



# Geotechnical Data Report

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**I-20 Wateree River Bridge Repairs  
Kershaw County, SC**

May 11, 2022

PIN: P029450, P029776, P029777

Terracon Project No. 7321P043A (Rev. 1)

**Prepared for:**

RS&H, Inc.  
North Charleston, SC

**Prepared by:**

Terracon Consultants, Inc.  
Columbia, SC



May 11, 2022

RS&H, Inc.  
4000 Faber Place Drive, Suite 130  
North Charleston, SC 29405



Attn: Mr. Andrew Smith, P.E., S.E.  
P: (843) 203-7810  
E: Andrew.Smith@rsandh.com

Re: Geotechnical Data Report  
I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777  
Terracon Project No. 7321P043A (Rev. 1)

Dear Mr. Smith:

We have completed a Geotechnical Data Report for the above referenced project. These services were conducted in general accordance with the Work Order, dated March 25, 2021 between RS&H and Terracon. This report presents the findings of the subsurface exploration and laboratory testing along with an overview of testing activities.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

Loren W. Martin, E.I.T.  
Staff Engineer

Phillip A. Morrison, P.E.  
Geotechnical Department Manager  
SC Registration No. 17275





## REPORT TOPICS

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## ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES  
SITE LOCATION AND EXPLORATION PLANS  
FIELD EXPLORATION RESULTS  
LABORATORY TEST RESULTS  
SUPPORTING INFORMATION

**Note:** Refer to each individual Attachment for a listing of contents.

**Geotechnical Data Report**  
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## **INTRODUCTION**

This geotechnical data report has been completed for the proposed replacement bridges over the Wateree River along I-20 between Stations 1792+55.00 and 1823+27.47 in Kershaw County, South Carolina. The purpose this work is to develop information relative to the subsurface soil and groundwater conditions in this area. This report presents the results of that work. No geotechnical recommendations are associated with the requested scope of study.

## **GEOTECHNICAL TESTING**

The data collected by Terracon in the area of the I-20 Eastbound and Westbound Bridges over Wateree River (Asset IDs 5779, 5784) includes:

- Seventeen (17) Soil Test Borings (STB) in the bridge area
- Five (5) Soil Test Borings (STB) in the bridge approach areas
- Four (4) Soil Test Borings (STB) in the temporary crossover areas
- Ten (10) Soil Test Borings (STB) in the pavement areas
- Eight (8) Cone Penetration Test (CPT) soundings
- Two (2) Seismic Cone Penetration Test (SCPT) soundings
- Eight (8) Flat Blade Dilatometer Test (DMT) Soundings
- Four (4) MASW Geophysical Tests
- Four (4) ER Geophysical Tests
- One (1) Downhole Seismic Geophysical Test
- Two (2) Bulk Samples (BS) of existing embankment material
- Four (4) Bulk Samples (BS) of the existing pavement subgrade material

Two additional soil test borings were performed for each of the I-20 over Wateree Swamp Overflow #1 Bridges (Asset IDs 5780, 5785) and I-20 over Wateree Swamp Overflow #2 Bridges (Asset IDs 5781, 5786) east of the Wateree River. The soil and groundwater data at these bridges was collected to evaluate the scour potential as part of the Life Cycle Cost Analysis performed during the early stages of the project.

**Site Location** and **Exploration Plan** in **Site Location and Exploration Plans** are maps showing the site and soil test boring, CPT/DMT and geophysical test locations at each of the noted bridges and their approach embankments, respectively. The results of the laboratory testing performed

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on soil samples obtained from the site during the field exploration are included on the boring logs **Field Exploration Results** and/or as separate graphs in **Laboratory Test Results**.

## PROJECT DESCRIPTION

Item	Description
<b>Information Provided</b>	Scope for I-20 over Wateree Bridges Project provided by RS&H Proposed Plans for Kershaw County Contract ID 2847360 I-20 over Wateree River Twin Bridges Replacement
<b>Project Description</b>	<p>The project site is located at the Interstate 20 crossing of Wateree River located between MM 94.05 and MM 97.63 in Kershaw County, South Carolina. Site location and exploration plans are presented in <b>Site Location</b> and <b>Exploration Plan</b>. It is our understanding that the South Carolina Department of Transportation (SCDOT) proposes to replace/rehabilitate the bridges at the following locations:</p> <ul style="list-style-type: none"><li>■ I-20 over Wateree River, EB and WB, Kershaw County, Asset IDs 5779, 5784</li><li>■ I-20 over Wateree Swamp Overflow #1, Kershaw County, Asset IDs 5780, 5785</li><li>■ I-20 over Wateree Swamp Overflow #2, Kershaw County, Asset IDs 5781, 5786</li></ul> <p>As currently planned, the two pairs of overflow bridges will be rehabilitated while the Wateree River bridges will be replaced.</p>
<b>Proposed Structure</b>	The replacement bridge structures will be 1515-foot dual bridges, supported by 10 intermediate bents and 2 end bents with spacings of about 115 feet to 157 feet. The bridge will provide 2 primary lanes in each direction. For the purposes of traffic flow during the construction activities, a temporary bridge is planned for the area between the two permanent bridges.
<b>Building Construction</b>	The bridge will be a reinforced concrete slab supported by 12 prestressed concrete beams.
<b>Grading/Slopes</b>	We understand that the replacement bridges would be essentially along the same alignment as the current bridges. As such, grading will be generally limited to modest filling of the interior median to match the temporary bridge structure and reshaping of the existing embankments.
<b>Retaining Walls</b>	The end bents will essentially function as a retaining wall at the face of each of the two embankment end slopes. No additional retaining walls are known to be planned.
<b>Pavements</b>	We understand that temporary crossover pavement areas are planned in support of the construction activities.

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## SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
<b>Project Location</b>	The project site is located at the Interstate 20 crossing of Wateree River in Kershaw County, South Carolina. The location of the site is presented on <b>Site Location</b> .
<b>Existing Improvements</b>	The existing bridges are multi-span structures typically supported by deep foundations. The Wateree River bridge structures are steel girder and concrete T-beams. The Overflow #1 and #2 bridges are flat slab construction. In the course of the Life Cycle Cost Analysis, it was determined that a portion of the Wateree River bridge is supported by shallow spread footing foundations.
<b>Current Ground Cover</b>	The embankments leading to the Wateree River bridges support asphalt-paved multi-lane roadways. Beyond the asphalt pavements, the roadway shoulders and medians are grassed. The perimeter side slopes and end slopes of the embankments below the bridges are vegetated by moderately dense underbrush and small- to moderate-sized trees.
<b>Existing Utilities</b>	The existing embankment's storm drain system includes periodic yard inlets along the interior grass median with storm drains leading to the outside slopes. Other utilities may be present but were not noted.
<b>Existing Topography</b>	Based on the provided topographic information, the roadway surface elevations range from about 160 to 163 feet. The elevations in the center grass median the elevations drop about 2 feet lower. The toe elevations of the perimeter west embankment range from about 142 feet on the north side slope to 139 feet on the south side. At the east embankment, the toe elevations ranged from about 142 feet on the north side to 145 feet on the south side. The side slope inclinations of each embankment range from about 2H:1V to 2.2H:1V. The end slope of the west embankment is flatter, approximately 3H:1V.
<b>Additional Observations</b>	There are several existing ponds located in the area to just to the west of the river bridges. The approach embankment crosses through two of the ponds. The dam of the east pond projects in a perpendicular direction from the approach embankment. The provided topographic information indicates the dam has crest elevations of 151 and 153 feet in the area near its intersection with the roadway embankment. The toe elevation is at Elevation 142 feet. The downstream slope has an inclination of about 1.4H:1V.

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## GEOTECHNICAL CHARACTERIZATION

### General Site Geology

Figure 1 shows the approximate location of the project site in the Generalized Geologic Map of South Carolina. The site lies in the Upper Coastal Plain physiological province. The coastal plain deposits at this site may be divided into two strata. Based on the mapping information, the upper deposits are Holocene/Pleistocene deposits of the Quaternary Period. The deeper strata may be part of the Pee Dee Formation /Black Creek Group (undivided), a Cretaceous Period deposit.

Below the Coastal Plain horizon, the soils consist of Piedmont residuum. These soils have weathered in-place from the parent crystalline bedrock material. Often, the soil fabric retains the relict structure of the rock from which it weathered.

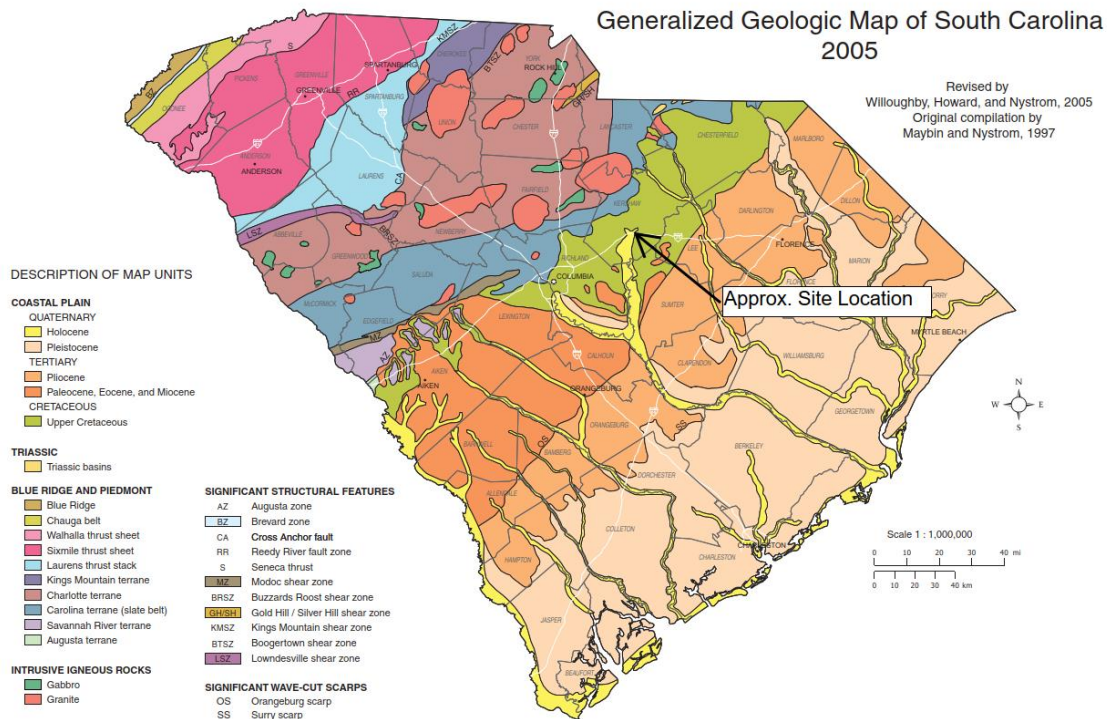


Figure 1. Approximate Site Location

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## Subsurface Conditions

Based on the preliminary and final field testing, the following generalized profile is considered representative of the soils in the area of the Wateree River bridge and approaches.

Geologic Formation	Elevation of Top of Stratum, ft.	Ave. Depth of Top of Stratum, ft. <sup>1</sup>	USCS Soil or Rock Type	Typical N Values
Existing Fill	157 to 163 (Ave. 161)	0	SM, SC	10 - 30
Holocene/ Pleistocene	131 to 145 (Ave. 140)	21	ML, CL, SM	0 - 10
Upper Cretaceous	110 to 136 (Ave. 121)	40	SW, SP, SM, CL, ML	10 – 100+
Residuum	94 to 117 (Ave. 107)	54	SM, SC	15 – 100+
Bedrock	77 to 95 (Ave. 85)	76	Granite and Schist	RR: 57 - 100 RQD: 44 - 100

1. Below roadway surface, based on an average elevation of 161 feet.

## Shear Wave Velocity

Shear wave velocity testing for the project included shear wave velocity testing of CPT soundings at two locations (one at each of the two bridge abutments), Multi-Channel Analysis of Surface Waves (MASW) testing at four locations (one at the embankment level and one at the floodplain level on each side of the river), and downhole seismic testing at one location (west bridge abutment at the embankment level). The test locations are provided on the [Exploration Plan](#). Electrical Resistivity testing was also at four locations (two within the floodplain on each side of the river) to further aid in defining the general rock surface.

From the results of the noted testing, a subsurface shear wave velocity profile was developed. Based on the shear wave velocity profile, the shear wave velocities begin to approximate 2,500 ft/sec at a depth of approximately 56 feet below the embankment surface (Elevation 105± feet). The depth at which the subsurface shear wave velocity consistently exceeds 2,500 ft/sec is considered the B-C Boundary. Based on the boring data, this falls steadily within the residual soil horizon. Soil consistencies below this level increase, grading to the bedrock horizon where the shear wave velocities near 5,000 ft/sec. The graphical shear wave velocity profiles are provided in [Exploration Results](#).

## Groundwater

Due to the drilling methods used to advance the soil borings/rock corings, water levels at the time of drilling were not available. Where possible, the borings were allowed to remain open for at least 24 hours to allow water levels to stabilize and were then measured in the field. Groundwater

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measurements were not collected in the roadway area borings (R-x). Further, the crossover area borings (CO-x) are shallow and did not reach the groundwater when checked. No water was observed above the existing ground surface at the time of our field investigation.

In the area of the Wateree River bridges, the recorded groundwater levels ranged from Elevation 118.6 feet to Elevation 152.7 feet at the locations left open to allow for the delayed water levels. The average elevation was about 132 feet. The elevation occurred at Boring B-9, located at the west bridge abutment in the median. The area is in a relative low area of the median and near a storm drain inlet. Further, the work was performed in the spring during a relatively wet time of the year. The remaining borings are closer to the noted average elevation. Water levels observed measured after 24 hours are recorded on the logs and are shown in the table below. The water levels from the borings performed for Overflow Bridges #1 and #2 (Borings B-1-B-4) also encountered groundwater and is also shown in the table.

Boring No.	Depth to Water at 24 hours (ft)	Elevation of Water at 24 hours (ft)	Boring No.	Depth to Water at 24 hours (ft)	Elevation of Water at 24 hours (ft)
E-1	36	123.3	B-18	14	128.6
E-2	34	127.0	B-19	16	126.6
B-9	9	152.7	B-20	32	128.8
B-10	16	122.6	E-3	19	141.0
B-11	14	119.8	E-4	26	133.7
B-8	40	122.9	E-5	21	138.0
B-12	13	118.6	B-4	7	128.1
B-15	13	122.3	B-3	9	127.5
B-05	26	136.8	B-2	23	136.1
B-16	14	124.9	B-1	24	134.9
B-17	15	126.0			

These observations represent groundwater conditions at the time of the field exploration, and may not be indicative of other times, or at other locations. Groundwater levels can be expected to fluctuate with varying seasonal and weather conditions. The Design-Build team should evaluate the groundwater conditions at the site and exercise engineering judgement when selecting foundation types.

## ATTACHMENTS



## EXPLORATION AND TESTING PROCEDURES

### Field Exploration

#### Overview

The testing locations were approved by the SCDOT and located in the field by Terracon by taking measurements from existing structures shown on the provided drawings. The borings were surveyed by CH Engineering, PLLC after testing and drilling was complete. The locations as shown in the Exploration Plan are shown to the scale indicated.

A field log of each test location was prepared by our engineer. The final boring logs included with this report represent the engineer's description of the encountered conditions, modified as necessary based on laboratory test results of the individual samples.

#### Soil Test Borings (STB)

All boring and sampling operations were conducted in general accordance with the following procedures:

- SCDOT Geotechnical Design Manual 2019
- ASTM D5783, "Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geo-environmental Exploration"
- ASTM D6151, "Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling"
- ASTM D1586 "Test Method for Penetration Test and Split-Barrel Sampling of Soils"
- ASTM D4220 "Standard Practices for Preserving and Transporting Soil"
- ASTM D2113 "Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration"
- ASTM D5079 "Standard Practices for Preserving and Transporting Rock Core Samples"

Each soil test boring was advanced using rotary wash drilling techniques. The initial sampling program is summarized in the following table:

Test ID	Total Depth	Interval of Continuous Sampling
B-1 to B-8	60 feet or refusal	0 to 40 feet
B-9 to B-20	120 feet or 20 feet of rock coring	0 to 10 feet, B-20 0 to 50 feet
B-9A (DHT-1)	120 feet min. (drilling and coring)	No sampling, coring only
E-1 to E-5	60 feet	0 to 10
CO-1 to CO-4	10 feet	0 to 10 feet
R-1 to R-10	30 feet	0 to 10 feet

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Test ID	Total Depth	Interval of Continuous Sampling
CPT-1 to CPT-10	Bridge area: 120 feet or refusal Embankment area: 60 feet or refusal	N/A
DMT-1 to DMT-8	Bridge area: 120 feet or refusal Embankment area: 60 feet or refusal	N/A

Soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-barrel sampler, also known as a standard split-spoon. The sampler is advanced into the soil a total of 18 to 24 inches by striking the drill rod using a 140-pound automatic hammer falling 30 inches. The number of blows required to advance the sampler for each of three to four, 6-inch increments is recorded. The sum of the number of blows for the second and third increments is called the “Standard Penetration Value”, or N-value ( $N_{meas}$ , blows per foot). The N-value, when properly evaluated, is an index to the soil strength.

Soil Classification provides a general guide to the engineering properties of various soil types and enables the engineer to apply his experience to current situations. In our exploration, samples obtained during drilling operations are examined and visually classified by a geotechnical engineer using the procedures outlined in ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System). Laboratory testing was also performed on select split-spoon samples to evaluate index properties for further classification. The soils are described according to color, texture, and relative density or consistency (based on standard penetration resistance). The designations shown on the logs are described in the 2019 SCDOT Geotechnical Design Manual, Chapter 6.

The borings were advanced either to the planned drilling depth at which they were terminated, or to refusal of the drilling equipment. For those which required rock sampling, the boring was continued below the refusal depth using diamond bit rock coring techniques. NQ2 sized cores were recovered from the borehole. The rock recovery ratios (REC, percentage of the total core run), Rock Quality Designation (RQD, percentage of the total core run of pieces greater than 4 inches) were recorded along with a description of the rock. An explanation of the rock descriptions shown on the logs is provided in the SCDOT GDM Chapter 6. Photos of the recovered rock core specimens are provided in **Field Exploration Results**.

As each boring was drilled by mud rotary methods, groundwater levels at the time of drilling were not available. Groundwater readings were collected from each of the soil test borings that could remain open after 24 hours. These water levels are indicated on the boring logs in **Field Exploration Results**.

At the conclusion of the work, the boreholes were backfilled with the drill cuttings and/or clean sand. The lesser of the upper 20 feet, the cave-in level or the boring depth of the boreholes were grouted with a cement bentonite grout and capped with cold-patch asphalt. The holes through the bridge deck were patched with non-shrink portland cement grout.

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### Cone Penetration Test (CPT) Soundings/Flat Blade Dilatometer Test (DMT) Soundings

Cone Penetration Test soundings were conducted in accordance with ASTM D5778 *Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils*. Additionally, CPT seismic testing will be conducted at each bridge abutment location on 3-foot intervals.

Flat Blade Dilatometer Test soundings were performed in accordance with ASTM D6635 *Standard Test Method for Performing the Flat Plate Dilatometer*.

The initial sampling program for the CPT/DMT and is summarized in the following table:

Test ID	Total Depth	Interval of Continuous Sampling
CPT-1 to CPT-10	Bridge area: 120 feet or refusal Embankment area: 60 feet or refusal	N/A
DMT-1 to DMT-8	Bridge area: 120 feet or refusal Embankment area: 60 feet or refusal	N/A

### Downhole Shear Wave Velocity Test (DHT)

One downhole seismic test was performed in a cased borehole drilled for this project. After the test boring was completed, the boring was filled with a fluid water/cement/bentonite grout and then a threaded PVC pipe casing (capped at the bottom end) was inserted into the borehole, providing a uniform bond between the soil and pipe exterior.

The downhole seismic test consisted of placing two downhole triaxial geophones at selected depth intervals in the borehole casing. The geophone was connected to a recording device (Seismic Source Daq Link 5 Seismograph) at the surface and clamped to the side of the casing at the selected test depth. The geophones are equipped with a spring-arm that is released at the bottom of the boring. The spring expands and forces the geophone against the casing wall. The interval between each geophone and each test depth was 3 feet for the entire depth of the cased borehole. An instrumented hammer was then used to strike a steel plate with cleats at the bottom (often called a shear wave golf shoe) that penetrated the ground and prevented sliding when struck. The steel plate was oriented to generate horizontal shear waves (SH) at the surface. An additional plate was also struck to better produce compression waves. The horizontal distance was measured and the plate was set exactly 10 feet from the borehole. The recorder was set to record the arrival times of the shear waves at the geophone locations. At least 15 blows (5 in each direction on the golf shoe, and 5 on the steel plate) were struck for each test depth to electronically stack and polarize the observed data, and to increase the signal-to-noise ratio. The data was stored on computer disks for processing and computation. The geophone was raised to the next depth interval and the process was repeated.

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Exhibit A-10 shows the downhole shear wave velocity and compressive wave velocity test results. The data was evaluated using the Fixed Interval method. S-wave arrival times using the Interval method were picked based on the onset of the signal (first break) as observed in the software package TomTime by GeoTom.

### Seismic Surface Wave Testing

Multi-Channel Analysis of Surface Waves (MASW testing) was performed to determine the shear wave velocity profile of the layered soil system. At the test location, both MASW readings (active) and Microtremor Array Measurement (MAM) readings (passive) were recorded. The MASW test was conducted using the 24-channel Geometrics Geode seismographs and 4.5-Hz geophones with a linear geometry at an interval of 10-ft. Surface waves were generated by a 20-pound sledgehammer striking a polyethylene plate at four locations. MAM testing was performed along the same survey line.

MASW (Active) Testing - Multi-Channel Analysis of Surface Waves (MASW) is a seismic method that uses the dispersive characteristics of Rayleigh-type surface waves to determine the variation of the shear-wave velocity of layered soils with depth.

MAM (Passive) Testing - Microtremor Array Measurement (MAM) “for lower frequency surface waves (passive waves) arising from microtremors and/or urban (traffic) noise and recorded them using a linear or two-dimensional (triangle, circle, semicircle, and “shapes”) array of geophones (Zywicki and Rix, 1999; Lie et al., 2000). Multiple noise records are required for analysis. The data filters out the Rayleigh waves through a technique called spatial auto-correction (SPAC). This allows the development of a dispersion curve that is defined as the lower envelope of the measured energy peaks. MAM testing results in lower peak energy selections than the active testing described above. The 2-D and 1-D shear wave velocity profiles are shown in **Field Exploration Results**.

### Laboratory Testing

Samples retrieved during the field exploration were taken to the laboratory to conduct the necessary laboratory tests. Terracon formulated a laboratory testing program to determine physical and mechanical engineering properties of the subsurface materials. Laboratory tests were conducted on the selected soil samples and the test results are presented in **Laboratory Test Results**. The laboratory tests included:

- Natural Moisture Content (ASTM D2216)
- Atterberg Limits Tests (ASTM D4318)
- Fines Content (ASTM D1140)
- Grain-Size Analyses with wash No.200 (ASTM D6913)
- Grain Size Analyses with Hydrometer (ASTM D7928 & ASTM D6913)
- Consolidated Undrained Triaxial Tests (ASTM D4767)

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- Standard Proctor Compaction Test (ASTM D698)
- California Bearing Ratio (ASTM D1883)
- Direct Shear (ASTM D3080)
- Resistivity Tests (ASTM G57)
- pH Tests (ASTM G51)
- Sulfate Tests (ASTM D516)
- Chloride Tests (ASTM D512)
- Unconfined Compression Test of Rock Cores (ASTM D7012)

## **SITE LOCATION AND EXPLORATION PLANS**

### **Contents:**

Site Location Plan

Exploration Plans (5 pages)

Boring Location Survey Data Summary (2 pages)

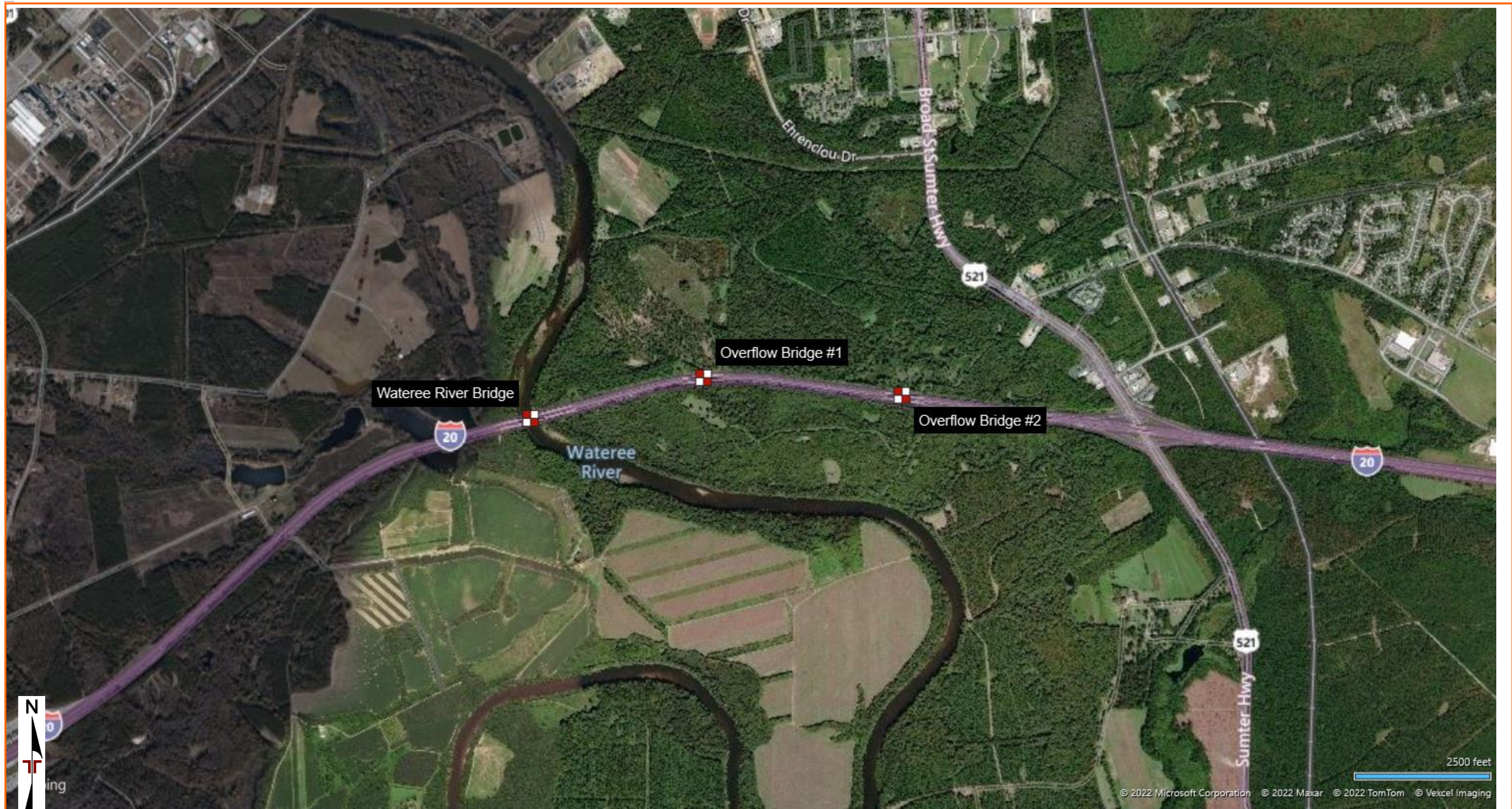
Subsurface Profile Cross Section (3 pages)

Note: All attachments are one page unless noted above.



**SITE LOCATION**

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**EXPLORATION PLAN (SPT/CPT/DMT) – WATEREE RIVER BRIDGE (WEST)**

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**EXPLORATION PLAN (SPT/CPT/DMT) – WATEREE RIVER BRIDGE (EAST)**

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**EXPLORATION PLAN (SPT/CPT/DMT) – OVERFLOW #1 BRIDGE**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

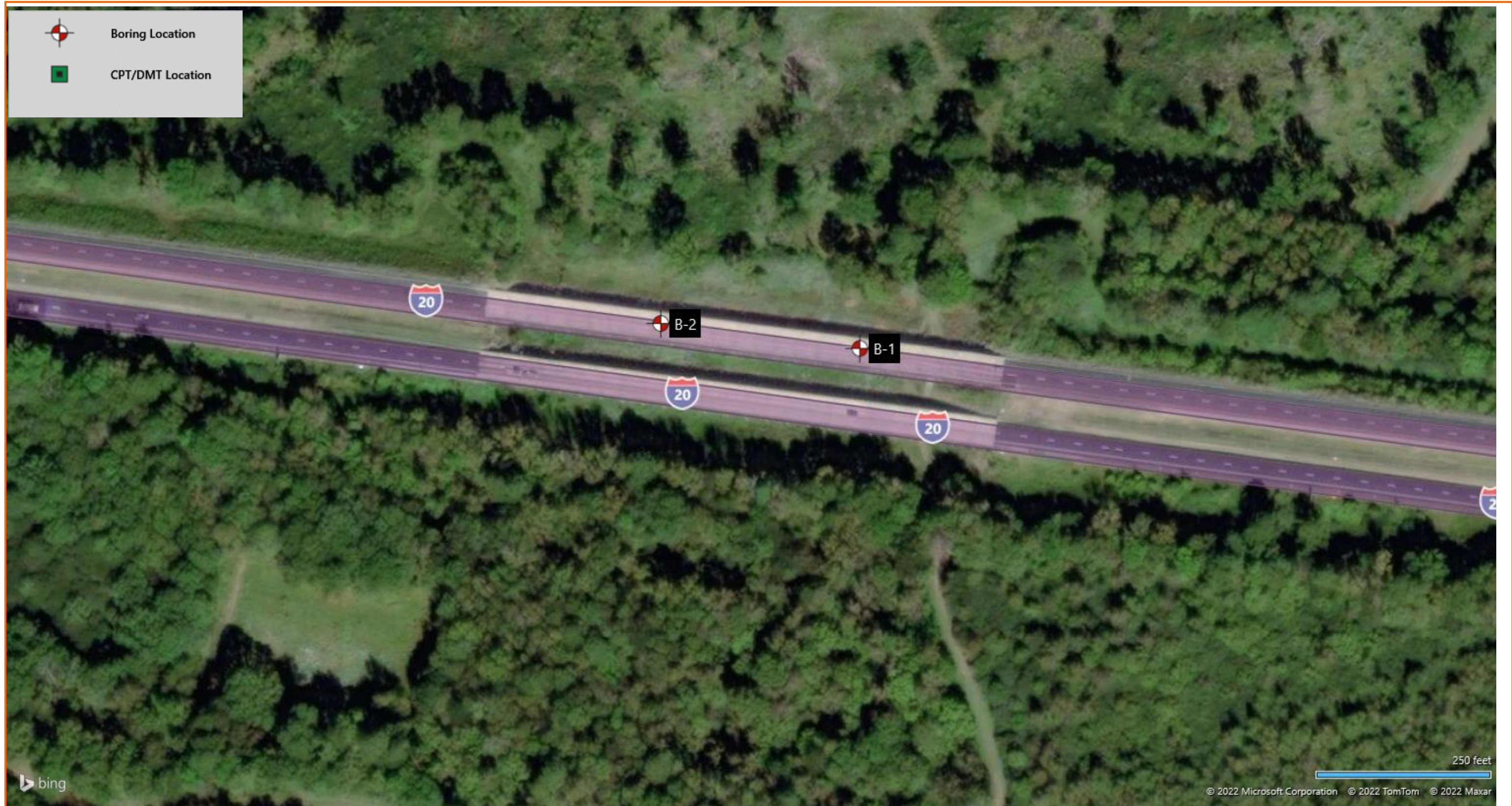
Terracon Project No. 7321P043A ■ PIN: P029450, P029776, P029777





**EXPLORATION PLAN (SPT/CPT/DMT) – OVERFLOW #2 BRIDGE**

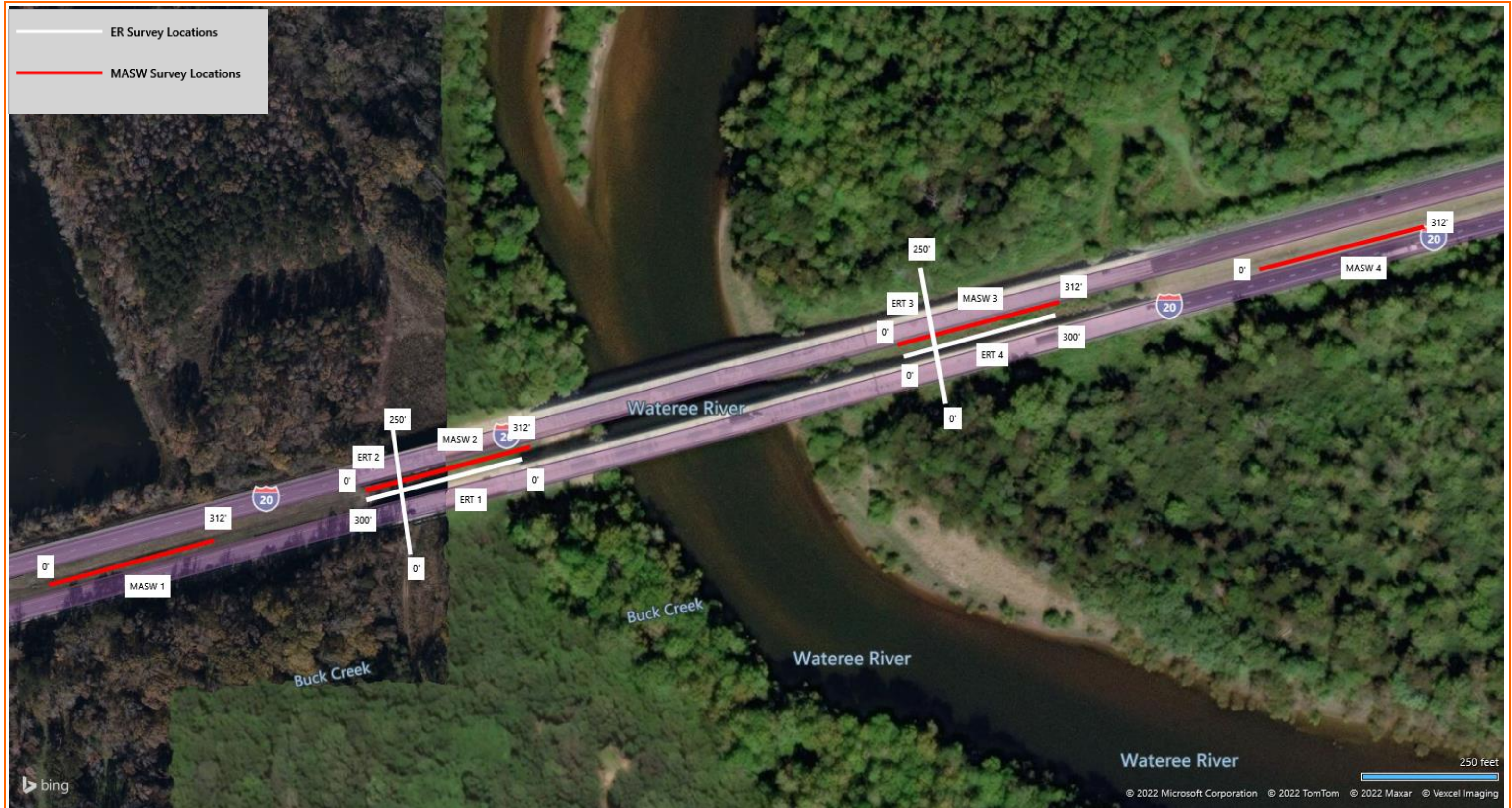
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**EXPLORATION PLAN (GEOPHYSICAL TESTING) – WATEREE RIVER BRIDGE**

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**Geotechnical Baseline Report**

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**Boring Location Survey Data Summary**

Boring No.	Ground Elev., ft.	Test Depth, ft.	Northing	Easting	Latitude	Longitude	Station	Offset
B-1	158.89	60.0	868072.06	2118917.38	34.2186098	-80.6065739	1879+26.88	56.41 – L
B-2	159.15	60.0	868106.54	2118631.10	34.2187076	-80.6075205	1876+38.54	54.14 – L
B-3 <sup>1</sup>	136.46	40.0	868456.90	2115142.63	34.2197063	-80.6190570	1841+40.20	69.68 – L
B-4 <sup>1</sup>	135.12	40.0	868429.69	2114875.40	34.2196342	-80.6199414	1838+74.75	67.32 – L
B-5	162.79	48.5	867746.87	2112111.54	34.2177853	-80.6290932	1810+35.00	56.06 – L
B-6	163.11	73.0	867683.86	2111877.61	34.2176145	-80.6298678	1807+92.74	55.08 – L
B-7	163.10	75.0	867655.01	2111767.79	34.2175363	-80.6302315	1806+79.19	55.33 – L
B-8	162.86	60.0	867592.01	2111530.21	34.2173654	-80.6310182	1804+33.40	55.30 – L
B-9	161.68	99.3	867459.29	2111207.92	34.2170039	-80.6320860	1800+88.04	9.53 – L
B-9A	161.16	120.7	867441.70	2111201.57	34.2169556	-80.6321072	1800+77.22	5.80 – R
B-10 <sup>1</sup>	138.58	81.3	867419.43	2111375.35	34.2168927	-80.6315326	1802+39.49	71.85 – R
B-11 <sup>1</sup>	133.81	70.5	867592.35	2111478.83	34.2173669	-80.6311882	1803+83.82	68.79 – L
B-12 <sup>1</sup>	131.60	56.5	867487.60	2111636.42	34.2170775	-80.6306681	1805+09.31	72.84 – R
B-13	163.12	98.1	867658.69	2111778.92	34.2175463	-80.6301946	1806+90.89	56.04 – L
B-14	163.15	92.5	867588.07	2111946.85	34.2173505	-80.6296399	1808+35.12	55.25 – R
B-15 <sup>1</sup>	135.28	65.7	867758.55	2112065.52	34.2178179	-80.6292453	1809+93.51	79.13 – L
B-16 <sup>1</sup>	138.88	73.6	867642.41	2112235.87	34.2174970	-80.6286831	1811+28.42	76.77 – R
B-17 <sup>1</sup>	141.02	75.4	867817.36	2112321.21	34.2179770	-80.6283987	1812+55.73	70.48 – L
B-18 <sup>1</sup>	142.59	84.4	867702.67	2112468.11	34.2176603	-80.6279141	1813+68.35	78.03 – R
B-19 <sup>1</sup>	142.63	86.5	867875.87	2112506.45	34.2181359	-80.6277852	1814+49.78	79.57 – R
B-20	160.80	95.4	867844.67	2112686.85	34.2180484	-80.6271888	1816+16.17	3.2 – L
CO-1	159.47	10.0	867326.16	2110791.37	34.2166421	-80.6334656	1796+51.11	12.39 – R
CO-2	159.72	10.0	867382.18	2110994.83	34.2167940	-80.6327918	1798+62.13	10.36 – R
CO-3	160.08	10.0	867949.64	2113014.38	34.2183336	-80.6261040	1819+59.66	20.75 – L
CO-4	159.27	10.0	868074.61	2113488.63	34.2186723	-80.6245335	1824+50.10	20.04 – L
E-1	159.33	60.0	867291.78	2110659.87	34.2165489	-80.6339010	1795+15.19	11.93 – R
E-2	161.03	60.0	867443.72	2111116.39	34.2169620	-80.6323890	1799+95.40	17.98 – L
E-3	160.02	60.0	867879.23	2112775.54	34.2181425	-80.6268950	1817+10.75	13.88 – L
E-4	159.71	60.0	868012.06	2113248.34	34.2185028	-80.6253292	1822+01.78	21.15 – L
E-5	159.02	60.0	868012.06	2113248.34	34.2188516	-80.6237139	1827+06.23	20.34 – L

1. Drilled in the area below the bridge.

**Geotechnical Baseline Report**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A

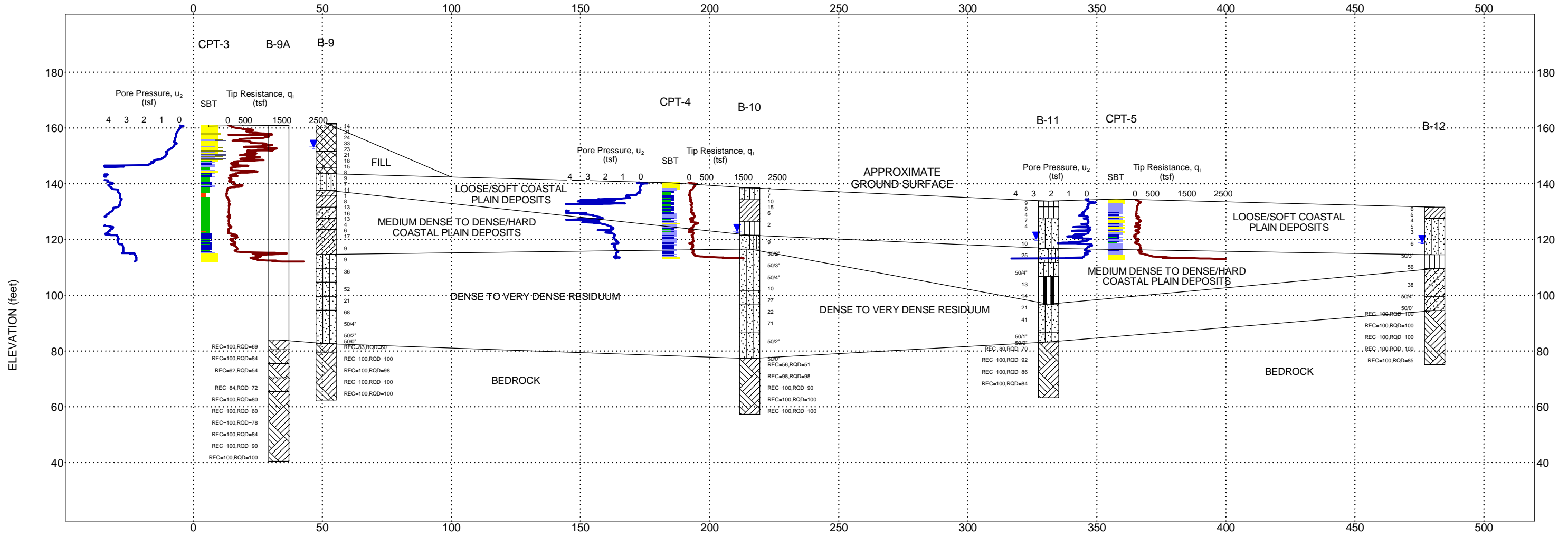
PIN: P029450, P029776, P029777

**Boring Location Survey Data Summary (Con't)**

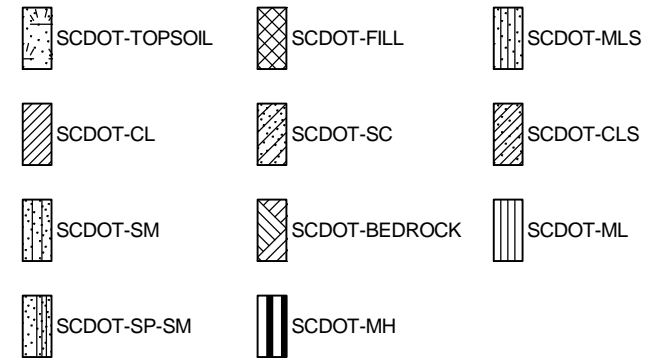
Boring No.	Ground Elev., ft.	Test Depth, ft.	Northing	Easting	Latitude	Longitude	Station	Offset
R-1	161.50	30.0	867347.13	2110626.97	34.2167013	-80.6340092	1794+97.55	49.91 – L
R-2	161.48	30.0	867250.91	2110651.15	34.2164366	-80.6339303	1794+96.29	49.20 – R
R-3	162.15	30.0	867475.19	2111111.38	34.2170485	-80.6324052	1799+98.62	49.69 – L
R-4	162.09	15.0	867380.27	2111138.91	34.2167874	-80.6323152	1800+00.91	49.12 – R
R-5	161.51	30.0	867910.88	2112761.86	34.2182296	-80.6269398	1817+05.64	47.97 – L
R-6	161.15	30.0	867817.58	2112786.22	34.2179730	-80.6268604	1817+05.28	48.45 – R
R-7	160.39	30.0	868041.25	2113252.47	34.2185830	-80.6253152	1822+13.27	48.30 – L
R-8	160.27	30.0	867947.28	2113275.97	34.2183245	-80.6252386	1822+11.91	48.55 – R
R-9	159.86	30.0	868171.46	2113739.76	34.2189360	-80.6237016	1827+17.66	49.32 – L
R-10	159.72	30.0	868076.62	2113761.38	34.2186751	-80.6236312	1827+14.26	47.89 – R
CPT-1	159.40	49.0	867289.80	2110648.69	34.2165435	-80.6339380	1795+03.87	10.98 - R
CPT-2	159.18	48.2	867367.03	2110933.66	34.2167530	-80.6329944	1979+99.12	9.34 - R
CPT-3	161.29	48.9	867460.15	2111187.07	34.2170064	-80.6321549	1800+67.93	15.76 - L
CPT-4 <sup>1</sup>	140.50	27.2	867554.57	2111336.82	34.2172644	-80.6316584	1802+36.87	68.65 - L
CPT-5 <sup>1</sup>	134.47	21.5	867457.77	2111517.00	34.2169966	-80.6310635	1803+86.24	71.08 - R
CPT-6 <sup>1</sup>	138.63	20.9	867779.28	2112160.41	34.2178739	-80.6289311	1810+90.55	74.86 - L
CPT-7 <sup>1</sup>	140.13	30.1	867680.20	2112345.04	34.2175998	-80.6283215	1812+43.63	68.22 - R
CPT-8	161.47	56.5	867852.75	2112681.92	34.2180706	-80.6272050	1816+13.47	12.26 - L
CPT-9	156.96	51.6	867993.61	2113255.47	34.2184521	-80.6253059	1822+03.97	1.48 - L
CPT-10	156.76	59.8	868123.05	2113742.07	34.2188029	-80.6236945	1827+07.49	1.93 - L
DMT-1	159.40	50.8	867289.80	2110648.69	34.2165435	-80.6339380	1795+03.87	10.98 - R
DMT-2	159.18	54.8	867367.03	2110933.66	34.2167530	-80.6329944	1979+99.12	9.34 - R
DMT-3	161.29	58.7	867460.15	2111187.07	34.2170064	-80.6321549	1800+67.93	15.76 - L
DMT-4 <sup>1</sup>	134.47	36.4	867457.77	2111517.00	34.2169966	-80.6310635	1803+86.24	71.08 - R
DMT-5 <sup>1</sup>	138.63	22.0	867779.28	2112160.41	34.2178739	-80.6289311	1810+90.55	74.86 - L
DMT-6	161.47	70.5	867852.75	2112681.92	34.2180706	-80.6272050	1816+13.47	12.26 - L
DMT-7	156.96	13.5	867993.61	2113255.47	34.2184521	-80.6253059	1822+03.97	1.48 - L
DMT-8	156.76	51.5	868123.05	2113742.07	34.2188029	-80.6236945	1827+07.49	1.93 - L

1. Performed in the area below the bridge.

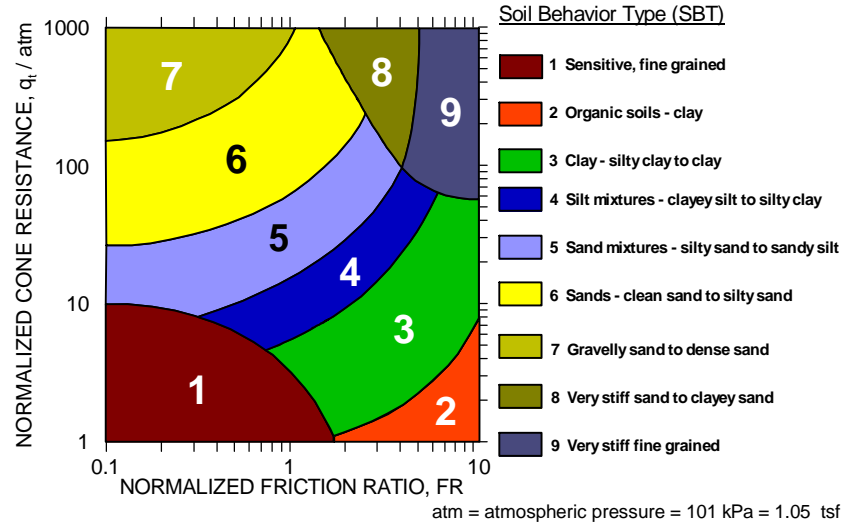
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SCDOT\_FENCE\_7321P043A CROSS SECTION DATA - SELECT BORINGS.GPJ TERRACON\_DATATEMPLATE.GDT 5/4/22



Legend for USCS Classification Graphic Symbols



CPT Soil Classification Graphic Symbols



**NOTES:**  
 See Exhibit for orientation of soil profile.  
 See General Notes in Appendix for symbols and soil classifications.  
 Soils profile provided for illustration purposes only.  
 Soils between borings may differ.  
 For presentation purposes, some locations are offset to allow display of both borings and CPTs.  
 BT - Boring Termination (Ft)  
 CPTT - CPT Termination (Ft)

▽ Water Level Reading at time of drilling.  
 ▼ Water Level Reading after drilling.

Project Manager: LM  
 Drawn by: PTK  
 Approved by: PAM  
 Date: MAY 2022

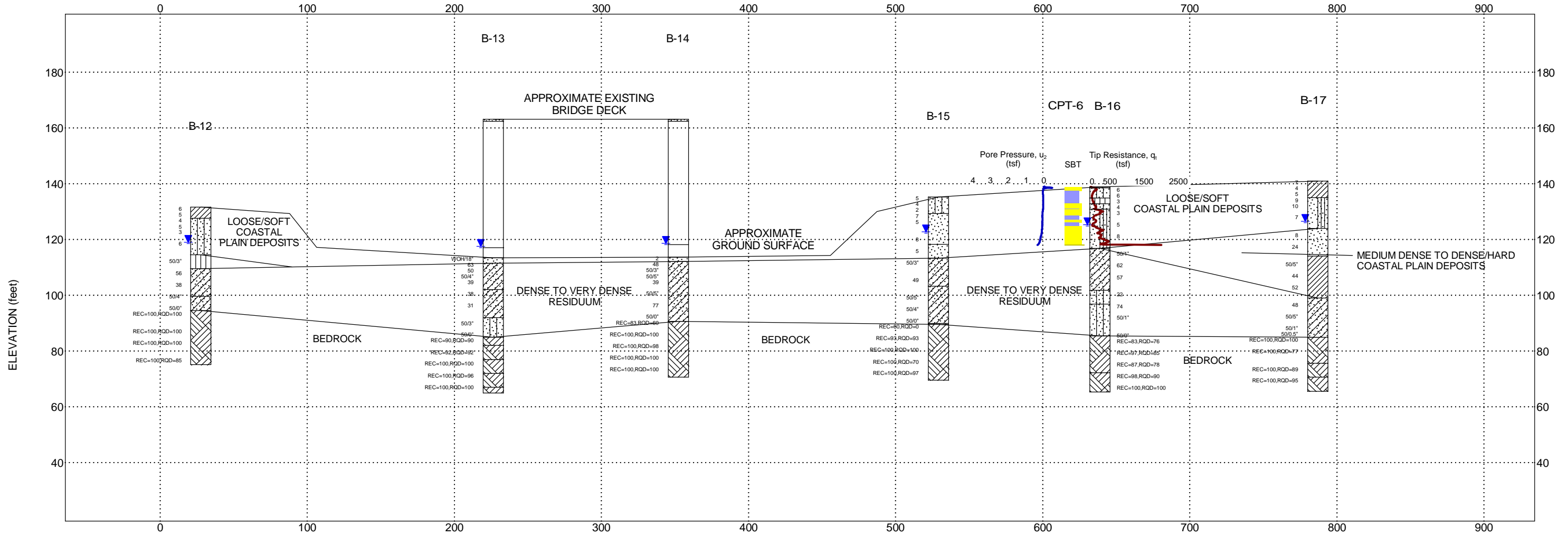
Project No.: 7321P043A  
 Scale: N.T.S.  
 File Name: PROFILE 1

**Terracon**  
 521 Clemson Rd  
 Columbia, SC  
 PH. 803-741-9000 FAX. 803-741-9900

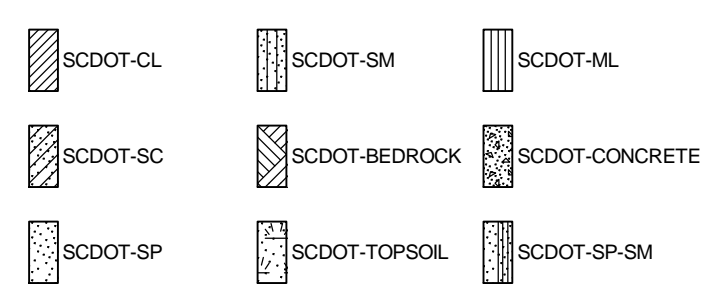
**SUBSURFACE PROFILE**  
 CROSS SECTION A-A' - PROFILE 1  
 I-20 WATEREE RIVER BRIDGE REPAIRS  
 KERSHAW COUNTY  
 KERSHAW COUNTY, SC

EXHIBIT

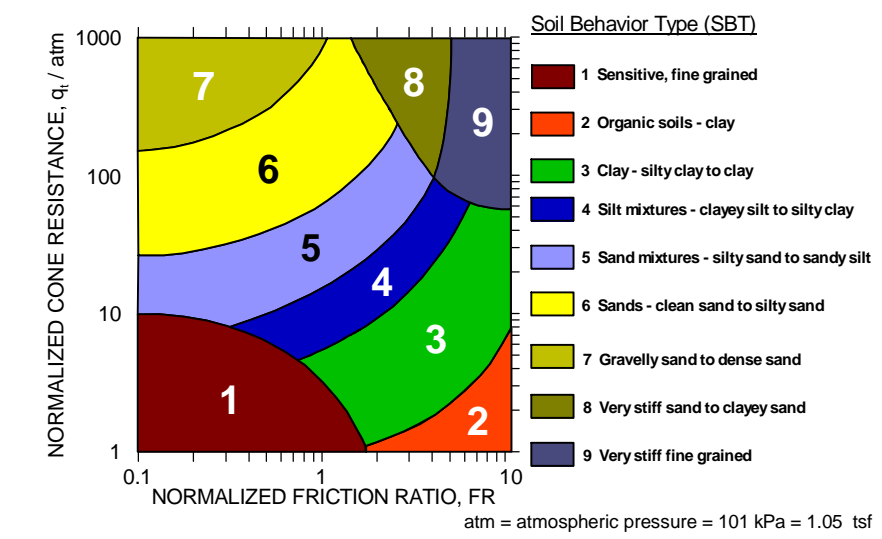
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Legend for USCS Classification Graphic Symbols



CPT Soil Classification Graphic Symbols



**NOTES:**  
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 BT - Boring Termination (Ft)  
 CPTT - CPT Termination (Ft)

Project Manager: LM  
 Drawn by: PTK  
 Approved by: PAM  
 Date: MAY 2022

Project No.: 7321P043A  
 Scale: N.T.S.  
 File Name: PROFILE 2

**Terracon**  
 521 Clemson Rd  
 Columbia, SC  
 PH. 803-741-9000 FAX. 803-741-9900

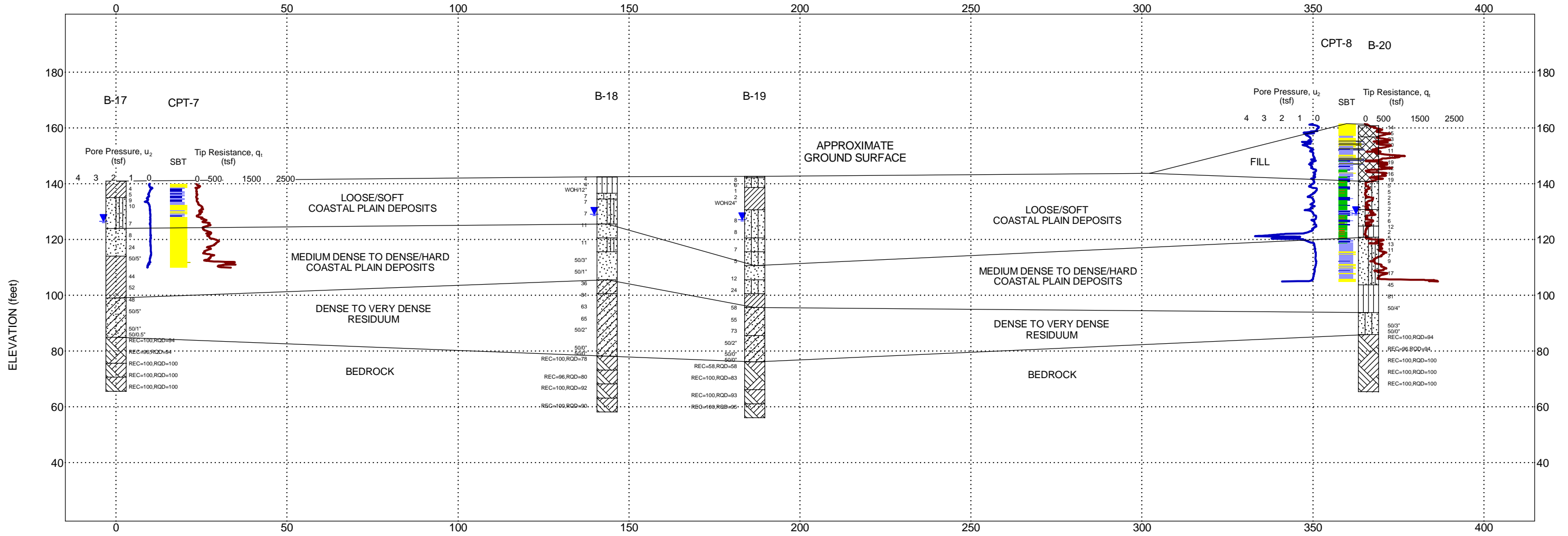
**SUBSURFACE PROFILE**  
 CROSS SECTION A-A' - PROFILE 2  
 I-20 WATEREE RIVER BRIDGE REPAIRS  
 KERSHAW COUNTY  
 KERSHAW COUNTY, SC

EXHIBIT

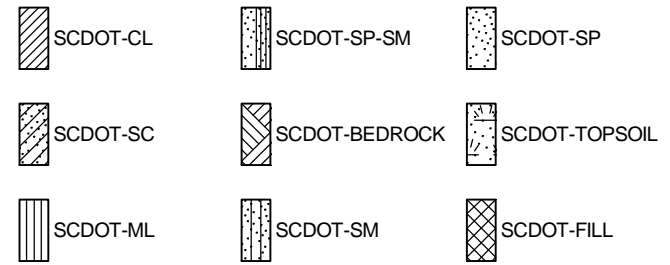


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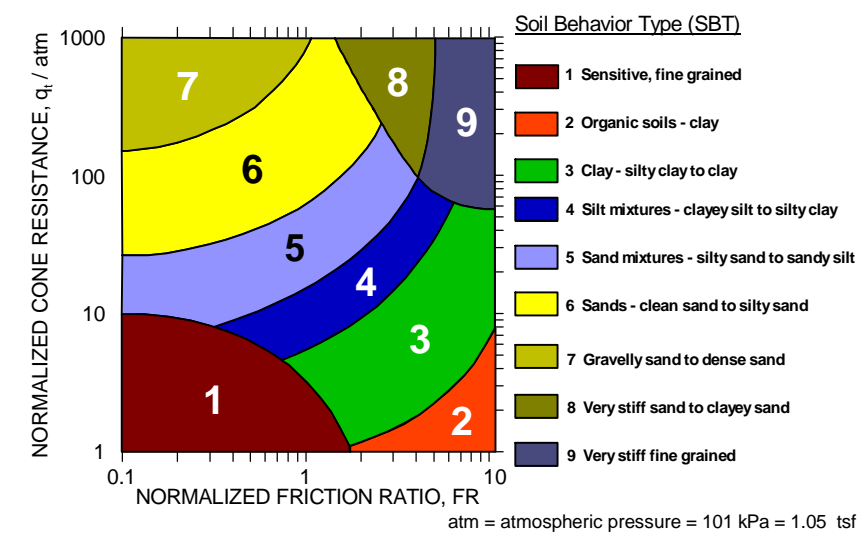
A'



Legend for USCS Classification Graphic Symbols



CPT Soil Classification Graphic Symbols



**NOTES:**  
 See Exhibit for orientation of soil profile.  
 See General Notes in Appendix for symbols and soil classifications.  
 Soils profile provided for illustration purposes only.  
 Soils between borings may differ.  
 For presentation purposes, some locations are offset to allow display of both borings and CPTs.  
 BT - Boring Termination (Ft)  
 CPTT - CPT Termination (Ft)

Water Level Reading at time of drilling.  
 Water Level Reading after drilling.

Project Manager: LM  
 Drawn by: PTK  
 Approved by: PAM  
 Date: MAY 2022

Project No.: 7321P043A  
 Scale: N.T.S.  
 File Name: PROFILE 3

**Terracon**  
 521 Clemson Rd  
 Columbia, SC  
 PH. 803-741-9000 FAX. 803-741-9900

**SUBSURFACE PROFILE**  
 CROSS SECTION A-A' - PROFILE 3  
 I-20 WATEREE RIVER BRIDGE REPAIRS  
 KERSHAW COUNTY  
 KERSHAW COUNTY, SC

EXHIBIT

## **FIELD EXPLORATION RESULTS**

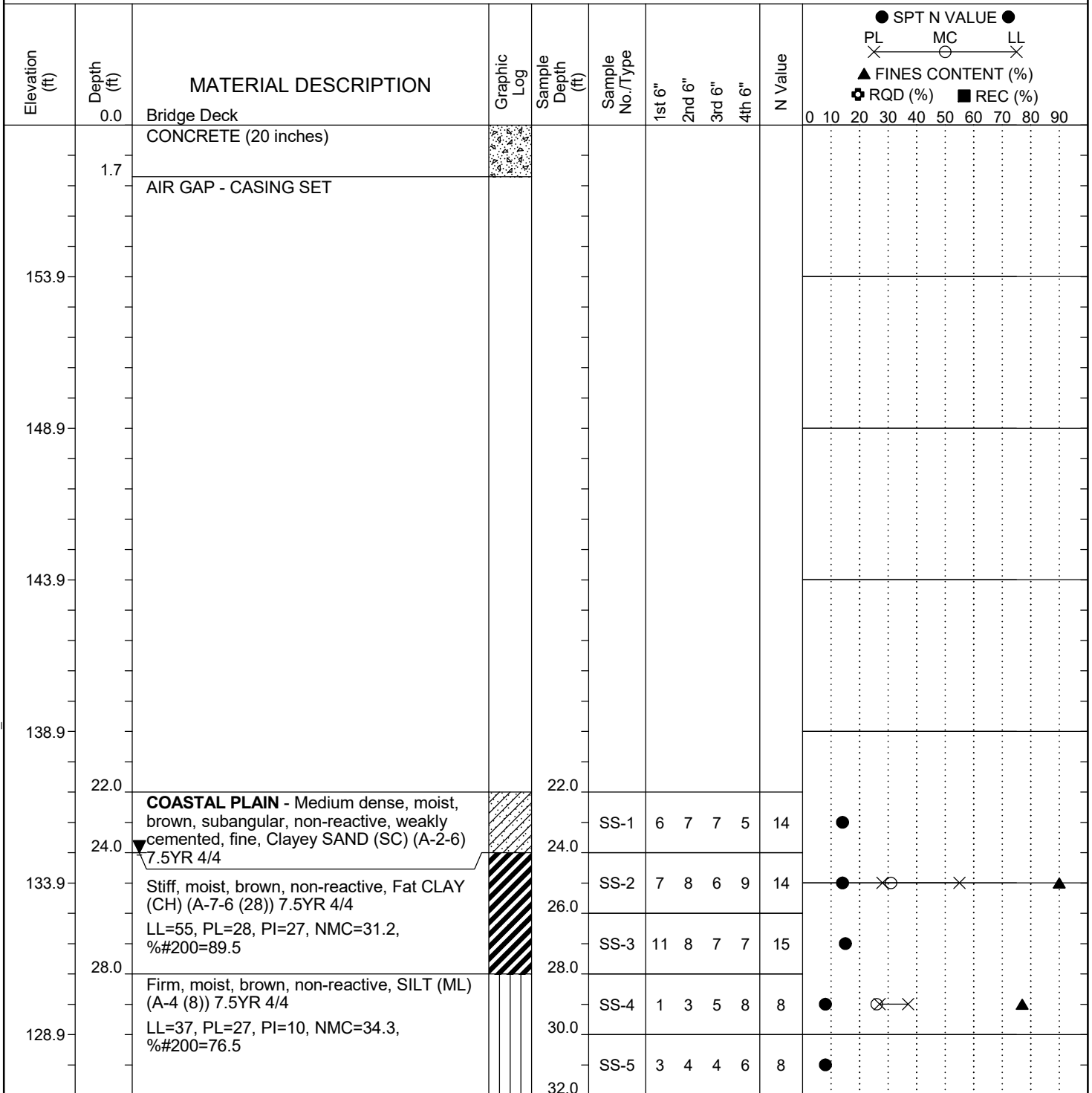
### **Contents:**

Bridge Boring Logs (B-1 through B-20)  
Crossover Boring Logs (CO-1 through CO-4)  
Embankment Boring Logs (E-1 through E-5)  
Pavement Boring Logs (R-1 through R-10)  
CPT Logs (CPT-1 through CPT-10)  
DMT Logs (DMT-1 through DMT-8)  
Rock Core Photograph Log (17 pages)  
Downhole Shear-Wave Velocity Test Results  
MASW Shear-Wave Velocity 2-D Profiles (4 pages)  
Field Electrical Resistivity Profiles (4 pages)  
MASW Shear-Wave Velocity 1-D Profiles (4 pages)  
Grout Logs (36 pages)  
Drill Rig Photograph Log (20 pages)

Note: All attachments are one page unless noted above.

# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777	<b>County:</b> Kershaw	<b>Boring No.:</b> B-1
<b>Site Description:</b> I-20 Wateree River Bridge Repairs	<b>Route:</b> I-20	
<b>Eng./Geo.:</b> LM	<b>Boring Location:</b> 1879+26.88	<b>Offset:</b> 56.41 L <b>Alignment:</b> Existing
<b>Elev.:</b> 158.9 ft	<b>Latitude:</b> 34.2186098	<b>Longitude:</b> -80.6065739 <b>Date Started:</b> 6/14/2021
<b>Total Depth:</b> 60 ft	<b>Soil Depth:</b> 60 ft	<b>Core Depth:</b> 0 ft <b>Date Completed:</b> 6/22/2021
<b>Bore Hole Diameter (in):</b> 3	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N) <b>Liner Used:</b> Y (N)
<b>Drill Machine:</b> CME-55/727	<b>Drill Method:</b> RW	<b>Hammer Type:</b> Automatic <b>Energy Ratio:</b> 88.8%
<b>Core Size:</b> N.A.	<b>Driller:</b> ST	<b>Groundwater:</b> TOB N.M. <b>24HR:</b> 24 ft



LEGEND

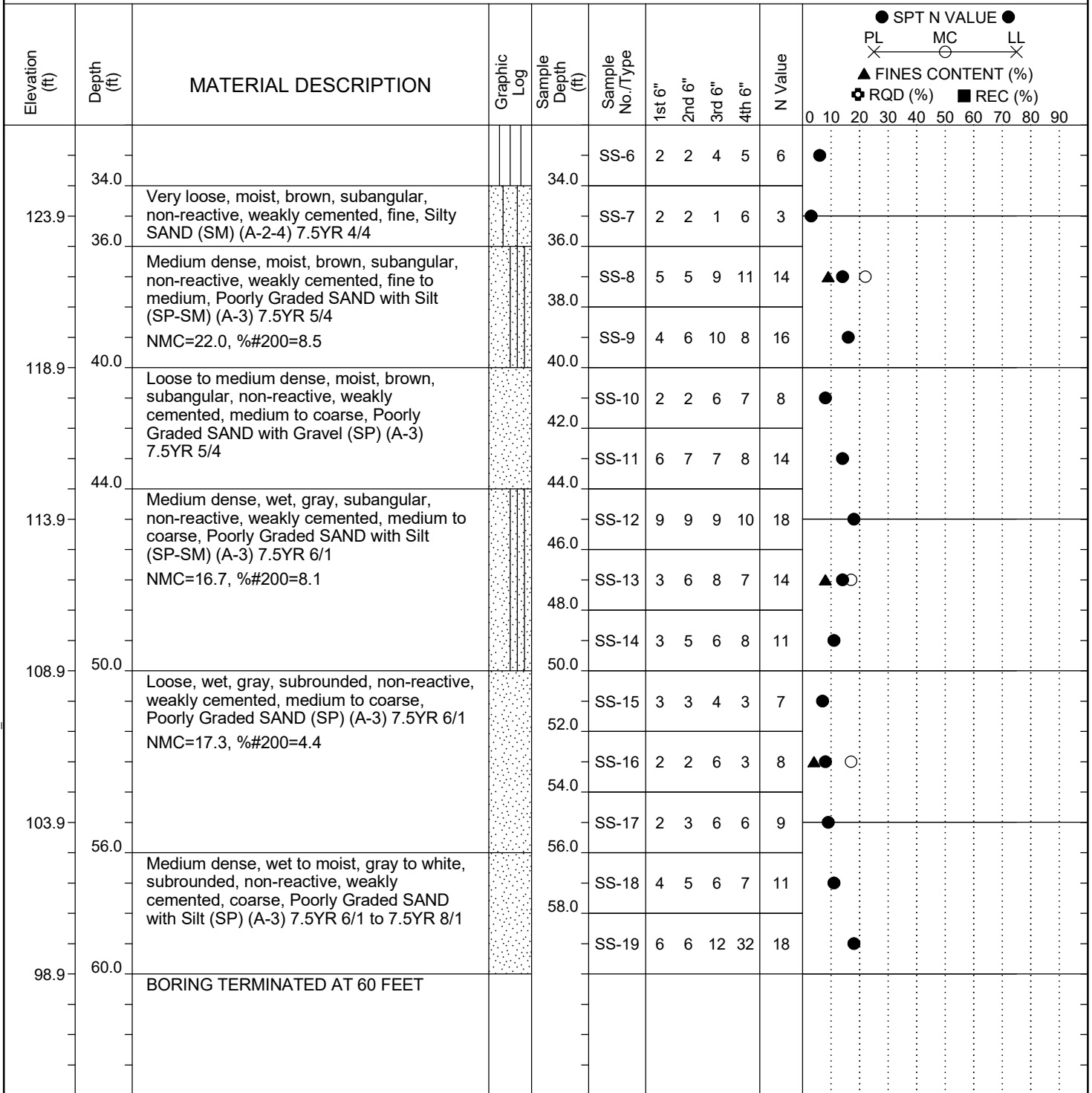
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-1
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1879+26.88	<b>Offset:</b>	56.41 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	158.9 ft	<b>Latitude:</b>	34.2186098	<b>Longitude:</b>	-80.6065739	<b>Date Started:</b>	6/14/2021
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	6/22/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55/727	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	24 ft



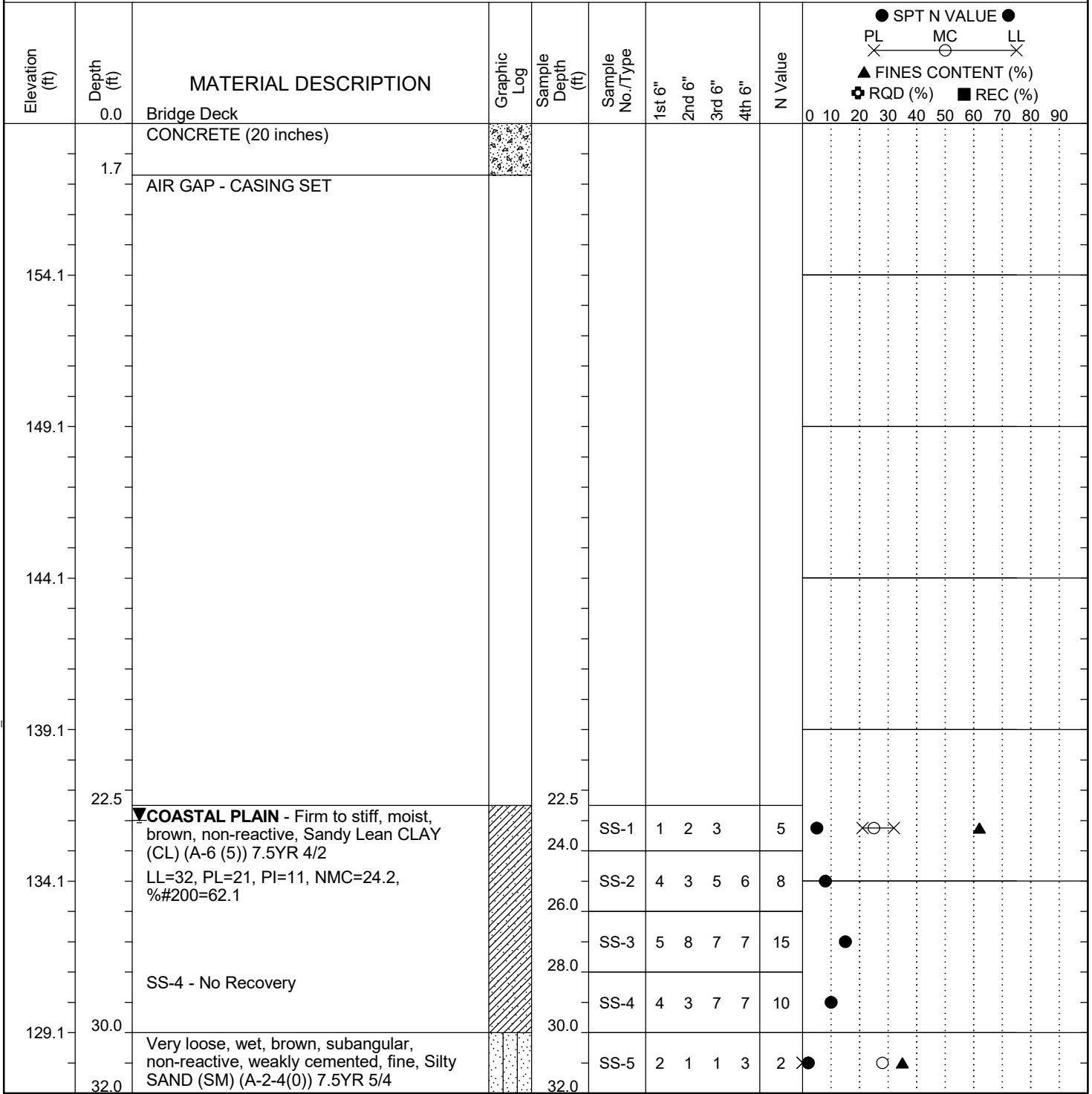
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-2
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1876+38.54	<b>Offset:</b>	54.14 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.1 ft	<b>Latitude:</b>	34.2187076	<b>Longitude:</b>	-80.6075205	<b>Date Started:</b>	6/21/2021
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	6/22/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55/727	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	23 ft



**LEGEND**

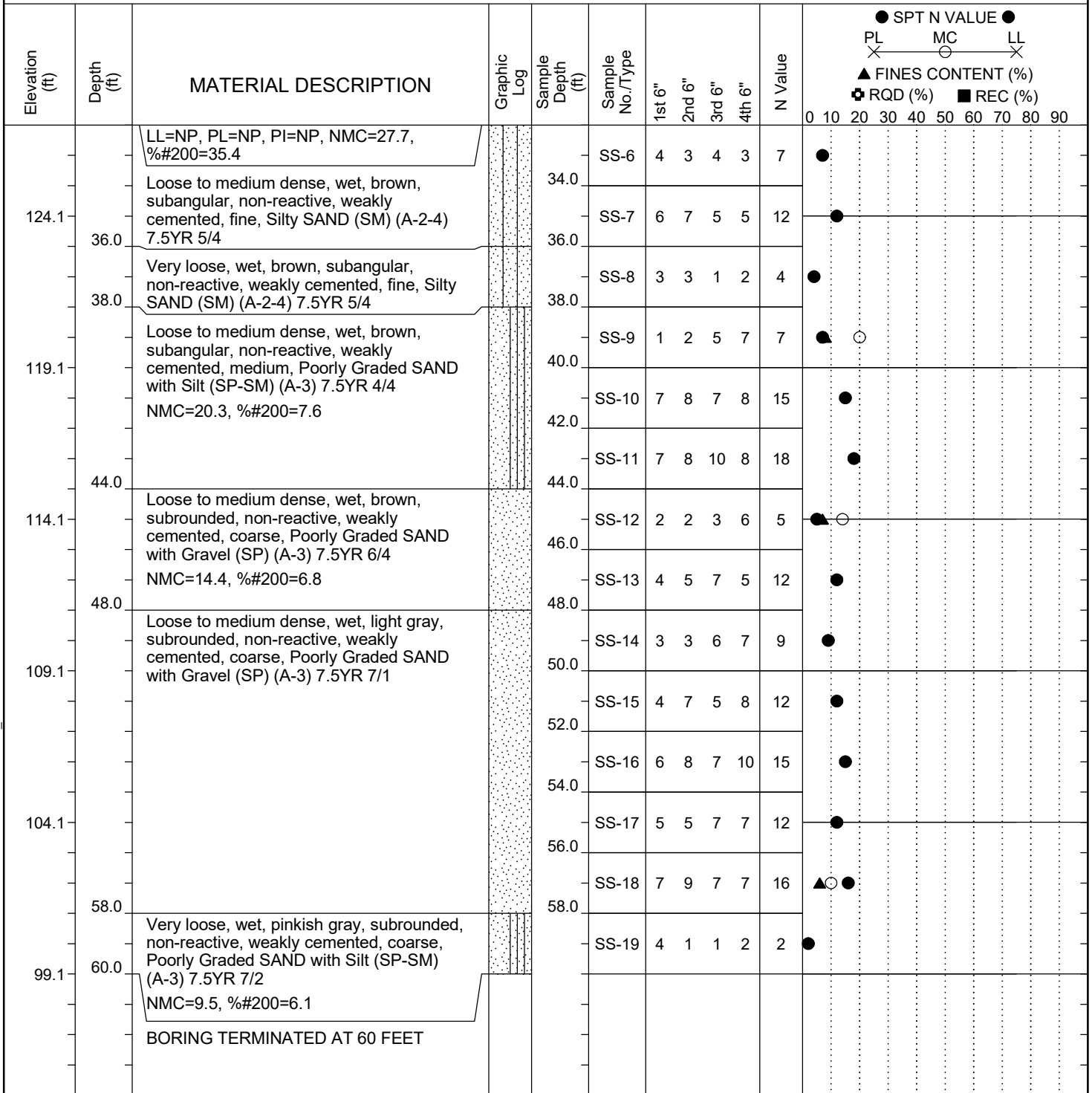
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-2
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1876+38.54	<b>Offset:</b>	54.14 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.1 ft	<b>Latitude:</b>	34.2187076	<b>Longitude:</b>	-80.6075205	<b>Date Started:</b>	6/21/2021
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	6/22/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55/727	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	23 ft



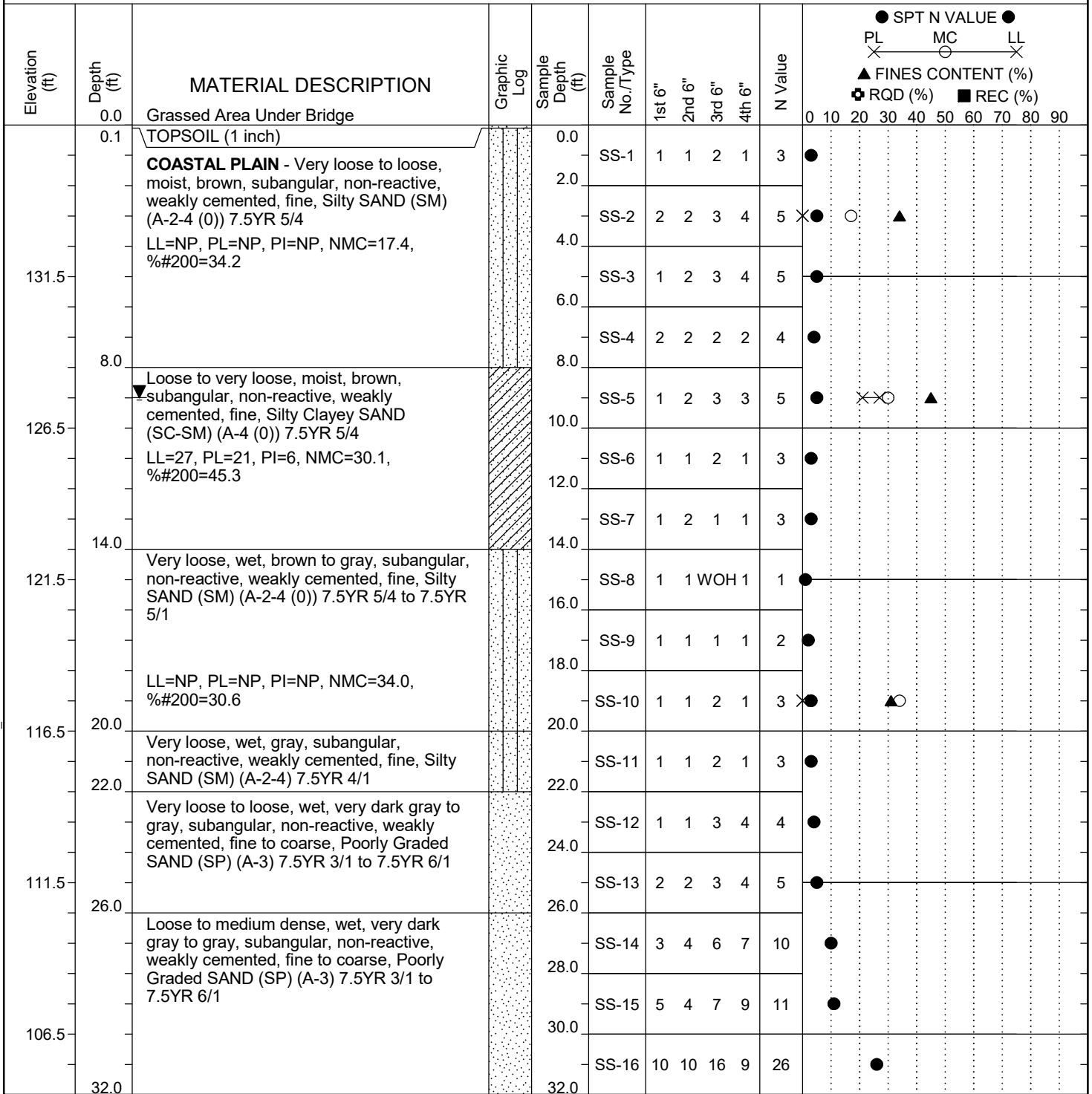
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-3
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1841+40.20	<b>Offset:</b>	69.68 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	136.5 ft	<b>Latitude:</b>	34.2197063	<b>Longitude:</b>	-80.619057	<b>Date Started:</b>	8/23/2021
<b>Total Depth:</b>	40 ft	<b>Soil Depth:</b>	40 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	8/26/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	GE	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	9 ft



## LEGEND

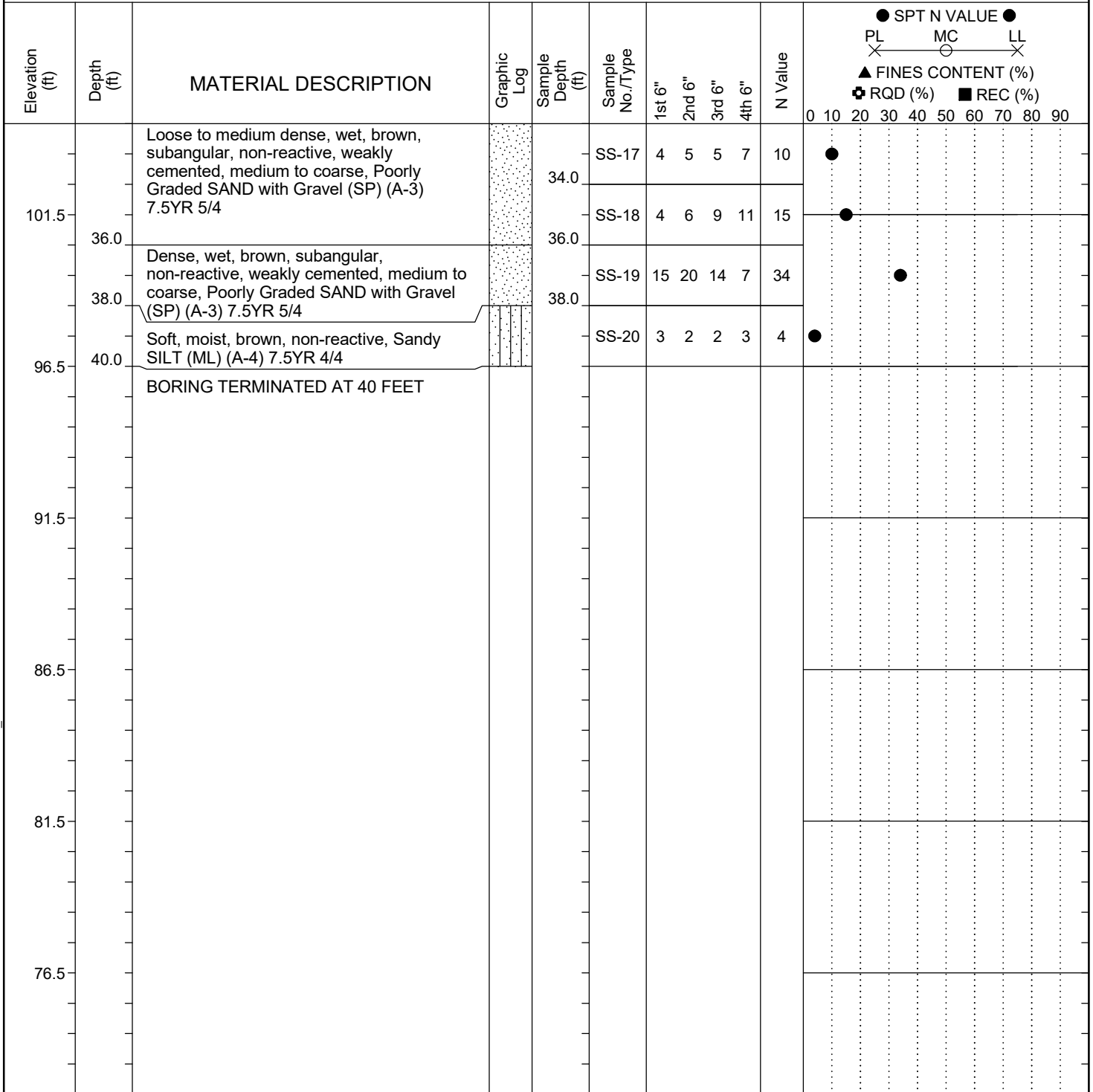
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-3
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1841+40.20	<b>Offset:</b>	69.68 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	136.5 ft	<b>Latitude:</b>	34.2197063	<b>Longitude:</b>	-80.619057	<b>Date Started:</b>	8/23/2021
<b>Total Depth:</b>	40 ft	<b>Soil Depth:</b>	40 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	8/26/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	GE	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	9 ft



### LEGEND

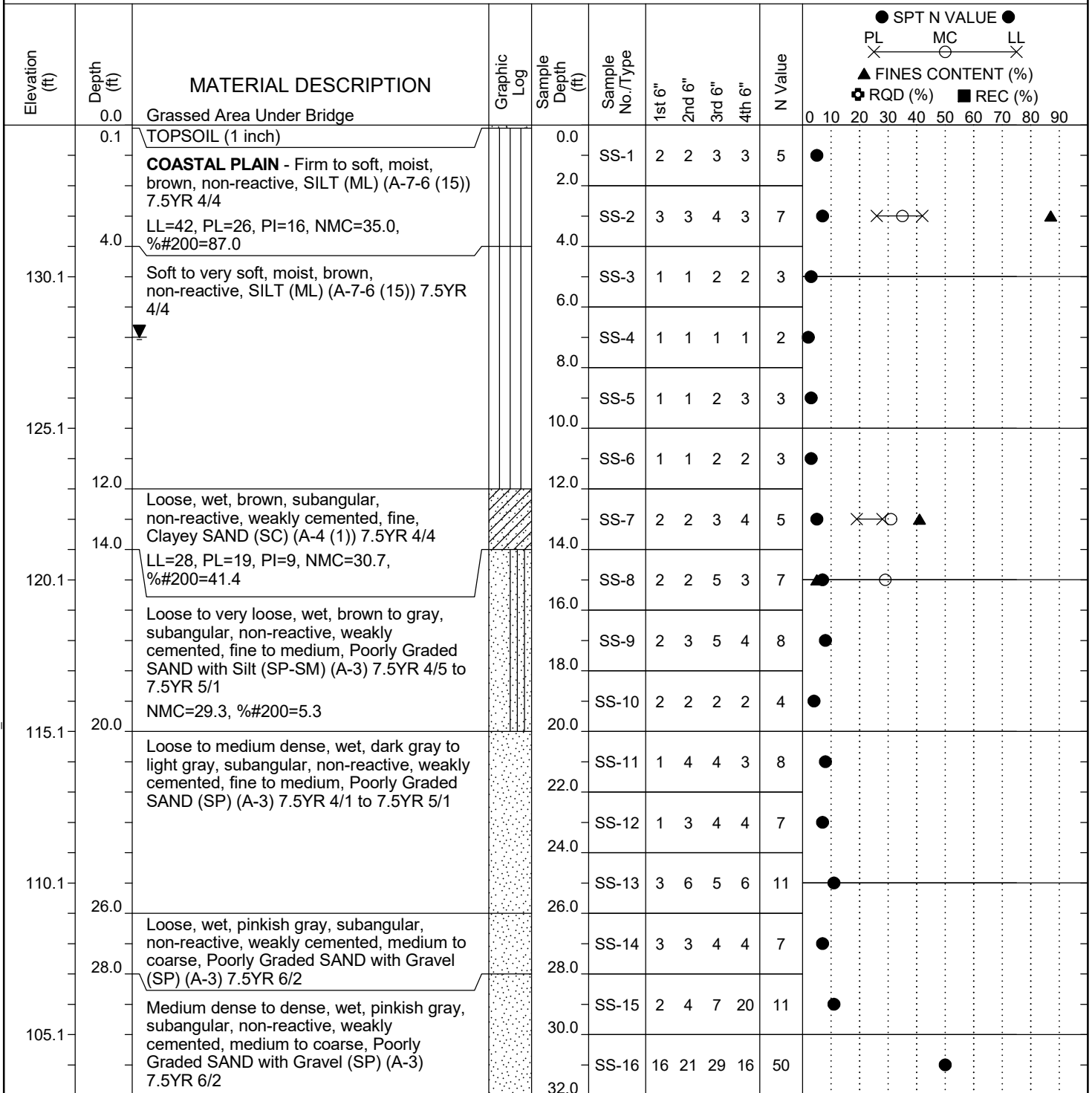
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-4
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1838+74.75	<b>Offset:</b>	67.32 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	135.1 ft	<b>Latitude:</b>	34.2196342	<b>Longitude:</b>	-80.6199414	<b>Date Started:</b>	8/23/2021
<b>Total Depth:</b>	40 ft	<b>Soil Depth:</b>	40 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	8/26/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	GE	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	7 ft



## LEGEND

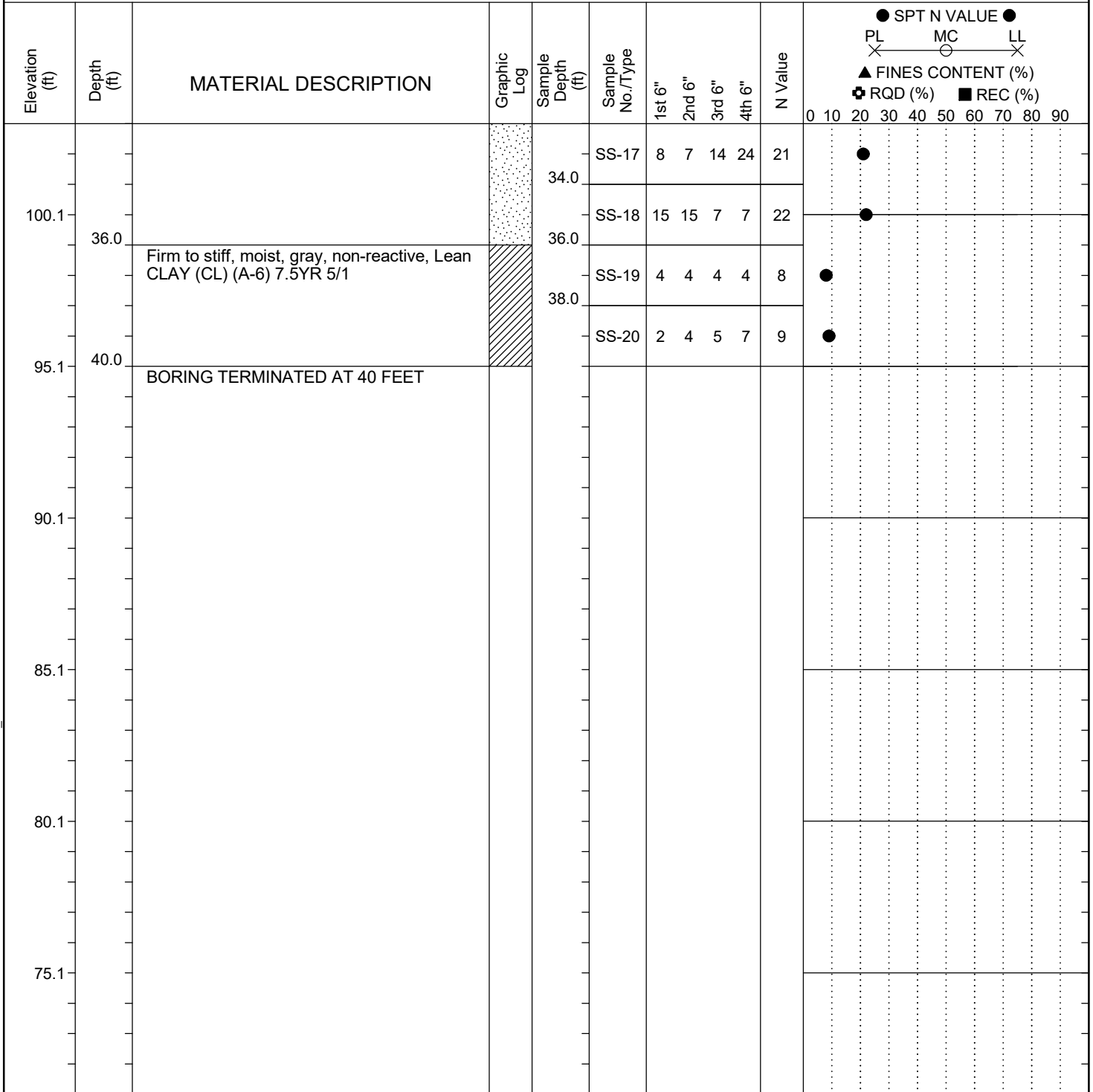
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-4
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1838+74.75	<b>Offset:</b>	67.32 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	135.1 ft	<b>Latitude:</b>	34.2196342	<b>Longitude:</b>	-80.6199414	<b>Date Started:</b>	8/23/2021
<b>Total Depth:</b>	40 ft	<b>Soil Depth:</b>	40 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	8/26/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	GE	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	7 ft



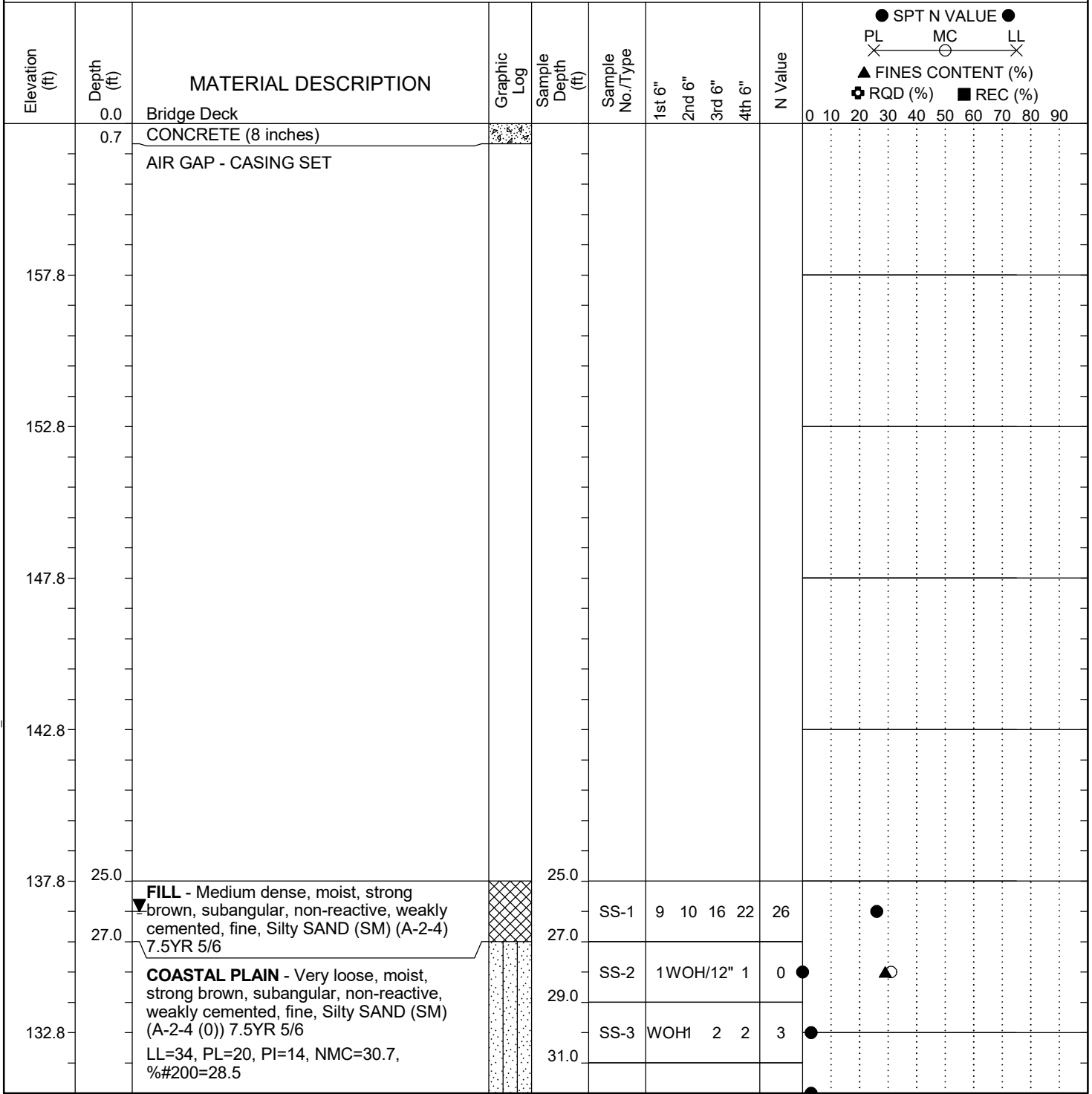
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-5
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1810+35.00	<b>Offset:</b>	56.06 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	162.8 ft	<b>Latitude:</b>	34.2177853	<b>Longitude:</b>	-80.6290932	<b>Date Started:</b>	5/5/2021
<b>Total Depth:</b>	48.5 ft	<b>Soil Depth:</b>	48.5 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/6/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	26 ft



**LEGEND**

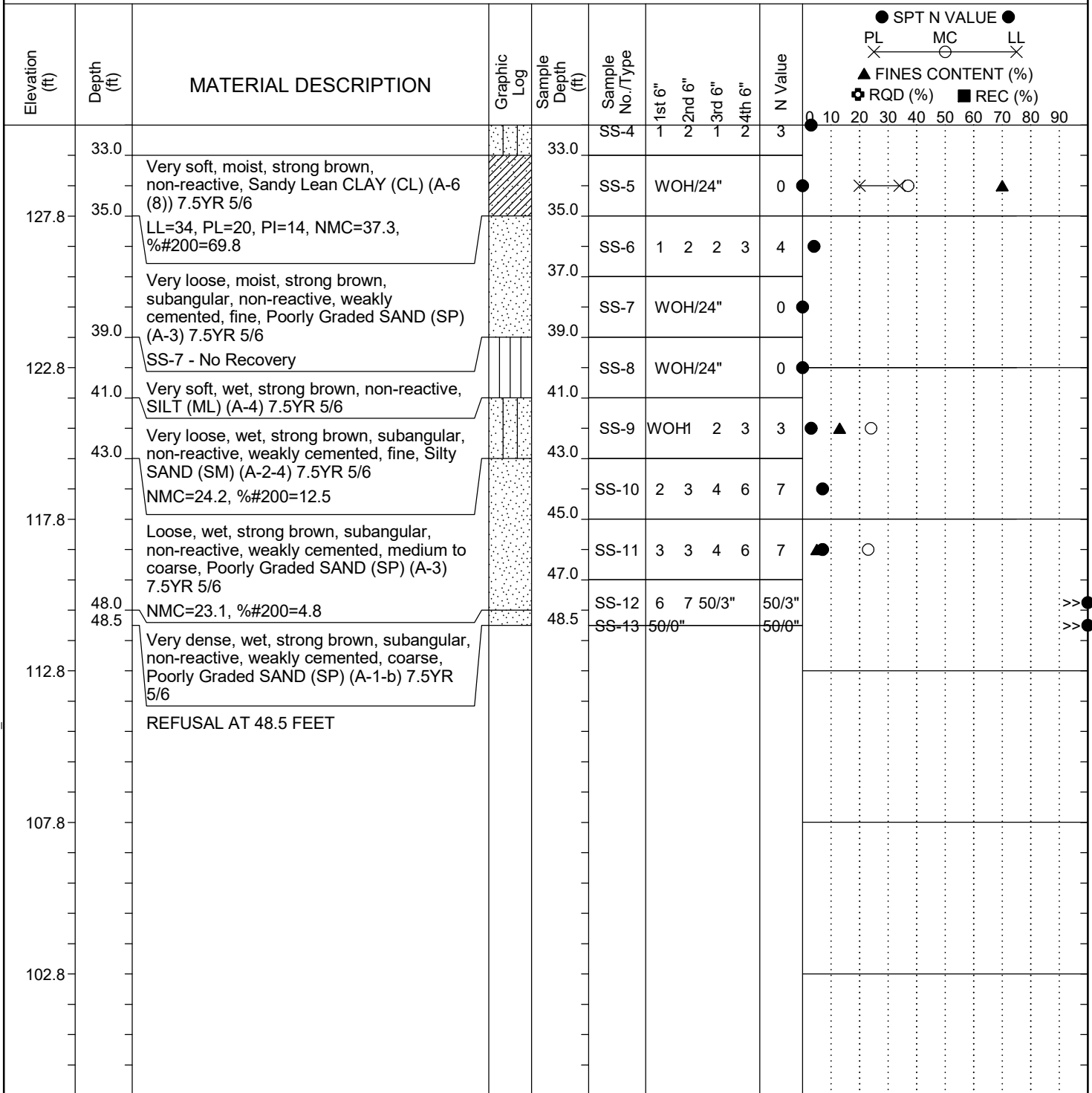
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-5
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1810+35.00	<b>Offset:</b>	56.06 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	162.8 ft	<b>Latitude:</b>	34.2177853	<b>Longitude:</b>	-80.6290932	<b>Date Started:</b>	5/5/2021
<b>Total Depth:</b>	48.5 ft	<b>Soil Depth:</b>	48.5 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/6/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	26 ft



## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-6
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1807+92.74	<b>Offset:</b>	55.08 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2176145	<b>Longitude:</b>	-80.6298678	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	73 ft	<b>Soil Depth:</b>	73 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 39 ft	<b>24HR</b>	N.M.

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 (%)										
											0	10	20	30	40	50	60	70	80	90	
	0.0	Bridge Deck																			
	0.7	CONCRETE (8 inches)																			
		AIR GAP - CASING SET																			
158.1																					
153.1																					
148.1																					
143.1																					
138.1																					
133.1																					

LEGEND

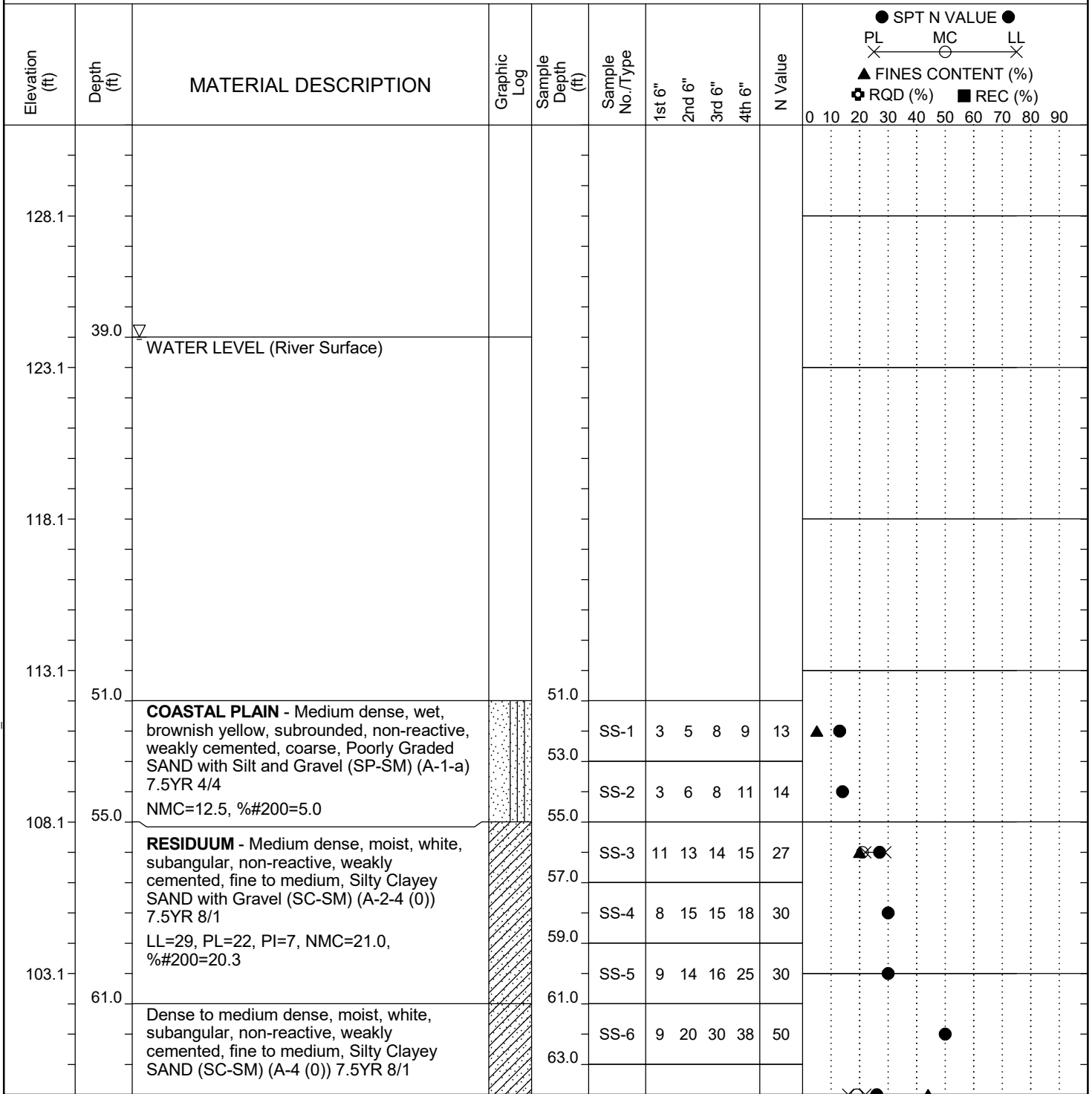
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<b>SAMPLER TYPE</b> SS - Split Spoon      NQ - Rock Core, 1-7/8" UD - Undisturbed Sample      CU - Cuttings AWG - Rock Core, 1-1/8"      CT - Continuous Tube		<b>DRILLING METHOD</b> HSA - Hollow Stem Auger      RW - Rotary Wash CFA - Continuous Flight Augers      RC - Rock Core DC - Driving Casing	
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SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-6
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1807+92.74	<b>Offset:</b>	55.08 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2176145	<b>Longitude:</b>	-80.6298678	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	73 ft	<b>Soil Depth:</b>	73 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 39 ft	<b>24HR</b>	N.M.



**LEGEND**

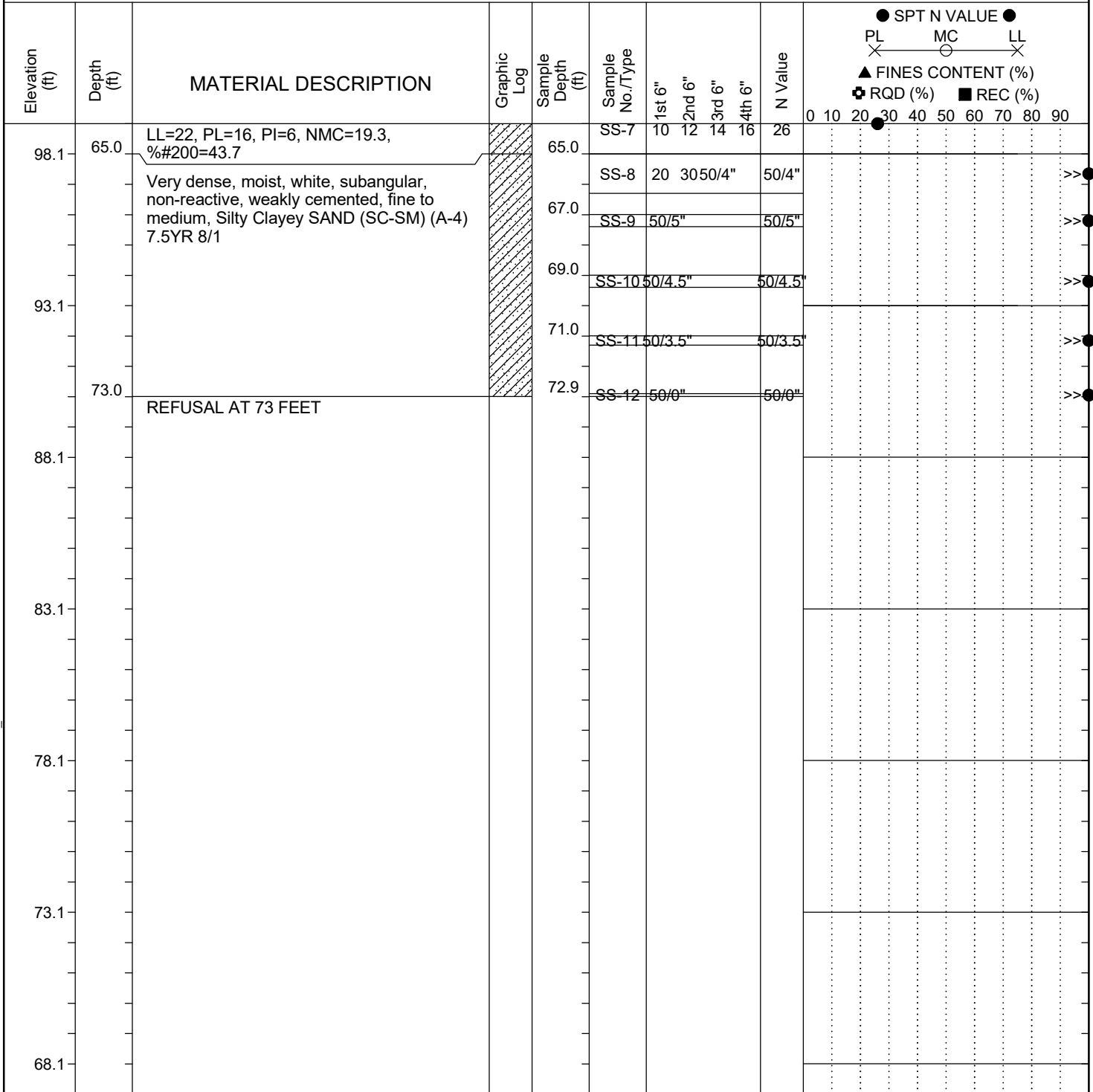
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<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-6
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1807+92.74	<b>Offset:</b>	55.08 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2176145	<b>Longitude:</b>	-80.6298678	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	73 ft	<b>Soil Depth:</b>	73 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 39 ft	<b>24HR</b>	N.M.



### 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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-7
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1806+79.19	<b>Offset:</b>	55.33 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2175363	<b>Longitude:</b>	-80.6302315	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	75 ft	<b>Soil Depth:</b>	75 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 31 ft	<b>24HR</b>	N/A

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 (%)										
											0	10	20	30	40	50	60	70	80	90	
	0.0	Bridge Deck																			
	0.7	CONCRETE (8 inches)																			
		AIR GAP - CASING SET																			
158.1																					
153.1																					
148.1																					
143.1																					
138.1																					
133.1																					
	31.0	▽ WATER LEVEL (River Surface)																			

LEGEND

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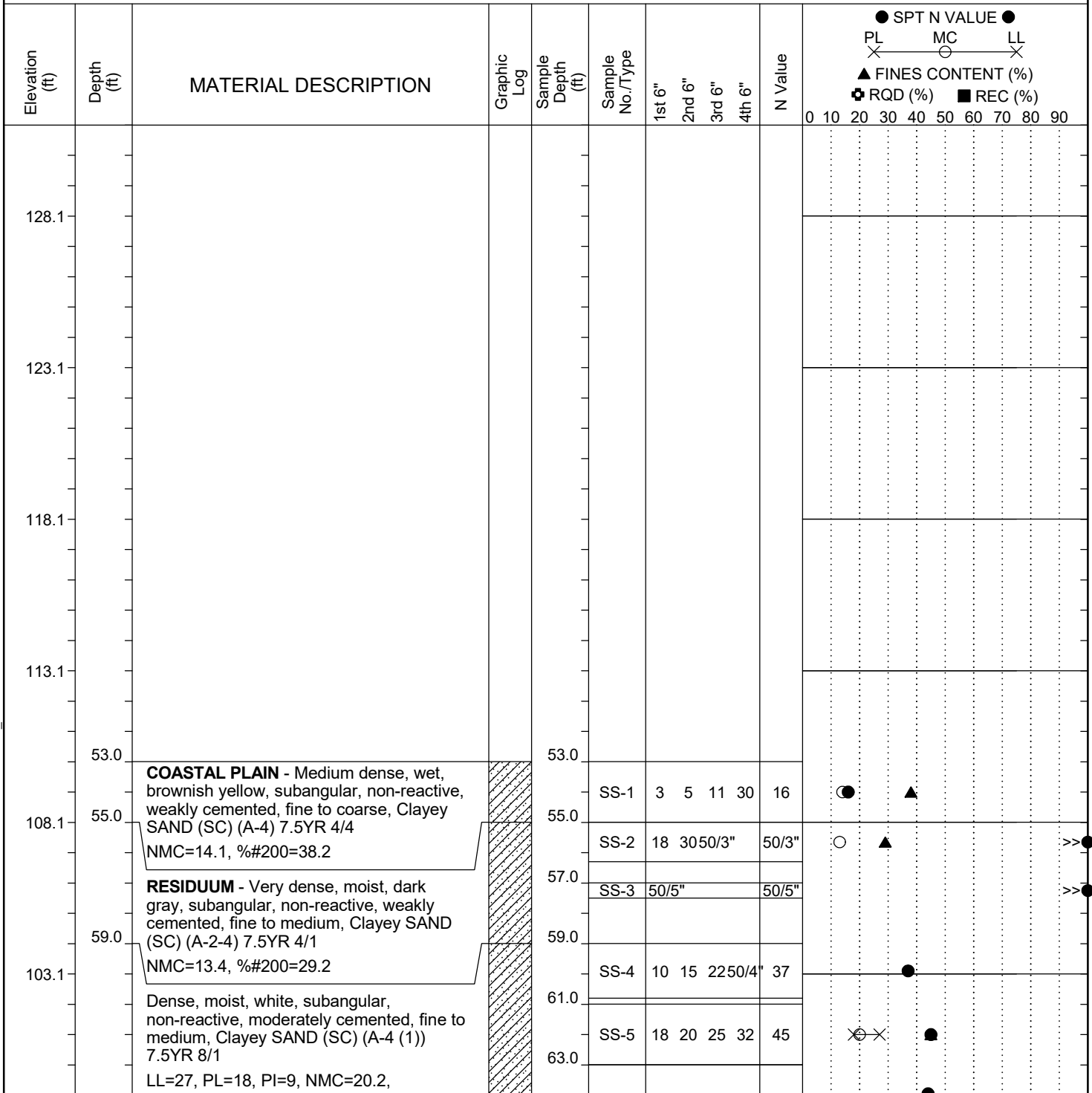
<b>SAMPLER TYPE</b> SS - Split Spoon      NQ - Rock Core, 1-7/8" UD - Undisturbed Sample      CU - Cuttings AWG - Rock Core, 1-1/8"      CT - Continuous Tube		<b>DRILLING METHOD</b> HSA - Hollow Stem Auger      RW - Rotary Wash CFA - Continuous Flight Augers      RC - Rock Core DC - Driving Casing	
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SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-7
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1806+79.19	<b>Offset:</b>	55.33 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2175363	<b>Longitude:</b>	-80.6302315	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	75 ft	<b>Soil Depth:</b>	75 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 31 ft	<b>24HR</b>	N/A



## LEGEND

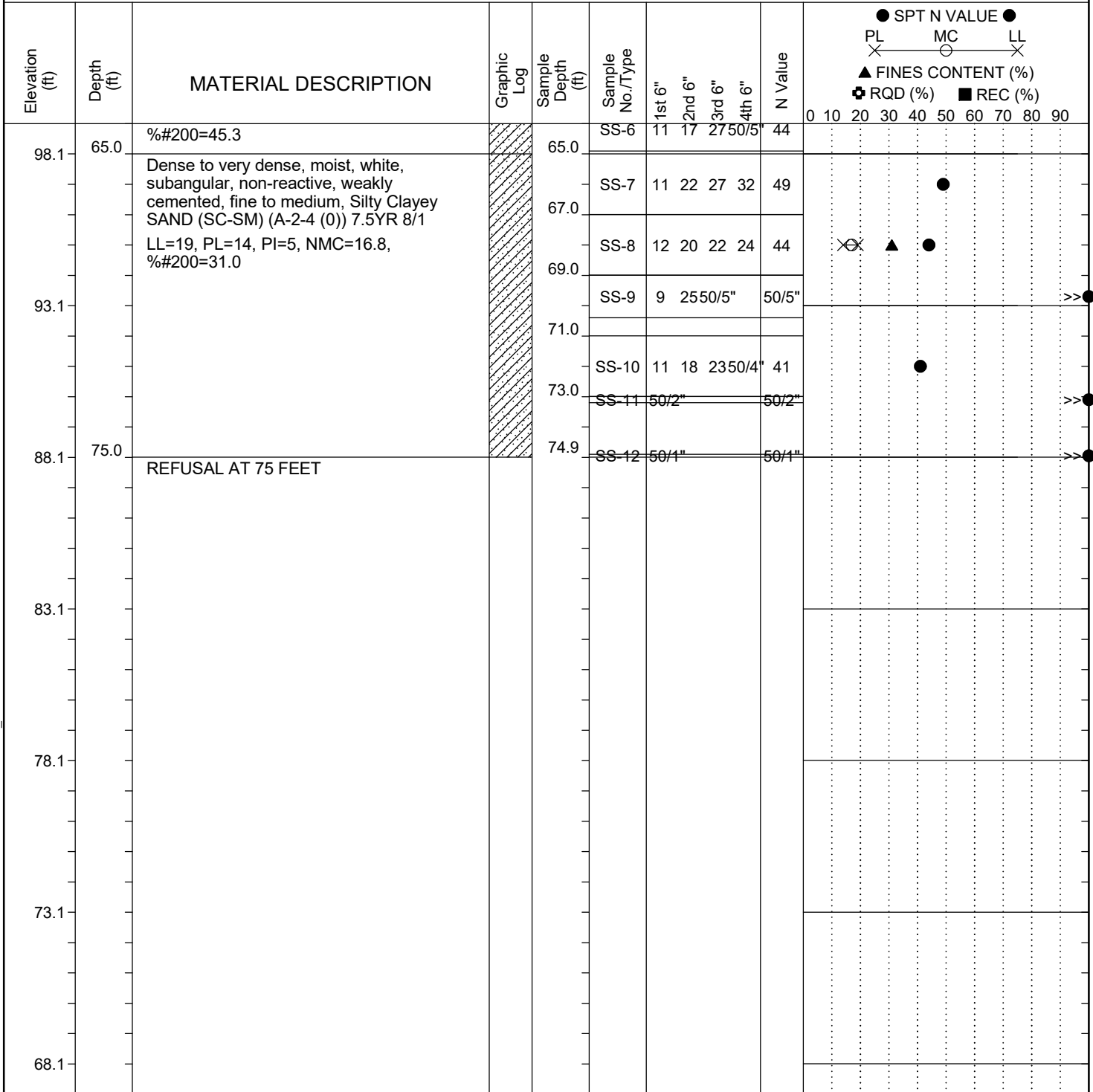
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-7
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1806+79.19	<b>Offset:</b>	55.33 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2175363	<b>Longitude:</b>	-80.6302315	<b>Date Started:</b>	5/7/2021
<b>Total Depth:</b>	75 ft	<b>Soil Depth:</b>	75 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/7/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB 31 ft	<b>24HR</b>	N/A



## LEGEND

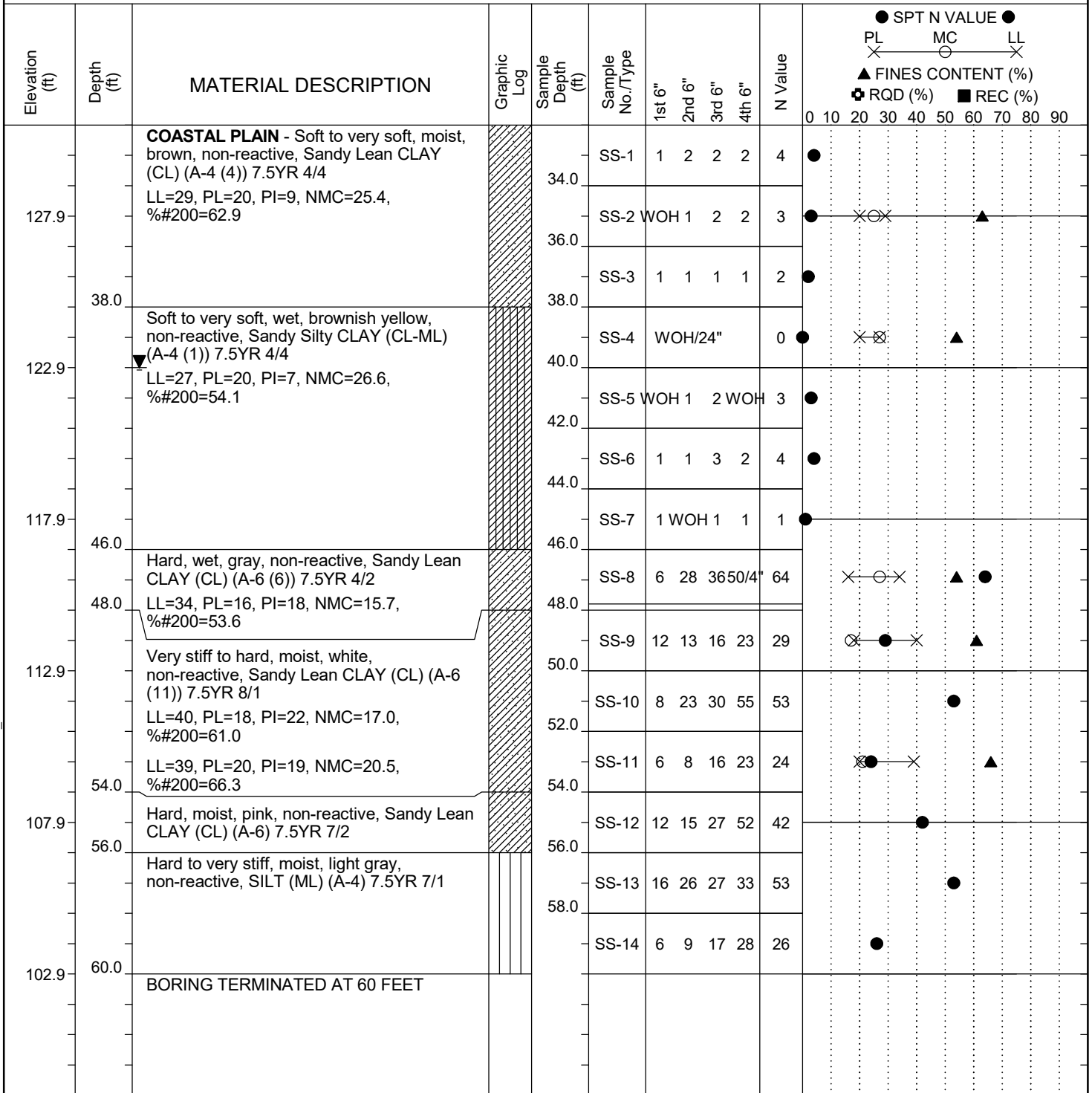
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-8
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1804+33.40	<b>Offset:</b>	55.3 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	162.9 ft	<b>Latitude:</b>	34.2173654	<b>Longitude:</b>	-80.6310182	<b>Date Started:</b>	5/5/2021
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	5/6/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	Simco 2800	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	84.4%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	40 ft



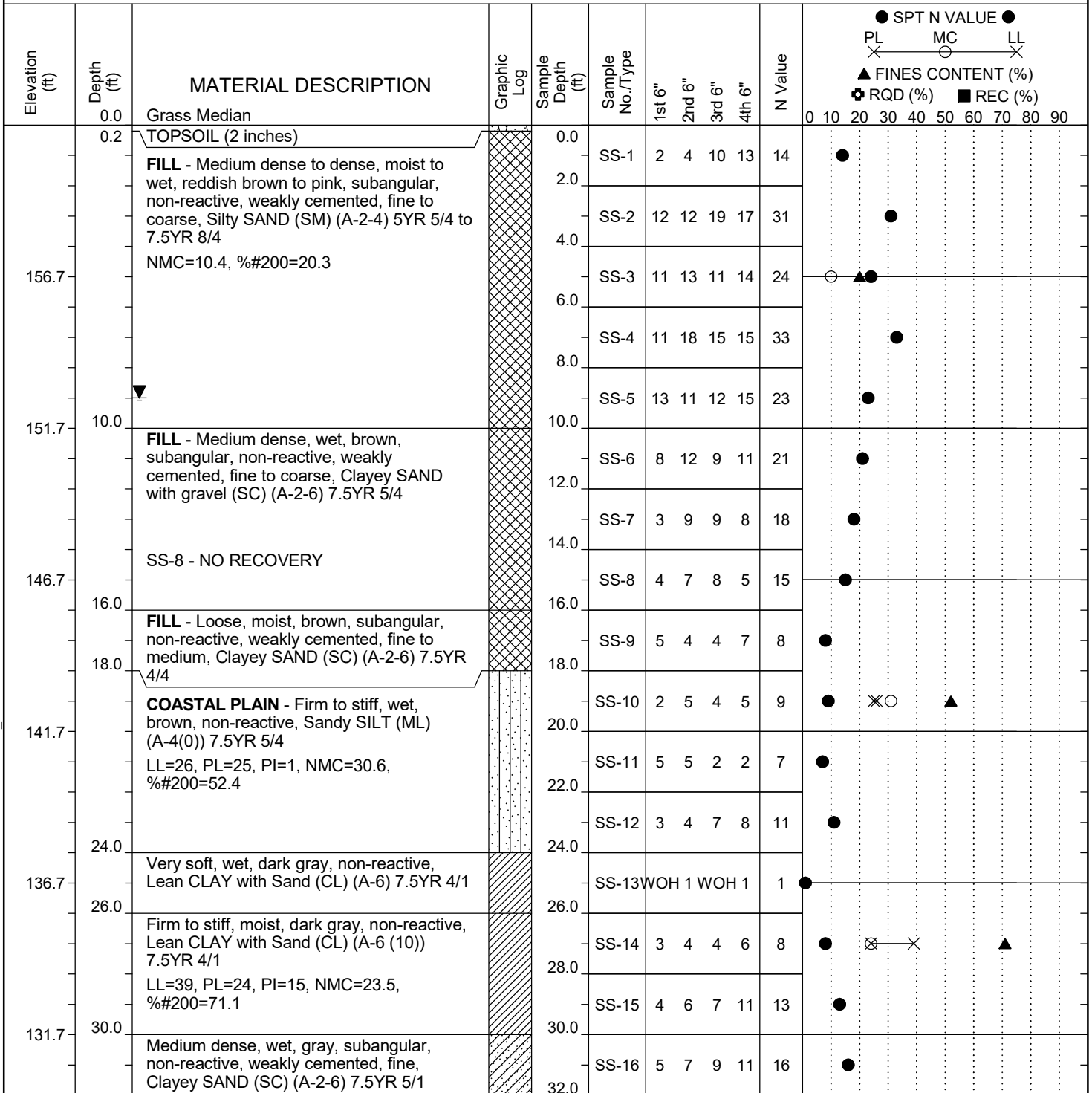
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-9
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1800+88.04	<b>Offset:</b>	9.53 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.7 ft	<b>Latitude:</b>	34.2170039	<b>Longitude:</b>	-80.632086	<b>Date Started:</b>	6/23/2021
<b>Total Depth:</b>	99.3 ft	<b>Soil Depth:</b>	79 ft	<b>Core Depth:</b>	20.3 ft	<b>Date Completed:</b>	6/24/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	9 ft



## LEGEND

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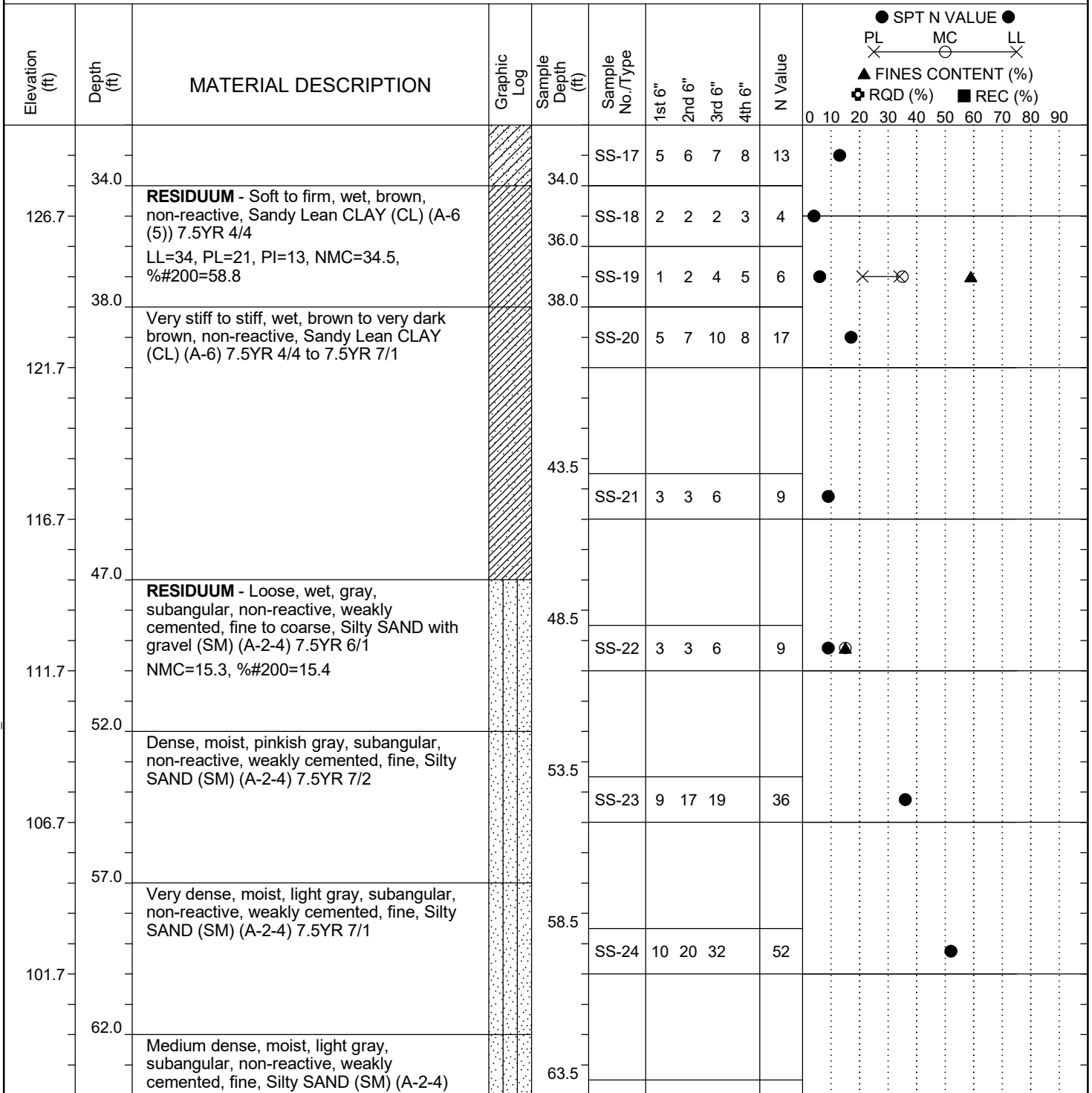
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-9
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1800+88.04	<b>Offset:</b>	9.53 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.7 ft	<b>Latitude:</b>	34.2170039	<b>Longitude:</b>	-80.632086	<b>Date Started:</b>	6/23/2021
<b>Total Depth:</b>	99.3 ft	<b>Soil Depth:</b>	79 ft	<b>Core Depth:</b>	20.3 ft	<b>Date Completed:</b>	6/24/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	9 ft



## LEGEND

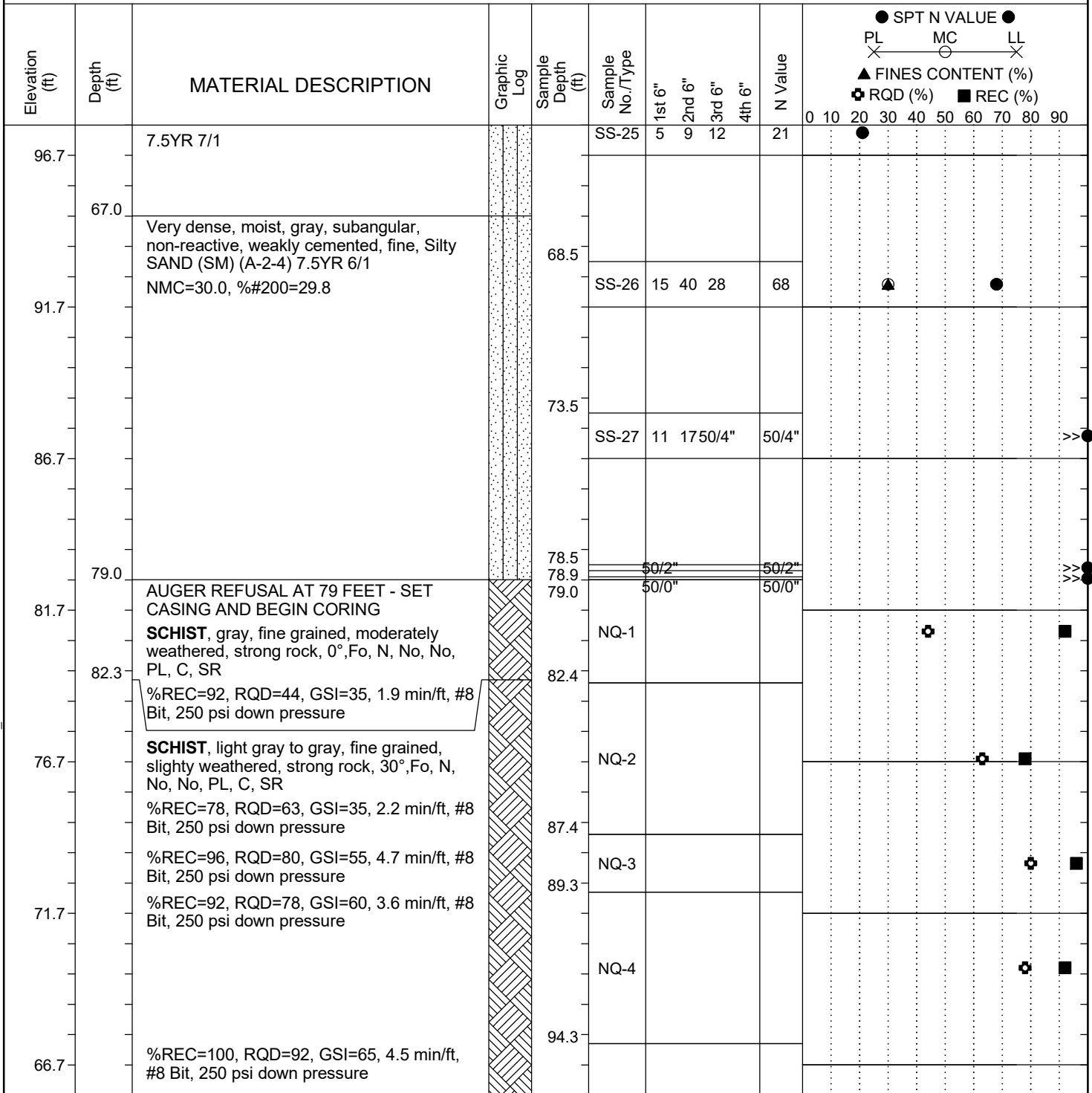
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777				<b>County:</b> Kershaw		<b>Boring No.:</b> B-9	
<b>Site Description:</b> I-20 Wateree River Bridge Repairs				<b>Route:</b> I-20			
<b>Eng./Geo.:</b> PM		<b>Boring Location:</b> 1800+88.04		<b>Offset:</b> 9.53 L		<b>Alignment:</b> Existing	
<b>Elev.:</b> 161.7 ft		<b>Latitude:</b> 34.2170039		<b>Longitude:</b> -80.632086		<b>Date Started:</b> 6/23/2021	
<b>Total Depth:</b> 99.3 ft		<b>Soil Depth:</b> 79 ft		<b>Core Depth:</b> 20.3 ft		<b>Date Completed:</b> 6/24/2021	
<b>Bore Hole Diameter (in):</b> 3		<b>Sampler Configuration</b>		<b>Liner Required:</b> Y (N)		<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME-55		<b>Drill Method:</b> RW/RC		<b>Hammer Type:</b> Automatic		<b>Energy Ratio:</b> 88.8%	
<b>Core Size:</b> NQ2		<b>Driller:</b> ST		<b>Groundwater:</b> TOB N.M.		<b>24HR:</b> 9 ft	



## LEGEND

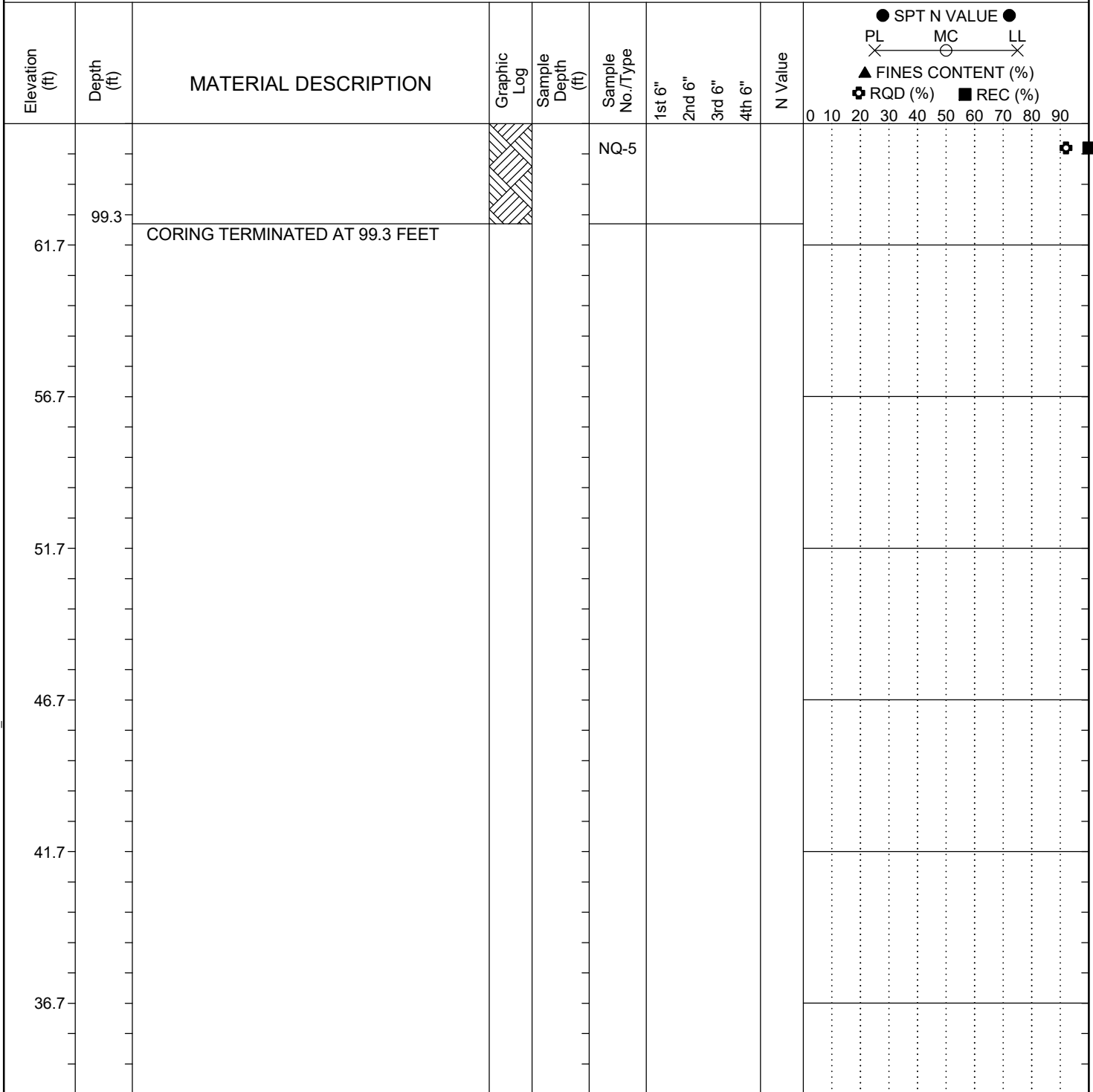
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-9
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1800+88.04	<b>Offset:</b>	9.53 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.7 ft	<b>Latitude:</b>	34.2170039	<b>Longitude:</b>	-80.632086	<b>Date Started:</b>	6/23/2021
<b>Total Depth:</b>	99.3 ft	<b>Soil Depth:</b>	79 ft	<b>Core Depth:</b>	20.3 ft	<b>Date Completed:</b>	6/24/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-55	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	88.8%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	9 ft



## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

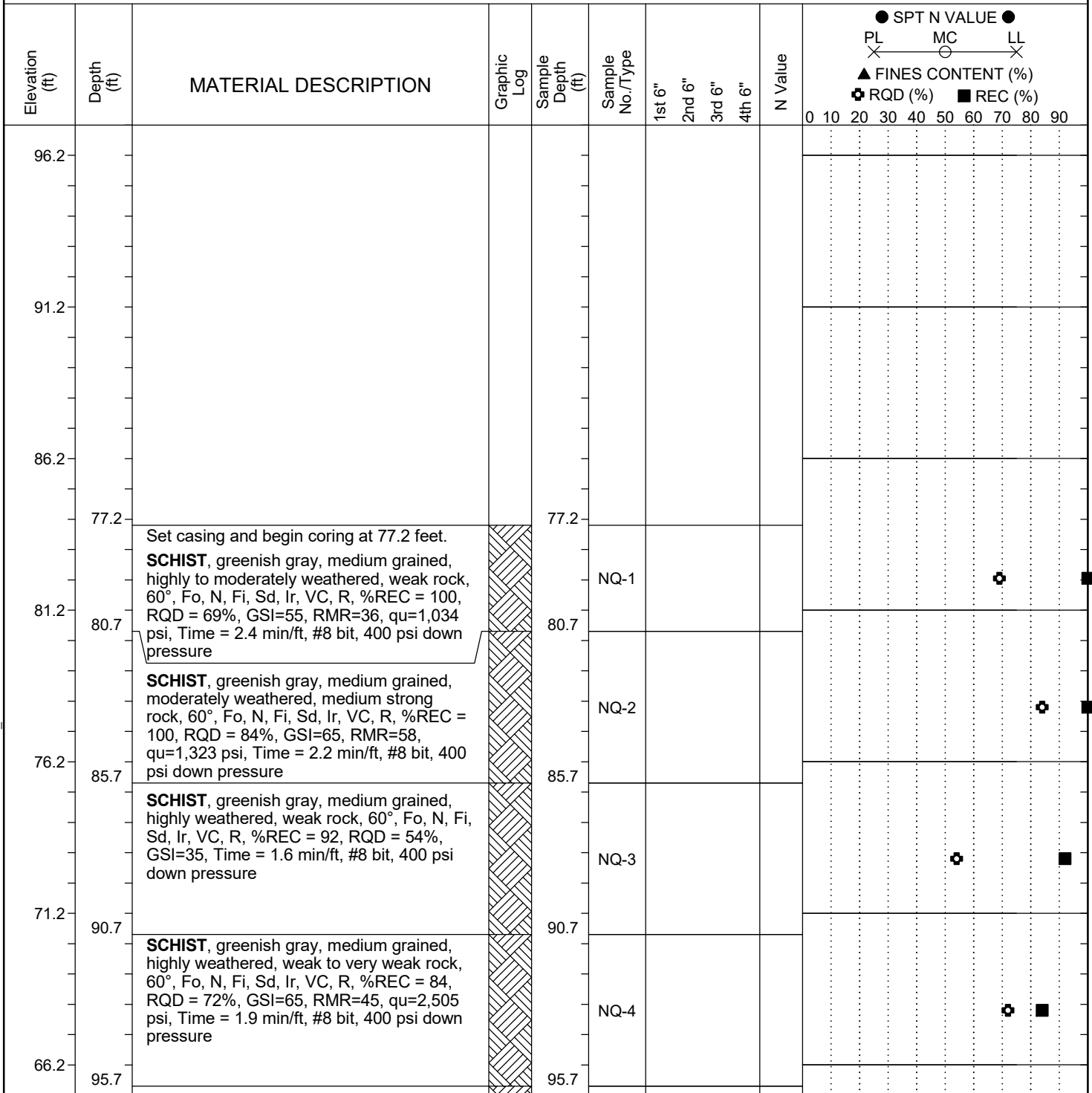






# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-9A
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1800+77.22	<b>Offset:</b>	5.8 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.2 ft	<b>Latitude:</b>	34.2169556	<b>Longitude:</b>	-80.6321072	<b>Date Started:</b>	12/15/2021
<b>Total Depth:</b>	120.7 ft	<b>Soil Depth:</b>	77.2 ft	<b>Core Depth:</b>	43.5 ft	<b>Date Completed:</b>	12/15/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.0%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N/A	<b>24HR</b>	N/A



**LEGEND**

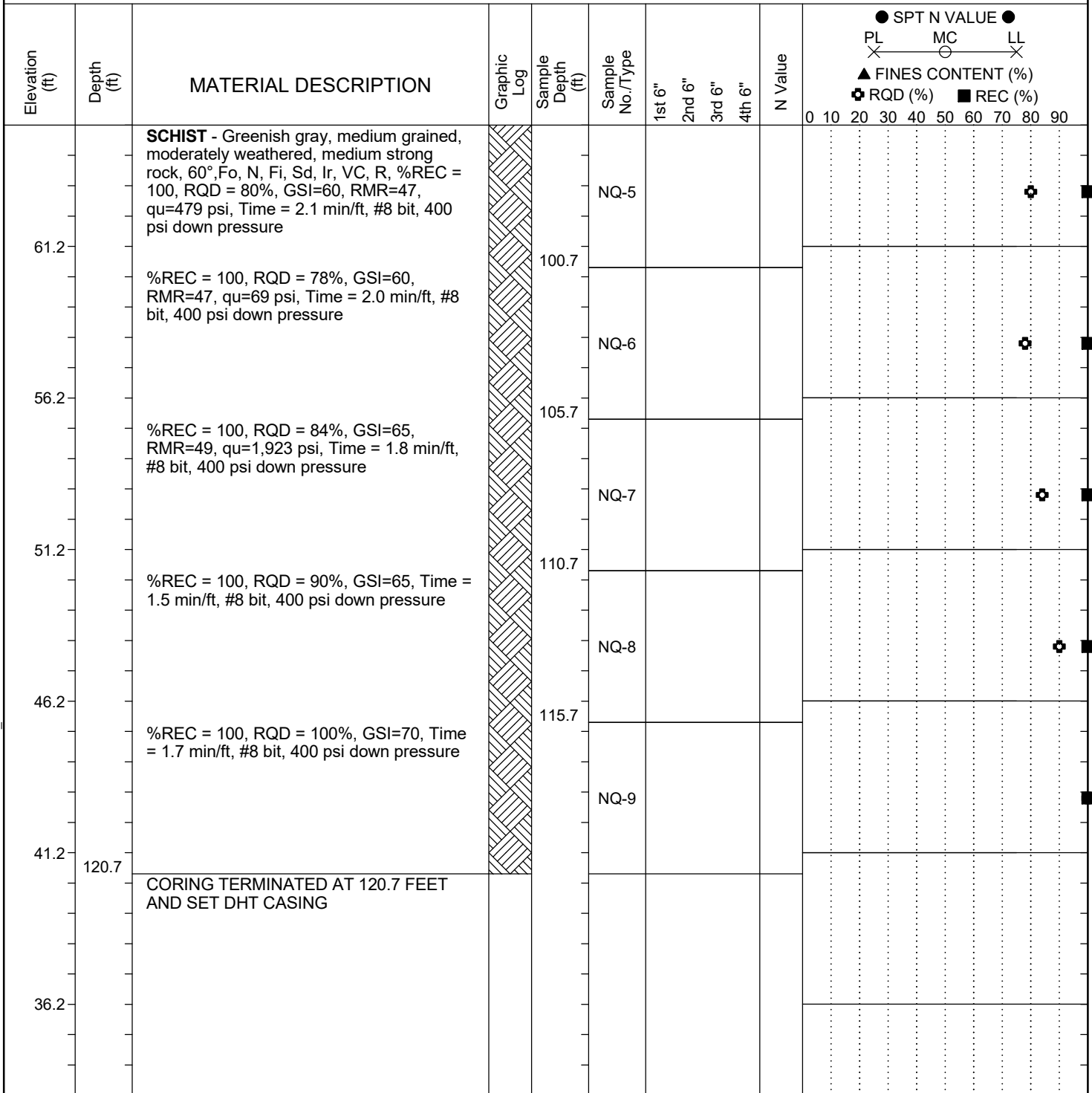
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-9A
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1800+77.22	<b>Offset:</b>	5.8 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.2 ft	<b>Latitude:</b>	34.2169556	<b>Longitude:</b>	-80.6321072	<b>Date Started:</b>	12/15/2021
<b>Total Depth:</b>	120.7 ft	<b>Soil Depth:</b>	77.2 ft	<b>Core Depth:</b>	43.5 ft	<b>Date Completed:</b>	12/15/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.0%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N/A	<b>24HR</b>	N/A



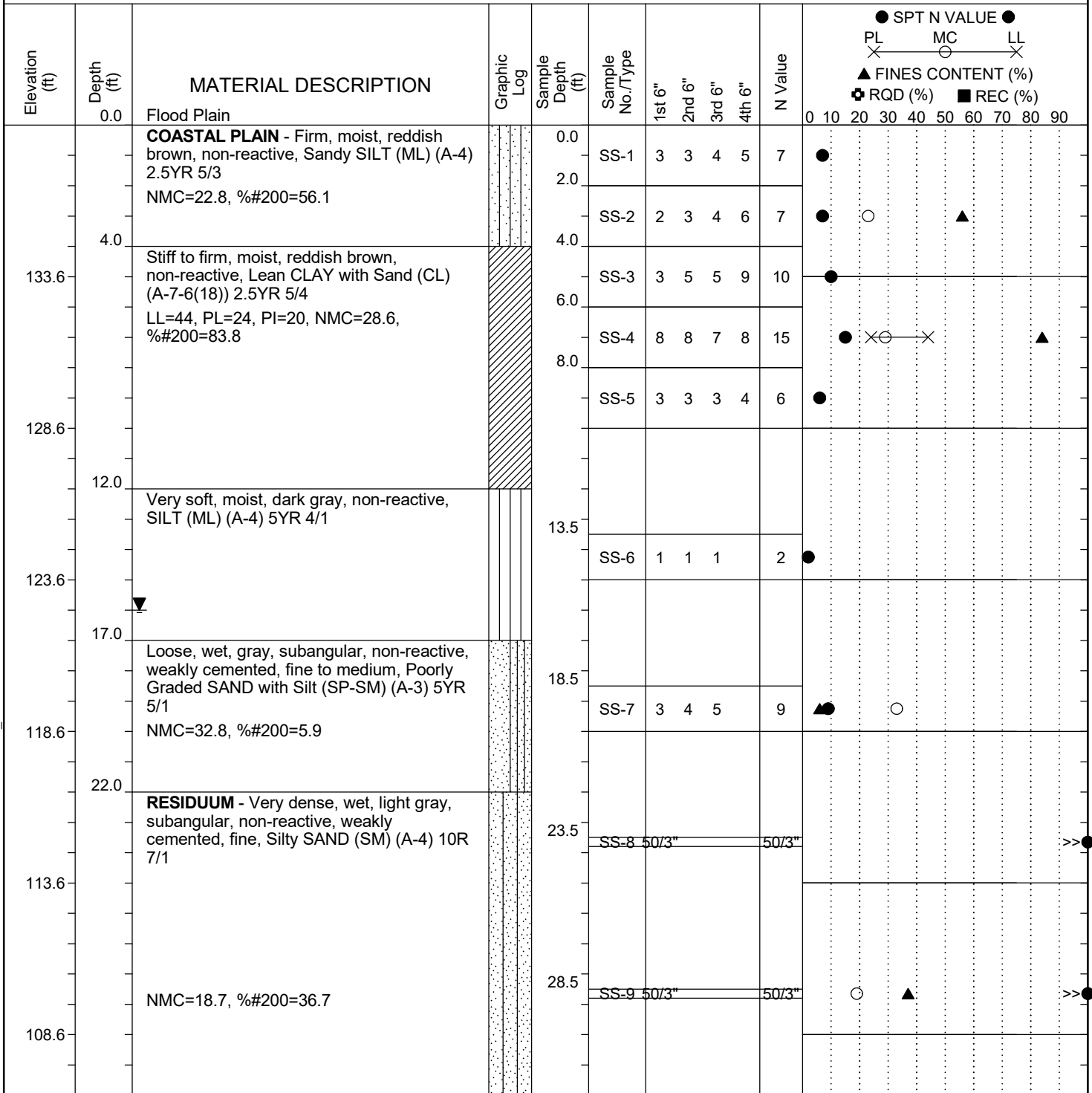
## LEGEND

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 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-10
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1802+39.49	<b>Offset:</b>	71.85 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.6 ft	<b>Latitude:</b>	34.2168927	<b>Longitude:</b>	-80.6315326	<b>Date Started:</b>	12/21/2021
<b>Total Depth:</b>	81.3 ft	<b>Soil Depth:</b>	61.3 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



## LEGEND

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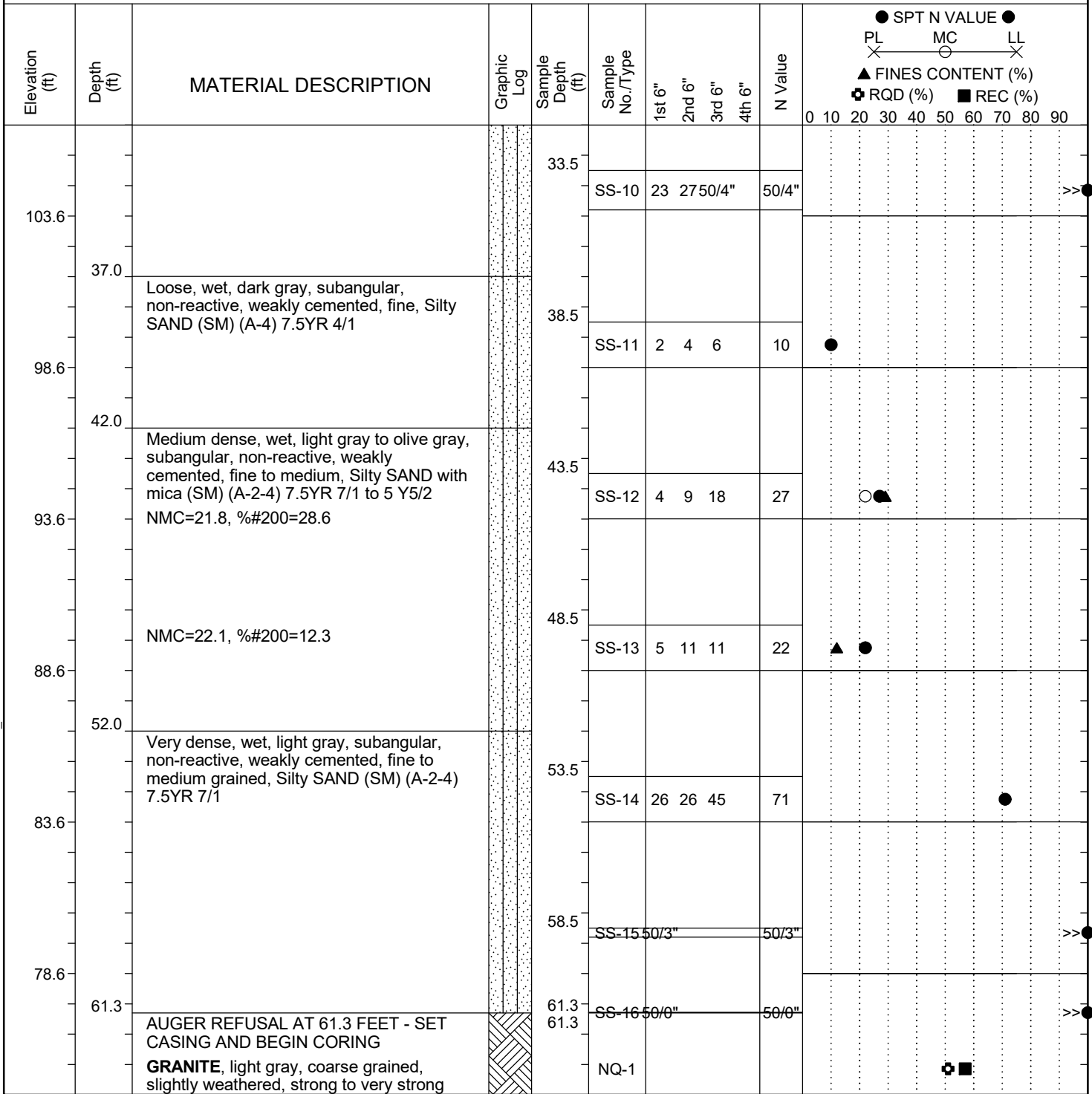
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATATEMPLATE.GDT 5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-10
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1802+39.49	<b>Offset:</b>	71.85 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.6 ft	<b>Latitude:</b>	34.2168927	<b>Longitude:</b>	-80.6315326	<b>Date Started:</b>	12/21/2021
<b>Total Depth:</b>	81.3 ft	<b>Soil Depth:</b>	61.3 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



## LEGEND

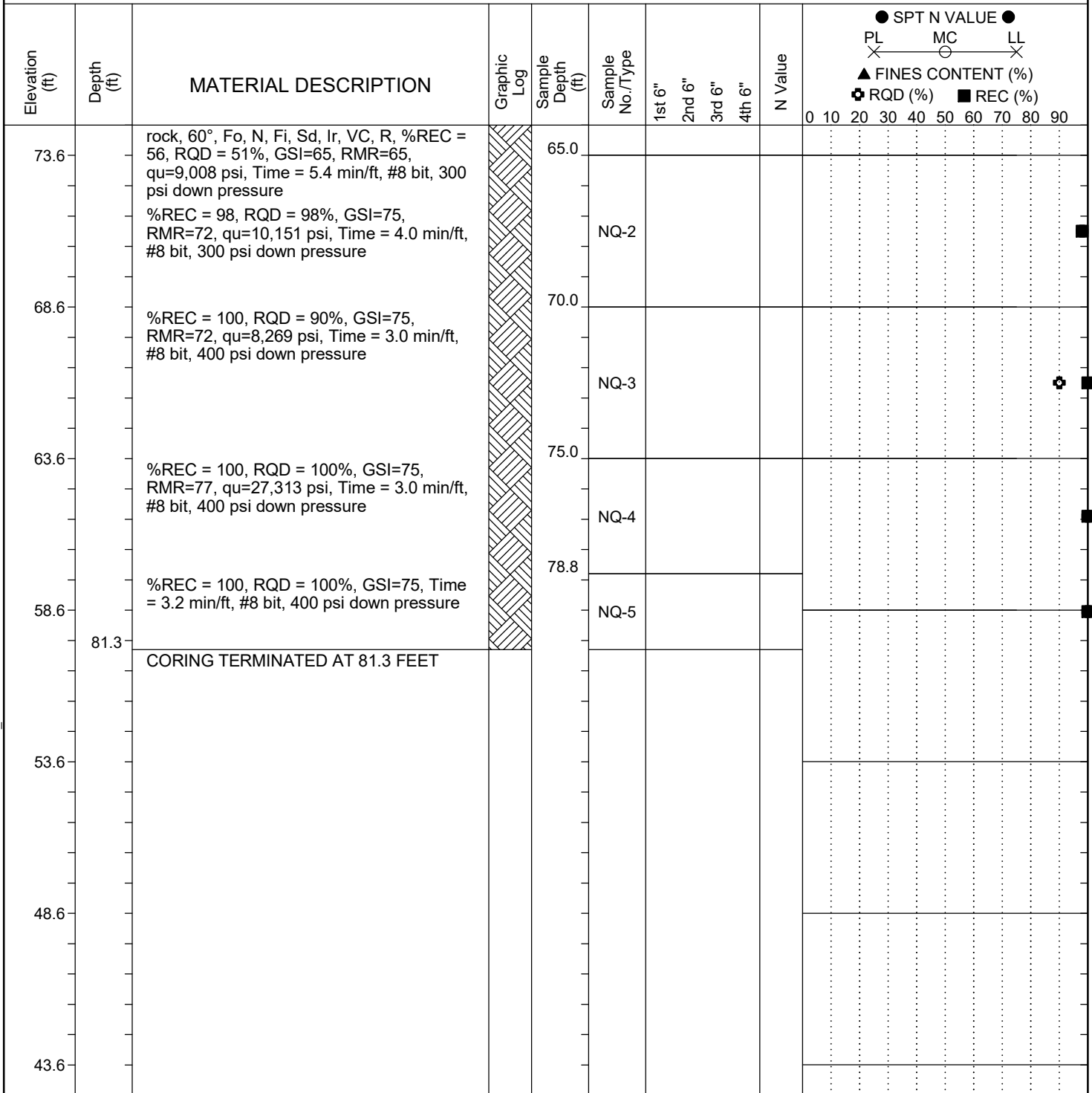
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-10
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1802+39.49	<b>Offset:</b>	71.85 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.6 ft	<b>Latitude:</b>	34.2168927	<b>Longitude:</b>	-80.6315326	<b>Date Started:</b>	12/21/2021
<b>Total Depth:</b>	81.3 ft	<b>Soil Depth:</b>	61.3 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



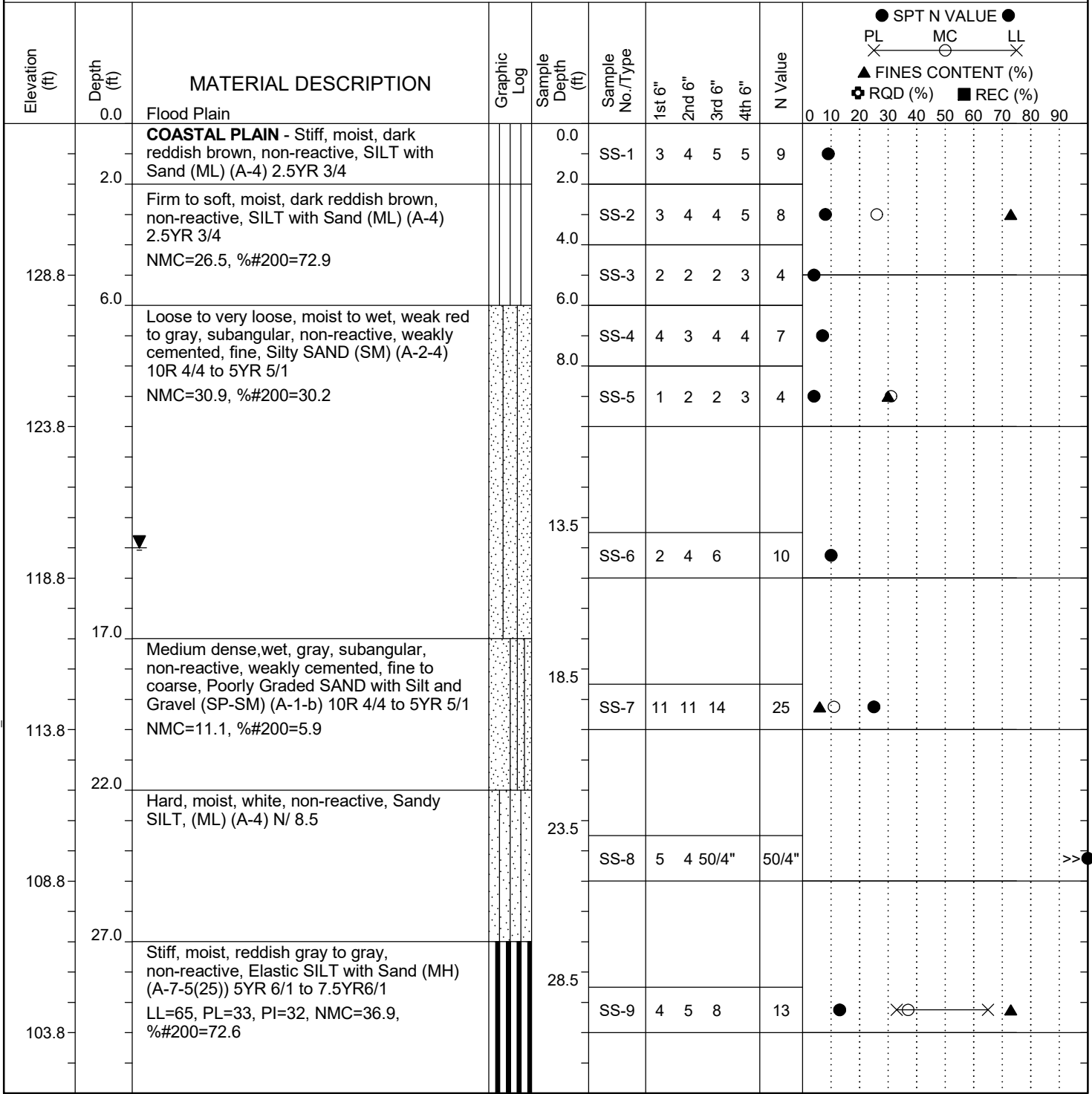
## LEGEND

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

SC.DOT 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-11
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1803+83.82	<b>Offset:</b>	68.79 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	133.8 ft	<b>Latitude:</b>	34.2173669	<b>Longitude:</b>	-80.6311882	<b>Date Started:</b>	12/22/2021
<b>Total Depth:</b>	70.5 ft	<b>Soil Depth:</b>	50.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



**LEGEND**

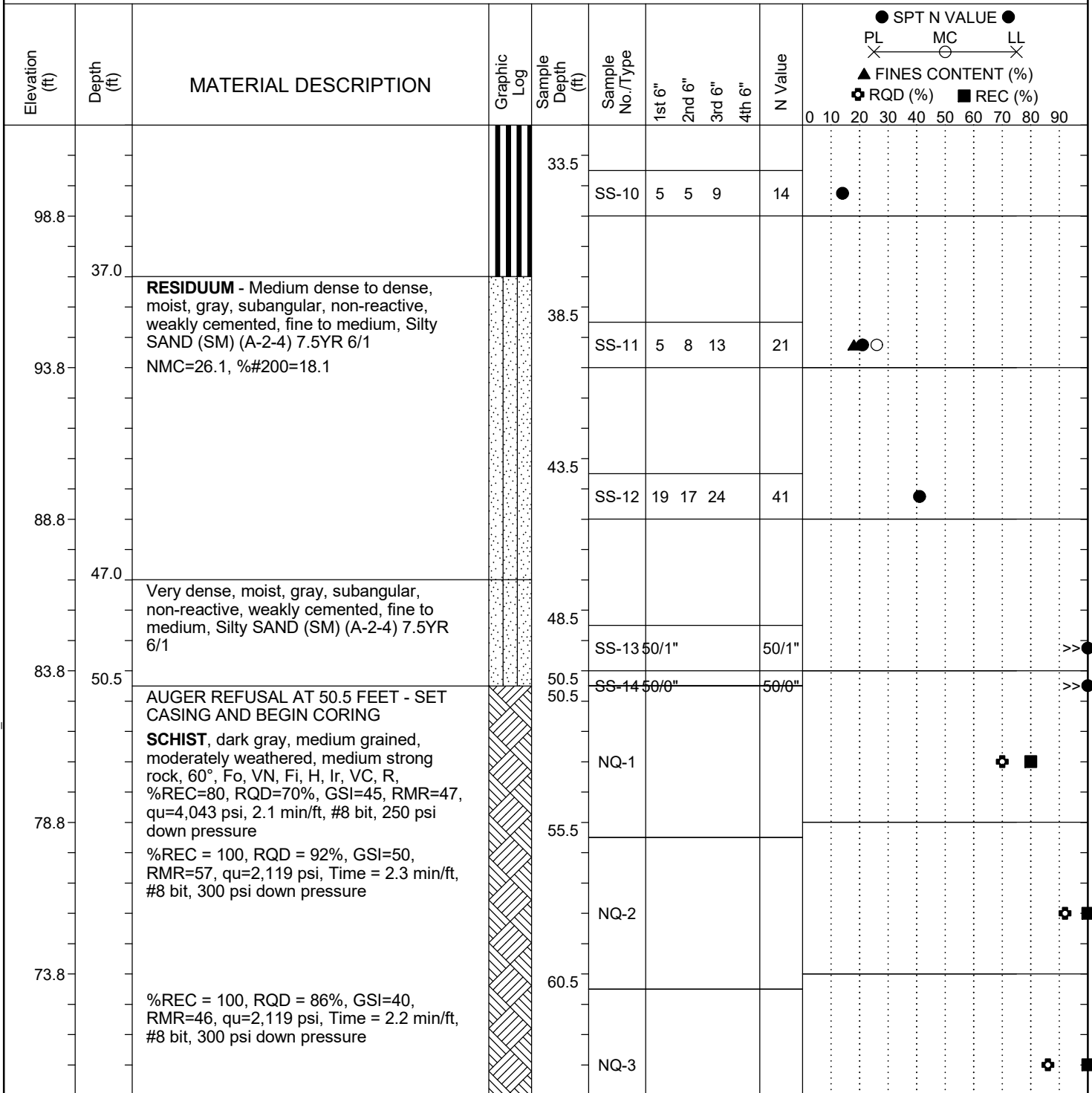
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<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-11
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1803+83.82	<b>Offset:</b>	68.79 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	133.8 ft	<b>Latitude:</b>	34.2173669	<b>Longitude:</b>	-80.6311882	<b>Date Started:</b>	12/22/2021
<b>Total Depth:</b>	70.5 ft	<b>Soil Depth:</b>	50.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



**LEGEND**

*Continued Next Page*

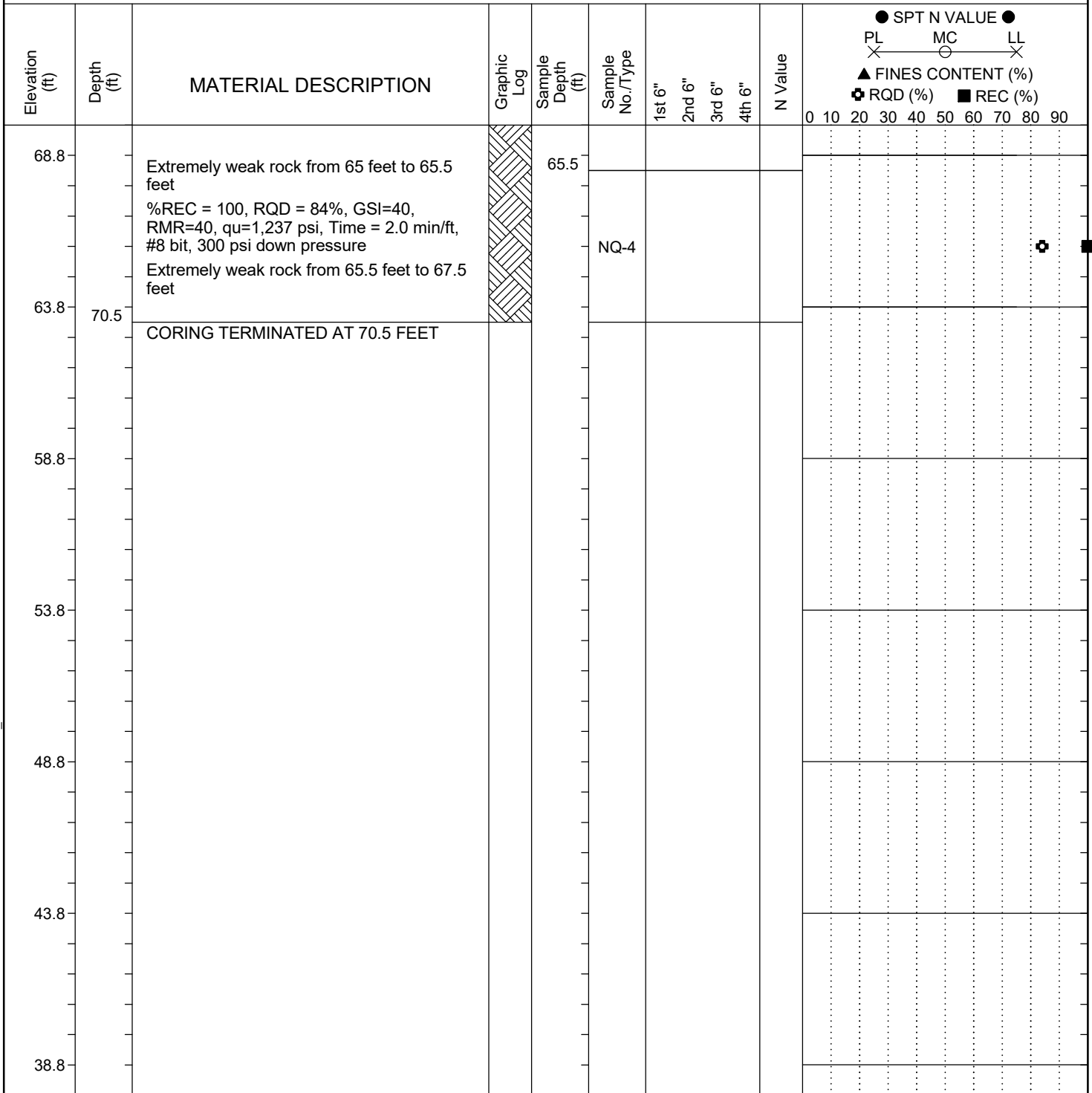
<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-11
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1803+83.82	<b>Offset:</b>	68.79 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	133.8 ft	<b>Latitude:</b>	34.2173669	<b>Longitude:</b>	-80.6311882	<b>Date Started:</b>	12/22/2021
<b>Total Depth:</b>	70.5 ft	<b>Soil Depth:</b>	50.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



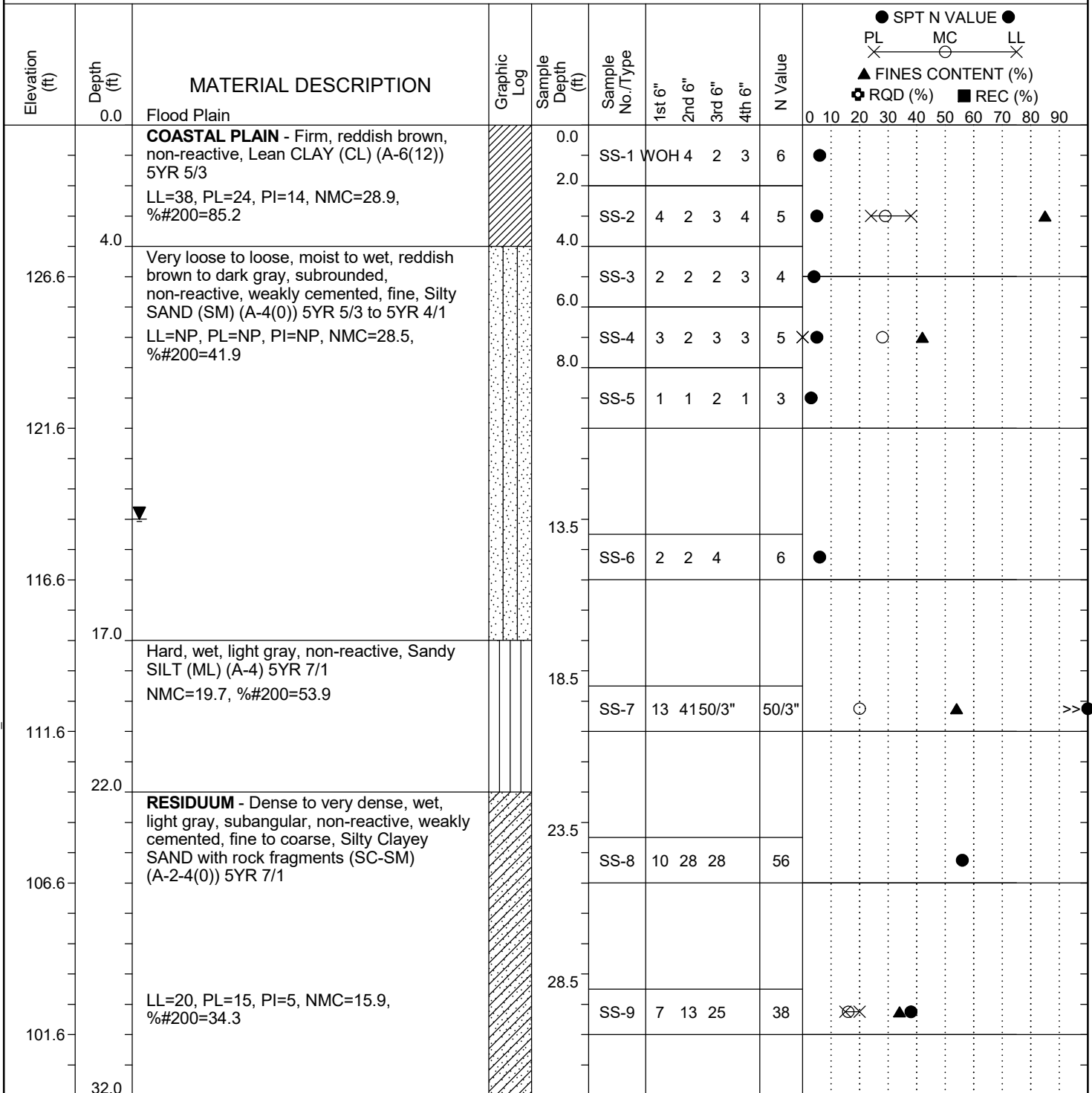
### LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-12
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1805+09.31	<b>Offset:</b>	72.84 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	131.6 ft	<b>Latitude:</b>	34.2170775	<b>Longitude:</b>	-80.6306681	<b>Date Started:</b>	12/22/2021
<b>Total Depth:</b>	56.5 ft	<b>Soil Depth:</b>	37 ft	<b>Core Depth:</b>	19.5 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	13 ft



## LEGEND

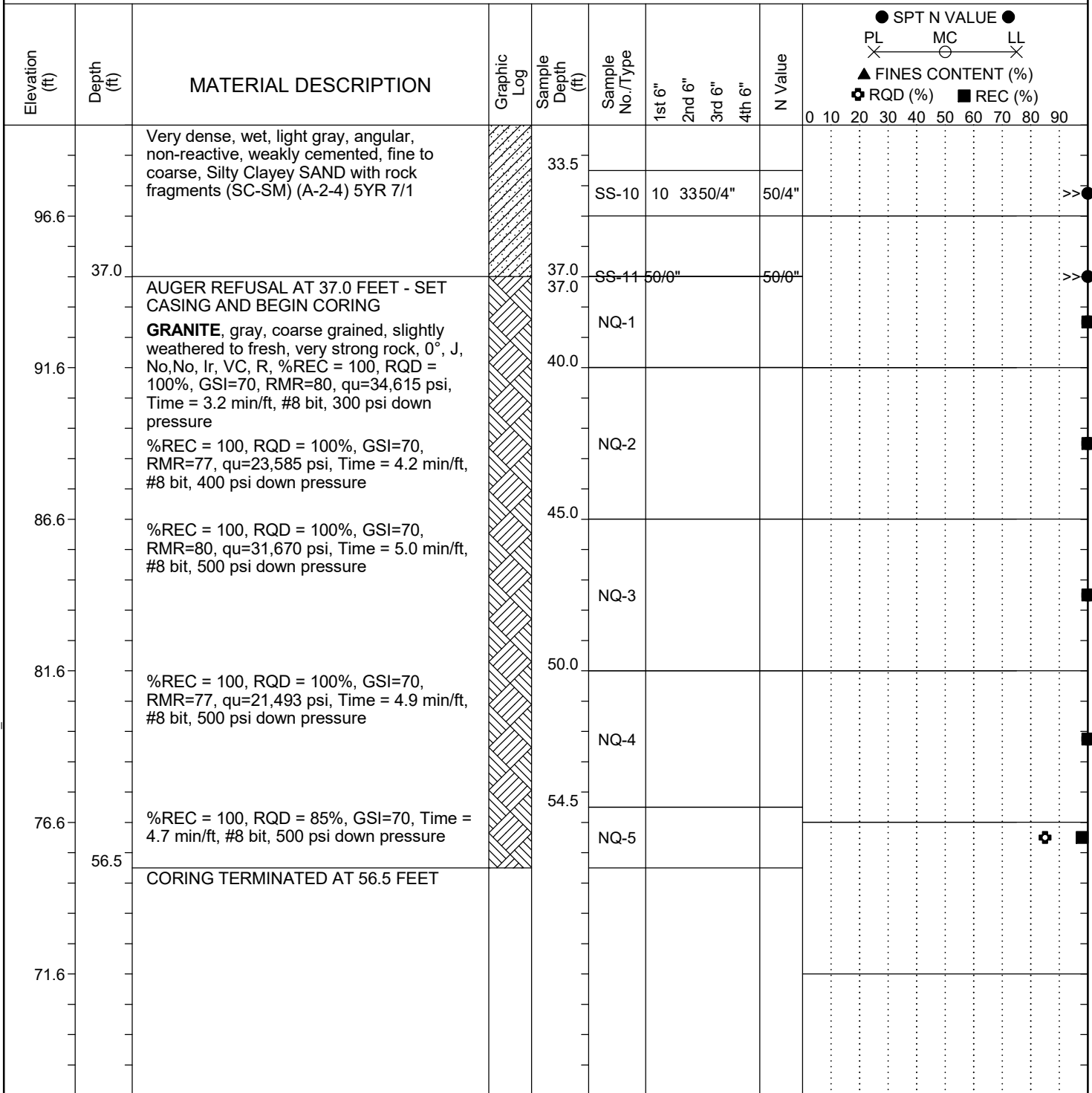
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-12
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1805+09.31	<b>Offset:</b>	72.84 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	131.6 ft	<b>Latitude:</b>	34.2170775	<b>Longitude:</b>	-80.6306681	<b>Date Started:</b>	12/22/2021
<b>Total Depth:</b>	56.5 ft	<b>Soil Depth:</b>	37 ft	<b>Core Depth:</b>	19.5 ft	<b>Date Completed:</b>	12/23/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	13 ft



## LEGEND

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

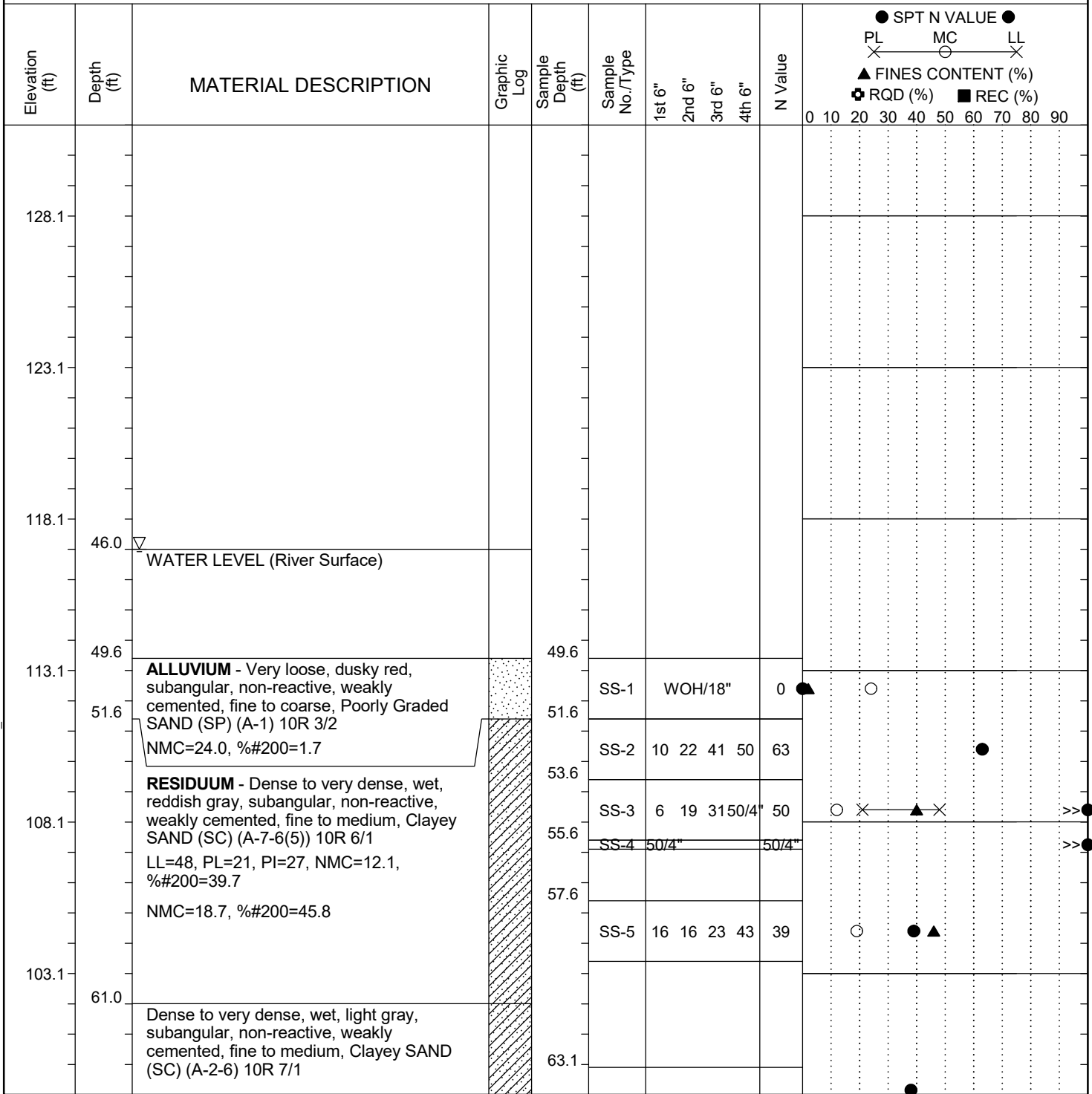
SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22





# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-13
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1806+90.89	<b>Offset:</b>	56.04 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2175463	<b>Longitude:</b>	-80.6301946	<b>Date Started:</b>	12/13/2021
<b>Total Depth:</b>	98.1 ft	<b>Soil Depth:</b>	78.1 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/13/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	46 ft



LEGEND

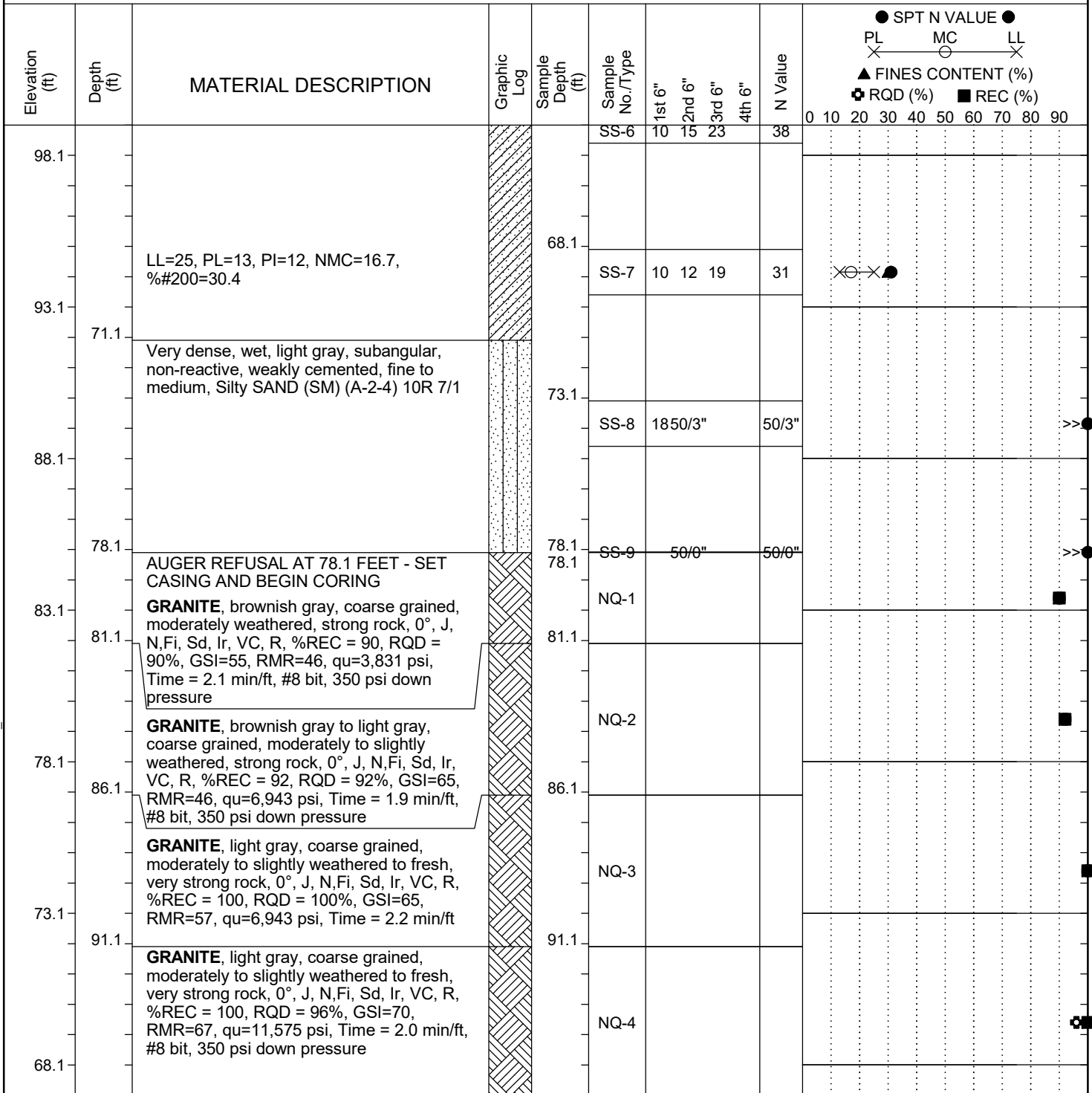
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SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
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

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-13
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1806+90.89	<b>Offset:</b>	56.04 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.1 ft	<b>Latitude:</b>	34.2175463	<b>Longitude:</b>	-80.6301946	<b>Date Started:</b>	12/13/2021
<b>Total Depth:</b>	98.1 ft	<b>Soil Depth:</b>	78.1 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/13/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	46 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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-14
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1808+35.12	<b>Offset:</b>	55.25 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.2 ft	<b>Latitude:</b>	34.2173505	<b>Longitude:</b>	-80.6296399	<b>Date Started:</b>	12/14/2021
<b>Total Depth:</b>	92.5 ft	<b>Soil Depth:</b>	72.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/14/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	45 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										
											0	10	20	30	40	50	60	70	80	90	
	0.0	Bridge Deck																			
	0.7	CONCRETE (8 inches)																			
		AIR GAP - CASING SET																			
158.2																					
153.2																					
148.2																					
143.2																					
138.2																					
133.2																					

