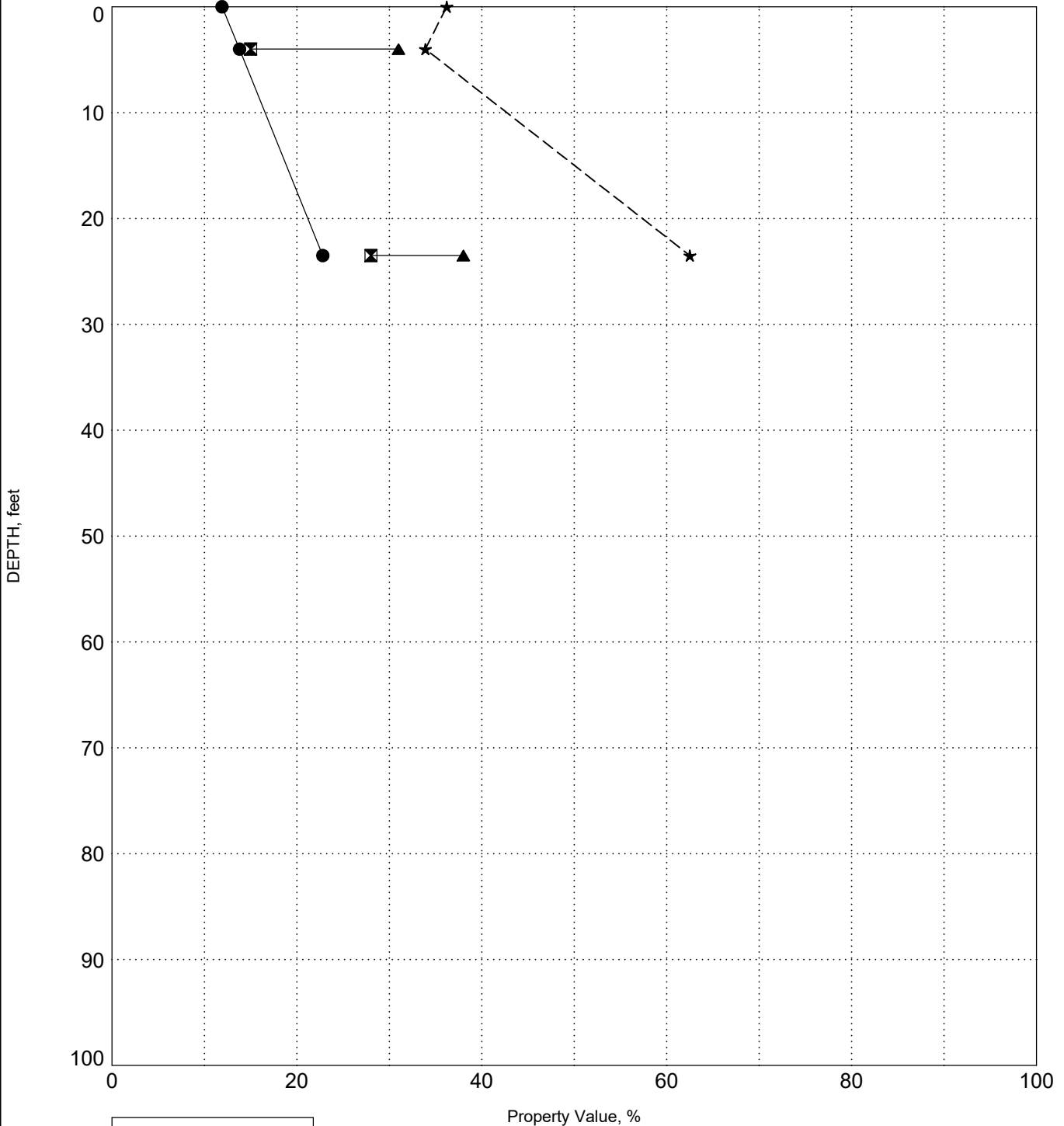
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 452.2

BORING W-1



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

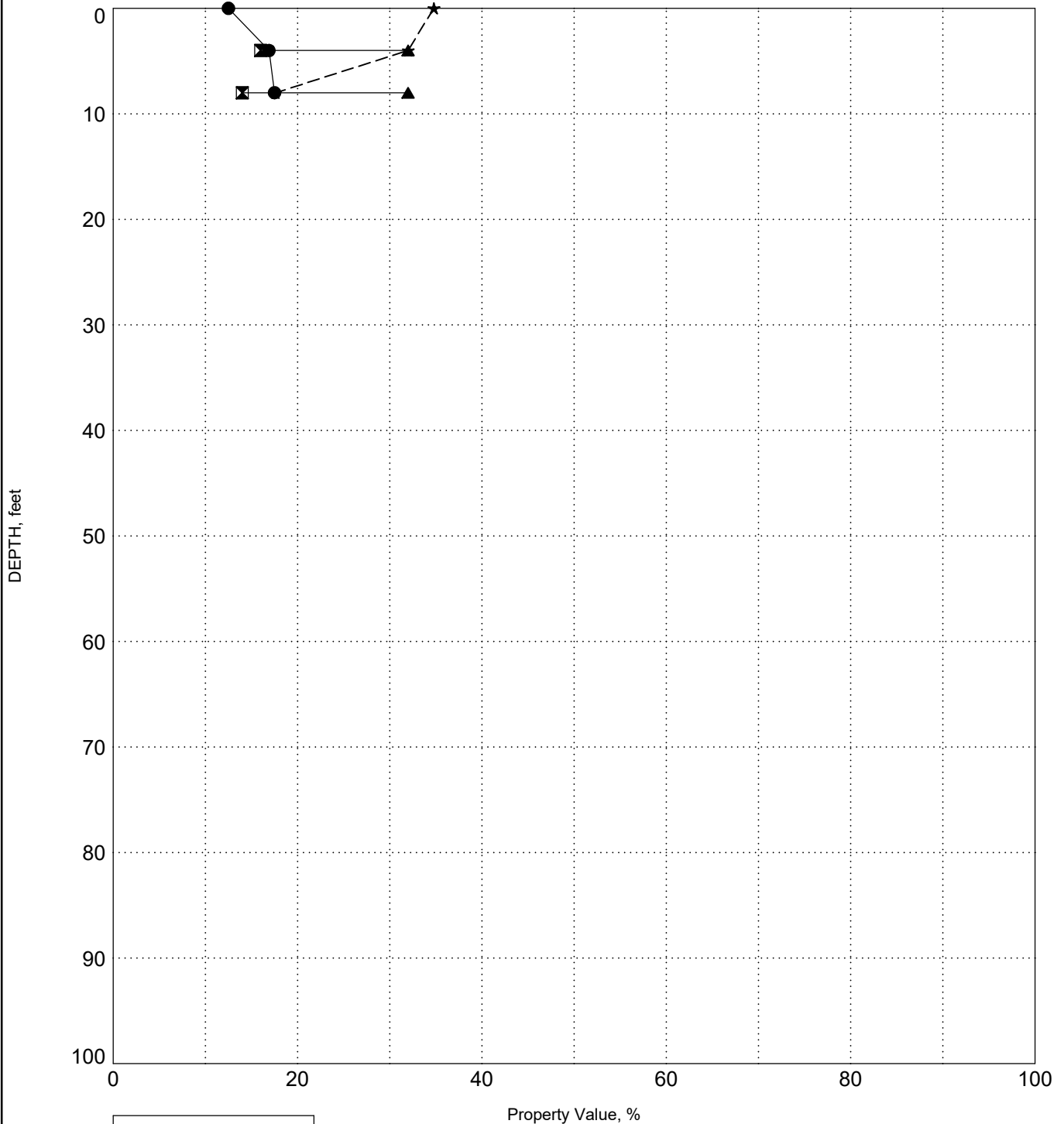
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 451.8

BORING W-2



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

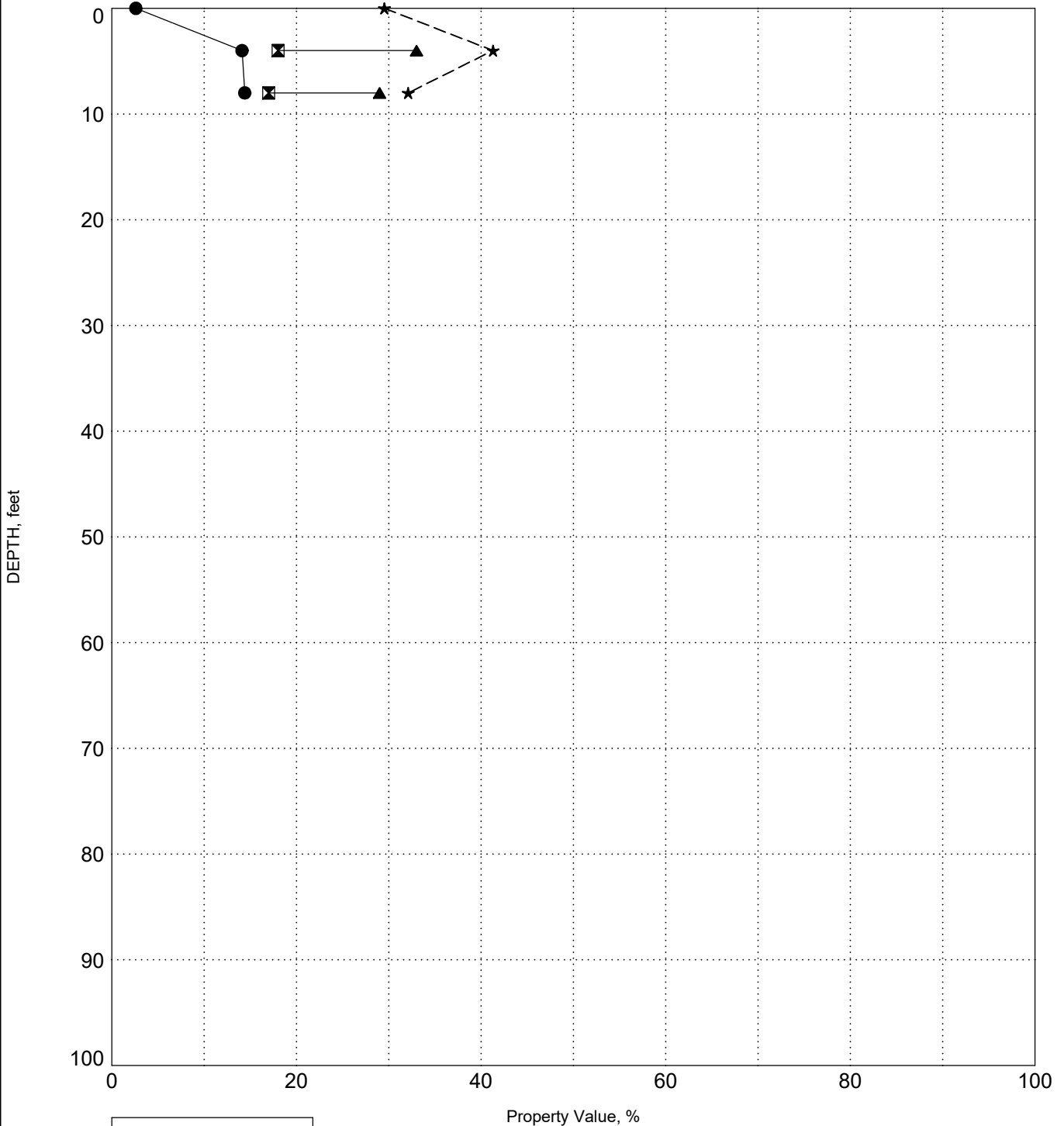
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 458.1

BORING W- 3



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

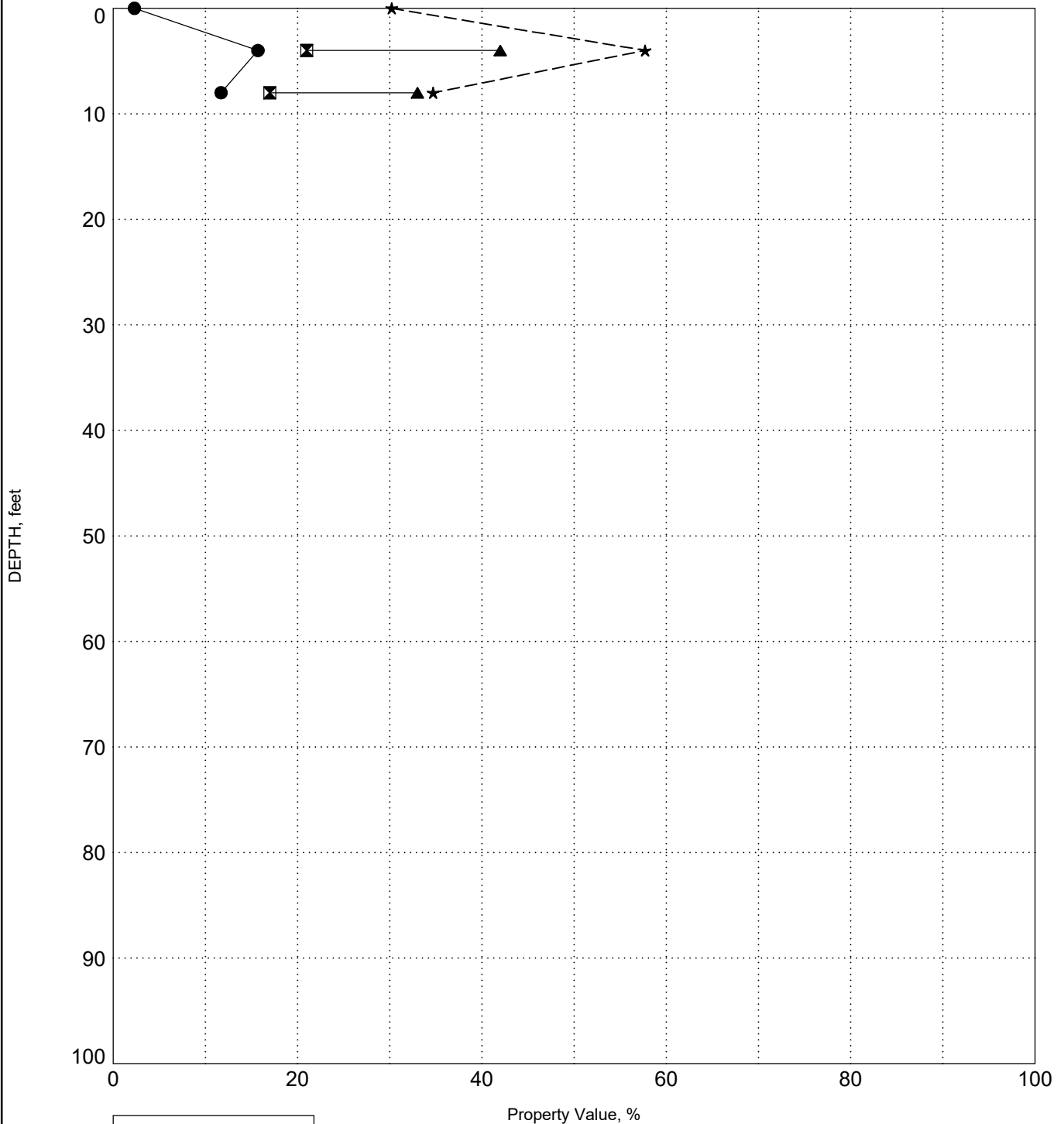
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 459.1

BORING W- 4



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

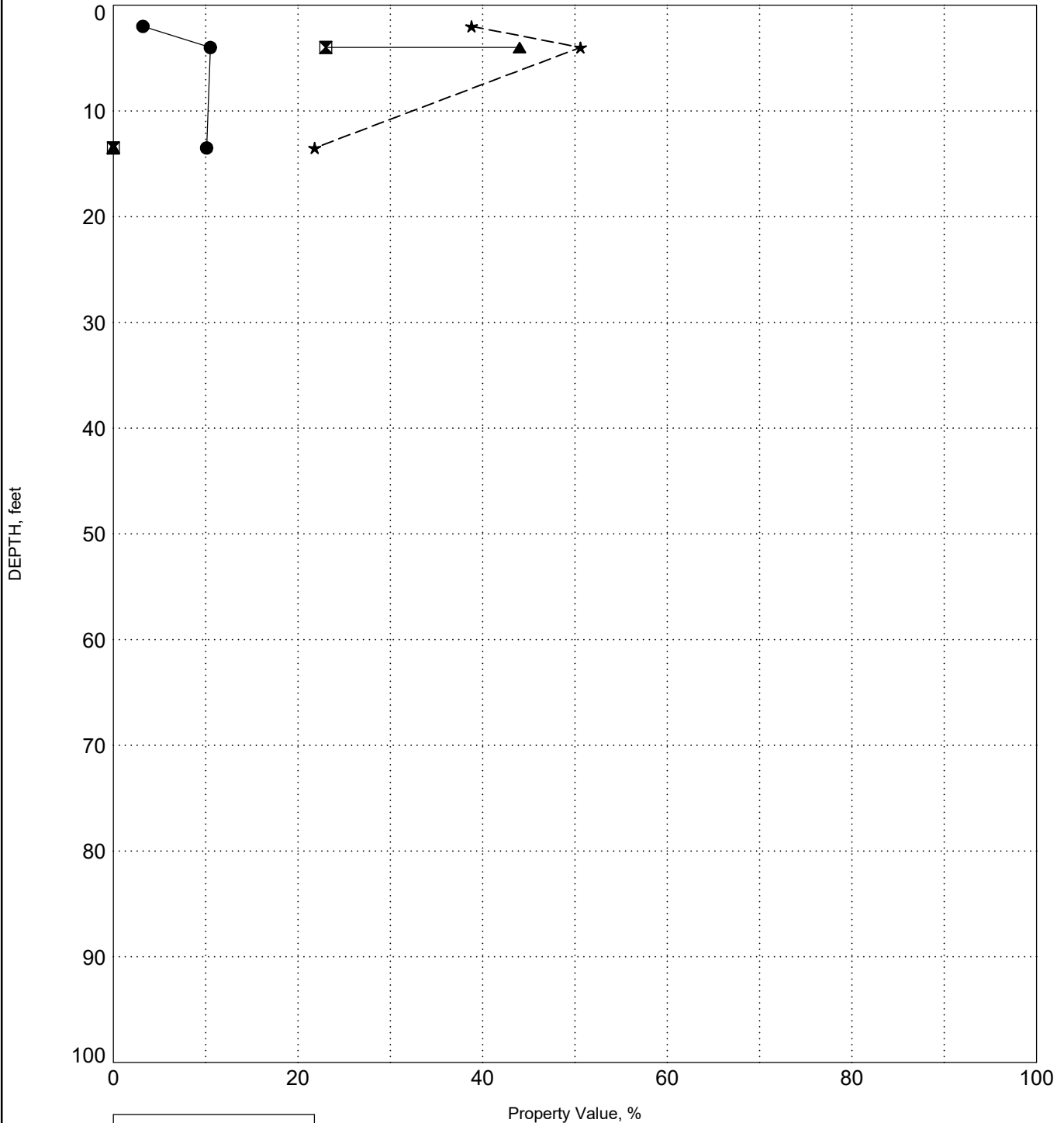
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 460.9

BORING W- 5



LEGEND	
●	Water Content
⊠	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

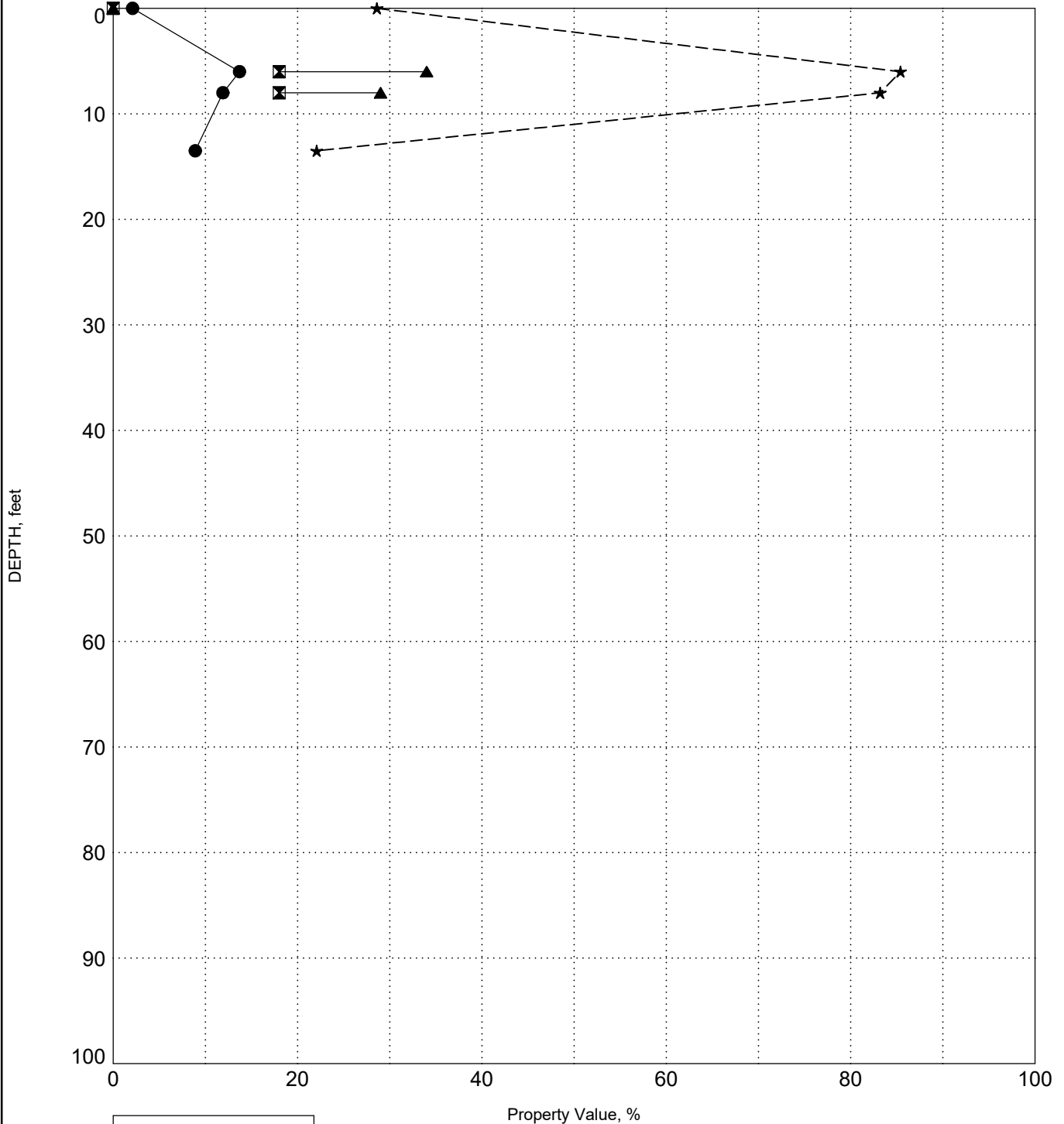
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 460.9

BORING W- 6



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

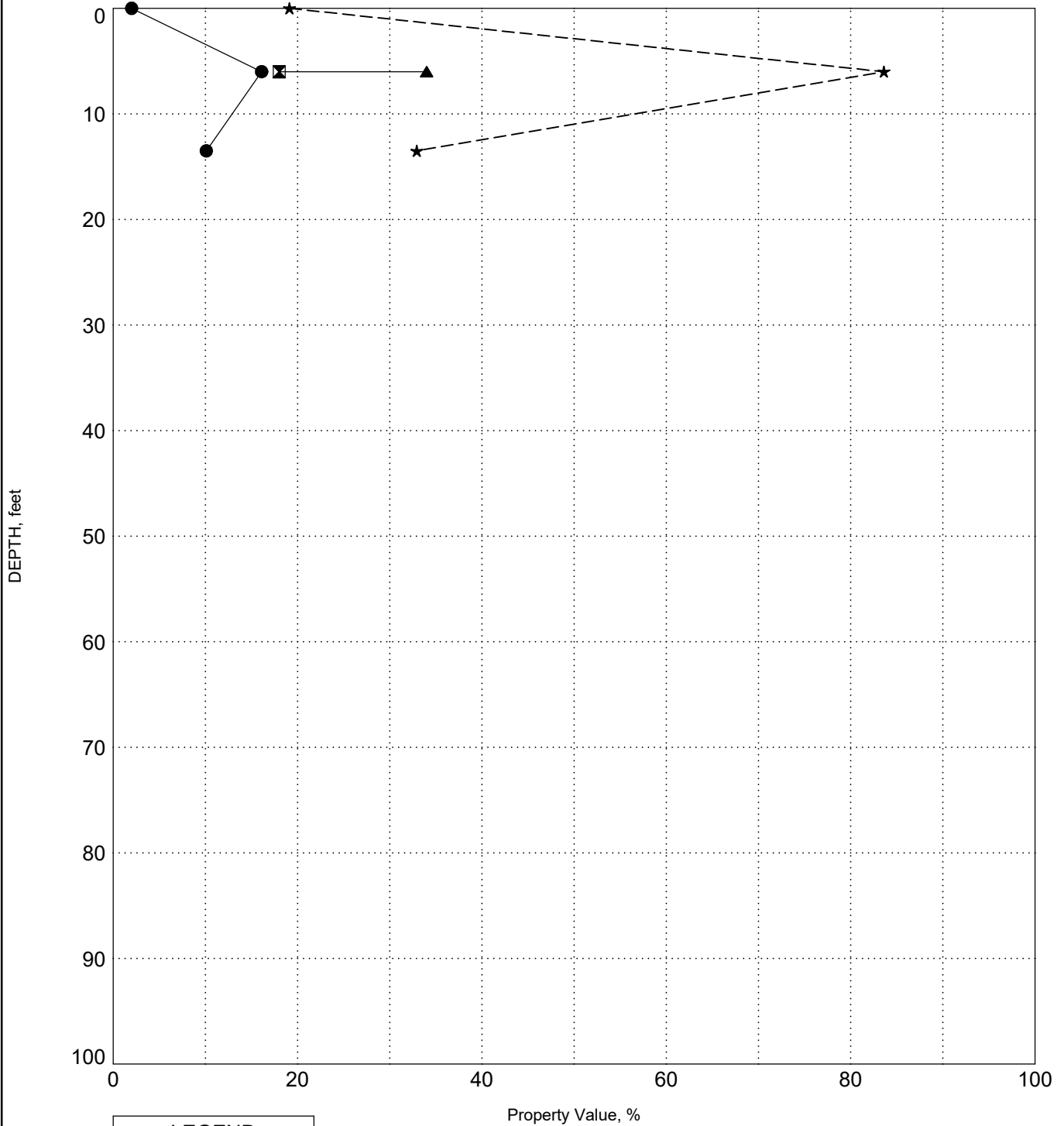
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 461.7

BORING W-7



LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines



INDEX PROPERTIES VERSUS DEPTH

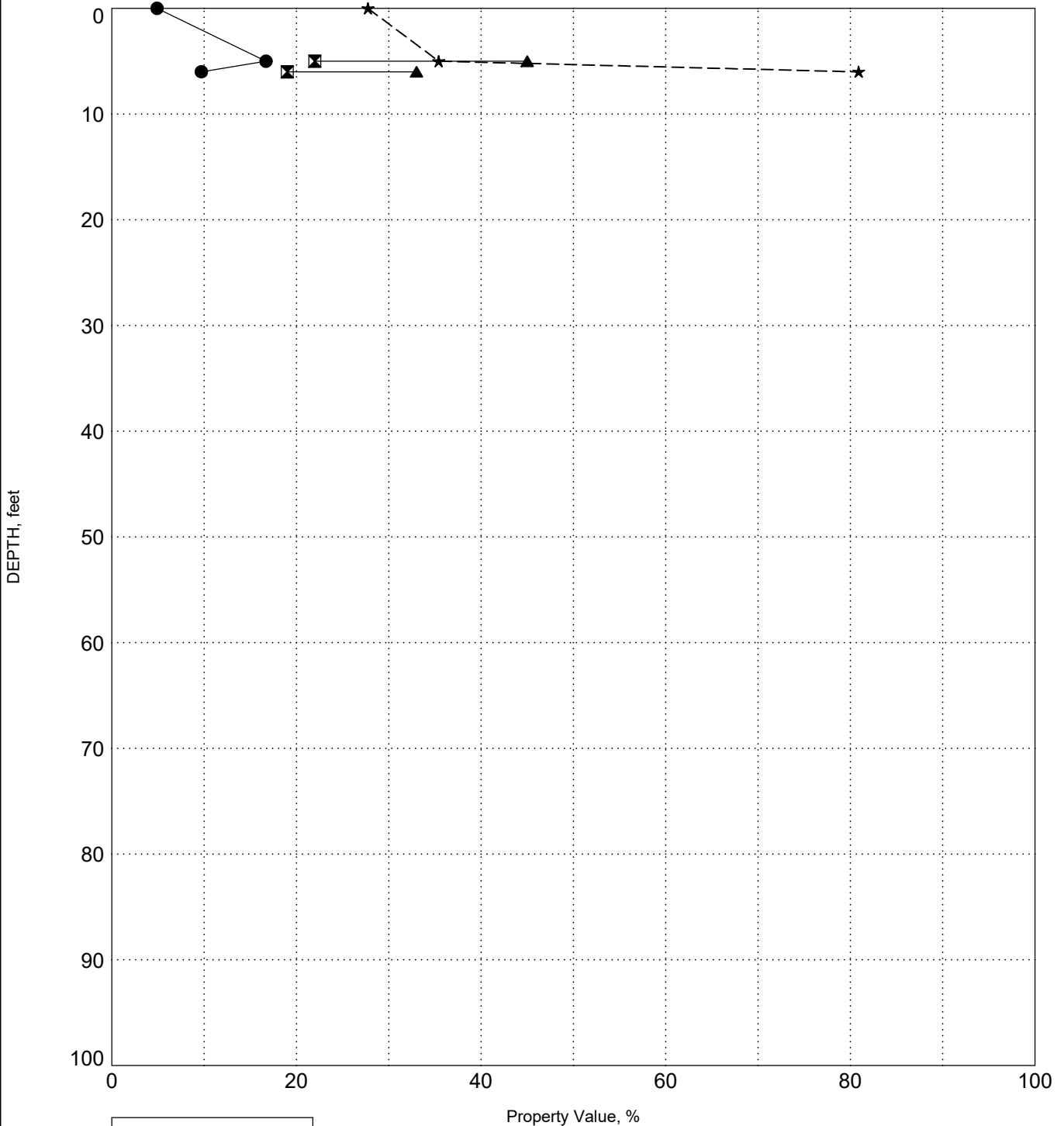
PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

SURFACE ELEVATION: 461.6

BORING W- 8



LEGEND	
●	Water Content
▣	Plastic Limit
▲	Liquid Limit
★	Fines

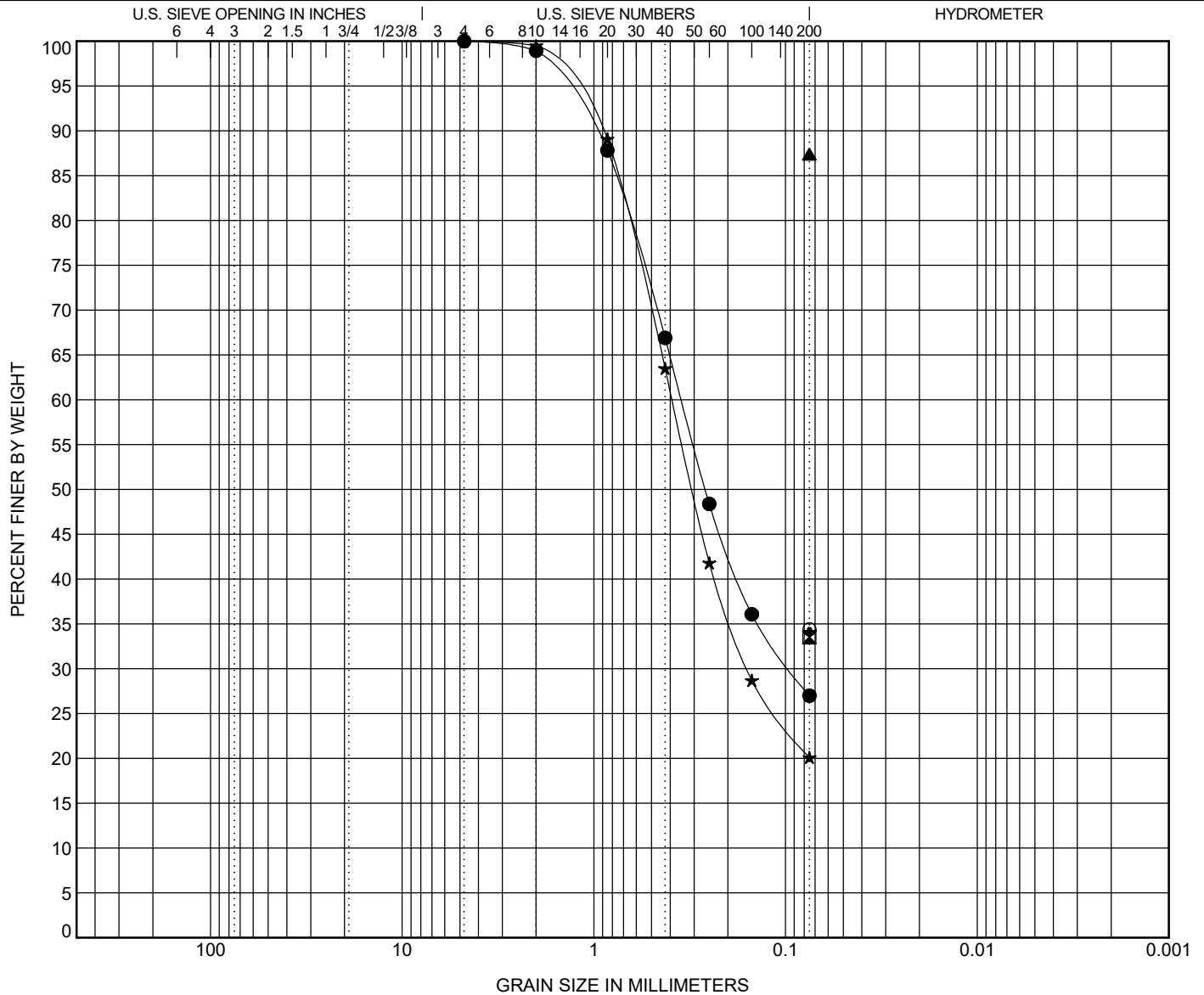


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● EB-1C	0.0	Silty SAND (SM)									
☒ EB-1C	4.0	Clayey SAND (SC)									
▲ EB-1C	23.5	SILT with Sand (ML)					44	33	11		
★ EB-2C	0.0	Silty SAND (SM)									
◎ EB-2C	4.0	Clayey SAND (SC)					40	22	18		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● EB-1C	0.0	4.75	0.349	0.094		0.0	73.0	27.0			
☒ EB-1C	4.0	0.075						33.5			
▲ EB-1C	23.5	0.075						87.4			
★ EB-2C	0.0	4.75	0.39	0.158		0.0	79.9	20.1			
◎ EB-2C	4.0	0.075						34.4			

GRAIN SIZE 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24

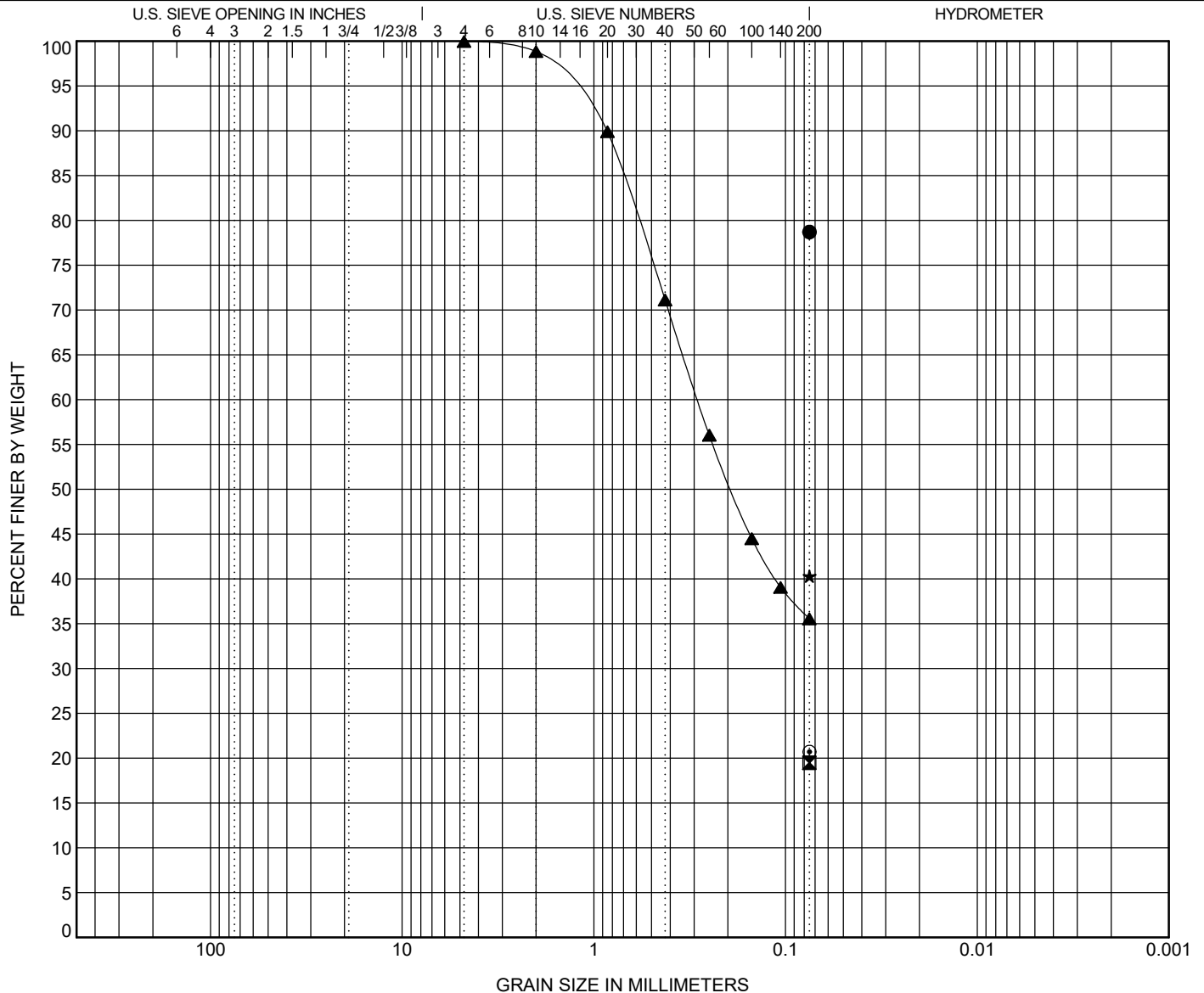


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



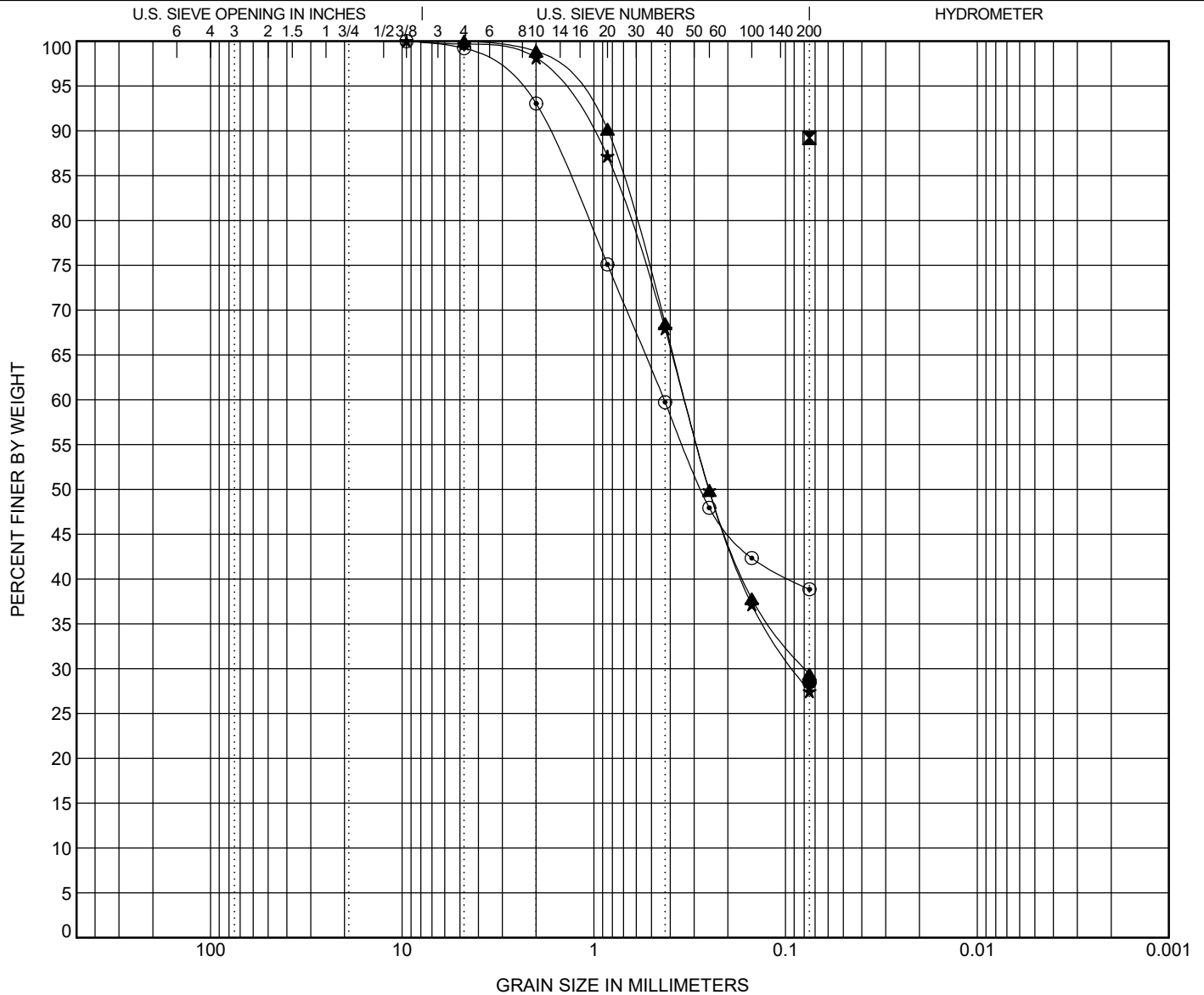


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● EB-4C	8.0	Clayey SAND (SC)									
☒ EB-4C	13.5	SILT (ML)					41	37	4		
▲ EB-5C	0.0	Silty SAND (SM)									
★ EB-5C	6.0	Silty SAND (SM)					NP	NP	NP		
⊙ EB-5C	8.0	Silty SAND (SM)					NP	NP	NP		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● EB-4C	8.0	0.075						28.5			
☒ EB-4C	13.5	0.075						89.2			
▲ EB-5C	0.0	4.75	0.334	0.079		0.0	70.6	29.4			
★ EB-5C	6.0	9.5	0.337	0.09		0.3	72.2	27.5			
⊙ EB-5C	8.0	9.5	0.43			0.8	60.4	38.9			