**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	

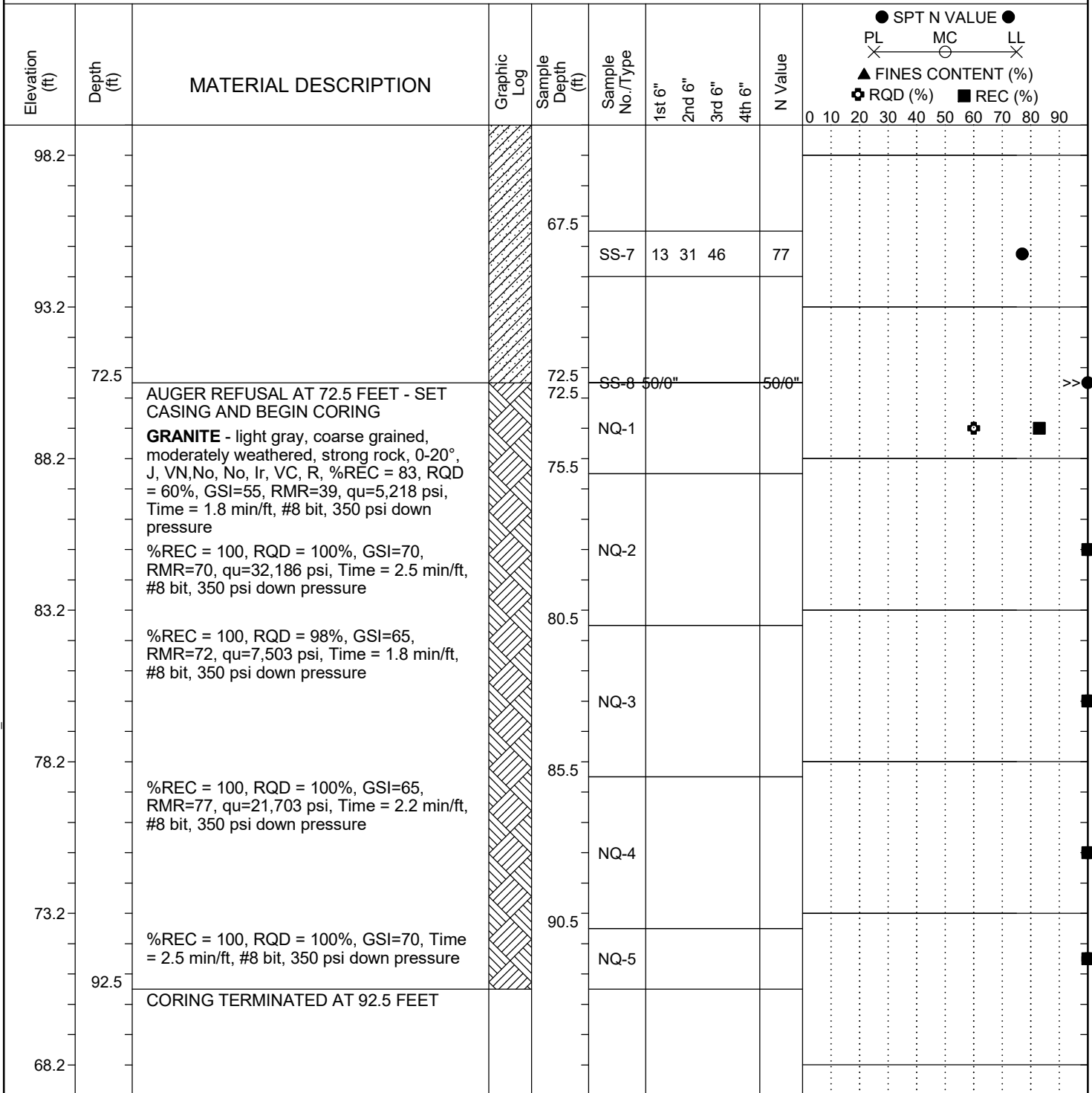
SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22





# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-14
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1808+35.12	<b>Offset:</b>	55.25 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	163.2 ft	<b>Latitude:</b>	34.2173505	<b>Longitude:</b>	-80.6296399	<b>Date Started:</b>	12/14/2021
<b>Total Depth:</b>	92.5 ft	<b>Soil Depth:</b>	72.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	12/14/2021
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	45 ft



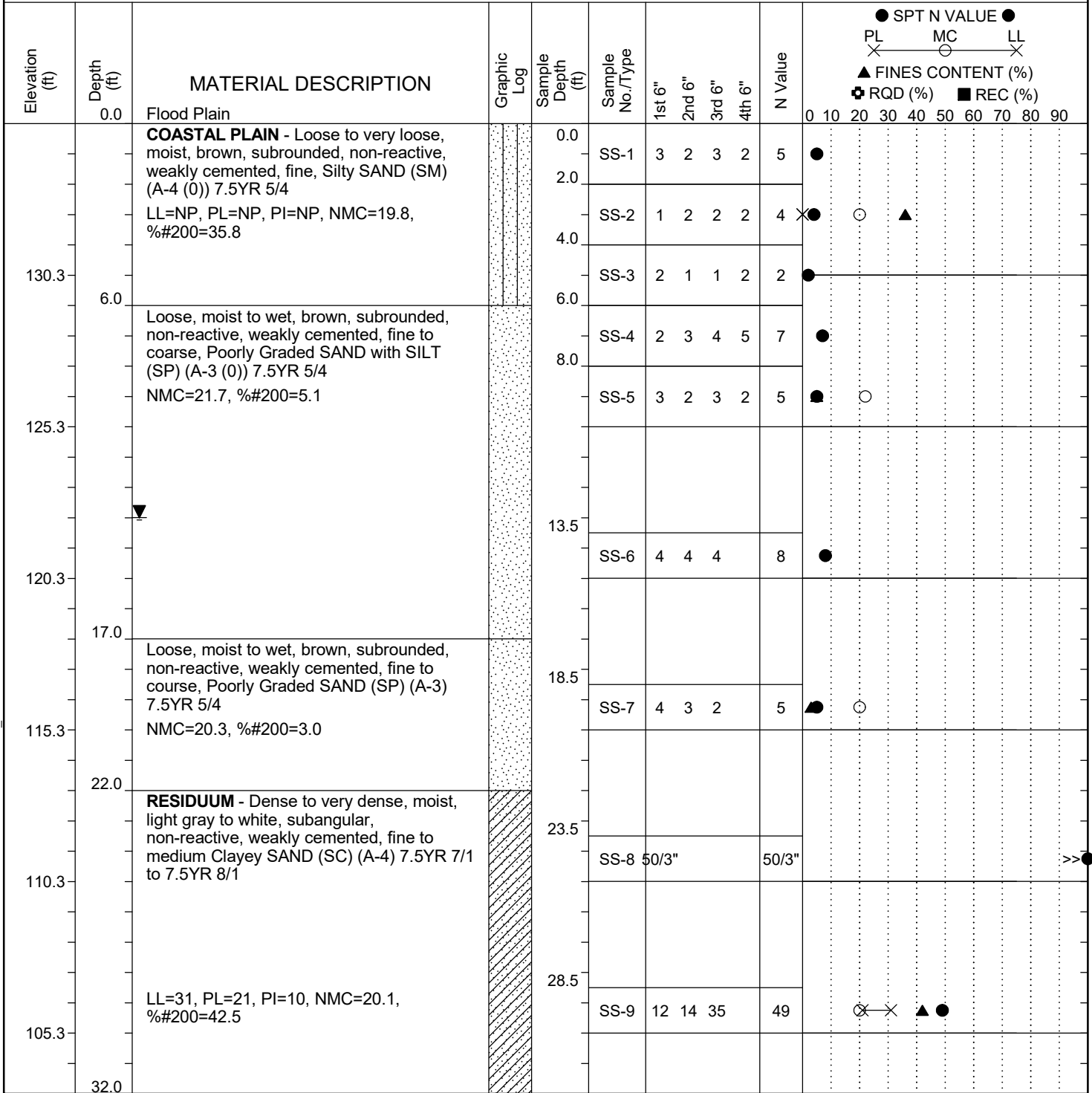
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-15
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1809+93.51	<b>Offset:</b>	79.13 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	135.3 ft	<b>Latitude:</b>	34.2178179	<b>Longitude:</b>	-80.6292453	<b>Date Started:</b>	1/10/2022
<b>Total Depth:</b>	65.7 ft	<b>Soil Depth:</b>	45.3 ft	<b>Core Depth:</b>	20.4 ft	<b>Date Completed:</b>	1/11/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	13 ft



## LEGEND

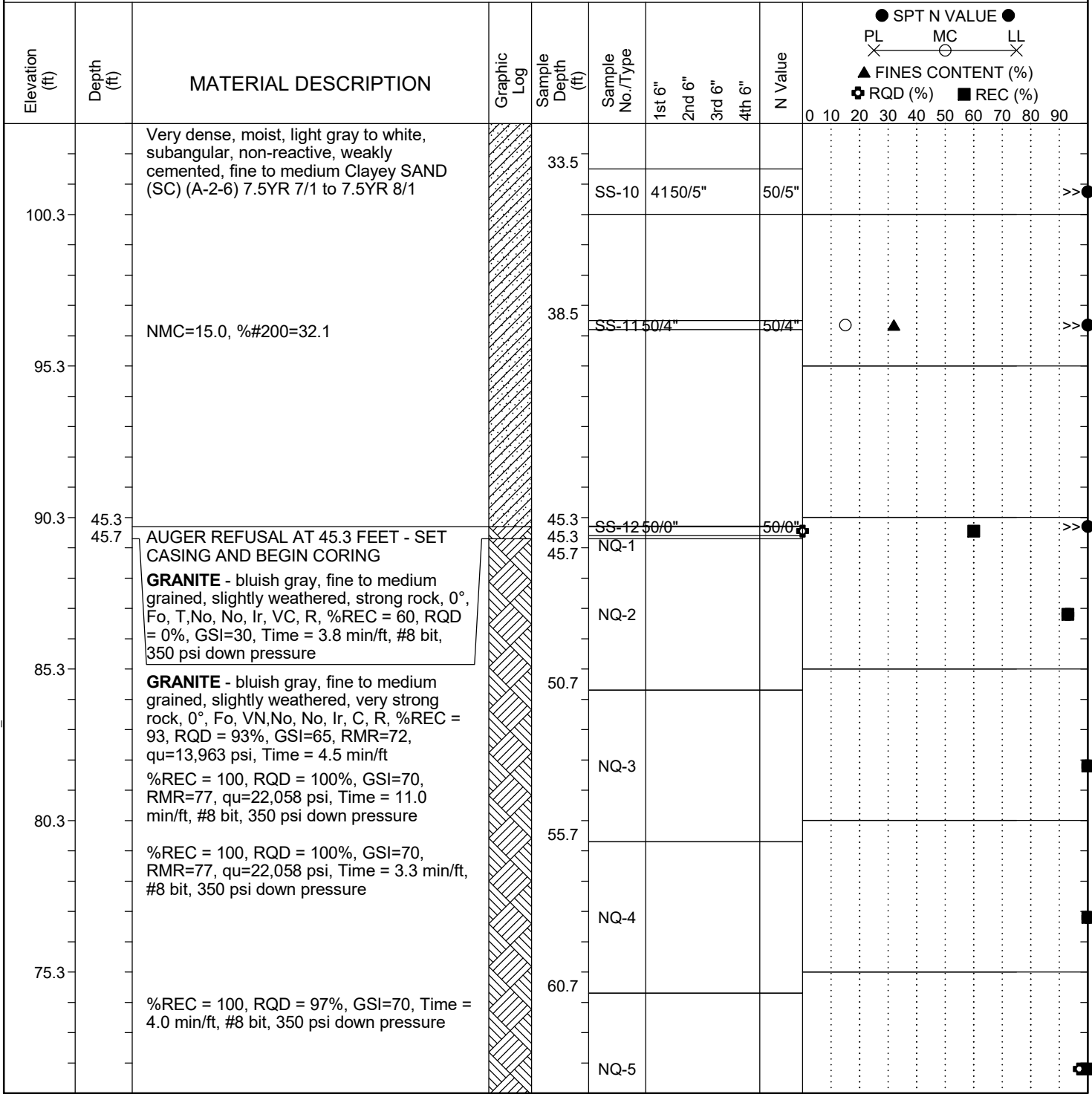
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777				<b>County:</b> Kershaw		<b>Boring No.:</b> B-15	
<b>Site Description:</b> I-20 Wateree River Bridge Repairs				<b>Route:</b> I-20			
<b>Eng./Geo.:</b> AF		<b>Boring Location:</b> 1809+93.51		<b>Offset:</b> 79.13 L		<b>Alignment:</b> Existing	
<b>Elev.:</b> 135.3 ft		<b>Latitude:</b> 34.2178179		<b>Longitude:</b> -80.6292453		<b>Date Started:</b> 1/10/2022	
<b>Total Depth:</b> 65.7 ft		<b>Soil Depth:</b> 45.3 ft		<b>Core Depth:</b> 20.4 ft		<b>Date Completed:</b> 1/11/2022	
<b>Bore Hole Diameter (in):</b> 3		<b>Sampler Configuration</b>		<b>Liner Required:</b> Y (N)		<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> D-50, S/N 472		<b>Drill Method:</b> RW/RC		<b>Hammer Type:</b> Automatic		<b>Energy Ratio:</b> 87.2%	
<b>Core Size:</b> NQ2		<b>Driller:</b> ST		<b>Groundwater:</b> TOB N.M.		<b>24HR</b> 13 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	

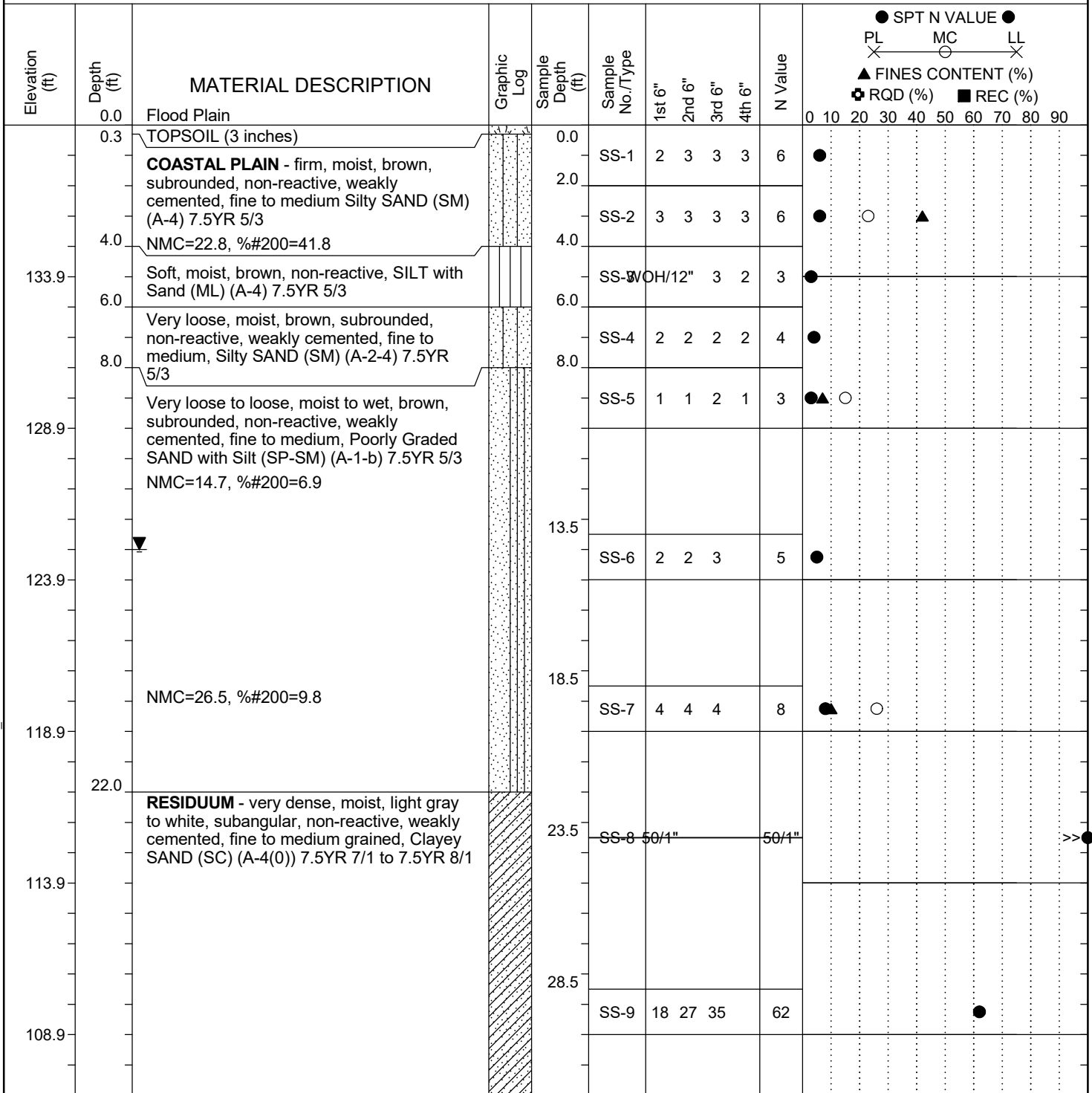
SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22





# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-16
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1811+28.42	<b>Offset:</b>	76.77 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.9 ft	<b>Latitude:</b>	34.217497	<b>Longitude:</b>	-80.6286831	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	73.6 ft	<b>Soil Depth:</b>	53.4 ft	<b>Core Depth:</b>	20.2 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



## LEGEND

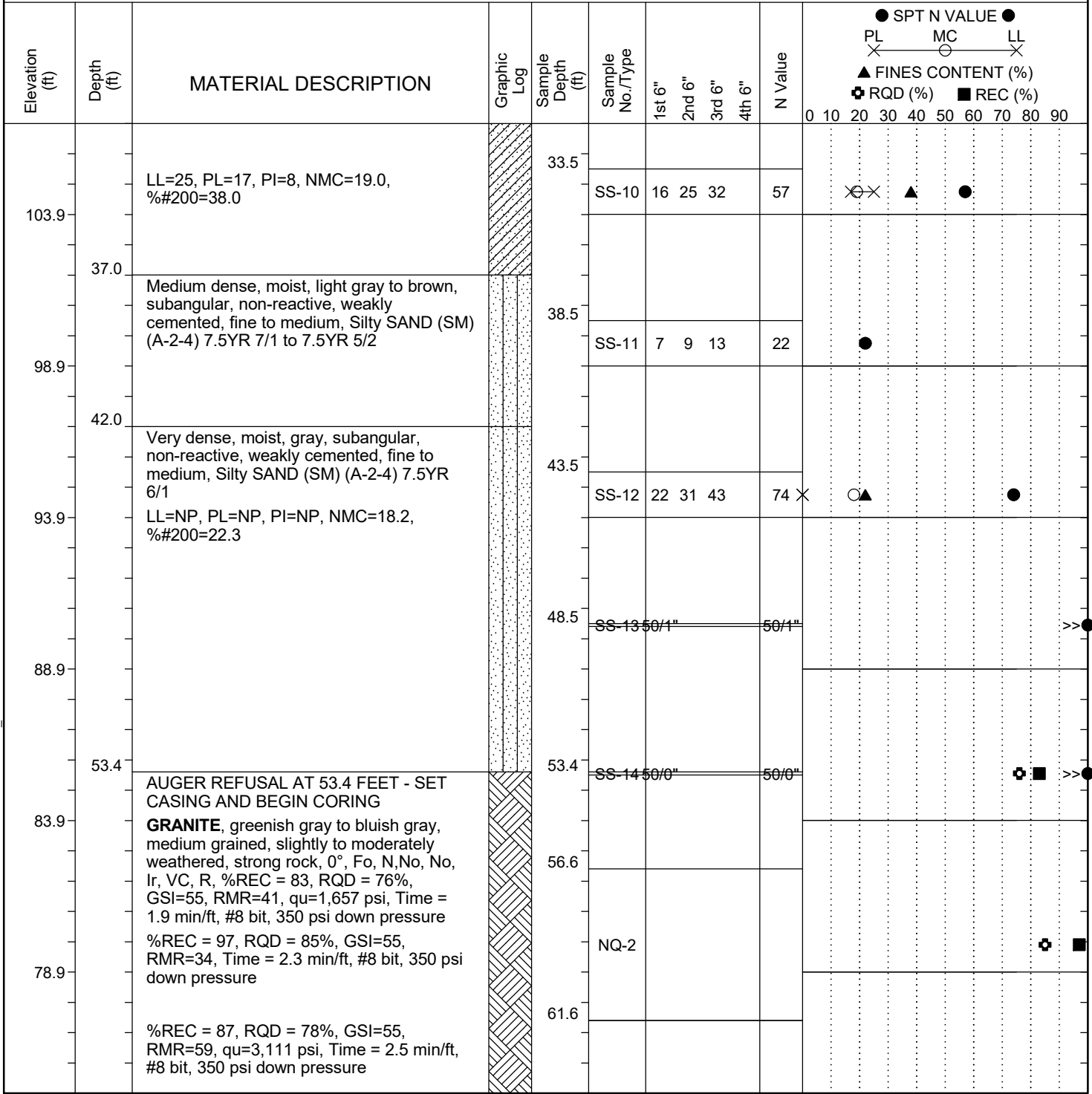
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-16
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1811+28.42	<b>Offset:</b>	76.77 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.9 ft	<b>Latitude:</b>	34.217497	<b>Longitude:</b>	-80.6286831	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	73.6 ft	<b>Soil Depth:</b>	53.4 ft	<b>Core Depth:</b>	20.2 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



**LEGEND**

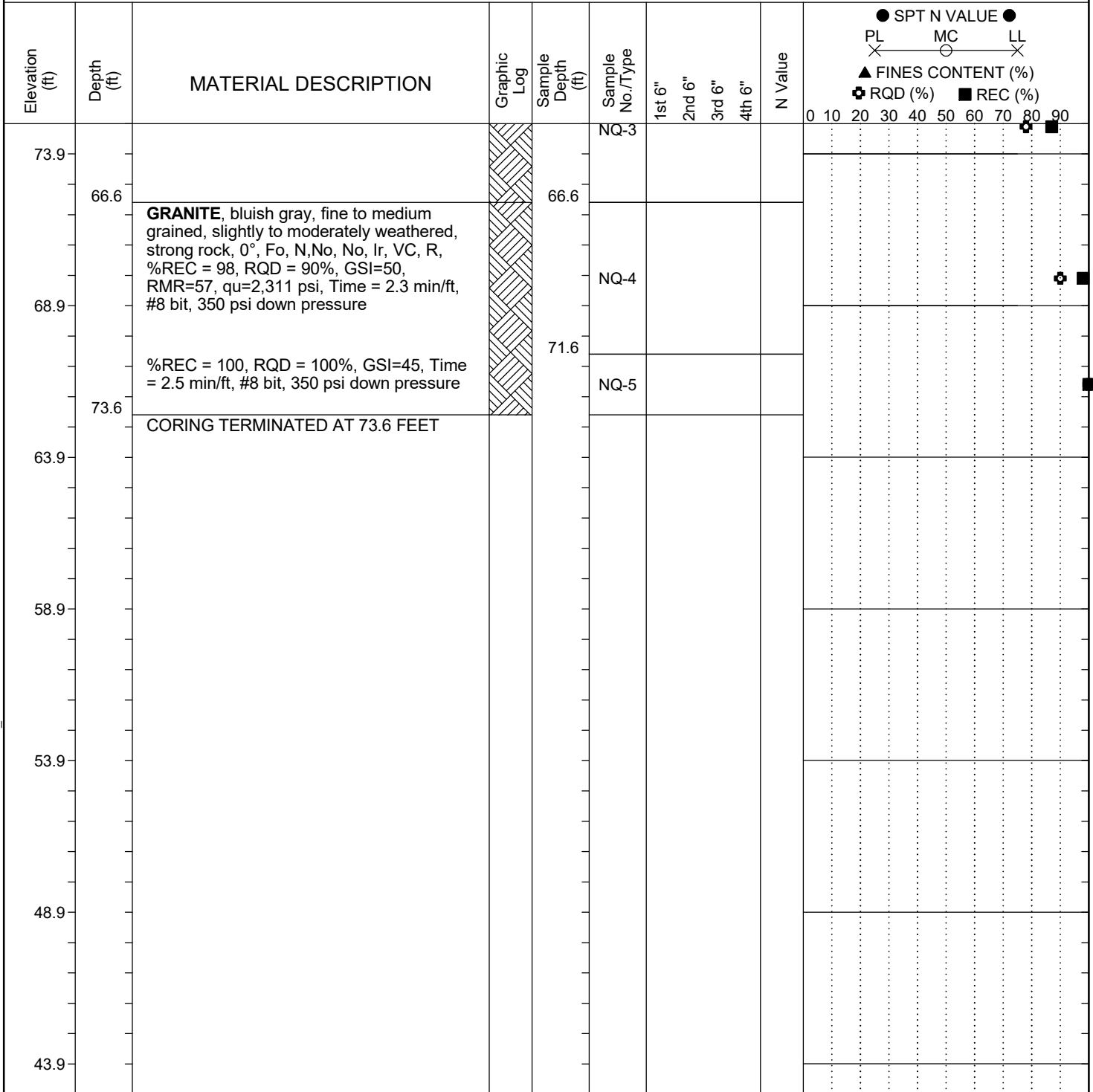
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE\_GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-16
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1811+28.42	<b>Offset:</b>	76.77 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	138.9 ft	<b>Latitude:</b>	34.217497	<b>Longitude:</b>	-80.6286831	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	73.6 ft	<b>Soil Depth:</b>	53.4 ft	<b>Core Depth:</b>	20.2 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



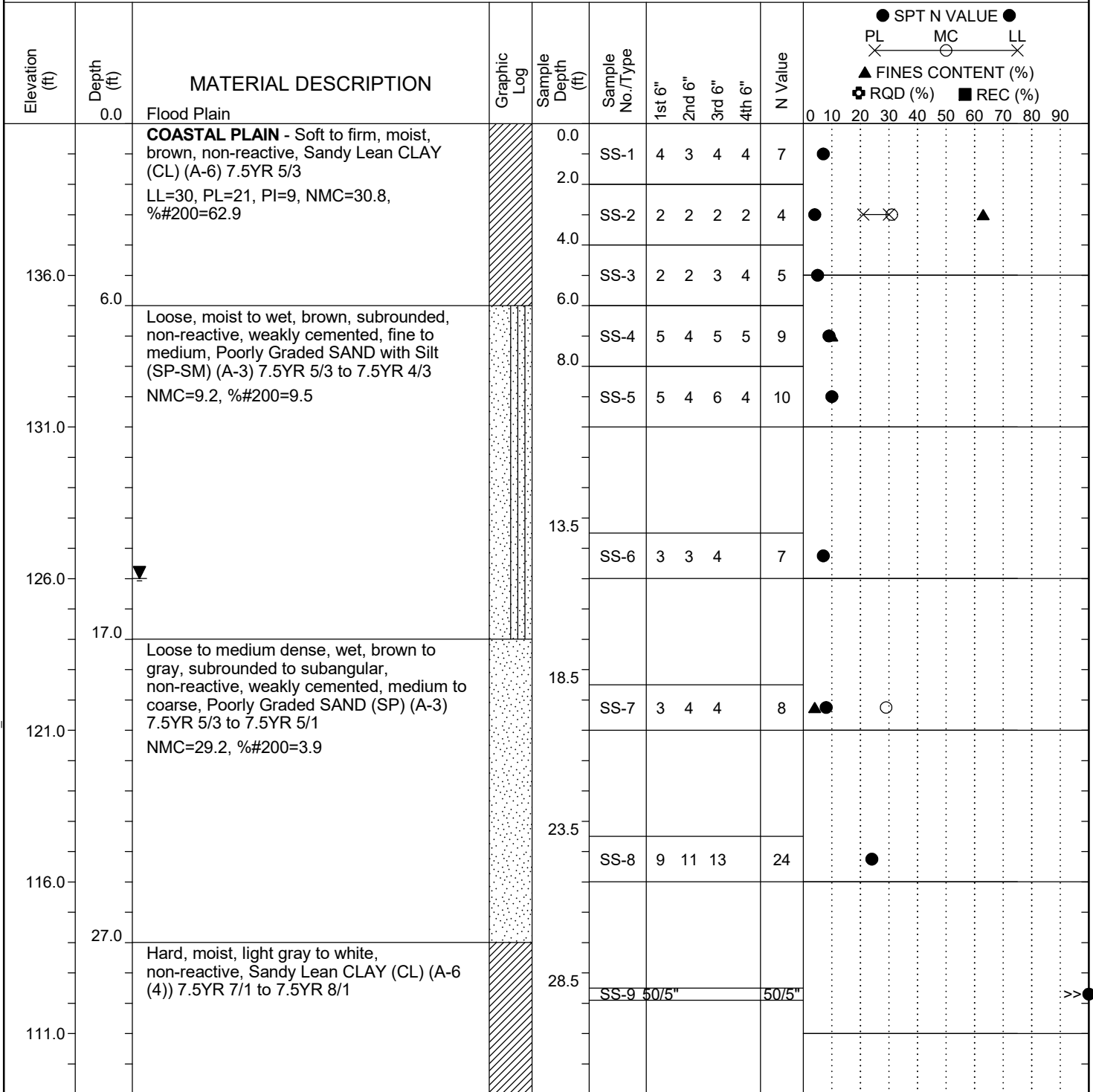
### LEGEND

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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-17
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1812+55.73	<b>Offset:</b>	70.48 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	141.0 ft	<b>Latitude:</b>	34.217977	<b>Longitude:</b>	-80.6283987	<b>Date Started:</b>	1/12/2022
<b>Total Depth:</b>	75.4 ft	<b>Soil Depth:</b>	56 ft	<b>Core Depth:</b>	19.4 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	15 ft



## LEGEND

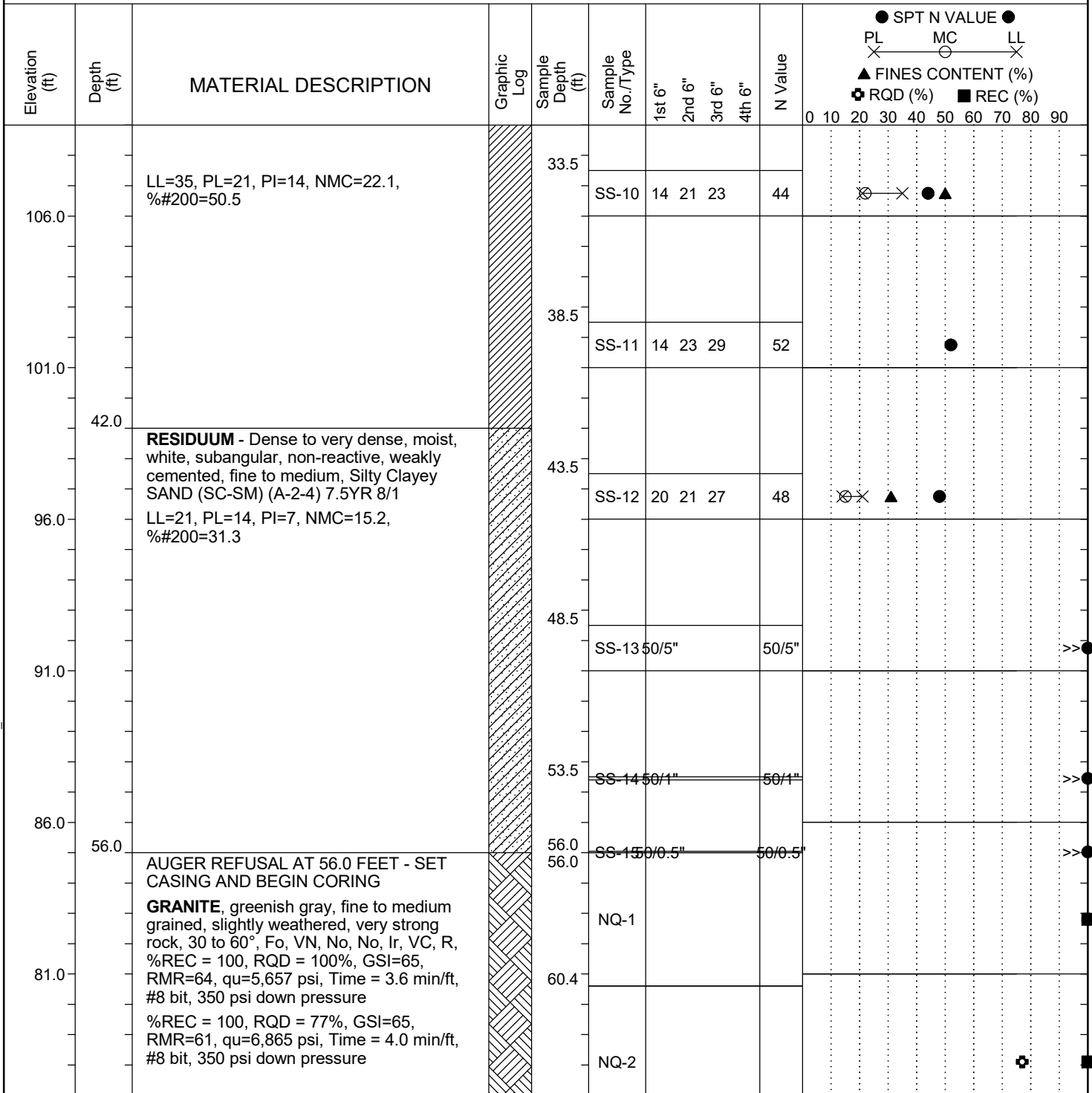
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-17
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1812+55.73	<b>Offset:</b>	70.48 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	141.0 ft	<b>Latitude:</b>	34.217977	<b>Longitude:</b>	-80.6283987	<b>Date Started:</b>	1/12/2022
<b>Total Depth:</b>	75.4 ft	<b>Soil Depth:</b>	56 ft	<b>Core Depth:</b>	19.4 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	15 ft



**LEGEND**

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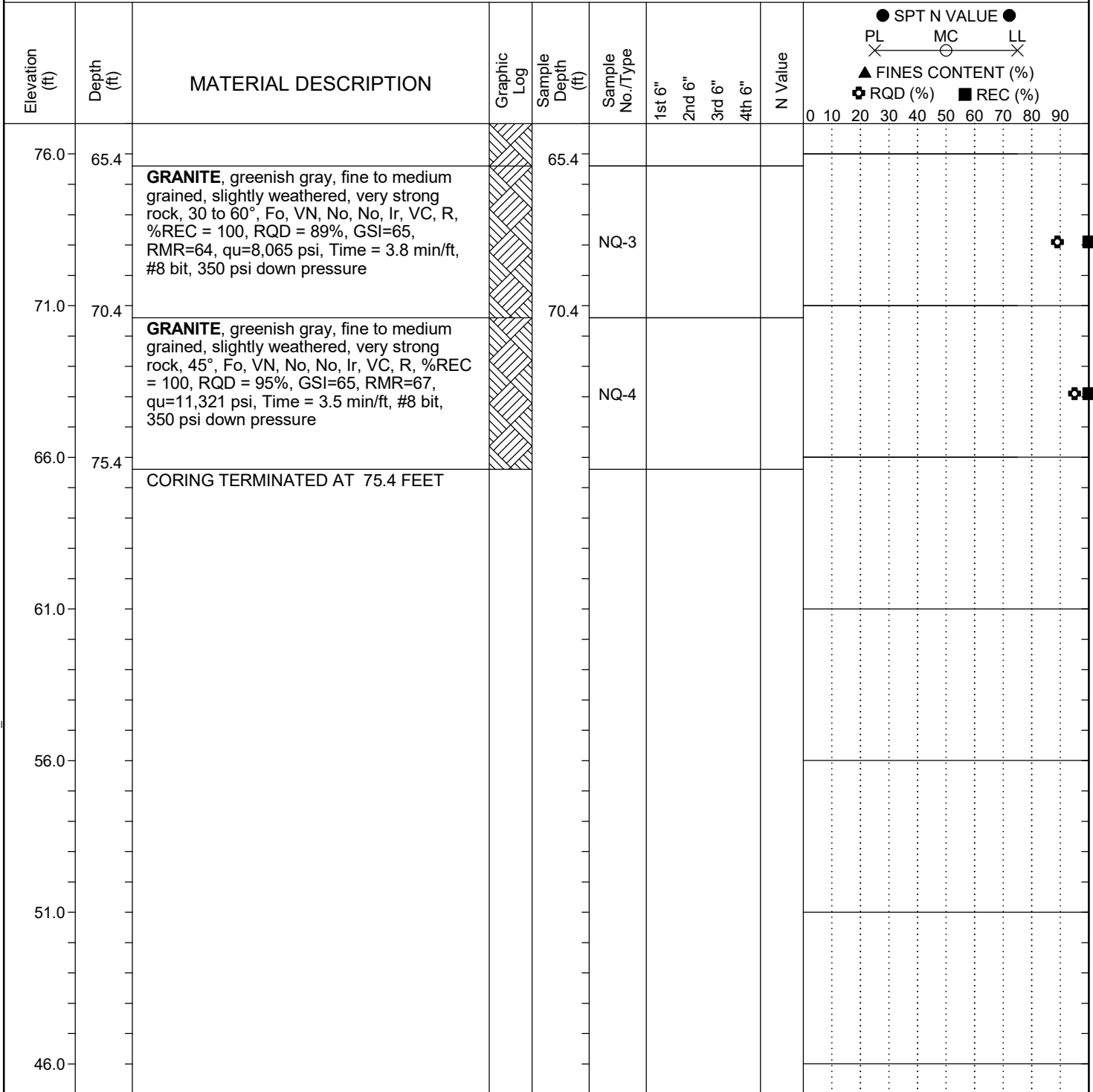
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-17
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1812+55.73	<b>Offset:</b>	70.48 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	141.0 ft	<b>Latitude:</b>	34.217977	<b>Longitude:</b>	-80.6283987	<b>Date Started:</b>	1/12/2022
<b>Total Depth:</b>	75.4 ft	<b>Soil Depth:</b>	56 ft	<b>Core Depth:</b>	19.4 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	15 ft



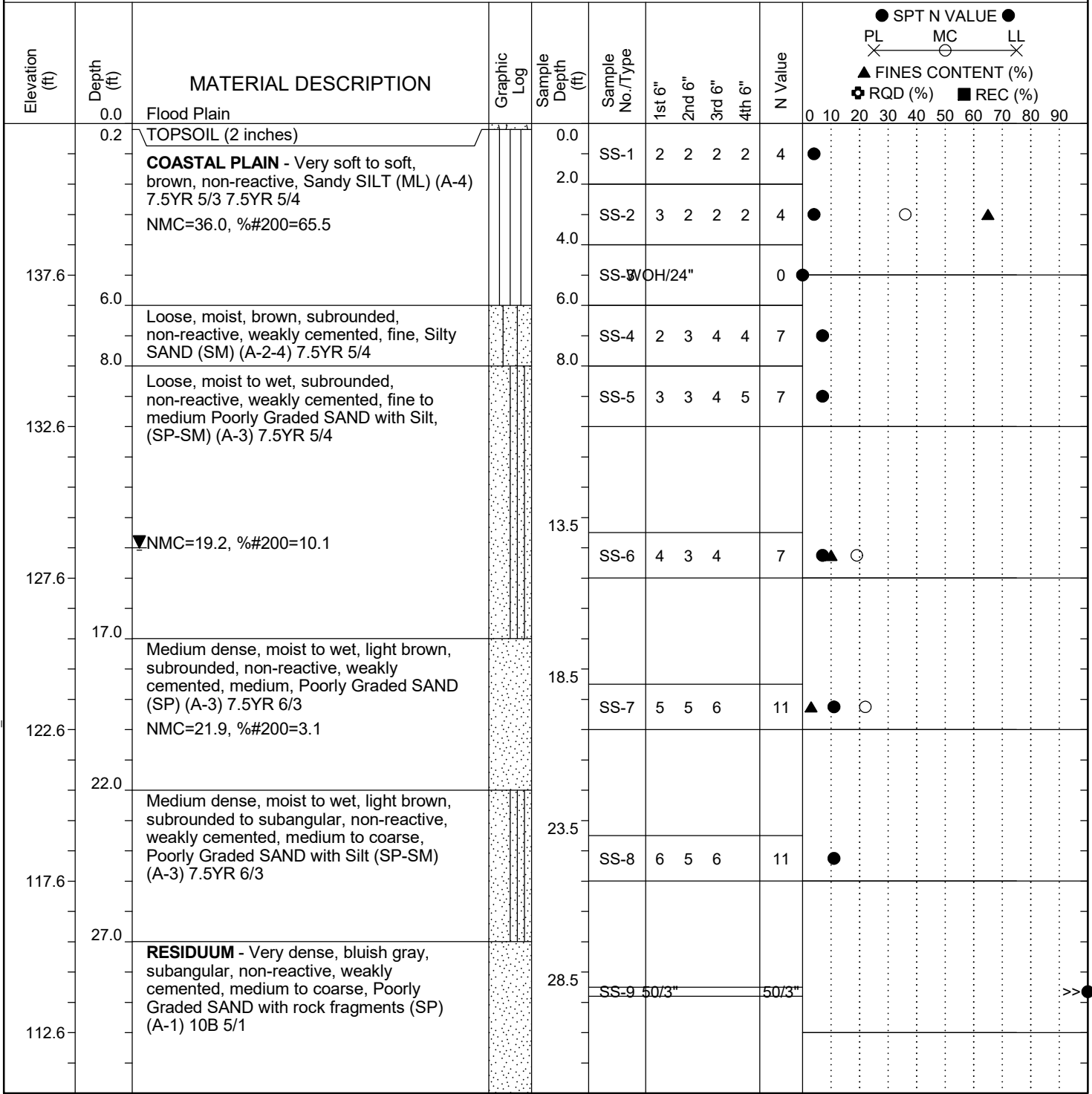
## LEGEND

<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-18
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1813+68.35	<b>Offset:</b>	78.03 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2176603	<b>Longitude:</b>	-80.6279141	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	84.4 ft	<b>Soil Depth:</b>	64.4 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



## LEGEND

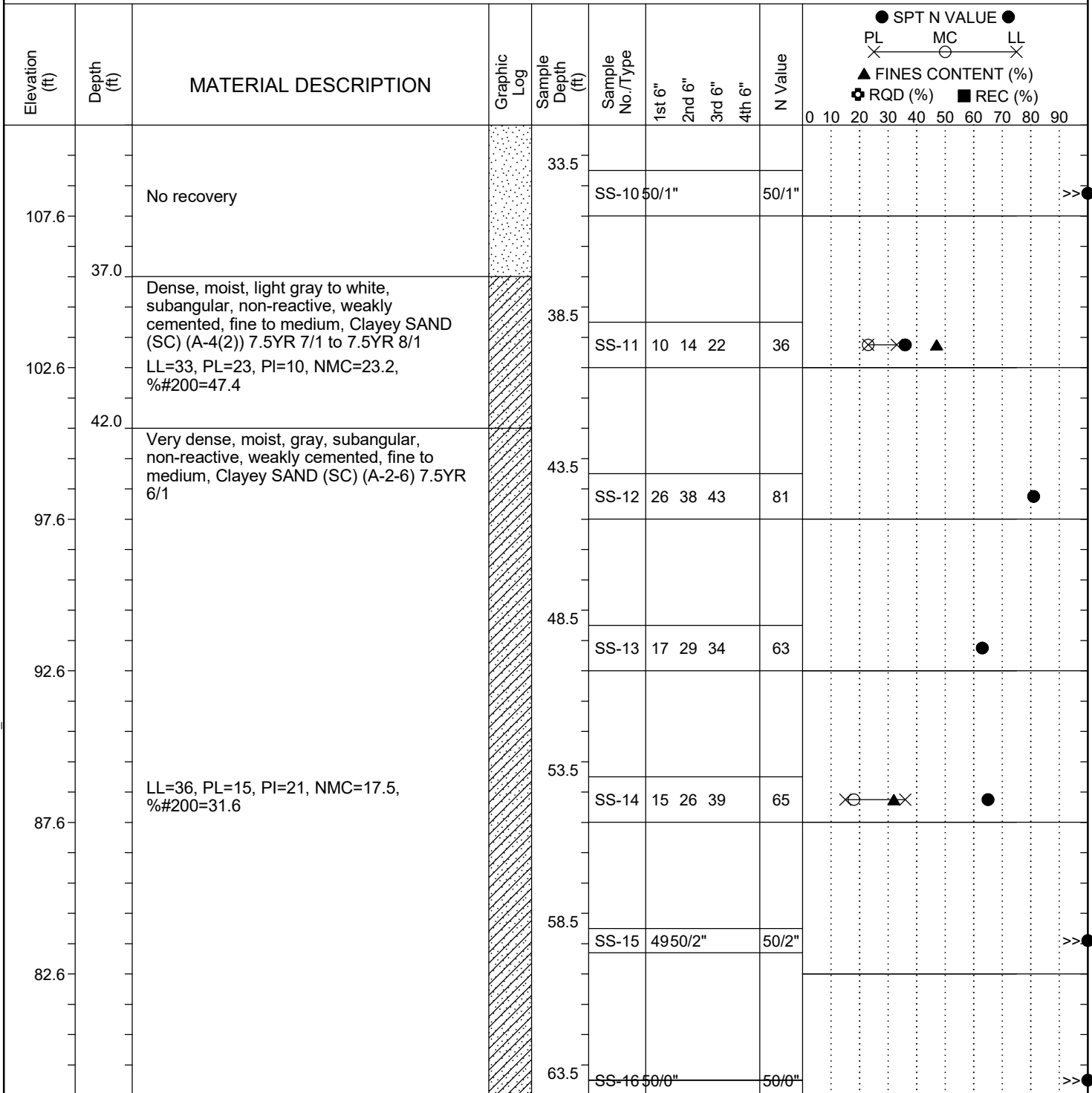
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-18
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1813+68.35	<b>Offset:</b>	78.03 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2176603	<b>Longitude:</b>	-80.6279141	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	84.4 ft	<b>Soil Depth:</b>	64.4 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



LEGEND

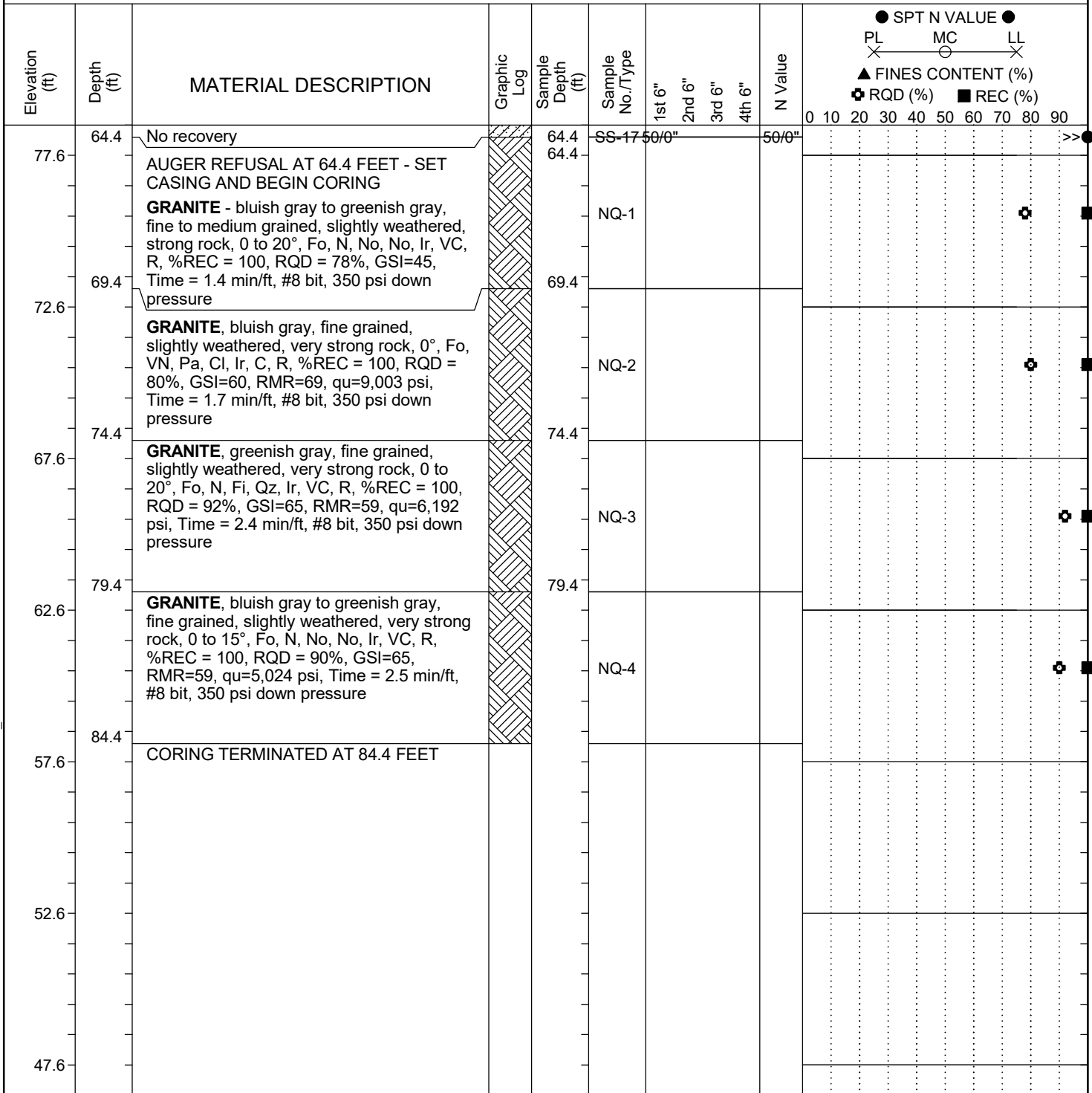
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<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-18
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1813+68.35	<b>Offset:</b>	78.03 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2176603	<b>Longitude:</b>	-80.6279141	<b>Date Started:</b>	1/18/2022
<b>Total Depth:</b>	84.4 ft	<b>Soil Depth:</b>	64.4 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	14 ft



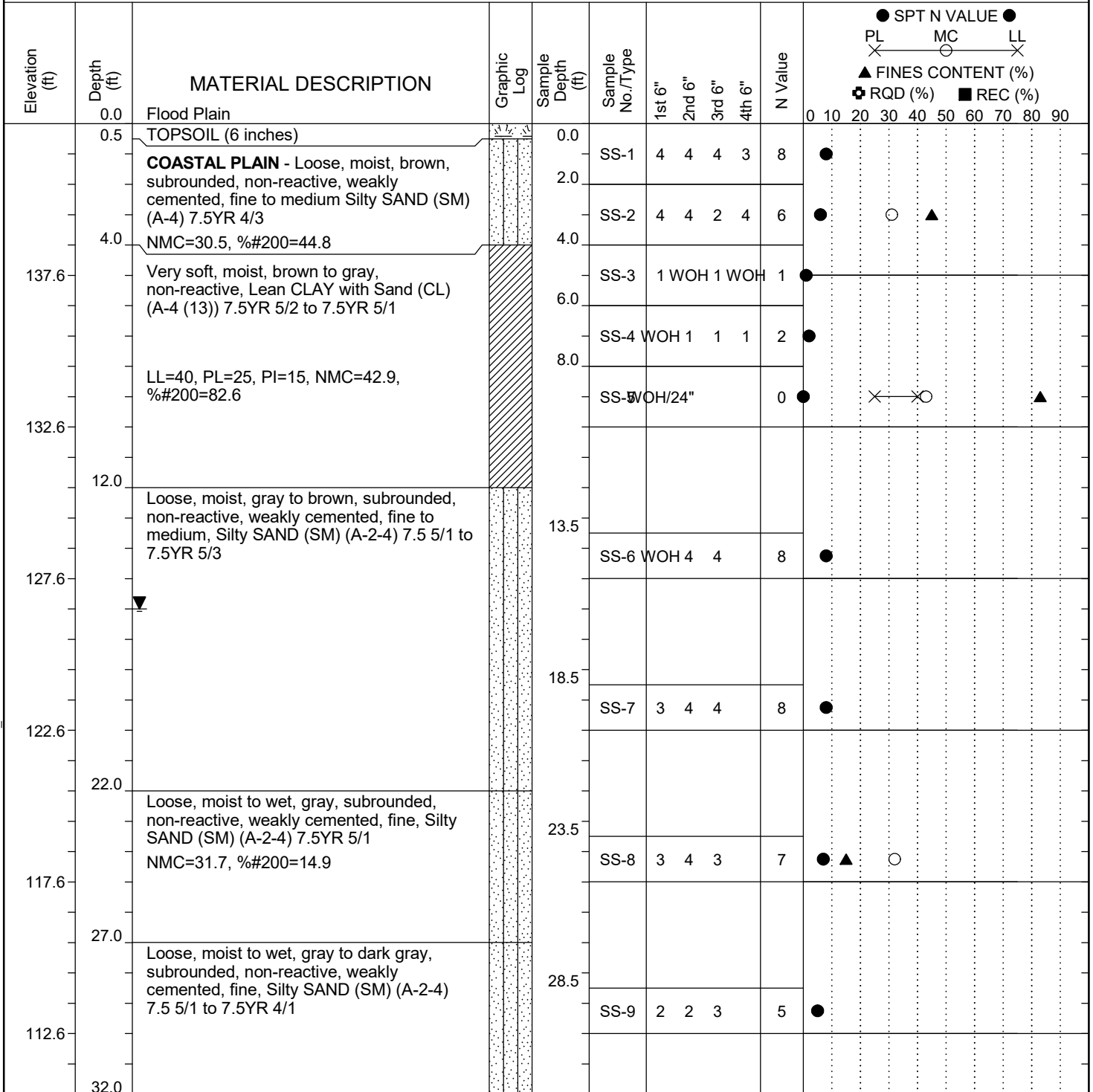
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-19
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1814+49.78	<b>Offset:</b>	79.57 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2181359	<b>Longitude:</b>	-80.6277852	<b>Date Started:</b>	1/13/2022
<b>Total Depth:</b>	86.5 ft	<b>Soil Depth:</b>	66.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



## LEGEND

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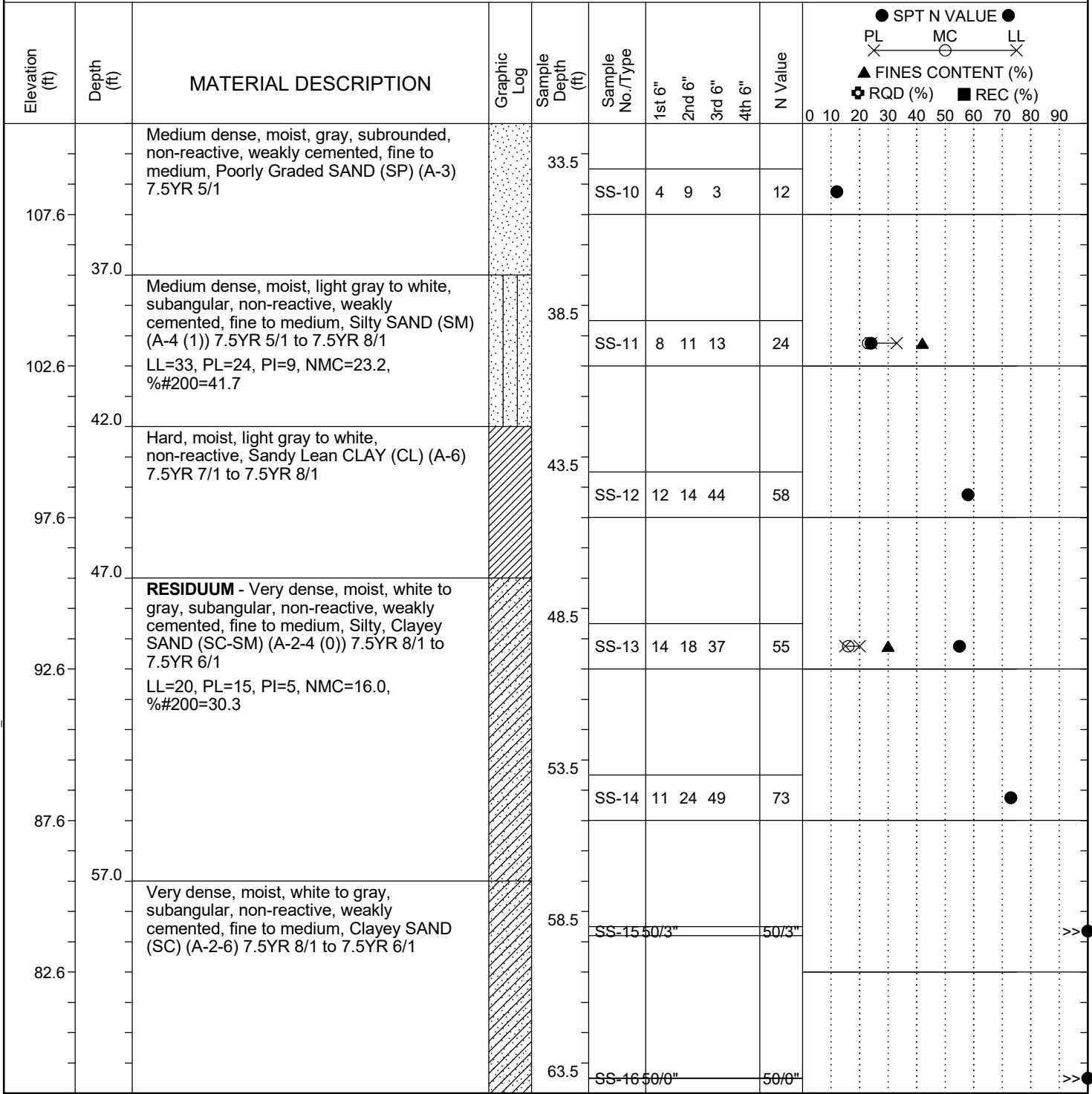
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-19
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1814+49.78	<b>Offset:</b>	79.57 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2181359	<b>Longitude:</b>	-80.6277852	<b>Date Started:</b>	1/13/2022
<b>Total Depth:</b>	86.5 ft	<b>Soil Depth:</b>	66.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



**LEGEND**

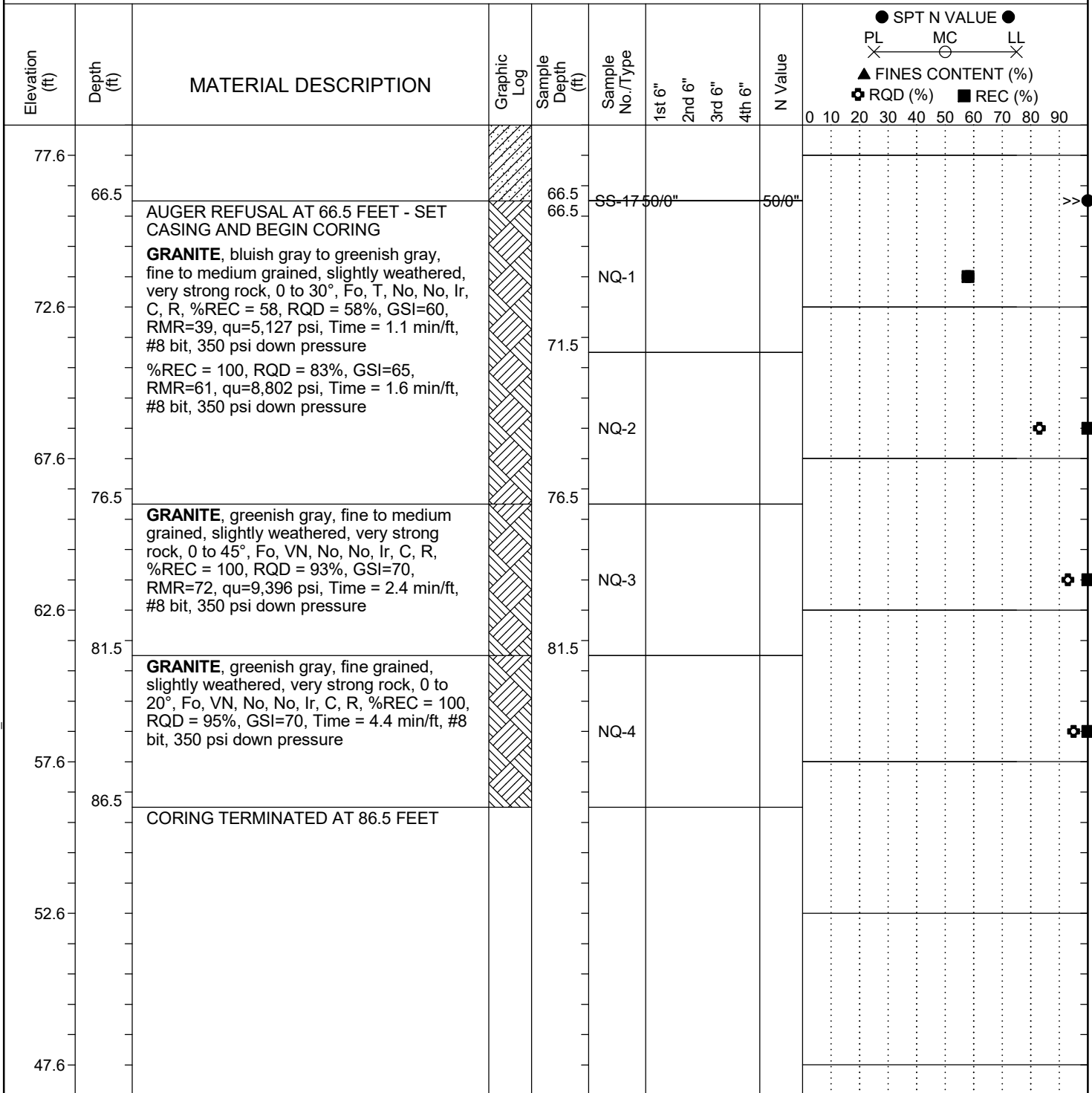
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<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous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

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-19
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	AF	<b>Boring Location:</b>	1814+49.78	<b>Offset:</b>	79.57 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	142.6 ft	<b>Latitude:</b>	34.2181359	<b>Longitude:</b>	-80.6277852	<b>Date Started:</b>	1/13/2022
<b>Total Depth:</b>	86.5 ft	<b>Soil Depth:</b>	66.5 ft	<b>Core Depth:</b>	20 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	D-50, S/N 472	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	87.2%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	16 ft



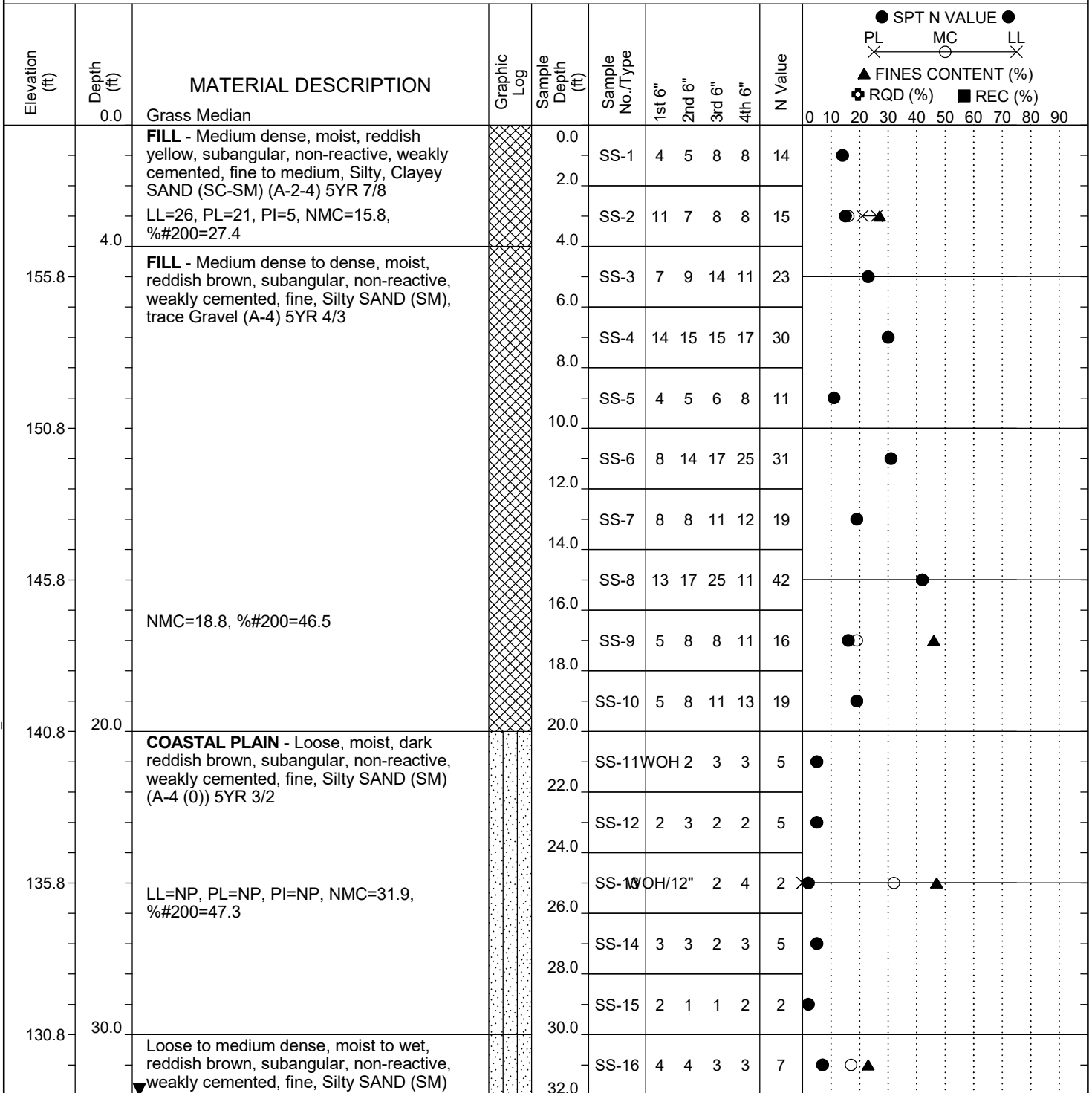
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-20
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1816+16.17	<b>Offset:</b>	3.2 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.8 ft	<b>Latitude:</b>	34.2180484	<b>Longitude:</b>	-80.6271888	<b>Date Started:</b>	12/16/2021
<b>Total Depth:</b>	95.4 ft	<b>Soil Depth:</b>	74.9 ft	<b>Core Depth:</b>	20.5 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.0%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	32 ft



## LEGEND

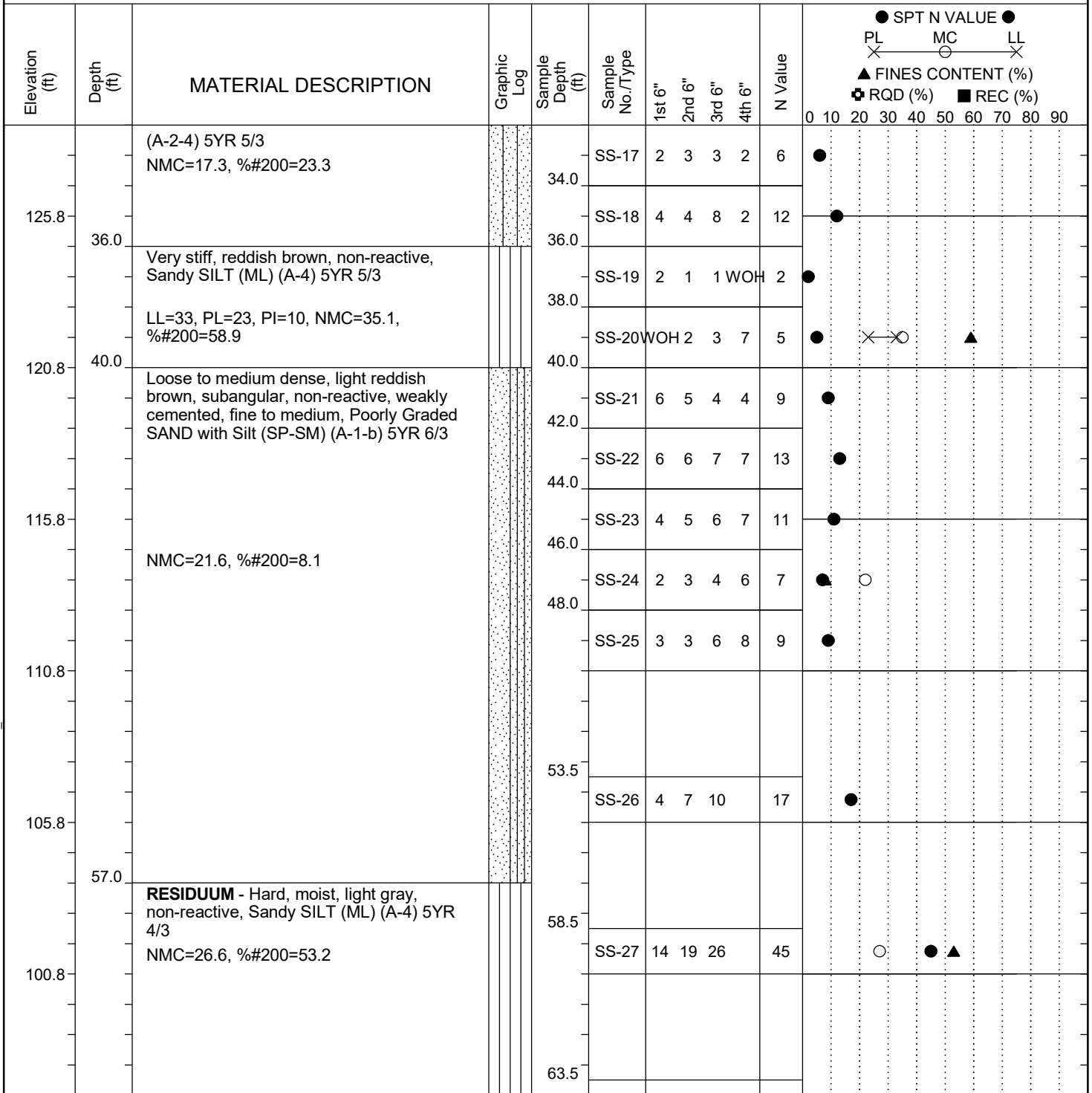
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-20
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1816+16.17	<b>Offset:</b>	3.2 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.8 ft	<b>Latitude:</b>	34.2180484	<b>Longitude:</b>	-80.6271888	<b>Date Started:</b>	12/16/2021
<b>Total Depth:</b>	95.4 ft	<b>Soil Depth:</b>	74.9 ft	<b>Core Depth:</b>	20.5 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.0%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	32 ft



LEGEND

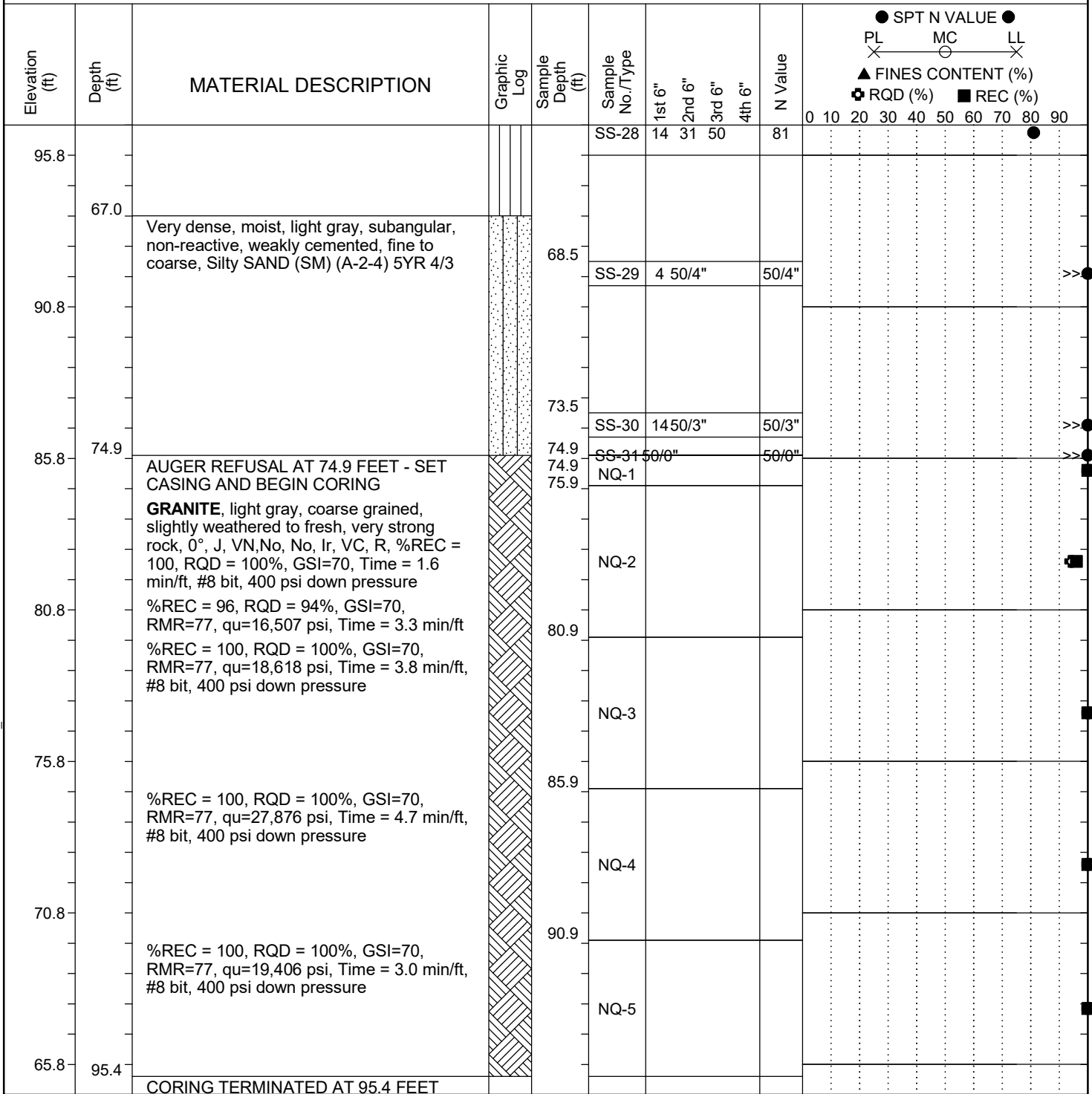
Continued Next Page

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-20
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	PM	<b>Boring Location:</b>	1816+16.17	<b>Offset:</b>	3.2 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.8 ft	<b>Latitude:</b>	34.2180484	<b>Longitude:</b>	-80.6271888	<b>Date Started:</b>	12/16/2021
<b>Total Depth:</b>	95.4 ft	<b>Soil Depth:</b>	74.9 ft	<b>Core Depth:</b>	20.5 ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	GP448	<b>Drill Method:</b>	RW/RC	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	93.0%
<b>Core Size:</b>	NQ2	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	32 ft

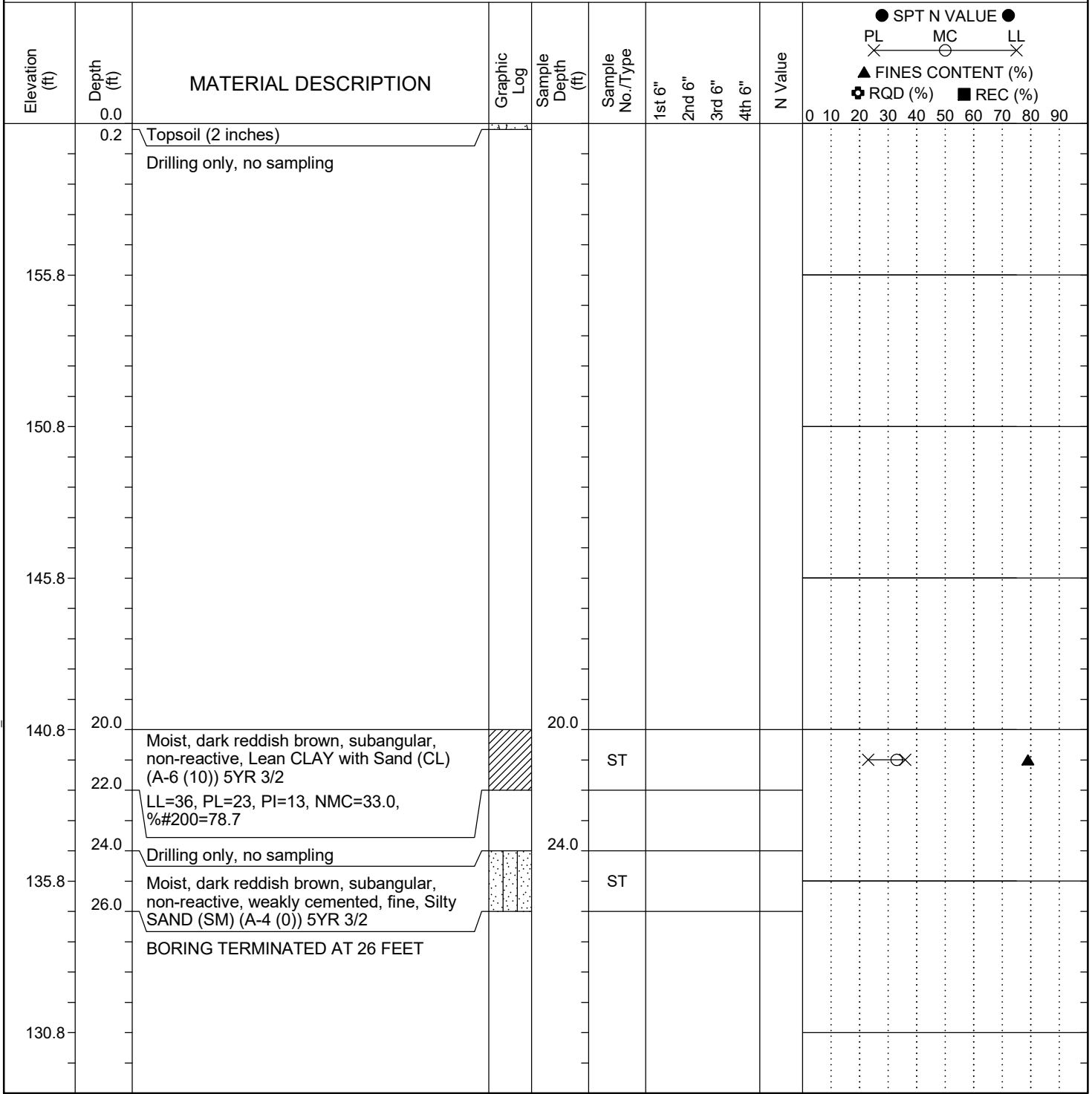


SC.DOT 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
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

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	B-20A
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1816+16.17	<b>Offset:</b>	3.2 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.8 ft	<b>Latitude:</b>		<b>Longitude:</b>		<b>Date Started:</b>	1/10/2022
<b>Total Depth:</b>	26 ft	<b>Soil Depth:</b>	26 ft	<b>Core Depth:</b>	ft	<b>Date Completed:</b>	1/19/2022
<b>Bore Hole Diameter (in):</b>	4	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y N	<b>Liner Used:</b>	Y N
<b>Drill Machine:</b>		<b>Drill Method:</b>		<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	
<b>Core Size:</b>		<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.E.



### LEGEND

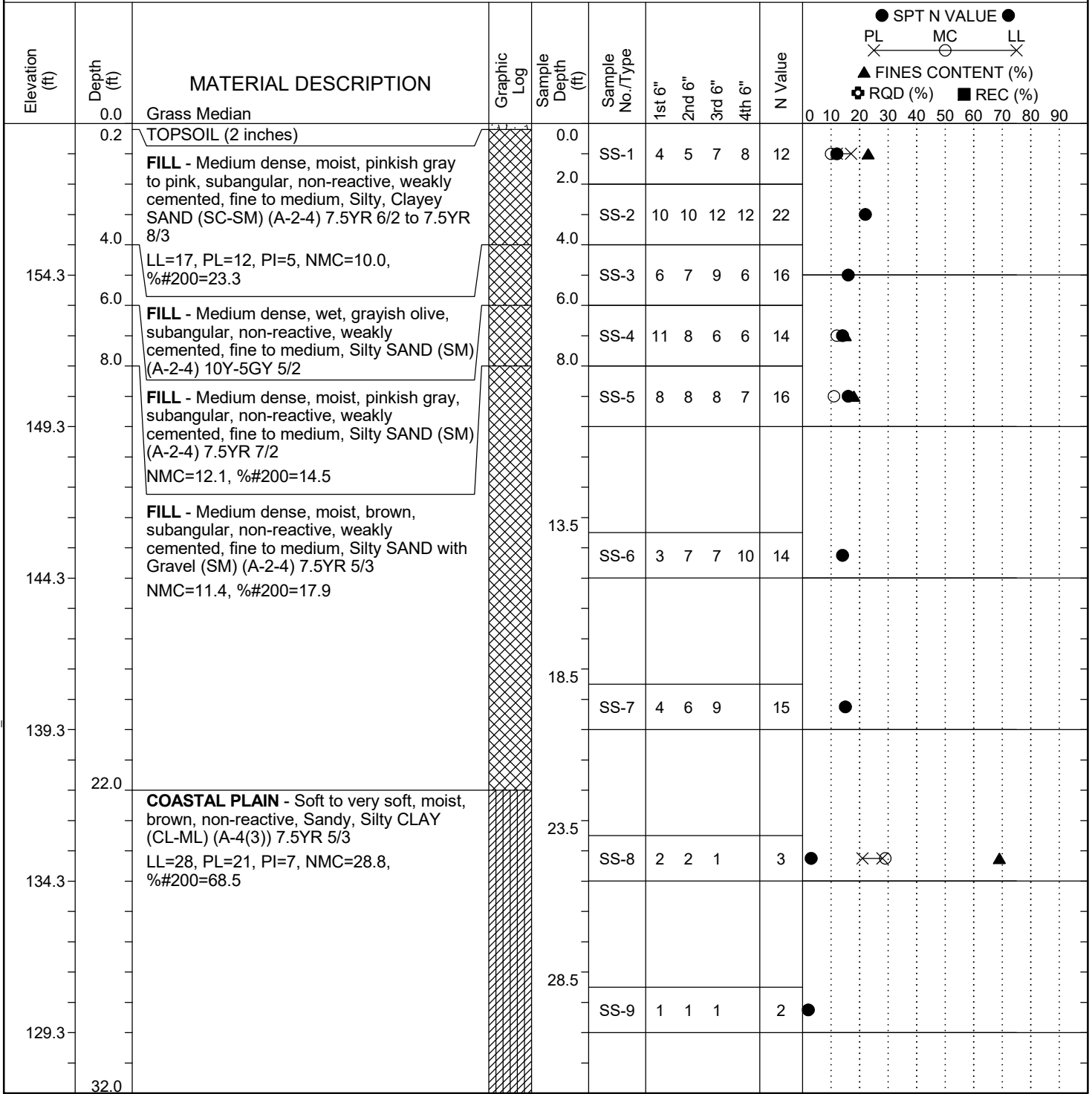
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC.DOT 7.321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT\_DATATEMPLATE.GDT 5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777	<b>County:</b> Kershaw	<b>Boring No.:</b> E-1
<b>Site Description:</b> I-20 Wateree River Bridge Repairs	<b>Route:</b> I-20	
<b>Eng./Geo.:</b> LM	<b>Boring Location:</b> 1795+15.19	<b>Offset:</b> 11.93 R
<b>Alignment:</b> Existing	<b>Date Started:</b> 1/5/2022	
<b>Elev.:</b> 159.3 ft	<b>Latitude:</b> 34.2165489	<b>Longitude:</b> -80.633901
<b>Total Depth:</b> 60 ft	<b>Soil Depth:</b> 60 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 2/3/2022		
<b>Bore Hole Diameter (in):</b> 3	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME-45C	<b>Drill Method:</b> RW	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 91.6%		
<b>Core Size:</b> N.A.	<b>Driller:</b> CC	<b>Groundwater:</b> TOB N.M.
<b>24HR:</b> 36 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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-1
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1795+15.19	<b>Offset:</b>	11.93 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.3 ft	<b>Latitude:</b>	34.2165489	<b>Longitude:</b>	-80.633901	<b>Date Started:</b>	1/5/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	36 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 (%)			
124.3	37.0	Stiff, moist, brown, non-reactive, Lean CLAY with Sand (CL) (A-7-6(18)) 7.5YR 5/3 LL=43, PL=23, PI=20, NMC=28.9, %200=84.6	[Hatched Pattern]	33.5	SS-10	3	4	6		10	●	×	○	×		▲						
119.3	42.0	Soft, wet, gray, non-reactive, SILT (ML) (A-2-4) 7.5YR 5/1	[Dotted Pattern]	38.5	SS-11WOH	1	2			3	●											
114.3	43.5	Medium dense, wet, dark gray, subrounded, non-reactive, weakly cemented, fine to medium, Silty SAND (SM) (A-2-4) 7.5YR 4/1 NMC=53.3, %200=21.9	[Dotted Pattern]	43.5	SS-12	3	3	8		11	●	▲		○								
109.3	48.5		[Dotted Pattern]	48.5	SS-13	11	11	17		28			●									
104.3	52.0	<b>RESIDUUM</b> - Dense, wet, light gray, subrounded, non-reactive, weakly cemented, fine to medium, Silty SAND (SM) (A-2-4(0)) 7.5YR 7/1 LL=33, PL=26, PI=7, NMC=18.1, %200=33.4	[Dotted Pattern]	53.5	SS-14	17	26	23		49		○	×	▲		●						
99.3	60.0	BORING TERMINATED AT 60 FEET	[Dotted Pattern]	58.5	SS-15	11	16	26		42						●						

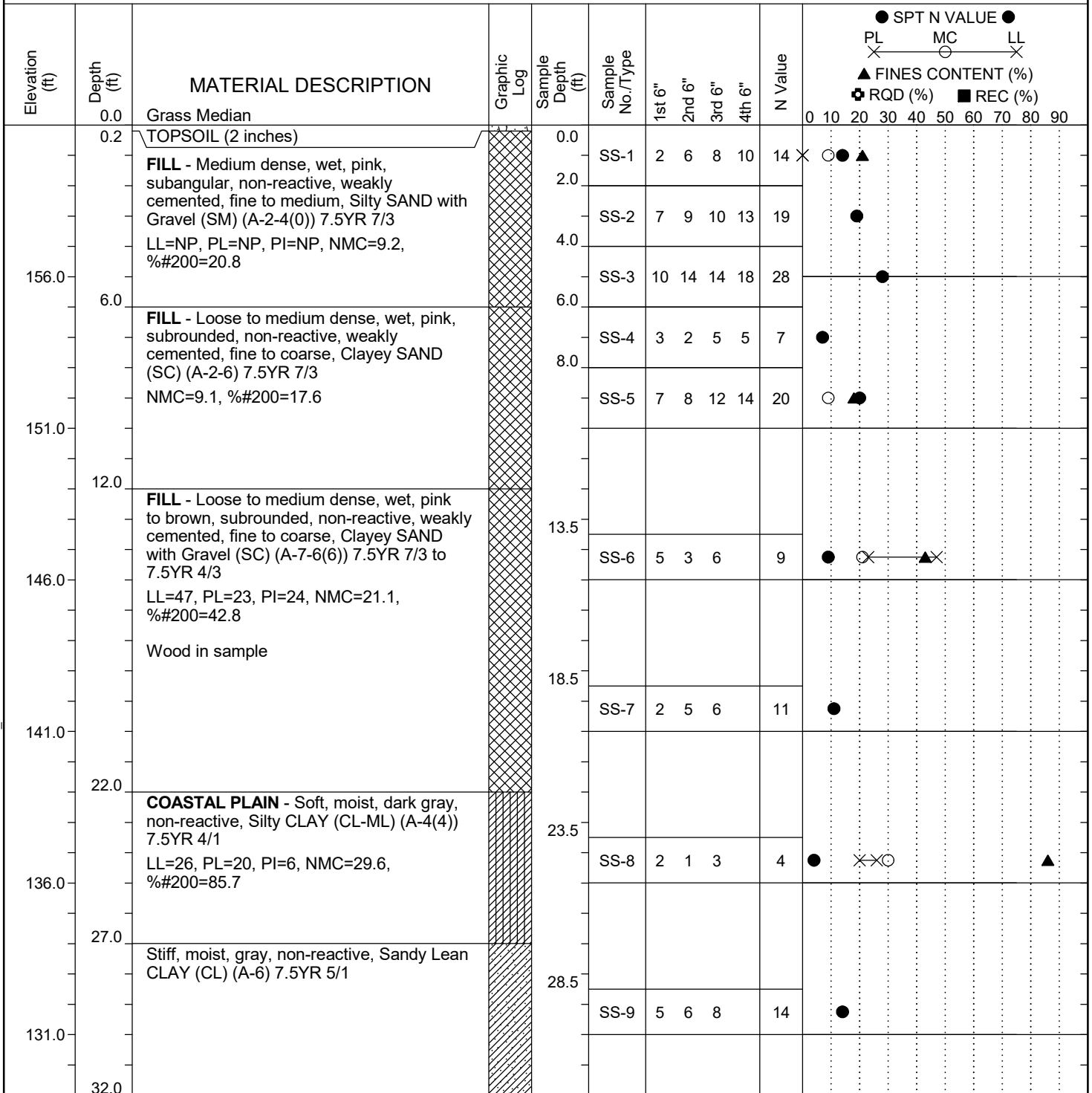
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-2
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1799+95.40	<b>Offset:</b>	17.98 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.0 ft	<b>Latitude:</b>	34.216962	<b>Longitude:</b>	-80.632389	<b>Date Started:</b>	1/5/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	34 ft



## LEGEND

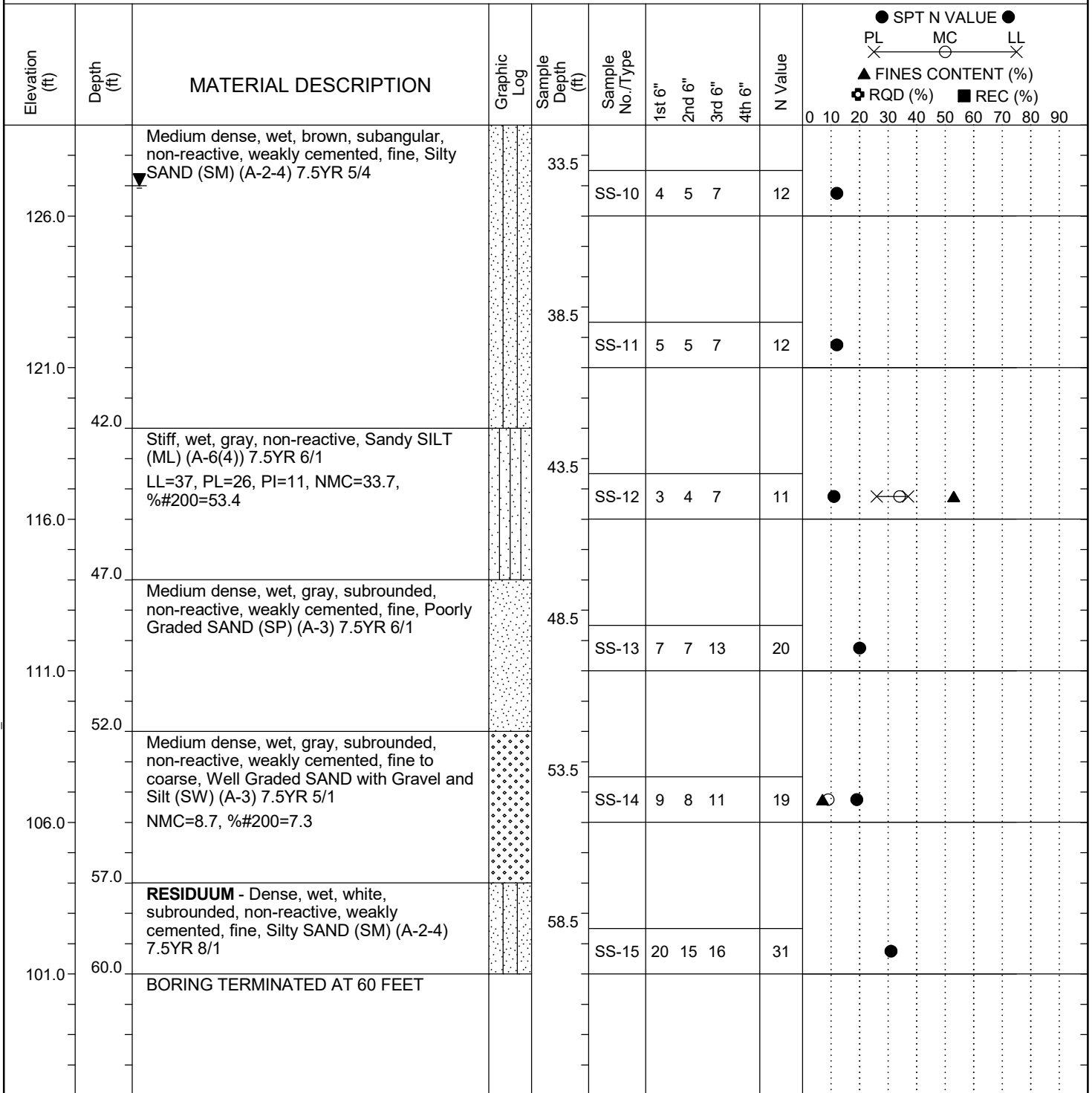
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7.321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-2
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1799+95.40	<b>Offset:</b>	17.98 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.0 ft	<b>Latitude:</b>	34.216962	<b>Longitude:</b>	-80.632389	<b>Date Started:</b>	1/5/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	34 ft



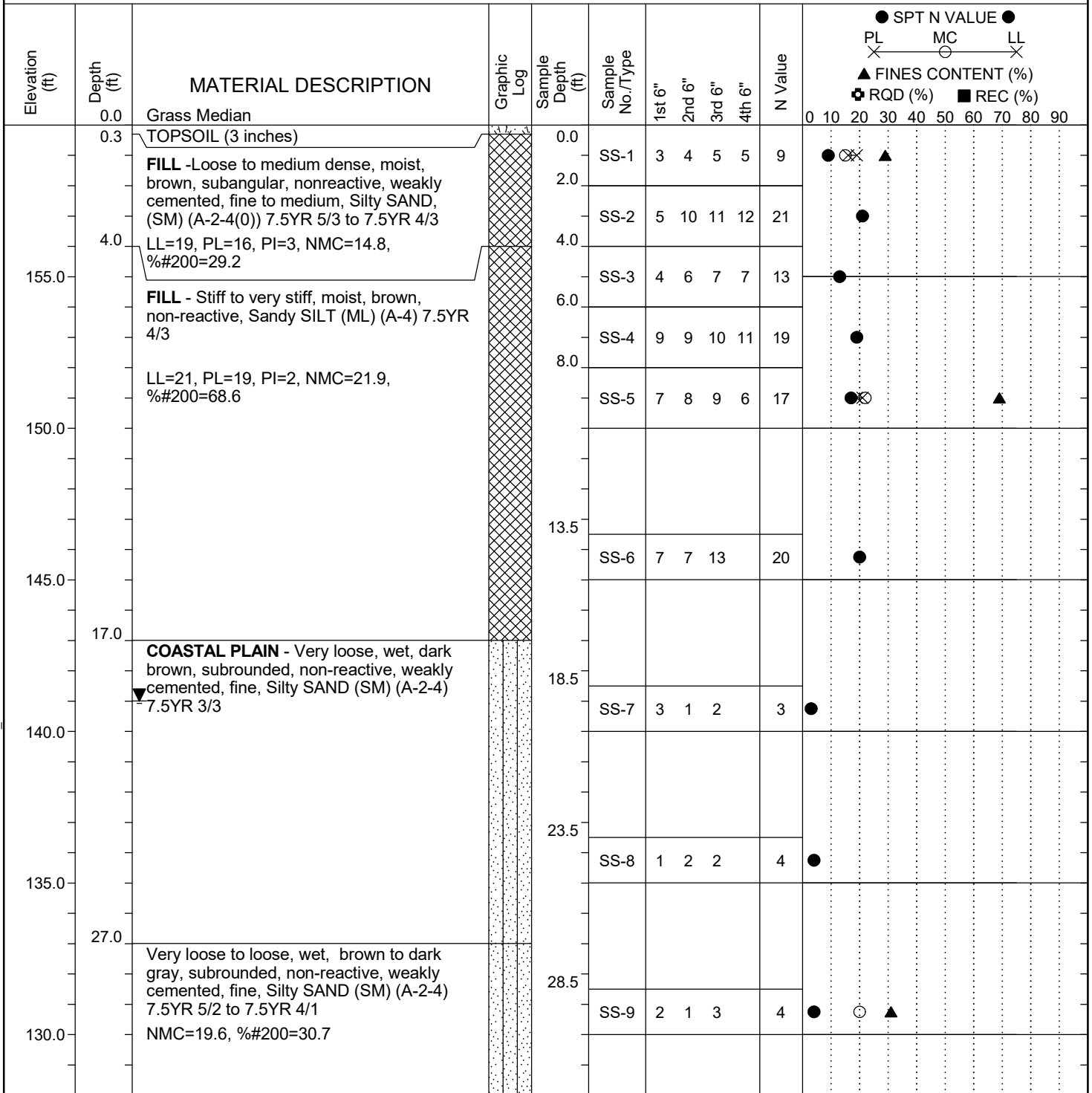
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-3
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1817+10.75	<b>Offset:</b>	13.88 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.0 ft	<b>Latitude:</b>	34.2181425	<b>Longitude:</b>	-80.626895	<b>Date Started:</b>	1/5/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	19 ft



**LEGEND**

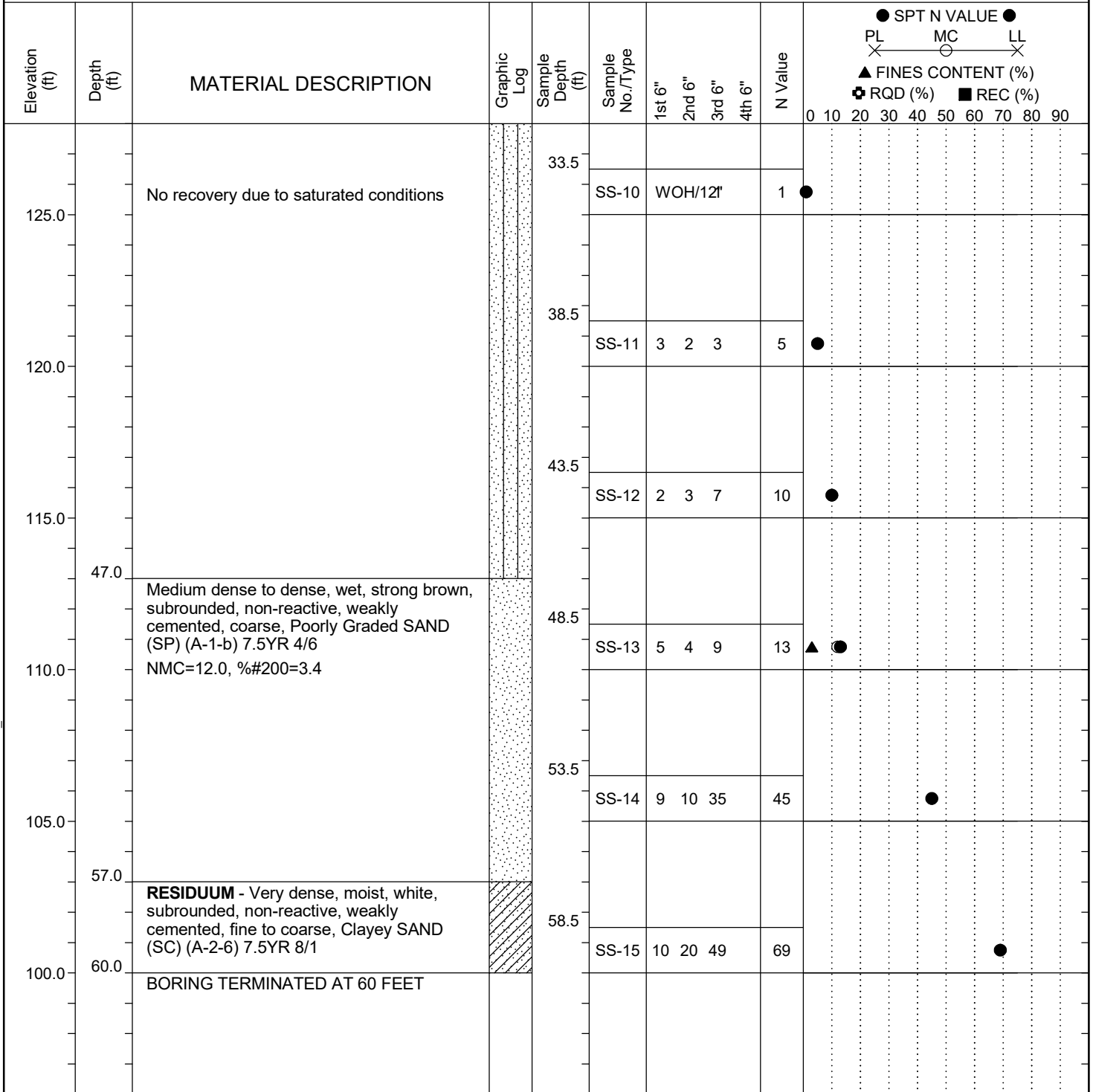
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-3
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1817+10.75	<b>Offset:</b>	13.88 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.0 ft	<b>Latitude:</b>	34.2181425	<b>Longitude:</b>	-80.626895	<b>Date Started:</b>	1/5/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	19 ft



## LEGEND

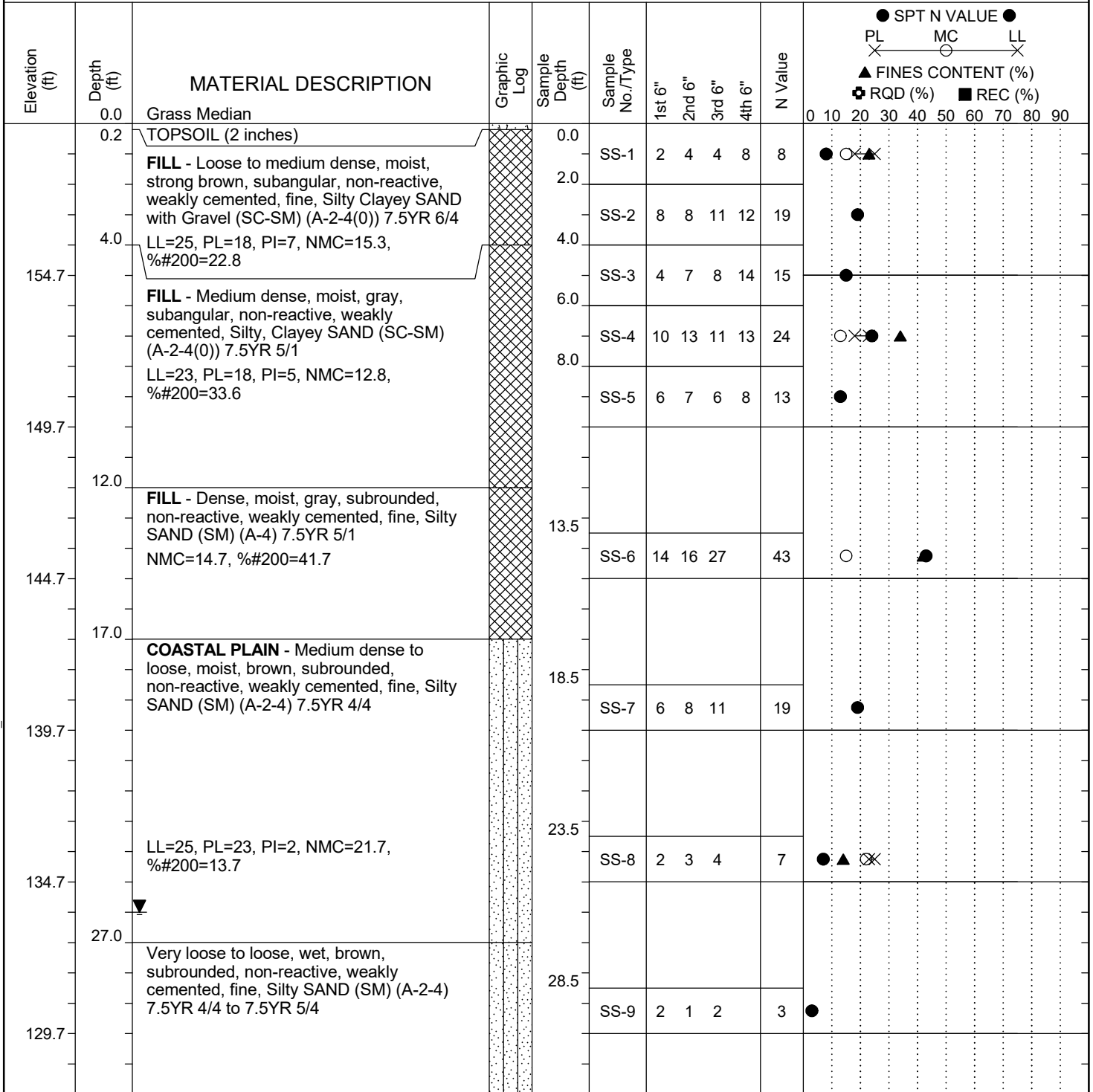
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777	<b>County:</b> Kershaw	<b>Boring No.:</b> E-4
<b>Site Description:</b> I-20 Wateree River Bridge Repairs	<b>Route:</b> I-20	
<b>Eng./Geo.:</b> LM	<b>Boring Location:</b> 1822+01.78	<b>Offset:</b> 21.15 L
<b>Alignment:</b> Existing		
<b>Elev.:</b> 159.7 ft	<b>Latitude:</b> 34.2185028	<b>Longitude:</b> -80.6253292
<b>Date Started:</b> 1/4/2022		
<b>Total Depth:</b> 60 ft	<b>Soil Depth:</b> 60 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 2/3/2022		
<b>Bore Hole Diameter (in):</b> 3	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME-45C	<b>Drill Method:</b> RW	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 91.6%		
<b>Core Size:</b> N.A.	<b>Driller:</b> ST	<b>Groundwater:</b> TOB N.M.
<b>24HR:</b> 26 ft		



## LEGEND

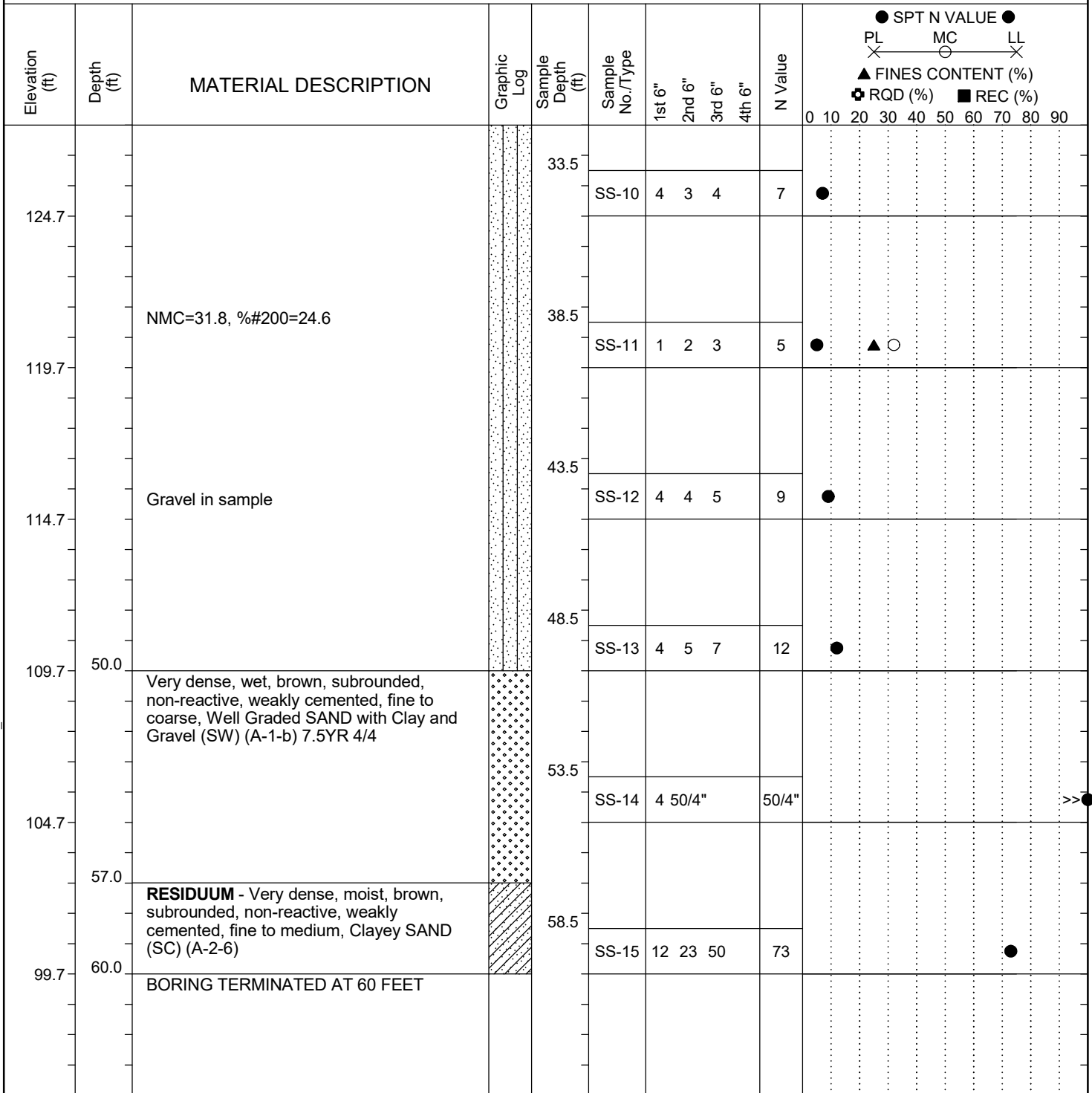
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-4
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1822+01.78	<b>Offset:</b>	21.15 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.7 ft	<b>Latitude:</b>	34.2185028	<b>Longitude:</b>	-80.6253292	<b>Date Started:</b>	1/4/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	26 ft



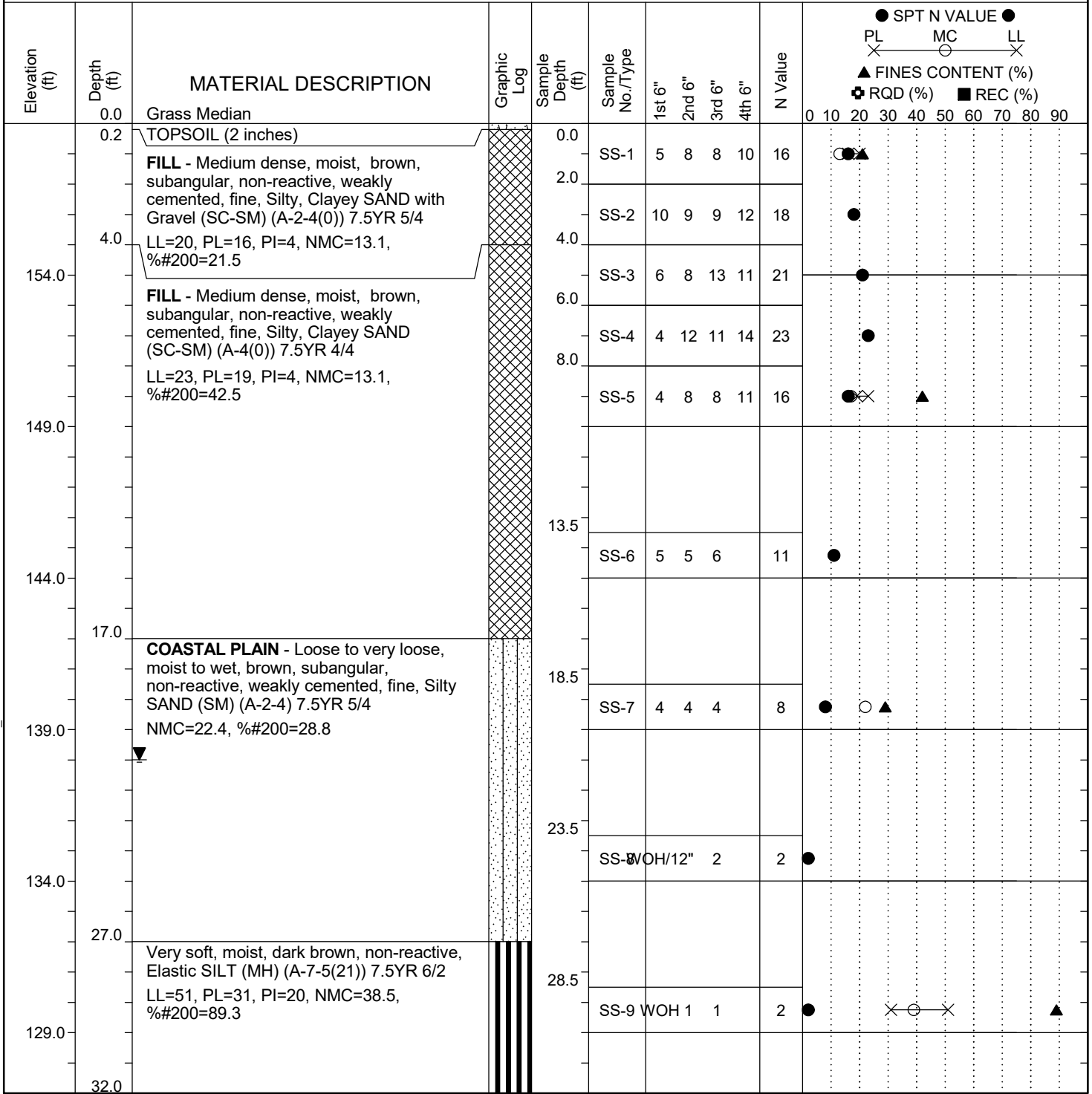
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b> P029450, P029776, P029777			<b>County:</b> Kershaw		<b>Boring No.:</b> E-5	
<b>Site Description:</b> I-20 Wateree River Bridge Repairs				<b>Route:</b> I-20		
<b>Eng./Geo.:</b> LM		<b>Boring Location:</b> 1827+06.23		<b>Offset:</b> 20.34 L	<b>Alignment:</b> Existing	
<b>Elev.:</b> 159.0 ft	<b>Latitude:</b> 34.2188516		<b>Longitude:</b> -80.6237139		<b>Date Started:</b> 1/4/2022	
<b>Total Depth:</b> 60 ft		<b>Soil Depth:</b> 60 ft		<b>Core Depth:</b> 0 ft	<b>Date Completed:</b> 2/3/2022	
<b>Bore Hole Diameter (in):</b> 3		<b>Sampler Configuration</b>		<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME-45C		<b>Drill Method:</b> RW		<b>Hammer Type:</b> Automatic		<b>Energy Ratio:</b> 91.6%
<b>Core Size:</b> N.A.		<b>Driller:</b> ST		<b>Groundwater:</b> TOB N.M.		<b>24HR:</b> 21 ft



**LEGEND**

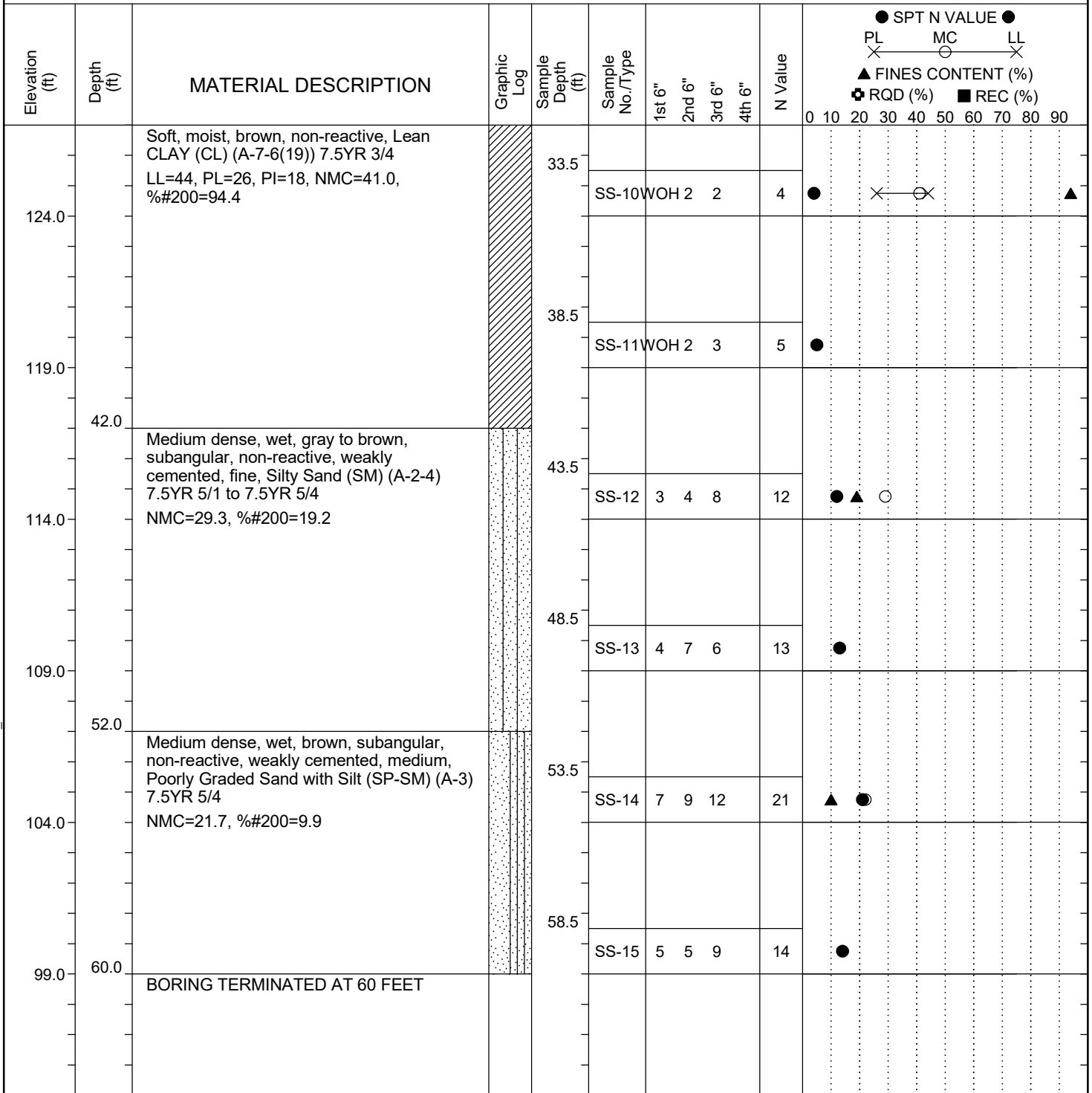
*Continued Next Page*

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	E-5
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1827+06.23	<b>Offset:</b>	20.34 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.0 ft	<b>Latitude:</b>	34.2188516	<b>Longitude:</b>	-80.6237139	<b>Date Started:</b>	1/4/2022
<b>Total Depth:</b>	60 ft	<b>Soil Depth:</b>	60 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	2/3/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	ST	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	21 ft



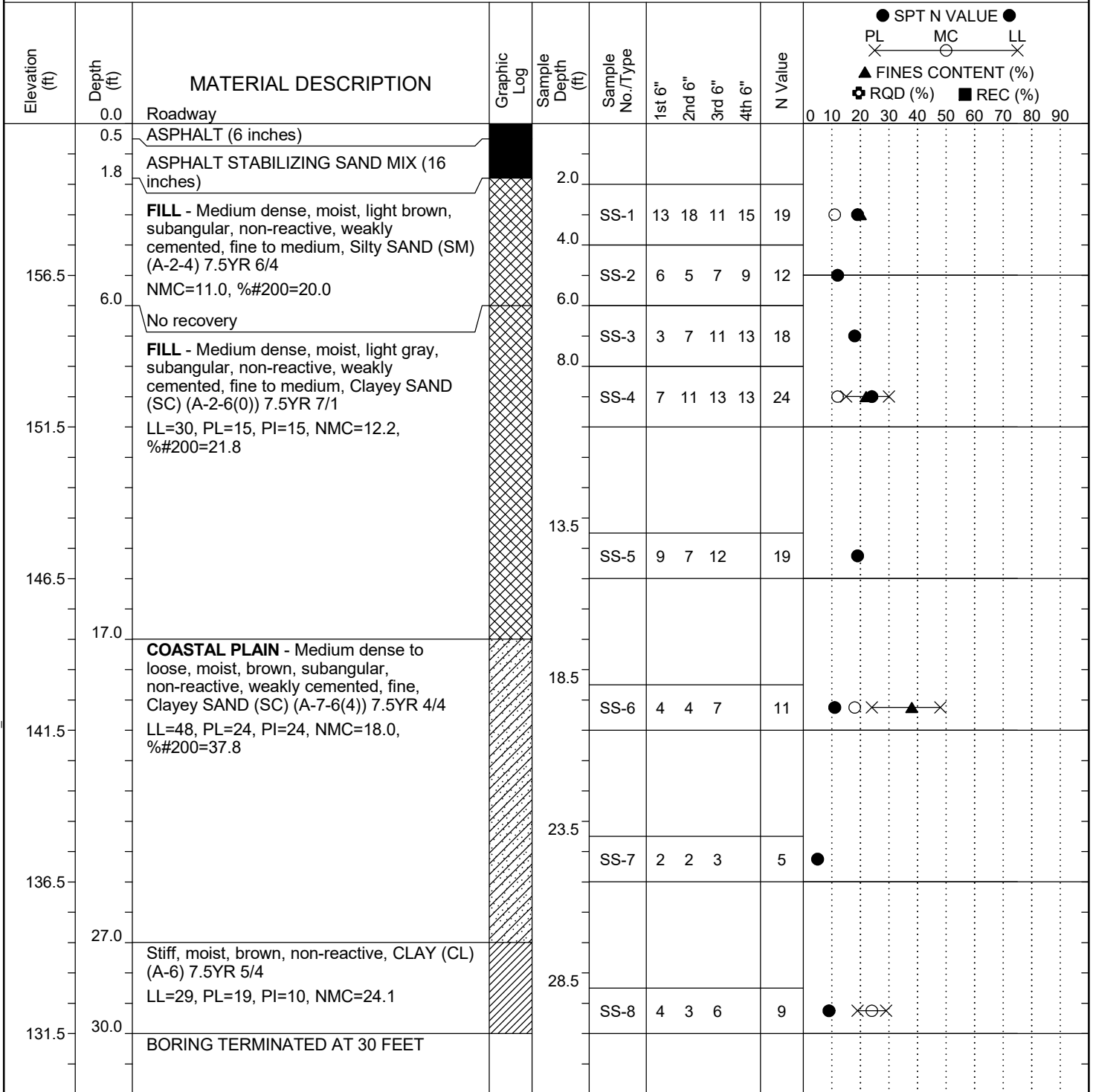
## LEGEND

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

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-1
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1794+97.55	<b>Offset:</b>	49.91 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.5 ft	<b>Latitude:</b>	34.2167013	<b>Longitude:</b>	-80.6340092	<b>Date Started:</b>	1/31/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/31/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



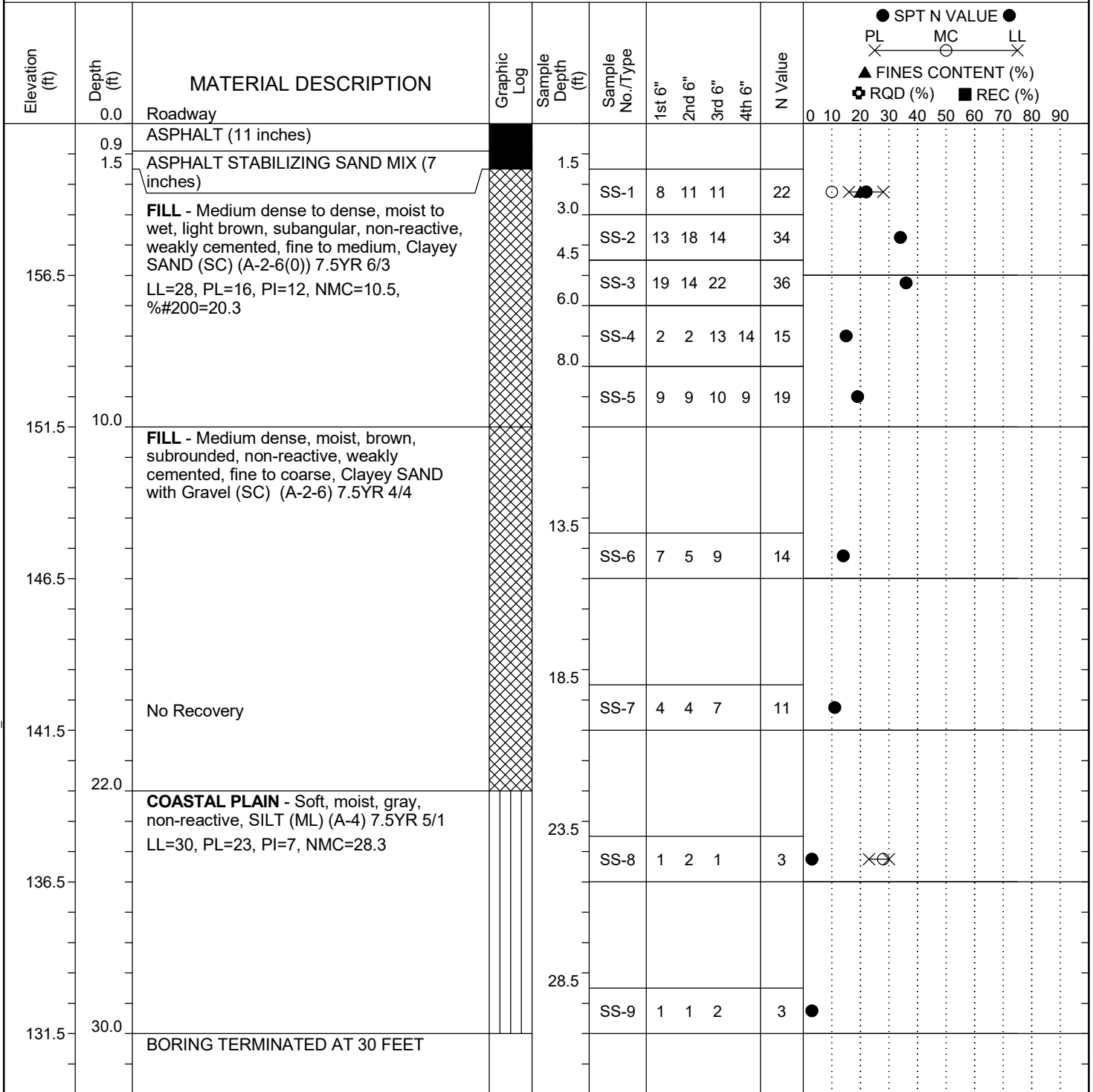
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-2
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1794+96.29	<b>Offset:</b>	49.2 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.5 ft	<b>Latitude:</b>	34.2164366	<b>Longitude:</b>	-80.6339303	<b>Date Started:</b>	1/12/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/12/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



## LEGEND

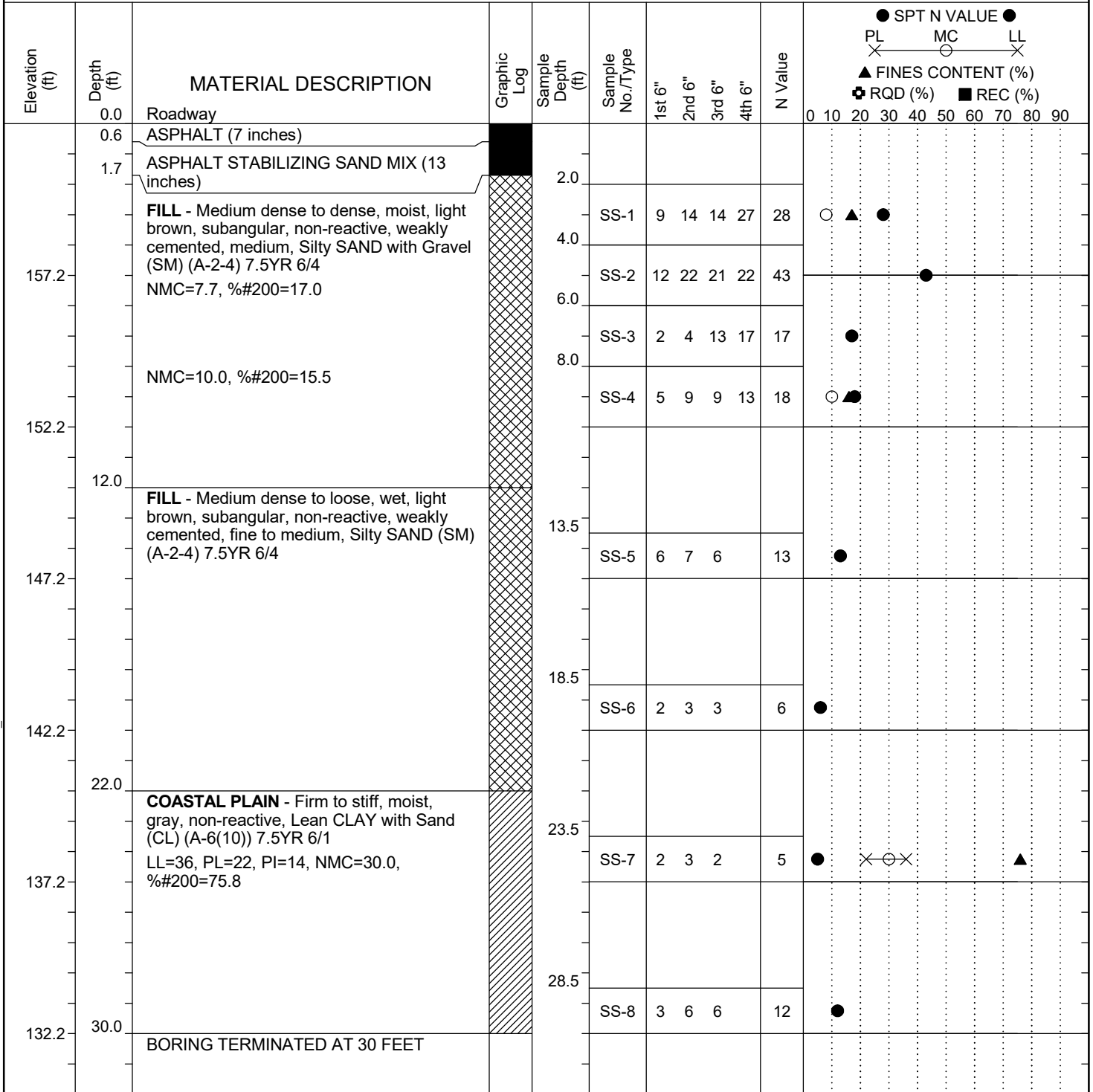
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-3
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1799+98.62	<b>Offset:</b>	49.69 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	162.2 ft	<b>Latitude:</b>	34.2170485	<b>Longitude:</b>	-80.6324052	<b>Date Started:</b>	1/31/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/31/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



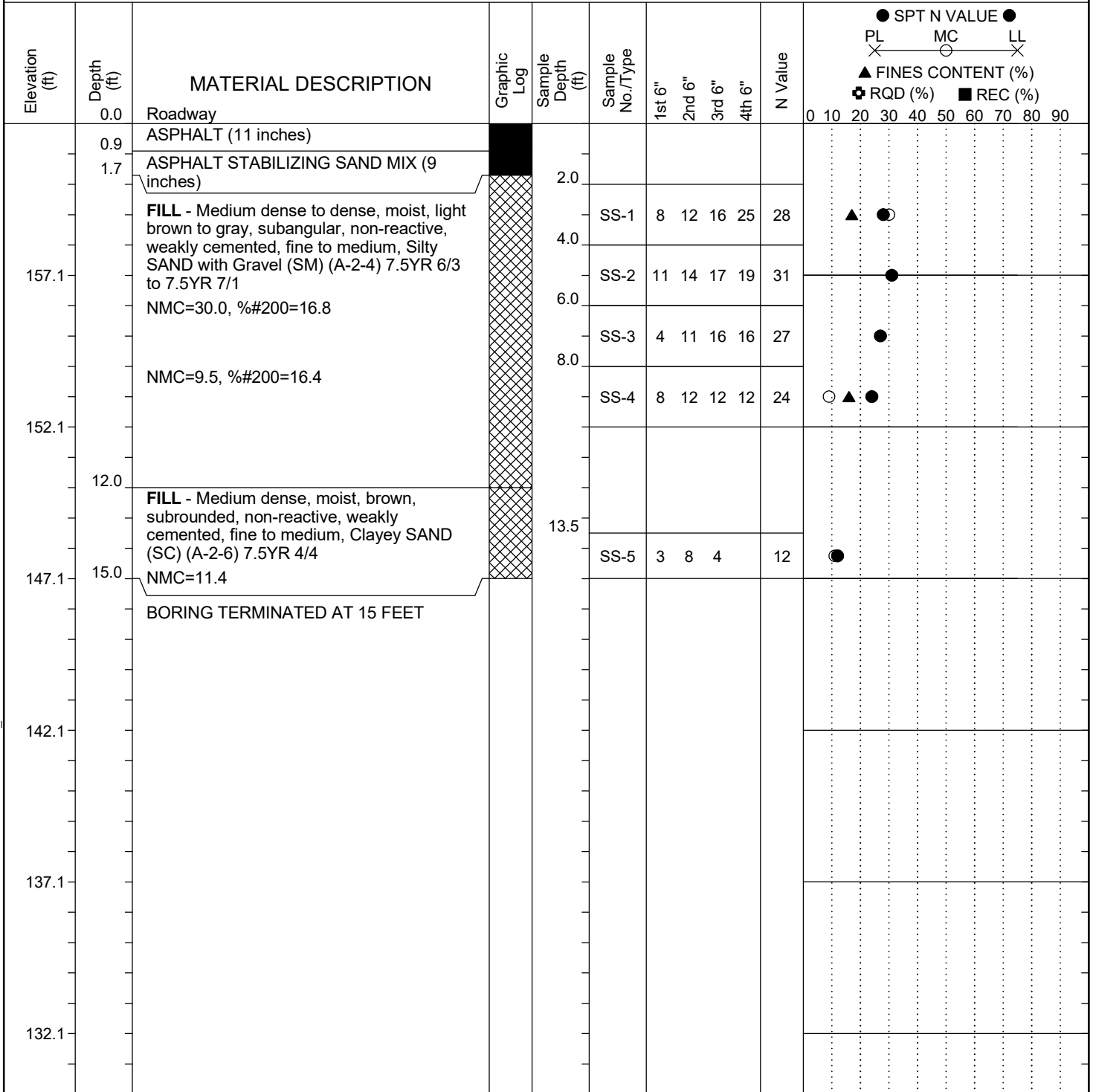
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-4
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1800+00.91	<b>Offset:</b>	49.12 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	162.1 ft	<b>Latitude:</b>	34.2167874	<b>Longitude:</b>	-80.6323152	<b>Date Started:</b>	1/12/2022
<b>Total Depth:</b>	15 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/12/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



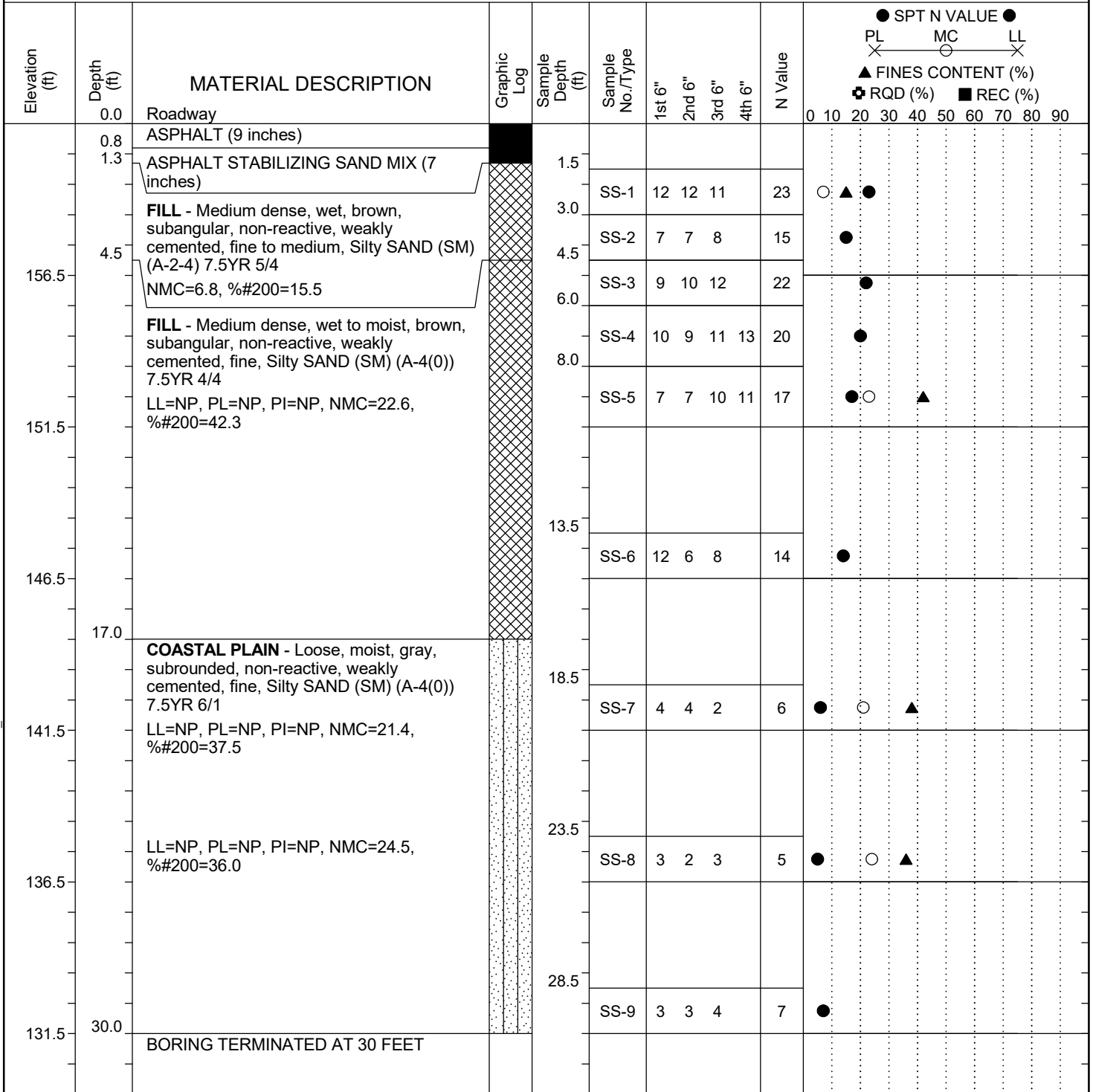
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-5
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1817+05.64	<b>Offset:</b>	47.97 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.5 ft	<b>Latitude:</b>	34.2182296	<b>Longitude:</b>	-80.6269398	<b>Date Started:</b>	1/31/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/31/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



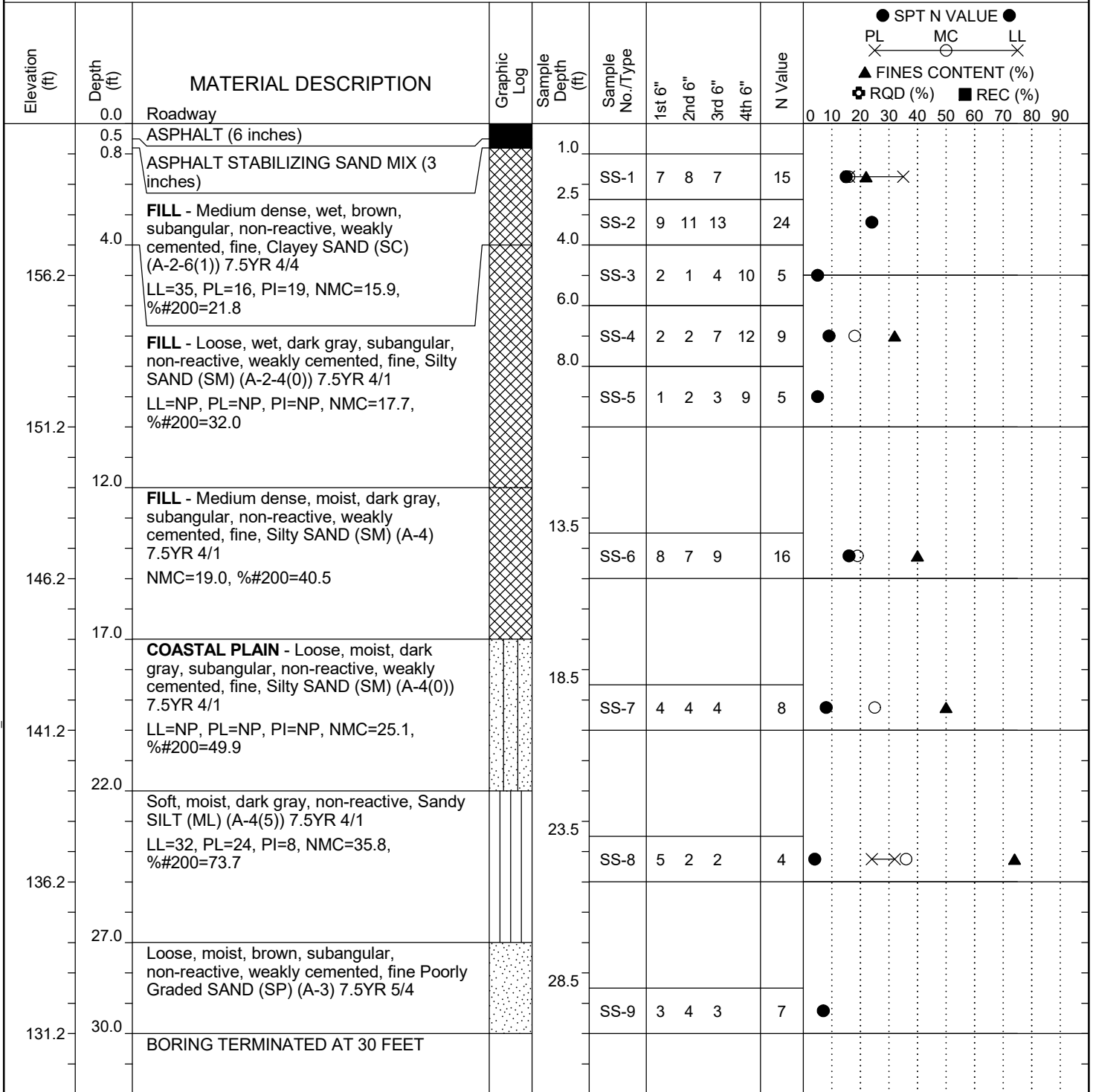
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-6
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1817+05.28	<b>Offset:</b>	48.45 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	161.2 ft	<b>Latitude:</b>	34.217973	<b>Longitude:</b>	-80.6268604	<b>Date Started:</b>	1/24/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/24/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



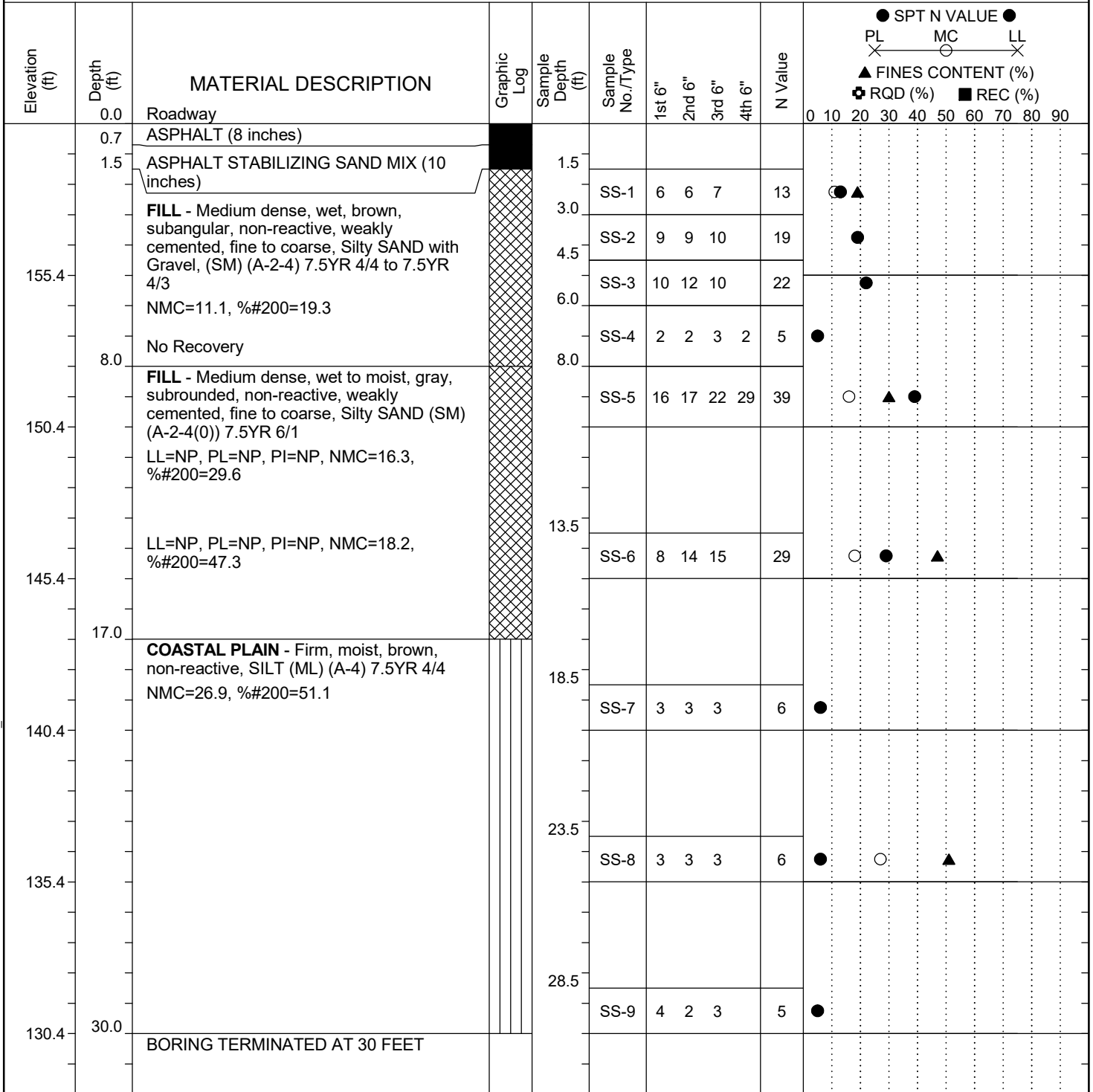
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-7
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1822+13.27	<b>Offset:</b>	48.3 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.4 ft	<b>Latitude:</b>	34.218583	<b>Longitude:</b>	-80.6253152	<b>Date Started:</b>	1/30/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/30/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



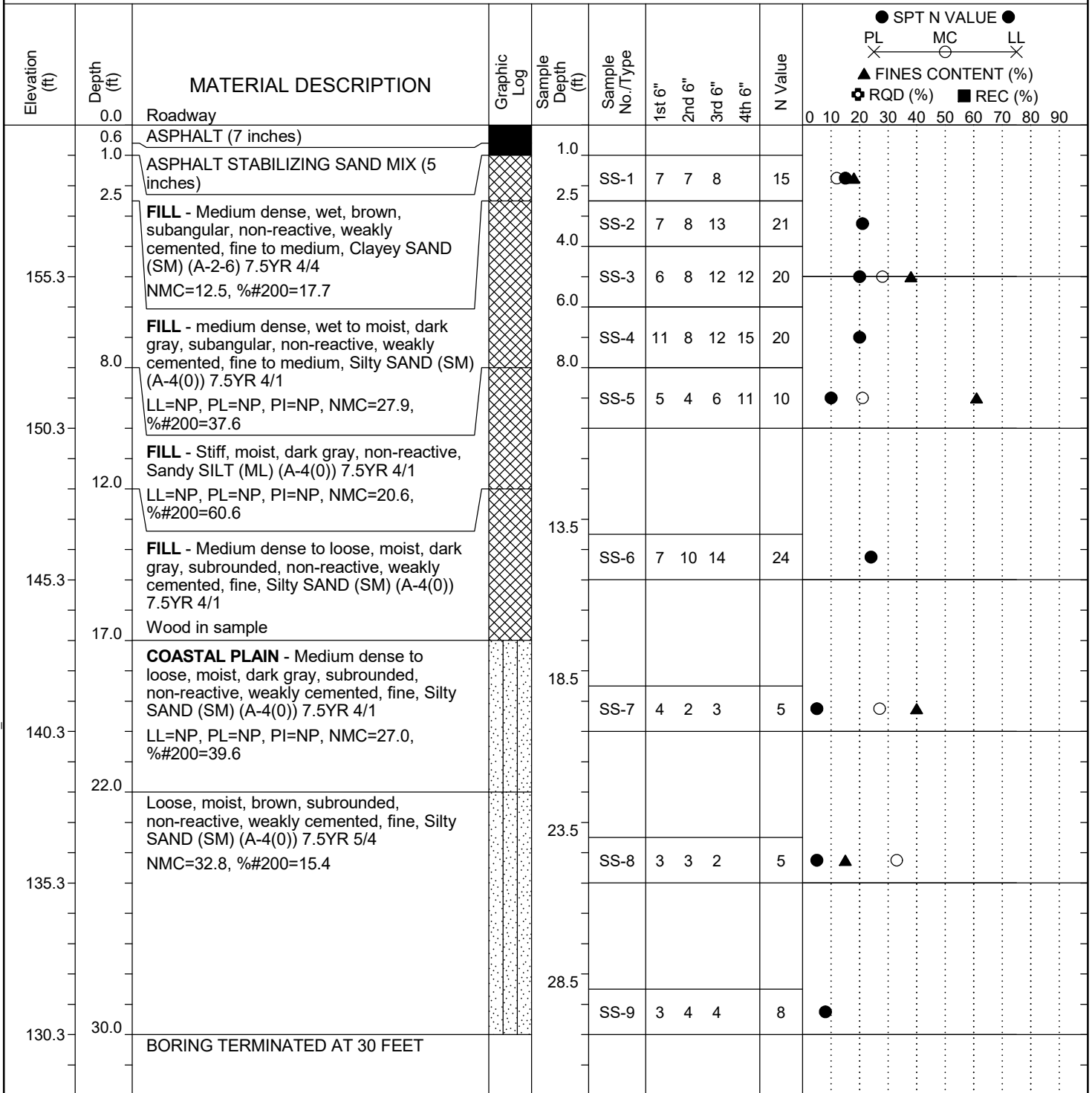
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-8
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1822+11.91	<b>Offset:</b>	48.55 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	160.3 ft	<b>Latitude:</b>	34.2183245	<b>Longitude:</b>	-80.6252386	<b>Date Started:</b>	1/24/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/24/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB	N.M.	24HR



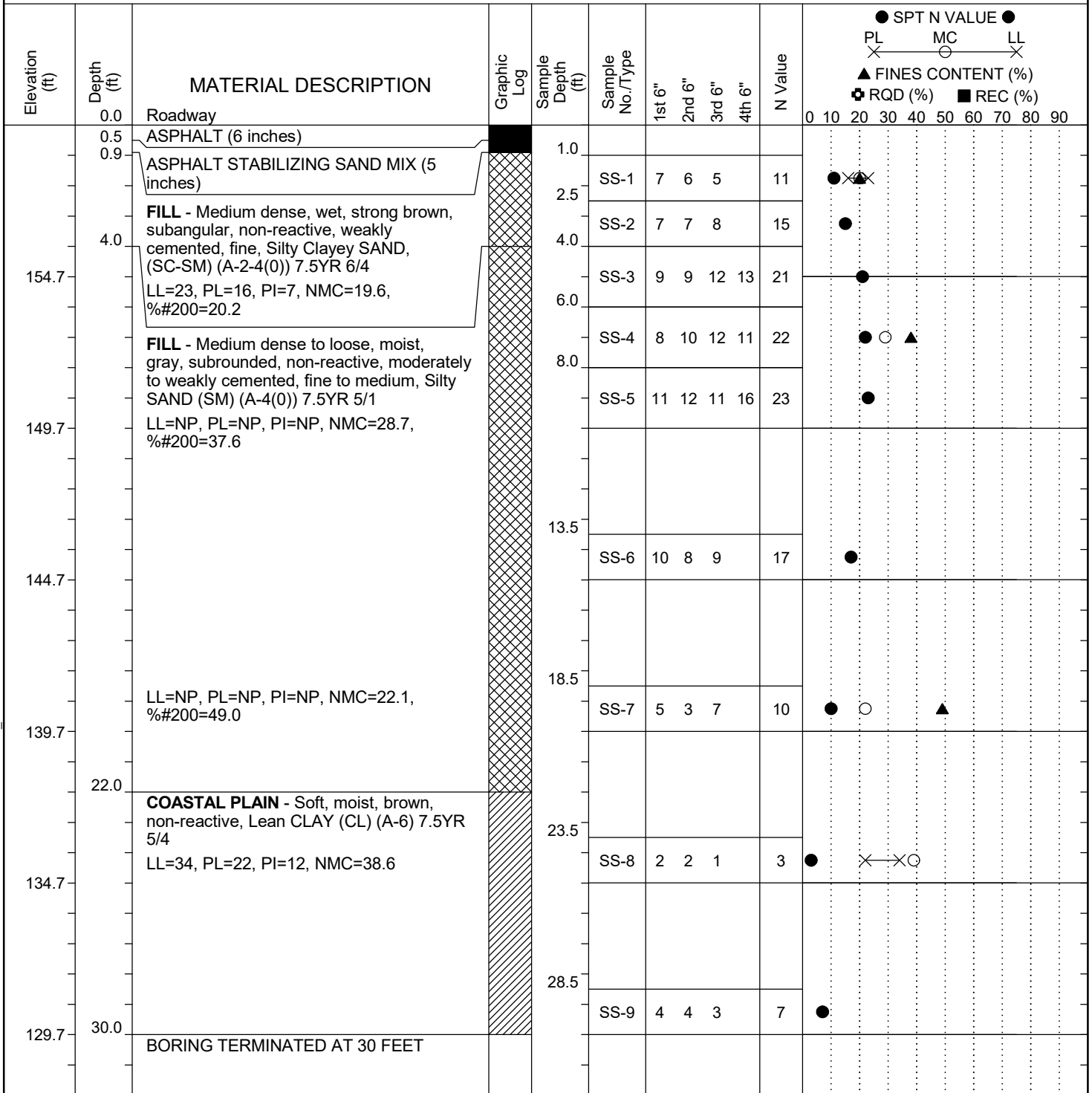
## LEGEND

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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-10
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1827+14.26	<b>Offset:</b>	47.89 R	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.7 ft	<b>Latitude:</b>	34.2186751	<b>Longitude:</b>	-80.6236312	<b>Date Started:</b>	1/30/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/30/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



## LEGEND

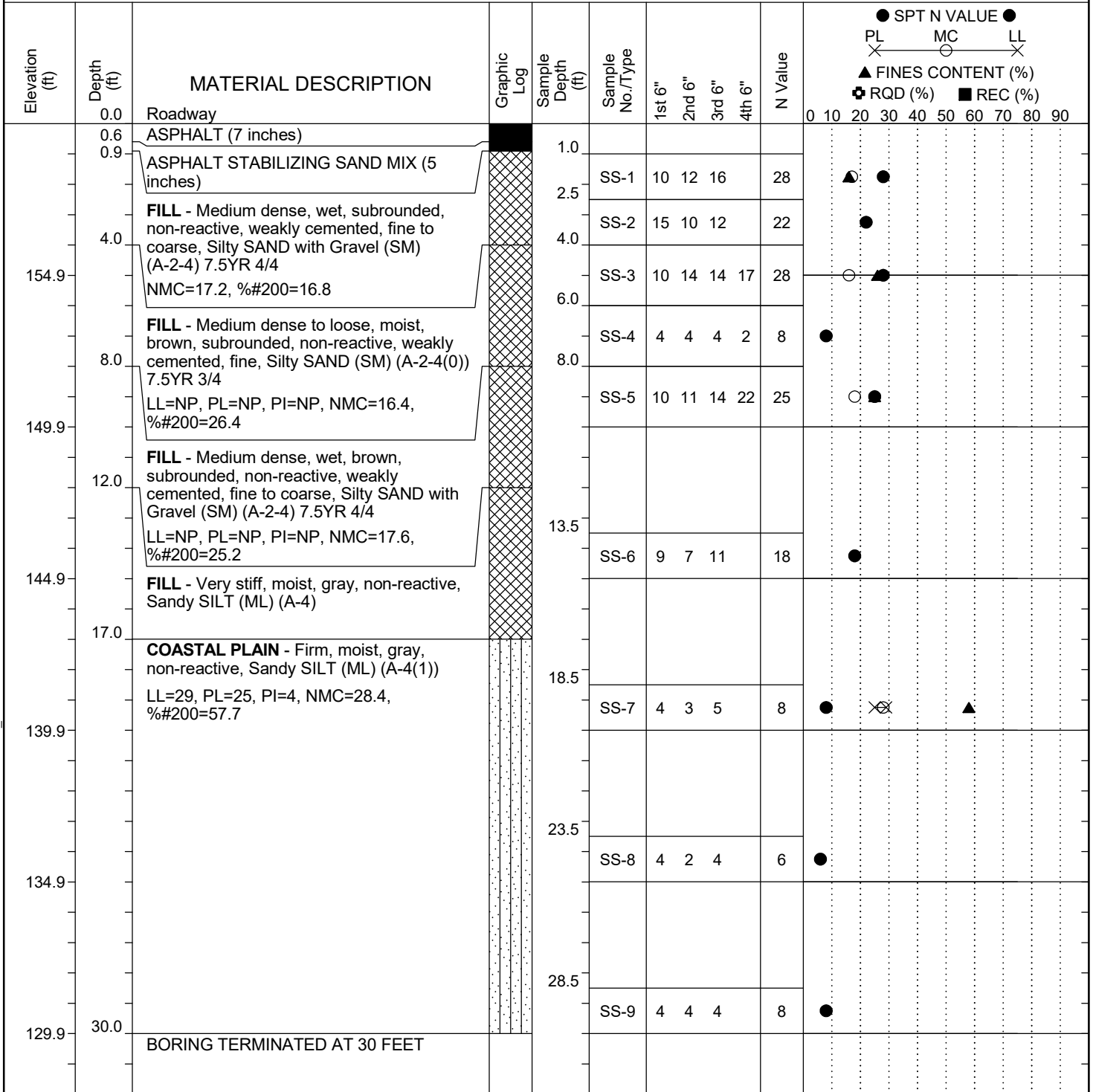
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22



# SCDOT Soil Test Log

<b>Project ID:</b>	P029450, P029776, P029777			<b>County:</b>	Kershaw	<b>Boring No.:</b>	R-9
<b>Site Description:</b>	I-20 Wateree River Bridge Repairs					<b>Route:</b>	I-20
<b>Eng./Geo.:</b>	LM	<b>Boring Location:</b>	1827+17.66	<b>Offset:</b>	49.32 L	<b>Alignment:</b>	Existing
<b>Elev.:</b>	159.9 ft	<b>Latitude:</b>	34.218936	<b>Longitude:</b>	-80.6237016	<b>Date Started:</b>	1/30/2022
<b>Total Depth:</b>	30 ft	<b>Soil Depth:</b>	30 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	1/30/2022
<b>Bore Hole Diameter (in):</b>	3	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME-45C	<b>Drill Method:</b>	RW	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	91.6%
<b>Core Size:</b>	N.A.	<b>Driller:</b>	CC	<b>Groundwater:</b>	TOB N.M.	<b>24HR</b>	N.M.



## 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\_7321P043A\_SCDOT\_I-20\_WATEREE\_RIVER\_BRIDGE\_REPAIRS.GPJ\_SCDOT\_DATATEMPLATE.GDT\_5/6/22

# CPT LOG NO. CPT-1

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

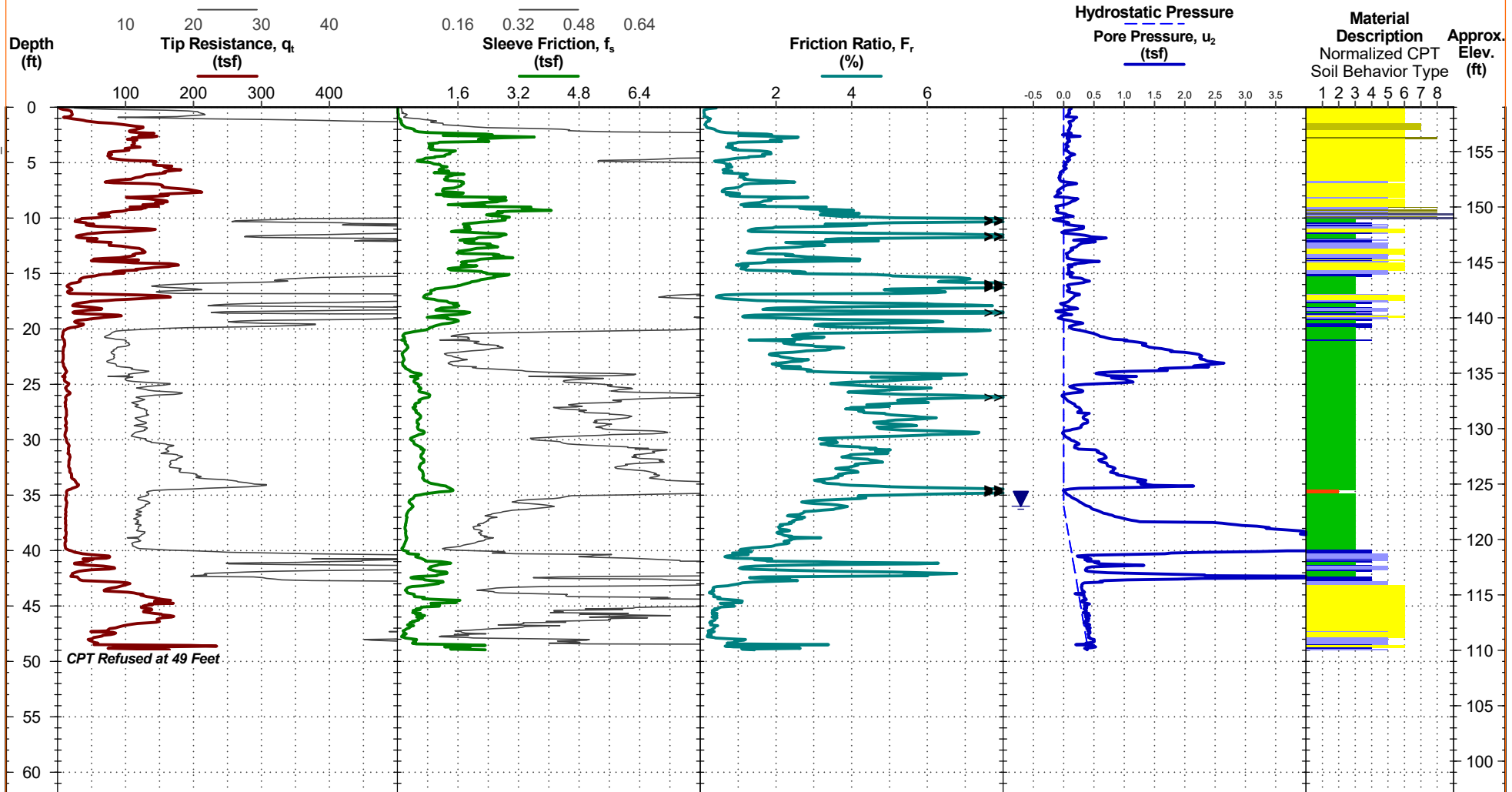
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-

LL: 34.21654°, -80.63394° Station: 1795+03.87

NE: 2110648.69,867289.8 Offset: 10.98 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREEE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 36 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/15/2021

Rig: GP477

Project No.: 7321P043A

CPT Completed: 12/15/2021

Operator: RF

# CPT LOG NO. CPT-2

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

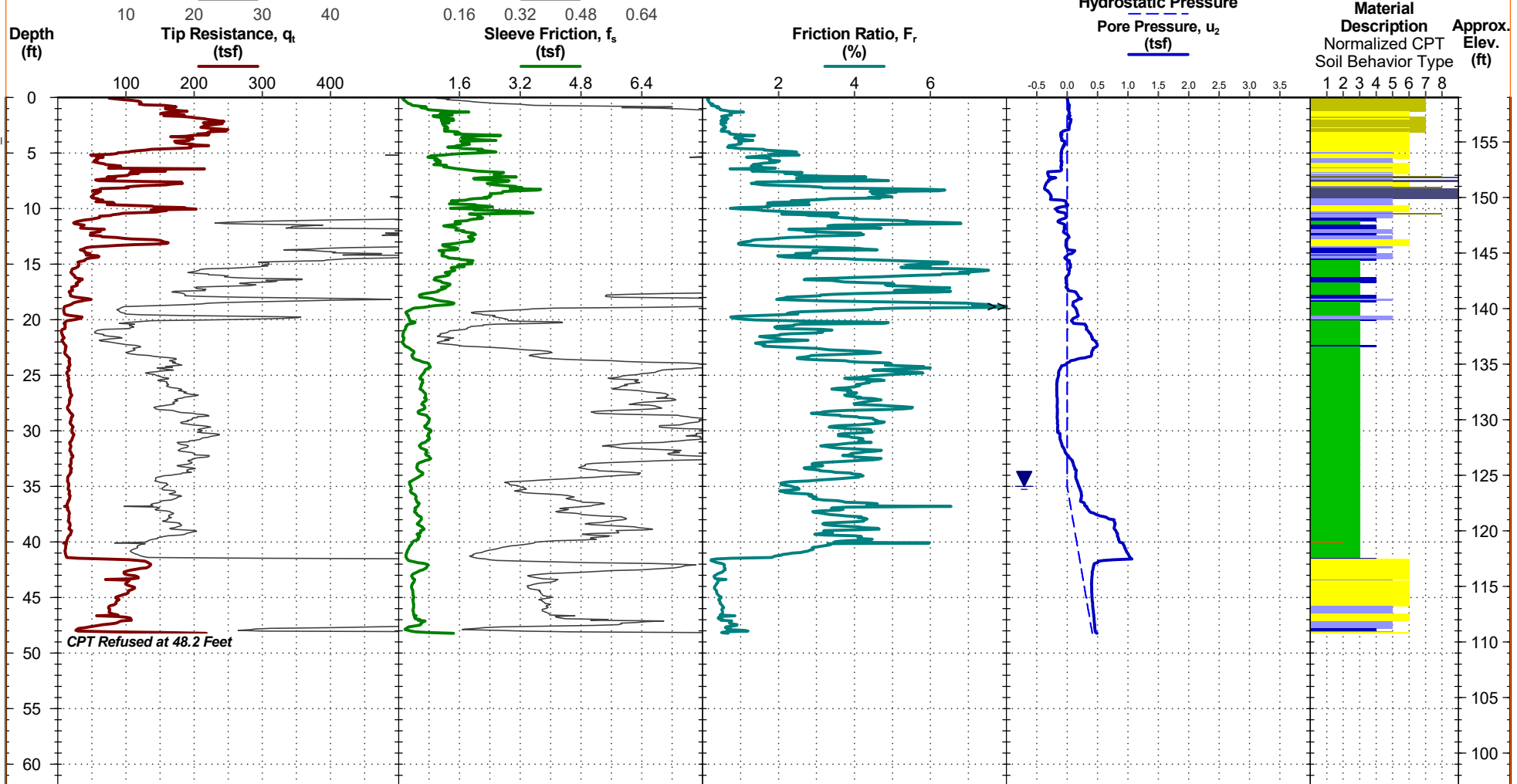
**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-

LL: 34.21675°, -80.63299° Station: 1979+99.12

NE: 2110933.66, 867367.03 Offset: 9.34 - R



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREEE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22

**WATER LEVEL OBSERVATION**

▼ 35 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/15/2021

Rig: GP477

Project No.: 7321P043A

CPT Completed: 12/15/2021

Operator: RF

# CPT LOG NO. CPT-3

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

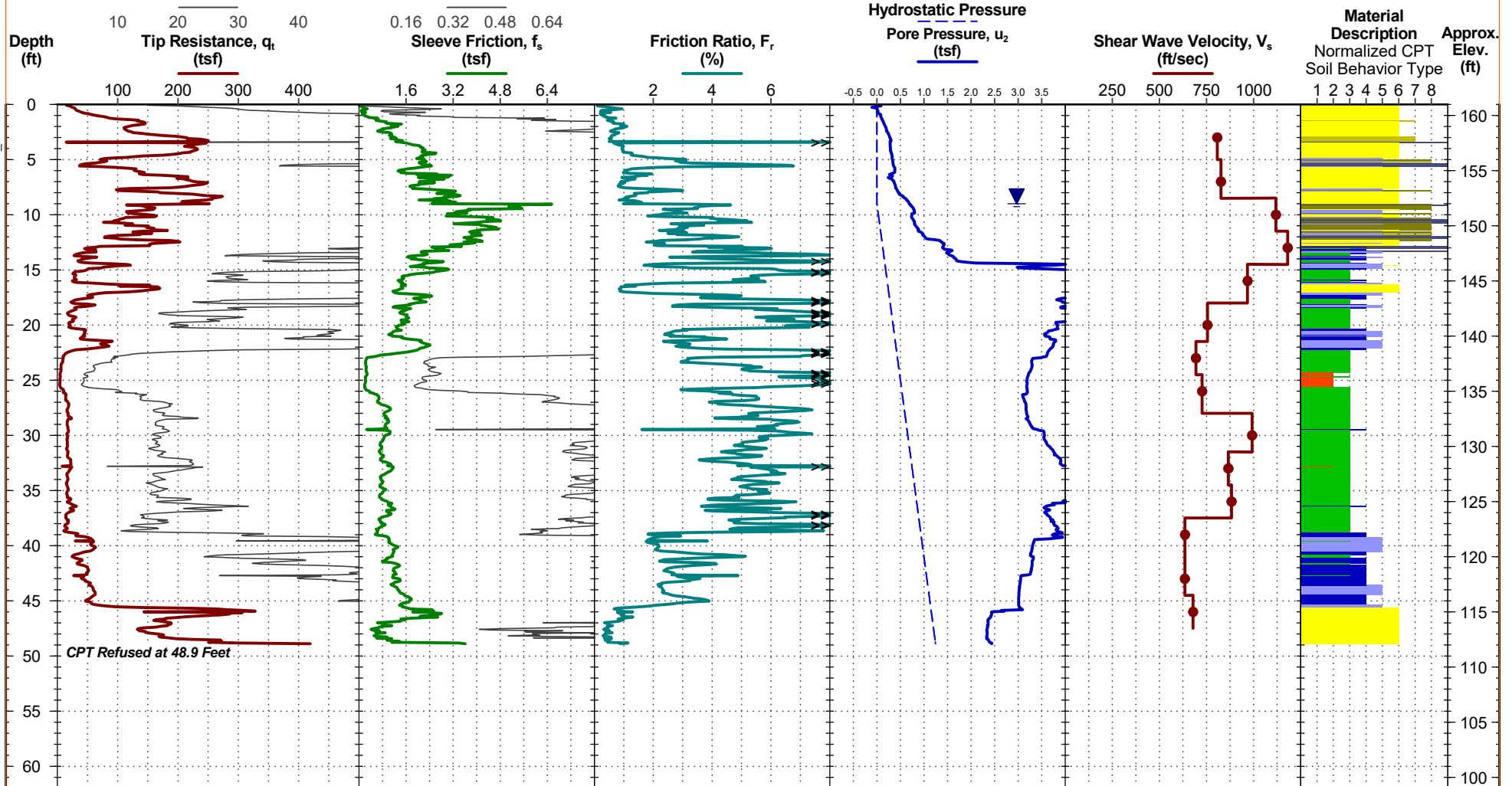
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161 ft +/-

LL: 34.21701°, -80.63215° Station: 1800+67.93

NE: 211187.07, 867460.15 Offset: 15.76 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATEREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 9 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/4/2022

Rig: GP477

Project No.: 7321P043A

CPT Completed: 1/4/2022

Operator: RF

# CPT LOG NO. CPT-4

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

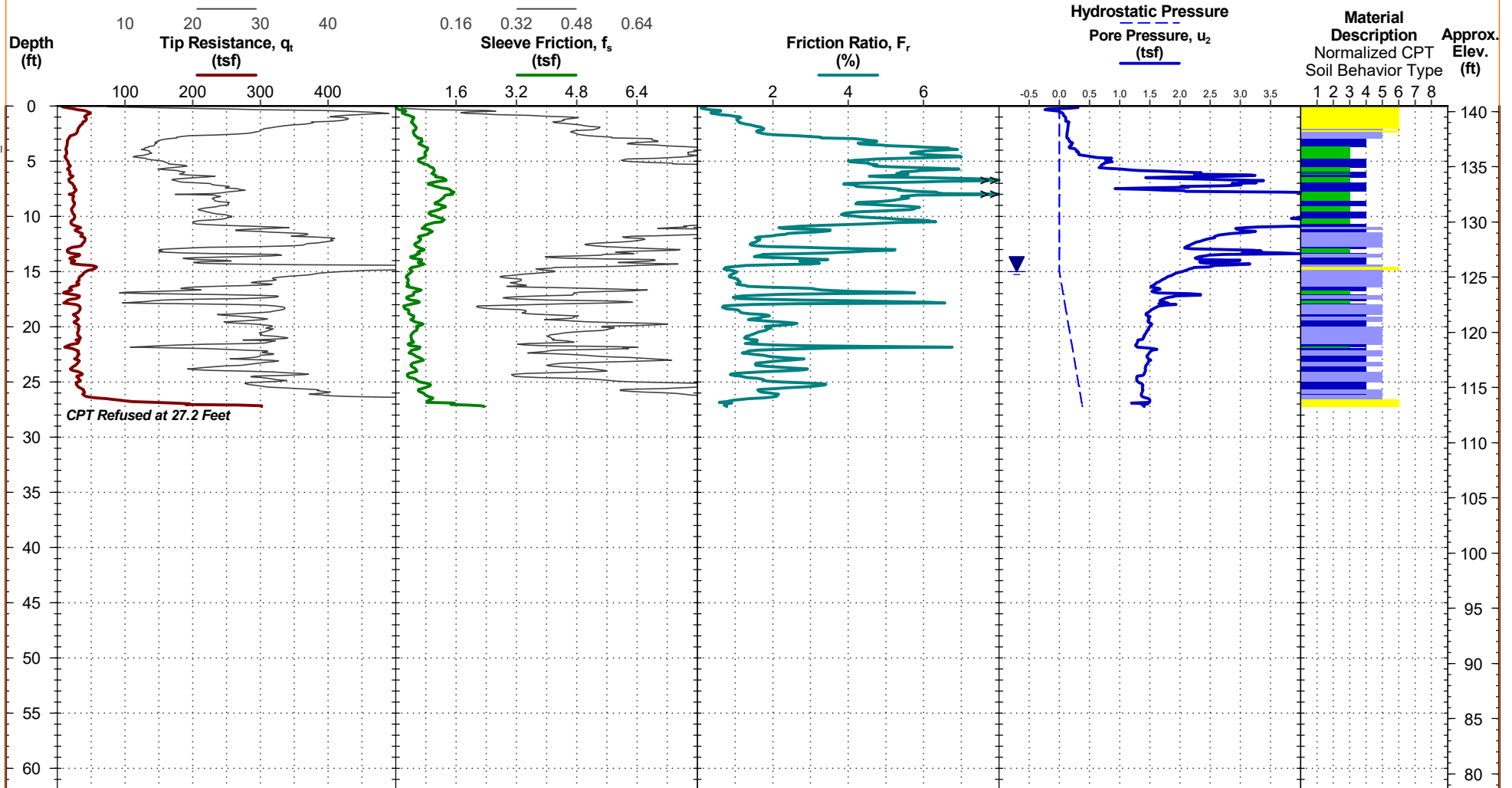
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 140.5 ft +/-

LL: 34.21726°, -80.63166° Station: 1802+36.87

NE: 2111336.82, 867554.57 Offset: 68.65 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 15 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/17/2021

Rig: GP477

Project No.: 7321P043A

CPT Completed: 12/17/2021

Operator: RF

# CPT LOG NO. CPT-5

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

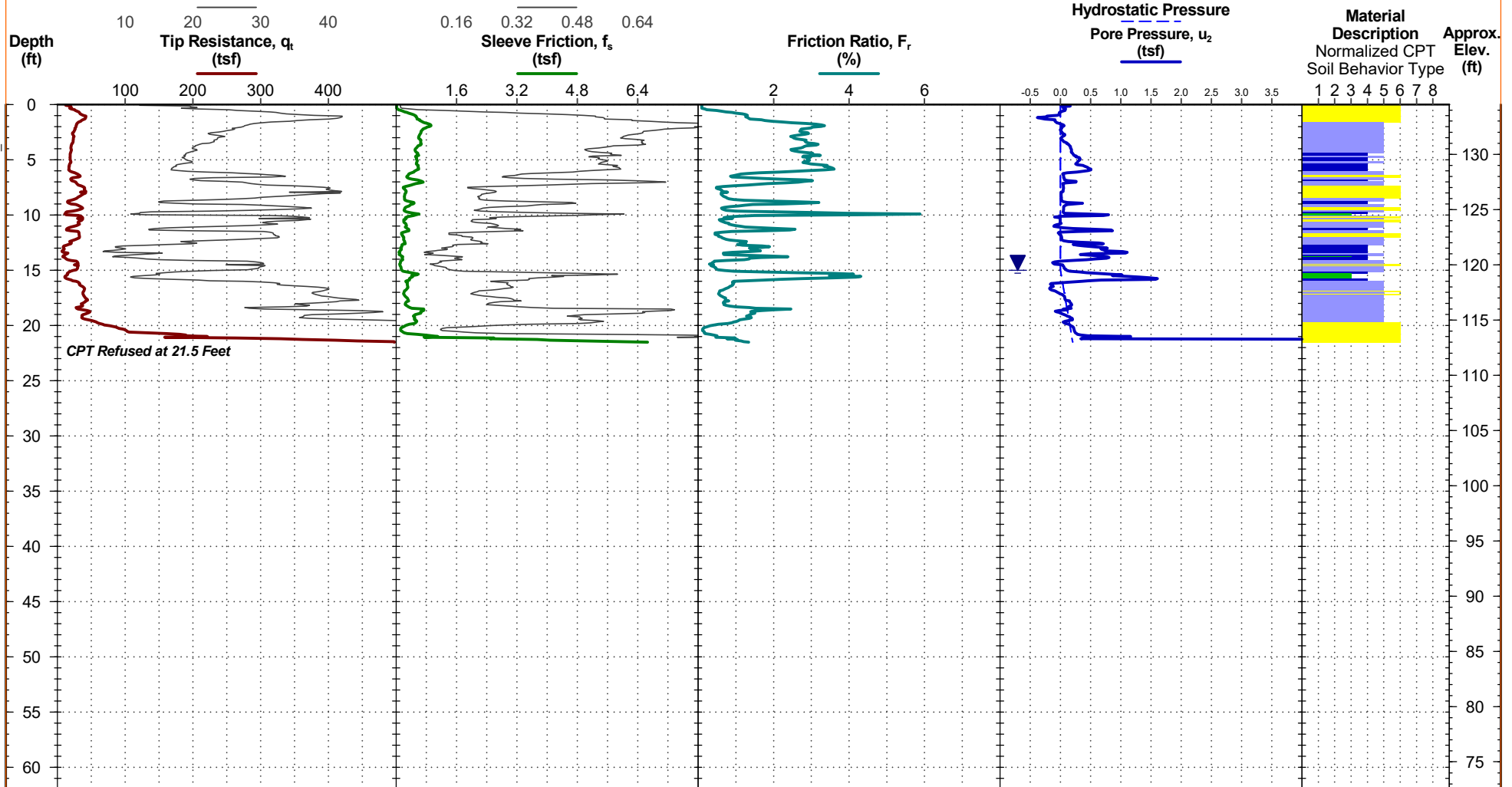
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 134.5 ft +/-

LL: 34.217°,-80.63106° Station: 1803+86.24

NE: 2111517,867457.77 Offset: 71.08 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

<b>WATER LEVEL OBSERVATION</b>	Probe no. 5384 with net area ratio of .862 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 1/27/2021 Tip and sleeve areas of 10 cm <sup>2</sup> and 150 cm <sup>2</sup> Ring friction reducer with O.D. of 2 in	<p>521 Clemson Rd Columbia, SC</p>	CPT Started: 12/17/2021 Rig: GP477 Project No.: 7321P043A	CPT Completed: 12/17/2021 Operator: RF
▼ 15 ft measured water depth (used in normalizations and correlations)				

# CPT LOG NO. CPT-6

**PROJECT:** I-20 Wateree River Bridge Repairs

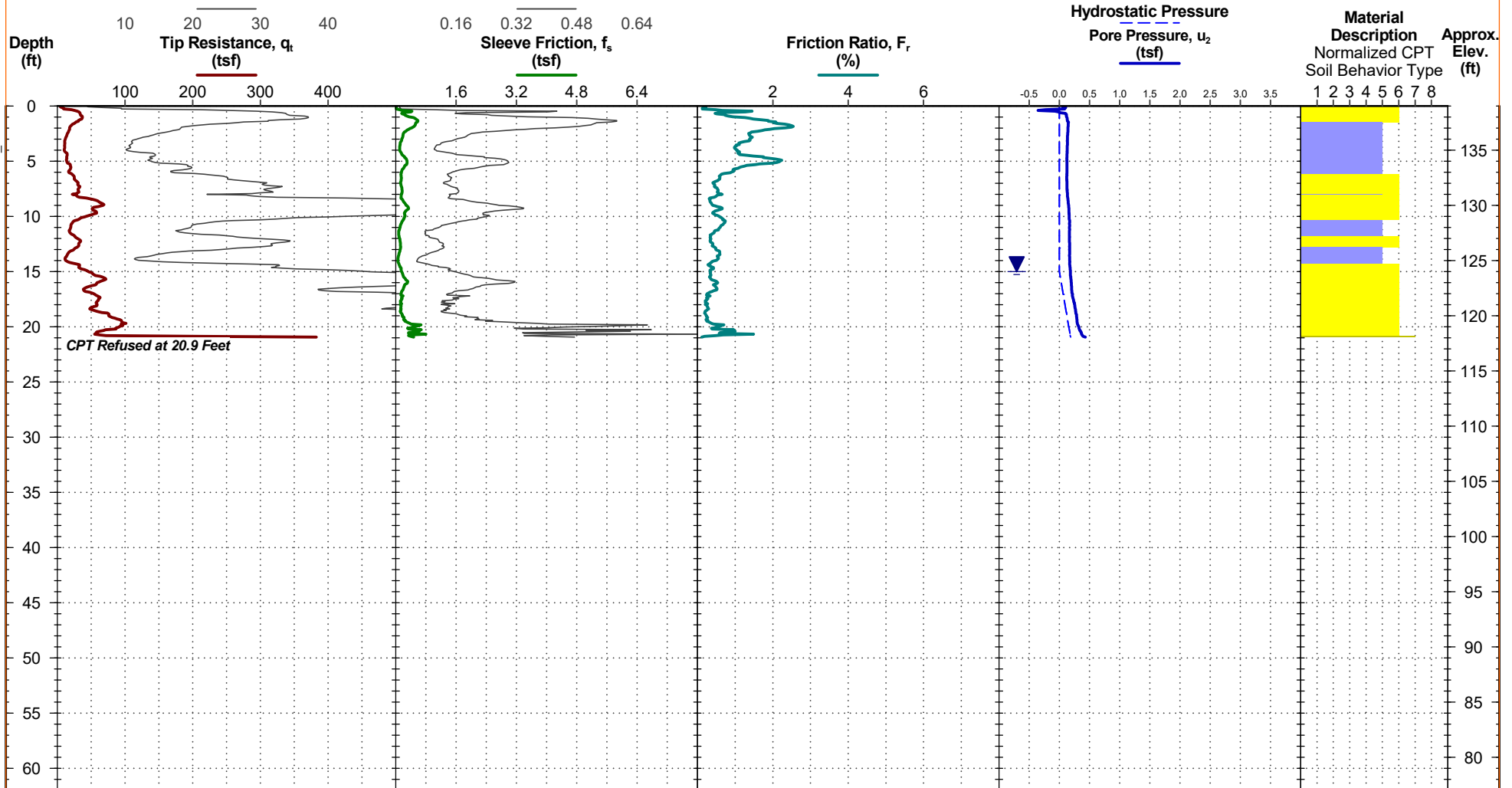
**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 139 ft +/-  
LL: 34.21787°, -80.62893° Station: 1810+90.55  
NE: 2112160.41, 867779.28 Offset: 74.86 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 15 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/5/2022

Rig: GP477

Project No.: 7321P043A

CPT Completed: 1/5/2022

Operator: RF



# CPT LOG NO. CPT-7

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

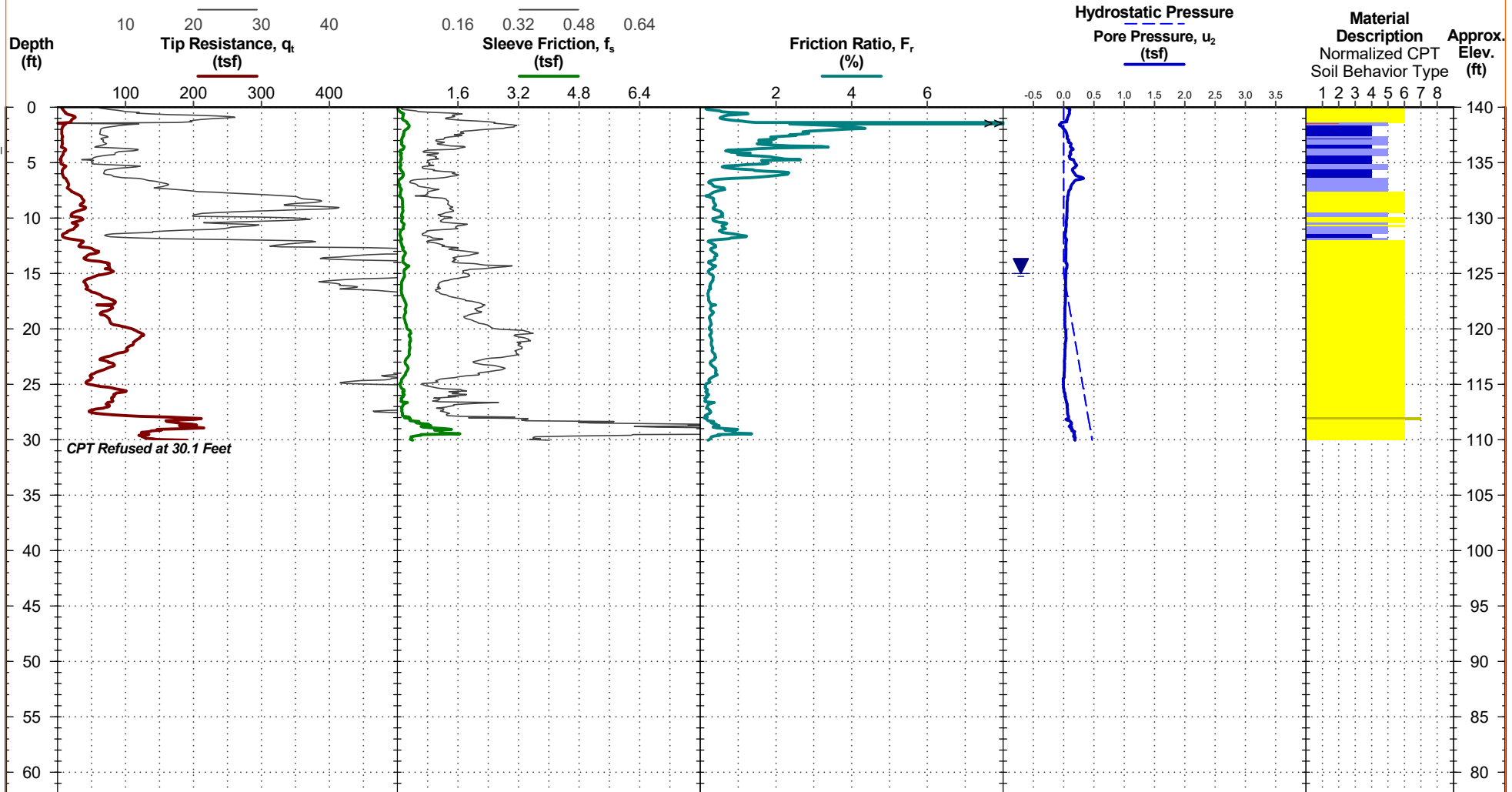
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 140 ft +/-

LL: 34.2176°, -80.62832° Station: 1812+43.63

NE: 2112345.04, 867680.2 Offset: 68.22 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREEE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 15 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/5/2022

CPT Completed: 1/5/2022

Rig: GP477

Operator: RF

Project No.: 7321P043A

# CPT LOG NO. CPT-8

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

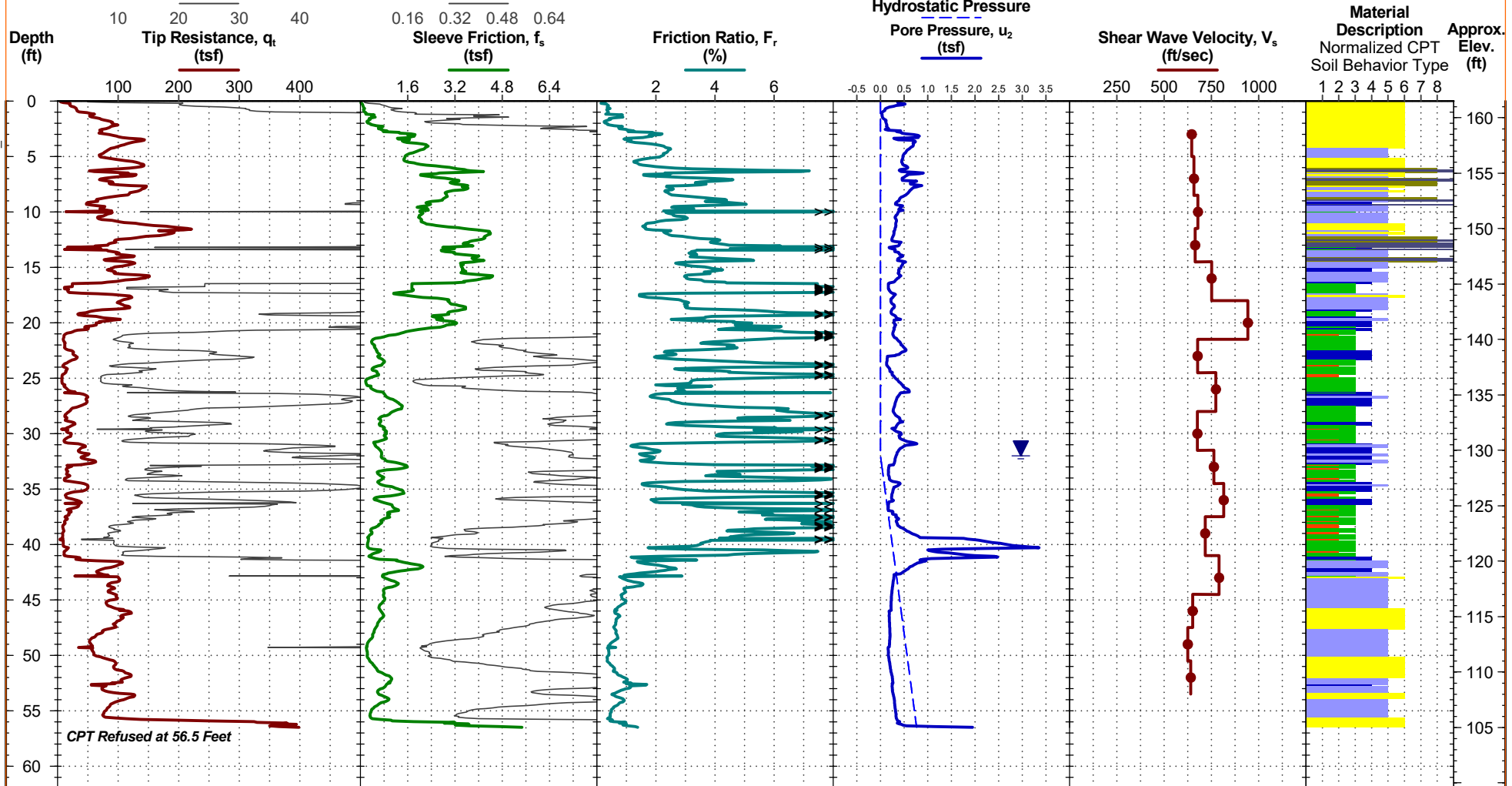
**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161.5 ft +/-

LL: 34.21807°, -80.62721° Station: 1816+13.47

NE: 2112681.92, 867852.75 Offset: 12.26 - L



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREEE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22

**WATER LEVEL OBSERVATION**

▼ 32 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/4/2022

Rig: GP477

Project No.: 7321P043A

CPT Completed: 1/4/2022

Operator: RF

# CPT LOG NO. CPT-9

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

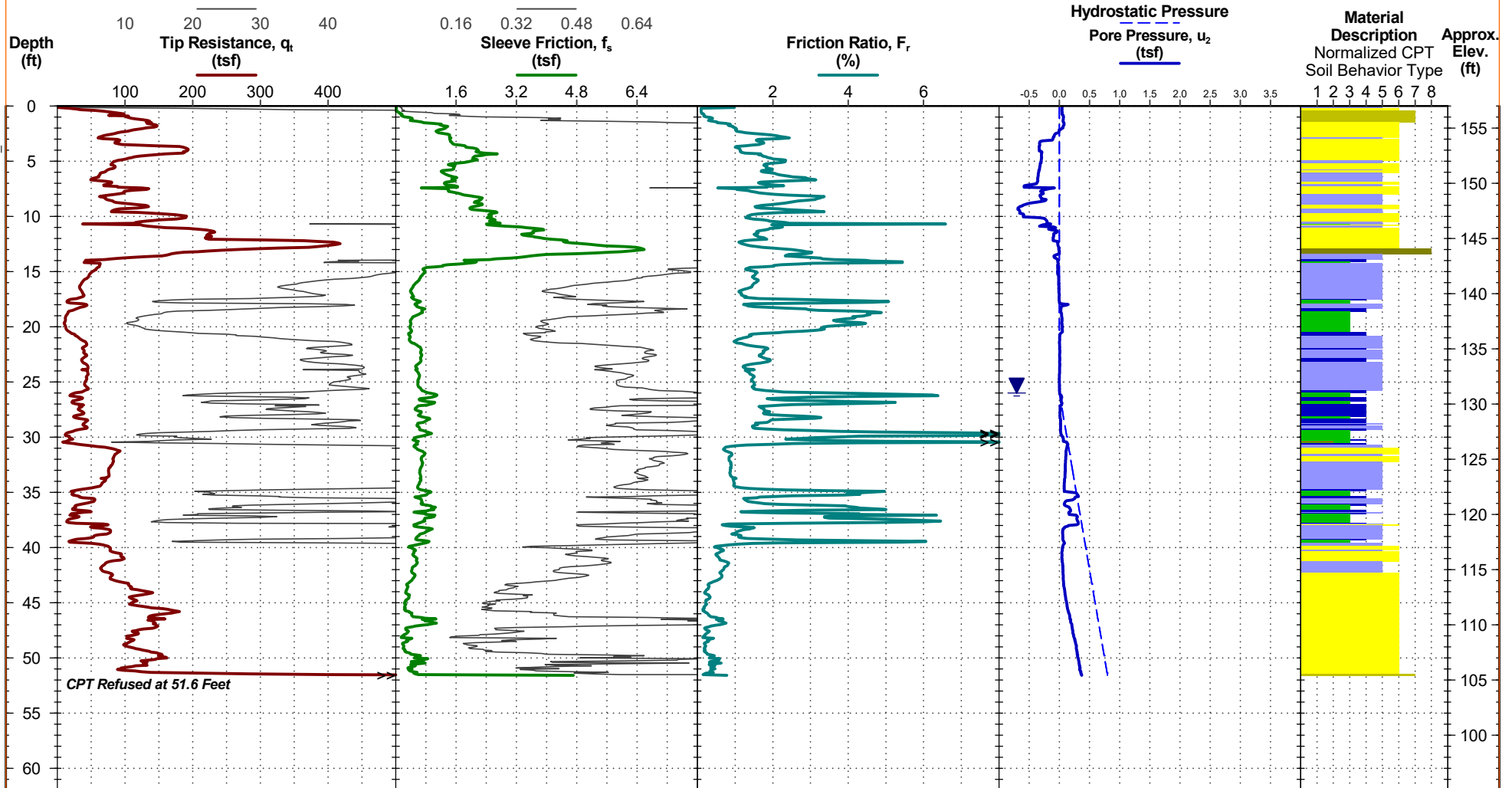
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-

LL: 34.21845°, -80.62531° Station: 1822+03.97

NE: 2113255.47, 867993.61 Offset: 1.48 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATEREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 26 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/16/2021

Rig: GP477

Project No.: 7321P043A

CPT Completed: 12/16/2021

Operator: RF

# CPT LOG NO. CPT-10

**PROJECT:** I-20 Wateree River Bridge Repairs

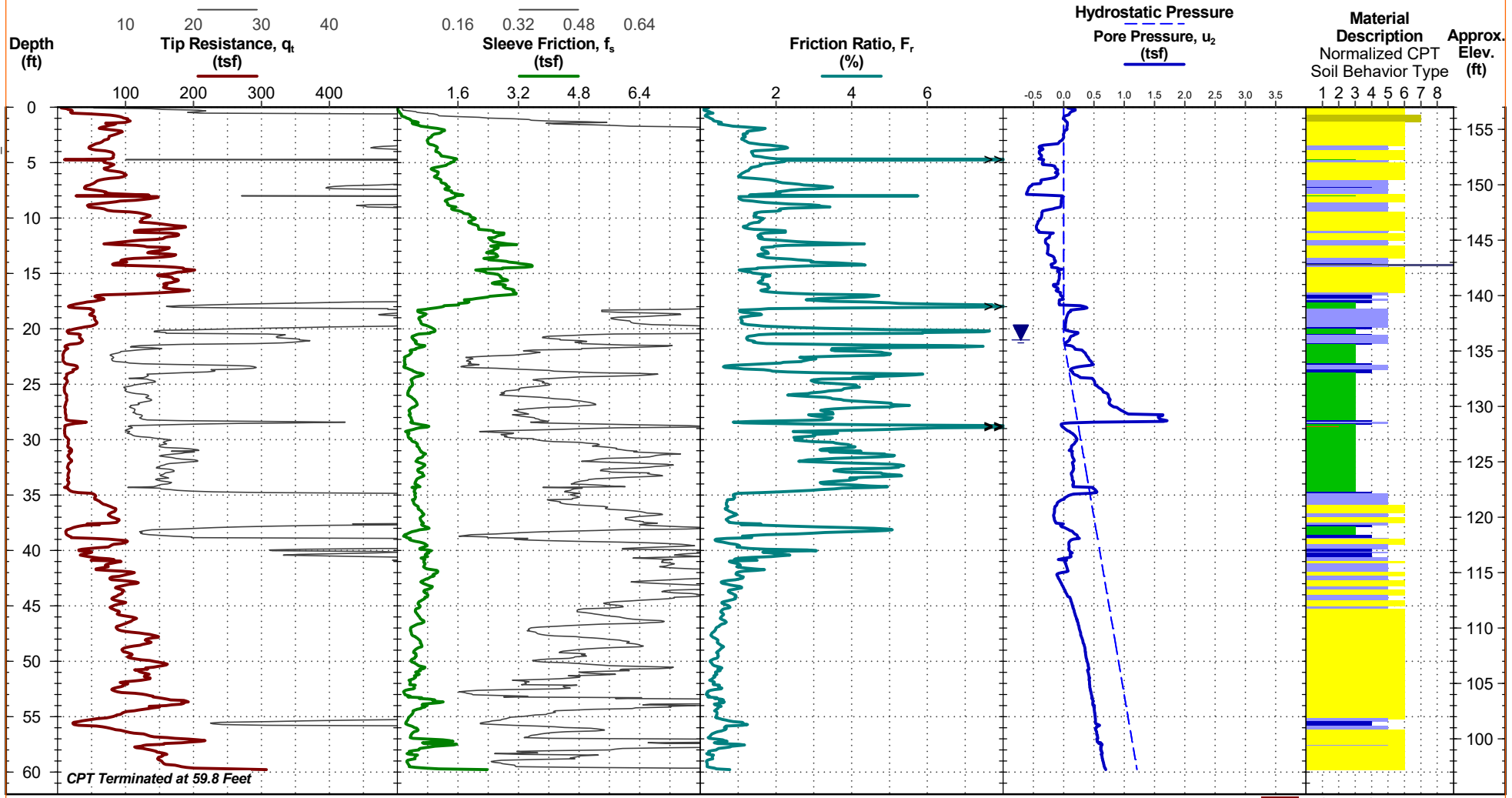
**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-  
LL: 34.2188°, -80.62369° Station: 1827+07.49  
NE: 2113742.07, 868123.05 Offset: 1.93 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT 7321P043A I-20 WATREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/23/22



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

CPT sensor calibration reports available upon request.