GRAIN SIZE 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24

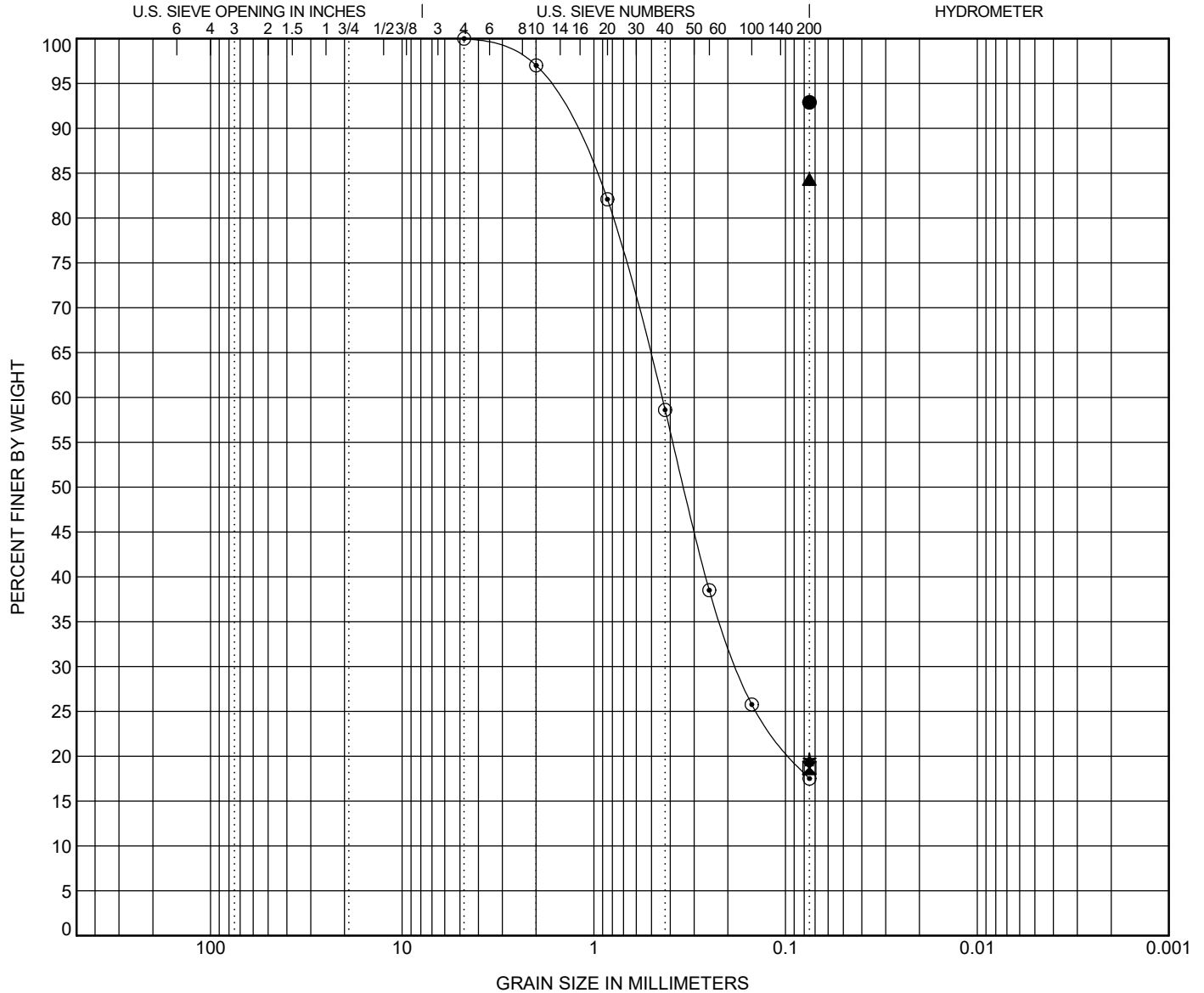


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



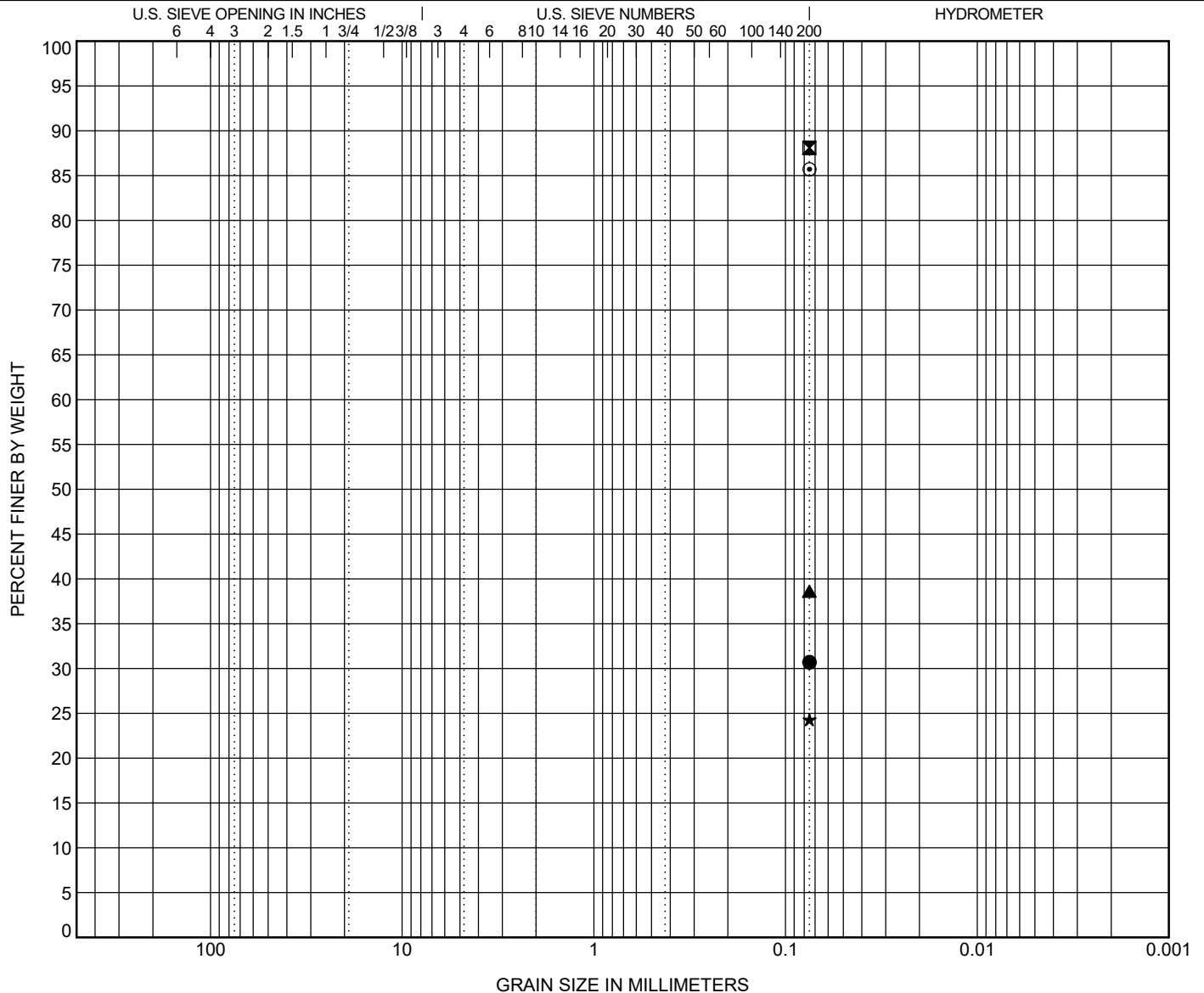


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



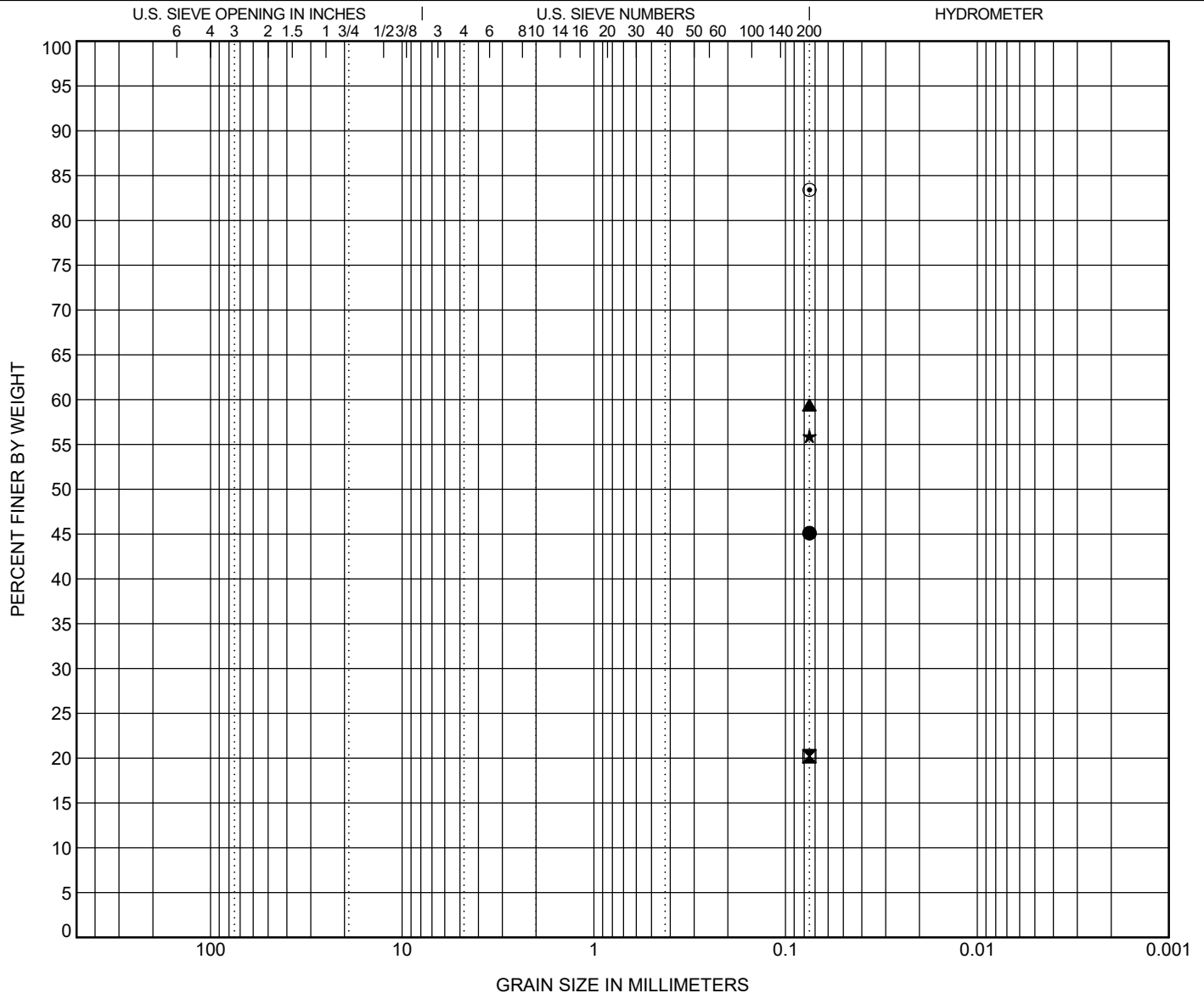


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● IB- 1C	0.0	Clayey SAND (SC)					34	16	18		
☒ IB- 1C	6.0	Clayey SAND (SC)					36	18	18		
▲ IB- 1C	18.5	Sandy Elastic SILT (MH)					58	38	20		
★ IB- 2C	2.0	Sandy Lean CLAY (CL)					38	18	20		
◎ IB- 2C	13.5	SILT with Sand (ML)					46	30	16		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● IB- 1C	0.0	0.075						45.1			
☒ IB- 1C	6.0	0.075						20.2			
▲ IB- 1C	18.5	0.075						59.4			
★ IB- 2C	2.0	0.075						55.9			
◎ IB- 2C	13.5	0.075						83.4			

GRAIN SIZE 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24

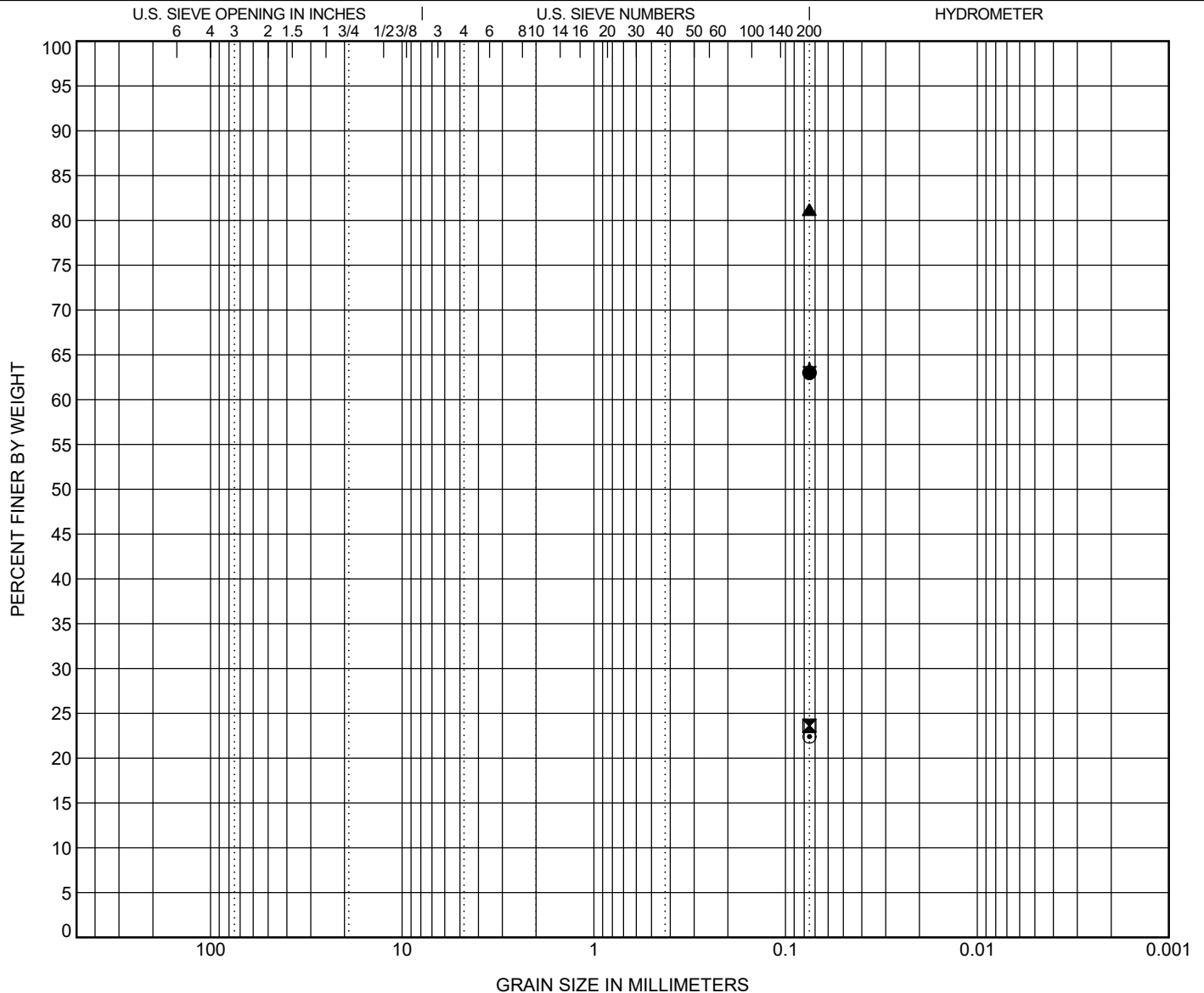


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



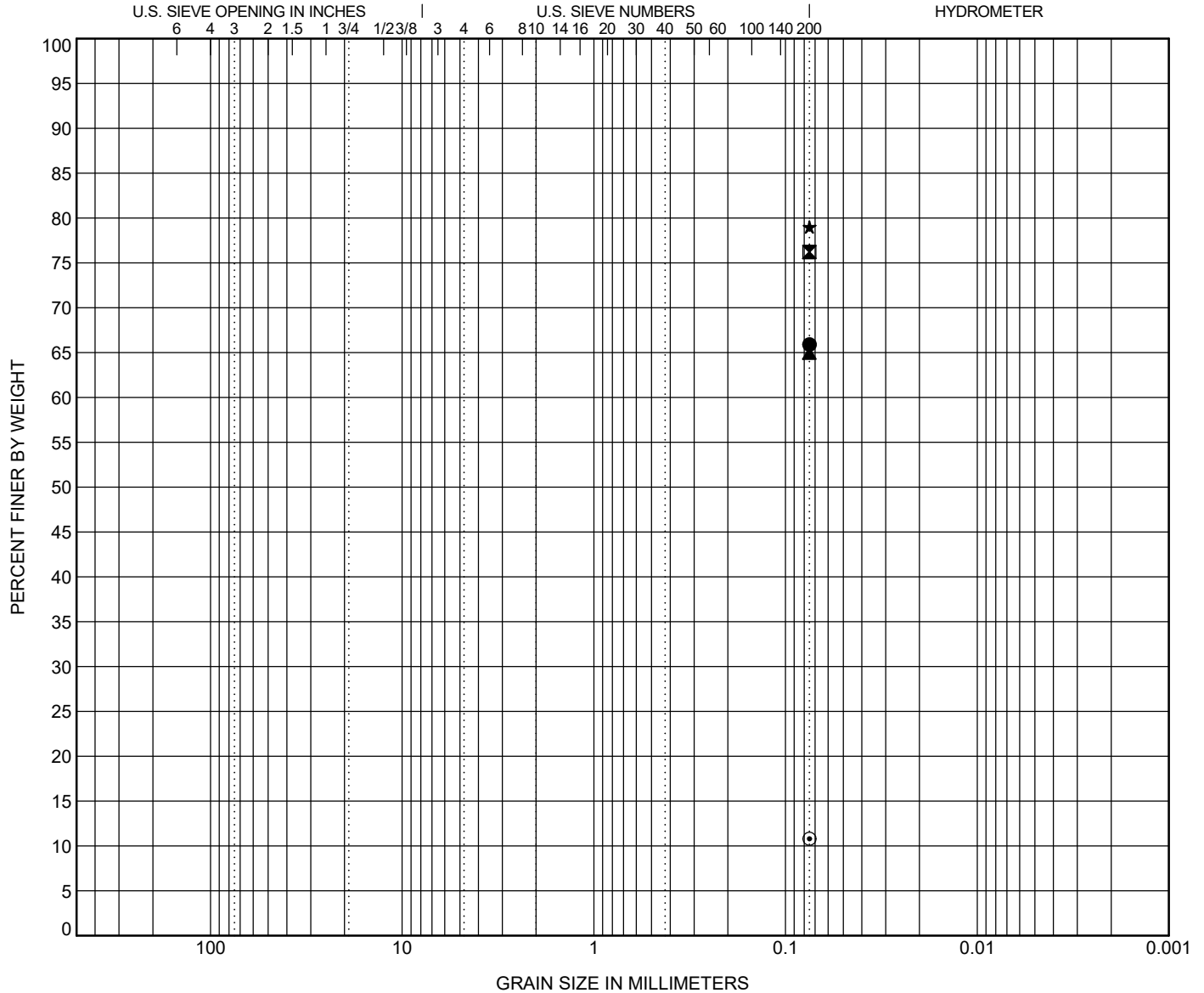


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



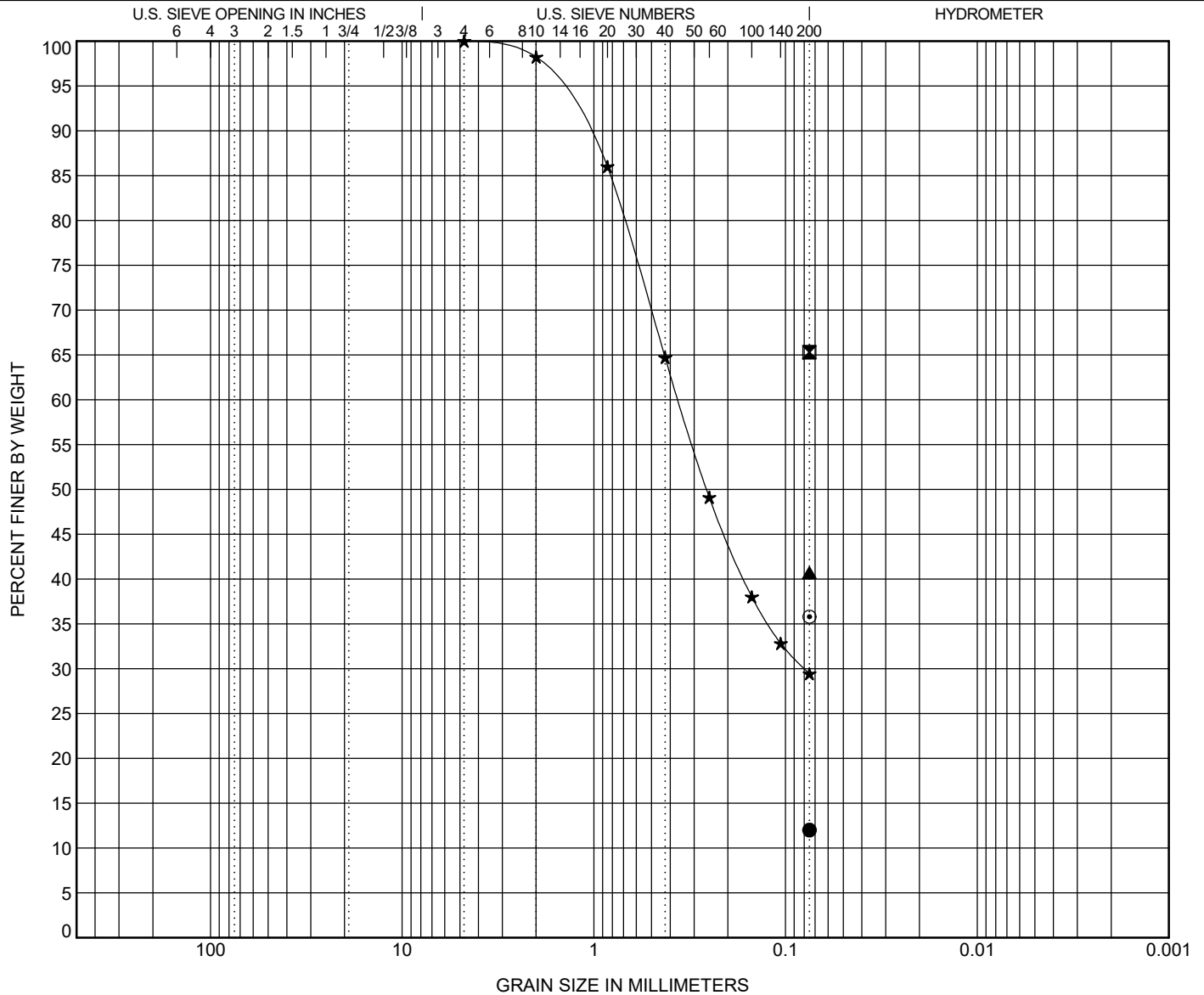


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



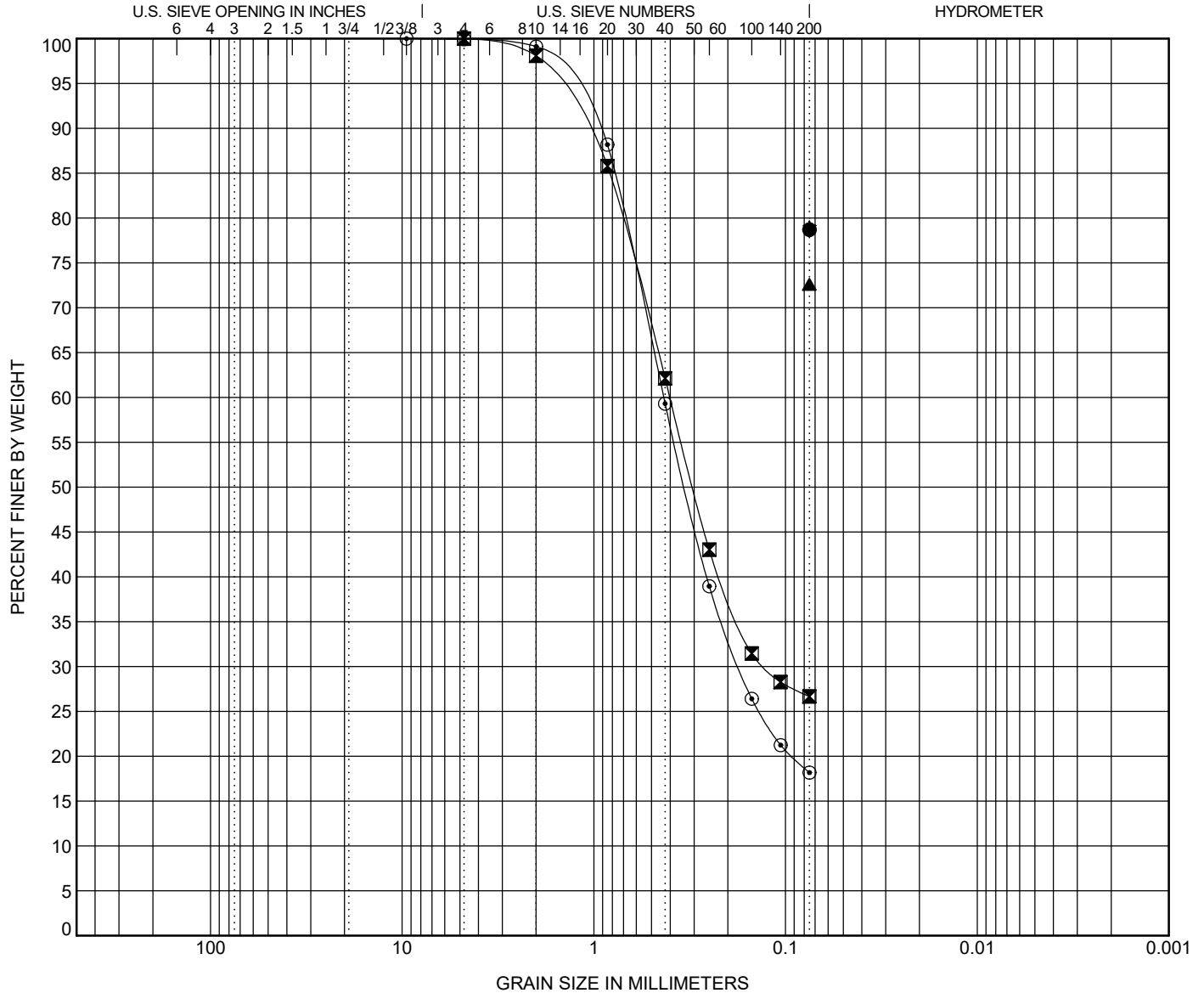


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● IB- 7C	8.0	Lean CLAY with Sand (CL)					37	18	19		
▣ IB- 7C	13.5	Silty SAND (SM)									
▲ IB- 7C	28.5	SILT with Sand (ML)					44	33	11		
★ IB- 7C	63.5	SILT with Sand (ML)					39	33	6		
◎ IB- 8C	0.0	Silty SAND (SM)									
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● IB- 7C	8.0	0.075						78.7			
▣ IB- 7C	13.5	4.75	0.401	0.128		0.0	73.3	26.7			
▲ IB- 7C	28.5	0.075						72.6			
★ IB- 7C	63.5	0.075						79.0			
◎ IB- 8C	0.0	9.5	0.432	0.174		0.1	81.8	18.2			

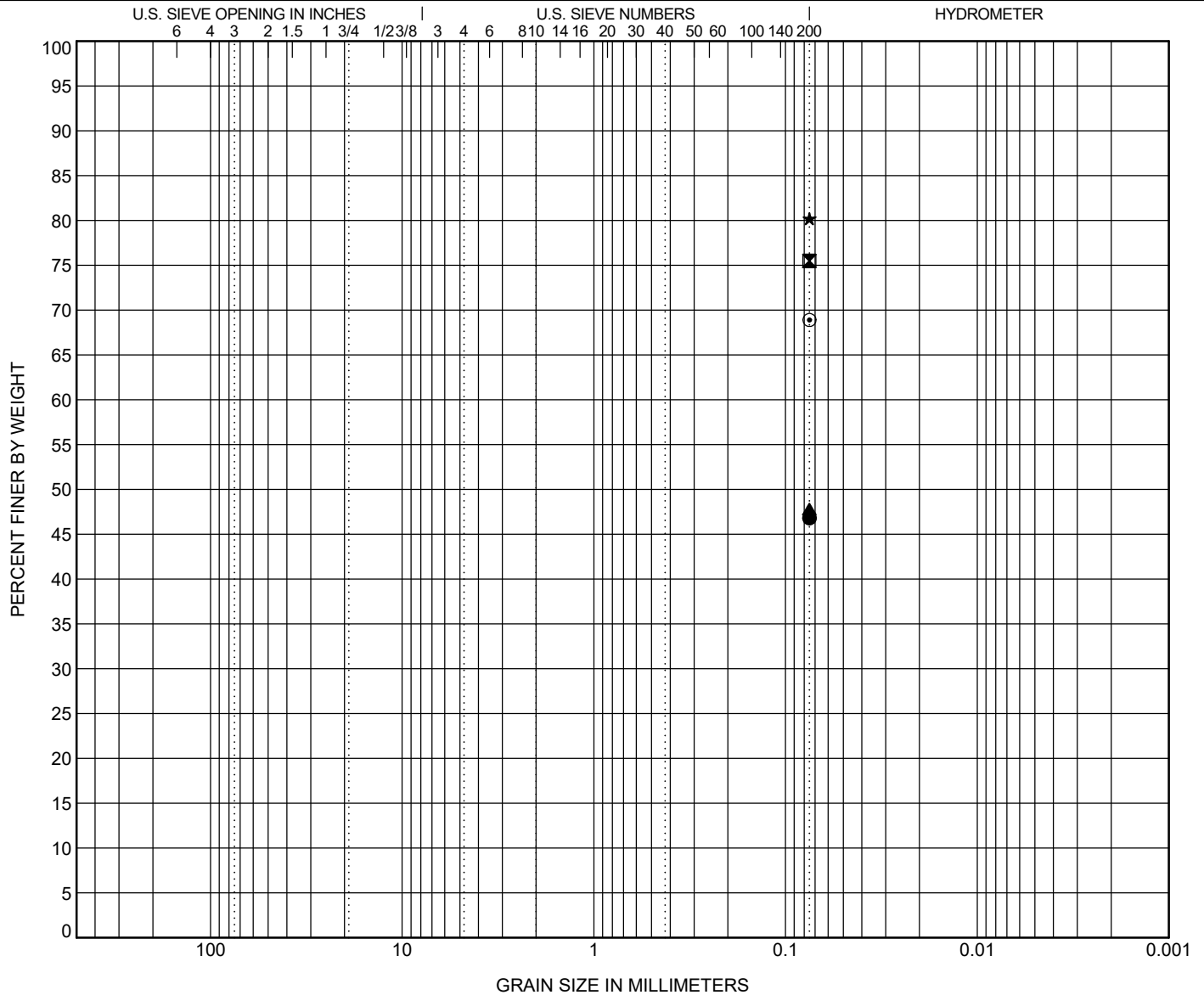


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



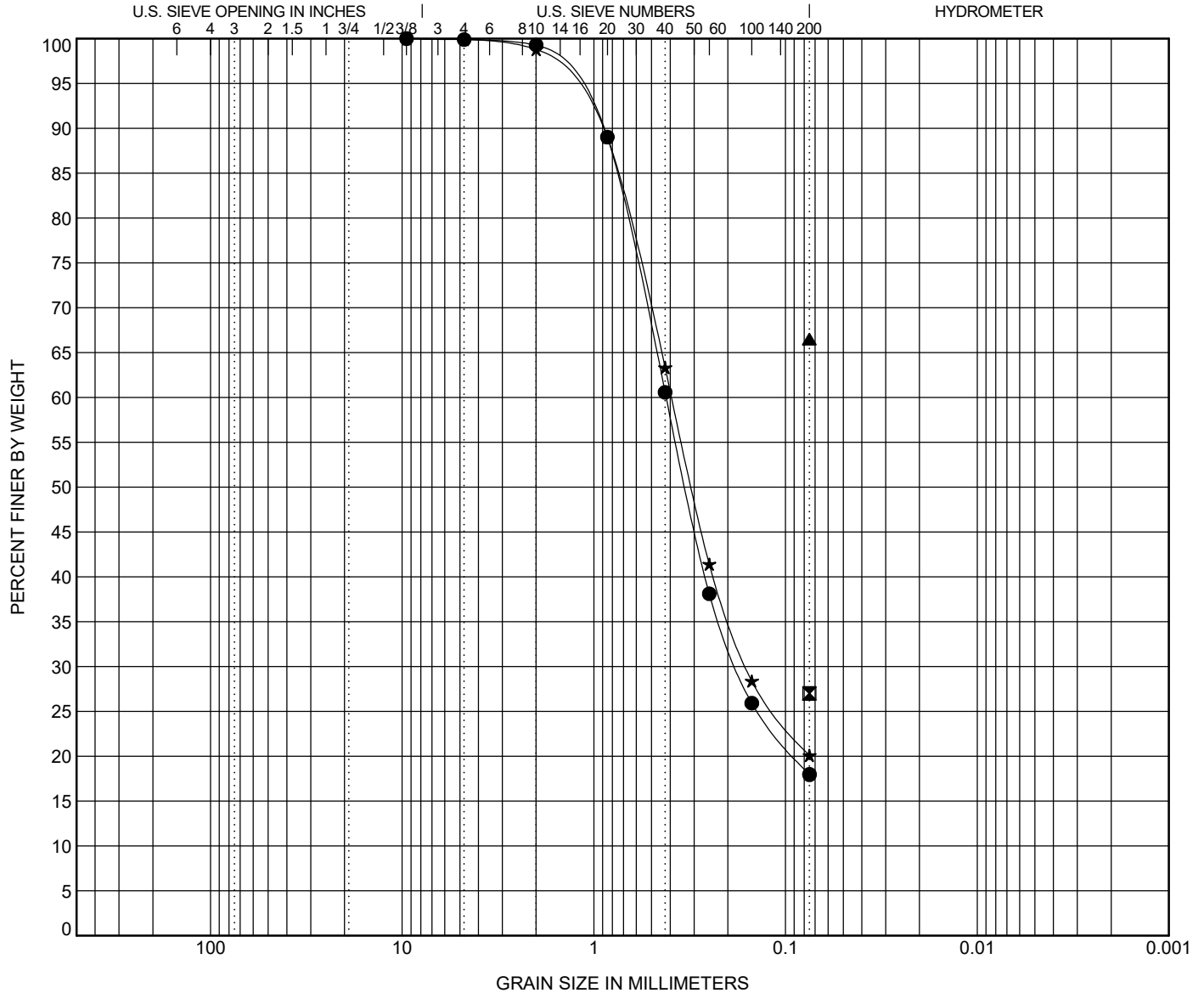


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

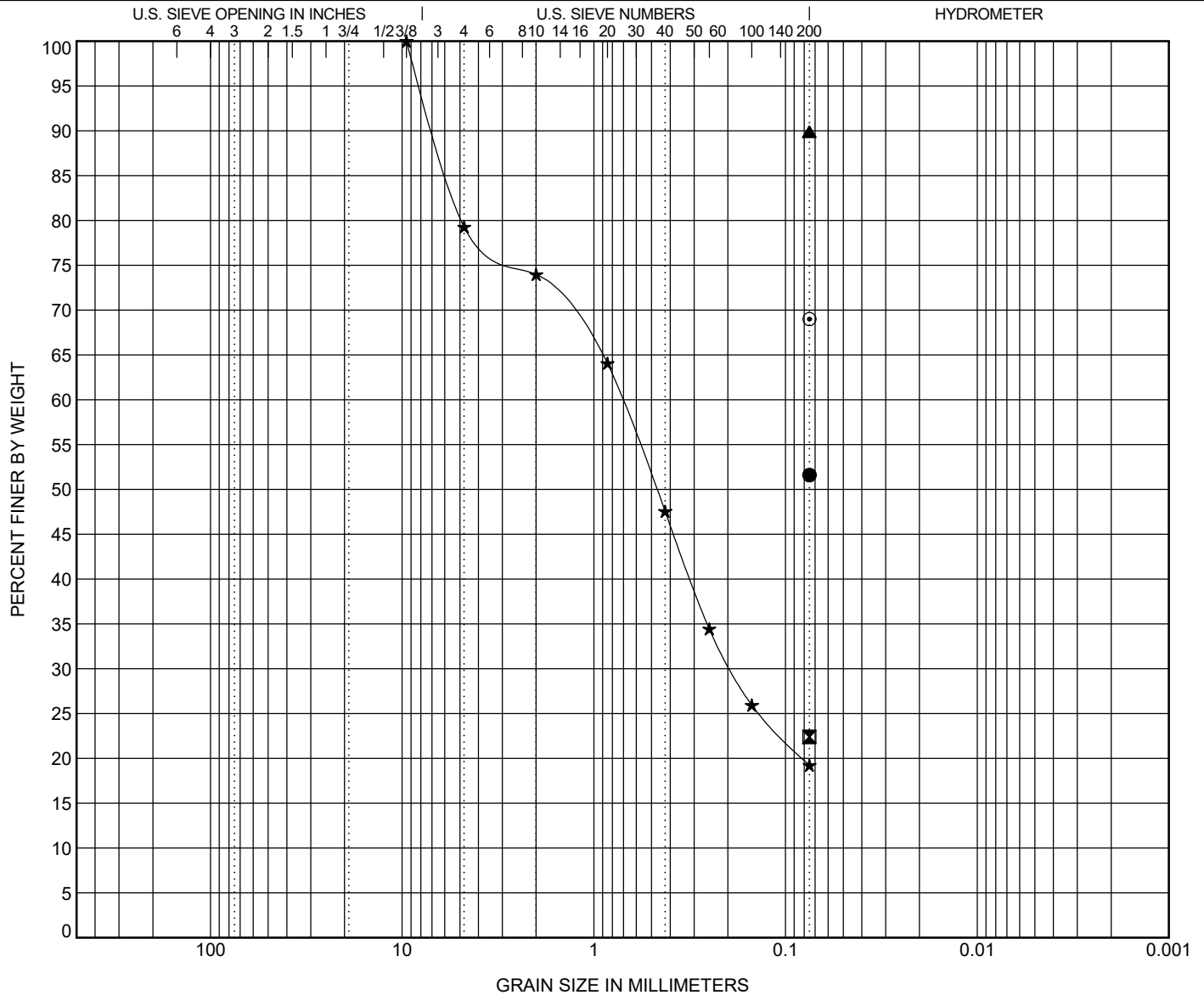
BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● IB- 9C	0.0	Silty SAND (SM)					NP	NP	NP		
☒ IB- 9C	8.0	Clayey SAND (SC)									
▲ IB- 9C	13.5	Sandy Lean CLAY (CL)					30	17	13		
★ IB-10C	0.0	Silty SAND (SM)					NP	NP	NP		
◎ IB-10C	2.0	Silty SAND (SM)									
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● IB- 9C	0.0	9.5	0.419	0.178		0.1	81.9	18.0			
☒ IB- 9C	8.0	0.075						27.0			
▲ IB- 9C	13.5	0.075						66.5			
★ IB-10C	0.0	9.5	0.392	0.16		0.1	79.8	20.1			
◎ IB-10C	2.0	0.075						17.9			

GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification					LL	PL	PI	Cc	Cu
●	IB-10C	8.0	Sandy Fat CLAY (CH)					50	27	23		
▣	IB-10C	18.5	Silty SAND (SM)									
▲	IB-10C	28.5	Elastic SILT (MH)					62	45	17		
★	IB-11C	0.0	Silty SAND (SM)					NP	NP	NP		
◎	IB-11C	2.0	Sandy SILT (ML)					42	28	14		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
●	IB-10C	8.0	0.075					51.6				
▣	IB-10C	18.5	0.075					22.4				
▲	IB-10C	28.5	0.075					89.9				
★	IB-11C	0.0	9.5	0.716	0.191	20.7	60.0	19.2				
◎	IB-11C	2.0	0.075					69.0				

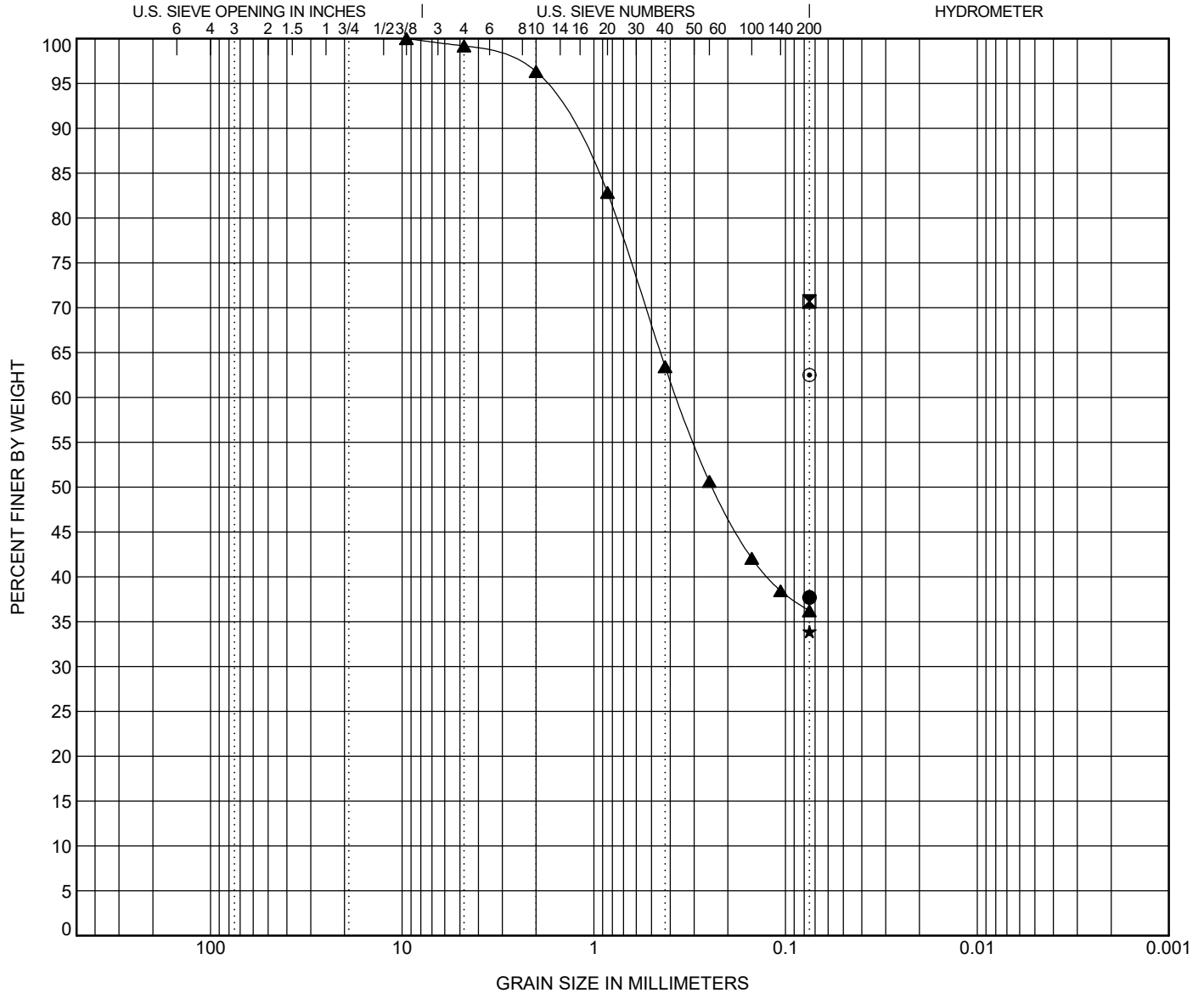


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



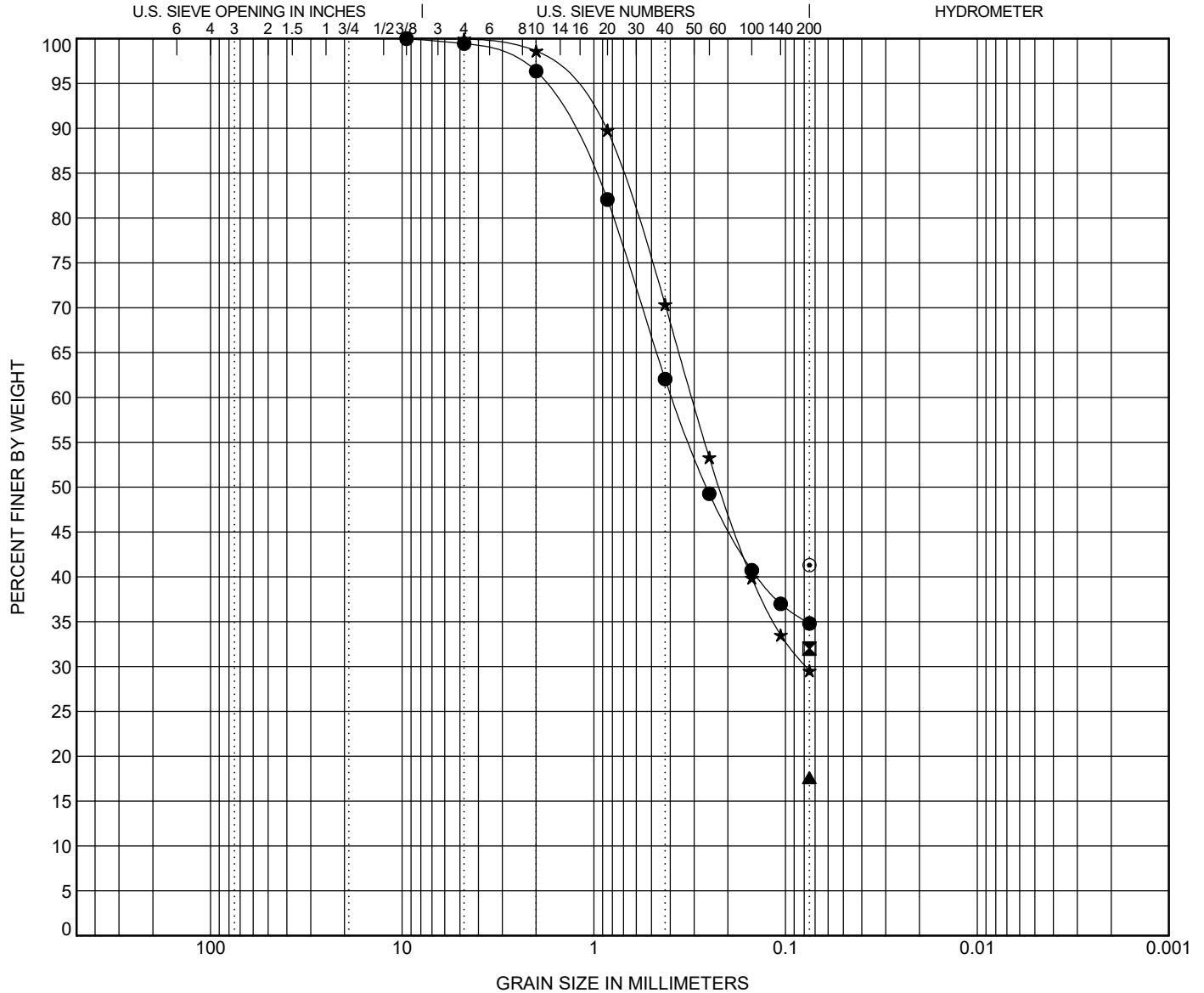


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● W-2	0.0	Silty SAND (SM)									
■ W-2	4.0	Clayey SAND (SC)					32	16	16		
▲ W-2	8.0	Clayey SAND (SC)					32	14	18		
★ W-3	0.0	Silty SAND (SM)									
◎ W-3	4.0	Clayey SAND (SC)					33	18	15		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● W-2	0.0	9.5	0.39			0.6	64.7	34.8			
■ W-2	4.0	0.075						32.0			
▲ W-2	8.0	0.075						17.6			
★ W-3	0.0	9.5	0.308	0.078		0.0	70.4	29.5			
◎ W-3	4.0	0.075						41.3			