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 21 ft measured water depth  
(used in normalizations and correlations)

Probe no. 5384 with net area ratio of .862  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/16/2021

Rig: GP477

Project No.: 7321P043A

CPT Completed: 12/16/2021

Operator: RF

3/23/22 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE\_GDT 3/23/22

# CPT CORRELATIVE PARAMETER LOG NO. CPT-1

SEE CPT LOG NO. CPT-1 FOR DETAILED TEST RESULTS

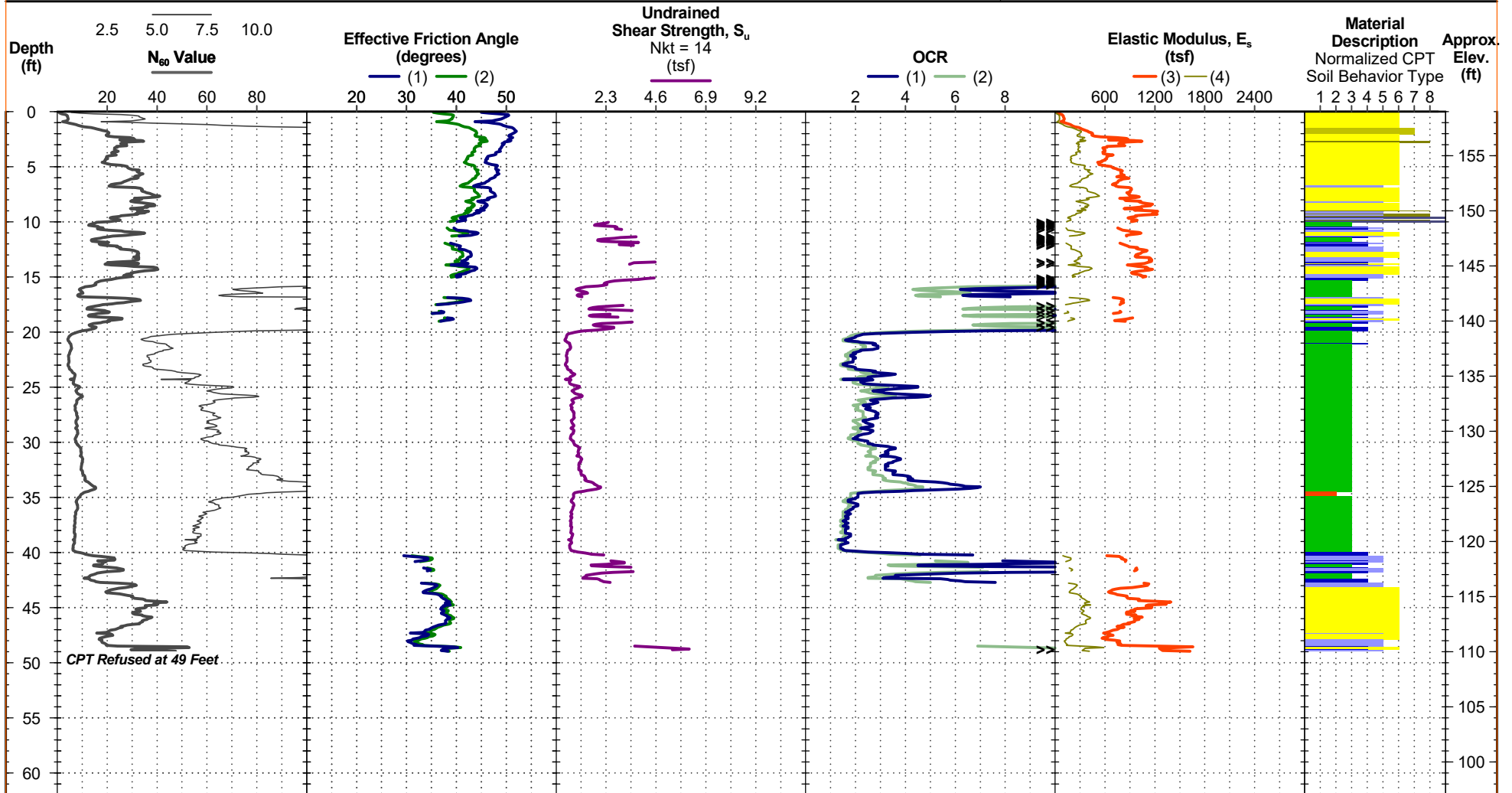
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-  
LL: 34.21654°, -80.63394° Station: 1795+03.87  
NE: 2110648.69,867289.8 Offset: 10.98 - R



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

36 ft measured water depth (used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/15/2021

CPT Completed: 12/15/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A

3/23/21 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE\_GDT 3/23/21

# CPT CORRELATIVE PARAMETER LOG NO. CPT-2

SEE CPT LOG NO. CPT-2 FOR DETAILED TEST RESULTS

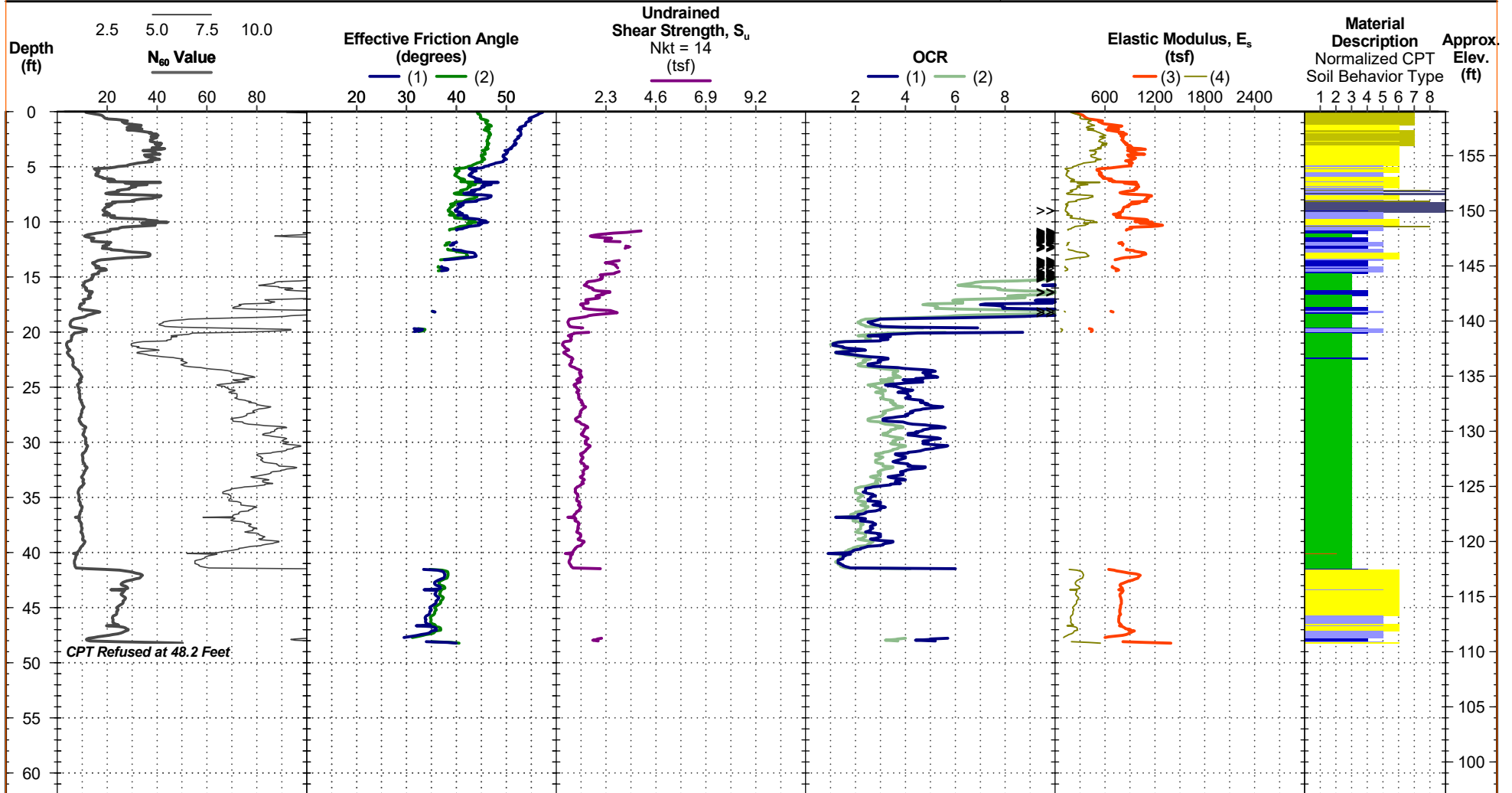
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-  
LL: 34.21675°, -80.63299° Station: 1979+99.12  
NE: 2110933.66, 867367.03 Offset: 9.34 - R



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

35 ft measured water depth (used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/15/2021

CPT Completed: 12/15/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A



THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE.GDT 3/23/22

# CPT CORRELATIVE PARAMETER LOG NO. CPT-3

SEE CPT LOG NO. CPT-3 FOR DETAILED TEST RESULTS

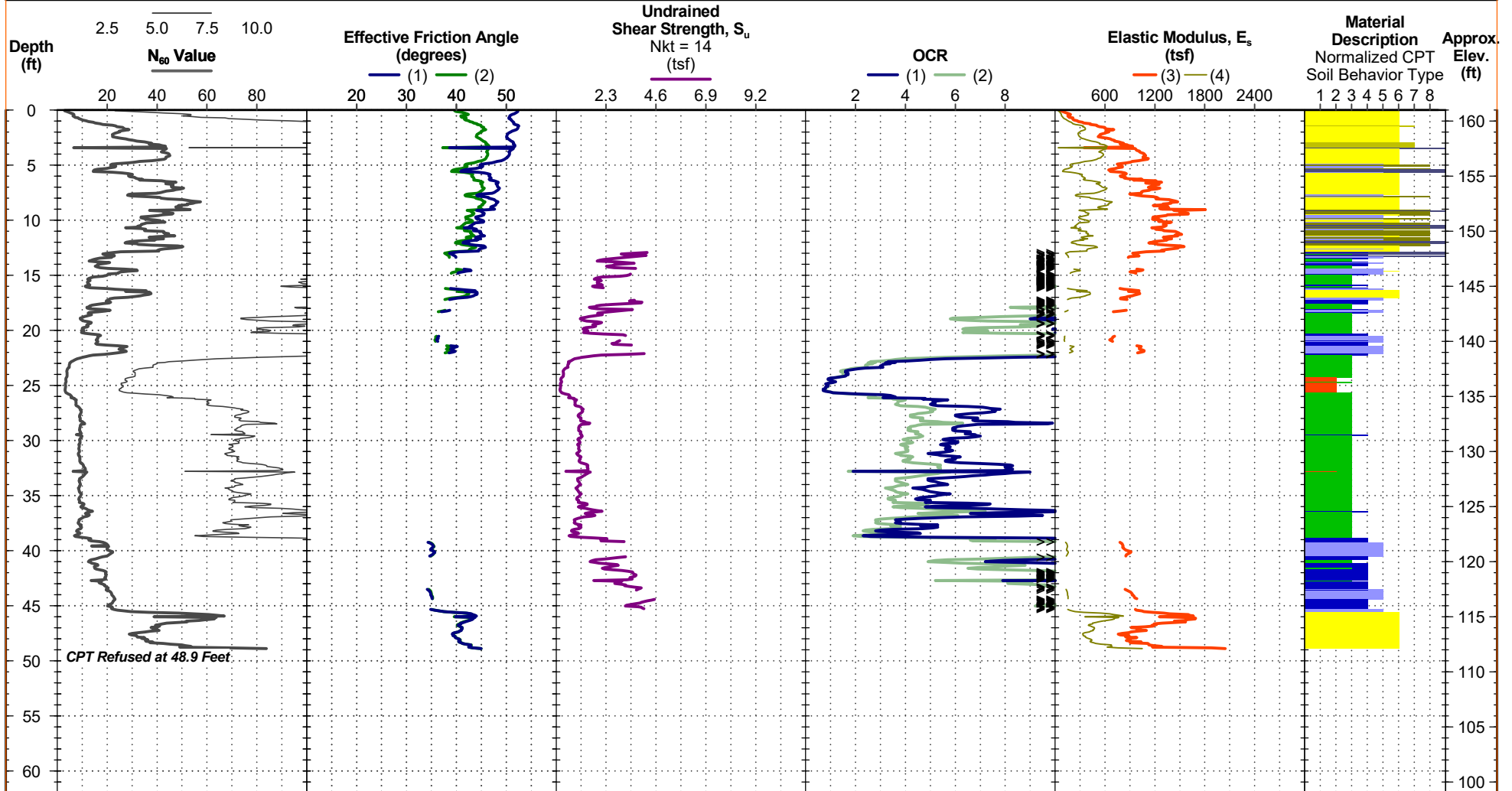
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161 ft +/-  
LL: 34.21701°, -80.63215° Station: 1800+67.93  
NE: 2111187.07, 867460.15 Offset: 15.76 - L



Tip resistance, sleeve resistance, porewater pressure, shearwave velocity, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

▼ 9 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/4/2022

CPT Completed: 1/4/2022

Rig: GP477

Operator: RF

Project No.: 7321P043A



3/23/21 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON

# CPT CORRELATIVE PARAMETER LOG NO. CPT-4

SEE CPT LOG NO. CPT-4 FOR DETAILED TEST RESULTS

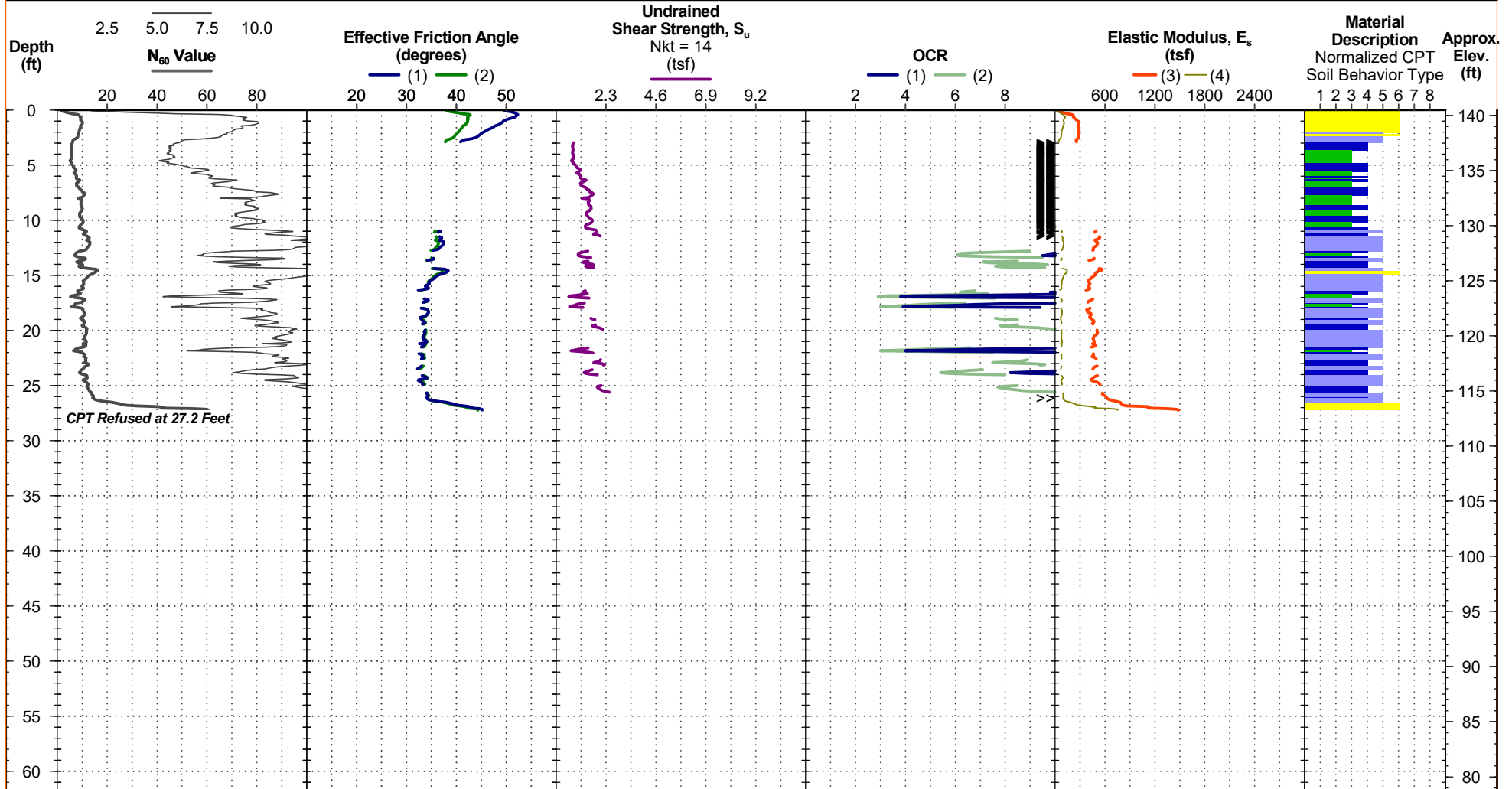
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 140.5 ft +/-  
LL: 34.21726°, -80.63166° Station: 1802+36.87  
NE: 2111336.82, 867554.57 Offset: 68.65 - L



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

15 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/17/2021

CPT Completed: 12/17/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A

3/23/21 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE\_GDT 3/23/21

# CPT CORRELATIVE PARAMETER LOG NO. CPT-5

SEE CPT LOG NO. CPT-5 FOR DETAILED TEST RESULTS

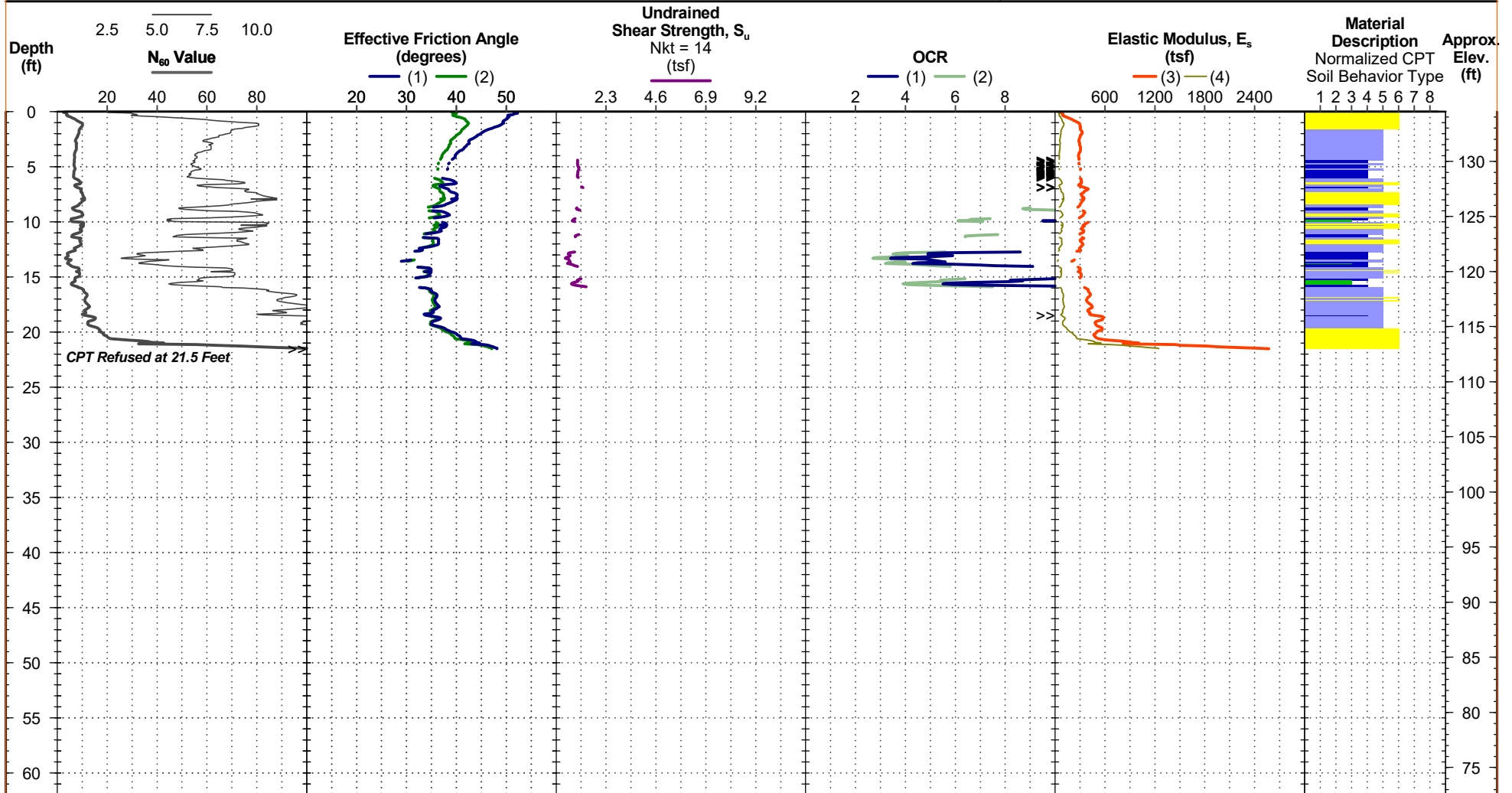
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 134.5 ft +/-  
LL: 34.217°, -80.63106° Station: 1803+86.24  
NE: 2111517,867457.77 Offset: 71.08 - R



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

15 ft measured water depth (used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/17/2021

CPT Completed: 12/17/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A

3/23/22 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON DATA\TEMPLATE\_GDT 3/23/22

# CPT CORRELATIVE PARAMETER LOG NO. CPT-6

SEE CPT LOG NO. CPT-6 FOR DETAILED TEST RESULTS

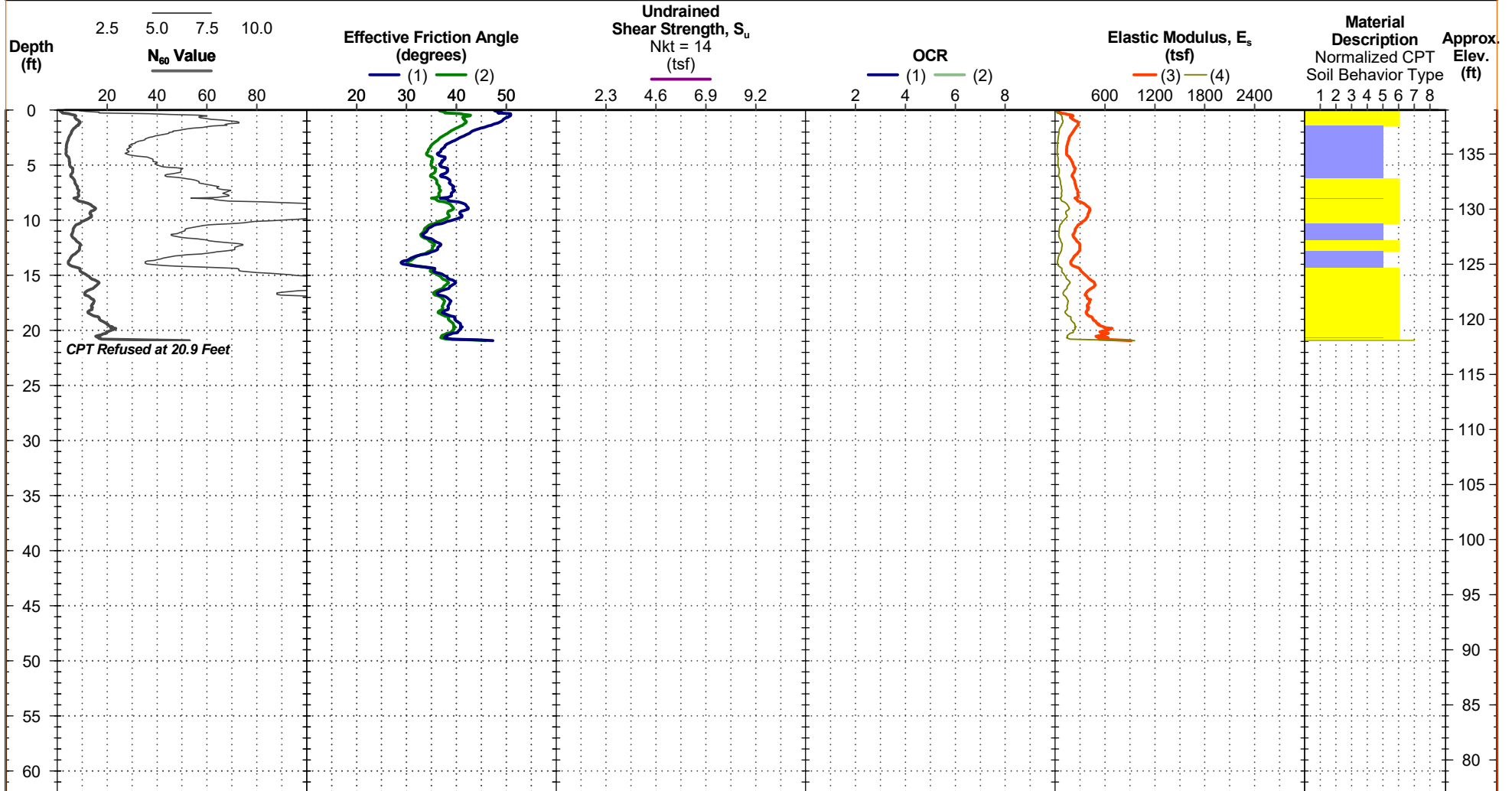
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 139 ft +/-  
LL: 34.21787°, -80.62893° Station: 1810+90.55  
NE: 2112160.41, 867779.28 Offset: 74.86 - L



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

15 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/5/2022

CPT Completed: 1/5/2022

Rig: GP477

Operator: RF

Project No.: 7321P043A

3/23/22 TERRACON\_DATA\TEMPLATE\_GDT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON

# CPT CORRELATIVE PARAMETER LOG NO. CPT-7

SEE CPT LOG NO. CPT-7 FOR DETAILED TEST RESULTS

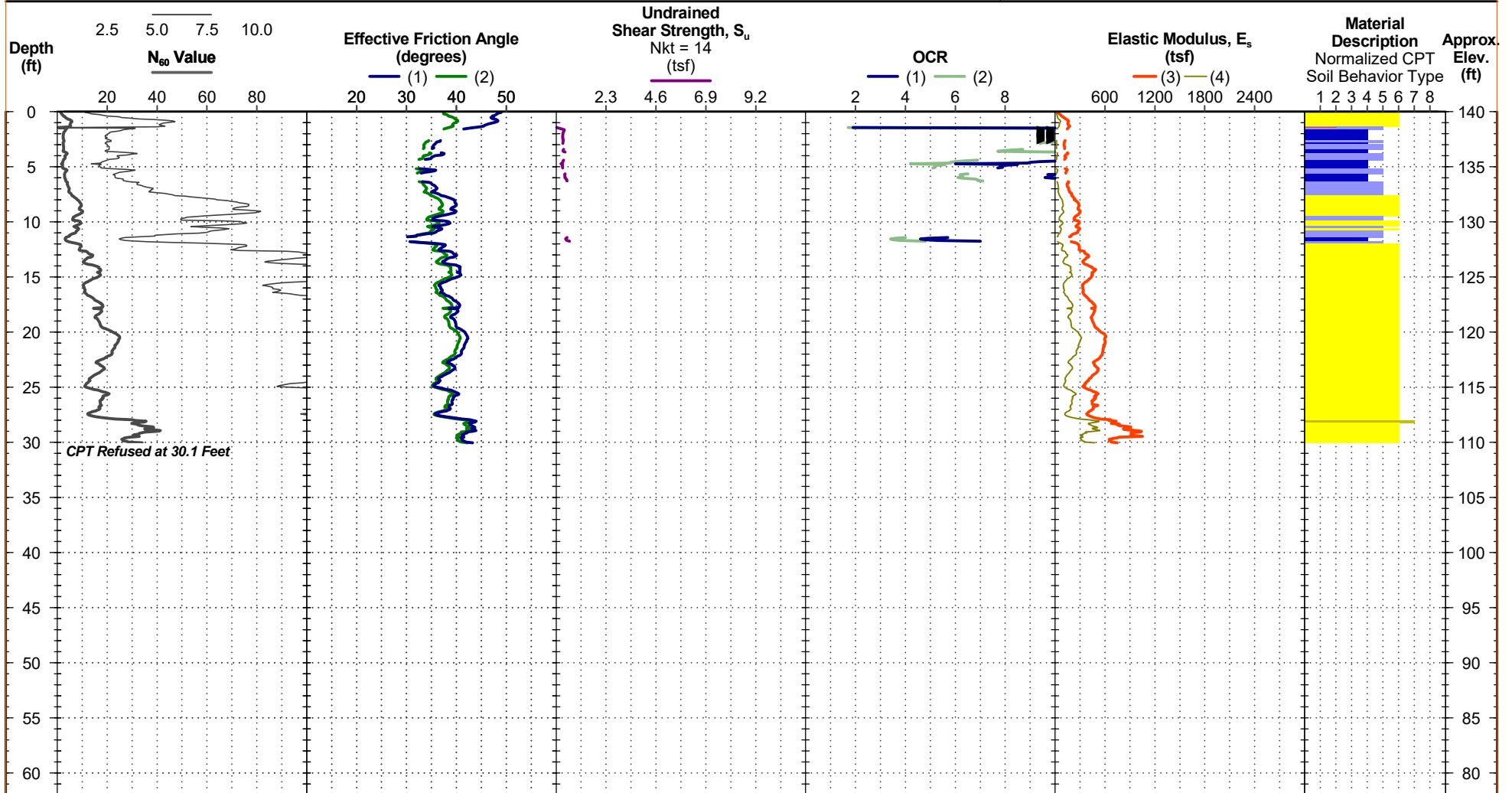
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 140 ft +/-  
LL: 34.2176°, -80.62832° Station: 1812+43.63  
NE: 2112345.04, 867680.2 Offset: 68.22 - R



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

15 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/5/2022

CPT Completed: 1/5/2022

Rig: GP477

Operator: RF

Project No.: 7321P043A

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE.GDT 3/23/22

# CPT CORRELATIVE PARAMETER LOG NO. CPT-8

SEE CPT LOG NO. CPT-8 FOR DETAILED TEST RESULTS

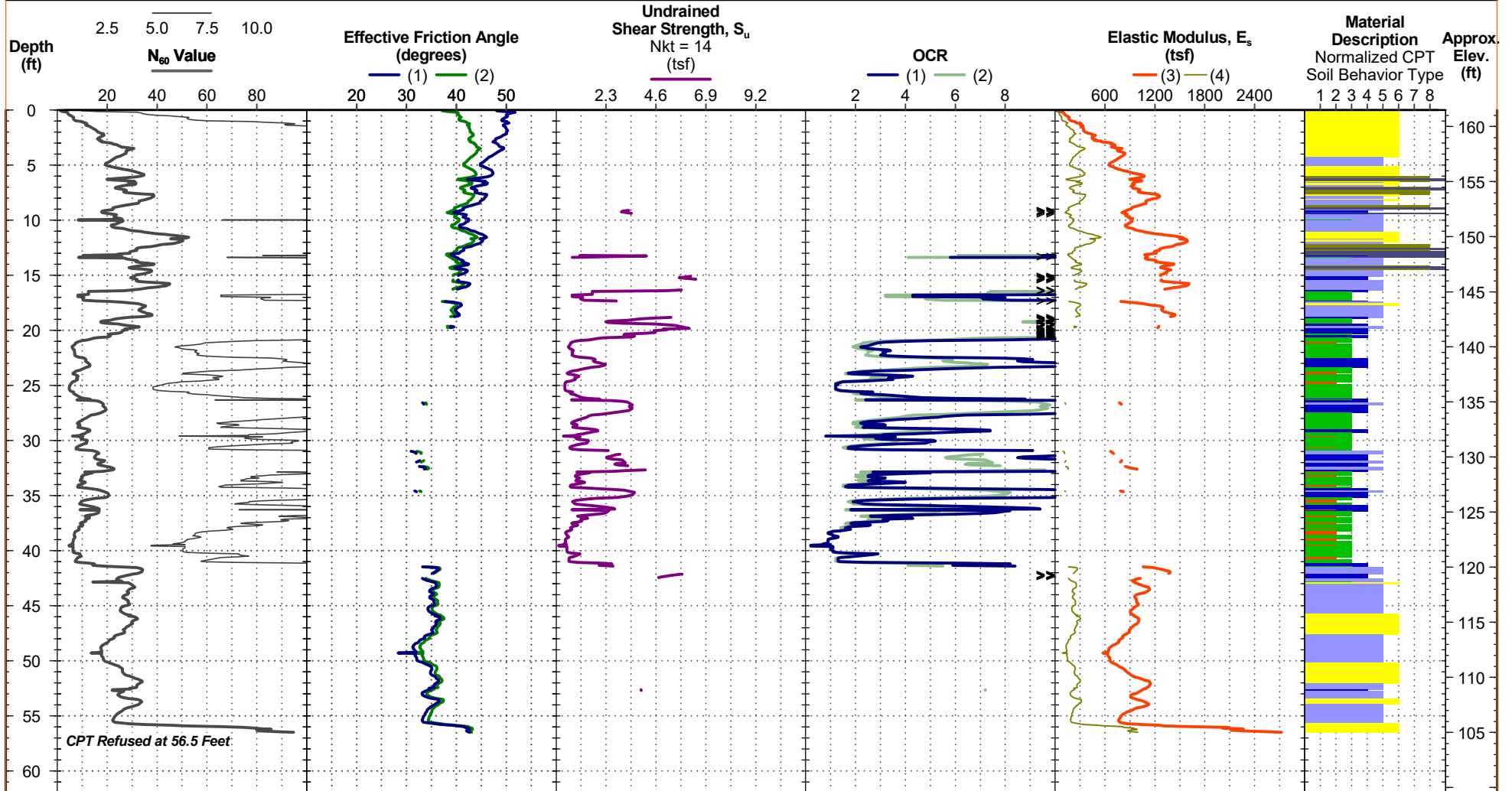
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161.5 ft +/-  
LL: 34.21807°, -80.62721° Station: 1816+13.47  
NE: 2112681.92,867852.75 Offset: 12.26 - L



Tip resistance, sleeve resistance, porewater pressure, shearwave velocity, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

32 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 1/4/2022

Rig: GP477

Project No.: 7321P043A

CPT Completed: 1/4/2022

Operator: RF

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATA\TEMPLATE.GDT 3/23/22

# CPT CORRELATIVE PARAMETER LOG NO. CPT-9

SEE CPT LOG NO. CPT-9 FOR DETAILED TEST RESULTS

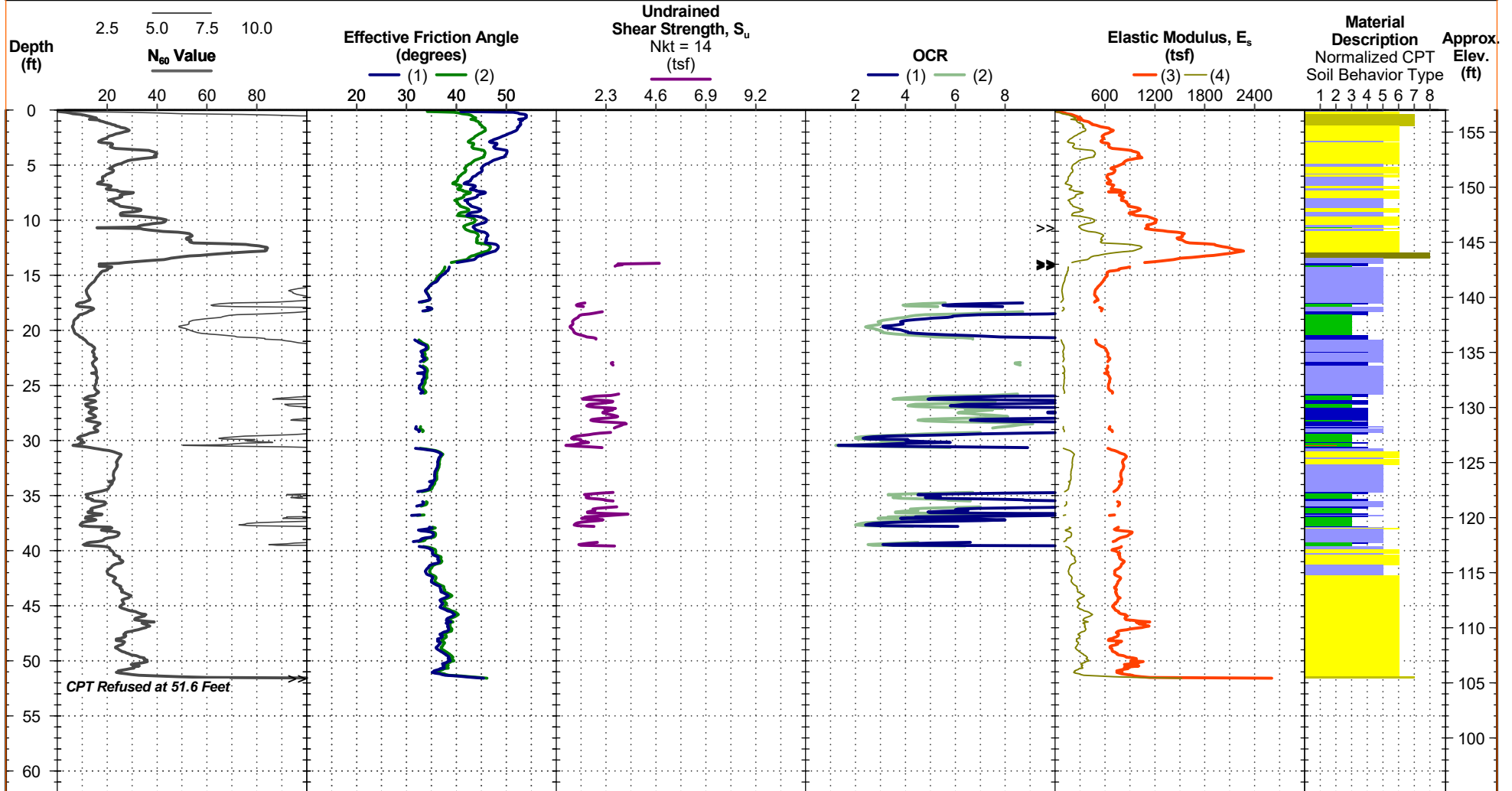
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-  
LL: 34.21845°, -80.62531° Station: 1822+03.97  
NE: 2113255.47, 867993.61 Offset: 1.48 - L



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

26 ft measured water depth (used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/16/2021

CPT Completed: 12/16/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A



# CPT CORRELATIVE PARAMETER LOG NO. CPT-10

SEE CPT LOG NO. CPT-10 FOR DETAILED TEST RESULTS

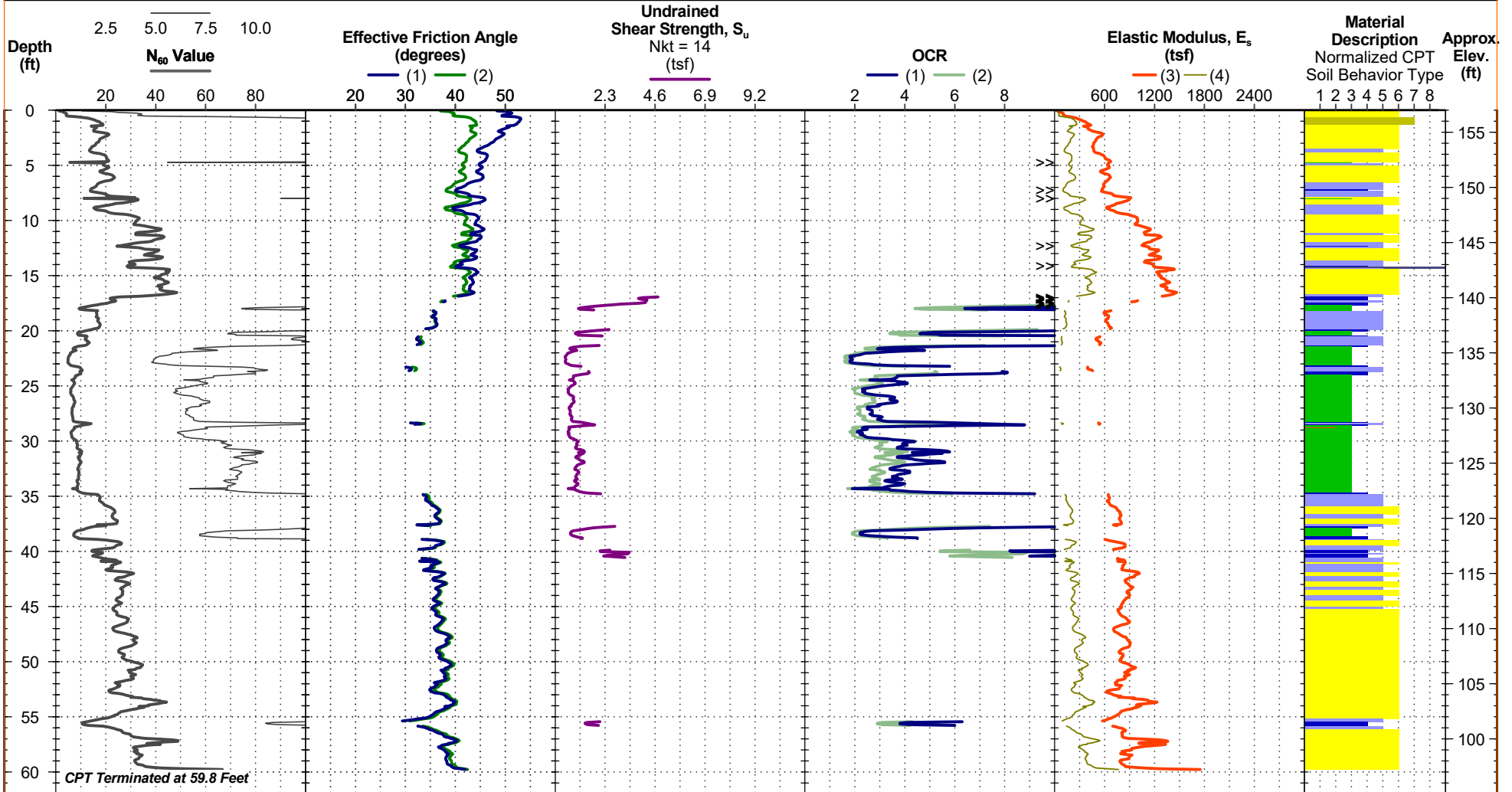
**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-  
LL: 34.2188°, -80.62369° Station: 1827+07.49  
NE: 2113742.07, 868123.05 Offset: 1.93 - L



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing.

**WATER LEVEL OBSERVATION**

21 ft measured water depth  
(used in normalizations and correlations)

Notes:  
Probe no. 5384 with net area ratio of .862  
Manufactured by Geotech A.B.; calibrated 1/27/2021  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 2 in



CPT Started: 12/16/2021

CPT Completed: 12/16/2021

Rig: GP477

Operator: RF

Project No.: 7321P043A

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT 7321P043A I-20 WATeree RIVE.GPJ TERRACON\_DATA\TEMPLATE.GDT 3/23/22



# DMT LOG NO. DMT-1

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

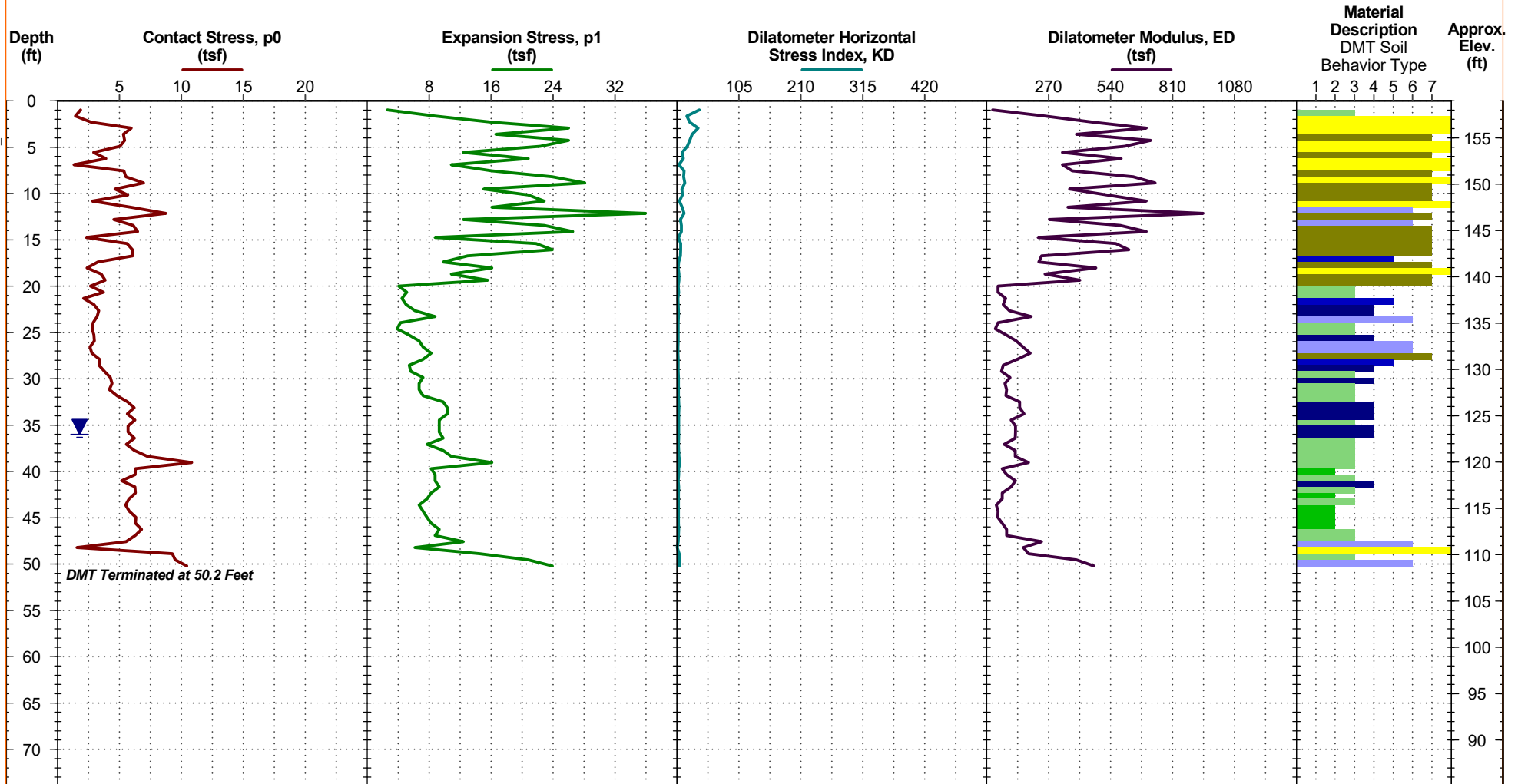
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-

LL: 34.21654°, -80.63394° Station: 1795+03.87

NE: 2110648.69,867289.8 Offset: 10.98 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

▼ 36 ft measured water depth  
(used in normalizations and correlations)

Calibrations: ΔA - 0.1 bar; ΔB - 0.4 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 1/15/2022

Rig: GP477

Project No.: 7321P043A

DMT Completed: 1/15/2022

Operator: RF

# DMT LOG NO. DMT-2

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

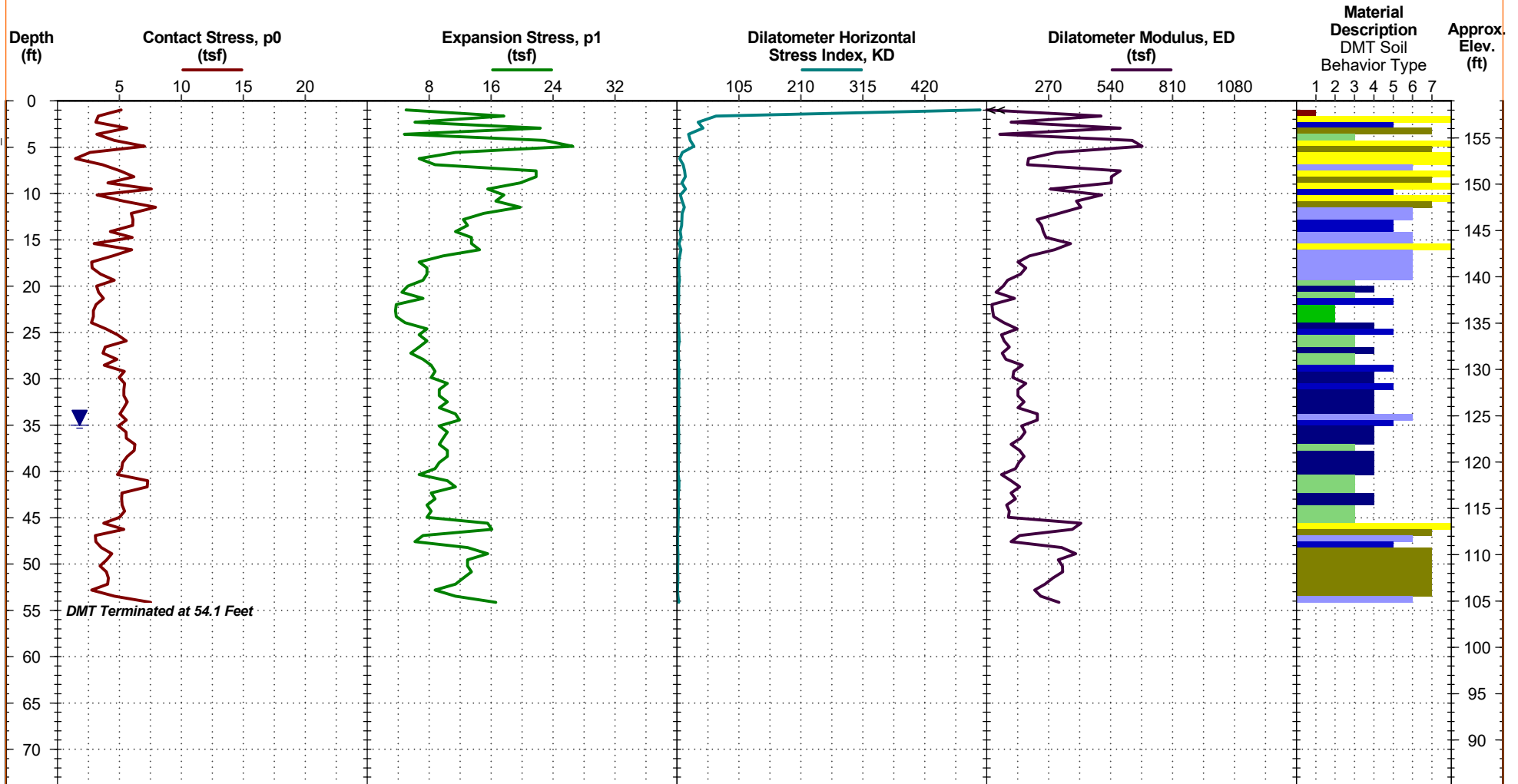
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 159 ft +/-

LL: 34.21675°, -80.63299° Station: 1979+99.12

NE: 2110933.66,867367.03 Offset: 9.34 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREEE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

▼ 35 ft measured water depth  
(used in normalizations and correlations)

Calibrations: ΔA - 0.1 bar; ΔB - 0.4 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 12/15/2021

Rig: GP477

Project No.: 7321P043A

DMT Completed: 12/15/2021

Operator: RF

# DMT LOG NO. DMT-3

**PROJECT:** I-20 Wateree River Bridge Repairs

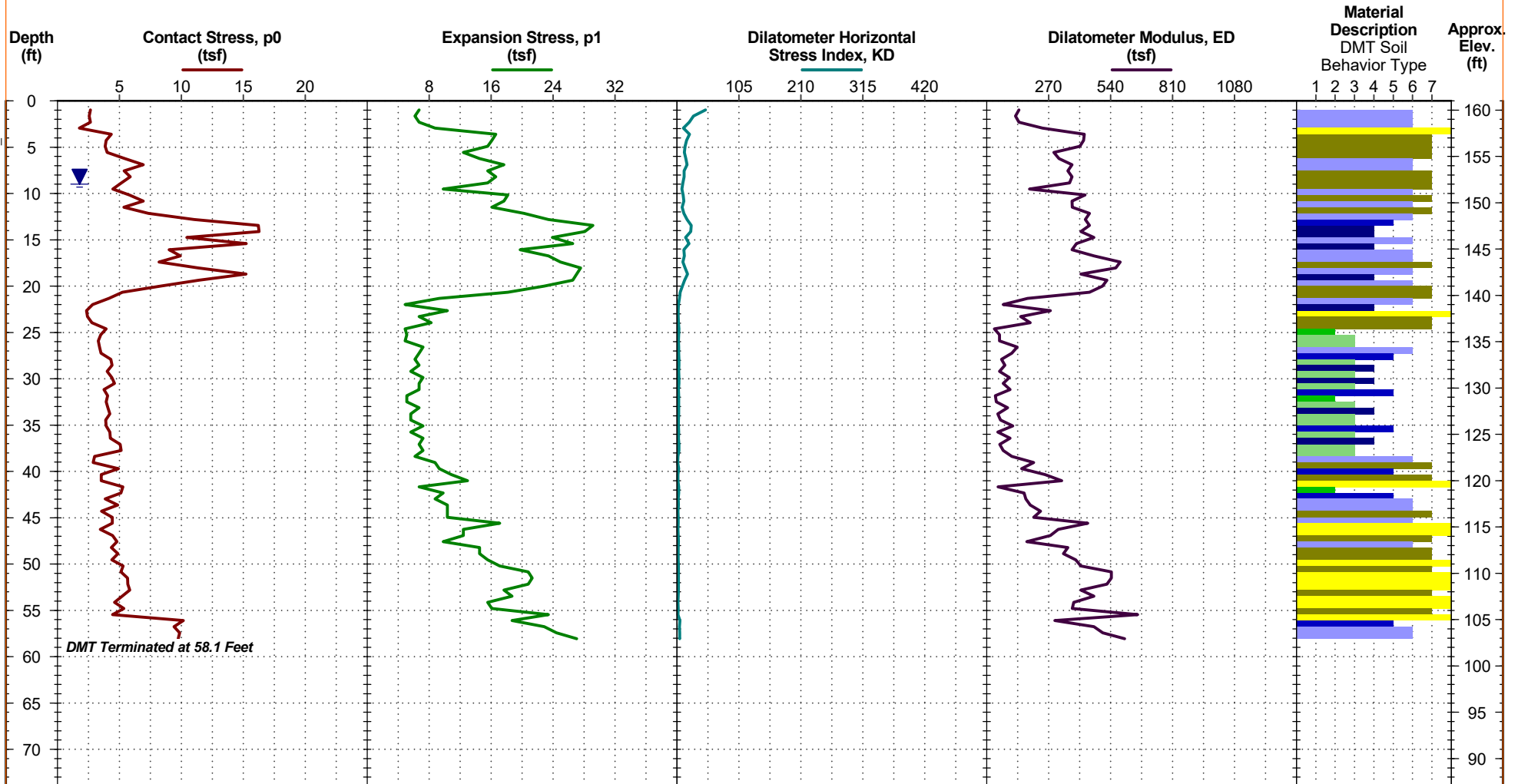
**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161 ft +/-  
LL: 34.21701°, -80.63215° Station: 1800+67.93  
NE: 2111187.07, 867460.15 Offset: 15.76 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

▼ 9 ft measured water depth  
(used in normalizations and correlations)

Calibrations: ΔA - 0.1 bar; ΔB - 0.4 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 12/16/2021

Rig: GP477

Project No.: 7321P043A

DMT Completed: 12/16/2021

Operator: RF

# DMT LOG NO. DMT-4

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

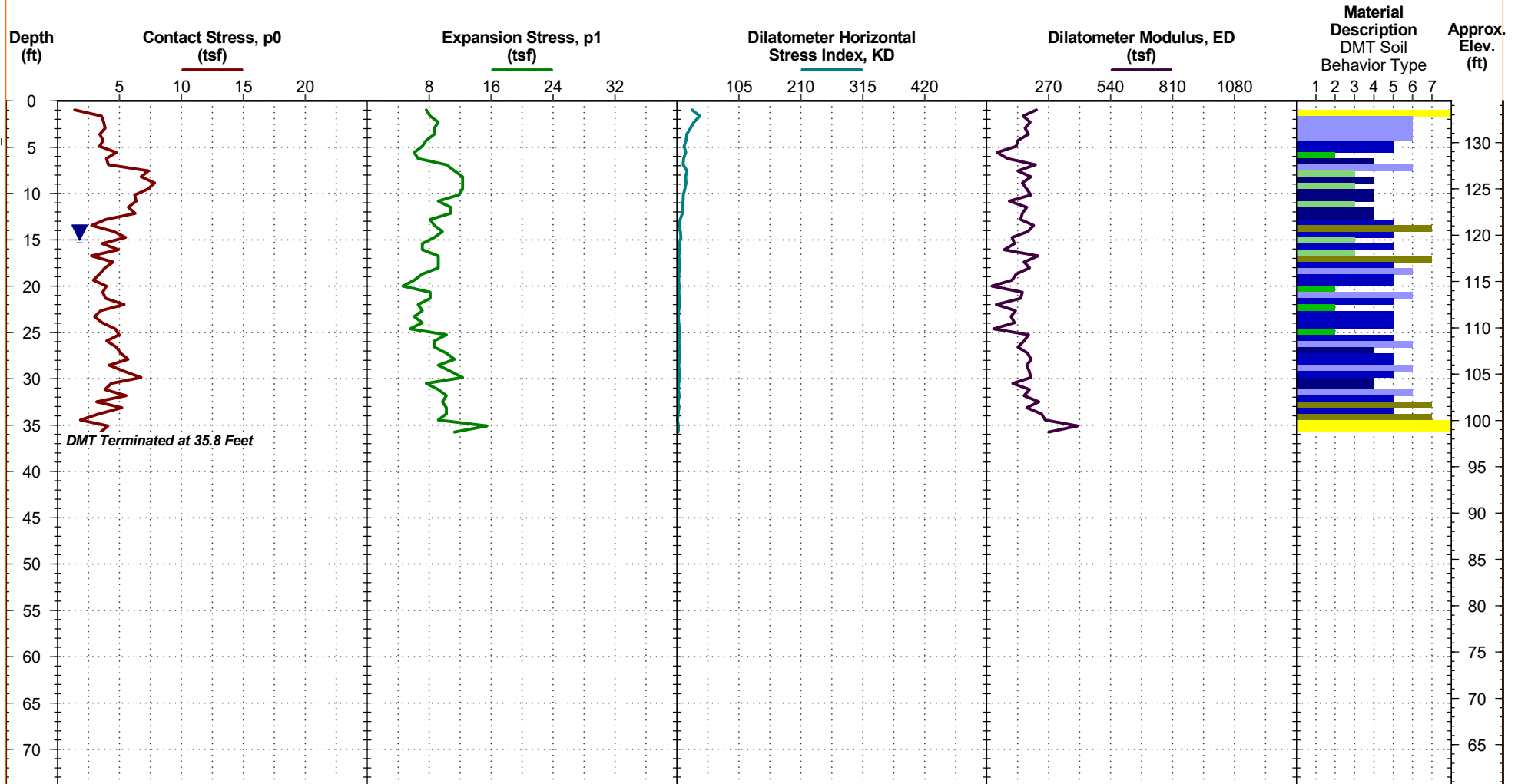
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 134.5 ft +/-

LL: 34.21700°, -80.63106° Station: 1803+86.24

NE: 2111517,867457.77 Offset: 71.08 - R

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT: 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



**WATER LEVEL OBSERVATION**

15 ft measured water depth  
(used in normalizations and correlations)

Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 12/17/2021

Rig: GP477

Project No.: 7321P043A

DMT Completed: 12/17/2021

Operator: RF

# DMT LOG NO. DMT-5

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

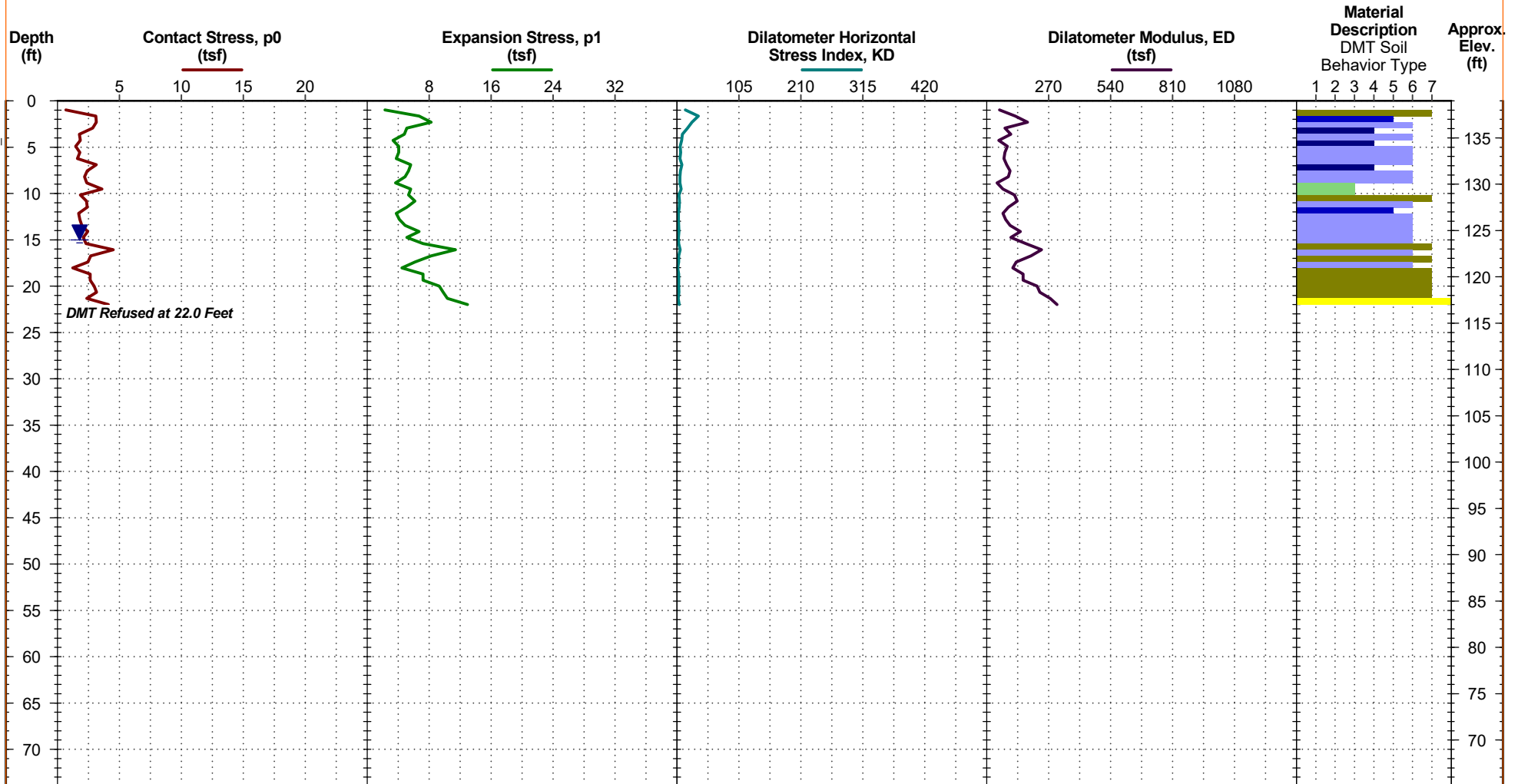
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 139 ft +/-

LL: 34.21787°, -80.62893° Station: 1810+90.55

NE: 2112160.41, 867779.28 Offset: 74.86 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

Calibrations: ΔA - 0.1 bar; ΔB - 0.6 bar; Zm - 0 bar

15 ft measured water depth (used in normalizations and correlations)



DMT Started: 1/4/2022

DMT Completed: 1/4/2022

Rig: GP477

Operator: RF

Project No.: 7321P043A

# DMT LOG NO. DMT-6

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

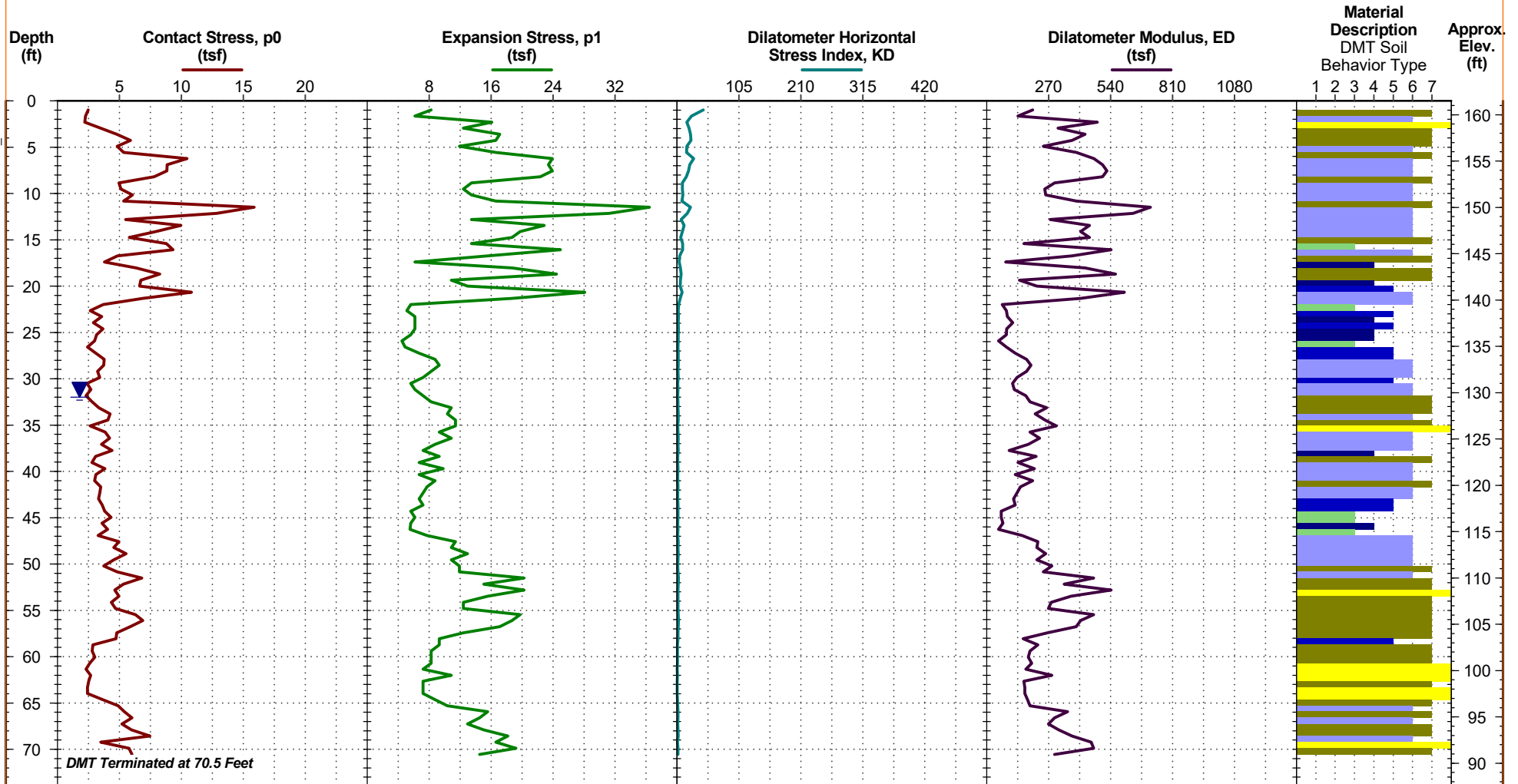
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 161.5 ft +/-

LL: 34.21807°, -80.62721° Station: 1816+13.47

NE: 2112681.92, 867852.75 Offset: 12.26 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

▼ 32 ft measured water depth (used in normalizations and correlations)

Calibrations: ΔA - 0.1 bar; ΔB - 0.8 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 1/4/2022

Rig: GP477

Project No.: 7321P043A

DMT Completed: 1/4/2022

Operator: RF

# DMT LOG NO. DMT-7

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

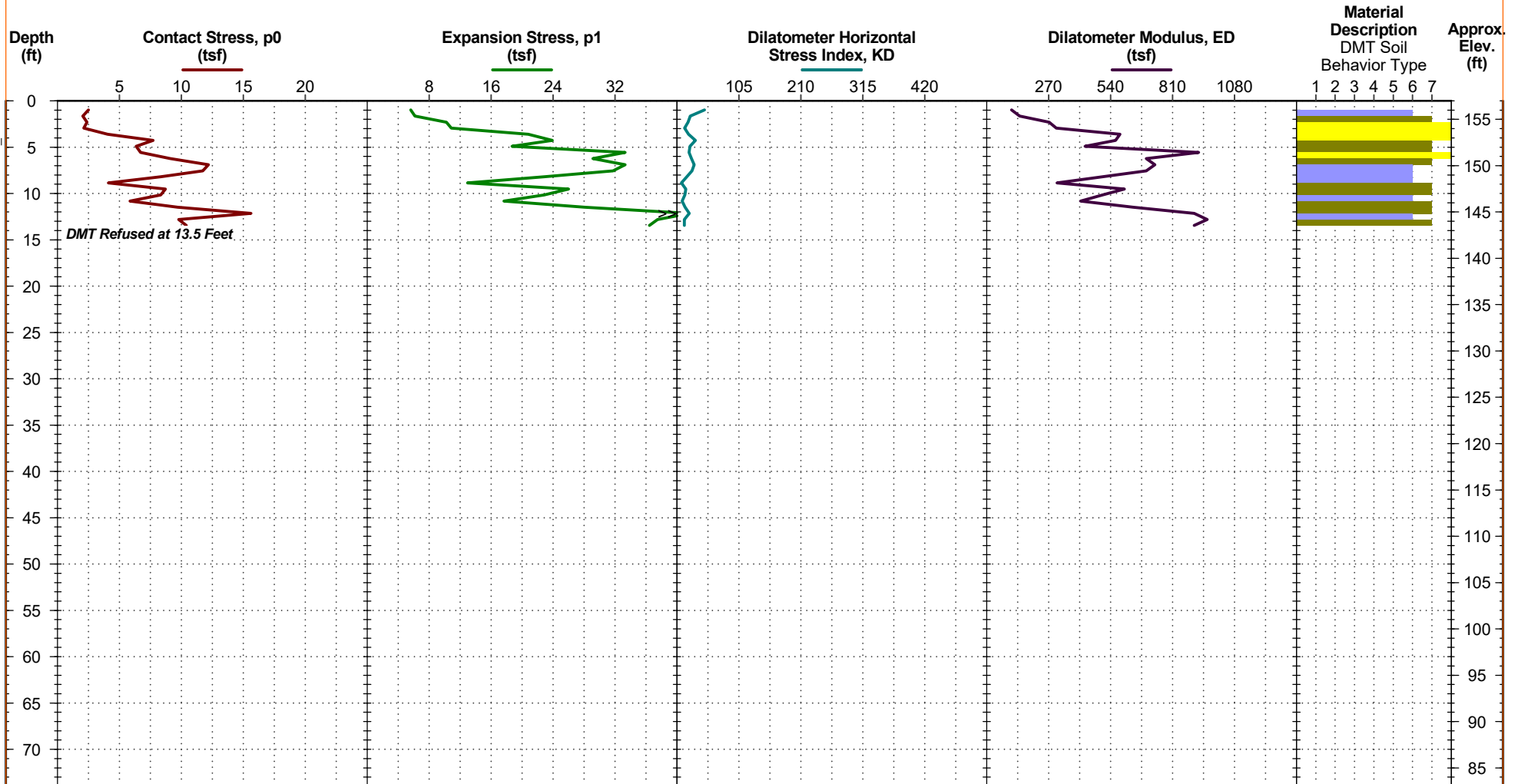
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-

LL: 34.21845°, -80.62531° Station: 1822+03.97

NE: 2113255.47, 867993.61 Offset: 1.48 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATREE RIVE.GPJ TERRACON\_DATA\_TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

Calibrations: ΔA - 0.1 bar; ΔB - 0.8 bar; Zm - 0 bar



DMT Started: 1/4/2022

DMT Completed: 1/4/2022

Rig:

Operator: RF

Project No.: 7321P043A



# DMT LOG NO. DMT-7A

**PROJECT:** I-20 Wateree River Bridge Repairs

**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

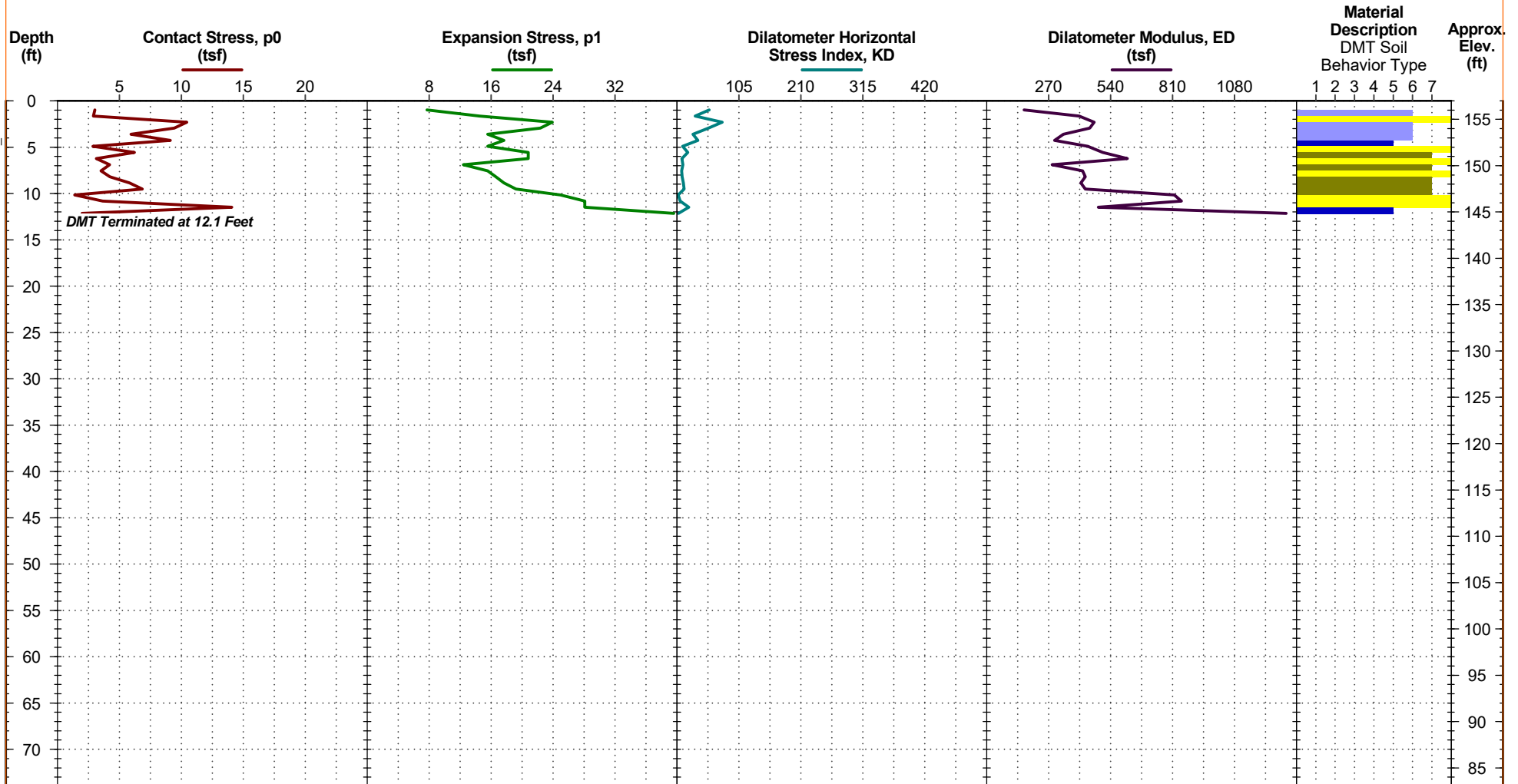
**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-

LL: 34.21845°, -80.62531° Station: 1822+03.97

NE: 2113255.47, 867993.61 Offset: 1.48 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATeree RIVE.GPJ TERRACON\_DATA TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

Calibrations: ΔA - 0.1 bar; ΔB - 0.3 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 12/16/2021

DMT Completed: 12/16/2021

Rig:

Operator: RF

Project No.: 7321P043A

# DMT LOG NO. DMT-8

**PROJECT:** I-20 Wateree River Bridge Repairs

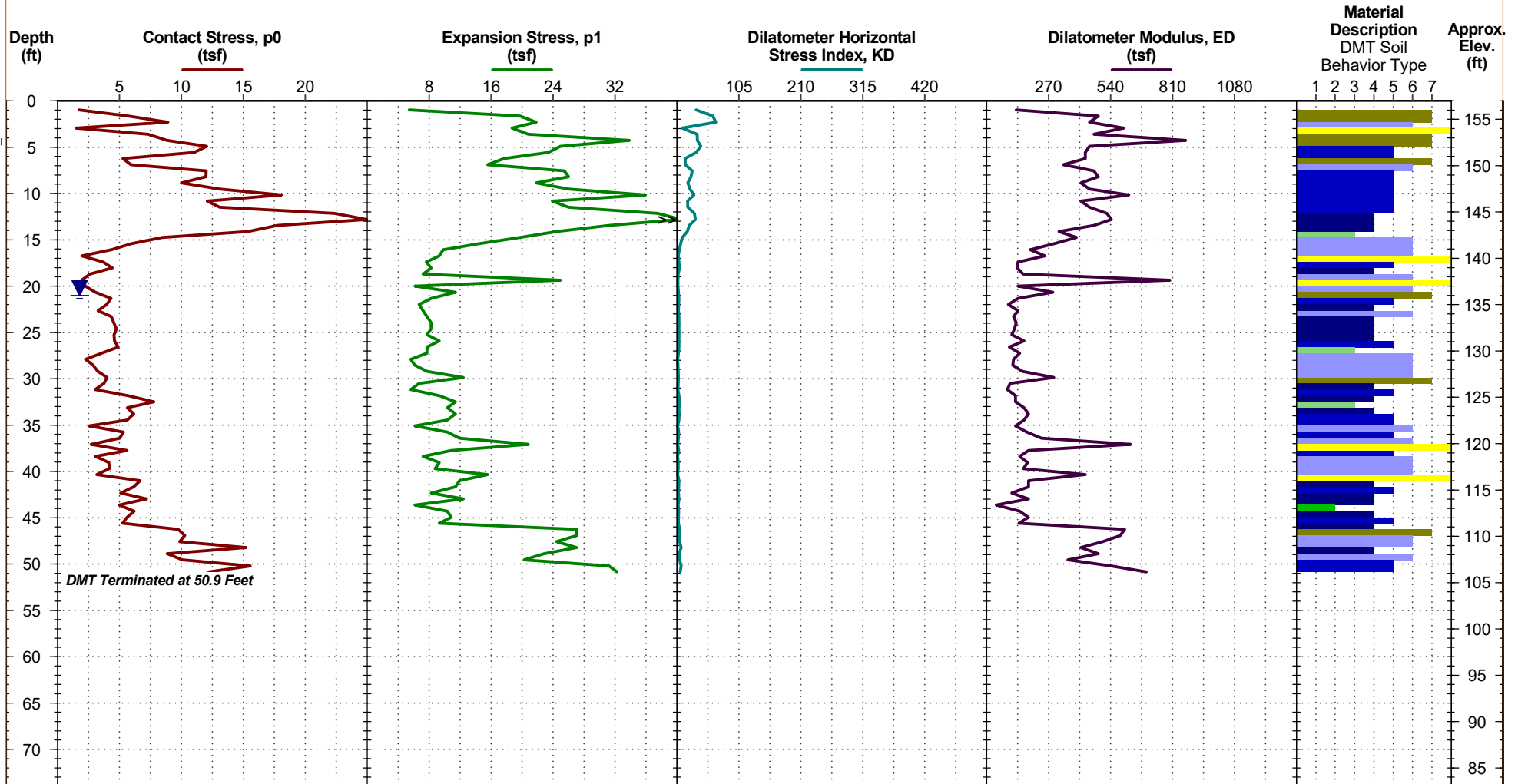
**CLIENT:** RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

**TEST LOCATION:** See Exhibit A-2

**SITE:** Kershaw County  
Kershaw County, SC

Approx. Surface Elev: 157 ft +/-  
LL: 34.21880°, -80.62369° Station: 1827+07.49  
NE: 2113742.07, 868123.05 Offset: 1.93 - L

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT 7321P043A I-20 WATeree RIVE.GPJ TERRACON\_DATA TEMPLATE.GDT 3/23/22



See Plan Sheets for explanation of symbols and abbreviations.

DMT specification reports available upon request.

- 1 Muck / peat
- 2 Clay
- 3 Silty clay
- 4 Clayey silt
- 5 Silt
- 6 Sandy silt
- 7 Silty sand
- 8 Sand

**WATER LEVEL OBSERVATION**

21 ft measured water depth (used in normalizations and correlations)

Calibrations: ΔA - 0.1 bar; ΔB - 0.4 bar; Zm - 0 bar  
Blade no. 507



DMT Started: 12/16/2021

Rig: GP477

Project No.: 7321P043A

DMT Completed: 12/16/2021

Operator: RF

**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-9 (Box 1 of 2)



B-9 (Box 2 of 2)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-9A (Box 1 of 5)



B-9A (Box 2 of 5)



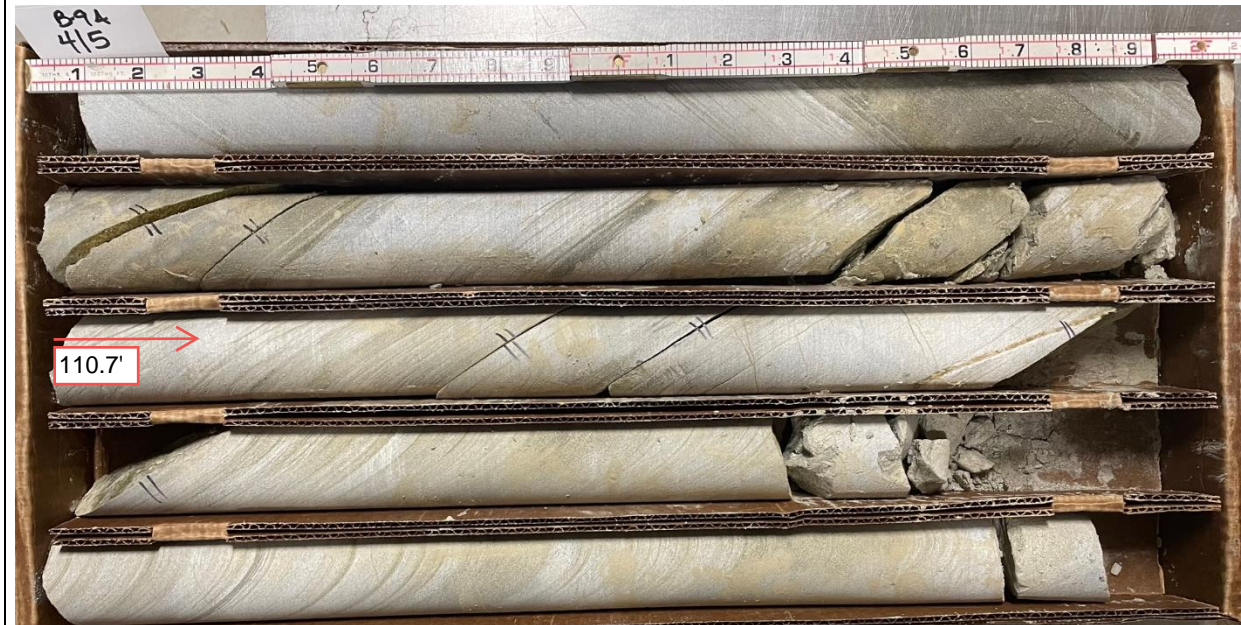
**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-9A (Box 3 of 5)



B-9A (Box 4 of 5)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-9A (Box 5 of 5)



B-10 (Box 1 of 3)



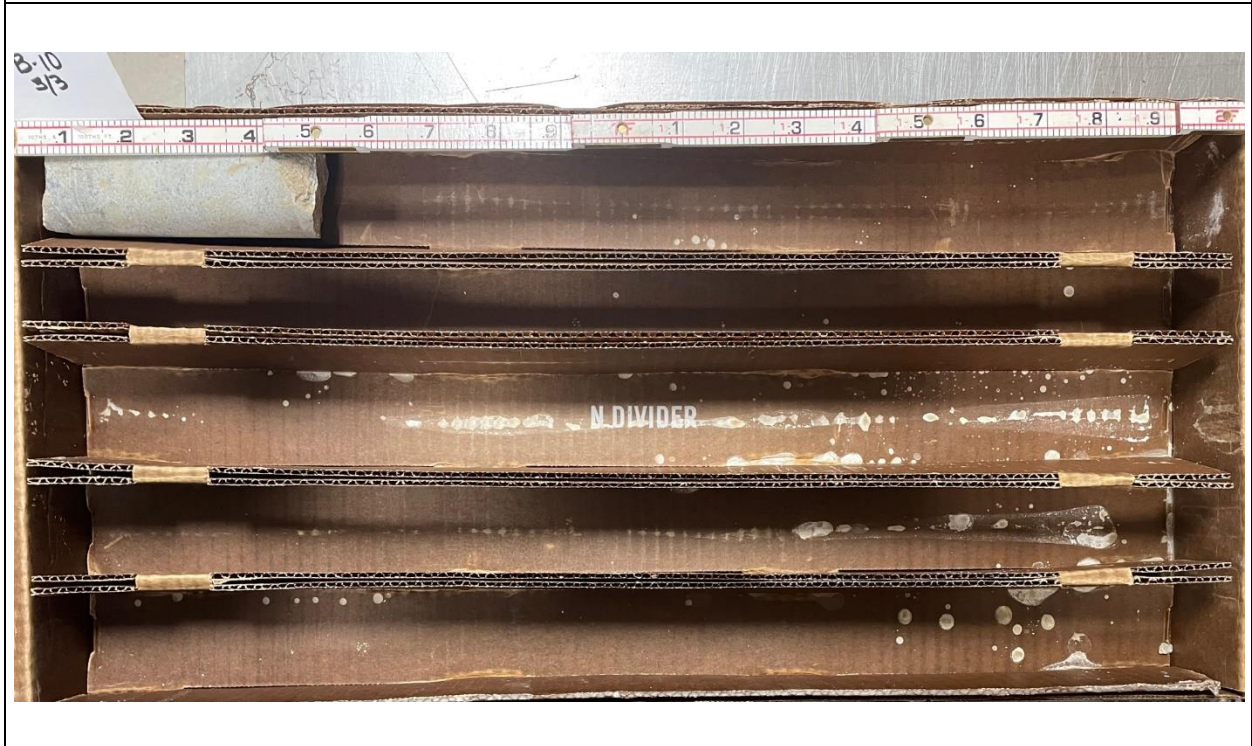
**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-10 (Box 2 of 3)



B-10 (Box 3 of 3)



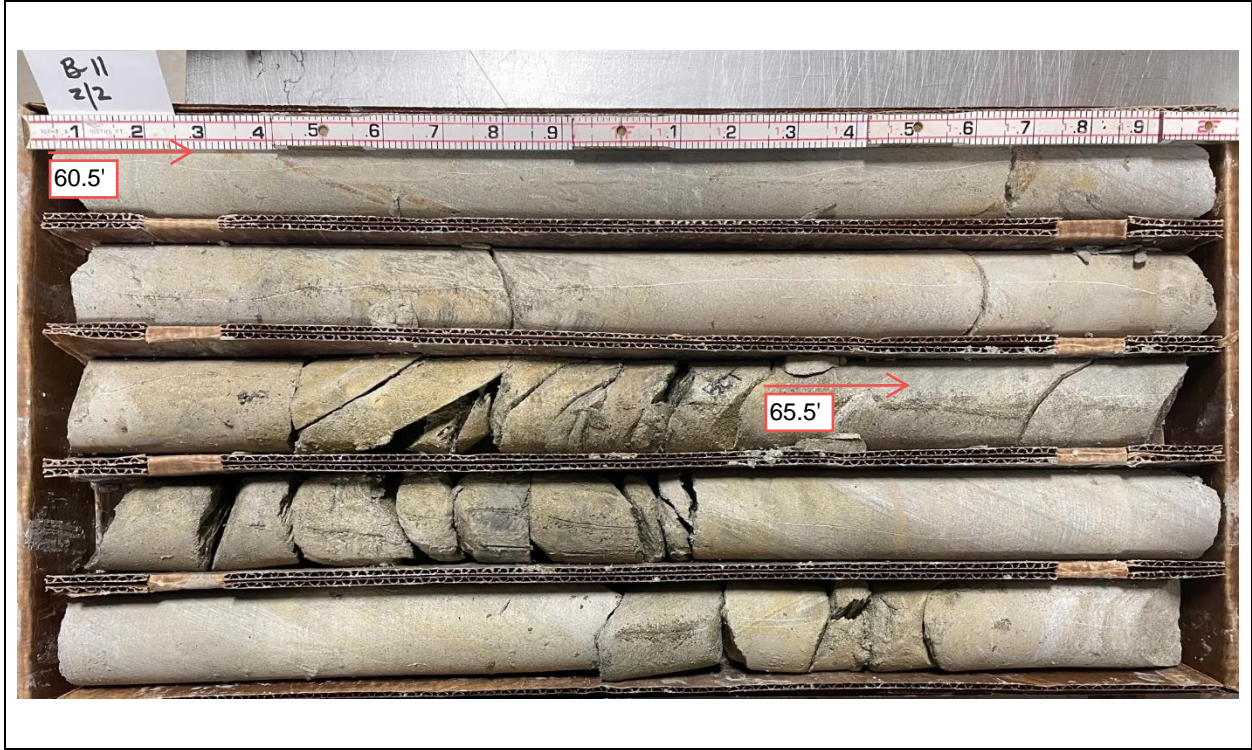
**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-11 (Box 1 of 2)



B-11 (Box 2 of 2)



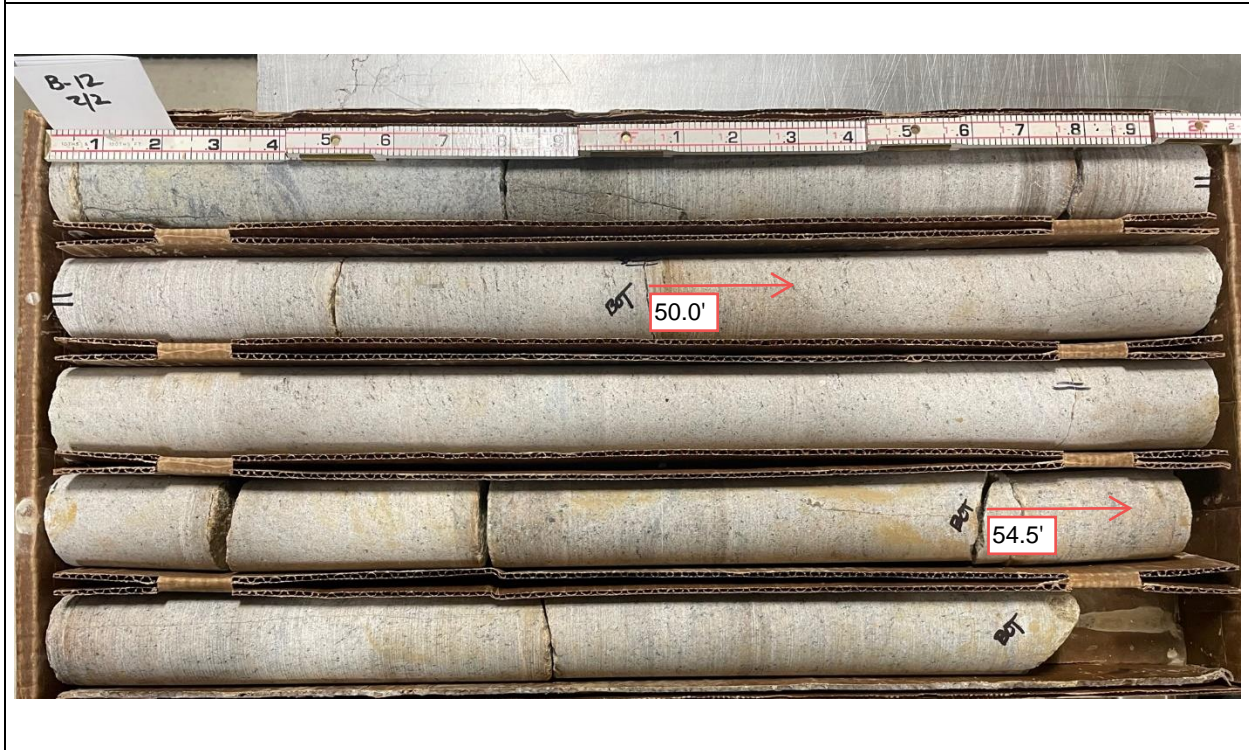
**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-12 (Box 1 of 2)



B-12 (Box 2 of 2)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-13 (Box 1 of 2)



B-13 (Box 2 of 2)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-14 (Box 1 of 2)



B-14 (Box 2 of 2)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-15 (Box 1 of 3)



B-15 (Box 2 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-15 (Box 3 of 3)



B-16 (Box 1 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-16 (Box 2 of 3)



B-16 (Box 3 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-17 (Box 1 of 3)



B-17 (Box 2 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-17 (Box 3 of 3)



B-18 (Box 1 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-18 (Box 2 of 3)



B-18 (Box 3 of 3)



**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-19 (Box 1 of 2)



B-19 (Box 2 of 2)



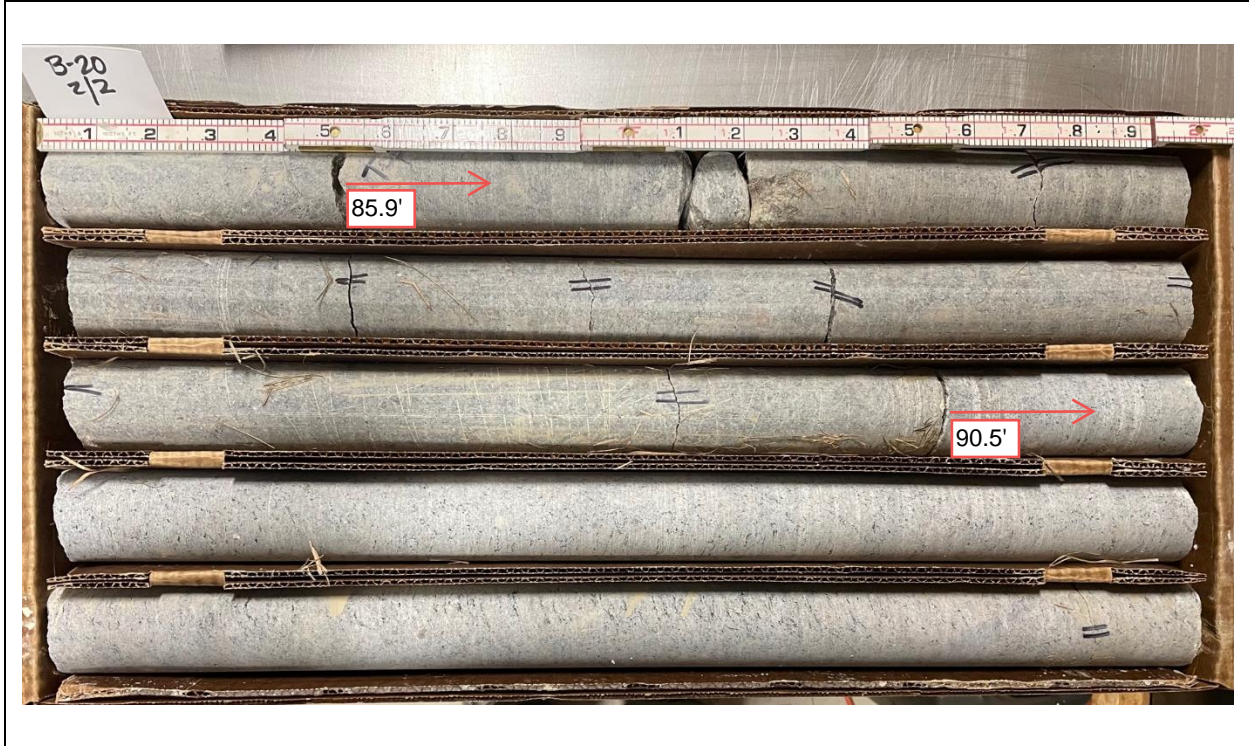
**Geotechnical Data Report – Rock Core Photographs**

I-20 over Wateree Bridges Project ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



B-20 (Box 1 of 2)



B-20 (Box 2 of 2)

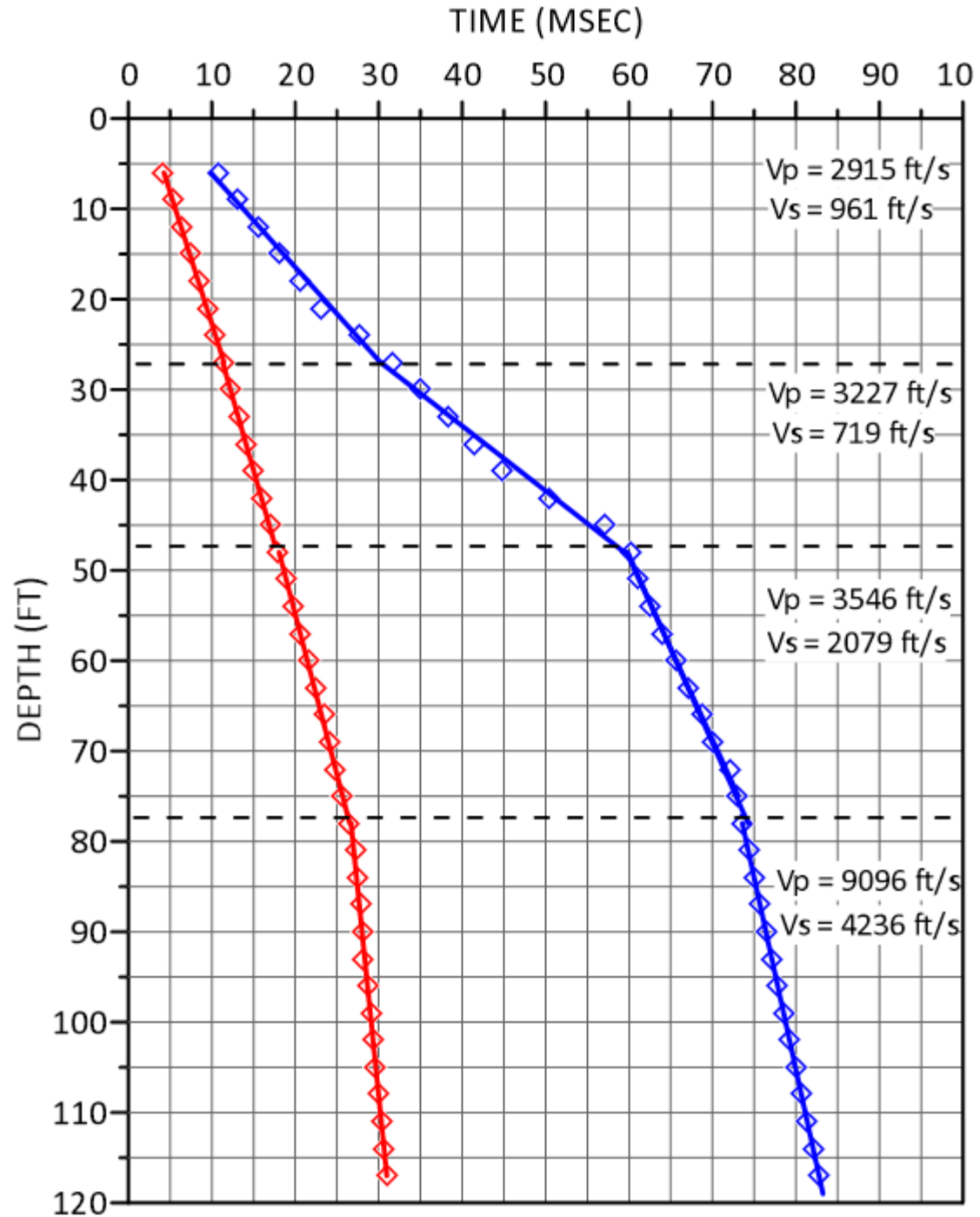


Figure 1: Downhole P-wave travel times (red diamonds) and S-wave travel times (blue diamonds). The inverse slope of straight lines fit to the travel times (using linear regression) that represent velocity.

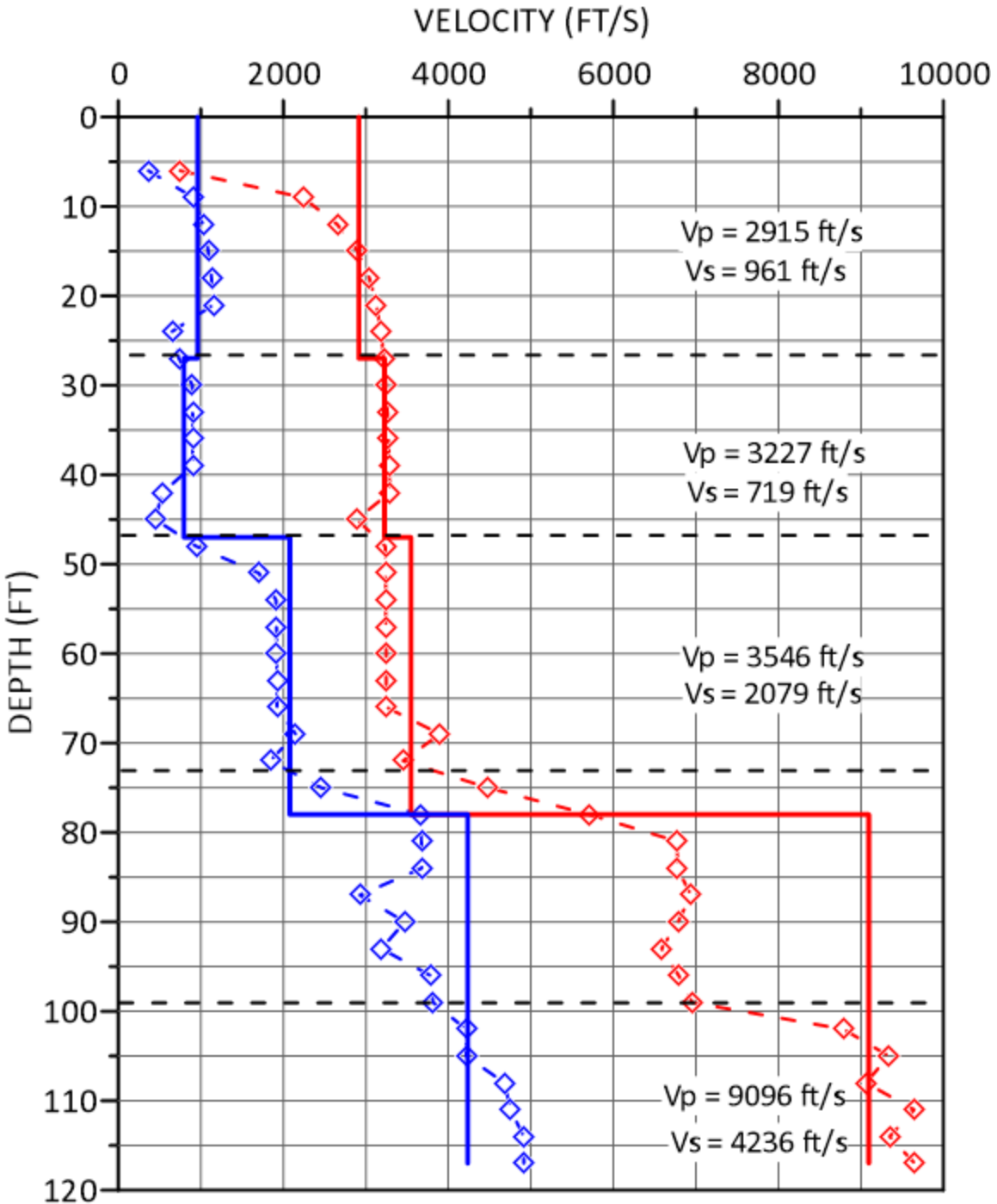
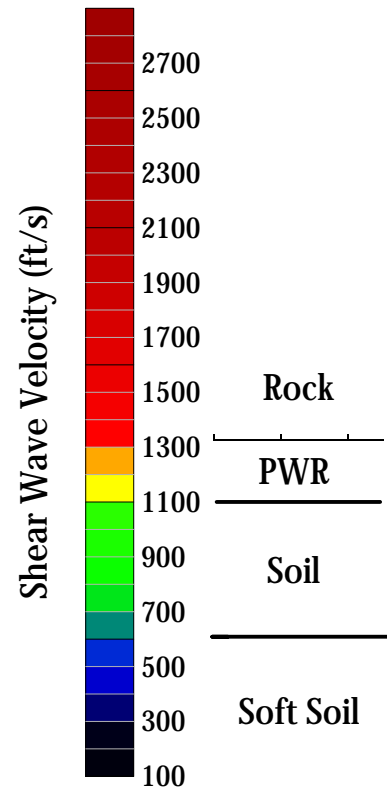


Figure 2: Downhole P-wave velocities (red diamonds) and S-wave velocities (blue diamonds). Solid lines represent layered velocities determined by linear regression. Dashed Lines represent interval velocities.

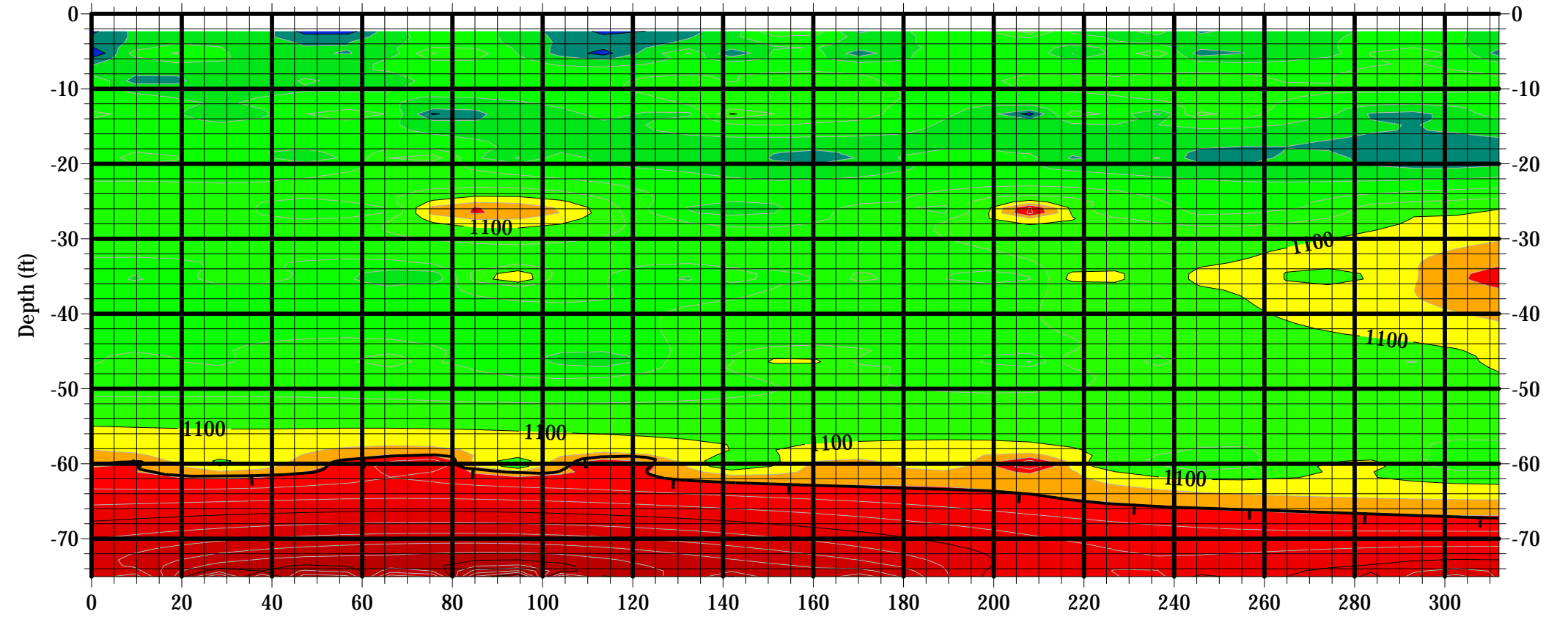
DEPTH (FT)	INTERVAL VELOCITIES		LAYER VELOCITIES	
	Vp (ft/sec)	Vs (ft/sec)	Vp (ft/sec)	Vs (ft/sec)
6	749	366	2915	961
9	2239	910	2915	961
12	2653	1024	2915	961
15	2900	1091	2915	961
18	3044	1130	2915	961
21	3130	1154	2915	961
24	3184	650	2915	961
27	3220	735	2915	961
30	3244	898	3227	795
33	3262	901	3227	795
36	3274	903	3227	795
39	3284	904	3227	795
42	3291	536	3227	795
45	2889	449	3227	795
48	3236	945	3546	2079
51	3240	1703	3546	2079
54	3243	1912	3546	2079
57	3245	1916	3546	2079
60	3247	1920	3546	2079
63	3249	1923	3546	2079
66	3250	1925	3546	2079
69	3898	2150	3546	2079
72	3450	1841	3546	2079
75	4483	2461	3546	2079
78	5710	3669	9096	4236
81	6773	3674	9096	4236
84	6778	3678	9096	4236
87	6939	2928	9096	4236
90	6786	3472	9096	4236
93	6585	3191	9096	4236
96	6792	3784	9096	4236
99	6952	3815	9096	4236
102	8788	4214	9096	4236
105	9339	4217	9096	4236
108	9061	4679	9096	4236
111	9646	4756	9096	4236
114	9349	4914	9096	4236
117	9652	4916	9096	4236

Figure 3: Interval velocities (left) and layer velocities (right).

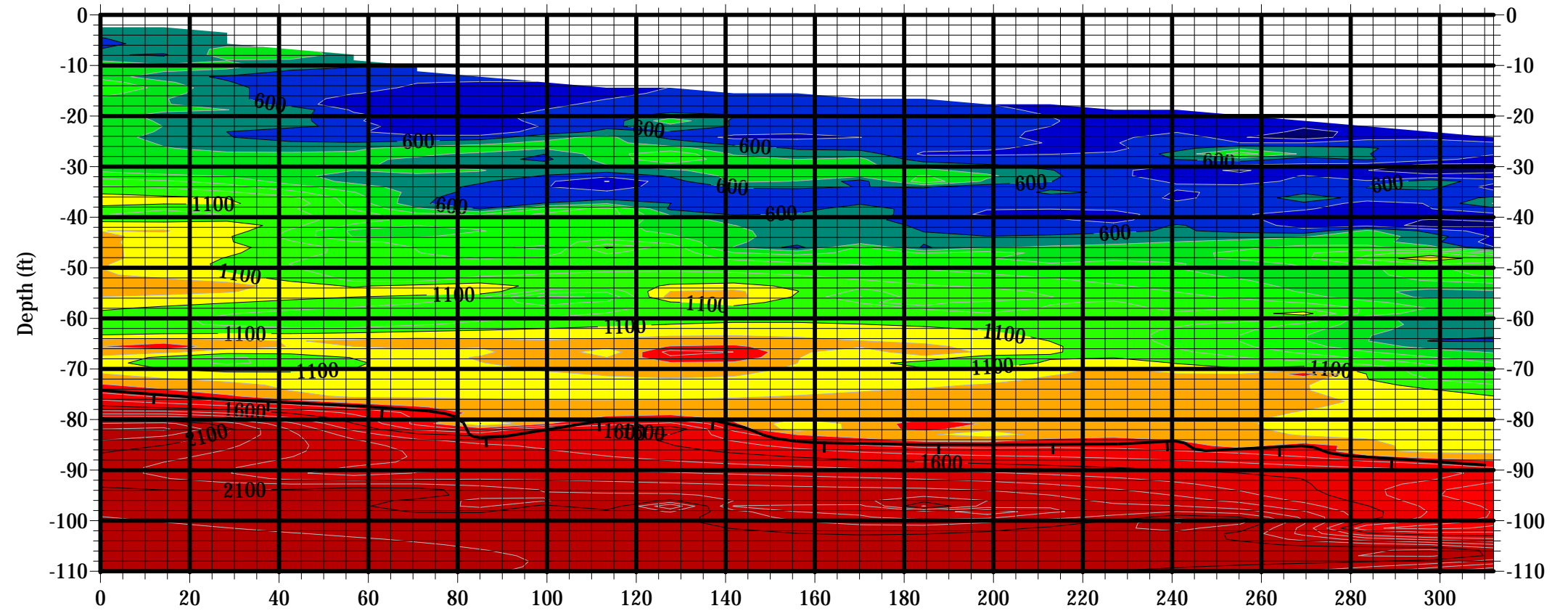




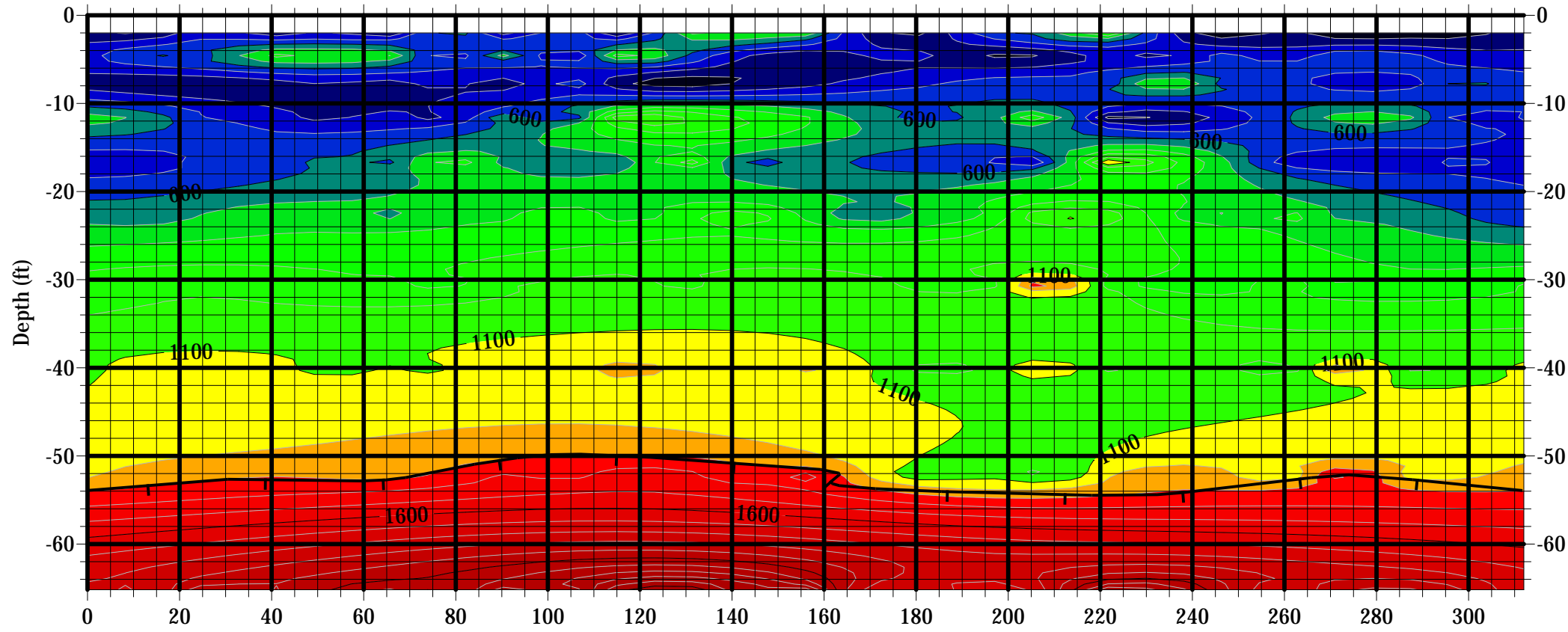
**MASW 1**  
Distance (ft)



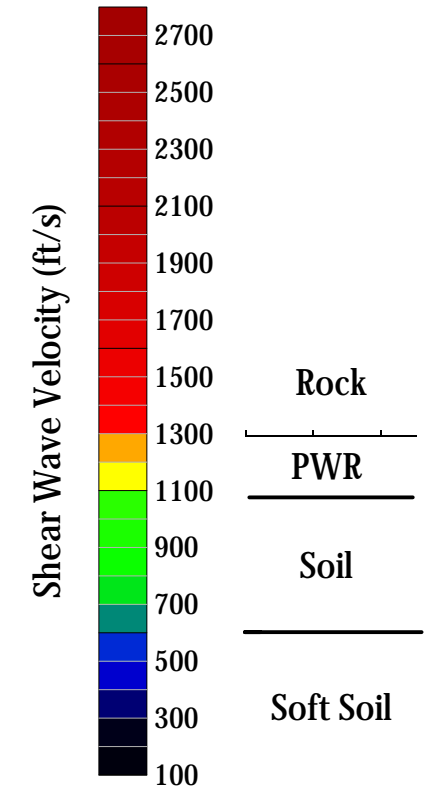
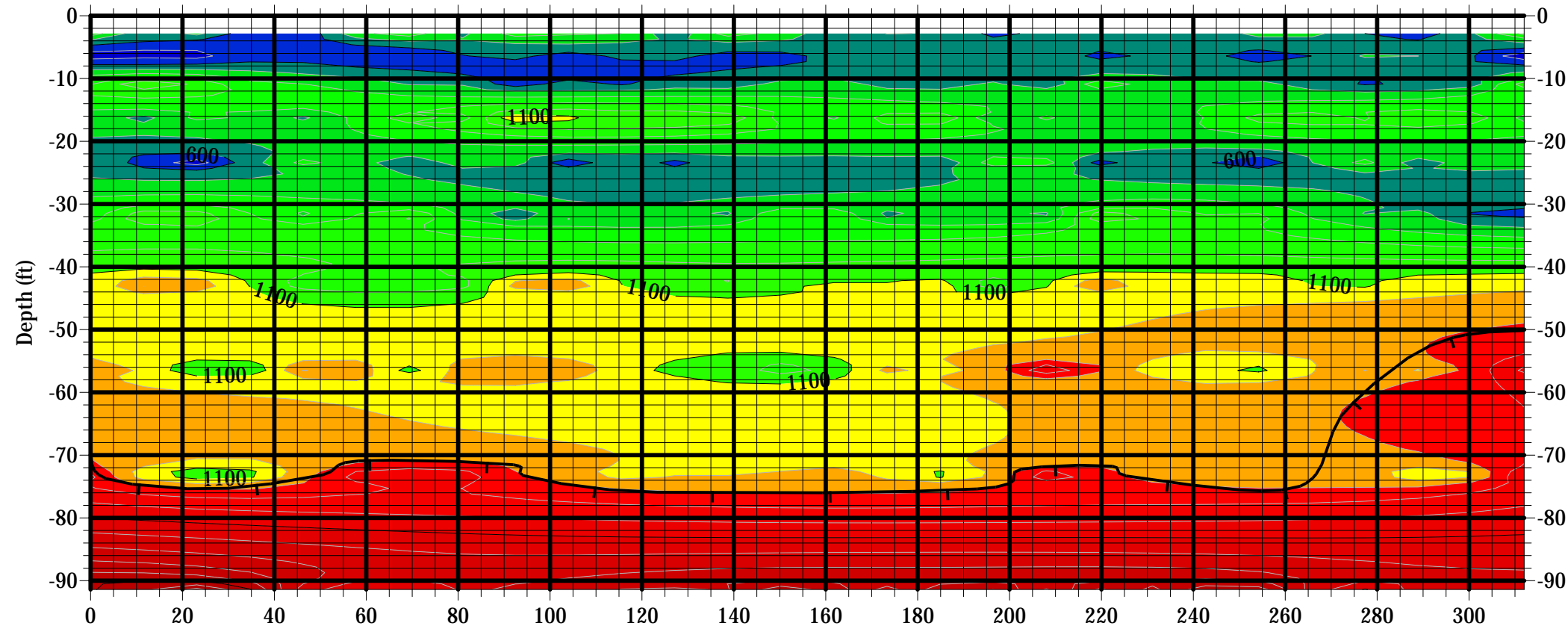
**MASW 2**  
Distance (ft)



**MASW 3**  
Distance (ft)

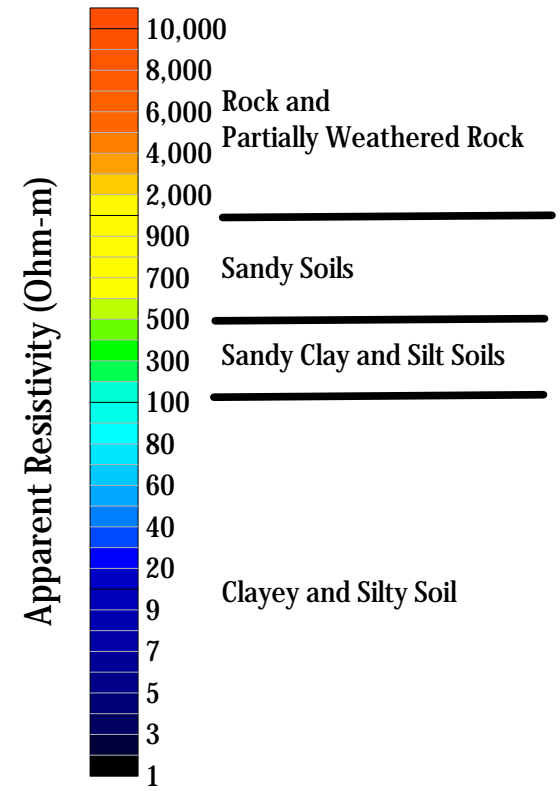
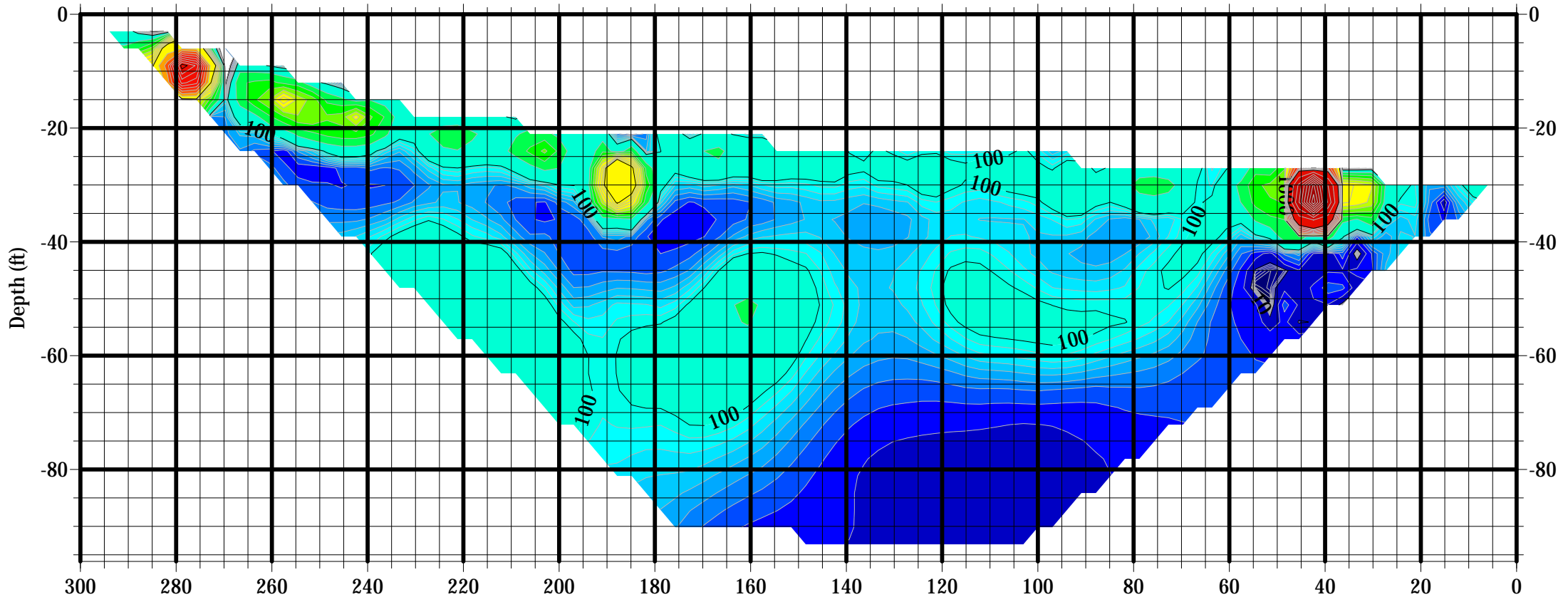


**MASW 4**  
Distance (ft)

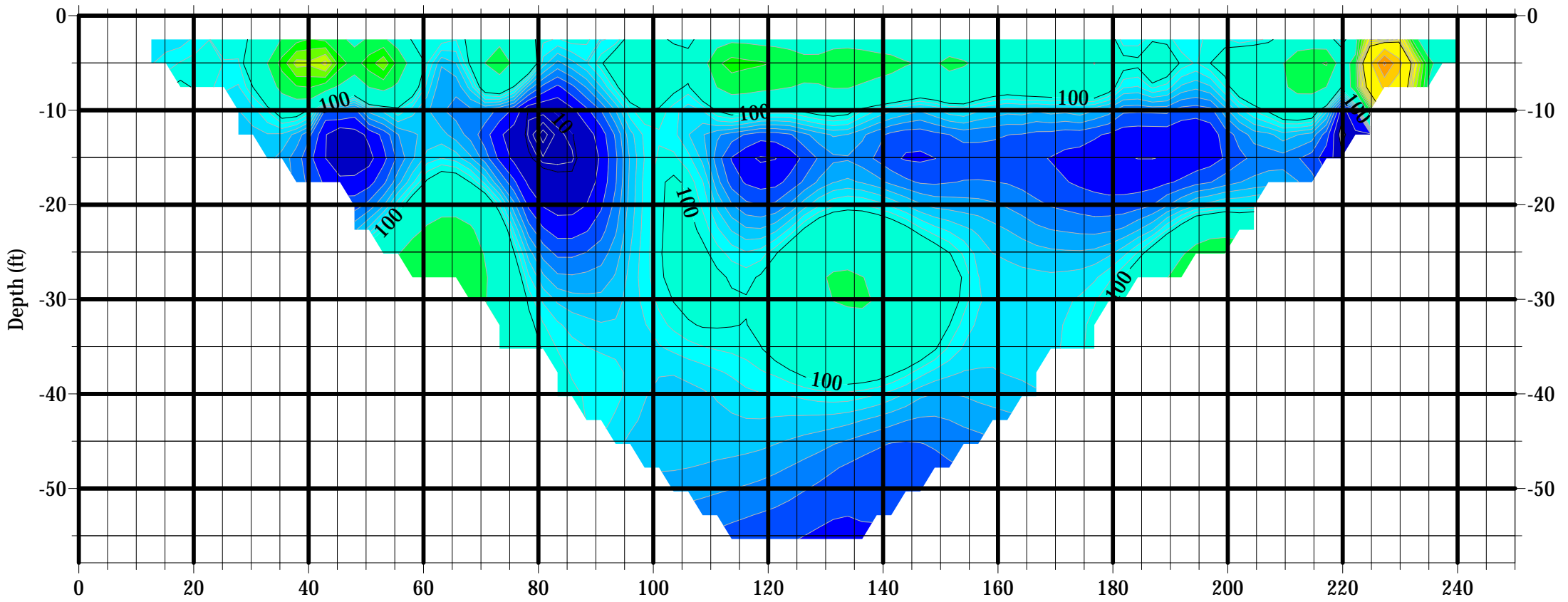




**ERT 1**  
Distance (ft)

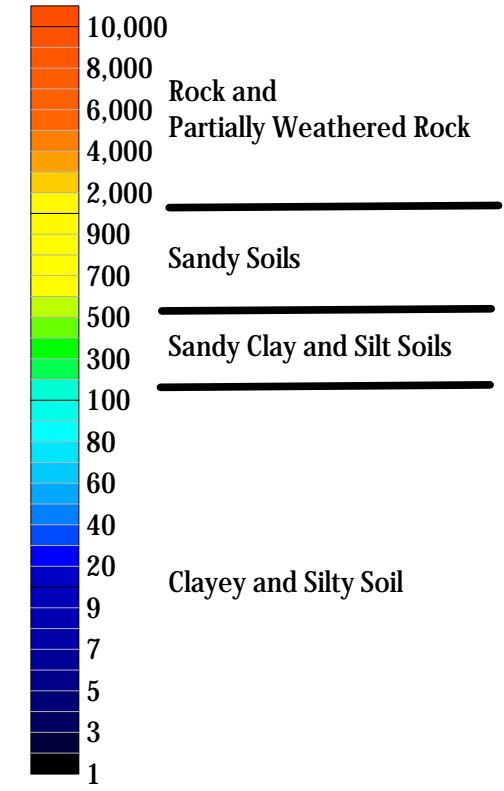
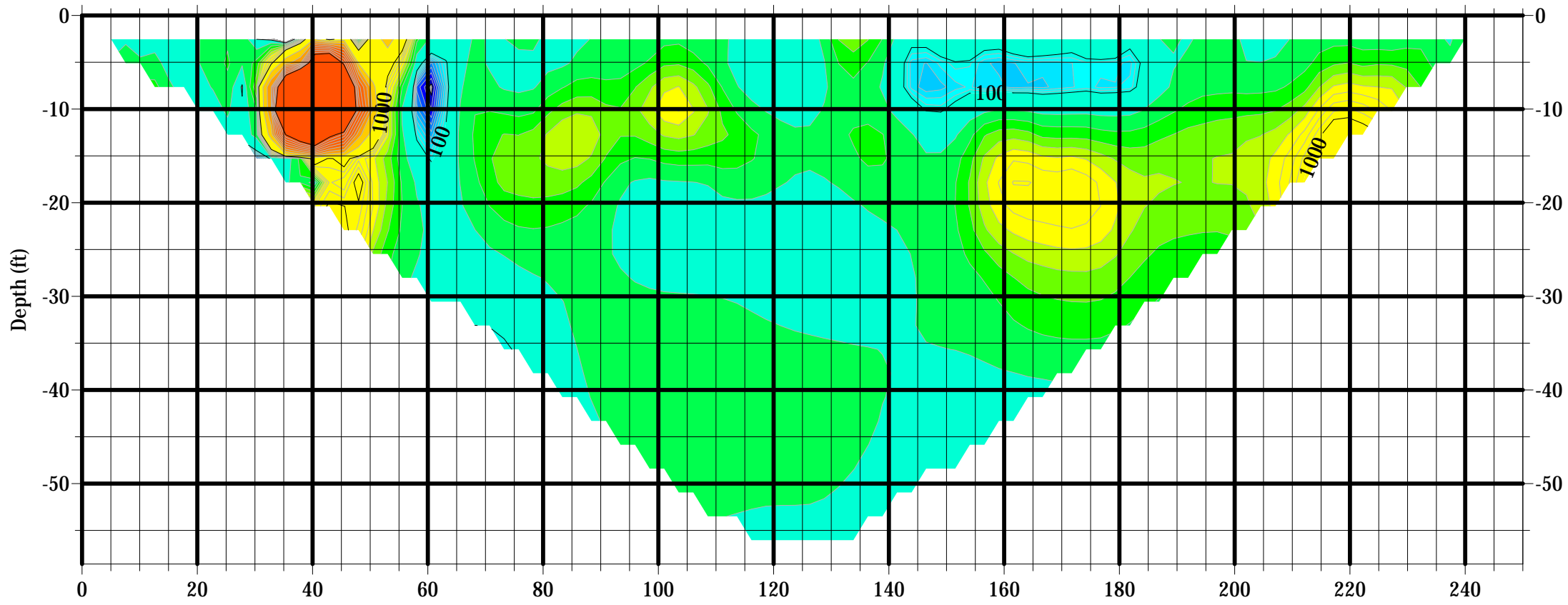


**ERT 2**  
Distance (ft)

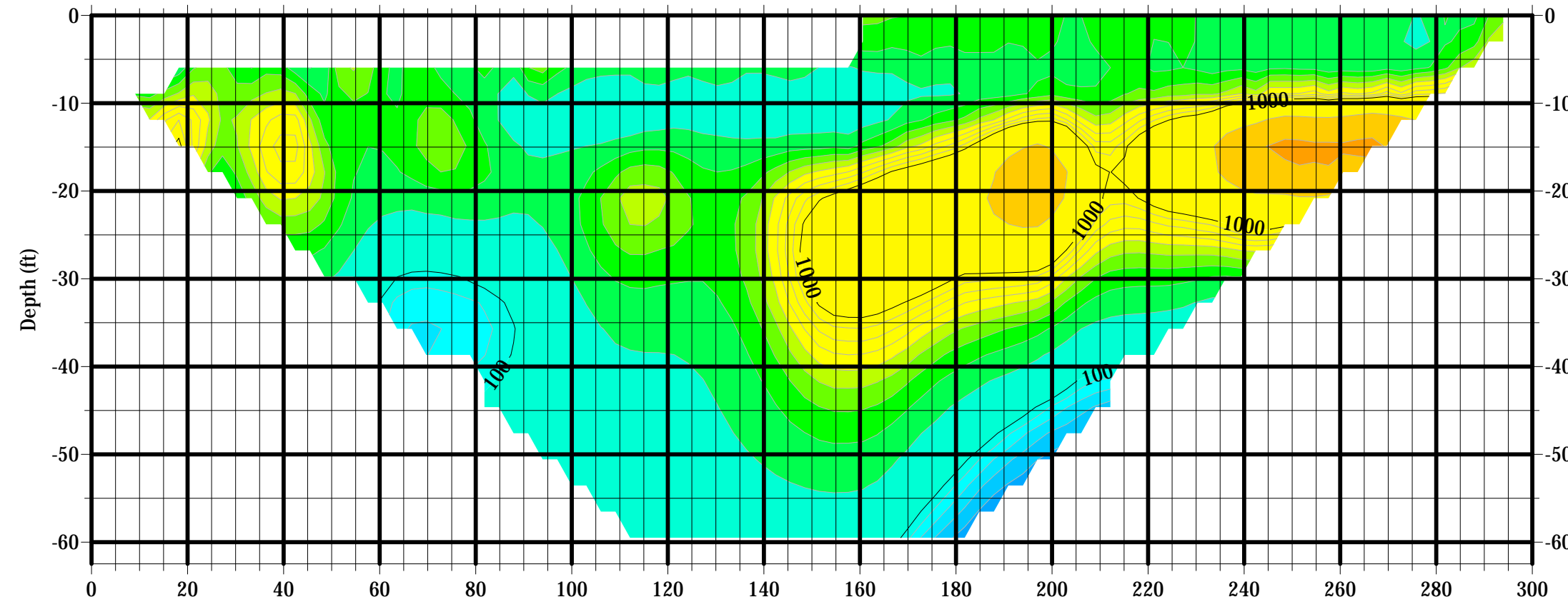




**ERT 3**  
Distance (ft)



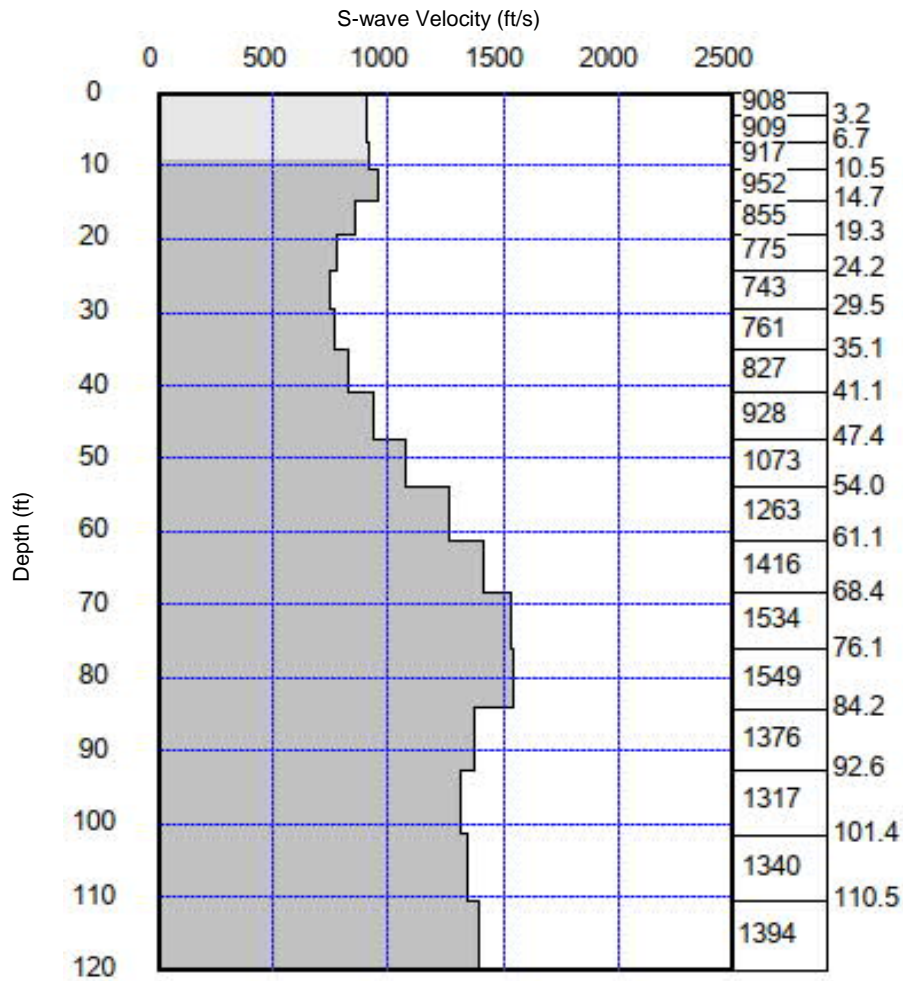
**ERT 4**  
Distance (ft)



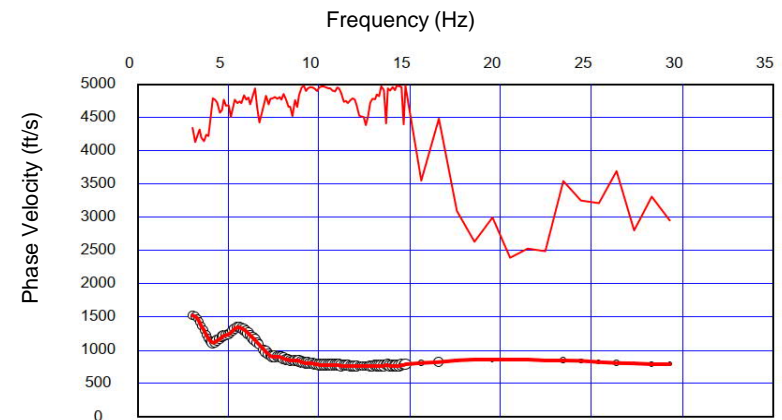
## Exploration Results

I-20 Wateree River Bridge Repairs  
Terracon Project No. 70215252

### Shear-Wave Profile 1



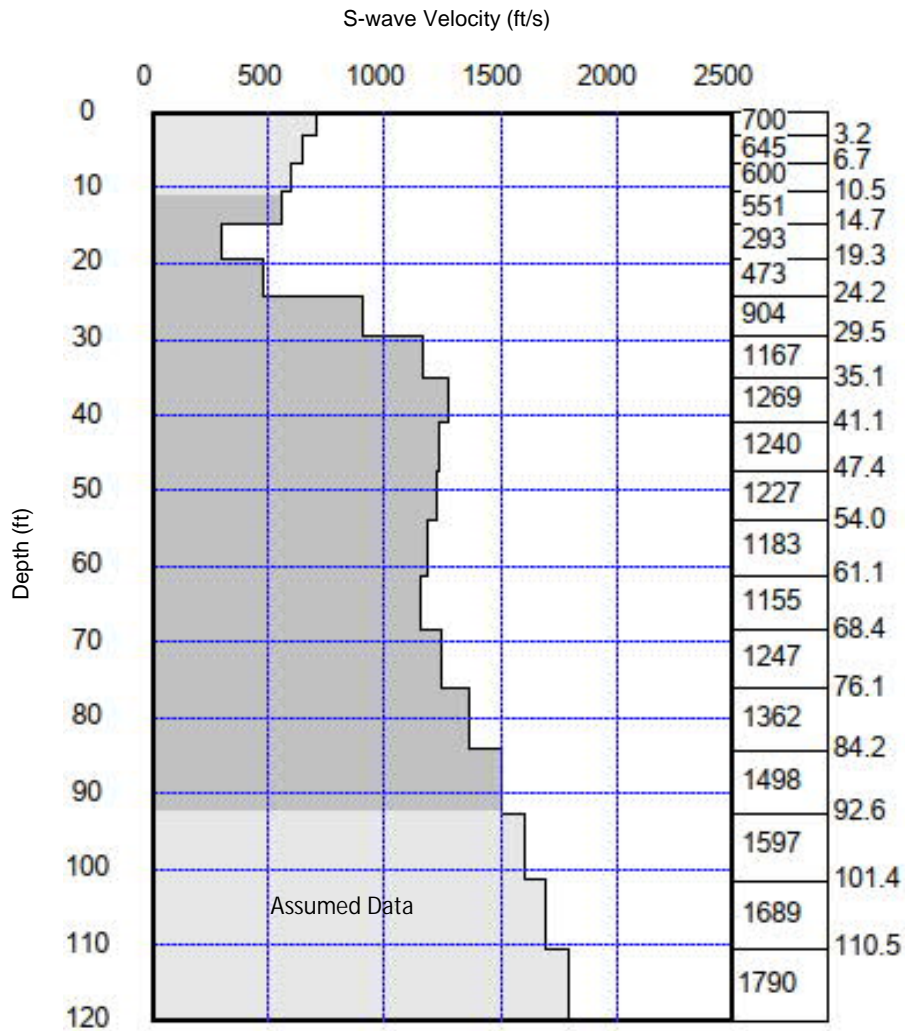
Testing Results	
Depth(ft)	S-wave velocity(ft/s)
0.0	908.9
3.2	909.1
6.7	917.1
10.5	952.2
14.7	855.4
19.3	775.4
24.2	743.5
29.5	761.7
35.1	827.8
41.1	929.0
47.4	1073.5
54.0	1263.9
61.1	1416.1
68.4	1534.6
76.1	1549.7
84.2	1376.0
92.6	1317.0
101.4	1340.7
110.5	1394.3
120.0	1549.7



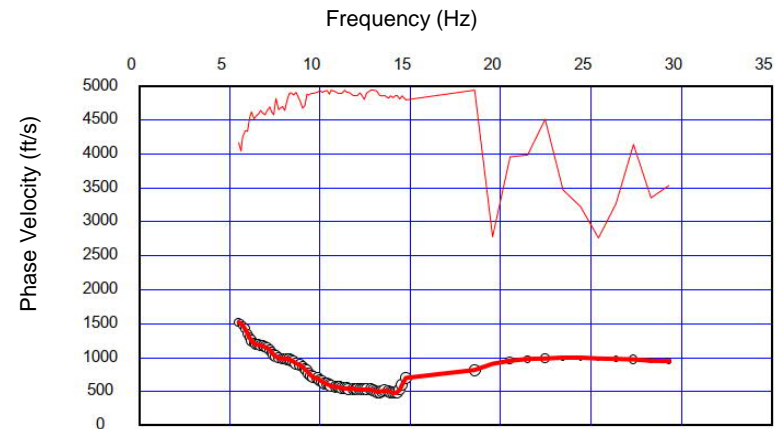
## Exploration Results

I-20 Wateree River Bridge Repairs  
Terracon Project No. 70215252

### Shear-Wave Profile 2



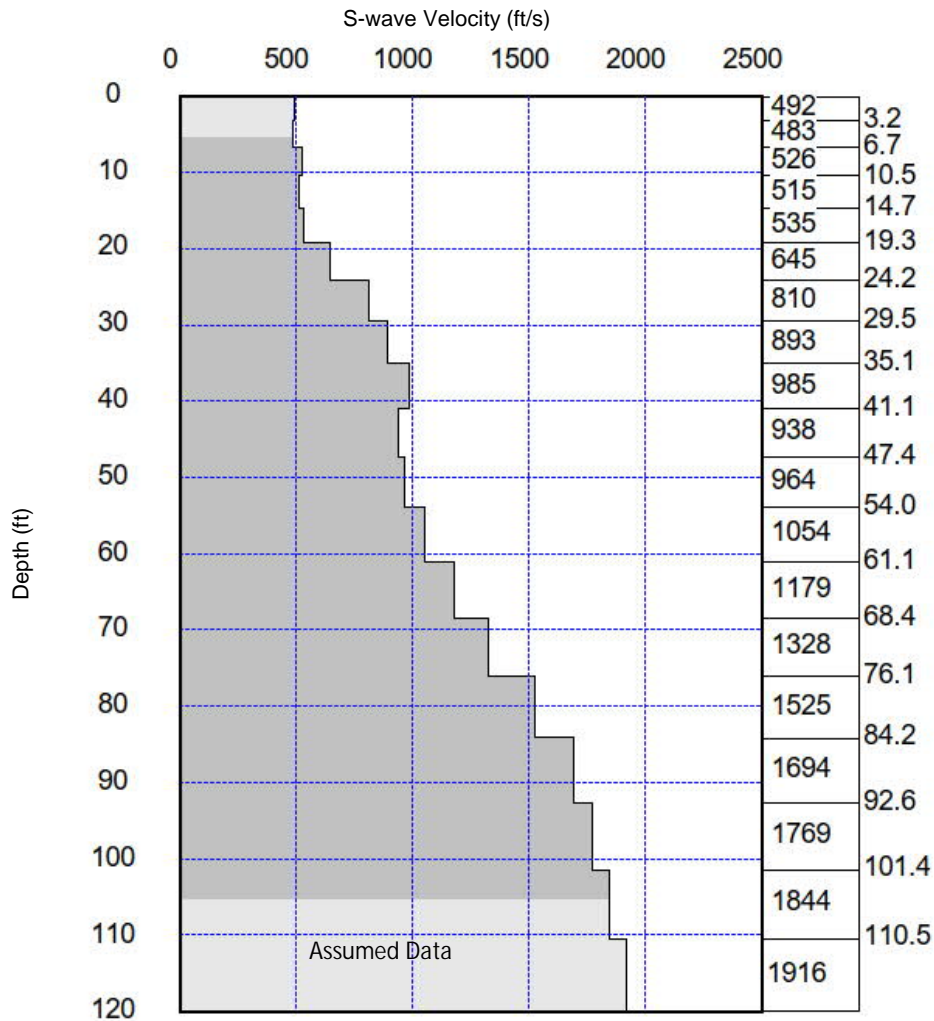
Testing Results	
Depth(ft)	S-wave velocity(ft/s)
0.0	700.0
3.2	645.0
6.7	600.0
10.5	551.4
14.7	293.7
19.3	473.5
24.2	904.9
29.5	1167.5
35.1	1269.3
41.1	1240.6
47.4	1227.8
54.0	1183.9
61.1	1155.7
68.4	1247.4
76.1	1362.2
84.2	1498.5
92.6	1597.1
101.4	1689.2
110.5	1790.0
120.0	1878.0



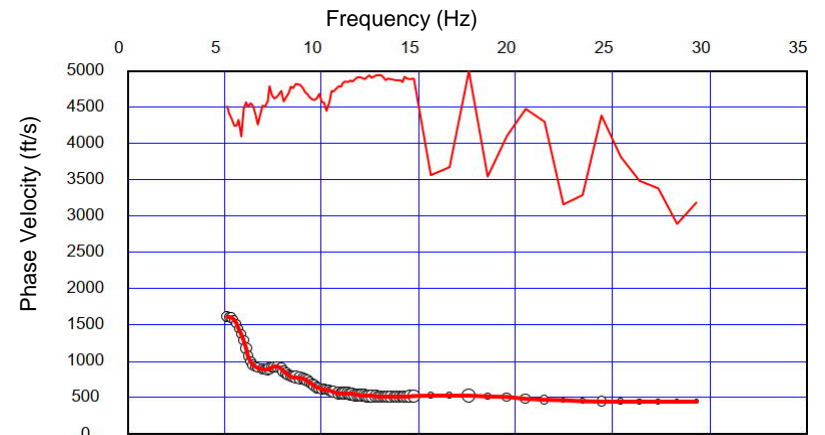
## Exploration Results

I-20 Wateree River Bridge Repairs  
Terracon Project No. 70215252

### Shear-Wave Profile 3



Testing Results	
Depth(ft)	S-wave velocity(ft/s)
0.0	492.5
3.2	483.9
6.7	526.7
10.5	515.8
14.7	535.7
19.3	645.9
24.2	810.9
29.5	893.3
35.1	985.9
41.1	938.0
47.4	964.8
54.0	1054.1
61.1	1179.1
68.4	1328.0
76.1	1526.0
84.2	1694.5
92.6	1769.4
101.4	1844.4
110.5	1916.0
120.0	1955.6

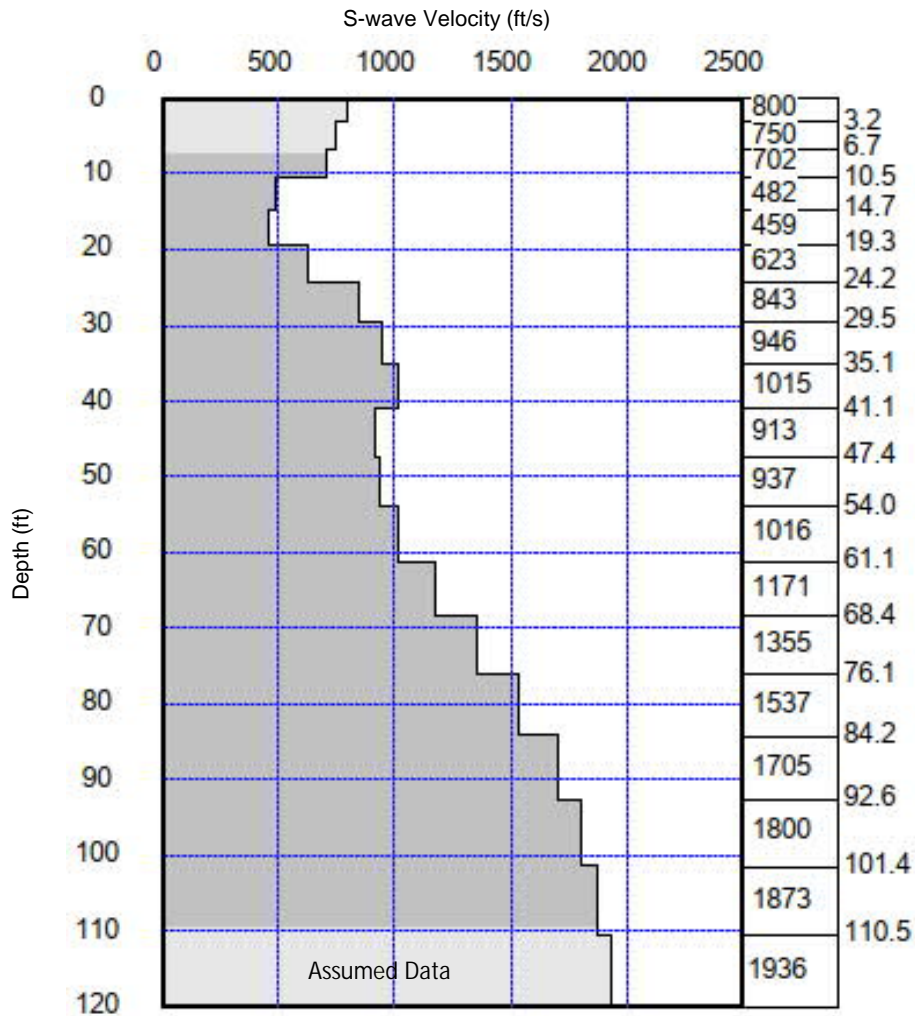




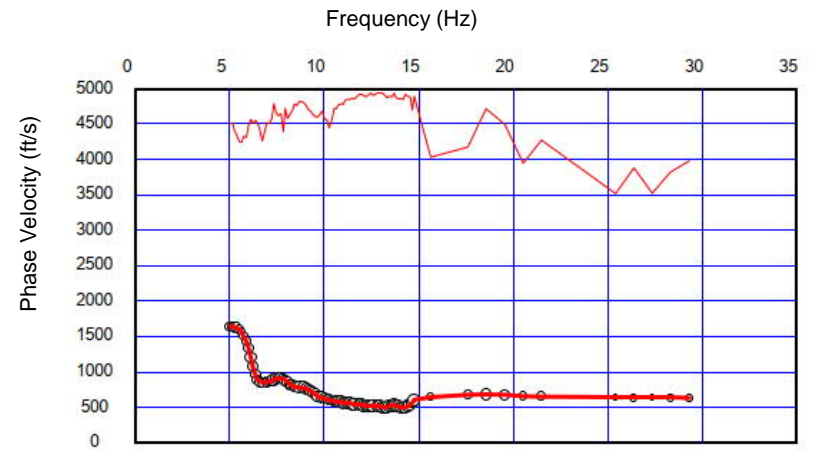
## Exploration Results

I-20 Wateree River Bridge Repairs  
Terracon Project No. 70215252

### Shear-Wave Profile 4



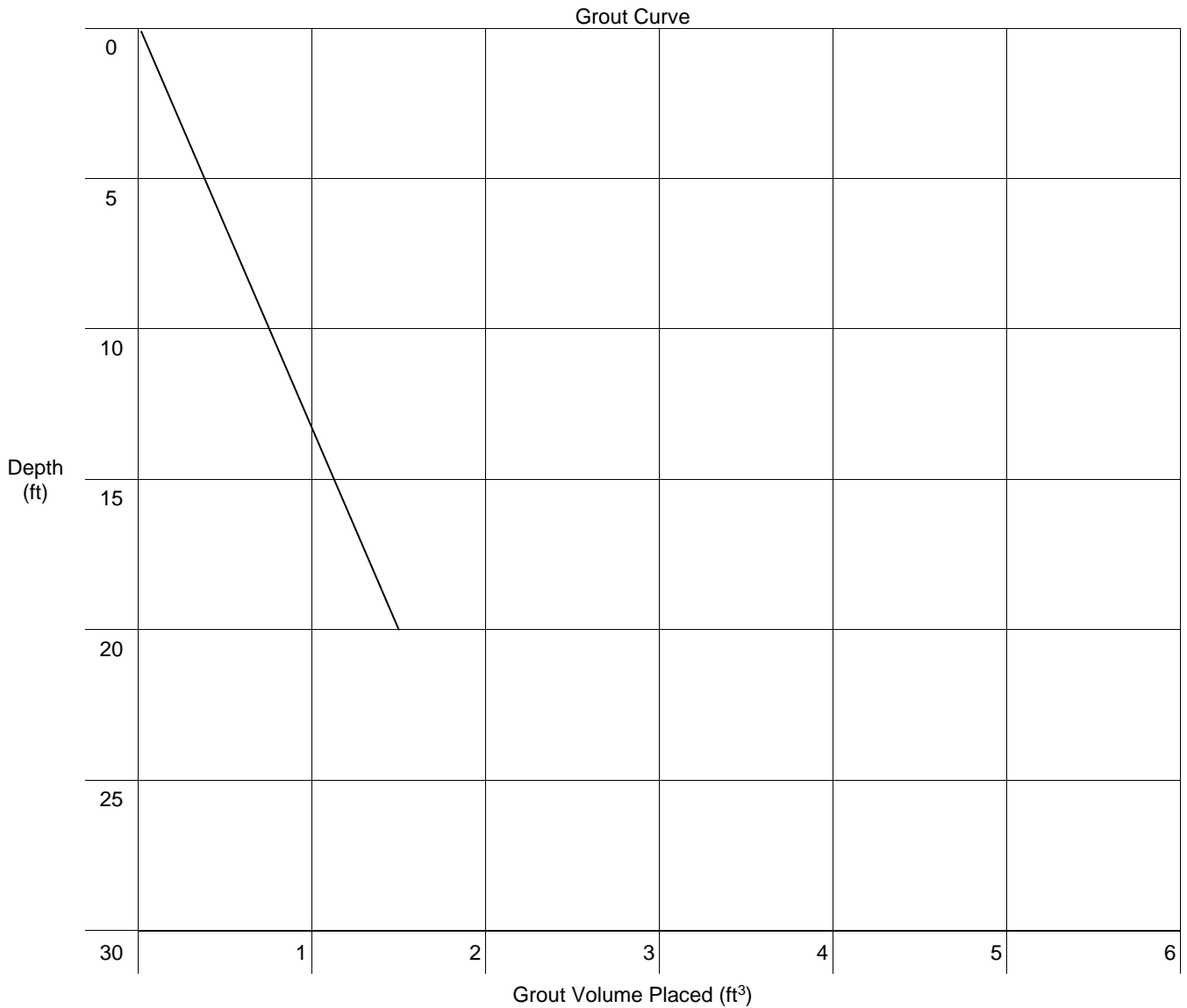
Testing Results	
Depth(ft)	S-wave velocity(ft/s)
0.0	800.0
3.2	750.0
6.7	702.0
10.5	482.4
14.7	460.0
19.3	623.2
24.2	843.4
29.5	946.2
35.1	1016.0
41.1	913.4
47.4	937.3
54.0	1016.6
61.1	1171.6
68.4	1356.0
76.1	1537.1
84.2	1705.3
92.6	1800.3
101.4	1873.7
110.5	1936.5
120.0	1955.3





## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-1	
Project ID:	P029450, P029776, P029777		Station:	1879+26.88	
Consultant Firm:	Terracon Consultants, Inc.	Date:	6/22/2021	Offset:	56.41 L
Grouted By (Driller's Name):	ST				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				

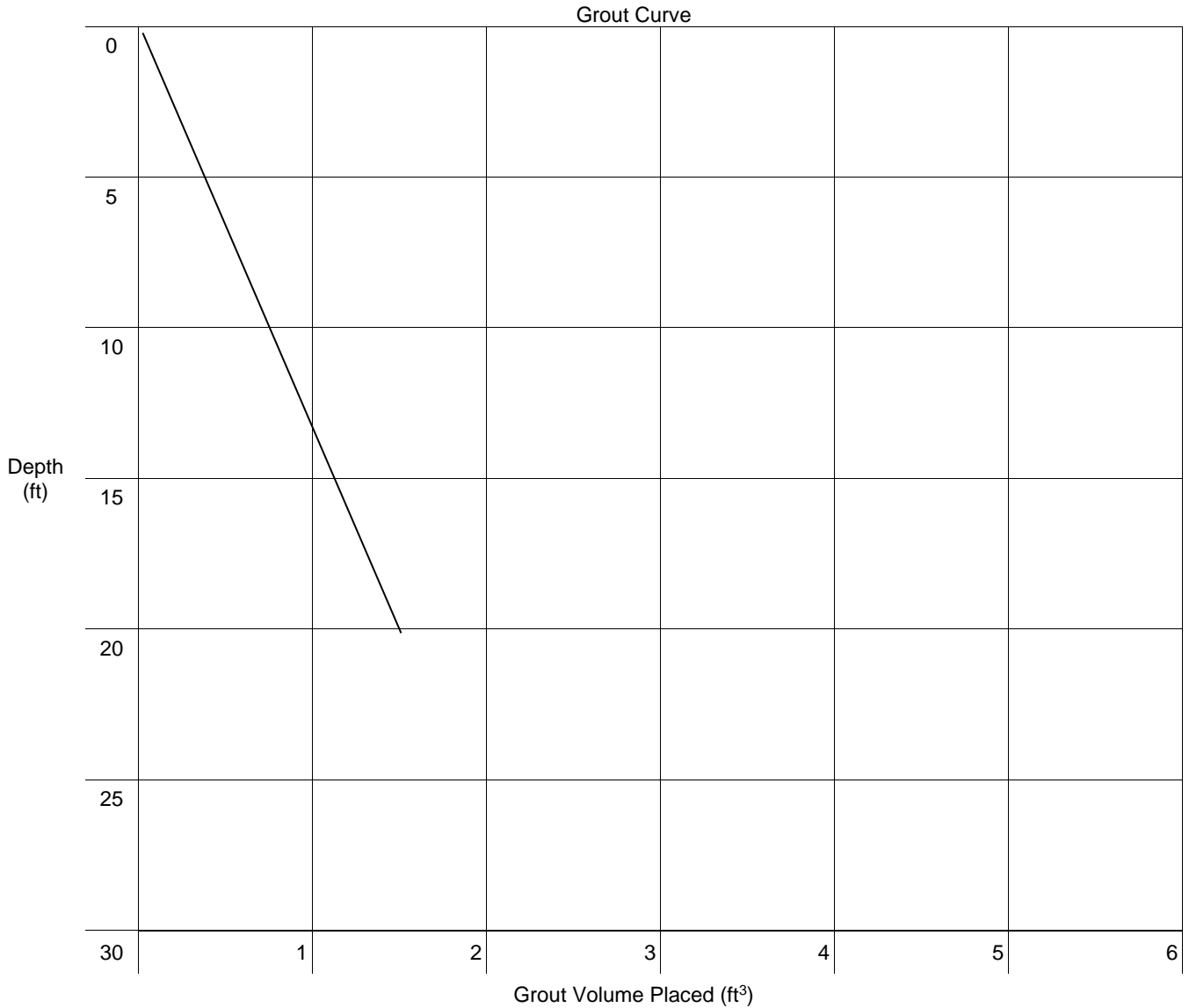


Number of Bags On-Site	10	ea.
Depth of Test Hole Grouted	20	ft.
Diameter of Test Hole	0.25	ft.
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	2	ea.
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-2	
Project ID:	P029450, P029776, P029777		Station:	1876+38.54	
Consultant Firm:	Terracon Consultants, Inc.	Date:	6/22/2021	Offset:	54.14 L
Grouted By (Driller's Name):	ST				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				



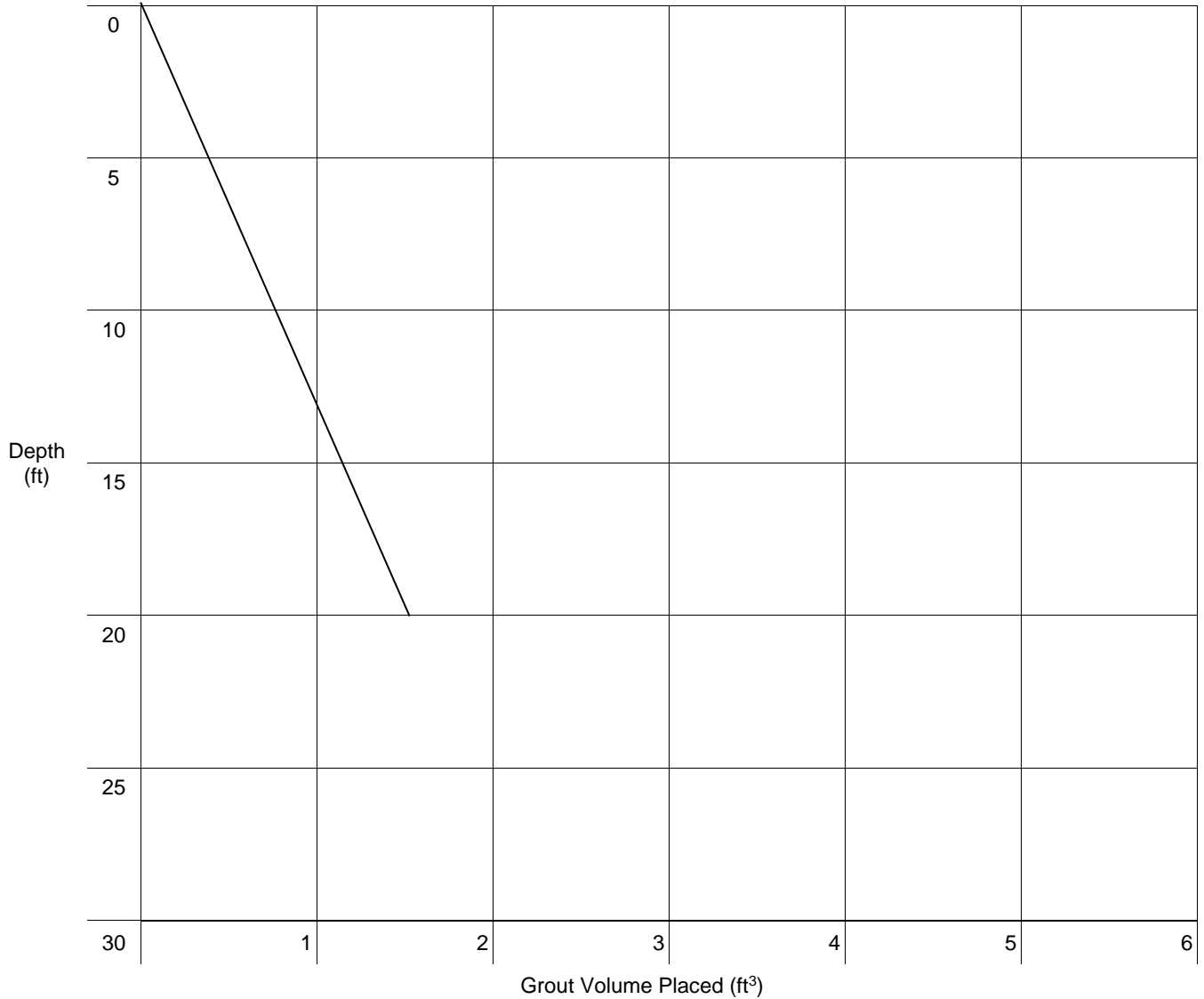
Number of Bags On-Site	10	ea.
Depth of Test Hole Grouted	20	ft.
Diameter of Test Hole	0.25	ft.
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	2	ea.
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name: I-20 Wateree River Bridge Repairs  
Project ID: P029450, P029776, P029777 Test Hole No.: B-3  
Consultant Firm: Terracon Consultants, Inc. Station: 1841+40.20  
Grouted By (Driller's Name): ST Date 8/26/2021 Offset: 69.68 L  
Notes: Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water

GROUT CURVE



Number of Bags On-Site	<u>10</u>	ea.
Depth of Test Hole Grouted	<u>20</u>	ft.
Diameter of Test Hole	<u>0.25</u>	ft.
Area of Test Hole	<u>0.05</u>	ft <sup>2</sup>
Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Volume of Casing (If applicable)	<u>N/A</u>	ft <sup>3</sup>
Theoretical Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Number of Bags Used	<u>2</u>	ea.
Volume Placed	<u>1.5</u>	ft <sup>3</sup>

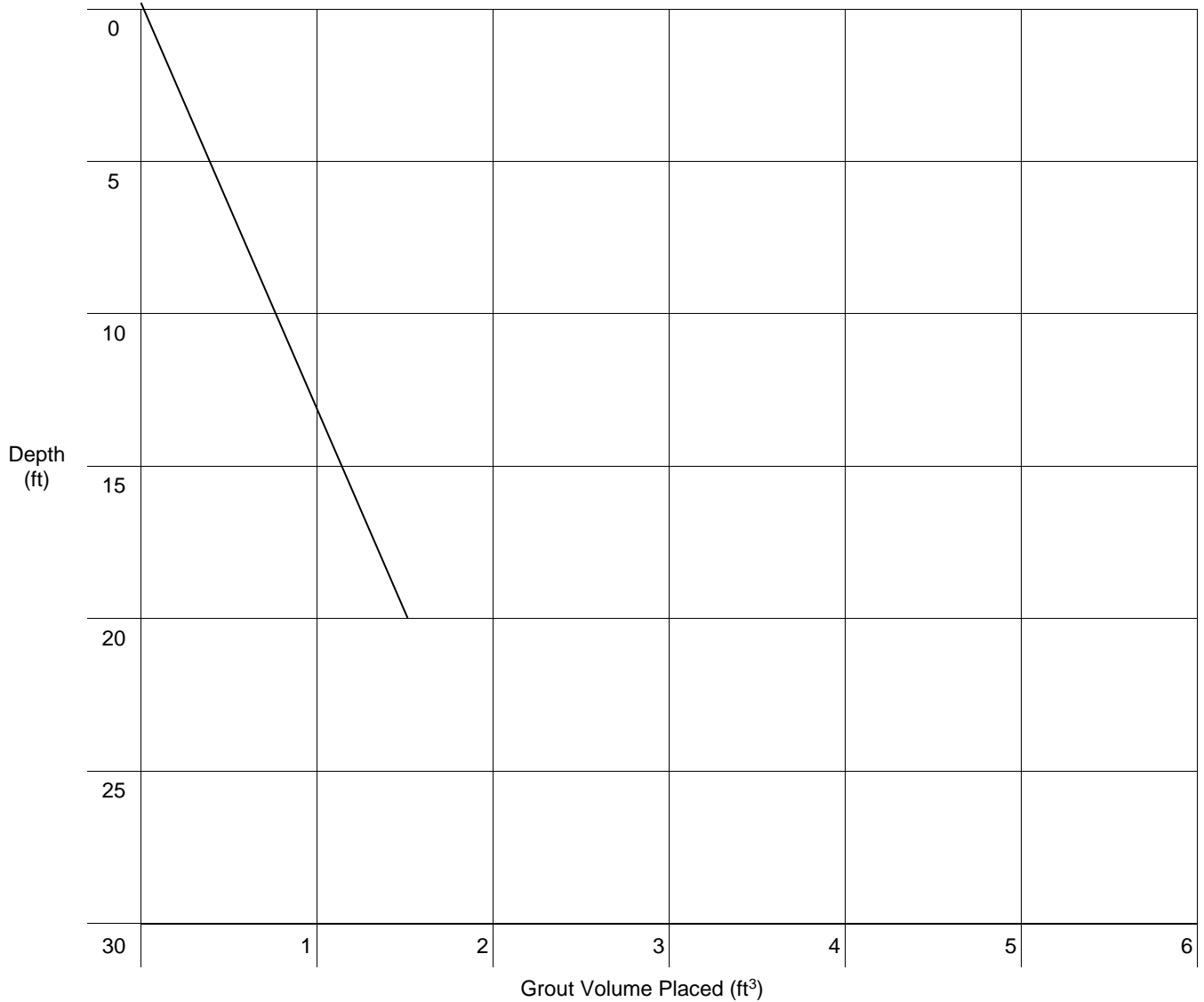




## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-4
Project ID:	P029450, P029776, P029777		Station:	1838+74.75
Consultant Firm:	Terracon Consultants, Inc.		Offset:	67.32 L
Grouted By (Driller's Name):	ST	Date	8/23/2021	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

GROUT CURVE

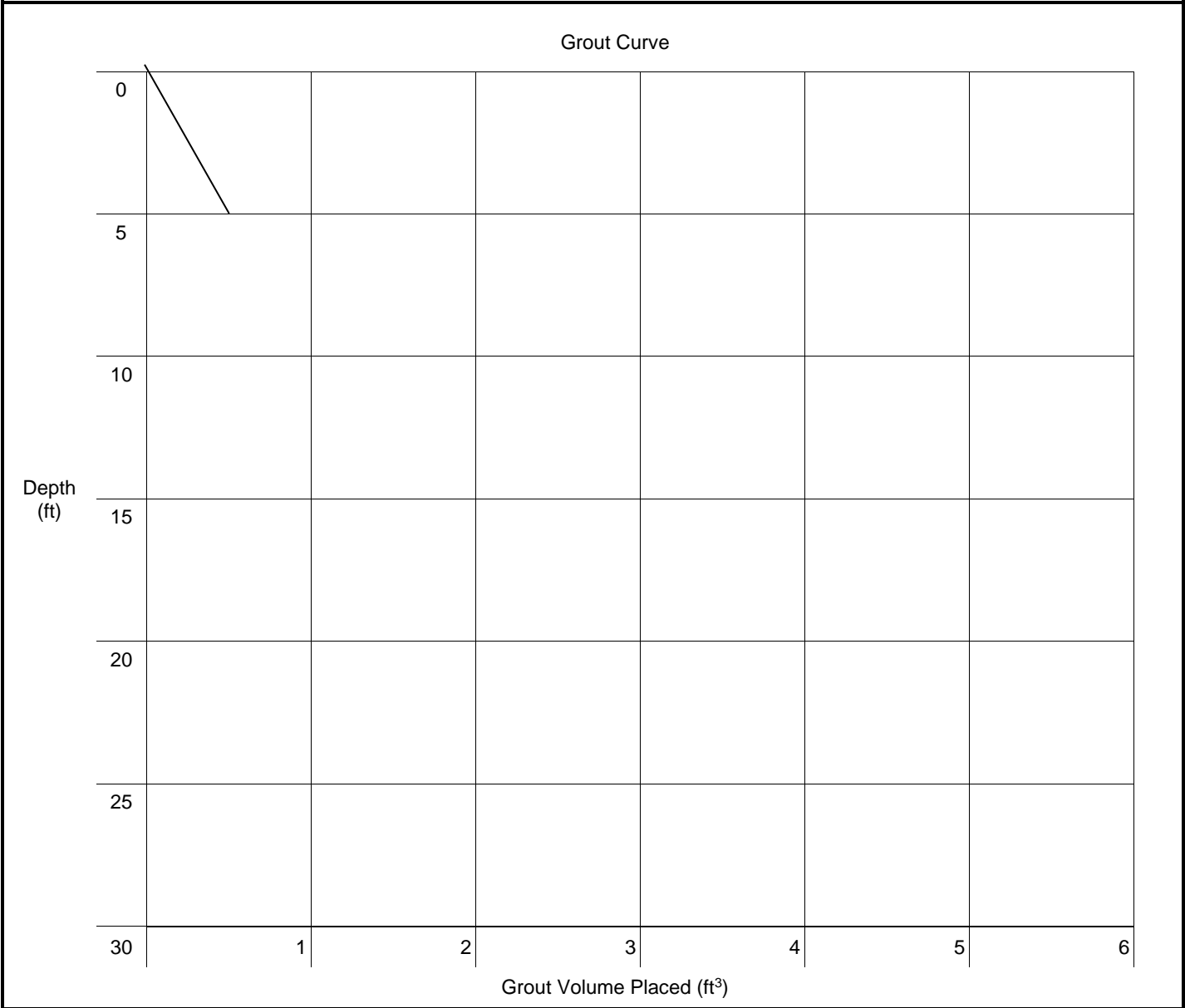


Number of Bags On-Site	10	ea.
Depth of Test Hole Grouted	20	ft.
Diameter of Test Hole	0.25	ft.
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	2	ea.
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs	Test Hole No.:	B-5
Project ID:	P029450, P029776, P029777	Station:	1810+35.00
Consultant Firm:	Terracon Consultants, Inc.	Offset:	56.06 L
Grouted By (Driller's Name):	ST	Date	5/6/2021
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

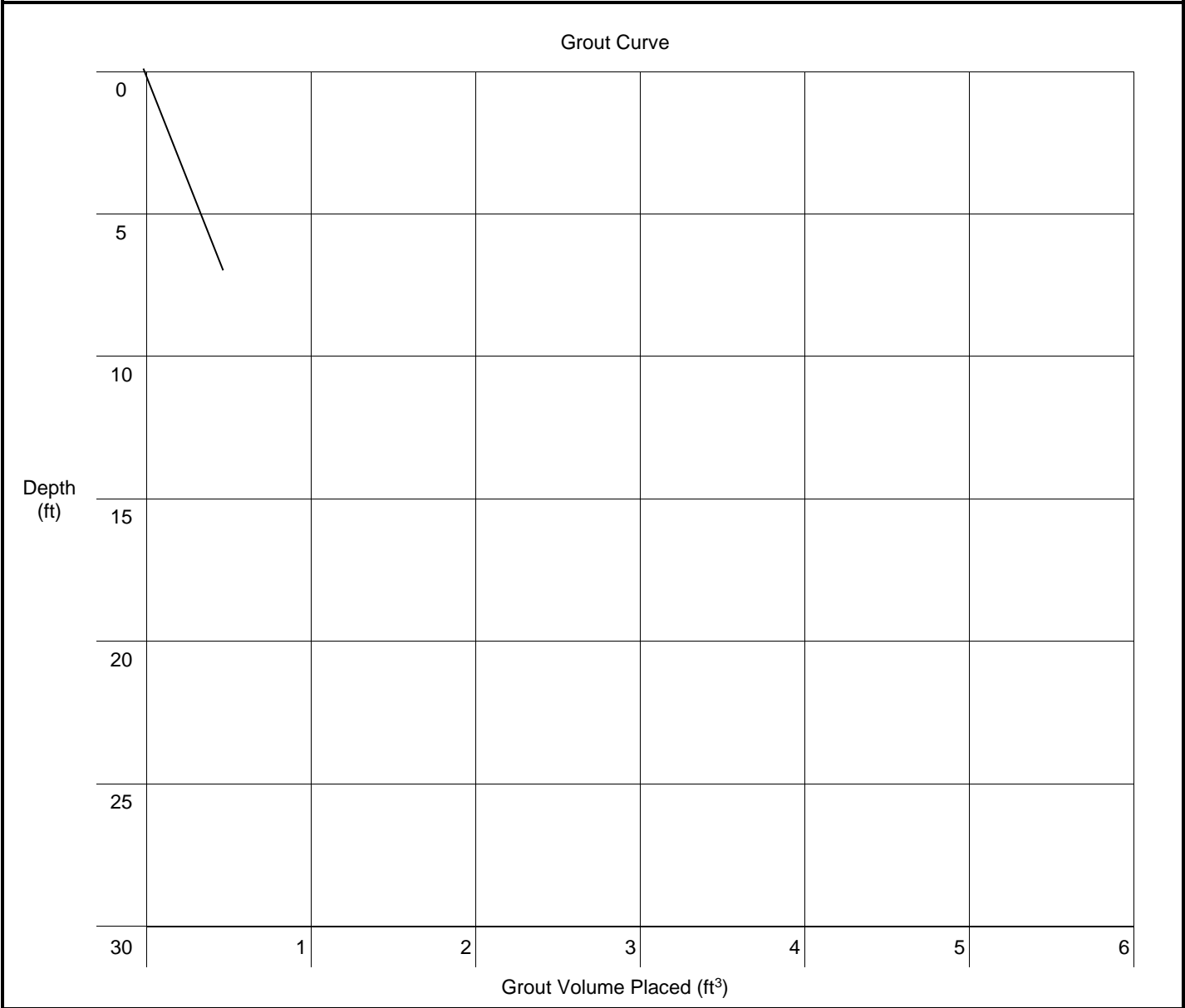


Number of Bags On-Site	10	Ea
Depth of Test Hole Grouted	5 (cave in)	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.25	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.25	ft <sup>3</sup>
Number of Bags Used	<1	Ea
Volume Placed	0.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: B-8
Project ID:	P029450, P029776, P029777		Station: 1804+33.40
Consultant Firm:	Terracon Consultants, Inc.		Offset: 55.3 L
Grouted By (Driller's Name):	st	Date 5/6/2021	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

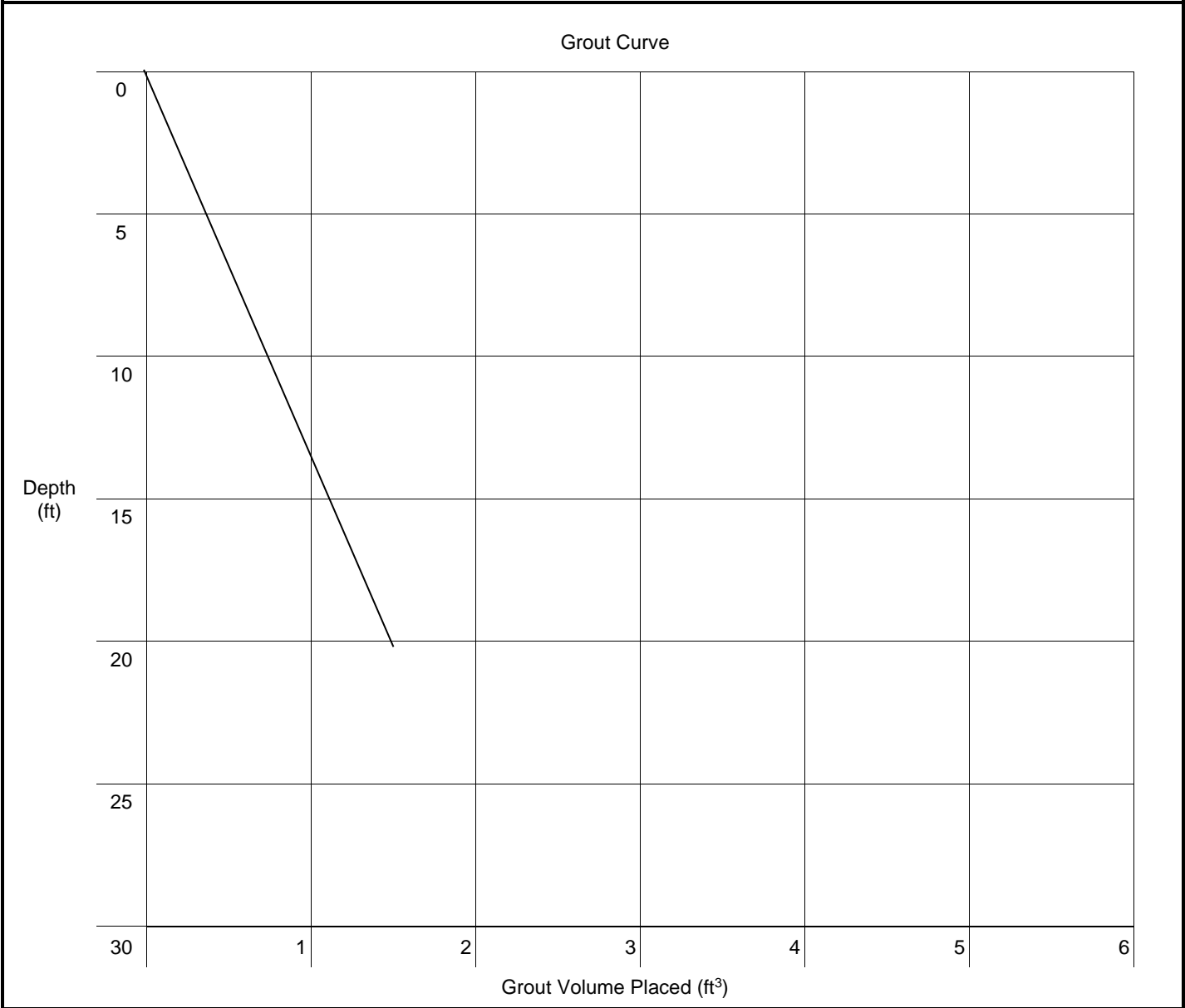


Number of Bags On-Site	10	Ea
Depth of Test Hole Grouted	7 (cave in)	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.35	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.35	ft <sup>3</sup>
Number of Bags Used	<1	Ea
Volume Placed	0.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs	Test Hole No.:	B-9
Project ID:	P029450, P029776, P029777	Station:	1800+88.04
Consultant Firm:	Terracon Consultants, Inc.	Offset:	9.53 L
Grouted By (Driller's Name):	ST	Date	6/24/2021
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



Number of Bags On-Site	10	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	2	ea
Volume Placed	1.5	ft <sup>3</sup>