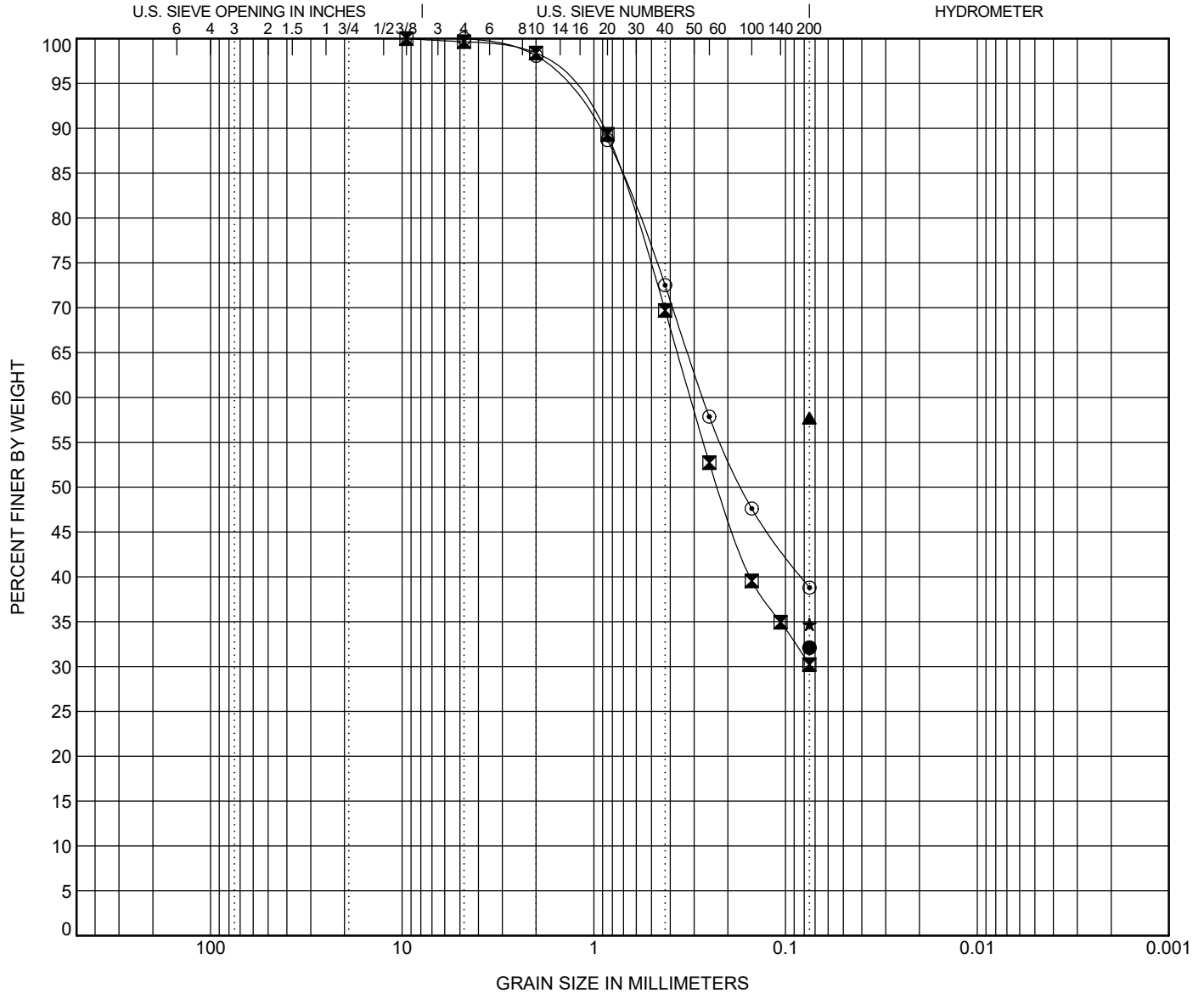


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



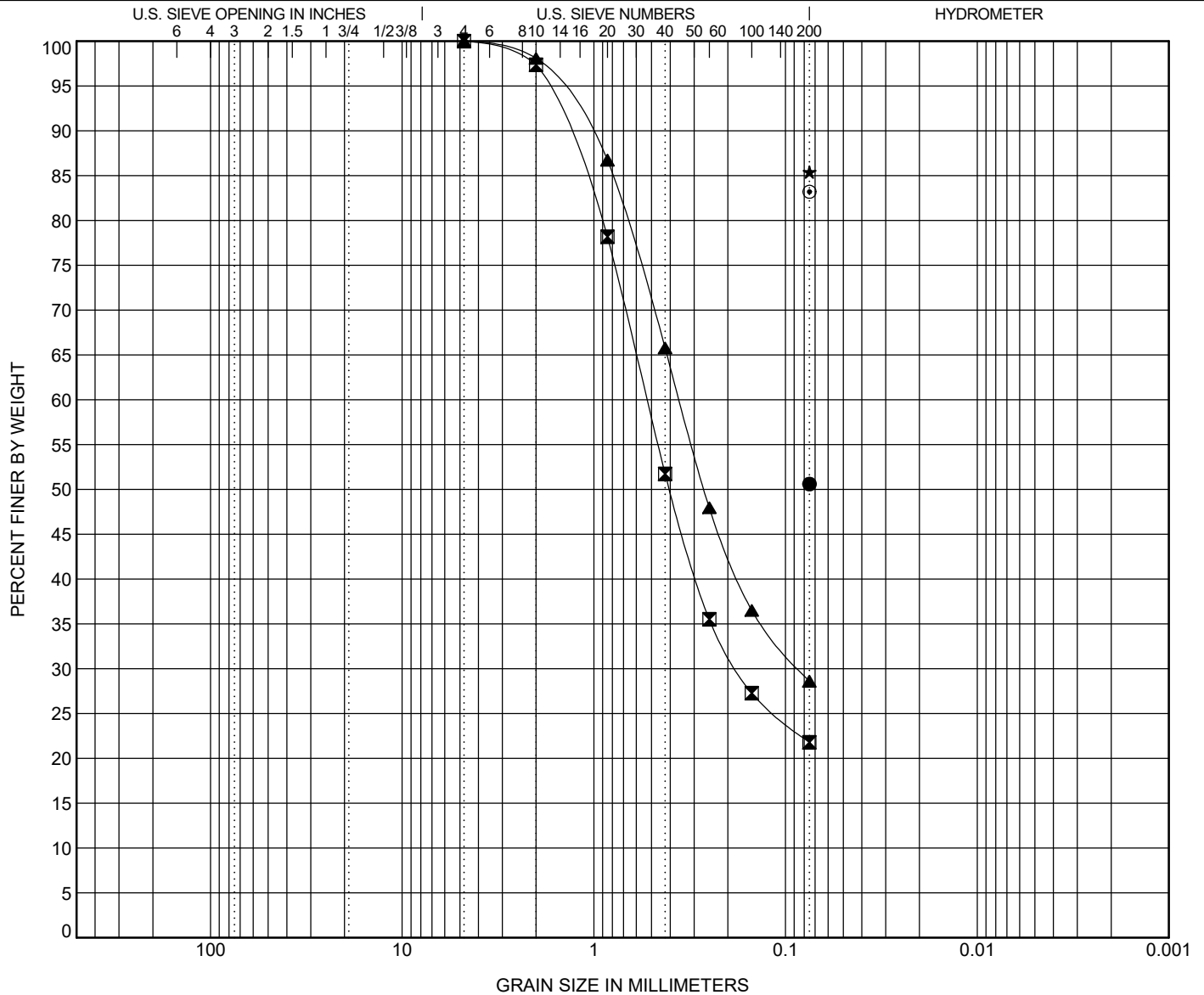


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● W-5	4.0	Sandy Lean CLAY (CL)					44	23	21		
■ W-5	13.5	Silty SAND (SM)					NP	NP	NP		
▲ W-6	0.0	Silty SAND (SM)					NP	NP	NP		
★ W-6	6.0	Lean CLAY with Sand (CL)					34	18	16		
⊙ W-6	8.0	Lean CLAY with Sand (CL)					29	18	11		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● W-5	4.0	0.075						50.6			
■ W-5	13.5	4.75	0.528	0.178		0.0	78.2	21.8			
▲ W-6	0.0	4.75	0.358	0.085		0.0	71.4	28.6			
★ W-6	6.0	0.075						85.4			
⊙ W-6	8.0	0.075						83.2			

GRAIN SIZE 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 1/12/24

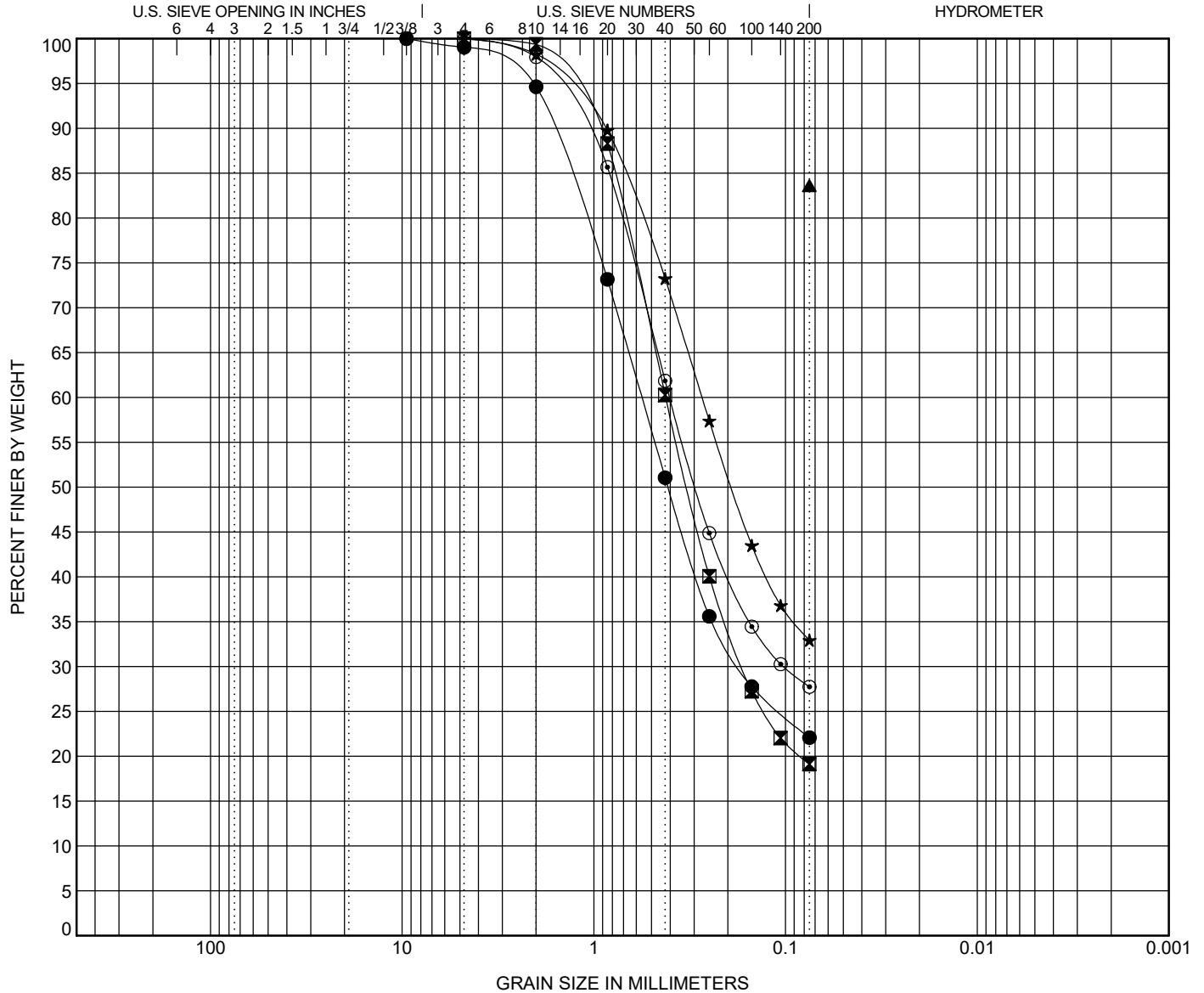


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● W-6	13.5	Silty SAND (SM)									
☒ W-7	0.0	Silty SAND (SM)									
▲ W-7	6.0	Lean CLAY with Sand (CL)					34	18	16		
★ W-7	13.5	Silty SAND (SM)									
◎ W-8	0.0	Silty SAND (SM)									
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● W-6	13.5	9.5	0.563	0.174		1.0	77.0	22.1			
☒ W-7	0.0	4.75	0.422	0.167		0.0	80.9	19.1			
▲ W-7	6.0	0.075						83.6			
★ W-7	13.5	4.75	0.273			0.0	67.1	32.9			
◎ W-8	0.0	9.5	0.401	0.102		0.1	72.2	27.7			

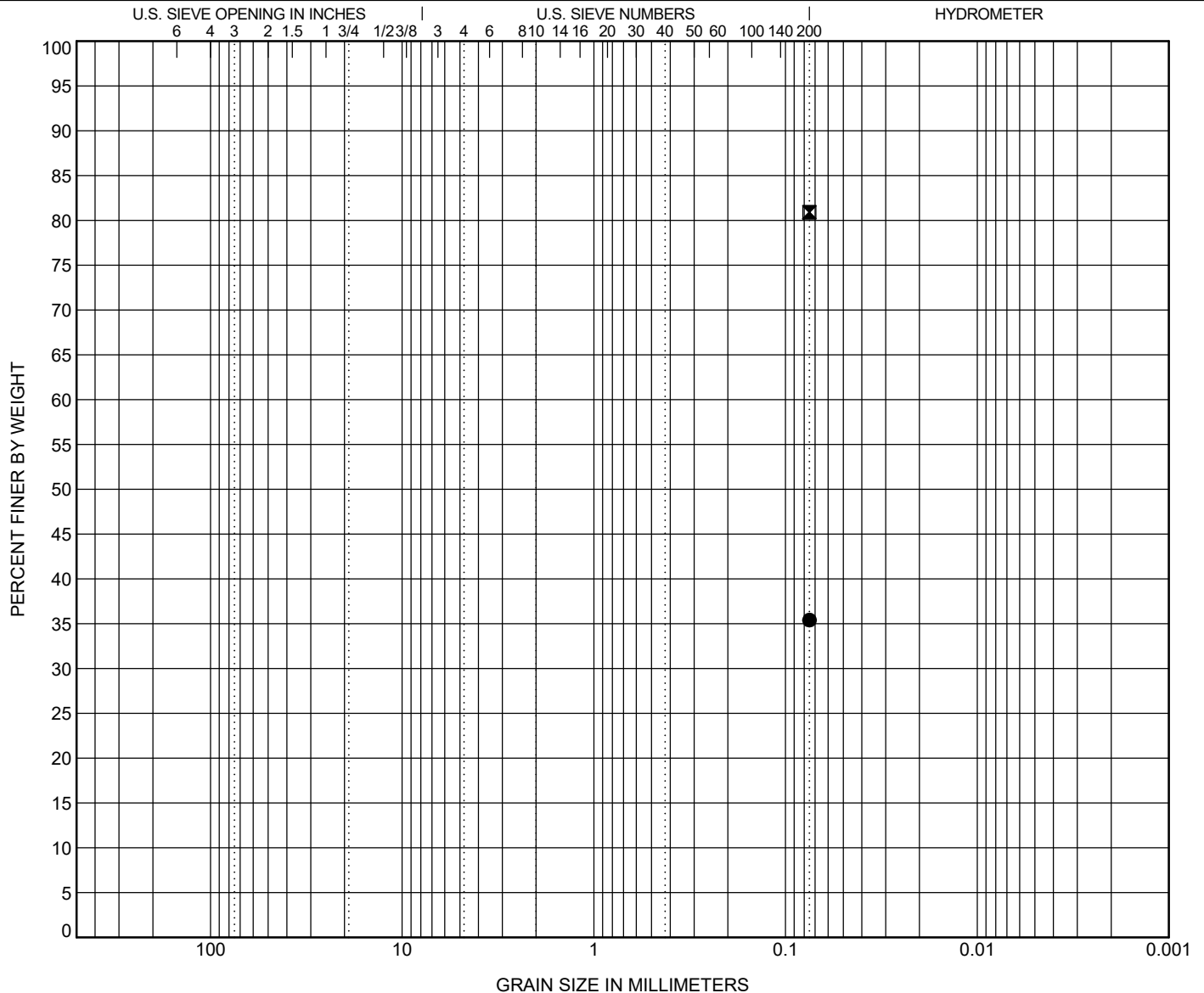


GRAIN SIZE DISTRIBUTION

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● W-8	5.0	Clayey SAND (SC)					45	22	23		
■ W-8	6.0	Lean CLAY with Sand (CL)					33	19	14		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● W-8	5.0	0.075						35.4			
■ W-8	6.0	0.075						80.9			

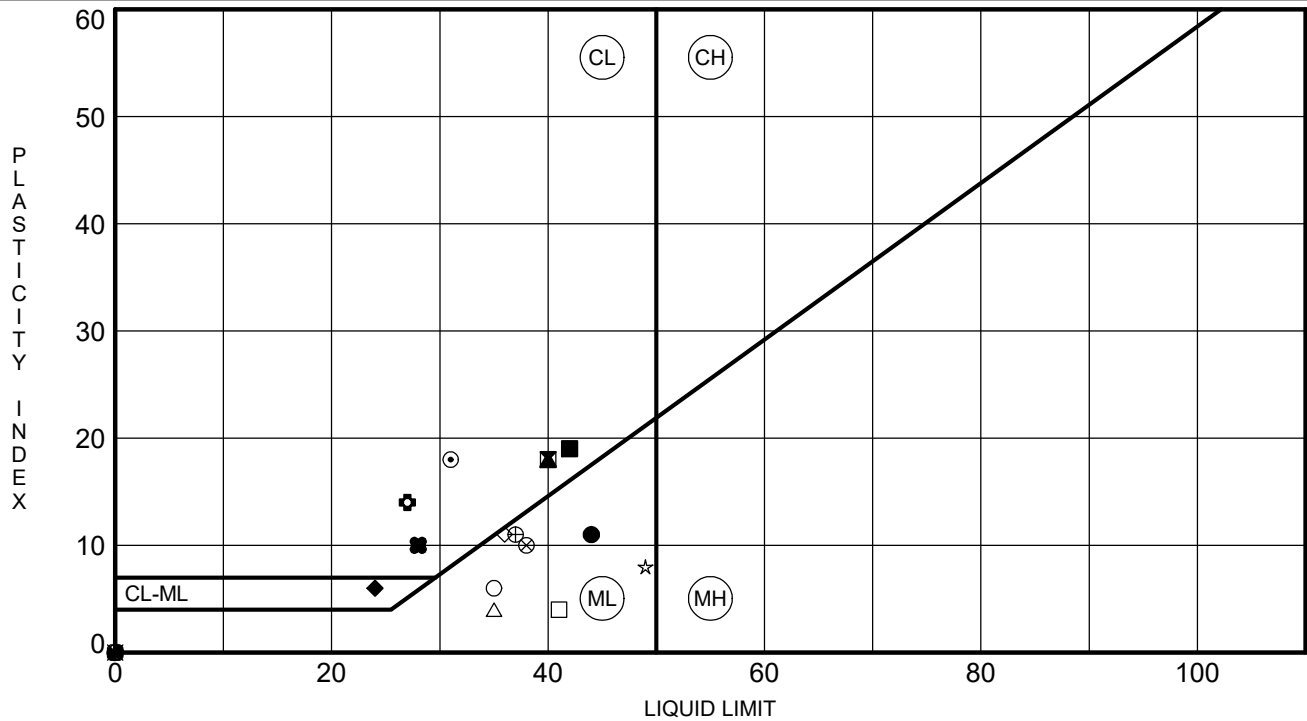


ATTERBERG LIMITS' RESULTS

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



ATTERBERG LIMITS 23610178A CONNECTOR BRIDGE OVER I-77 GPJ SCDOT DATA TEMPLATE 01_30_2015.GDT 1/12/24

	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	EB-1C	23.5	44	33	11	87	SILT with Sand (ML)
⊠	EB-2C	4.0	40	22	18	34	Clayey SAND (SC)
▲	EB-2C	6.0	40	22	18	79	Lean CLAY with Sand (CL)
★	EB-2C	18.5	NP	NP	NP	20	Silty SAND (SM)
⊙	EB-3C	4.0	31	13	18	40	Clayey SAND (SC)
⊕	EB-3C	8.0	27	13	14	21	Clayey SAND (SC)
○	EB-3C	33.5	35	29	6	81	SILT with Sand (ML)
△	EB-3C	78.5	35	31	4	67	Sandy SILT (ML)
⊗	EB-3C	93.5	38	28	10	70	Sandy SILT (ML)
⊕	EB-4C	6.0	37	26	11	44	Silty SAND (SM)
□	EB-4C	13.5	41	37	4	89	SILT (ML)
⊕	EB-5C	6.0	NP	NP	NP	27	Silty SAND (SM)
⬤	EB-5C	8.0	NP	NP	NP	39	Silty SAND (SM)
★	EB-5C	23.5	49	41	8	93	SILT (ML)
⊗	EB-6C	0.0	NP	NP	NP	19	Silty SAND (SM)
■	EB-6C	4.0	42	23	19	84	Lean CLAY with Sand (CL)
◆	EB-6C	13.5	24	18	6	20	Silty, Clayey SAND (SC-SM)
◇	EM- 1	8.0	36	25	11	88	SILT with Sand (ML)
×	EM- 2	0.0	NP	NP	NP	39	Silty SAND (SM)
⬤	EM- 2	6.0	28	18	10	24	Clayey SAND (SC)

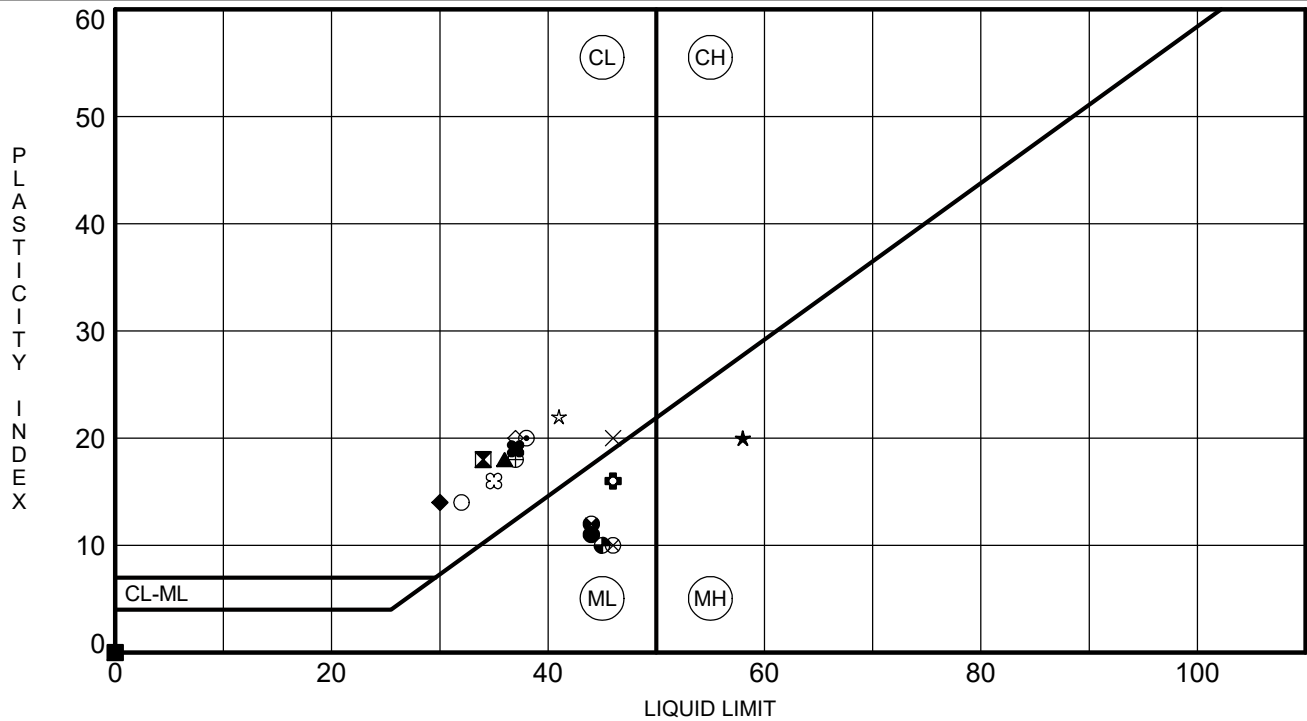


ATTERBERG LIMITS' RESULTS

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



ATTERBERG LIMITS 23610178A CONNECTOR BRIDGE OVER I-77 GPJ SCDOT DATA TEMPLATE 01_30_2015.GDT 1/12/24

	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	EM- 2	13.5	44	33	11	86	SILT with Sand (ML)
⊠	IB- 1C	0.0	34	16	18	45	Clayey SAND (SC)
▲	IB- 1C	6.0	36	18	18	20	Clayey SAND (SC)
★	IB- 1C	18.5	58	38	20	59	Sandy Elastic SILT (MH)
⊙	IB- 2C	2.0	38	18	20	56	Sandy Lean CLAY (CL)
⊕	IB- 2C	13.5	46	30	16	83	SILT with Sand (ML)
○	IB- 3C	0.0	32	18	14	63	Sandy Lean CLAY (CL)
△	IB- 3C	8.0	NP	NP	NP	24	Silty SAND (SM)
⊗	IB- 3C	13.5	46	36	10	81	SILT with Sand (ML)
⊕	IB- 4C	2.0	37	19	18	64	Sandy Lean CLAY (CL)
□	IB- 4C	8.0	NP	NP	NP	22	Silty SAND (SM)
⊗	IB- 4C	18.5	44	32	12	66	Sandy SILT (ML)
◆	IB- 4C	88.5	45	35	10	76	SILT with Sand (ML)
☆	IB- 5C	2.0	41	19	22	65	Sandy Lean CLAY (CL)
⊗	IB- 5C	4.0	35	19	16	79	Lean CLAY with Sand (CL)
■	IB- 6C	0.0	NP	NP	NP	12	Silty SAND (SM)
◆	IB- 6C	2.0	30	16	14	65	Sandy Lean CLAY (CL)
◇	IB- 6C	6.0	37	17	20	41	Clayey SAND (SC)
×	IB- 7C	4.0	46	26	20	36	Clayey SAND (SC)
⊗	IB- 7C	8.0	37	18	19	79	Lean CLAY with Sand (CL)