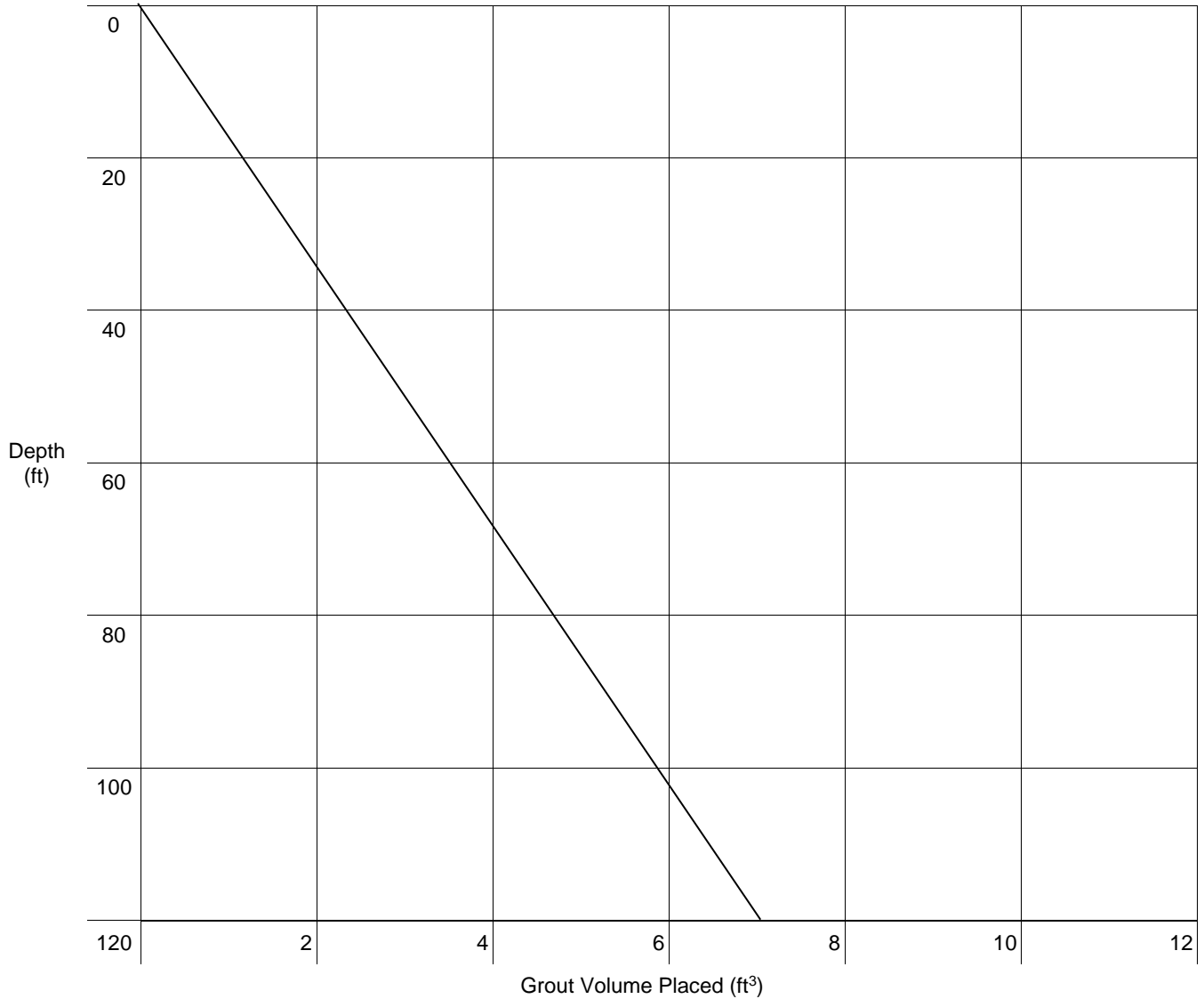




## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-9A	
Project ID:	P029450, P029776, P029777		Station:	1800+77.22	
Consultant Firm:	Terracon Consultants, Inc.	Date	12/15/21	Offset:	5.8 R
Grouted By (Driller's Name):	CC				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				

GROUT CURVE



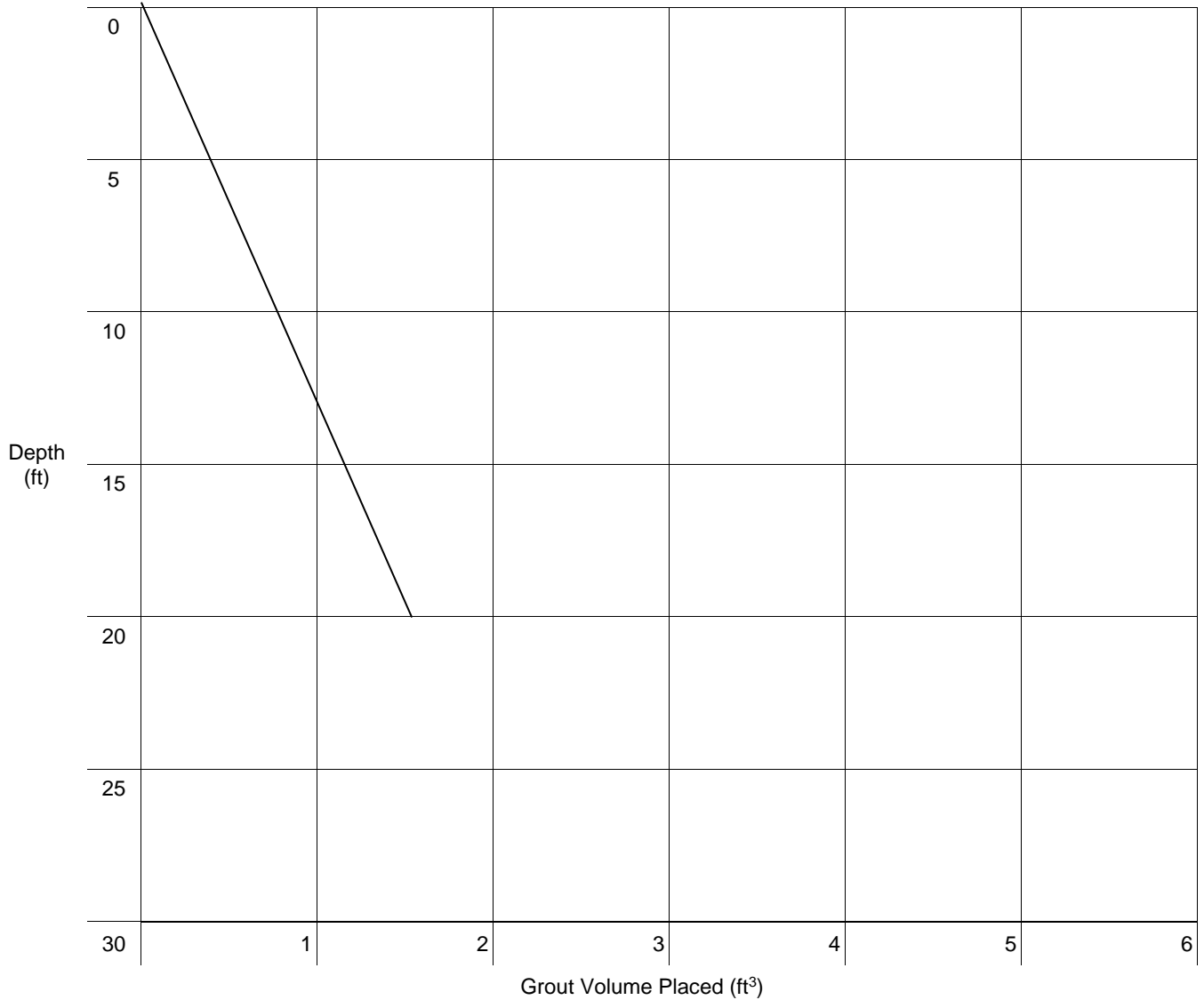
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	120.7	Ft
Diameter of Test Hole	0.33	Ft
Area of Test Hole	0.09	ft <sup>2</sup>
Volume of Test Hole	10.3	ft <sup>3</sup>
Volume of Casing (If applicable)	0.03	ft <sup>3</sup>
Theoretical Volume of Test Hole	7.1	ft <sup>3</sup>
Number of Bags Used	5	ea
Volume Placed	9	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name: I-20 Wateree River Bridge Repairs  
Project ID: P029450, P029776, P029777 Test Hole No.: B-10  
Consultant Firm: Terracon Consultants, Inc. Station: 1802+39.49  
Grouted By (Driller's Name): ST Date 12/21/2021 Offset: 71.85 R  
Notes: Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water

GROUT CURVE

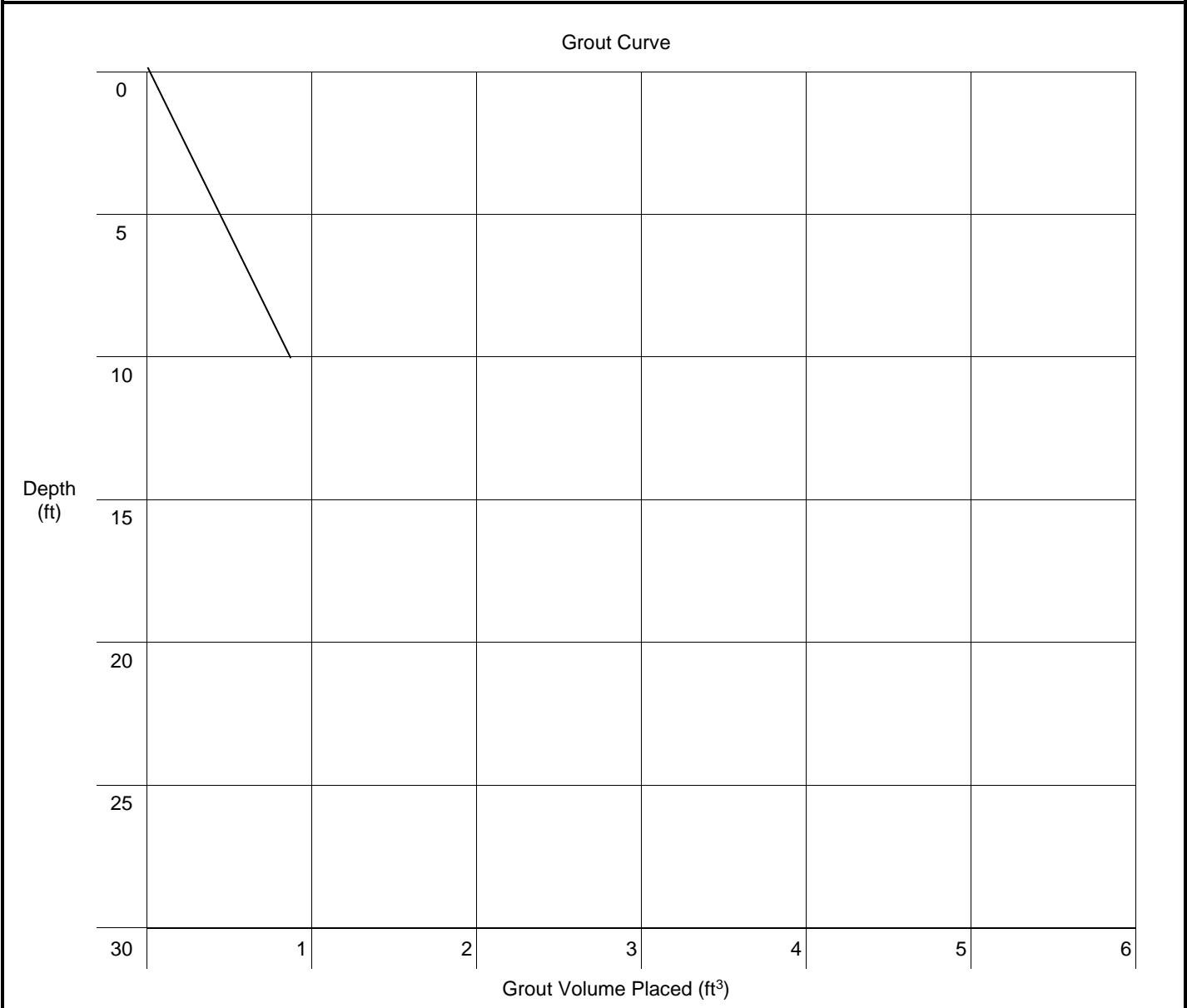


Number of Bags On-Site	<u>40</u>	ea
Depth of Test Hole Grouted	<u>20</u>	ft
Diameter of Test Hole	<u>0.25</u>	ft
Area of Test Hole	<u>0.05</u>	ft <sup>2</sup>
Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Volume of Casing (If applicable)	<u>N/A</u>	ft <sup>3</sup>
Theoretical Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Number of Bags Used	<u>1</u>	ea
Volume Placed	<u>1.5</u>	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-11
Project ID:	P029450, P029776, P029777		Station:	1803+83.82
Consultant Firm:	Terracon Consultants, Inc.		Offset:	68.79 L
Grouted By (Driller's Name):	ST	Date	12/23/21	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

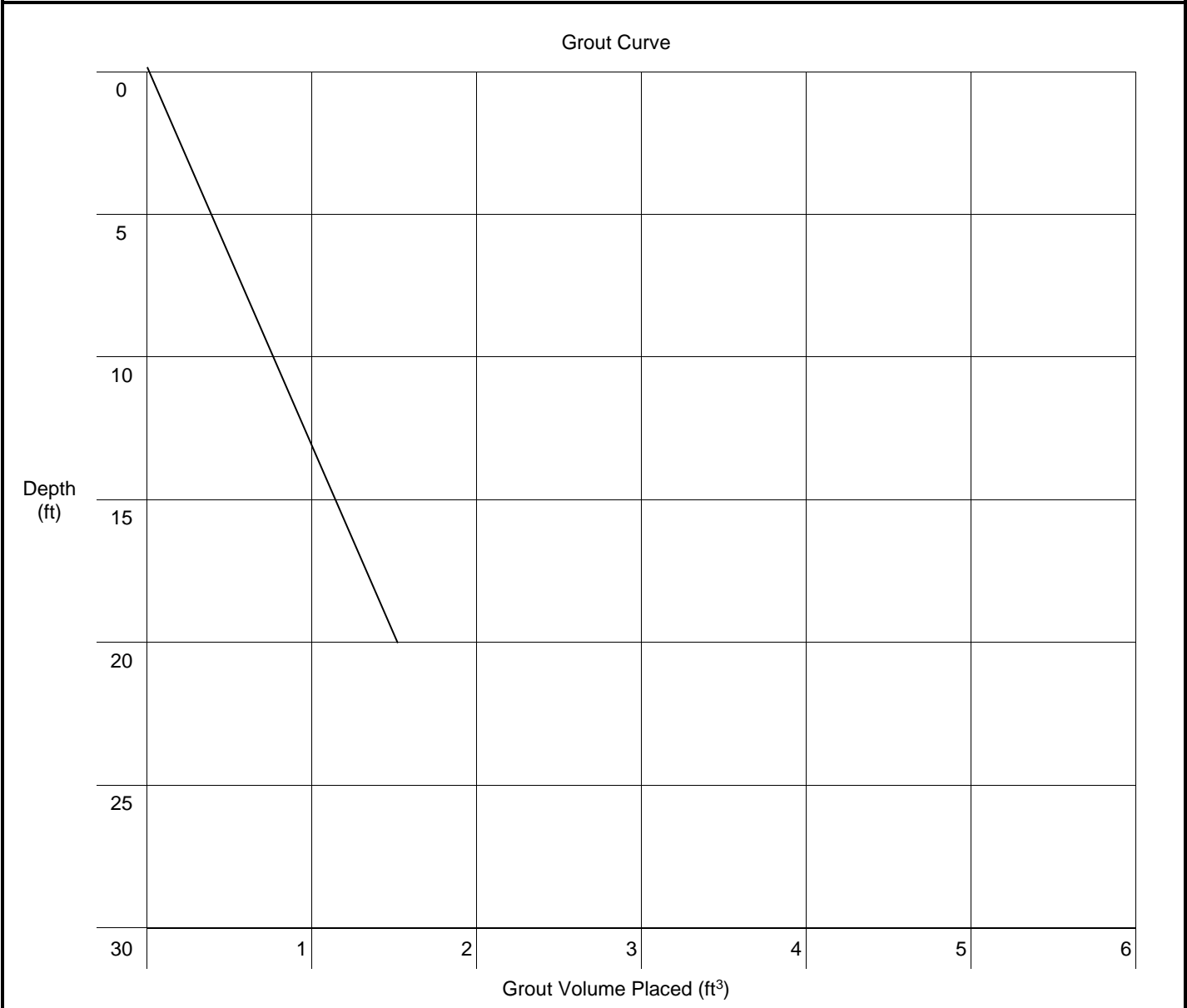


Number of Bags On-Site	40		ea
Depth of Test Hole Grouted	20		ft
Diameter of Test Hole	0.25		ft
Area of Test Hole	0.05		ft <sup>2</sup>
Volume of Test Hole	1.0		ft <sup>3</sup>
Volume of Casing (If applicable)	N/A		ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0		ft <sup>3</sup>
Number of Bags Used	1		ea
Volume Placed	1.5		ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: B-12
Project ID:	P029450, P029776, P029777		Station: 1805+09.31
Consultant Firm:	Terracon Consultants, Inc.		Offset: 72.84 R
Grouted By (Driller's Name):	ST	Date 12/23/2021	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

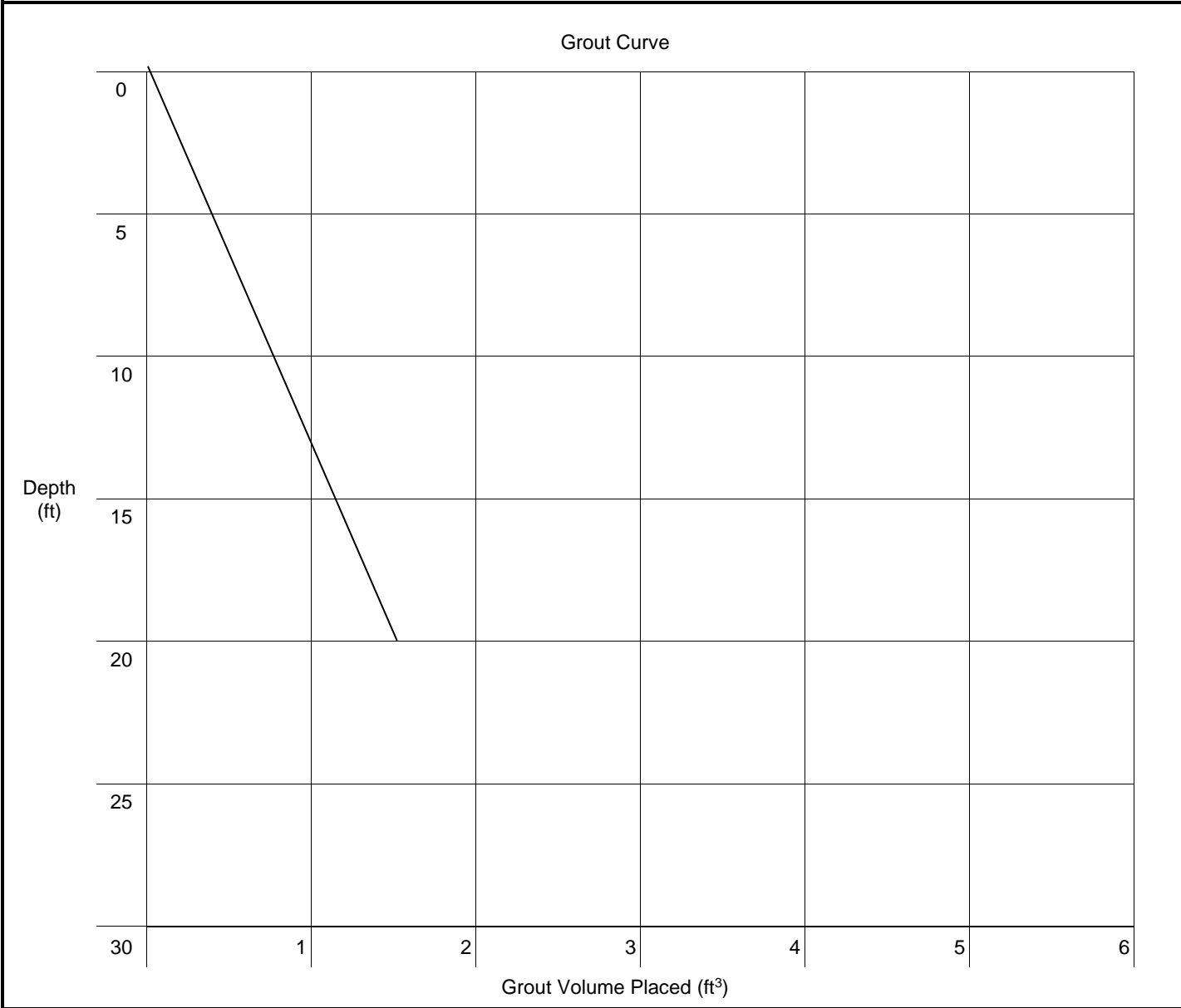


Number of Bags On-Site	40	ea
Depth of Test Hole Grouted	20	ft
Diameter of Test Hole	0.25	ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	B-15
Project ID:	P029450, P029776, P029777		Station:	1809+93.51
Consultant Firm:	Terracon Consultants, Inc.		Offset:	79.13 L
Grouted By (Driller's Name):	ST	Date	1/11/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			



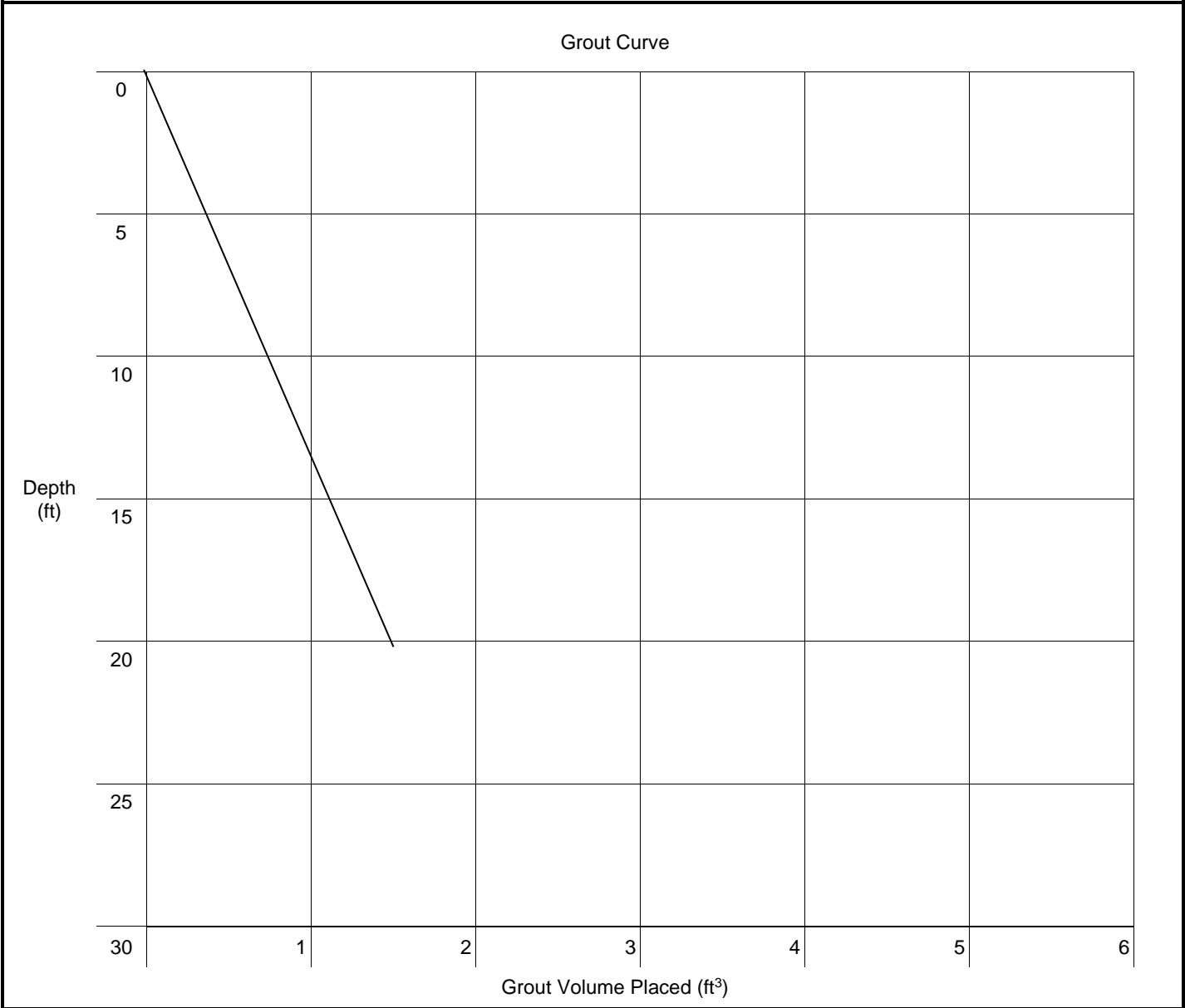
Number of Bags On-Site	40		ea
Depth of Test Hole Grouted	20		ft
Diameter of Test Hole	0.25		ft
Area of Test Hole	0.05		ft <sup>2</sup>
Volume of Test Hole	1.0		ft <sup>3</sup>
Volume of Casing (If applicable)	N/A		ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0		ft <sup>3</sup>
Number of Bags Used	1		ea
Volume Placed	1.5		ft <sup>3</sup>





**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: B-16
Project ID:	P029450, P029776, P029777		Station: 1811+28.42
Consultant Firm:	Terracon Consultants, Inc.		Offset: 76.77 R
Grouted By (Driller's Name):	ST	Date 1/19/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

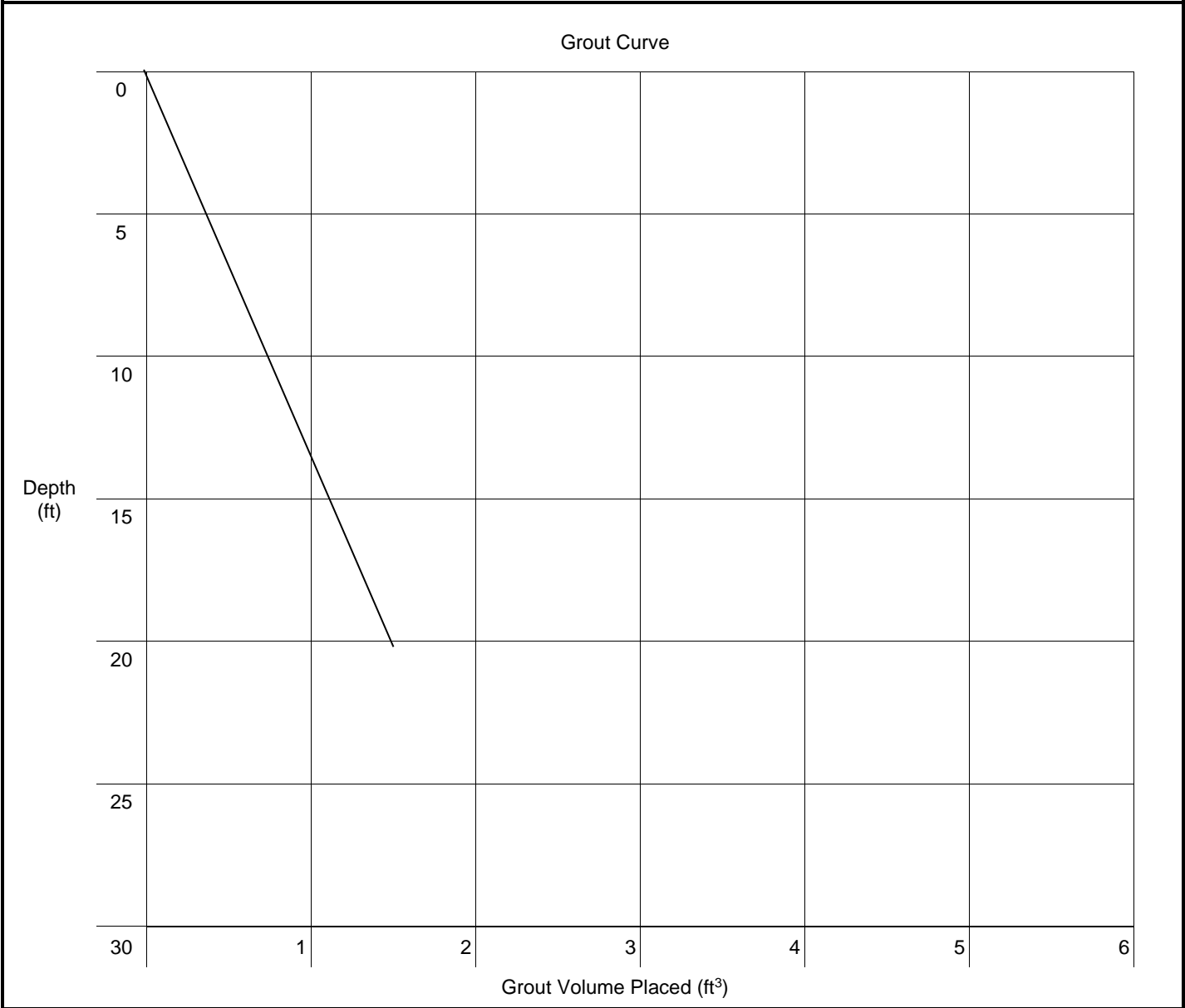


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: B-17
Project ID:	P029450, P029776, P029777		Station: 1812+55.73
Consultant Firm:	Terracon Consultants, Inc.		Offset: 70.48 L
Grouted By (Driller's Name):	ST	Date 1/19/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



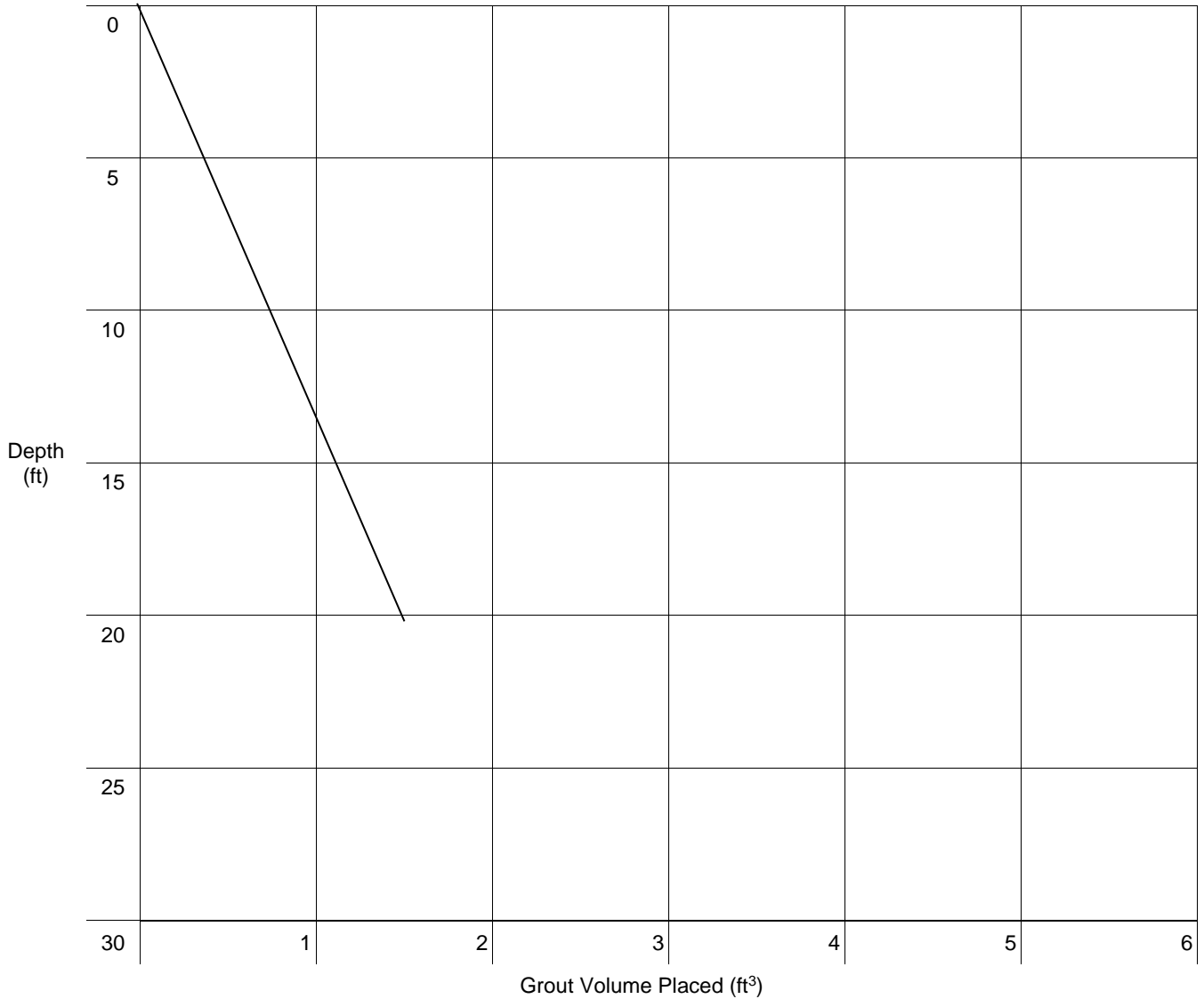
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name: I-20 Wateree River Bridge Repairs  
Project ID: P029450, P029776, P029777 Test Hole No.: B-18  
Consultant Firm: Terracon Consultants, Inc. Station: 1813+68.35  
Grouted By (Driller's Name): Truesdale Date 1/19/2022 Offset: 78.03 R  
Notes: Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water

GROUT CURVE



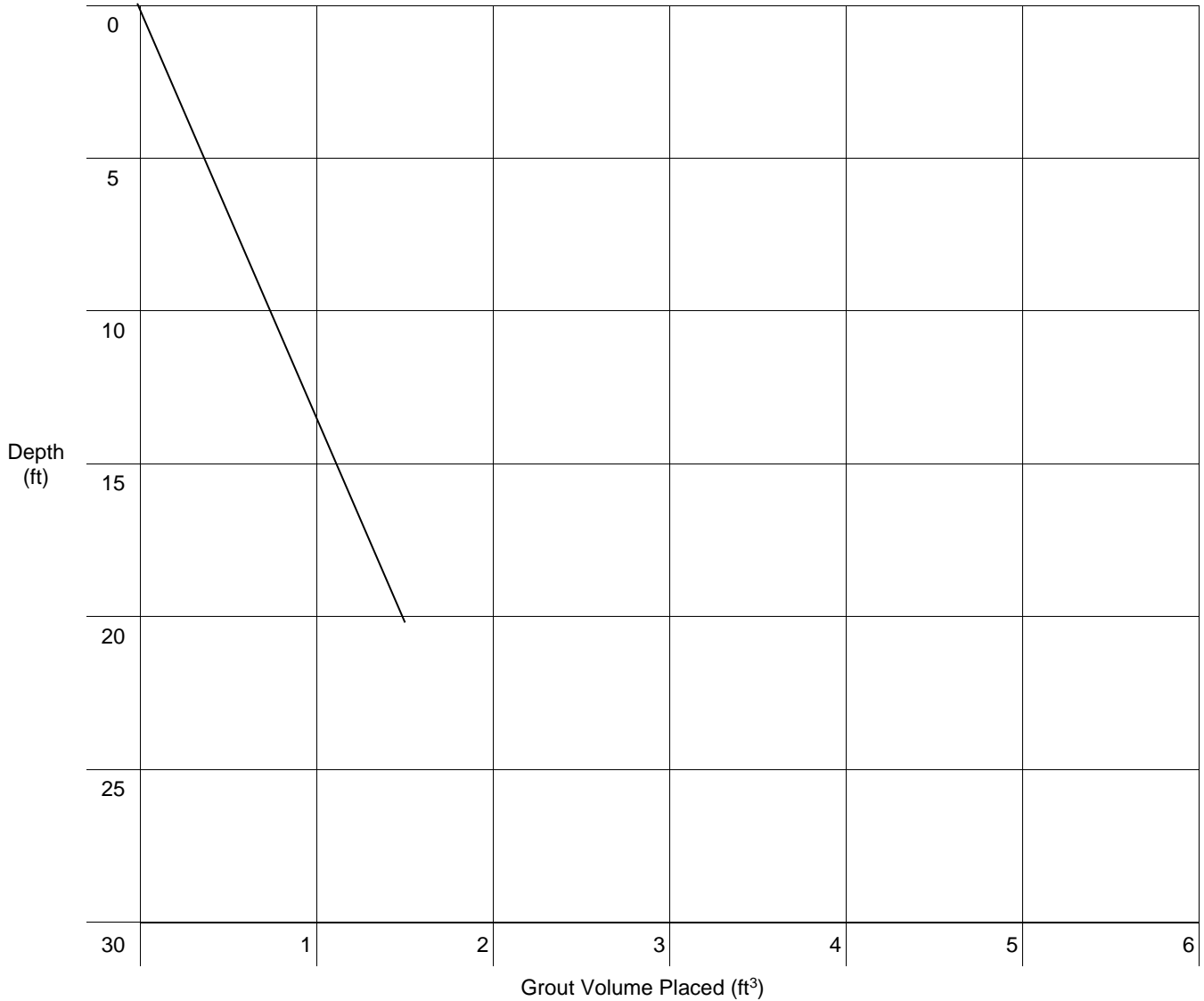
Number of Bags On-Site	<u>40</u>	Ea
Depth of Test Hole Grouted	<u>20</u>	Ft
Diameter of Test Hole	<u>0.25</u>	Ft
Area of Test Hole	<u>0.05</u>	ft <sup>2</sup>
Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Volume of Casing (If applicable)	<u>N/A</u>	ft <sup>3</sup>
Theoretical Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Number of Bags Used	<u>1</u>	ea
Volume Placed	<u>1.5</u>	ft <sup>3</sup>



### GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name: I-20 Wateree River Bridge Repairs  
Project ID: P029450, P029776, P029777 Test Hole No.: B-19  
Consultant Firm: Terracon Consultants, Inc. Station: 1814+49.78  
Grouted By (Driller's Name): ST Date 1/19/2022 Offset: 79.57 R  
Notes: Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water

Grout Curve

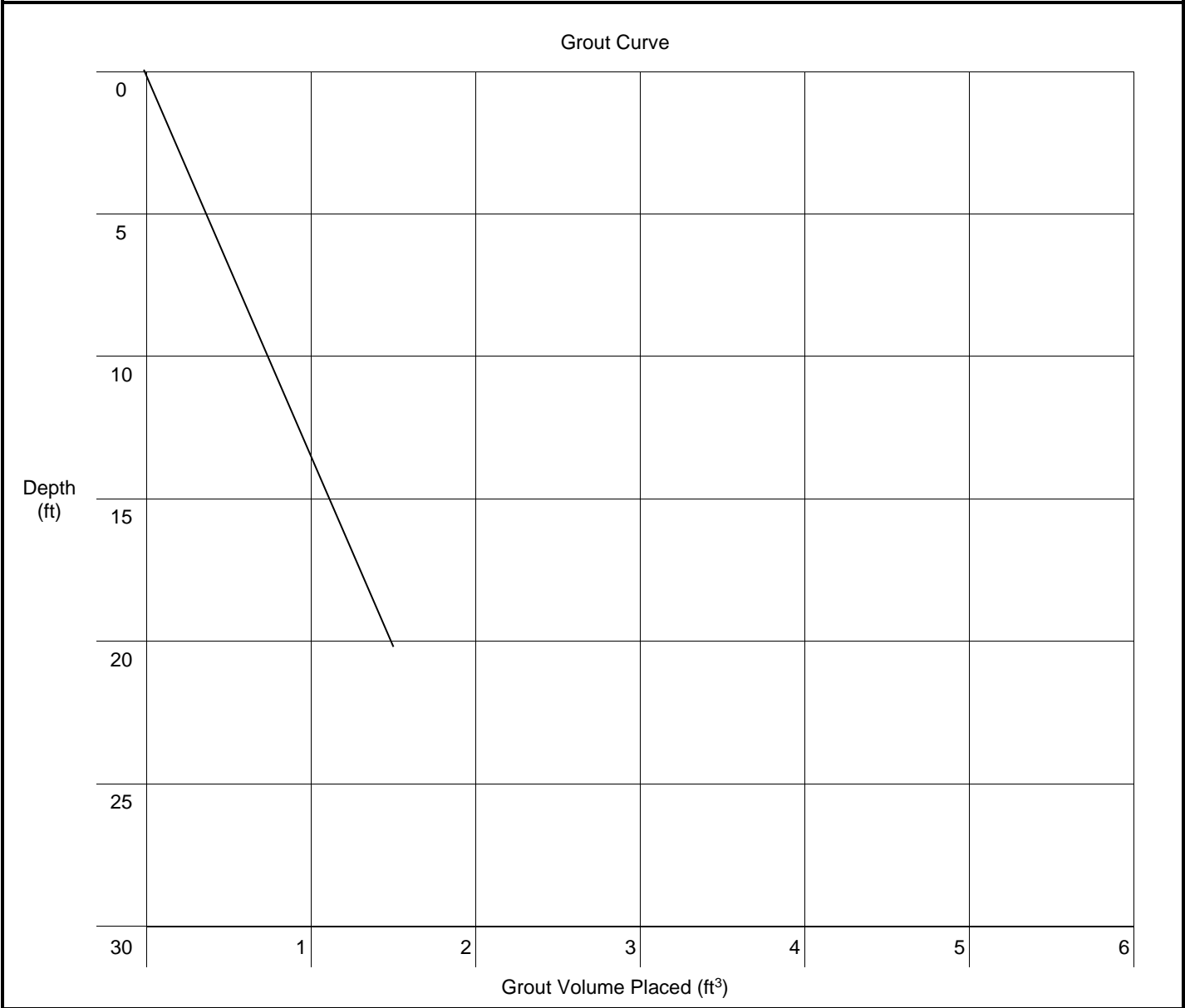


Number of Bags On-Site	<u>40</u>	Ea
Depth of Test Hole Grouted	<u>20</u>	Ft
Diameter of Test Hole	<u>0.25</u>	Ft
Area of Test Hole	<u>0.05</u>	ft²
Volume of Test Hole	<u>1.0</u>	ft³
Volume of Casing (If applicable)	<u>N/A</u>	ft³
Theoretical Volume of Test Hole	<u>1.0</u>	ft³
Number of Bags Used	<u>1</u>	ea
Volume Placed	<u>1.5</u>	ft³



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs	Test Hole No.:	B-20
Project ID:	P029450, P029776, P029777	Station:	1816+16.17
Consultant Firm:	Terracon Consultants, Inc.	Offset:	3.2 L
Grouted By (Driller's Name):	CC	Date	1/19/2022
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



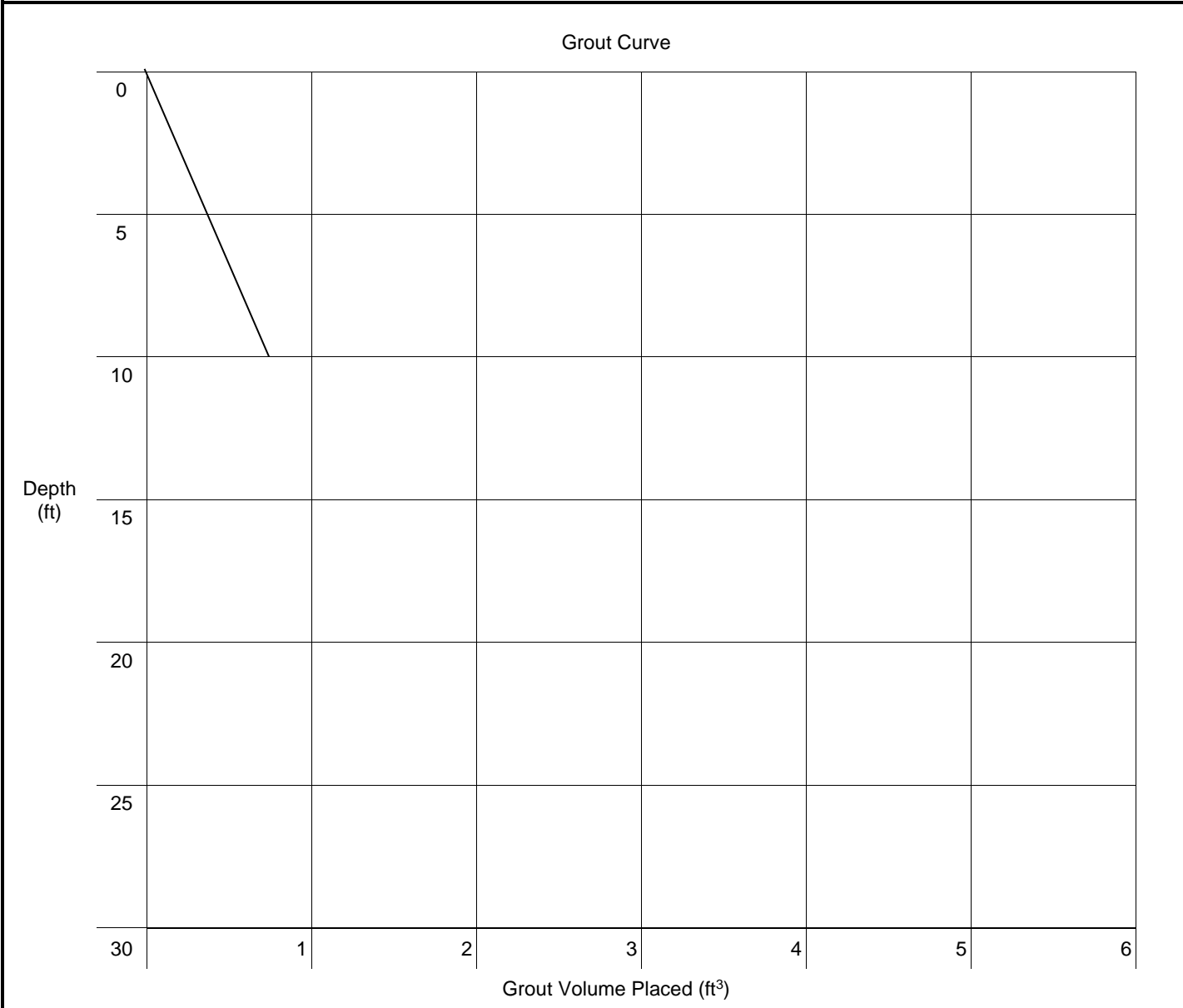
Number of Bags On-Site	40	Ea	
Depth of Test Hole Grouted	20	Ft	
Diameter of Test Hole	0.25	Ft	
Area of Test Hole	0.05	ft <sup>2</sup>	
Volume of Test Hole	1.0	ft <sup>3</sup>	
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>	
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>	
Number of Bags Used	1	ea	
Volume Placed	1.5	ft <sup>3</sup>	





**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	<u>I-20 Wateree River Bridge Repairs</u>	Test Hole No.:	<u>CO-1</u>
Project ID:	<u>P029450, P029776, P029777</u>	Station:	<u>1796+51.11</u>
Consultant Firm:	<u>Terracon Consultants, Inc.</u>	Offset:	<u>12.39 R</u>
Grouted By (Driller's Name):	<u>CC</u>	Date	<u>2/3/2022</u>
Notes:	<u>Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water</u>		

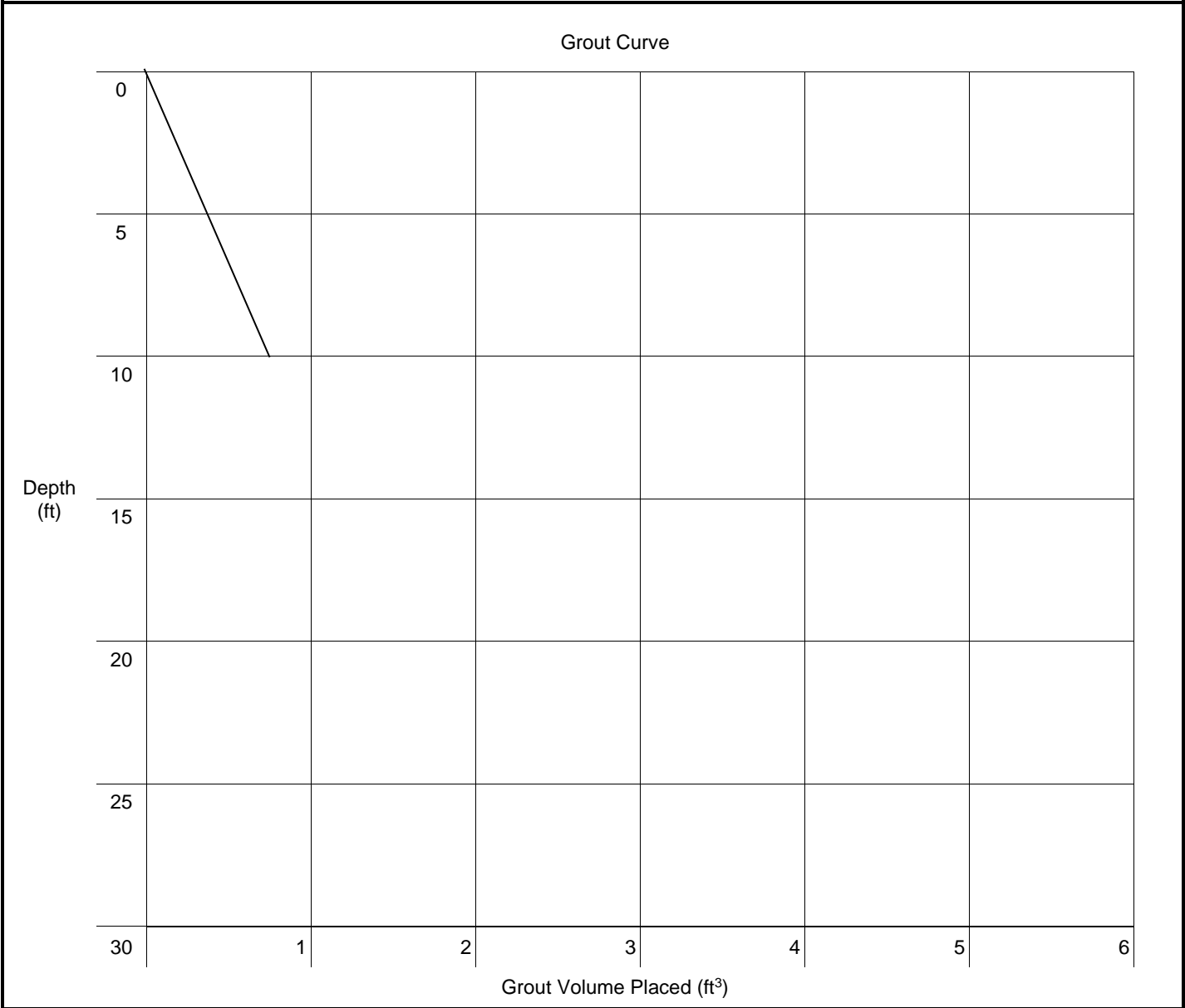


Number of Bags On-Site	<u>40</u>	<u>Ea</u>
Depth of Test Hole Grouted	<u>10</u>	<u>Ft</u>
Diameter of Test Hole	<u>0.25</u>	<u>Ft</u>
Area of Test Hole	<u>0.05</u>	<u>ft²</u>
Volume of Test Hole	<u>0.25</u>	<u>ft³</u>
Volume of Casing (If applicable)	<u>N/A</u>	<u>ft³</u>
Theoretical Volume of Test Hole	<u>0.3</u>	<u>ft³</u>
Number of Bags Used	<u>1</u>	<u>ea</u>
Volume Placed	<u>0.8</u>	<u>ft³</u>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: CO-2
Project ID:	P029450, P029776, P029777		Station: 1798+62.13
Consultant Firm:	Terracon Consultants, Inc.		Offset: 10.36 R
GROUTED BY (DRILLER'S NAME):	CC	Date 2/3/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

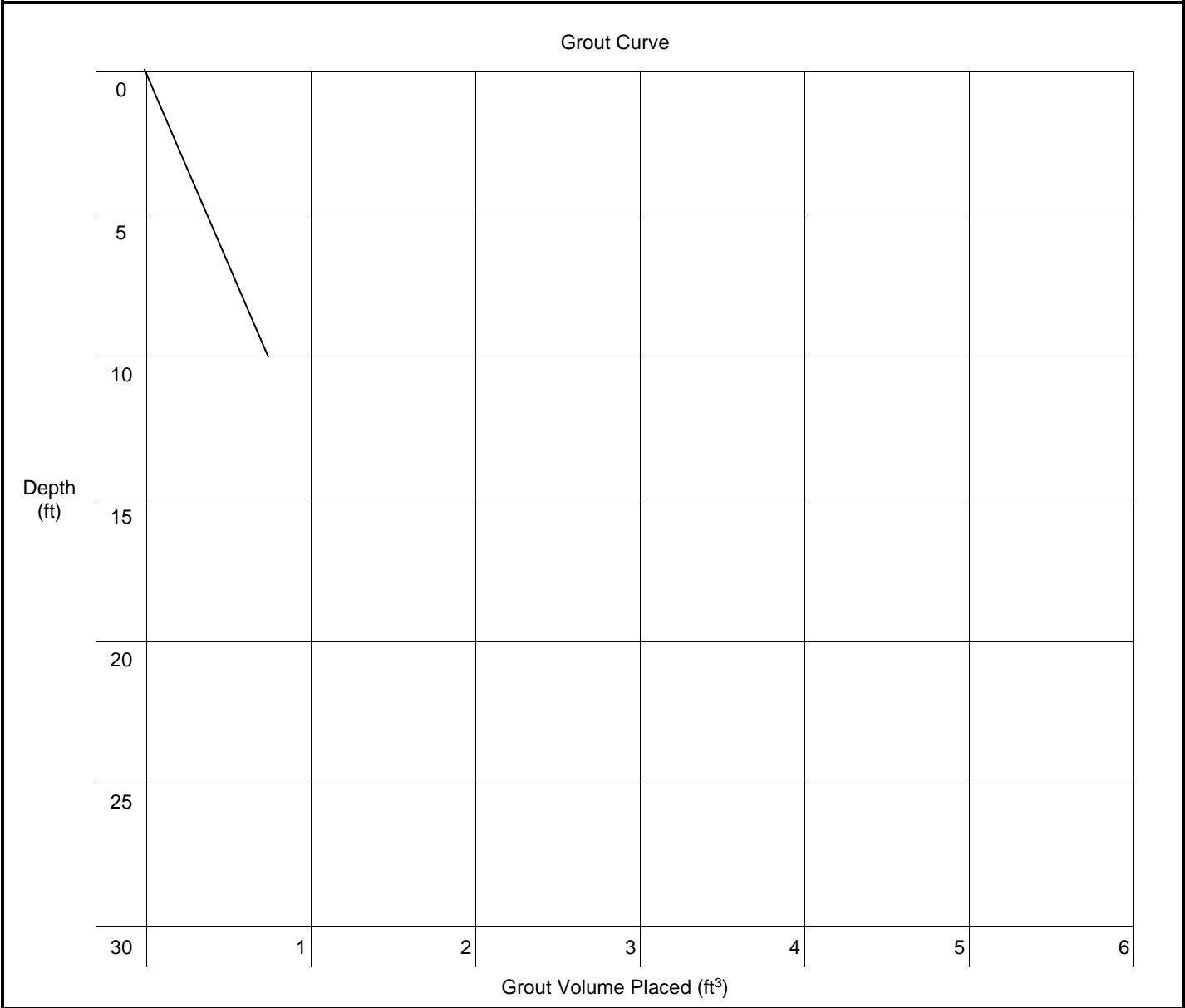


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	10	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.25	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.3	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	0.8	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs	Test Hole No.:	CO-3
Project ID:	P029450, P029776, P029777	Station:	1819+59.66
Consultant Firm:	Terracon Consultants, Inc.	Offset:	20.75 L
Grouted By (Driller's Name):	ST	Date	2/3/2022
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

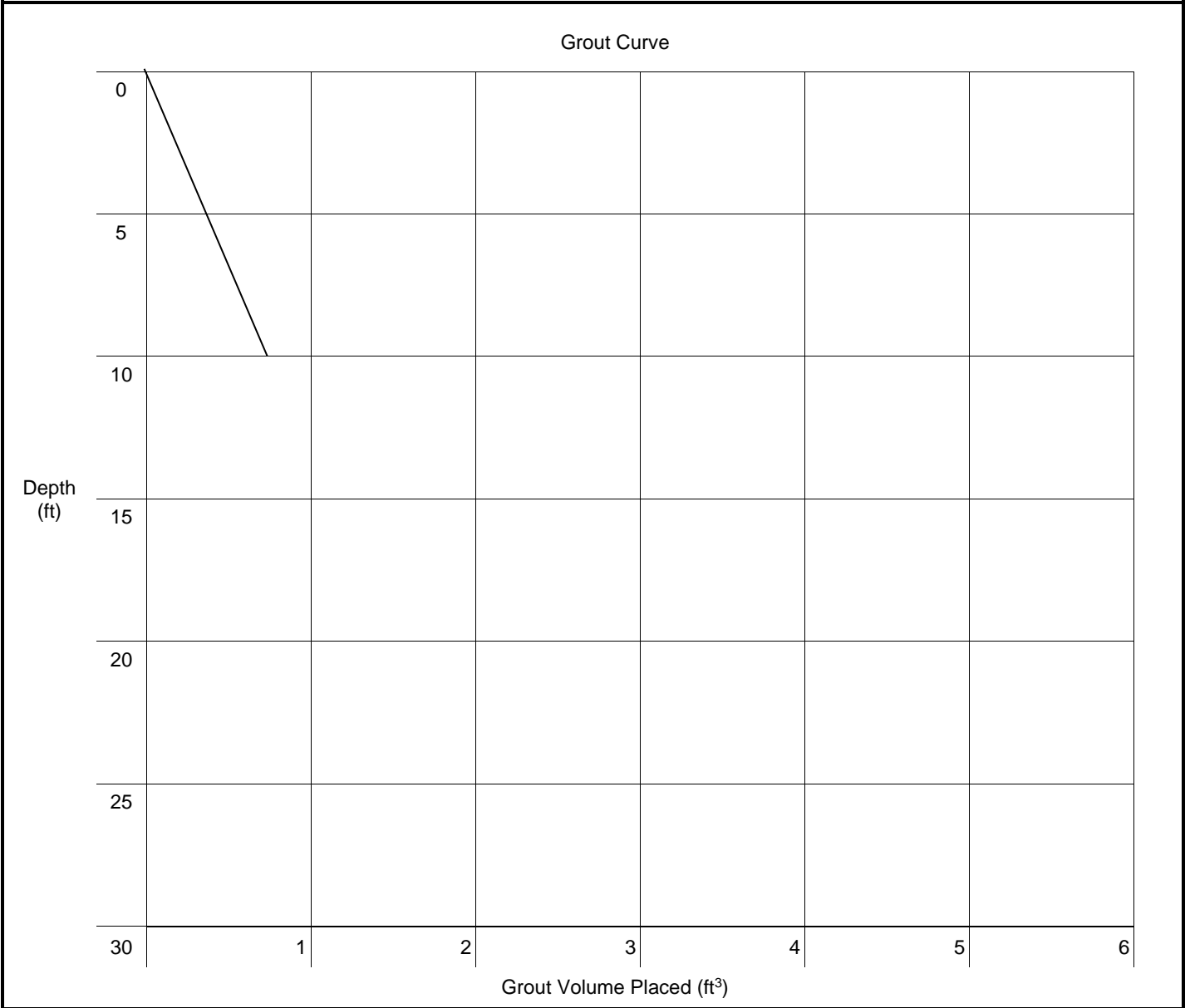


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	10	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.25	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.3	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	0.8	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: CO-4
Project ID:	P029450, P029776, P029777		Station: 1824+50.10
Consultant Firm:	Terracon Consultants, Inc.		Offset: 20.04 L
Grouted By (Driller's Name):	ST	Date 2/3/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

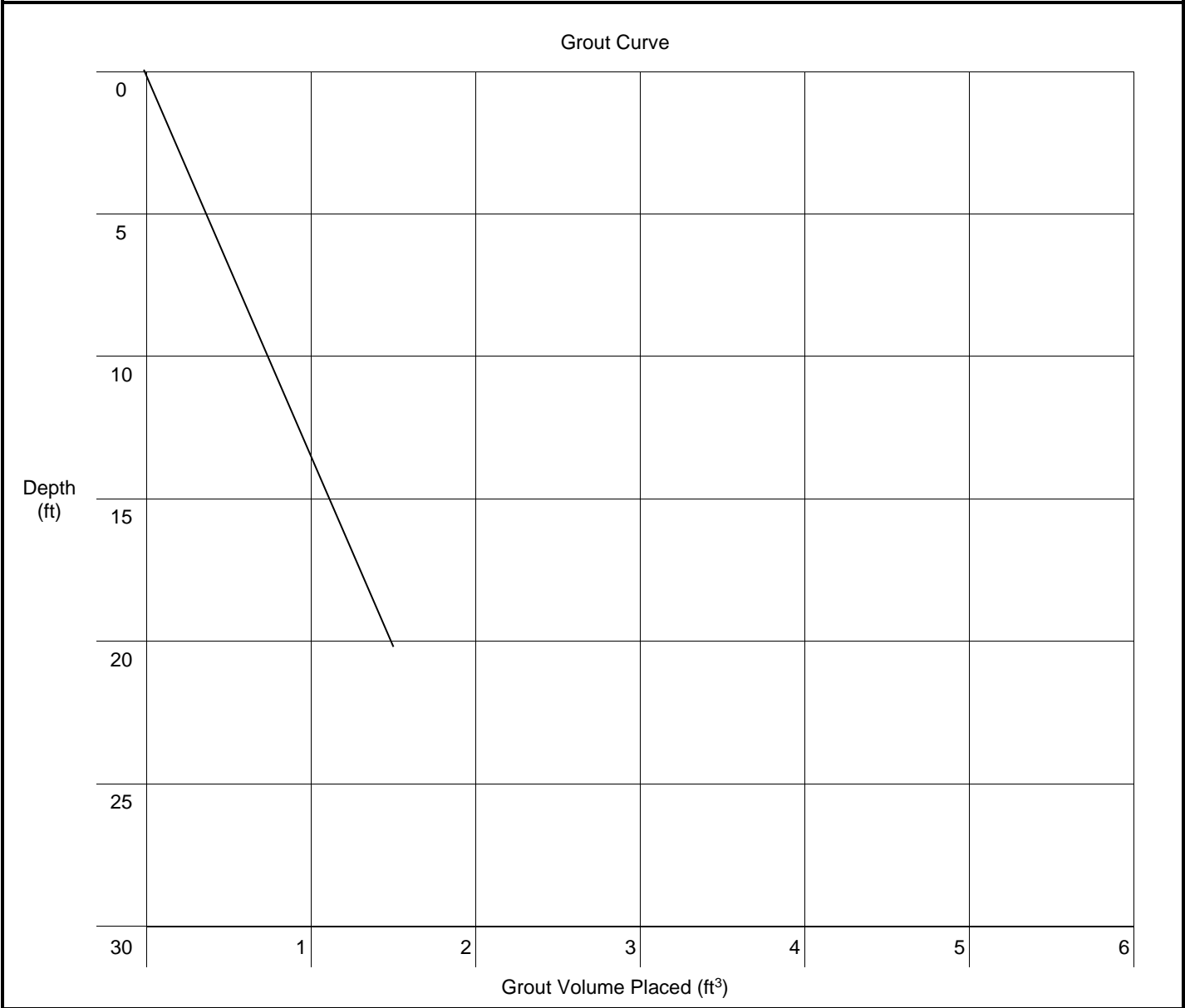


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	10	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.25	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.3	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	0.8	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	E-1	
Project ID:	P029450, P029776, P029777		Station:	1795+15.19	
Consultant Firm:	Terracon Consultants, Inc.	Date:	6/24/2021	Offset:	11.93 R
Grouted By (Driller's Name):	CC				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				



Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>

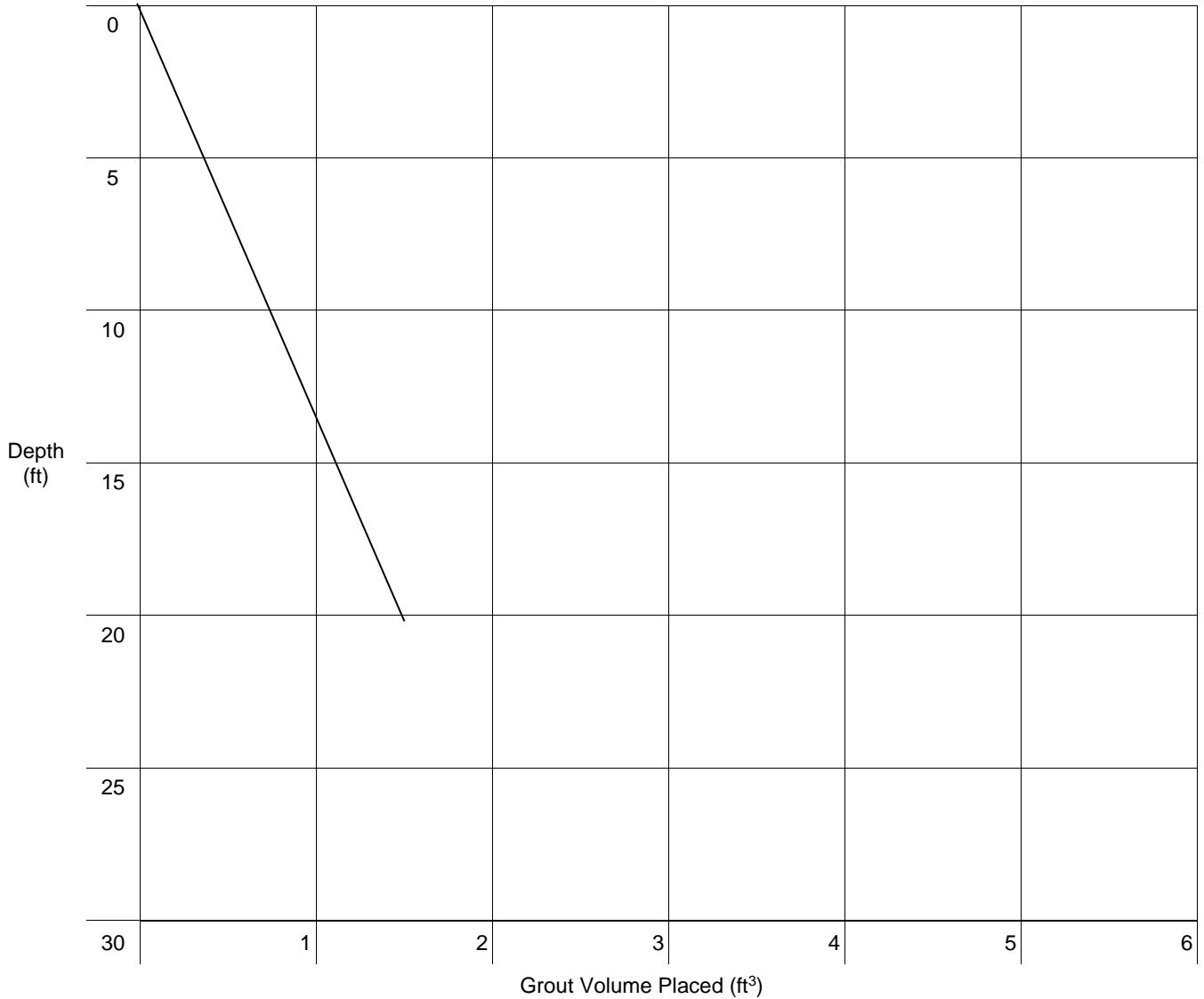




## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	E-2	
Project ID:	P029450, P029776, P029777		Station:	1799+95.40	
Consultant Firm:	Terracon Consultants, Inc.	Date	2/3/2022	Offset:	17.98 L
Grouted By (Driller's Name):	CC				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				

GROUT CURVE



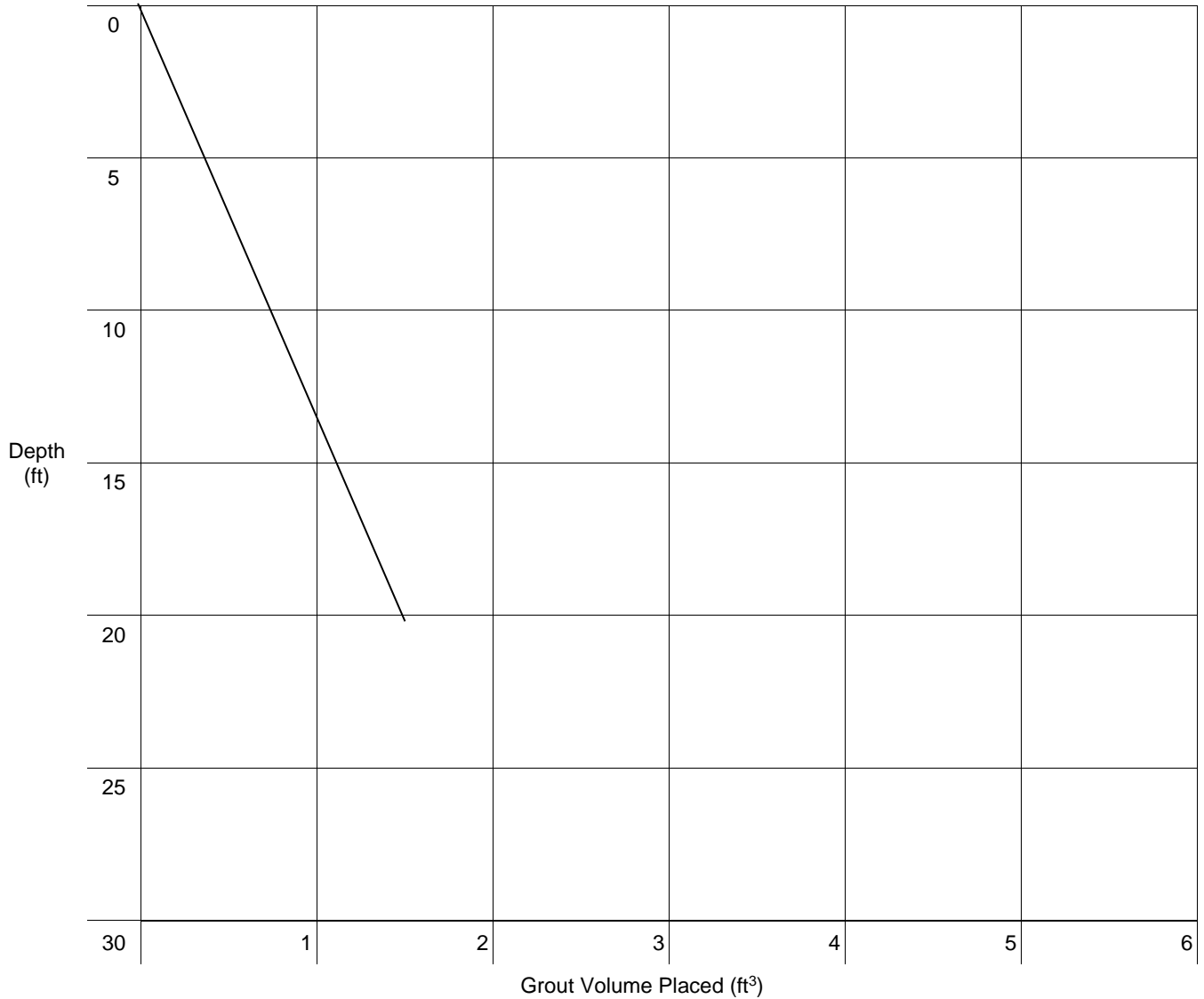
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	E-3
Project ID:	P029450, P029776, P029777		Station:	1799+95.40
Consultant Firm:	Terracon Consultants, Inc.		Offset:	17.98 L
Grouted By (Driller's Name):	CC	Date	2/3/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

GROUT CURVE



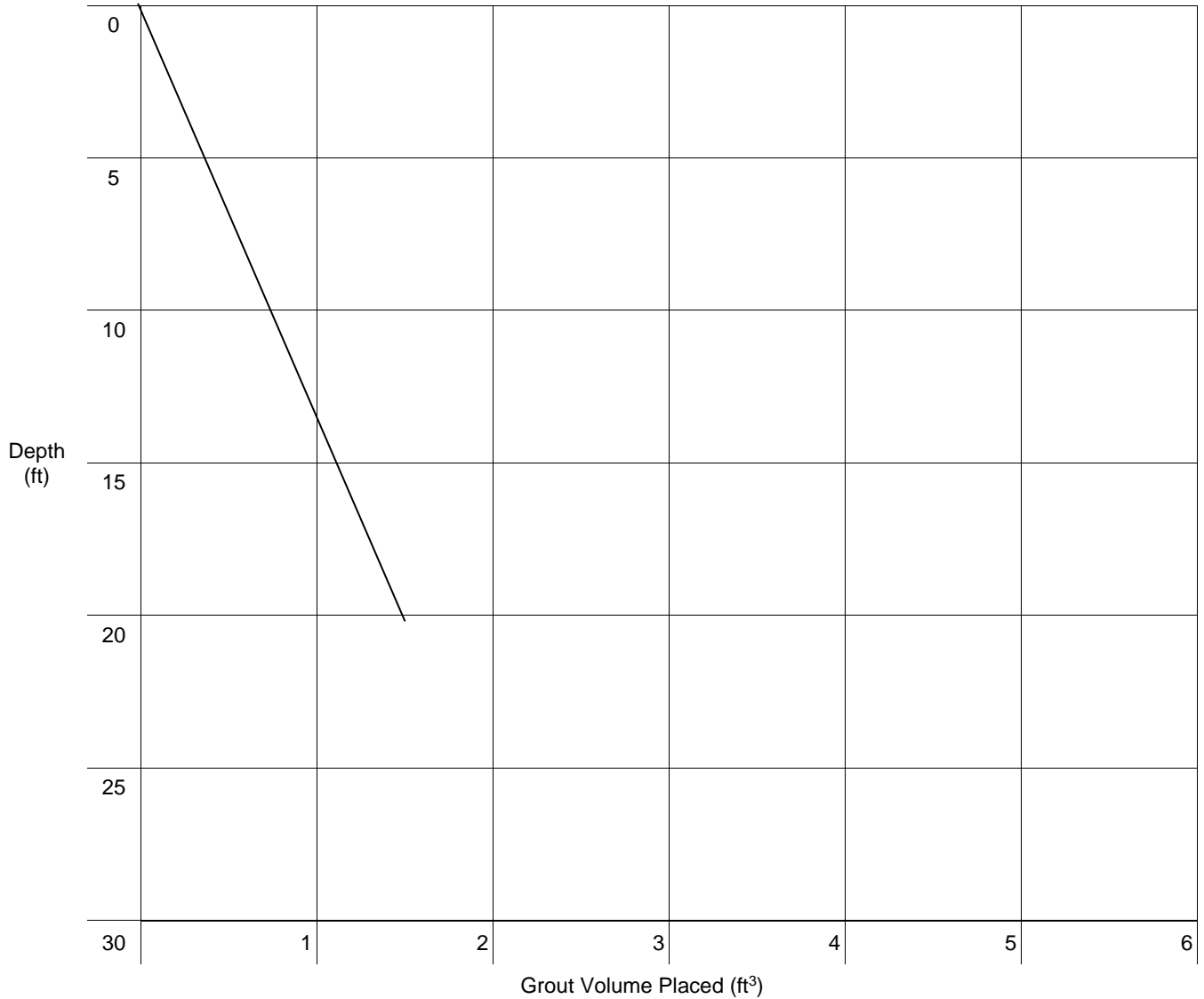
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	E-4
Project ID:	P029450, P029776, P029777		Station:	1822+01.78
Consultant Firm:	Terracon Consultants, Inc.		Offset:	21.15 L
Grouted By (Driller's Name):	ST	Date	2/3/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

Grout Curve

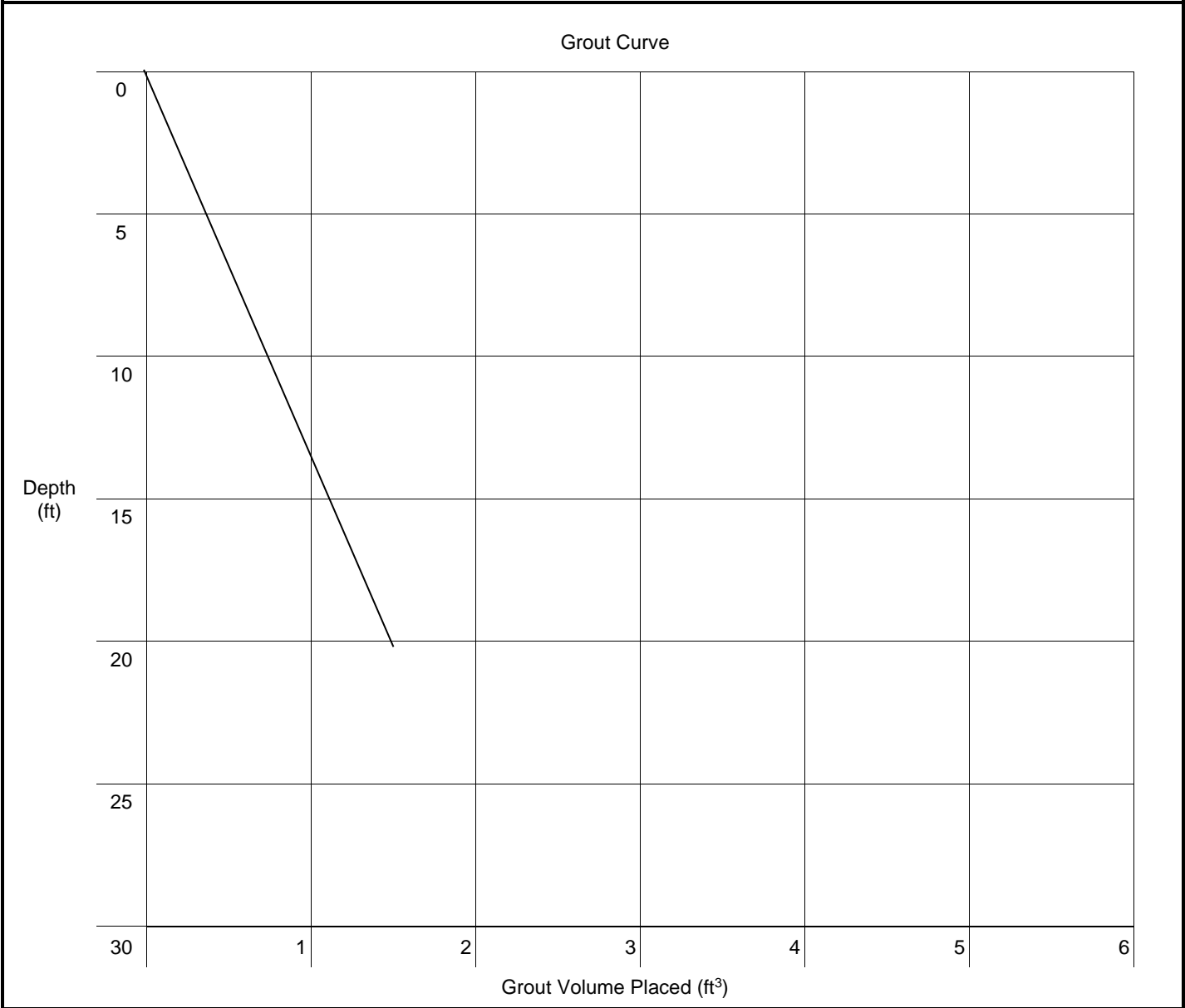


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: E-5
Project ID:	P029450, P029776, P029777		Station: 1827+06.23
Consultant Firm:	Terracon Consultants, Inc.		Offset: 20.34 L
Grouted By (Driller's Name):	ST	Date 2/3/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		

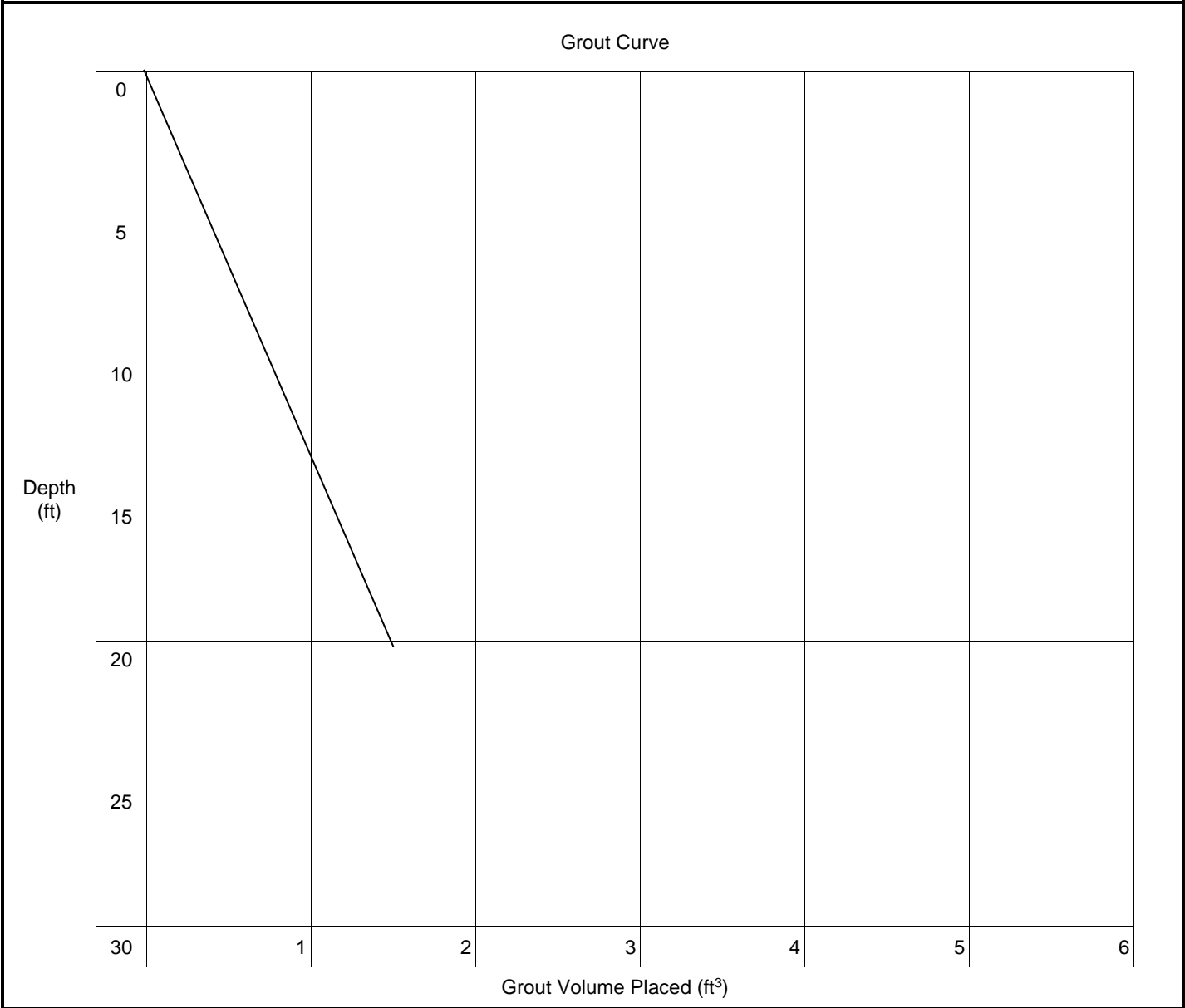


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: R-1
Project ID:	P029450, P029776, P029777		Station: 1794+97.55
Consultant Firm:	Terracon Consultants, Inc.		Offset: 49.91 L
Grouted By (Driller's Name):	CC	Date 1/31/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



Number of Bags On-Site	40	Ea	
Depth of Test Hole Grouted	20	Ft	
Diameter of Test Hole	0.25	Ft	
Area of Test Hole	0.05	ft <sup>2</sup>	
Volume of Test Hole	1.0	ft <sup>3</sup>	
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>	
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>	
Number of Bags Used	1	ea	
Volume Placed	1.5	ft <sup>3</sup>	

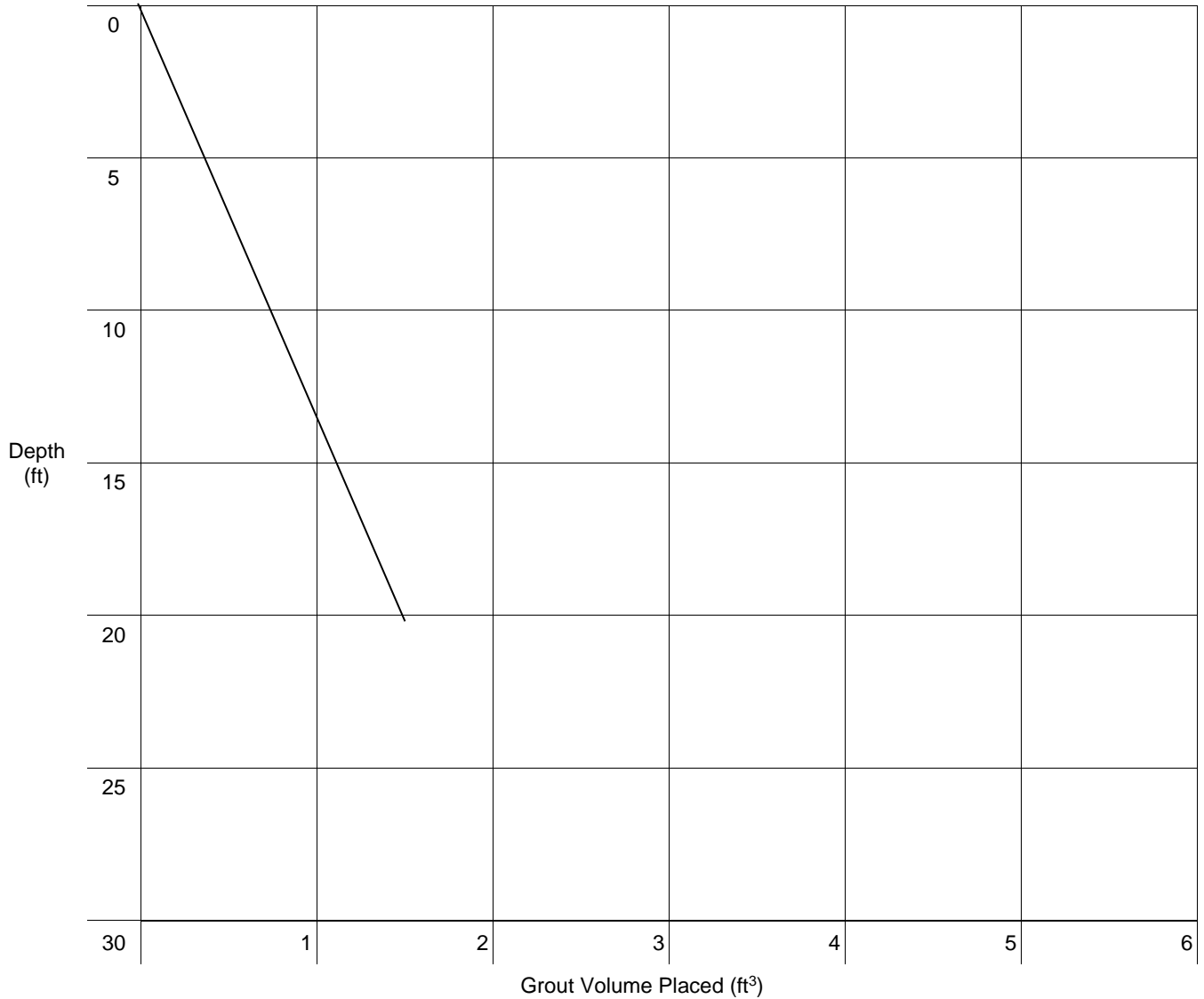




## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name: I-20 Wateree River Bridge Repairs  
Project ID: P029450, P029776, P029777 Test Hole No.: R-2  
Consultant Firm: Terracon Consultants, Inc. Station: 1794+96.29  
Grouted By (Driller's Name): CC Date 1/12/2022 Offset: 49.2 R  
Notes: Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water

GROUT CURVE



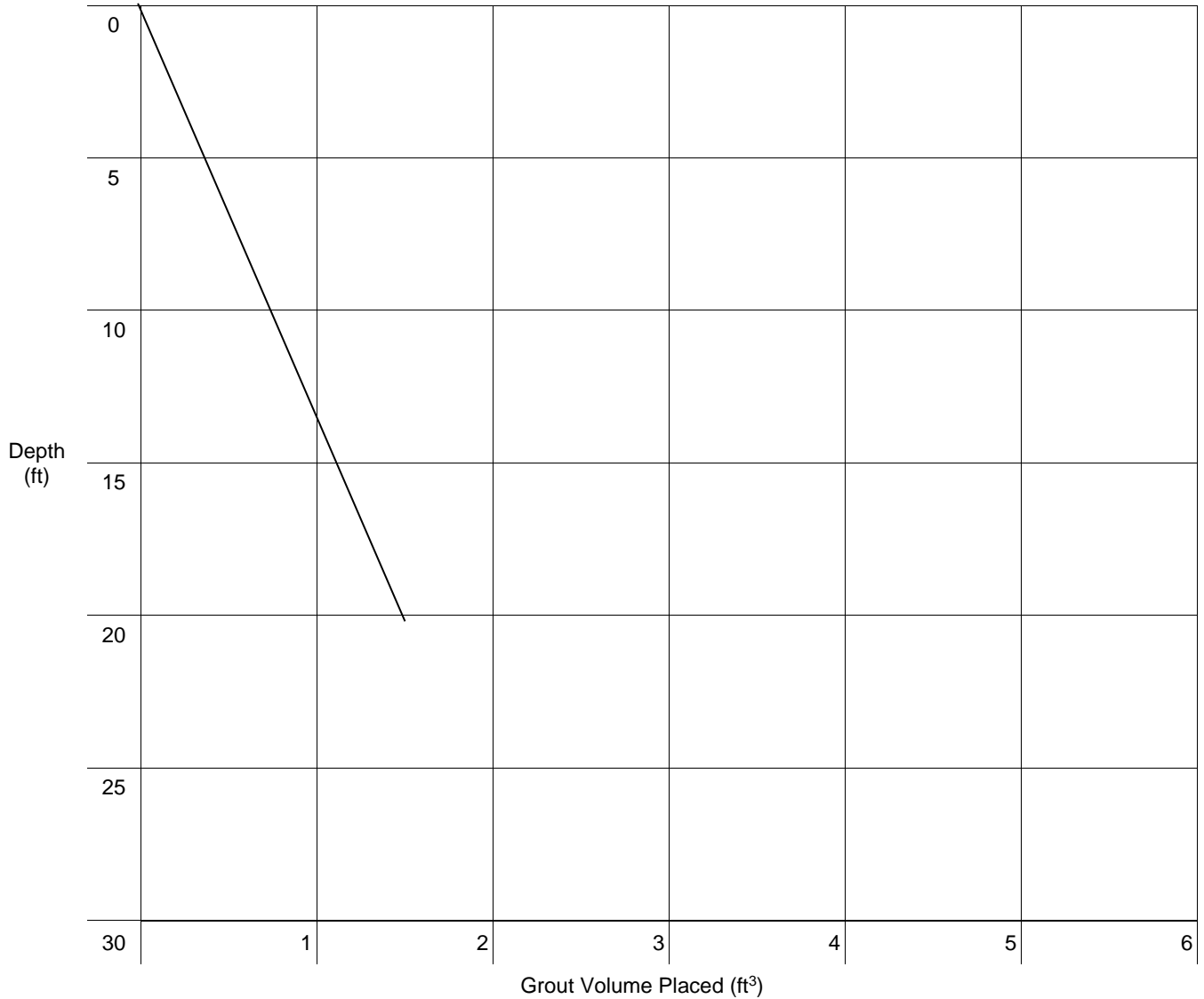
Number of Bags On-Site	<u>40</u>	Ea
Depth of Test Hole Grouted	<u>20</u>	Ft
Diameter of Test Hole	<u>0.25</u>	Ft
Area of Test Hole	<u>0.05</u>	ft <sup>2</sup>
Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Volume of Casing (If applicable)	<u>N/A</u>	ft <sup>3</sup>
Theoretical Volume of Test Hole	<u>1.0</u>	ft <sup>3</sup>
Number of Bags Used	<u>1</u>	ea
Volume Placed	<u>1.5</u>	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	R-3
Project ID:	P029450, P029776, P029777		Station:	1799+98.62
Consultant Firm:	Terracon Consultants, Inc.		Offset:	49.69 L
Grouted By (Driller's Name):	CC	Date	1/31/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

GROUT CURVE

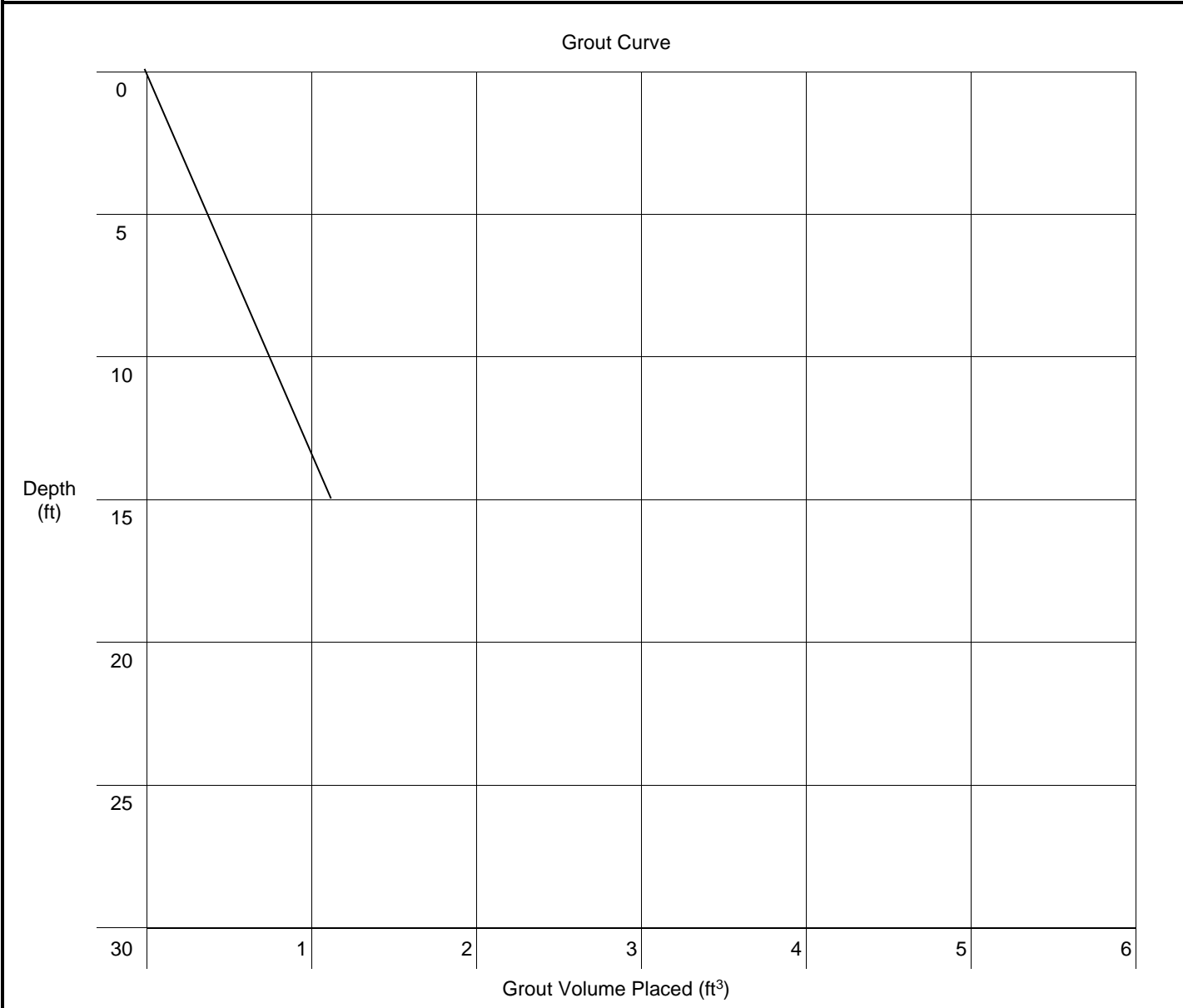


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: R-4
Project ID:	P029450, P029776, P029777		Station: 1800+00.91
Consultant Firm:	Terracon Consultants, Inc.		Offset: 49.12 R
GROUTED BY (DRILLER'S NAME):	CC	Date 1/12/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



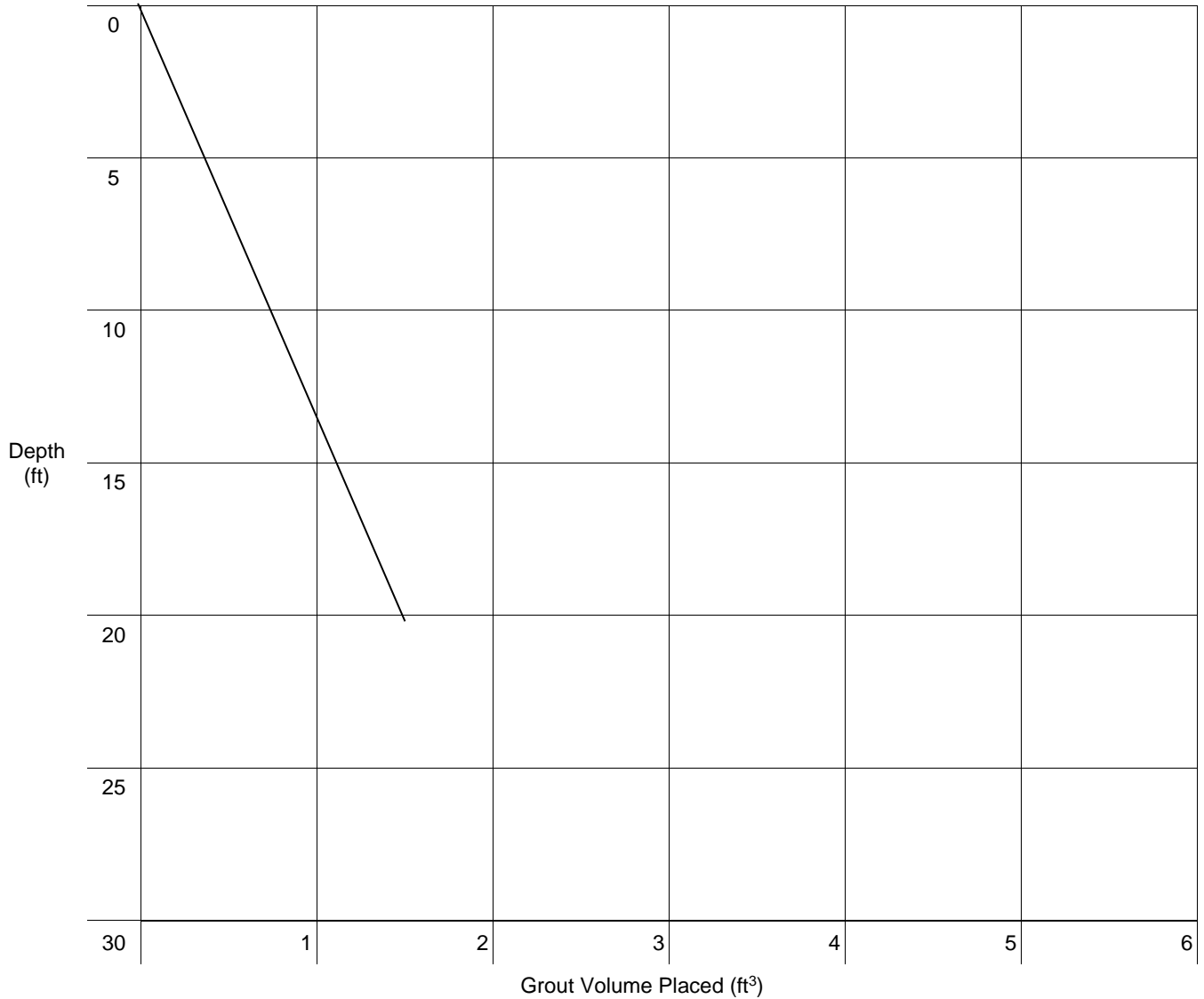
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	15	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	0.8	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	0.8	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.1	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	R-5	
Project ID:	P029450, P029776, P029777		Station:	1817+05.64	
Consultant Firm:	Terracon Consultants, Inc.	Date:	1/31/2022	Offset:	47.97 L
Grouted By (Driller's Name):	CC				
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water				

GROUT CURVE

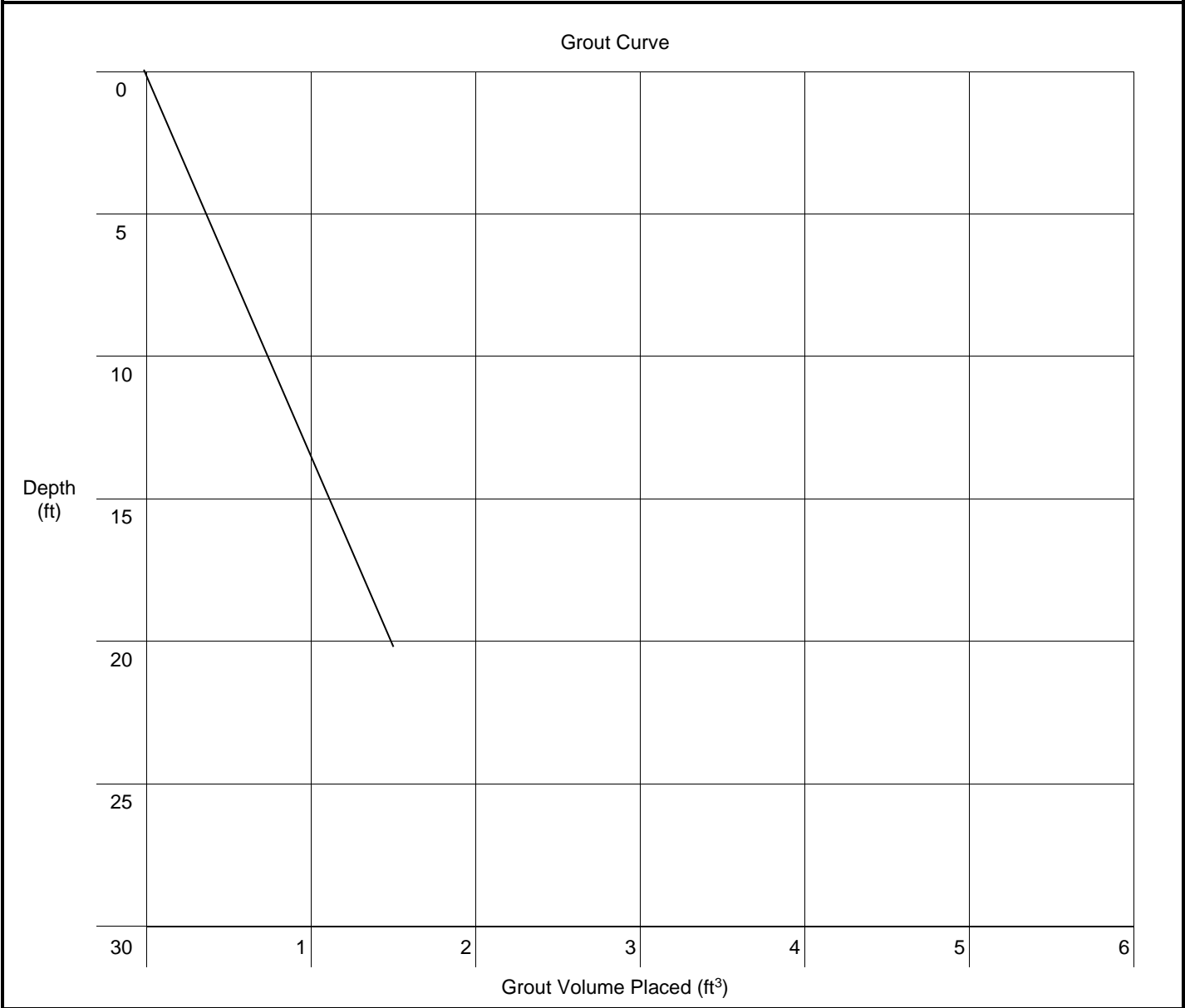


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: R-6
Project ID:	P029450, P029776, P029777		Station: 1817+05.28
Consultant Firm:	Terracon Consultants, Inc.		Offset: 48.45 R
GROUTED BY (DRILLER'S NAME):	CC	Date 1/24/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



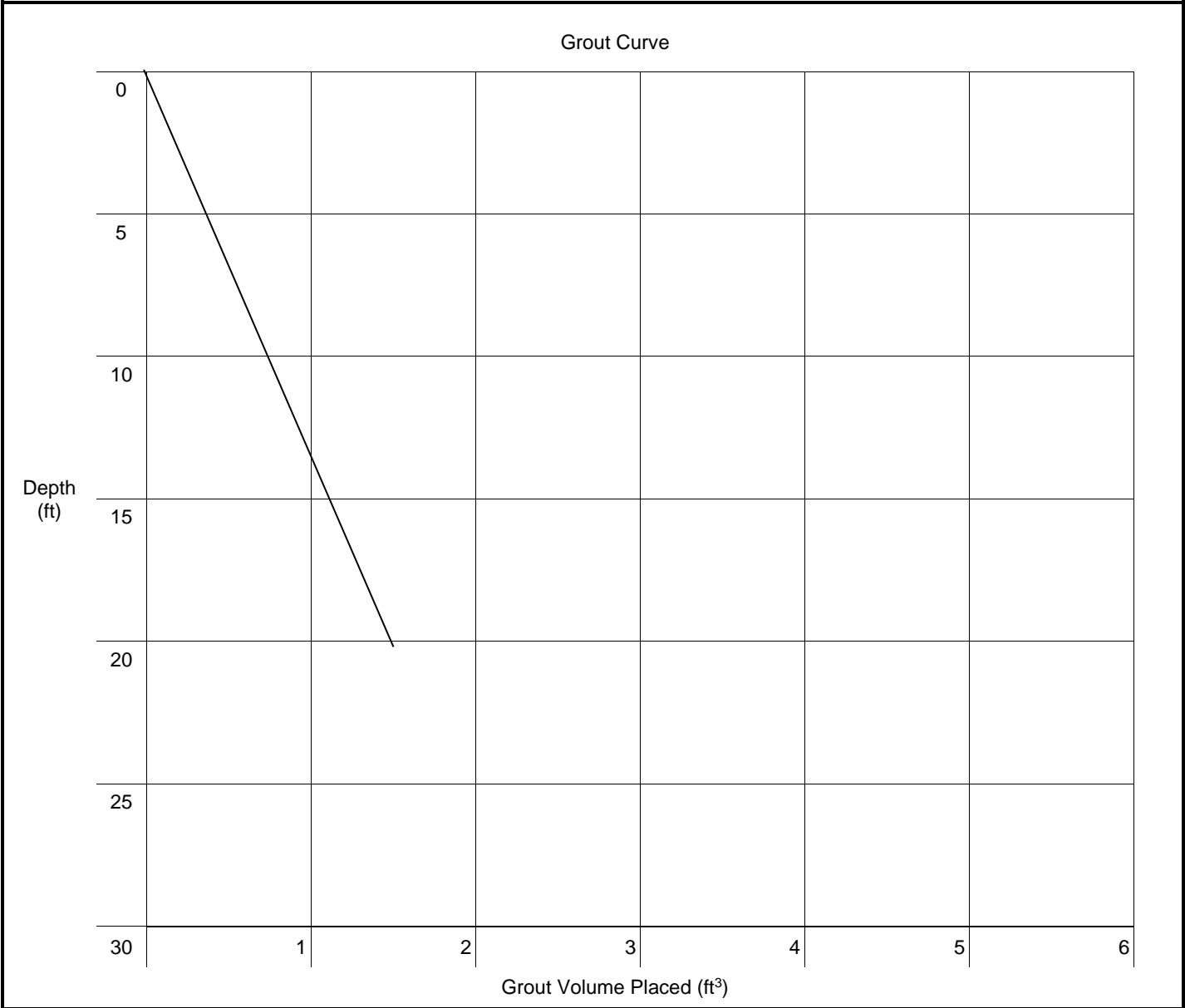
Number of Bags On-Site	40	Ea	
Depth of Test Hole Grouted	20	Ft	
Diameter of Test Hole	0.25	Ft	
Area of Test Hole	0.05	ft <sup>2</sup>	
Volume of Test Hole	1.0	ft <sup>3</sup>	
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>	
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>	
Number of Bags Used	1	ea	
Volume Placed	1.5	ft <sup>3</sup>	





**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.: R-7
Project ID:	P029450, P029776, P029777		Station: 1822+13.27
Consultant Firm:	Terracon Consultants, Inc.		Offset: 48.3 L
Grouted By (Driller's Name):	CC	Date 1/30/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



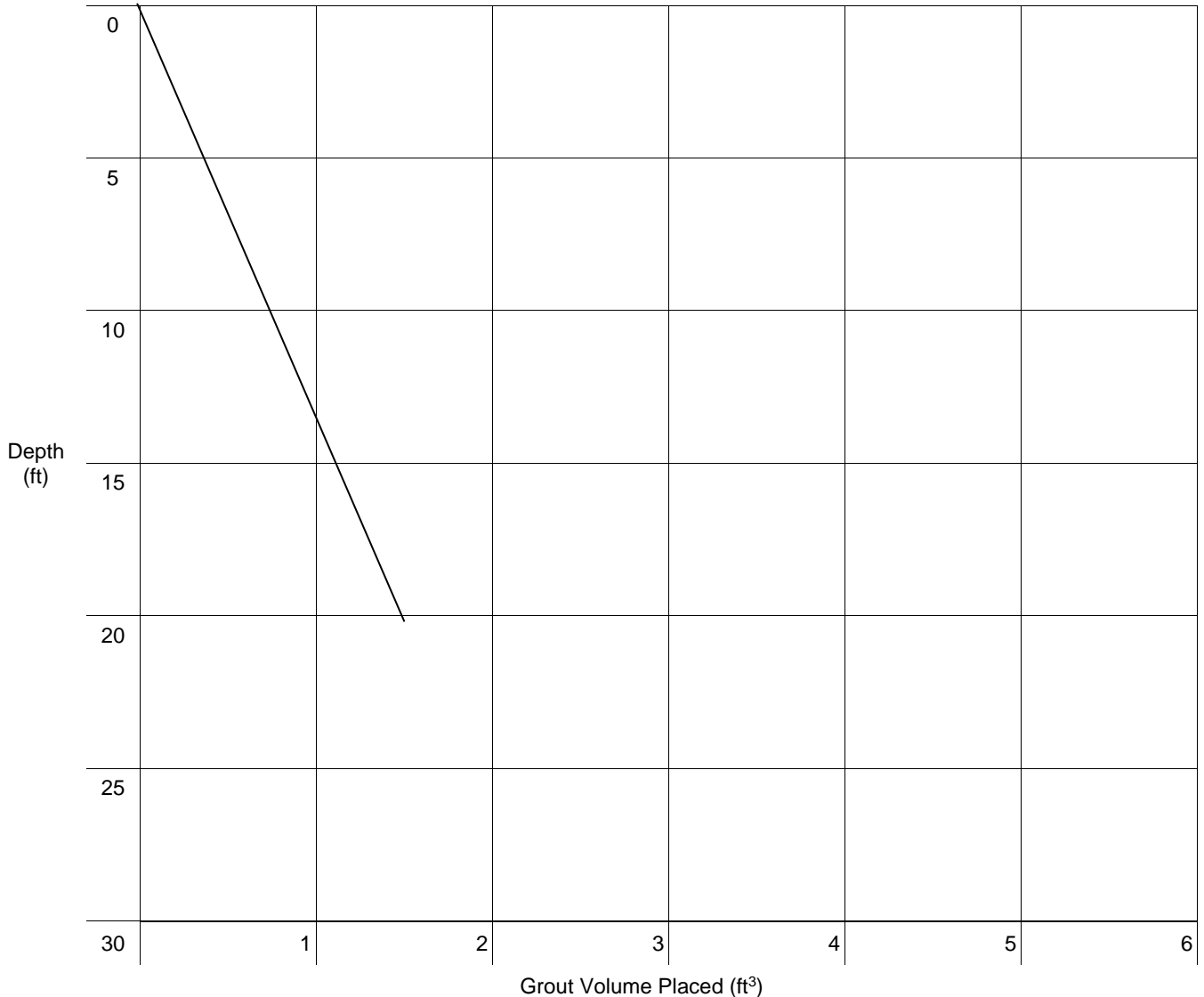
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	R-8
Project ID:	P029450, P029776, P029777		Station:	1822+11.91
Consultant Firm:	Terracon Consultants, Inc.		Offset:	48.55 R
Grouted By (Driller's Name):	CC	Date	1/24/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

GROUT CURVE



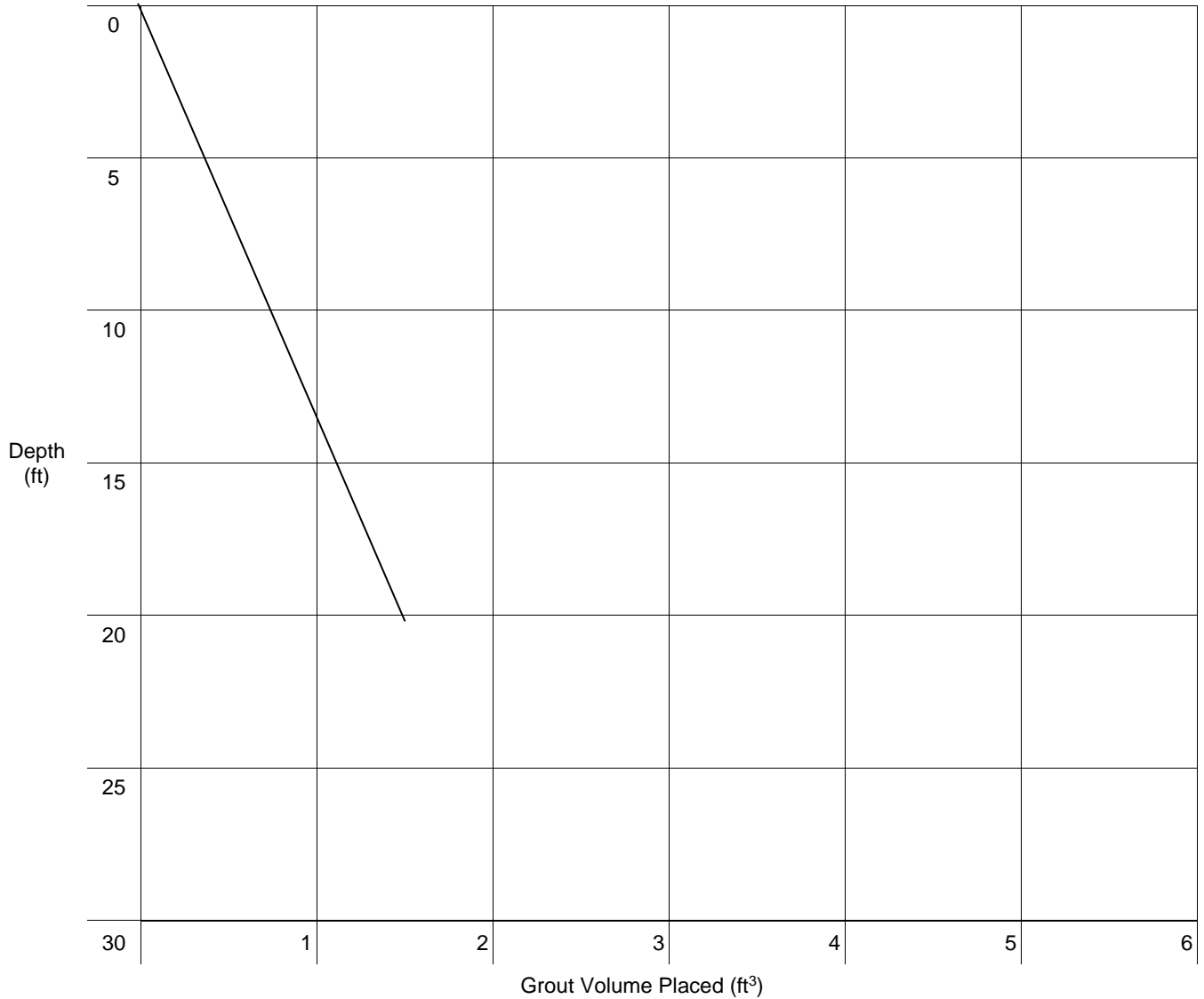
Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



## GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)

Project Name:	I-20 Wateree River Bridge Repairs		Test Hole No.:	R-9
Project ID:	P029450, P029776, P029777		Station:	1827+17.66
Consultant Firm:	Terracon Consultants, Inc.		Offset:	49.32 L
Grouted By (Driller's Name):	CC	Date	1/30/2022	
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water			

GROUT CURVE

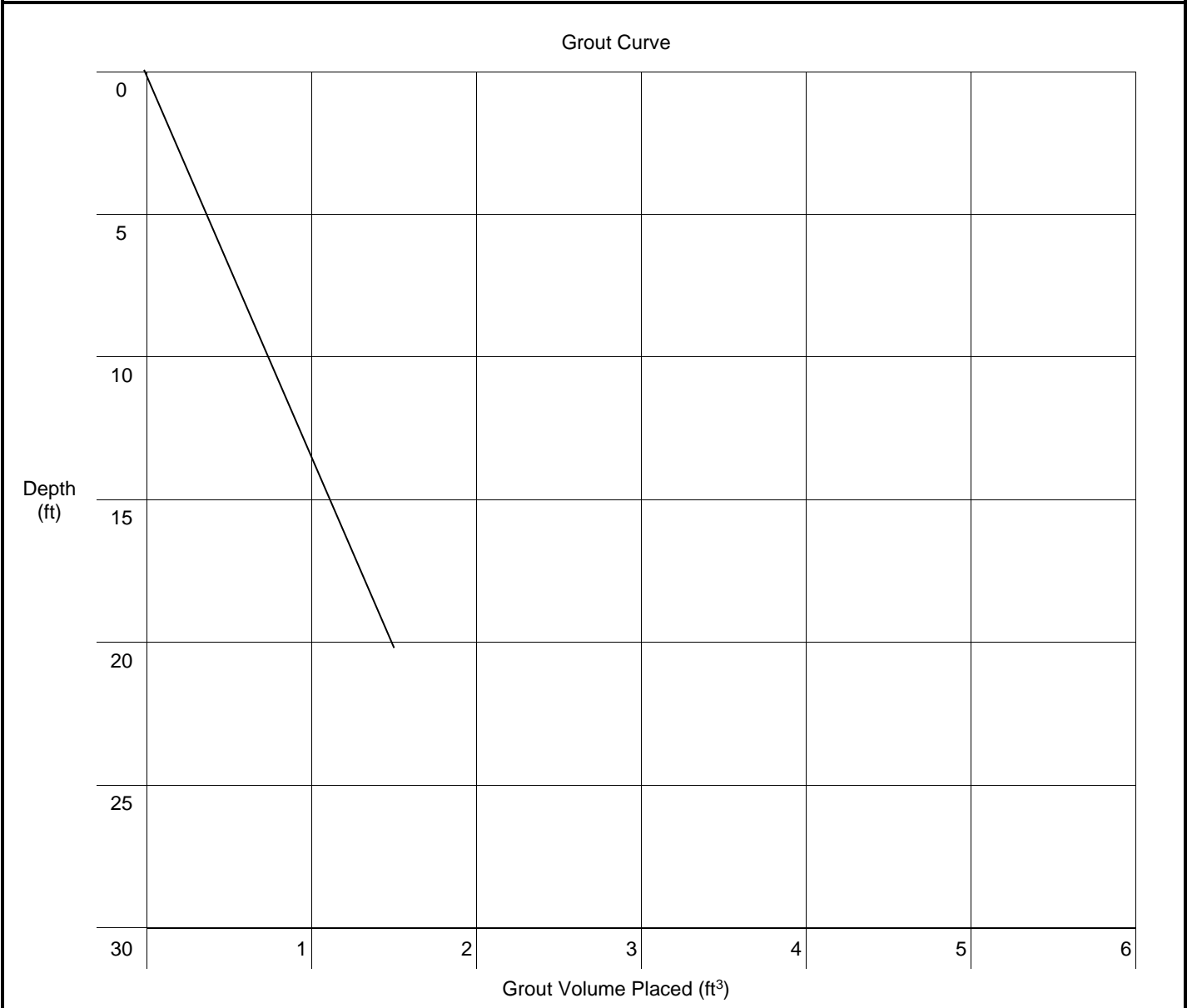


Number of Bags On-Site	40	Ea
Depth of Test Hole Grouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>



**GROUT LOG OF TEST HOLES FOR GEOTECHNICAL ON-CALL (REV 03-23-16)**

Project Name:	I-20 Wateree River Bridge Repairs	Test Hole No.:	R-10
Project ID:	P029450, P029776, P029777	Station:	1827+14.26
Consultant Firm:	Terracon Consultants, Inc.	Offset:	47.89 R
Gouted By (Driller's Name):	CC	Date	1/30/2022
Notes:	Mix design: 1 pound cement, 1 pound bentonite, 6 pounds water		



Number of Bags On-Site	40	Ea
Depth of Test Hole Gouted	20	Ft
Diameter of Test Hole	0.25	Ft
Area of Test Hole	0.05	ft <sup>2</sup>
Volume of Test Hole	1.0	ft <sup>3</sup>
Volume of Casing (If applicable)	N/A	ft <sup>3</sup>
Theoretical Volume of Test Hole	1.0	ft <sup>3</sup>
Number of Bags Used	1	ea
Volume Placed	1.5	ft <sup>3</sup>

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-1



Drill rig on B-2



**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-3

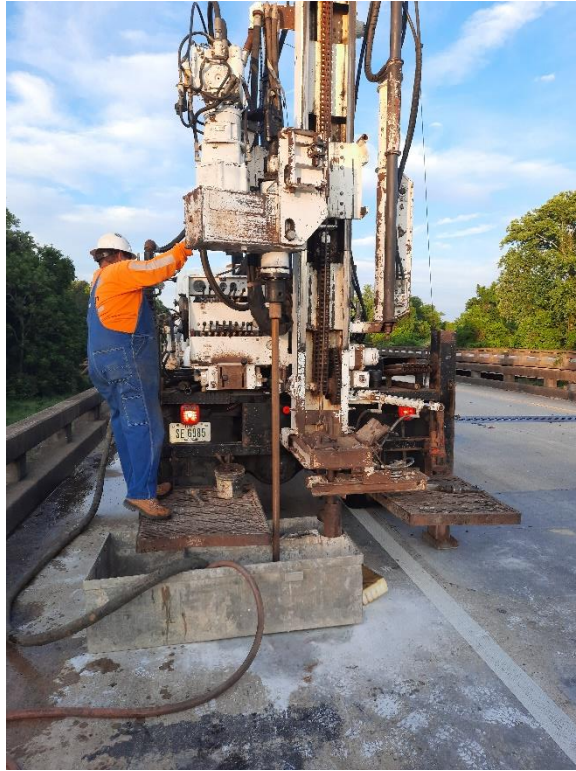


Drill rig on B-4

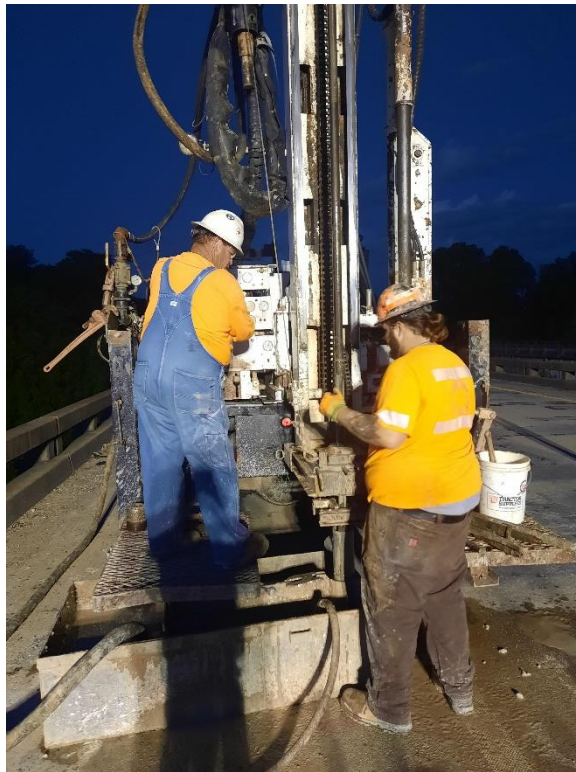
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-5



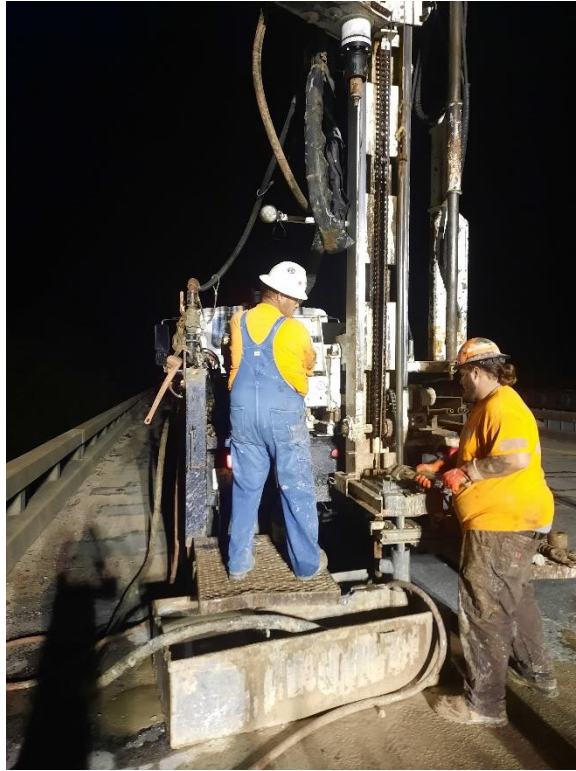
Drill rig on B-6



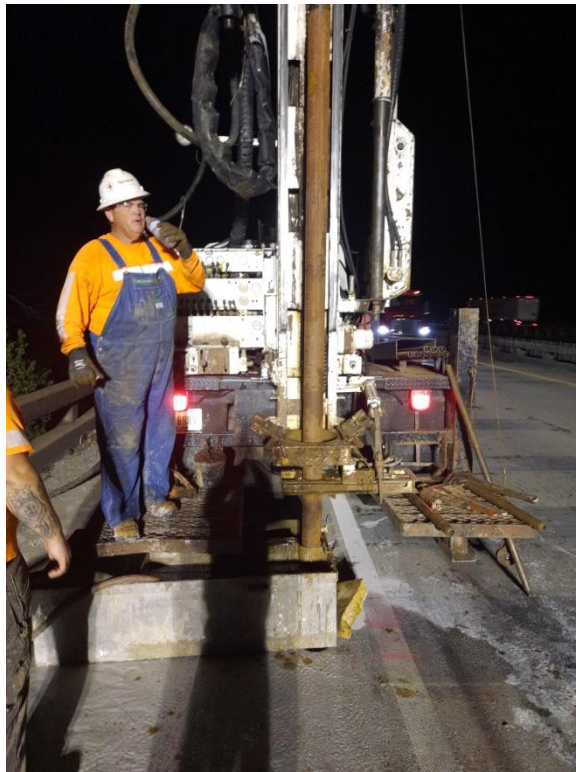
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-7



Drill rig on B-8

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-9



Drill rig on B-9A

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-10



Drill rig on B-11



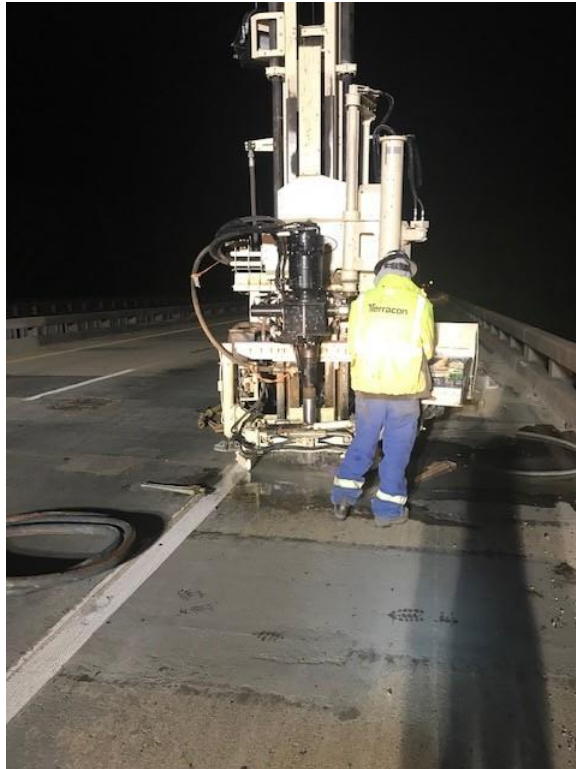
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-12



Drill rig on B-13

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-14



Drill rig on B-15

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-16



Drill rig on B-17



**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-18

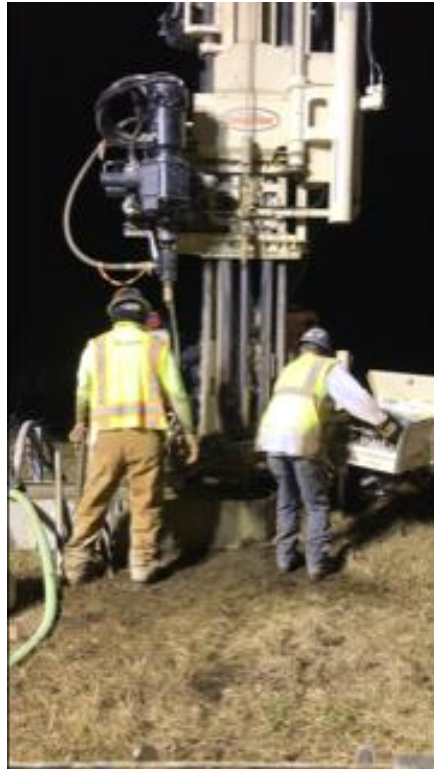


Drill rig on B-19

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on B-20



Drill rig on CO-1



**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on CO-2

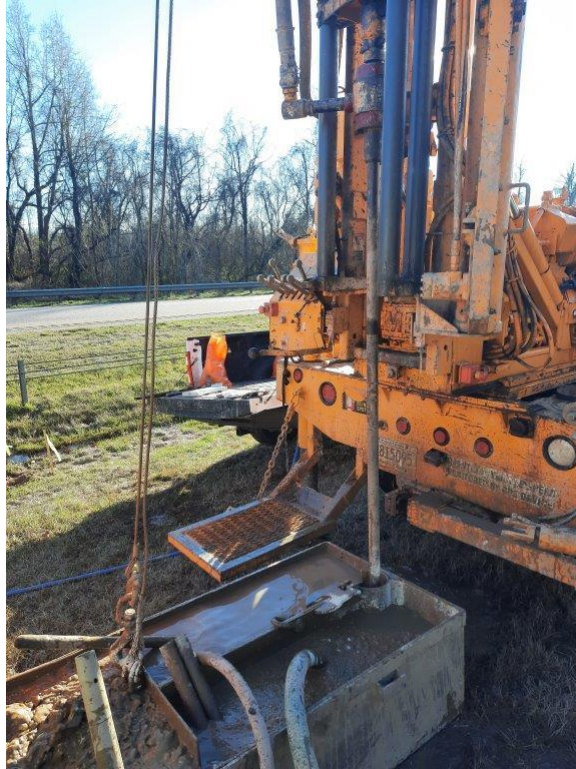


Drill rig on CO-3

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on CO-4



Drill rig on E-1



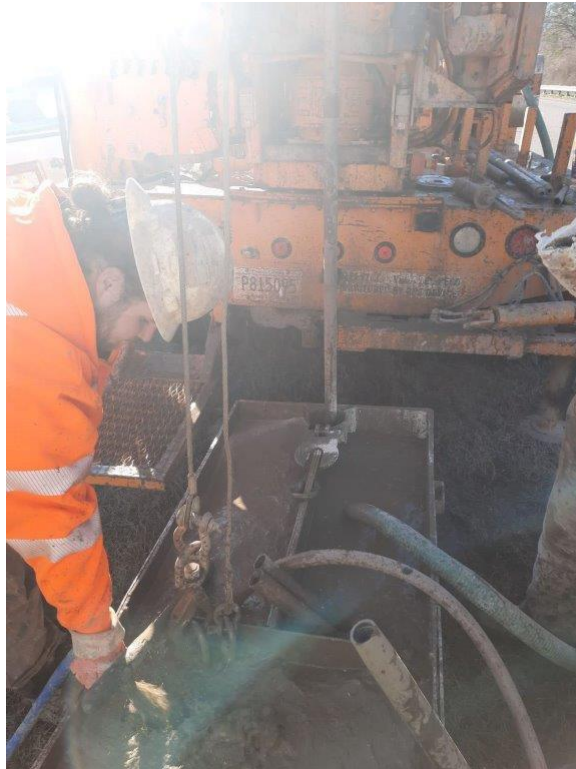
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on E-2



Drill rig on E-3

**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on E-4



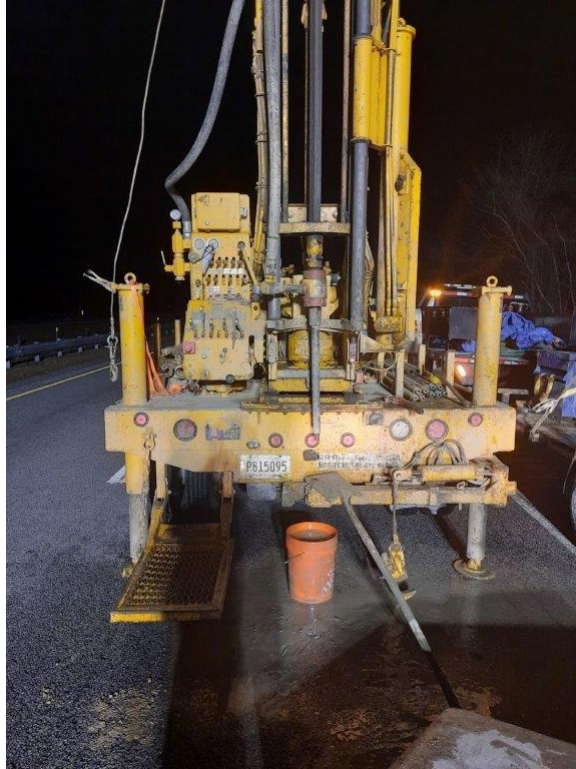
Drill rig on E-5



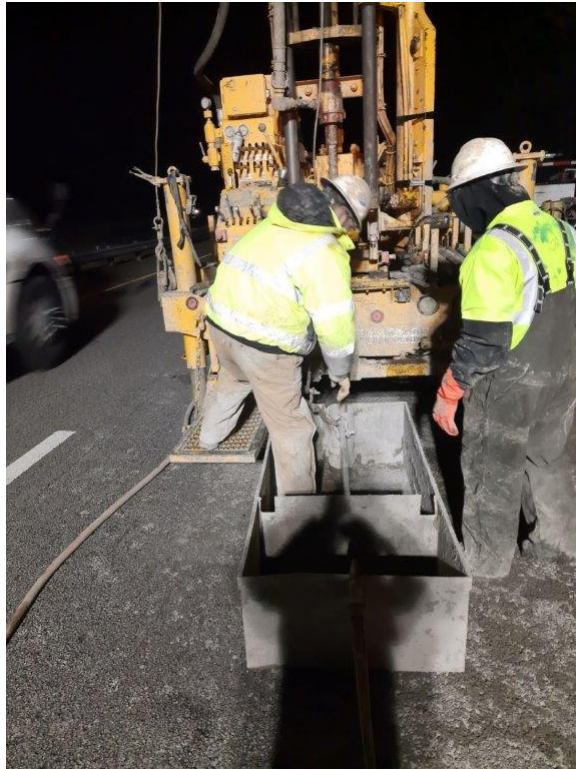
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on R-1



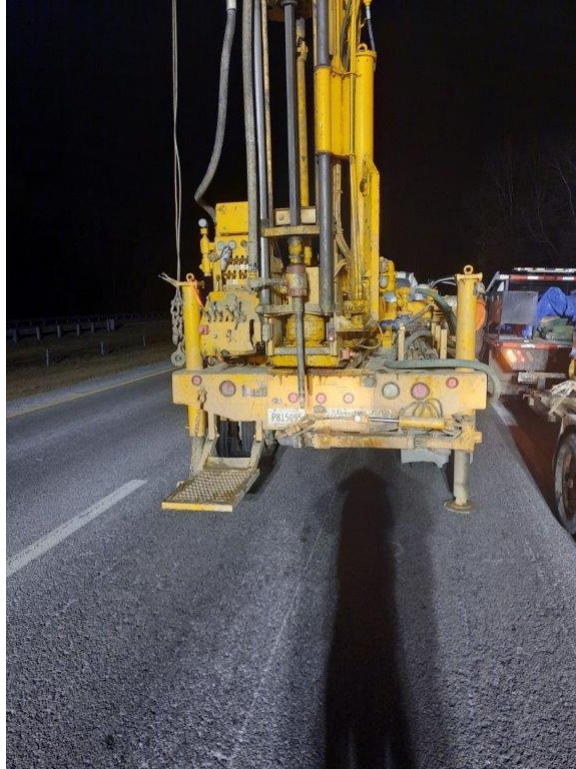
Drill rig on R-2



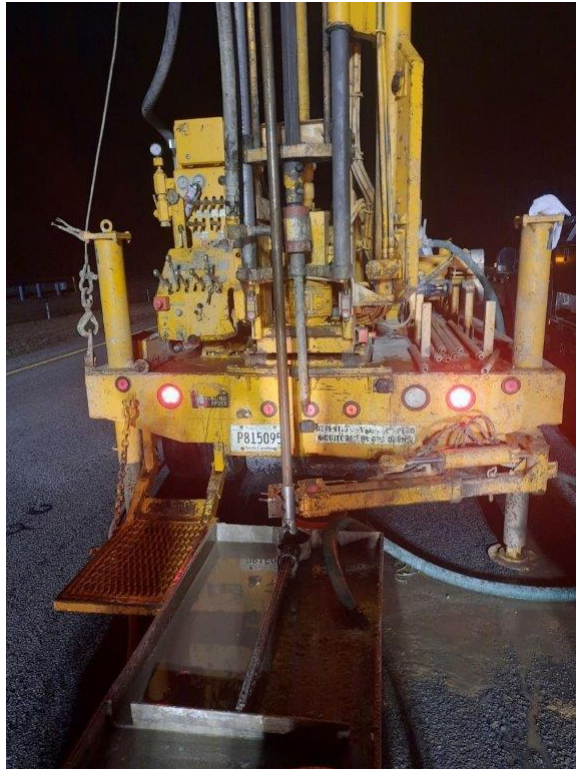
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on R-3



Drill rig on R-4

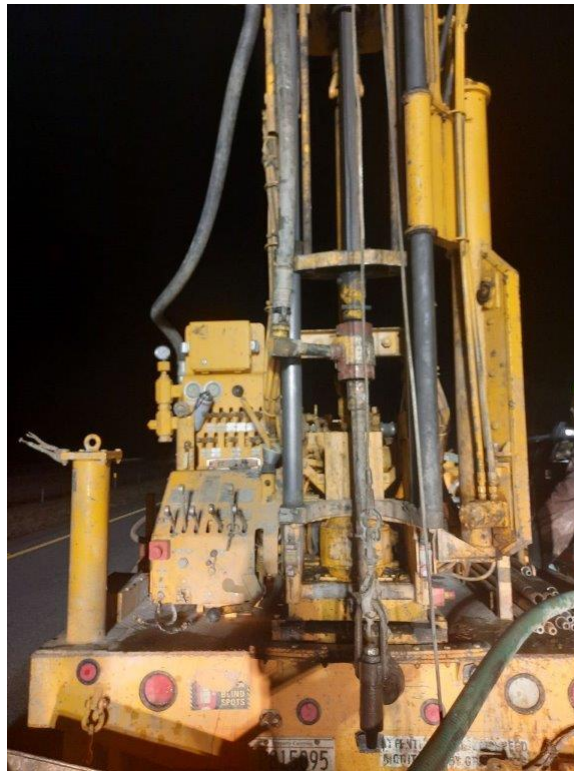
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on R-5

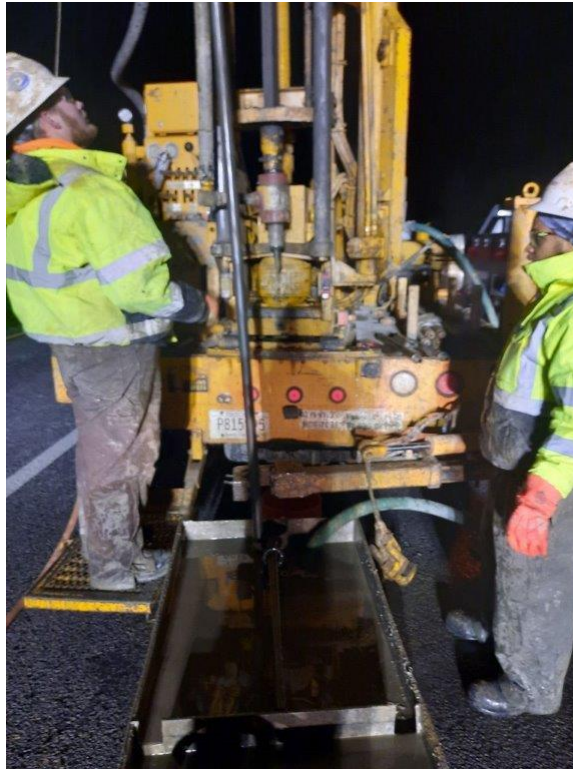


Drill rig on R-6

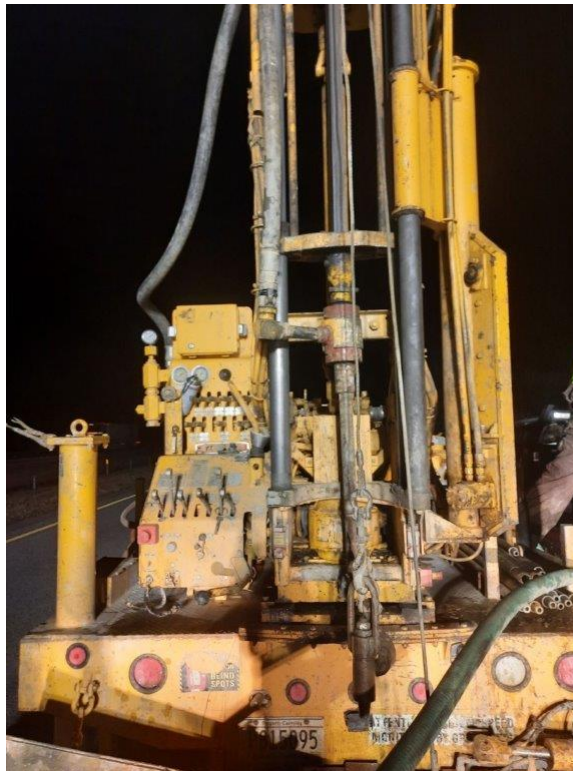
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on R-7



Drill rig on R-8



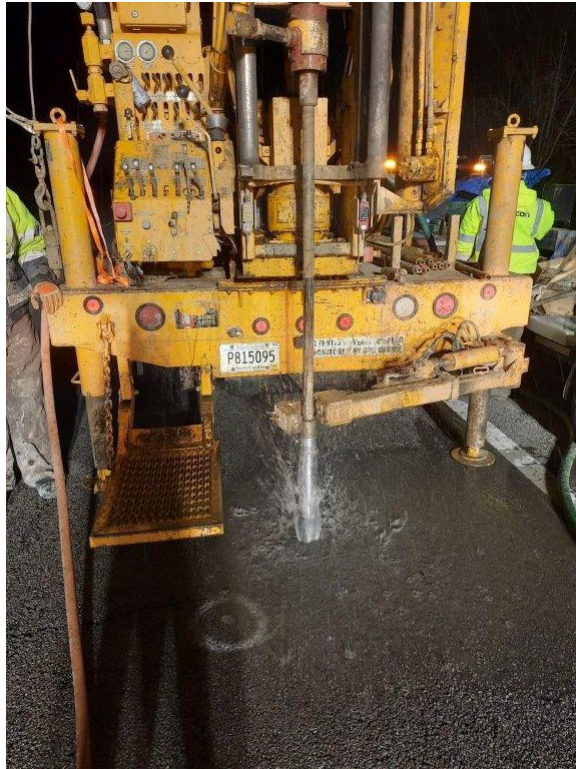
**Geotechnical Data Report – Drill Rig Photographs**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC

Terracon Project No. 7321P043A ■ SCDOT Project ID: P029450, P029776, P029777



Drill rig on R-9



Drill rig on R-10

## **LABORATORY TEST RESULTS**

### **Contents:**

Summary of Laboratory Results (7 pages)  
Grain Size Distribution (39 pages)  
Atterberg Limits (6 pages)  
Index Properties Versus Depth (41 pages)  
Moisture-Density Relationships (6 pages)  
CBR Test Results (4 pages)  
Direct Shear Test Results (2 pages)  
Triaxial Shear Test Results (12 pages)  
Rock Coring Summary (2 pages)  
Rock Testing Data Sheets (94 pages)  
Corrosivity Test Results

Note: All attachments are one page unless noted above.



# SUMMARY OF LABORATORY RESULTS

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
B-1	24-26	FAT CLAY(CH) / A-7-6 (28)	55	28	27	89.5	0.0	10.5	43.1	46.4	31.2
B-1	28-30	SILT with SAND(ML) / A-4 (8)	37	27	10	76.5	0.0	23.5	50.4	26.1	34.3
B-1	36-38	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				8.5					22.0
B-1	46-48	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				8.1					16.7
B-1	52-54	POORLY GRADED SAND(SP) / A-3				4.4					17.3
B-2	22.5-24	SANDY LEAN CLAY(CL) / A-6 (5)	32	21	11	62.1	1.2	36.7	37.7	24.5	24.2
B-2	30-32	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	35.4	0.0	64.6	22.7	12.7	27.7
B-2	38-40	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				7.6					20.3
B-2	44-46	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				6.8					14.4
B-2	56-58	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				6.1					9.5
B-3	2-4	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	34.2	0.0	65.8	23.1	11.1	17.4
B-3	8-10	SILTY, CLAYEY SAND(SC-SM) / A-4 (0)	27	21	6	45.3	0.0	54.7	26.9	18.4	30.1
B-3	18-20	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	30.6					34.0
B-4	2-4	SILT(ML) / A-7-6 (15)	42	26	16	87.0	0.0	13.0	49.8	37.2	35.0
B-4	12-14	CLAYEY SAND(SC) / A-4 (1)	28	19	9	41.4	0.0	58.6	22.3	19.1	30.7
B-4	14-16	POORLY GRADED SAND WITH SILT(SP-SM) / A-3				5.3					29.3
B-5	27-29	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	28.5	0.0	71.5	15.6	12.9	30.7
B-5	33-35	SANDY LEAN CLAY(CL) / A-6 (8)	34	20	14	69.8	0.0	30.2	40.3	29.6	37.3
B-5	41-43	SILTY SAND(SM) / A-2-4				12.5	0.0	87.5	7.9	4.5	24.2
B-5	45-47	POORLY GRADED SAND(SP) / A-3				4.8					23.1
B-6	51-53	POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM) / A-1-a				5.0	33.4	61.5	3.3	1.7	12.5
B-6	55-57	SILTY, CLAYEY SAND with GRAVEL(SC-SM) / A-2-4 (0)	29	22	7	20.3	17.6	62.1	5.7	14.6	21.0
B-6	63-65	SILTY, CLAYEY SAND(SC-SM) / A-4 (0)	22	16	6	43.7	0.2	56.0	17.7	26.0	19.3
B-7	53-55	CLAYEY SAND(SC) / A-4				38.2	0.0	61.8	14.6	23.5	14.1
B-7	55-56.3	CLAYEY SAND(SC) / A-2-4				29.2	14.7	56.1	8.7	20.5	13.4
B-7	61-63	CLAYEY SAND(SC) / A-4 (1)	27	18	9	45.3	0.8	53.9	15.6	29.7	20.2
B-7	67-69	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	19	14	5	31.0					16.8
B-8	34-36	SANDY LEAN CLAY(CL) / A-4 (4)	29	20	9	62.9	0.7	36.4	39.5	23.4	25.4

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



521 Clemson Rd  
Columbia, SC

PH. 803-741-9000

FAX. 803-741-9900

PROJECT NUMBER: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# SUMMARY OF LABORATORY RESULTS

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-LANDSCAPE\_A\_7321P043A I-20 WATEREE RVE.GPJ TERRACON\_DATA TEMPLATE.GDT 5/5/22

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
B-8	38-40	SANDY SILTY CLAY(CL-ML) / A-4 (1)	27	20	7	54.1	1.3	44.6	33.4	20.7	26.6
B-8	46-47.8	SANDY LEAN CLAY(CL) / A-6 (6)	34	16	18	53.6	1.0	45.4	15.2	38.4	15.7
B-8	48-50	SANDY LEAN CLAY(CL) / A-6 (11)	40	18	22	61.0					17.0
B-8	52-54	SANDY LEAN CLAY(CL) / A-6 (11)	39	20	19	66.3					20.5
B-9	4-6	SILTY SAND(SM) / A-2-4				20.3					10.4
B-9	18-20	SANDY SILT(ML) / A-4 (0)	26	25	1	52.4					30.6
B-9	26-28	LEAN CLAY with SAND(CL) / A-6 (10)	39	24	15	71.1					23.5
B-9	36-38	SANDY LEAN CLAY(CL) / A-6 (5)	34	21	13	58.8					34.5
B-9	48.5-50	SILTY SAND(SM) / A-2-4				15.4					15.3
B-9	68.5-70	SILTY SAND(SM) / A-2-4				29.8					30.0
B-9 Bulk	0-5	SILTY SAND(SM) / A-1-b (0)	19	17	2	19.0	5.4	75.6			1.0
B-9B	18-20	CLAYEY SAND(SC) / A-6 (4)	36	17	19	41.9	1.8	56.4			18.9
B-10	2-4					56.1	0.1	43.8			22.8
B-10	6-8	LEAN CLAY with SAND(CL) / A-7-6 (18)	44	24	20	83.8					28.6
B-10	18.5-20					5.9	0.0	94.1			32.8
B-10	28.5-30					36.7					18.7
B-10	43.5-45					28.6					21.8
B-10	48.5-50					12.3					22.1
B-11	2-4					72.9					26.5
B-11	8-10					30.2					30.9
B-11	18.5-20					5.9	32.0	62.1			11.1
B-11	28.5-30	ELASTIC SILT with SAND(MH) / A-7-5 (25)	65	33	32	72.6					36.9
B-11	38.5-40					18.1					26.1
B-12	2-4	LEAN CLAY(CL) / A-6 (12)	38	24	14	85.2	0.0	14.8	57.1	28.0	28.9
B-12	6-8	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	41.9					28.5
B-12	18.5-20					53.9	0.1	46.0			19.7
B-12	28.5-30	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	20	15	5	34.3					15.9
B-13	49.6-51.6	POORLY GRADED SAND(SP)				1.7	0.4	97.9			24.0

PROJECT: I-20 Waterree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



521 Clemson Rd  
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PH. 803-741-9000

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PROJECT NUMBER: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# SUMMARY OF LABORATORY RESULTS

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-LANDSCAPE\_A\_7321P043A I-20 WATEREE RVE.GPJ TERRACON\_DATA TEMPLATE.GDT 5/5/22

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
B-13	53.6-55.6	CLAYEY SAND(SC) / A-7-6 (5)	48	21	27	39.7					12.1
B-13	57.6-59.6					45.8	0.0	54.2			18.7
B-13	68.1-69.6	CLAYEY SAND(SC) / A-2-6 (0)	25	13	12	30.4					16.7
B-14	49.5-51	POORLY GRADED SAND with GRAVEL(SP)				2.7	44.7	52.6			12.8
B-14	53-55	CLAYEY SAND(SC) / A-4 (2)	31	21	10	47.2					17.4
B-14	62.5-64					37.1	0.0	62.9			16.3
B-15	2-4	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	35.8	0.0	64.2	23.1	12.7	19.8
B-15	8-10					5.1					21.7
B-15	18.5-20	POORLY GRADED SAND(SP)				3.0	11.5	85.5			20.3
B-15	28.5-30	CLAYEY SAND(SC) / A-4 (1)	31	21	10	42.5					20.1
B-15	38.5-40					32.1					15.0
B-16	2-4					41.8					22.8
B-16	8-10					6.9	0.2	93.0			14.7
B-16	18.5-20					9.8					26.5
B-16	33.5-35	CLAYEY SAND(SC) / A-4 (0)	25	17	8	38.0					19.0
B-16	43.5-45	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	22.3					18.2
B-17	2-4	SANDY LEAN CLAY(CL) / A-4 (4)	30	21	9	62.9					30.8
B-17	6-8					9.5	0.0	90.5			9.2
B-17	18.5-20					3.9					29.2
B-17	33.5-35	SANDY LEAN CLAY(CL) / A-6 (4)	35	21	14	50.5					22.1
B-17	43.5-45	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	21	14	7	31.3					15.2
B-18	2-4					65.5					36.0
B-18	13.5-15					10.1	0.0	89.9			19.2
B-18	18.5-20					3.1					21.9
B-18	38.5-40	CLAYEY SAND(SC) / A-4 (2)	33	23	10	47.4					23.2
B-18	53.5-55	CLAYEY SAND(SC) / A-2-6 (2)	36	15	21	31.6					17.5
B-19	2-4					44.8					30.5
B-19	8-10	LEAN CLAY with SAND(CL) / A-6 (13)	40	25	15	82.6					42.9

PROJECT: I-20 Wateree River Bridge Repairs	 521 Clemson Rd Columbia, SC	PROJECT NUMBER: 7321P043A
SITE: Kershaw County Kershaw County, SC	PH. 803-741-9000      FAX. 803-741-9900	CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL

# SUMMARY OF LABORATORY RESULTS

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-LANDSCAPE\_A\_7321P043A I-20 WATEREE RVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
B-19	23.5-25					14.9					31.7
B-19	38.5-40	SILTY SAND(SM) / A-4 (1)	33	24	9	41.7					23.2
B-19	48.5-50	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	20	15	5	30.3					16.0
B-20	2-4	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	26	21	5	27.4					15.8
B-20	16-18					46.5					18.8
B-20	24-26	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	47.3					31.9
B-20	30-32					23.3					17.3
B-20	38-40	SANDY LEAN CLAY(CL) / A-4 (4)	33	23	10	58.9					35.1
B-20	46-48					8.1	0.4	91.5			21.6
B-20	58.5-60					53.2					26.6
B-20 Bulk	0-5	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	21	15	6	29.6	3.4	67.1			0.8
B-20A	20-22	LEAN CLAY with SAND(CL) / A-6 (10)	36	23	13	78.7	0.0	21.3			33.0
CO-1	0-2	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	17	12	5	23.4	3.1	73.5			16.4
CO-1	4-6	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	20	13	7	21.1	0.4	78.5			12.3
CO-1	6-8					19.7	9.0	71.2			16.8
CO-2	0-2	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	19.0	13.1	67.9			11.7
CO-2	6-8					9.4	31.4	59.2			14.2
CO-3	0-2	CLAYEY SAND(SC) / A-2-4 (0)	22	14	8	25.5	5.7	68.9			11.1
CO-3	4-6	SANDY SILT(ML) / A-4 (0)	22	20	2	50.7	0.0	49.3			17.3
CO-3	6-8	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	21	17	4	29.2	7.5	63.3			14.9
CO-4	0-2	SILTY, CLAYEY SAND(SC-SM) / A-1-b (0)	24	18	6	22.1	10.1	67.9			14.2
CO-4	6-8	SILTY, CLAYEY SAND(SC-SM) / A-4 (0)	22	18	4	49.3	0.0	50.7			15.0
E-1	0-2	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	17	12	5	23.3	0.6	76.1			10.0
E-1	6-8					14.5	4.6	80.8			12.1
E-1	8-10					17.9	25.9	56.2			11.4
E-1	23.5-25	SANDY SILTY CLAY(CL-ML) / A-4 (3)	28	21	7	68.5	0.2	31.3			28.8
E-1	33.5-35	LEAN CLAY with SAND(CL) / A-7-6 (18)	43	23	20	84.6	0.0	15.4			28.9
E-1	43.5-45					21.9	0.0	78.1			53.3

PROJECT: I-20 Wateree River Bridge Repairs  SITE: Kershaw County Kershaw County, SC	521 Clemson Rd Columbia, SC  PH. 803-741-9000      FAX. 803-741-9900	PROJECT NUMBER: 7321P043A  CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL
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# SUMMARY OF LABORATORY RESULTS

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
E-1	53.5-55	SILTY SAND(SM) / A-2-4 (0)	33	26	7	33.4	0.0	66.6			18.1
E-2	0-2	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	20.8	13.3	65.9			9.2
E-2	8-10					17.6	27.5	54.9			9.1
E-2	13.5-15	CLAYEY SAND(SC) / A-7-6 (6)	47	23	24	42.8	3.6	53.6			21.1
E-2	23.5-25	SILTY CLAY(CL-ML) / A-4 (4)	26	20	6	85.7	0.2	14.2			29.6
E-2	43.5-45	SANDY SILT(ML) / A-6 (4)	37	26	11	53.4	0.0	46.6			33.7
E-2	53.5-55					7.3	39.7	53.0			8.7
E-3	0-2	SILTY SAND(SM) / A-2-4 (0)	19	16	3	29.2	3.3	67.5			14.8
E-3	8-10	SANDY SILT(ML) / A-4 (0)	21	19	2	68.6	0.0	31.4			21.9
E-3	28.5-30					30.7	0.2	69.1			19.6
E-3	48.5-50	POORLY GRADED SAND(SP)				3.4	1.9	94.7			12.0
E-4	0-2	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	25	18	7	22.8	4.3	72.8			15.3
E-4	6-8	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	23	18	5	33.6	5.1	61.2			12.8
E-4	13.5-15					41.7	0.0	58.3			14.7
E-4	23.5-25	SILTY SAND(SM) / A-2-4 (0)	25	23	2	13.7	0.0	86.3			21.7
E-4	38.5-40					24.6	0.0	75.4			31.8
E-5	0-2	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	20	16	4	21.5	3.1	75.5			13.1
E-5	8-10	SILTY, CLAYEY SAND(SC-SM) / A-4 (0)	23	19	4	42.5	0.0	57.5			16.6
E-5	18.5-20					28.8	0.0	71.2			22.4
E-5	28.5-30	ELASTIC SILT(MH) / A-7-5 (21)	51	31	20	89.3	0.0	10.7			38.5
E-5	33.5-35	LEAN CLAY(CL) / A-7-6 (19)	44	26	18	94.4	0.0	5.6			41.0
E-5	43.5-45					19.2	4.0	76.9			29.3
E-5	53.5-55					9.9	4.1	86.1			21.7
R-1	2-4					20.0	12.6	67.3			11.0
R-1	8-10	CLAYEY SAND(SC) / A-2-6 (0)	30	15	15	21.8	10.9	67.3			12.2
R-1	18.5-20	CLAYEY SAND(SC) / A-7-6 (4)	48	24	24	37.8	3.0	59.2			18.0
R-1	28.5-30		29	19	10						24.1
R-1 Bulk	0-10	CLAYEY SAND(SC) / A-2-6 (0)	25	13	12	22.7	4.8	72.5			9.6

PROJECT: I-20 Wateree River Bridge Repairs  SITE: Kershaw County Kershaw County, SC	<b>Terracon</b> 521 Clemson Rd Columbia, SC  PH. 803-741-9000      FAX. 803-741-9900	PROJECT NUMBER: 7321P043A  CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL
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# SUMMARY OF LABORATORY RESULTS

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
R-2	1.5-3	CLAYEY SAND(SC) / A-2-6 (0)	28	16	12	20.3	4.9	74.8			10.5
R-2	23.5-25		30	23	7						28.3
R-2 Bulk	0-10	SILTY, CLAYEY SAND(SC-SM) / A-1-b (0)	19	15	4	16.6	5.1	78.3			9.2
R-3	2-4					17.0	10.3	72.7			7.7
R-3	8-10					15.5	34.0	50.5			10.0
R-3	23.5-25	LEAN CLAY with SAND(CL) / A-6 (10)	36	22	14	75.8	0.1	24.1			30.0
R-4	2-4					16.8	6.3	76.8			30.0
R-4	8-10					16.4	17.7	65.9			9.5
R-4	13.5-15										11.4
R-5	1.5-3					15.5	5.0	79.5			6.8
R-5	8-10	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	42.3	0.0	57.7			22.6
R-5	18.5-20	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	37.5	0.0	62.5			21.4
R-5	23.5-25	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	36.0	0.0	64.0			24.5
R-5 Bulk	0-10	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	23	16	7	28.5	4.1	67.4			11.5
R-6	1-2.5	CLAYEY SAND(SC) / A-2-6 (1)	35	16	19	21.8	9.7	68.4			15.9
R-6	6-8	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	32.0	0.2	67.8			17.7
R-6	13.5-15					40.5	0.0	59.5			19.0
R-6	18.5-20	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	49.9	0.0	50.1			25.1
R-6	23.5-25	SILT with SAND(ML) / A-4 (5)	32	24	8	73.7	2.7	23.6			35.8
R-6 Bulk	0-10	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	24	18	6	35.5	3.3	61.2			12.0
R-7	1.5-3					19.3	17.0	63.8			11.1
R-7	8-10	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	29.6	10.6	59.8			16.3
R-7	13.5-15	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	47.3	0.0	52.7			18.2
R-7	23.5-25					51.1	0.0	48.9			26.9
R-8	1-2.5					17.7	16.6	65.8			12.5
R-8	4-6	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	37.6	2.0	60.4			27.9
R-8	8-10	SANDY SILT(ML) / A-4 (0)	NP	NP	NP	60.6	0.0	39.4			20.6
R-8	18.5-20	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	39.6	0.0	60.4			27.0

PROJECT: I-20 Wateree River Bridge Repairs  SITE: Kershaw County Kershaw County, SC	<b>Terracon</b> 521 Clemson Rd Columbia, SC  PH. 803-741-9000      FAX. 803-741-9900	PROJECT NUMBER: 7321P043A  CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL
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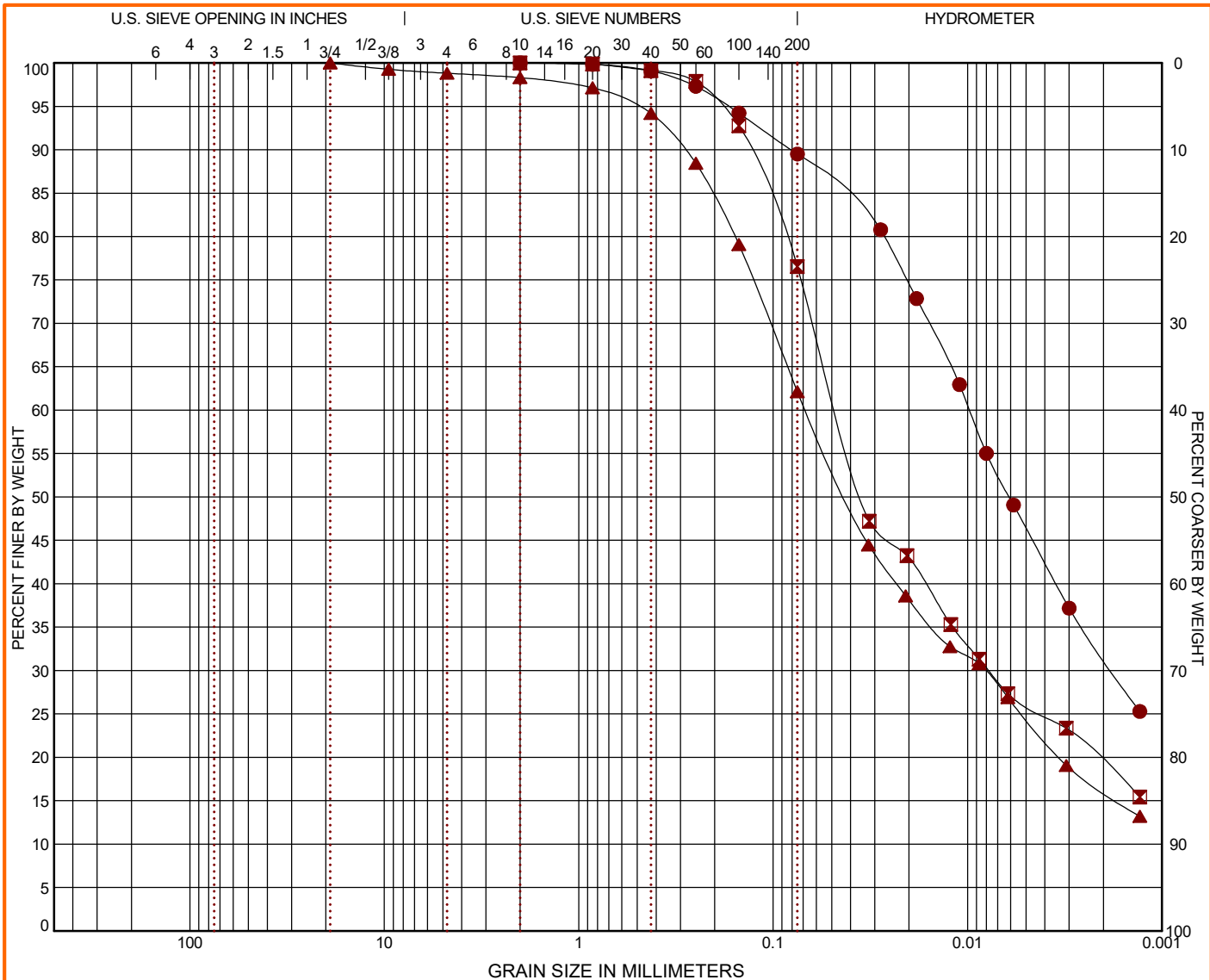
## SUMMARY OF LABORATORY RESULTS

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	% Gravel	% Sand	% Silt	% Clay	Water Content (%)
R-8	23.5-25					15.4	0.0	84.6			32.8
R-9	1-2.5					16.4	16.2	67.4			17.2
R-9	4-6	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	26.4	10.6	63.0			16.4
R-9	8-10	SILTY SAND(SM) / A-2-4 (0)	NP	NP	NP	25.2	10.8	64.1			17.6
R-9	18.5-20	SANDY SILT(ML) / A-4 (1)	29	25	4	57.7	0.1	42.2			28.4
R-10	1-2.5	SILTY, CLAYEY SAND(SC-SM) / A-2-4 (0)	23	16	7	20.2	11.7	68.1			19.6
R-10	6-8	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	37.6	0.9	61.4			28.7
R-10	18.5-20	SILTY SAND(SM) / A-4 (0)	NP	NP	NP	49.0	0.0	51.0			22.1
R-10	23.5-25		34	22	12						38.6

PROJECT: I-20 Wateree River Bridge Repairs	<p style="font-size: small; margin: 0;">521 Clemson Rd Columbia, SC</p>	PROJECT NUMBER: 7321P043A
SITE: Kershaw County Kershaw County, SC	PH. 803-741-9000      FAX. 803-741-9900	CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-1	24 - 26	0.0	0.0	10.5	43.1		46.4	CH
☒ B-1	28 - 30	0.0	0.0	23.5	50.4		26.1	ML
▲ B-2	22.5 - 24	0.0	1.2	36.7	37.7		24.5	CL

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.01	0.046	0.068
D <sub>30</sub>	0.002	0.008	0.008
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	#10	100.0	3/4"	100.0
#20	99.83	#20	99.88	3/8"	99.26
#40	99.08	#40	99.13	#4	98.81
#60	97.3	#60	97.87	#10	98.3
#100	94.23	#100	92.77	#20	97.14
#200	89.51	#200	76.52	#40	94.19
				#60	88.45
				#100	79.09
				#200	62.12

SOIL DESCRIPTION
● A-7-6 (28)
☒ A-4 (8)
▲ A-6 (5)

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

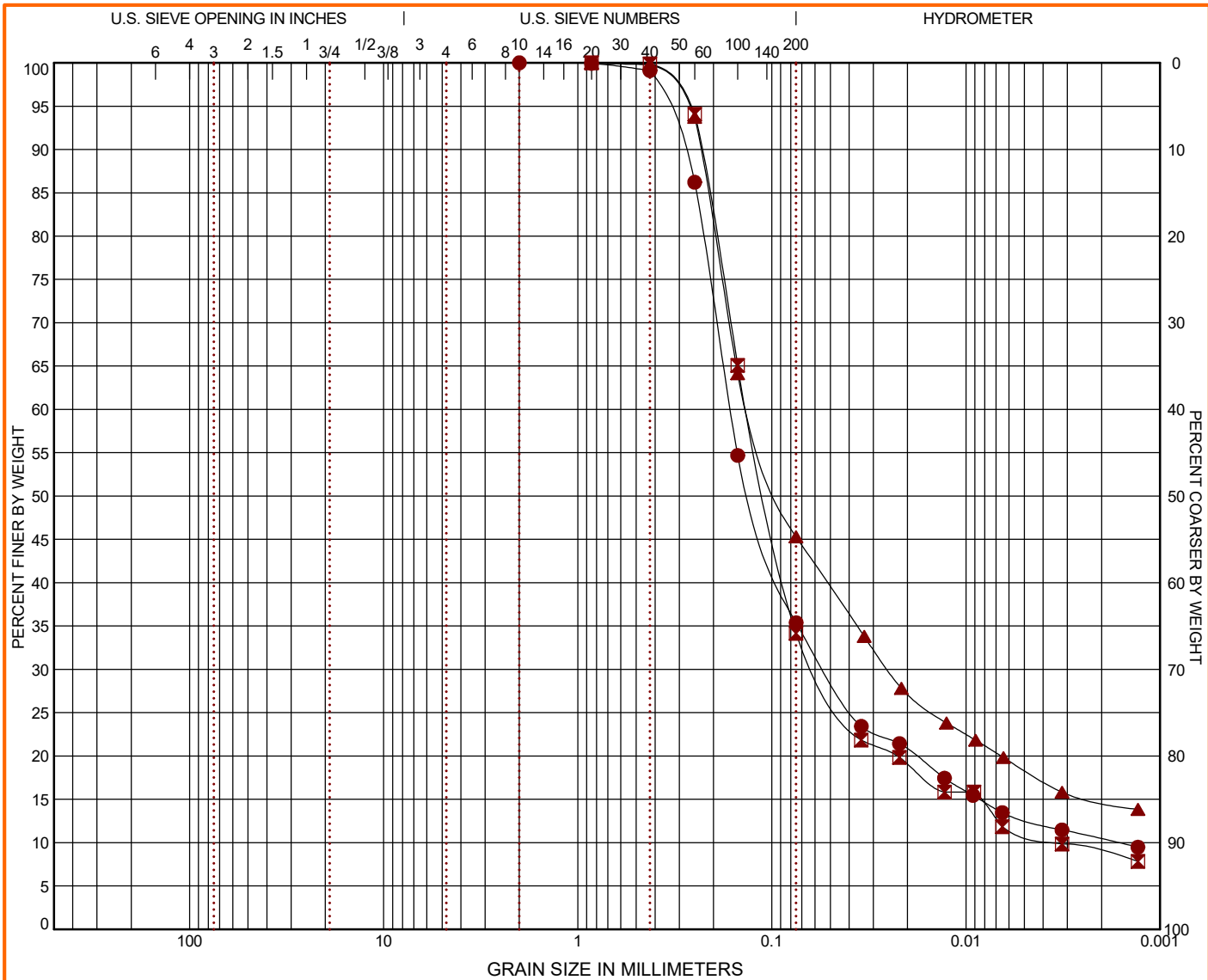
PROJECT: I-20 Wateree River Bridge Repairs  
 SITE: Kershaw County  
 Kershaw County, SC



PROJECT NUMBER: 7321P043A  
 CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-2	30 - 32	0.0	0.0	64.6	22.7		12.7	SM
☒ B-3	2 - 4	0.0	0.0	65.8	23.1		11.1	SM
▲ B-3	8 - 10	0.0	0.0	54.7	26.9		18.4	SC-SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.163	0.134	0.129
D <sub>30</sub>	0.053	0.058	0.025
D <sub>10</sub>	0.002	0.003	

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>	10.44	7.38	
C <sub>u</sub>	99.57	39.70	

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	#20	100.0	#20	100.0
#20	99.94	#40	99.88	#40	99.82
#40	99.1	#60	94.07	#60	93.71
#60	86.22	#100	65.08	#100	64.11
#100	54.69	#200	34.17	#200	45.3
#200	35.39				

SOIL DESCRIPTION	
●	A-2-4 (0)
☒	A-2-4 (0)
▲	A-4 (0)

REMARKS	
●	
☒	
▲	

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

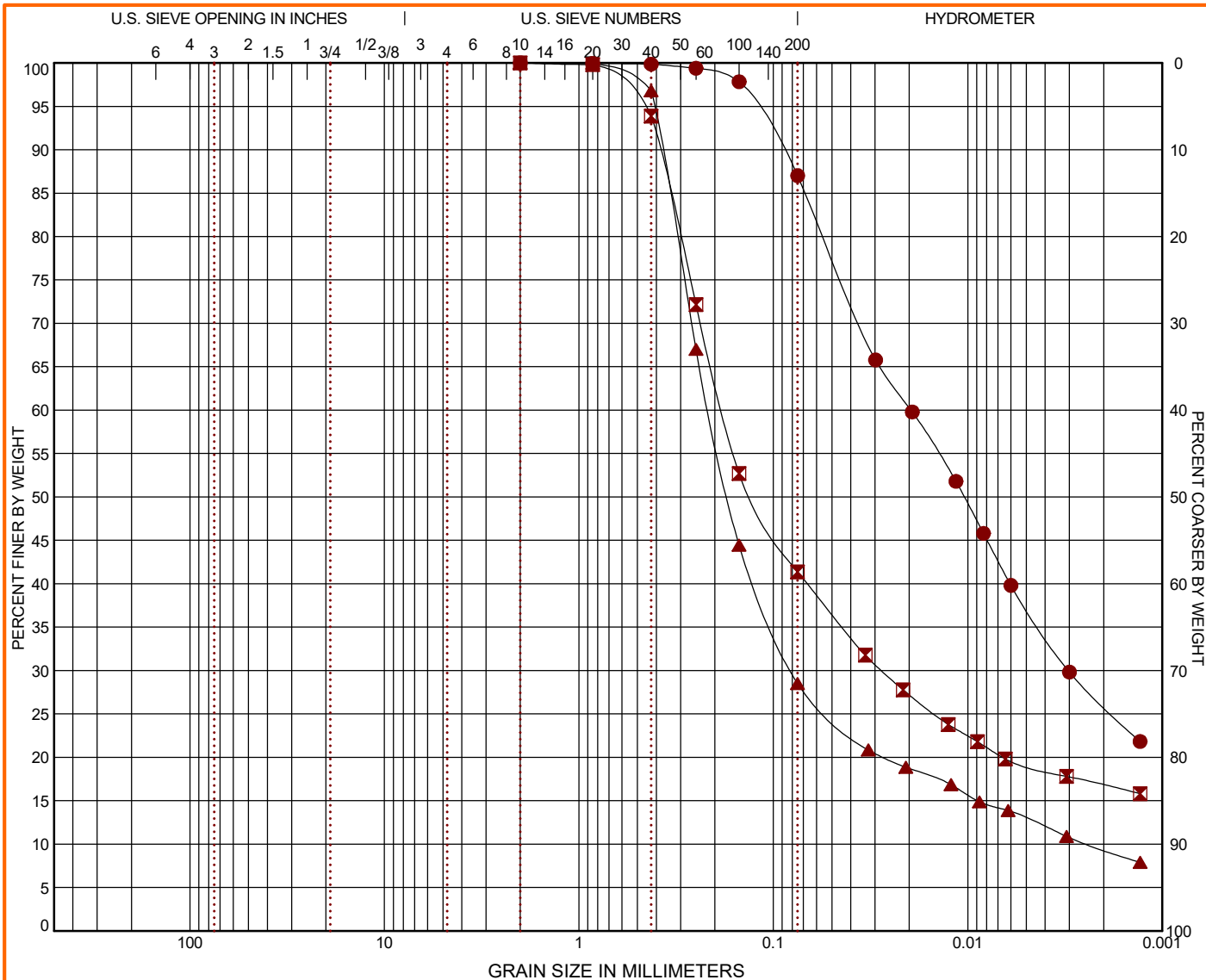


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-4	2 - 4	0.0	0.0	13.0	49.8		37.2	ML
☒ B-4	12 - 14	0.0	0.0	58.6	22.3		19.1	SC
▲ B-5	27 - 29	0.0	0.0	71.5	15.6		12.9	SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.02	0.182	0.213
D <sub>30</sub>	0.003	0.028	0.08
D <sub>10</sub>			0.002

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	#10	100.0	#10	100.0
#20	99.94	#20	99.82	#20	99.97
#40	99.86	#40	93.89	#40	96.79
#60	99.39	#60	72.16	#60	66.99
#100	97.84	#100	52.69	#100	44.45
#200	87.02	#200	41.38	#200	28.5

SOIL DESCRIPTION	
●	A-7-6 (15)
☒	A-4 (1)
▲	A-2-4 (0)

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			12.54
C <sub>u</sub>			89.10

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



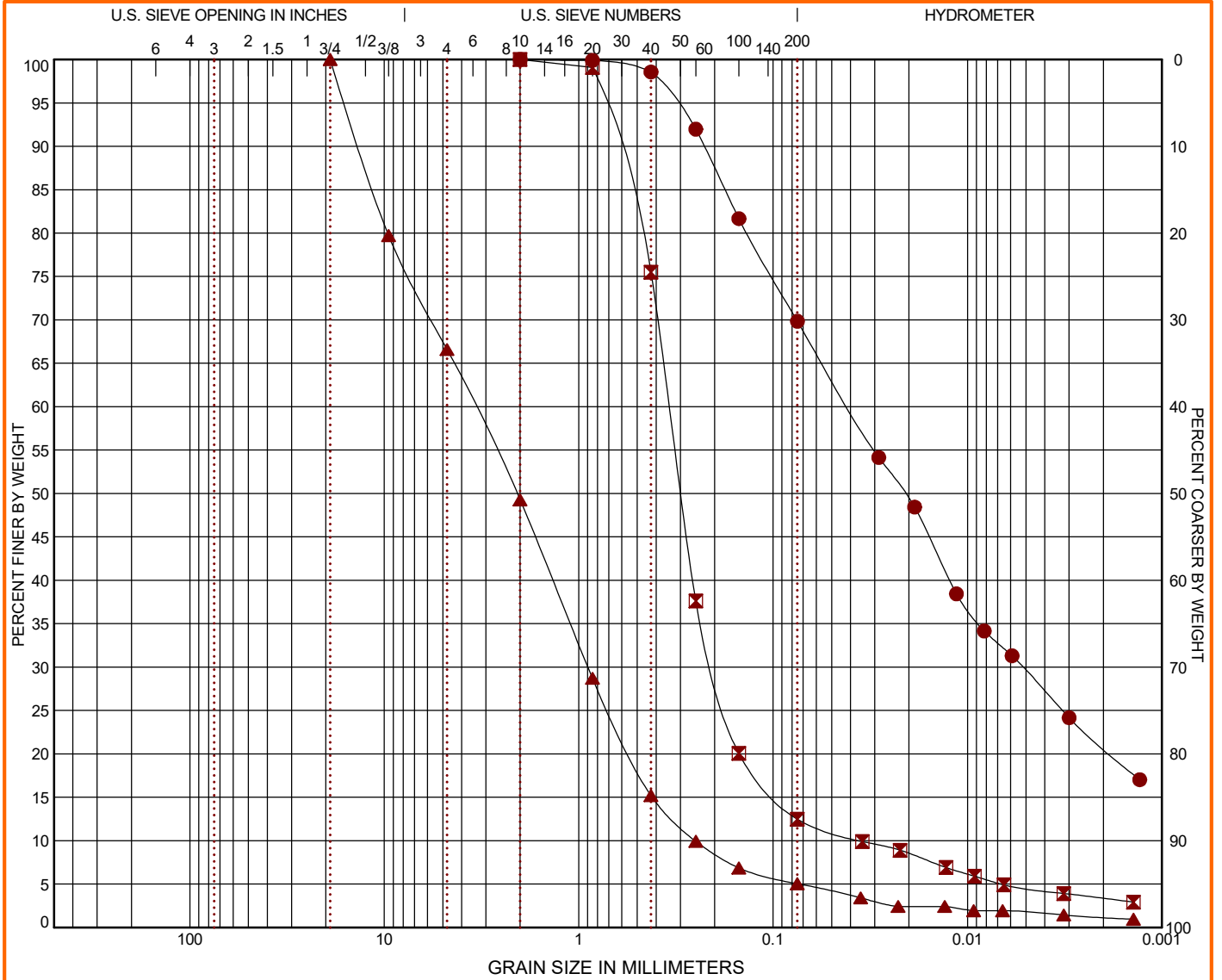
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-5	33 - 35	0.0	0.0	30.2	40.3		29.6	SP-SM
☒ B-5	41 - 43	0.0	0.0	87.5	7.9		4.5	SP-SM
▲ B-6	51 - 53	0.0	33.4	61.5	3.3		1.7	SP-SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.041	0.342	3.418
D <sub>30</sub>	0.005	0.2	0.897
D <sub>10</sub>		0.036	0.252

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>		3.27	0.93
C <sub>u</sub>		9.55	13.58

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	#10	100.0	3/4"	100.0
#20	99.9	#20	99.07	3/8"	79.71
#40	98.56	#40	75.49	#4	66.59
#60	91.97	#60	37.61	#10	49.27
#100	81.66	#100	20.07	#20	28.71
#200	69.84	#200	12.48	#40	15.2
				#60	9.93
				#100	6.86
				#200	5.04

SOIL DESCRIPTION	
●	A-6 (8)
☒	SILTY SAND(SM) / A-2-4
▲	POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM) / A-1-a
REMARKS	
●	
☒	
▲	

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

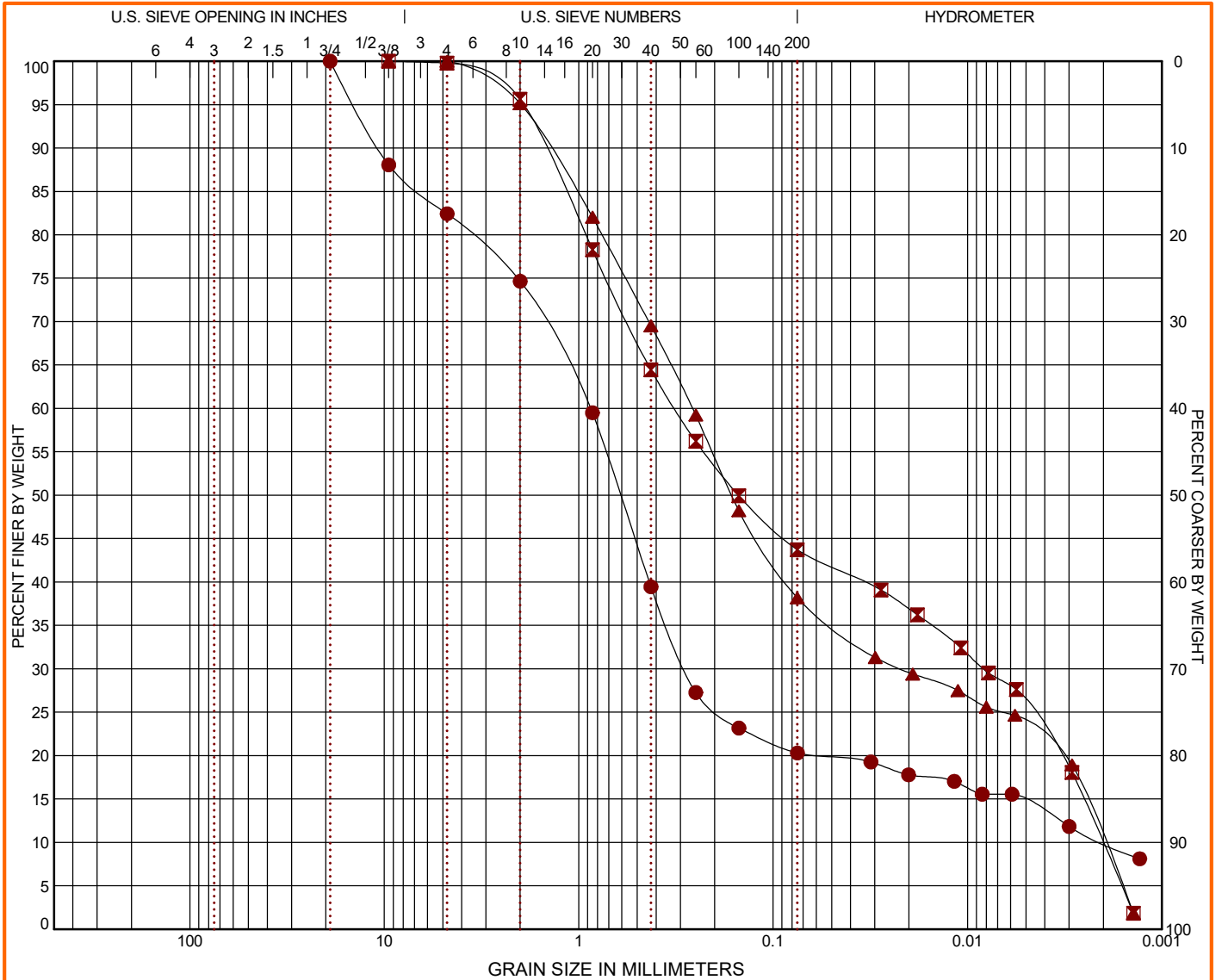


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Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-6	55 - 57	0.0	17.6	62.1	5.7		14.6	SC-SM
☒ B-6	63 - 65	0.0	0.2	56.0	17.7		26.0	SC-SM
▲ B-7	53 - 55	0.0	0.0	61.8	14.6		23.5	

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.874	0.319	0.26
D <sub>30</sub>	0.282	0.008	0.022
D <sub>10</sub>	0.002	0.002	0.002

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>	45.71	0.10	0.94
C <sub>u</sub>	440.75	158.10	131.18

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/4"	100.0	3/8"	100.0	3/8"	100.0
3/8"	88.05	#4	99.78	#4	99.98
#4	82.42	#10	95.6	#10	95.1
#10	74.65	#20	78.29	#20	82.03
#20	59.5	#40	64.45	#40	69.53
#40	39.45	#60	56.21	#60	59.24
#60	27.27	#100	49.93	#100	48.2
#100	23.17	#200	43.73	#200	38.18
#200	20.31				

SOIL DESCRIPTION
● A-2-4 (0)
☒ A-4 (0)
▲ CLAYEY SAND(SC) / A-4

REMARKS
●
☒
▲

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

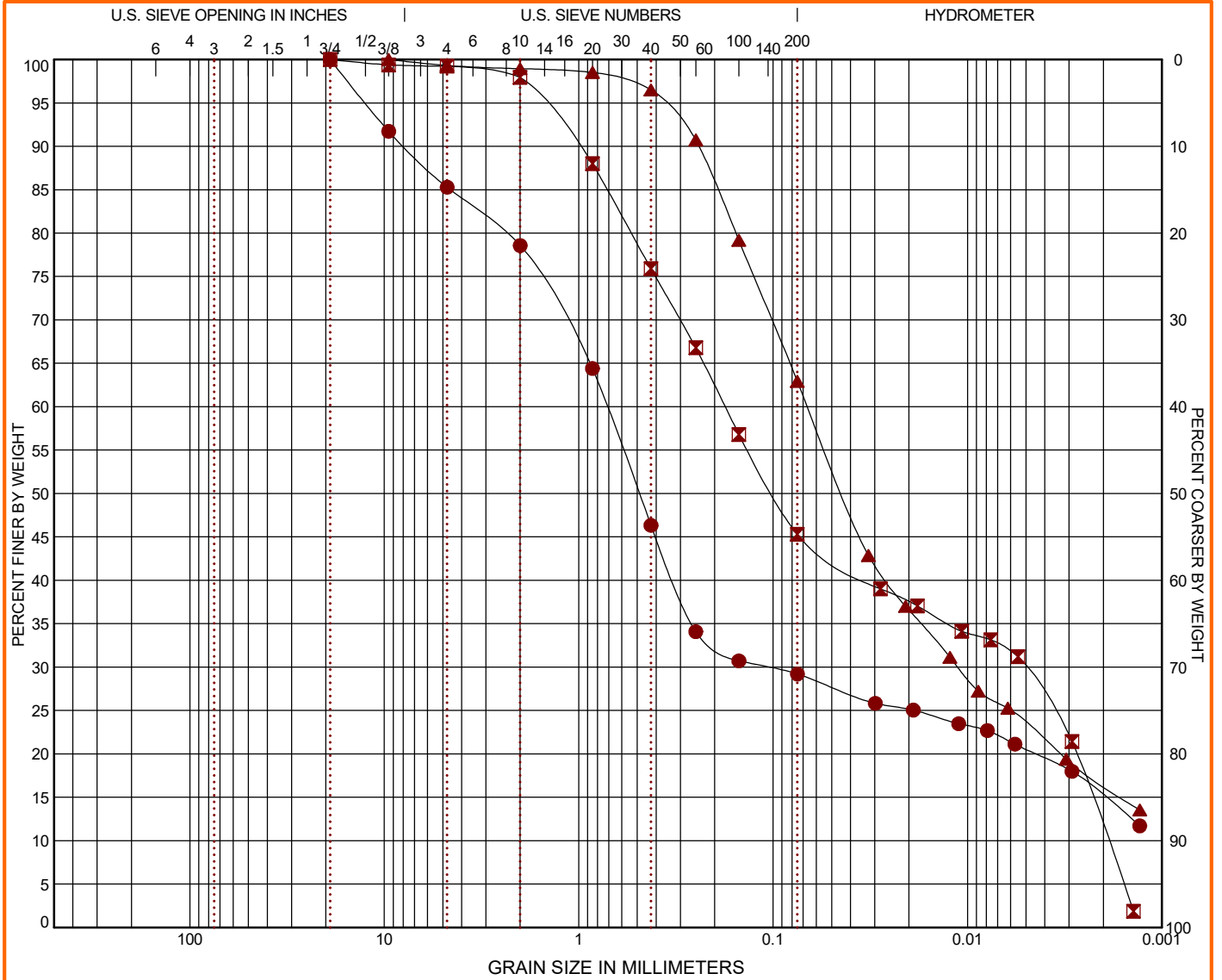


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Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-7	55 - 56.3	0.0	14.7	56.1	8.7		20.5	
☒ B-7	61 - 63	0.0	0.8	53.9	15.6		29.7	SC
▲ B-8	34 - 36	0.0	0.7	36.4	39.5		23.4	CL

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.718	0.177	0.066
D <sub>30</sub>	0.108	0.005	0.011
D <sub>10</sub>		0.002	

COEFFICIENTS		
	●	☒
C <sub>c</sub>		0.08
C <sub>u</sub>		93.25

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/4"	100.0	3/4"	100.0	3/8"	100.0
3/8"	91.72	3/8"	99.37	#4	99.31
#4	85.28	#4	99.23	#10	98.94
#10	78.57	#10	97.93	#20	98.51
#20	64.4	#20	87.99	#40	96.49
#40	46.33	#40	75.89	#60	90.72
#60	34.09	#60	66.79	#100	79.17
#100	30.72	#100	56.8	#200	62.92
#200	29.21	#200	45.29		

SOIL DESCRIPTION	
●	CLAYEY SAND(SC) / A-2-4
☒	A-4 (1)
▲	A-4 (4)

REMARKS	
●	
☒	
▲	

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

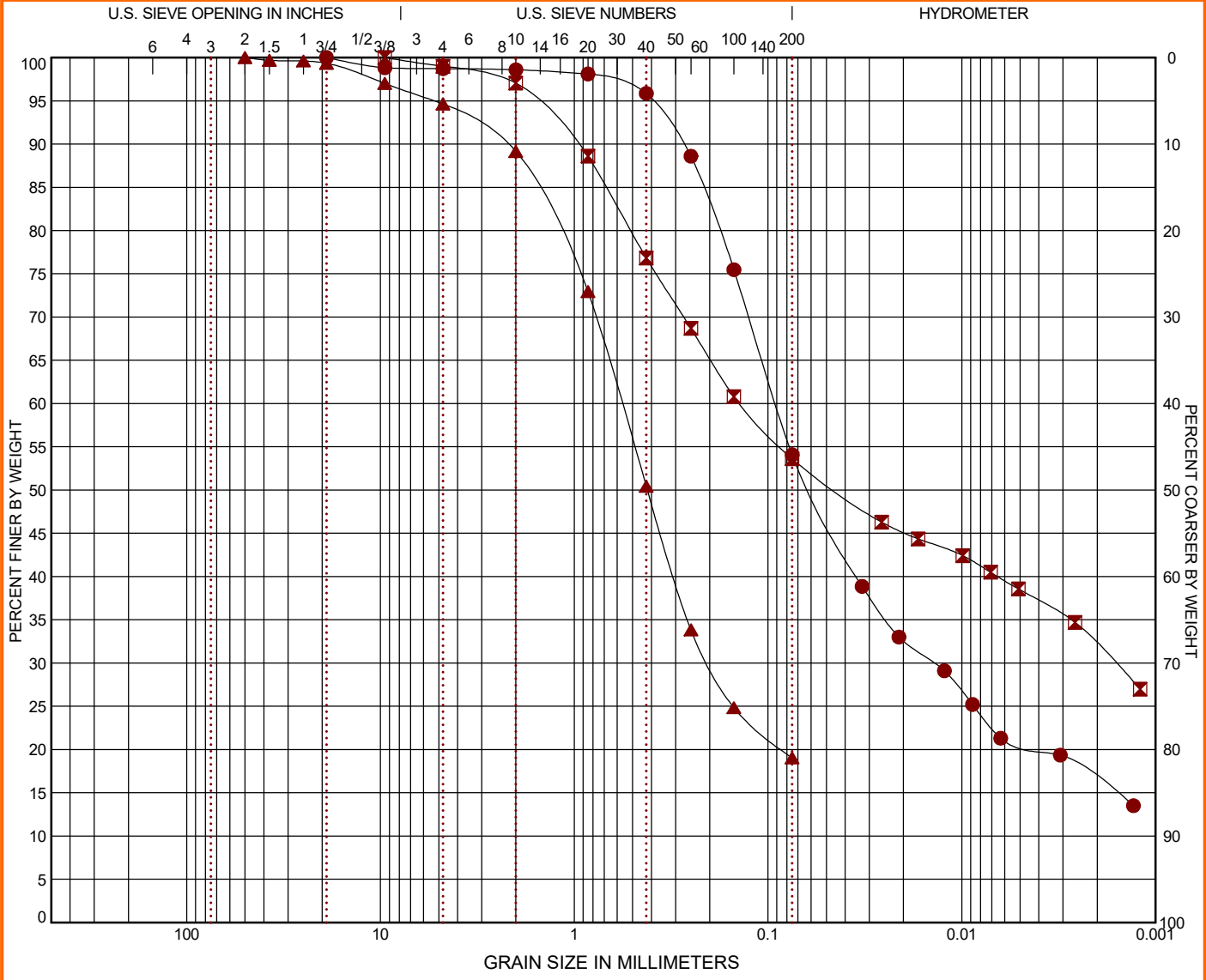


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Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-8	38 - 40	0.0	1.3	44.6	33.4		20.7	CL-ML
☒ B-8	46 - 47.8	0.0	1.0	45.4	15.2		38.4	CL
▲ B-9 Bulk	0 - 5	0.0	5.4	75.6		19.0		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.091	0.139	0.571
D <sub>30</sub>	0.014	0.002	0.201
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/4"	100.0	3/8"	100.0	2"	100.0
3/8"	98.81	#4	99.0	1 1/2"	99.68
#4	98.71	#10	97.04	1"	99.6
#10	98.59	#20	88.59	3/4"	99.34
#20	98.1	#40	76.84	3/8"	97.01
#40	95.86	#60	68.7	#4	94.63
#60	88.6	#100	60.79	#10	89.15
#100	75.48	#200	53.62	#20	72.95
#200	54.07			#40	50.43
				#60	33.84
				#100	24.85
				#200	19.05