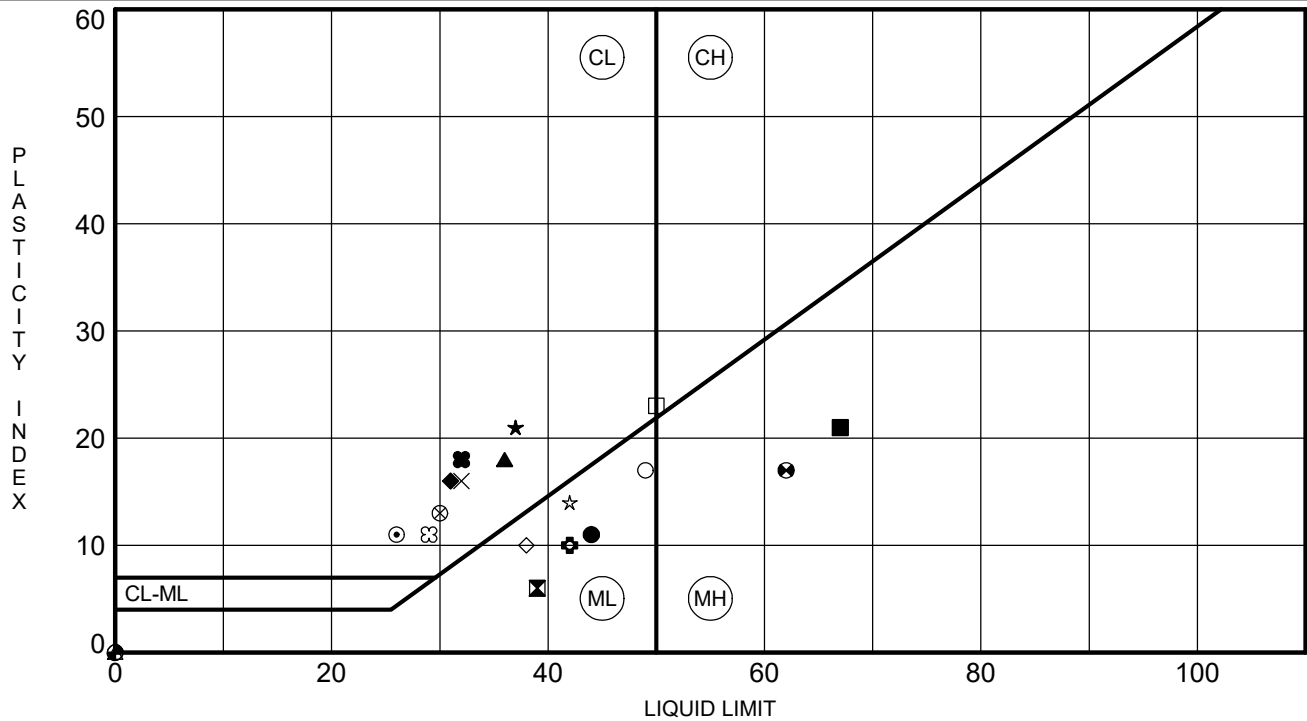


ATTERBERG LIMITS' RESULTS

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland



ATTERBERG LIMITS 23610178A CONNECTOR BRIDGE OVER I-77 GPJ SCDOT DATA TEMPLATE 01_30_2015.GDT 1/12/24

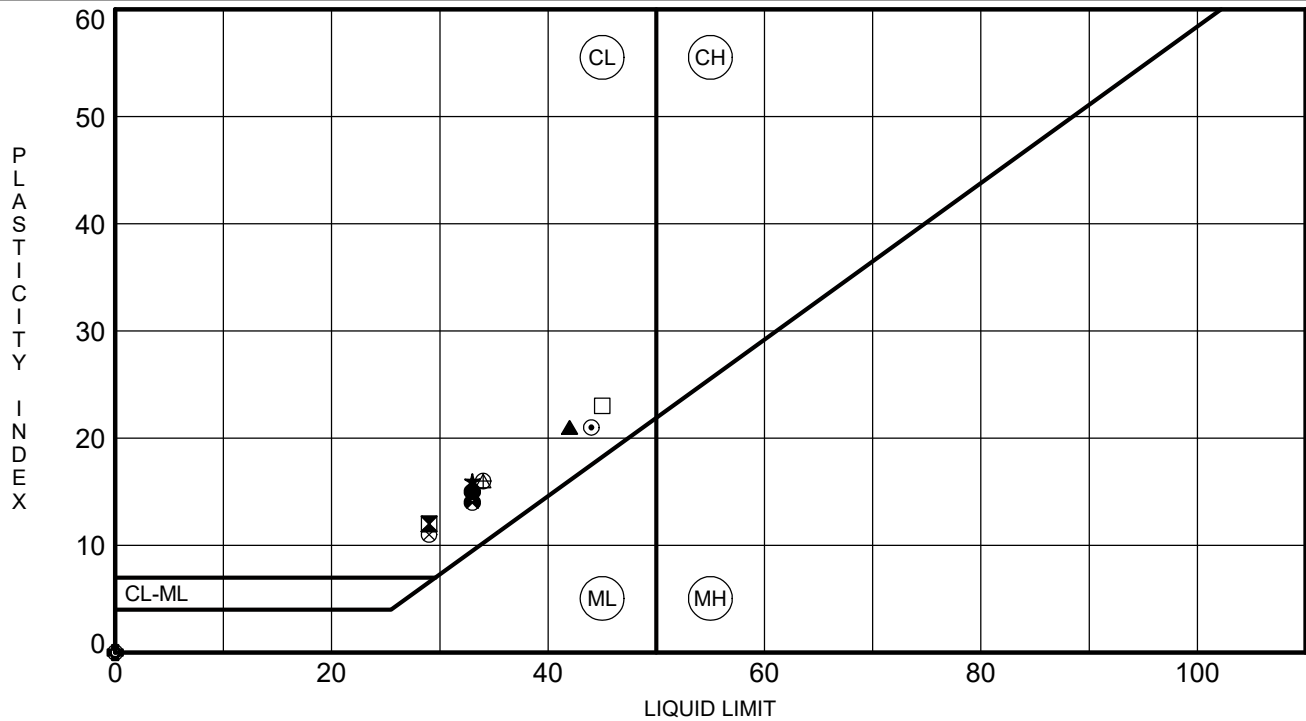
	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	IB- 7C	28.5	44	33	11	73	SILT with Sand (ML)
⊗	IB- 7C	63.5	39	33	6	79	SILT with Sand (ML)
▲	IB- 8C	6.0	36	18	18	47	Clayey SAND (SC)
★	IB- 8C	8.0	37	16	21	76	Lean CLAY with Sand (CL)
⊙	IB- 8C	13.5	26	15	11	48	Clayey SAND (SC)
⊕	IB- 8C	23.5	42	32	10	80	SILT with Sand (ML)
○	IB- 8C	48.5	49	32	17	69	Sandy SILT (ML)
△	IB- 9C	0.0	NP	NP	NP	18	Silty SAND (SM)
⊗	IB- 9C	13.5	30	17	13	67	Sandy Lean CLAY (CL)
⊕	IB-10C	0.0	NP	NP	NP	20	Silty SAND (SM)
□	IB-10C	8.0	50	27	23	52	Sandy Fat CLAY (CH)
⊕	IB-10C	28.5	62	45	17	90	Elastic SILT (MH)
●	IB-11C	0.0	NP	NP	NP	19	Silty SAND (SM)
★	IB-11C	2.0	42	28	14	69	Sandy SILT (ML)
⊗	IB-11C	6.0	29	18	11	38	Clayey SAND (SC)
■	IB-11C	33.5	67	46	21	71	Elastic SILT with Sand (MH)
◆	W- 1	4.0	31	15	16	34	Clayey SAND (SC)
◇	W- 1	23.5	38	28	10	63	Sandy SILT (ML)
×	W- 2	4.0	32	16	16	32	Clayey SAND (SC)
⊕	W- 2	8.0	32	14	18	18	Clayey SAND (SC)

ATTERBERG LIMITS' RESULTS

PROJECT ID P042443 (S&ME 23610178A)

PROJECT NAME I-77 Exit 26 Phase I

PROJECT COUNTY Richland

[illegible]

TTTERBERG LIMITS 23610178A CONNECTOR BRIDGE OVER I-77.GPJ SCDOT DATA TEMPLATE 01 30 2015.GDT 1/12/24

Appendix VII – Laboratory Test Data Sheets – Corrosion Series Testing



Results Only Soil Testing for I-77 Exit 26 Interchange - Connector Bridge over I-77

December 5, 2023

Prepared for:

**Matt Cooke
S&ME, Inc.
134 Suber Road
Columbia, SC 29210
mcooke@smeinc.com**

**Project X Job#: S231204F
Client Job or PO#: 23610178A**

Respectfully Submitted,

Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com





Soil Analysis Lab Results

Client: S&ME, Inc.

Job Name: I-77 Exit 26 Interchange - Connector Bridge over I-77

Client Job Number: 23610178A

Project X Job Number: S231204F

December 5, 2023

	Method	AASHTO T290		AASHTO T291		AASHTO T288		AASHTO T289
Bore# / Description	Depth	Sulfates SO ₄ ²⁻		Chlorides Cl ⁻		Resistivity As Rec'd Minimum		pH
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)	
EB-2C SS-8	23.5-25	21.7	0.0022	49.3	0.0049	93,800	56,950	6.9
EB-3C SS-6	13.5-15	30.6	0.0031	77.1	0.0077	42,880	34,840	6.0
IB-7C SS-7	18.5-20	25.4	0.0025	75.7	0.0076	73,700	67,000	5.6
IB-1C SS-6	13.5-15	43.1	0.0043	105.7	0.0106	45,560	40,200	5.7
IB-11C SS-7	18.5-20	26.5	0.0026	59.9	0.0060	67,000	58,290	6.8
EB-5C SS-10	33.5-35	27.2	0.0027	62.9	0.0063	93,800	67,000	7.0

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography

mg/kg = milligrams per kilogram (parts per million) of dry soil weight

ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown

Chemical Analysis performed on 1:3 Soil-To-Water extract

PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.



Lab Request Sheet Chain of Custody

Phone (213) 928-7213 · Fax (951) 226-1720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Project X Job Number										S 231204F										S&ME-SC										23610178A										1-77-Connector B										6 Quad - AASHTO-ASTM																													
IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.																																																																															
Company Name:															S&ME, Inc.															Contact Name:															Matt Cooke															Phone No:										803-260-9849									
Mailing Address:															134 Suber Road, Columbia, SC 29210															Contact Email:															mcooke@smeinc.com																																		
Accounting Contact:															Kathryn Friedrichs															Invoice Email:															smeinc_invoice@concursolutions.com																																		
Client Project No:															23610178A															Project Name:															I-77 Exit 26 Interchange — Connector Bridge over I-77																																		
P.O. #:															23610178A															3-5 Day Standard					3 Day Guarantee 50% mark-up					24 Hr RUSH 100% mark-up					ANALYSIS REQUESTED (Please circle)																																		
(Business Days) Turn Around Time:															<input checked="" type="checkbox"/>					<input type="checkbox"/>					<input type="checkbox"/>					SEE SPECIAL INSTRUCTIONS ON TEST METHODS										*Req: Min. 3 Samples, site map, and groundwater info																																							
Results By: <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> Email															Default Method															ASTM G106-13 ASTM G1288 ASTM G57 ASTM G59 ASTM G51 ASTM G52 ASTM G53 ASTM G54 ASTM G55 ASTM G56 ASTM G57 ASTM G58 ASTM G59 ASTM G60 ASTM G61 ASTM G62 ASTM G63 ASTM G64 ASTM G65 ASTM G66 ASTM G67 ASTM G68 ASTM G69 ASTM G70 ASTM G71 ASTM G72 ASTM G73 ASTM G74 ASTM G75 ASTM G76 ASTM G77 ASTM G78 ASTM G79 ASTM G80 ASTM G81 ASTM G82 ASTM G83 ASTM G84 ASTM G85 ASTM G86 ASTM G87 ASTM G88 ASTM G89 ASTM G90 ASTM G91 ASTM G92 ASTM G93 ASTM G94 ASTM G95 ASTM G96 ASTM G97 ASTM G98 ASTM G99 ASTM G100 ASTM G101 ASTM G102 ASTM G103 ASTM G104 ASTM G105 ASTM G106 ASTM G107 ASTM G108 ASTM G109 ASTM G110 ASTM G111 ASTM G112 ASTM G113 ASTM G114 ASTM G115 ASTM G116 ASTM G117 ASTM G118 ASTM G119 ASTM G120 ASTM G121 ASTM G122 ASTM G123 ASTM G124 ASTM G125 ASTM G126 ASTM G127 ASTM G128 ASTM G129 ASTM G130 ASTM G131 ASTM G132 ASTM G133 ASTM G134 ASTM G135 ASTM G136 ASTM G137 ASTM G138 ASTM G139 ASTM G140 ASTM G141 ASTM G142 ASTM G143 ASTM G144 ASTM G145 ASTM G146 ASTM G147 ASTM G148 ASTM G149 ASTM G150 ASTM G151 ASTM G152 ASTM G153 ASTM G154 ASTM G155 ASTM G156 ASTM G157 ASTM G158 ASTM G159 ASTM G160 ASTM G161 ASTM G162 ASTM G163 ASTM G164 ASTM G165 ASTM G166 ASTM G167 ASTM G168 ASTM G169 ASTM G170 ASTM G171 ASTM G172 ASTM G173 ASTM G174 ASTM G175 ASTM G176 ASTM G177 ASTM G178 ASTM G179 ASTM G180 ASTM G181 ASTM G182 ASTM G183 ASTM G184 ASTM G185 ASTM G186 ASTM G187 ASTM G188 ASTM G189 ASTM G190 ASTM G191 ASTM G192 ASTM G193 ASTM G194 ASTM G195 ASTM G196 ASTM G197 ASTM G198 ASTM G199 ASTM G200 ASTM G201 ASTM G202 ASTM G203 ASTM G204 ASTM G205 ASTM G206 ASTM G207 ASTM G208 ASTM G209 ASTM G210 ASTM G211 ASTM G212 ASTM G213 ASTM G214 ASTM G215 ASTM G216 ASTM G217 ASTM G218 ASTM G219 ASTM G220 ASTM G221 ASTM G222 ASTM G223 ASTM G224 ASTM G225 ASTM G226 ASTM G227 ASTM G228 ASTM G229 ASTM G230 ASTM G231 ASTM G232 ASTM G233 ASTM G234 ASTM G235 ASTM G236 ASTM G237 ASTM G238 ASTM G239 ASTM G240 ASTM G241 ASTM G242 ASTM G243 ASTM G244 ASTM G245 ASTM G246 ASTM G247 ASTM G248 ASTM G249 ASTM G250 ASTM G251 ASTM G252 ASTM G253 ASTM G254 ASTM G255 ASTM G256 ASTM G257 ASTM G258 ASTM G259 ASTM G260 ASTM G261 ASTM G262 ASTM G263 ASTM G264 ASTM G265 ASTM G266 ASTM G267 ASTM G268 ASTM G269 ASTM G270 ASTM G271 ASTM G272 ASTM G273 ASTM G274 ASTM G275 ASTM G276 ASTM G277 ASTM G278 ASTM G279 ASTM G280 ASTM G281 ASTM G282 ASTM G283 ASTM G284 ASTM G285 ASTM G286 ASTM G287 ASTM G288 ASTM G289 ASTM G290 ASTM G291 ASTM G292 ASTM G293 ASTM G294 ASTM G295 ASTM G296 ASTM G297 ASTM G298 ASTM G299 ASTM G300 ASTM G301 ASTM G302 ASTM G303 ASTM G304 ASTM G305 ASTM G306 ASTM G307 ASTM G308 ASTM G309 ASTM G310 ASTM G311 ASTM G312 ASTM G313 ASTM G314 ASTM G315 ASTM G316 ASTM G317 ASTM G318 ASTM G319 ASTM G320 ASTM G321 ASTM G322 ASTM G323 ASTM G324 ASTM G325 ASTM G326 ASTM G327 ASTM G328 ASTM G329 ASTM G330 ASTM G331 ASTM G332 ASTM G333 ASTM G334 ASTM G335 ASTM G336 ASTM G337 ASTM G338 ASTM G339 ASTM G340 ASTM G341 ASTM G342 ASTM G343 ASTM G344 ASTM G345 ASTM G346 ASTM G347 ASTM G348 ASTM G349 ASTM G350 ASTM G351 ASTM G352 ASTM G353 ASTM G354 ASTM G355 ASTM G356 ASTM G357 ASTM G358 ASTM G359 ASTM G360 ASTM G361 ASTM G362 ASTM G363 ASTM G364 ASTM G365 ASTM G366 ASTM G367 ASTM G368 ASTM G369 ASTM G370 ASTM G371 ASTM G372 ASTM G373 ASTM G374 ASTM G375 ASTM G376 ASTM G377 ASTM G378 ASTM G379 ASTM G380 ASTM G381 ASTM G382 ASTM G383 ASTM G384 ASTM G385 ASTM G386 ASTM G387 ASTM G388 ASTM G389 ASTM G390 ASTM G391 ASTM G392 ASTM G393 ASTM G394 ASTM G395 ASTM G396 ASTM G397 ASTM G398 ASTM G399 ASTM G400 ASTM G401 ASTM G402 ASTM G403 ASTM G404 ASTM G405 ASTM G406 ASTM G407 ASTM G408 ASTM G409 ASTM G410 ASTM G411 ASTM G412 ASTM G413 ASTM G414 ASTM G415 ASTM G416 ASTM G417 ASTM G418 ASTM G419 ASTM G420 ASTM G421 ASTM G422 ASTM G423 ASTM G424 ASTM G425 ASTM G426 ASTM G427 ASTM G428 ASTM G429 ASTM G430 ASTM G431 ASTM G432 ASTM G433 ASTM G434 ASTM G435 ASTM G436 ASTM G437 ASTM G438 ASTM G439 ASTM G440 ASTM G441 ASTM G442 ASTM G443 ASTM G444 ASTM G445 ASTM G446 ASTM G447 ASTM G448 ASTM G449 ASTM G450 ASTM G451 ASTM G452 ASTM G453 ASTM G454 ASTM G455 ASTM G456 ASTM G457 ASTM G458 ASTM G459 ASTM G460 ASTM G461 ASTM G462 ASTM G463 ASTM G464 ASTM G465 ASTM G466 ASTM G467 ASTM G468 ASTM G469 ASTM																																																	

Appendix VIII – Laboratory Test Data Sheets – Undisturbed Samples

SIEVE ANALYSIS OF SOIL

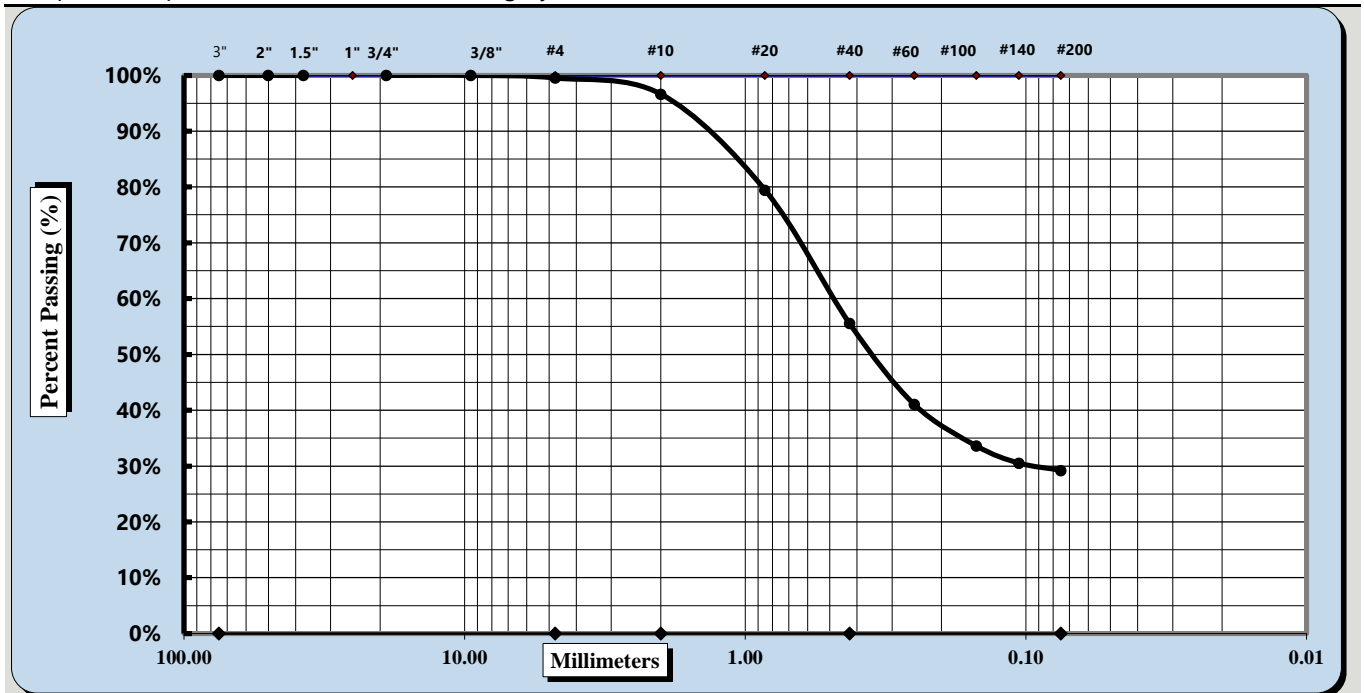


Single sieve set

ASTM D 6913

S&ME, Inc. - Greenville: 48 Brookfield Oaks Dr., Suite F Greenville, SC 29607

Project #:	23610178A	Report Date:	1/3/24
Project Name:	I-77 Exit 26 Interchange	Test Date:	12/18-1/03/24
Client Name:	RS&H, Inc.		
Client Address:	1520 South Boulevard Suite 200 Charlotte, NC 28203		
Boring #:	W-2	Log #:	129g
		Sample Date:	10/25/23
Location:	UD-1	Type:	Undisturbed
		Depth:	5 - 7'
Sample Description: CLAYEY SAND (SC) - gray, fine to medium			



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Method: B	Procedure for obtaining Specimen: Moist	Dispersion Process:	Dispersant
Maximum Particle Size 4.75 mm	Coarse Sand 2.9%	Fine Sand 26.3%	
Gravel 0.5%	Medium Sand 41.1%	Silt & Clay 29.2%	
Liquid Limit 25	Plastic Limit 13	Plastic Index 12	

Natural Moisture *

Notes / Deviations / References:

*See CU Triaxial Test Report

Brian Vaughan, P.E.
Technical Responsibility

Brian Vaughan
Signature

QA Supervisor
Position

1/3/24
Date

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LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX



ASTM D 4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc. - Greenville 48 Brookfield Oaks Dr., Suite F Greenville, SC 29607

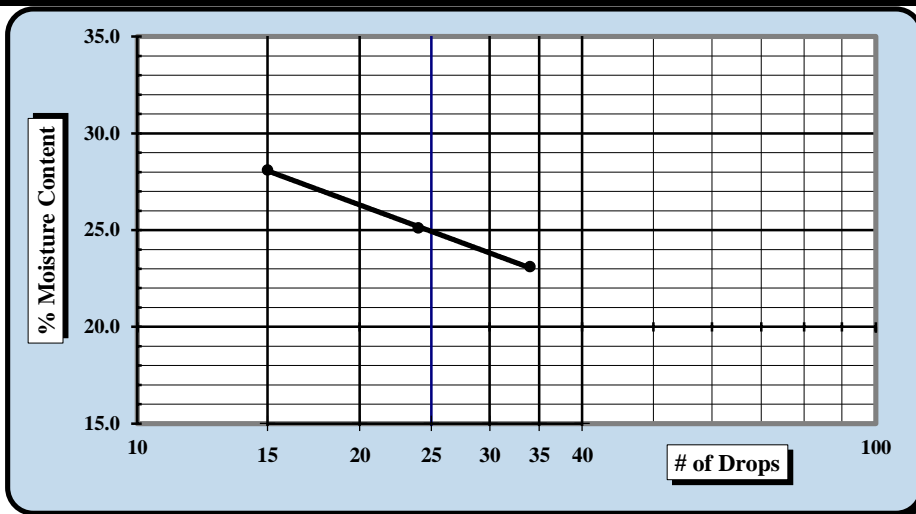
Project #: 23610178A Report Date: 1/03/24
Project Name: I-77 Exit 26 Interchange Test Date: 1/02/24
Client Name: RS&H, Inc.
Client Address: 1520 South Boulevard Suite 200 Charlotte, NC 28203

Boring #: W-2 Log #: 129g Sample Date: 10/25/23
Location: UD-1 Type: Undisturbed Depth: 5 - 7'

Sample Description: CLAYEY SAND (SC) - gray, fine to medium

Type and Specification	S&ME ID #	Cal Date:	Type and Specification	S&ME ID #	Cal Date:
Balance (0.01 g)	13942	10/31/2023	Grooving tool	23119	10/15/2023
LL Apparatus	23158	7/18/2023			
Oven	13978	10/1/2023			

Pan #		Liquid Limit						Plastic Limit		
Tare #:		1	2	3				4	5	
A	Tare Weight	26.70	26.50	26.36				25.91	26.96	
B	Wet Soil Weight + A	42.71	43.77	41.85				36.13	35.57	
C	Dry Soil Weight + A	39.71	40.30	38.45				34.92	34.56	
D	Water Weight (B-C)	3.00	3.47	3.40				1.21	1.01	
E	Dry Soil Weight (C-A)	13.01	13.80	12.09				9.01	7.60	
F	% Moisture (D/E)*100	23.1%	25.1%	28.1%				13.4%	13.3%	
N	# OF DROPS	34	24	15				Moisture Contents determined by ASTM D 2216		
LL	LL = F * FACTOR									
Ave.	Average							13.4%		



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 **25**
Plastic Limit **13**
Plastic Index **12**
Group Symbol **CL**

Multipoint Method ☒
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☒ Air Dried ☒ % Passing the #200 Sieve: 29.2%

Notes / Deviations / References: Group symbol for minus #40 sieve portion only (see Sample Description for classification of entire sample).