SOIL DESCRIPTION	
●	A-4 (1)
☒	A-6 (6)
▲	A-1-b (0)
REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

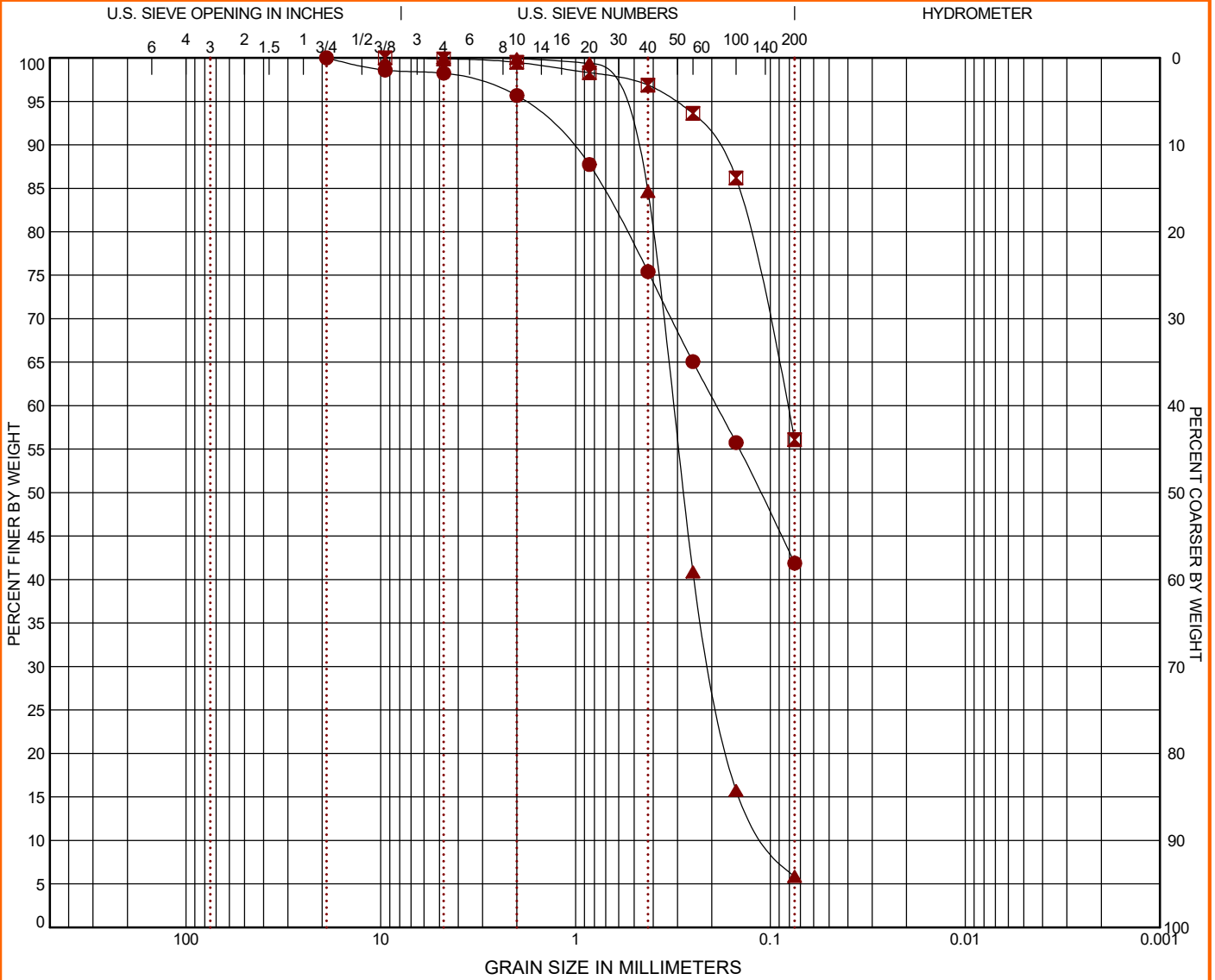
PROJECT: I-20 Wateree River Bridge Repairs  
 SITE: Kershaw County  
 Kershaw County, SC



PROJECT NUMBER: 7321P043A  
 CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-9B	18 - 20	0.0	1.8	56.4		41.9		SC
☒ B-10	2 - 4	0.0	0.1	43.8		56.1		
▲ B-10	18.5 - 20	0.0	0.0	94.1		5.9		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.189	0.082	0.315
D <sub>30</sub>			0.2
D <sub>10</sub>			0.1

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			1.27
C <sub>u</sub>			3.15

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/4"	100.0	3/8"	100.0	#4	100.0
3/8"	98.59	#4	99.89	#10	99.92
#4	98.24	#10	99.48	#20	99.37
#10	95.67	#20	98.3	#40	84.64
#20	87.74	#40	96.87	#60	40.9
#40	75.41	#60	93.62	#100	15.77
#60	65.07	#100	86.19	#200	5.87
#100	55.76	#200	56.1		
#200	41.88				

SOIL DESCRIPTION	
●	A-6 (4)
☒	
▲	

REMARKS	
●	
☒	
▲	

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



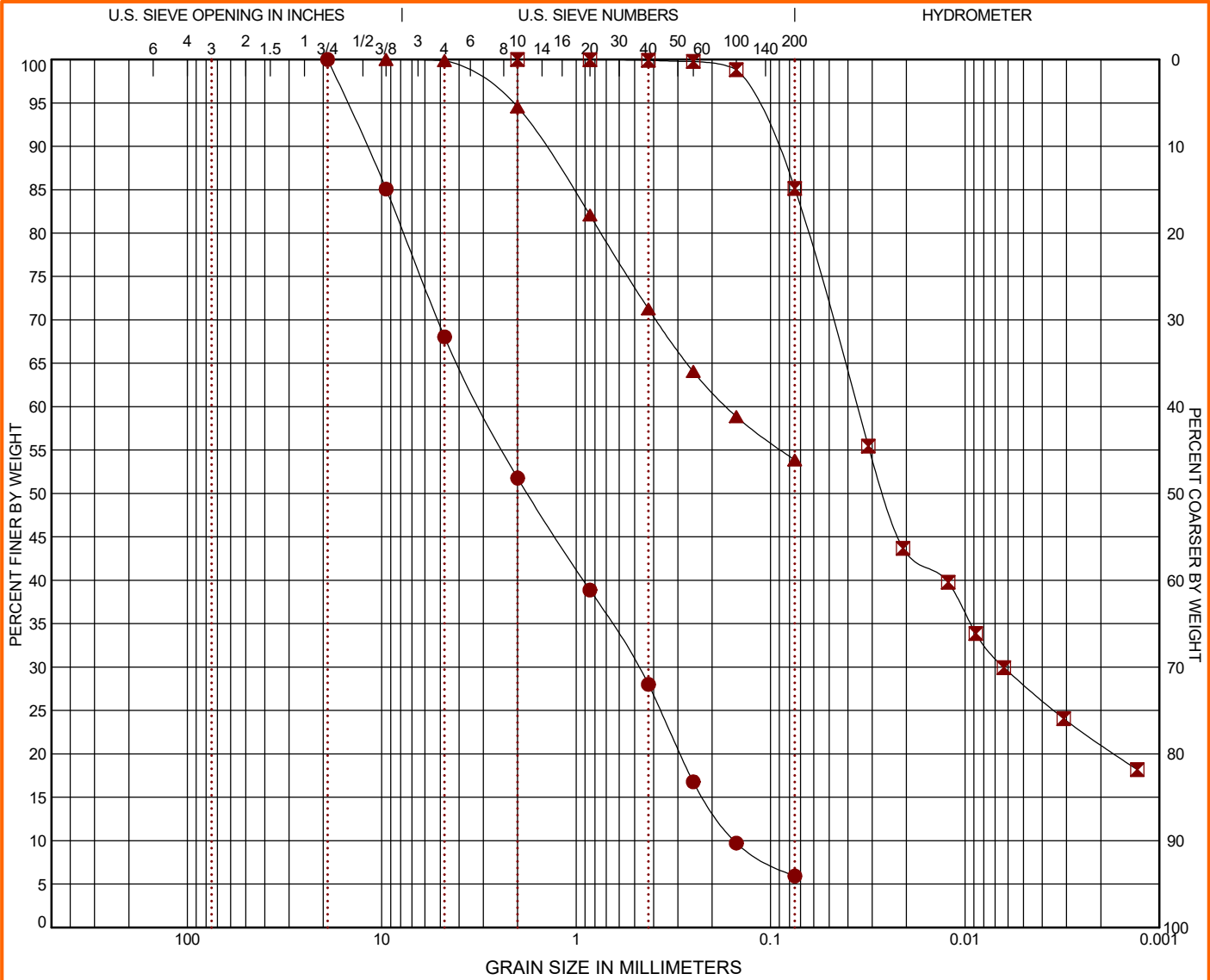
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-11	18.5 - 20	0.0	32.0	62.1		5.9		
☒ B-12	2 - 4	0.0	0.0	14.8	57.1		28.0	CL
▲ B-12	18.5 - 20	0.0	0.1	46.0		53.9		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	3.098	0.036	0.168
D <sub>30</sub>	0.483	0.006	
D <sub>10</sub>	0.153		

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>	0.49		
C <sub>u</sub>	20.25		

	●	☒	▲
Sieve	% Finer	Sieve	% Finer
3/4"	100.0	#10	100.0
3/8"	85.07	#20	99.98
#4	68.04	#40	99.9
#10	51.78	#60	99.77
#20	38.88	#100	98.83
#40	28.01	#200	85.16
#60	16.79	#60	64.06
#100	9.73	#100	58.86
#200	5.93	#200	53.86

SOIL DESCRIPTION	
●	
☒	A-6 (12)
▲	

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



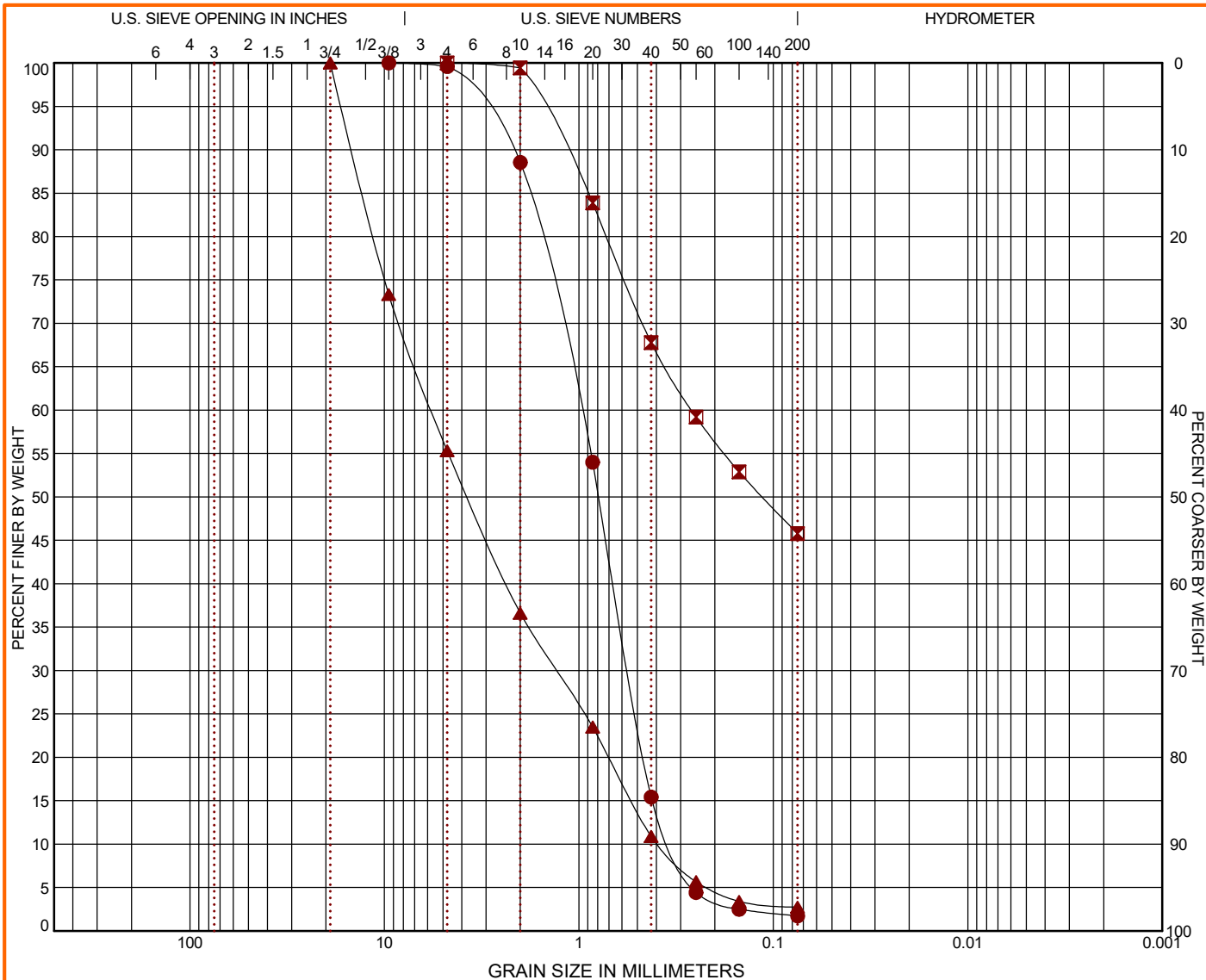
521 Clemson Rd  
Columbia, SC

PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-13	49.6 - 51.6	0.0	0.4	97.9		1.7		SP
☒ B-13	57.6 - 59.6	0.0	0.0	54.2		45.8		
▲ B-14	49.5 - 51	0.0	44.7	52.6		2.7		SP

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.986	0.263	5.688
D <sub>30</sub>	0.552		1.299
D <sub>10</sub>	0.327		0.388

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>	0.95		0.76
C <sub>u</sub>	3.01		14.66

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	#4	100.0	3/4"	100.0
#4	99.58	#10	99.42	3/8"	73.32
#10	88.54	#20	83.88	#4	55.32
#20	54.0	#40	67.77	#10	36.61
#40	15.42	#60	59.2	#20	23.5
#60	4.43	#100	52.89	#40	10.89
#100	2.48	#200	45.78	#60	5.68
#200	1.73			#100	3.4
				#200	2.75

SOIL DESCRIPTION	
●	
☒	
▲	
REMARKS	
●	
☒	
▲	

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PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

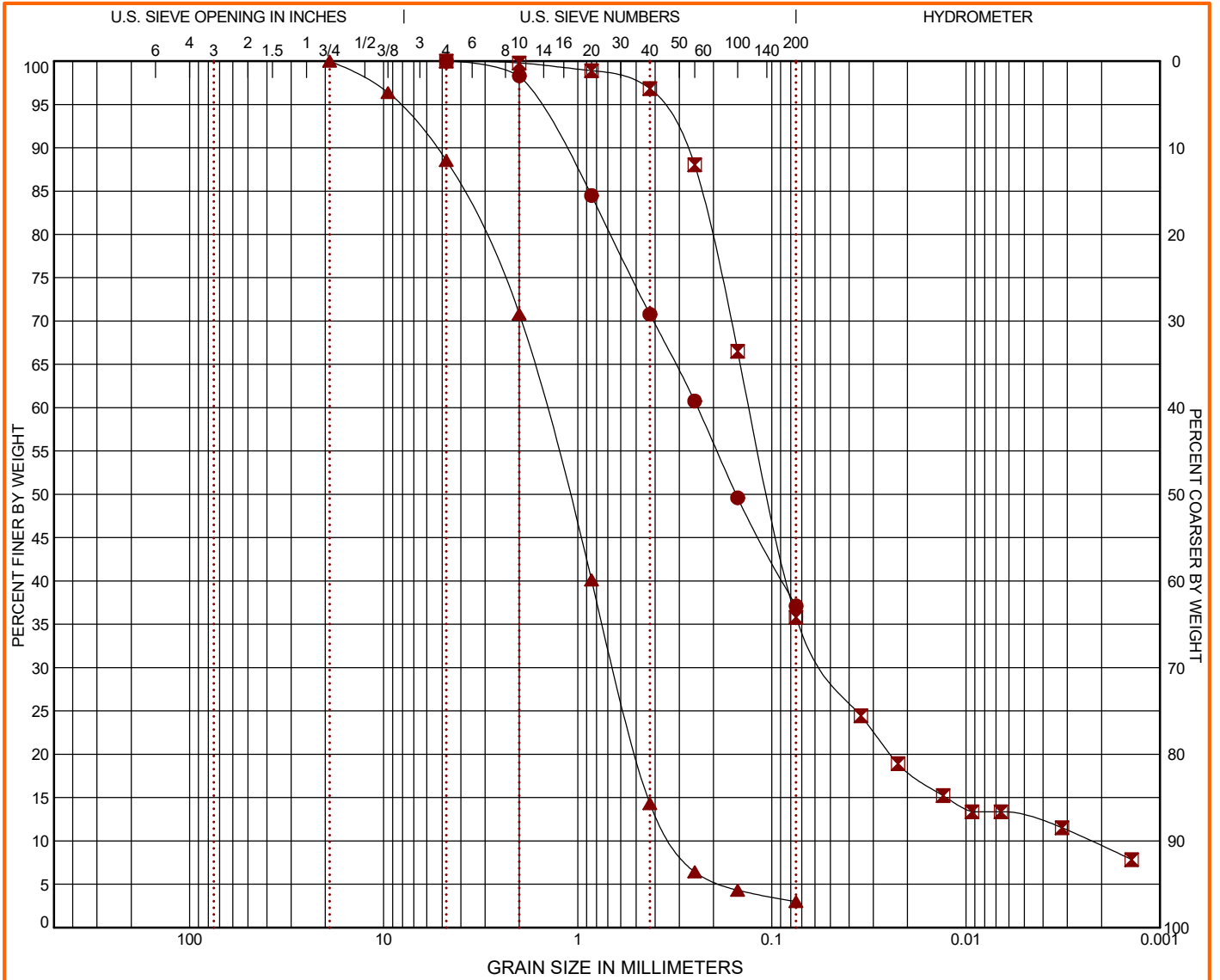


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-14	62.5 - 64	0.0	0.0	62.9		37.1		
☒ B-15	2 - 4	0.0	0.0	64.2	23.1		12.7	SM
▲ B-15	18.5 - 20	0.0	11.5	85.5		3.0		SP

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.241	0.13	1.479
D <sub>30</sub>		0.051	0.648
D <sub>10</sub>		0.002	0.318

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>		8.75	0.89
C <sub>u</sub>		57.16	4.66

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#4	100.0	3/4"	100.0
#10	98.3	#10	99.79	3/8"	96.36
#20	84.49	#20	98.9	#4	88.53
#40	70.78	#40	96.83	#10	70.81
#60	60.77	#60	88.04	#20	40.13
#100	49.6	#100	66.5	#40	14.31
#200	37.12	#200	35.8	#60	6.44
				#100	4.31
				#200	3.0

SOIL DESCRIPTION	
●	
☒	A-4 (0)
▲	
REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



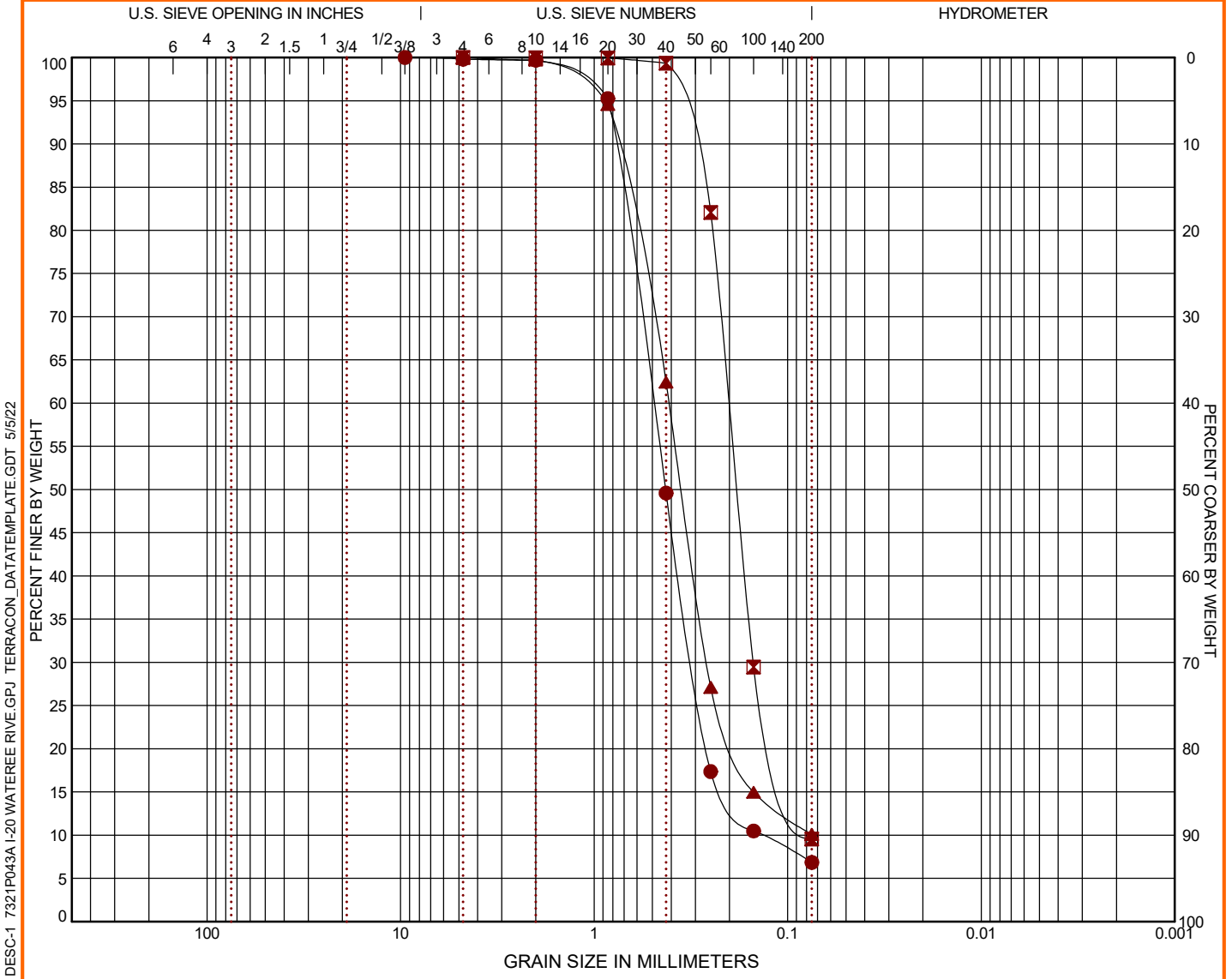
521 Clemson Rd  
Columbia, SC

PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY			
	coarse	fine	coarse	medium	fine				

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-16	8 - 10	0.0	0.2	93.0		6.9		
☒ B-17	6 - 8	0.0	0.0	90.5		9.5		
▲ B-18	13.5 - 15	0.0	0.0	89.9		10.1		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.498	0.202	0.41
D <sub>30</sub>	0.308	0.151	0.261
D <sub>10</sub>	0.137	0.076	

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	#4	100.0	#4	100.0
#4	99.8	#10	99.98	#10	99.71
#10	99.69	#20	99.93	#20	94.56
#20	95.25	#40	99.34	#40	62.43
#40	49.59	#60	82.07	#60	27.12
#60	17.36	#100	29.45	#100	14.97
#100	10.48	#200	9.54	#200	10.09
#200	6.85				

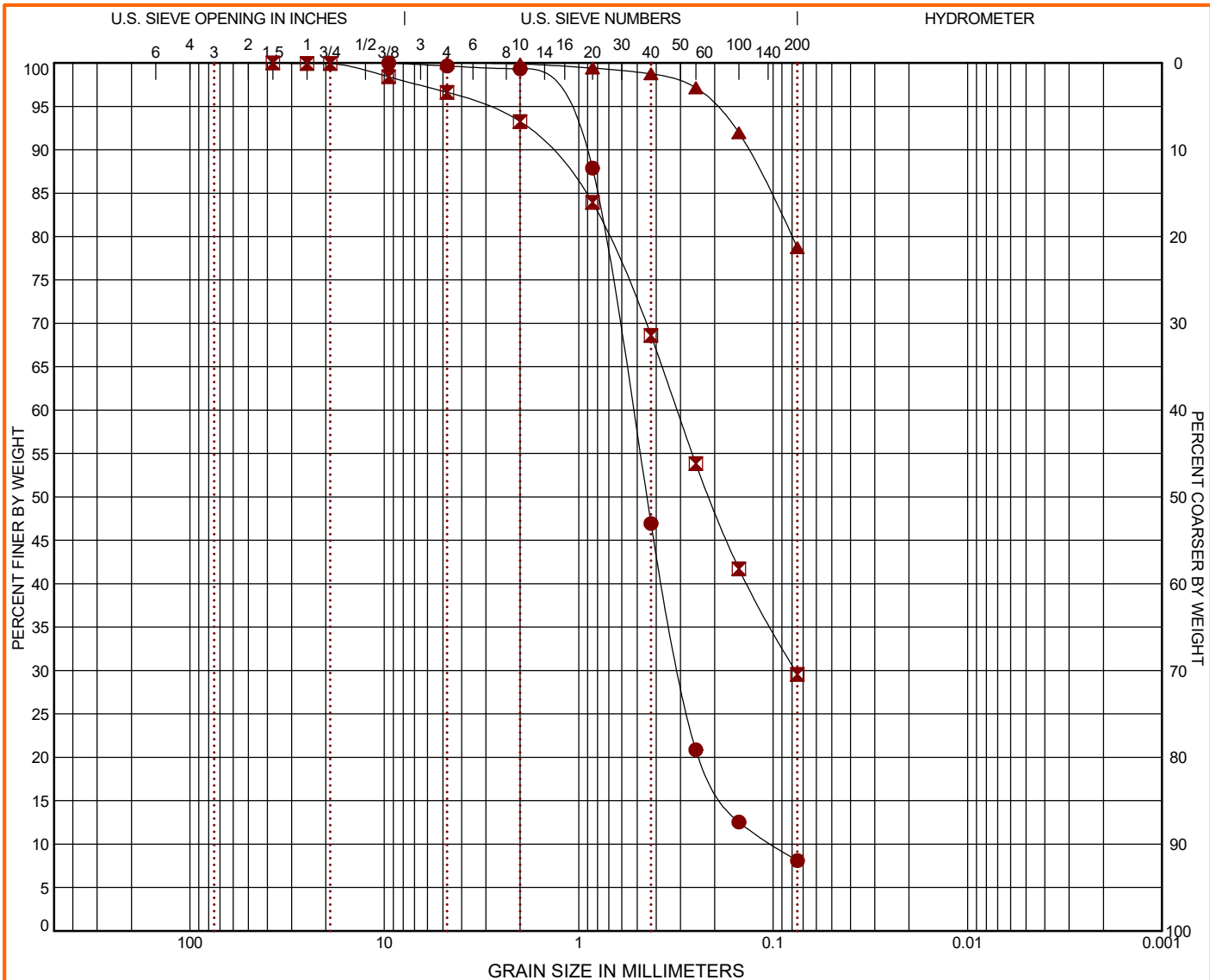
SOIL DESCRIPTION
●
☒
▲
REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs	<p style="font-size: small;">521 Clemson Rd Columbia, SC</p>	PROJECT NUMBER: 7321P043A
SITE: Kershaw County Kershaw County, SC	CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL	

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● B-20	46 - 48	0.0	0.4	91.5		8.1		
☒ B-20 Bulk	0 - 5	0.0	3.4	67.1		29.6		SC-SM
▲ B-20A	20 - 22	0.0	0.0	21.3		78.7		CL

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.53	0.312	
D <sub>30</sub>	0.301	0.077	
D <sub>10</sub>	0.101		

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>	1.70		
C <sub>u</sub>	5.26		

Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	1 1/2"	100.0	#4	100.0
#4	99.64	1"	99.93	#10	99.88
#10	99.33	3/4"	99.93	#20	99.41
#20	87.88	3/8"	98.4	#40	98.74
#40	46.94	#4	96.62	#60	97.15
#60	20.87	#10	93.25	#100	91.95
#100	12.54	#20	83.93	#200	78.71
#200	8.1	#40	68.61		
		#60	53.84		
		#100	41.72		
		#200	29.56		

SOIL DESCRIPTION	
●	
☒	A-2-4 (0)
▲	A-6 (10)

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



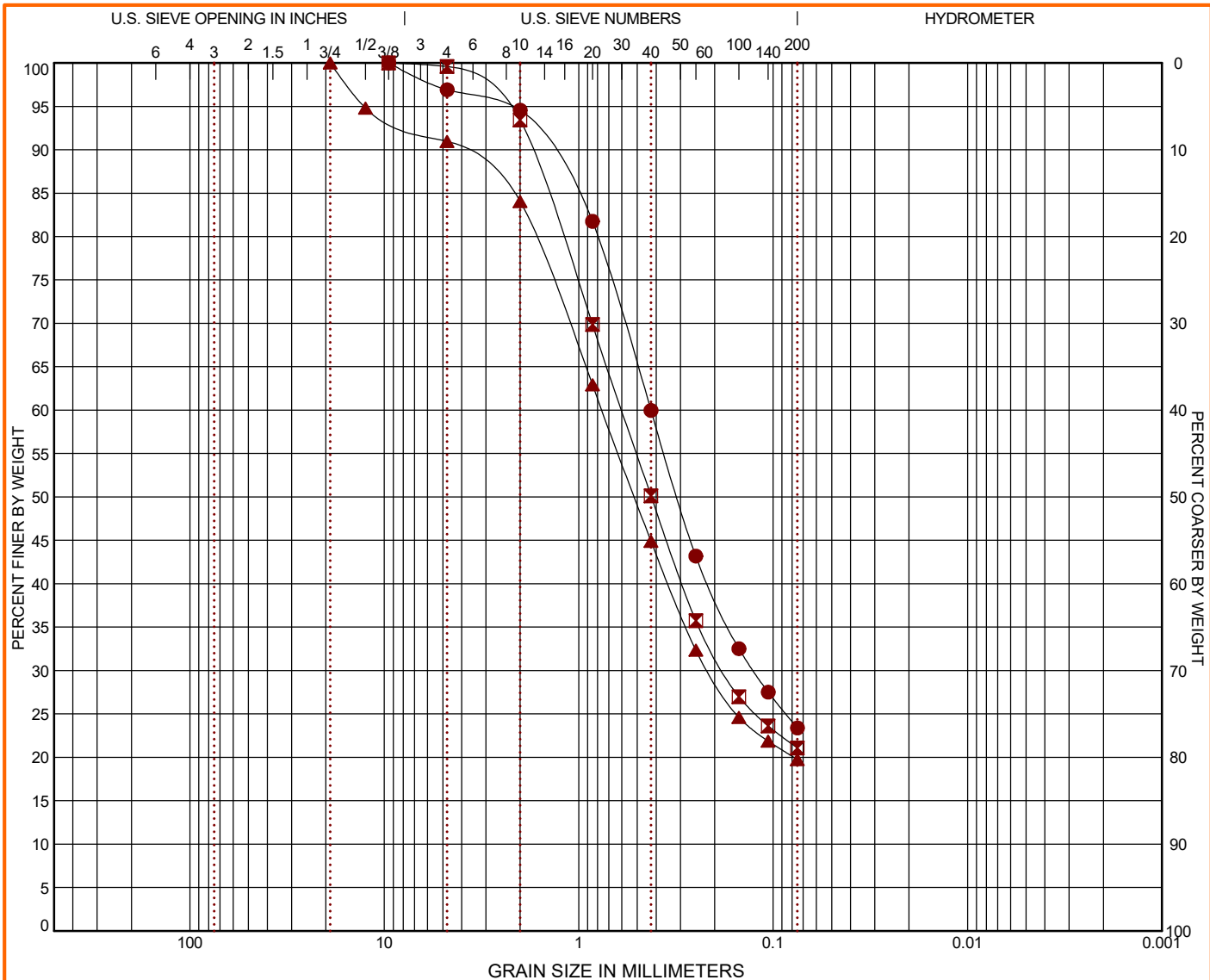
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	CO-1	0 - 2	0.0	3.1	73.5		23.4		SC-SM
☒	CO-1	4 - 6	0.0	0.4	78.5		21.1		SC-SM
▲	CO-1	6 - 8	0.0	9.0	71.2		19.7		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.425	0.601	0.76
D <sub>30</sub>	0.126	0.179	0.214
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	3/8"	100.0	3/4"	100.0
#4	96.91	#4	99.58	1/2"	94.79
#10	94.55	#10	93.42	#4	90.95
#20	81.75	#20	69.87	#10	84.03
#40	59.96	#40	50.12	#20	62.92
#60	43.19	#60	35.75	#40	44.9
#100	32.51	#100	27.0	#60	32.36
#140	27.51	#140	23.62	#100	24.61
#200	23.39	#200	21.08	#140	21.87
				#200	19.75

SOIL DESCRIPTION
● A-2-4 (0)
☒ A-2-4 (0)
▲

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT: 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



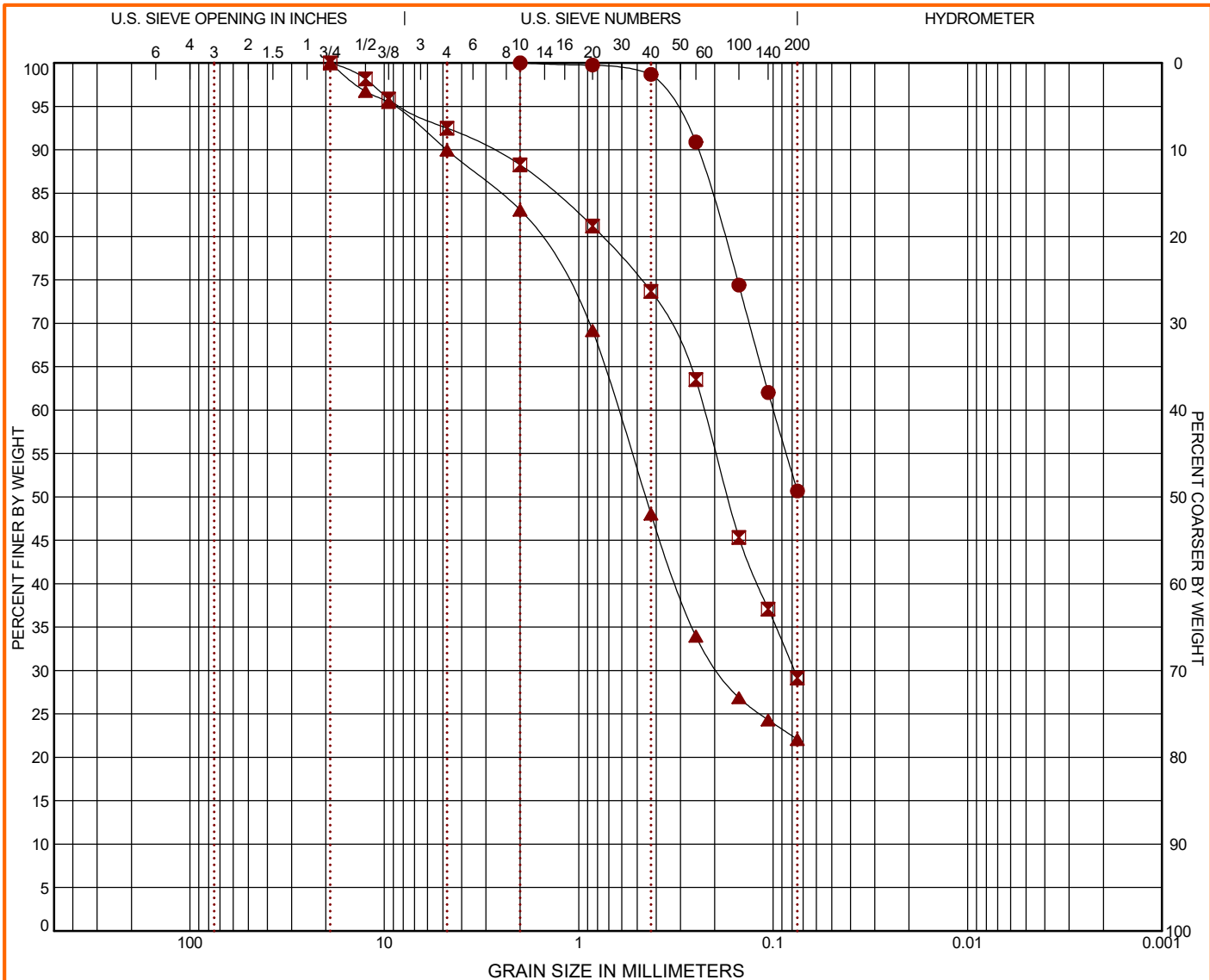
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● CO-3	4 - 6	0.0	0.0	49.3		50.7		ML
☒ CO-3	6 - 8	0.0	7.5	63.3		29.2		SC-SM
▲ CO-4	0 - 2	0.0	10.1	67.9		22.1		SC-SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.1	0.226	0.629
D <sub>30</sub>		0.078	0.188
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	3/4"	100.0	3/4"	100.0
#20	99.76	1/2"	98.16	1/2"	96.71
#40	98.67	3/8"	95.83	3/8"	95.47
#60	90.89	#4	92.48	#4	89.95
#100	74.41	#10	88.25	#10	83.05
#140	62.03	#20	81.21	#20	69.18
#200	50.69	#40	73.7	#40	48.03
		#60	63.52	#60	33.96
		#100	45.34	#100	26.87
		#140	37.08	#140	24.31
		#200	29.15	#200	22.07

SOIL DESCRIPTION
● A-4 (0)
☒ A-2-4 (0)
▲ A-1-b (0)

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

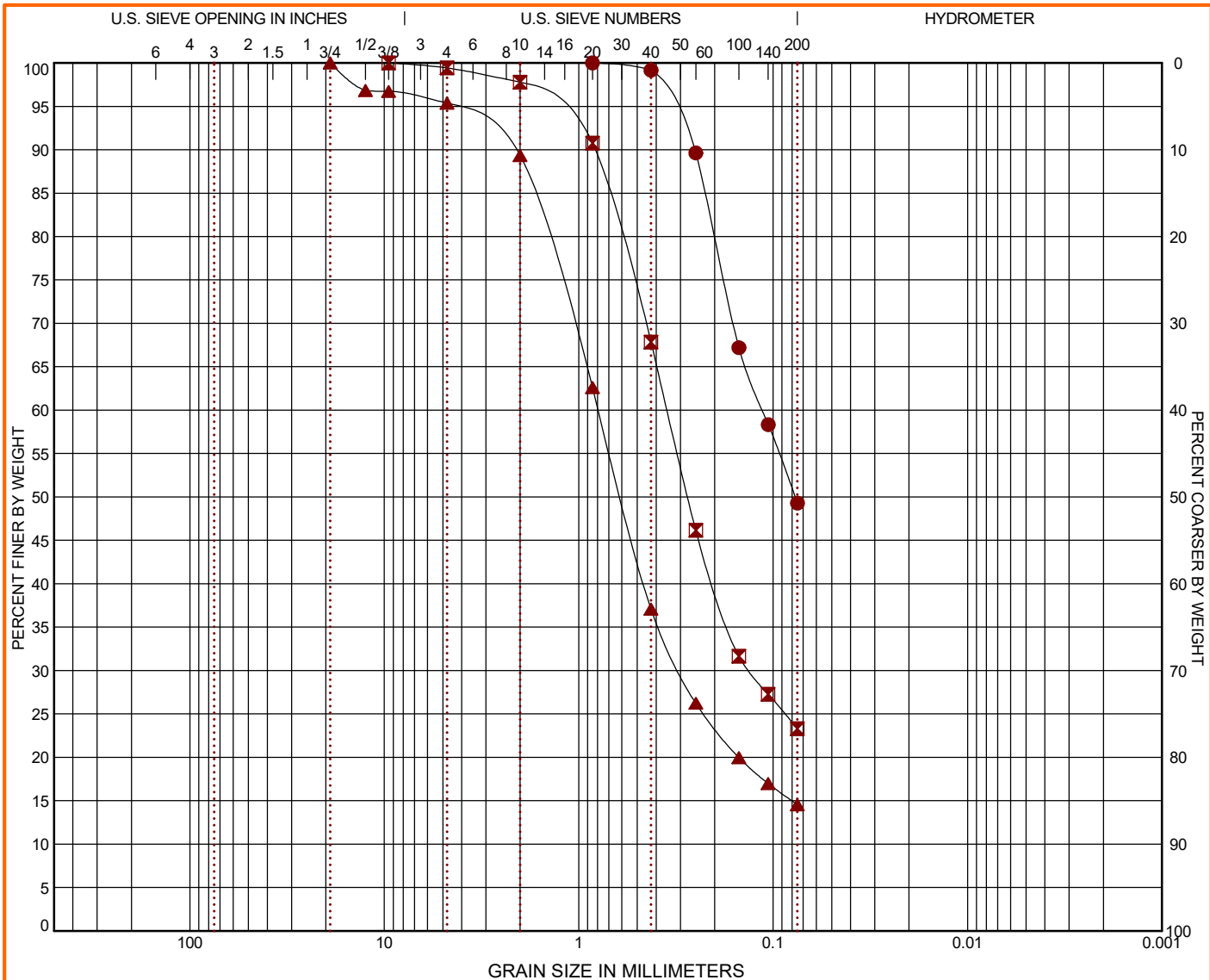


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● CO-4	6 - 8	0.0	0.0	50.7		49.3		SC-SM
☒ E-1	0 - 2	0.0	0.6	76.1		23.3		SC-SM
▲ E-1	6 - 8	0.0	4.6	80.8		14.5		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.113	0.351	0.792
D <sub>30</sub>		0.132	0.301
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#20	100.0	3/8"	100.0	3/4"	100.0
#40	99.16	#4	99.42	1/2"	96.83
#60	89.63	#10	97.78	3/8"	96.71
#100	67.2	#20	90.76	#4	95.37
#140	58.33	#40	67.84	#10	89.34
#200	49.29	#60	46.15	#20	62.6
		#100	31.65	#40	37.08
		#140	27.27	#60	26.24
		#200	23.29	#100	19.97
				#140	16.98
				#200	14.55

SOIL DESCRIPTION
● A-4 (0)
☒ A-2-4 (0)
▲

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

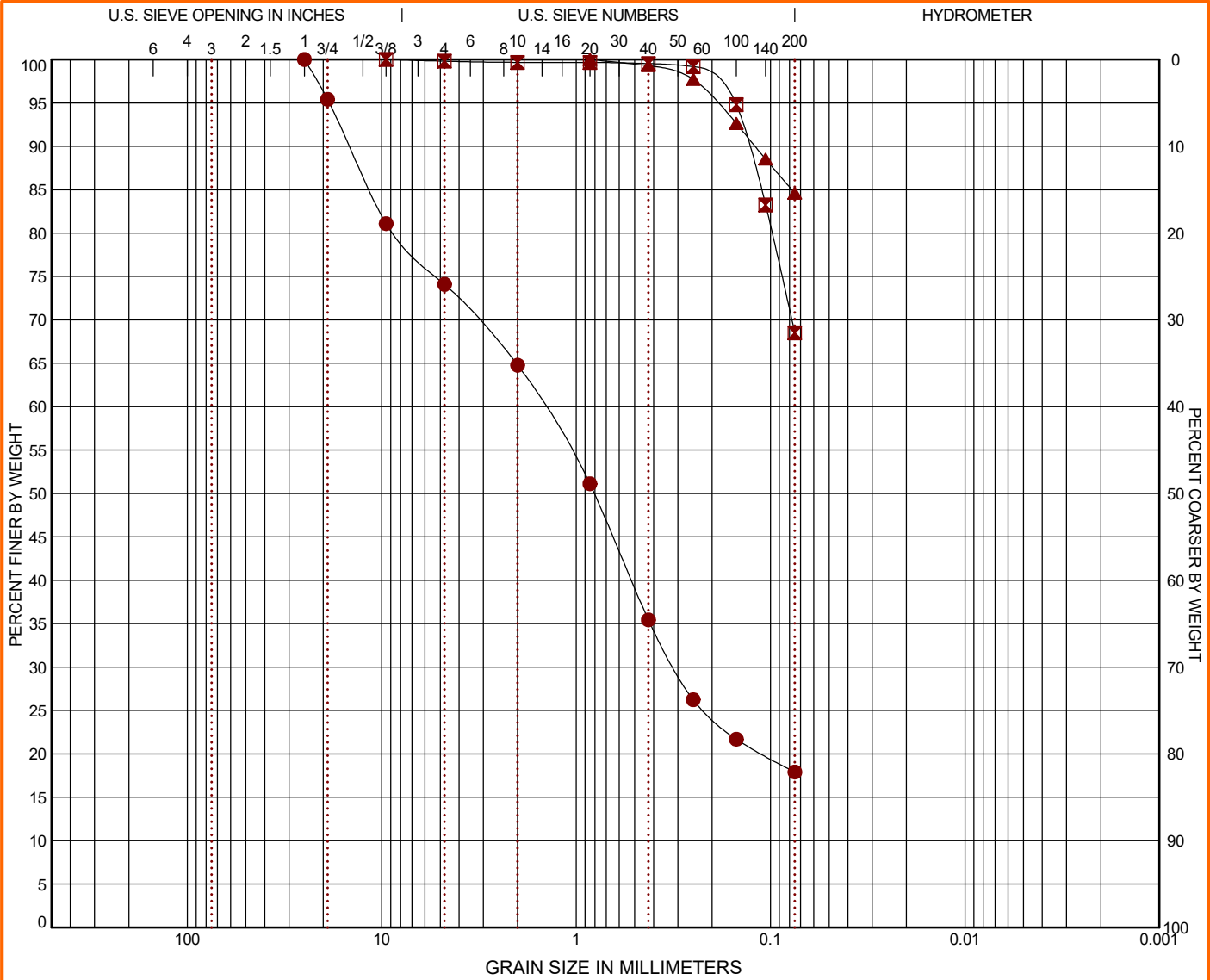


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

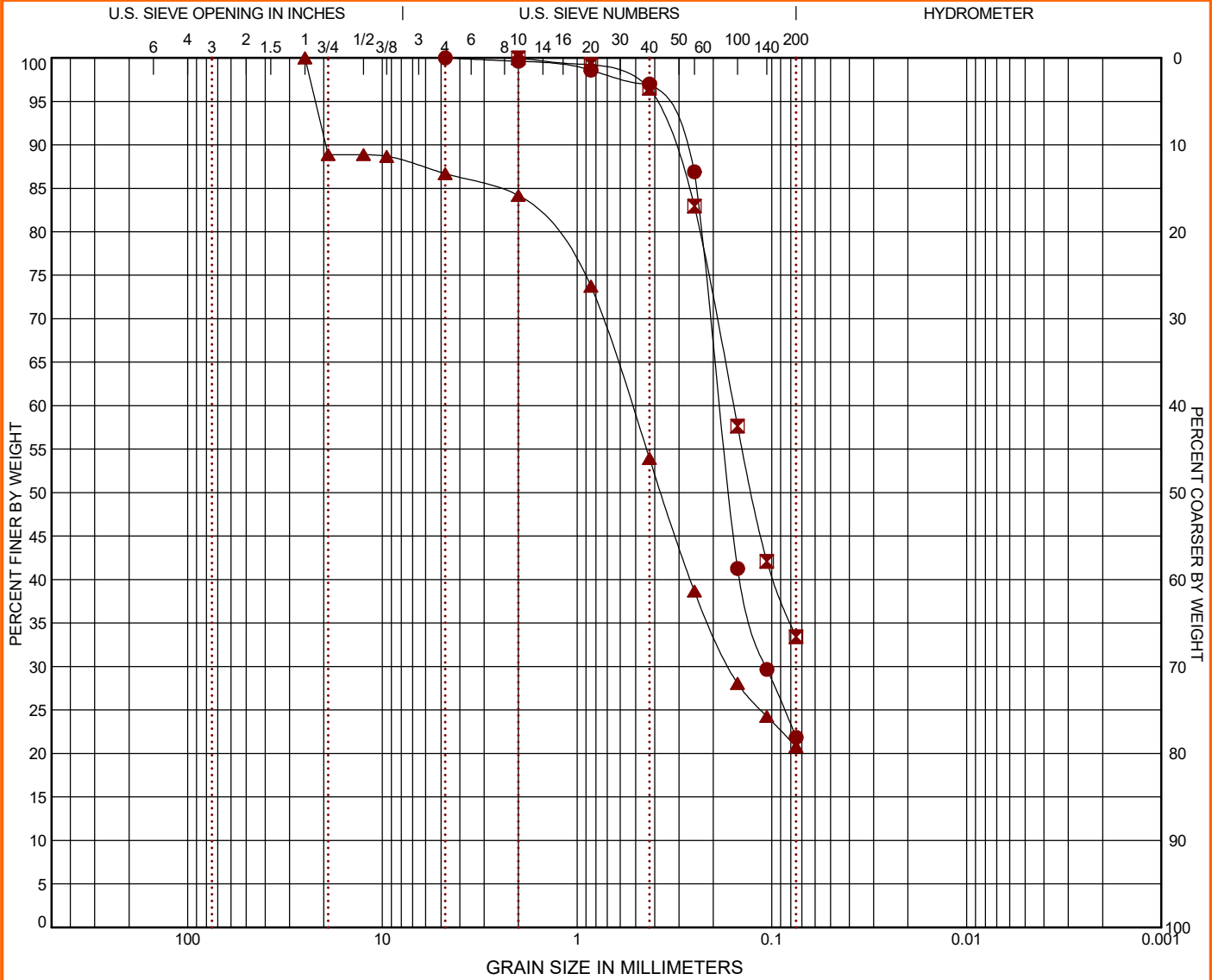
ASTM D422 / ASTM C136





# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-1	43.5 - 45	0.0	0.0	78.1		21.9		
☒ E-1	53.5 - 55	0.0	0.0	66.6		33.4		SM
▲ E-2	0 - 2	0.0	13.3	65.9		20.8		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.185	0.157	0.526
D <sub>30</sub>	0.107		0.165
D <sub>10</sub>			
COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#10	100.0	1"	100.0
#10	99.61	#20	99.24	3/4"	88.87
#20	98.58	#40	96.51	1/2"	88.87
#40	97.0	#60	82.95	3/8"	88.68
#60	86.9	#100	57.64	#4	86.68
#100	41.27	#140	42.1	#10	84.17
#140	29.67	#200	33.43	#20	73.75
#200	21.86			#40	53.93
				#60	38.68
				#100	28.06
				#140	24.26
				#200	20.79

SOIL DESCRIPTION	
●	
☒	A-2-4 (0)
▲	A-2-4 (0)
REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

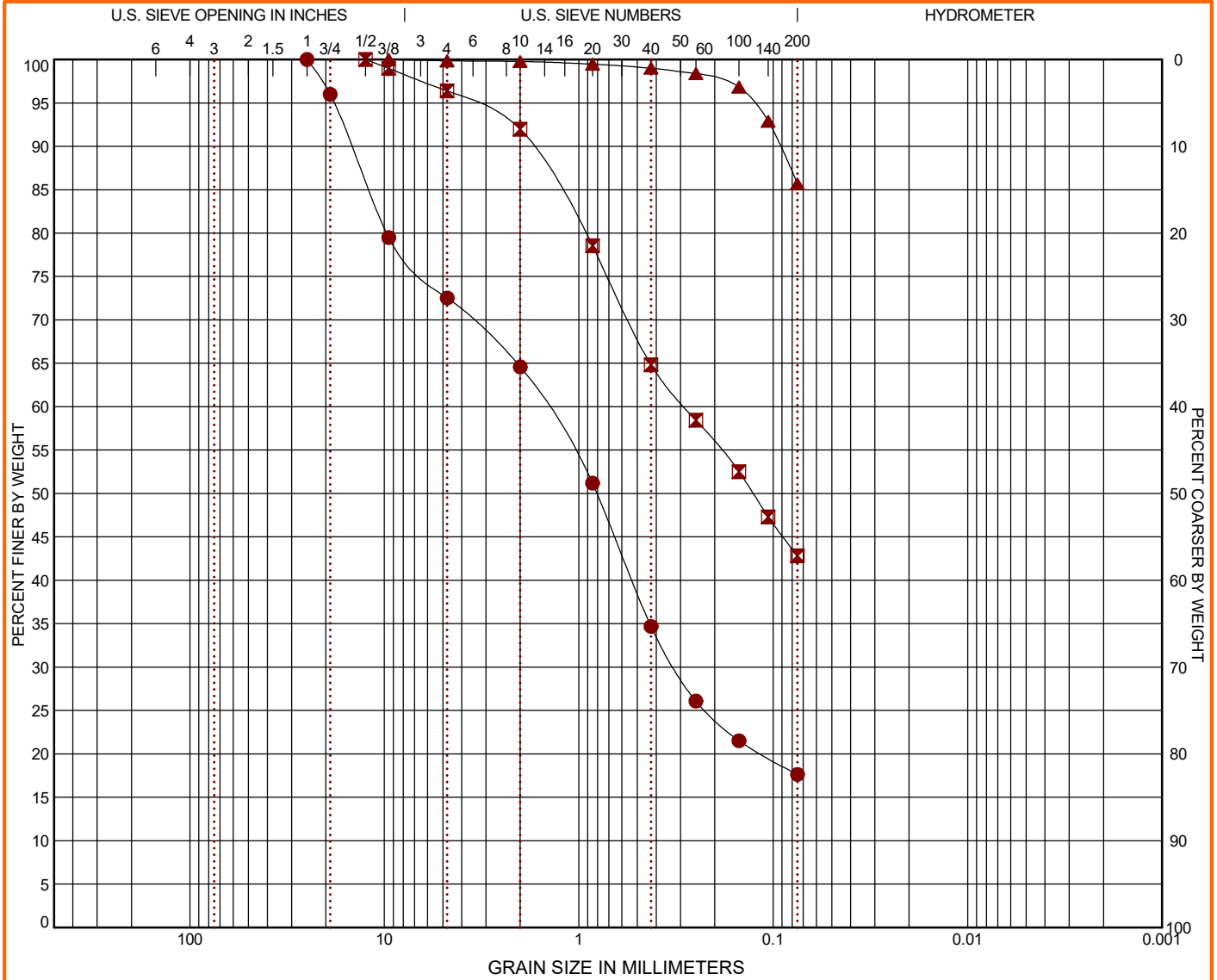


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-2	8 - 10	0.0	27.5	54.9	17.6			
☒ E-2	13.5 - 15	0.0	3.6	53.6	42.8			SC
▲ E-2	23.5 - 25	0.0	0.2	14.2	85.7			CL-ML

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	1.492	0.285	
D <sub>30</sub>	0.318		
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0	1/2"	100.0	3/8"	100.0
3/4"	95.99	3/8"	98.97	#4	99.85
3/8"	79.48	#4	96.37	#10	99.77
#4	72.52	#10	91.96	#20	99.46
#10	64.58	#20	78.55	#40	98.99
#20	51.19	#40	64.82	#60	98.37
#40	34.68	#60	58.44	#100	96.82
#60	26.09	#100	52.52	#140	92.87
#100	21.52	#140	47.31	#200	85.67
#200	17.63	#200	42.82		

SOIL DESCRIPTION	
●	
☒	A-7-6 (6)
▲	A-4 (4)

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

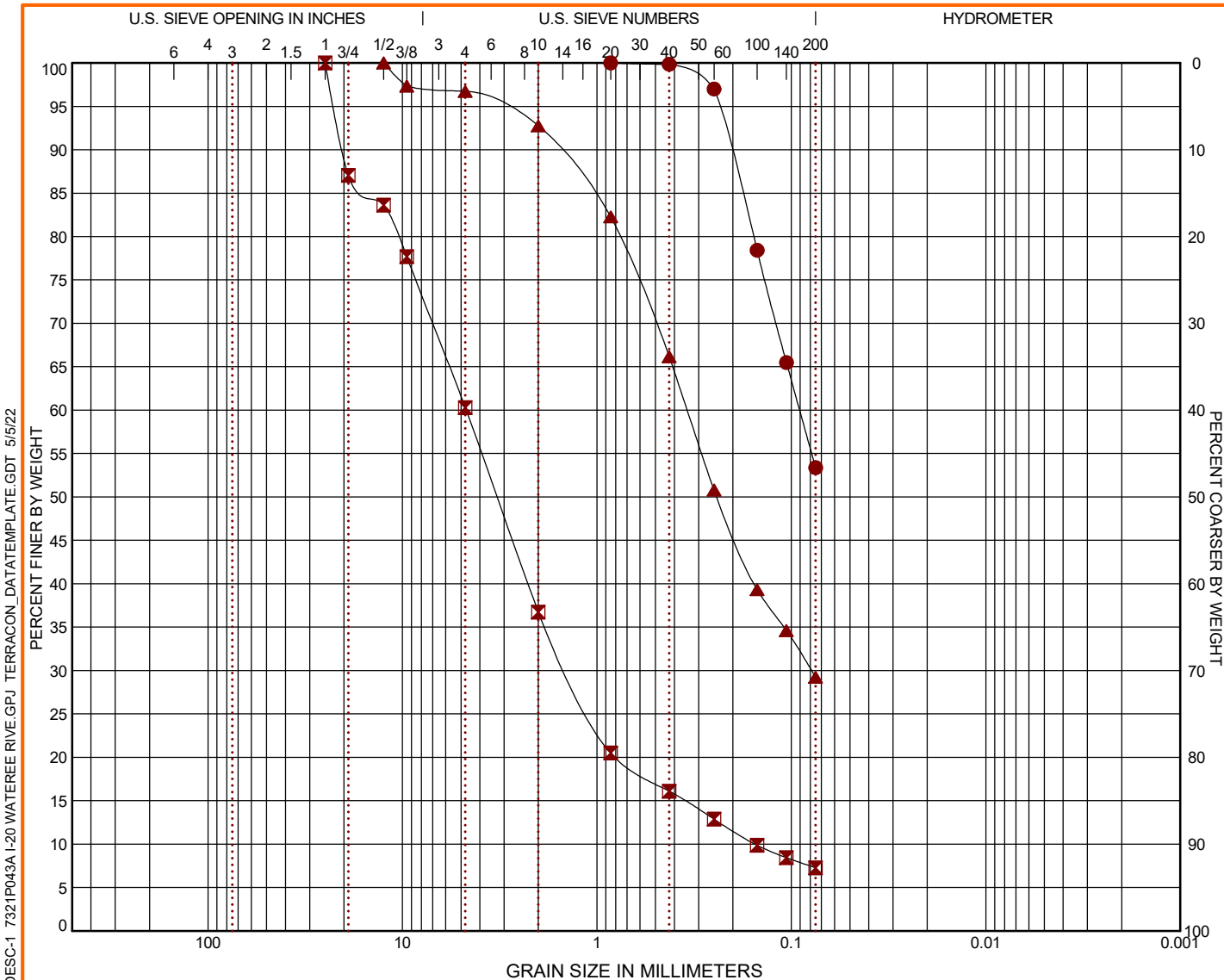


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-2	43.5 - 45	0.0	0.0	46.6		53.4		ML
☒ E-2	53.5 - 55	0.0	39.7	53.0		7.3		
▲ E-3	0 - 2	0.0	3.3	67.5		29.2		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.091	4.698	0.344
D <sub>30</sub>		1.403	0.079
D <sub>10</sub>		0.153	

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>		2.73	
C <sub>u</sub>		30.63	

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#20	100.0	1"	100.0	1/2"	100.0
#40	99.85	3/4"	87.05	3/8"	97.33
#60	96.99	1/2"	83.61	#4	96.72
#100	78.42	3/8"	77.69	#10	92.75
#140	65.48	#4	60.3	#20	82.27
#200	53.37	#10	36.72	#40	66.16
		#20	20.49	#60	50.79
		#40	16.11	#100	39.32
		#60	12.88	#140	34.61
		#100	9.87	#200	29.22
		#140	8.44		
		#200	7.28		

SOIL DESCRIPTION
● A-6 (4)
☒
▲ A-2-4 (0)

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



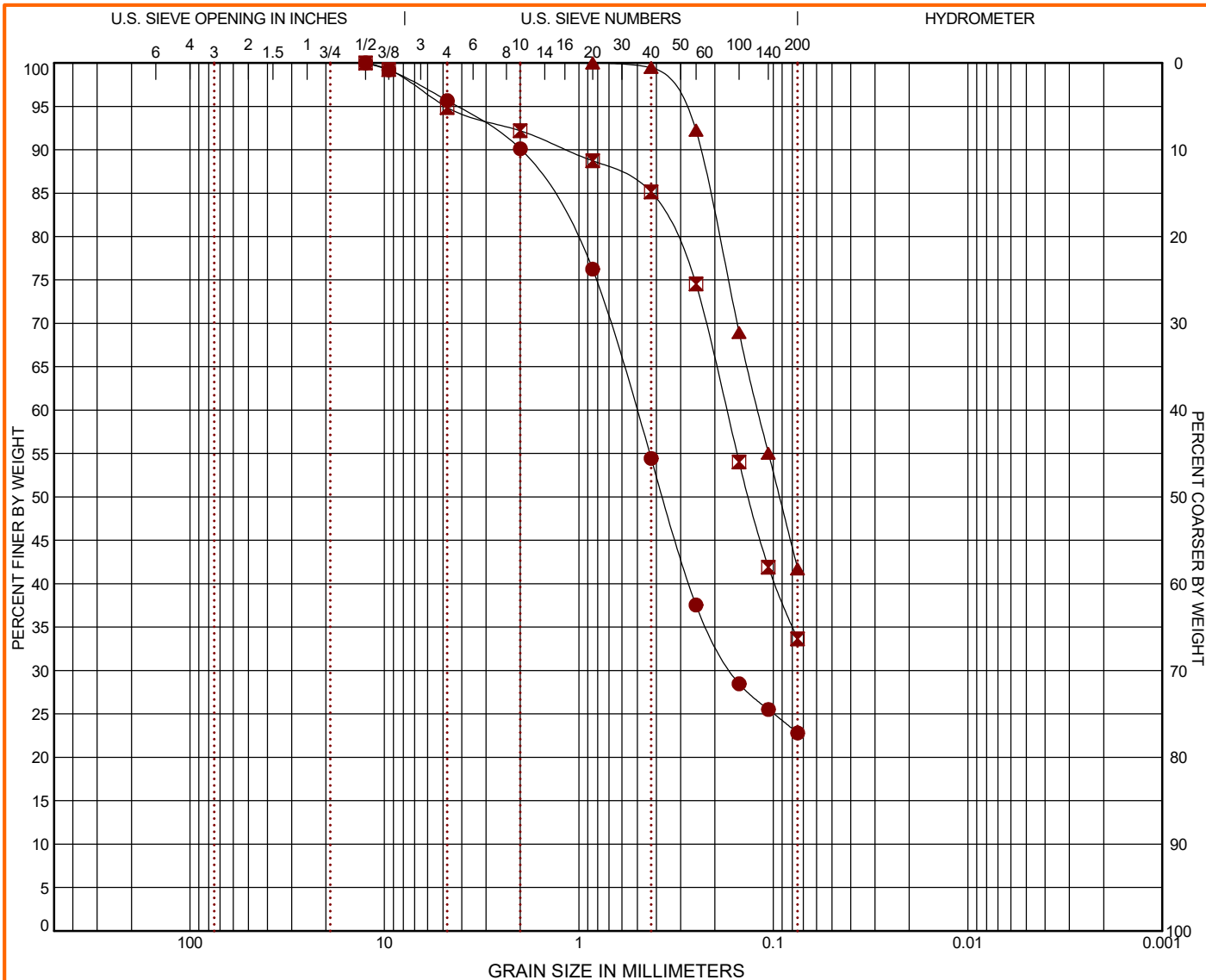
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-4	0 - 2	0.0	4.3	72.8		22.8		SC-SM
☒ E-4	6 - 8	0.0	5.1	61.2		33.6		SC-SM
▲ E-4	13.5 - 15	0.0	0.0	58.3		41.7		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.507	0.174	0.12
D <sub>30</sub>	0.163		
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1/2"	100.0	1/2"	100.0	#20	100.0
3/8"	99.18	3/8"	99.23	#40	99.47
#4	95.65	#4	94.87	#60	92.25
#10	90.11	#10	92.18	#100	68.94
#20	76.24	#20	88.72	#140	55.03
#40	54.44	#40	85.13	#200	41.72
#60	37.55	#60	74.55		
#100	28.48	#100	54.04		
#140	25.52	#140	41.92		
#200	22.81	#200	33.65		

SOIL DESCRIPTION
● A-2-4 (0)
☒ A-2-4 (0)
▲

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



PROJECT NUMBER: 7321P043A

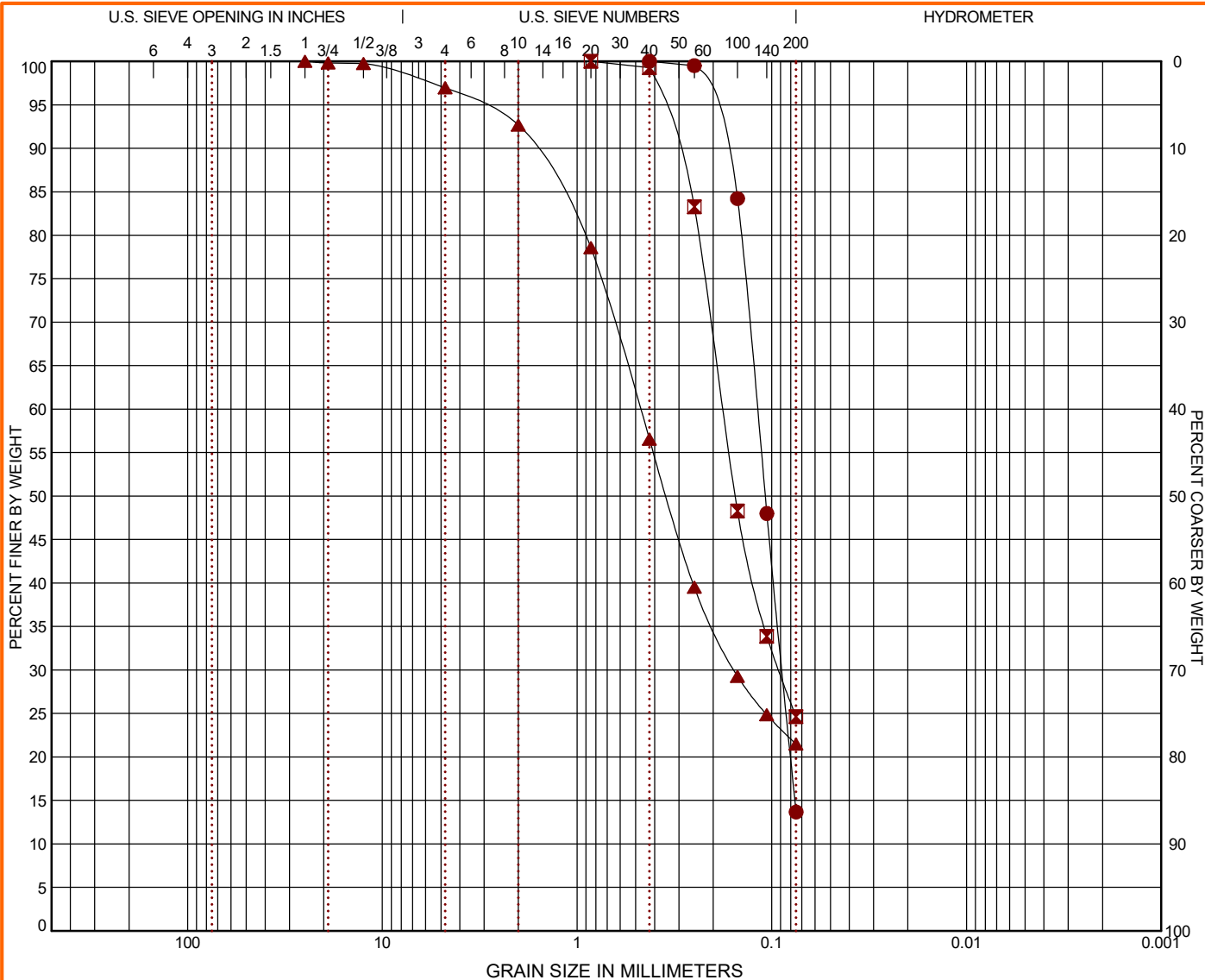
CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT. 5/5/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-4	23.5 - 25	0.0	0.0	86.3		13.7		SM
☒ E-4	38.5 - 40	0.0	0.0	75.4		24.6		
▲ E-5	0 - 2	0.0	3.1	75.5		21.5		SC-SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.119	0.178	0.474
D <sub>30</sub>	0.088	0.092	0.156
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

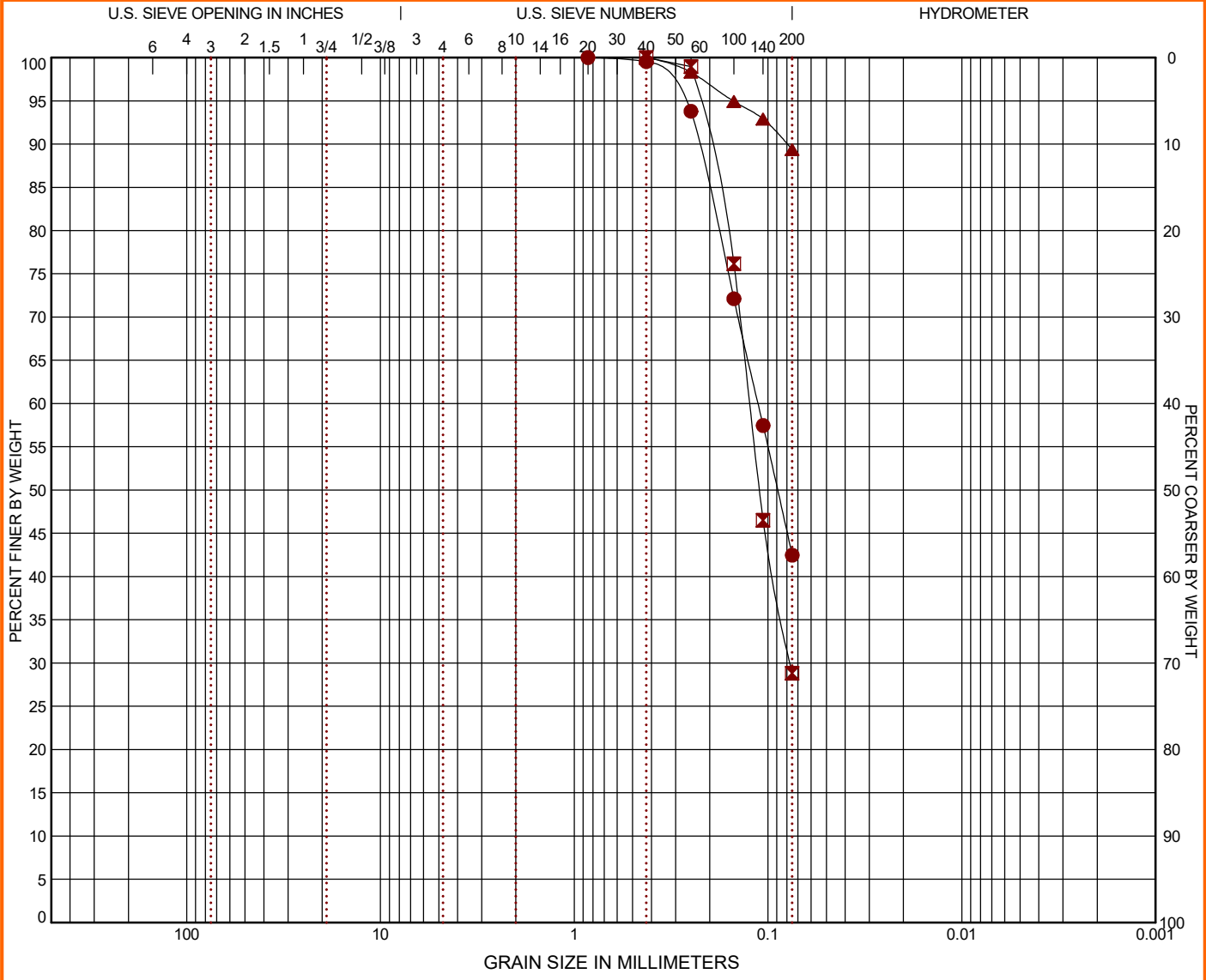
●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#40	100.0	#20	100.0	1"	100.0
#60	99.5	#40	99.28	3/4"	99.81
#100	84.21	#60	83.29	1/2"	99.74
#140	48.0	#100	48.28	#4	96.95
#200	13.67	#140	33.86	#10	92.66
		#200	24.62	#20	78.57
				#40	56.55
				#60	39.53
				#100	29.27
				#140	24.85
				#200	21.47

SOIL DESCRIPTION
● A-2-4 (0)
☒
▲ A-2-4 (0)
REMARKS
●
☒
▲

PROJECT: I-20 Wateree River Bridge Repairs  SITE: Kershaw County Kershaw County, SC	521 Clemson Rd Columbia, SC	PROJECT NUMBER: 7321P043A  CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL
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# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY			
	coarse	fine	coarse	medium	fine				

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-5	8 - 10	0.0	0.0	57.5		42.5		SC-SM
☒ E-5	18.5 - 20	0.0	0.0	71.2		28.8		
▲ E-5	28.5 - 30	0.0	0.0	10.7		89.3		MH

GRAIN SIZE			
	●	☒	▲
<b>D<sub>60</sub></b>	0.113	0.124	
<b>D<sub>30</sub></b>		0.077	
<b>D<sub>10</sub></b>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#20	100.0	#40	100.0	#40	100.0
#40	99.53	#60	98.94	#60	98.31
#60	93.79	#100	76.17	#100	94.93
#100	72.11	#140	46.52	#140	92.9
#140	57.46	#200	28.82	#200	89.35
#200	42.47				

SOIL DESCRIPTION
● A-4 (0)
☒
▲ A-7-5 (21)

COEFFICIENTS			
	●	☒	▲
<b>C<sub>c</sub></b>			
<b>C<sub>u</sub></b>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



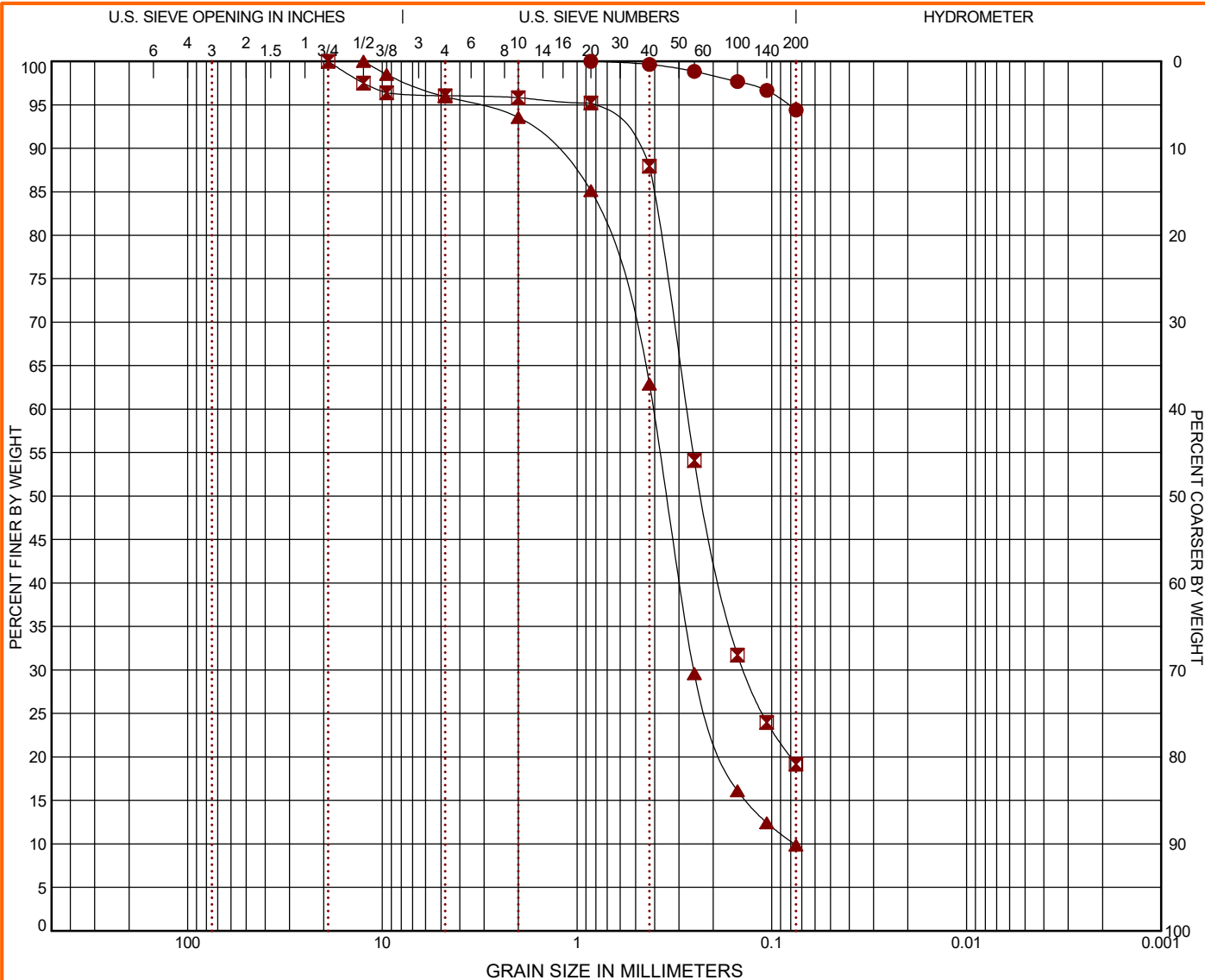
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● E-5	33.5 - 35	0.0	0.0	5.6		94.4		CL
⊠ E-5	43.5 - 45	0.0	4.0	76.9		19.2		
▲ E-5	53.5 - 55	0.0	4.1	86.1		9.9		

GRAIN SIZE			
	●	⊠	▲
<b>D<sub>60</sub></b>		0.274	0.406
<b>D<sub>30</sub></b>		0.139	0.252
<b>D<sub>10</sub></b>			0.076

COEFFICIENTS			
	●	⊠	▲
<b>C<sub>c</sub></b>			2.04
<b>C<sub>u</sub></b>			5.31

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#20	100.0	3/4"	100.0	1/2"	100.0
#40	99.64	1/2"	97.49	3/8"	98.49
#60	98.84	3/8"	96.38	#4	95.92
#100	97.67	#4	96.03	#10	93.55
#140	96.65	#10	95.82	#20	85.13
#200	94.4	#20	95.19	#40	62.89
		#40	87.95	#60	29.6
		#60	54.08	#100	16.11
		#100	31.72	#140	12.42
		#140	23.98	#200	9.86
		#200	19.18		

SOIL DESCRIPTION	
●	A-7-6 (19)
⊠	
▲	

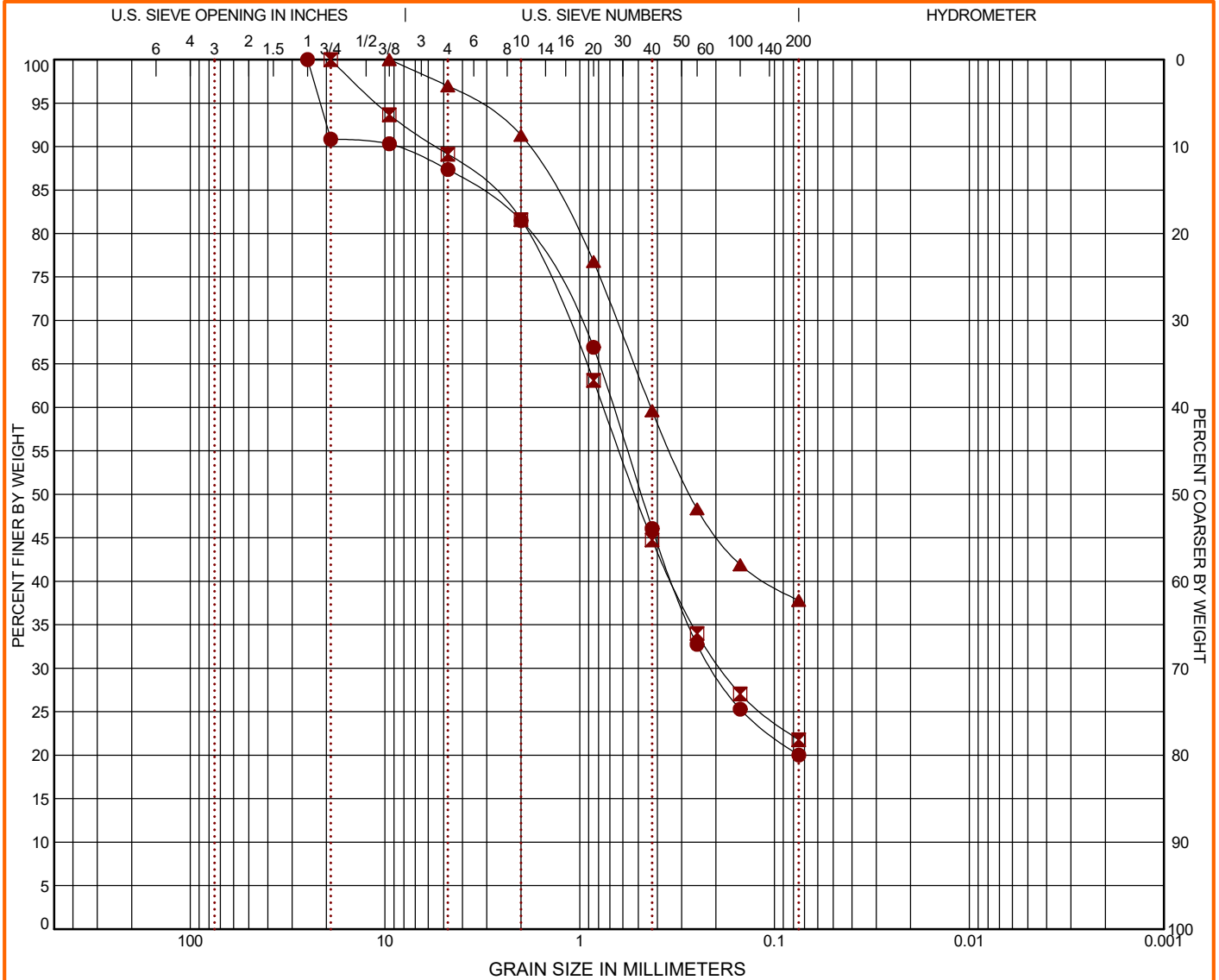
  

REMARKS	
●	
⊠	
▲	

PROJECT: I-20 Wateree River Bridge Repairs	<p style="font-size: small; margin-top: 5px;">521 Clemson Rd Columbia, SC</p>	PROJECT NUMBER: 7321P043A
SITE: Kershaw County Kershaw County, SC	CLIENT: RS&H Architects-Engineers-Planners, Inc. Jacksonville, FL	

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
R-1	2 - 4	0.0	12.6	67.3		20.0		
R-1	8 - 10	0.0	10.9	67.3		21.8		SC
R-1	18.5 - 20	0.0	3.0	59.2		37.8		SC

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.675	0.756	0.432
D <sub>30</sub>	0.207	0.186	
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0	3/4"	100.0	3/8"	100.0
3/4"	90.85	3/8"	93.65	#4	96.97
3/8"	90.32	#4	89.12	#10	91.29
#4	87.35	#10	81.6	#20	76.78
#10	81.49	#20	63.1	#40	59.61
#20	66.91	#40	44.75	#60	48.33
#40	46.08	#60	33.98	#100	41.91
#60	32.75	#100	27.05	#200	37.81
#100	25.3	#200	21.78		
#200	20.02				

SOIL DESCRIPTION	
●	
☒	A-2-6 (0)
▲	A-7-6 (4)

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

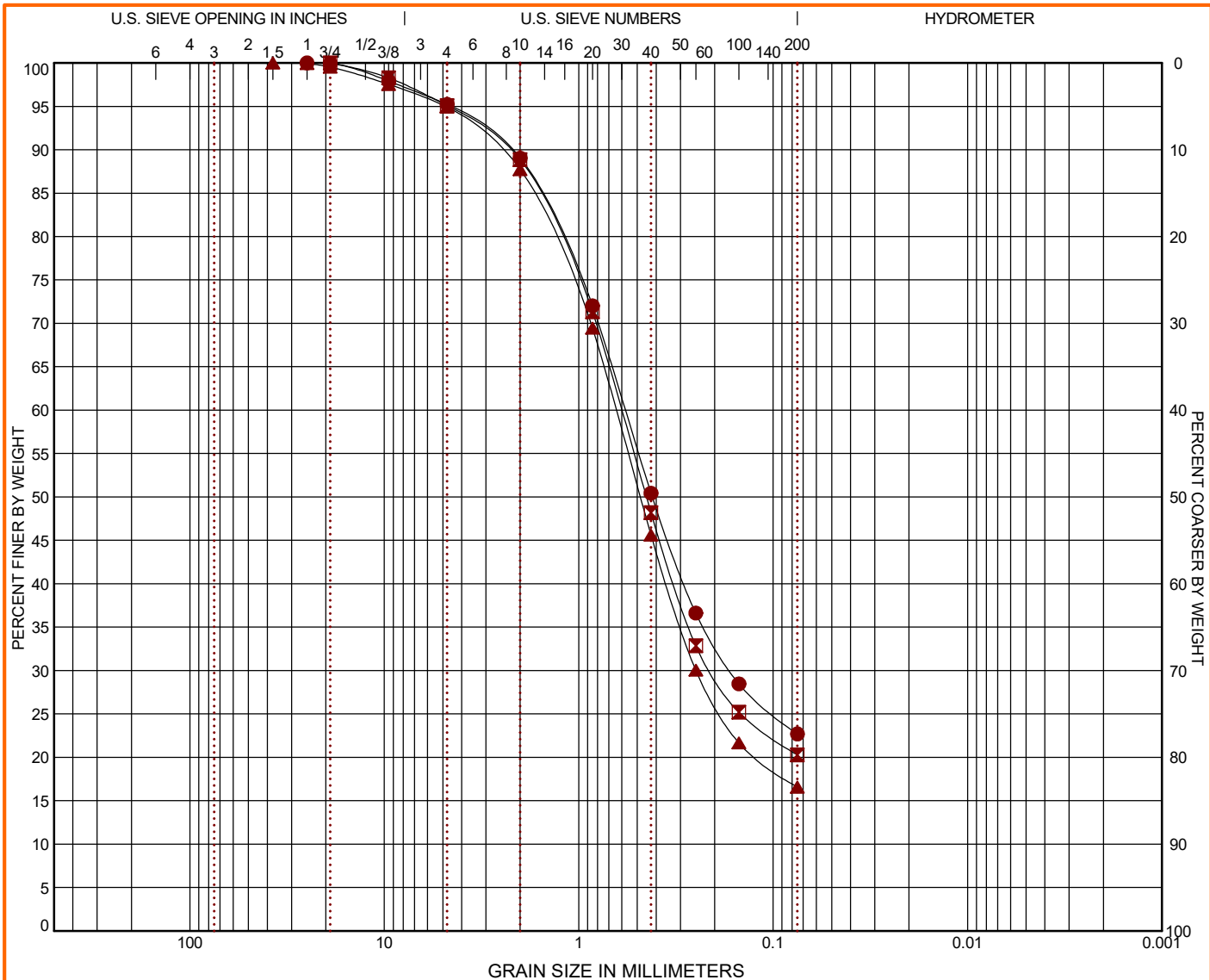


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● R-1 Bulk	0 - 10	0.0	4.8	72.5		22.7		SC
☒ R-2	1.5 - 3	0.0	4.9	74.8		20.3		SC
▲ R-2 Bulk	0 - 10	0.0	5.1	78.3		16.6		SC-SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.578	0.605	0.646
D <sub>30</sub>	0.165	0.207	0.249
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0	3/4"	100.0	1 1/2"	100.0
3/4"	99.93	3/8"	98.27	1"	99.93
3/8"	97.9	#4	95.09	3/4"	99.52
#4	95.22	#10	88.85	3/8"	97.53
#10	89.04	#20	71.33	#4	94.9
#20	72.02	#40	48.18	#10	87.71
#40	50.43	#60	32.86	#20	69.44
#60	36.62	#100	25.2	#40	45.6
#100	28.47	#200	20.28	#60	30.05
#200	22.7			#100	21.67
				#200	16.58

SOIL DESCRIPTION
● A-2-6 (0)
☒ A-2-6 (0)
▲ A-1-b (0)

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT: 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



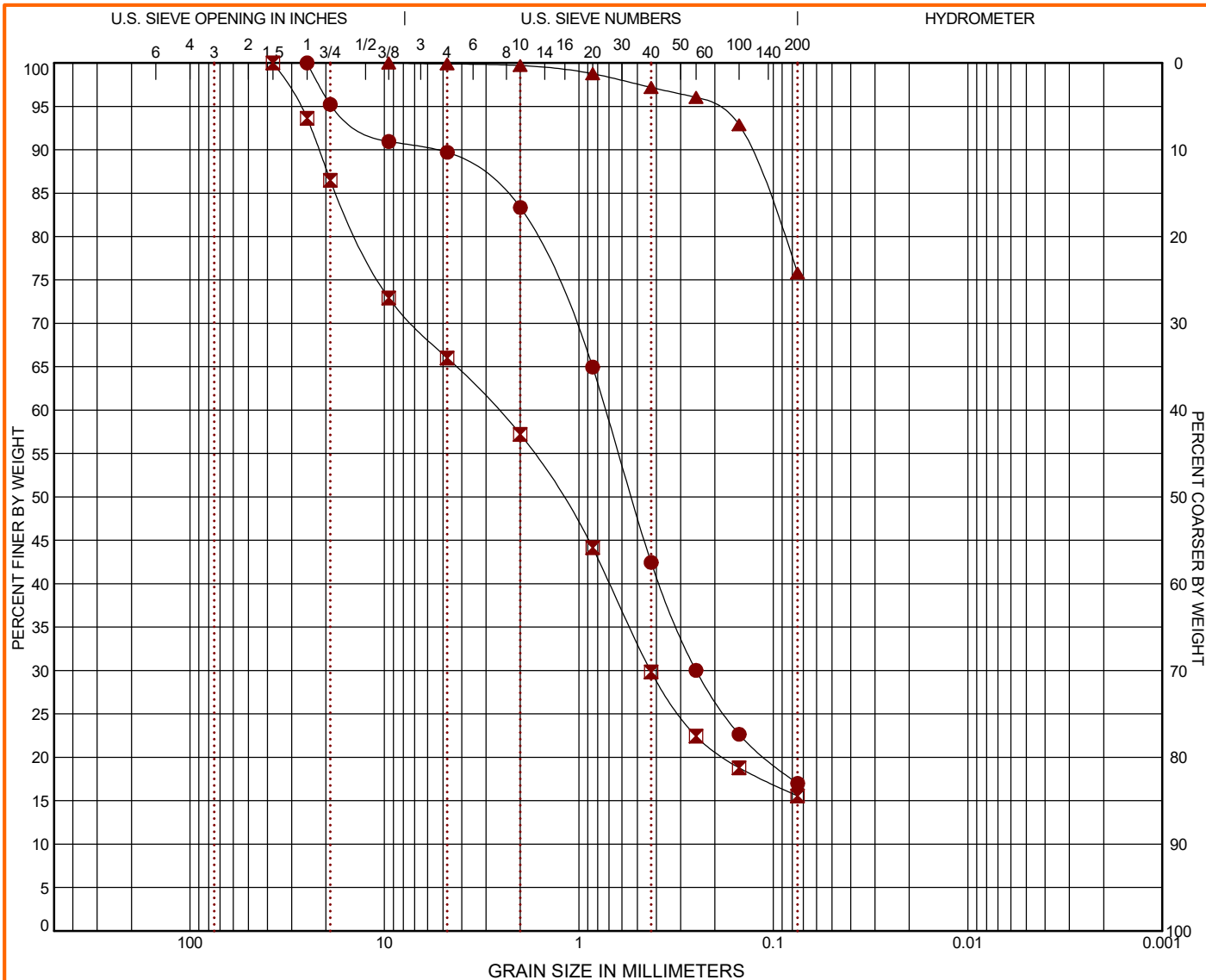
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



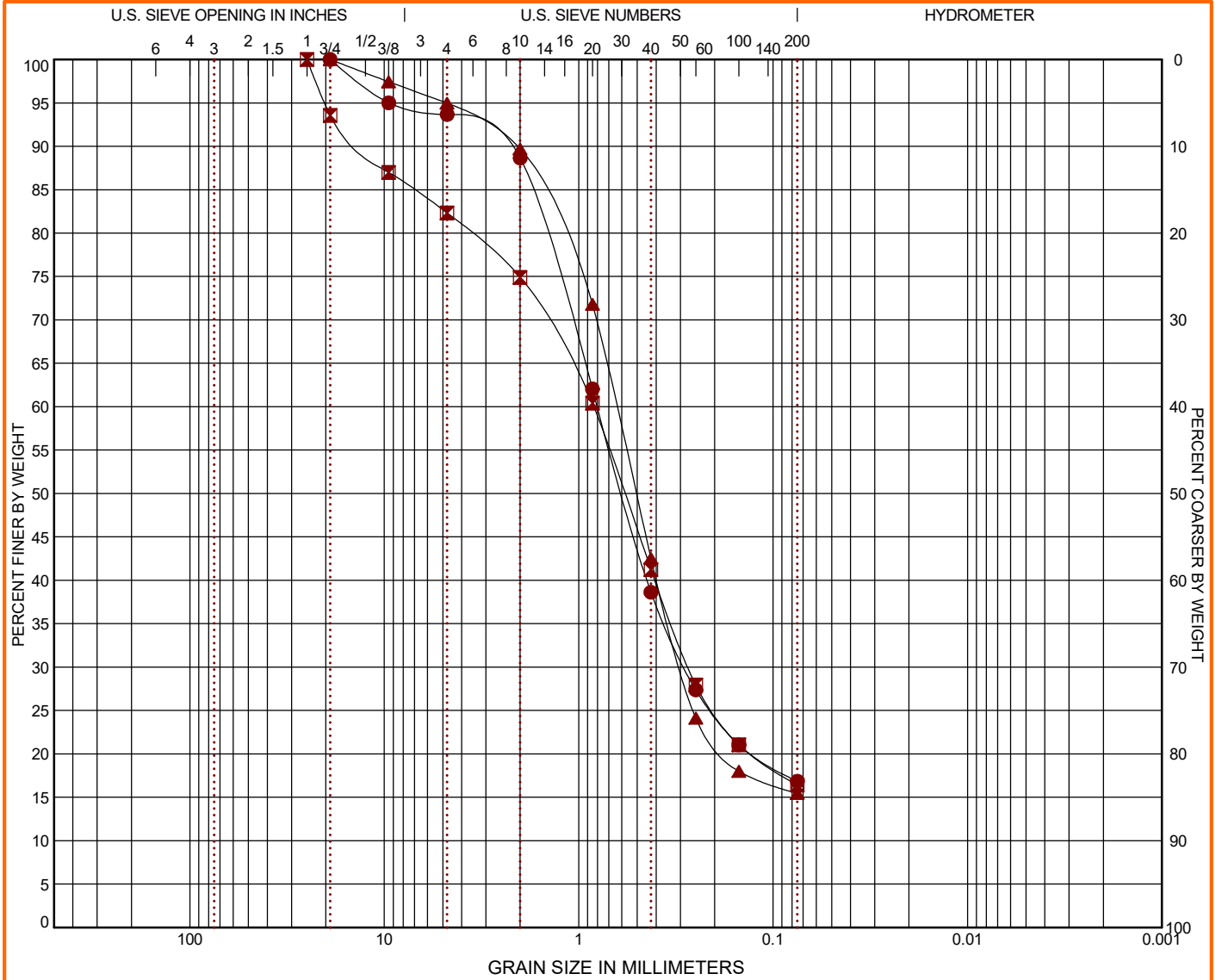
# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● R-4	2 - 4	0.0	6.3	76.8		16.8		
☒ R-4	8 - 10	0.0	17.7	65.9		16.4		
▲ R-5	1.5 - 3	0.0	5.0	79.5		15.5		

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.8	0.838	0.643
D <sub>30</sub>	0.283	0.271	0.296
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/4"	100.0	1"	100.0	3/4"	100.0
3/8"	95.01	3/4"	93.57	3/8"	97.43
#4	93.67	3/8"	86.99	#4	94.96
#10	88.65	#4	82.32	#10	89.7
#20	62.04	#10	74.9	#20	71.79
#40	38.62	#20	60.4	#40	42.52
#60	27.38	#40	41.25	#60	24.13
#100	21.04	#60	27.95	#100	18.01
#200	16.85	#100	21.05	#200	15.45
		#200	16.41		

SOIL DESCRIPTION	
●	
☒	
▲	

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

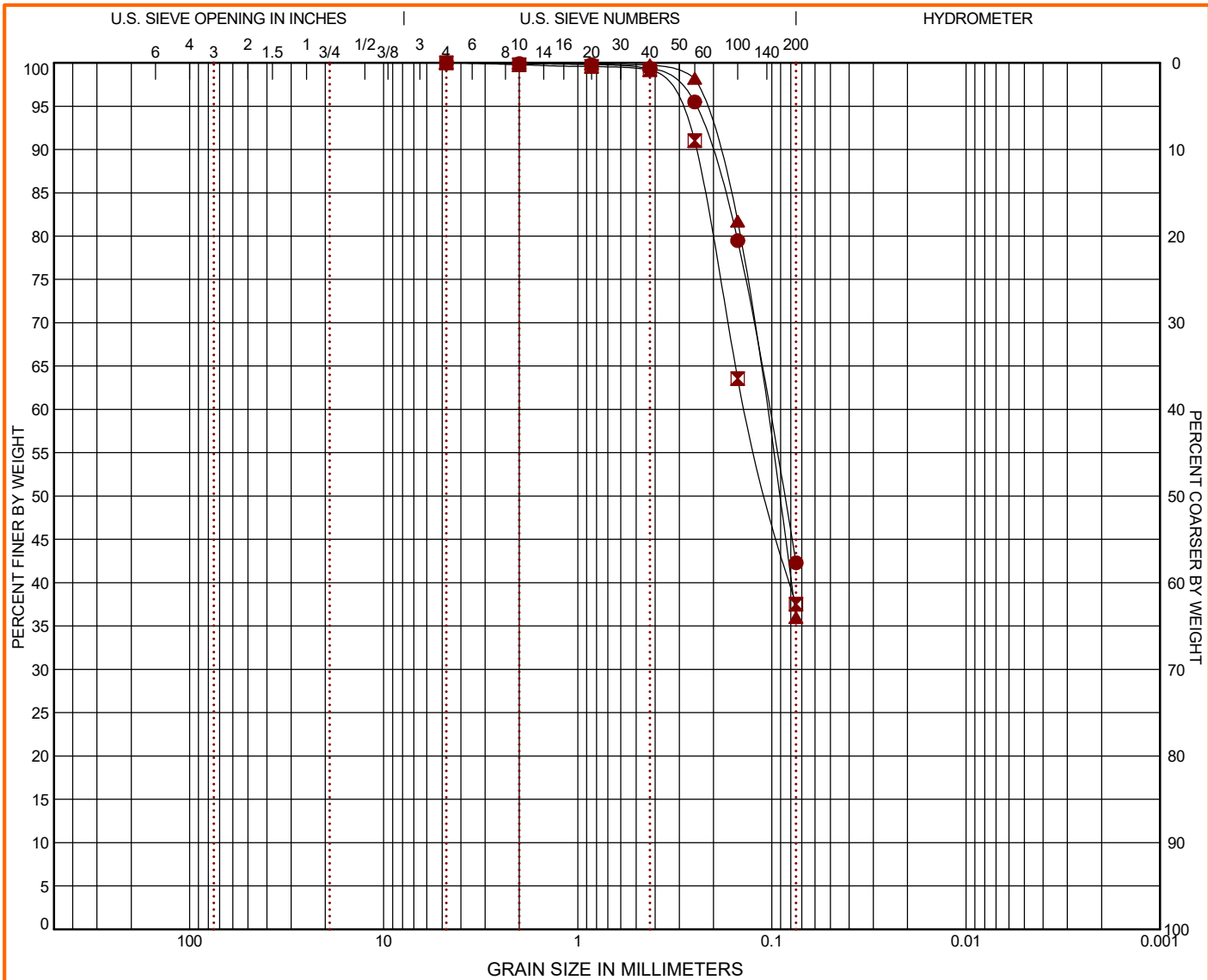


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
R-5	8 - 10	0.0	0.0	57.7		42.3		SM
R-5	18.5 - 20	0.0	0.0	62.5		37.5		SM
R-5	23.5 - 25	0.0	0.0	64.0		36.0		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.104	0.136	0.108
D <sub>30</sub>			
D <sub>10</sub>			
COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#4	100.0	#4	100.0
#10	99.9	#10	99.78	#10	99.96
#20	99.79	#20	99.58	#20	99.89
#40	99.36	#40	99.2	#40	99.77
#60	95.48	#60	91.02	#60	98.21
#100	79.48	#100	63.55	#100	81.73
#200	42.3	#200	37.51	#200	35.99

SOIL DESCRIPTION	
●	A-4 (0)
☒	A-4 (0)
▲	A-4 (0)
REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

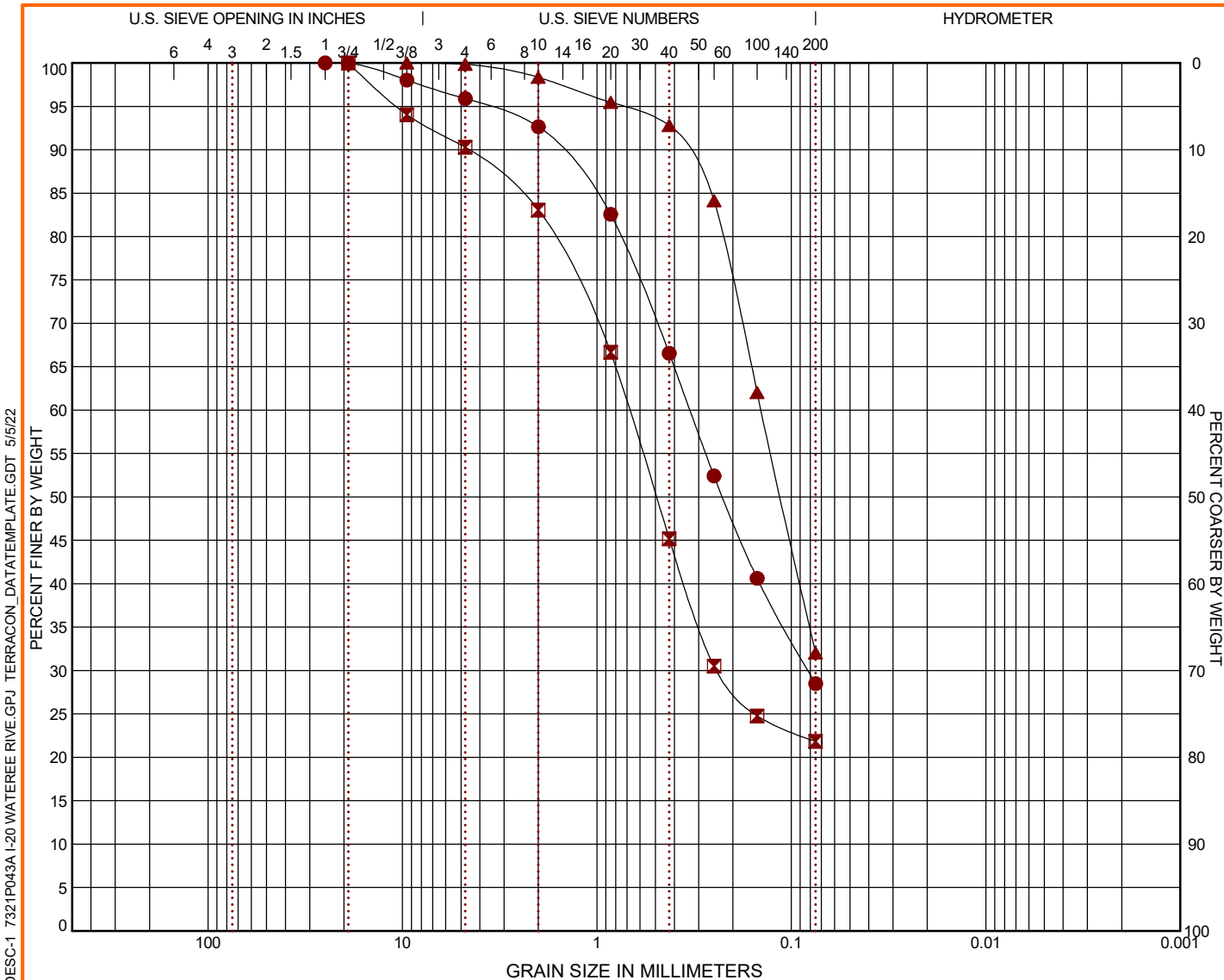


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● R-5 Bulk	0 - 10	0.0	4.1	67.4		28.5		SC-SM
☒ R-6	1 - 2.5	0.0	9.7	68.4		21.8		SC
▲ R-6	6 - 8	0.0	0.2	67.8		32.0		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.332	0.686	0.143
D <sub>30</sub>	0.082	0.239	
D <sub>10</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0	3/4"	100.0	3/8"	100.0
3/4"	99.96	3/8"	94.04	#4	99.84
3/8"	98.02	#4	90.28	#10	98.34
#4	95.88	#10	83.06	#20	95.47
#10	92.64	#20	66.65	#40	92.8
#20	82.56	#40	45.18	#60	84.13
#40	66.55	#60	30.5	#100	62.04
#60	52.42	#100	24.77	#200	32.04
#100	40.63	#200	21.83		
#200	28.5				

SOIL DESCRIPTION
● A-2-4 (0)
☒ A-2-6 (1)
▲ A-2-4 (0)

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS
●
☒
▲

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

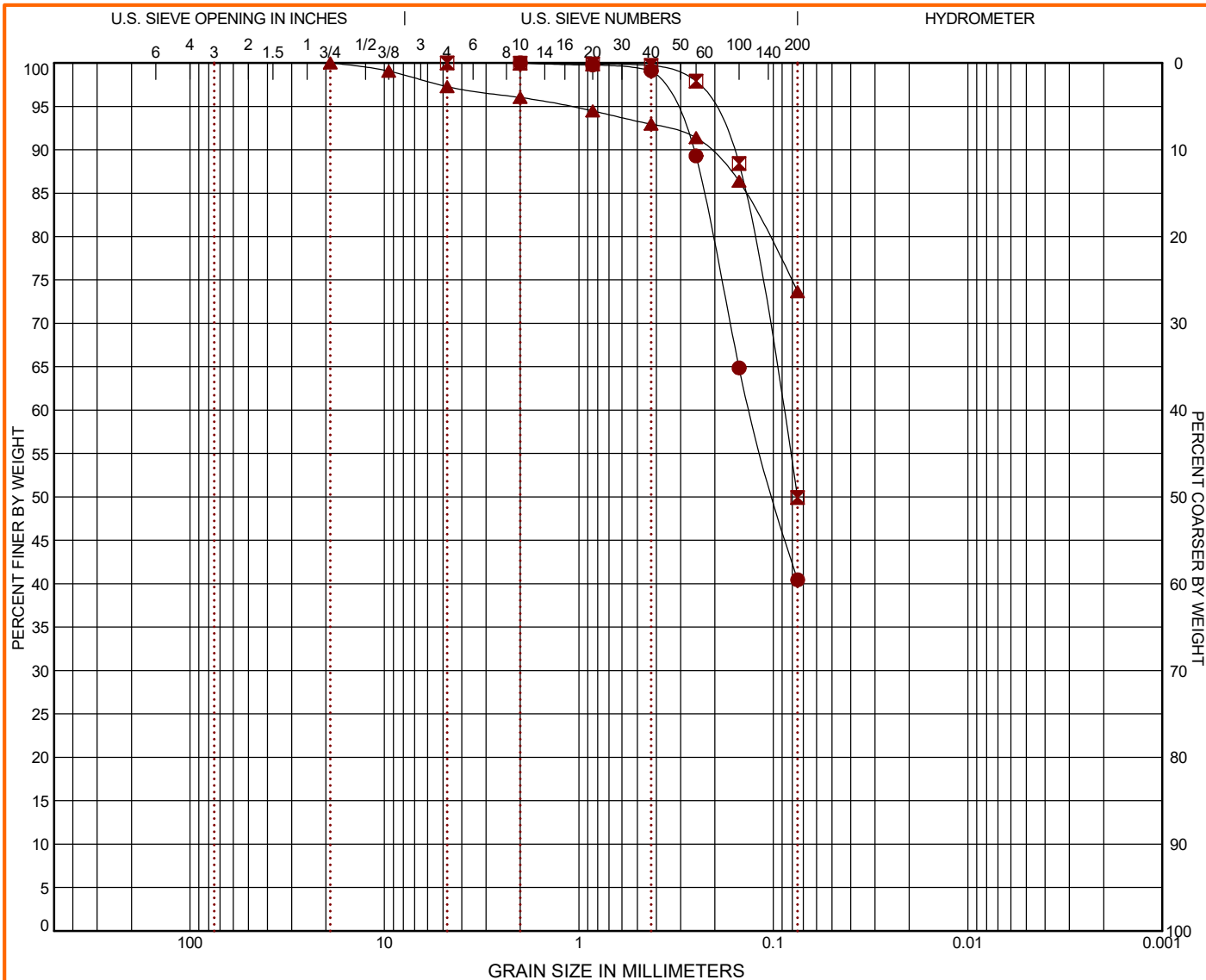


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
R-6	13.5 - 15	0.0	0.0	59.5		40.5		
R-6	18.5 - 20	0.0	0.0	50.1		49.9		SM
R-6	23.5 - 25	0.0	2.7	23.6		73.7		ML

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.131	0.09	
D <sub>30</sub>			
D <sub>10</sub>			
COEFFICIENTS			
C <sub>c</sub>	●	☒	▲
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	#4	100.0	3/4"	100.0
#20	99.77	#10	99.97	3/8"	99.05
#40	99.11	#20	99.89	#4	97.26
#60	89.29	#40	99.71	#10	96.01
#100	64.86	#60	97.91	#20	94.48
#200	40.45	#100	88.4	#40	92.95
		#200	49.95	#60	91.39
				#100	86.37
				#200	73.66

SOIL DESCRIPTION	
●	
☒	A-4 (0)
▲	A-4 (5)
REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



521 Clemson Rd  
Columbia, SC

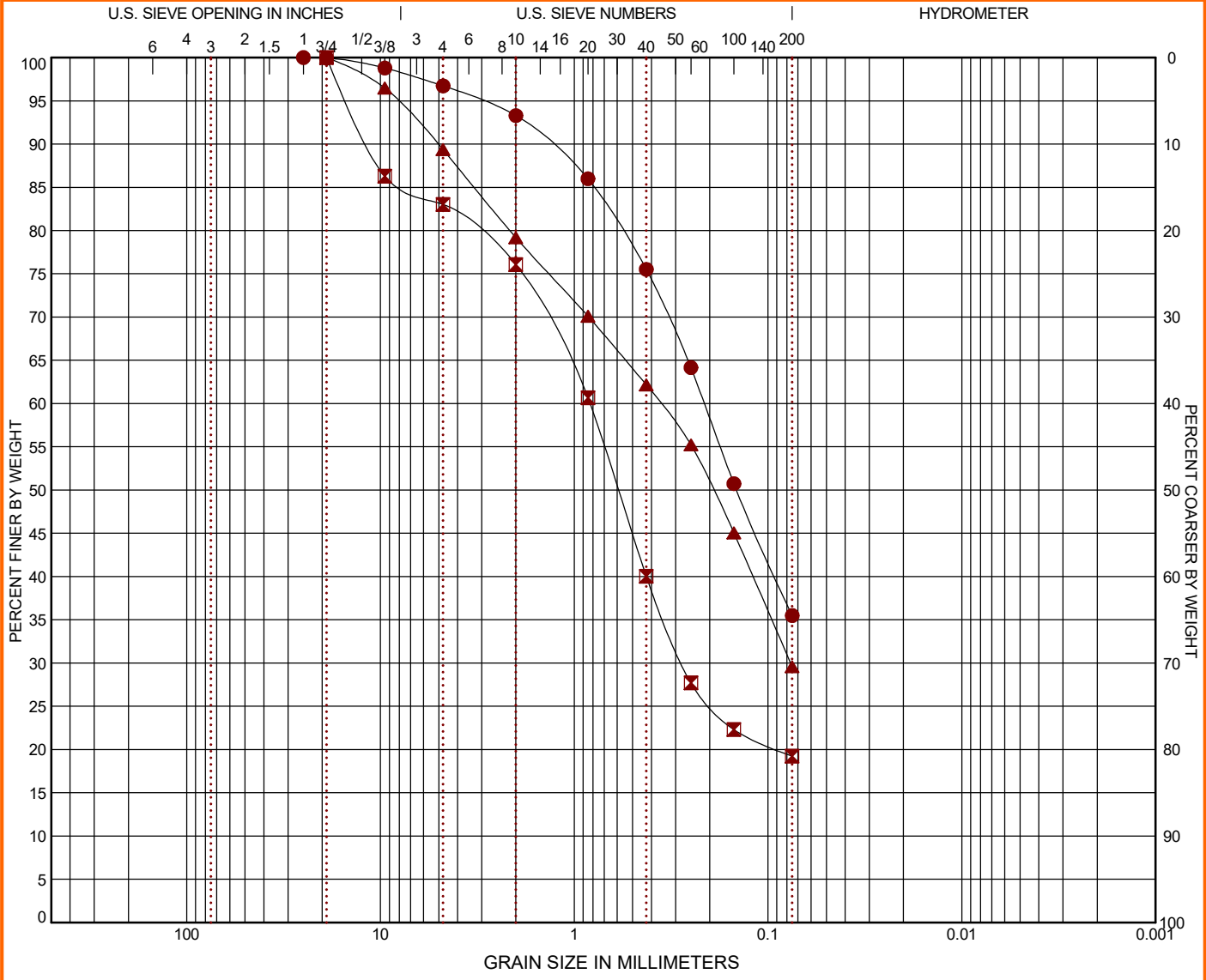
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



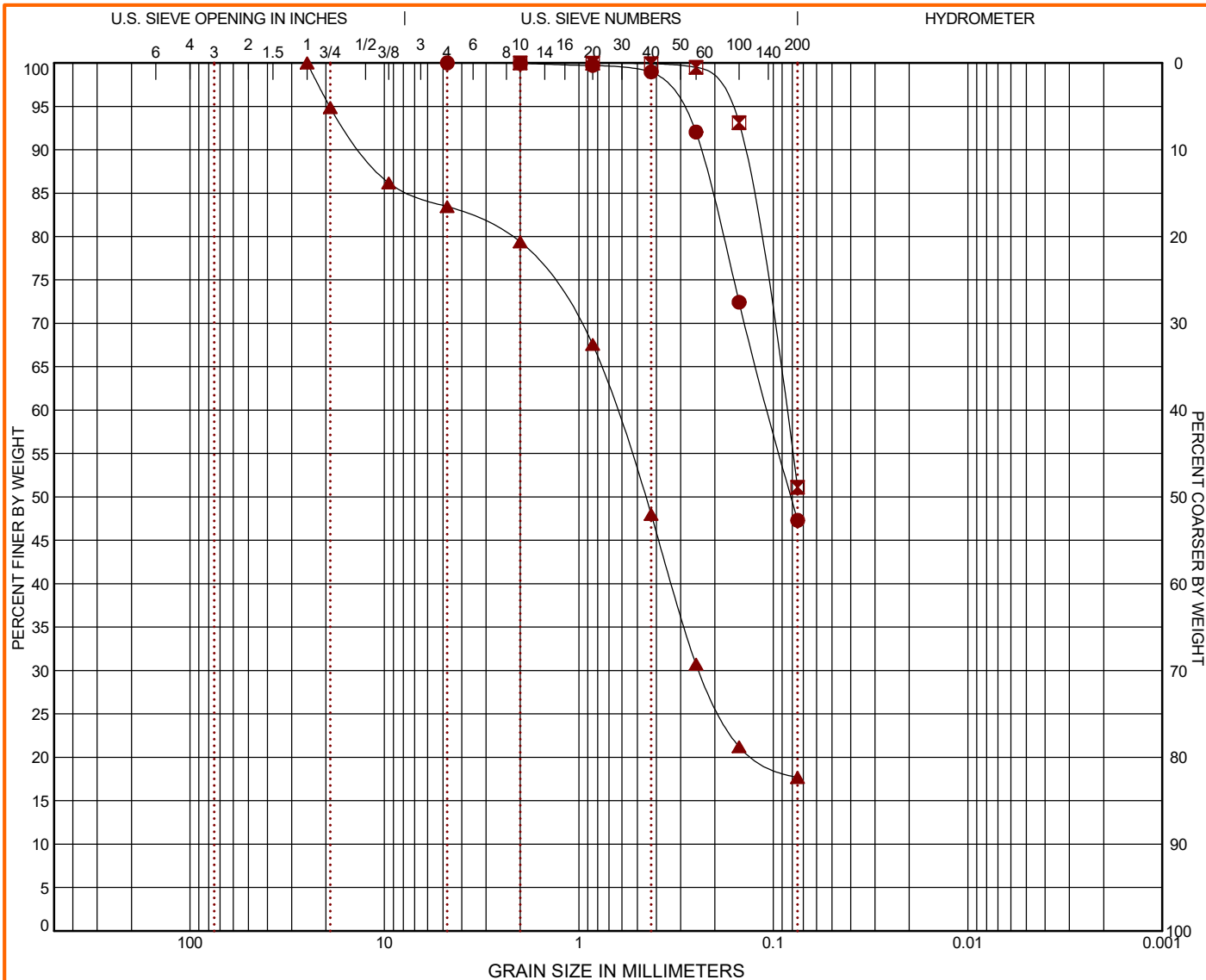
# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



# GRAIN SIZE DISTRIBUTION

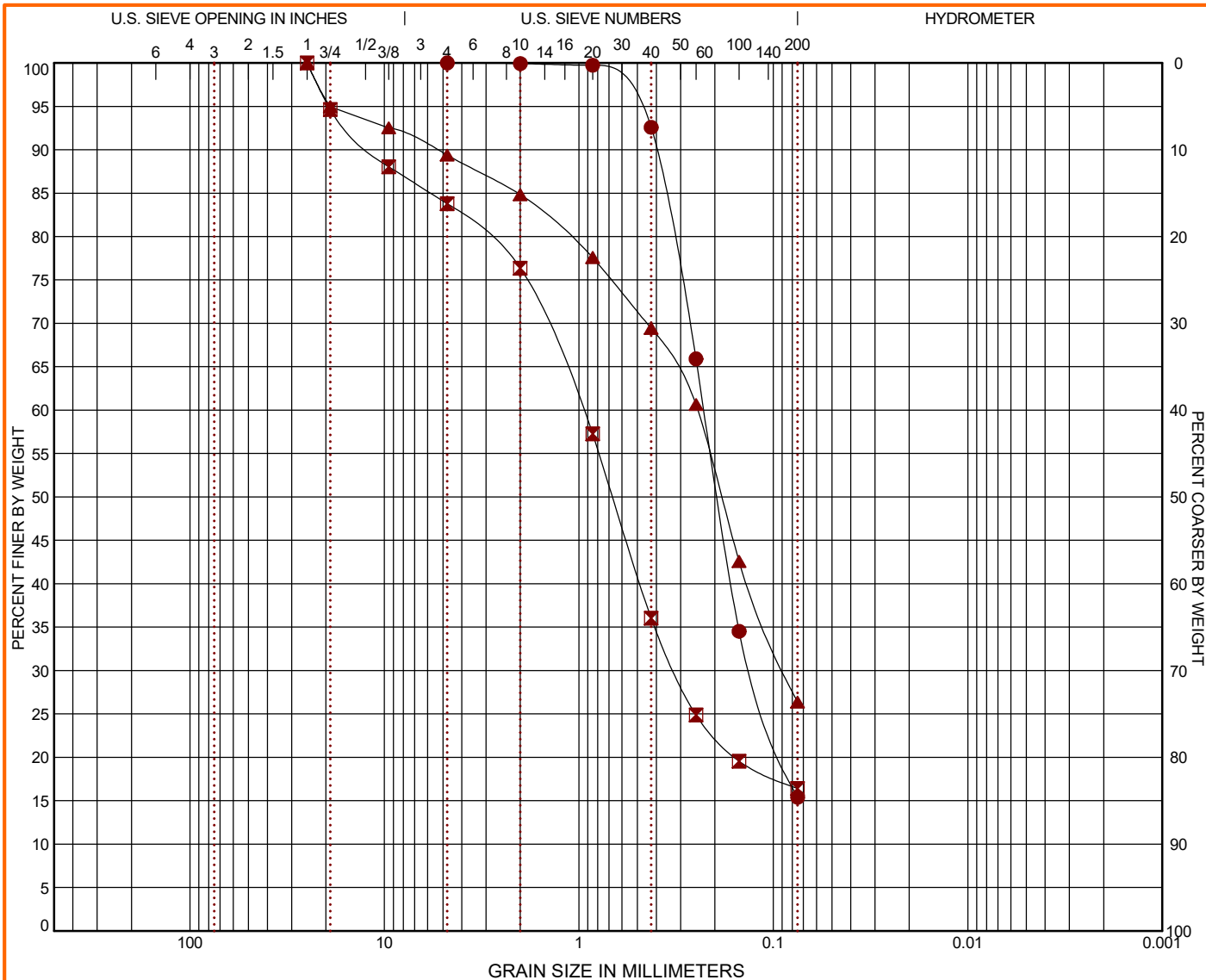
ASTM D422 / ASTM C136





# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
R-8	23.5 - 25	0.0	0.0	84.6		15.4		
R-9	1 - 2.5	0.0	16.2	67.4		16.4		
R-9	4 - 6	0.0	10.6	63.0		26.4		SM

GRAIN SIZE			
	●	☒	▲
D <sub>60</sub>	0.227	0.961	0.245
D <sub>30</sub>	0.127	0.319	0.088
D <sub>10</sub>			

COEFFICIENTS			
	●	☒	▲
C <sub>c</sub>			
C <sub>u</sub>			

●		☒		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	1"	100.0	1"	100.0
#10	99.93	3/4"	94.64	3/4"	94.94
#20	99.74	3/8"	88.03	3/8"	92.52
#40	92.58	#4	83.79	#4	89.38
#60	65.9	#10	76.36	#10	84.82
#100	34.52	#20	57.26	#20	77.58
#200	15.4	#40	36.04	#40	69.43
		#60	24.89	#60	60.65
		#100	19.55	#100	42.57
		#200	16.41	#200	26.37

SOIL DESCRIPTION	
●	
☒	
▲	A-2-4 (0)

REMARKS	
●	
☒	
▲	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

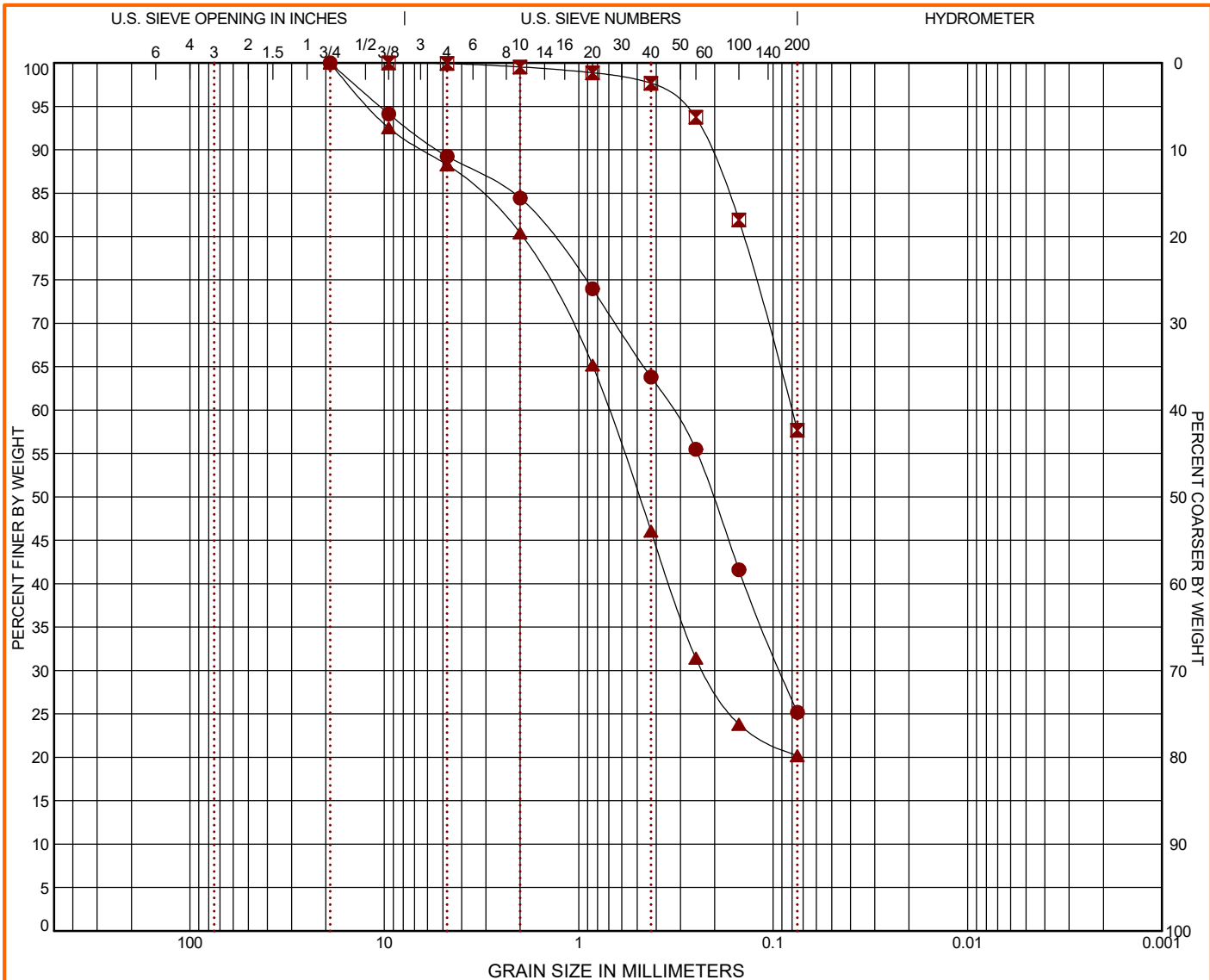


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# GRAIN SIZE DISTRIBUTION

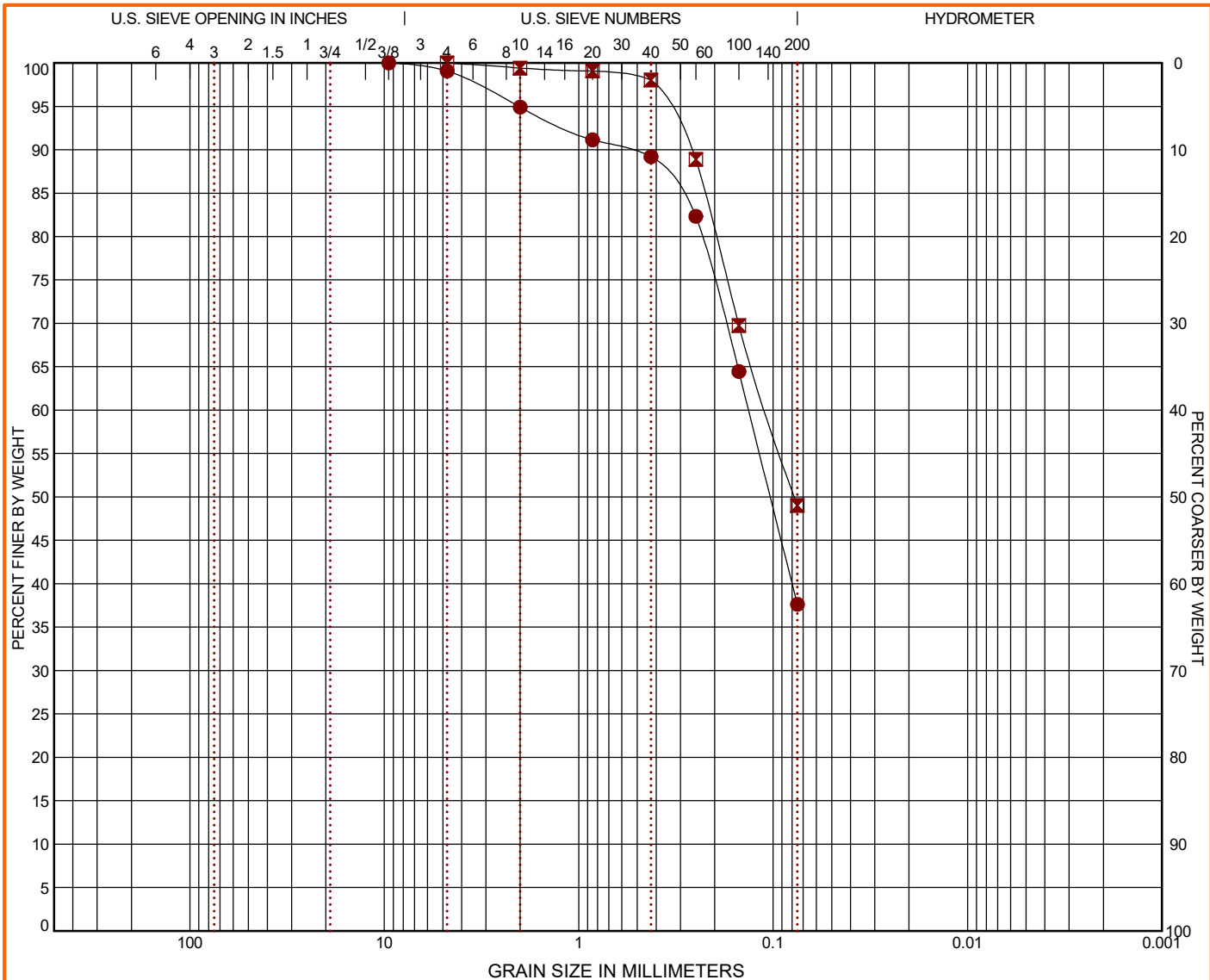
ASTM D422 / ASTM C136





# GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
● R-10	6 - 8	0.0	0.9	61.4		37.6		SM
✕ R-10	18.5 - 20	0.0	0.0	51.0		49.0		SM

GRAIN SIZE			
	●	✕	
D <sub>60</sub>	0.134	0.108	
D <sub>30</sub>			
D <sub>10</sub>			

Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	#4	100.0		
#4	99.06	#10	99.4		
#10	94.9	#20	99.08		
#20	91.14	#40	98.03		
#40	89.19	#60	88.89		
#60	82.32	#100	69.76		
#100	64.45	#200	49.0		
#200	37.63				

SOIL DESCRIPTION	
●	A-4 (0)
✕	A-4 (0)

COEFFICIENTS			
	●	✕	
C <sub>c</sub>			
C <sub>u</sub>			

REMARKS	
●	
✕	

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: AASHTO DESC-1 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



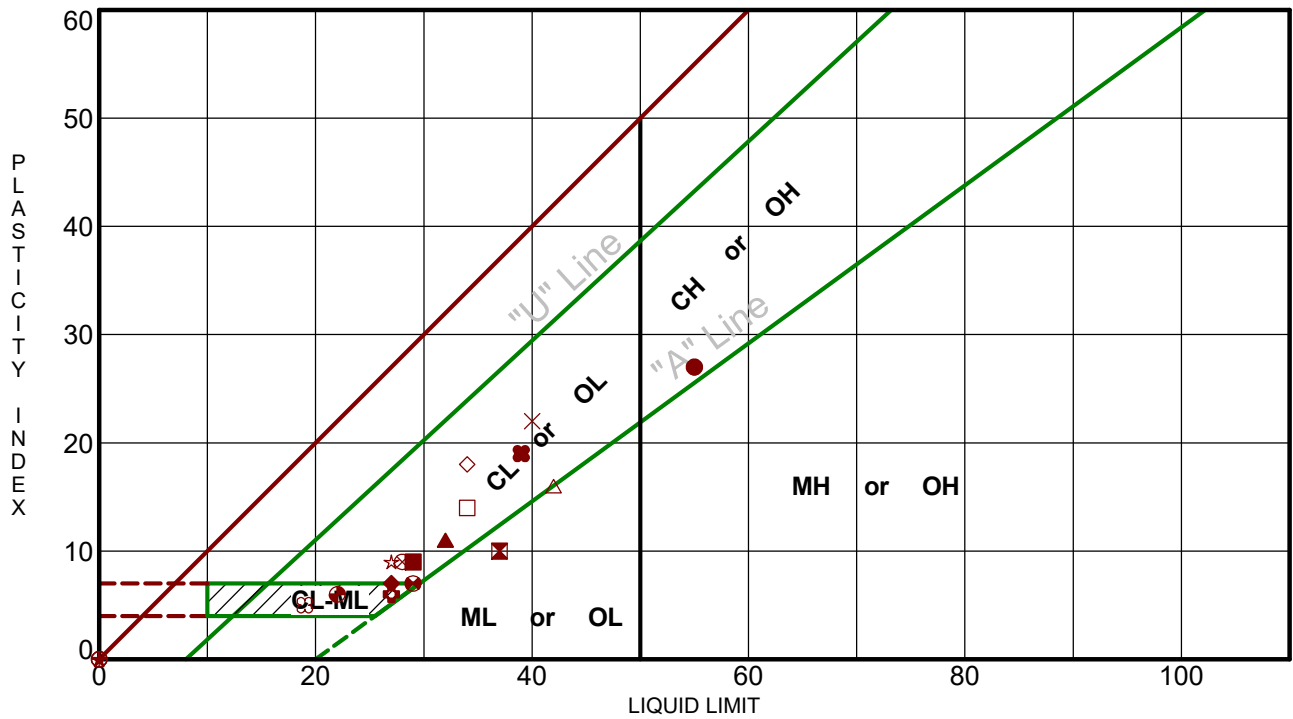
521 Clemson Rd  
Columbia, SC

PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# ATTERBERG LIMITS RESULTS

ASTM D4318



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS-AASHTO 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

Sample ID	LL	PL	PI	Fines	AASHTO	Description
● B-1	55	28	27	89.5	A-7-6 (28)	FAT CLAY (CH)
⊠ B-1	37	27	10	76.5	A-4 (8)	SILT with SAND (ML)
▲ B-2	32	21	11	62.1	A-6 (5)	SANDY LEAN CLAY (CL)
★ B-2	NP	NP	NP	35.4	A-2-4 (0)	SILTY SAND (SM)
⊙ B-3	NP	NP	NP	34.2	A-2-4 (0)	SILTY SAND (SM)
⊕ B-3	27	21	6	45.3	A-4 (0)	SILTY, CLAYEY SAND (SC-SM)
○ B-3	NP	NP	NP	30.6	A-2-4 (0)	SILTY SAND (SM)
△ B-4	42	26	16	87.0	A-7-6 (15)	SILT (ML)
⊗ B-4	28	19	9	41.4	A-4 (1)	CLAYEY SAND (SC)
⊕ B-5	NP	NP	NP	28.5	A-2-4 (0)	SILTY SAND (SM)
□ B-5	34	20	14	69.8	A-6 (8)	SANDY LEAN CLAY (CL)
⊕ B-6	29	22	7	20.3	A-2-4 (0)	SILTY, CLAYEY SAND with GRAVEL (SC-SM)
⊕ B-6	22	16	6	43.7	A-4 (0)	SILTY, CLAYEY SAND (SC-SM)
★ B-7	27	18	9	45.3	A-4 (1)	CLAYEY SAND (SC)
⊗ B-7	19	14	5	31.0	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
■ B-8	29	20	9	62.9	A-4 (4)	SANDY LEAN CLAY (CL)
◆ B-8	27	20	7	54.1	A-4 (1)	SANDY SILTY CLAY (CL-ML)
◇ B-8	34	16	18	53.6	A-6 (6)	SANDY LEAN CLAY (CL)
× B-8	40	18	22	61.0	A-6 (11)	SANDY LEAN CLAY (CL)
⊕ B-8	39	20	19	66.3	A-6 (11)	SANDY LEAN CLAY (CL)

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

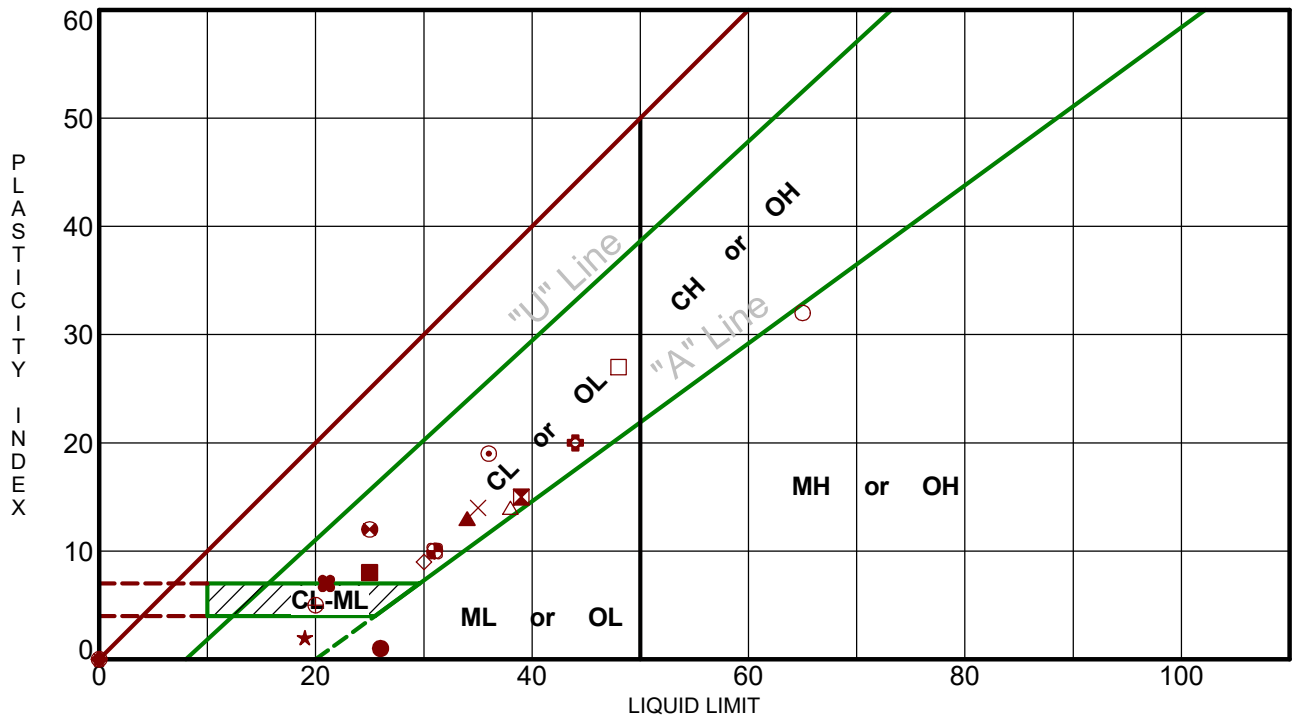


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# ATTERBERG LIMITS RESULTS

ASTM D4318



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS-AASHTO 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

Sample ID	LL	PL	PI	Fines	AASHTO	Description
● B-9	26	25	1	52.4	A-4 (0)	SANDY SILT (ML)
■ B-9	39	24	15	71.1	A-6 (10)	LEAN CLAY with SAND (CL)
▲ B-9	34	21	13	58.8	A-6 (5)	SANDY LEAN CLAY (CL)
★ B-9 Bulk	19	17	2	19.0	A-1-b (0)	SILTY SAND (SM)
⊙ B-9B	36	17	19	41.9	A-6 (4)	CLAYEY SAND (SC)
⊕ B-10	44	24	20	83.8	A-7-6 (18)	LEAN CLAY with SAND (CL)
○ B-11	65	33	32	72.6	A-7-5 (25)	ELASTIC SILT with SAND (MH)
△ B-12	38	24	14	85.2	A-6 (12)	LEAN CLAY (CL)
⊗ B-12	NP	NP	NP	41.9	A-4 (0)	SILTY SAND (SM)
⊕ B-12	20	15	5	34.3	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
□ B-13	48	21	27	39.7	A-7-6 (5)	CLAYEY SAND (SC)
⊕ B-13	25	13	12	30.4	A-2-6 (0)	CLAYEY SAND (SC)
⊕ B-14	31	21	10	47.2	A-4 (2)	CLAYEY SAND (SC)
★ B-15	NP	NP	NP	35.8	A-4 (0)	SILTY SAND (SM)
⊗ B-15	31	21	10	42.5	A-4 (1)	CLAYEY SAND (SC)
■ B-16	25	17	8	38.0	A-4 (0)	CLAYEY SAND (SC)
◆ B-16	NP	NP	NP	22.3	A-2-4 (0)	SILTY SAND (SM)
◇ B-17	30	21	9	62.9	A-4 (4)	SANDY LEAN CLAY (CL)
× B-17	35	21	14	50.5	A-6 (4)	SANDY LEAN CLAY (CL)
⊕ B-17	21	14	7	31.3	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

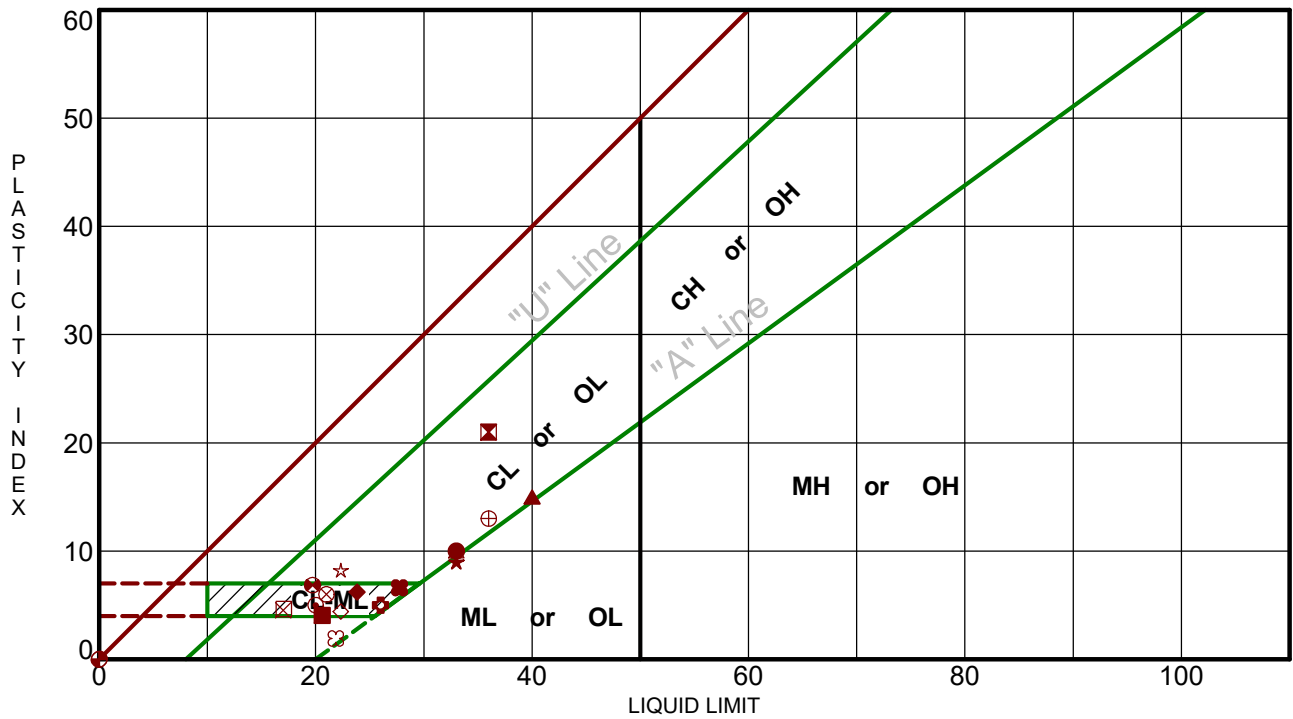


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# ATTERBERG LIMITS RESULTS

ASTM D4318



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS-AASHTO 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

Sample ID	LL	PL	PI	Fines	AASHTO	Description
● B-18	33	23	10	47.4	A-4 (2)	CLAYEY SAND (SC)
⊠ B-18	36	15	21	31.6	A-2-6 (2)	CLAYEY SAND (SC)
▲ B-19	40	25	15	82.6	A-6 (13)	LEAN CLAY with SAND (CL)
★ B-19	33	24	9	41.7	A-4 (1)	SILTY SAND (SM)
⊕ B-19	20	15	5	30.3	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ B-20	26	21	5	27.4	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
○ B-20	NP	NP	NP	47.3	A-4 (0)	SILTY SAND (SM)
△ B-20	33	23	10	58.9	A-4 (4)	SANDY LEAN CLAY (CL)
⊗ B-20 Bulk	21	15	6	29.6	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ B-20A	36	23	13	78.7	A-6 (10)	LEAN CLAY with SAND (CL)
□ CO-1	17	12	5	23.4	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ CO-1	20	13	7	21.1	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ CO-2	NP	NP	NP	19.0	A-2-4 (0)	SILTY SAND (SM)
★ CO-3	22	14	8	25.5	A-2-4 (0)	CLAYEY SAND (SC)
⊗ CO-3	22	20	2	50.7	A-4 (0)	SANDY SILT (ML)
■ CO-3	21	17	4	29.2	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
◆ CO-4	24	18	6	22.1	A-1-b (0)	SILTY, CLAYEY SAND (SC-SM)
◇ CO-4	22	18	4	49.3	A-4 (0)	SILTY, CLAYEY SAND (SC-SM)
× E-1	17	12	5	23.3	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ E-1	28	21	7	68.5	A-4 (3)	SANDY SILTY CLAY (CL-ML)

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC

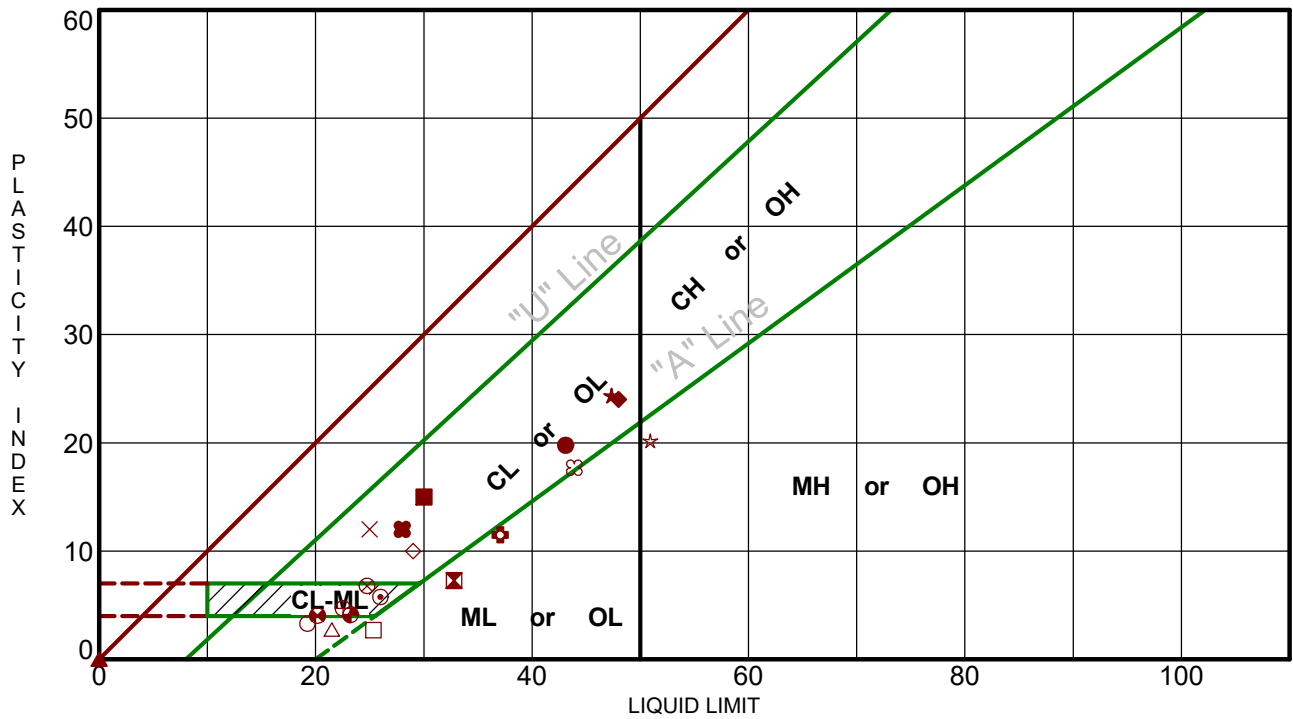


PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

# ATTERBERG LIMITS RESULTS

ASTM D4318



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS-AASHTO 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 5/5/22

Sample ID	LL	PL	PI	Fines	AASHTO	Description
● E-1	43	23	20	84.6	A-7-6 (18)	LEAN CLAY with SAND (CL)
⊠ E-1	33	26	7	33.4	A-2-4 (0)	SILTY SAND (SM)
▲ E-2	NP	NP	NP	20.8	A-2-4 (0)	SILTY SAND (SM)
★ E-2	47	23	24	42.8	A-7-6 (6)	CLAYEY SAND (SC)
⊙ E-2	26	20	6	85.7	A-4 (4)	SILTY CLAY (CL-ML)
⊕ E-2	37	26	11	53.4	A-6 (4)	SANDY SILT (ML)
○ E-3	19	16	3	29.2	A-2-4 (0)	SILTY SAND (SM)
△ E-3	21	19	2	68.6	A-4 (0)	SANDY SILT (ML)
⊗ E-4	25	18	7	22.8	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ E-4	23	18	5	33.6	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
□ E-4	25	23	2	13.7	A-2-4 (0)	SILTY SAND (SM)
⊕ E-5	20	16	4	21.5	A-2-4 (0)	SILTY, CLAYEY SAND (SC-SM)
⊕ E-5	23	19	4	42.5	A-4 (0)	SILTY, CLAYEY SAND (SC-SM)
★ E-5	51	31	20	89.3	A-7-5 (21)	ELASTIC SILT (MH)
⊗ E-5	44	26	18	94.4	A-7-6 (19)	LEAN CLAY (CL)
■ R-1	30	15	15	21.8	A-2-6 (0)	CLAYEY SAND (SC)
◆ R-1	48	24	24	37.8	A-7-6 (4)	CLAYEY SAND (SC)
◇ R-1	29	19	10			
× R-1 Bulk	25	13	12	22.7	A-2-6 (0)	CLAYEY SAND (SC)
⊕ R-2	28	16	12	20.3	A-2-6 (0)	CLAYEY SAND (SC)

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL









# INDEX PROPERTIES VERSUS DEPTH

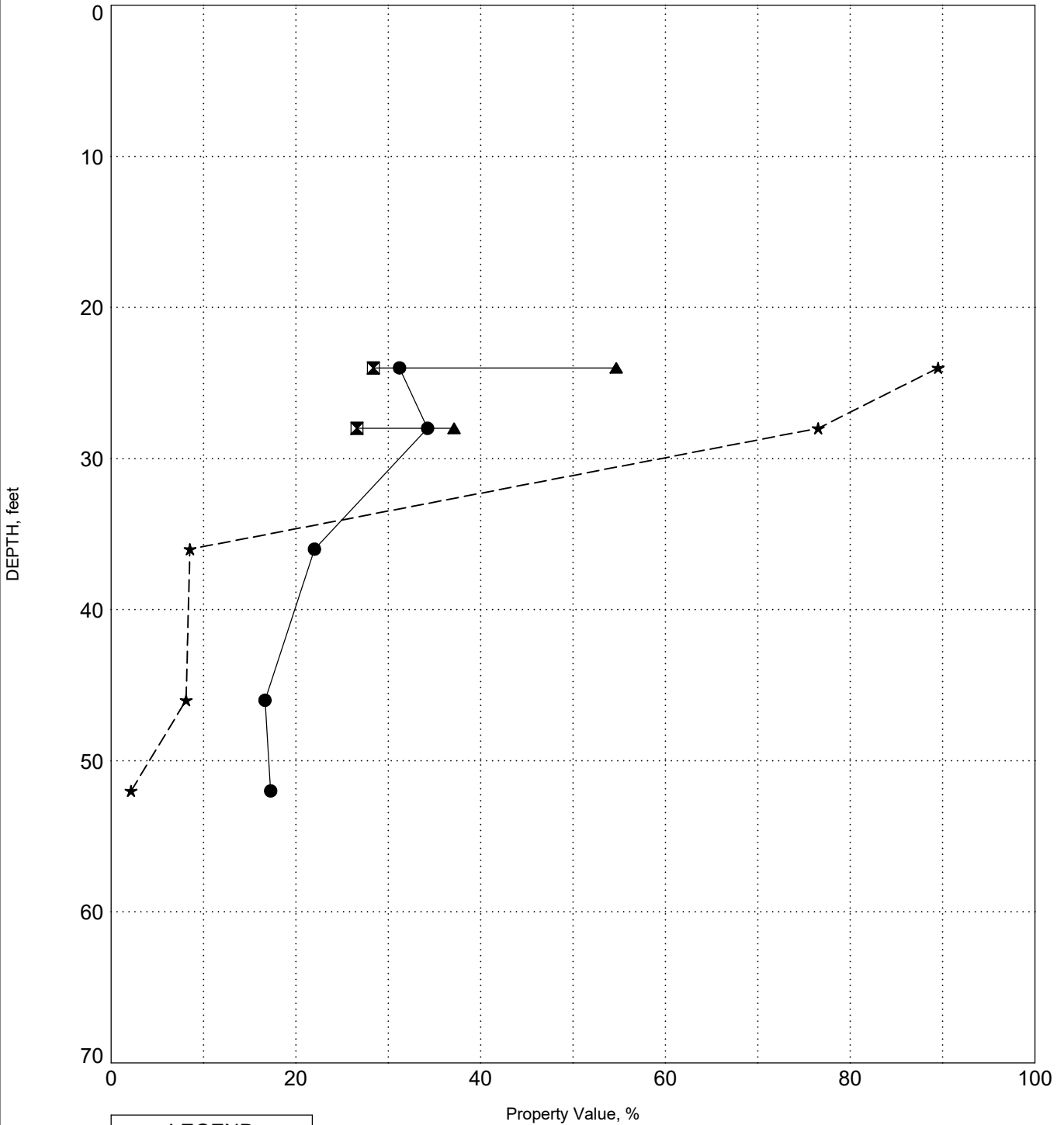
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 158.9

## BORING B-1



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

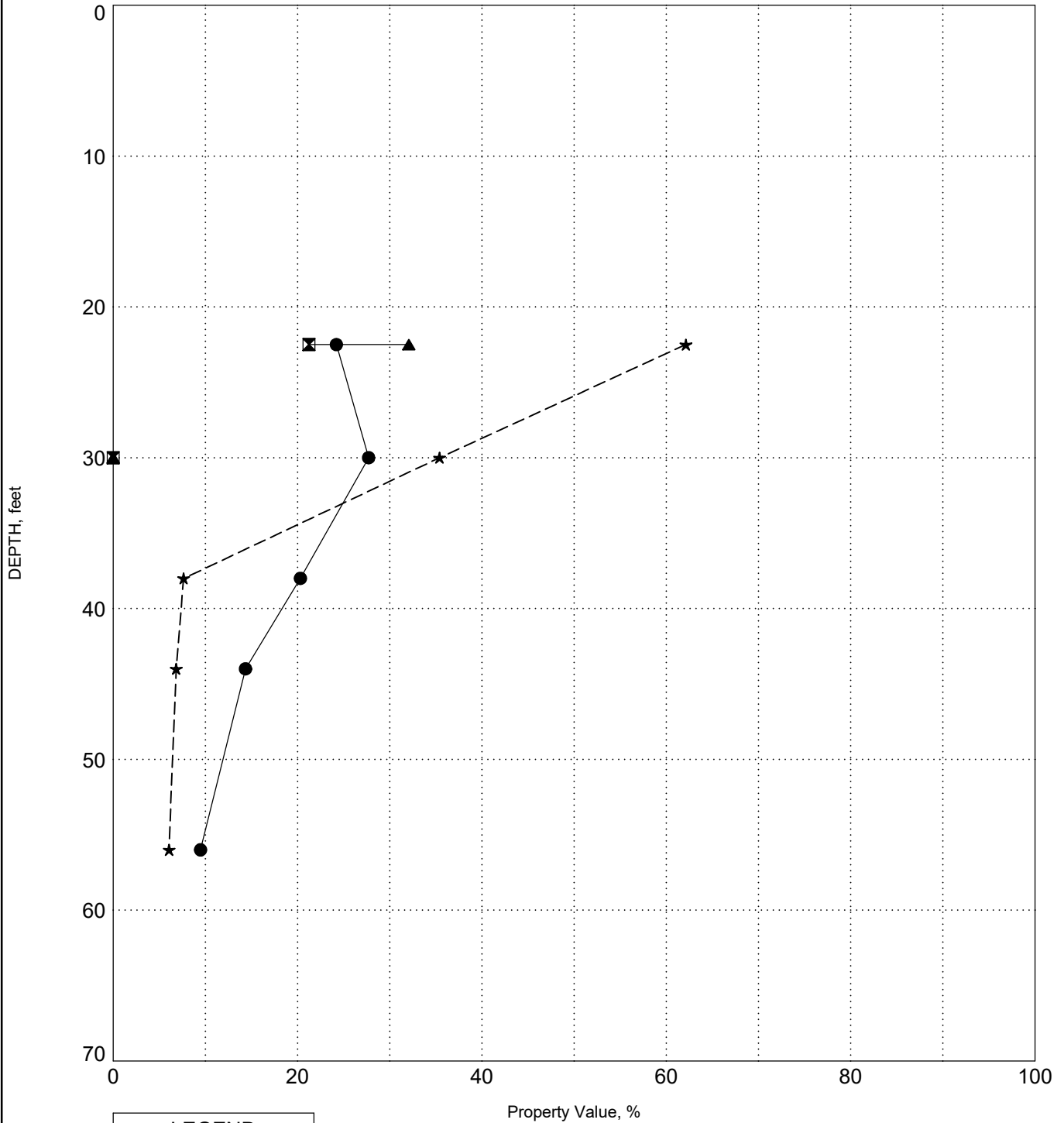
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 159.1

## BORING B-2



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22







# INDEX PROPERTIES VERSUS DEPTH

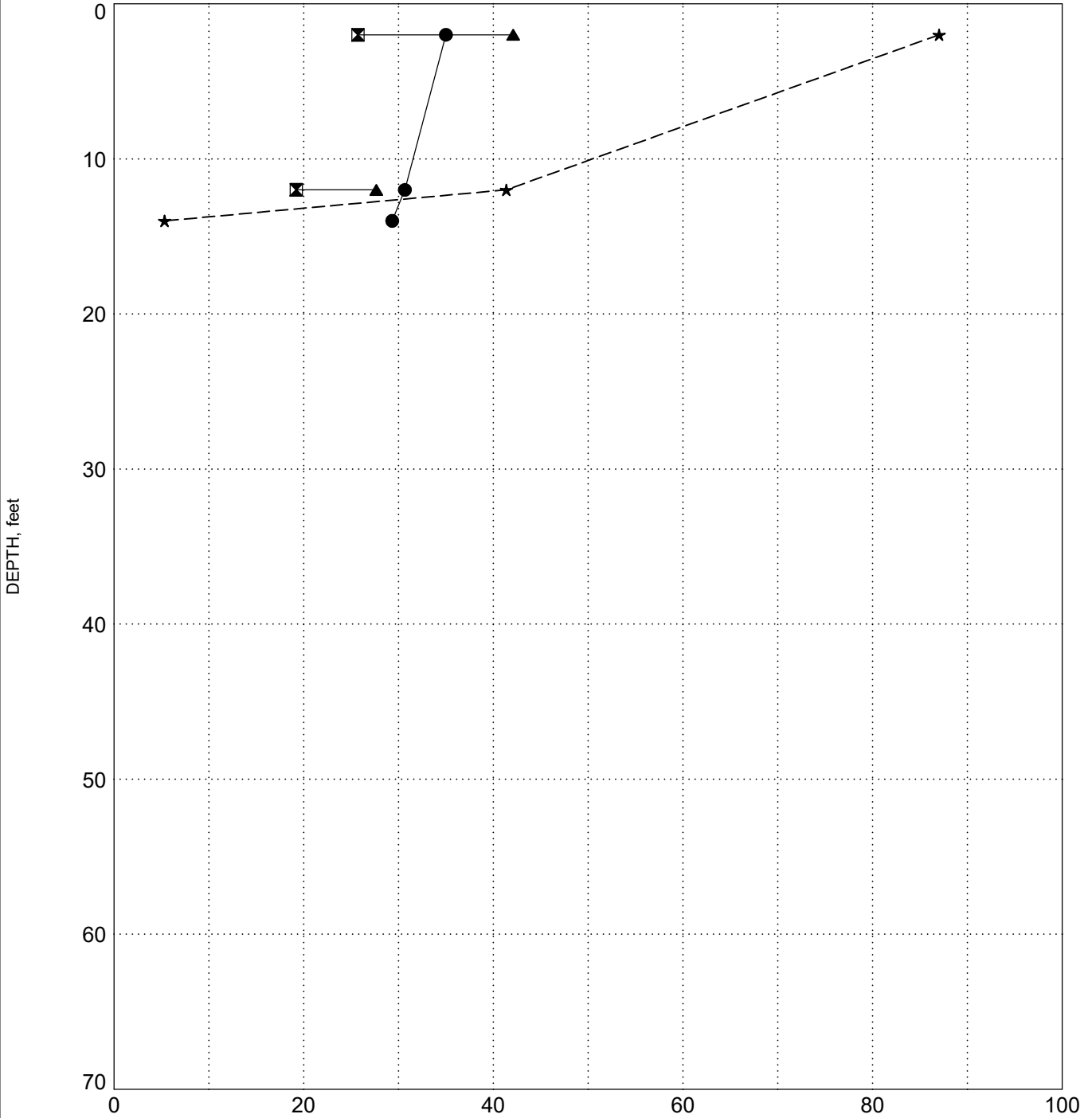
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 135.1

## BORING B-4



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

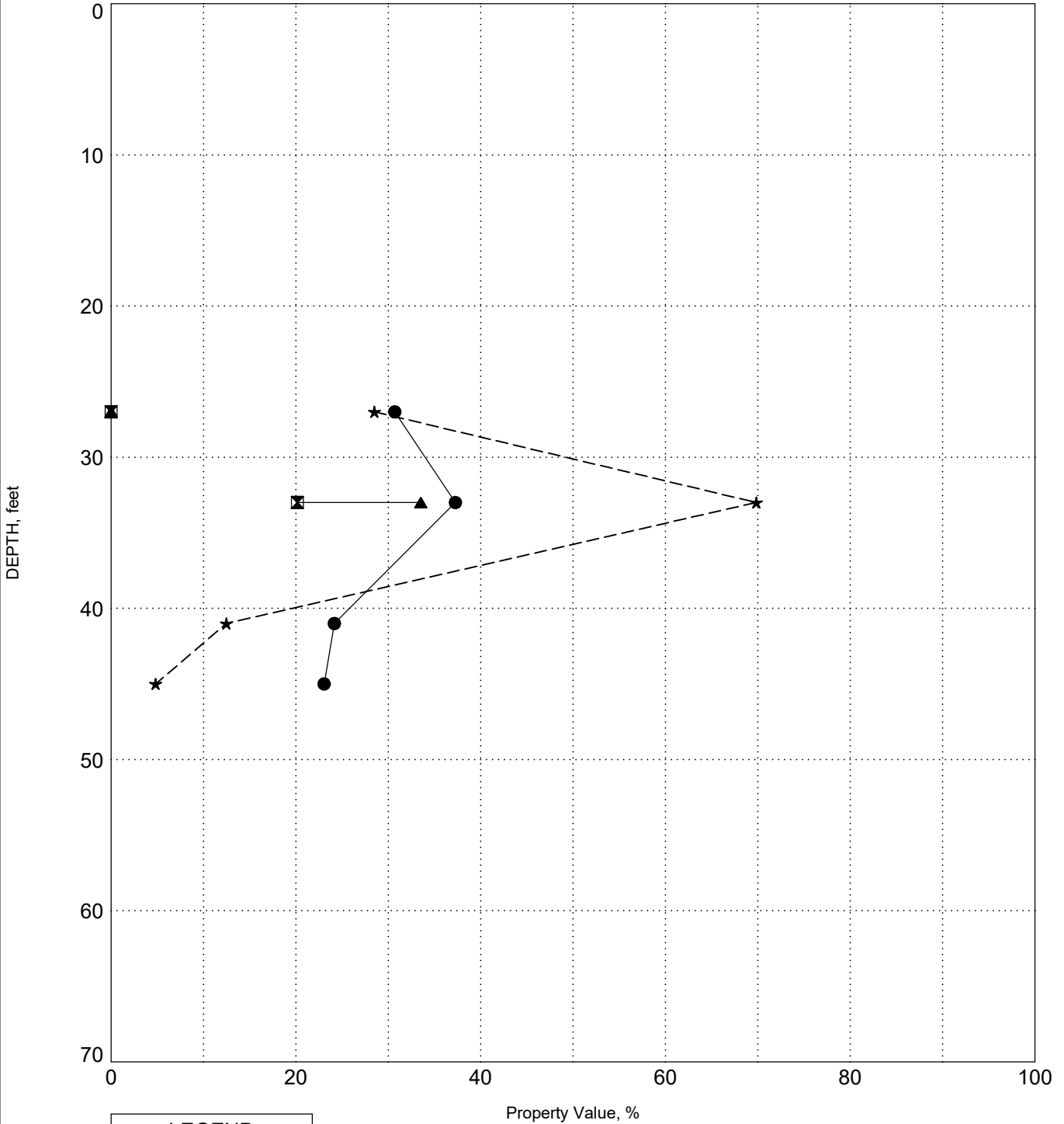
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-5

SURFACE ELEVATION: 162.8



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

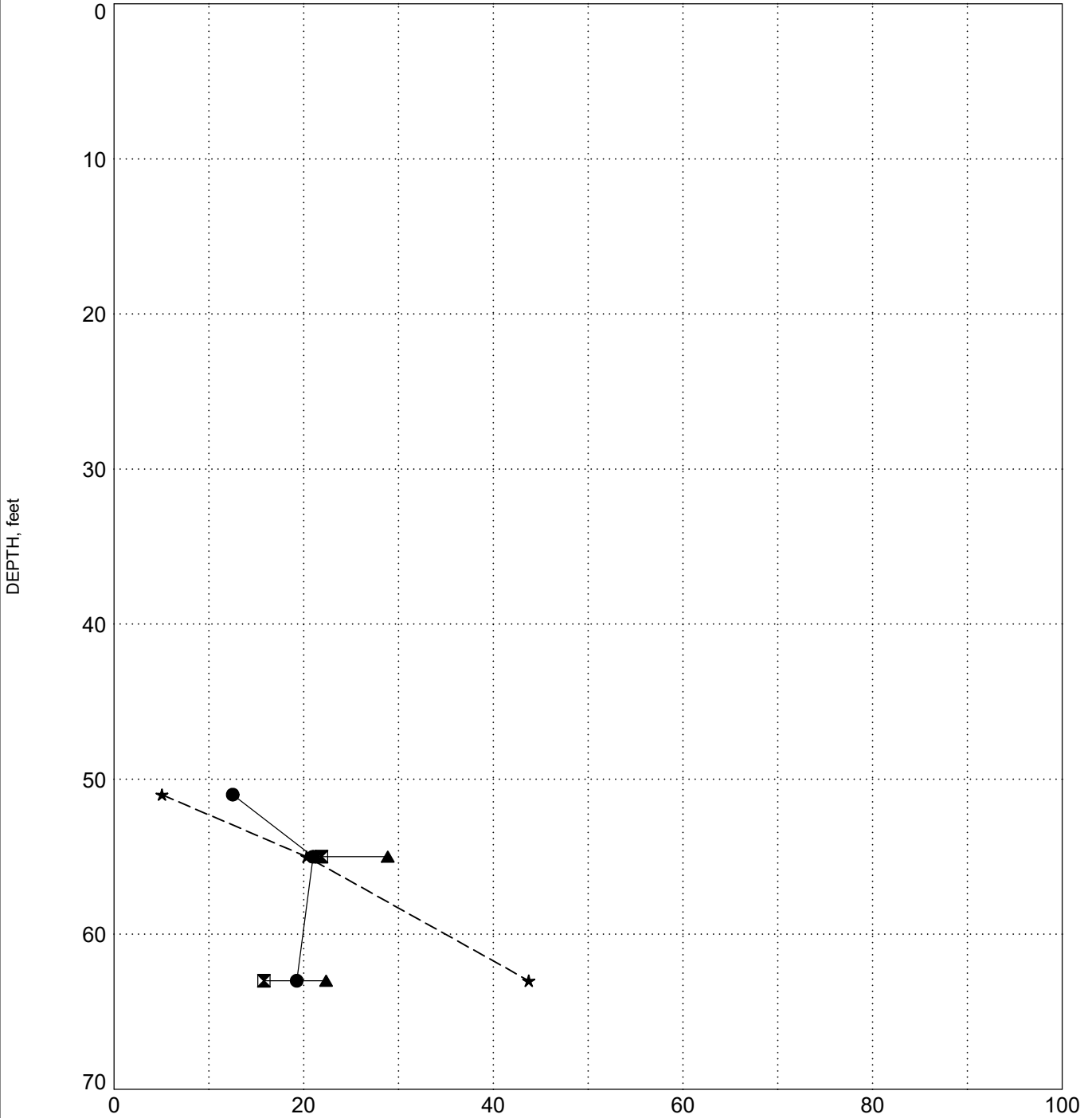
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-6

SURFACE ELEVATION: 163.1



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

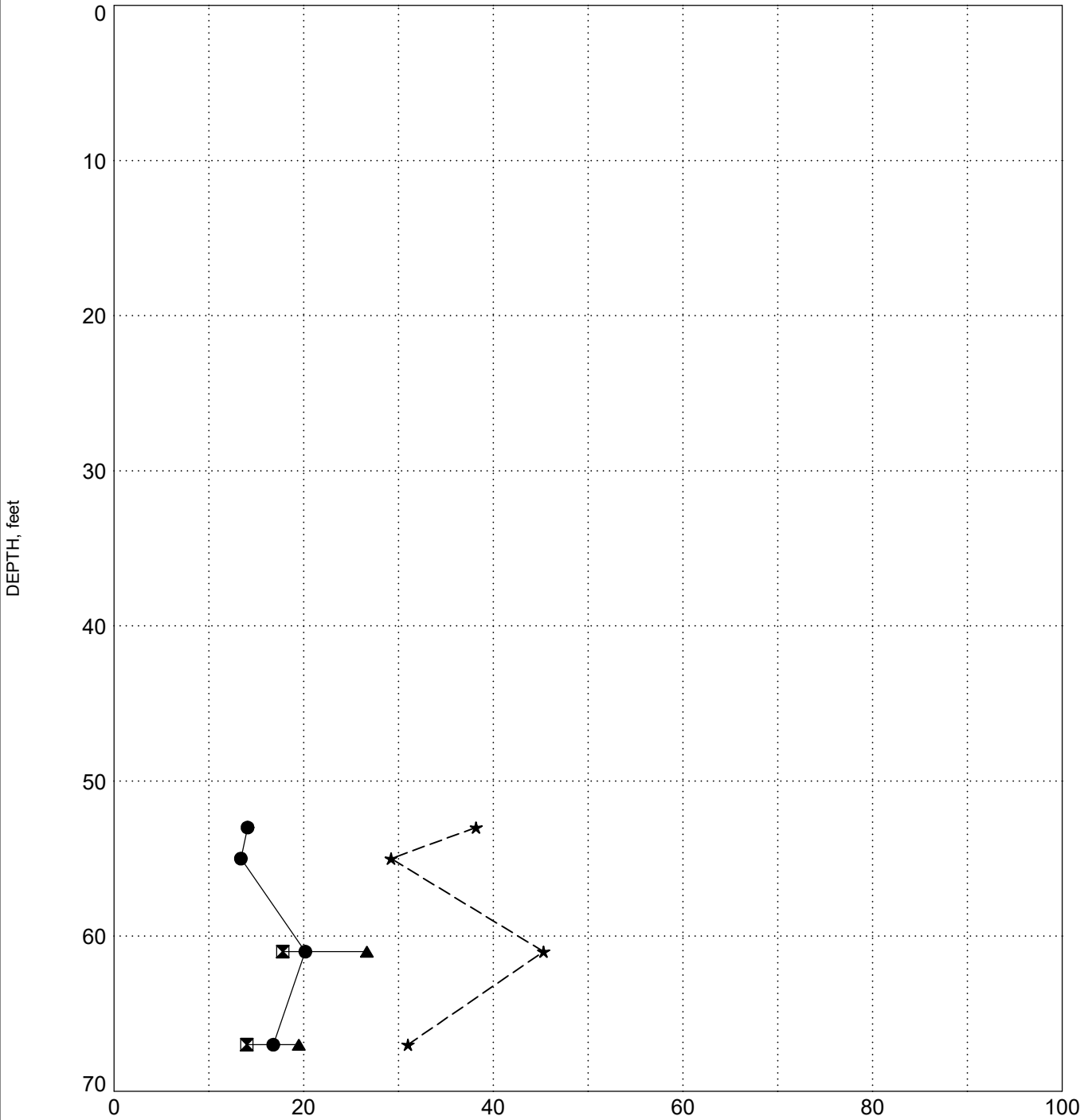
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-7

SURFACE ELEVATION: 163.1



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

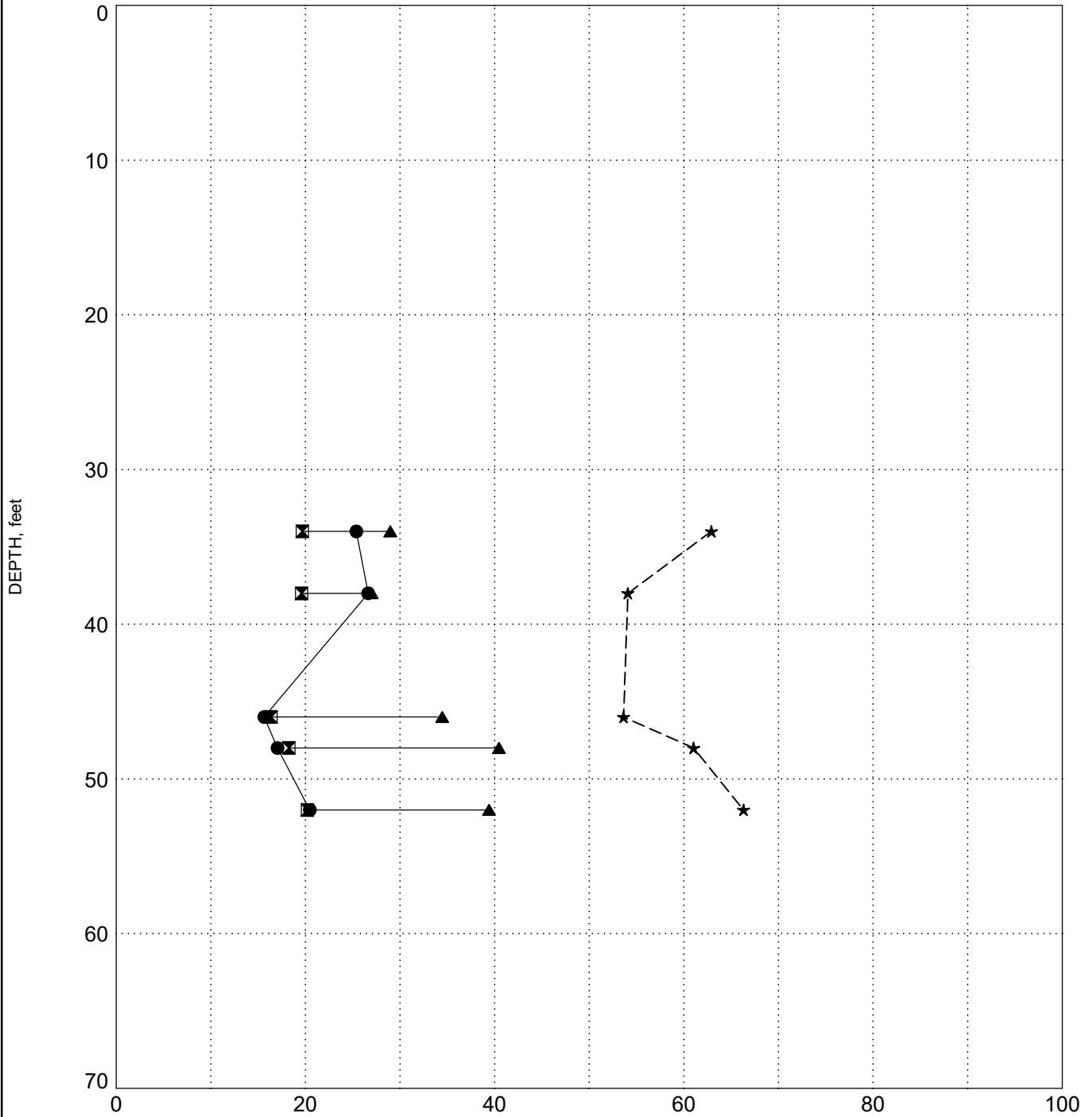
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 162.9

## BORING B-8



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22





# INDEX PROPERTIES VERSUS DEPTH

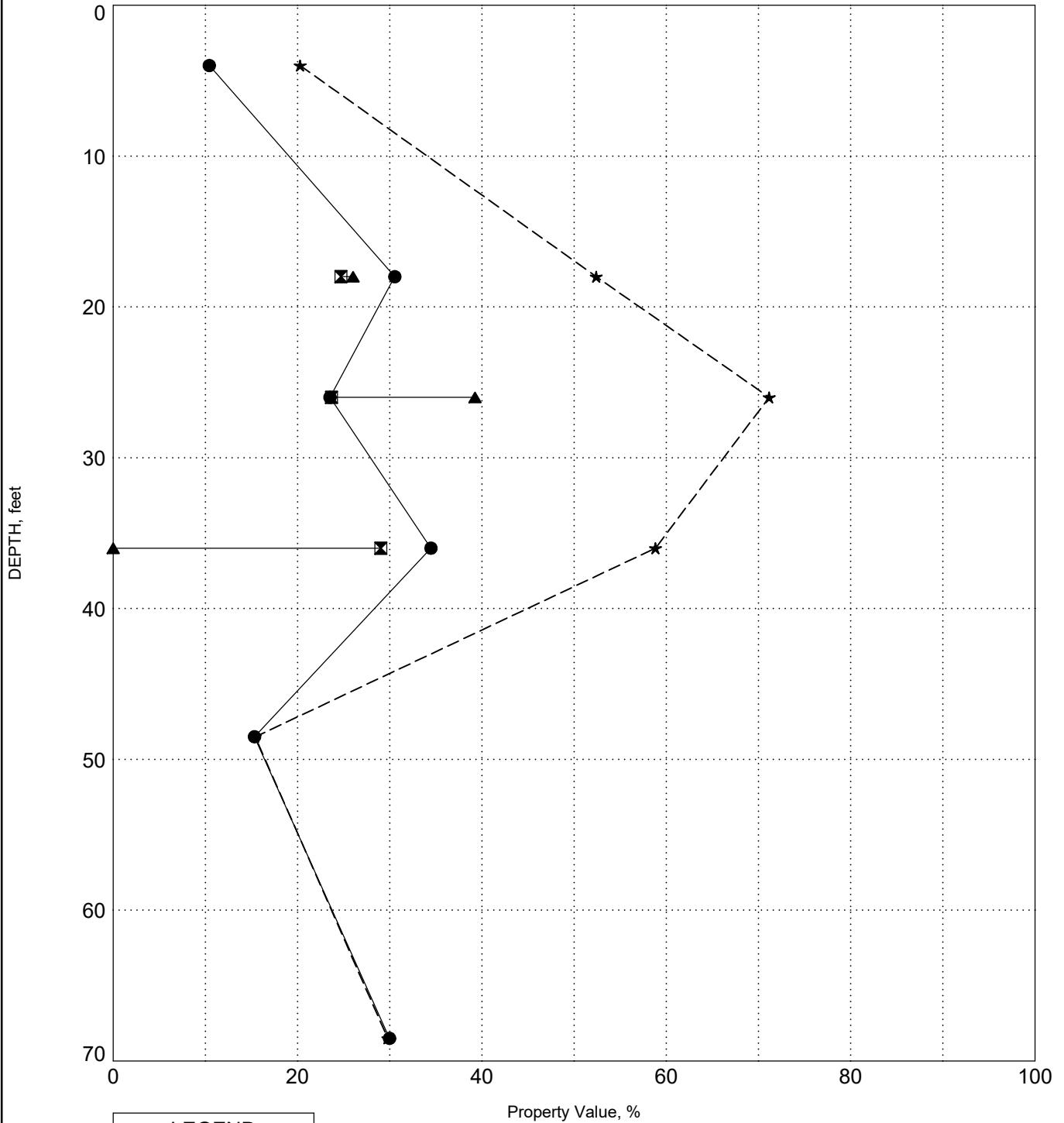
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 161.7

## BORING B-9



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

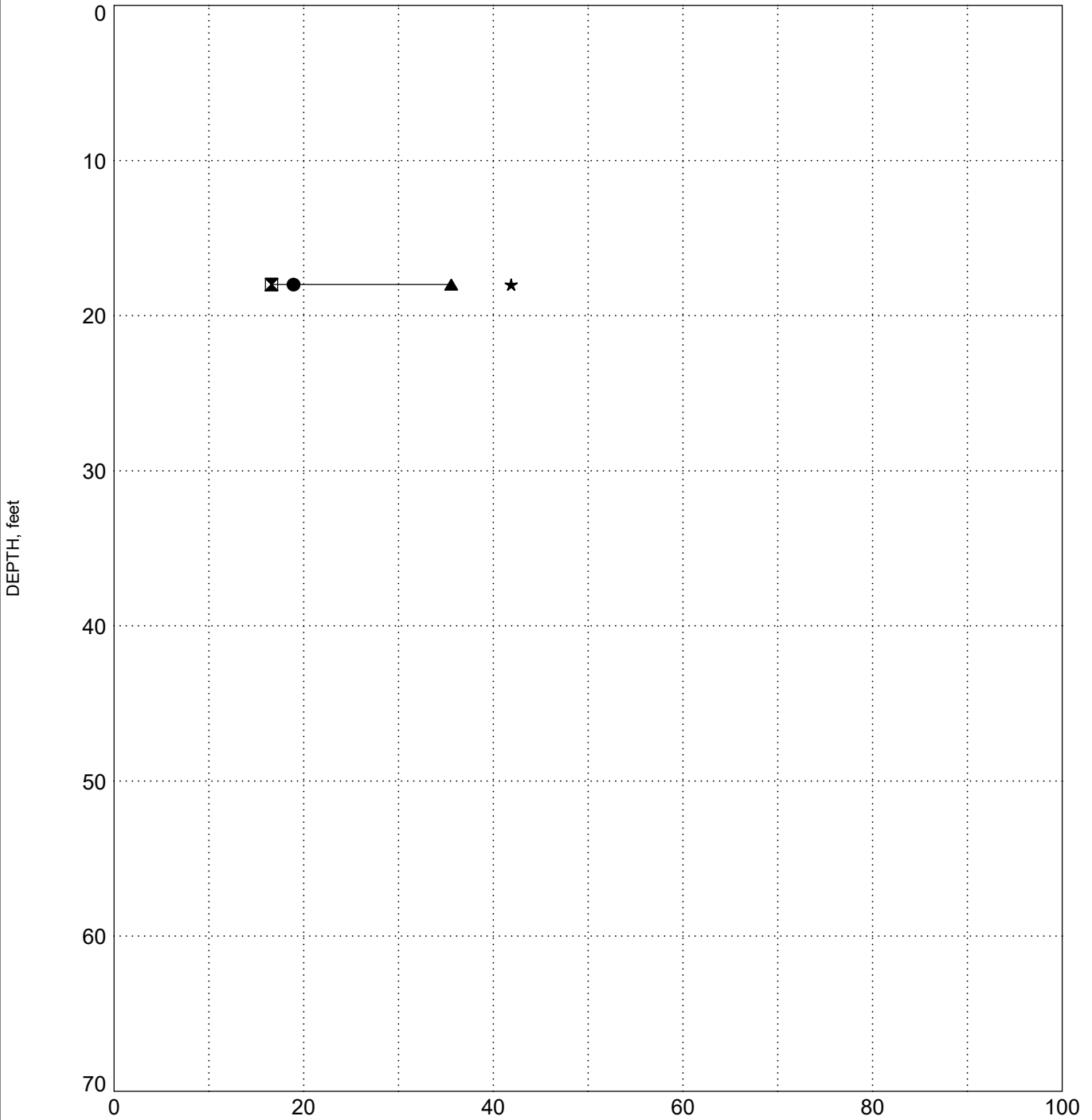
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 161.2

## BORING B-9B



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

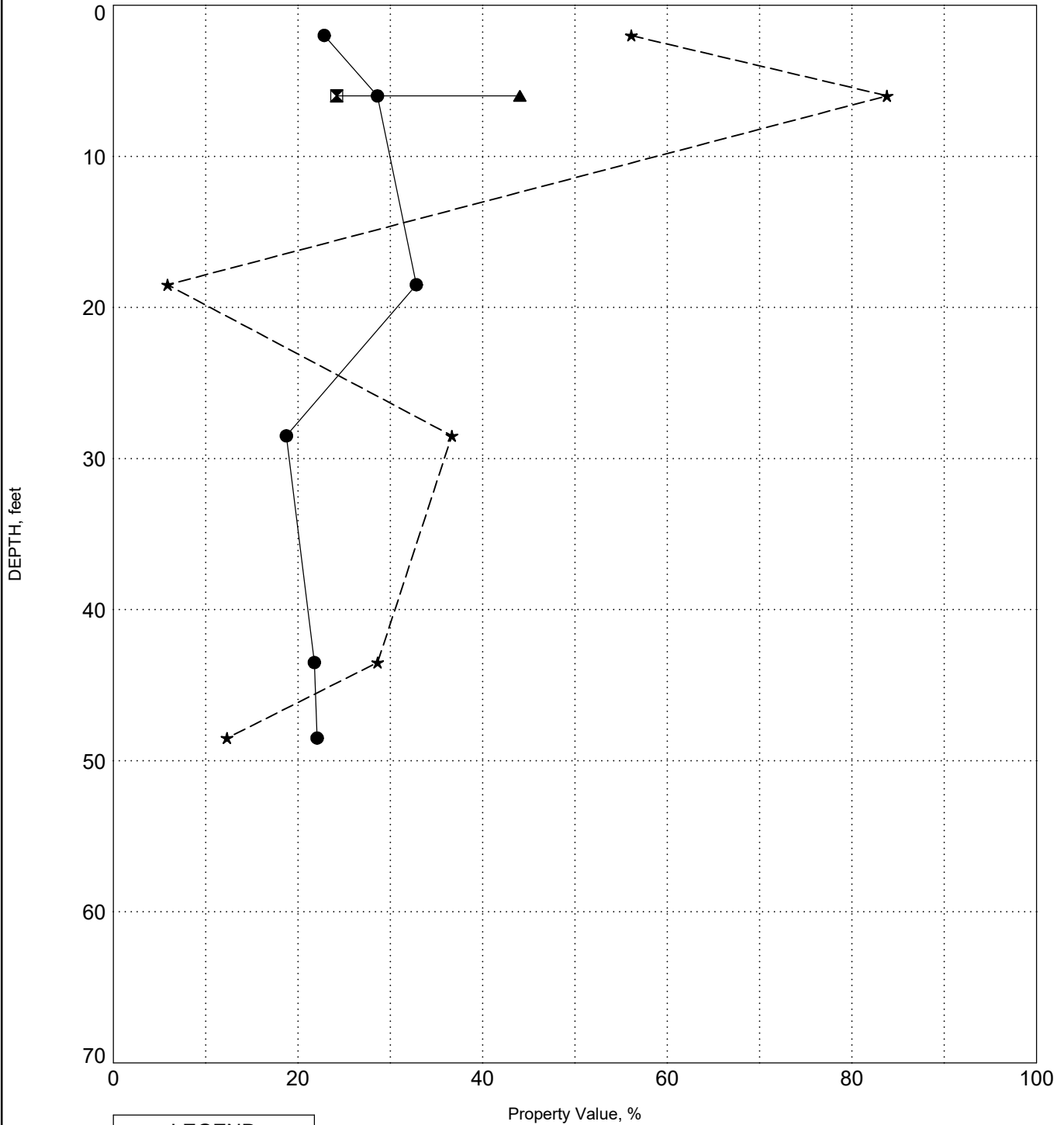
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 138.6

## BORING B-10



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

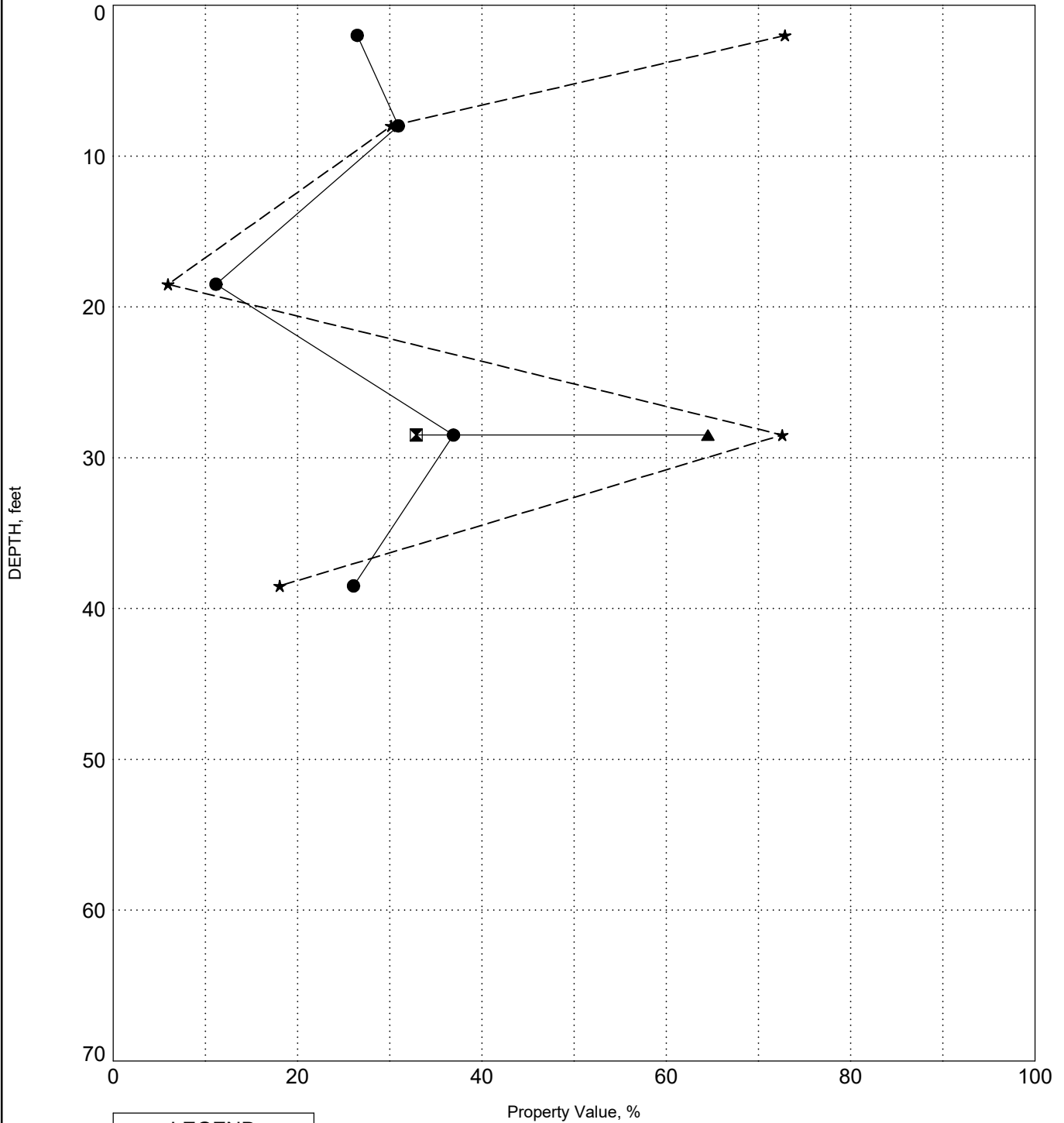
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 133.8