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

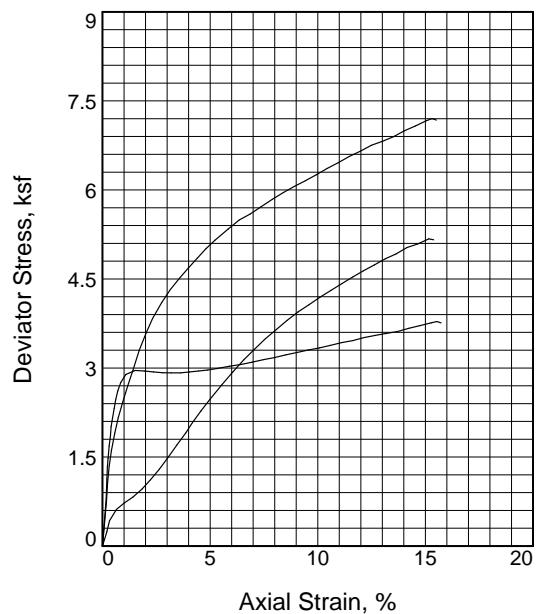
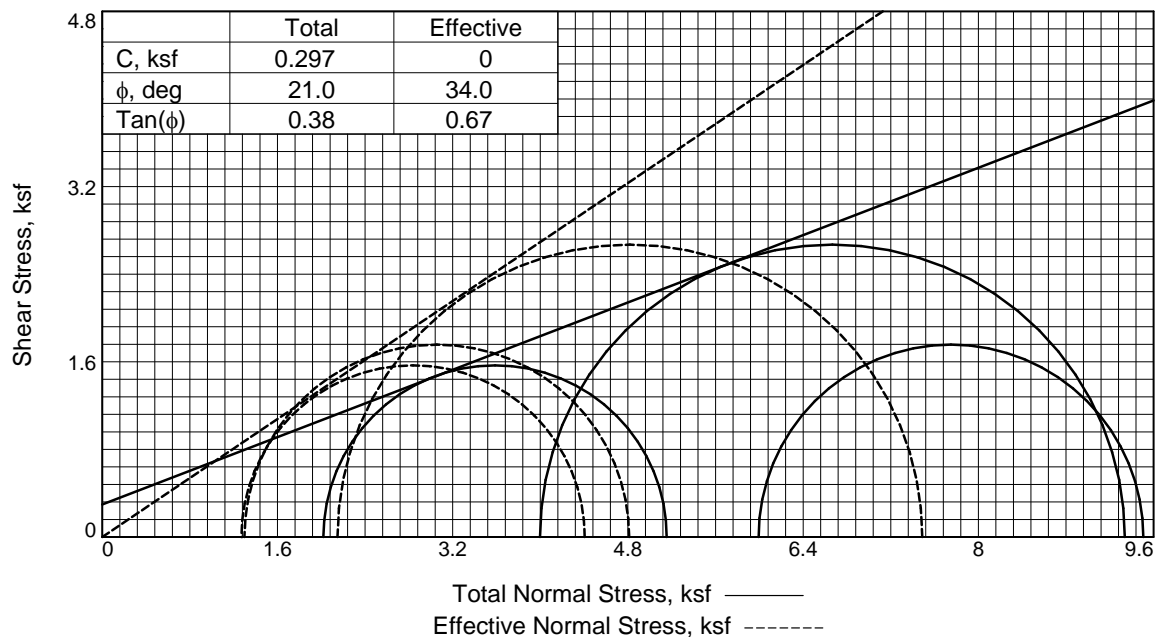
Benjamin J. Kovalski
Technician Name

1/03/24
Date

Brian Vaughan, P.E.
Technical Responsibility

1/03/24
Date

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Specimen No.		1	2	3
Initial	Water Content, %	5.1	6.9	6.5
	Dry Density, pcf	113.7	117.7	109.3
	Saturation, %	29.9	45.3	33.6
	Void Ratio	0.4550	0.4060	0.5132
	Diameter, in.	2.874	2.845	2.853
	Height, in.	5.730	5.710	5.680
At Test	Water Content, %	15.2	12.9	14.2
	Dry Density, pcf	116.7	123.5	119.4
	Saturation, %	96.8	100.8	98.0
	Void Ratio	0.4171	0.3393	0.3851
	Diameter, in.	2.848	2.803	2.774
	Height, in.	5.683	5.603	5.498
Strain rate, %/min.		0.48	0.48	0.48
Eff. Cell Pressure, ksf		2.019	3.997	5.993
Fail. Stress, ksf		3.135	5.340	3.513
Total Pore Pr., ksf		9.389	10.489	13.335
Strain, %		6.6	5.8	12.2
Ult. Stress, ksf		5.160	7.178	3.760
Total Pore Pr., ksf		8.447	9.646	13.228
Strain, %		15.4	15.5	15.7
$\bar{\sigma}_1$ Failure, ksf		4.406	7.488	4.811
$\bar{\sigma}_3$ Failure, ksf		1.270	2.148	1.298

Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: CLAYEY SAND (SC) - gray, fine to medium

LL= 25 **PL=** 13 **PI=** 12

Assumed Specific Gravity= 2.65

Remarks: The specimens failed with bulging.
Failure selected at peak stress ratio. ASTM D4767.

Figure 1

Client: RS&H, Inc.

Project: I-77 Exit 26 Interchange

Location: UD-1

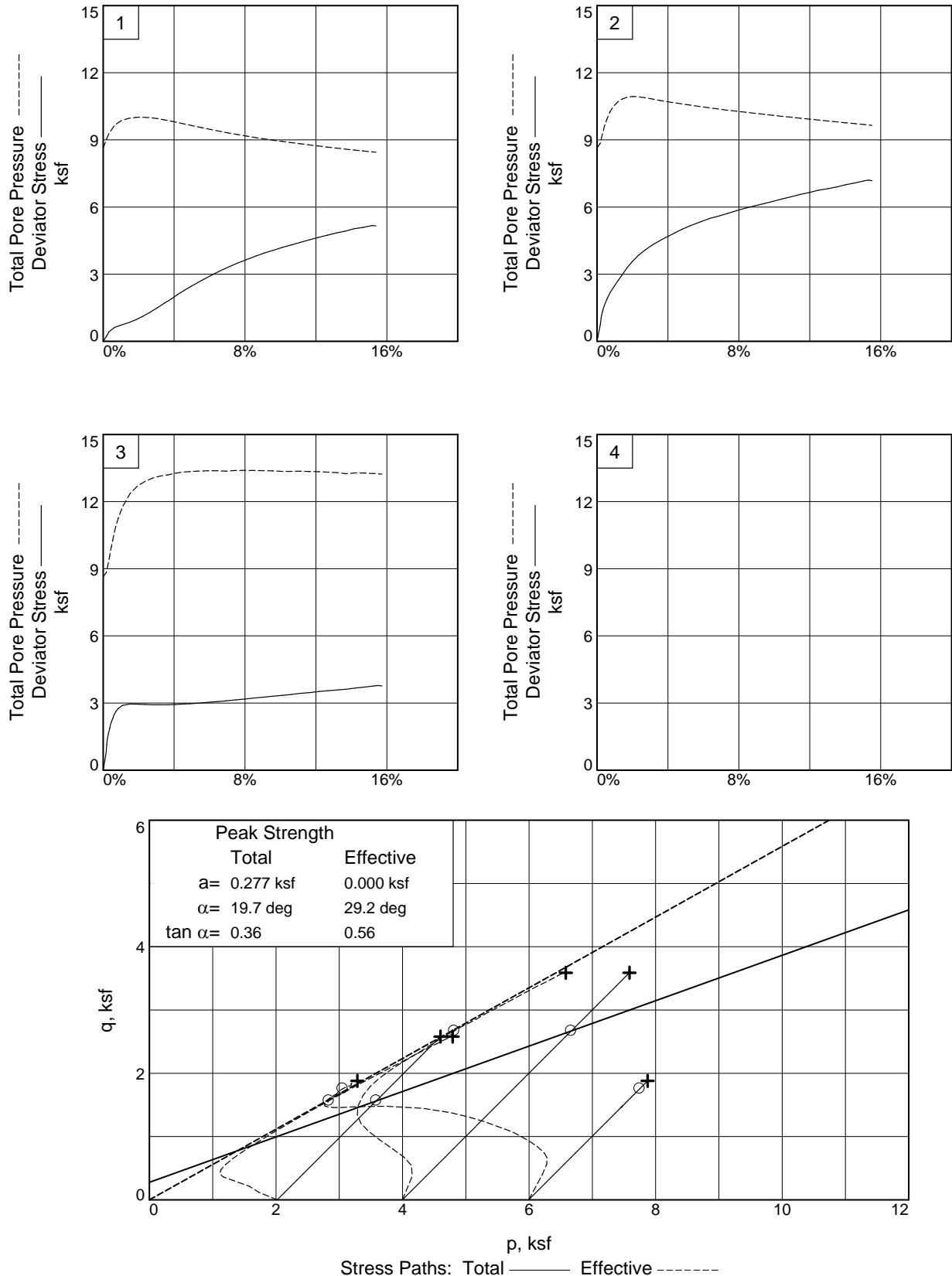
Sample Number: W-2

Depth: 5 - 7'

Proj. No.: 23610178A

Date Sampled: 10/25/23

TRIAXIAL SHEAR TEST REPORT
S&ME, Inc.
Greenville, SC



Client: RS&H, Inc.

Project: I-77 Exit 26 Interchange

Location: UD-1 **Depth:** 5 - 7'

Sample Number: W-2

Project No.: 23610178A

Figure 2

S&ME, Inc.

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

1/16/2024
9:23 AM

Date: 10/25/23
Client: RS&H, Inc.
Project: I-77 Exit 26 Interchange
Project No.: 23610178A
Location: UD-1
Depth: 5 - 7' **Sample Number:** W-2
Description: CLAYEY SAND (SC) - gray, fine to medium
Remarks: The specimens failed with bulging. Failure selected at peak stress ratio. ASTM D4767.
Type of Sample: Undisturbed
Assumed Specific Gravity=2.65 **LL**=25 **PL**=13 **PI**=12
Test Method: ASTM D 4767 Method A

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	76.460			1264.640
Moisture content: Dry soil+tare, gms.	72.730			1097.500
Moisture content: Tare, gms.	0.000			0.000
Moisture, %	5.1	16.4	15.2	15.2
Moist specimen weight, gms.	1166.35			
Diameter, in.	2.874	2.870	2.848	
Area, in. ²	6.487	6.469	6.371	
Height, in.	5.730	5.722	5.683	
Net decrease in height, in.		0.008	0.039	
Net decrease in water volume, cc.			13.300	
Wet density, pcf	119.5	132.9	134.5	
Dry density, pcf	113.7	114.2	116.7	
Void ratio	0.4550	0.4489	0.4171	
Saturation, %	29.9	97.0	96.8	

Test Readings for Specimen No. 1

Membrane modulus = 0.14 kN/cm²
Membrane thickness = 0.03 cm
Consolidation cell pressure = 74.020 psi (10.659 ksf)
Consolidation back pressure = 60.000 psi (8.640 ksf)
Consolidation effective confining stress = 2.019 ksf
Strain rate, %/min. = 0.48
Fail. Stress = 3.135 ksf at reading no. 17
Ult. Stress = 5.160 ksf at reading no. 35

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	2.019	2.019	1.00	60.000	2.019	0.000
1	0.0114	10.715	10.7	0.2	0.242	1.605	1.847	1.15	62.874	1.726	0.121
2	0.0187	18.949	18.9	0.3	0.427	1.367	1.794	1.31	64.526	1.581	0.213
3	0.0367	27.554	27.6	0.6	0.619	1.004	1.623	1.62	67.047	1.314	0.309
4	0.0571	32.318	32.3	1.0	0.723	0.806	1.530	1.90	68.420	1.168	0.362
5	0.0805	37.112	37.1	1.4	0.827	0.699	1.526	2.18	69.165	1.113	0.413
6	0.1037	43.139	43.1	1.8	0.957	0.653	1.611	2.46	69.482	1.132	0.479
7	0.1266	50.492	50.5	2.2	1.116	0.646	1.761	2.73	69.537	1.204	0.558
8	0.1502	58.888	58.9	2.6	1.296	0.663	1.959	2.95	69.415	1.311	0.648
9	0.1733	68.258	68.3	3.0	1.496	0.706	2.201	3.12	69.120	1.453	0.748
10	0.1963	77.986	78.0	3.5	1.702	0.761	2.463	3.24	68.732	1.612	0.851
11	0.2198	87.796	87.8	3.9	1.908	0.825	2.733	3.31	68.288	1.779	0.954
12	0.2374	96.003	96.0	4.2	2.079	0.876	2.955	3.37	67.936	1.916	1.040
13	0.2602	105.619	105.6	4.6	2.278	0.946	3.224	3.41	67.448	2.085	1.139
14	0.2834	114.946	114.9	5.0	2.469	1.016	3.484	3.43	66.966	2.250	1.234
15	0.3151	127.186	127.2	5.5	2.715	1.107	3.822	3.45	66.334	2.465	1.358
16	0.3440	138.040	138.0	6.1	2.931	1.192	4.123	3.46	65.742	2.658	1.466
17	0.3729	148.451	148.5	6.6	3.135	1.270	4.406	3.47	65.199	2.838	1.568
18	0.4014	157.842	157.8	7.1	3.316	1.347	4.662	3.46	64.668	3.005	1.658
19	0.4299	167.182	167.2	7.6	3.493	1.417	4.910	3.46	64.177	3.164	1.746
20	0.4589	175.592	175.6	8.1	3.648	1.485	5.133	3.46	63.709	3.309	1.824
21	0.4873	183.948	183.9	8.6	3.801	1.552	5.354	3.45	63.241	3.453	1.901
22	0.5167	192.109	192.1	9.1	3.948	1.616	5.563	3.44	62.799	3.590	1.974
23	0.5453	198.999	199.0	9.6	4.066	1.673	5.739	3.43	62.405	3.706	2.033
24	0.5743	206.462	206.5	10.1	4.195	1.728	5.923	3.43	62.022	3.825	2.098
25	0.6029	213.160	213.2	10.6	4.307	1.783	6.090	3.42	61.641	3.936	2.153
26	0.6318	220.088	220.1	11.1	4.422	1.831	6.253	3.42	61.306	4.042	2.211
27	0.6605	226.880	226.9	11.6	4.532	1.881	6.414	3.41	60.955	4.147	2.266
28	0.6891	233.596	233.6	12.1	4.640	1.931	6.570	3.40	60.614	4.250	2.320
29	0.7179	239.932	239.9	12.6	4.738	1.980	6.718	3.39	60.272	4.349	2.369
30	0.7470	246.564	246.6	13.1	4.841	2.023	6.864	3.39	59.968	4.444	2.420
31	0.7751	252.108	252.1	13.6	4.921	2.066	6.987	3.38	59.674	4.526	2.461
32	0.8039	259.149	259.1	14.1	5.029	2.115	7.144	3.38	59.331	4.630	2.515
33	0.8326	263.871	263.9	14.7	5.091	2.152	7.243	3.37	59.075	4.697	2.545
34	0.8617	269.873	269.9	15.2	5.175	2.193	7.368	3.36	58.794	4.780	2.588
35	0.8743	269.807	269.8	15.4	5.160	2.211	7.372	3.33	58.663	4.792	2.580

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	62.770			1250.510
Moisture content: Dry soil+tare, gms.	58.700			1107.610
Moisture content: Tare, gms.	0.000			0.000
Moisture, %	6.9	14.4	12.9	12.9
Moist specimen weight, gms.	1198.83			
Diameter, in.	2.845	2.827	2.803	
Area, in. ²	6.357	6.276	6.171	
Height, in.	5.710	5.674	5.603	
Net decrease in height, in.		0.036	0.071	
Net decrease in water volume, cc.			17.000	
Wet density, pcf	125.8	137.2	139.5	
Dry density, pcf	117.7	119.9	123.5	
Void ratio	0.4060	0.3794	0.3393	
Saturation, %	45.3	100.7	100.8	

Test Readings for Specimen No. 2

Membrane modulus = 0.14 kN/cm²

Membrane thickness = 0.03 cm

Consolidation cell pressure = 87.760 psi (12.637 ksf)

Consolidation back pressure = 60.000 psi (8.640 ksf)

Consolidation effective confining stress = 3.997 ksf

Strain rate, %/min. = 0.48

Fail. Stress = 5.340 ksf at reading no. 20

Ult. Stress = 7.178 ksf at reading no. 40

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	3.997	3.997	1.00	60.000	3.997	0.000
1	0.0104	32.085	32.1	0.2	0.747	3.779	4.526	1.20	61.520	4.152	0.374
2	0.0134	46.570	46.6	0.2	1.084	3.600	4.684	1.30	62.760	4.142	0.542
3	0.0176	58.190	58.2	0.3	1.354	3.344	4.697	1.40	64.541	4.020	0.677
4	0.0232	69.148	69.1	0.4	1.607	3.043	4.650	1.53	66.625	3.847	0.803
5	0.0319	81.879	81.9	0.6	1.900	2.685	4.585	1.71	69.115	3.635	0.950
6	0.0411	93.601	93.6	0.7	2.168	2.378	4.546	1.91	71.246	3.462	1.084
7	0.0526	104.829	104.8	0.9	2.423	2.128	4.551	2.14	72.984	3.339	1.212
8	0.0656	116.877	116.9	1.2	2.695	1.938	4.633	2.39	74.302	3.286	1.348
9	0.0789	128.543	128.5	1.4	2.957	1.815	4.773	2.63	75.153	3.294	1.479
10	0.0958	143.904	143.9	1.7	3.301	1.725	5.026	2.91	75.781	3.375	1.650
11	0.1132	156.874	156.9	2.0	3.587	1.698	5.285	3.11	75.969	3.491	1.793
12	0.1303	168.266	168.3	2.3	3.835	1.710	5.546	3.24	75.882	3.628	1.918
13	0.1540	180.763	180.8	2.7	4.102	1.758	5.860	3.33	75.555	3.809	2.051
14	0.1768	191.353	191.4	3.2	4.324	1.818	6.142	3.38	75.137	3.980	2.162
15	0.2004	200.557	200.6	3.6	4.513	1.878	6.391	3.40	74.719	4.134	2.256
16	0.2235	209.036	209.0	4.0	4.683	1.936	6.620	3.42	74.313	4.278	2.342
17	0.2468	217.517	217.5	4.4	4.852	1.982	6.835	3.45	73.993	4.409	2.426
18	0.2694	225.575	225.6	4.8	5.011	2.032	7.043	3.47	73.651	4.537	2.505
19	0.2927	232.975	233.0	5.2	5.153	2.080	7.233	3.48	73.317	4.656	2.576
20	0.3270	243.000	243.0	5.8	5.340	2.148	7.488	3.49	72.843	4.818	2.670
21	0.3558	251.328	251.3	6.4	5.493	2.203	7.696	3.49	72.460	4.949	2.746
22	0.3849	257.456	257.5	6.9	5.595	2.258	7.853	3.48	72.082	5.055	2.798

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
23	0.4128	264.503	264.5	7.4	5.718	2.312	8.029	3.47	71.708	5.170	2.859
24	0.4416	271.729	271.7	7.9	5.841	2.355	8.197	3.48	71.403	5.276	2.921
25	0.4704	278.543	278.5	8.4	5.954	2.401	8.356	3.48	71.083	5.379	2.977
26	0.4990	285.009	285.0	8.9	6.059	2.449	8.508	3.47	70.752	5.478	3.029
27	0.5282	291.225	291.2	9.4	6.155	2.493	8.649	3.47	70.445	5.571	3.078
28	0.5565	297.681	297.7	9.9	6.257	2.540	8.796	3.46	70.122	5.668	3.128
29	0.5847	304.398	304.4	10.4	6.362	2.584	8.946	3.46	69.818	5.765	3.181
30	0.6136	310.745	310.7	11.0	6.457	2.624	9.082	3.46	69.537	5.853	3.229
31	0.6424	317.725	317.7	11.5	6.564	2.668	9.232	3.46	69.231	5.950	3.282
32	0.6715	323.916	323.9	12.0	6.653	2.709	9.362	3.46	68.947	6.036	3.326
33	0.7000	330.642	330.6	12.5	6.752	2.750	9.502	3.46	68.663	6.126	3.376
34	0.7290	335.955	336.0	13.0	6.820	2.790	9.610	3.44	68.382	6.200	3.410
35	0.7571	341.656	341.7	13.5	6.896	2.831	9.726	3.44	68.103	6.278	3.448
36	0.7861	348.756	348.8	14.0	6.997	2.874	9.871	3.43	67.803	6.372	3.498
37	0.8147	354.907	354.9	14.5	7.078	2.910	9.988	3.43	67.554	6.449	3.539
38	0.8429	361.475	361.5	15.0	7.166	2.948	10.115	3.43	67.286	6.531	3.583
39	0.8578	364.448	364.4	15.3	7.203	2.970	10.173	3.43	67.136	6.571	3.601
40	0.8691	364.047	364.0	15.5	7.178	2.991	10.169	3.40	66.988	6.580	3.589

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	65.130			1172.280
Moisture content: Dry soil+tare, gms.	61.150			1026.110
Moisture content: Tare, gms.	0.000			0.000
Moisture, %	6.5	18.1	14.2	14.2
Moist specimen weight, gms.	1109.91			
Diameter, in.	2.853	2.837	2.774	
Area, in. ²	6.393	6.320	6.046	
Height, in.	5.680	5.648	5.498	
Net decrease in height, in.		0.032	0.150	
Net decrease in water volume, cc.			40.300	
Wet density, pcf	116.4	131.4	136.5	
Dry density, pcf	109.3	111.2	119.4	
Void ratio	0.5132	0.4876	0.3851	
Saturation, %	33.6	98.4	98.0	

Test Readings for Specimen No. 3

Membrane modulus = 0.14 kN/cm²

Membrane thickness = 0.03 cm

Consolidation cell pressure = 101.620 psi (14.633 ksf)

Consolidation back pressure = 60.000 psi (8.640 ksf)

Consolidation effective confining stress = 5.993 ksf

Strain rate, %/min. = 0.48

Fail. Stress = 3.513 ksf at reading no. 36

Ult. Stress = 3.760 ksf at reading no. 44

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	5.993	5.993	1.00	60.000	5.993	0.000
1	0.0095	33.724	33.7	0.2	0.802	5.808	6.610	1.14	61.284	6.209	0.401
2	0.0111	47.566	47.6	0.2	1.131	5.714	6.845	1.20	61.937	6.280	0.565
3	0.0124	56.101	56.1	0.2	1.333	5.615	6.948	1.24	62.630	6.281	0.667
4	0.0143	62.149	62.1	0.3	1.476	5.505	6.981	1.27	63.394	6.243	0.738
5	0.0170	70.899	70.9	0.3	1.684	5.287	6.971	1.32	64.903	6.129	0.842
6	0.0202	78.420	78.4	0.4	1.861	5.068	6.929	1.37	66.424	5.999	0.931
7	0.0221	84.848	84.8	0.4	2.013	4.859	6.872	1.41	67.880	5.865	1.006
8	0.0254	90.669	90.7	0.5	2.150	4.662	6.811	1.46	69.247	5.737	1.075
9	0.0300	97.815	97.8	0.5	2.317	4.345	6.663	1.53	71.444	5.504	1.159
10	0.0335	104.080	104.1	0.6	2.464	4.072	6.536	1.61	73.340	5.304	1.232
11	0.0391	110.604	110.6	0.7	2.616	3.745	6.361	1.70	75.610	5.053	1.308
12	0.0466	116.632	116.6	0.8	2.755	3.387	6.142	1.81	78.098	4.764	1.377
13	0.0596	122.710	122.7	1.1	2.891	2.882	5.773	2.00	81.605	4.328	1.446
14	0.0835	126.099	126.1	1.5	2.958	2.271	5.229	2.30	85.849	3.750	1.479
15	0.1066	126.257	126.3	1.9	2.949	1.936	4.885	2.52	88.172	3.411	1.475
16	0.1299	126.187	126.2	2.4	2.935	1.730	4.665	2.70	89.607	3.197	1.467
17	0.1531	126.093	126.1	2.8	2.920	1.586	4.506	2.84	90.605	3.046	1.460
18	0.1757	126.545	126.5	3.2	2.918	1.494	4.412	2.95	91.246	2.953	1.459
19	0.1995	127.162	127.2	3.6	2.919	1.442	4.361	3.02	91.603	2.902	1.460
20	0.2226	128.403	128.4	4.0	2.935	1.364	4.299	3.15	92.146	2.832	1.467
21	0.2453	129.629	129.6	4.5	2.950	1.319	4.269	3.24	92.463	2.794	1.475
22	0.2685	130.877	130.9	4.9	2.965	1.291	4.257	3.30	92.651	2.774	1.483

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
23	0.2911	132.554	132.6	5.3	2.990	1.273	4.263	3.35	92.781	2.768	1.495
24	0.3251	135.214	135.2	5.9	3.030	1.256	4.286	3.41	92.901	2.771	1.515
25	0.3537	137.329	137.3	6.4	3.061	1.253	4.314	3.44	92.917	2.784	1.530
26	0.3821	139.777	139.8	7.0	3.098	1.275	4.373	3.43	92.769	2.824	1.549
27	0.4108	142.481	142.5	7.5	3.140	1.240	4.381	3.53	93.006	2.811	1.570
28	0.4398	144.971	145.0	8.0	3.177	1.237	4.414	3.57	93.030	2.825	1.588
29	0.4683	147.840	147.8	8.5	3.222	1.243	4.464	3.59	92.988	2.854	1.611
30	0.4971	150.550	150.5	9.0	3.262	1.252	4.514	3.61	92.926	2.883	1.631
31	0.5249	153.258	153.3	9.5	3.302	1.260	4.562	3.62	92.868	2.911	1.651
32	0.5538	155.818	155.8	10.1	3.338	1.281	4.618	3.61	92.727	2.949	1.669
33	0.5820	158.708	158.7	10.6	3.380	1.281	4.662	3.64	92.722	2.971	1.690
34	0.6108	161.945	161.9	11.1	3.429	1.274	4.703	3.69	92.773	2.988	1.714
35	0.6395	164.510	164.5	11.6	3.463	1.288	4.751	3.69	92.676	3.019	1.731
36	0.6685	167.893	167.9	12.2	3.513	1.298	4.811	3.71	92.605	3.055	1.756
37	0.6971	170.629	170.6	12.7	3.549	1.318	4.867	3.69	92.468	3.092	1.774
38	0.7252	173.312	173.3	13.2	3.584	1.338	4.921	3.68	92.330	3.130	1.792
39	0.7537	175.868	175.9	13.7	3.615	1.386	5.001	3.61	91.992	3.194	1.807
40	0.7821	179.561	179.6	14.2	3.669	1.351	5.020	3.72	92.238	3.185	1.834
41	0.8104	182.882	182.9	14.7	3.714	1.358	5.072	3.74	92.191	3.215	1.857
42	0.8394	186.346	186.3	15.3	3.761	1.380	5.141	3.72	92.035	3.261	1.881
43	0.8536	187.966	188.0	15.5	3.782	1.391	5.173	3.72	91.960	3.282	1.891
44	0.8645	187.327	187.3	15.7	3.760	1.405	5.166	3.68	91.860	3.286	1.880



Project Name: I-77 Exit 26 Interchange

Project #: 23610178A

Boring #: W-2

Depth: 5.0' – 7.0' (UD-1)

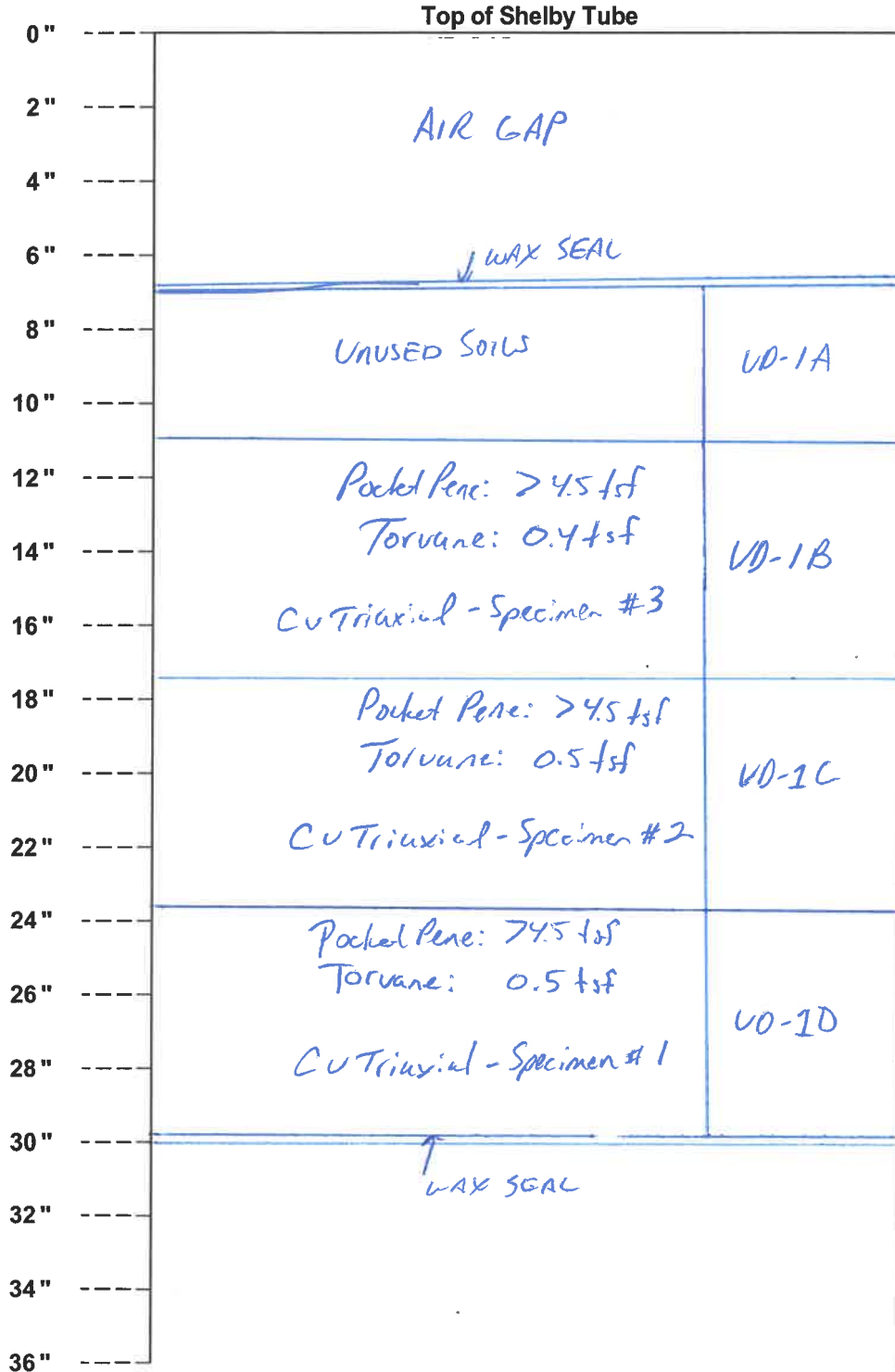
Sample Date: 10/25/23

Test Type: Consolidated Undrained Triaxial Shear (ASTM D4767)



SCDOT Shelby Tube Log

Project ID:	I-77 Exit 26 Interchange	County:		Boring No.:	W-2
Project Description:	23610178A	Route:			
UD Sample No.:	UD-1	Depth:	5-7'		
Date Sampled:	10/25/23	Date Extracted:	12/13/23		
Extracted By:	B. Kovalevsk	Eng. Firm:	S.M.E., Inc.		



SIEVE ANALYSIS OF SOIL

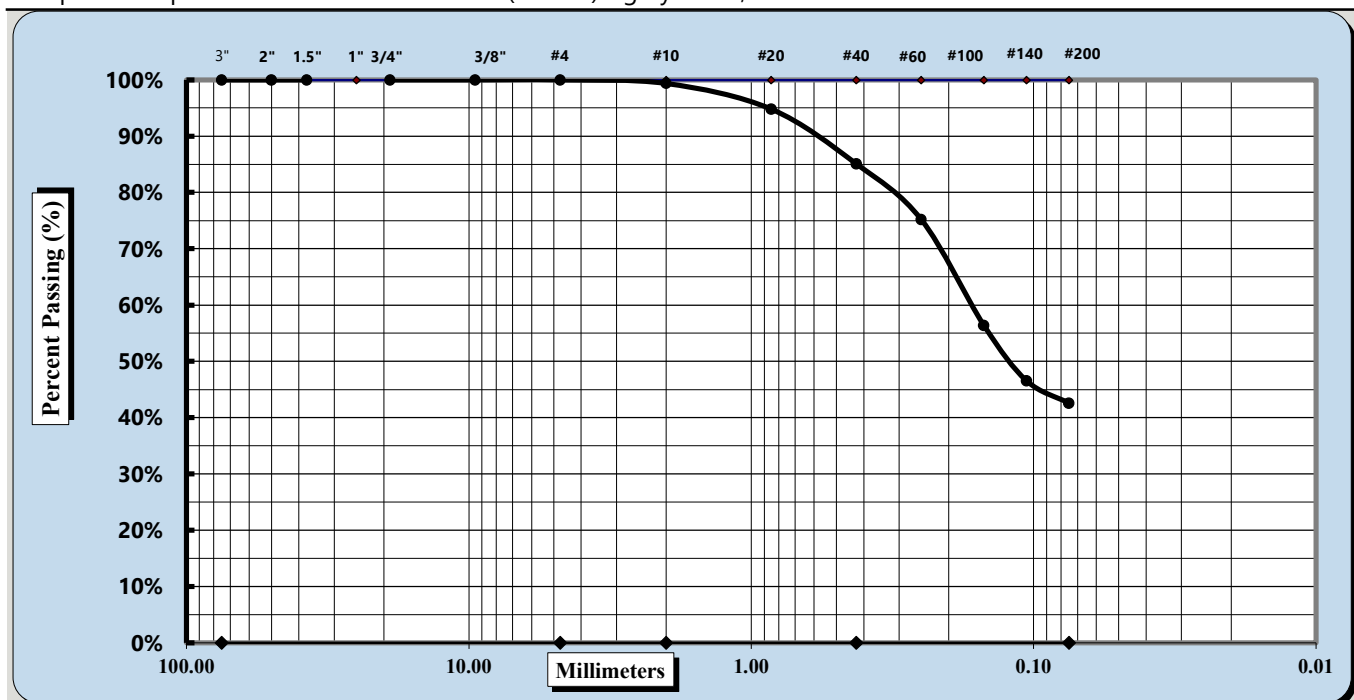


Single sieve set

ASTM D 6913

S&ME, Inc. - Greenville: 48 Brookfield Oaks Dr., Suite F Greenville, SC 29607

Project #:	23610178A	Report Date:	1/11/24
Project Name:	I-77 Exit 26 Interchange	Test Date:	1/08 - 1/10/24
Client Name:	RS&H, Inc.		
Client Address:	1520 South Boulevard Suite 200 Charlotte, NC 28203		
Boring #:	W-2	Log #:	129g
		Sample Date:	10/26/23
Location:	UD-2	Type:	Undisturbed
		Depth:	7 - 9'
Sample Description: SILTY CLAYEY SAND (SC-SM) - gray white, medium to fine			



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Method: B	Procedure for obtaining Specimen: Moist	Dispersion Process:	Dispersant
Maximum Particle Size 2.00 mm	Coarse Sand 0.6%	Fine Sand 42.5%	
Gravel 0.0%	Medium Sand 14.3%	Silt & Clay 42.6%	
Liquid Limit 18	Plastic Limit 14	Plastic Index 4	
Natural Moisture 14.0%			

Notes / Deviations / References:

Brian Vaughan, P.E.
Technical Responsibility

Brian Vaughan
Signature

QA Supervisor
Position

1/11/24
Date

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LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX



ASTM D 4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc. - Greenville 48 Brookfield Oaks Dr., Suite F Greenville, SC 29607

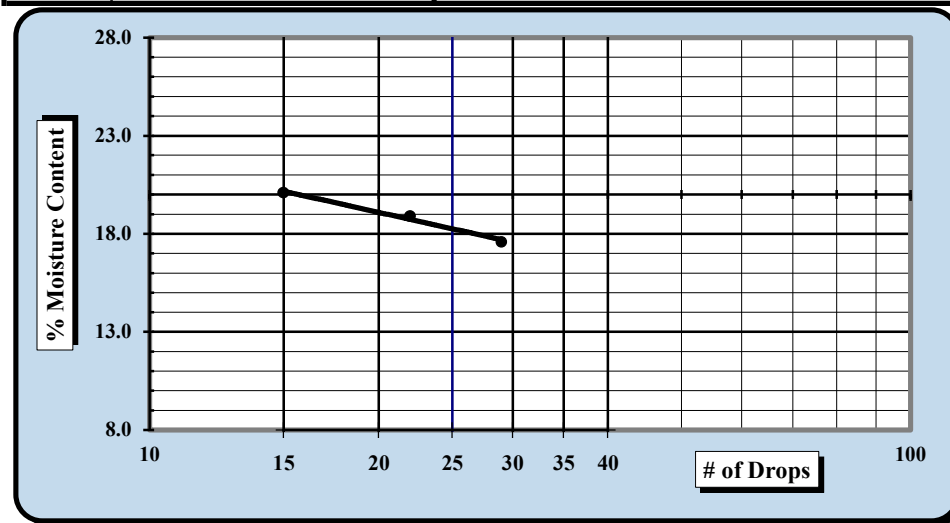
Project #: 23610178A Report Date: 1/11/24
Project Name: I-77 Exit 26 Interchange Test Date: 1/10/24
Client Name: RS&H, Inc.
Client Address: 1520 South Boulevard Suite 200 Charlotte, NC 28203

Boring #: W-2 Log #: 129g Sample Date: 10/26/23
Location: UD-2 Type: Undisturbed Depth: 7 - 9'

Sample Description: SILTY CLAYEY SAND (SC-SM) - gray white, medium to white

Type and Specification	S&ME ID #	Cal Date:	Type and Specification	S&ME ID #	Cal Date:
Balance (0.01 g)	13942	10/31/2023	Grooving tool	23119	10/15/2023
LL Apparatus	23158	7/18/2023			
Oven	13978	10/1/2023			

Pan #		Liquid Limit						Plastic Limit		
Tare #:		6	7	8				9	10	
A	Tare Weight	27.77	26.32	27.32				26.83	26.75	
B	Wet Soil Weight + A	47.79	43.31	45.78				33.94	34.59	
C	Dry Soil Weight + A	44.79	40.61	42.69				33.08	33.65	
D	Water Weight (B-C)	3.00	2.70	3.09				0.86	0.94	
E	Dry Soil Weight (C-A)	17.02	14.29	15.37				6.25	6.90	
F	% Moisture (D/E)*100	17.6%	18.9%	20.1%				13.8%	13.6%	
N	# OF DROPS	29	22	15				Moisture Contents determined by ASTM D 2216		
LL	LL = F * FACTOR									
Ave.	Average							13.7%		



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 **18**
Plastic Limit **14**
Plastic Index **4**
Group Symbol **CL-ML**

Multipoint Method ☒
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☒ Air Dried ☒ % Passing the #200 Sieve: 42.6%

Notes / Deviations / References: Group symbol for minus #40 sieve portion only (see Sample Description for classification of entire sample).

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

Benjamin J. Kovaleski
Technician Name

1/11/24
Date

Brian Vaughan, P.E.
Technical Responsibility

1/11/24
Date

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DENSITY (UNIT WEIGHT) OF SOIL SPECIMENS

ASTM D 7263 - Method B



Project #: 23610178A

Project Name: I-77 Exit 26
Interchange

Sample Description: SILTY CLAYEY SAND (SC-SM) -
gray white, medium to fine

Liquid Limit: 18
Plastic Limit: 14
Plastic Index: 4

Report Date: 1/11/24
Test Date(s): 1/08 - 1/10/24

Sample Date: 10/26/23

Boring #: W-2
Depth: 7 - 9'

Sample Type: UD

% Passing #200: 42.6

TUBE DATA

Weight of Tube and Soil 1814.3 g.

Weight of Tube 435.3 g.

Weight of Soil 1379.0 g.

Length of Tube 6.060 in. 0.5050 ft.

Diameter of Sample 2.898 in. 0.2415 ft.

Volume of Soil 0.0231 ft³

MOISTURE CONTENT DATA

Wet Weight 345.65 g.

Dry Weight 303.13 g.

Weight of Water 42.52 g.

Moisture Content 14.0 %

Pan # D-8

Wet Unit Weight 131.4 pcf

Dry Unit Weight 115.3 pcf

Type and Specification	S&ME ID #	Cal Date:	Type and Specification	S&ME ID #	Cal Date:
Balance (0.01 g)	13945	10/31/2023	Calipers (0.0005")	23286	10/31/2023
Balance (0.002 lb)	13946	10/31/2023	Straightedge	23330	12/9/2023
Oven	22915	10/1/2023			

Technician Name: Benjamin Kovaleski

NICET Lab Level III 117226
Certification#

1/11/24
Date

Technical Responsibility: Brian Vaughan, P.E.

Brian Vaughan
Signature

QA Supervisor
Position

SCDOT Shelby Tube Log

Project ID:	23610178A	County:		Boring No.:	W-2
Project Description:	I-77 Exit 26 Interchange	Route:			
UD Sample No.:	UD-2	Depth:	7-9'		
Date Sampled:	10/26/23	Date Extracted:	1/08/24		
Extracted By:	B. Kovaloski	Eng. Firm:	SIME, Inc.		

0"	Top of Shelby Tube		
2"	AIR GAP		
4"	↓ WAX SEAL		
6"	Torvane: 0.2 tsf Pocket Pene: 0.8 tsf		UD-2A
8"			
10"			
12"	Torvane: 0.3 tsf Pocket Pene: 2.3 tsf		UD-2B
14"			
16"			
18"	Torvane: 0.2 tsf Pocket Pene: 74.5 tsf Unit Weight		UD-2C
20"			
22"			
24"	Torvane: 0.2 tsf Pocket Pene: 3.5 tsf		UD-2D
26"			
28"			
30"	↑ WAX SEAL		
32"			
34"			
36"			

Appendix IX– 3-Point ADRS Curve

3-Point Acceleration Design Response Spectrum

SCDOT v3.2 - 12/12/2023

Project ID:	P042443	Latitude:	34.1939
Route:	I-77	County:	40 - Richland
Project:	New Exit 26 Interchange		
	Longitude:		

Designer:	N. Harman - Support
Date:	12/12/2023

Design EQ	PGA	S _{DS}	S _{D1}	M _W	R	PGV	D ₅₋₉₅	T _o
	g	g	g	-	km	inches/sec	sec	sec
FEE	0.20	0.32	0.06	7.30	126.93	2.14	37.10	0.17
SEE	0.41	0.77	0.16	7.28	125.90	6.06	36.64	0.16

Fundamental Period of Structure, T_0^*	Range of Interest		$V_{s,H}^*$	H	T_{NH}	
	sec				sec	
sec	0.5^*T_0	2.0^*T_0	ft/sec	ft	$(4^*H)/V_{s,H}^*$	$(6^*H)/V_{s,H}^*$
0.00	0.00	0.00	2101.56	96.70	0.14	0.28
0.00	0.00	0.00	H = B-C Boundary			

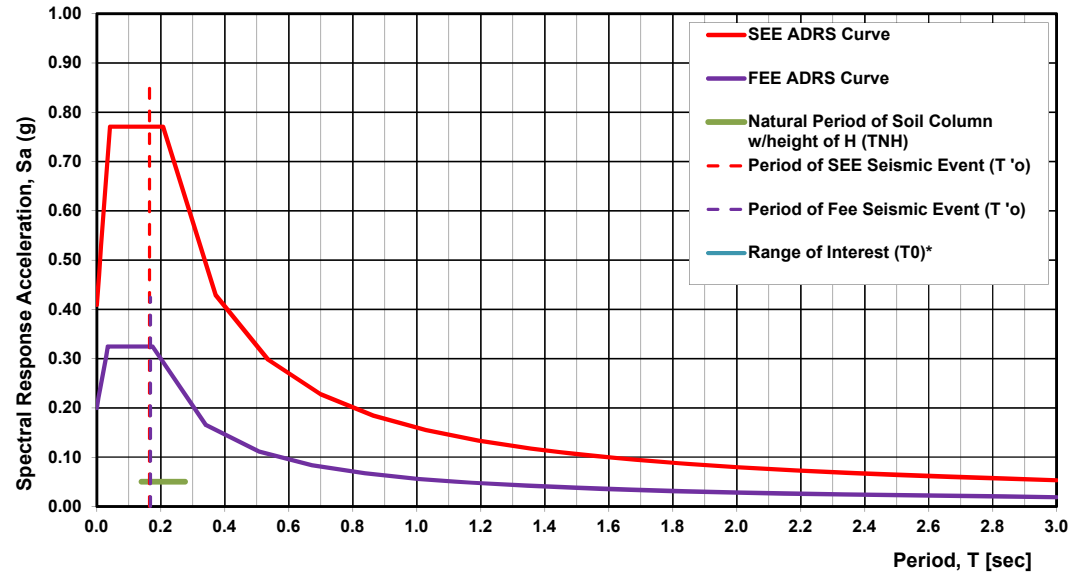
H = B-C Boundary

Damping:	5%
Geologic Condition:	Geologically Realistic (Q = 100)*
ADRS Location within Soil Column:	SCP
	At Ground Surface

South Carolina Piedmont

*Same Geologic Condition as used in SCENARIO_PC (2006)

SC Seismic ADRS Curve



FEE Data		SEE Data	
T	S _a	T	S _a
0.00	0.200	0.00	0.409
0.01	0.221	0.01	0.469
0.01	0.241	0.01	0.530
0.02	0.262	0.02	0.590
0.02	0.283	0.03	0.650
0.03	0.304	0.03	0.710
0.03	0.324	0.04	0.771
0.05	0.324	0.06	0.771
0.06	0.324	0.07	0.771
0.07	0.324	0.08	0.771
0.08	0.324	0.10	0.771
0.09	0.324	0.11	0.771
0.10	0.324	0.12	0.771
0.12	0.324	0.14	0.771
0.13	0.324	0.15	0.771
0.14	0.324	0.17	0.771
0.15	0.324	0.18	0.771
0.16	0.324	0.19	0.771
0.17	0.324	0.21	0.771
0.34	0.166	0.37	0.430
0.51	0.111	0.54	0.298
0.67	0.084	0.70	0.228
0.84	0.067	0.86	0.185
1.01	0.056	1.03	0.155
1.17	0.048	1.19	0.134
1.34	0.042	1.36	0.118
1.50	0.038	1.52	0.105
1.67	0.034	1.69	0.095
1.84	0.031	1.85	0.086
2.00	0.028	2.01	0.079
2.17	0.026	2.18	0.073
2.34	0.024	2.34	0.068
2.50	0.023	2.51	0.064
2.67	0.021	2.67	0.060
2.83	0.020	2.84	0.056
3.00	0.019	3.00	0.053

Appendix X – Electronic Data Files

gINT® Project Files

Excel® Downhole Seismic Velocity File