## BORING B-11



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

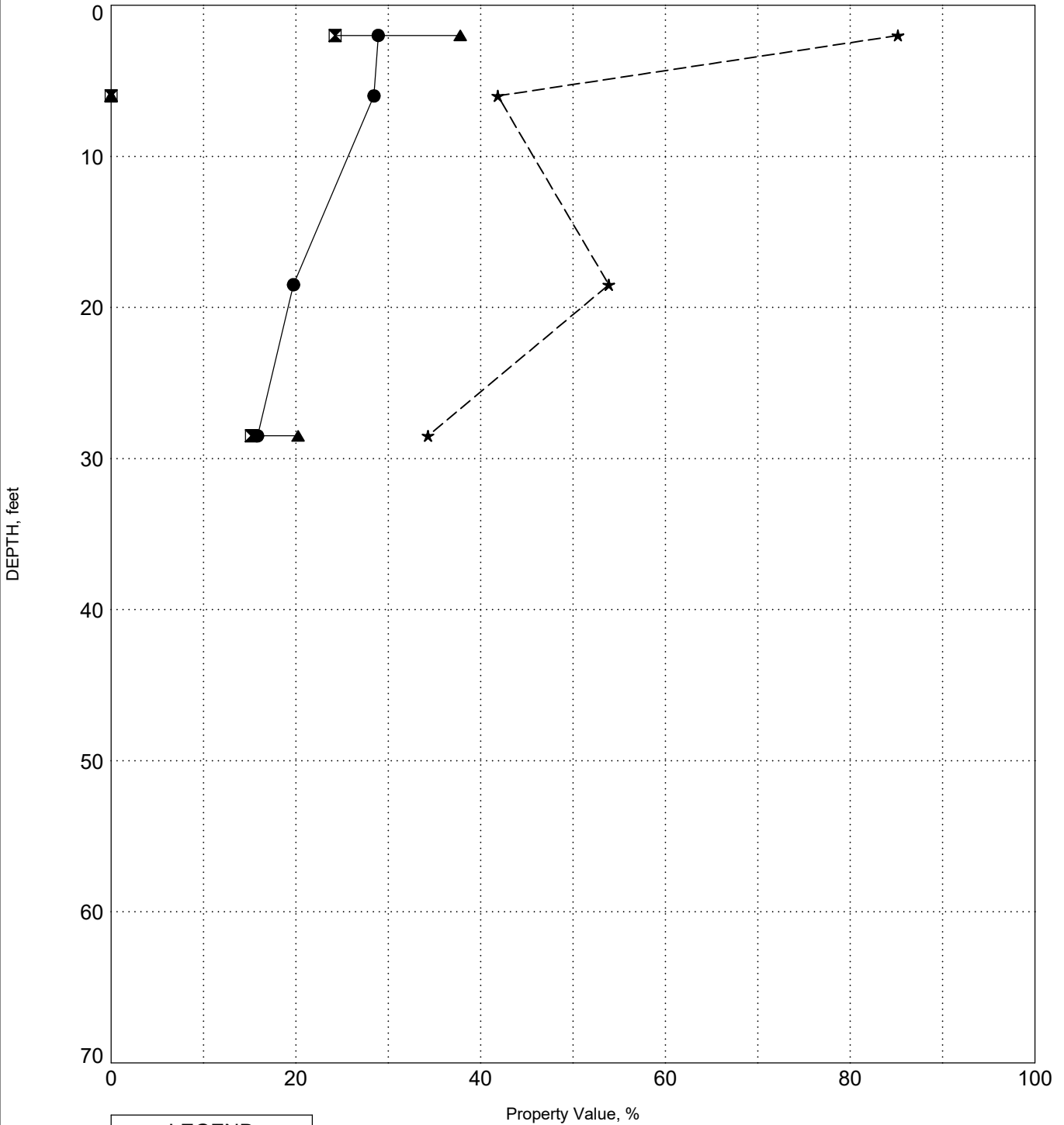
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 131.6

## BORING B-12



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





# INDEX PROPERTIES VERSUS DEPTH

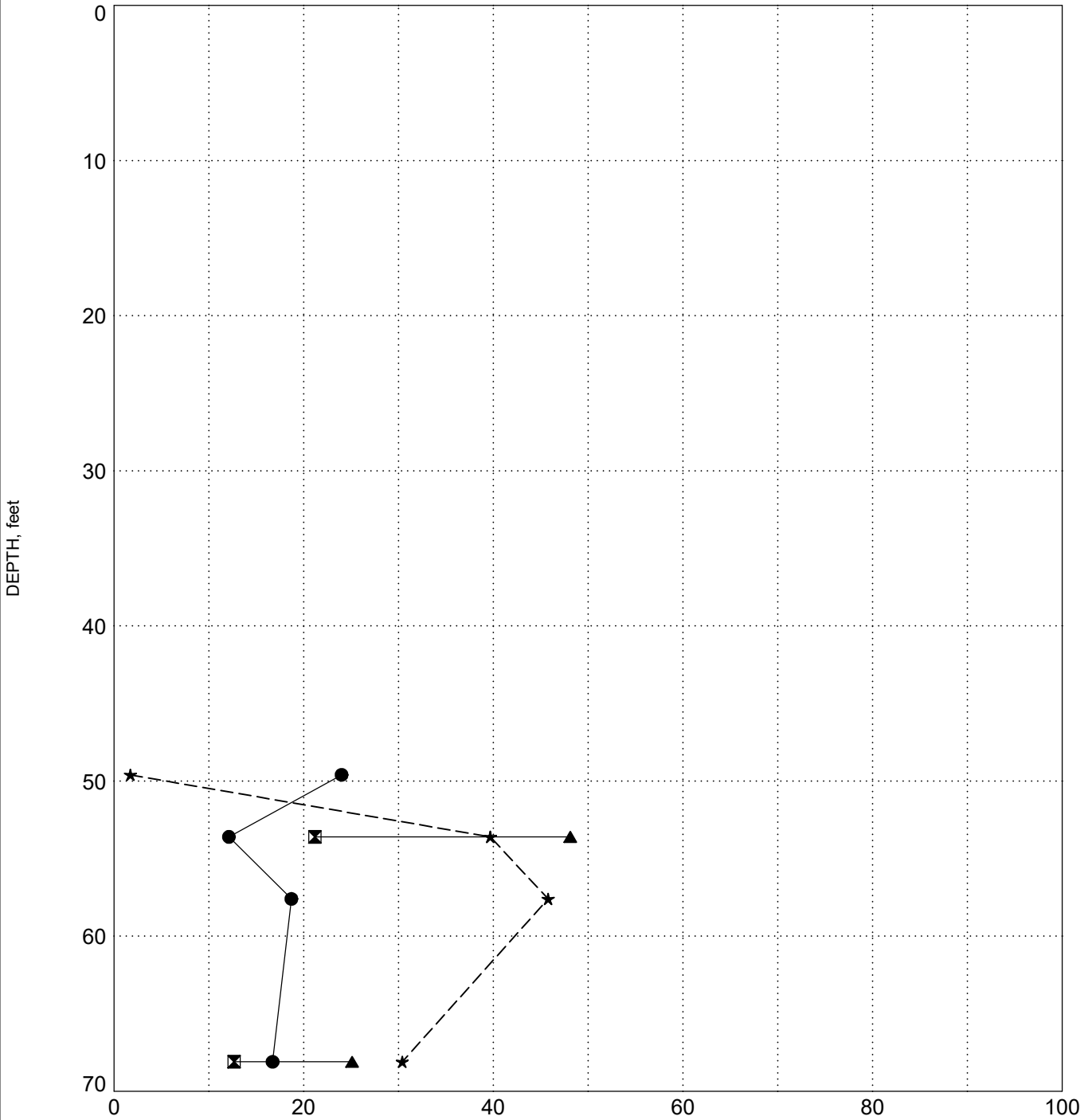
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-13

SURFACE ELEVATION: 163.1



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

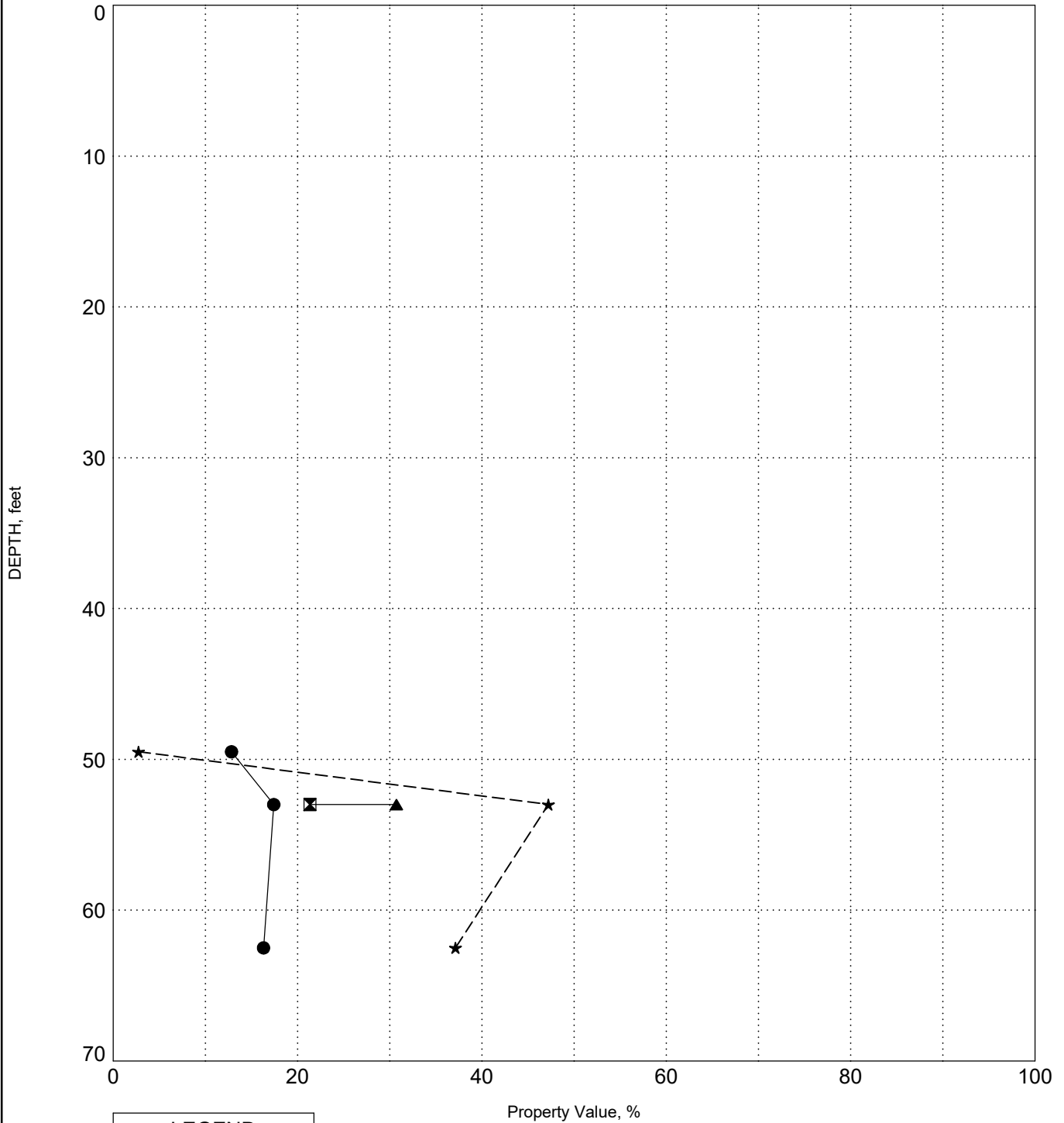
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-14

SURFACE ELEVATION: 163.2



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

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# INDEX PROPERTIES VERSUS DEPTH

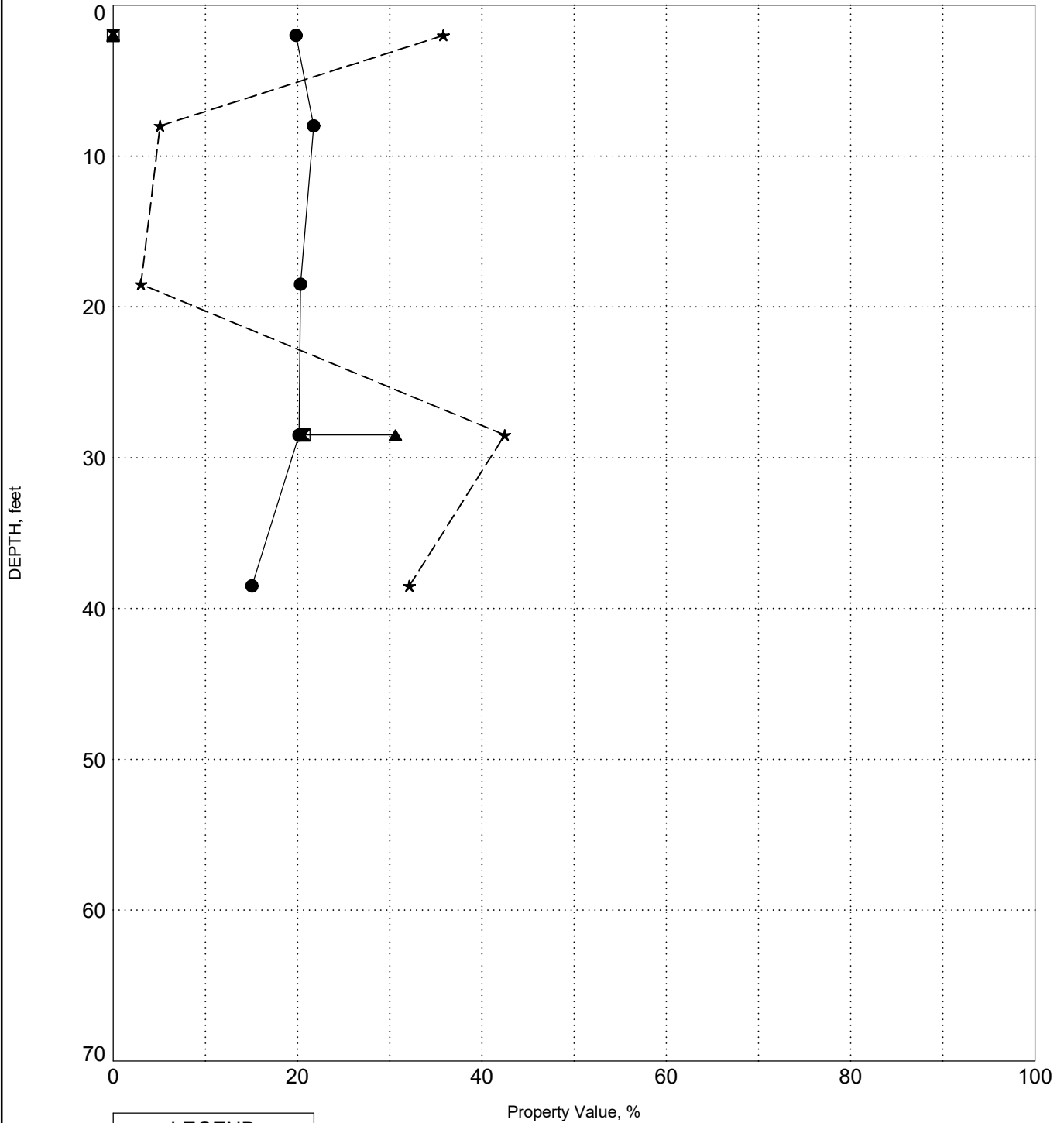
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 135.3

## BORING B-15



INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22

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



# INDEX PROPERTIES VERSUS DEPTH

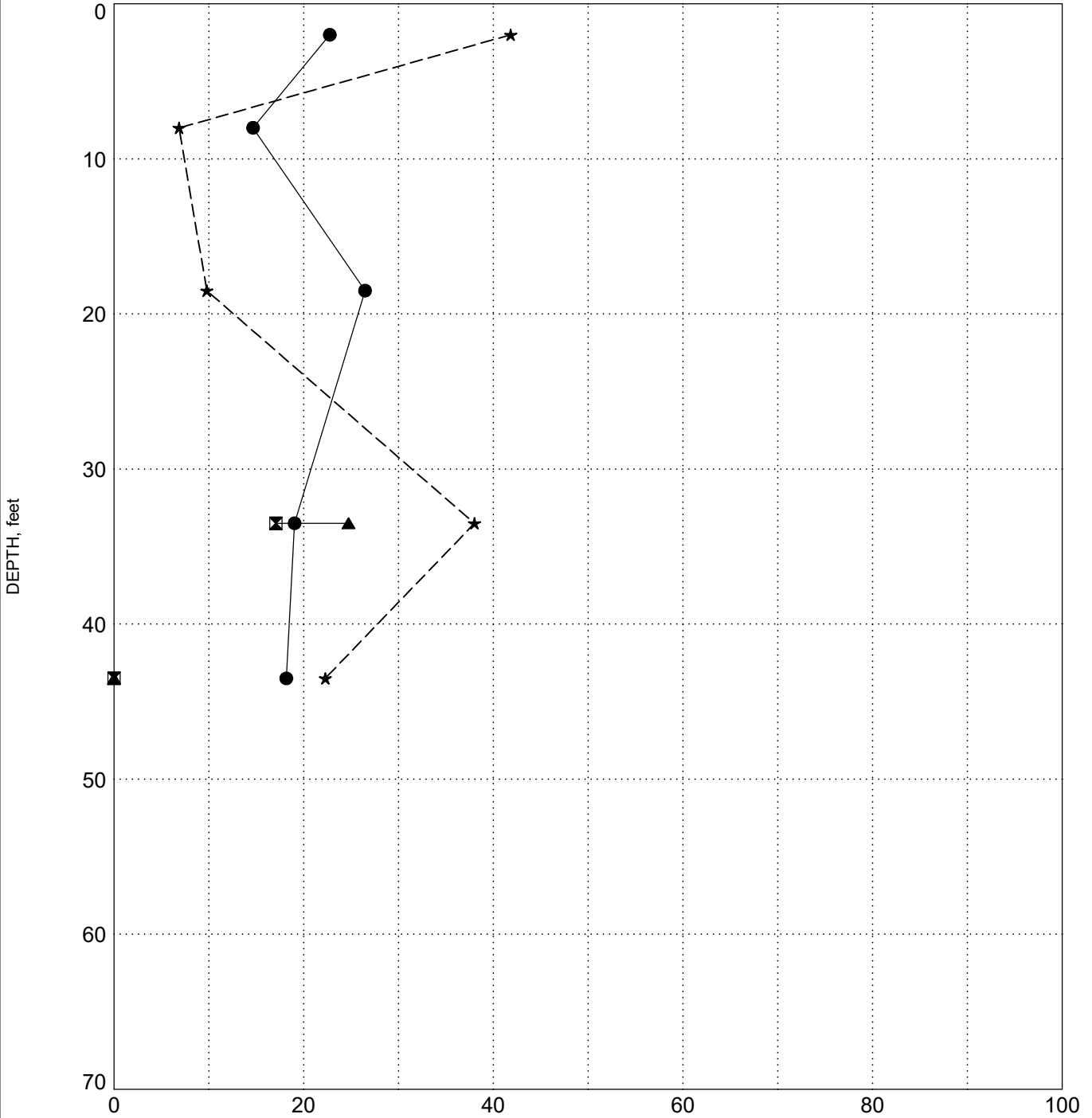
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING B-16

SURFACE ELEVATION: 138.9



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

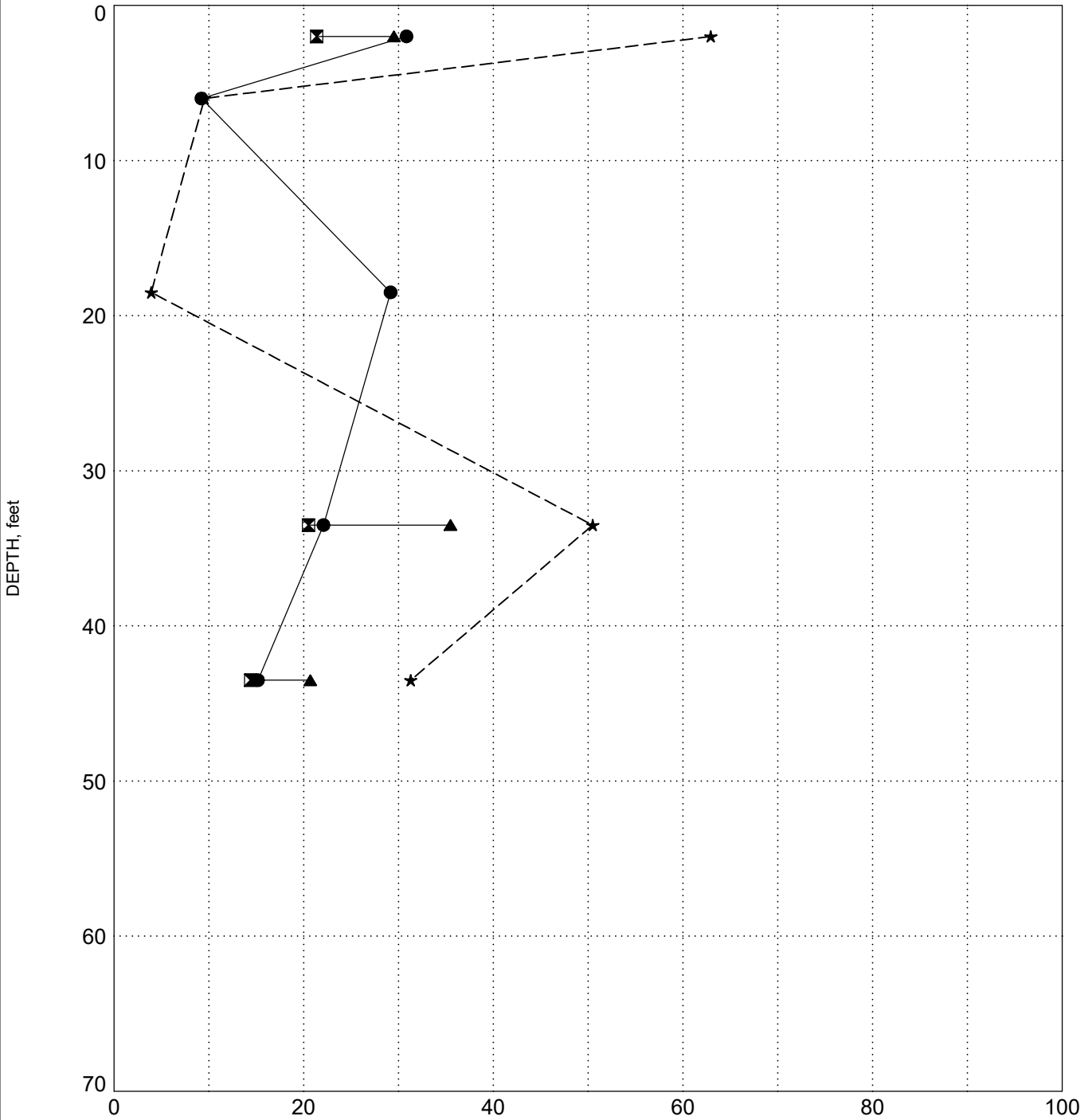
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 141.0

## BORING B-17



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22





# INDEX PROPERTIES VERSUS DEPTH

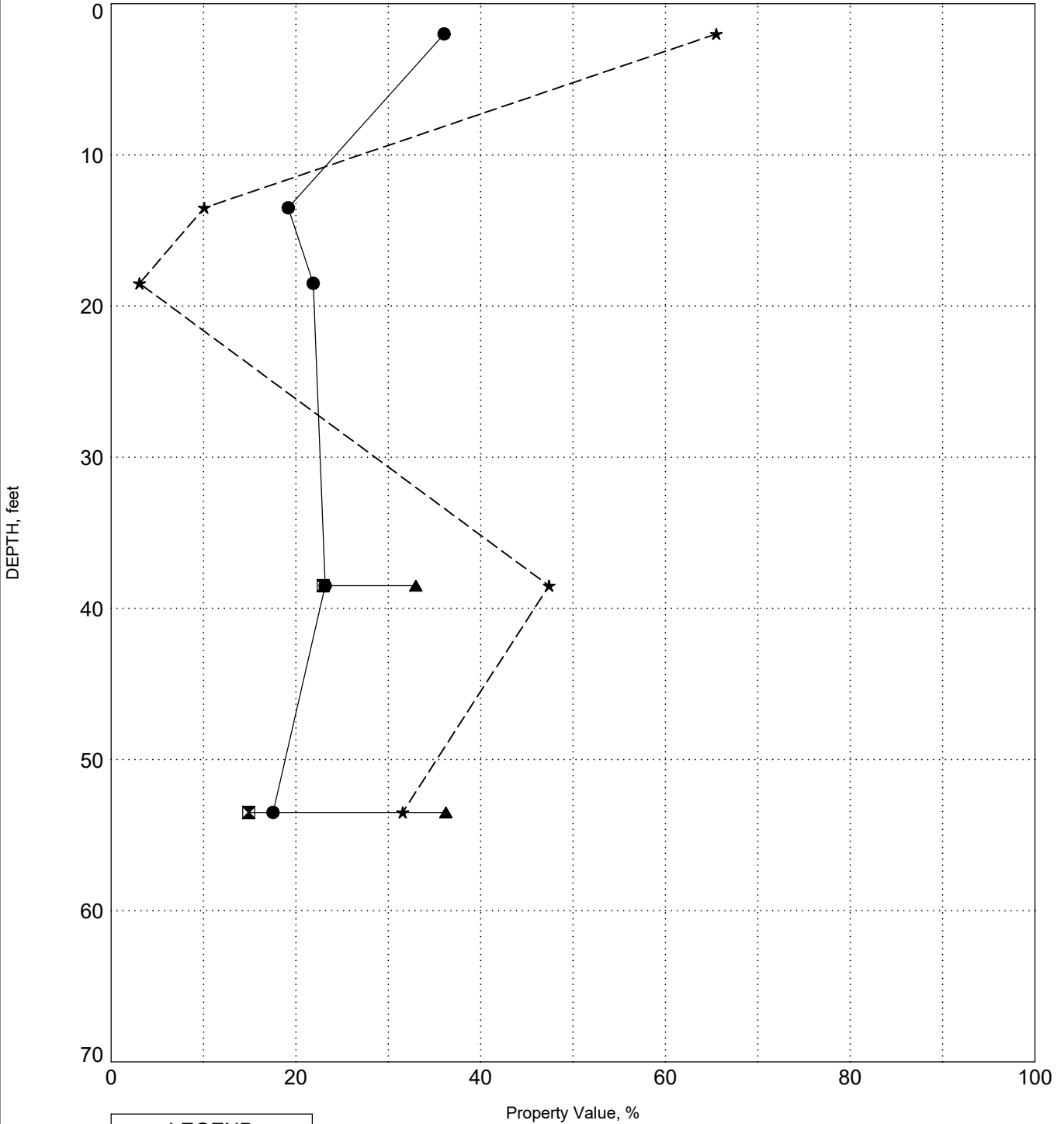
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 142.6

## BORING B-18



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

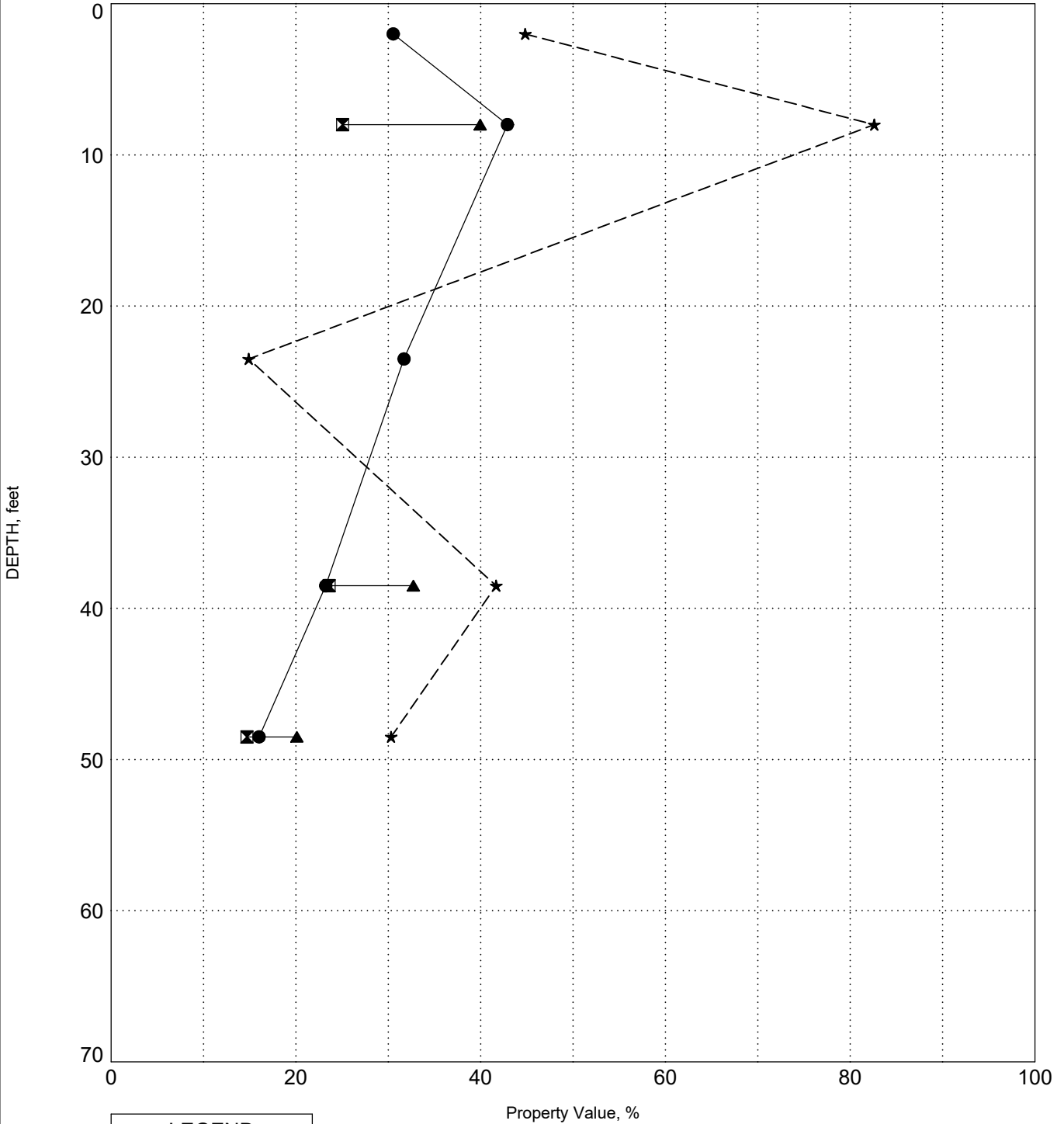
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 142.6

## BORING B-19



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

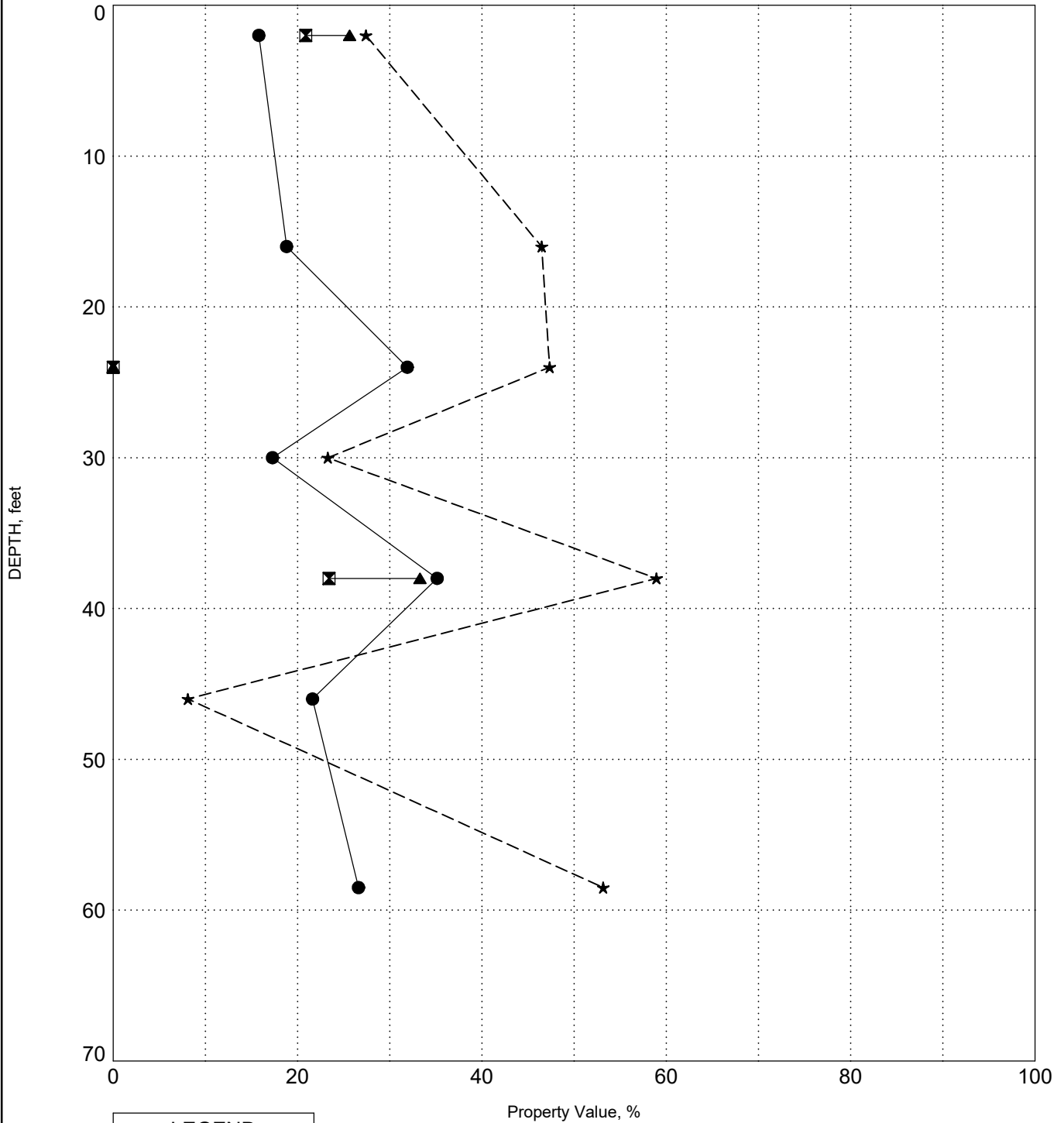
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 160.8

## BORING B-20



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

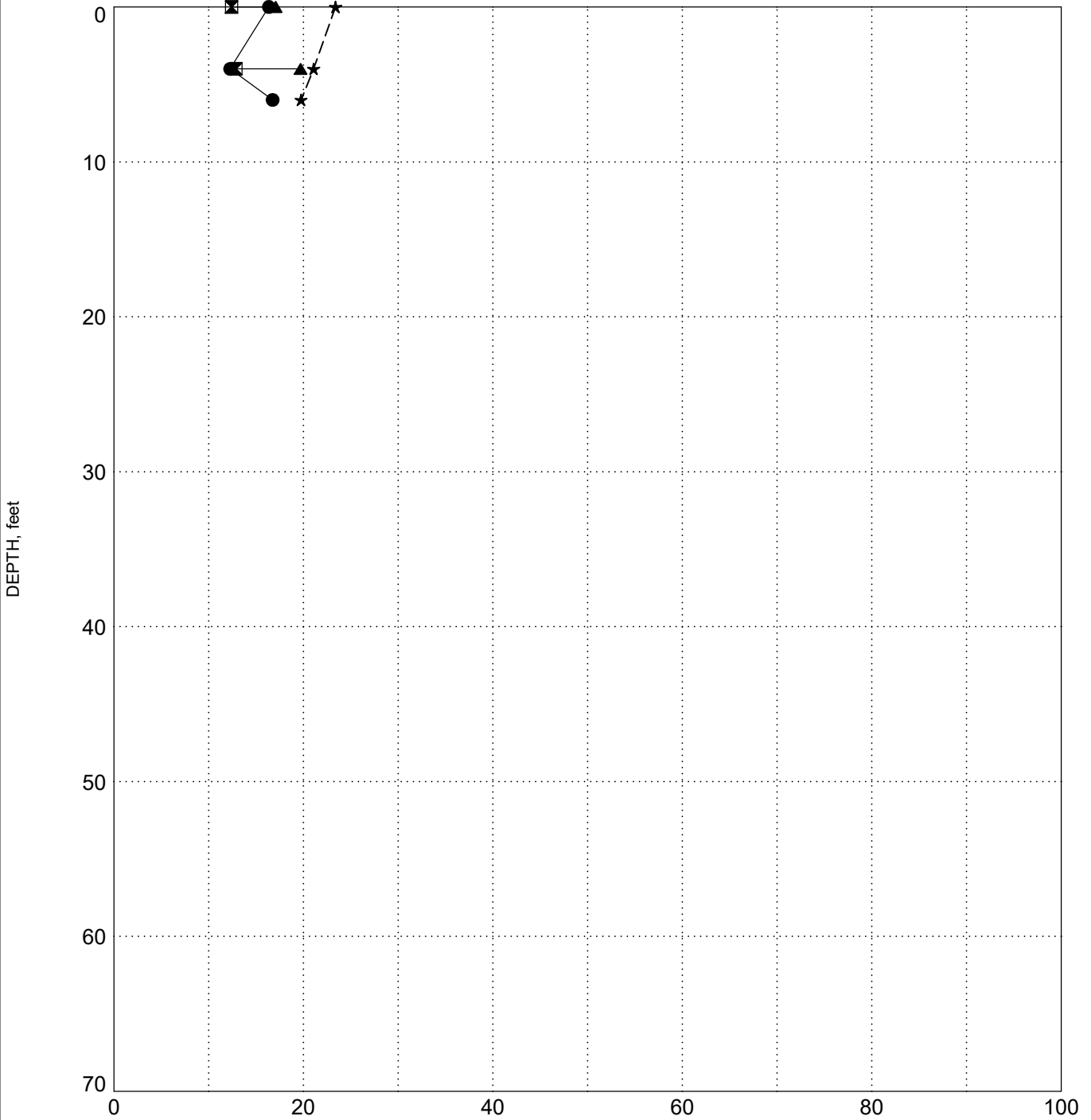
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING CO-1

SURFACE ELEVATION: 159.5



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

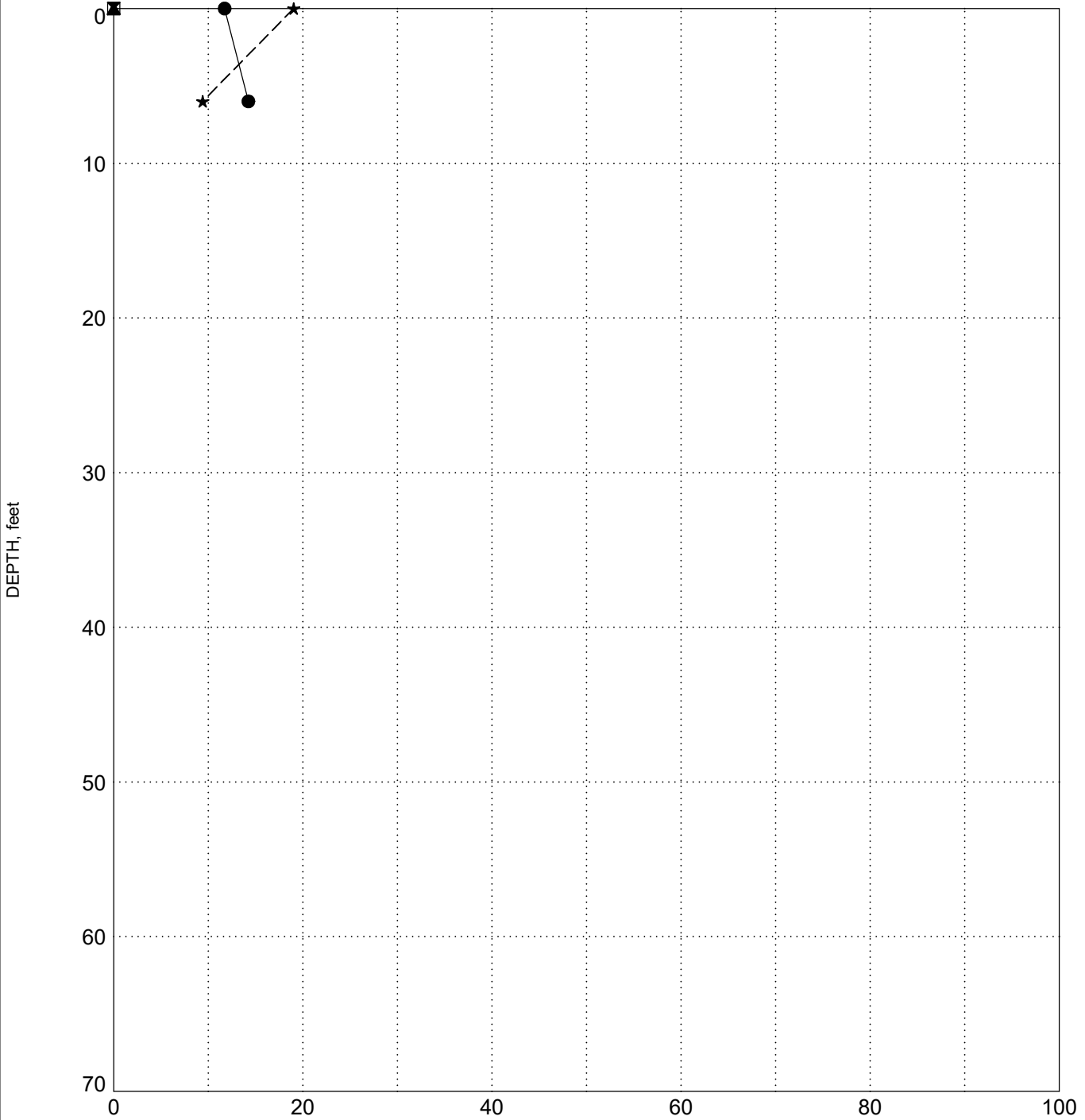
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING CO-2

SURFACE ELEVATION: 159.7



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

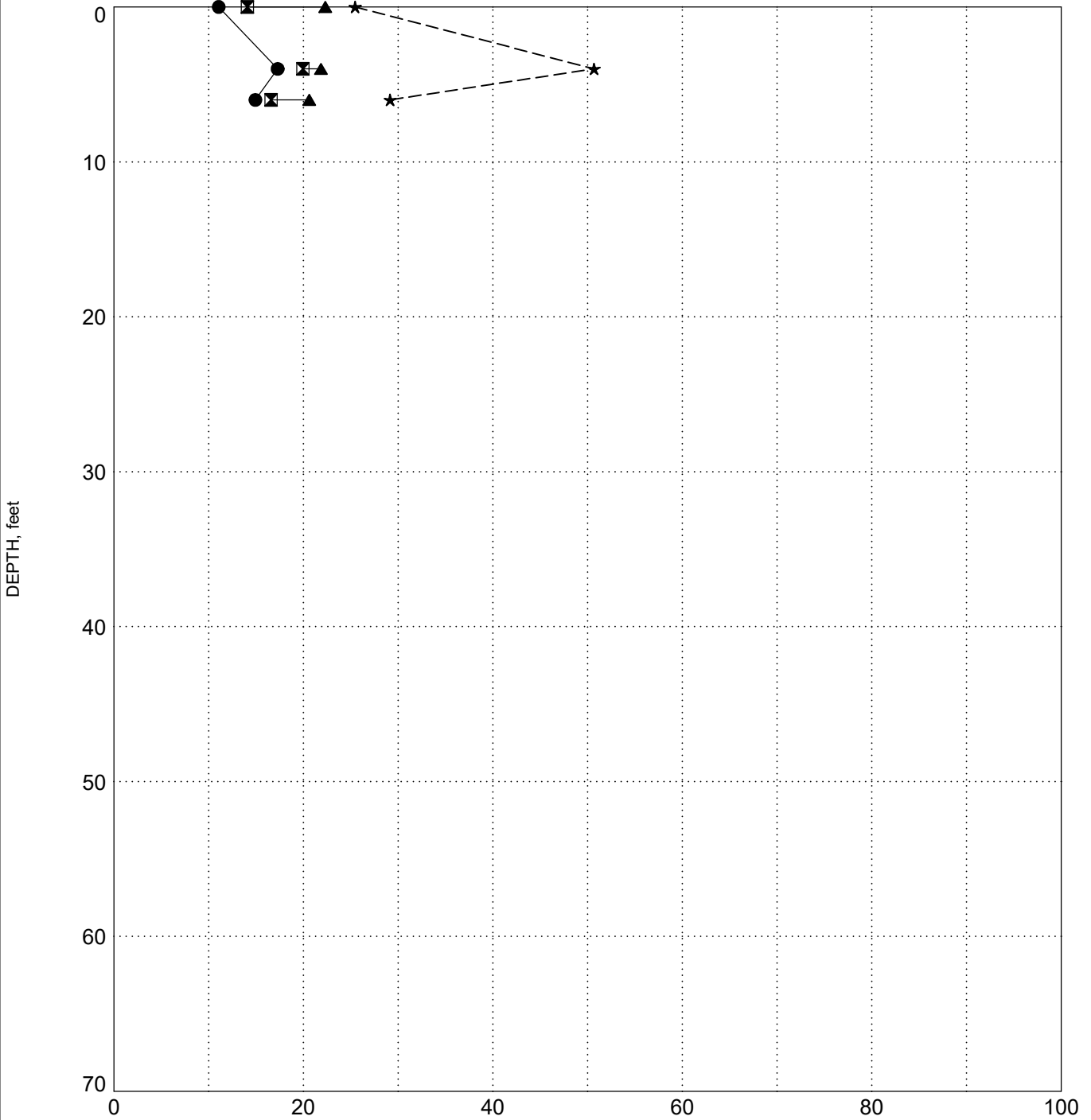
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 160.1

## BORING CO-3



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22





# INDEX PROPERTIES VERSUS DEPTH

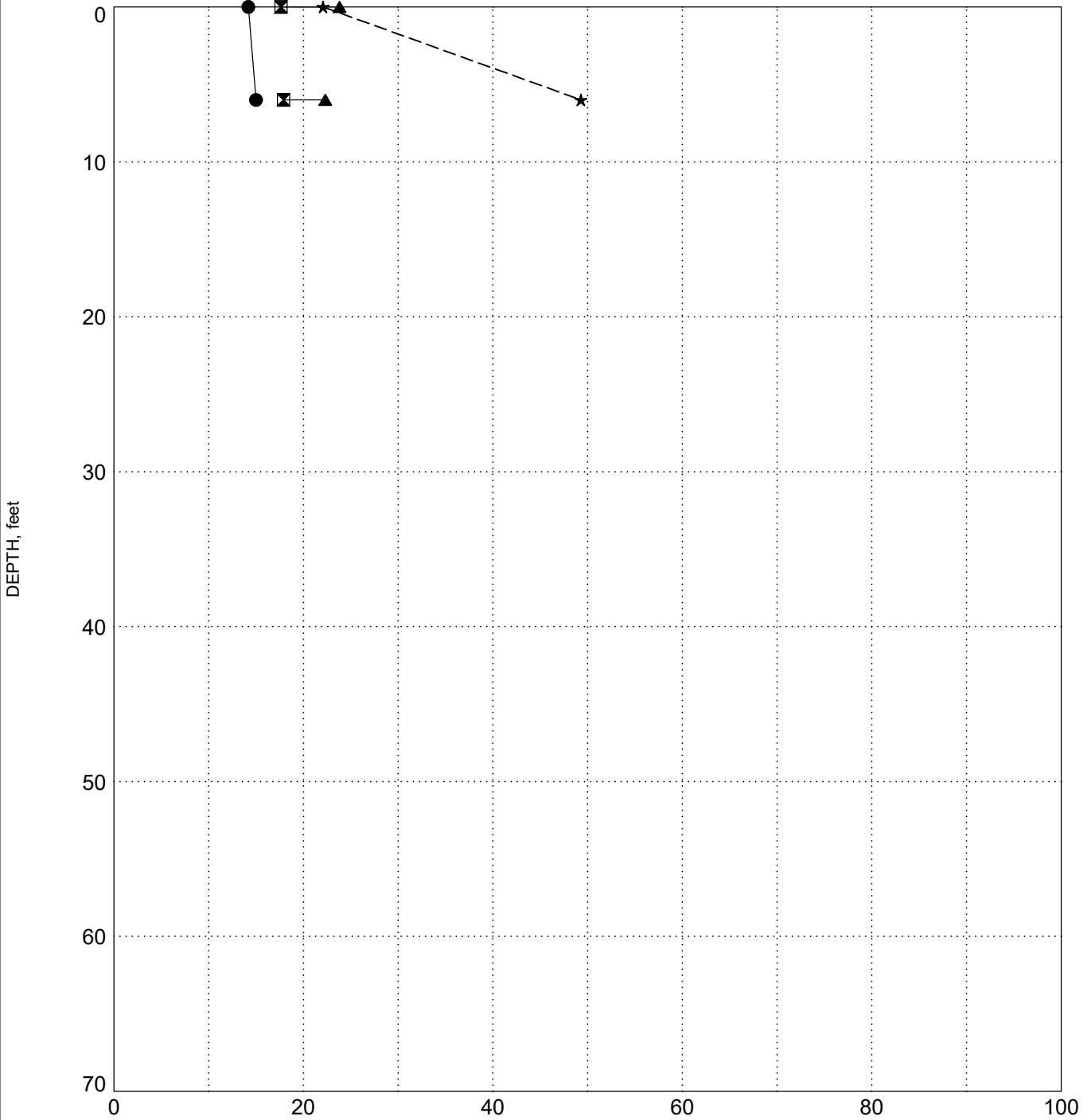
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 159.3

## BORING CO-4



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

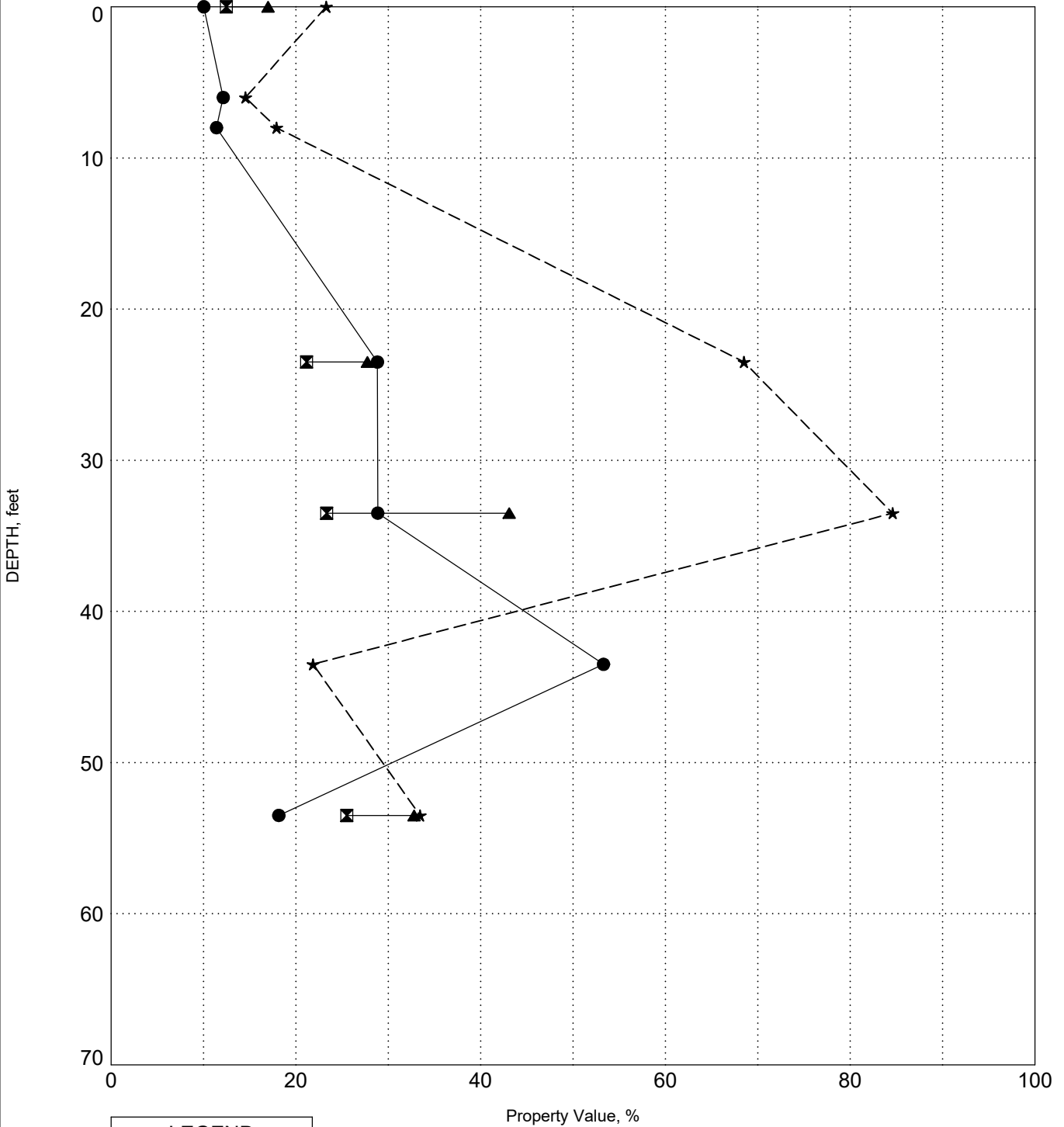
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING E-1

SURFACE ELEVATION: 159.3



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



# INDEX PROPERTIES VERSUS DEPTH

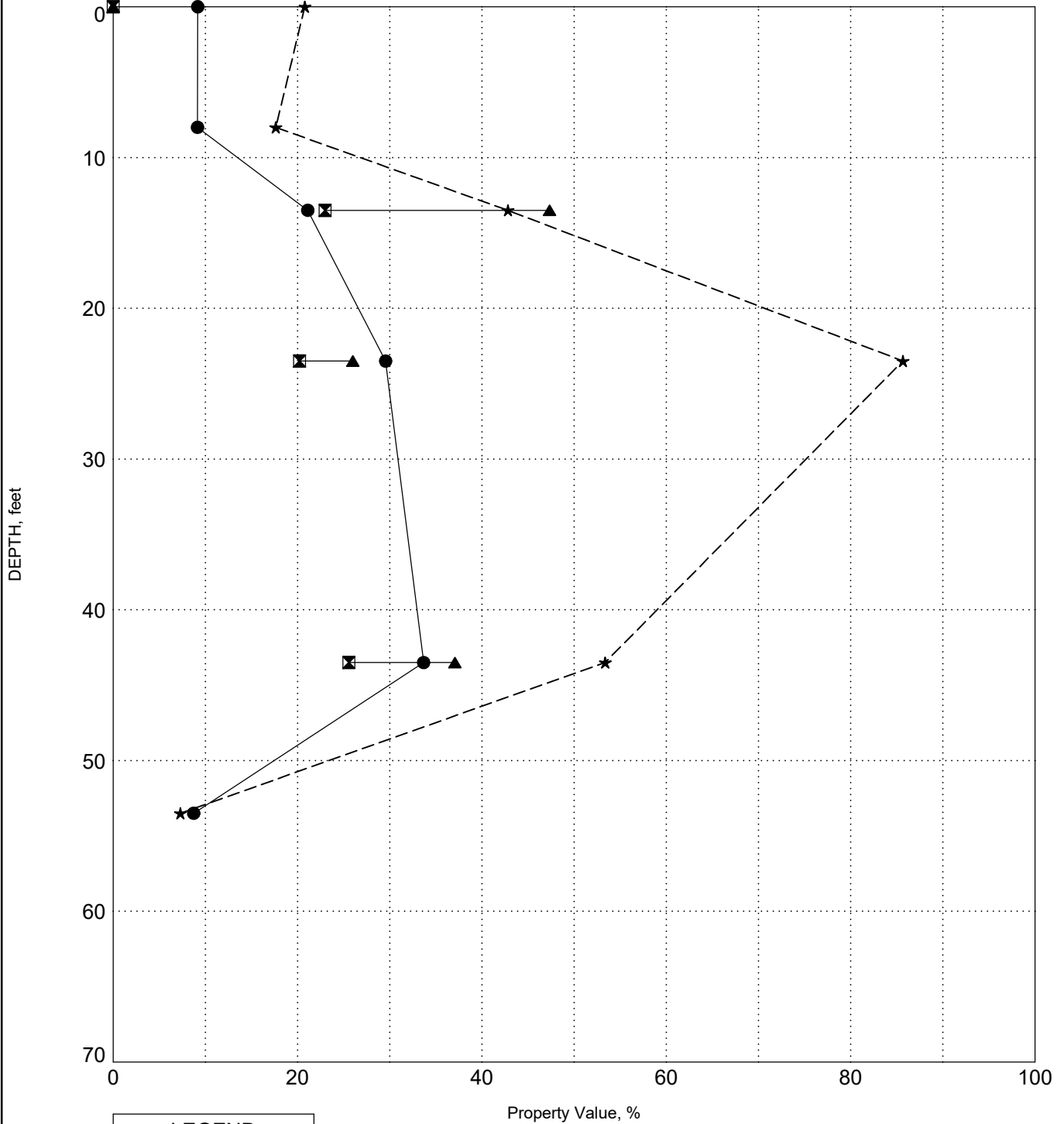
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 161.0

## BORING E-2



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

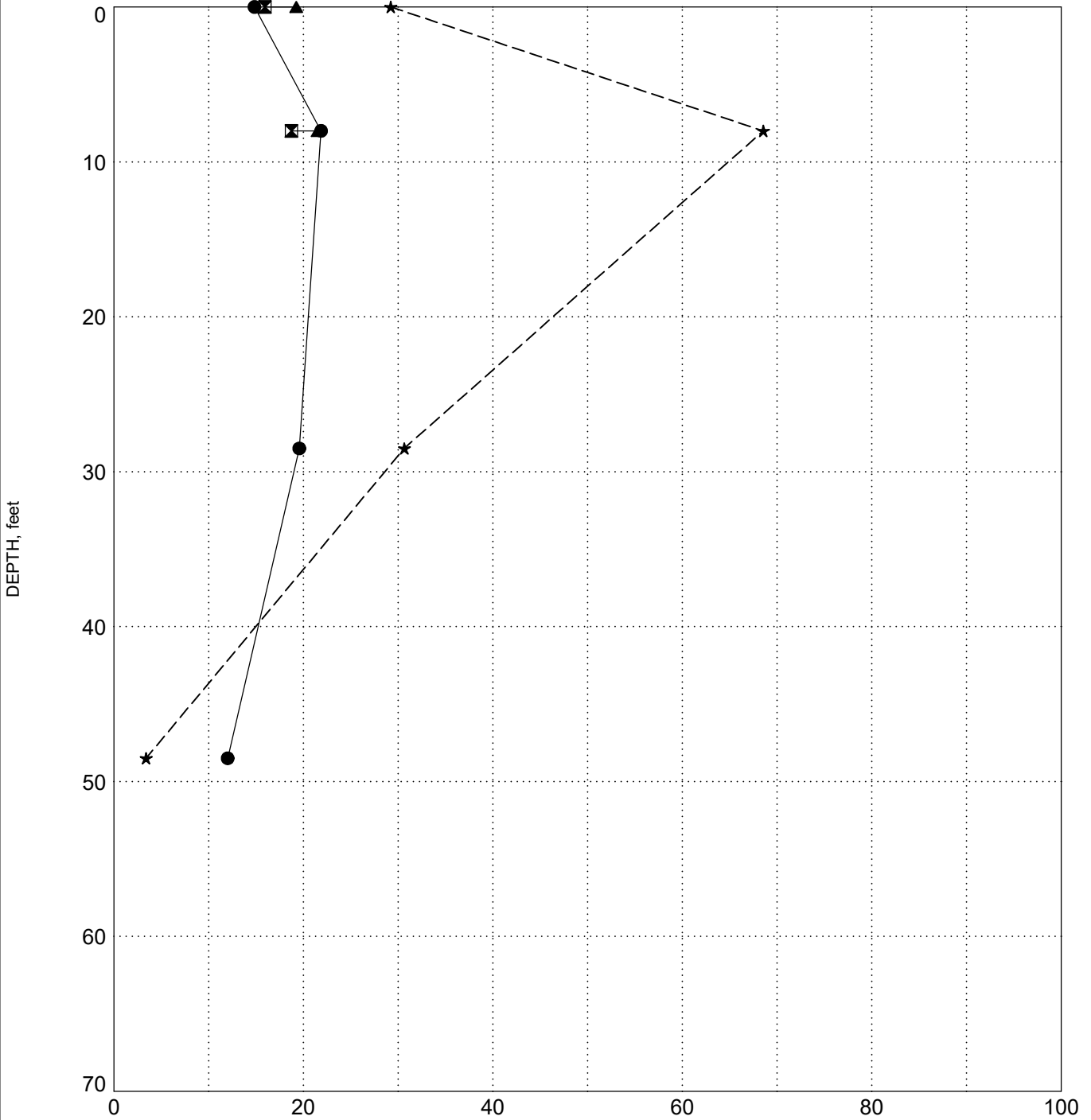
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING E-3

SURFACE ELEVATION: 160.0



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

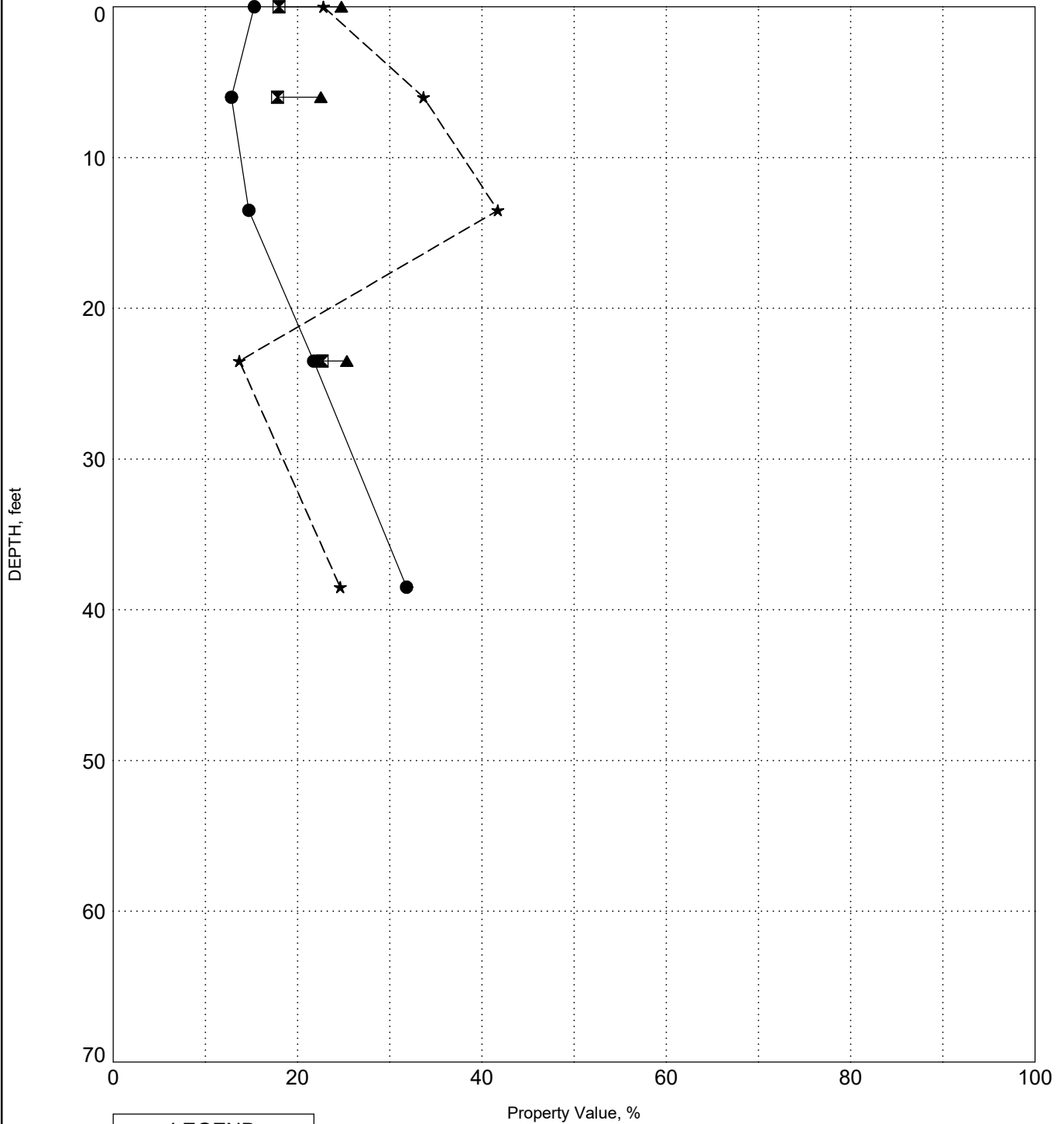
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING E-4

SURFACE ELEVATION: 159.7



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

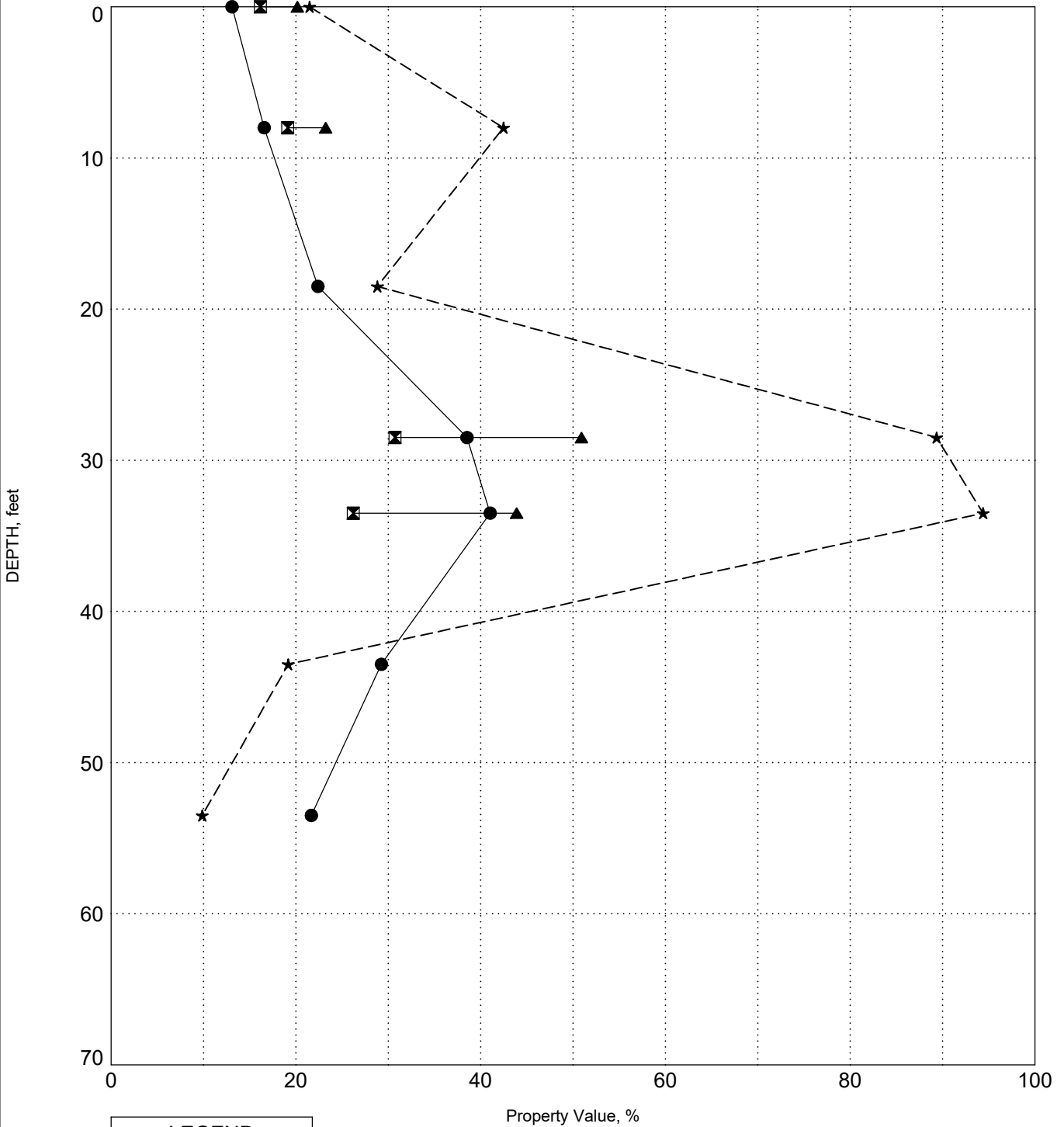
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING E-5

SURFACE ELEVATION: 159.0



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22





# INDEX PROPERTIES VERSUS DEPTH

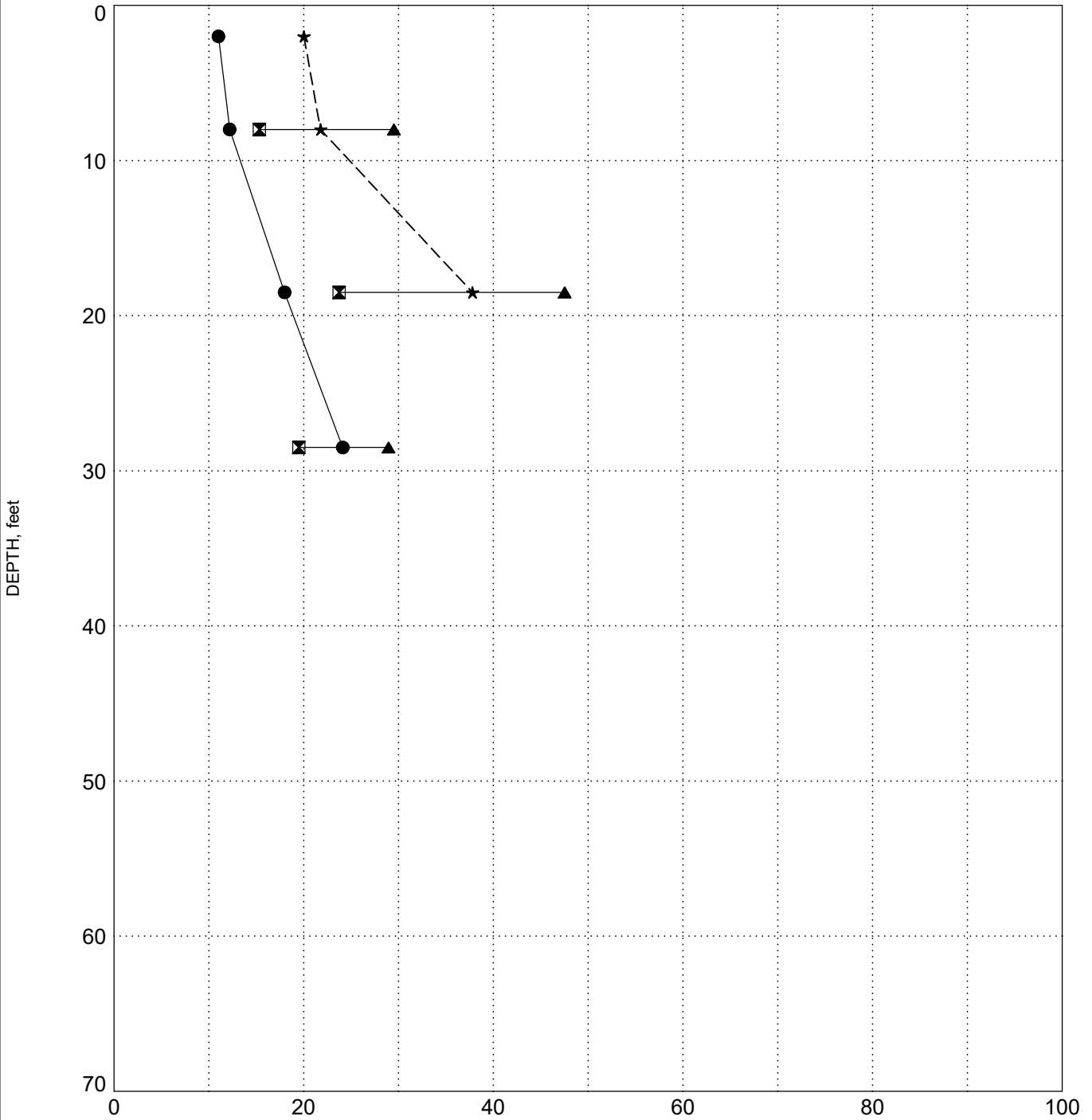
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-1

SURFACE ELEVATION: 161.5



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



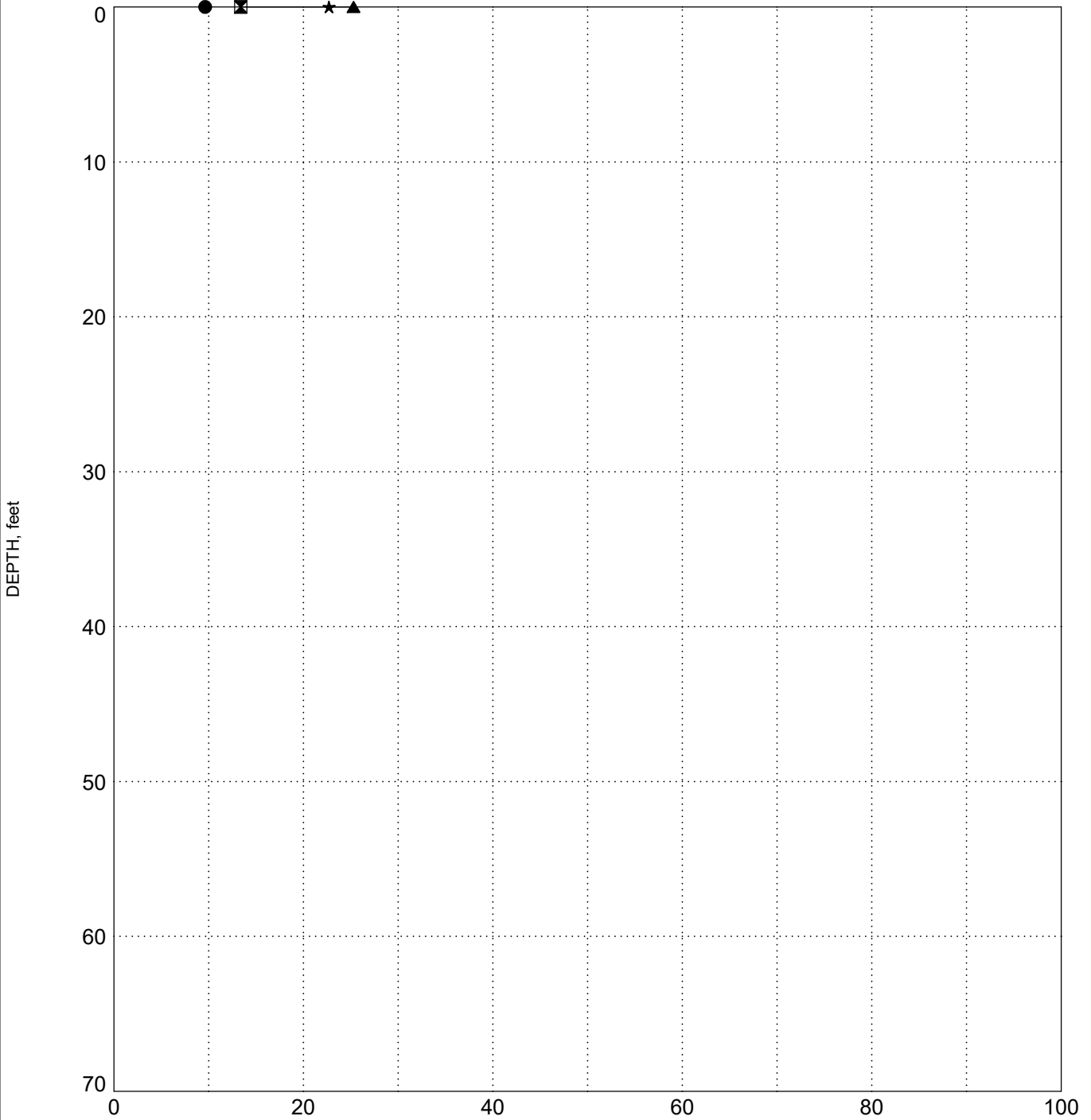
# INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-1 Bulk



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

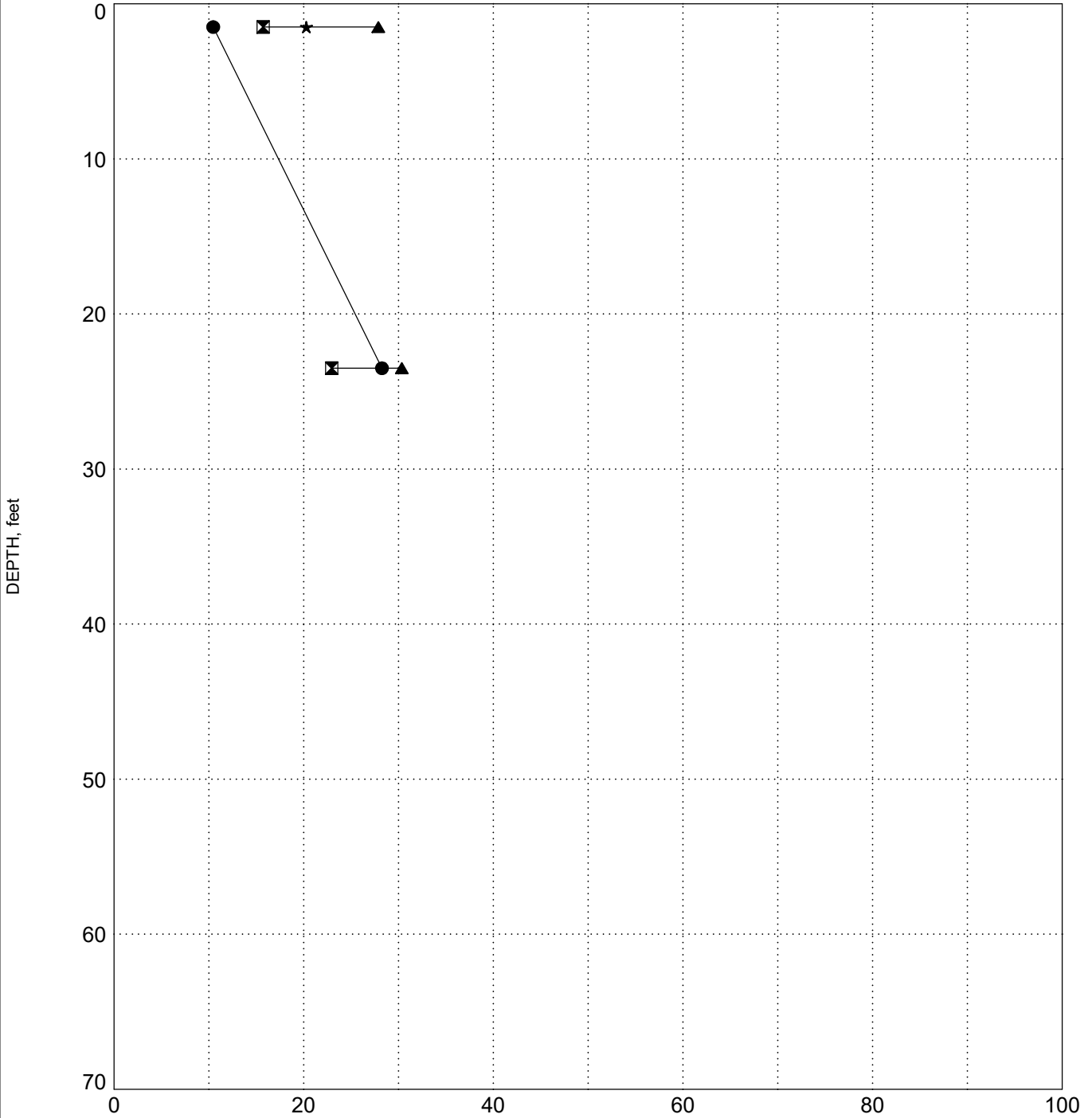
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-2

SURFACE ELEVATION: 161.5



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

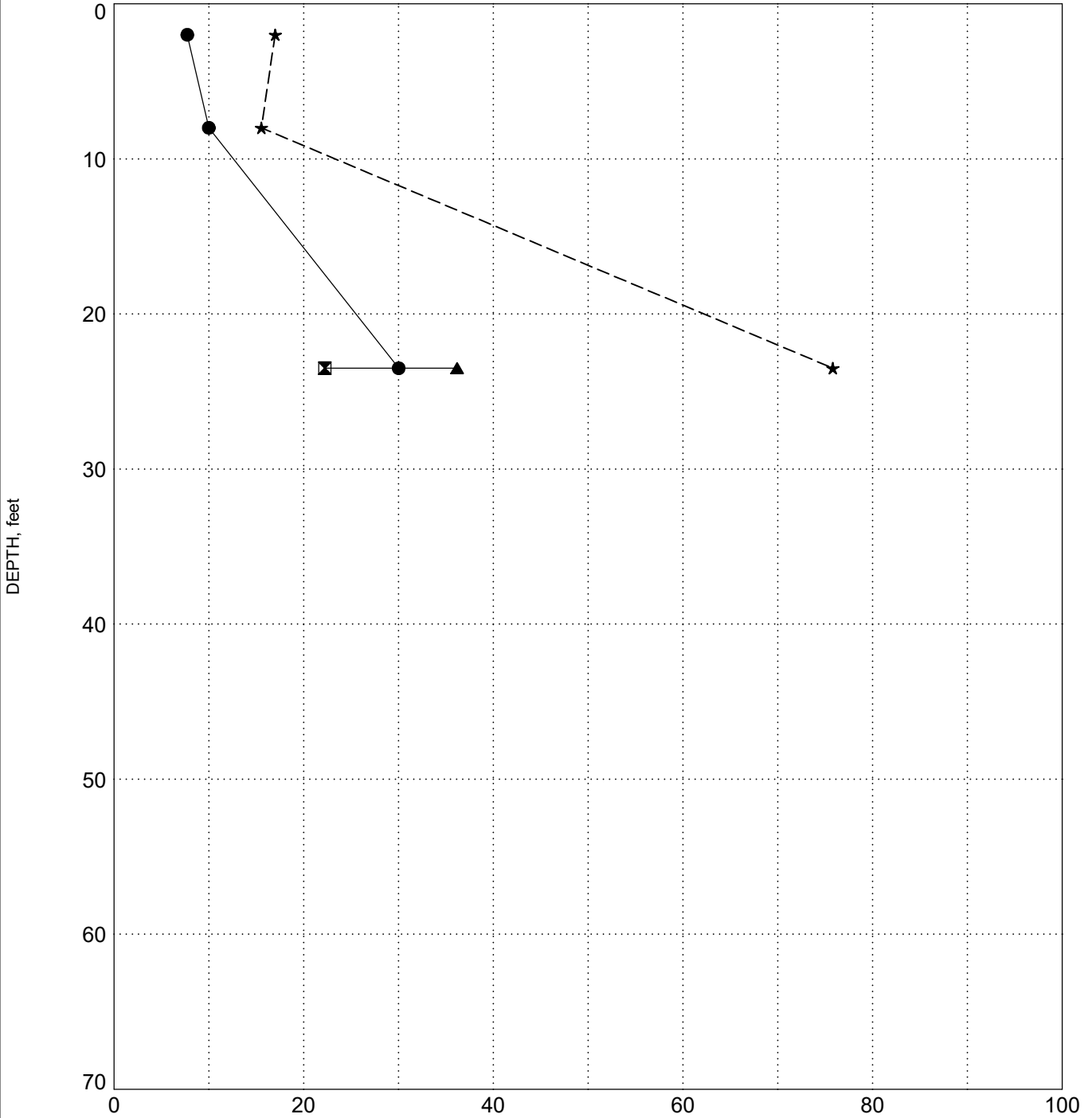
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-3

SURFACE ELEVATION: 162.2



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

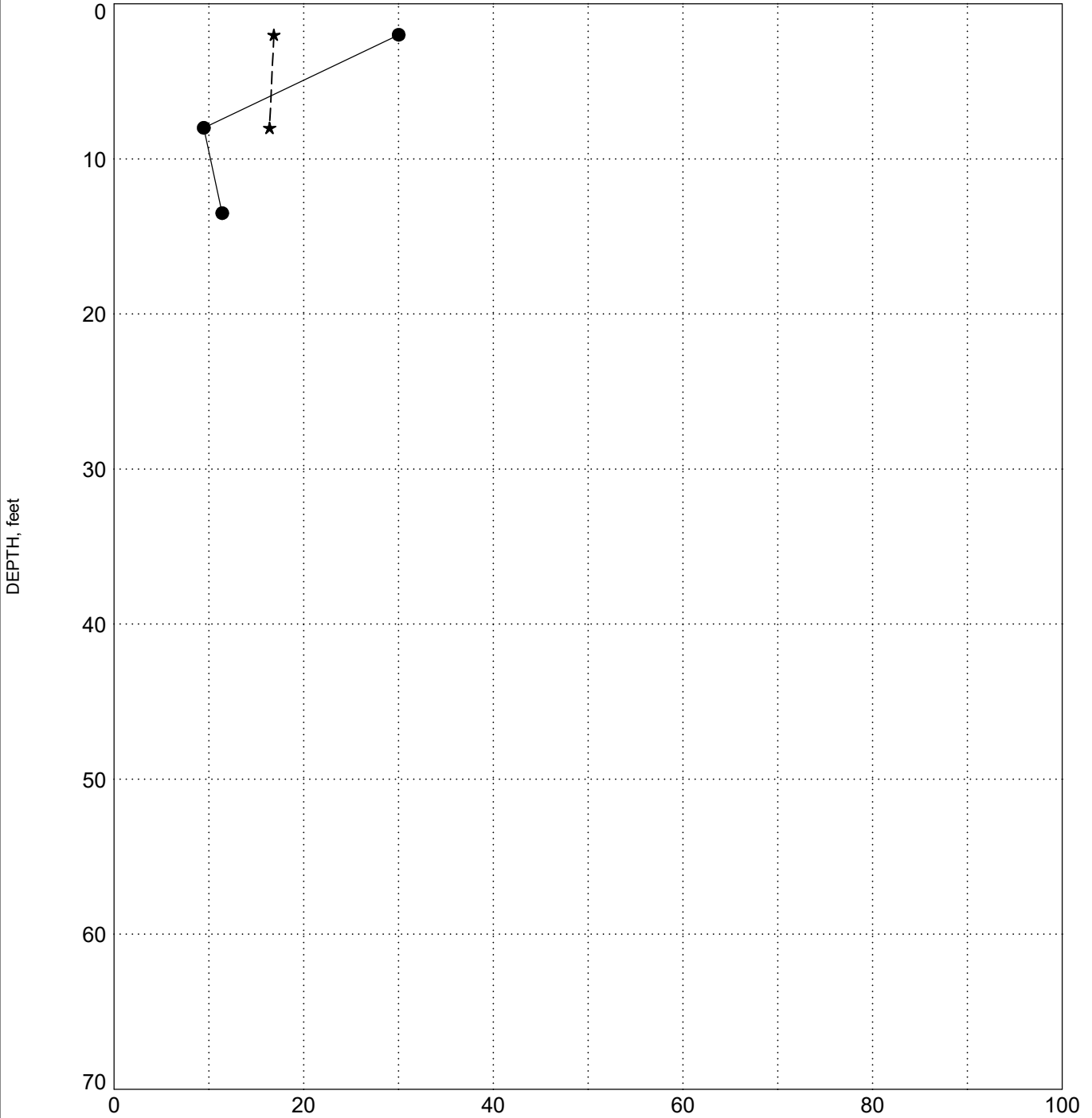
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-4

SURFACE ELEVATION: 162.1



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

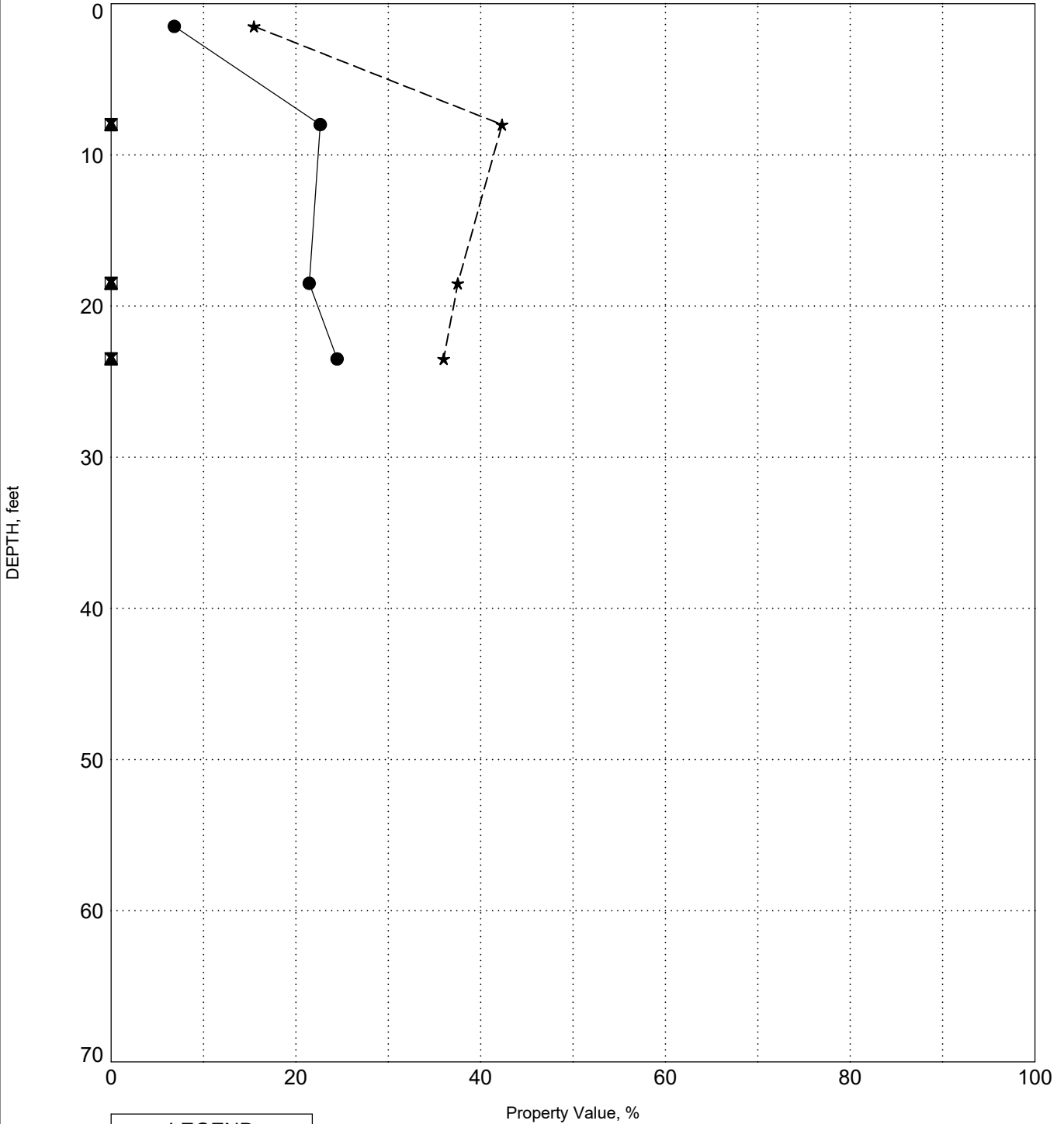
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 161.5

## BORING R-5



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

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# INDEX PROPERTIES VERSUS DEPTH

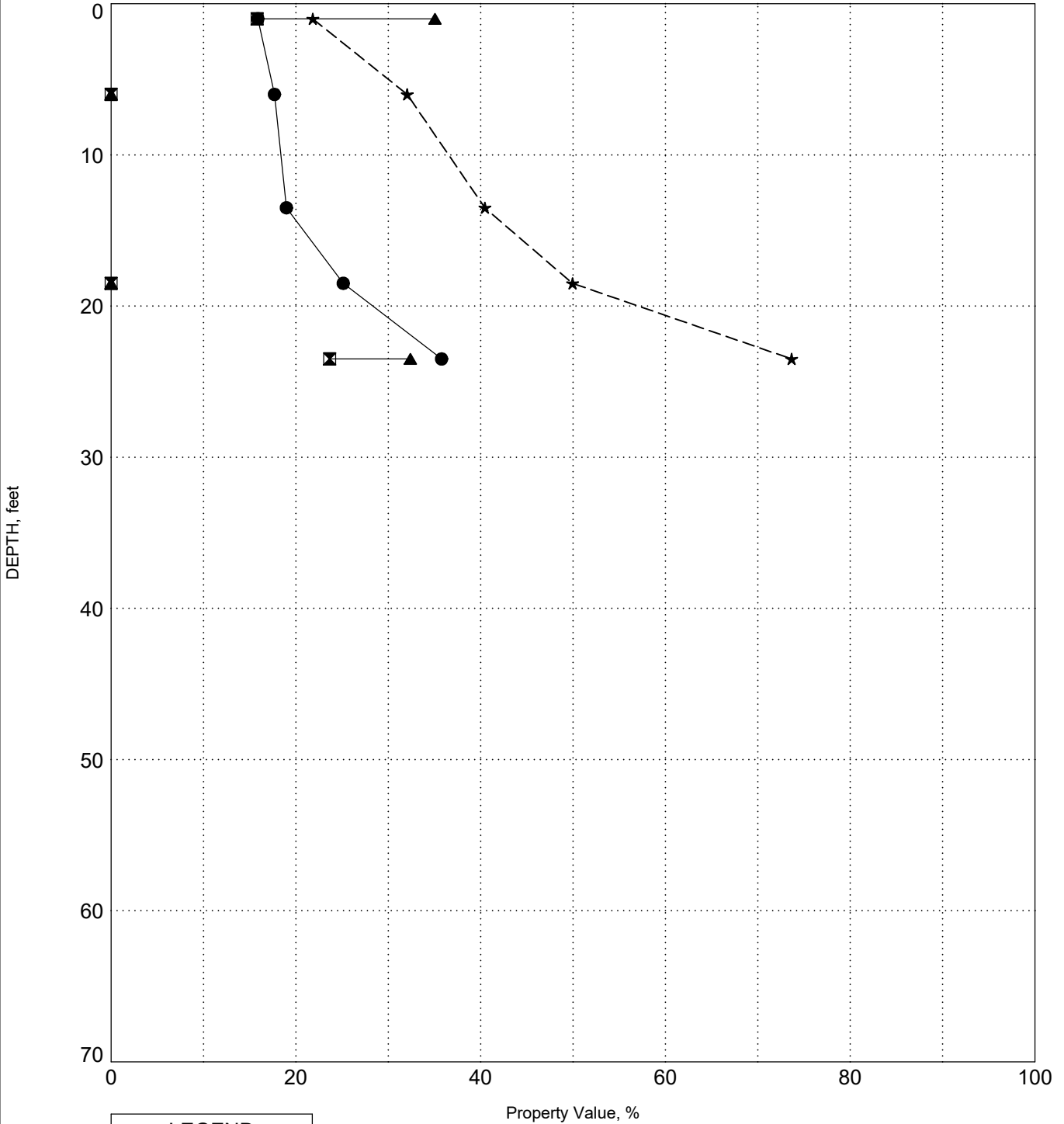
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-6

SURFACE ELEVATION: 161.2



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

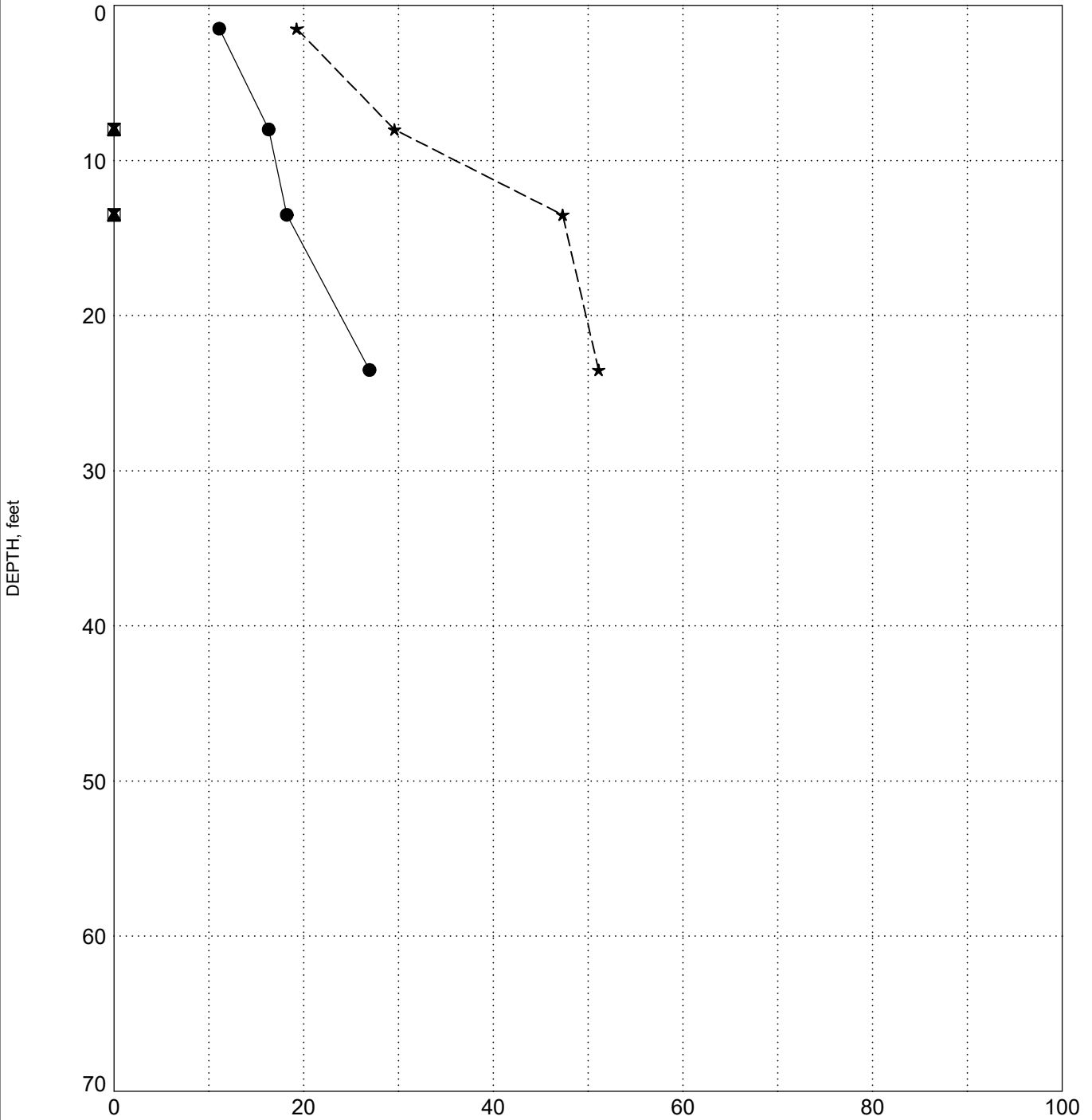
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 160.4

## BORING R-7



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

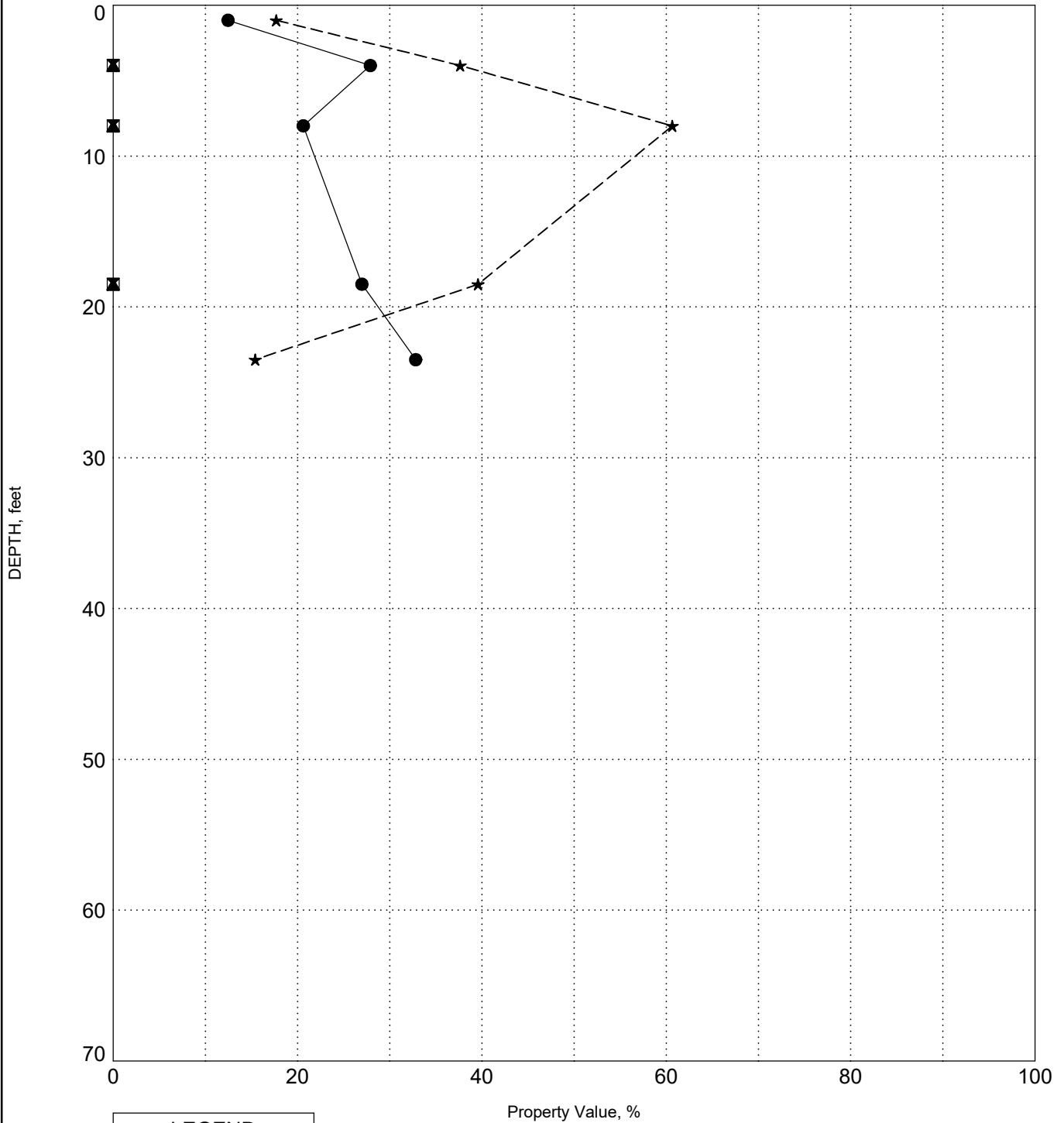
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 160.3

## BORING R-8



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

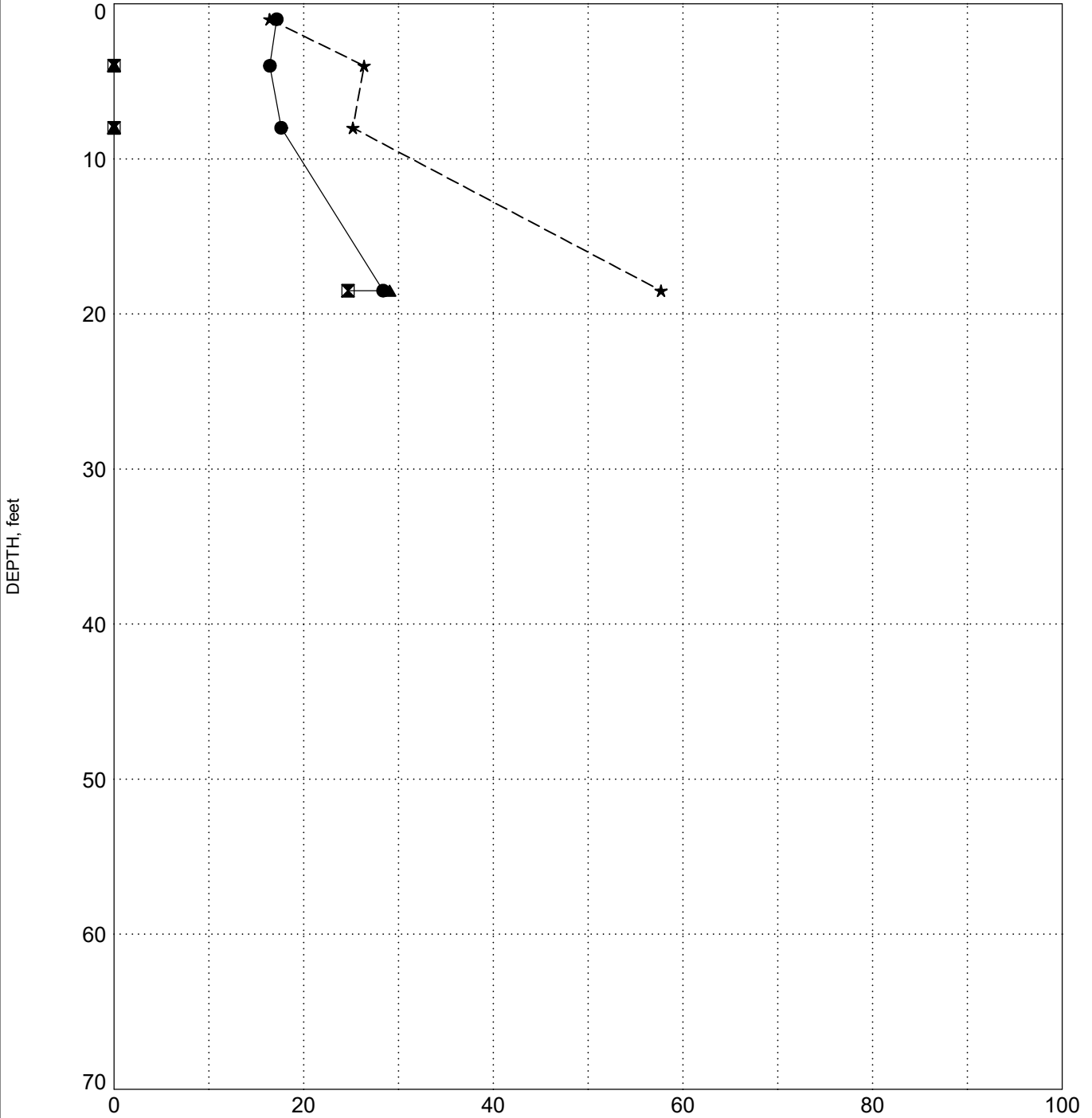
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

## BORING R-9

SURFACE ELEVATION: 159.9



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

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22



# INDEX PROPERTIES VERSUS DEPTH

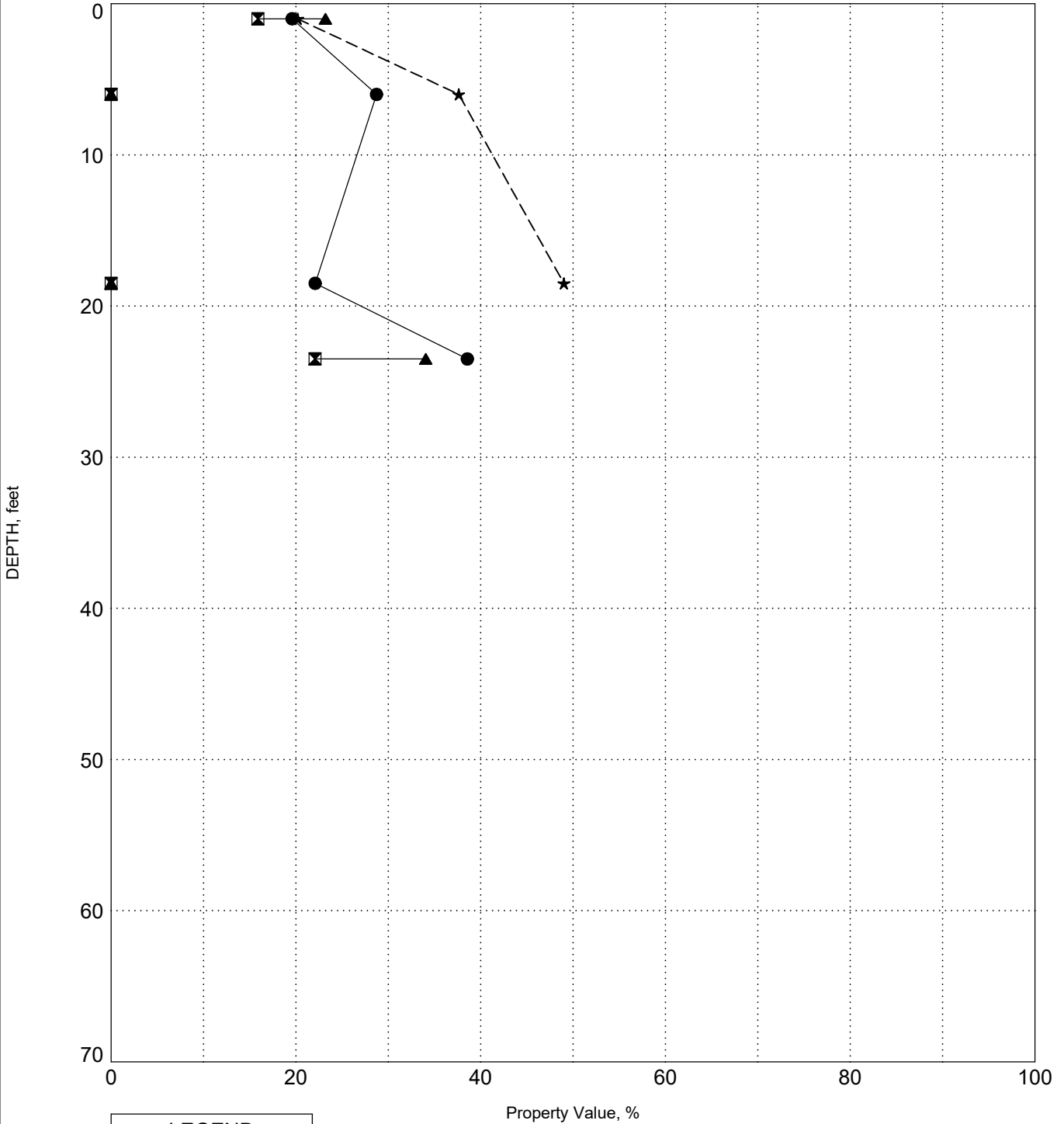
PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

SURFACE ELEVATION: 159.7

## BORING R-10



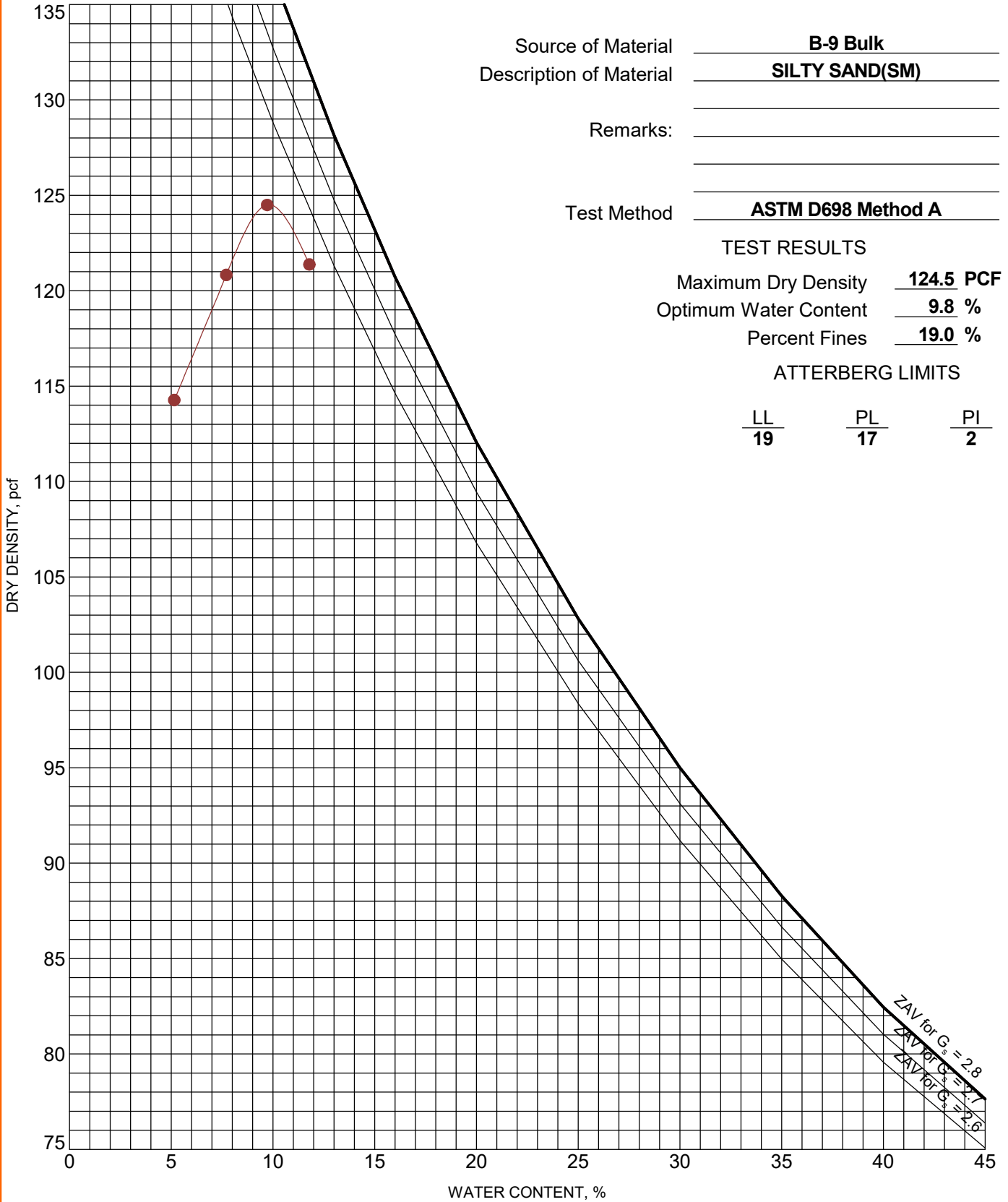
LEGEND	
●	Water Content
☒	Plastic Limit
▲	Liquid Limit
★	Fines

INDEX PROPS 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATA TEMPLATE\_01\_30\_2015.GDT 5/6/22

# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material B-9 Bulk  
 Description of Material SILTY SAND(SM)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

### TEST RESULTS

Maximum Dry Density 124.5 PCF  
 Optimum Water Content 9.8 %  
 Percent Fines 19.0 %

### ATTERBERG LIMITS

LL      PL      PI  
 19      17      2

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



PROJECT NUMBER: 7321P043A

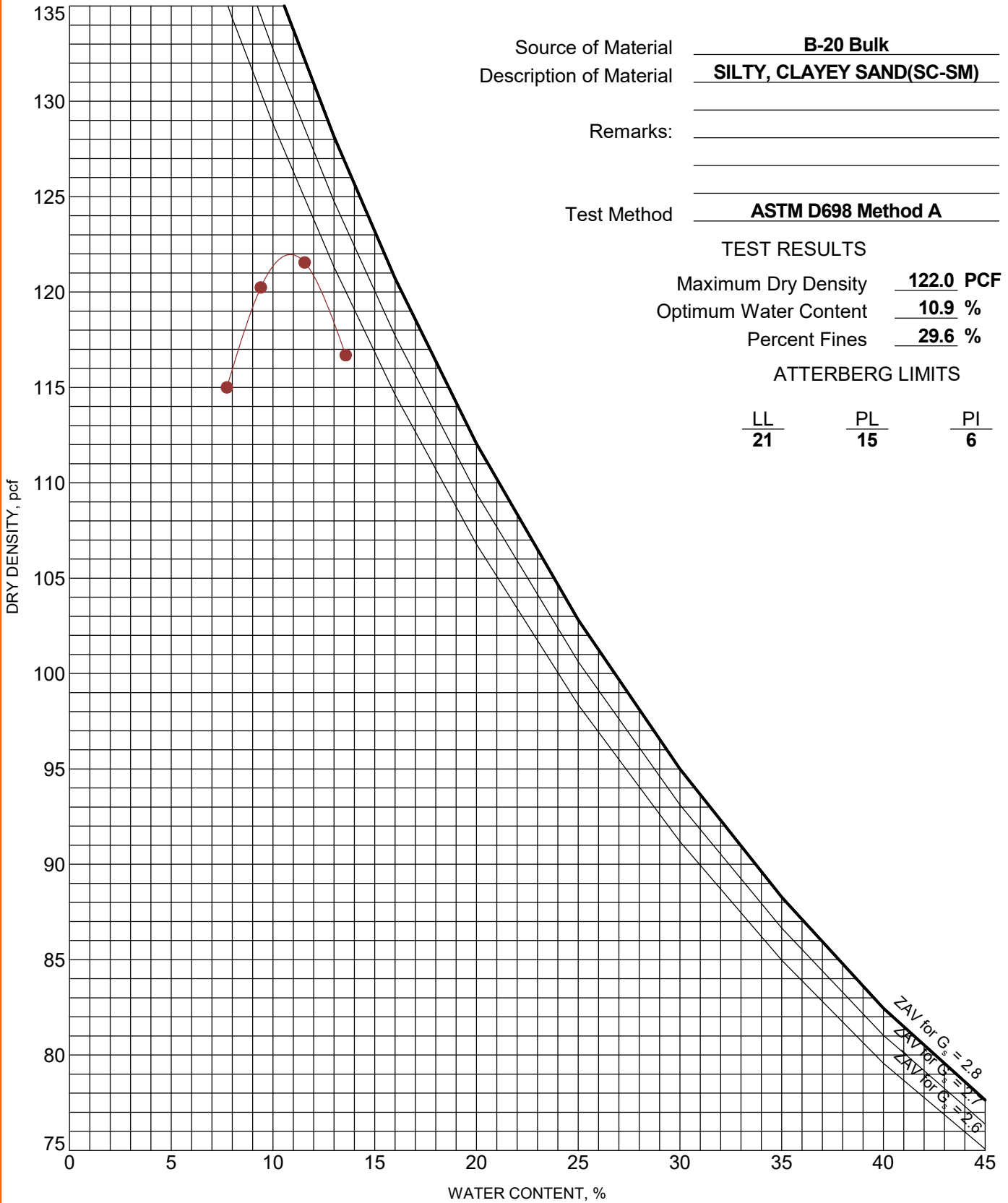
CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL



# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material B-20 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

## TEST RESULTS

Maximum Dry Density 122.0 PCF  
 Optimum Water Content 10.9 %  
 Percent Fines 29.6 %

## ATTERBERG LIMITS

LL      PL      PI  
21      15      6

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



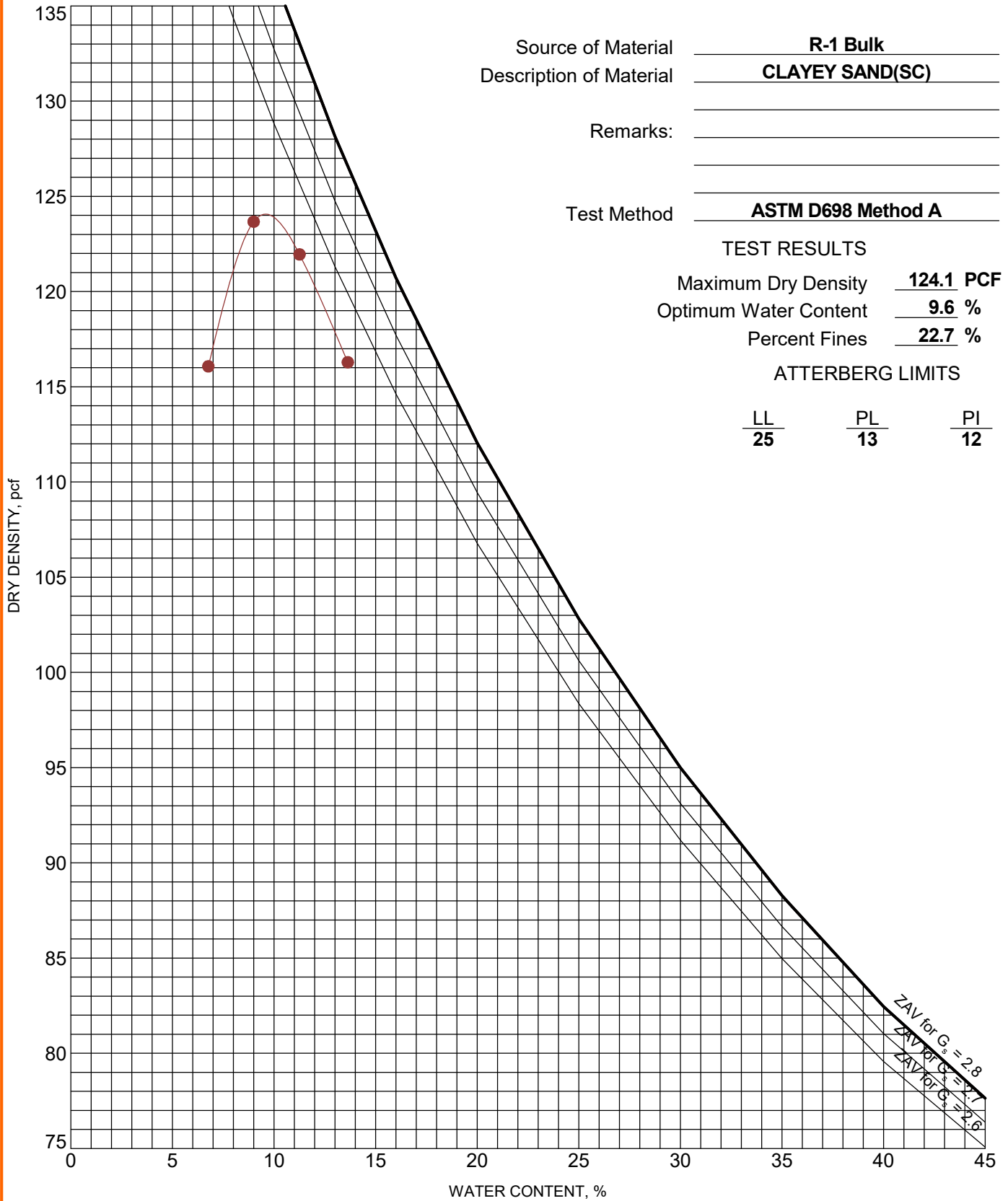
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-1 Bulk  
 Description of Material CLAYEY SAND(SC)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

### TEST RESULTS

Maximum Dry Density 124.1 PCF  
 Optimum Water Content 9.6 %  
 Percent Fines 22.7 %

### ATTERBERG LIMITS

LL      PL      PI  
25      13      12

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



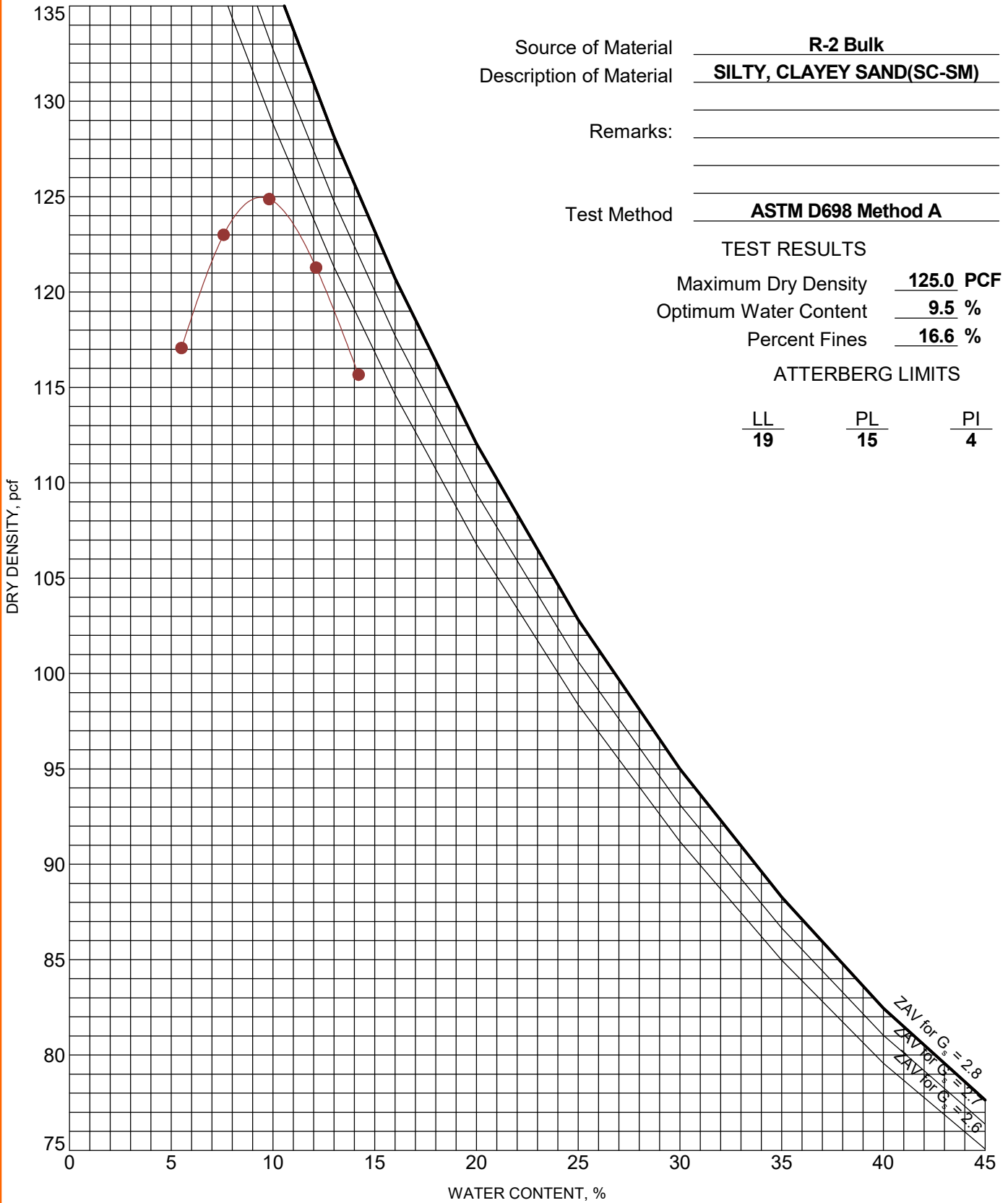
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-2 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

**TEST RESULTS**

Maximum Dry Density 125.0 PCF  
 Optimum Water Content 9.5 %  
 Percent Fines 16.6 %

**ATTERBERG LIMITS**

LL      PL      PI  
19      15      4

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



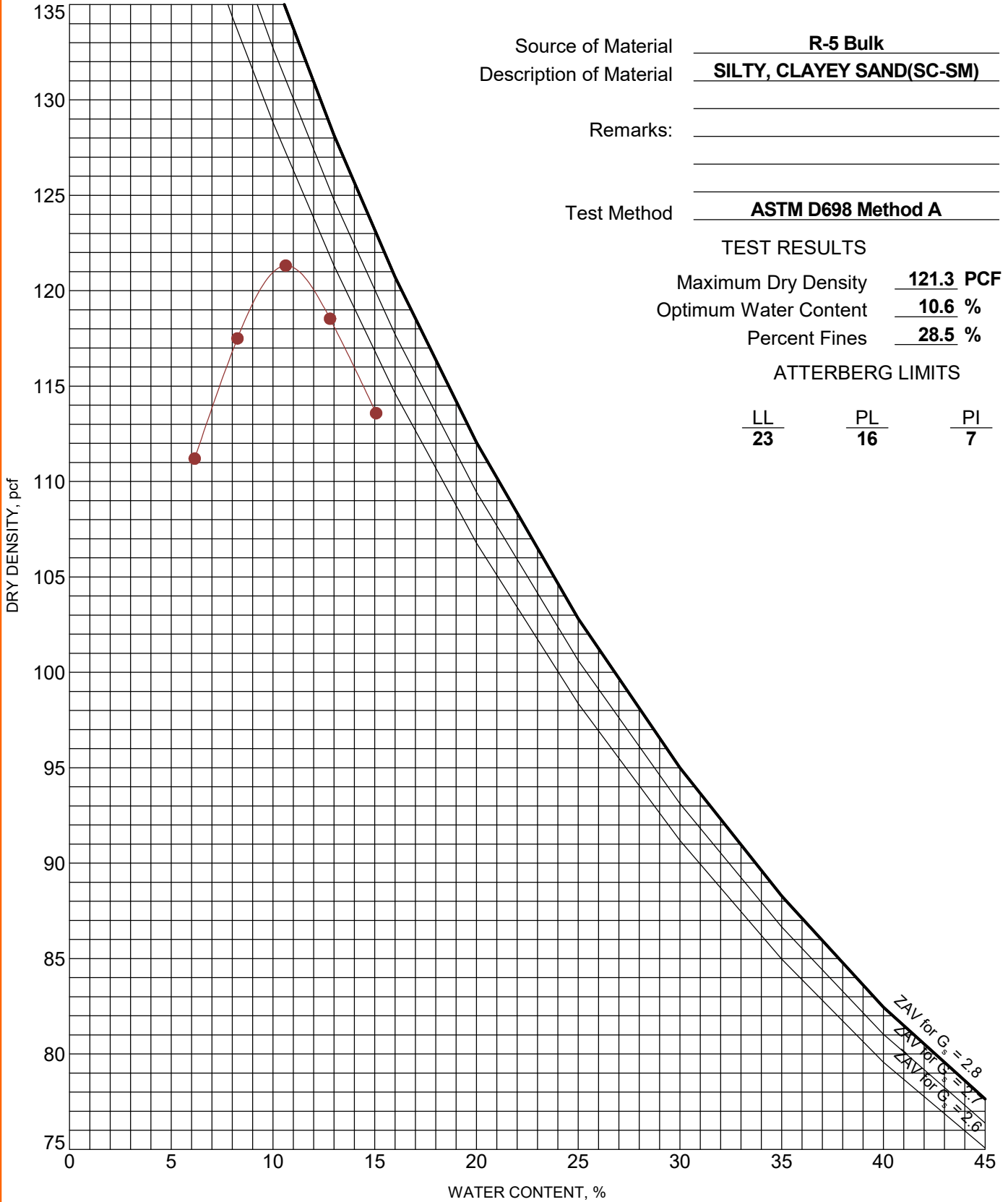
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTON - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-5 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



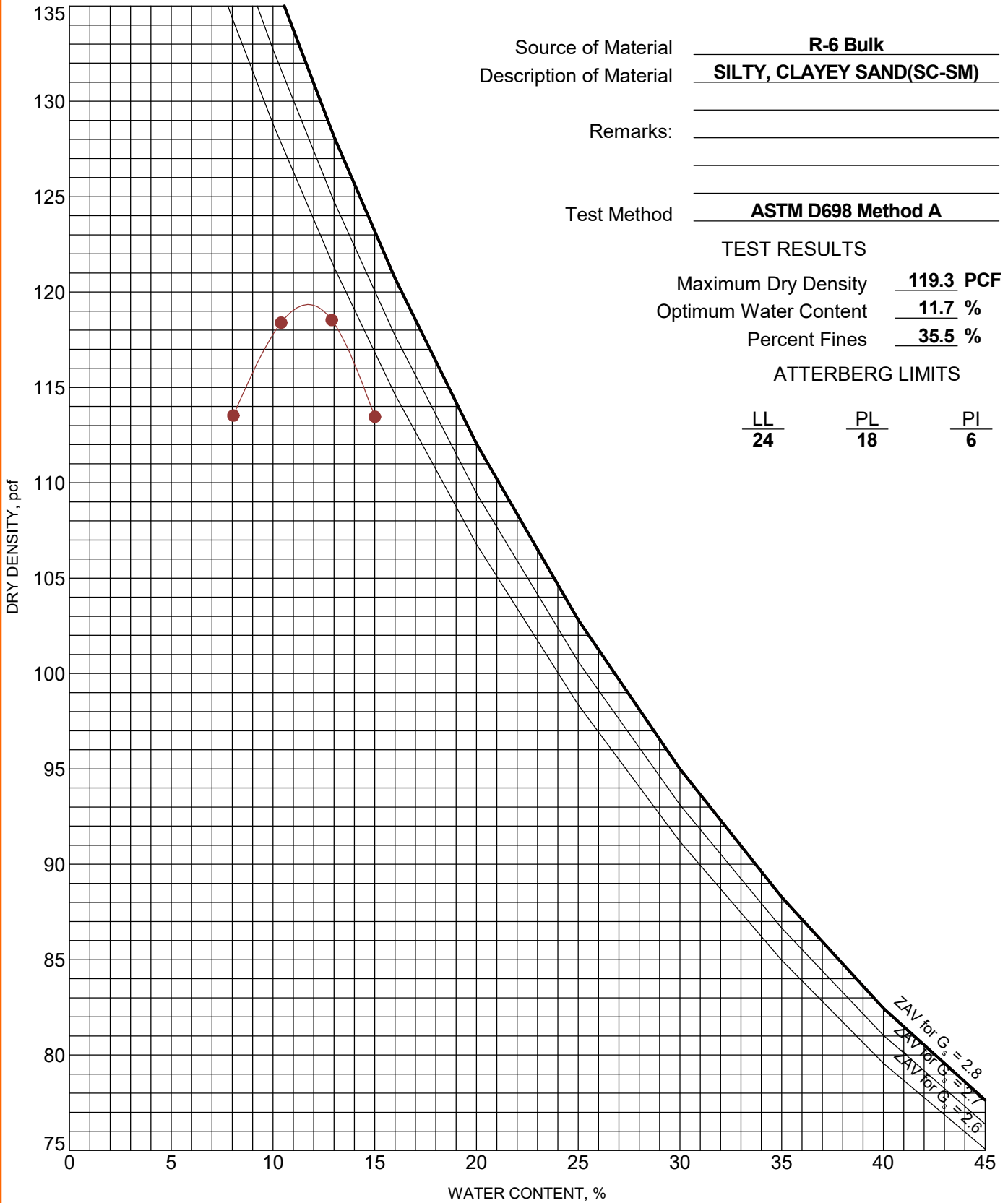
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

# MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-6 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 Test Method ASTM D698 Method A

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
Kershaw County, SC



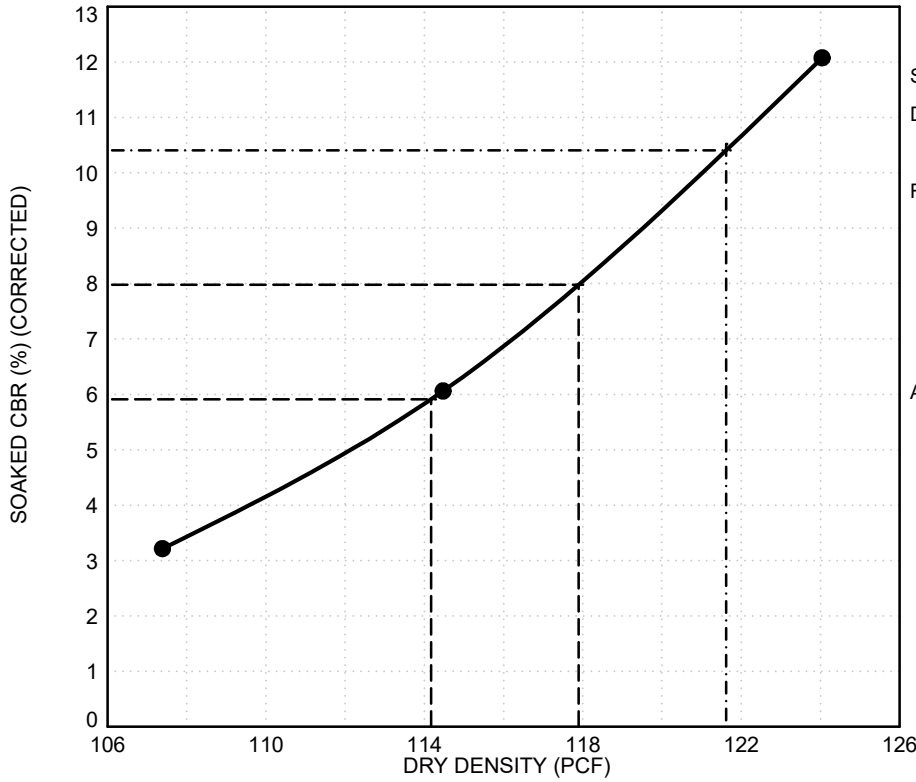
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
Architects-Engineers-Planners, Inc.  
Jacksonville, FL

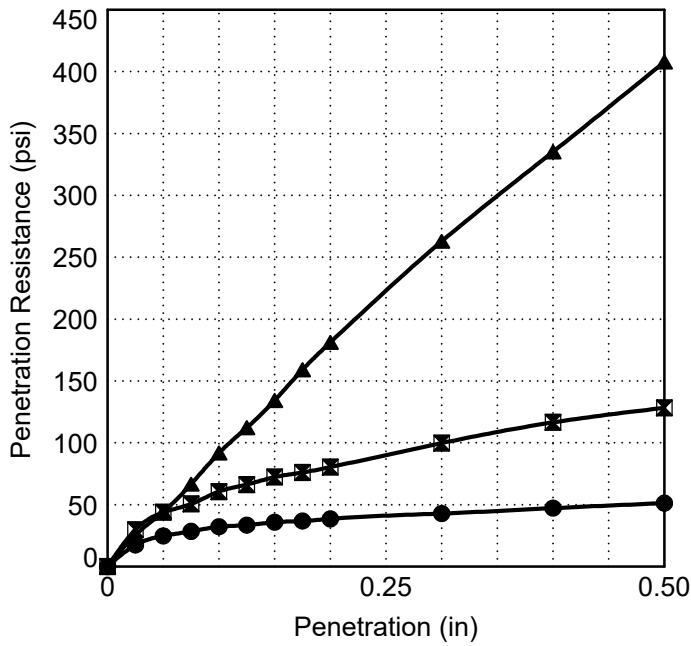
# CALIFORNIA BEARING RATIO

ASTM D1883-07<sup>2</sup>

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CBR 3PT REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-1 Bulk  
 Description of Material CLAYEY SAND(SC)  
 Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Percent Fines 22.7 %  
 Atterberg Limits  $\frac{LL}{25}$   $\frac{PL}{13}$   $\frac{PI}{12}$



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 698A		
Maximum Dry Density, (pcf)	124.1	124.1	124.1
Optimum Moisture Content, (%)	9.6	9.6	9.6
Dry Density before Soaking, (pcf)	107.39	114.47	124.04
Moisture Content, (%)			
After Compaction	9.4	9.6	9.8
Top 1" After Soaking	14.5	12.8	10.7
Surcharge, (lbs)	15.00	15.00	15.00
Swell, (%)	0.00	-0.07	-0.09
Bearing Ratio, (%)	2.6	5.4	12.1

Dry Density @ 92% 114.2 pcf  
 Dry Density @ 95% 117.9 pcf  
 Dry Density @ 98% 121.6 pcf

CBR @ 92% Density 5.9  
 CBR @ 95% Density 8.0  
 CBR @ 98% Density 10.4

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



PROJECT NUMBER: 7321P043A

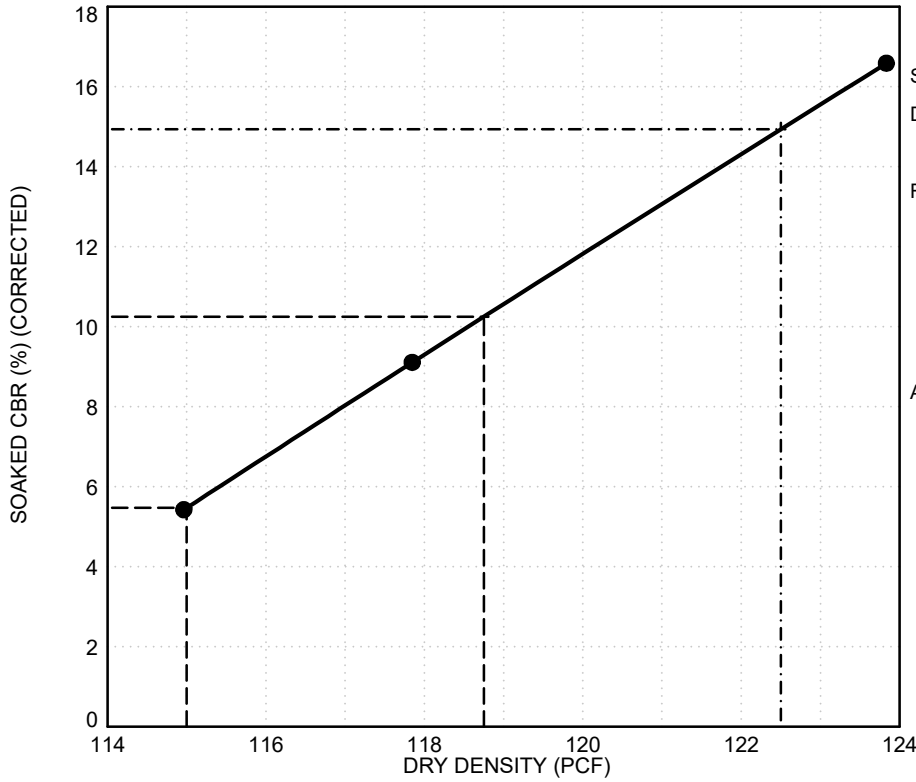
CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL



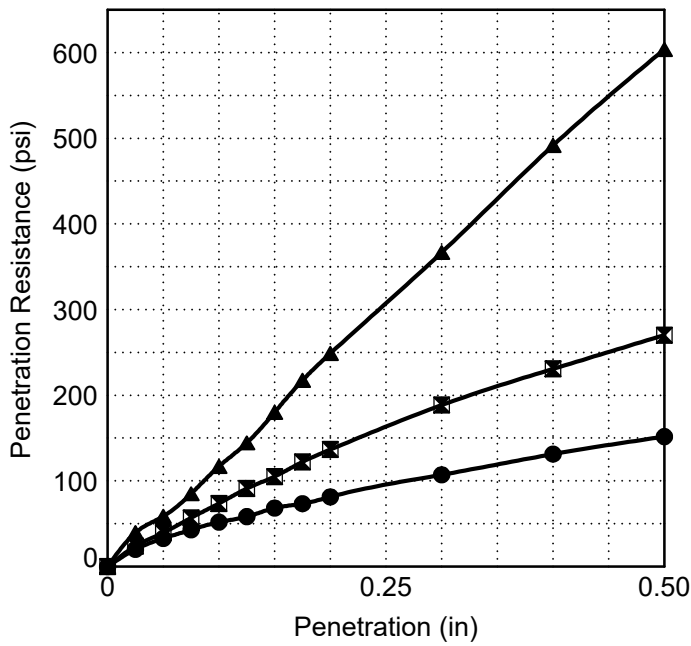
# CALIFORNIA BEARING RATIO

ASTM D1883-07<sup>2</sup>

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CBR 3PT REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-2 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Percent Fines 16.6 %  
 Atterberg Limits  $\frac{LL}{19}$   $\frac{PL}{15}$   $\frac{PI}{4}$



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 698A		
Maximum Dry Density, (pcf)	125	125	125
Optimum Moisture Content, (%)	9.5	9.5	9.5
Dry Density before Soaking, (pcf)	114.96	117.85	123.83
Moisture Content, (%)			
After Compaction	9.7	9.8	9.7
Top 1" After Soaking	12.4	11.4	10.4
Surcharge, (lbs)	15.00	15.00	15.00
Swell, (%)	0.00	0.00	0.00
Bearing Ratio, (%)	5.4	9.1	16.6

Dry Density @ 92% 115.0 pcf  
 Dry Density @ 95% 118.8 pcf  
 Dry Density @ 98% 122.5 pcf

CBR @ 92% Density 5.5  
 CBR @ 95% Density 10.3  
 CBR @ 98% Density 14.9

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



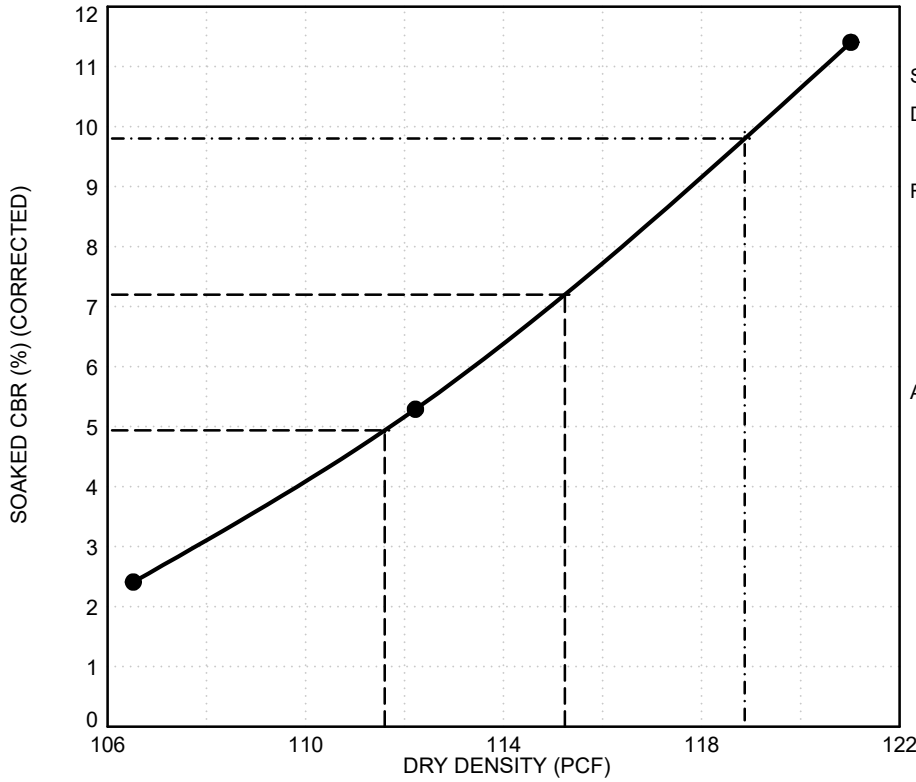
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

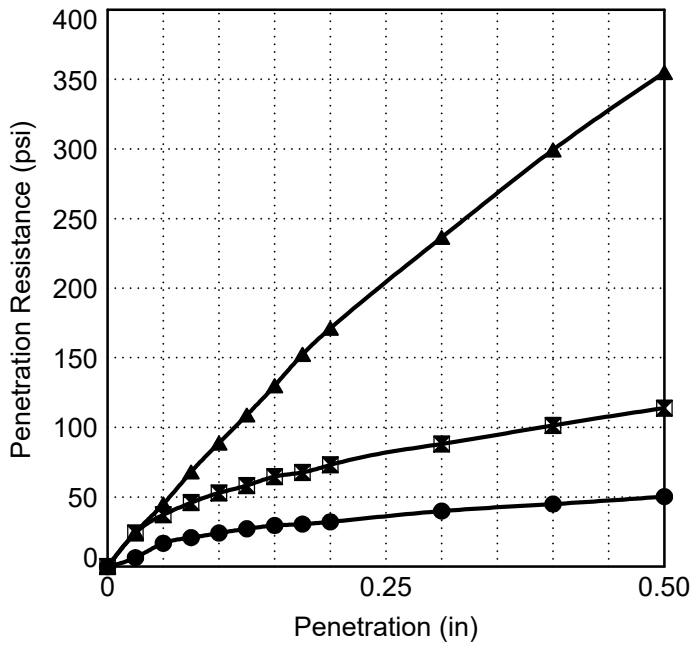
# CALIFORNIA BEARING RATIO

ASTM D1883-07<sup>2</sup>

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CBR 3PT REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-5 Bulk  
 Description of Material SILTY, CLAYEY SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Percent Fines 28.5 %  
 Atterberg Limits  $\frac{LL}{23}$   $\frac{PL}{16}$   $\frac{PI}{7}$



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 698A		
Maximum Dry Density, (pcf)	121.3	121.3	121.3
Optimum Moisture Content, (%)	10.6	10.6	10.6
Dry Density before Soaking, (pcf)	106.52	112.22	121.02
Moisture Content, (%)			
After Compaction	11	10.9	10.9
Top 1" After Soaking	17.9	14.5	11.6
Surcharge, (lbs)	15.00	15.00	15.00
Swell, (%)	0.13	0.04	-0.07
Bearing Ratio, (%)	2.1	4.9	11.4

Dry Density @ 92% 111.6 pcf  
 Dry Density @ 95% 115.2 pcf  
 Dry Density @ 98% 118.9 pcf

CBR @ 92% Density 4.9  
 CBR @ 95% Density 7.2  
 CBR @ 98% Density 9.8

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



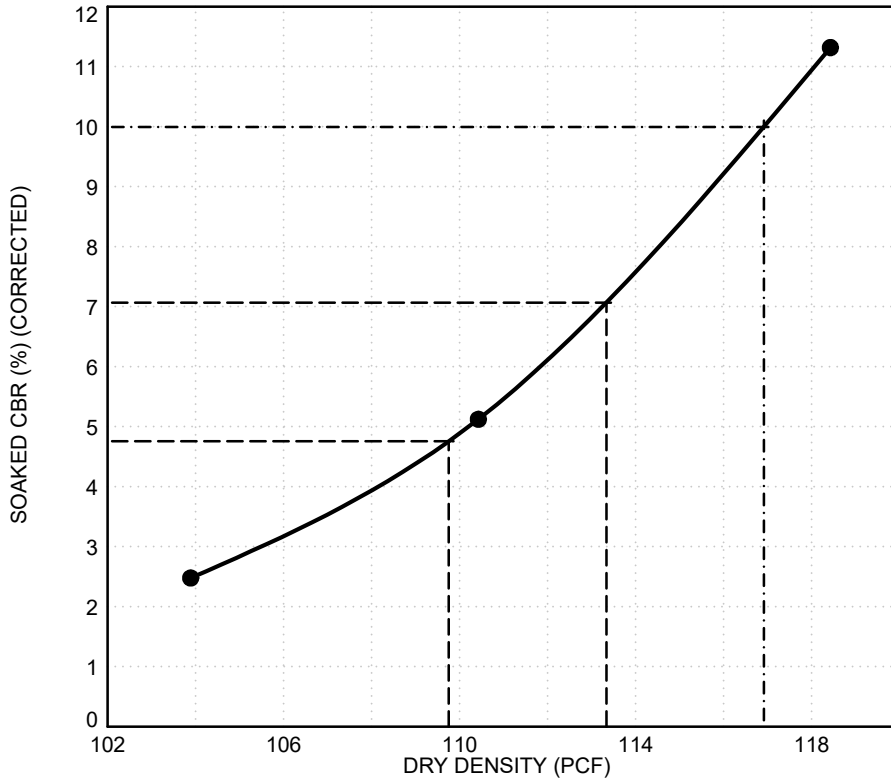
PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

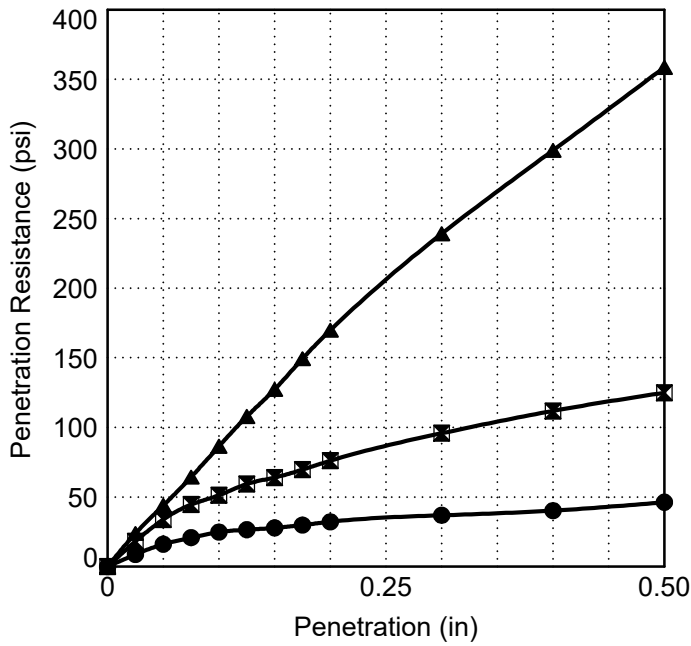
# CALIFORNIA BEARING RATIO

ASTM D1883-07<sup>2</sup>

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CBR 3PT REPORT 7321P043A I-20 WATEREE RIVE.GPJ TERRACON\_DATATEMPLATE.GDT 3/24/22



Source of Material R-6 Bulk  
 Description of Material SILTY, CLAYEY  
SAND(SC-SM)  
 Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Percent Fines 35.5 %  
 Atterberg Limits  $\frac{LL}{24}$   $\frac{PL}{18}$   $\frac{PI}{6}$



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 698A		
Maximum Dry Density, (pcf)	119.3	119.3	119.3
Optimum Moisture Content, (%)	11.7	11.7	11.7
Dry Density before Soaking, (pcf)	103.89	110.43	118.43
Moisture Content, (%)			
After Compaction	11.9	12.1	11.9
Top 1" After Soaking	18.1	15.7	13.5
Surcharge, (lbs)	15.00	15.00	15.00
Swell, (%)	0.07	0.09	0.28
Bearing Ratio, (%)	2.1	5.1	11.3

Dry Density @ 92% 109.8 pcf  
 Dry Density @ 95% 113.3 pcf  
 Dry Density @ 98% 116.9 pcf

CBR @ 92% Density 4.8  
 CBR @ 95% Density 7.1  
 CBR @ 98% Density 10.0

PROJECT: I-20 Wateree River Bridge Repairs

SITE: Kershaw County  
 Kershaw County, SC



PROJECT NUMBER: 7321P043A

CLIENT: RS&H  
 Architects-Engineers-Planners, Inc.  
 Jacksonville, FL

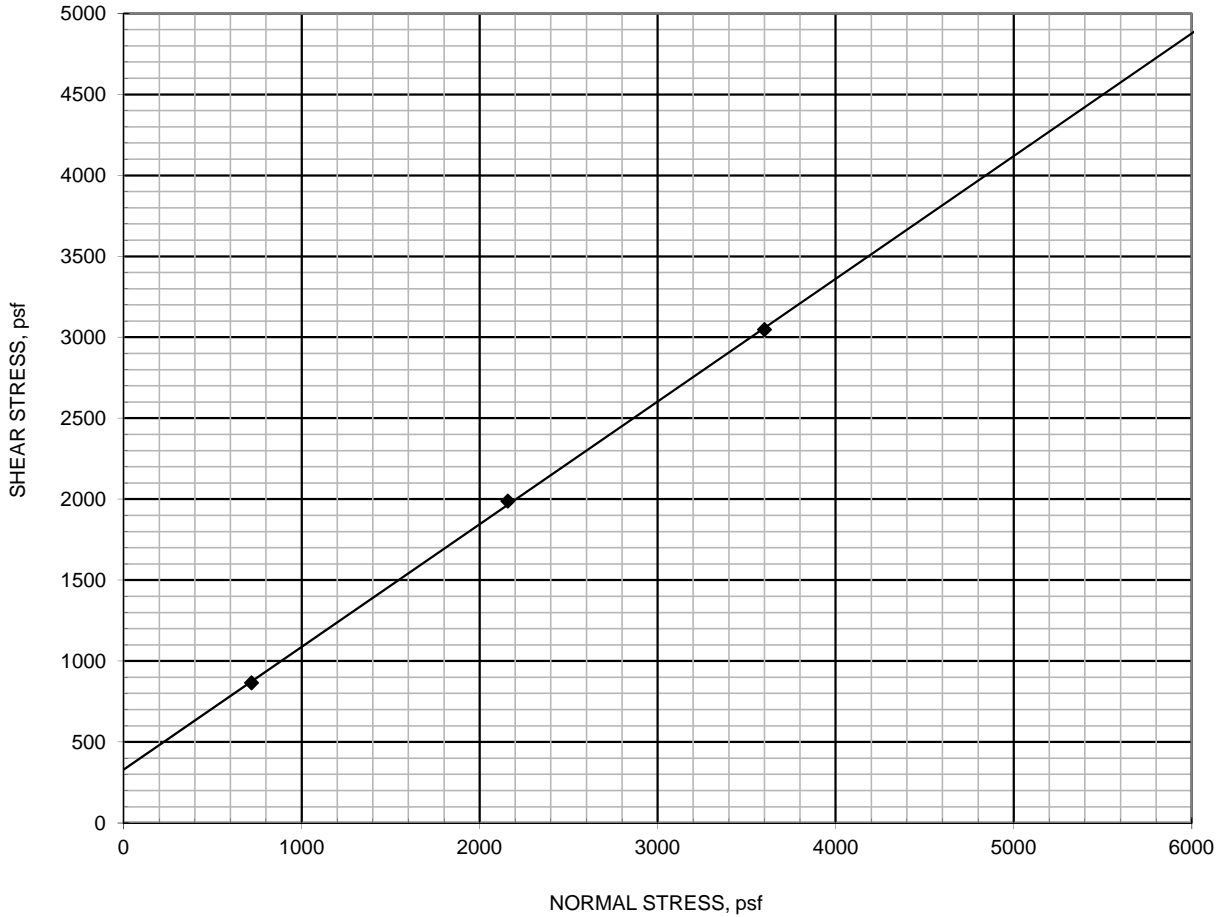
**DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS**


**ASTM D3080**

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SHEAR STRENGTH

◆ MAXIMUM SHEAR STRESS      — INTERPRETED FAILURE

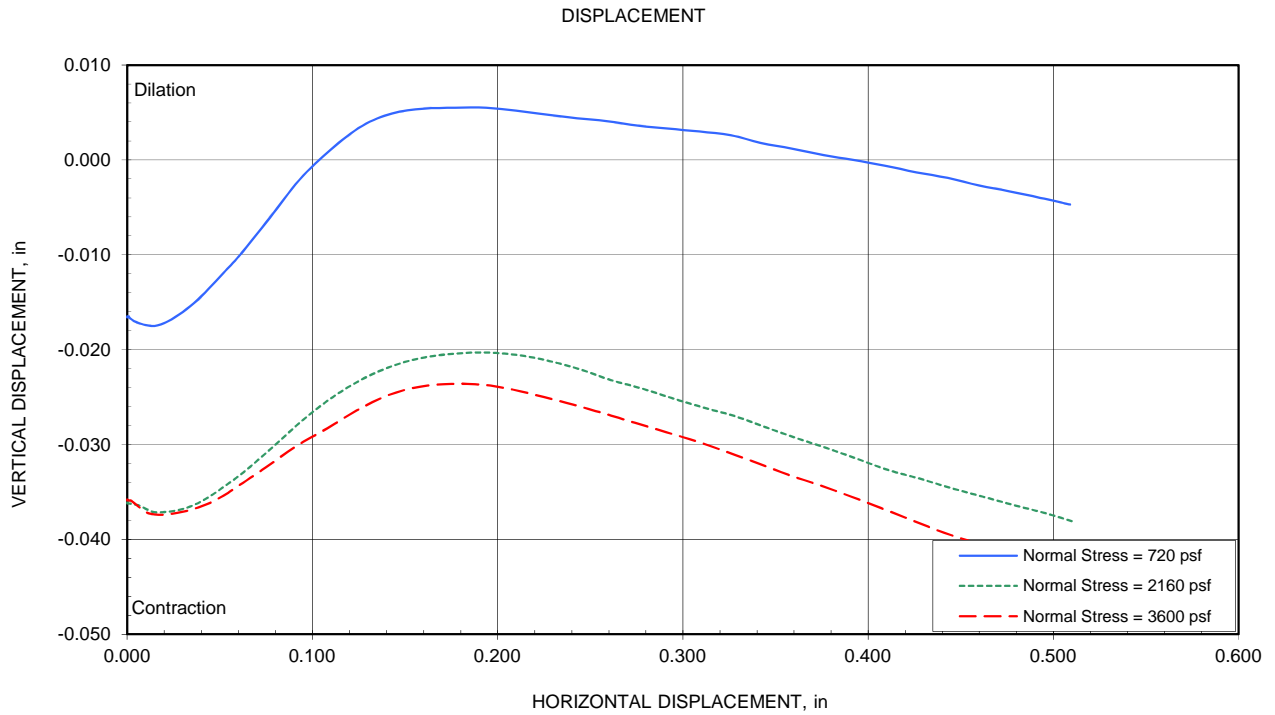
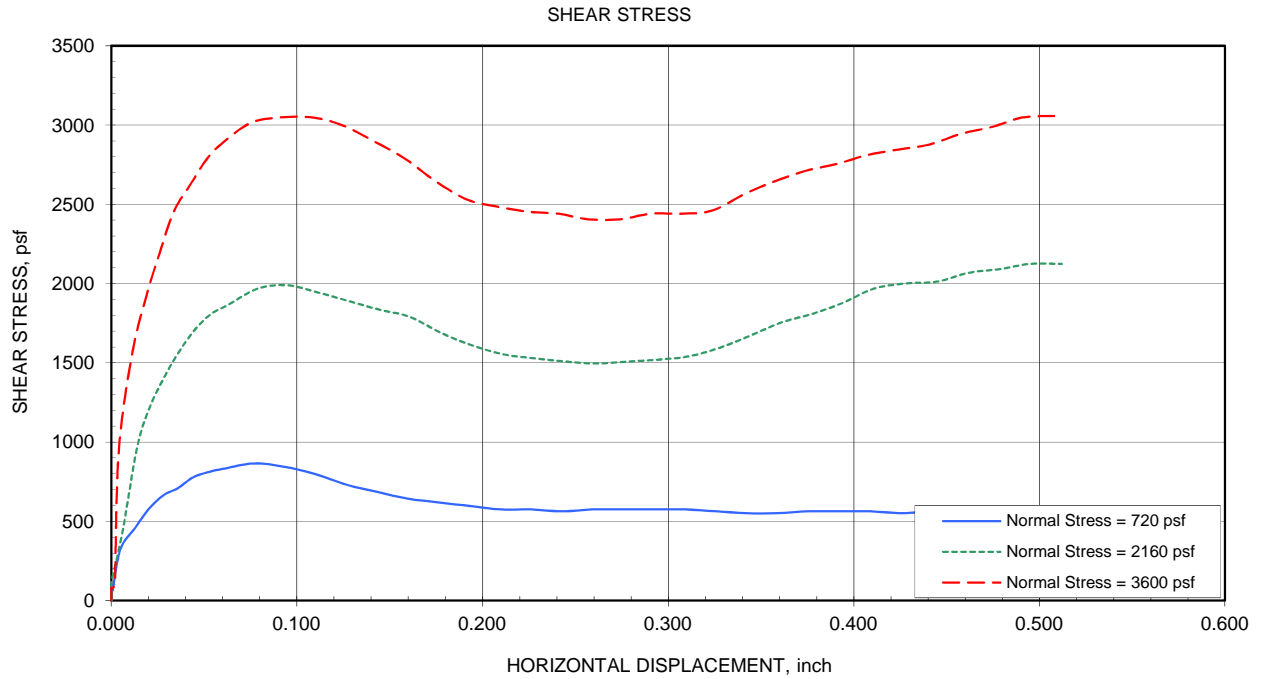


AT MAXIMUM SHEAR STRESS		FRICITION ANGLE	COHESION*	NORMAL STRESS, psf		
		37.2 deg	331 psf	720	2160	3600
INITIAL AREA, in2	4.909	INITIAL MOISTURE, %		10.9	10.9	10.9
INITIAL LENGTH, in	1.000	INITIAL DRY DENSITY, pcf		118.3	118.5	118.2
SPECIFIC GRAVITY	2.65	INITIAL SATURATION, %		72.6	73.0	72.5
SG ASSUMED	X	INITIAL VOID RATIO		0.40	0.40	0.40
SG TESTED		FINAL MOISTURE, %		13.0	13.6	13.7
LIQUID LIMIT	19	FINAL SATURATION, %		87.9	100.0	100.0
PLASTIC LIMIT	17	FINAL VOID RATIO		0.39	0.34	0.34
PLASTICITY INDEX	2	MAXIMUM SHEAR STRESS, psf		865	1989	3048
SAMPLE TYPE	RECOMPACTED	RATE OF LOADING, in/min		0.0080	0.0080	0.0079
DESCRIPTION	Silty Sand (SM) / A-1-b (0)					
SAMPLE NO.	B-9 Bulk 0-5'	*Apparent Cohesion				
PROJECT: I-20 Wateree River Bridge Repairs		 521 Clemson Road Columbia, SC		PROJECT NUMBER: 7321P043A		
LOCATION: Kershaw County, SC				CLIENT: RS&H Architects-Engineers-Planners, Inc.		
NOTES: Percent Fines: 19.0% Recompacted to 95% of the Standard Proctor				DATE: 02/22/22		

**DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS**

**ASTM D3080**

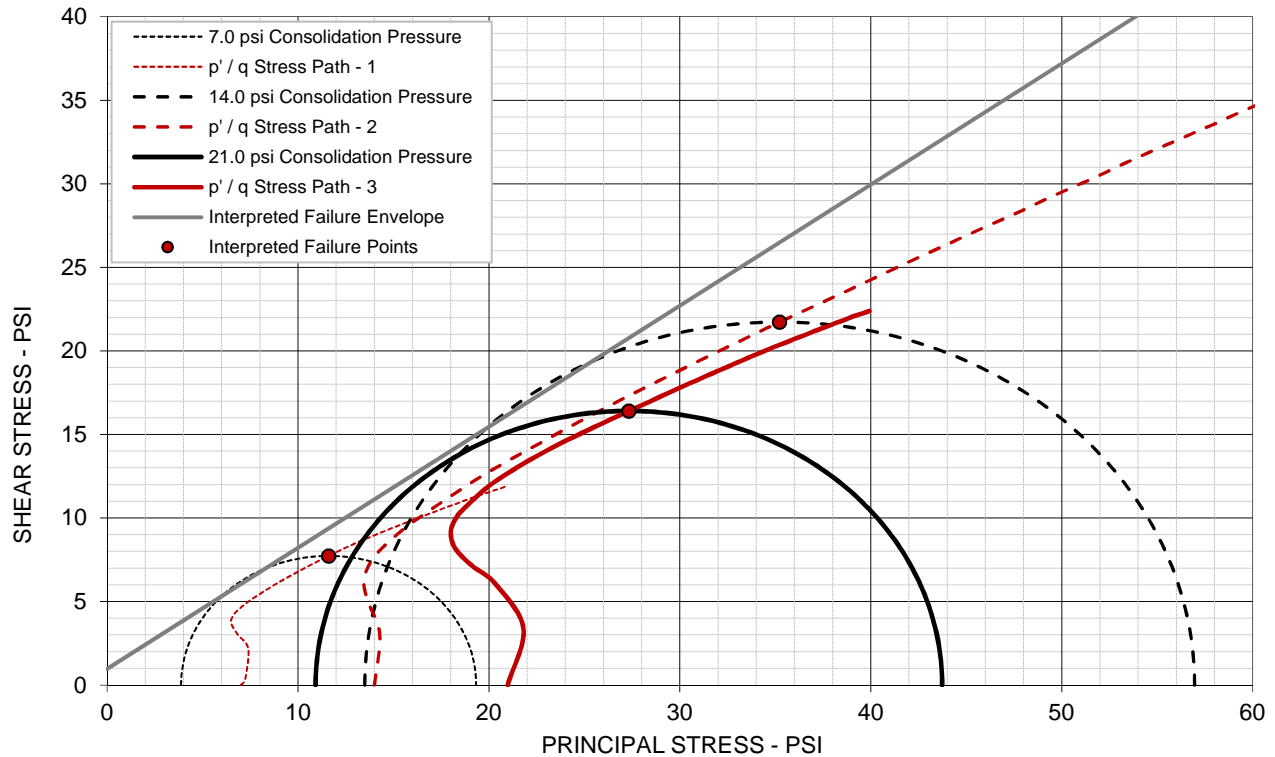
Page 2 of 2



DESCRIPTION	Silty Sand (SM) / A-1-b (0)		
SAMPLE NO.	B-9 Bulk 0-5'		
PROJECT: I-20 Wateree River Bridge Repairs	 521 Clemson Road Columbia, SC	PROJECT NUMBER: 7321P043A	
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.	
NOTES: Percent Fines: 19.0% Recompacted to 95% of the Standard Proctor		DATE: 02/22/22	

## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

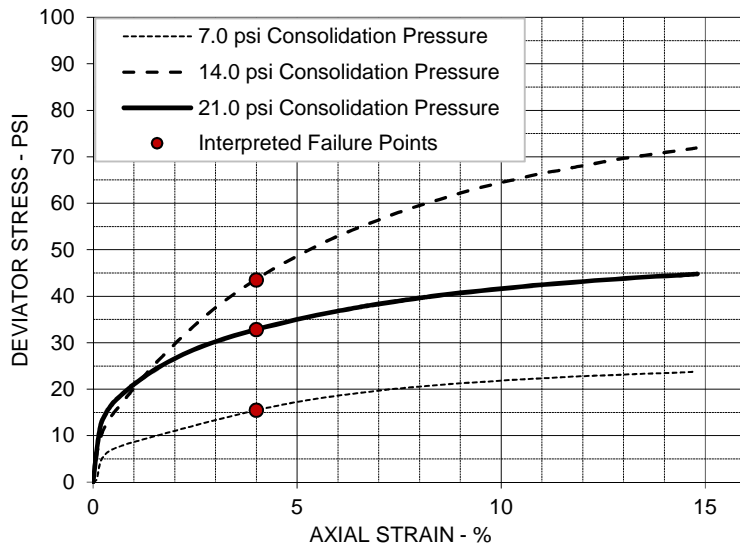
Failure Criteria: Set Strain = 4%



### EFFECTIVE STRESS PARAMETERS

$\phi' = 35.9 \text{ deg}$

$c' = 1.0 \text{ psi}$



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	18.9	18.9	18.9
Dry Density - pcf	105.0	110.1	110.2
Diameter - inches	2.88	2.88	2.89
Height - inches	5.95	5.94	5.94
AT TEST			
Final Moisture - %	24.3	17.4	16.7
Dry Density - pcf	105.5	110.8	111.0
Calculated Diameter (in.)	2.87	2.86	2.87
Height - inches	5.92	5.90	5.89
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	15.45	43.46	32.81
Total Pore Pressure - psi	53.1	50.5	60.1
Strain Rate - %/min	0.0010	0.0010	0.0010
Failure Strain - %	4.0	4.0	4.0
$\sigma_1'$ Failure - psi	19.33	56.96	43.73
$\sigma_3'$ Failure - psi	3.88	13.50	10.92

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Clayey Sand (SC) / A-6 (4)

SAMPLE ID: B-9B 18.0-20.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36    PL: 17    PI: 19    Percent -200: 41.9%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

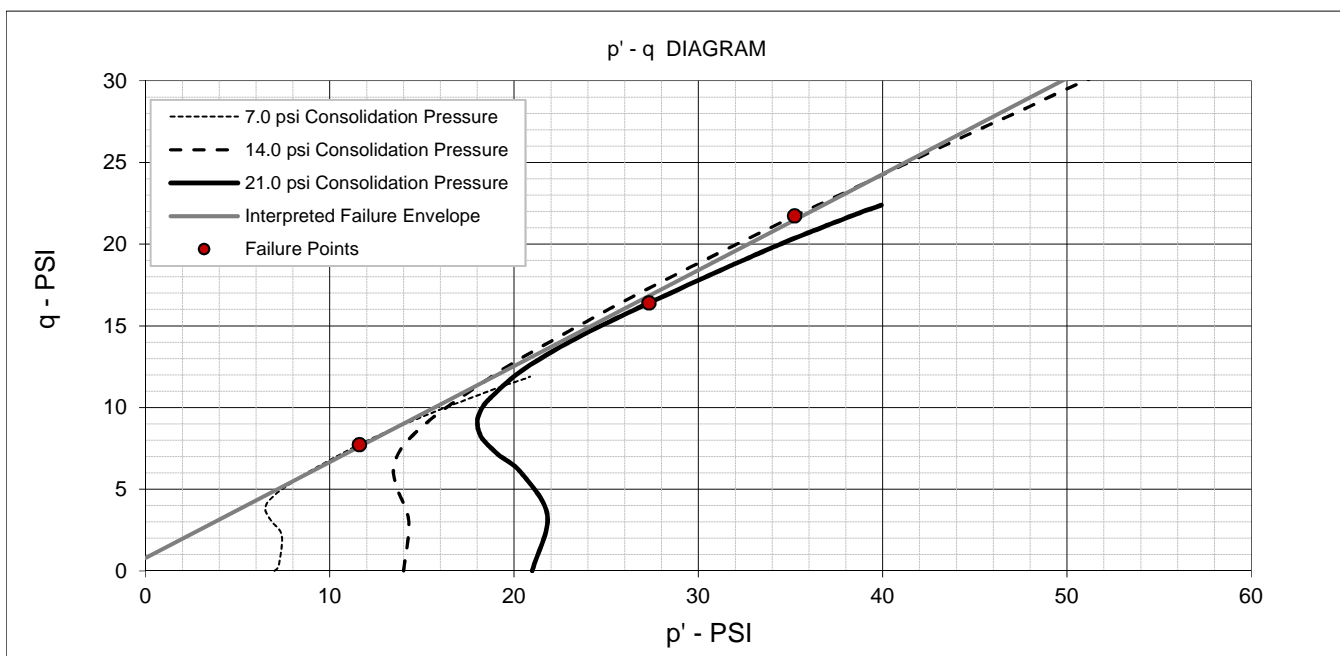
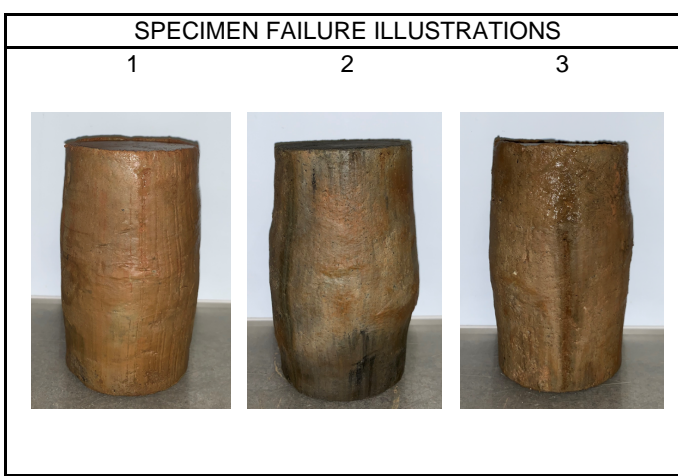
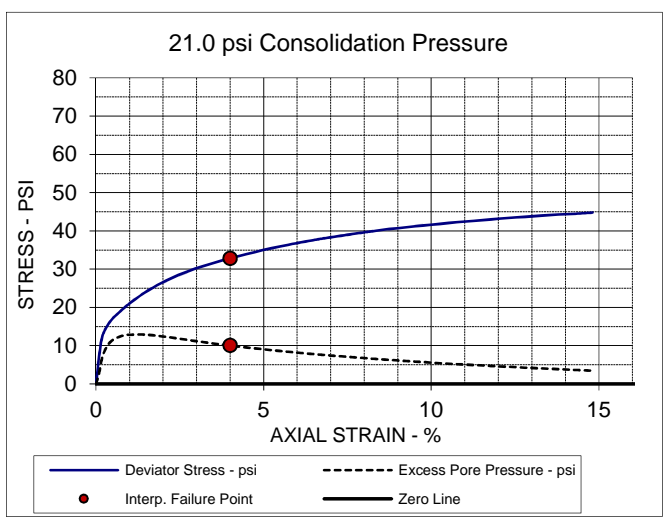
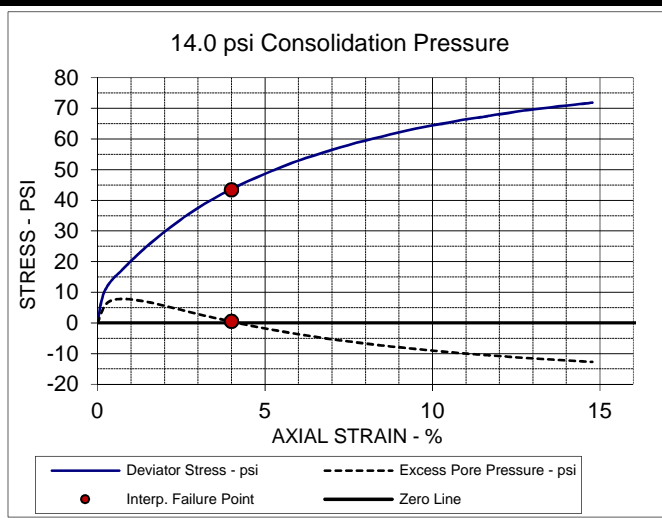
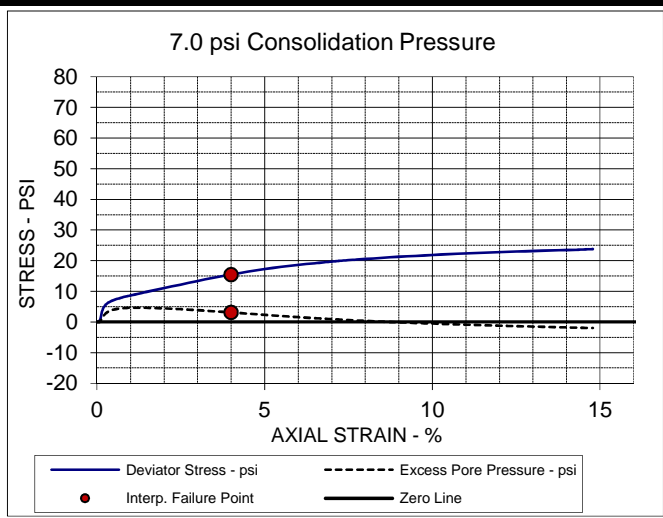
CLIENT: RS&H Architects-Engineers-Planners, Inc.

DATE: 03/24/22

521 Clemson Road  
Columbia, SC



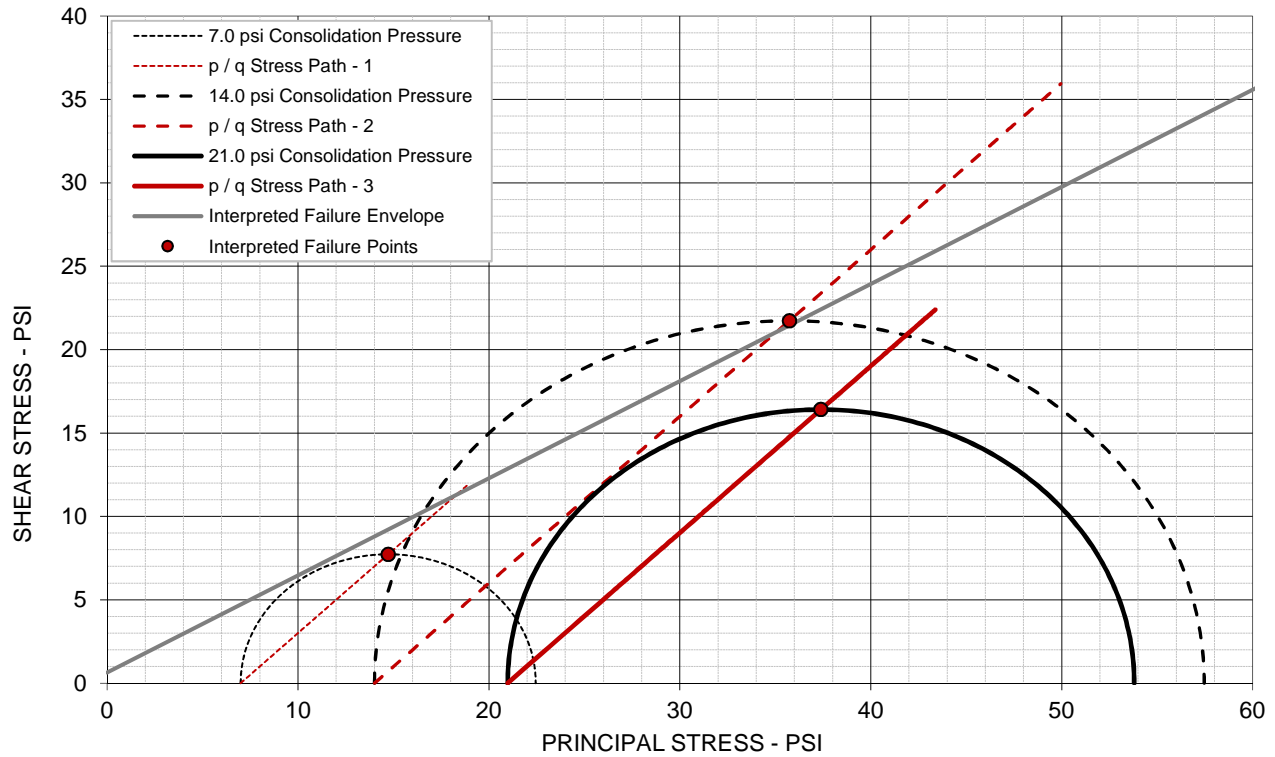




<b>EFFECTIVE STRESS PARAMETERS</b>		$R^2 = 1.00$	$\alpha = 30.4 \text{ deg}$	$a = 0.8 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-9B 18.0-20.0' ST-1		521 Clemson Road Columbia, SC		
DESCRIPTION: Clayey Sand (SC) / A-6 (4)				

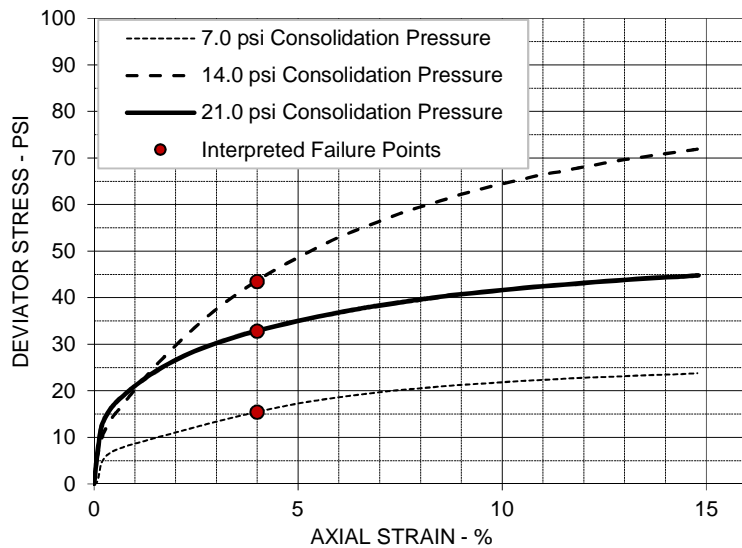
## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

Failure Criteria: Set Strain = 4%



### TOTAL STRESS PARAMETERS

$\phi = 30.2 \text{ deg}$        $c = 0.6 \text{ psi}$



SPECIMEN NO.	1	2	3
<b>INITIAL</b>			
Moisture Content - %	18.9	18.9	18.9
Dry Density - pcf	105.0	110.1	110.2
Diameter - inches	2.88	2.88	2.89
Height - inches	5.95	5.94	5.94
<b>AT TEST</b>			
Final Moisture - %	24.3	17.4	16.7
Dry Density - pcf	105.5	110.8	111.0
Calculated Diameter (in.)	2.87	2.86	2.87
Height - inches	5.92	5.90	5.89
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	15.45	43.46	32.81
Total Pore Pressure - psi	53.1	50.5	60.1
Strain Rate - %/min	0.0010	0.0010	0.0010
Failure Strain - %	4.0	4.0	4.0
$\sigma_1$ Failure - psi	22.45	57.46	53.80
$\sigma_3$ Failure - psi	7.00	14.01	20.98

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Clayey Sand (SC) / A-6 (4)

SAMPLE ID: B-9B 18.0-20.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36      PL: 17      PI: 19      Percent -200: 41.9%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

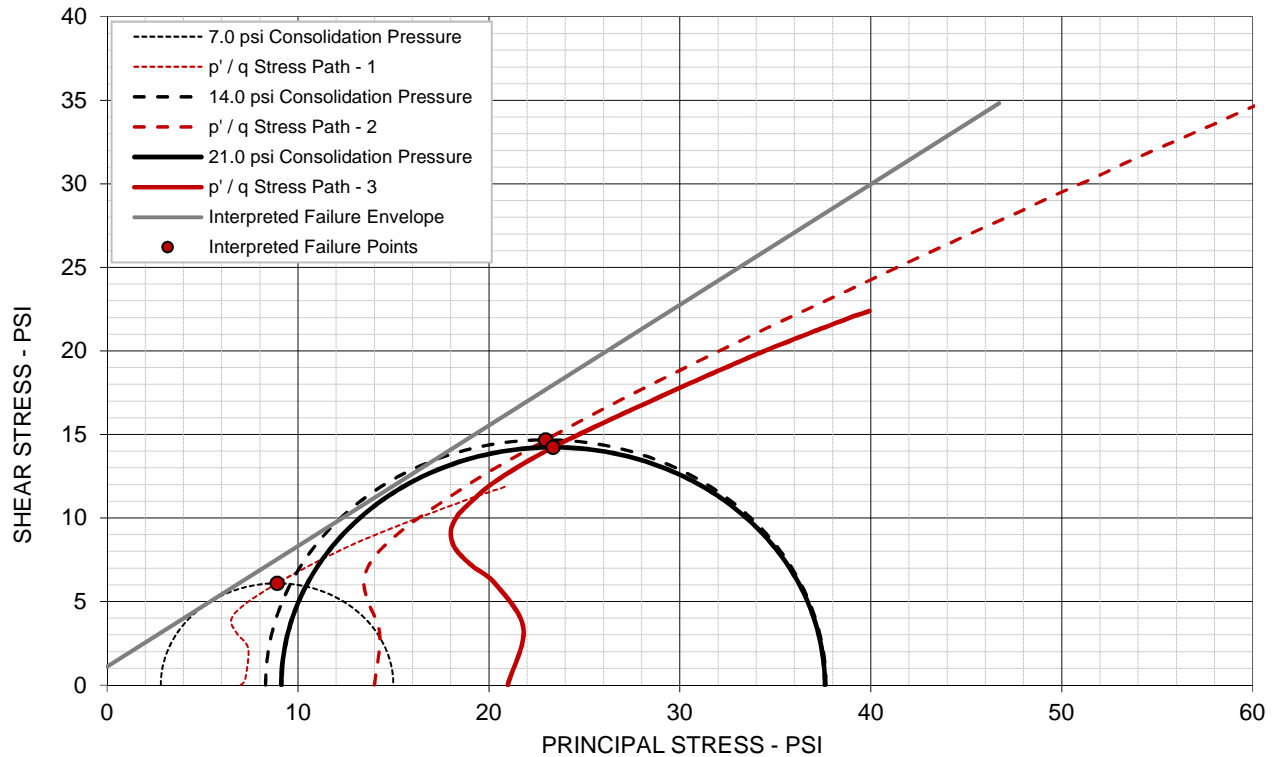
DATE: 03/24/22

**521 Clemson Road  
Columbia, SC**



## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

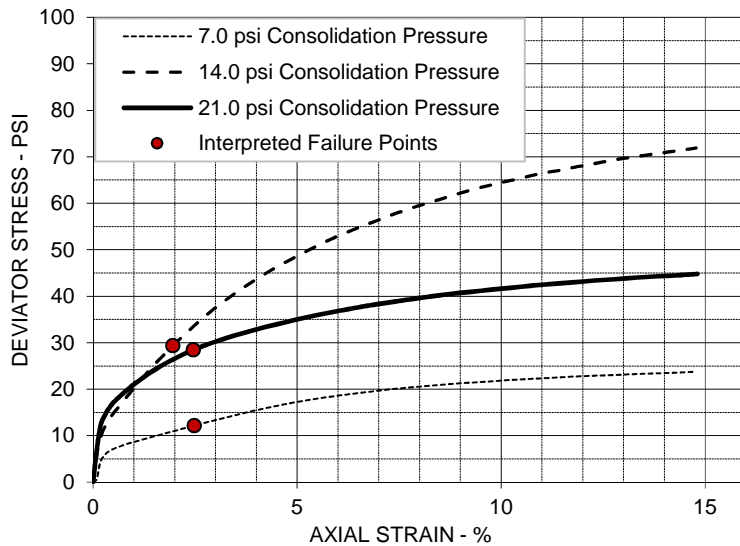
Failure Criteria: Max Obliquity (s1': s3')



### EFFECTIVE STRESS PARAMETERS

$\phi' = 35.8 \text{ deg}$

$c' = 1.1 \text{ psi}$



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	18.9	18.9	18.9
Dry Density - pcf	105.0	110.1	110.2
Diameter - inches	2.88	2.88	2.89
Height - inches	5.95	5.94	5.94
AT TEST			
Final Moisture - %	24.3	17.4	16.7
Dry Density - pcf	105.5	110.8	111.0
Calculated Diameter (in.)	2.87	2.86	2.87
Height - inches	5.92	5.90	5.89
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	12.18	29.35	28.46
Total Pore Pressure - psi	54.2	55.7	61.9
Strain Rate - %/min	0.0010	0.0010	0.0010
Failure Strain - %	2.5	2.0	2.5
$\sigma_1'$ Failure - psi	14.99	37.65	37.59
$\sigma_3'$ Failure - psi	2.81	8.30	9.13

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Clayey Sand (SC) / A-6 (4)

SAMPLE ID: B-9B 18.0-20.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36    PL: 17    PI: 19    Percent -200: 41.9%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

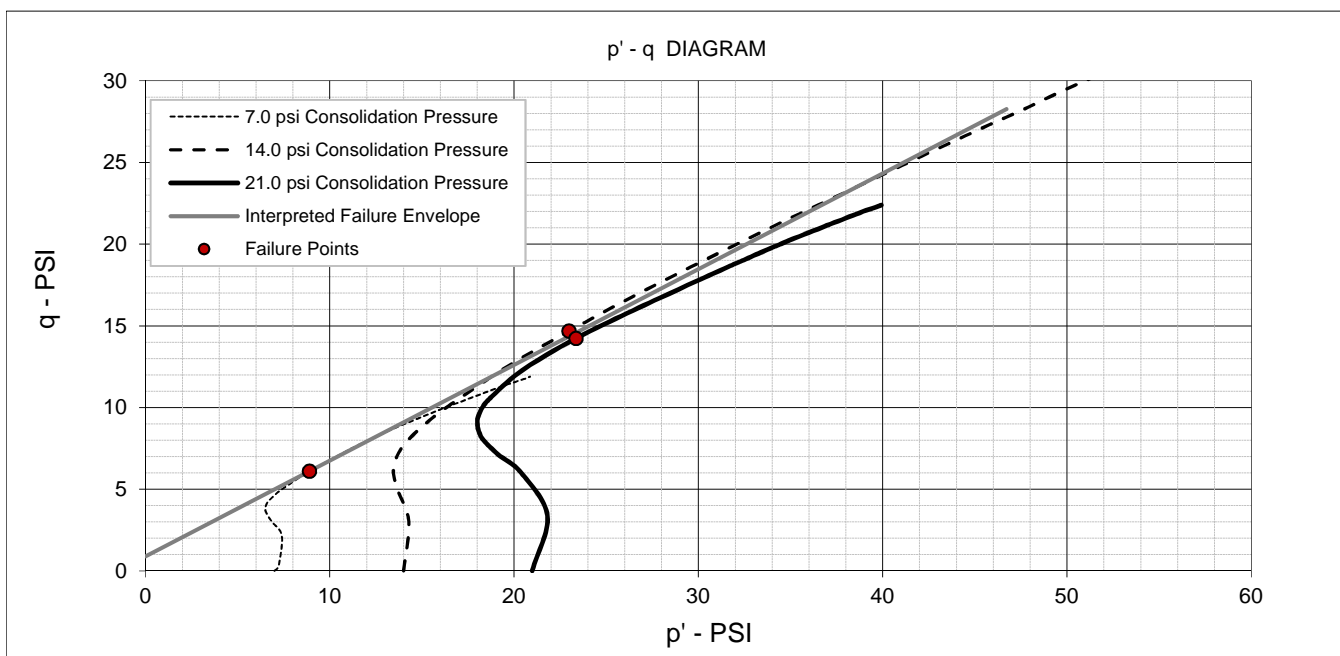
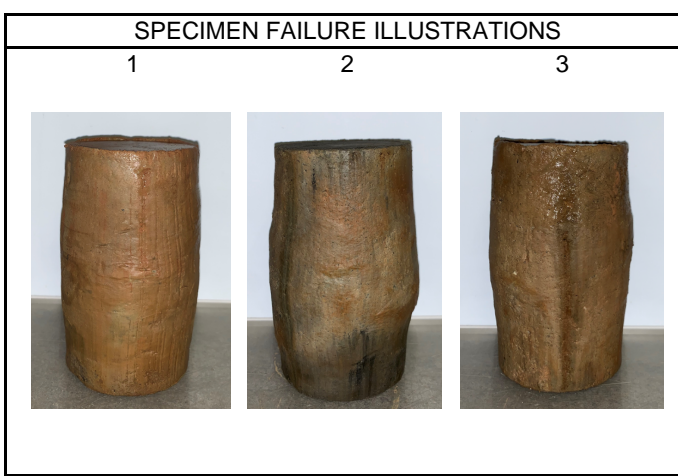
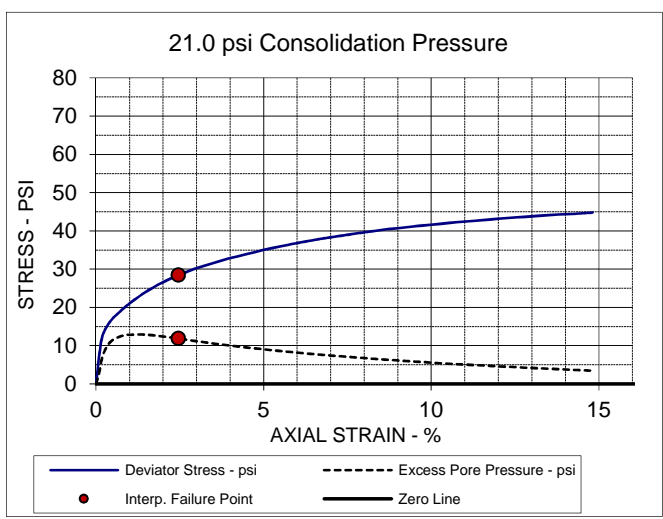
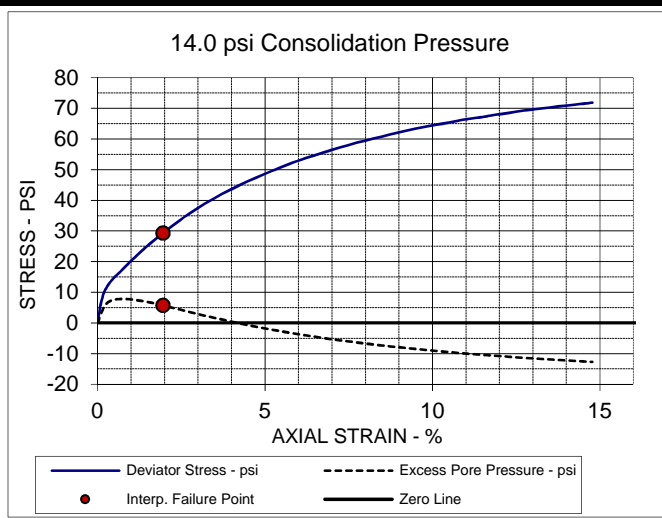
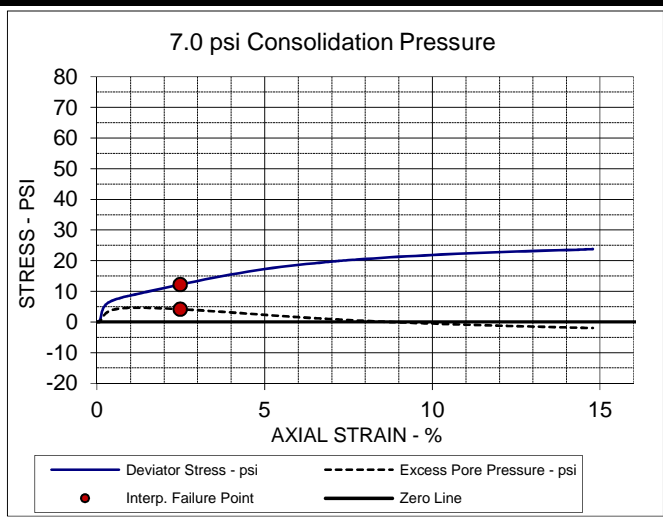
PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

DATE: 03/24/22

521 Clemson Road  
Columbia, SC

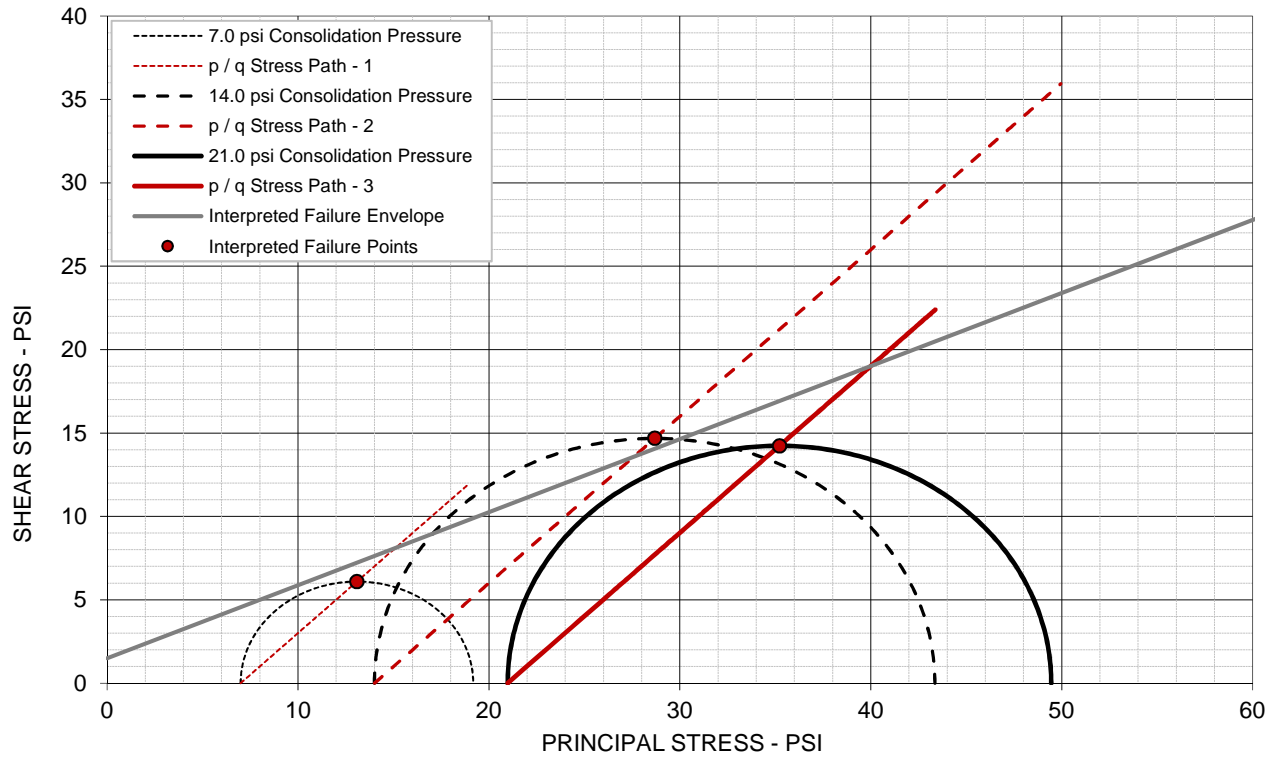




EFFECTIVE STRESS PARAMETERS		$R^2 = 1.00$	$\alpha = 30.4 \text{ deg}$	$a = 0.9 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-9B 18.0-20.0' ST-1		521 Clemson Road Columbia, SC		
DESCRIPTION: Clayey Sand (SC) / A-6 (4)				

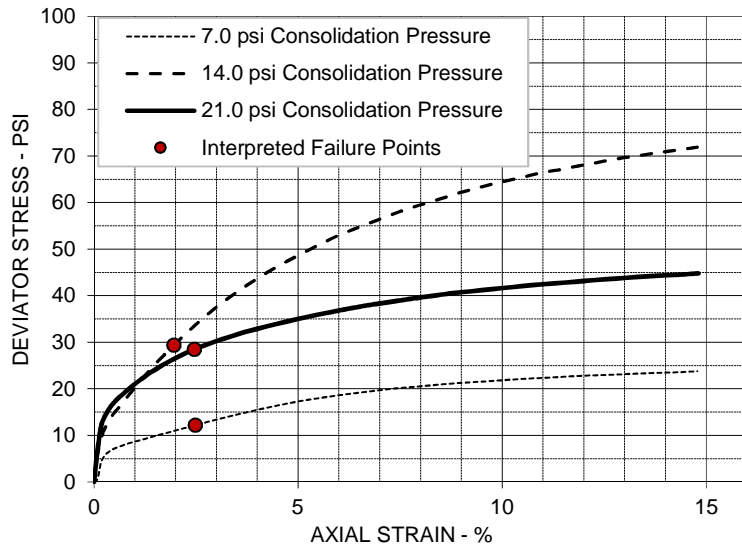
## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

Failure Criteria: Max Obliquity (s1': s3')



### TOTAL STRESS PARAMETERS

$\phi = 23.7$  deg       $c = 1.5$  psi



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	18.9	18.9	18.9
Dry Density - pcf	105.0	110.1	110.2
Diameter - inches	2.88	2.88	2.89
Height - inches	5.95	5.94	5.94
AT TEST			
Final Moisture - %	24.3	17.4	16.7
Dry Density - pcf	105.5	110.8	111.0
Calculated Diameter (in.)	2.87	2.86	2.87
Height - inches	5.92	5.90	5.89
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	12.18	29.35	28.46
Total Pore Pressure - psi	54.2	55.7	61.9
Strain Rate - %/min	0.0010	0.0010	0.0010
Failure Strain - %	2.5	2.0	2.5
$\sigma_1$ Failure - psi	19.18	43.35	49.45
$\sigma_3$ Failure - psi	7.00	14.01	20.98

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Clayey Sand (SC) / A-6 (4)

SAMPLE ID: B-9B 18.0-20.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36      PL: 17      PI: 19      Percent -200: 41.9%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

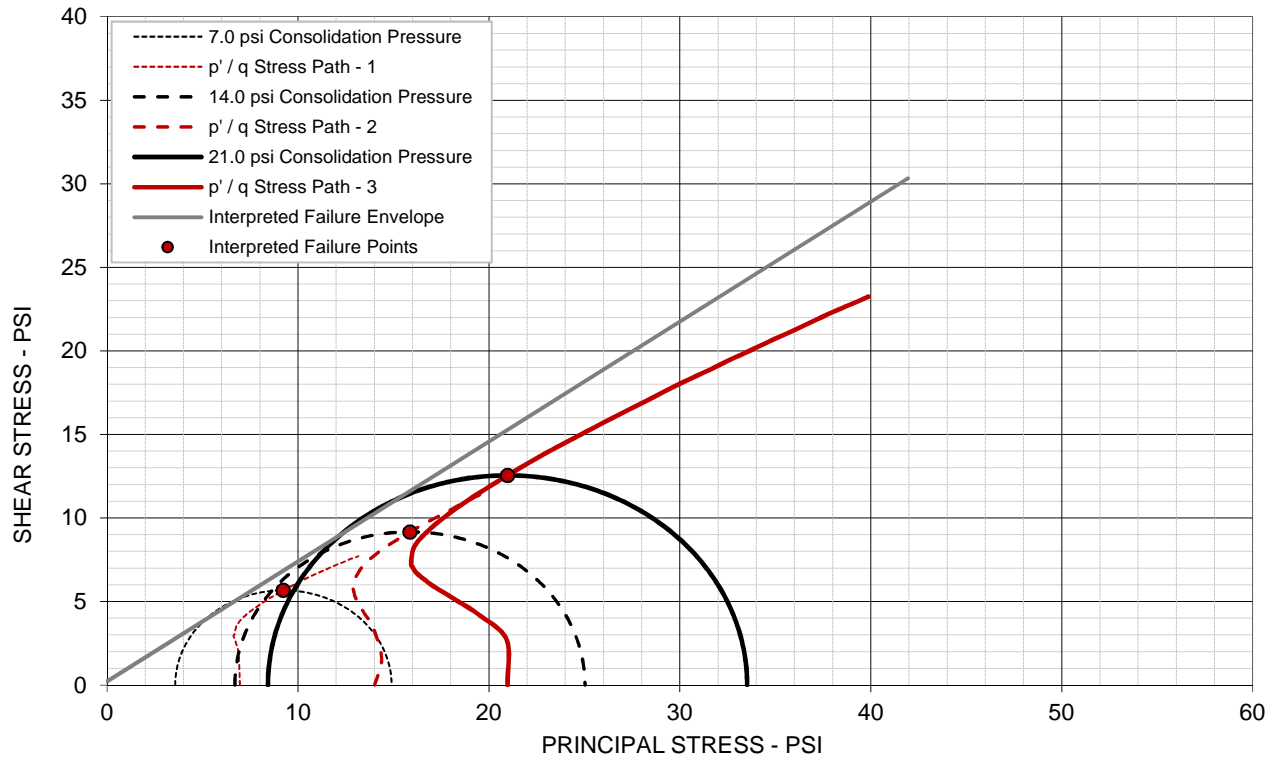
DATE: 03/24/22

**521 Clemson Road  
Columbia, SC**



## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

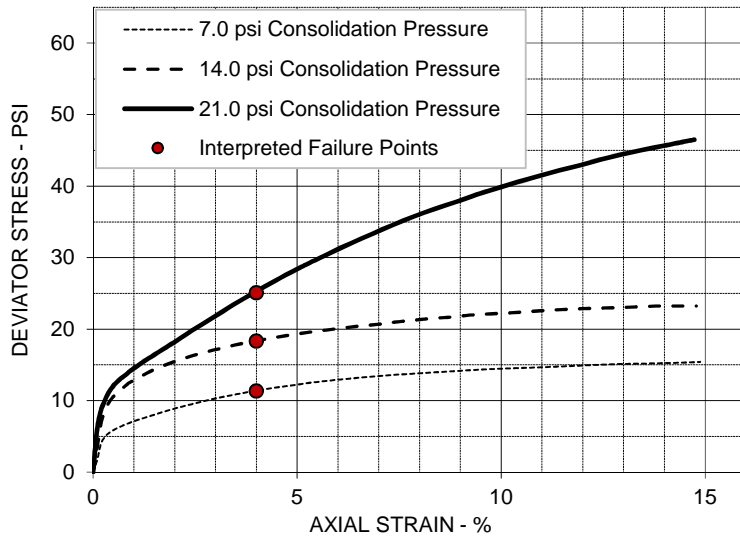
Failure Criteria: Set Strain = 4%



### EFFECTIVE STRESS PARAMETERS

$\phi' = 35.7$  deg

$c' = 0.2$  psi



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	33.0	33.0	33.0
Dry Density - pcf	85.8	88.5	88.9
Diameter - inches	2.84	2.84	2.88
Height - inches	5.97	5.98	5.95
AT TEST			
Final Moisture - %	33.4	28.3	25.8
Dry Density - pcf	86.7	89.9	90.9
Calculated Diameter (in.)	2.81	2.82	2.83
Height - inches	5.91	5.94	5.83
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	11.33	18.33	25.09
Total Pore Pressure - psi	53.4	57.3	62.6
Strain Rate - %/min	0.050	0.050	0.050
Failure Strain - %	4.0	4.0	4.0
$\sigma_1'$ Failure - psi	14.90	25.03	33.52
$\sigma_3'$ Failure - psi	3.57	6.70	8.43

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)

SAMPLE ID: B-20A 20.0-22.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36 PL: 23 PI: 13 Percent -200: 78.7%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

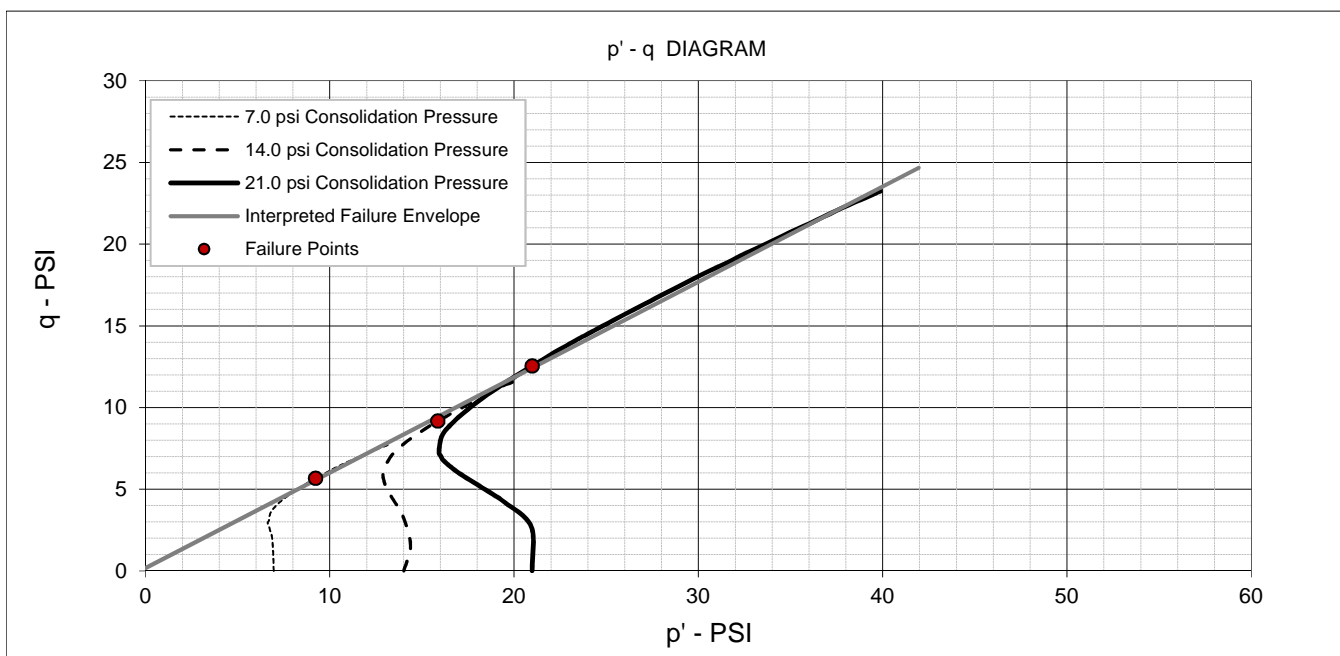
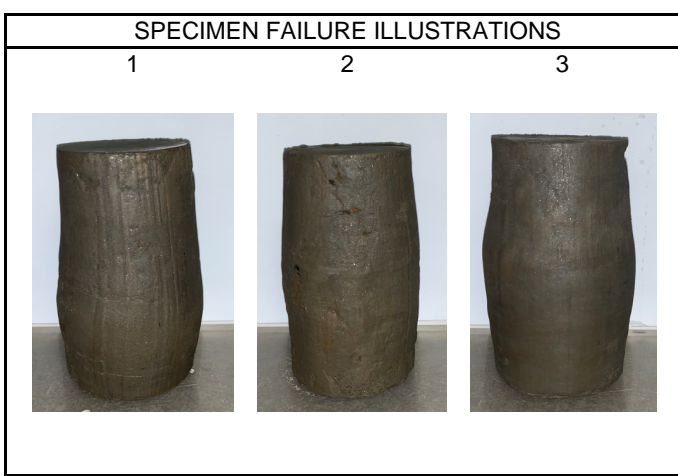
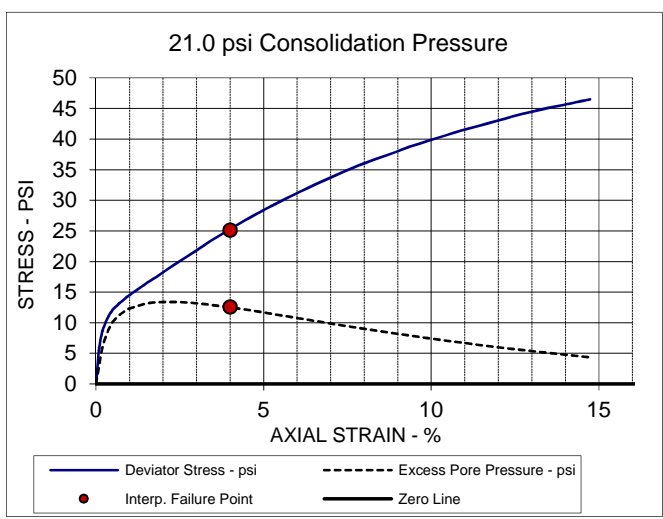
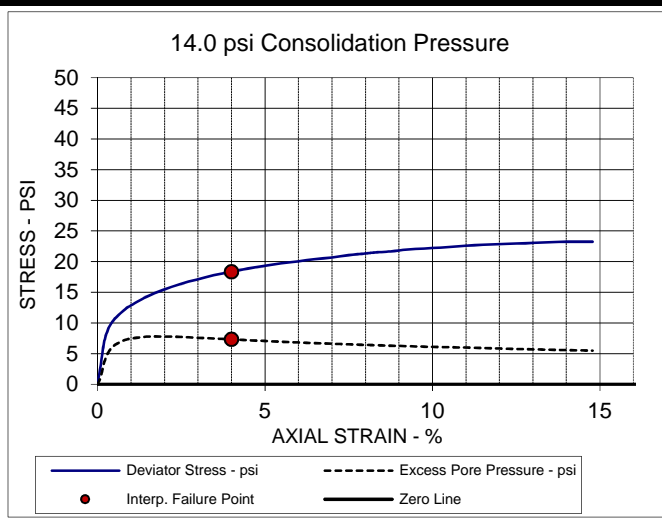
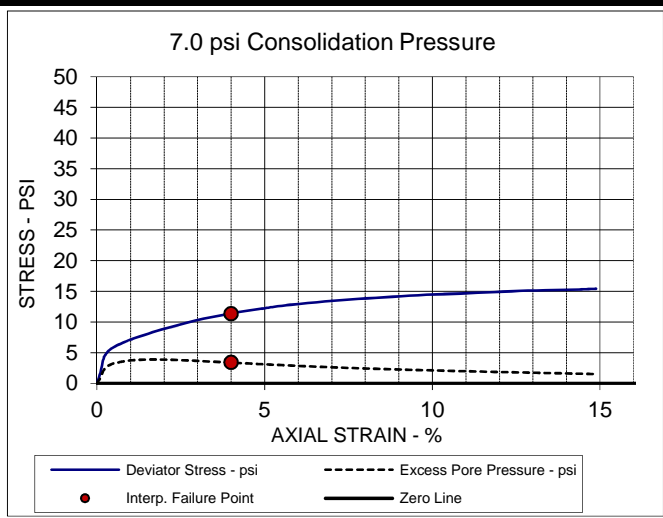
CLIENT: RS&H Architects-Engineers-Planners, Inc.

DATE: 02/17/22

521 Clemson Road  
Columbia, SC



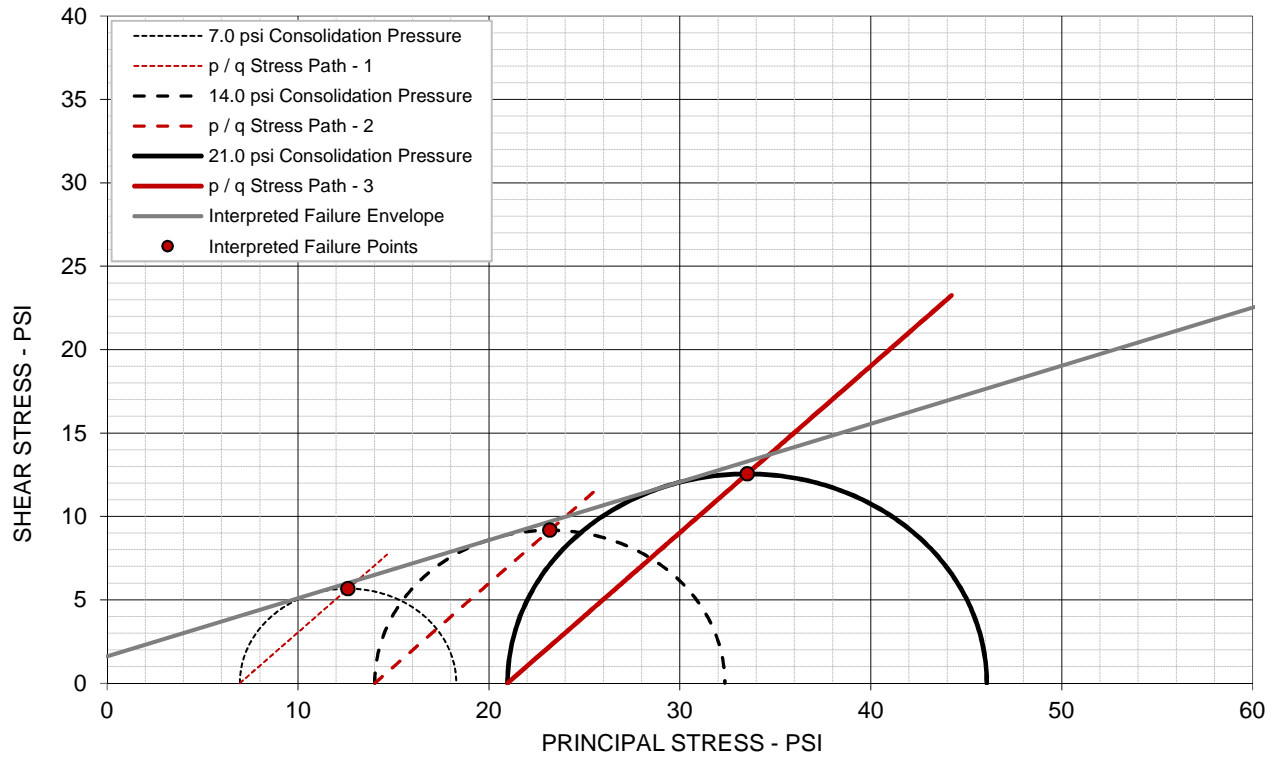




<b>EFFECTIVE STRESS PARAMETERS</b>		$R^2 = 1.00$	$\alpha = 30.3 \text{ deg}$	$a = 0.2 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-20A 20.0-22.0' ST-1		521 Clemson Road Columbia, SC		
DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)				

## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

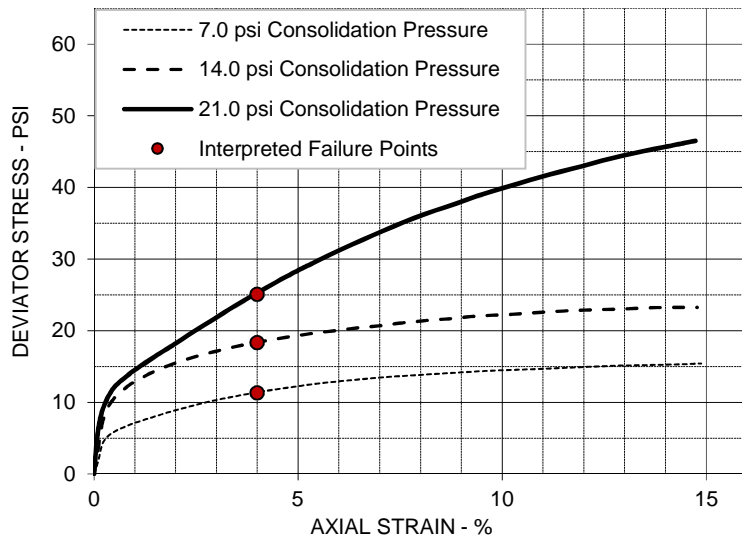
Failure Criteria: Set Strain = 4%



### TOTAL STRESS PARAMETERS

$\phi = 19.2 \text{ deg}$

$c = 1.6 \text{ psi}$



### SPECIMEN NO.

1    2    3

#### INITIAL

Moisture Content - %	33.0	33.0	33.0
Dry Density - pcf	85.8	88.5	88.9
Diameter - inches	2.84	2.84	2.88
Height - inches	5.97	5.98	5.95

#### AT TEST

Final Moisture - %	33.4	28.3	25.8
Dry Density - pcf	86.7	89.9	90.9
Calculated Diameter (in.)	2.81	2.82	2.83
Height - inches	5.91	5.94	5.83
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	11.33	18.33	25.09
Total Pore Pressure - psi	53.4	57.3	62.6
Strain Rate - %/min	0.05	0.05	0.05
Failure Strain - %	4.0	4.0	4.0
$\sigma_1$ Failure - psi	18.29	32.35	46.07
$\sigma_3$ Failure - psi	6.96	14.02	20.98

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed  
 DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)  
 SAMPLE ID: B-20A 20.0-22.0' ST-1  
 SPECIFIC GRAVITY: 2.65  
 LL: 36    PL: 23    PI: 13    Percent -200: 78.7%

Remarks:

### PROJECT INFORMATION

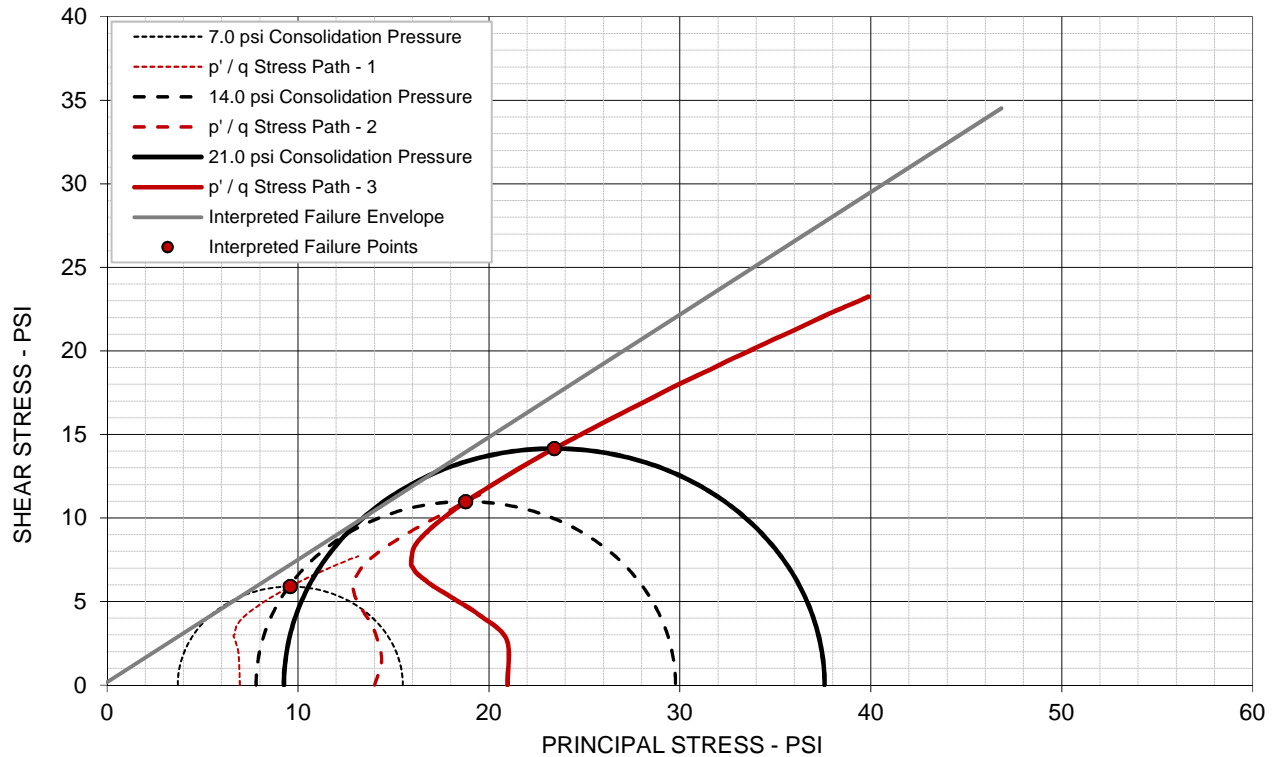
PROJECT: I-20 Wateree River Bridge Repairs  
 LOCATION: Kershaw County, SC  
 PROJECT #: 7321P043A  
 CLIENT: RS&H Architects-Engineers-Planners, Inc.  
 DATE: 02/17/22

521 Clemson Road  
Columbia, SC



## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

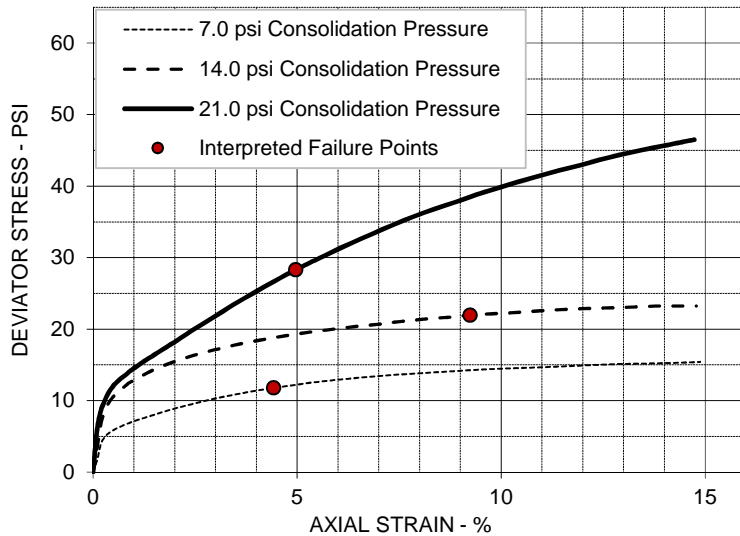
Failure Criteria: Max Obliquity (s1': s3')



### EFFECTIVE STRESS PARAMETERS

$\phi' = 36.3 \text{ deg}$

$c' = 0.2 \text{ psi}$



SPECIMEN NO.	1	2	3
	INITIAL		
Moisture Content - %	33.0	33.0	33.0
Dry Density - pcf	85.8	88.5	88.9
Diameter - inches	2.84	2.84	2.88
Height - inches	5.97	5.98	5.95
AT TEST			
Final Moisture - %	33.4	28.3	25.8
Dry Density - pcf	86.7	89.9	90.9
Calculated Diameter (in.)	2.81	2.82	2.83
Height - inches	5.91	5.94	5.83
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	11.79	21.97	28.31
Total Pore Pressure - psi	53.3	56.2	61.8
Strain Rate - %/min	0.050	0.050	0.050
Failure Strain - %	4.4	9.2	5.0
$\sigma_1'$ Failure - psi	15.49	29.77	37.58
$\sigma_3'$ Failure - psi	3.70	7.80	9.26

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed  
 DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)  
 SAMPLE ID: B-20A 20.0-22.0' ST-1  
 SPECIFIC GRAVITY: 2.65  
 LL: 36    PL: 23    PI: 13    Percent -200: 78.7%

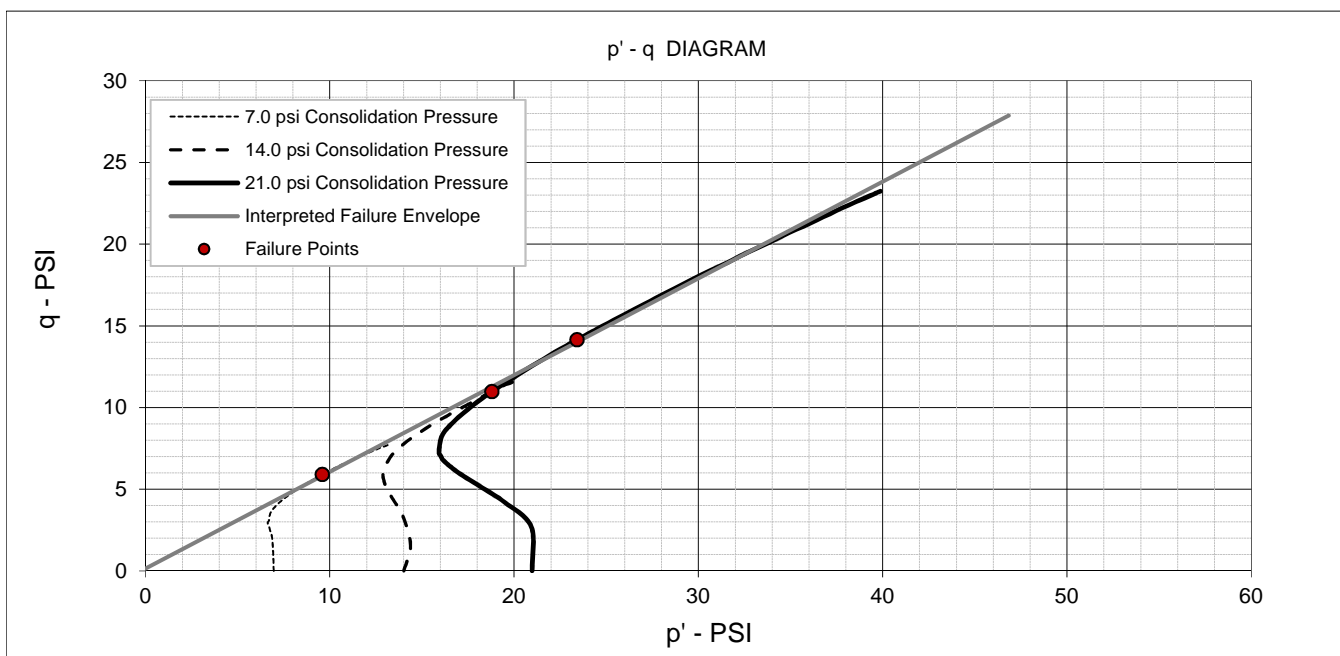
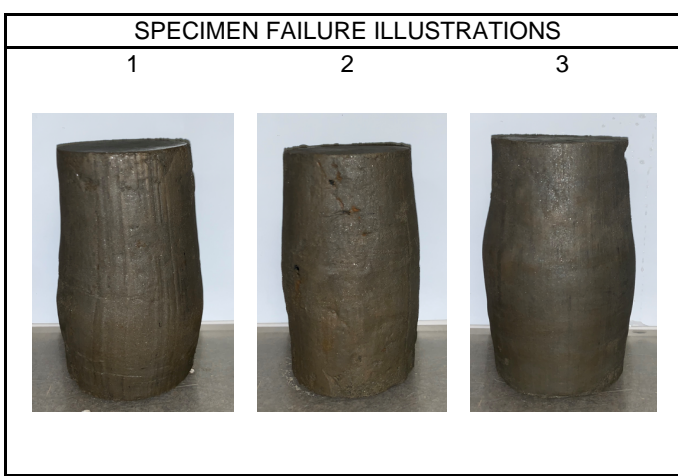
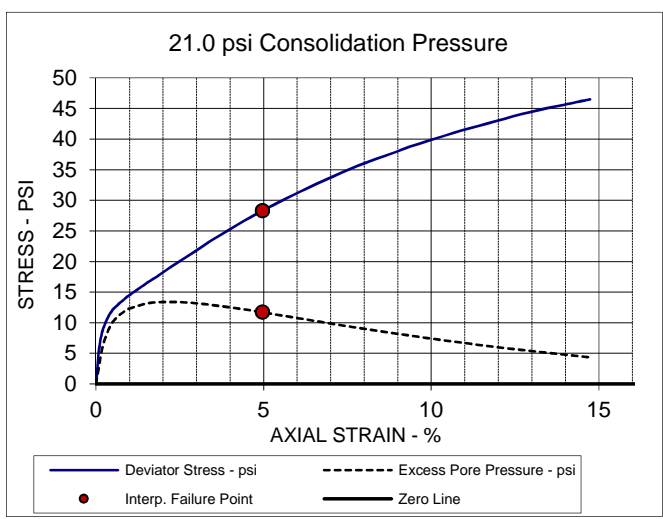
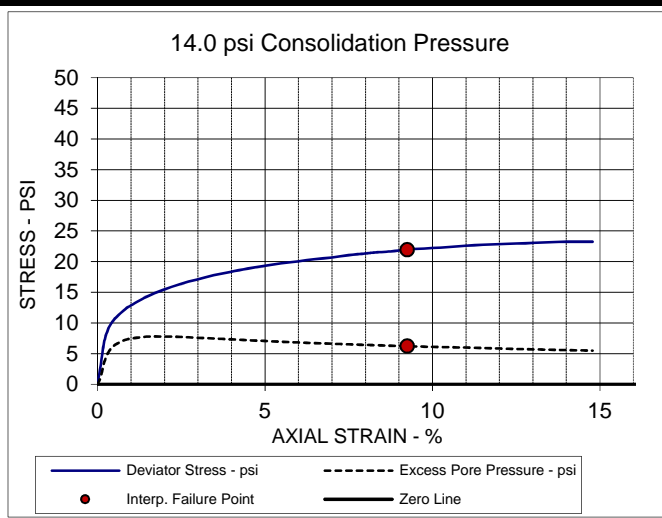
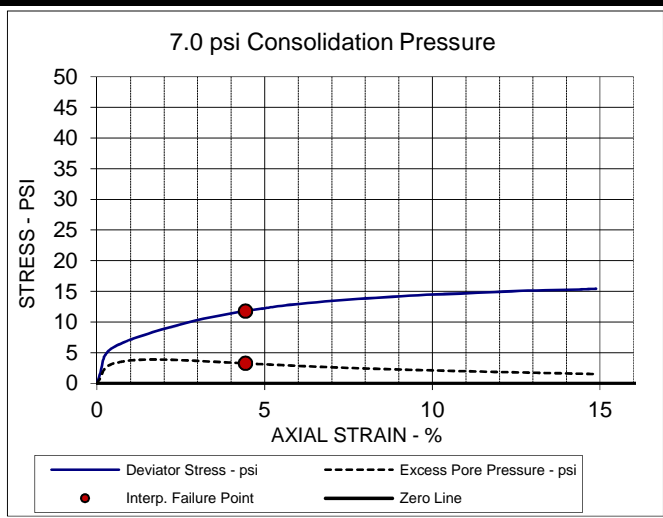
Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs  
 LOCATION: Kershaw County, SC  
 PROJECT #: 7321P043A  
 CLIENT: RS&H Architects-Engineers-Planners, Inc.  
 DATE: 02/17/22

521 Clemson Road  
Columbia, SC

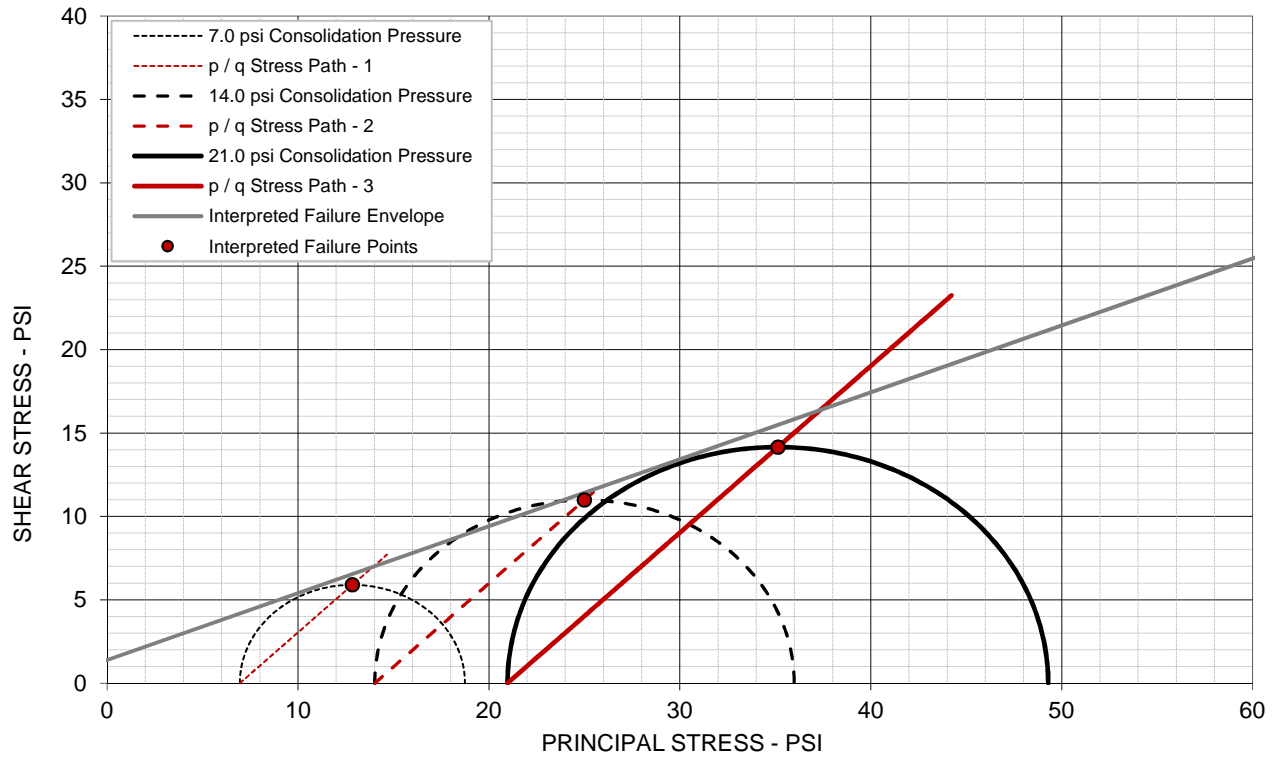




EFFECTIVE STRESS PARAMETERS		$R^2 = 1.00$	$\alpha = 30.6 \text{ deg}$	$a = 0.1 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-20A 20.0-22.0' ST-1		521 Clemson Road		
DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)		Columbia, SC		

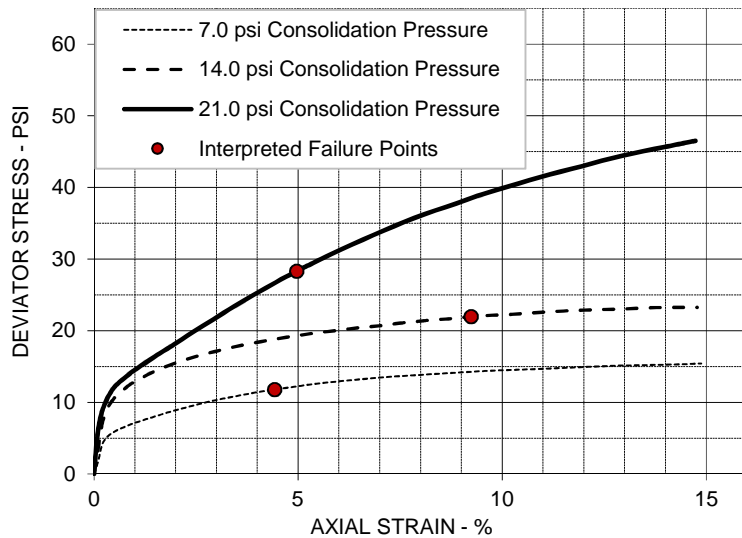
## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

Failure Criteria: Max Obliquity (s1': s3')



### TOTAL STRESS PARAMETERS

$\phi = 21.9$  deg       $c = 1.4$  psi



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	33.0	33.0	33.0
Dry Density - pcf	85.8	88.5	88.9
Diameter - inches	2.84	2.84	2.88
Height - inches	5.97	5.98	5.95
AT TEST			
Final Moisture - %	33.4	28.3	25.8
Dry Density - pcf	86.7	89.9	90.9
Calculated Diameter (in.)	2.81	2.82	2.83
Height - inches	5.91	5.94	5.83
Effect. Consol. Stress - psi	7.0	14.0	21.0
Failure Stress - psi	11.79	21.97	28.31
Total Pore Pressure - psi	53.3	56.2	61.8
Strain Rate - %/min	0.05	0.05	0.05
Failure Strain - %	4.4	9.2	5.0
$\sigma_1$ Failure - psi	18.74	35.99	49.29
$\sigma_3$ Failure - psi	6.96	14.02	20.98

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Undisturbed

DESCRIPTION: Lean Clay with Sand (CL) / A-6 (10)

SAMPLE ID: B-20A 20.0-22.0' ST-1

SPECIFIC GRAVITY: 2.65

LL: 36      PL: 23      PI: 13      Percent -200: 78.7%

Remarks:

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

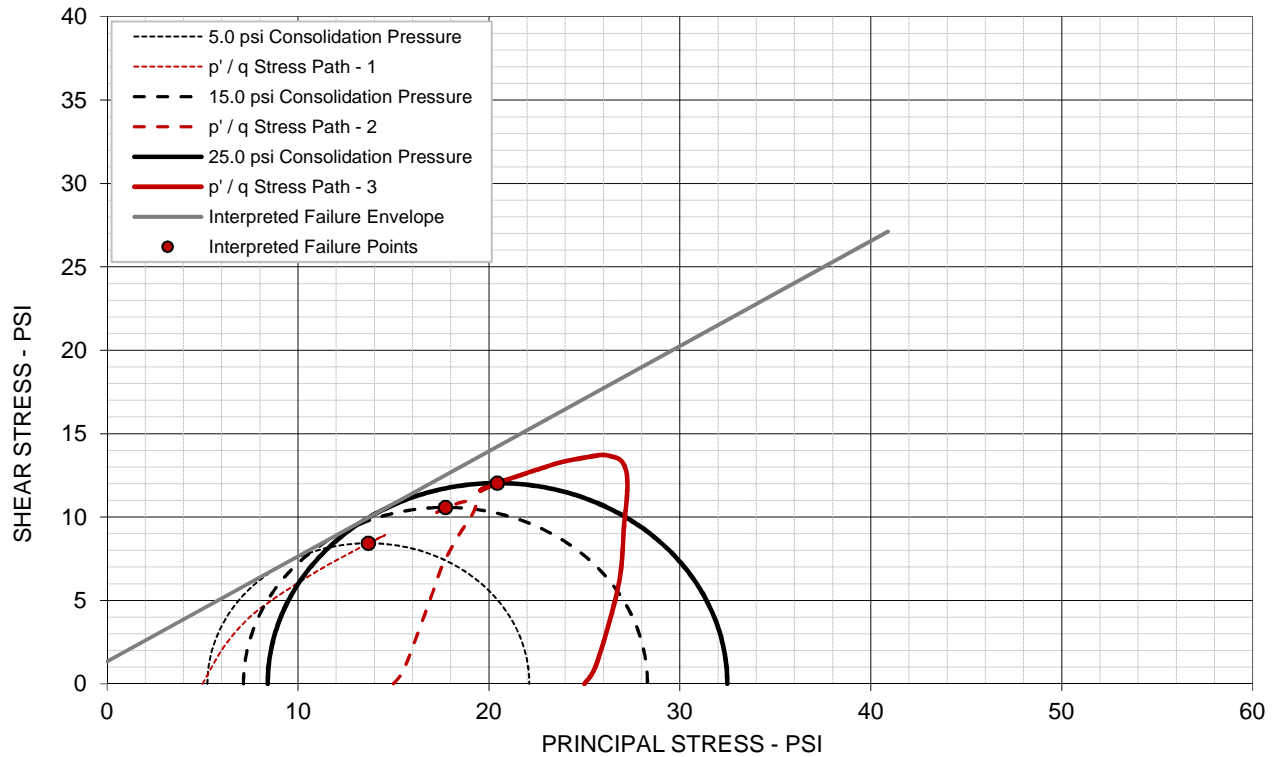
DATE: 02/17/22

**521 Clemson Road  
Columbia, SC**



## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

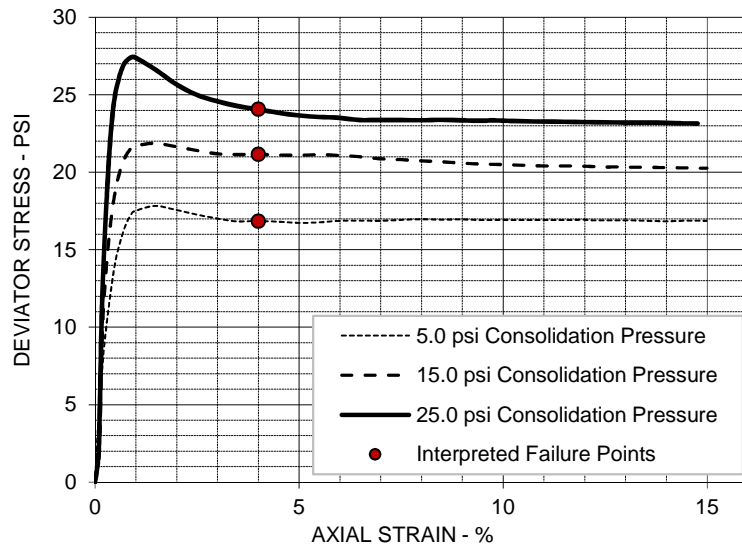
Failure Criteria: Set Strain = 4%



### EFFECTIVE STRESS PARAMETERS

$\phi' = 32.2 \text{ deg}$

$c' = 1.3 \text{ psi}$



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	11.1	11.1	11.1
Dry Density - pcf	115.8	115.9	116.0
Diameter - inches	2.86	2.86	2.86
Height - inches	6.00	6.00	5.99
AT TEST			
Final Moisture - %	15.4	15.7	15.1
Dry Density - pcf	115.9	116.4	116.8
Calculated Diameter (in.)	2.85	2.85	2.85
Height - inches	5.99	5.98	5.97
Effect. Consol. Stress - psi	5.0	15.0	25.0
Failure Stress - psi	16.86	21.16	24.07
Total Pore Pressure - psi	89.7	97.9	106.6
Strain Rate - %/min	0.0030	0.0030	0.0030
Failure Strain - %	4.0	4.0	4.0
$\sigma_1'$ Failure - psi	22.11	28.30	32.48
$\sigma_3'$ Failure - psi	5.26	7.14	8.41

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Remolded

DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)

SAMPLE ID: B-20 Bulk 0-5'

SPECIFIC GRAVITY: 2.65

LL: 21 PL: 15 PI: 6 Percent -200: 29.6%

Remarks: Remolded to 95% of the Standard Proctor

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

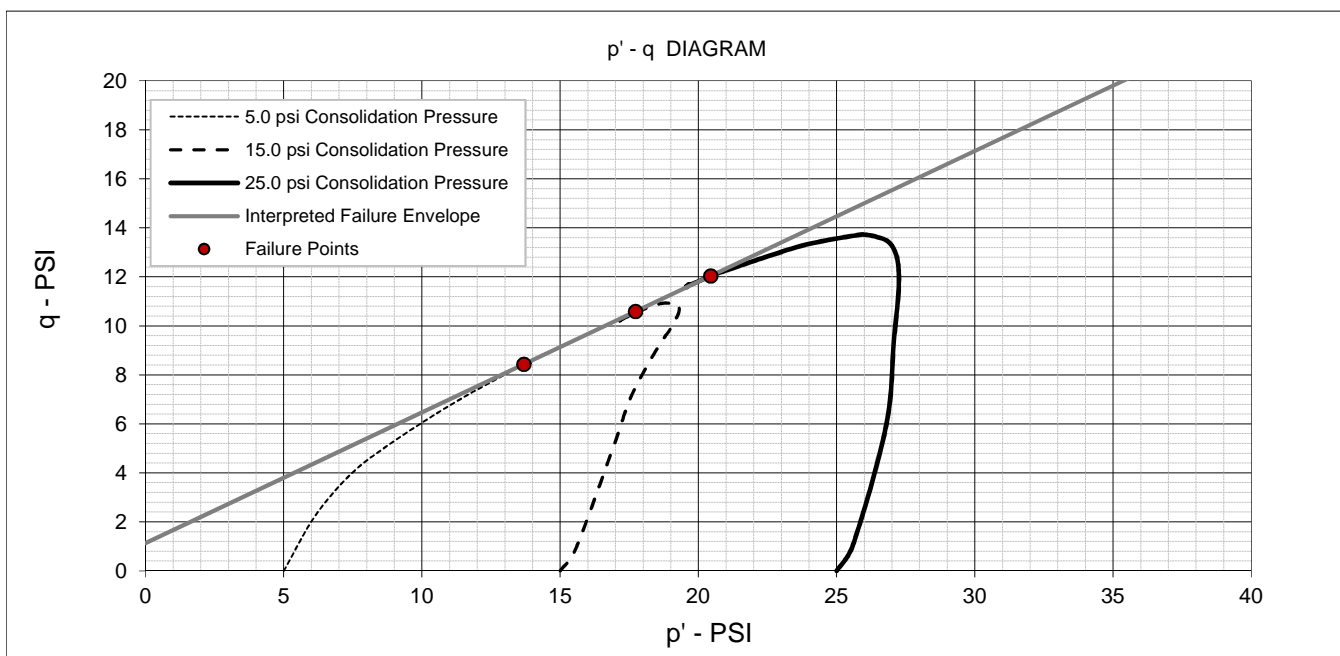
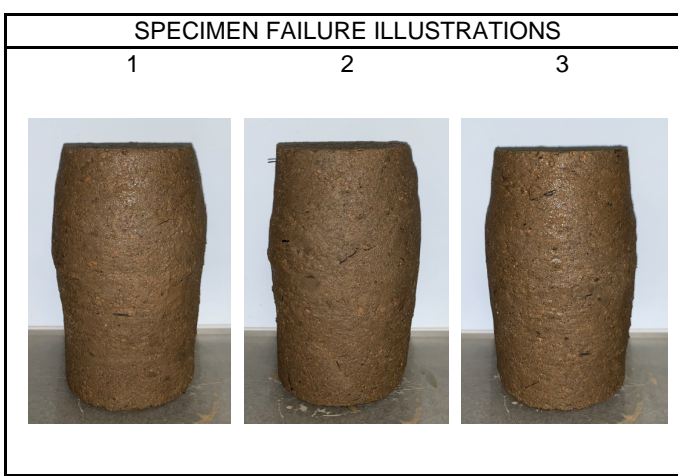
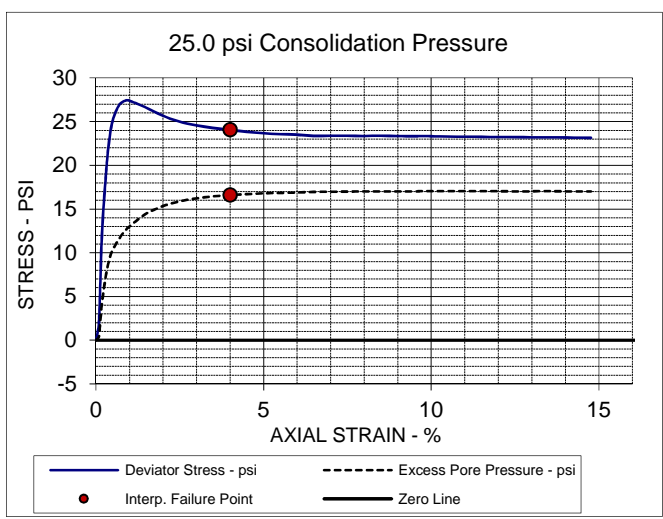
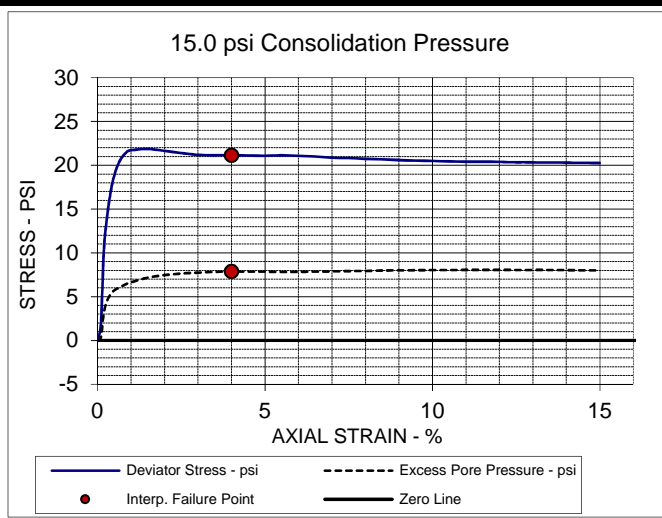
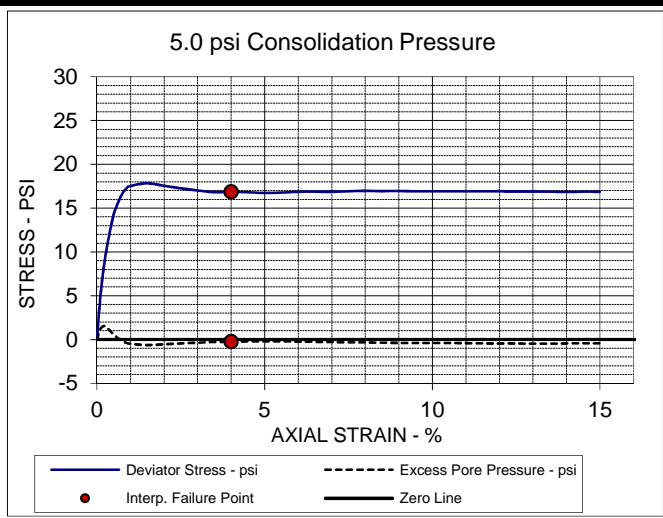
CLIENT: RS&H Architects-Engineers-Planners, Inc.

DATE: 03/24/22

521 Clemson Road  
Columbia, SC



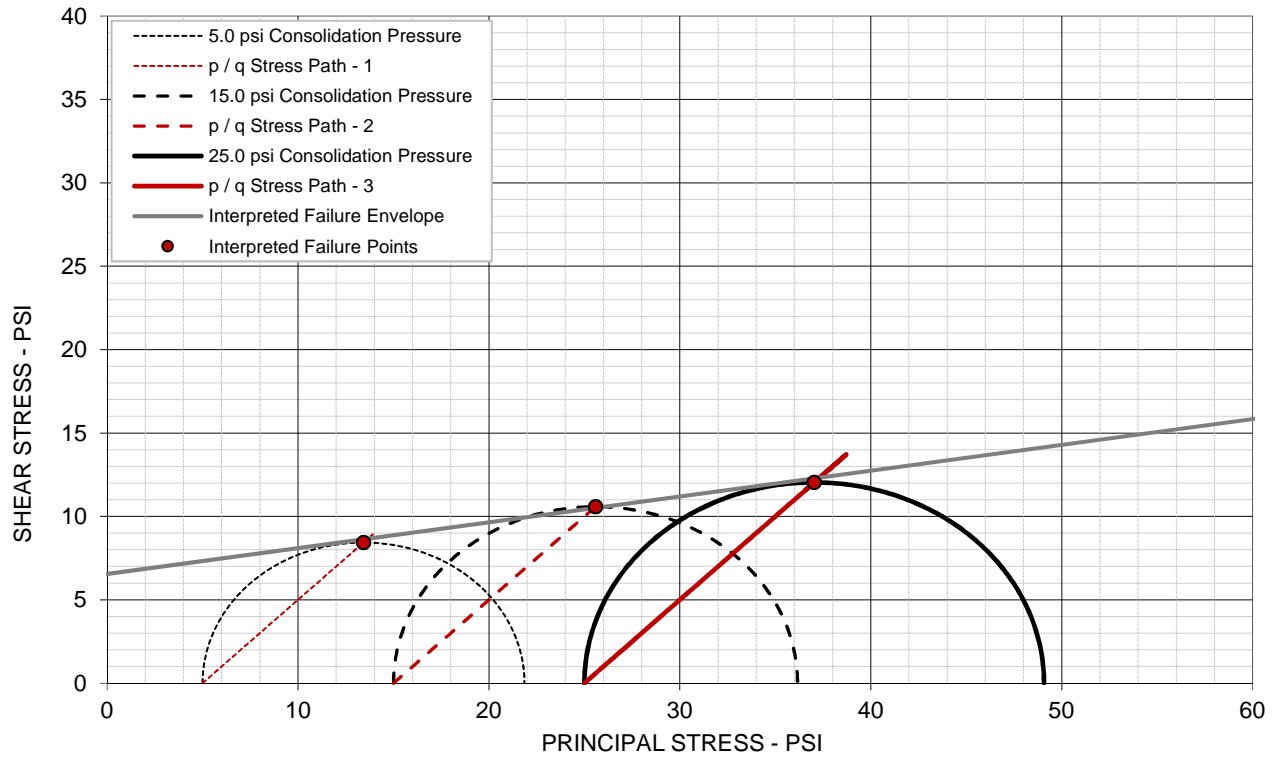




EFFECTIVE STRESS PARAMETERS		$R^2 = 1.00$	$\alpha = 28.1 \text{ deg}$	$a = 1.1 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-20 Bulk 0-5'		521 Clemson Road		
DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)		Columbia, SC		

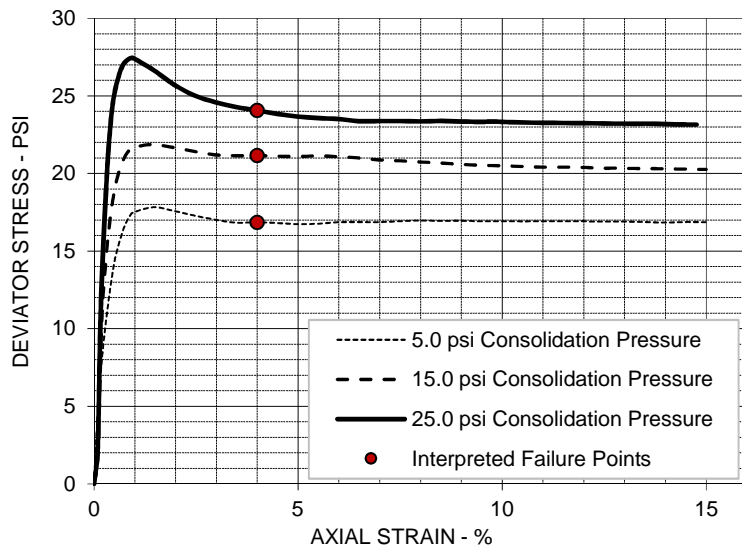
## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

Failure Criteria: Set Strain = 4%



### TOTAL STRESS PARAMETERS

$\phi = 8.8 \text{ deg}$        $c = 6.5 \text{ psi}$



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	11.1	11.1	11.1
Dry Density - pcf	115.8	115.9	116.0
Diameter - inches	2.86	2.86	2.86
Height - inches	6.00	6.00	5.99
AT TEST			
Final Moisture - %	15.4	15.7	15.1
Dry Density - pcf	115.9	116.4	116.8
Calculated Diameter (in.)	2.85	2.85	2.85
Height - inches	5.99	5.98	5.97
Effect. Consol. Stress - psi	5.0	15.0	25.0
Failure Stress - psi	16.86	21.16	24.07
Total Pore Pressure - psi	89.7	97.9	106.6
Strain Rate - %/min	0.0030	0.0030	0.0030
Failure Strain - %	4.0	4.0	4.0
$\sigma_1$ Failure - psi	21.86	36.16	49.07
$\sigma_3$ Failure - psi	5.00	15.01	25.00

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Remolded

DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)

SAMPLE ID: B-20 Bulk 0-5'

SPECIFIC GRAVITY: 2.65

LL: 21      PL: 15      PI: 6      Percent -200: 29.6%

Remarks: Remolded to 95% of the Standard Proctor

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

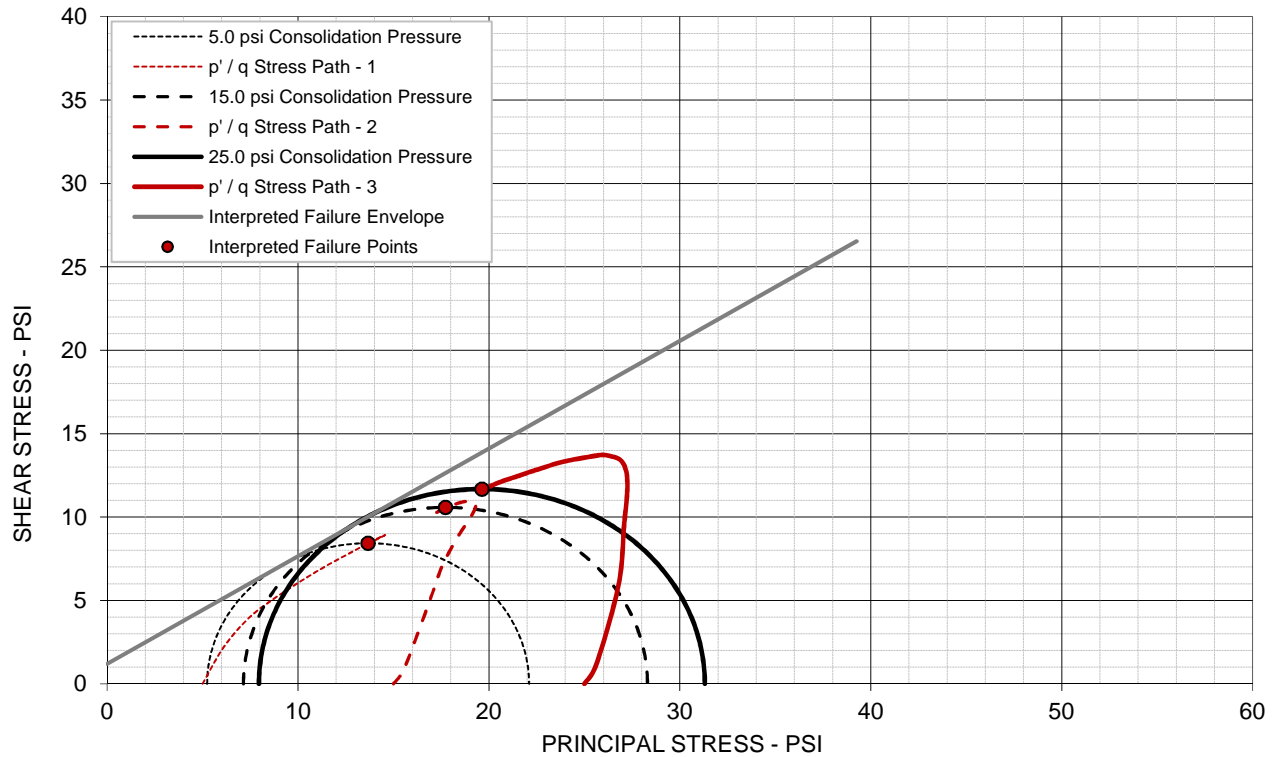
DATE: 03/24/22

**521 Clemson Road  
Columbia, SC**



## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

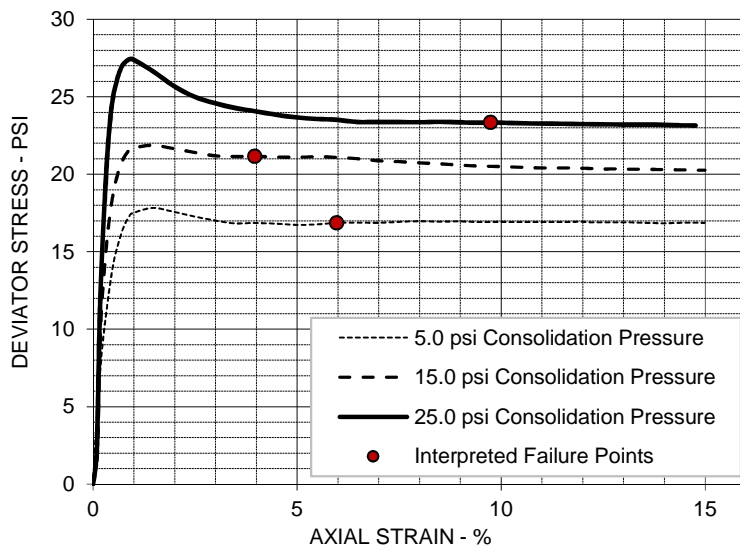
Failure Criteria: Max Obliquity ( $s_1': s_3'$ )



### EFFECTIVE STRESS PARAMETERS

$\phi' = 32.8 \text{ deg}$

$c' = 1.2 \text{ psi}$



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	11.1	11.1	11.1
Dry Density - pcf	115.8	115.9	116.0
Diameter - inches	2.86	2.86	2.86
Height - inches	6.00	6.00	5.99
AT TEST			
Final Moisture - %	15.4	15.7	15.1
Dry Density - pcf	115.9	116.4	116.8
Calculated Diameter (in.)	2.85	2.85	2.85
Height - inches	5.99	5.98	5.97
Effect. Consol. Stress - psi	5.0	15.0	25.0
Failure Stress - psi	16.86	21.16	23.35
Total Pore Pressure - psi	89.8	97.9	107.1
Strain Rate - %/min	0.0030	0.0030	0.0030
Failure Strain - %	6.0	4.0	9.7
$\sigma_1'$ Failure - psi	22.10	28.30	31.31
$\sigma_3'$ Failure - psi	5.24	7.14	7.95

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Remolded

DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)

SAMPLE ID: B-20 Bulk 0-5'

SPECIFIC GRAVITY: 2.65

LL: 21 PL: 15 PI: 6 Percent -200: 29.6%

Remarks: Remolded to 95% of the Standard Proctor

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs

LOCATION: Kershaw County, SC

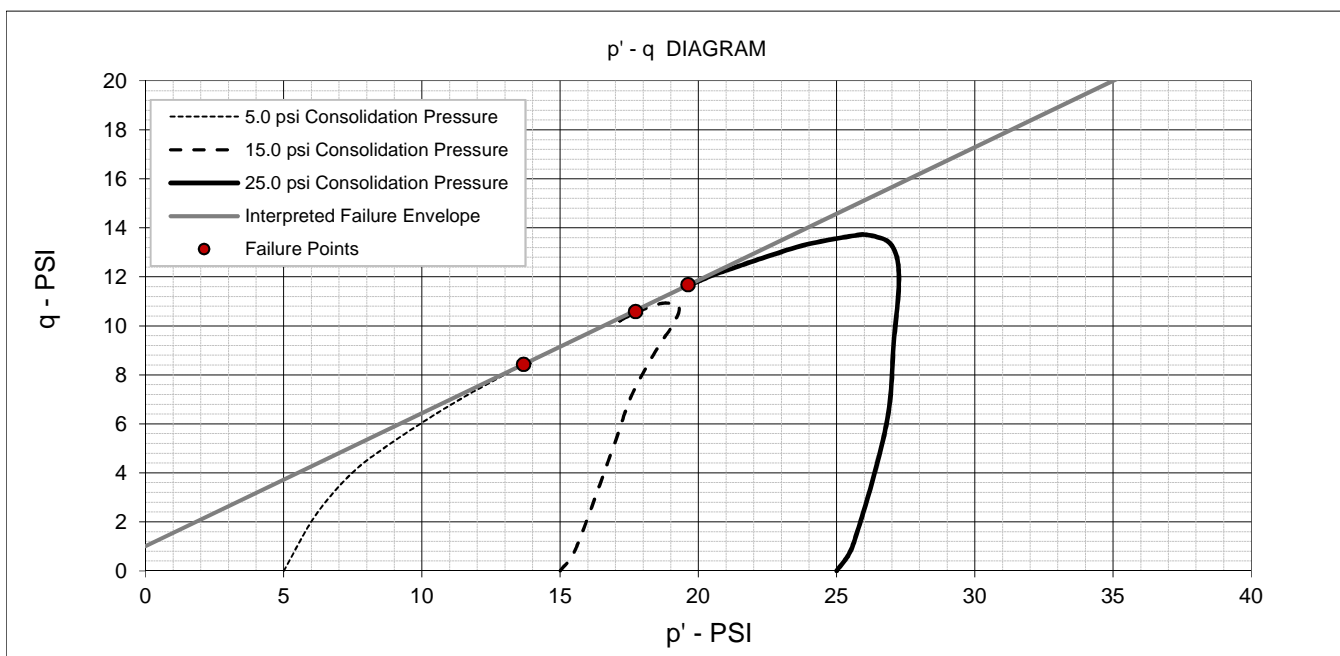
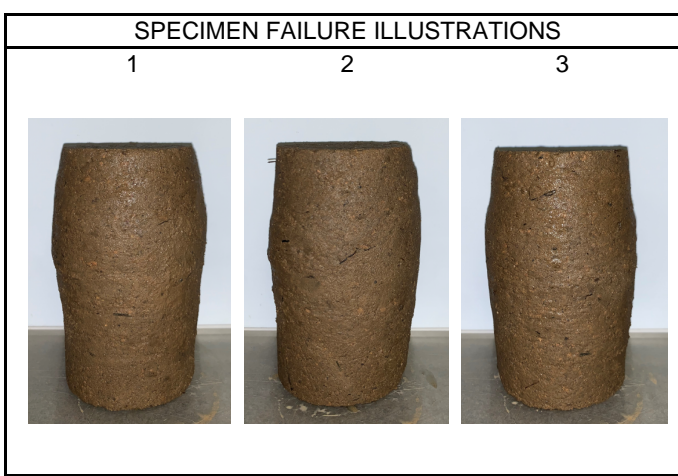
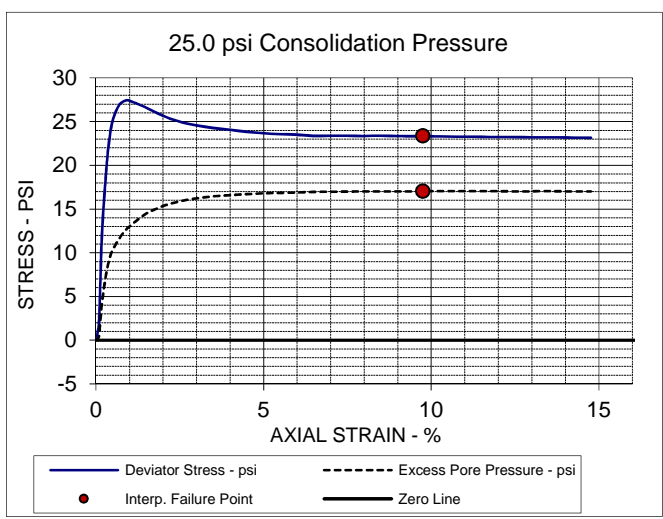
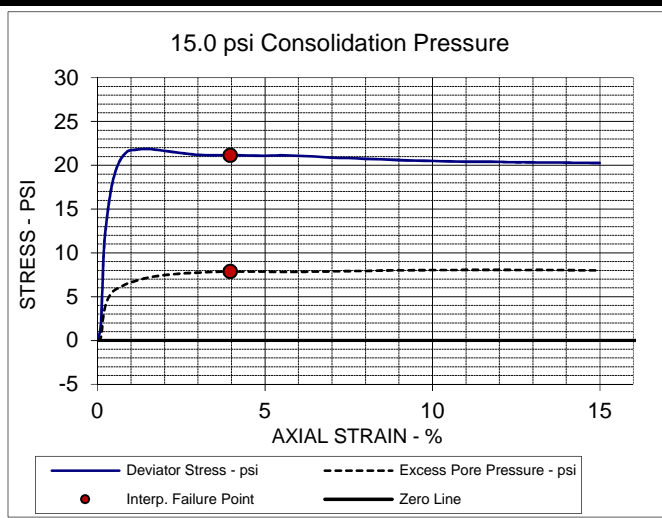
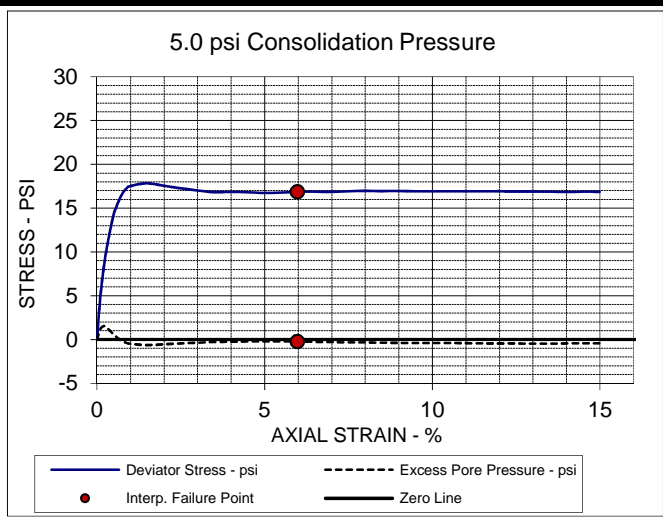
PROJECT #: 7321P043A

CLIENT: RS&H Architects-Engineers-Planners, Inc.

DATE: 03/24/22

521 Clemson Road  
Columbia, SC

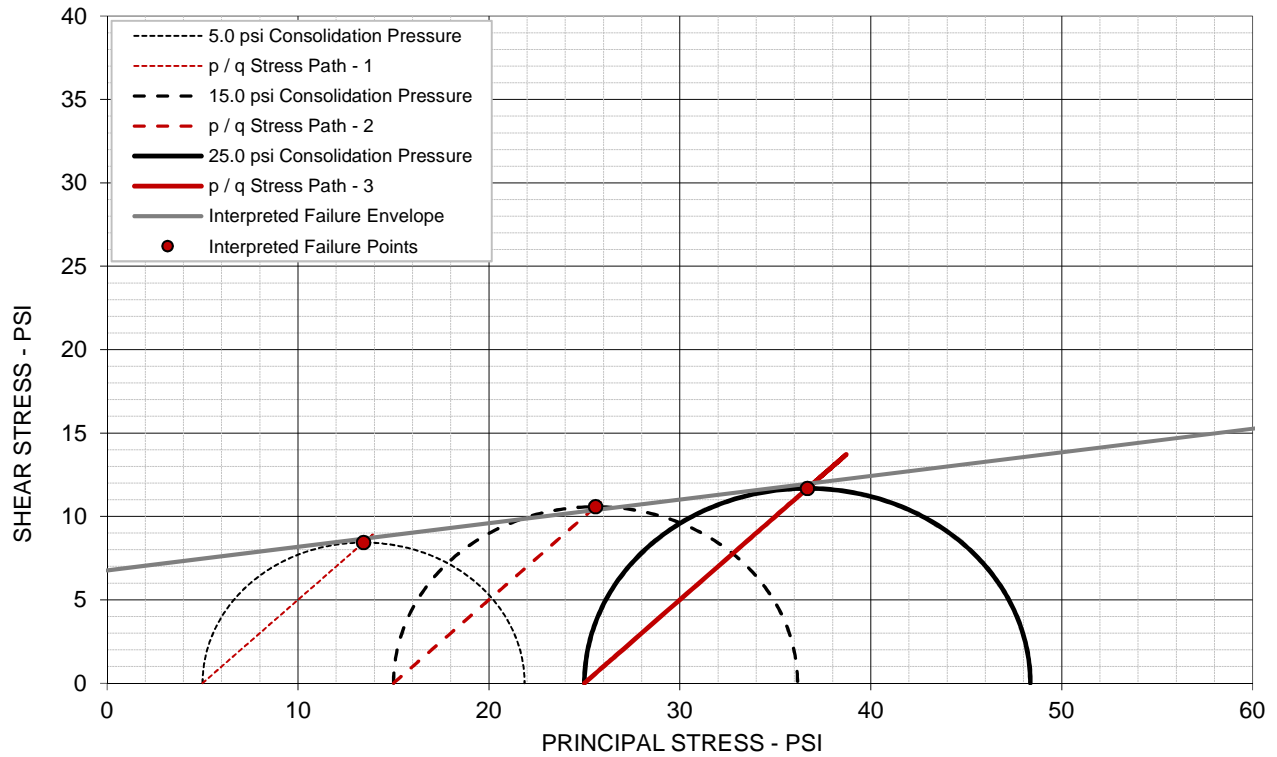




EFFECTIVE STRESS PARAMETERS		$R^2 = 1.00$	$\alpha = 28.5 \text{ deg}$	$a = 1.0 \text{ psi}$
PROJECT: I-20 Wateree River Bridge Repairs		ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION TEST		
LOCATION: Kershaw County, SC		CLIENT: RS&H Architects-Engineers-Planners, Inc.		
SAMPLE ID: B-20 Bulk 0-5'		521 Clemson Road		
DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)		Columbia, SC		

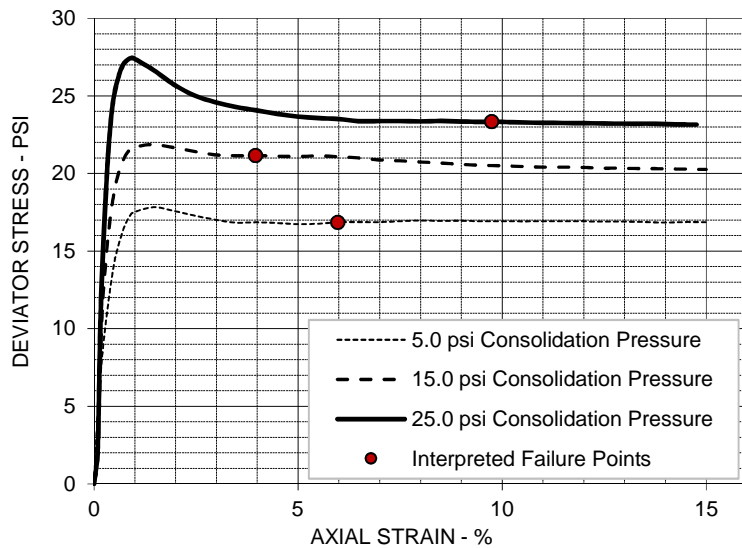
## ICU TRIAXIAL COMPRESSION TEST ASTM D4767 / AASHTO T297

Failure Criteria: Max Obliquity (s1': s3')



### TOTAL STRESS PARAMETERS

$\phi = 8.1$  deg       $c = 6.8$  psi



SPECIMEN NO.	1	2	3
INITIAL			
Moisture Content - %	11.1	11.1	11.1
Dry Density - pcf	115.8	115.9	116.0
Diameter - inches	2.86	2.86	2.86
Height - inches	6.00	6.00	5.99
AT TEST			
Final Moisture - %	15.4	15.7	15.1
Dry Density - pcf	115.9	116.4	116.8
Calculated Diameter (in.)	2.85	2.85	2.85
Height - inches	5.99	5.98	5.97
Effect. Consol. Stress - psi	5.0	15.0	25.0
Failure Stress - psi	16.86	21.16	23.35
Total Pore Pressure - psi	89.8	97.9	107.1
Strain Rate - %/min	0.0030	0.0030	0.0030
Failure Strain - %	6.0	4.0	9.7
$\sigma_1$ Failure - psi	21.87	36.16	48.35
$\sigma_3$ Failure - psi	5.00	15.01	25.00

### TEST DESCRIPTION

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL COMPRESSION

SAMPLE TYPE: Remolded  
 DESCRIPTION: Silty, Clayey Sand (SC-SM) / A-2-4 (0)  
 SAMPLE ID: B-20 Bulk 0-5'  
 SPECIFIC GRAVITY: 2.65  
 LL: 21      PL: 15      PI: 6      Percent -200: 29.6%

Remarks: Remolded to 95% of the Standard Proctor

### PROJECT INFORMATION

PROJECT: I-20 Wateree River Bridge Repairs  
 LOCATION: Kershaw County, SC  
 PROJECT #: 7321P043A  
 CLIENT: RS&H Architects-Engineers-Planners, Inc.  
 DATE: 03/24/22

**521 Clemson Road  
Columbia, SC**





# Rock Coring Summary

PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

Borehole	Core Run Number	Core Run Top Depth	REC (%)	RQD (%)	q <sub>u</sub> (psi)	Poisson's Ratio	Secant Modulus (ksi)	Unit Weight (pcf)	RMR	GSI
B-9	NQ-1	79.0	92	44						35
B-9	NQ-2	82.4	78	63						35
B-9	NQ-3	87.4	96	80						55
B-9	NQ-4	89.3	92	78						60
B-9	NQ-5	94.3	100	92						65
B-9A	NQ-1	77.2	100	69	1034	0.05	87	155	36	55
B-9A	NQ-2	80.7	100	84	1323	0.00	284	154	58	65
B-9A	NQ-3	85.7	92	54						35
B-9A	NQ-4	90.7	84	72	2505	0.07	474	162	45	65
B-9A	NQ-5	95.7	100	80	479	0.00	34	154	47	60
B-9A	NQ-6	100.7	100	78	69	0.00	16	162	47	60
B-9A	NQ-7	105.7	100	84	1923	0.01	360	162	49	65
B-9A	NQ-8	110.7	100	90						65
B-9A	NQ-9	115.7	100	100						70
B-10	NQ-1	61.3	57	51	9008	0.12	1022	162	65	65
B-10	NQ-2	65.0	98	98	10151	0.06	1182	162	72	75
B-10	NQ-3	70.0	100	90	8269	0.28	991	163	72	75
B-10	NQ-4	75.0	100	100	27313	0.07	1760	162	77	75
B-10	NQ-5	78.8	100	100						
B-11	NQ-1	50.5	80	70	4043	0.11	625	164	47	45
B-11	NQ-2	55.5	100	92	2119	0.02	392	162	57	50
B-11	NQ-3	60.5	100	86	2652	0.13	541	161	46	40
B-11	NQ-4	65.5	100	84	1237	0.00	239	163	40	40
B-12	NQ-1	37.0	100	100	34615	0.16	1664	164	80	70
B-12	NQ-2	40.0	100	100	23585	0.09	1701	164	77	70
B-12	NQ-3	45.0	100	100	31670	0.09	1679	164	80	70
B-12	NQ-4	50.0	100	100	21493	0.02	1506	164	77	70
B-12	NQ-5	54.5	98	85						70
B-13	NQ-1	78.1	90	90	3831	0.17	416	157	46	55
B-13	NQ-2	81.1	92	92	6943	0.19	555	160	46	65
B-13	NQ-3	86.1	100	100	9941	0.17	1015	163	57	65
B-13	NQ-4	91.1	100	96	11575	0.17	1055	158	67	70
B-13	NQ-5	96.1	100	85						70
B-14	NQ-1	72.5	83	60	5218	0.49	417	156	39	55
B-14	NQ-2	75.5	100	100	32186	0.08	1805	164	70	70
B-14	NQ-3	80.5	100	100	7503	0.19	619	159	72	65
B-14	NQ-4	85.5	100	100	21703	0.11	1563	163	77	65
B-14	NQ-5	90.5	100	100						70
B-15	NQ-1	45.3	60	0						30
B-15	NQ-2	45.7	93	93	13963	0.09	1379	164	72	65
B-15	NQ-3	50.7	100	100	22058	0.11	1544	162	77	70
B-15	NQ-4	55.7	100	100	19178	0.06	1372	164	77	70
B-15	NQ-5	60.7	100	97						70

ROCK CORING SUMMARY 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATATEMPLATE.GDT 3/20/22





# Rock Coring Summary

PROJECT ID P029450, P029776, P029777

PROJECT NAME I-20 Wateree River Bridge Repairs

PROJECT COUNTY Kershaw

Borehole	Core Run Number	Core Run Top Depth	REC (%)	RQD (%)	q <sub>u</sub> (psi)	Poisson's Ratio	Secant Modulus (ksi)	Unit Weight (pcf)	RMR	GSI
B-16	NQ-1	53.4	83	76	1657	0.06	164	156	41	55
B-16	NQ-2	56.6	97	85	2212	0.37	237	156	34	55
B-16	NQ-3	61.6	87	78	3111	0.25	348		59	55
B-16	NQ-4	66.6	98	90	2311	0.49	229	169	57	50
B-16	NQ-5	71.6	100	63						45
B-17	NQ-1	56.0	100	100	5657	0.13	754	162	64	65
B-17	NQ-2	60.4	100	77	6865	0.04	889	161	61	65
B-17	NQ-3	65.4	100	89	8065	0.09	1014	162	64	65
B-17	NQ-4	70.4	100	95	11321	0.12	1156	162	67	65
B-18	NQ-1	64.4	100	78						45
B-18	NQ-2	69.4	100	80	9003	0.13	1032	163	69	60
B-18	NQ-3	74.4	100	92	6192	0.10	817	162	59	65
B-18	NQ-4	79.4	100	90	5024	0.36	559	160	59	65
B-19	NQ-1	66.5	58	58	5127	0.06	758	161	39	60
B-19	NQ-2	71.5	100	83	8802	0.09	1040	166	61	65
B-19	NQ-3	76.5	100	93	9396	0.12	970	163	72	70
B-19	NQ-4	81.5	100	95						70
B-20	NQ-1	74.9	100	100						70
B-20	NQ-2	75.9	96	94	16507	0.02	1338	167	77	70
B-20	NQ-3	80.9	100	100	18618	0.07	1559	165	77	70
B-20	NQ-4	85.9	100	100	27876	0.04	1823	165	77	70
B-20	NQ-5	90.9	100	100	19406	0.13	1388	164	77	70

ROCK CORING SUMMARY 7321P043A SCDOT I-20 WATEREE RIVER BRIDGE REPAIRS.GPJ SCDOT DATATEMPLATE.GDT 3/2022

**Client**

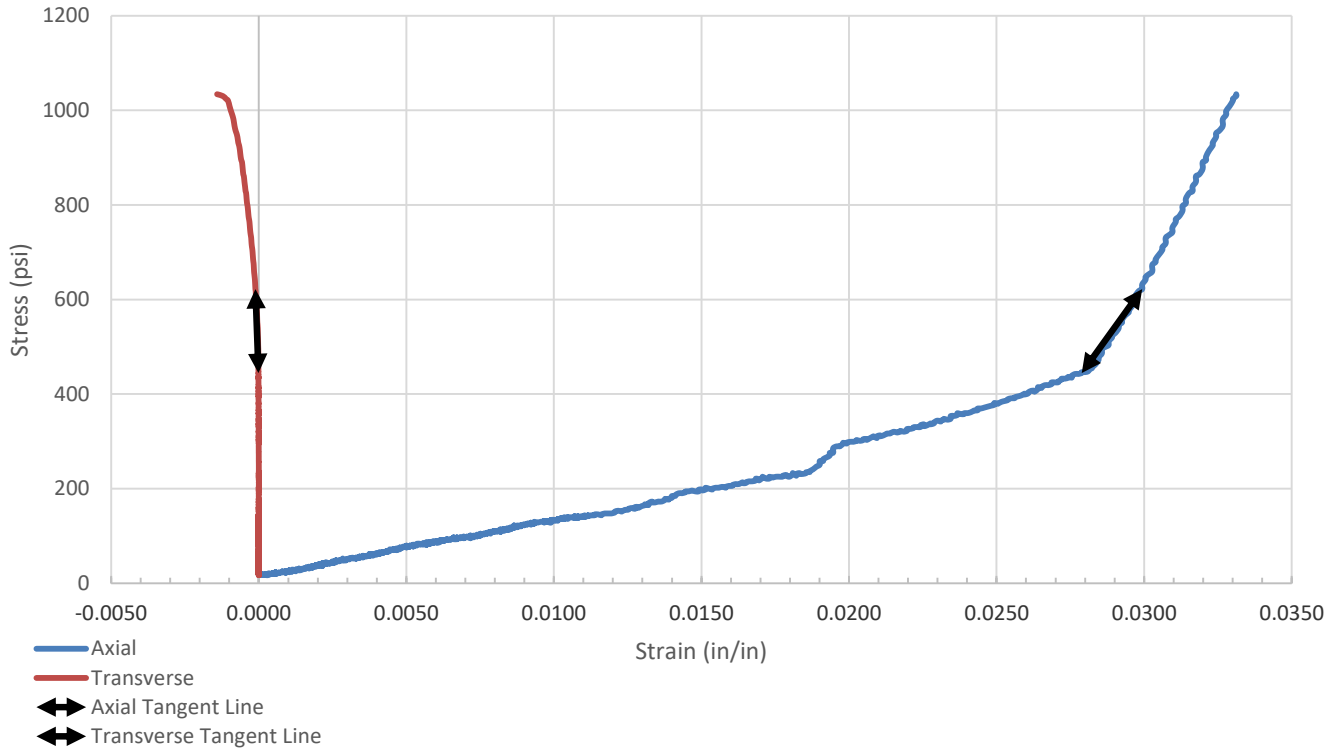
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	77.2

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	534
Length (in.):	4.415	Diameter (in.):	1.95
L/D Ratio:	2.3	Density (pcf):	155.081

**TEST RESULTS**

Failure Load (lbs):	3057
Failure Strain (%):	3.85
Unconfined Compressive Strength (psi):	1,034
Elastic Modulus, E, (ksi):	87
Poisson's Ratio, u:	0.050
Time of Failure (min):	03:07
Rate of Loading (psi/sec):	5.525
Moisture Content Post-break:	5.0%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0133
Diameter 1b:	0.0084
Diameter 2a:	0.0041
Diameter 2b:	0.0038
Max Deviation from Flatness:	0.0053
Parallelism Deviation:	
Diameter a:	0.76
Diameter b:	0.77

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

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**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

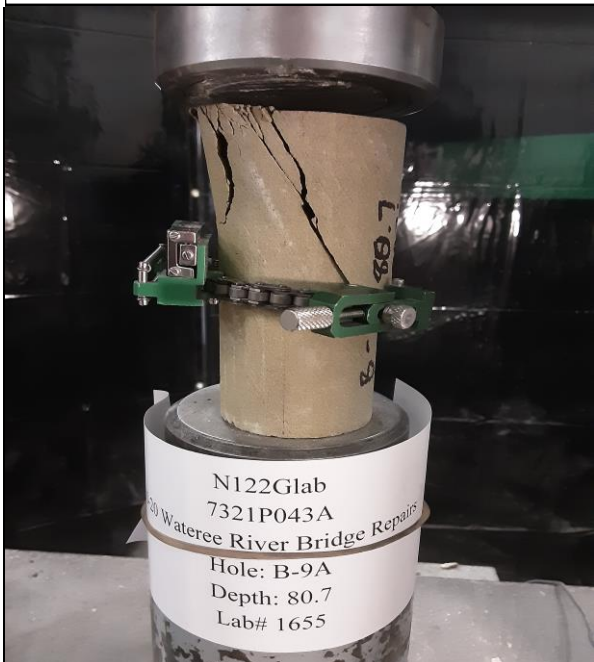
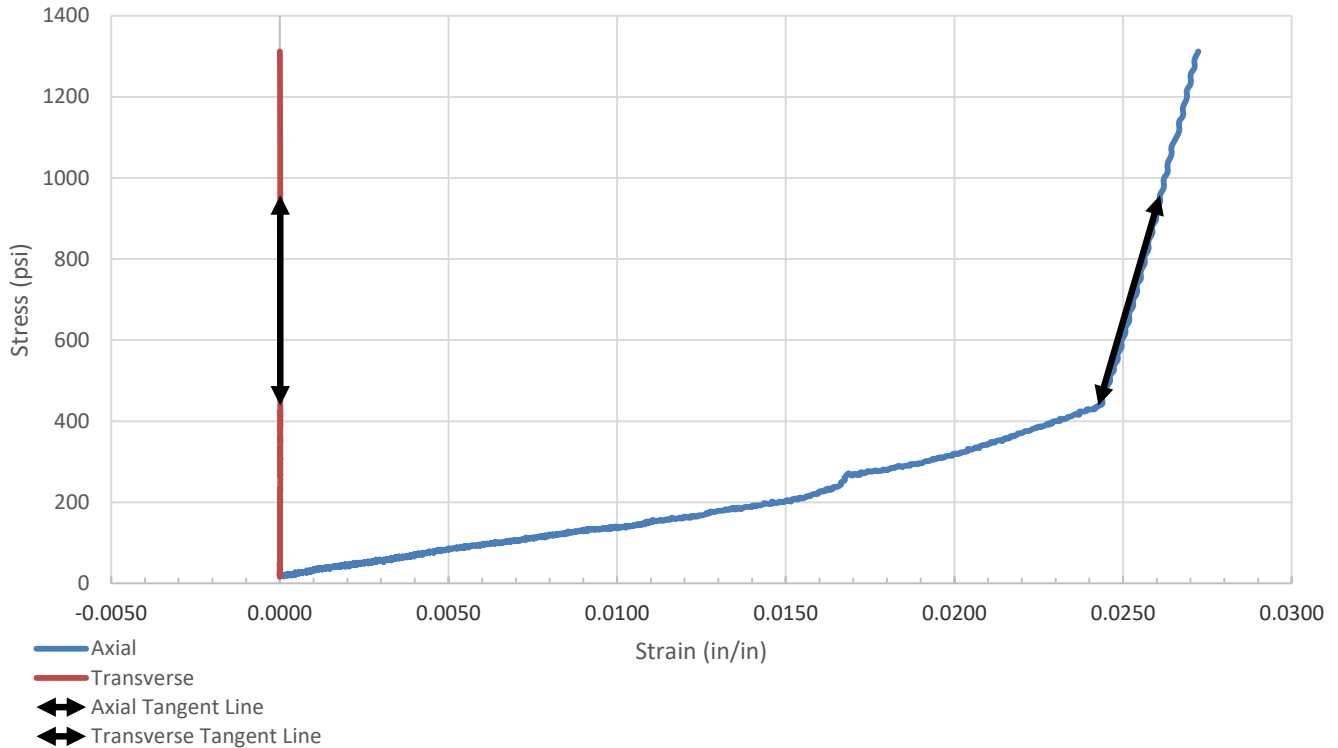
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	80.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	547.2
Length (in.):	4.41	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	154.298

**TEST RESULTS**

Failure Load (lbs):	4034
Failure Strain (%):	2.72
Unconfined Compressive Strength (psi):	1,323
Elastic Modulus, E, (ksi):	284
Poisson's Ratio, u:	0.001
Time of Failure (min):	03:35
Rate of Loading (psi/sec):	6.144
Moisture Content Post-break:	2.8%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0048
Diameter 1b:	0.0048
Diameter 2a:	0.0029
Diameter 2b:	0.0087
Max Deviation from Flatness:	0.0067
Parallelism Deviation:	
Diameter a:	0.17
Diameter b:	0.20

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

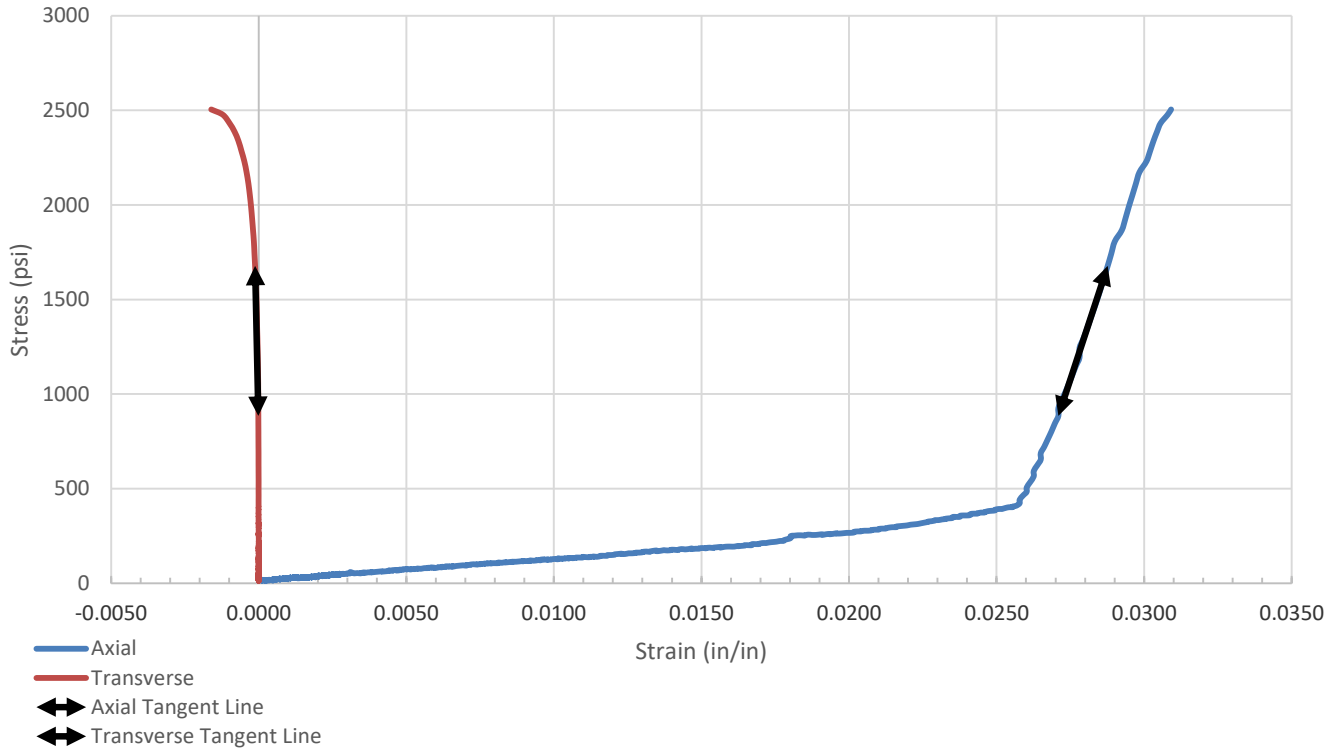
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	90.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	549.78
Length (in.):	4.21	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	161.571

**TEST RESULTS**

Failure Load (lbs):	7712
Failure Strain (%):	4.00
Unconfined Compressive Strength (psi):	2,505
Elastic Modulus, E, (ksi):	474
Poisson's Ratio, u:	0.066
Time of Failure (min):	02:53
Rate of Loading (psi/sec):	14.495
Moisture Content Post-break:	1.0%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0056
Diameter 1b:	0.0172
Diameter 2a:	0.0034
Diameter 2b:	0.0124
Max Deviation from Flatness:	0.0044
Parallelism Deviation:	
Diameter a:	0.52
Diameter b:	0.13

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Samples sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

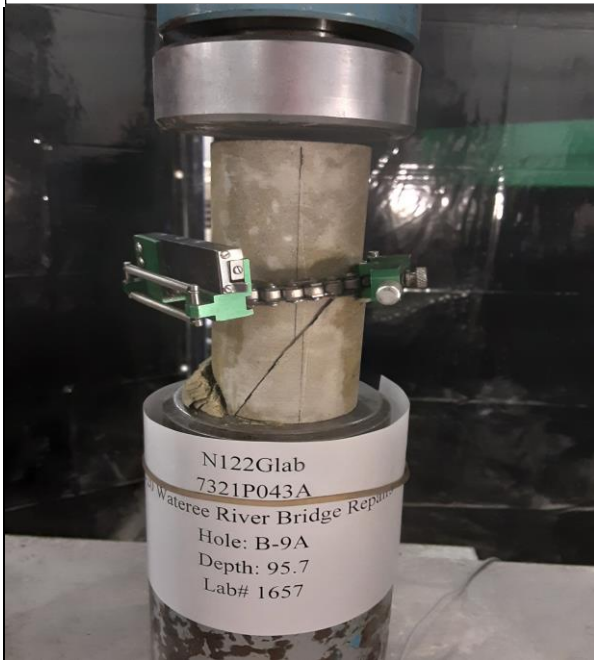
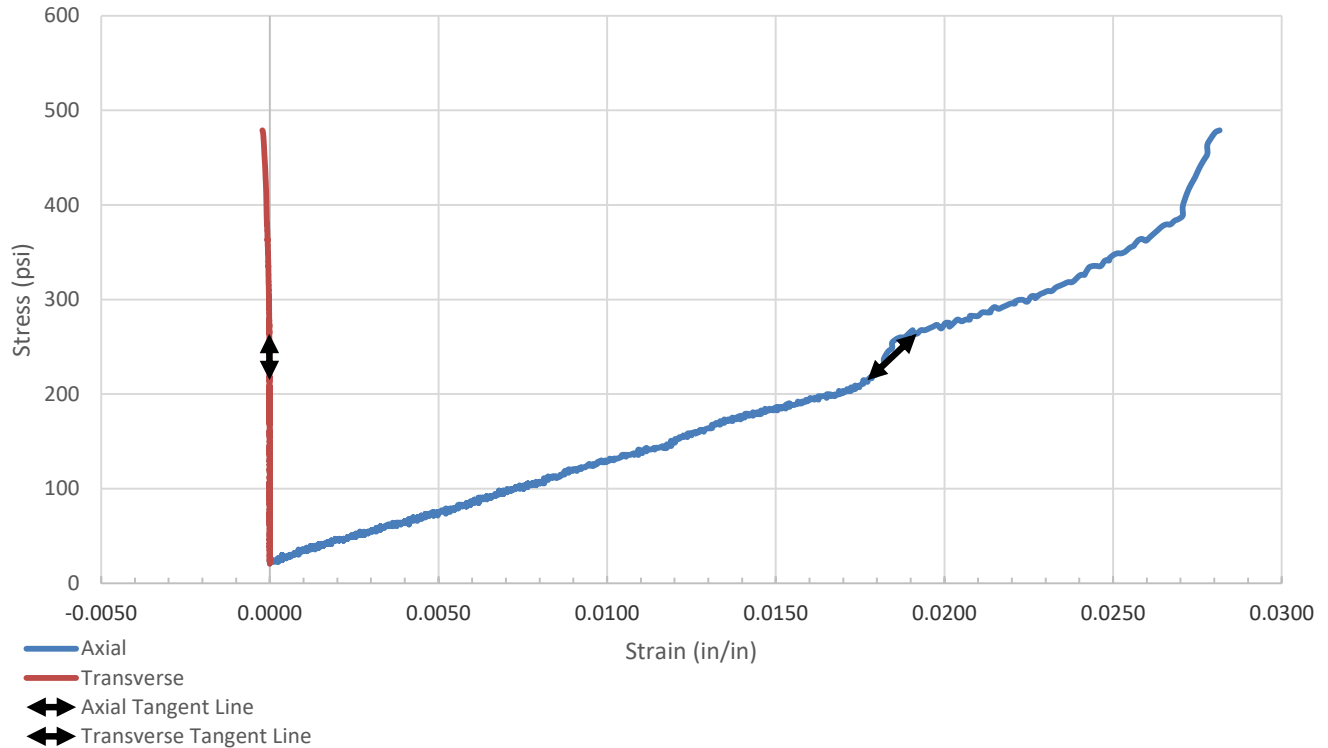
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	95.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-5	Mass (g):	509.85
Length (in.):	4.14	Diameter (in.):	1.97
L/D Ratio:	2.1	Density (pcf):	153.921

**TEST RESULTS**

Failure Load (lbs):	1460
Failure Strain (%):	2.84
Unconfined Compressive Strength (psi):	479
Elastic Modulus, E, (ksi):	34
Poisson's Ratio, u:	0.004
Time of Failure (min):	02:48
Rate of Loading (psi/sec):	2.844
Moisture Content Post-break:	3.2%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0130
Diameter 1b:	0.0065
Diameter 2a:	0.0130
Diameter 2b:	0.0036
Max Deviation from Flatness:	0.0064
Parallelism Deviation:	
Diameter a:	0.06
Diameter b:	0.33

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

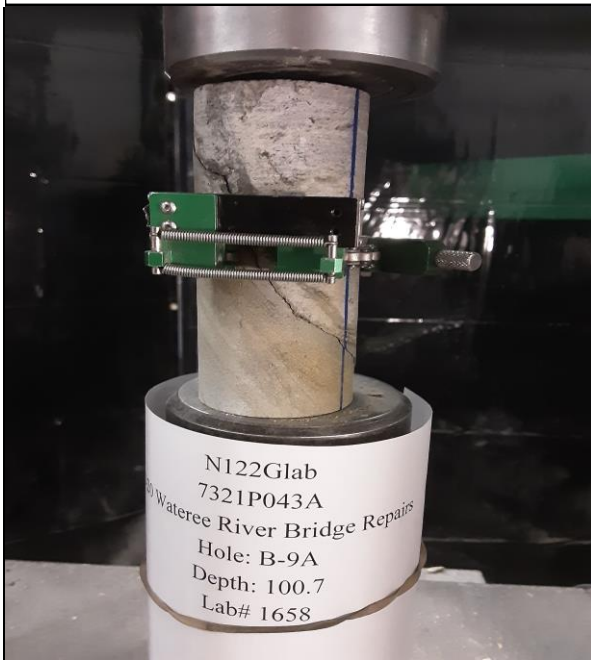
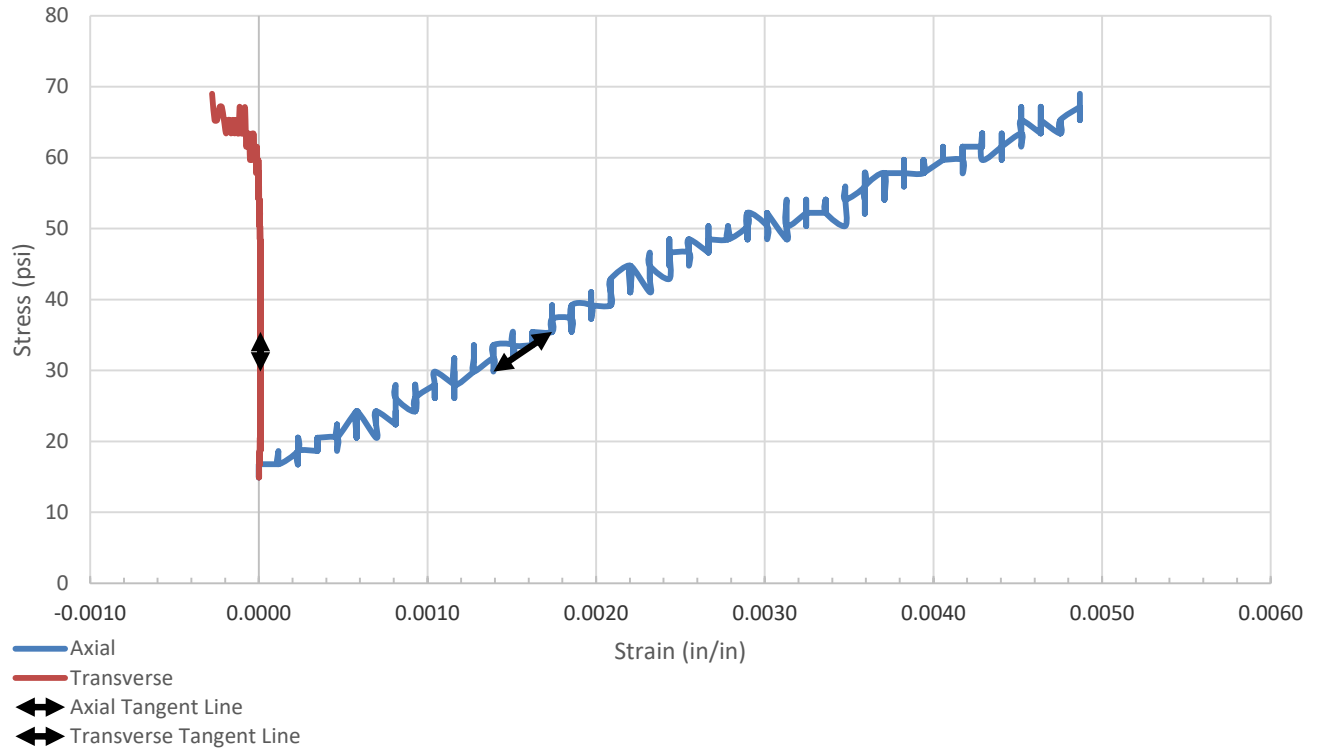
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	100.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-6	Mass (g):	569.54
Length (in.):	4.335	Diameter (in.):	1.99
L/D Ratio:	2.2	Density (pcf):	161.734

**TEST RESULTS**

Failure Load (lbs):	212
Failure Strain (%):	0.79
Unconfined Compressive Strength (psi):	69
Elastic Modulus, E, (ksi):	16
Poisson's Ratio, u:	0.002
Time of Failure (min):	01:08
Rate of Loading (psi/sec):	1.009
Moisture Content Post-break:	1.0%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0029
Diameter 1b:	0.0190
Diameter 2a:	0.0031
Diameter 2b:	0.0216
Max Deviation from Flatness:	0.0035
Parallelism Deviation:	
Diameter a:	0.19
Diameter b:	2.61

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

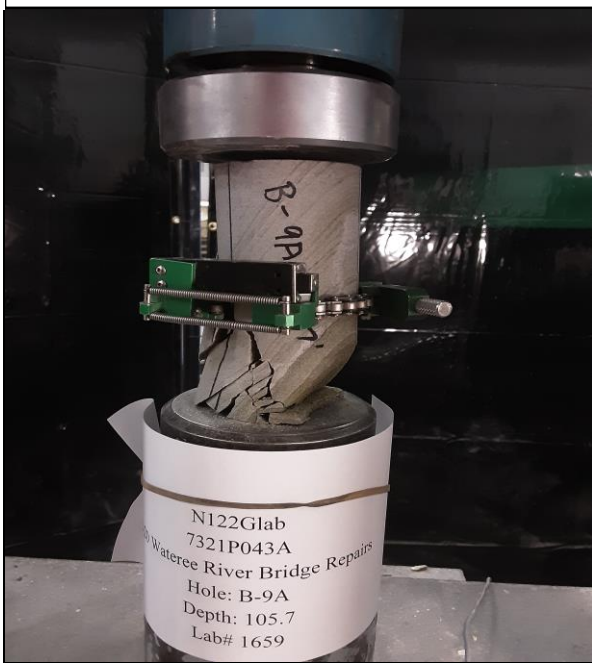
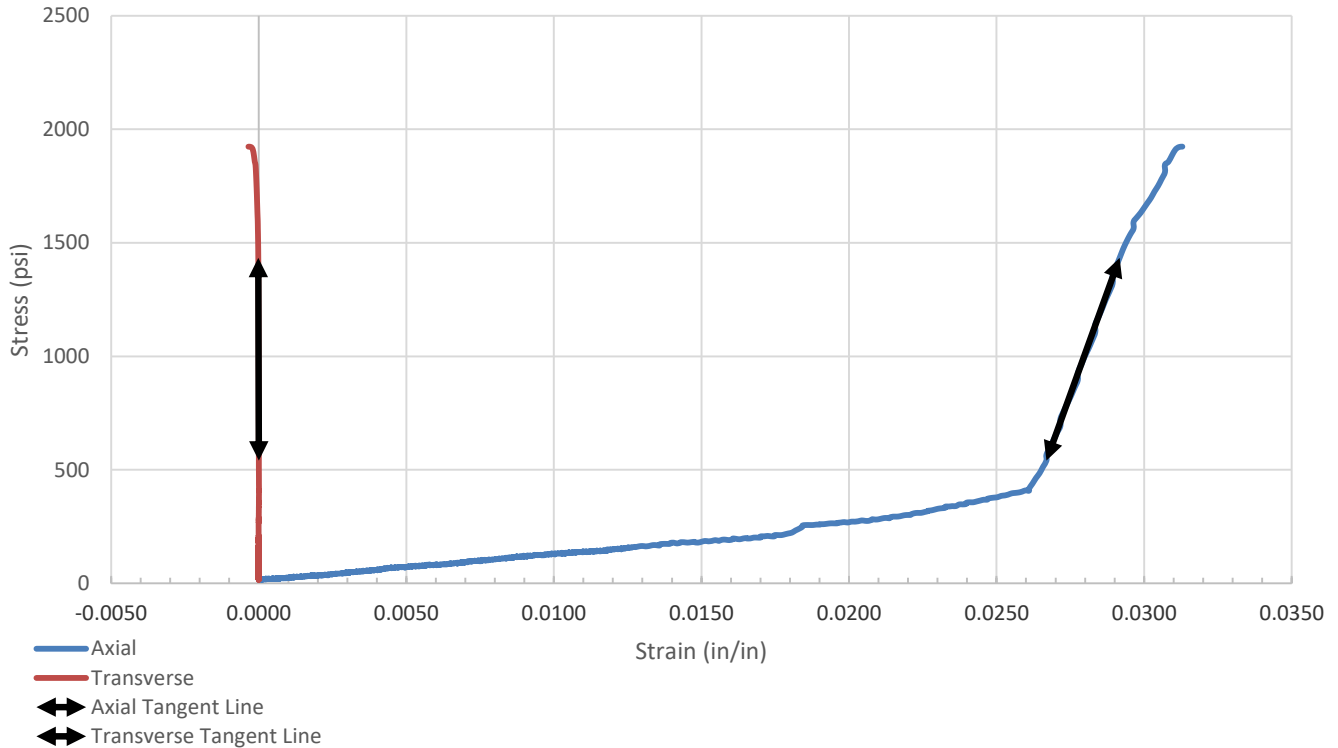
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



SAMPLE LOCATION			
Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-9A	Depth (feet):	105.7
SPECIMEN INFORMATION			
Sample No.:	NQ-7	Mass (g):	563.89
Length (in.):	4.255	Diameter (in.):	2.00
L/D Ratio:	2.1	Density (pcf):	161.509
TEST RESULTS			
Failure Load (lbs):	5982		
Failure Strain (%):	3.20		
Unconfined Compressive Strength (psi):	1,923		
Elastic Modulus, E, (ksi):	360		
Poisson's Ratio, u:	0.008		
Time of Failure (min):	02:46		
Rate of Loading (psi/sec):	11.559		
Moisture Content Post-break:	0.5%		



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0124
Diameter 1b:	0.0139
Diameter 2a:	0.0107
Diameter 2b:	0.0071
Max Deviation from Flatness:	0.0047
Parallelism Deviation:	
Diameter a:	0.12
Diameter b:	1.16

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample partially sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

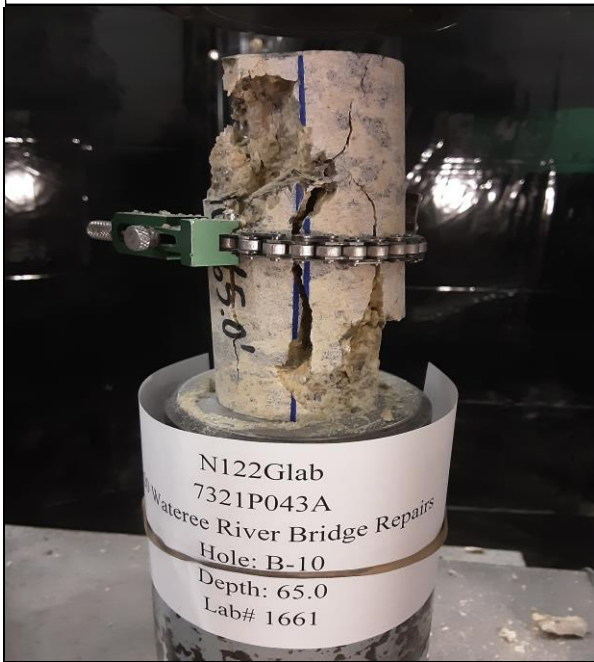
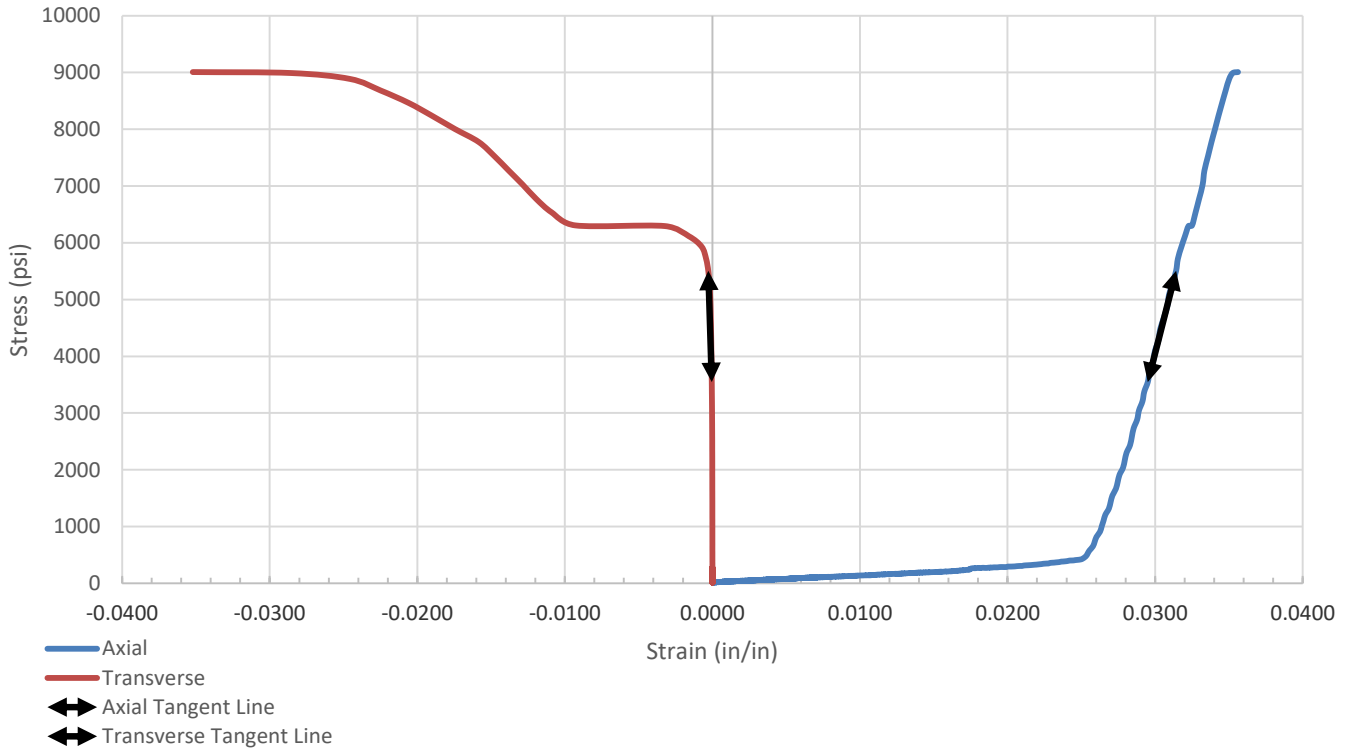
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-10	Depth (feet):	61.3

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	531.62
Length (in.):	4.19	Diameter (in.):	1.95
L/D Ratio:	2.1	Density (pcf):	161.847

**TEST RESULTS**

Failure Load (lbs):	26903
Failure Strain (%):	3.75
Unconfined Compressive Strength (psi):	9,008
Elastic Modulus, E, (ksi):	1022
Poisson's Ratio, u:	0.123
Time of Failure (min):	03:31
Rate of Loading (psi/sec):	42.654
Moisture Content Post-break:	0.3%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0032
Diameter 1b:	0.0139
Diameter 2a:	0.0038
Diameter 2b:	0.0194
Max Deviation from Flatness:	0.0088
Parallelism Deviation:	
Diameter a:	0.20
Diameter b:	1.85

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

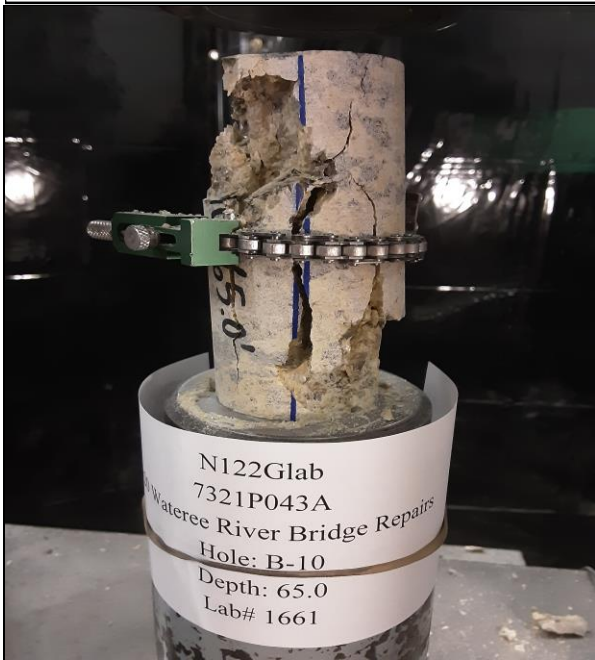
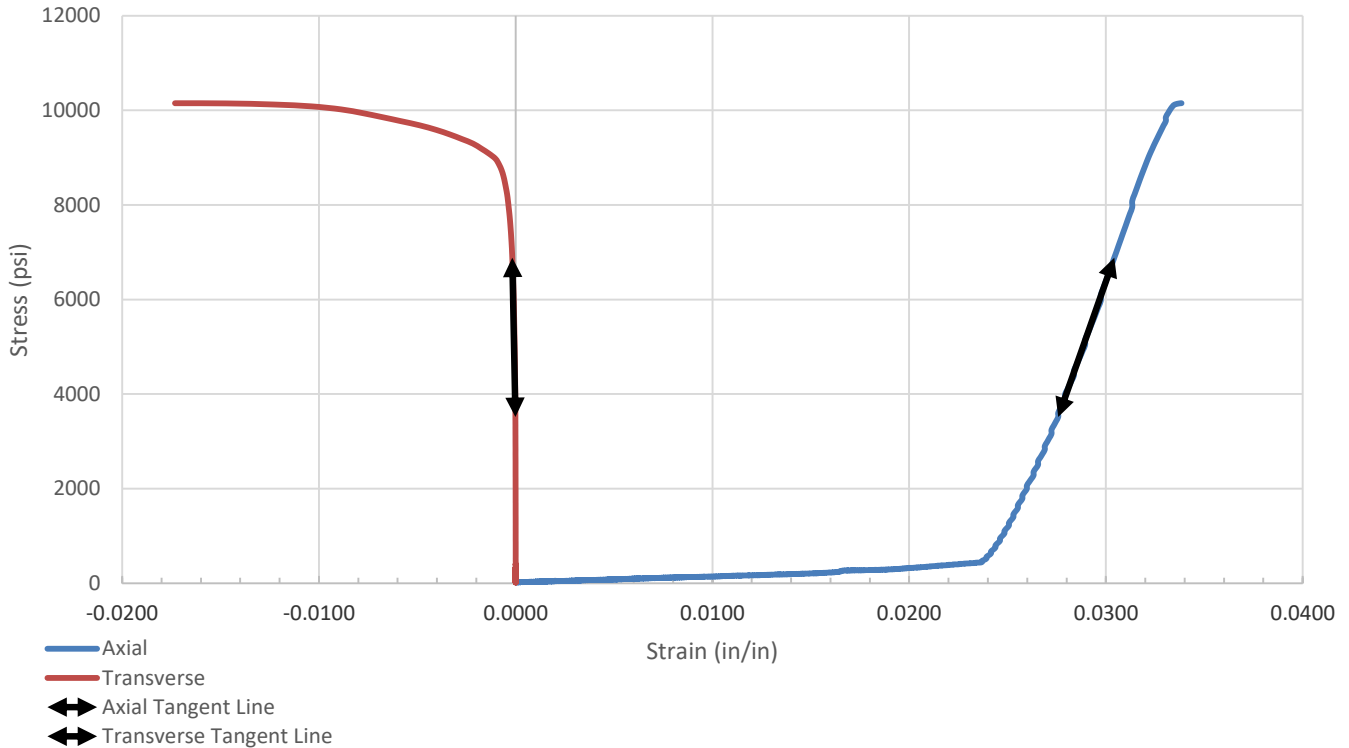
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-10	Depth (feet):	65

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	561.74
Length (in.):	4.41	Diameter (in.):	1.96
L/D Ratio:	2.3	Density (pcf):	161.656

**TEST RESULTS**

Failure Load (lbs):	30317
Failure Strain (%):	3.61
Unconfined Compressive Strength (psi):	10,151
Elastic Modulus, E, (ksi):	1182
Poisson's Ratio, u:	0.056
Time of Failure (min):	03:47
Rate of Loading (psi/sec):	44.799
Moisture Content Post-break:	0.3%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0118
Diameter 1b:	0.0032
Diameter 2a:	0.0061
Diameter 2b:	0.0099
Max Deviation from Flatness:	0.0038
Parallelism Deviation:	
Diameter a:	0.40
Diameter b:	0.79

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

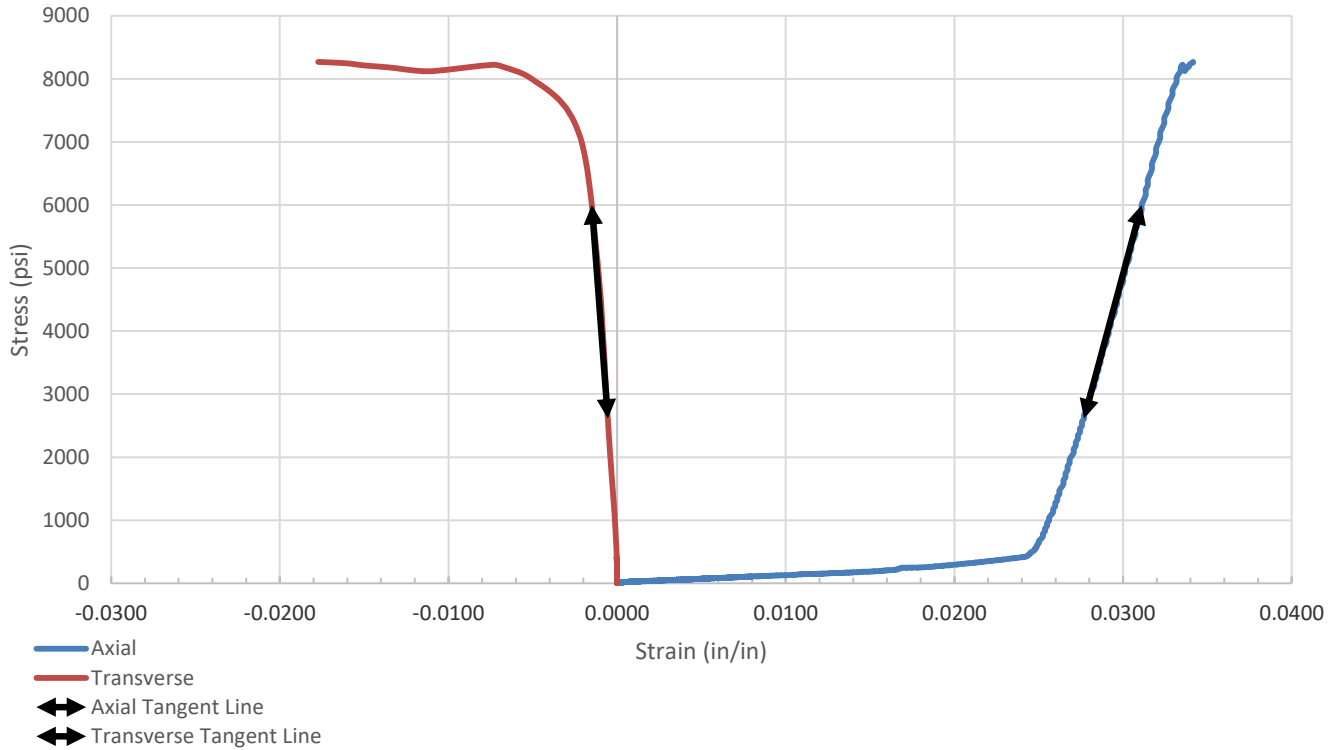
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-10	Depth (feet):	70

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	528.16
Length (in.):	4.12	Diameter (in.):	1.96
L/D Ratio:	2.1	Density (pcf):	162.691

**TEST RESULTS**

Failure Load (lbs):	24694
Failure Strain (%):	3.43
Unconfined Compressive Strength (psi):	8,269
Elastic Modulus, E, (ksi):	991
Poisson's Ratio, u:	0.278
Time of Failure (min):	04:35
Rate of Loading (psi/sec):	30.046
Moisture Content Post-break:	0.4%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0078
Diameter 1b:	0.0092
Diameter 2a:	0.0080
Diameter 2b:	0.0138
Max Deviation from Flatness:	0.0070
Parallelism Deviation:	
Diameter a:	0.02
Diameter b:	1.27

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

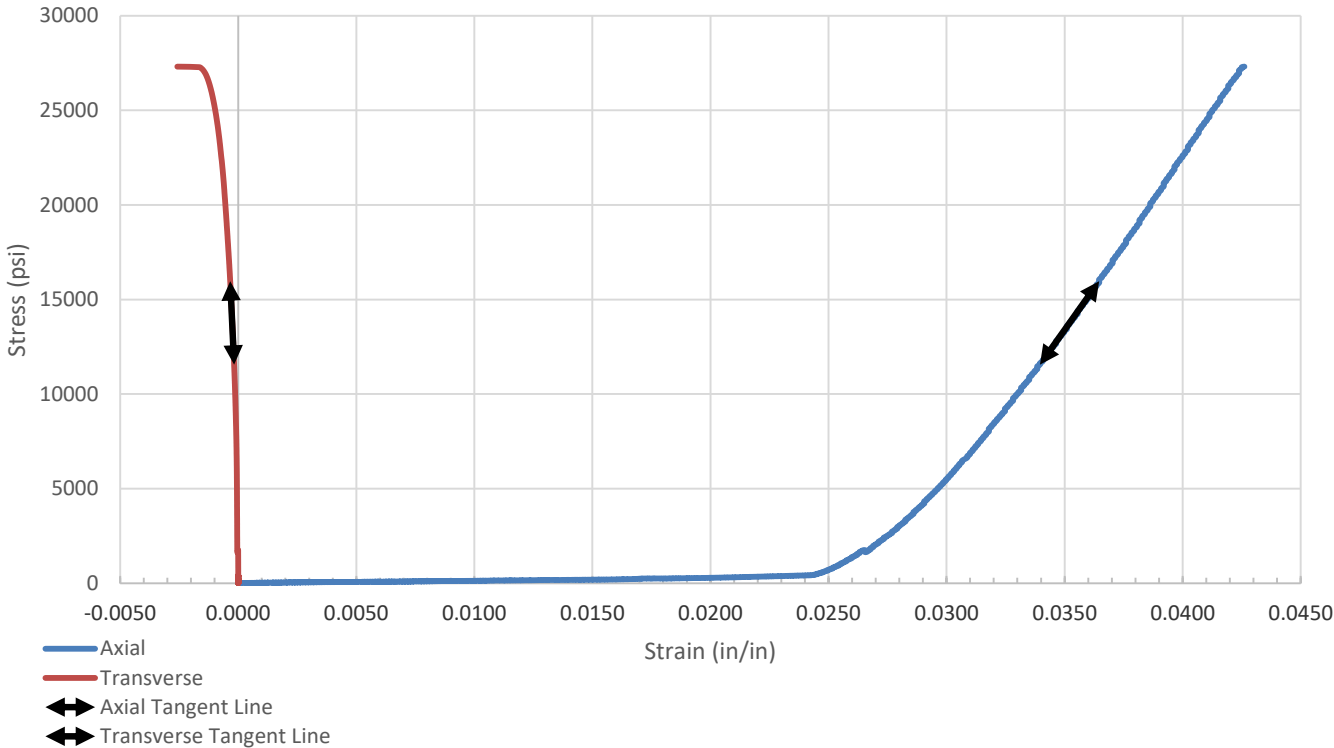
Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**  
 RS&H, Inc.  
 North Charleston, SC

**Project**  
 I-20 Wateree River Bridge Repairs  
 Kershaw County, SC  
 PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



SAMPLE LOCATION			
Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-10	Depth (feet):	75
SPECIMEN INFORMATION			
Sample No.:	NQ-4	Mass (g):	569.12
Length (in.):	4.41	Diameter (in.):	1.97
L/D Ratio:	2.2	Density (pcf):	162.117
TEST RESULTS			
Failure Load (lbs):	82408		
Failure Strain (%):	4.76		
Unconfined Compressive Strength (psi):	27,313		
Elastic Modulus, E, (ksi):	1760		
Poisson's Ratio, u:	0.066		
Time of Failure (min):	04:16		
Rate of Loading (psi/sec):	106.691		
Moisture Content Post-break:	0.1%		

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
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**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0195
Diameter 1b:	0.0023
Diameter 2a:	0.0116
Diameter 2b:	0.0010
Max Deviation from Flatness:	0.0023
Parallelism Deviation:	
Diameter a:	0.55
Diameter b:	0.11

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

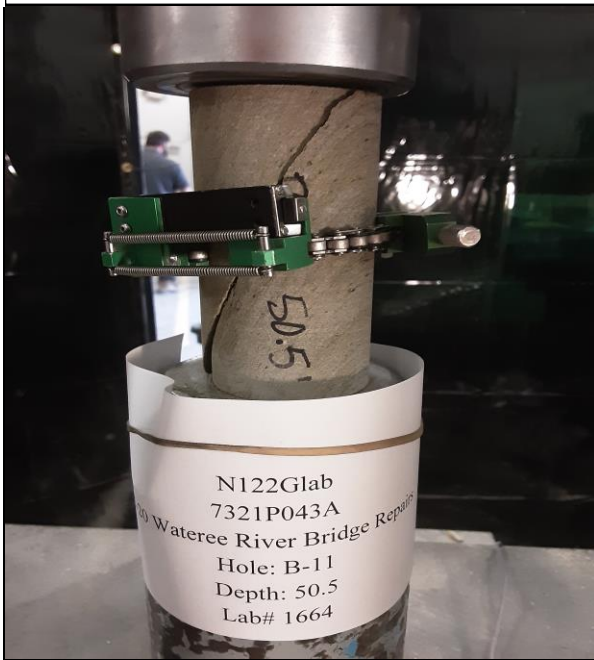
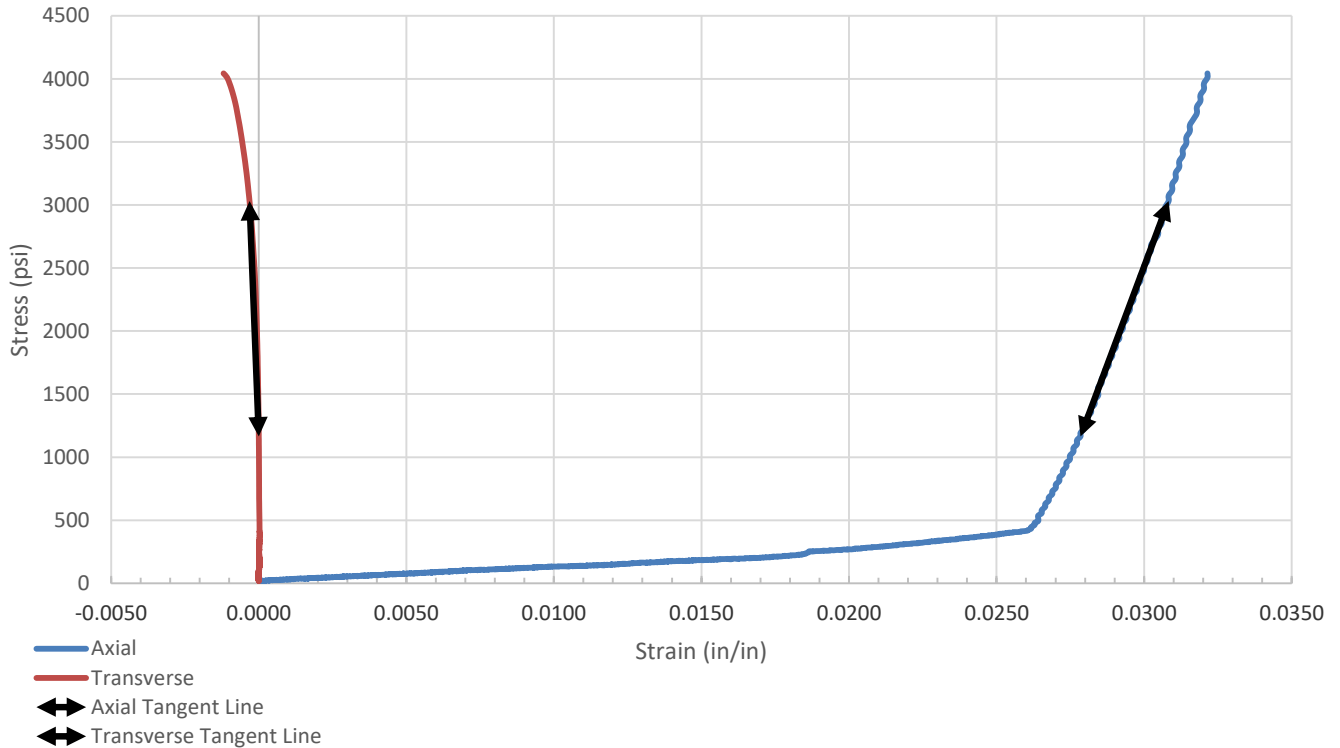
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-11	Depth (feet):	50.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	558.6
Length (in.):	4.205	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	164.358

**TEST RESULTS**

Failure Load (lbs):	12450
Failure Strain (%):	3.30
Unconfined Compressive Strength (psi):	4,043
Elastic Modulus, E, (ksi):	625
Poisson's Ratio, u:	0.105
Time of Failure (min):	02:58
Rate of Loading (psi/sec):	22.690
Moisture Content Post-break:	0.9%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0066
Diameter 1b:	0.0091
Diameter 2a:	0.0054
Diameter 2b:	0.0149
Max Deviation from Flatness:	0.0069
Parallelism Deviation:	
Diameter a:	0.04
Diameter b:	1.39

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

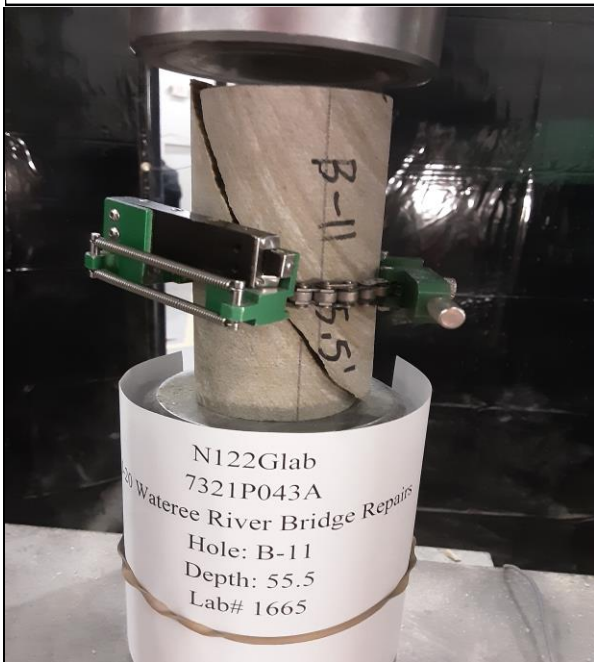
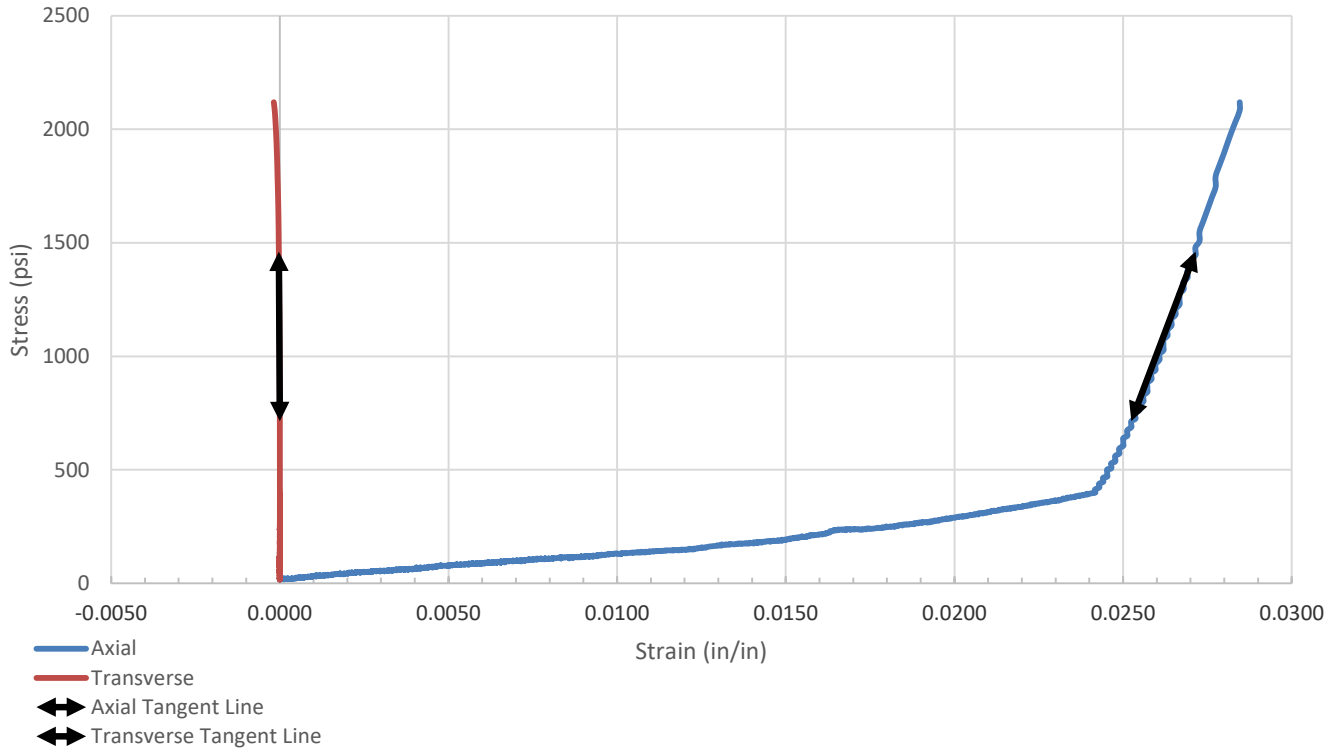
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-11	Depth (feet):	55.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	549.86
Length (in.):	4.22	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	162.029

**TEST RESULTS**

Failure Load (lbs):	6460
Failure Strain (%):	2.91
Unconfined Compressive Strength (psi):	2,119
Elastic Modulus, E, (ksi):	392
Poisson's Ratio, u:	0.015
Time of Failure (min):	03:38
Rate of Loading (psi/sec):	9.703
Moisture Content Post-break:	1.0%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

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**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0068
Diameter 1b:	0.0011
Diameter 2a:	0.0041
Diameter 2b:	0.0049
Max Deviation from Flatness:	0.0017
Parallelism Deviation:	
Diameter a:	0.17
Diameter b:	0.33

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

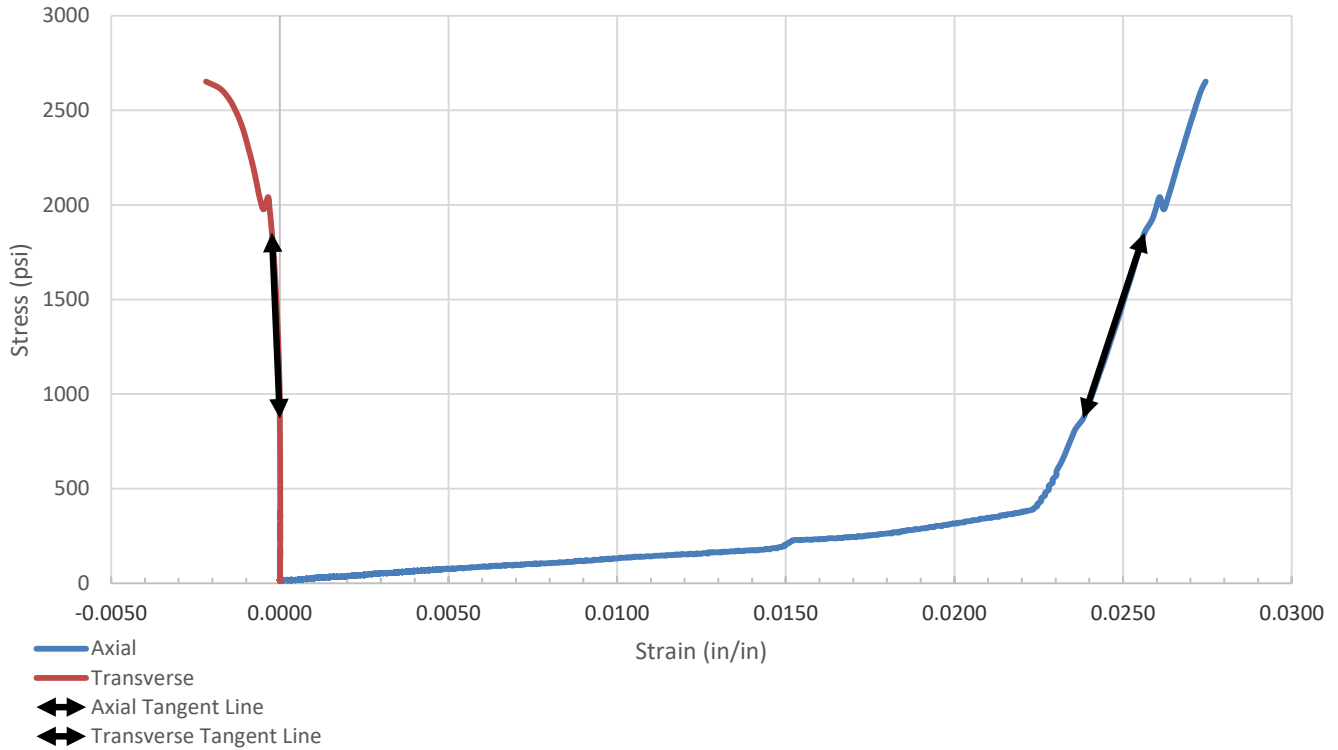
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-11	Depth (feet):	60.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	577.35
Length (in.):	4.43	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	161.247

**TEST RESULTS**

Failure Load (lbs):	8167
Failure Strain (%):	3.15
Unconfined Compressive Strength (psi):	2,652
Elastic Modulus, E, (ksi):	541
Poisson's Ratio, u:	0.130
Time of Failure (min):	03:17
Rate of Loading (psi/sec):	13.477
Moisture Content Post-break:	0.7%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
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**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0049
Diameter 1b:	0.0019
Diameter 2a:	0.0045
Diameter 2b:	0.0020
Max Deviation from Flatness:	0.0023
Parallelism Deviation:	
Diameter a:	0.02
Diameter b:	0.05

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Notes:

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

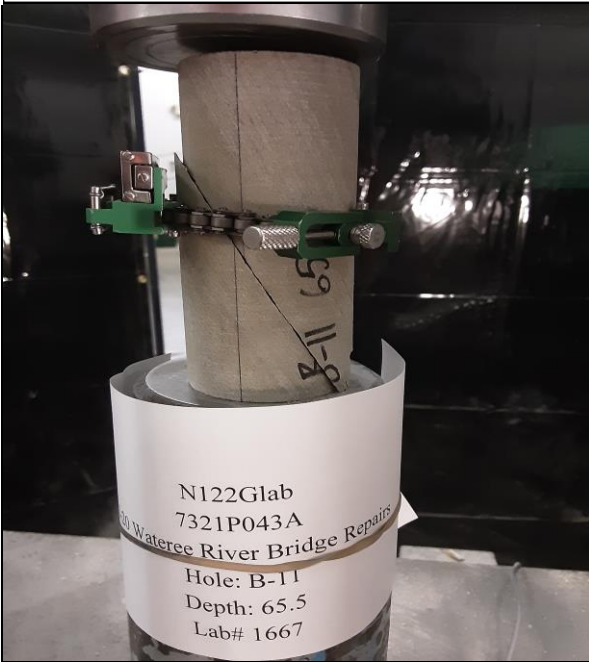
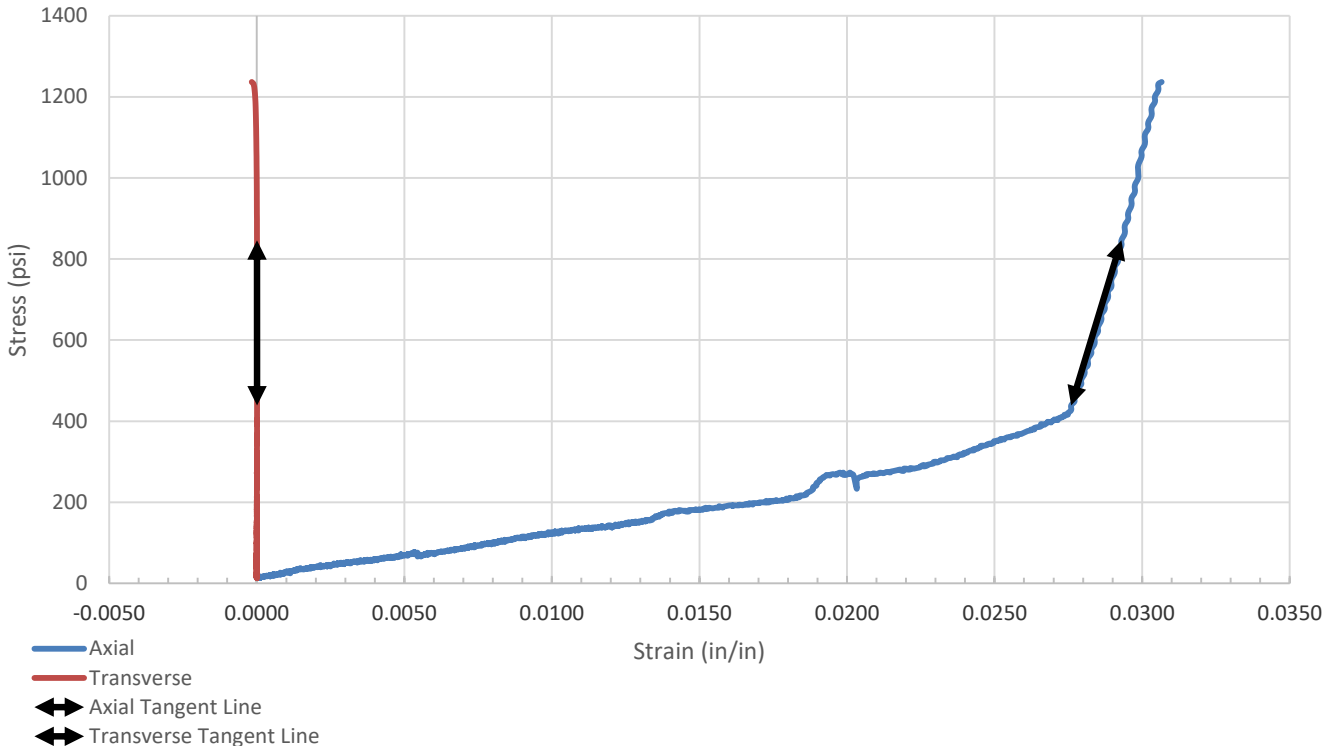
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



SAMPLE LOCATION			
Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Schist		
Boring:	B-11	Depth (feet):	65.5
SPECIMEN INFORMATION			
Sample No.:	NQ-4	Mass (g):	577.93
Length (in.):	4.425	Diameter (in.):	1.97
L/D Ratio:	2.2	Density (pcf):	163.236
TEST RESULTS			
Failure Load (lbs):	3770		
Failure Strain (%):	3.08		
Unconfined Compressive Strength (psi):	1,237		
Elastic Modulus, E, (ksi):	239		
Poisson's Ratio, u:	0.001		
Time of Failure (min):	03:20		
Rate of Loading (psi/sec):	6.171		
Moisture Content Post-break:	1.0%		

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0013
Diameter 1b:	0.0214
Diameter 2a:	0.0023
Diameter 2b:	0.0090
Max Deviation from Flatness:	0.0020
Parallelism Deviation:	
Diameter a:	0.16
Diameter b:	1.83

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

**Notes:**

Sample sheared along bedding plane.

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:

**Client**

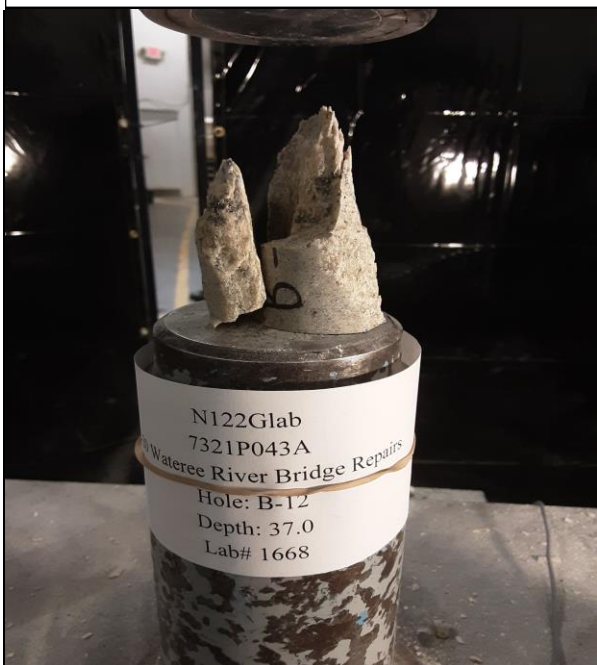
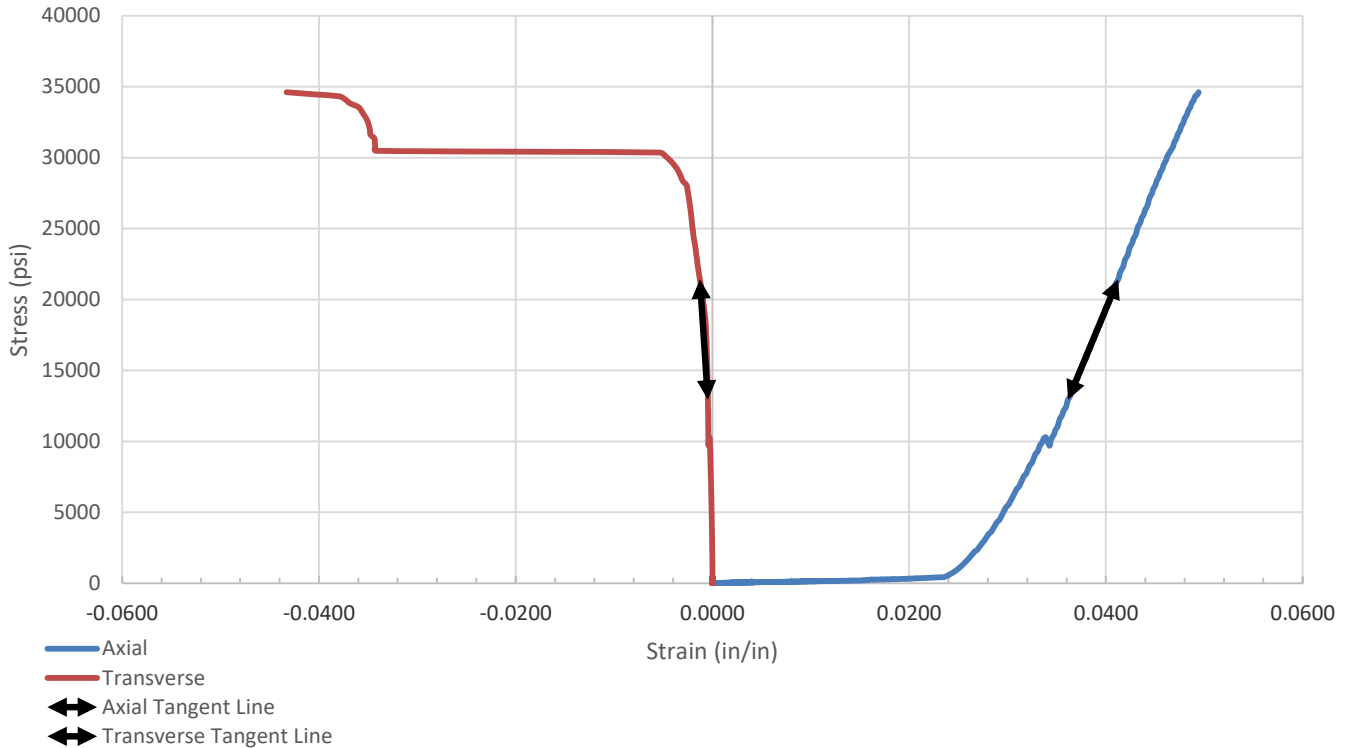
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-12	Depth (feet):	37

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	563.86
Length (in.):	4.24	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	163.709

**TEST RESULTS**

Failure Load (lbs):	106581
Failure Strain (%):	4.94
Unconfined Compressive Strength (psi):	34,615
Elastic Modulus, E, (ksi):	1664
Poisson's Ratio, u:	0.160
Time of Failure (min):	03:05
Rate of Loading (psi/sec):	186.904
Moisture Content Post-break:	0.2%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0125
Diameter 1b:	0.0053
Diameter 2a:	0.0025
Diameter 2b:	0.0064
Max Deviation from Flatness:	0.0042
Parallelism Deviation:	
Diameter a:	0.63
Diameter b:	0.52

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

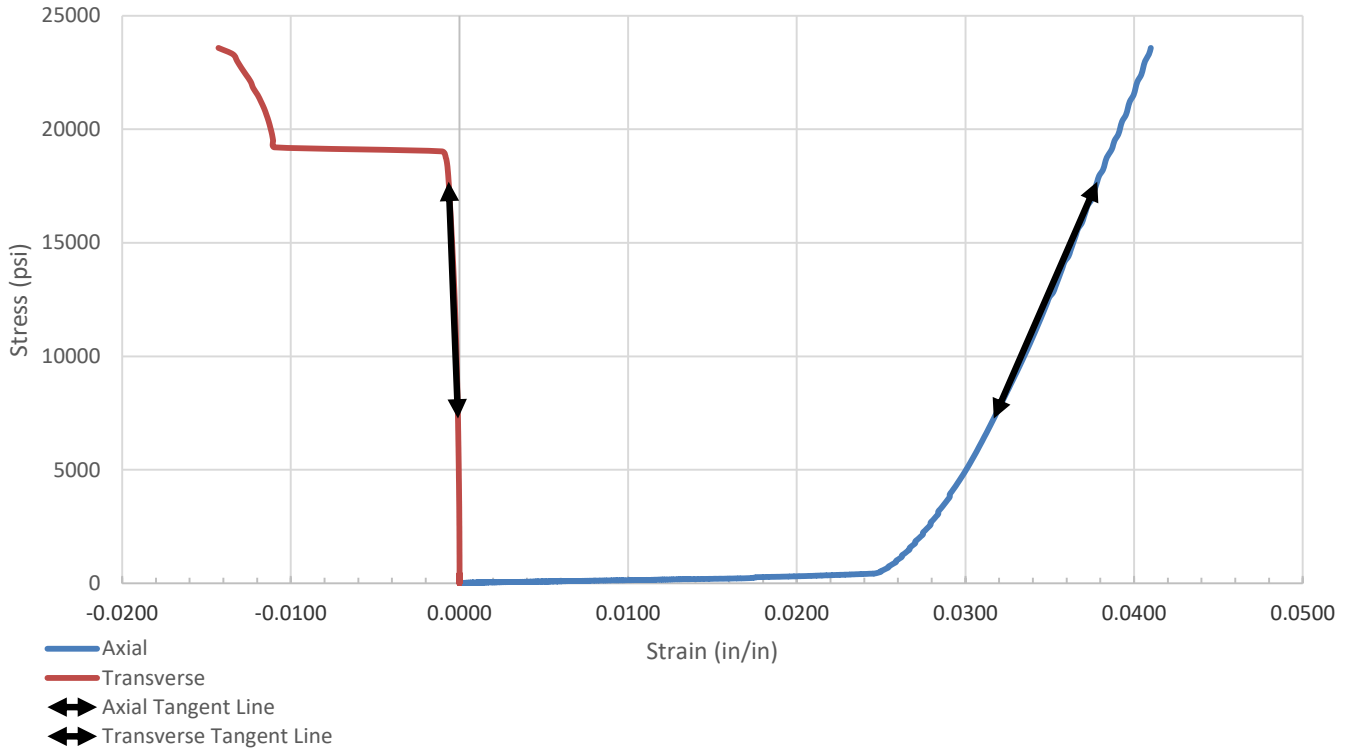
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-12	Depth (feet):	40

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	586.78
Length (in.):	4.425	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	164.066

**TEST RESULTS**

Failure Load (lbs):	72620
Failure Strain (%):	4.51
Unconfined Compressive Strength (psi):	23,585
Elastic Modulus, E, (ksi):	1701
Poisson's Ratio, u:	0.090
Time of Failure (min):	03:02
Rate of Loading (psi/sec):	129.445
Moisture Content Post-break:	0.2%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0019
Diameter 1b:	0.0086
Diameter 2a:	0.0029
Diameter 2b:	0.0082
Max Deviation from Flatness:	0.0021
Parallelism Deviation:	
Diameter a:	0.12
Diameter b:	1.01

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

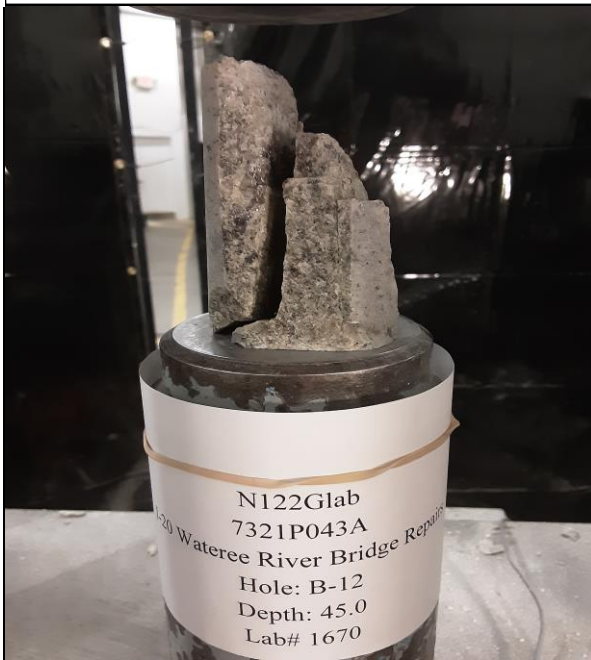
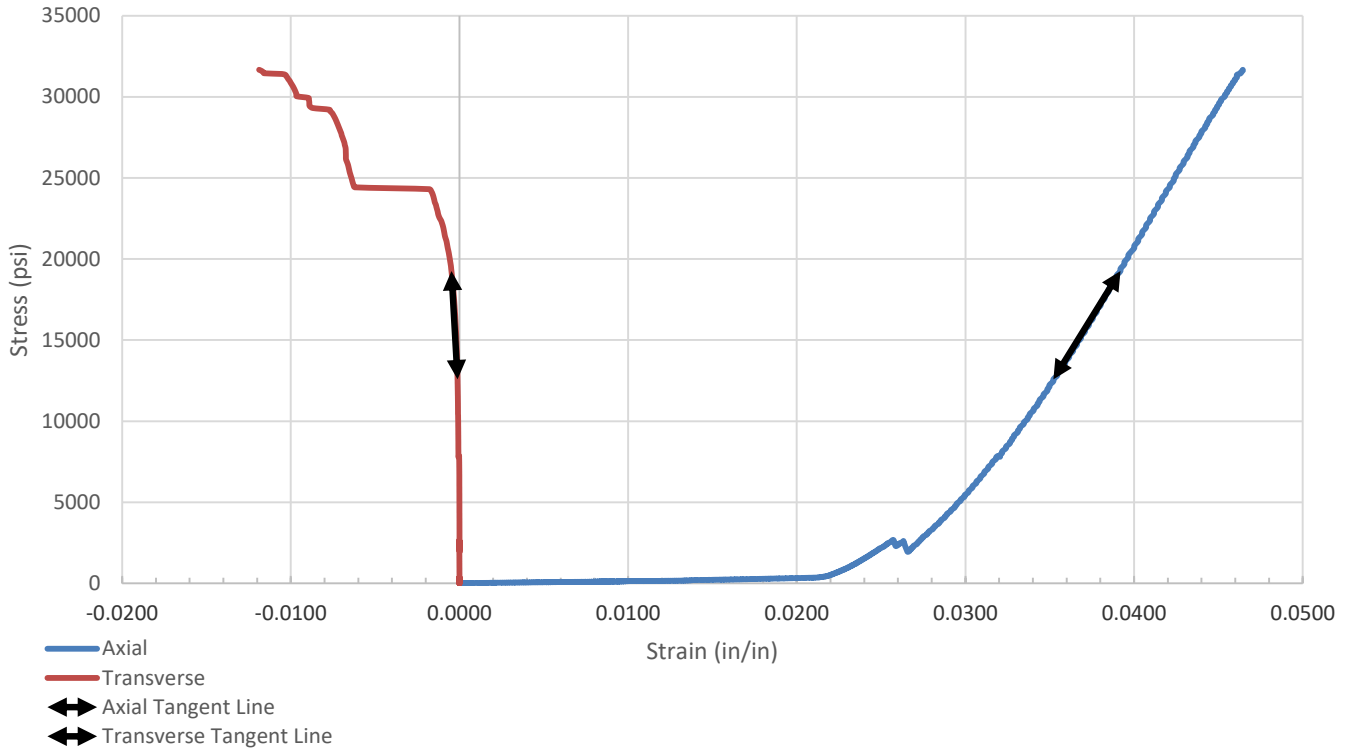
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-12	Depth (feet):	45

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	572.5
Length (in.):	4.295	Diameter (in.):	1.99
L/D Ratio:	2.2	Density (pcf):	164.089

**TEST RESULTS**

Failure Load (lbs):	97514
Failure Strain (%):	5.69
Unconfined Compressive Strength (psi):	31,670
Elastic Modulus, E, (ksi):	1679
Poisson's Ratio, u:	0.091
Time of Failure (min):	04:02
Rate of Loading (psi/sec):	130.976
Moisture Content Post-break:	0.2%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0132
Diameter 1b:	0.0020
Diameter 2a:	0.0025
Diameter 2b:	0.0112
Max Deviation from Flatness:	0.0014
Parallelism Deviation:	
Diameter a:	0.65
Diameter b:	0.83

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

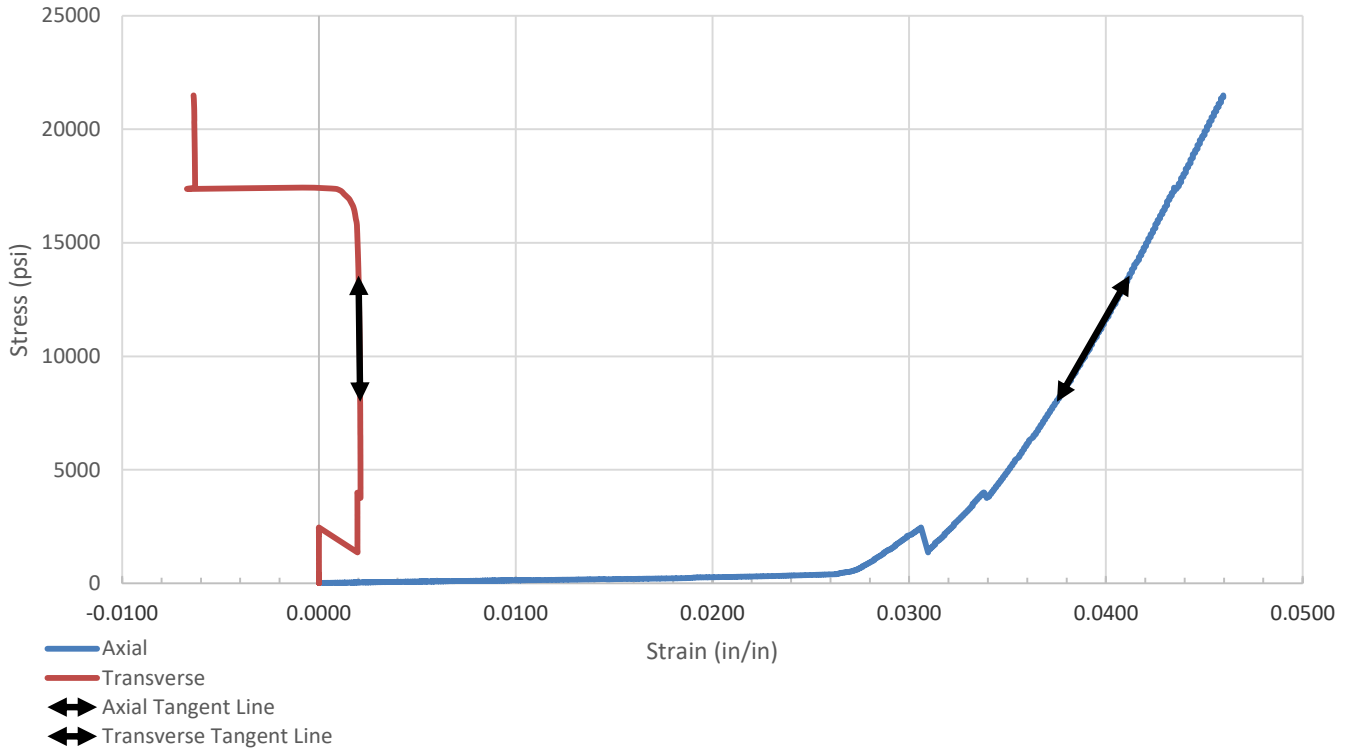
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-12	Depth (feet):	50

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	560.56
Length (in.):	4.22	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	164.349

**TEST RESULTS**

Failure Load (lbs):	66180
Failure Strain (%):	4.61
Unconfined Compressive Strength (psi):	21,493
Elastic Modulus, E, (ksi):	1506
Poisson's Ratio, u:	0.022
Time of Failure (min):	04:23
Rate of Loading (psi/sec):	81.600
Moisture Content Post-break:	0.2%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0106
Diameter 1b:	0.0137
Diameter 2a:	0.0123
Diameter 2b:	0.0102
Max Deviation from Flatness:	0.0018
Parallelism Deviation:	
Diameter a:	0.14
Diameter b:	1.54

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

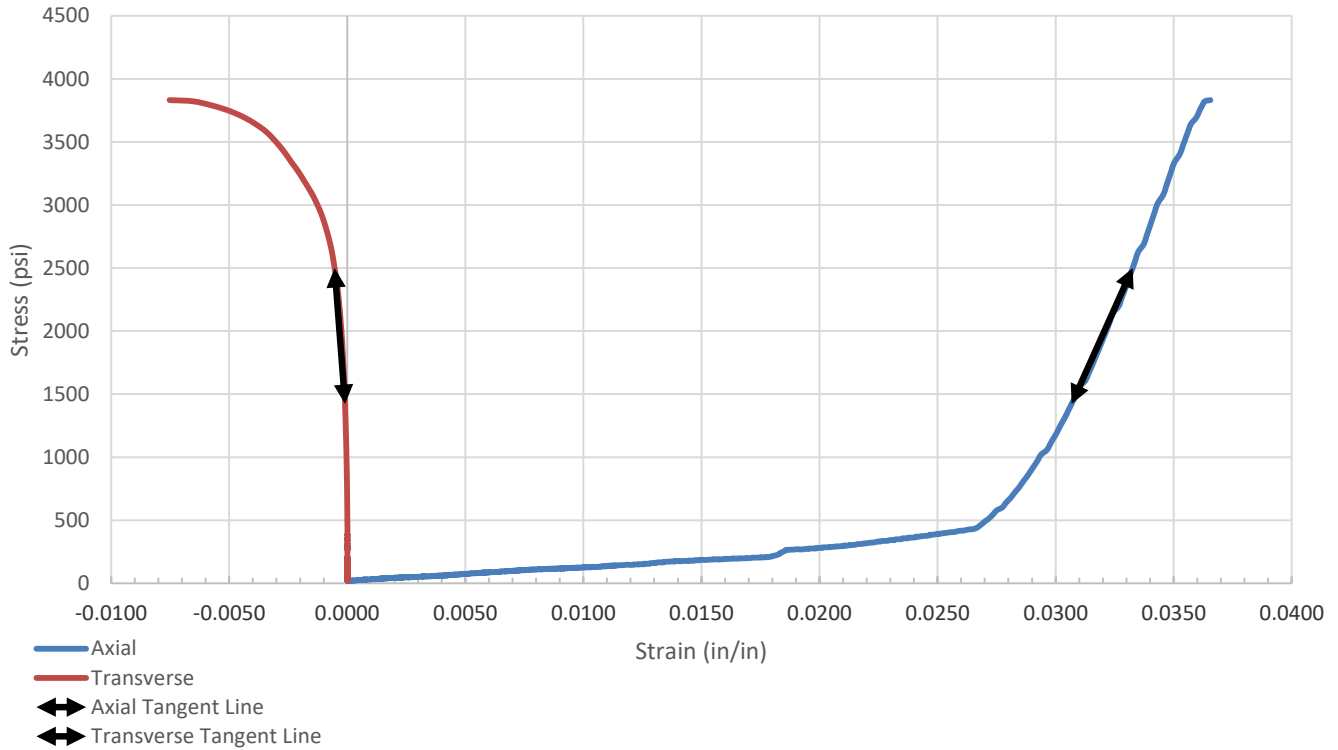
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-13	Depth (feet):	78.1

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	542.06
Length (in.):	4.275	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	156.880

**TEST RESULTS**

Failure Load (lbs):	11797
Failure Strain (%):	3.81
Unconfined Compressive Strength (psi):	3,831
Elastic Modulus, E, (ksi):	416
Poisson's Ratio, u:	0.171
Time of Failure (min):	02:46
Rate of Loading (psi/sec):	23.109
Moisture Content Post-break:	1.3%

---

<b>Client</b>	<b>Project</b>
RS&H, Inc. North Charleston, SC	I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777
	Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0145
Diameter 1b:	0.0026
Diameter 2a:	0.0134
Diameter 2b:	0.0048
Max Deviation from Flatness:	0.0042
Parallelism Deviation:	
Diameter a:	0.06
Diameter b:	0.44

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

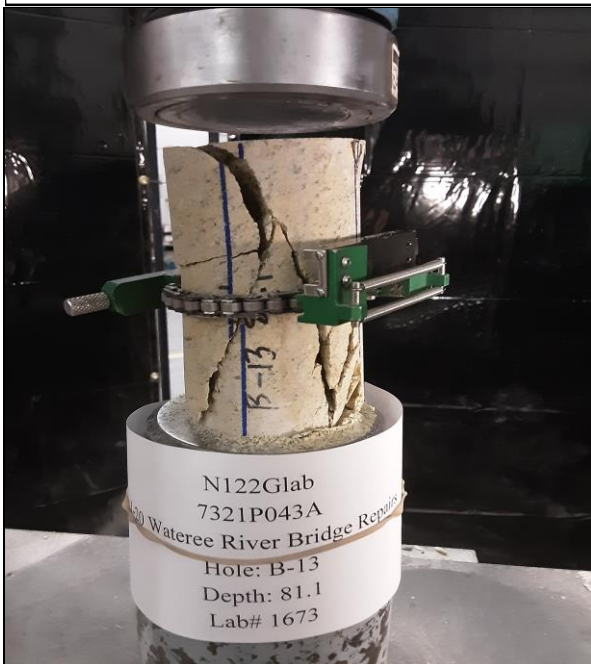
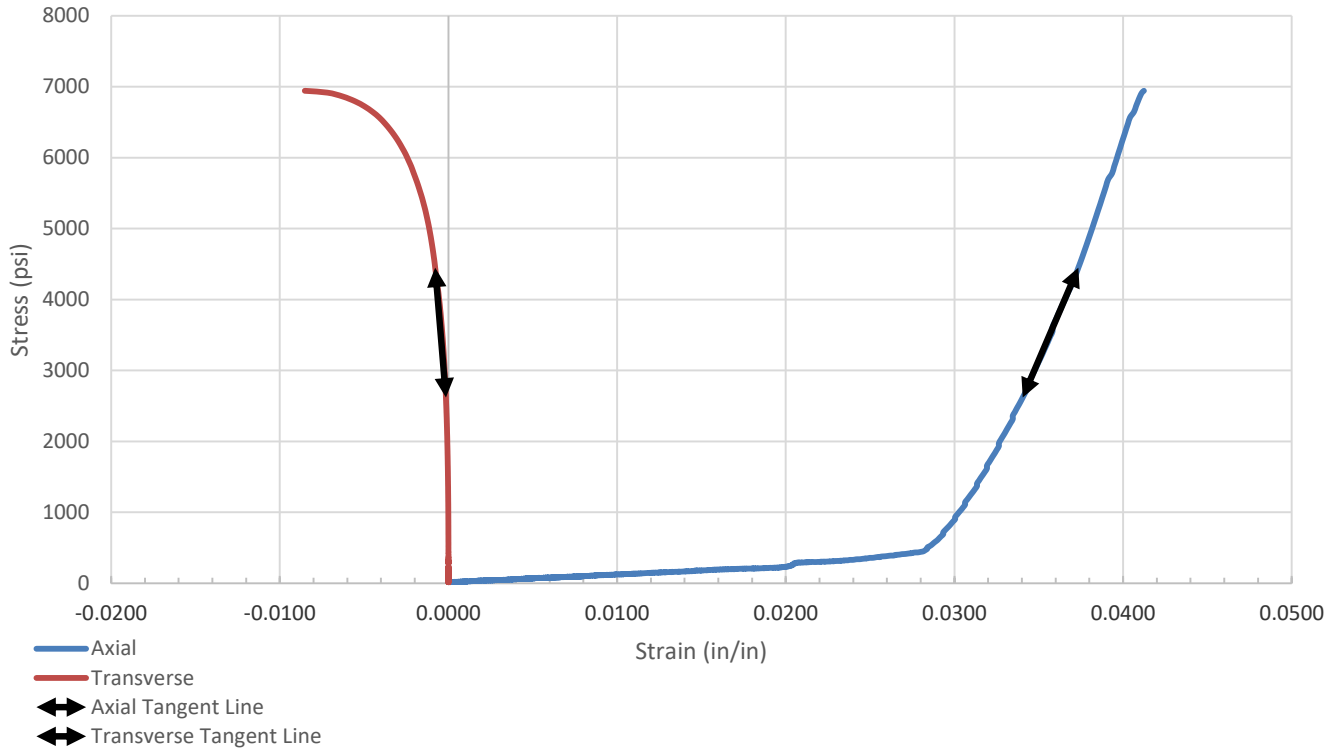
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-13	Depth (feet):	81.1

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	550.12
Length (in.):	4.265	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	160.395

**TEST RESULTS**

Failure Load (lbs):	21162
Failure Strain (%):	4.16
Unconfined Compressive Strength (psi):	6,943
Elastic Modulus, E, (ksi):	555
Poisson's Ratio, u:	0.194
Time of Failure (min):	03:43
Rate of Loading (psi/sec):	31.134
Moisture Content Post-break:	0.8%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0035
Diameter 1b:	0.0172
Diameter 2a:	0.0076
Diameter 2b:	0.0150
Max Deviation from Flatness:	0.0058
Parallelism Deviation:	
Diameter a:	0.39
Diameter b:	1.87

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

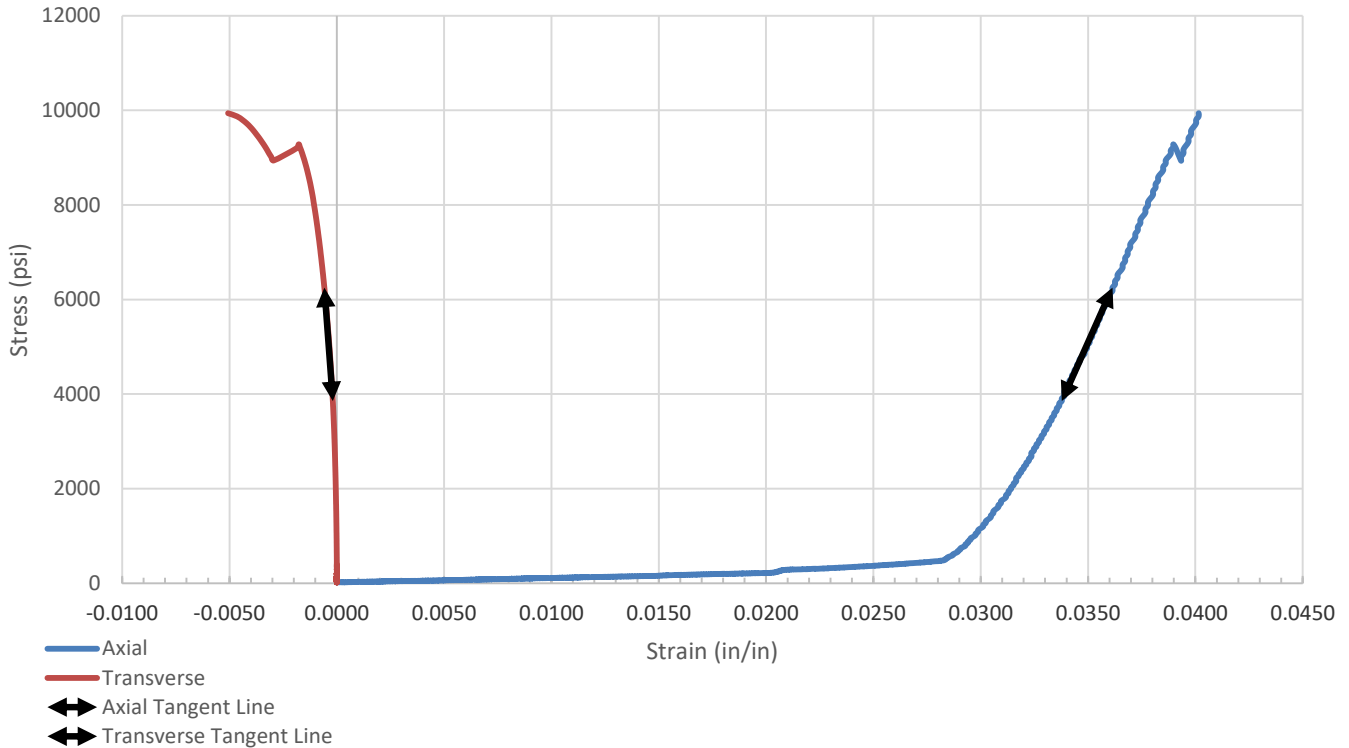
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-13	Depth (feet):	86.1

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	554.49
Length (in.):	4.255	Diameter (in.):	1.97
L/D Ratio:	2.2	Density (pcf):	162.873

**TEST RESULTS**

Failure Load (lbs):	30299
Failure Strain (%):	4.26
Unconfined Compressive Strength (psi):	9,941
Elastic Modulus, E, (ksi):	1015
Poisson's Ratio, u:	0.167
Time of Failure (min):	03:50
Rate of Loading (psi/sec):	43.145
Moisture Content Post-break:	0.7%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0007
Diameter 1b:	0.0092
Diameter 2a:	0.0016
Diameter 2b:	0.0052
Max Deviation from Flatness:	0.0012
Parallelism Deviation:	
Diameter a:	0.06
Diameter b:	0.86

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

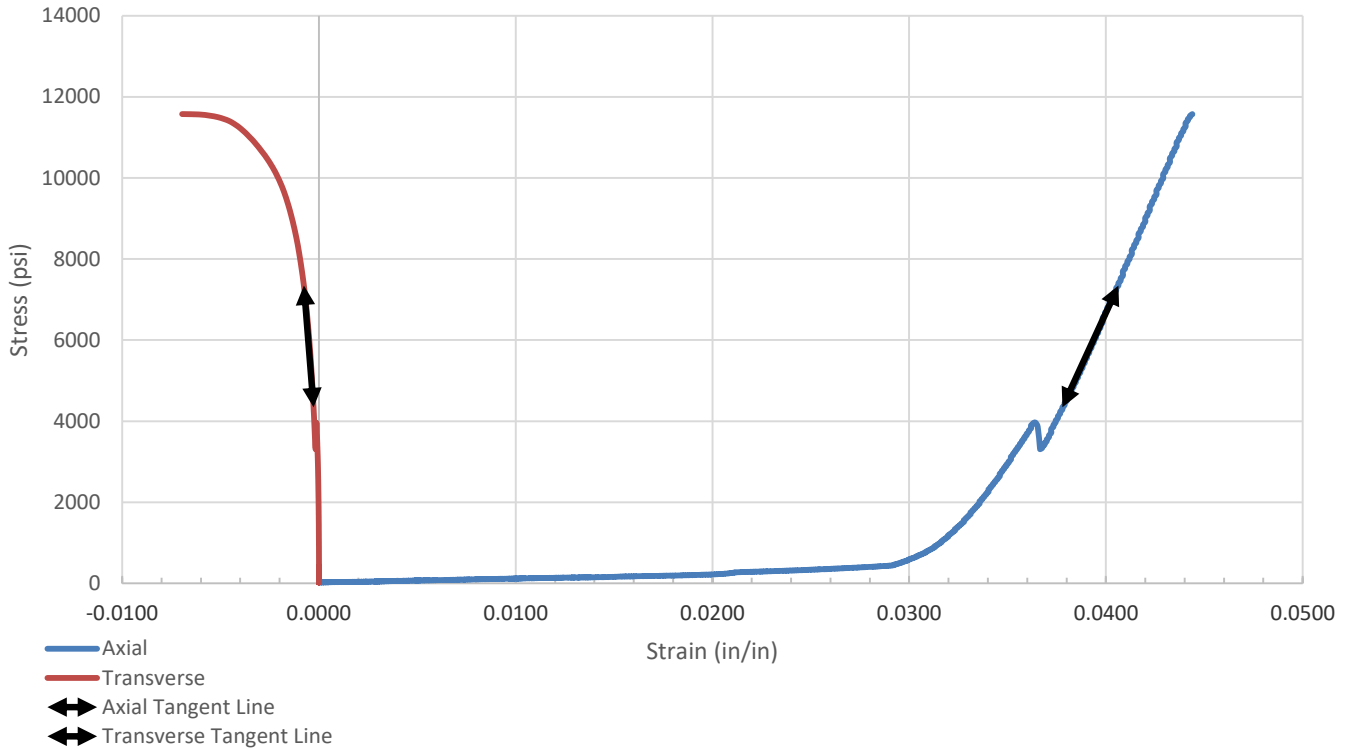
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-13	Depth (feet):	91.1

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	577.75
Length (in.):	4.415	Diameter (in.):	2.01
L/D Ratio:	2.2	Density (pcf):	157.895

**TEST RESULTS**

Failure Load (lbs):	36365
Failure Strain (%):	4.76
Unconfined Compressive Strength (psi):	11,575
Elastic Modulus, E, (ksi):	1055
Poisson's Ratio, u:	0.173
Time of Failure (min):	04:20
Rate of Loading (psi/sec):	44.589
Moisture Content Post-break:	0.4%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0140
Diameter 1b:	0.0103
Diameter 2a:	0.0081
Diameter 2b:	0.0025
Max Deviation from Flatness:	0.0021
Parallelism Deviation:	
Diameter a:	0.39
Diameter b:	0.77

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

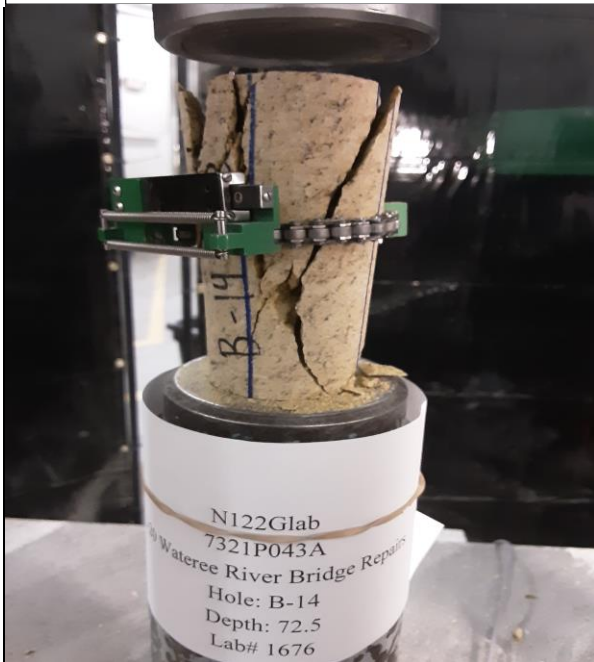
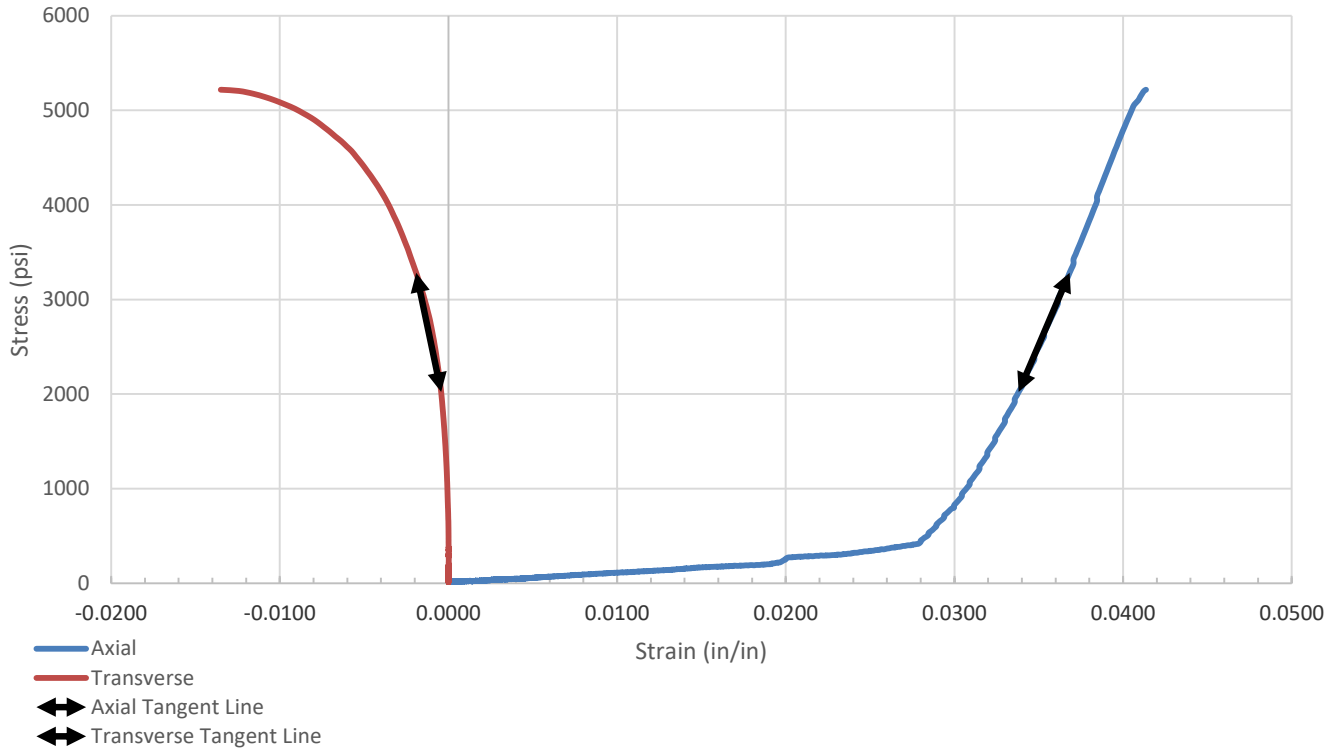
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-14	Depth (feet):	72.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	546.85
Length (in.):	4.325	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	156.437

**TEST RESULTS**

Failure Load (lbs):	16068
Failure Strain (%):	4.39
Unconfined Compressive Strength (psi):	5,218
Elastic Modulus, E, (ksi):	417
Poisson's Ratio, u:	0.490
Time of Failure (min):	03:38
Rate of Loading (psi/sec):	23.937
Moisture Content Post-break:	0.7%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0382
Diameter 1b:	0.0257
Diameter 2a:	0.0333
Diameter 2b:	0.0289
Max Deviation from Flatness:	0.0056
Parallelism Deviation:	
Diameter a:	0.45
Diameter b:	3.31

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

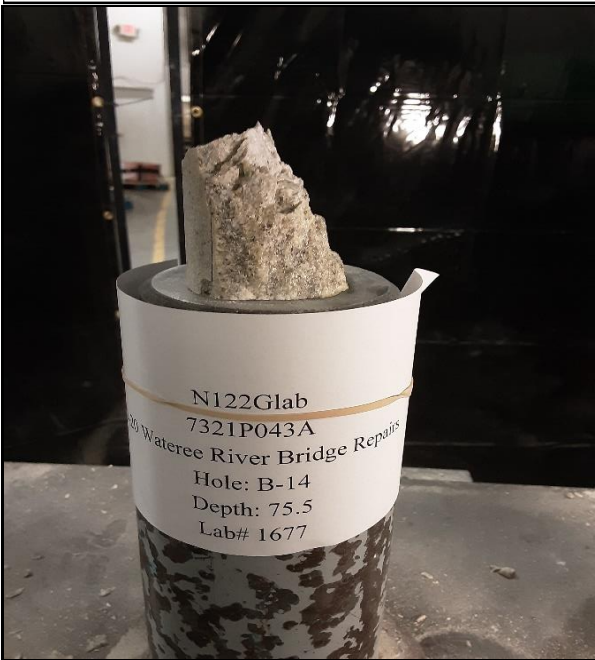
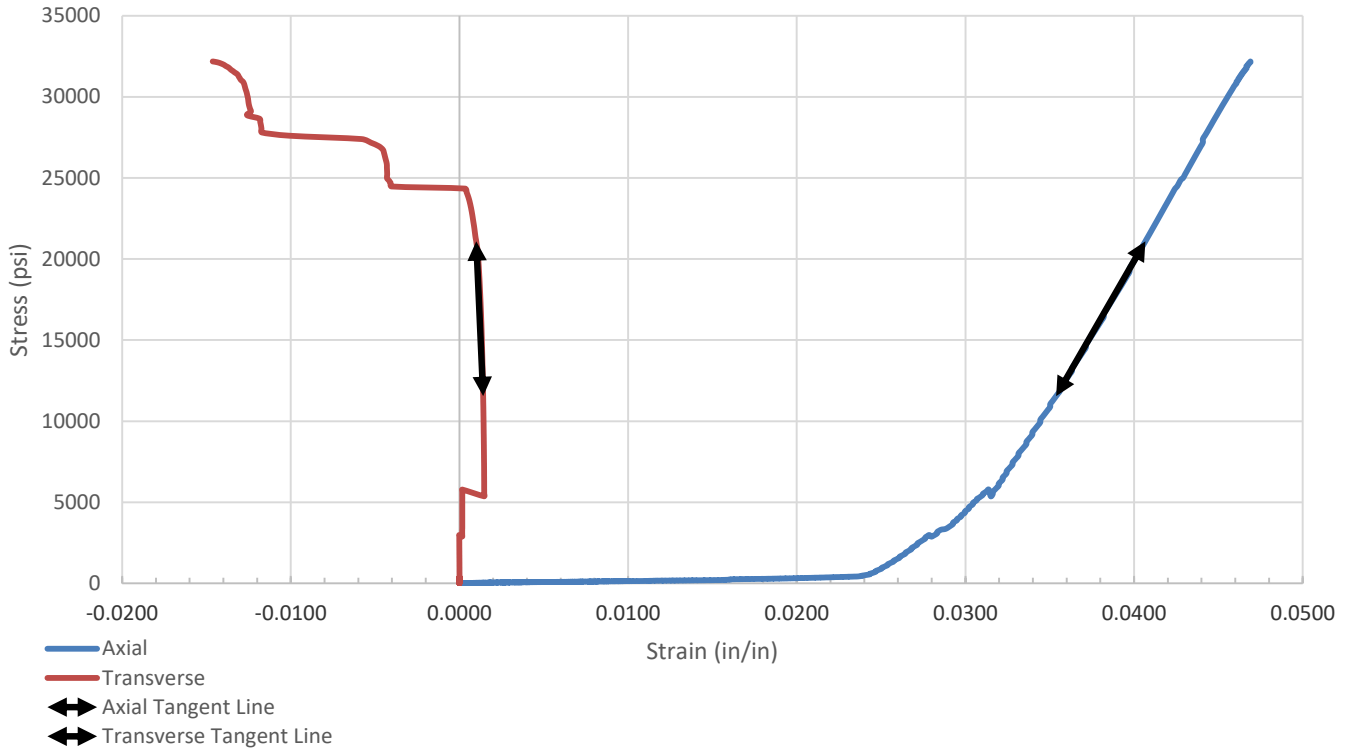
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-14	Depth (feet):	75.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	562.92
Length (in.):	4.275	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	163.743

**TEST RESULTS**

Failure Load (lbs):	98104
Failure Strain (%):	5.20
Unconfined Compressive Strength (psi):	32,186
Elastic Modulus, E, (ksi):	1805
Poisson's Ratio, u:	0.077
Time of Failure (min):	03:21
Rate of Loading (psi/sec):	160.447
Moisture Content Post-break:	0.2%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0126
Diameter 1b:	0.0046
Diameter 2a:	0.0115
Diameter 2b:	0.0126
Max Deviation from Flatness:	0.0037
Parallelism Deviation:	
Diameter a:	0.10
Diameter b:	0.93

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

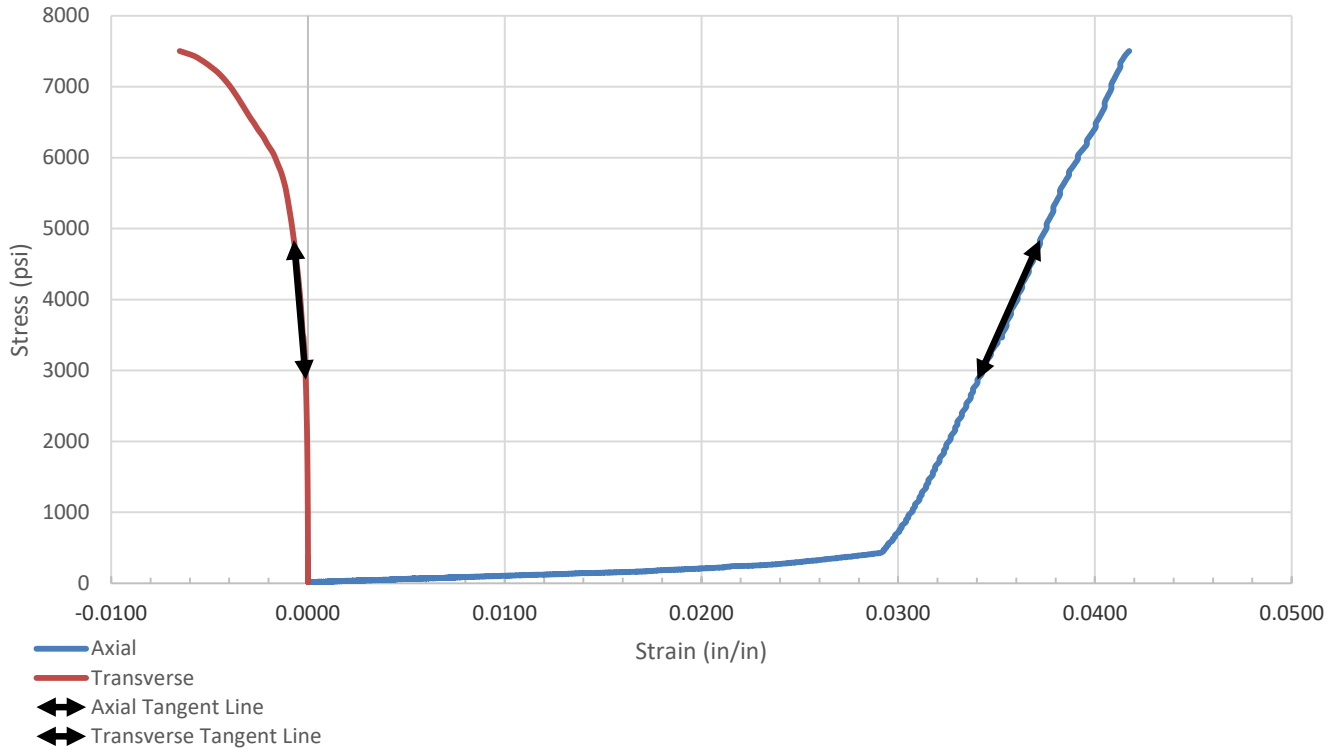
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-14	Depth (feet):	80.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	570.86
Length (in.):	4.43	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	159.435

**TEST RESULTS**

Failure Load (lbs):	23103
Failure Strain (%):	4.23
Unconfined Compressive Strength (psi):	7,503
Elastic Modulus, E, (ksi):	619
Poisson's Ratio, u:	0.189
Time of Failure (min):	04:07
Rate of Loading (psi/sec):	30.426
Moisture Content Post-break:	0.7%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0203
Diameter 1b:	0.0112
Diameter 2a:	0.0119
Diameter 2b:	0.0087
Max Deviation from Flatness:	0.0020
Parallelism Deviation:	
Diameter a:	0.51
Diameter b:	1.25

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

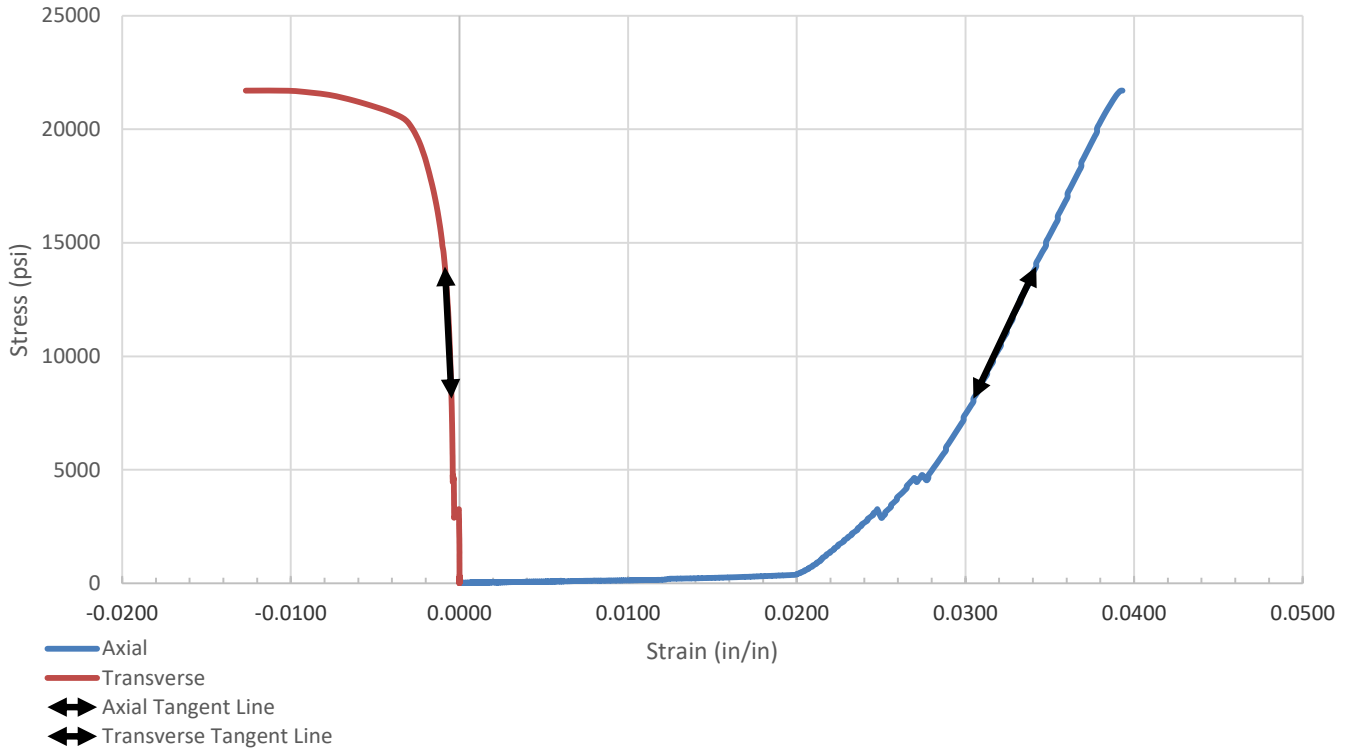
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-14	Depth (feet):	85.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	570.48
Length (in.):	4.32	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	163.386

**TEST RESULTS**

Failure Load (lbs):	66827
Failure Strain (%):	3.93
Unconfined Compressive Strength (psi):	21,703
Elastic Modulus, E, (ksi):	1563
Poisson's Ratio, u:	0.105
Time of Failure (min):	03:52
Rate of Loading (psi/sec):	93.469
Moisture Content Post-break:	0.3%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0152
Diameter 1b:	0.0022
Diameter 2a:	0.0228
Diameter 2b:	0.0036
Max Deviation from Flatness:	0.0021
Parallelism Deviation:	
Diameter a:	0.49
Diameter b:	0.30

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

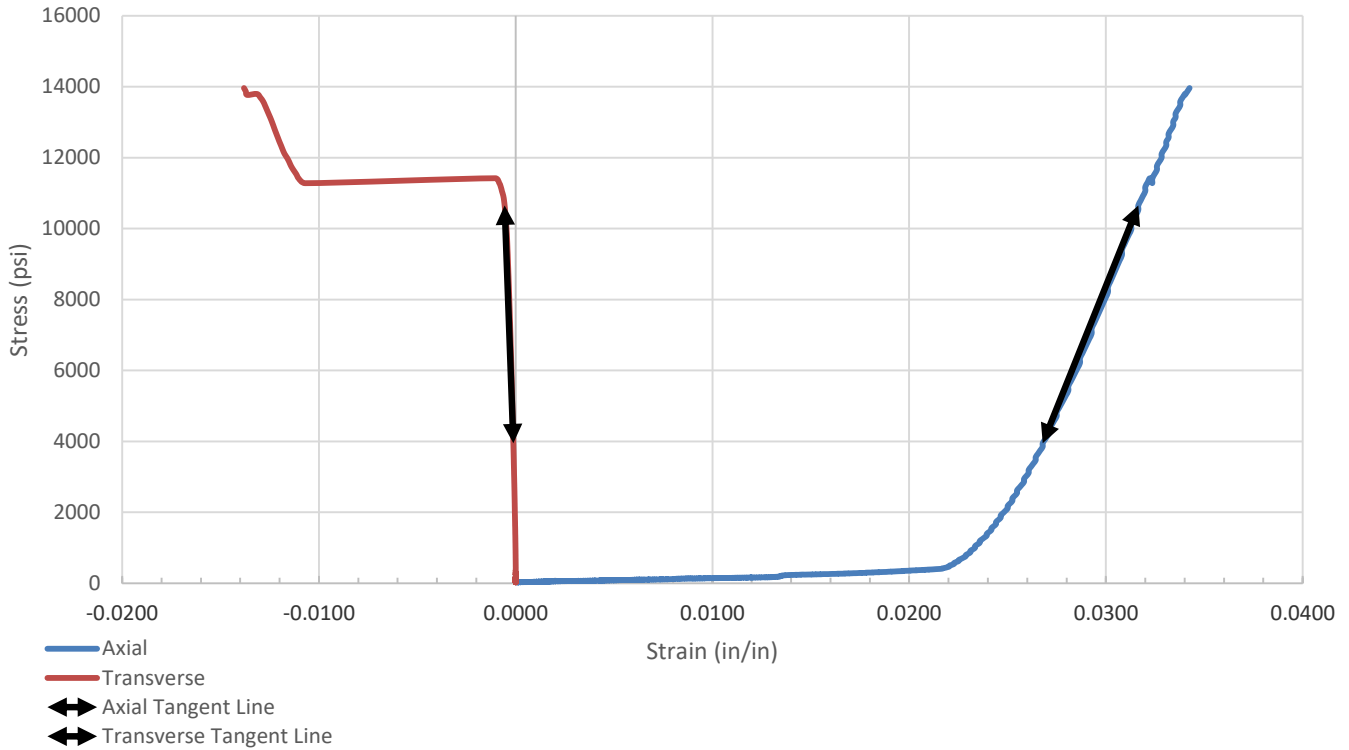
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-15	Depth (feet):	45.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	564.13
Length (in.):	4.24	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	163.787

**TEST RESULTS**

Failure Load (lbs):	42992
Failure Strain (%):	3.77
Unconfined Compressive Strength (psi):	13,963
Elastic Modulus, E, (ksi):	1379
Poisson's Ratio, u:	0.091
Time of Failure (min):	03:31
Rate of Loading (psi/sec):	66.237
Moisture Content Post-break:	0.2%



---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
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**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0071
Diameter 1b:	0.0064
Diameter 2a:	0.0059
Diameter 2b:	0.0057
Max Deviation from Flatness:	0.0060
Parallelism Deviation:	
Diameter a:	0.25
Diameter b:	0.75

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

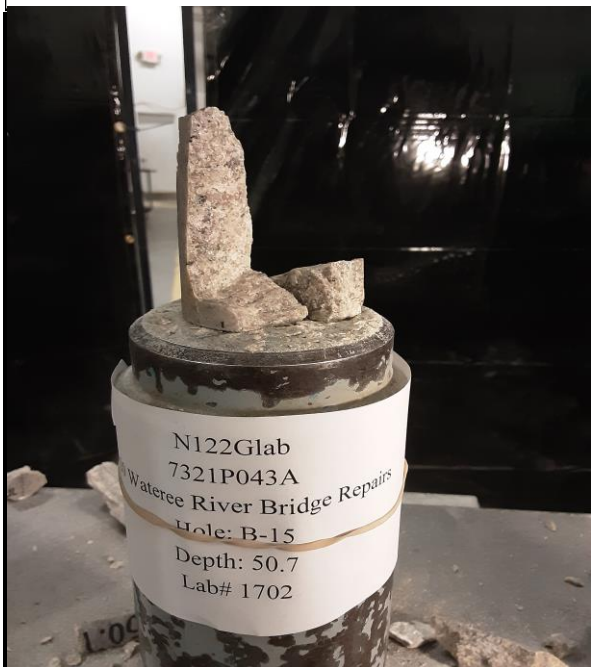
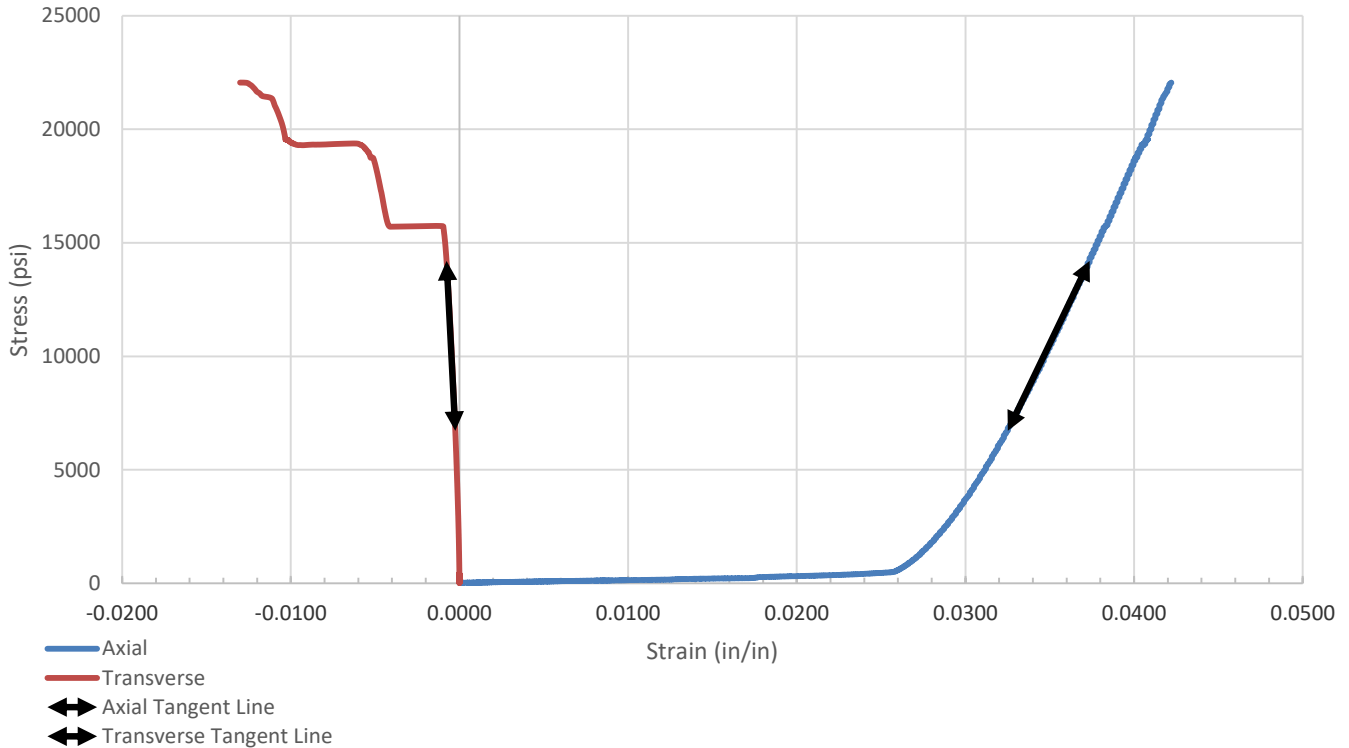
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-15	Depth (feet):	50.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	565.42
Length (in.):	4.25	Diameter (in.):	2.00
L/D Ratio:	2.1	Density (pcf):	162.138

**TEST RESULTS**

Failure Load (lbs):	68607
Failure Strain (%):	4.67
Unconfined Compressive Strength (psi):	22,058
Elastic Modulus, E, (ksi):	1544
Poisson's Ratio, u:	0.107
Time of Failure (min):	06:16
Rate of Loading (psi/sec):	58.697
Moisture Content Post-break:	0.3%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
---	--

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0015
Diameter 1b:	0.0082
Diameter 2a:	0.0020
Diameter 2b:	0.0058
Max Deviation from Flatness:	0.0027
Parallelism Deviation:	
Diameter a:	0.05
Diameter b:	0.77

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

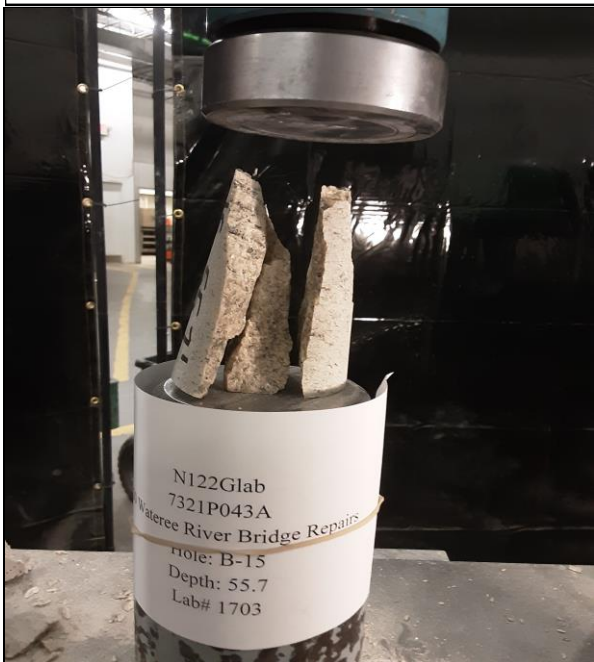
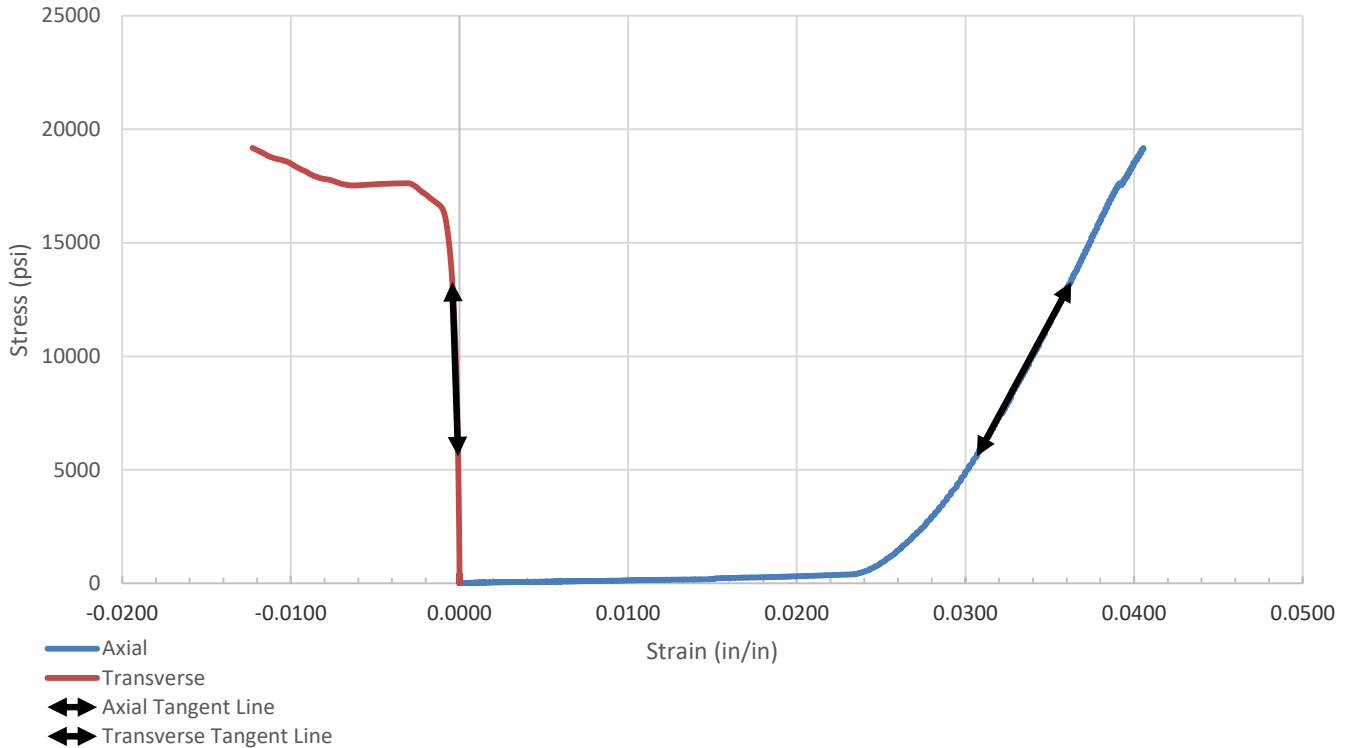
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-15	Depth (feet):	55.7

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	559.94
Length (in.):	4.225	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	163.973

**TEST RESULTS**

Failure Load (lbs):	59051
Failure Strain (%):	4.57
Unconfined Compressive Strength (psi):	19,178
Elastic Modulus, E, (ksi):	1372
Poisson's Ratio, u:	0.062
Time of Failure (min):	03:48
Rate of Loading (psi/sec):	84.041
Moisture Content Post-break:	0.3%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0019
Diameter 1b:	0.0130
Diameter 2a:	0.0034
Diameter 2b:	0.0133
Max Deviation from Flatness:	0.0040
Parallelism Deviation:	
Diameter a:	0.14
Diameter b:	1.45

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

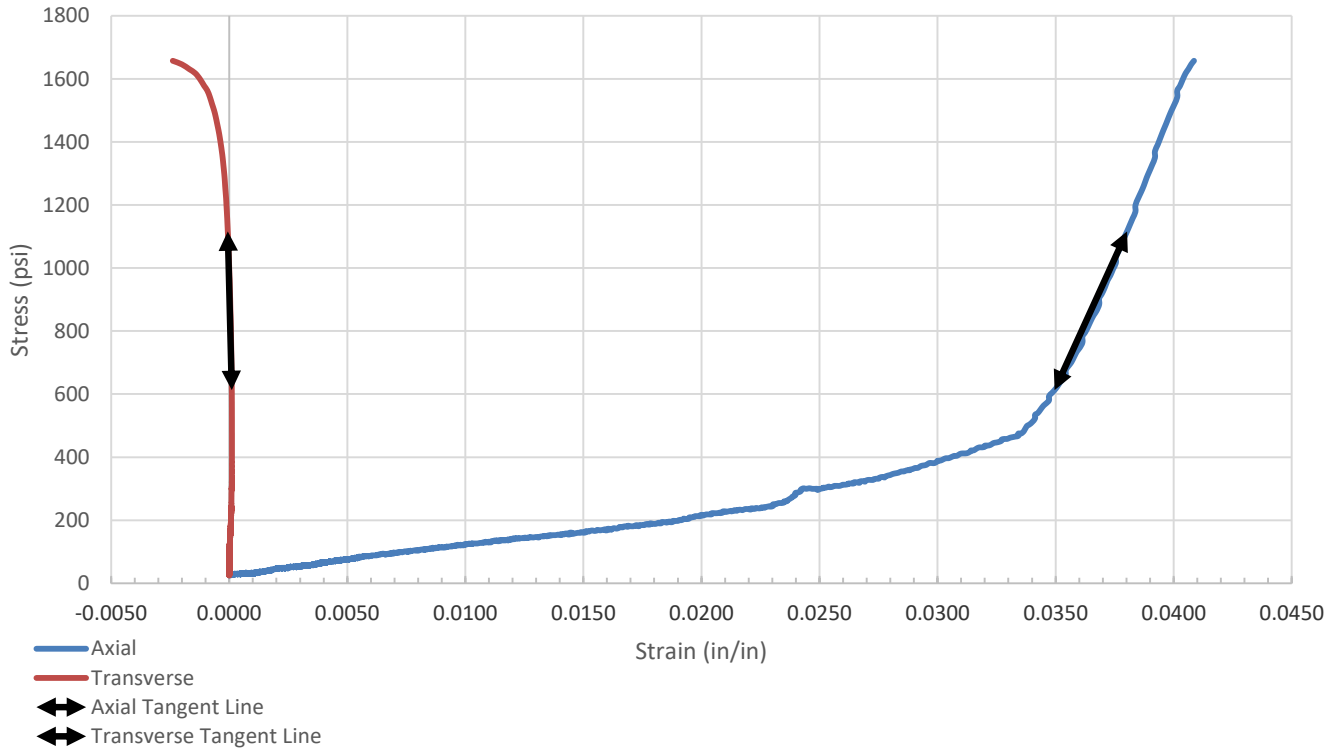
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-16	Depth (feet):	53.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	533.5
Length (in.):	4.255	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	155.915

**TEST RESULTS**

Failure Load (lbs):	5051
Failure Strain (%):	4.18
Unconfined Compressive Strength (psi):	1,657
Elastic Modulus, E, (ksi):	164
Poisson's Ratio, u:	0.055
Time of Failure (min):	03:56
Rate of Loading (psi/sec):	7.010
Moisture Content Post-break:	1.9%



---

<b>Client</b>	<b>Project</b>
RS&H, Inc. North Charleston, SC	I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777
	Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0171
Diameter 1b:	0.0105
Diameter 2a:	0.0138
Diameter 2b:	0.0052
Max Deviation from Flatness:	0.0060
Parallelism Deviation:	
Diameter a:	0.17
Diameter b:	0.80

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

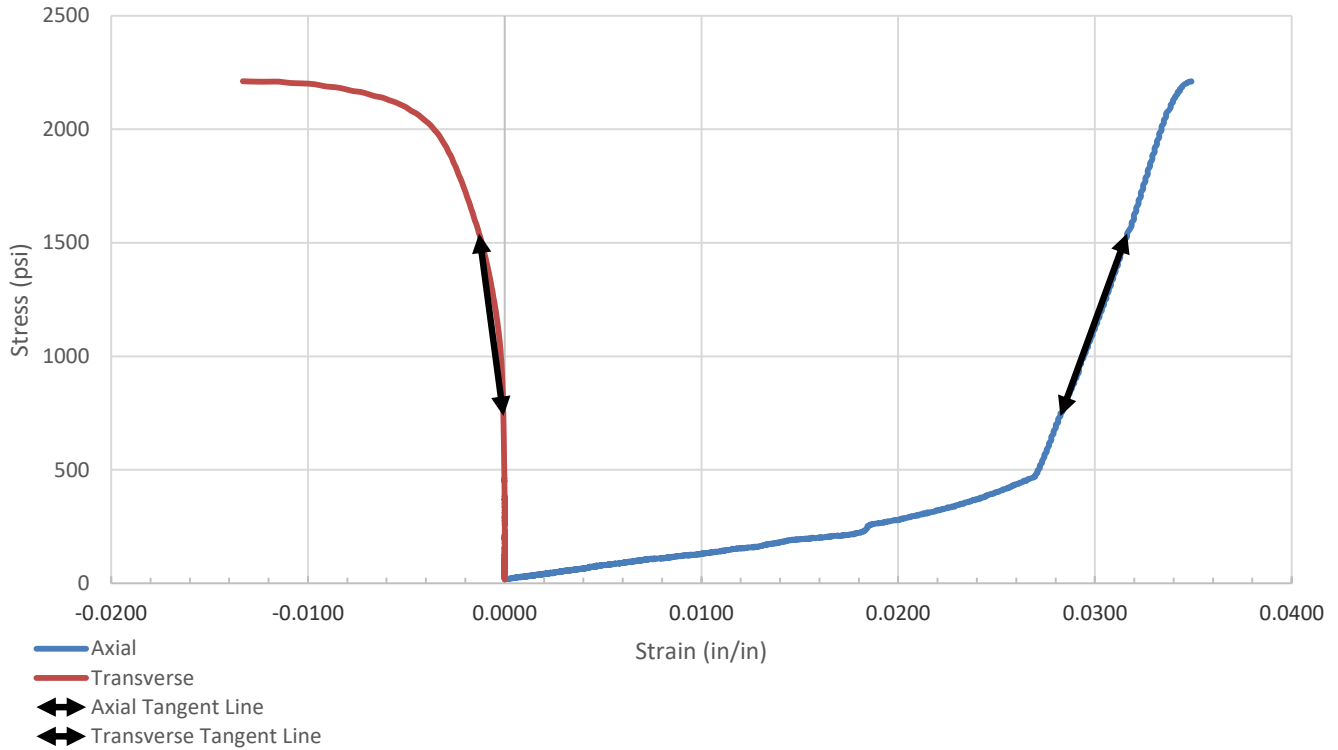
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-16	Depth (feet):	56.6

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	540.45
Length (in.):	4.305	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	156.112

**TEST RESULTS**

Failure Load (lbs):	6741
Failure Strain (%):	3.61
Unconfined Compressive Strength (psi):	2,212
Elastic Modulus, E, (ksi):	237
Poisson's Ratio, u:	0.365
Time of Failure (min):	03:32
Rate of Loading (psi/sec):	10.432
Moisture Content Post-break:	1.5%

Client	Project
RS&H, Inc. North Charleston, SC	I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777
	Project No. 7321P043A

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>	
Side Straightness:	0.0190	
Perpendicularity Deviation:		
Diameter 1a:	0.0121	Fail
Diameter 1b:	0.0027	
Diameter 2a:	0.0111	Fail
Diameter 2b:	0.0019	
Max Deviation from Flatness:	0.0028	Fail
Parallelism Deviation:		
Diameter a:	0.02	
Diameter b:	0.15	

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	0
Compression (spherically seated):	0

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

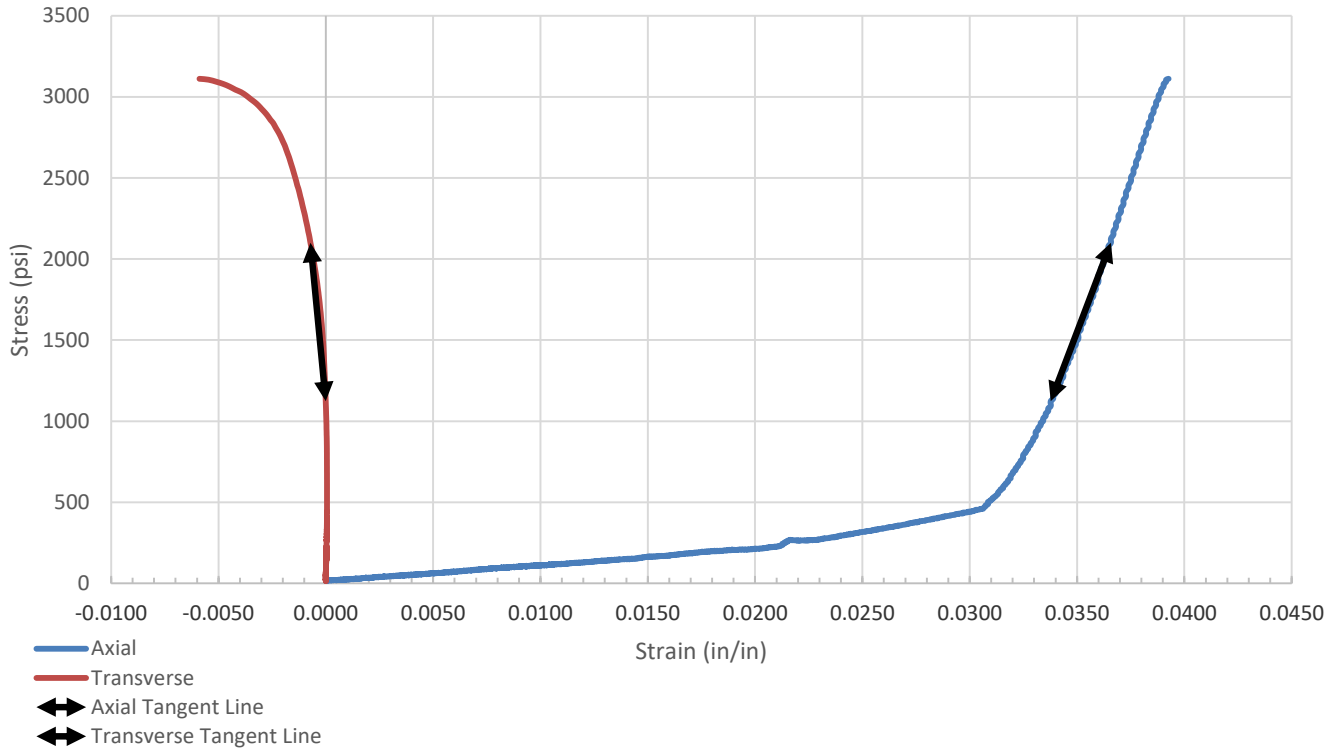
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-16	Depth (feet):	61.6

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	548.63
Length (in.):	4.3	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	157.859

**TEST RESULTS**

Failure Load (lbs):	9580
Failure Strain (%):	4.13
Unconfined Compressive Strength (psi):	3,111
Elastic Modulus, E, (ksi):	348
Poisson's Ratio, u:	0.254
Time of Failure (min):	04:16
Rate of Loading (psi/sec):	12.145
Moisture Content Post-break:	1.0%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
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---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0040
Diameter 1b:	0.0095
Diameter 2a:	0.0036
Diameter 2b:	0.0105
Max Deviation from Flatness:	0.0015
Parallelism Deviation:	
Diameter a:	0.06
Diameter b:	1.23

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

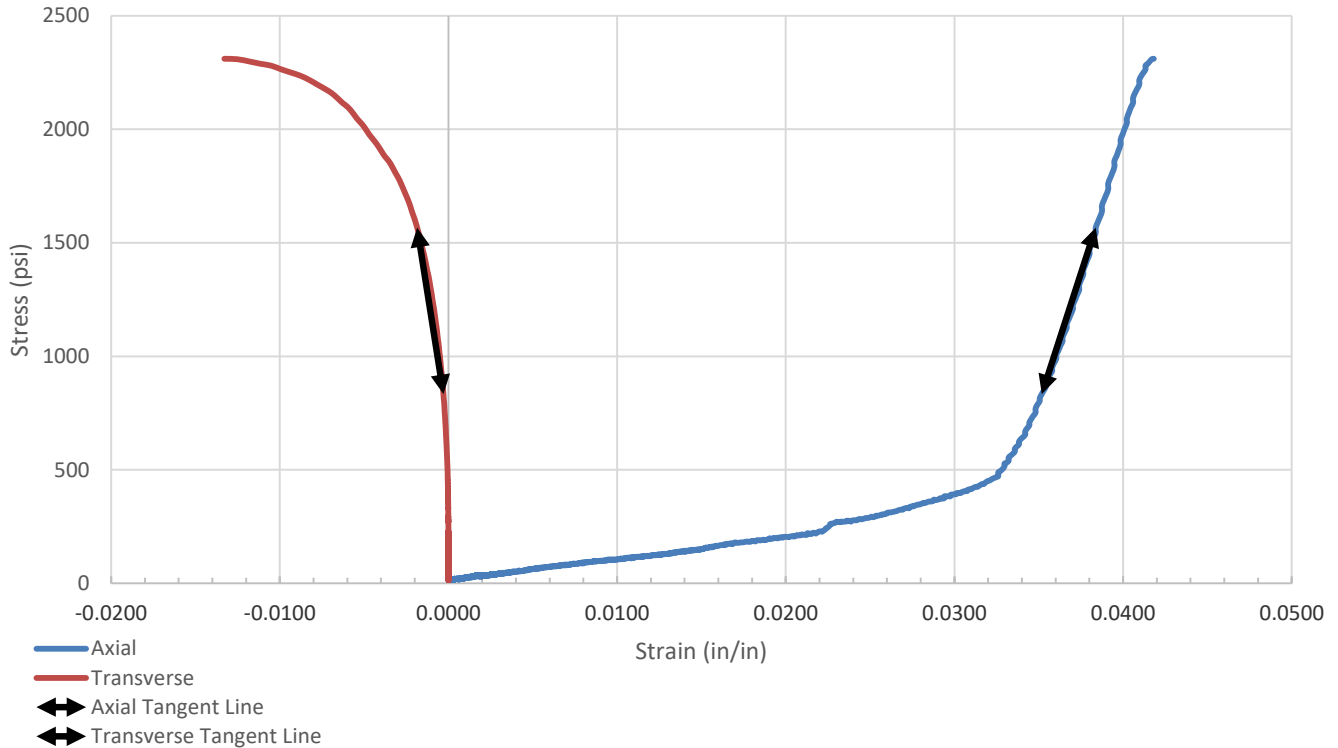
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-16	Depth (feet):	66.6

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	516.01
Length (in.):	4.085	Diameter (in.):	1.91
L/D Ratio:	2.1	Density (pcf):	168.835

**TEST RESULTS**

Failure Load (lbs):	6551
Failure Strain (%):	4.53
Unconfined Compressive Strength (psi):	2,311
Elastic Modulus, E, (ksi):	229
Poisson's Ratio, u:	0.487
Time of Failure (min):	03:38
Rate of Loading (psi/sec):	10.590
Moisture Content Post-break:	1.5%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0097
Diameter 1b:	0.0228
Diameter 2a:	0.0142
Diameter 2b:	0.0345
Max Deviation from Flatness:	0.0086
Parallelism Deviation:	
Diameter a:	0.16
Diameter b:	3.72

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

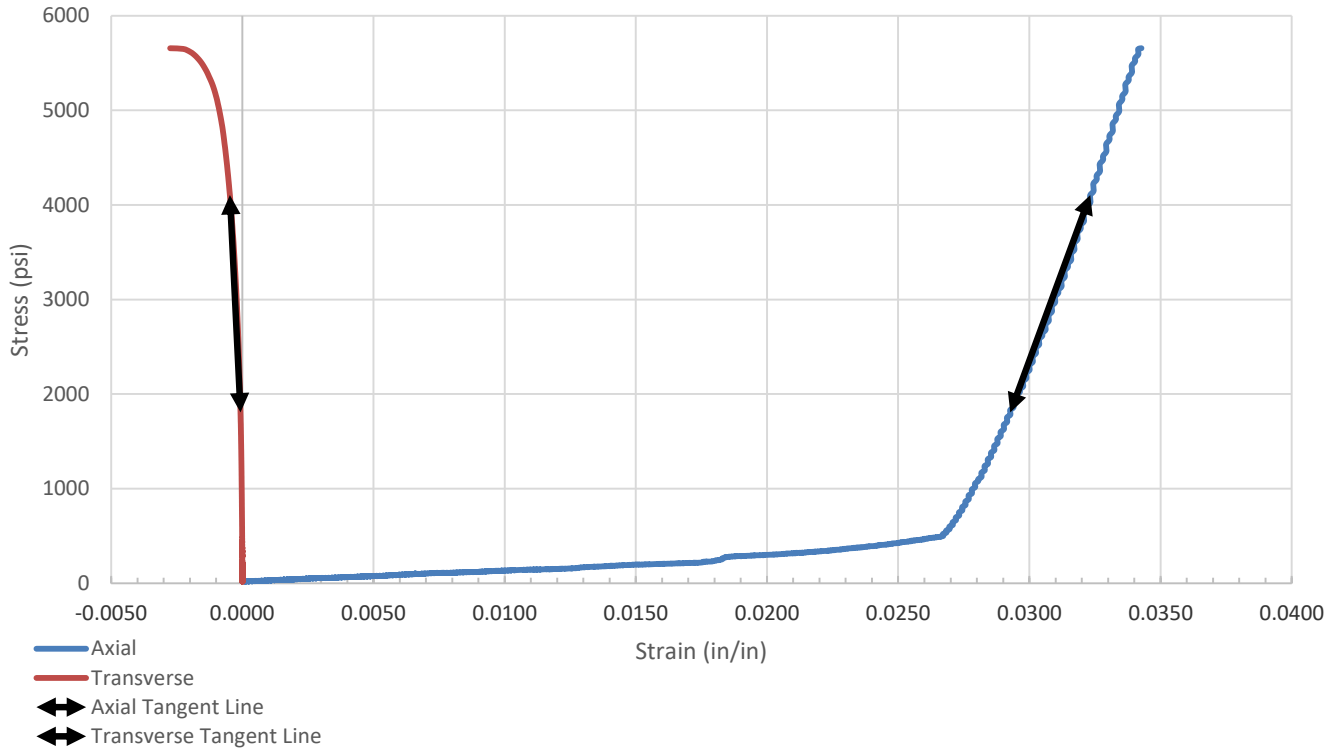
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-17	Depth (feet):	56

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	539.23
Length (in.):	4.12	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	161.933

**TEST RESULTS**

Failure Load (lbs):	17419
Failure Strain (%):	3.63
Unconfined Compressive Strength (psi):	5,657
Elastic Modulus, E, (ksi):	754
Poisson's Ratio, u:	0.133
Time of Failure (min):	04:27
Rate of Loading (psi/sec):	21.156
Moisture Content Post-break:	0.7%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0115
Diameter 1b:	0.0018
Diameter 2a:	0.0099
Diameter 2b:	0.0075
Max Deviation from Flatness:	0.0075
Parallelism Deviation:	
Diameter a:	0.02
Diameter b:	0.29

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

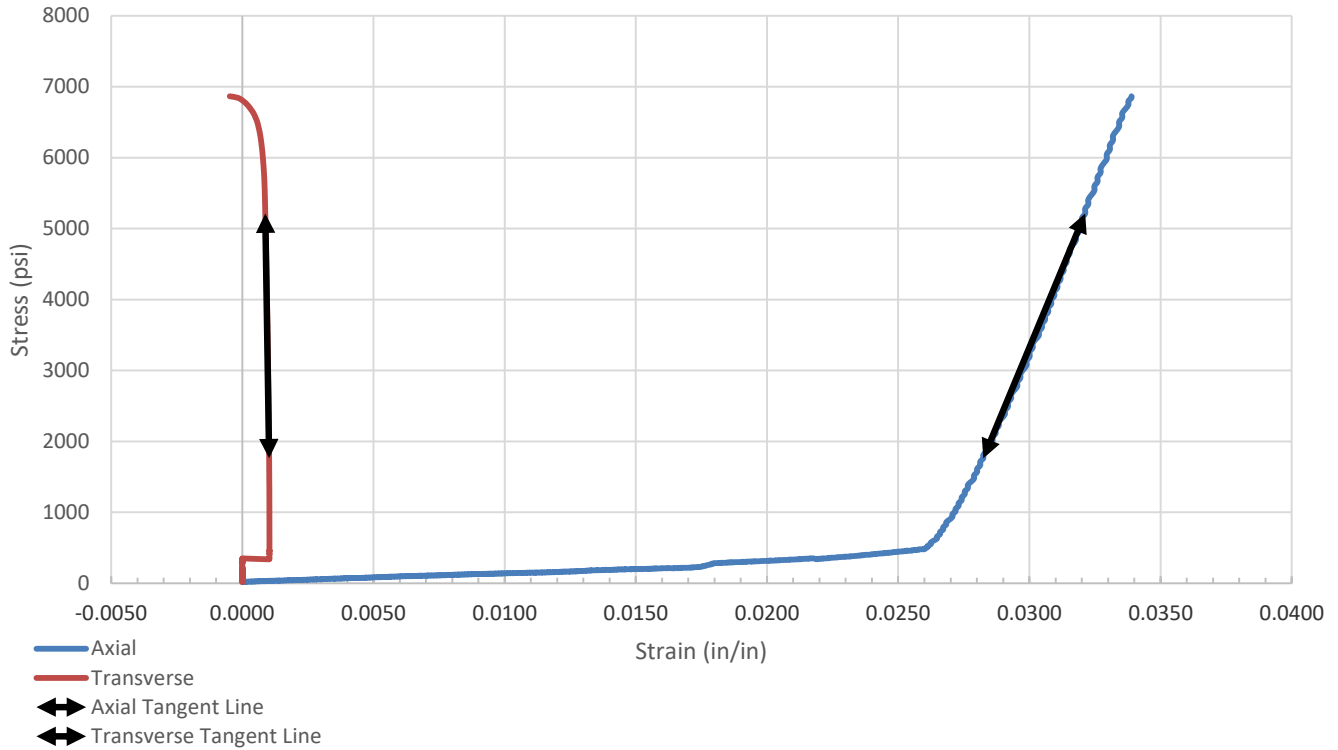
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-17	Depth (feet):	60.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	558.14
Length (in.):	4.27	Diameter (in.):	1.99
L/D Ratio:	2.2	Density (pcf):	160.910

**TEST RESULTS**

Failure Load (lbs):	21139
Failure Strain (%):	3.47
Unconfined Compressive Strength (psi):	6,865
Elastic Modulus, E, (ksi):	889
Poisson's Ratio, u:	0.038
Time of Failure (min):	02:39
Rate of Loading (psi/sec):	43.071
Moisture Content Post-break:	0.6%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
---	--

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**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0056
Diameter 1b:	0.0169
Diameter 2a:	0.0080
Diameter 2b:	0.0184
Max Deviation from Flatness:	0.0038
Parallelism Deviation:	
Diameter a:	0.22
Diameter b:	2.29

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

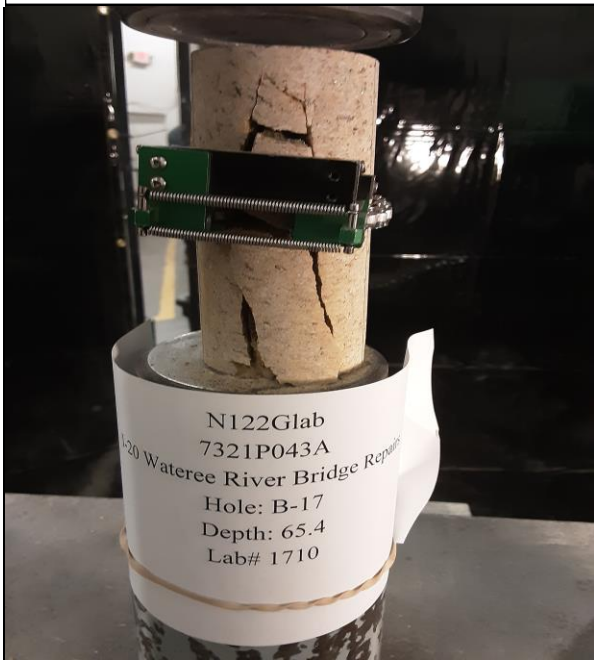
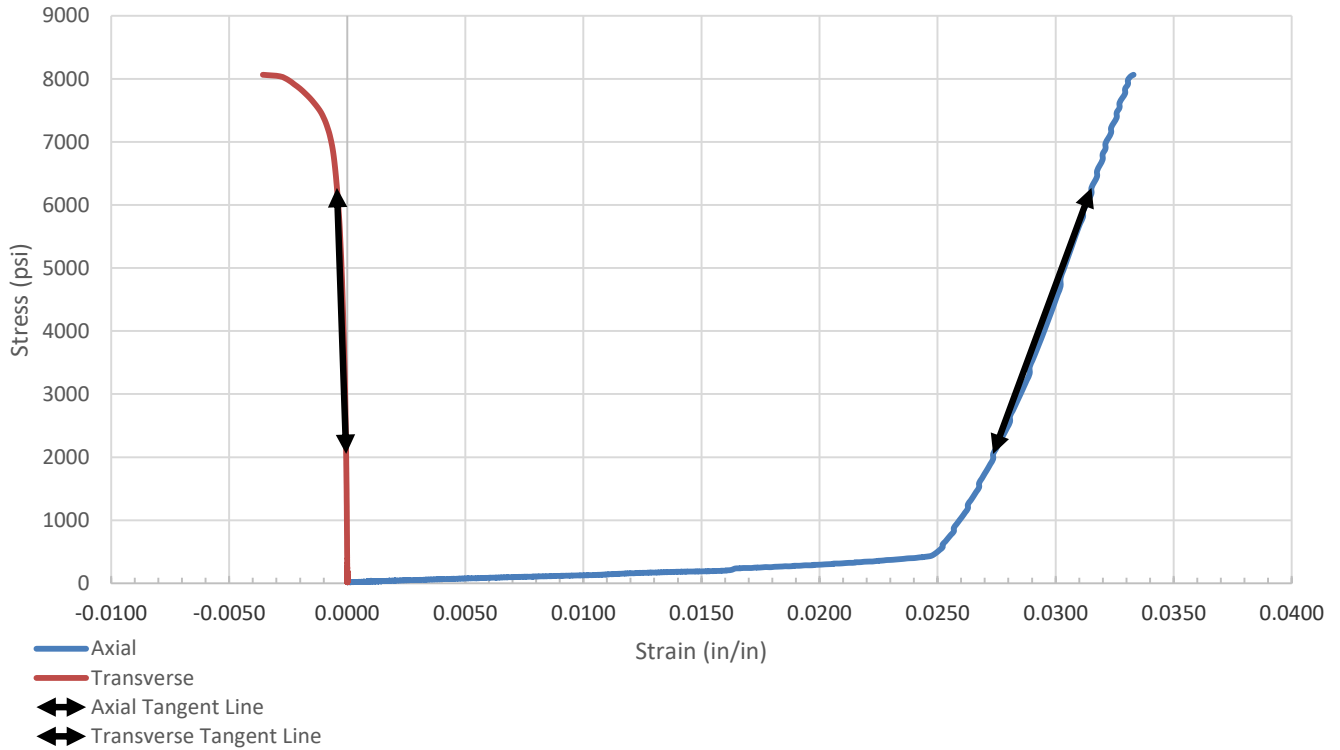
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-17	Depth (feet):	65.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	553.47
Length (in.):	4.225	Diameter (in.):	1.98
L/D Ratio:	2.1	Density (pcf):	162.078

**TEST RESULTS**

Failure Load (lbs):	24831
Failure Strain (%):	3.50
Unconfined Compressive Strength (psi):	8,065
Elastic Modulus, E, (ksi):	1014
Poisson's Ratio, u:	0.094
Time of Failure (min):	02:32
Rate of Loading (psi/sec):	52.917
Moisture Content Post-break:	0.6%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0202
Diameter 1b:	0.0029
Diameter 2a:	0.0150
Diameter 2b:	0.0023
Max Deviation from Flatness:	0.0109
Parallelism Deviation:	
Diameter a:	0.08
Diameter b:	0.20

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

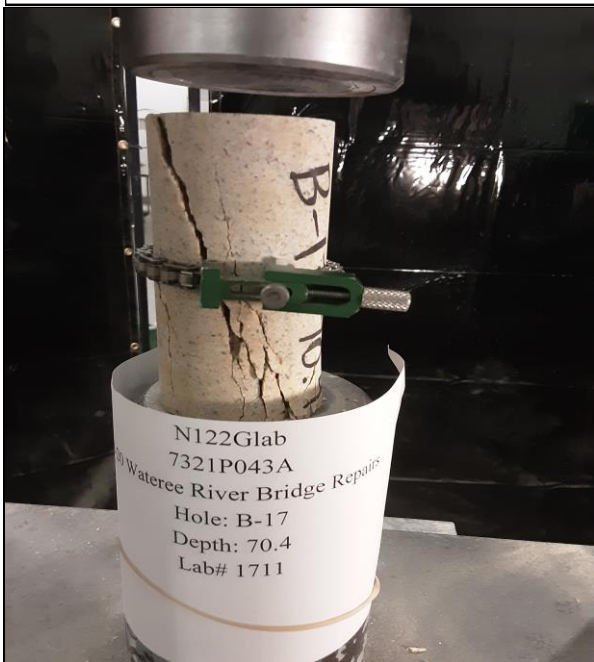
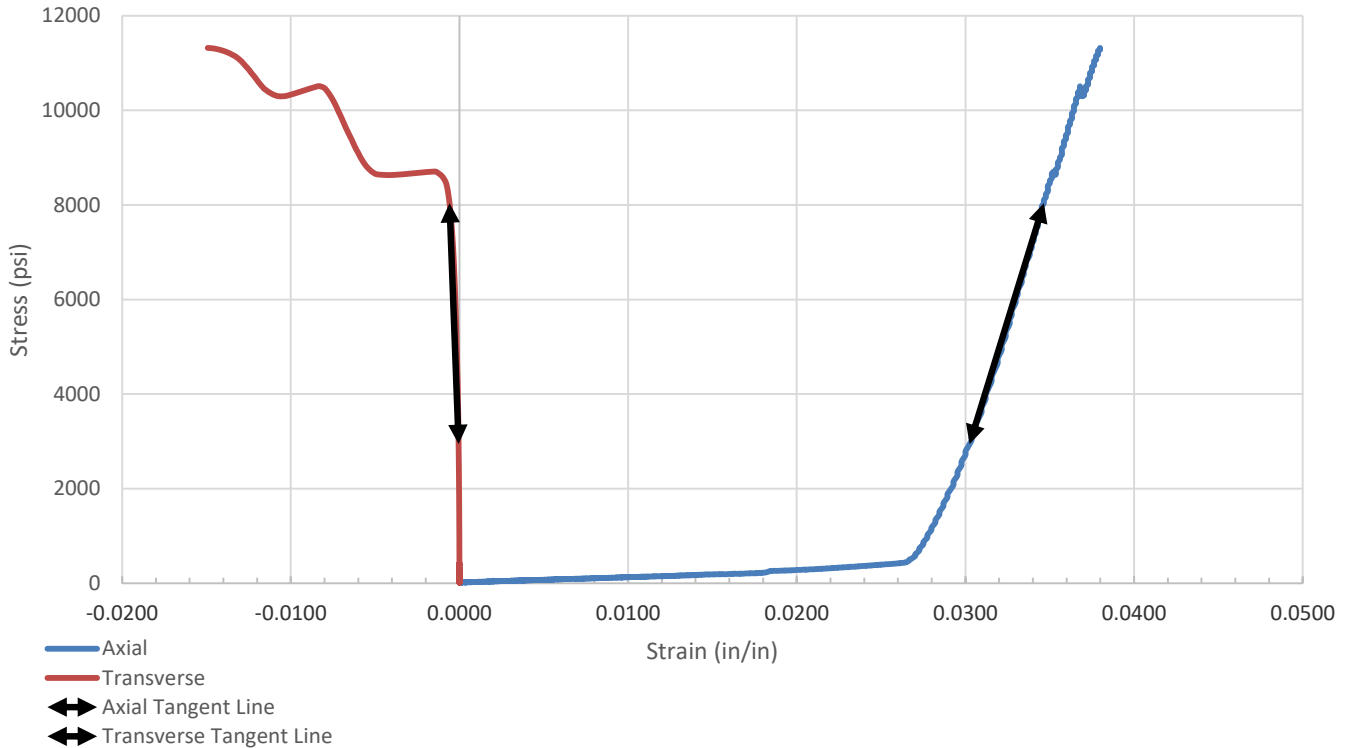
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



SAMPLE LOCATION			
Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-17	Depth (feet):	70.4
SPECIMEN INFORMATION			
Sample No.:	NQ-4	Mass (g):	558.35
Length (in.):	4.22	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	162.060
TEST RESULTS			
Failure Load (lbs):	35210		
Failure Strain (%):	4.10		
Unconfined Compressive Strength (psi):	11,321		
Elastic Modulus, E, (ksi):	1156		
Poisson's Ratio, u:	0.122		
Time of Failure (min):	03:12		
Rate of Loading (psi/sec):	58.900		
Moisture Content Post-break:	0.4%		

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0038
Diameter 1b:	0.0071
Diameter 2a:	0.0066
Diameter 2b:	0.0052
Max Deviation from Flatness:	0.0037
Parallelism Deviation:	
Diameter a:	0.54
Diameter b:	0.69

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

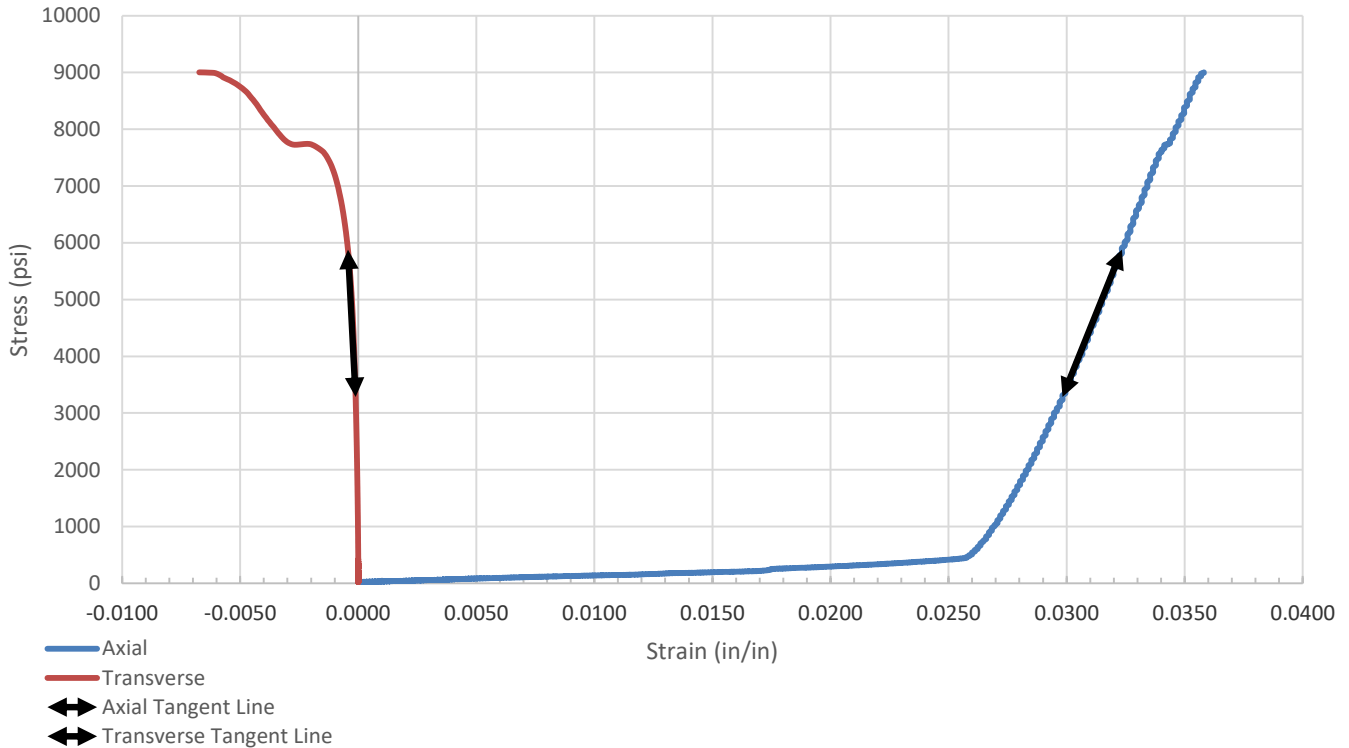
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-18	Depth (feet):	69.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	554.16
Length (in.):	4.195	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	162.618

**TEST RESULTS**

Failure Load (lbs):	27722
Failure Strain (%):	3.59
Unconfined Compressive Strength (psi):	9,003
Elastic Modulus, E, (ksi):	1032
Poisson's Ratio, u:	0.128
Time of Failure (min):	04:31
Rate of Loading (psi/sec):	33.198
Moisture Content Post-break:	0.5%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0113
Diameter 1b:	0.0066
Diameter 2a:	0.0176
Diameter 2b:	0.0055
Max Deviation from Flatness:	0.0057
Parallelism Deviation:	
Diameter a:	0.23
Diameter b:	0.74

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

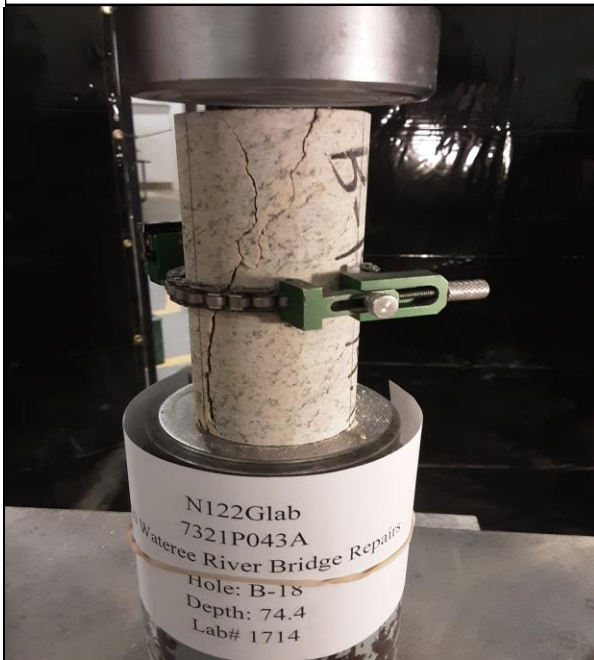
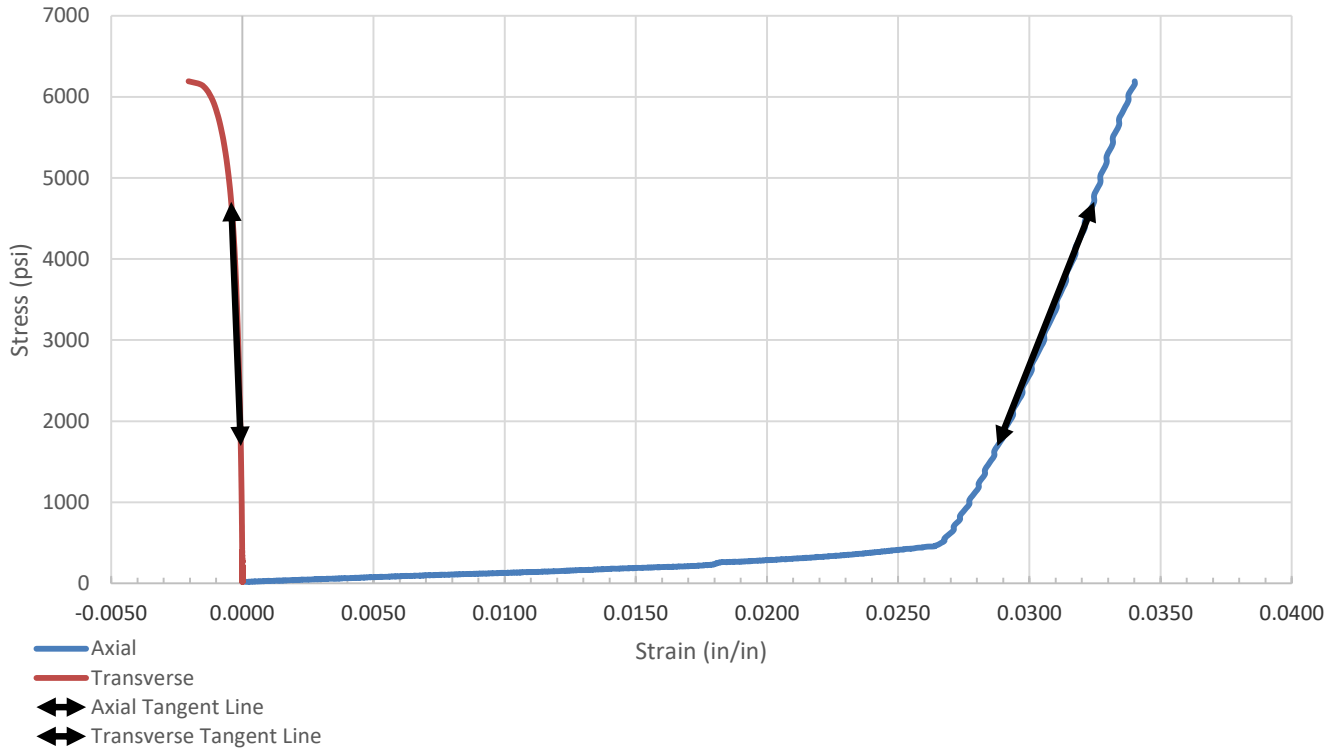
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-18	Depth (feet):	74.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	557.52
Length (in.):	4.225	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	162.443

**TEST RESULTS**

Failure Load (lbs):	19067
Failure Strain (%):	3.62
Unconfined Compressive Strength (psi):	6,192
Elastic Modulus, E, (ksi):	817
Poisson's Ratio, u:	0.099
Time of Failure (min):	02:16
Rate of Loading (psi/sec):	45.399
Moisture Content Post-break:	0.5%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0085
Diameter 1b:	0.0230
Diameter 2a:	0.0019
Diameter 2b:	0.0221
Max Deviation from Flatness:	0.0108
Parallelism Deviation:	
Diameter a:	0.22
Diameter b:	2.78

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

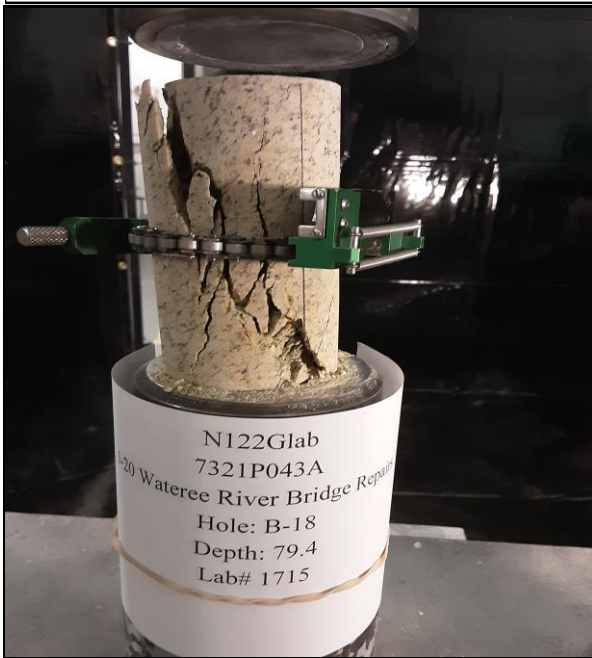
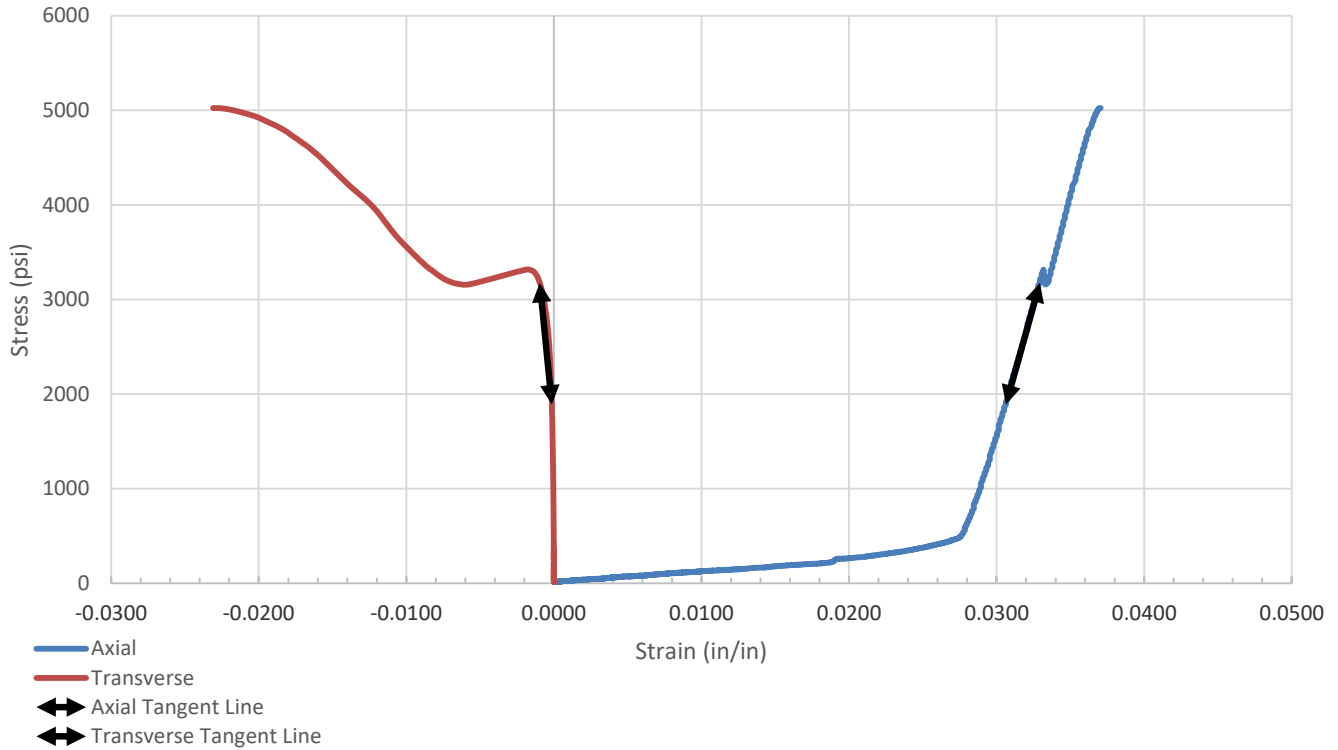
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-18	Depth (feet):	79.4

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	542.81
Length (in.):	4.15	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	160.207

**TEST RESULTS**

Failure Load (lbs):	15627
Failure Strain (%):	3.90
Unconfined Compressive Strength (psi):	5,024
Elastic Modulus, E, (ksi):	559
Poisson's Ratio, u:	0.355
Time of Failure (min):	03:23
Rate of Loading (psi/sec):	24.775
Moisture Content Post-break:	0.7%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
---	--

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0047
Diameter 1b:	0.0063
Diameter 2a:	0.0101
Diameter 2b:	0.0059
Max Deviation from Flatness:	0.0099
Parallelism Deviation:	
Diameter a:	0.07
Diameter b:	0.68

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

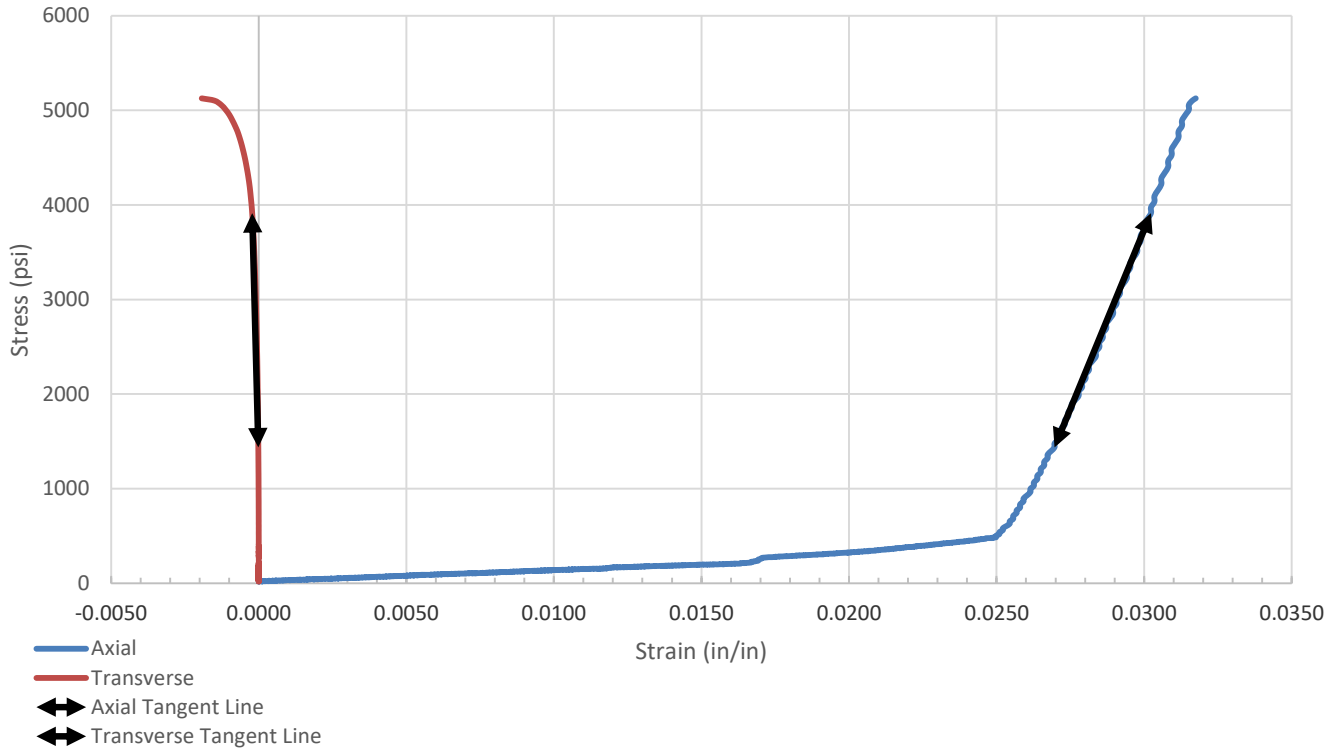
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-19	Depth (feet):	66.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-1	Mass (g):	560.25
Length (in.):	4.305	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	161.015

**TEST RESULTS**

Failure Load (lbs):	15787
Failure Strain (%):	3.29
Unconfined Compressive Strength (psi):	5,127
Elastic Modulus, E, (ksi):	758
Poisson's Ratio, u:	0.064
Time of Failure (min):	03:05
Rate of Loading (psi/sec):	27.775
Moisture Content Post-break:	0.9%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0017
Diameter 1b:	0.0146
Diameter 2a:	0.0007
Diameter 2b:	0.0159
Max Deviation from Flatness:	0.0061
Parallelism Deviation:	
Diameter a:	0.07
Diameter b:	0.01

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

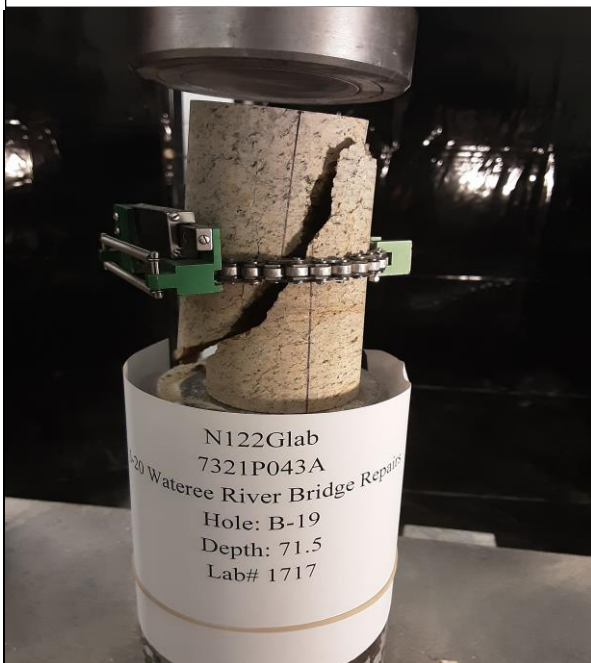
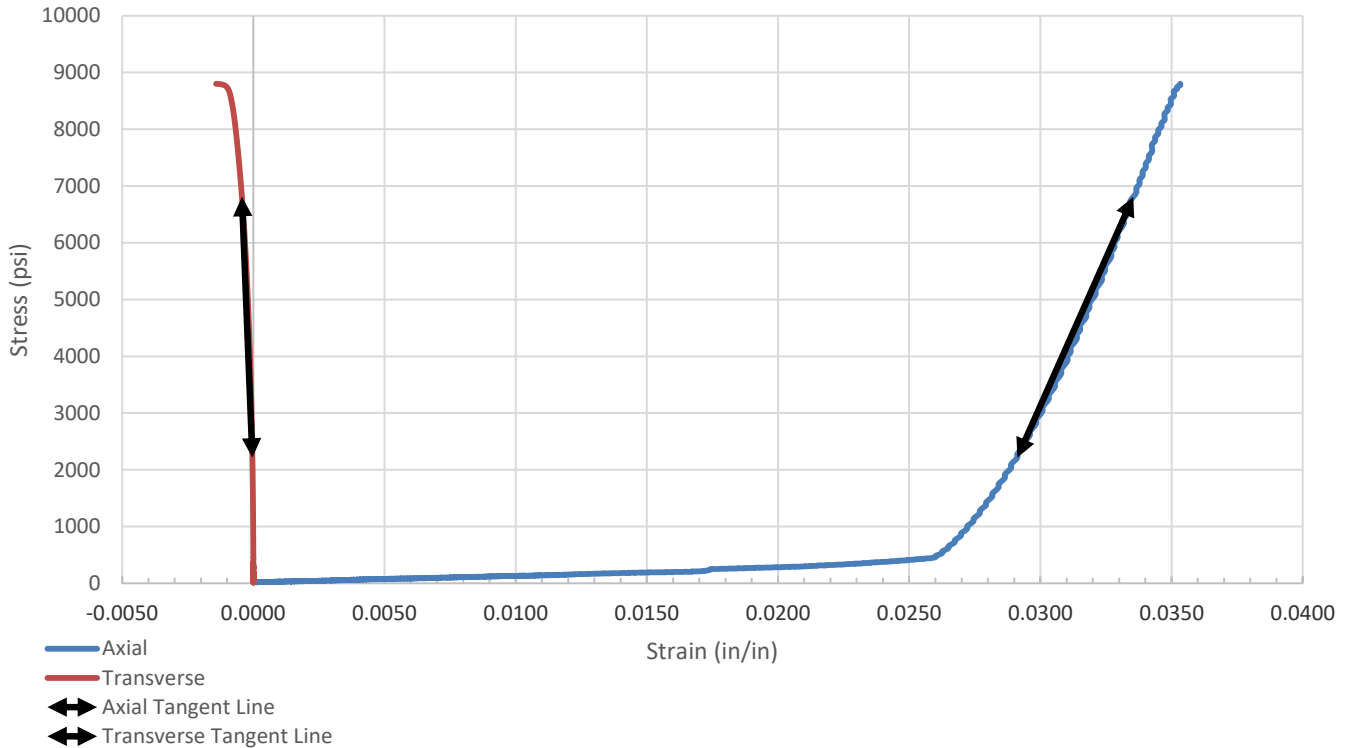
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-19	Depth (feet):	71.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	557.44
Length (in.):	4.21	Diameter (in.):	1.97
L/D Ratio:	2.1	Density (pcf):	165.490

**TEST RESULTS**

Failure Load (lbs):	26829
Failure Strain (%):	3.76
Unconfined Compressive Strength (psi):	8,802
Elastic Modulus, E, (ksi):	1040
Poisson's Ratio, u:	0.090
Time of Failure (min):	03:08
Rate of Loading (psi/sec):	46.770
Moisture Content Post-break:	0.5%



---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0031
Diameter 1b:	0.0088
Diameter 2a:	0.0036
Diameter 2b:	0.0093
Max Deviation from Flatness:	0.0021
Parallelism Deviation:	
Diameter a:	0.01
Diameter b:	1.09

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

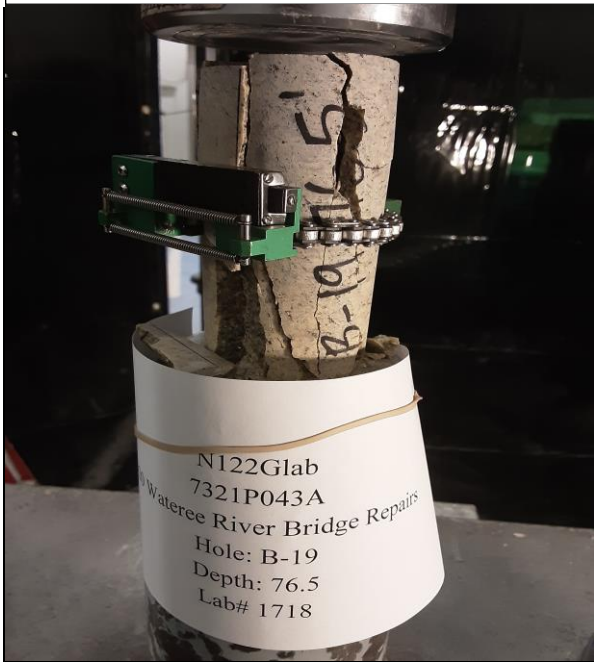
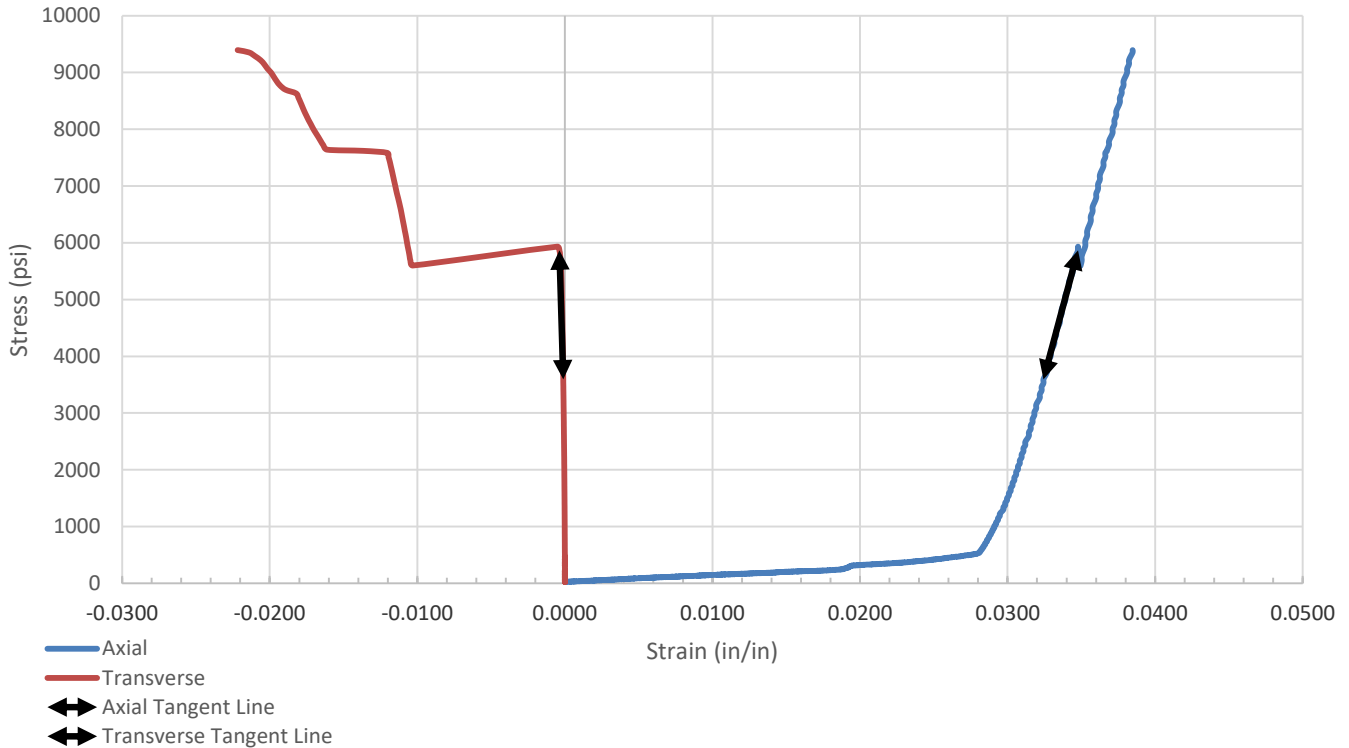
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-19	Depth (feet):	76.5

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	540.4
Length (in.):	4.075	Diameter (in.):	1.99
L/D Ratio:	2.1	Density (pcf):	163.250

**TEST RESULTS**

Failure Load (lbs):	28930
Failure Strain (%):	3.87
Unconfined Compressive Strength (psi):	9,396
Elastic Modulus, E, (ksi):	970
Poisson's Ratio, u:	0.112
Time of Failure (min):	03:15
Rate of Loading (psi/sec):	48.282
Moisture Content Post-break:	0.4%

---

<b>Client</b>	<b>Project</b>
RS&H, Inc. North Charleston, SC	I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777
	Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0130
Diameter 1b:	0.0067
Diameter 2a:	0.0025
Diameter 2b:	0.0050
Max Deviation from Flatness:	0.0083
Parallelism Deviation:	
Diameter a:	0.58
Diameter b:	0.61

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

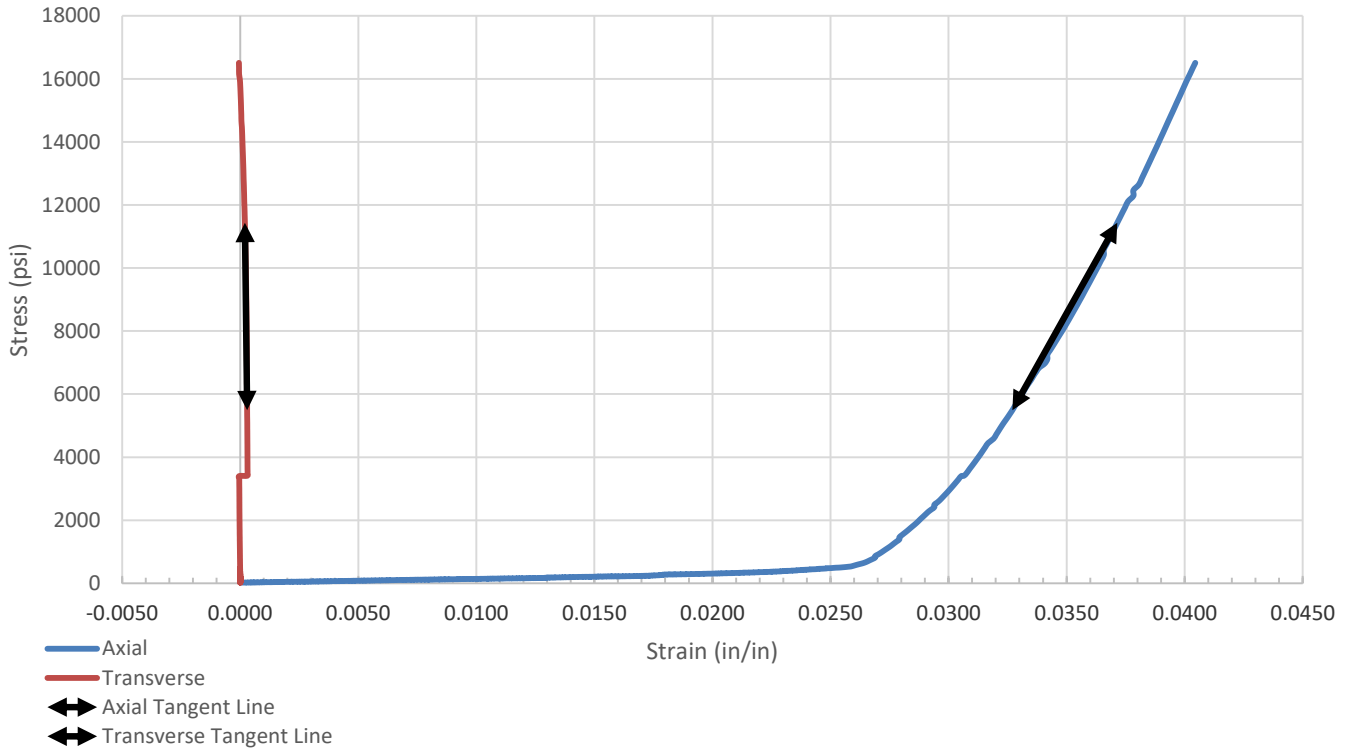
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-20	Depth (feet):	75.9

**SPECIMEN INFORMATION**

Sample No.:	NQ-2	Mass (g):	590.55
Length (in.):	4.41	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	166.522

**TEST RESULTS**

Failure Load (lbs):	50315
Failure Strain (%):	4.08
Unconfined Compressive Strength (psi):	16,507
Elastic Modulus, E, (ksi):	1338
Poisson's Ratio, u:	0.021
Time of Failure (min):	02:31
Rate of Loading (psi/sec):	109.032
Moisture Content Post-break:	0.2%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0088
Diameter 1b:	0.0108
Diameter 2a:	0.0021
Diameter 2b:	0.0069
Max Deviation from Flatness:	0.0029
Parallelism Deviation:	
Diameter a:	0.43
Diameter b:	1.08

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

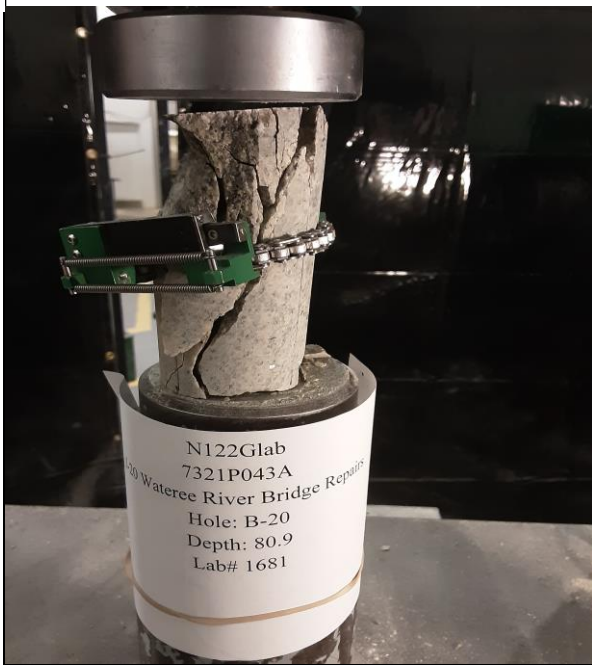
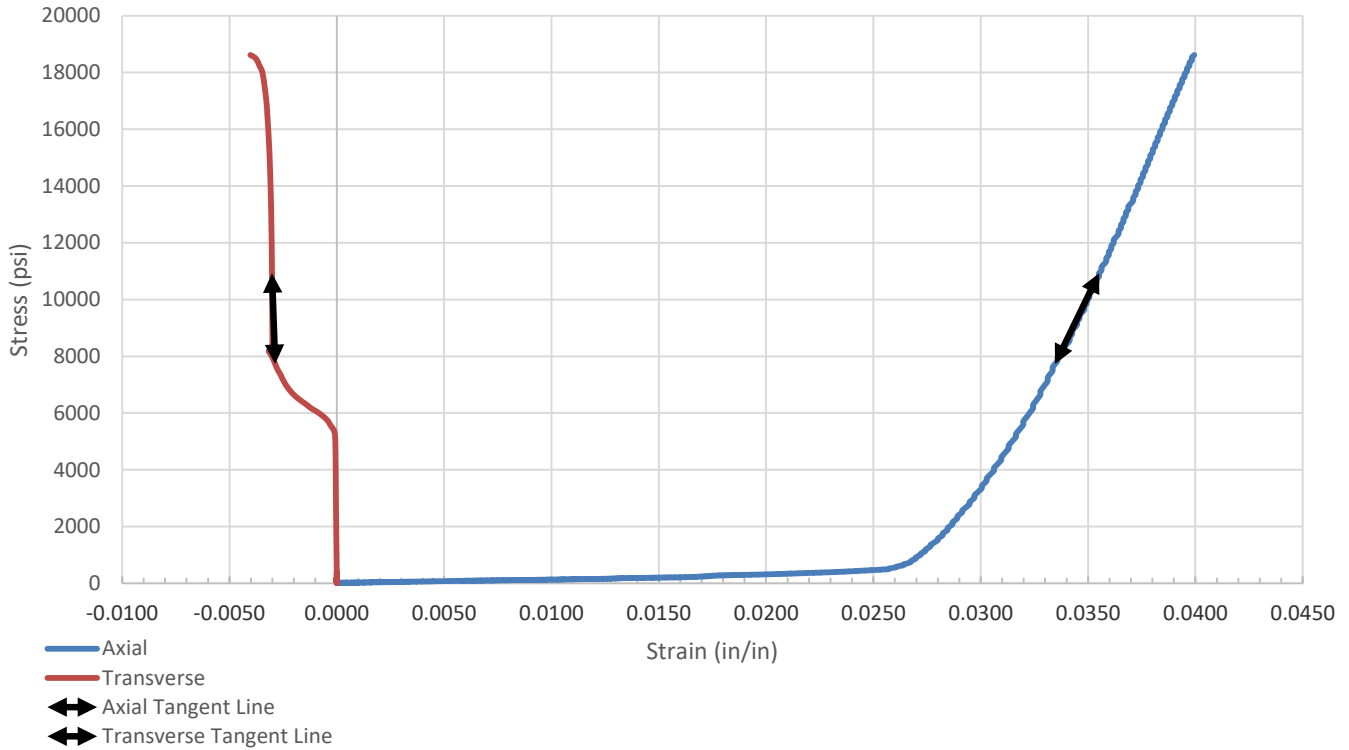
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-20	Depth (feet):	80.9

**SPECIMEN INFORMATION**

Sample No.:	NQ-3	Mass (g):	584.07
Length (in.):	4.415	Diameter (in.):	1.97
L/D Ratio:	2.2	Density (pcf):	165.344

**TEST RESULTS**

Failure Load (lbs):	56748
Failure Strain (%):	4.00
Unconfined Compressive Strength (psi):	18,618
Elastic Modulus, E, (ksi):	1559
Poisson's Ratio, u:	0.072
Time of Failure (min):	02:59
Rate of Loading (psi/sec):	104.126
Moisture Content Post-break:	0.2%

---

<b>Client</b> RS&H, Inc. North Charleston, SC	<b>Project</b> I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777  Project No. 7321P043A
---	--

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0058
Diameter 1b:	0.0099
Diameter 2a:	0.0072
Diameter 2b:	0.0068
Max Deviation from Flatness:	0.0023
Parallelism Deviation:	
Diameter a:	0.07
Diameter b:	1.08

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:



**Client**

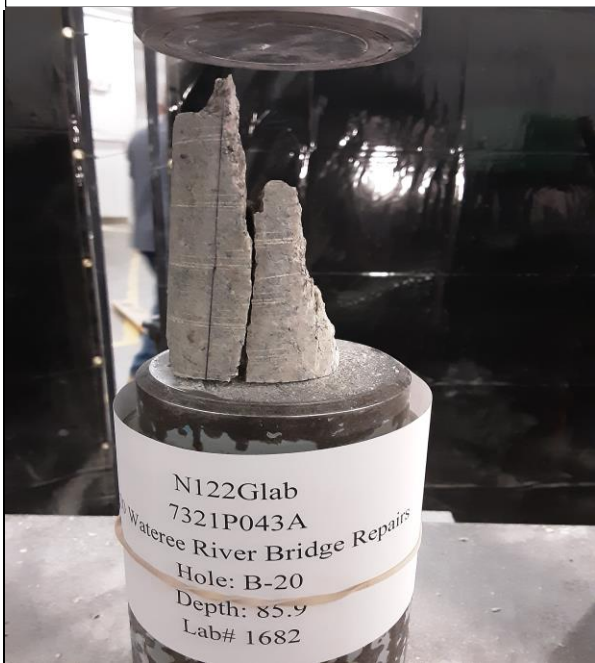
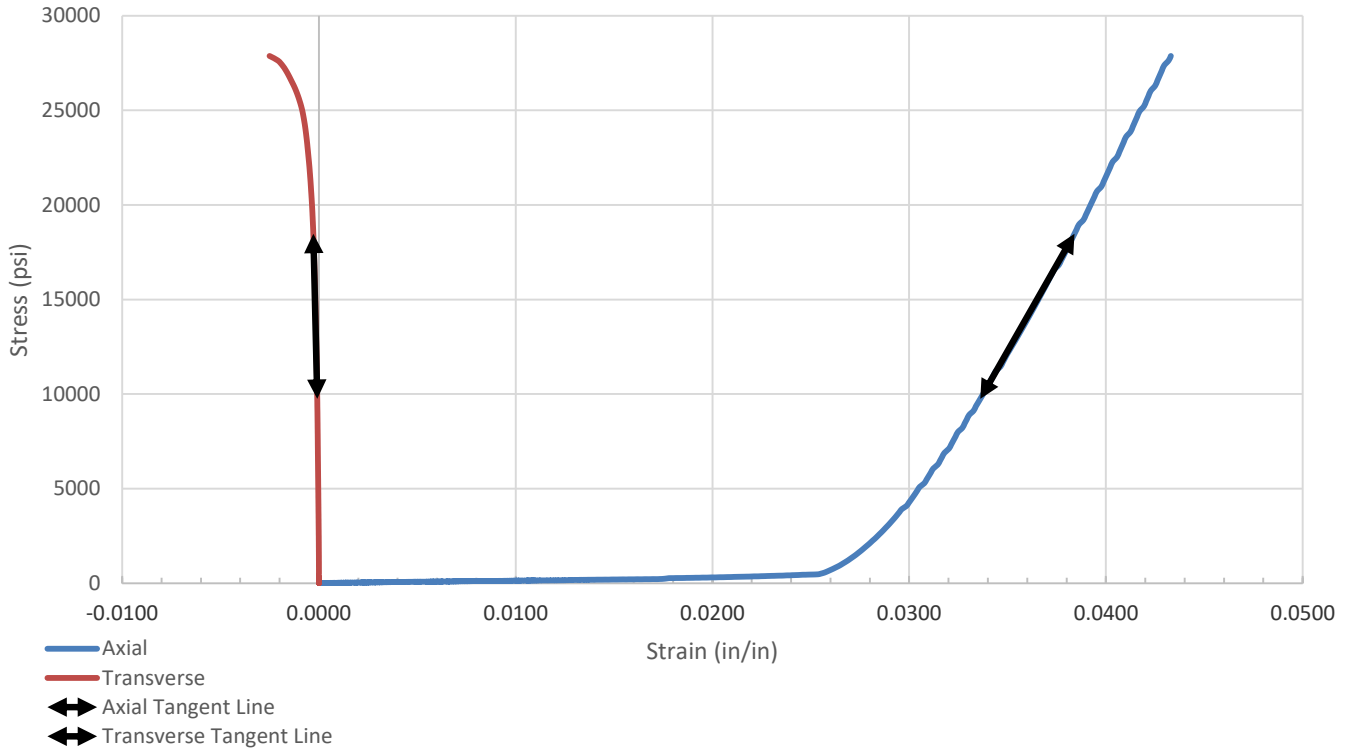
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-20	Depth (feet):	85.9

**SPECIMEN INFORMATION**

Sample No.:	NQ-4	Mass (g):	583.63
Length (in.):	4.41	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	164.571

**TEST RESULTS**

Failure Load (lbs):	84967
Failure Strain (%):	4.35
Unconfined Compressive Strength (psi):	27,876
Elastic Modulus, E, (ksi):	1823
Poisson's Ratio, u:	0.042
Time of Failure (min):	02:52
Rate of Loading (psi/sec):	161.880
Moisture Content Post-break:	0.2%

---

<b>Client</b>	<b>Project</b>
RS&H, Inc. North Charleston, SC	I-20 Wateree River Bridge Repairs Kershaw County, SC PIN: P029450, P029776, P029777
	Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0024
Diameter 1b:	0.0109
Diameter 2a:	0.0020
Diameter 2b:	0.0092
Max Deviation from Flatness:	0.0017
Parallelism Deviation:	
Diameter a:	0.04
Diameter b:	1.19

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

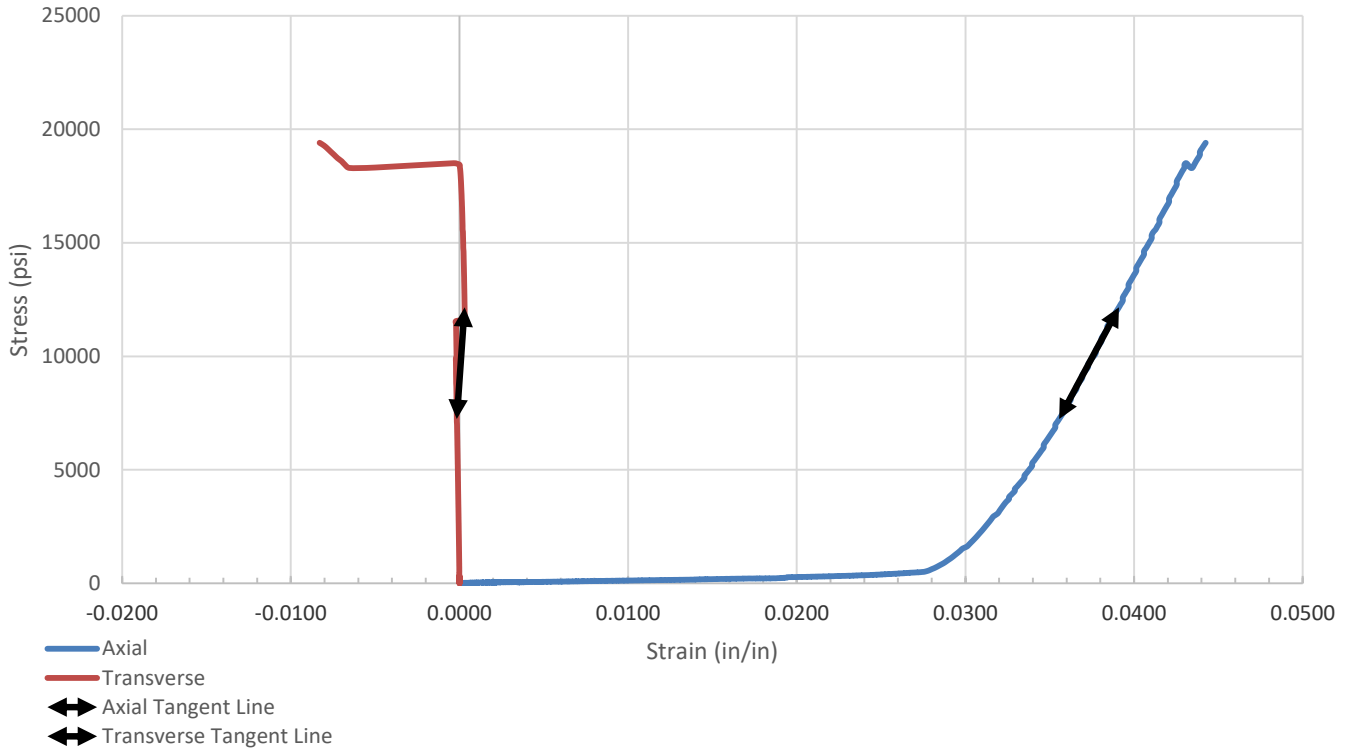
RS&H, Inc.  
North Charleston, SC

**Project**

I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777

Project No. 7321P043A

ASTM D7012 Stress/ Strain Curve



**SAMPLE LOCATION**

Site:	I-20 Wateree River Bridge Repairs		
Rock Type:	Granite		
Boring:	B-20	Depth (feet):	90.9

**SPECIMEN INFORMATION**

Sample No.:	NQ-5	Mass (g):	580.79
Length (in.):	4.395	Diameter (in.):	1.98
L/D Ratio:	2.2	Density (pcf):	163.500

**TEST RESULTS**

Failure Load (lbs):	59752
Failure Strain (%):	4.83
Unconfined Compressive Strength (psi):	19,406
Elastic Modulus, E, (ksi):	1388
Poisson's Ratio, u:	0.131
Time of Failure (min):	02:30
Rate of Loading (psi/sec):	129.717
Moisture Content Post-break:	0.2%

---

**Client**RS&H, Inc.  
North Charleston, SC**Project**I-20 Wateree River Bridge Repairs  
Kershaw County, SC  
PIN: P029450, P029776, P029777Project No. 7321P043A

---

**ASTM D4543 Test Results:**

<u>Parameter</u>	<u>Data</u>
Side Straightness:	0.0190
Perpendicularity Deviation:	
Diameter 1a:	0.0190
Diameter 1b:	0.0048
Diameter 2a:	0.0074
Diameter 2b:	0.0121
Max Deviation from Flatness:	0.0035
Parallelism Deviation:	
Diameter a:	0.75
Diameter b:	1.06

---

**Equipment:**

	TICCS ID:
Calipers:	W-54522
Scale:	B-38686
Dial Indicator:	W-71336
Compression (spherically seated):	Yes

---

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:  
Notes:

**Client**

RS&H Architects- Engineers-Planners, Inc.  
Jacksonville, FL

**Project**

I-20 Wateree River Bridge Repairs

**Sample Submitted By:** Terracon (73)

**Date Received:** 2/21/2022

**Lab No.:** 22-0173

**Results of Corrosion Analysis**

<b>Sample Number</b>	SS-4	SS-15	SS-8	SS-15
<b>Sample Location</b>	B-9	B-9	B-20	B-20
<b>Sample Depth (ft.)</b>	6.0-8.0	28.0-30.0	14.0-16.0	28.0-30.0
pH Analysis, ASTM G 51	8.32	8.21	8.16	8.09
Water Soluble Sulfate (SO <sub>4</sub> ), ASTM C 1580 (mg/kg)	100	27	24	49
Chlorides, ASTM D 512, (mg/kg)	30	72	70	32
Saturated Minimum Resistivity, ASTM G 187, (ohm-cm)	12610	5141	7372	9700



**Analyzed By:**

Nathan Campo  
Engineering Technician II

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

## **SUPPORTING INFORMATION**

### **Contents:**

Soil Description Terms  
Rock Description Terms  
Soil/Rock Symbols  
Rig Calibration Reports

## SOIL DESCRIPTION TERMS

### Relative Density/Consistency Terms

<u>Relative Density</u> <sup>1</sup>			<u>Consistency</u> <sup>2</sup>		
Descriptive Term	Relative Density	SPT Blow Count	Descriptive Term	Unconfined Compression Strength ( $q_u$ ) (tsf)	SPT Blow Count
Very Loose	0 to 15%	4 and less	Very Soft	0.25 and less	2 and less
Loose	16 to 35%	5 to 10	Soft	0.26 to 0.50	3 to 4
Medium Dense	36 to 65%	11 to 30	Firm	0.51 to 1.00	5 to 8
Dense	66 to 85%	31 to 50	Stiff	1.01 to 2.00	9 to 15
Very Dense	86 to 100%	51 and more	Very Stiff	2.01 to 4.00	16 to 30
			Hard	4.01 and more	31 and more

### Moisture Condition

<u>Descriptive Term</u>	<u>Criteria</u>
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually in coarse-grained soils below the water table

### Color

Describe the sample color while sample is still moist.

### Angularity<sup>1</sup>

<u>Descriptive Term</u>	<u>Criteria</u>
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

### HCl Reaction<sup>3</sup>

<u>Descriptive Term</u>	<u>Criteria</u>
None Reactive	No visible reaction
Weakly Reactive	Some reaction, with bubbles forming slowly
Strongly Reactive	Violent reaction, with bubbles forming immediately

### Cementation<sup>3</sup>

<u>Descriptive Term</u>	<u>Criteria</u>
Weakly Cemented	Crumbles or breaks with handling or little finger pressure
Moderately Cemented	Crumbles or breaks with considerable finger pressure
Strongly Cemented	Will not crumble or break with finger pressure

### Particle-Size Range<sup>1</sup>

<u>Gravel</u>	Diameter, mm	Sieve Size	<u>Sand</u>	Diameter, mm	Sieve Size
Fine	4.76 to 19.1	#4 to ¾ inch	Fine	0.074 to 0.42	#200 to #40
Coarse	19.1 to 76.2	¾ inch to 3 inch	Medium	0.42 to 2.00	#40 to #10
			Coarse	4.00 to 4.76	#10 to #4

### Primary Soil Type<sup>1,2</sup>

The primary soil type will be shown in all capital letters.

### USCS Soil Designation

Indicate USCS soil designation as defined in ASTM D-2487 and D-2488

### AASHTO Soil Designation

Indicate AASHTO soil designation as defined in AASHTO M-145 and ASTM D-3282

<sup>1</sup> Applies to coarse-grained soils (major portion retained on No. 200 sieve)

<sup>2</sup> Applies to fine-grained soils (major portion passing No. 200 sieve)

<sup>3</sup> Use as required



## DESCRIPTION OF ROCK PROPERTIES

### WEATHERING

Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately Severe	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.
Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very severe	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete	Rock reduced to "soil". Rock "fabric" not discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

### HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)

Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

#### Joint, Bedding, and Foliation Spacing in Rock <sup>a</sup>

Spacing	Joints	Bedding/Foliation
Less than 2 in.	Very close	Very thin
2 in. – 1 ft.	Close	Thin
1 ft. – 3 ft.	Moderately close	Medium
3 ft. – 10 ft.	Wide	Thick
More than 10 ft.	Very wide	Very thick

a. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

#### Rock Quality Designator (RQD)<sup>a</sup>

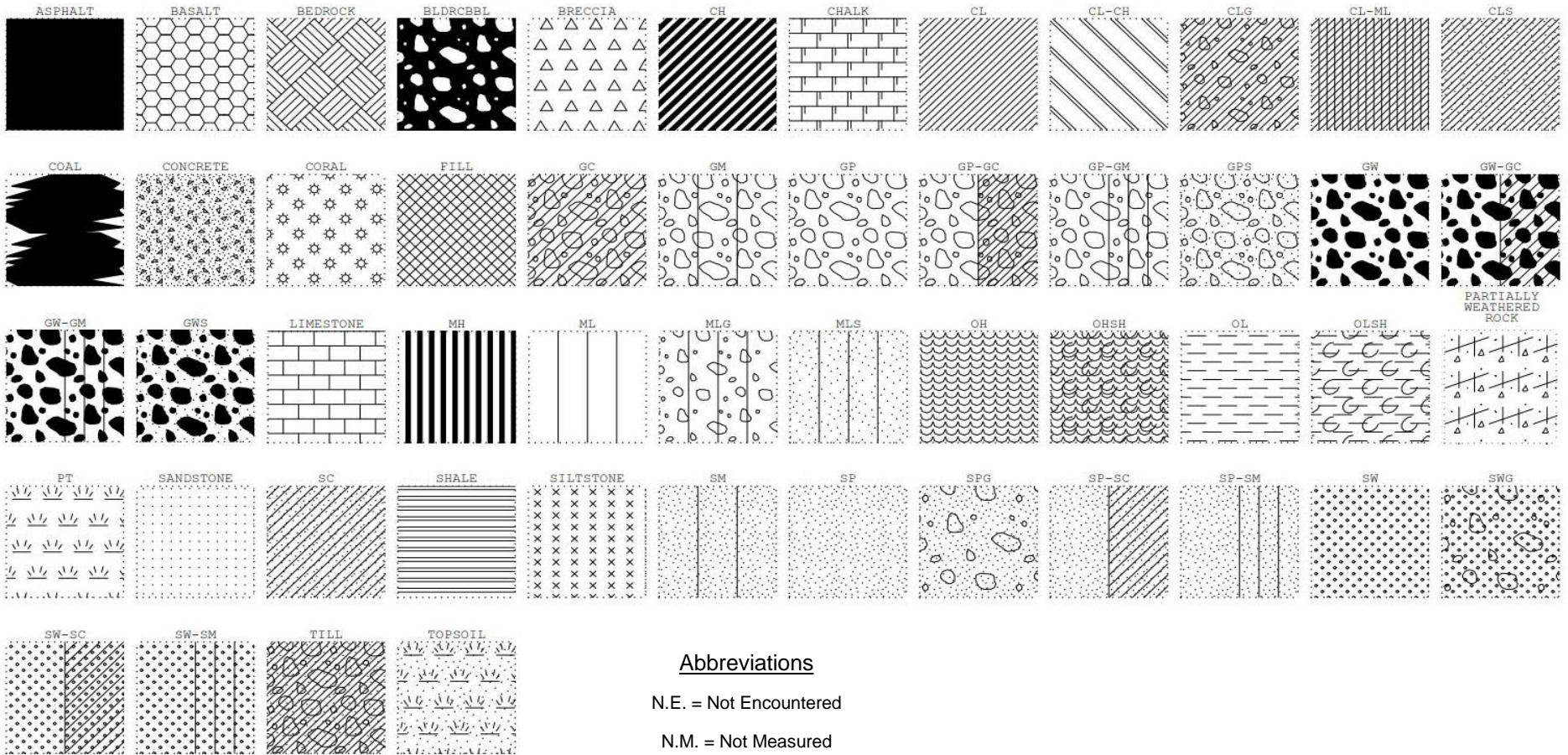
RQD, as a percentage	Diagnostic description
Exceeding 90	Excellent
90 – 75	Good
75 – 50	Fair
50 – 25	Poor
Less than 25	Very poor

#### Joint Openness Descriptors

Openness	Descriptor
No Visible Separation	Tight
Less than 1/32 in.	Slightly Open
1/32 to 1/8 in.	Moderately Open
1/8 to 3/8 in.	Open
3/8 in. to 0.1 ft.	Moderately Wide
Greater than 0.1 ft.	Wide

a. RQD (given as a percentage) = length of core in pieces  
4 in. and longer/length of run.

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976. U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.



Abbreviations

N.E. = Not Encountered

N.M. = Not Measured

Project Manager:	KJZ
Project No.	7321P043A
Drawn by:	KJZ
Scale:	N.T.S.
Checked by:	KJZ
File Name:	Soil - Rock - Log
Approved by:	PAM
Date:	MAR 2022

**Terracon**  
Consulting Engineers & Scientists

521 Clemson Road Columbia, South Carolina 29229  
PH. (803) 741-9000 FAX. (803) 741-9900

SOIL / ROCK / LOG SYMBOL LEGEND

# SPT AUTOMATIC HAMMER ENERGY CALIBRATION REPORT

Drill Rig Model: **Simco 2800**  
 Serial Number: **072068**  
 Terracon Drill Rig Asset Number: **DR#009**  
 January 28, 2021



**Prepared for:**  
 Terracon Consultants, Inc.  
 Chattanooga Exploration Services

**Prepared by:**  
 Terracon Consultants, Inc.  
 Exploration Services Group



January 28, 2021

Terracon Consultants, Inc.  
 51 Lost Mound Drive Ste. #135  
 Chattanooga, TN 37406

Attn: Mr. Taylor Taluskie  
 E: taylor.taluskie@terracon.com

**Re: SPT Automatic Hammer Energy Calibration Report**  
**Terracon Drill Rig DR#009; Simco 2800**  
**Terracon Project Number: D3XX0500**

Dear Mr. Taylor Taluskie:

This report provides the Energy Transfer Ratio (ETR) for the SPT automatic hammer found on drill rig model Simco 2800; Terracon Drill Rig Asset Number DR#009 (Serial Number: 072068).

**Table 1: Hammer Efficiency Summary**

Drill Rig Model	Serial No.	Drill Rig Year	Drill Rig No.	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (C <sub>e</sub> )
Simco 2800	072068	2007	DR#009	84.4% ± 3.0%	1.41

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

**James Smith**  
 National Exploration Manager

**Marie Maher, P.G.**  
 Regional Exploration Manager

Attachments:  
 Exhibit A: Calibration Information  
 Exhibit B: PDA SPT Analyzer Results

Terracon Consultants, Inc. 10841 S. Ridgeview Road Olathe, KS 66061  
 P (407) 446 2527 terracon.com

terracon.com



Environmental Facilities Geotechnical Materials

Environmental Facilities Geotechnical Materials

## Exhibit A CALIBRATION INFORMATION

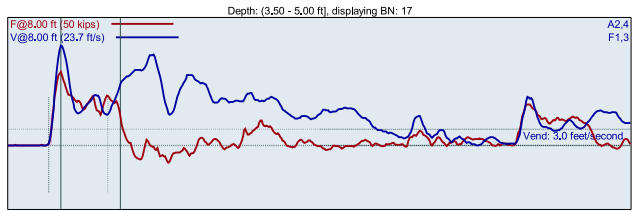
### CALIBRATION INFORMATION

ITEM	DESCRIPTION
Drill Rig Identification	Drill Rig Model: Simco 2800 Drill Rig Year: 2007 Terracon Drill Rig Asset No.: DR#009; Serial No. 072068
Drill Rig Owner	Terracon Consultants, Inc. – Chattanooga, TN
Drill Rig Operator	Craig Penton; Chattanooga Exploration
Testing Date	01/25/2021
Testing Location	Project Site, Chattanooga Office Lot
Boring Identification	B-1
Hammer Type	140 pounds (automatic)
Boring Method	Hollow Stem Auger
Drill Rods	<ul style="list-style-type: none"> <li>■ AWJ</li> <li>■ 1 3/4" outside diameter</li> <li>■ 3/16" wall thickness</li> </ul>
Calibration Testing Equipment	<ul style="list-style-type: none"> <li>■ 2 foot AWJ rod instrumented w/ 2 strain gauges and 2 accelerometers</li> <li>■ Model SPT Analyzer™ (PDA)</li> </ul>
ASTM Methods Used	<p><b>ASTM D1586</b>, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils</p> <p><b>ASTM D4633-16</b>, Standard Method for Energy Measurement for Dynamic Penetrometers</p>
SPT Calibration Personnel	Jim Smith– National Exploration Manager, Terracon Consultants, Inc.

# Exhibit B PDA SPT ANALYZER RESULTS

DR009\_072068  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 8.00 ft  
WS: 16807.9 fts

3.5-5  
Test date: 1/25/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F1 : [512AWJ2] 208.48 PDICAL (1) FF1  
F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
A2 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A4 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

FMX: Maximum Force  
VMX: Maximum Velocity  
BPM: Blows/Minute  
EFV: Maximum Energy  
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM	EFV ft-lb	ETR %
1	5	27	17.4	1.9	293	83.7
2	5	29	17.2	48.4	301	86.1
3	5	29	17.7	49.2	293	83.8
4	5	29	16.5	49.7	307	87.8
5	5	30	16.9	49.8	306	87.5
6	6	29	17.1	49.8	310	88.7
7	6	30	17.2	49.9	309	88.4
8	6	29	17.0	49.8	304	87.0
9	6	29	17.4	49.9	314	89.9
10	6	29	17.5	49.8	308	87.9
11	6	27	17.6	50.0	305	87.2
12	8	28	18.1	49.9	306	87.3
13	8	29	17.9	49.9	308	88.1
14	8	29	18.2	49.9	306	87.5
15	8	29	18.1	49.8	304	86.9
16	8	29	17.5	50.0	297	84.9
17	8	29	18.5	49.9	311	88.7
18	8	29	18.2	50.0	306	87.5
19	8	28	17.2	49.8	319	91.2
Average		29	17.7	49.9	308	87.9
Std Dev		1	0.5	0.1	5	1.4
Maximum		30	18.5	50.0	319	91.2
Minimum		27	17.0	49.8	297	84.9

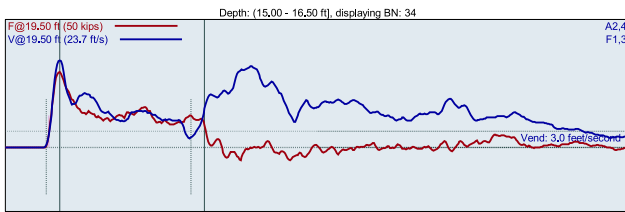
N-value: 14

Sample Interval Time: 21.66 seconds.

Responsive ■ Resourceful ■ Reliable

DR009\_072068  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 19.50 ft  
WS: 16807.9 fts

3.5-5  
Test date: 1/25/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F1 : [512AWJ2] 208.48 PDICAL (1) FF1  
F3 : [512AWJ1] 207.11 PDICAL (1) FF1

A2 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A4 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

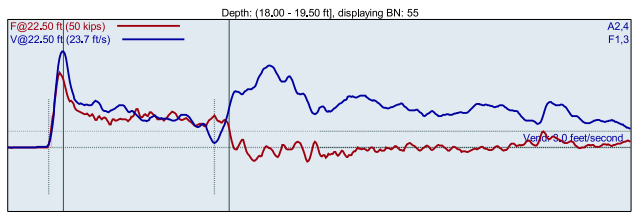
BL#	BC /6"	FMX kips	VMX ft/s	BPM	EFV ft-lb	ETR %
20	4	29	16.1	1.9	297	84.8
21	4	30	17.4	47.1	294	83.9
22	4	28	16.1	47.4	286	81.6
23	4	28	16.3	47.7	291	83.1
24	5	28	16.1	47.6	281	80.4
25	5	28	16.4	47.7	282	80.7
26	5	29	16.9	47.7	287	82.0
27	5	28	16.5	47.6	282	80.5
28	5	28	16.1	47.7	289	82.7
29	8	29	16.3	47.7	295	84.2
30	8	29	16.1	47.8	278	79.5
31	8	29	15.8	47.7	284	81.2
32	8	29	16.1	47.7	287	81.9
33	8	29	16.0	47.7	286	81.7
34	8	29	16.1	47.7	287	82.0
35	8	30	16.0	47.8	284	81.0
36	8	30	16.3	47.7	294	84.1
Average		29	16.2	47.7	286	81.7
Std Dev		1	0.3	0.0	5	1.3
Maximum		30	16.9	47.8	295	84.2
Minimum		28	15.8	47.6	278	79.5

N-value: 13

Sample Interval Time: 20.16 seconds.

DR009\_072068  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 22.50 ft  
WS: 16807.9 fts

3.5-5  
Test date: 1/25/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F1 : [512AWJ2] 208.48 PDICAL (1) FF1  
F3 : [512AWJ1] 207.11 PDICAL (1) FF1

A2 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A4 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM	EFV ft-lb	ETR %
37	6	30	18.7	1.9	292	83.6
38	6	30	18.8	50.8	295	84.3
39	6	31	19.0	51.3	299	85.5
40	6	31	19.0	51.4	292	83.3
41	6	32	19.1	51.5	302	86.2
42	6	32	19.2	51.4	300	85.7
43	7	32	19.3	51.5	288	82.4
44	7	32	19.0	51.5	296	84.7
45	7	32	19.1	51.5	292	83.5
46	7	31	19.3	51.5	300	85.6
47	7	32	19.2	51.6	303	86.5
48	7	32	19.2	51.5	295	84.2
49	7	32	19.0	51.5	296	84.6
50	8	32	18.9	51.6	302	86.2
51	8	30	19.0	51.5	294	83.9
52	8	29	17.8	51.5	288	82.3
53	8	29	17.6	51.6	289	82.4
54	8	30	17.8	51.7	286	81.7
55	8	29	17.8	51.6	285	81.4
56	8	29	17.7	51.6	286	81.8
57	8	30	17.8	51.6	285	81.3
Average		31	18.6	51.6	292	83.5
Std Dev		1	0.7	0.1	6	1.7
Maximum		32	19.3	51.7	303	86.5
Minimum		29	17.6	51.5	285	81.3

N-value: 15

Sample Interval Time: 23.31 seconds.



Summary of SPT Test Results

Proj#	DR0099_072068	Test Date:	1/25/2021					
FMX:	Maximum Force	EFV:	Maximum Energy					
VMX:	Maximum Velocity	ETR:	Energy Transfer Ratio - Rated					
BPM:	Blows/Minute							
Instr. Length	Blows Applied	N Value	N60 Value	Average FMX kips	Average VMX f/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
8.00	54-8	14	19	29	17.7	49.9	308	87.9
19.50	44-8	13	18	29	16.2	47.7	296	81.7
22.50	67-8	15	21	31	18.6	51.6	292	83.5
Overall Average Values:				29	17.6	49.8	295	84.4
Standard Deviation:				1	1.1	1.6	11	3.0
Overall Maximum Value:				32	19.3	51.7	319	91.2
Overall Minimum Value:				27	15.8	47.6	278	79.5

# Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4535 TB

was calibrated on 22 Nov 2020

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.



Issued by: *MCP*

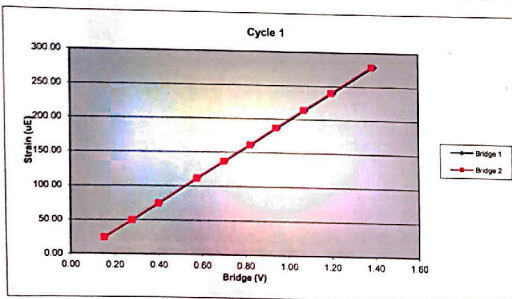
Pile Dynamics, Inc.  
30725 Aurora Road  
Cleveland, Ohio 44139 USA

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Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1132.67	23.60	0.15	0.15
3	2056.55	49.37	0.28	0.28
4	2942.12	73.95	0.40	0.40
5	4252.09	111.17	0.58	0.58
6	5167.88	136.67	0.71	0.70
7	6050.66	161.33	0.83	0.82
8	6943.89	186.76	0.95	0.94
9	7832.53	213.51	1.08	1.07
10	8843.21	239.49	1.21	1.20
11	10231.85	279.04	1.40	1.39

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7321.84	Force Calibration (lb/V)	7373.41
Offset	-3.28	Offset	2.70
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	205.55	Strain Calibration (µE/V)	206.99
Offset	-8.48	Offset	-8.31
Correlation	0.999994	Correlation	0.999994

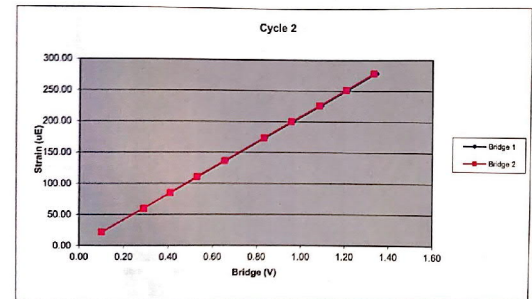
Force Strain Calibration	
EA (Kips)	35620.86
Offset	298.68
Correlation	0.999995



Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	755.93	21.36	0.10	0.10
3	2128.00	59.46	0.29	0.29
4	2995.73	84.22	0.41	0.41
5	3875.45	109.91	0.53	0.53
6	4786.75	135.82	0.65	0.65
7	6105.11	172.95	0.83	0.83
8	7031.52	199.34	0.96	0.95
9	7977.23	225.43	1.09	1.08
10	8890.97	251.05	1.21	1.21
11	9837.56	278.10	1.34	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7327.32	Force Calibration (lb/V)	7374.95
Offset	3.43	Offset	-7.02
Correlation	0.999998	Correlation	0.999998
Strain Calibration (µE/V)	207.37	Strain Calibration (µE/V)	208.71
Offset	-0.65	Offset	-0.34
Correlation	0.999993	Correlation	0.999989

Force Strain Calibration	
EA (Kips)	35334.52
Offset	5.22
Correlation	0.999988



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

Calibration Factors	512AWJ		
Bridge 1 ( $\mu$ EV)	207.11	Bridge 2 ( $\mu$ EV)	208.48
EA Factor (Kips)	35388.44	Area (in <sup>2</sup> )	1.18

Calibrated by: *Det Spas*  
 Calibrated Date: 11/12/2020

Pile Dynamics Inc  
 30725 Aurora Rd  
 Solon, OH 44139

Traceable to N.I.S.T.

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### Accelerometer Calibration Certificate Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
 Calibration performed on 21Apr2020

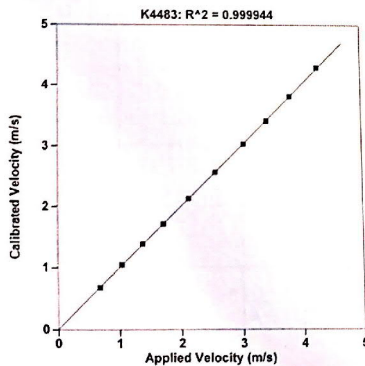
Serial No: K4483 Temperature: 22.3 °C  
 Model: PR Humidity: 28%  
 Calibrated on: Channel 3 on 8G 5061 LE

**PDA CALIBRATION FACTOR**  
 406.4 mv/5000g  
 (81.3  $\mu$ v/g)  
 R<sup>2</sup>: 0.999944 [Chip programmed]

Ref Acc 1: 65538! Cat on: 27Jan2020  
 1040 g's/volt  
 Ref Acc 2: 64648! Cat on: 27Jan2020  
 984 g's/volt

Operator: Will  
*Will*  
 Signed

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



Date printed 21Apr2020 version 2020.30.148 -2.55

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### Accelerometer Calibration Certificate Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
 Calibration performed on 21Apr2020

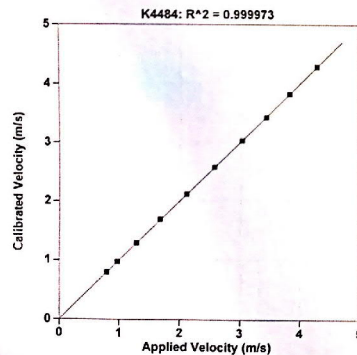
Serial No: K4484 Temperature: 22.3 °C  
 Model: PR Humidity: 28%  
 Calibrated on: Channel 3 on 8G 5061 LE

**PDA CALIBRATION FACTOR**  
 360.6 mv/5000g  
 (72.1  $\mu$ v/g)  
 R<sup>2</sup>: 0.999973 [Chip programmed]

Ref Acc 1: 65538! Cat on: 27Jan2020  
 1040 g's/volt  
 Ref Acc 2: 64648! Cat on: 27Jan2020  
 984 g's/volt

Operator: Will  
*Will*  
 Signed

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



Date printed 21Apr2020 version 2020.30.148 -1.00

Scanned with CamScanner

**Accelerometer Calibration Certificate**  
**Pile Dynamics, Inc.**



Calibrated by Pile Dynamics, Inc.  
 Calibration performed on 21Apr2020

Serial No: K10492      Temperature: 22.3 °C  
 Model: PR      Humidity: 28%  
 Calibrated on: Channel 3 on 8G 5061 LE

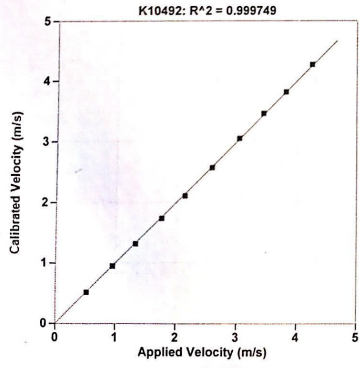
**PDA CALIBRATION FACTOR**

437.8 mv/5000g  
 (87.6  $\mu$ v/g)  
 R<sup>2</sup>: 0.999749 [Chip programmed]

Ref Acc 1: 65538!      Cal on: 27Jan2020  
 1040 g's/volt  
 Ref Acc 2: 64648!      Cal on: 27Jan2020  
 984 g's/volt

Operator: Will  
  
 Signed

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



Reference Velocity m/s	S/N K10492 Velocity m/s
0.525	0.514
0.956	0.946
1.331	1.315
1.756	1.730
2.134	2.098
2.573	2.558
3.020	3.031
3.419	3.440
3.794	3.797
4.237	4.257

Maximum Acceleration: 920 g's

Date printed 21Apr2020 version 2020 30 148 -4 98

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# SPT Automatic Hammer Energy Measurement Report

Drill Rig Model: CME 55/300  
 Serial Number: 359485  
 Terracon Drill Rig Asset Number: DR#727  
 June 22, 2021



**Prepared for:**  
 Terracon Consultants, Inc.  
 Columbia Exploration Services

**Prepared by:**  
 Terracon Consultants, Inc.  
 Exploration Services Group

June 22, 2021

Terracon Consultants, Inc.  
 521 Clemson Rd.  
 Columbia, SC 29229

Attn: Mr. Chris Costner  
 E: chris.costner@terracon.com

**Re: SPT Automatic Hammer Energy Measurement Report  
 Terracon Drill Rig DR#727; CME 55/300  
 Terracon Project Number: DUXX0500**

Dear Mr. Chris Costner:

This report provides the Energy Transfer Ratio (ETR) for the SPT automatic hammer found on drill rig model CME 55/300 ; Terracon Drill Rig Asset Number DR#727 (Serial Number: 359485).

**Table 1: Hammer Measurement Summary**

Drill Rig Model	Serial No.	Drill Rig Year	Drill Rig No.	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (Ce)
CME 55/300	359485	2008	DR#727	88.8% ± 2.2%	1.48

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

**James Smith**  
 National Exploration Manager

**Marie Maher, PG**  
 Regional Exploration Manager

Attachments:  
 Exhibit A: Measurement Information  
 Exhibit B: PDA SPT Analyzer Results

Terracon Consultants, Inc. 10841 S. Ridgeview Road Olathe, KS 66061  
 P (407) 446 2527 terracon.com

terracon.com



Environmental Facilities Geotechnical Materials

Environmental Facilities Geotechnical Materials

## Exhibit A Measurement Information

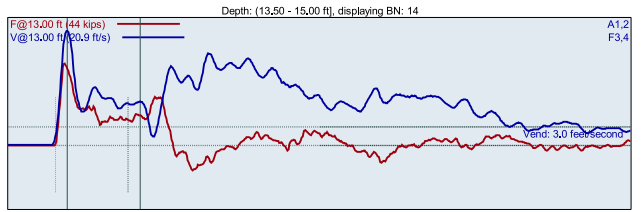
### MEASUREMENT INFORMATION

ITEM	DESCRIPTION
<b>Drill Rig Identification</b>	Drill Rig Model: CME 55/300 Drill Rig Year: 2008 Terracon Drill Rig Asset No.: DR#727; Serial No. 359485
<b>Drill Rig Owner</b>	Terracon Consultants, Inc. – Columbia, SC
<b>Drill Rig Operator</b>	Shiver Truesdale; Columbia Exploration
<b>Testing Date</b>	06/22/2021
<b>Testing Location</b>	Columbia, SC
<b>Boring Identification</b>	B-1
<b>Hammer Type</b>	140 pounds (automatic)
<b>Boring Method</b>	Hollow Stem Auger
<b>Drill Rods</b>	<ul style="list-style-type: none"> <li>■ AWJ</li> <li>■ 1 3/4" outside diameter</li> <li>■ 3/16" wall thickness</li> </ul>
<b>Testing Equipment</b>	<ul style="list-style-type: none"> <li>■ 2 foot AWJ rod instrumented w/ 2 strain gauges and 2 accelerometers</li> <li>■ Model SPT Analyzer™ (PDA)</li> </ul>
<b>ASTM Methods Used</b>	<b>ASTM D1586</b> , Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils  <b>ASTM D4633-16</b> , Standard Method for Energy Measurement for Dynamic Penetrometers
<b>Personnel</b>	Jim Smith – National Exploration Manager - Terracon Consultants, Inc.

## Exhibit B PDA SPT ANALYZER RESULTS

DU-727-359485  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 13.00 ft  
WS: 16807.9 ft/s

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

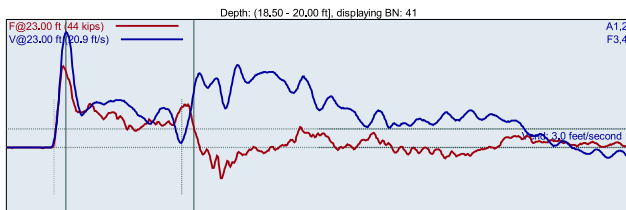
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %	
1	5	27	18.1	1.9	318	90.9	
2	5	28	18.6	55.6	337	96.3	
3	5	28	18.6	55.8	330	94.4	
4	5	28	18.6	55.7	323	92.3	
5	5	28	19.2	55.2	335	95.8	
6	4	28	18.9	55.6	325	92.8	
7	4	28	19.0	55.8	334	95.4	
8	4	28	18.9	55.1	339	96.9	
9	4	29	19.1	55.7	327	93.5	
10	7	28	18.9	55.8	326	93.1	
11	7	27	18.5	55.8	314	89.9	
12	7	29	19.0	55.3	312	88.1	
13	7	27	18.6	55.5	329	93.9	
14	7	28	18.8	55.5	319	91.2	
15	7	28	18.7	55.3	311	88.9	
16	7	28	18.8	55.5	330	94.3	
		Average	28	18.8	55.5	324	92.6
		Std Dev	0	0.2	0.2	9	2.5
		Maximum	29	19.1	55.8	339	96.9
		Minimum	27	18.5	55.1	311	88.9
N-value: 11							

Sample Interval Time: 16.27 seconds.

Responsive ■ Resourceful ■ Reliable

DU-727-359485  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 23.00 ft  
WS: 16807.9 ft/s

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
17	12	0	0.8	1.9	1	0.4
18	12	26	18.6	64.5	295	84.3
19	12	28	19.2	55.2	311	86.9
20	12	27	19.0	55.3	311	86.8
21	12	28	18.9	7.8	304	86.9
22	12	27	18.6	56.4	310	86.7
23	12	28	18.9	55.7	318	90.8
24	12	28	18.5	55.3	308	88.1
25	12	28	19.1	55.4	308	87.9
26	12	28	19.0	55.3	318	90.8
27	12	28	18.9	55.2	322	92.0
28	12	28	19.1	55.4	308	88.0
29	7	28	18.3	55.9	317	90.7
30	7	29	18.8	54.9	311	88.7
31	7	28	18.6	55.4	305	87.1
32	7	28	18.3	56.2	308	88.1
33	7	28	18.9	54.9	311	88.9
34	7	29	18.9	55.5	311	88.8
35	7	28	18.4	55.5	306	87.4
36	8	28	19.2	54.7	317	90.4
37	8	29	19.2	55.0	310	88.6
38	8	29	18.6	55.9	312	89.2
39	8	27	18.3	55.4	305	87.2
40	8	28	18.6	54.7	306	87.5
41	8	28	18.8	55.2	300	85.9
42	8	28	18.7	55.9	304	86.8
43	8	27	18.1	55.2	314	89.8

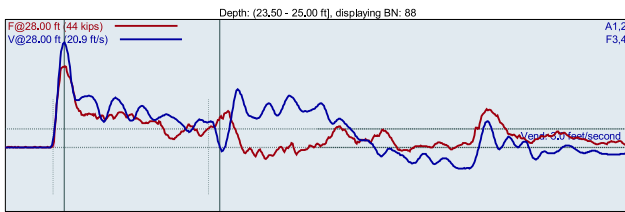
Sample Interval Time: 34.60 seconds.

	Average	Std Dev	Maximum	Minimum	N-value
28	18.7	0.3	19.2	18.1	15
55.3	0.5	56.2	54.7	309	88.3
5	0.2	317	300	85.9	1.3

Sample Interval Time: 34.60 seconds.

DU-727-359485  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 28.00 ft  
WS: 16807.9 ft/s

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1

A1 (PR): [K4484] 361,048 mv/6,4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4w/5000g (1) VF1

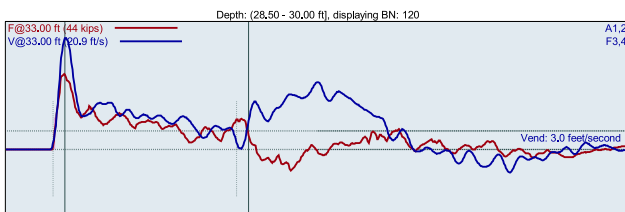
BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
44	15	28	17,1	1,9	308	88,1
45	15	27	16,8	54,3	298	85,1
46	15	28	17,5	53,8	311	88,8
47	15	27	16,6	53,5	299	85,3
48	15	28	16,7	53,6	300	85,5
49	15	28	17,5	52,9	319	91,3
50	15	28	17,0	53,8	310	88,5
51	15	28	17,8	53,8	318	90,8
52	15	27	17,0	53,6	311	88,9
53	15	28	17,3	53,1	313	89,6
54	15	28	16,8	53,6	305	87,2
55	15	28	17,2	54,0	305	87,3
56	15	28	17,0	52,9	312	89,0
57	15	28	16,6	54,5	310	88,6
58	15	29	17,7	52,7	323	92,4
59	14	28	16,9	53,7	311	88,7
60	14	28	17,5	54,1	311	88,8
61	14	27	16,8	54,2	299	85,5
62	14	28	17,5	52,8	315	89,9
63	14	28	16,8	53,1	308	87,9
64	14	28	16,8	54,0	305	87,2
65	14	28	16,9	53,5	312	89,3
66	14	28	16,7	53,3	309	88,4
67	14	28	17,0	53,5	306	87,4
68	14	28	17,5	53,9	319	91,1
69	14	28	17,2	53,5	310	88,5
70	14	28	16,9	54,0	303	86,7
71	14	28	17,4	53,2	314	89,8
72	14	28	17,7	53,3	320	91,5
73	18	28	16,7	54,0	308	88,1
74	18	27	17,6	52,9	305	87,3
75	18	28	17,7	53,6	313	89,5

76	18	28	16,9	53,3	305	87,2
77	18	28	17,7	53,1	317	90,5
78	18	28	17,2	54,3	310	88,7
79	18	28	16,9	52,5	304	87,0
80	18	28	17,1	53,9	311	88,9
81	18	28	17,6	53,5	312	89,1
82	18	28	16,8	53,3	307	87,7
83	18	28	17,4	53,9	309	88,2
84	18	28	17,0	53,0	310	88,6
85	18	28	17,0	53,4	309	88,3
86	18	28	17,4	53,2	312	89,2
87	18	28	17,3	53,7	314	89,1
88	18	28	17,1	53,5	309	88,3
89	18	28	17,3	53,3	314	89,7
90	18	28	17,1	53,3	316	90,3
Average		28	17,2	53,5	310	88,6
Std Dev		0	0,3	0,4	4	1,3
Maximum		28	17,7	54,3	320	91,5
Minimum		27	16,7	52,5	299	85,5
N-value: 32						

Sample Interval Time: 51,61 seconds.

DU-727-359485  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 33.00 ft  
WS: 16807.9 ft/s

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1

A1 (PR): [K4484] 361,048 mv/6,4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4w/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
91	11	0	0,6	1,9	1	0,3
92	11	25	18,7	61,8	301	86,0
93	11	26	18,7	55,6	303	86,5
94	11	26	18,7	55,2	294	84,1
95	11	26	19,0	55,6	305	87,2
96	11	26	18,9	55,1	310	88,4
97	11	26	18,7	55,5	305	87,0
98	11	26	18,9	55,1	309	88,2
99	11	27	19,0	55,1	317	90,5
100	11	26	18,5	54,9	309	88,3
101	11	26	18,6	56,4	304	86,8
102	10	26	18,5	53,8	308	88,0
103	10	26	18,3	56,3	306	87,4
104	10	26	18,1	55,6	302	86,3
105	10	27	18,9	55,0	301	86,0
106	10	26	18,4	54,5	309	88,3
107	10	26	18,6	56,7	312	89,0
108	10	26	18,5	54,5	308	87,9
109	10	26	18,4	54,2	310	88,6
110	10	27	18,6	56,3	309	88,3
111	10	26	18,2	55,6	305	87,3
112	11	26	18,2	53,9	300	85,7
113	11	26	18,6	55,8	311	88,8
114	11	26	18,1	55,5	304	86,9
115	11	26	18,4	54,7	307	87,8
116	11	26	18,4	55,8	307	87,8
117	11	25	17,9	55,6	297	85,0
118	11	26	18,4	55,3	306	87,5
119	11	26	18,4	54,5	304	86,7
120	11	26	18,2	55,6	301	86,1
121	11	26	18,5	55,6	301	86,1
122	11	26	18,3	55,0	305	87,2

Average	26	18,4	55,2	305	87,3	
Std Dev	0	0,2	0,8	4	1,1	
Maximum	27	18,9	56,7	312	89,0	
Minimum	25	17,9	53,8	297	85,0	
N-value: 21						

Sample Interval Time: 33,55 seconds.

Summary of SPT Test Results

Project: DJL727-359485, Test Date: 6/22/2021								
FMX: Maximum Force	EFV: Maximum Energy							
VMK: Maximum Velocity	ETR: Energy Transfer Ratio - Rated							
BPM: Blows/Minute								
Inch Length	Blows Applied	N Value	N60 Value	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-b	Average ETR %
13.00	5-4-7	11	16	28	18.8	55.5	324	92.6
23.00	12-4-4	15	22	28	18.7	55.3	309	88.3
28.00	15-4-18	32	47	28	17.2	53.5	310	88.6
33.00	11-10-11	21	31	26	18.4	55.2	305	87.3
Overall Average Values:				27	18.0	54.8	311	88.8
Standard Deviation:				1	0.8	1.1	8	2.2
Overall Maximum Value:				29	19.2	56.7	339	90.9
Overall Minimum Value:				25	16.7	52.5	297	85.0



# Certificate of Calibration

Pile Driving Analyzer®, Model SPT

Serial Number: 4535 TB

was calibrated on 22 Nov 2020

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.



Issued by *MCP*

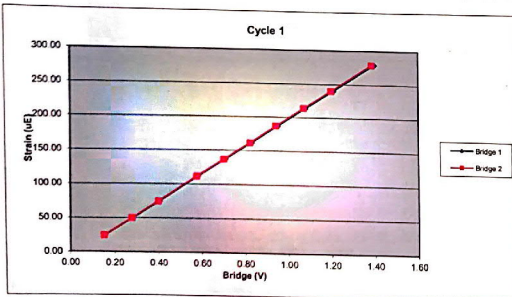
Pile Dynamics, Inc.  
30725 Aurora Road  
Cleveland, Ohio 44139 USA

Scanned with CamScanner

Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1132.67	23.60	0.15	0.15
3	2056.55	49.37	0.26	0.28
4	2942.12	73.95	0.40	0.40
5	4252.09	111.17	0.58	0.58
6	5167.88	136.67	0.71	0.70
7	6050.66	161.33	0.83	0.82
8	6943.89	186.76	0.95	0.94
9	7832.53	213.51	1.08	1.07
10	8843.21	239.49	1.21	1.20
11	10231.85	279.04	1.40	1.39

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7321.84	Force Calibration (lb/V)	7373.41
Offset	-3.28	Offset	2.70
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	205.55	Strain Calibration (µE/V)	206.99
Offset	-8.48	Offset	-8.31
Correlation	0.999994	Correlation	0.999994

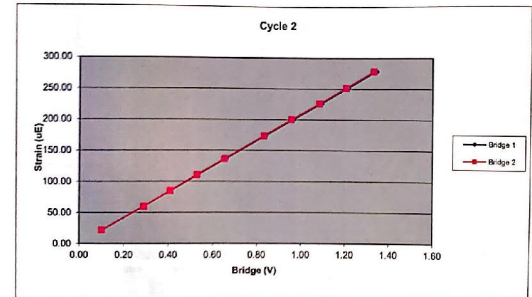
Force Strain Calibration	
EA (Kips)	35620.86
Offset	298.68
Correlation	0.999955



Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	755.93	21.36	0.10	0.10
3	2128.00	59.46	0.29	0.29
4	2995.73	84.22	0.41	0.41
5	3875.45	109.91	0.53	0.53
6	4786.75	135.82	0.65	0.65
7	6105.11	172.95	0.83	0.83
8	7031.52	199.34	0.96	0.95
9	7977.23	225.43	1.09	1.08
10	8890.97	251.05	1.21	1.21
11	9837.56	278.10	1.34	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7327.32	Force Calibration (lb/V)	7374.95
Offset	3.43	Offset	-7.02
Correlation	0.999998	Correlation	0.999998
Strain Calibration (µE/V)	207.37	Strain Calibration (µE/V)	208.71
Offset	-0.65	Offset	-0.34
Correlation	0.999993	Correlation	0.999989

Force Strain Calibration	
EA (Kips)	35334.52
Offset	5.22
Correlation	0.999988



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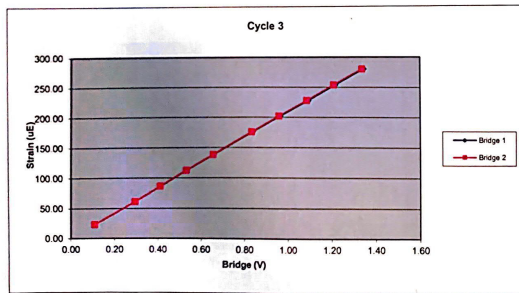
Scanned with CamScanner



S12AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	801.06	22.89	0.11	0.11
3	2155.39	60.77	0.29	0.30
4	3014.93	86.31	0.41	0.41
5	3905.47	112.48	0.53	0.53
6	4819.01	138.25	0.66	0.65
7	6132.21	175.76	0.84	0.83
8	7063.59	201.72	0.96	0.96
9	8011.25	227.50	1.09	1.09
10	8917.39	253.42	1.22	1.21
11	9861.64	280.02	1.34	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7338.67	Force Calibration (lb/V)	7385.24
Offset	-3.63	Offset	-15.94
Correlation	0.999999	Correlation	0.999998
Strain Calibration (µE/V)	208.41	Strain Calibration (µE/V)	209.73
Offset	0.50	Offset	0.15
Correlation	0.999958	Correlation	0.999961

Force Strain Calibration	
EA (Kips)	35209.93
Offset	-20.75
Correlation	0.999960



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

Calibration Factors		S12AWJ	
Bridge 1 (µE/V)	207.11	Bridge 2 (µE/V)	208.48
EA Factor (Kips)	35388.44	Area (in <sup>2</sup> )	1.18

Calibrated by: *Det Spas*  
Calibrated Date: 11/12/2020

Pile Dynamics Inc  
30725 Aurora Rd  
Solon, OH 44139

Traceable to N.I.S.T.

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### Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

Serial No: K4483 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

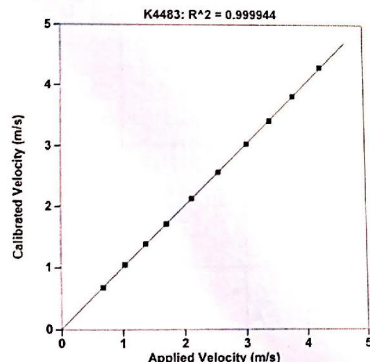
**PDA CALIBRATION FACTOR**  
406.4 mv/5000g  
(81.3 µv/g)  
R<sup>2</sup>: 0.999944 [Chip programmed]

Operator: Will

*Will*  
Signed

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

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



Reference Velocity (m/s)	S/N K4483 Velocity (m/s)
0.683	0.674
1.040	1.044
1.373	1.381
1.707	1.706
2.117	2.118
2.551	2.546
3.022	3.012
3.405	3.393
3.802	3.800
4.265	4.284

Maximum Acceleration: 932 g's

Date printed 21Apr2020 version 2020.30.148 -2.55

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### Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

Serial No: K4484 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

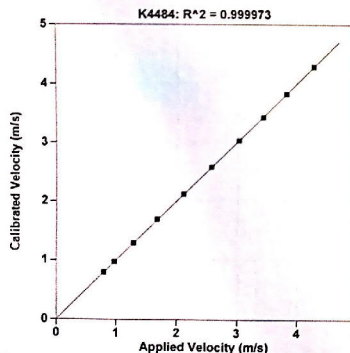
**PDA CALIBRATION FACTOR**  
360.6 mv/5000g  
(72.1 µv/g)  
R<sup>2</sup>: 0.999973 [Chip programmed]

Operator: Will

*Will*  
Signed

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

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



Reference Velocity (m/s)	S/N K4484 Velocity (m/s)
0.796	0.795
0.970	0.973
1.284	1.287
1.672	1.686
2.108	2.114
2.561	2.565
3.020	3.017
3.425	3.415
3.818	3.815
4.279	4.280

Maximum Acceleration: 929 g's

Date printed 21Apr2020 version 2020.30.148 -1.00

Scanned with CamScanner

**Geotechnical Data Report (Base)**

I-20 Wateree River Bridge Repairs ■ Kershaw County, SC  
September 6, 2021 ■ Terracon Project No. 7321P043A  
PIN: P029450, P029776, P029777

**LABORATORY TESTING DESCRIPTION**

The samples collected during the field exploration were taken to our laboratory for additional testing. The laboratory testing program was developed by the SCDOT. Using the provided testing program, the laboratory tests were conducted on selected soil samples from the borings and the bulk samples locations. The test results are presented in this appendix.

The laboratory test results were used to confirm the soil descriptions presented on the boring logs in Appendix A. Laboratory tests were performed in general accordance with the applicable ASTM, AASHTO, SCDOT or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- |   |  |                             |
|---|--|-----------------------------|
| ■ | Moisture Content Determination           | AASHTO T265/(ASTM D2216)    |
| ■ | Atterberg Limits                         | AASHTO T89/T90/(ASTM D4318) |
| ■ | Wash 200                                 | AASHTO T11/(ASTM D1140)     |
| ■ | Full Grain Size with Hydrometer Analysis | ASTM D7928                  |

**APPENDIX B  
LABORATORY TESTING**

Exhibit B-1 – Laboratory Testing Description  
Summary of Laboratory Data  
Laboratory Data Sheets

**APPENDIX C  
SUPPORTING DOCUMENTS**

Rig Calibration Reports

# SPT Automatic Hammer Energy Measurement Report

Drill Rig Model: CME 45B  
 Serial Number: 406484  
 Terracon Drill Rig Asset Number: DR#543  
 June 22, 2021



**Prepared for:**  
 Terracon Consultants, Inc.  
 Columbia Exploration Services

**Prepared by:**  
 Terracon Consultants, Inc.  
 Exploration Services Group

June 22, 2021

Terracon Consultants, Inc.  
 521 Clemson Rd.  
 Columbia, SC 29229

Attn: Mr. Chris Costner  
 E: chris.costner@terracon.com

**Re: SPT Automatic Hammer Energy Measurement Report**  
**Terracon Drill Rig DR#543; CME 45B**  
**Terracon Project Number: DUX0500**

Dear Mr. Chris Costner:

This report provides the Energy Transfer Ratio (ETR) for the SPT automatic hammer found on drill rig model CME 45B ; Terracon Drill Rig Asset Number DR#543 (Serial Number: 406484).

**Table 1: Hammer Measurement Summary**

Drill Rig Model	Serial No.	Drill Rig Year	Drill Rig No.	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (Ce)
CME 45B	406484	2018	DR#543	91.6% ± 3.0%	1.53

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

*James Smith*  
**James Smith**  
 National Exploration Manager

*Marie Maher*  
**Marie Maher, PG**  
 Regional Exploration Manager

Attachments:  
 Exhibit A: Measurement Information  
 Exhibit B: PDA SPT Analyzer Results

Terracon Consultants, Inc. 10841 S. Ridgeview Road Olathe, KS 66061  
 P (407) 446 2527 terracon.com

terracon.com

Environmental Facilities Geotechnical Materials

Environmental Facilities Geotechnical Materials

## Exhibit A Measurement Information

### MEASUREMENT INFORMATION

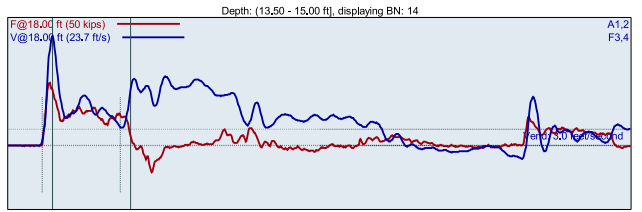
ITEM	DESCRIPTION
<b>Drill Rig Identification</b>	Drill Rig Model: CME 45B Drill Rig Year: 2018 Terracon Drill Rig Asset No.: DR#543; Serial No. 406484
<b>Drill Rig Owner</b>	Terracon Consultants, Inc. – Columbia, SC
<b>Drill Rig Operator</b>	Shiver Truesdale; Columbia Exploration
<b>Testing Date</b>	06/22/2021
<b>Testing Location</b>	Columbia, SC
<b>Boring Identification</b>	B-1
<b>Hammer Type</b>	140 pounds (automatic)
<b>Boring Method</b>	Hollow Stem Auger
<b>Drill Rods</b>	<ul style="list-style-type: none"> <li>■ AWJ</li> <li>■ 1 3/4" outside diameter</li> <li>■ 3/16" wall thickness</li> </ul>
<b>Testing Equipment</b>	<ul style="list-style-type: none"> <li>■ 2 foot AWJ rod instrumented w/ 2 strain gauges and 2 accelerometers</li> <li>■ Model SPT Analyzer™ (PDA)</li> </ul>
<b>ASTM Methods Used</b>	<b>ASTM D1586</b> , Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils  <b>ASTM D4633-16</b> , Standard Method for Energy Measurement for Dynamic Penetrometers
<b>Personnel</b>	Jim Smith – National Exploration Manager - Terracon Consultants, Inc.



# Exhibit B PDA SPT ANALYZER RESULTS

DU-543-406484  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 18.00 ft  
WS: 16807.9 fts

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

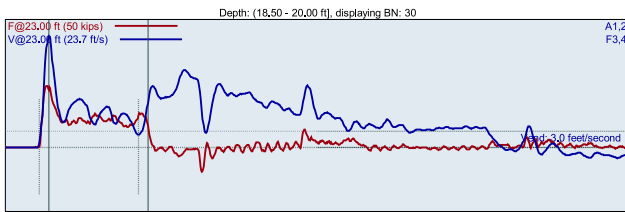
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
1	5	28	21.1	1.9	333	95.1
2	5	27	21.1	57.0	318	90.8
3	5	26	21.1	56.4	312	89.1
4	5	26	20.8	56.4	315	89.9
5	5	27	20.8	55.8	326	93.3
6	5	26	20.5	56.4	321	91.9
7	5	26	20.9	56.0	327	93.4
8	5	26	20.2	56.8	304	88.8
9	5	26	20.6	55.6	313	89.3
10	5	25	20.1	56.1	313	89.3
11	6	25	20.3	56.0	306	87.4
12	6	25	20.2	56.1	312	88.2
13	6	25	20.0	56.1	319	91.0
14	6	24	20.2	56.1	305	87.1
15	6	24	20.5	56.2	312	89.1
16	6	25	20.6	56.0	317	90.4
Average		25	20.4	56.1	313	89.5
Std Dev		1	0.2	0.3	7	1.9
Maximum		26	20.9	56.8	327	93.4
Minimum		24	20.0	55.6	304	86.8
N-value: 11						

Sample Interval Time: 16.02 seconds.

Responsive ■ Resourceful ■ Reliable

DU-543-406484  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 23.00 ft  
WS: 16807.9 fts

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



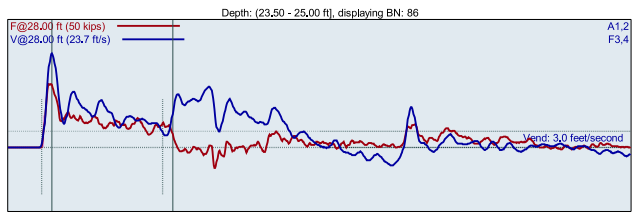
F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
17	6	0	1.4	1.9	7	
18	6	29	19.1	64.1	331	94.7
19	6	28	19.1	56.8	325	92.8
20	6	27	19.3	56.7	330	94.3
21	6	28	19.1	55.8	327	93.3
22	6	27	19.2	56.1	331	94.5
23	5	27	19.8	56.2	335	95.7
24	5	26	20.1	56.4	329	94.0
25	5	26	20.4	55.9	336	95.9
26	5	25	20.4	55.6	336	96.0
27	5	25	20.2	56.9	329	93.9
28	5	25	20.1	56.5	324	92.6
29	5	24	20.8	55.5	337	96.2
30	5	24	20.6	55.3	335	95.7
31	5	24	20.9	56.4	334	95.5
32	5	24	20.3	56.1	311	88.8
Average		25	20.4	51.7	330	94.4
Std Dev		1	0.3	13.0	8	2.2
Maximum		27	20.9	56.9	337	96.2
Minimum		24	19.8	55.3	311	88.8
N-value: 10						

Sample Interval Time: 19.58 seconds.

DU-543-406484  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 28.00 ft  
WS: 16807.9 fts

13.5-15  
Test date: 6/22/2021  
SP: 0.492 k/ft<sup>3</sup>  
EM: 30000 ksi



F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

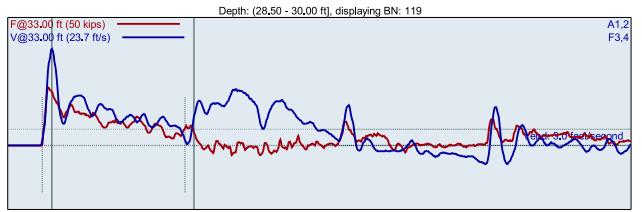
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
33	34	1	0.3	1.9	2	0.5
34	34	29	19.2	62.1	343	97.9
35	34	28	19.8	56.7	338	96.6
36	34	29	19.8	57.1	337	96.3
37	34	29	20.0	55.7	346	99.0
38	34	29	19.5	56.8	323	92.2
39	34	28	19.6	55.6	330	94.2
40	34	29	19.6	56.4	329	94.1
41	34	28	19.7	55.9	330	94.3
42	34	30	19.5	56.1	328	93.2
43	34	29	19.8	56.6	328	93.8
44	34	29	19.6	56.0	323	92.3
45	34	28	19.8	56.5	329	94.1
46	34	28	19.8	55.4	326	93.1
47	34	28	19.7	56.7	326	93.1
48	34	28	19.8	55.7	329	94.0
49	34	28	19.8	56.3	326	93.0
50	34	28	19.9	56.4	334	95.5
51	34	29	19.9	55.7	326	93.2
52	34	28	19.5	56.7	321	91.8
53	34	28	19.7	56.0	332	94.8
54	34	28	19.8	55.2	330	94.4
55	34	27	19.6	57.1	326	93.1
56	34	27	19.3	55.7	323	92.2
57	34	27	19.0	56.2	317	90.4
58	34	28	19.8	55.4	341	97.5
59	34	27	19.2	56.8	319	91.0
60	34	27	19.3	56.3	324	92.5
61	34	28	19.6	55.1	335	95.6
62	34	27	19.3	56.6	318	90.8
63	34	28	19.5	55.9	335	95.6
64	34	27	19.1	55.7	314	89.7

65	34	27	19.4	55.4	323	92.4
66	34	27	19.2	56.4	333	95.1
67	8	27	19.0	55.7	330	94.3
68	8	27	18.9	56.5	323	92.3
69	8	28	19.5	55.0	331	94.7
70	8	28	19.4	56.0	329	94.0
71	8	26	19.0	56.2	328	93.8
72	8	26	18.7	55.9	332	95.0
73	8	26	18.6	55.6	324	92.6
74	8	27	18.4	56.1	330	94.3
75	14	28	19.5	55.7	328	93.6
76	14	28	19.1	56.2	329	93.9
77	14	28	19.1	55.8	331	94.6
78	14	28	19.1	56.0	328	93.1
79	14	27	19.0	56.0	331	94.6
80	14	27	18.7	55.6	327	93.5
81	14	26	18.4	56.1	319	91.2
82	14	26	18.2	56.0	326	93.3
83	14	27	18.6	55.4	328	93.2
84	14	27	18.8	56.0	331	94.6
85	14	26	18.2	55.6	346	98.9
86	14	25	17.4	56.5	319	91.0
87	14	26	18.1	55.2	335	96.7
88	14	27	18.5	56.5	321	91.8
			18.7	55.9	328	93.8
Average						
Std Dev	1	0.5	0.4	6	1.6	
Maximum	28	19.5	56.5	346	98.9	
Minimum	25	17.4	55.0	319	91.0	
N-value: 22						

Sample Interval Time: 60.80 seconds.

DU-543-406484  
Jim Smith  
AR: 1.18 in<sup>2</sup>  
LE: 33.00 ft  
WS: 16807.9 fts

13.5-15  
Test date: 6/22/2021  
SP: 0.492 kft/3  
EM: 30000 ksi



F3 : [512AWJ1] 207.11 PDICAL (1) FF1  
F4 : [512AWJ2] 208.48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6.4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6.4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
89	10	0	0.9	1.9	2	0.7
90	10	30	18.6	62.2	326	93.2
91	10	29	18.7	55.9	307	87.6
92	10	27	18.4	55.1	319	91.3
93	10	26	17.7	54.8	329	93.9
94	10	25	17.1	56.5	306	87.4
95	10	25	17.5	54.6	316	90.3
96	10	26	17.2	55.2	318	90.9
97	10	25	17.5	55.7	309	88.4
98	10	23	18.1	55.0	321	91.6
99	10	25	17.8	55.7	313	89.5
100	10	24	18.4	55.0	314	89.7
101	10	22	18.2	55.6	316	90.3
102	10	23	18.2	55.4	317	90.5
103	10	23	17.7	55.3	317	90.6
104	10	23	18.1	54.9	328	93.8
105	10	24	17.9	55.6	308	87.9
106	10	23	17.5	55.5	308	88.0
107	10	24	17.9	54.8	314	89.7
108	10	23	18.0	55.9	317	90.5
109	13	23	18.1	55.1	309	88.2
110	13	23	18.1	55.0	304	86.7
111	13	23	17.5	55.1	320	91.3
112	13	23	18.0	54.5	313	89.5
113	13	22	17.9	55.7	323	92.4
114	13	22	17.3	55.6	296	84.7
115	13	24	17.6	54.6	305	87.1
116	13	24	17.4	55.2	307	87.8
117	13	23	17.6	55.0	306	87.5
118	13	23	17.9	55.2	309	88.2
119	13	23	17.9	55.0	310	88.6
120	13	23	17.9	55.0	316	90.3

121	13	23	17.9	54.9	314	89.7
Average						
Std Dev	1	0.3	0.3	7	1.9	
Maximum	25	18.4	55.9	328	93.8	
Minimum	22	17.3	54.5	296	84.7	
N-value: 23						

Sample Interval Time: 34.66 seconds.

Summary of SPT Test Results

Project: DU-543-406484 Test Date: 6/22/2021

FMX: Maximum Force  
VMX: Maximum Velocity  
BPM: Blows/Minute

EFV: Maximum Energy  
ETR: Energy Transfer Ratio - Rated

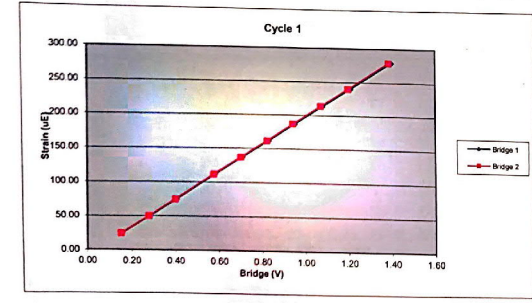
Blow Length ft	Blows Applied /6"	N Value	N60 Value	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
18.00	5-6	11	16	25	20.4	56.1	313	89.5
23.00	6-5	10	15	25	20.4	51.7	330	94.4
28.00	34-4-14	22	33	27	18.7	55.9	328	93.8
33.00	10-10-13	23	35	23	17.9	55.2	312	89.2
<b>Overall Average Values:</b>				25	19.0	55.1	321	91.6
<b>Standard Deviation:</b>				2	1.1	5.3	11	3.0
<b>Overall Maximum Value:</b>				28	20.9	56.9	346	98.9
<b>Overall Minimum Value:</b>				22	17.3	49.6	296	84.7



512AWJ		Cycle 1		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1132.67	23.60	0.15	0.15
3	2056.55	49.37	0.28	0.28
4	2942.12	73.95	0.40	0.40
5	4252.09	111.17	0.58	0.70
6	5167.88	136.67	0.71	0.82
7	6050.66	161.33	0.83	0.94
8	6943.89	186.76	1.08	1.07
9	7892.53	213.51	1.21	1.20
10	8843.21	239.49	1.40	1.39
11	10231.85	279.04		

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7321.84	Force Calibration (lb/V)	7373.41
Offset	-3.28	Offset	2.70
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	205.55	Strain Calibration (µE/V)	206.99
Offset	-8.48	Offset	-8.31
Correlation	0.999994	Correlation	0.999994

Force Strain Calibration	
EA (Kips)	35620.86
Offset	298.68
Correlation	0.999995



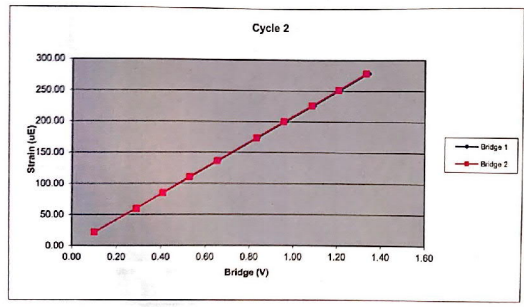
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512AWJ		Cycle 2		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	755.93	21.36	0.10	0.10
3	2128.00	59.46	0.29	0.29
4	2995.73	84.22	0.41	0.41
5	3875.45	109.91	0.53	0.53
6	4786.75	135.82	0.65	0.65
7	6105.11	172.95	0.83	0.83
8	7031.52	199.34	0.96	0.95
9	7977.23	225.43	1.09	1.08
10	8890.97	251.05	1.21	1.21
11	9837.56	278.10	1.34	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7327.32	Force Calibration (lb/V)	7374.95
Offset	3.43	Offset	-7.02
Correlation	0.999998	Correlation	0.999998
Strain Calibration (µE/V)	207.37	Strain Calibration (µE/V)	208.71
Offset	-0.05	Offset	-0.34
Correlation	0.999993	Correlation	0.999989

Force Strain Calibration	
EA (Kips)	35334.52
Offset	5.22
Correlation	0.999988

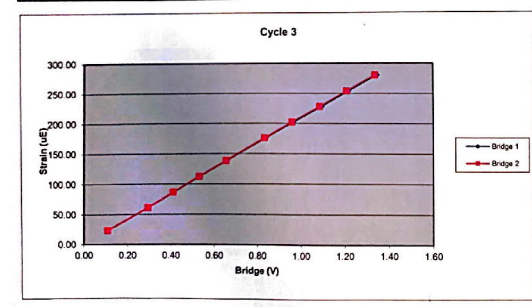


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512AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	801.06	22.69	0.11	0.11
3	2153.39	60.77	0.29	0.30
4	3014.93	86.31	0.41	0.41
5	3905.47	112.48	0.53	0.53
6	4819.01	138.25	0.66	0.65
7	6132.21	175.76	0.84	0.83
8	7063.59	201.72	0.96	0.96
9	8011.25	227.50	1.09	1.09
10	8917.39	253.42	1.22	1.21
11	9861.64	280.02	1.34	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7338.67	Force Calibration (lb/V)	7385.24
Offset	-3.63	Offset	-15.94
Correlation	0.999999	Correlation	0.999998
Strain Calibration (µE/V)	208.41	Strain Calibration (µE/V)	209.73
Offset	0.50	Offset	0.15
Correlation	0.999958	Correlation	0.999961

Force Strain Calibration	
EA (Kips)	35209.93
Offset	-20.75
Correlation	0.999960



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# Accelerometer Calibration Certificate Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

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

Calibration Factors	512AWJ		
Bridge 1 ( $\mu$ EV)	207.11	Bridge 2 ( $\mu$ EV)	208.48
EA Factor (Kips)	35388.44	Area (in <sup>2</sup> )	1.18

Calibrated by: *Willie Jones*  
Calibrated Date: 1/12/2020

Pile Dynamics Inc  
30725 Aurora Rd  
Solon, OH 44139

Traceable to N.I.S.T.

Serial No: K4483 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

### PDA CALIBRATION FACTOR

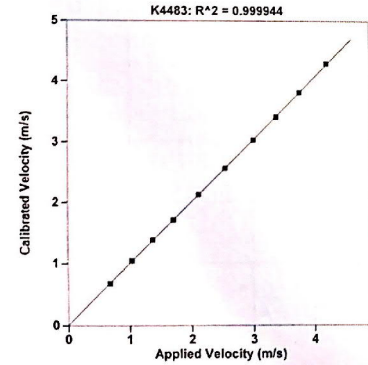
406.4 mv/5000g  
(81.3  $\mu$ v/g)  
R<sup>2</sup>: 0.999944 [Chip programmed]

Operator: Will

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

*Willie Jones*  
Signed

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



Reference Velocity m/s	S/N K4483 Velocity m/s
0.683	0.674
1.040	1.044
1.373	1.381
1.707	1.706
2.117	2.118
2.551	2.546
3.022	3.012
3.405	3.393
3.802	3.800
4.265	4.284

Maximum Acceleration: 932 g's

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# Accelerometer Calibration Certificate Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

Serial No: K4484 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

### PDA CALIBRATION FACTOR

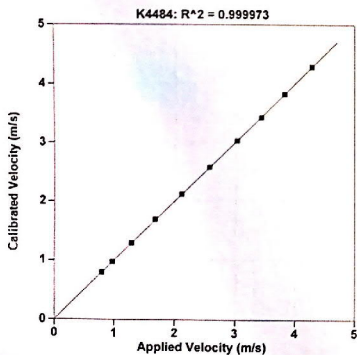
360.6 mv/5000g  
(72.1  $\mu$ v/g)  
R<sup>2</sup>: 0.999973 [Chip programmed]

Operator: Will

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

*Willie Jones*  
Signed

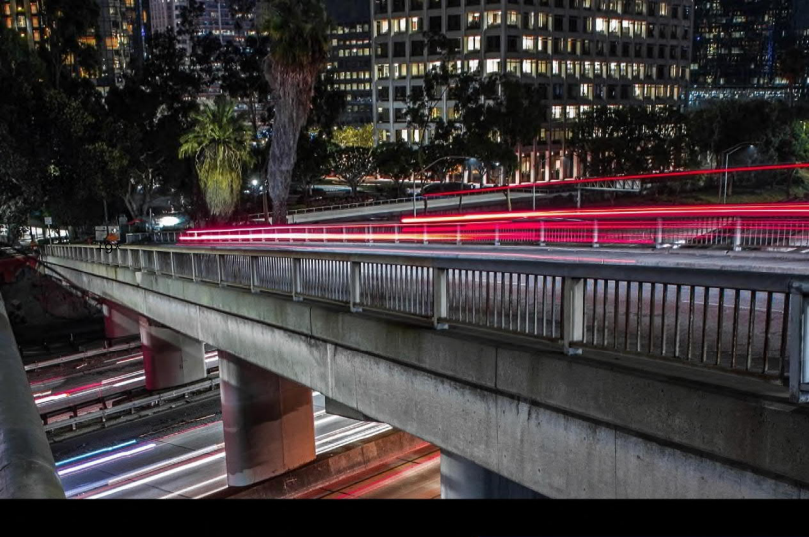
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).



Reference Velocity m/s	S/N K4484 Velocity m/s
0.796	0.795
0.970	0.973
1.264	1.287
1.672	1.686
2.108	2.114
2.561	2.565
3.020	3.017
3.425	3.415
3.818	3.815
4.279	4.280

Maximum Acceleration: 929 g's

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2400 Crownpoint Executive Drive  
Suite 800  
Charlotte, NC 28227

(980) 339-8684  
contact@carolinasgeotech.com  
www.carolinasgeotech.com

October 2, 2020

Mr. George R. Bridger  
Bridger Drilling Enterprise, Inc.  
114 Chimney Lane  
Wilmington, North Carolina 28409

SUBJECT: **Report of SPT Hammer Energy**  
Bridger Drilling CME 45C Track Rig (SN 415104)  
Clayton, North Carolina  
CG2 Project No.: 240019016

Dear Mr. Bridger:

Carolinas Geotechnical Group, PLLC (CG2) has completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer mounted on a Bridger Drilling Enterprise, Inc. (BD) CME 45C track-mounted drill rig with a serial number of 415104. This service was performed by Mr. Robert E. Kral, PE on September 21, 2020. SPT energy testing was performed in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT), Geotechnical Engineering Unit's requirements. The testing procedures, equipment used during testing, and detailed results are presented in this report.

CG2 recommends BD submit this Report of SPT Hammer Energy to the NCDOT Geotechnical Engineering Unit for review and approval no later than October 19, 2020.

**DYNAMIC TESTING METHODOLOGY**

Testing was performed using a model SPT-8 (Serial No. 4549 TB) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K10959 and K10960) bolted to a 2-foot long AWJ drill rod (SN 528AWJ) internally instrumented with two strain transducers. The instrumented AWJ drill rod has a cross-sectional area of 1.20 square inches, an outside diameter of approximately 1.75 inches, and an inside diameter of 1.25 inches at the gauge location. The accelerometers and strain gauges, which are mounted on opposing axis 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. Calibration sheets for the PDA, accelerometers, and the instrumented rod are included in the Appendix III.



**Report of SPT Hammer Energy**

Prepared for:  
Bridger Drilling Enterprise, Inc.  
114 Chimney Lane  
Wilmington, North Carolina 28409

October 2, 2020



October 2, 2020

Report of SPT Hammer Energy  
Clayton, North Carolina  
CG2 Project No.: 240019016



October 2, 2020

Report of SPT Hammer Energy  
Clayton, North Carolina  
CG2 Project No.: 240019016

**TESTING AND OBSERVATIONS**

CG2 personnel was on site September 21, 2020 to observe and perform high-strain dynamic testing during SPT sampling on the CME 45C track-mounted drill rig operated by G. Elster of BD. The measurements were taken during drilling operations at the NCDOT test site located in the north-west quadrant of the US 70 and NC 42 interchange in Clayton, North Carolina (Johnston County). The approximate coordinates (not professionally surveyed) for the test location are 35.623558, -78.512042. No Soil Test Boring Log was maintained. SPT energy measurements were recorded during three intervals at depths of approximately 28½, 33½, and 38½ feet below the existing ground surface. The information presented in the table below summarizes the equipment tested and tooling used during the SPT energy measurements.

**TABLE 1: SPT Field Data**

Drill Rig Information	
Manufacturer	CME
Model	45C
Serial Number	415104
Operator	G. Elster
Carrier	Track
Hammer Information	
Model / Type	CME / Auto
Serial Number	415104
Anvil Height (inches)	11.5
Anvil Diameter (inches)	2.5
Drop Height (inches)	30
Ram Weight (pounds)	140
Ram Serial Number	N/A
Drilling and Instrumented Rod Information	
Drill Rod Type	AWJ
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in <sup>2</sup> )	1.20
Typical Lengths (feet)	5 and 10
Instrumented Rod Type	AWJ (SN 528)
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in <sup>2</sup> )	1.20
Total Instrumented Rod Length (feet)	2.00
Length Below Gages (feet)	0.70
Split-Spoon Length (feet)	2.85

**DYNAMIC TESTING RESULTS**

Data collected from Strain Gauge F3 (528AWJ 2) appeared erratic at the beginning of the 28.5 to 30.0-foot sample interval before stabilizing approximately 7 blows into the drive. Therefore, data from Strain Gauge F3 was not including in the analysis of the 28.5 to 30.0-foot sample interval.

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.6 feet to the required drill rod length at each sample depth. Based on the test data, the automatic hammer on the CME 45C track-mounted drill rig operated at a rate of about 53.9 to 54.4 blows per minute (BPM) during dynamic testing. The measured transferred hammer energy (EFV) ranged from 310.1 to 333.8 foot-pounds, which corresponds to Energy Transfer Ratio (ETR) values of 88.6 to 95.4%, respectively.

The SPT Energy Measurement Data Summary tables in the Appendix present the test data from every hammer blow at each sampling interval along with representative force and velocity traces for each test interval. The reported blow counts, obtained by the drill rig personnel, and a summary of the test data and average computed hammer energy and transfer ratio values are provided in Table 2. 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. BLC
- Penetration vs. VMX
- Average ETR vs. Rod Length
- Penetration vs. FMX
- Penetration vs. ETR
- ETR vs. Rod Length

**Table 2: 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 (Coastal Plain)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	28½ - 30	30	33.6	2-3-6 / 9	SILT	54.2	321.9	92.0
2	33½ - 35	35	38.6	5-6-7 / 13	SILT	54.1	328.1	93.7
3	38½ - 40	40	43.6	5-6-8 / 14	SILT	54.3	326.6	93.9
<b>Overall Average</b>						<b>54.2</b>	<b>328.7</b>	<b>93.4</b>

The average hammer rate, transferred energy, and transfer ratio were calculated for each depth interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e. the blows that determine the N-value) were included when computing the average values shown in Table 2. The overall average transferred hammer energy for the automatic hammer on the CME 45C track-mounted drill rig (for all the depth intervals tested) was 326.7 foot-pounds, with an average ETR of 93.4%.

Report of SPT Hammer Energy  
 Clayton, North Carolina  
 CG2 Project No.: 240019016

**LIMITATIONS OF REPORT**

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The information 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.

**CLOSING**

CG2 is pleased to have the opportunity to provide these services to you. If you have questions concerning the content of this report, or if CG2 can be of further service, please contact CG2 at (980) 339-8684.

Sincerely,  
**Carolinas Geotechnical Group, PLLC**

Decalsigned by:  
  
 D. Matthew Brewer, PE  
 Senior Project Engineer

Decalsigned by:  
  
 Robert E. Kral, PE  
 Senior Project Engineer  
 NC Registration No. 042642

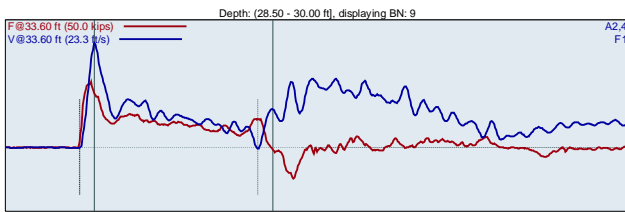


**APPENDIX I**

**Appendices:**

- Appendix I - CME 45C Track Rig (SN 415104) SPT Energy Measurements Summary Plots and Tables
- Appendix II - SPT Hammer Energy Field Form (Field Log)
- Appendix III - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix IV - Certificate of Proficiency

Pile Dynamics, Inc. Page 1 of 4  
 SPT Analyzer Results PDA-S Ver. 2018.30 - Printed: 10/1/2020  
 CME 45C (SN 415104) BORING B-1  
 R. KRAL Test date: 9/21/2020  
 B-1  
 AR: 1.20 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
 LE: 38.60 ft EM: 30000 ksi  
 WS: 16807.9 fts

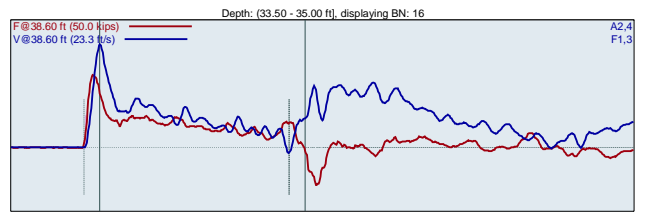


F1 : [528AWJ1] 206.98 PDICAL (1) FF1 A2 (PR): [K1095g] 398 mm/6.4v/5000g (1) VF1  
 A4 (PR): [K1096g] 400 mm/6.4v/5000g (1) VF1

LP		BL#	BC /6"	BPM bpm	FMX kips	VMX f/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %	
28.75	1	2	4.5	23.5	17.6	3.3	19.6	3.0	271.1	77.4		
29.00	2	2	54.7	24.1	18.7	3.0	20.1	3.0	302.4	86.4		
29.17	3	3	54.2	25.8	19.3	2.4	21.5	2.0	310.1	88.6		
29.33	4	3	54.1	26.0	19.6	2.3	21.7	2.0	318.5	91.0		
29.50	5	3	54.4	26.9	19.6	2.2	22.4	2.0	318.5	91.0		
29.58	6	6	54.3	26.6	19.3	1.9	22.2	1.0	318.4	91.0		
29.67	7	6	54.1	26.2	19.2	1.6	21.9	1.0	326.2	93.2		
29.75	8	6	54.1	26.4	19.3	1.3	22.0	1.0	328.4	93.8		
29.83	9	6	54.0	25.5	19.0	1.1	21.3	1.0	323.5	92.4		
29.92	10	6	54.2	25.1	19.2	1.1	20.9	1.0	327.2	93.5		
30.00	11	6	54.2	23.5	19.5	1.1	19.6	1.0	325.9	93.1		
Average				54.2	25.8	19.3	1.7	21.5	1.3	321.9	92.0	
Std Dev				0.1	0.9	0.2	0.5	0.8	0.5	5.6	1.6	
Maximum				54.4	26.9	19.6	2.4	22.4	2.0	328.4	93.8	
Minimum				54.0	23.5	19.0	1.1	19.6	1.0	310.1	88.6	
N-value: 9												

Sample Interval Time: 11.03 seconds.

Pile Dynamics, Inc. Page 2 of 4  
 SPT Analyzer Results PDA-S Ver. 2018.30 - Printed: 10/1/2020  
 CME 45C (SN 415104) BORING B-1  
 R. KRAL Test date: 9/21/2020  
 B-1  
 AR: 1.20 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
 LE: 38.60 ft EM: 30000 ksi  
 WS: 16807.9 fts



F1 : [528AWJ1] 206.98 PDICAL (1) FF1 A2 (PR): [K1095g] 398 mm/6.4v/5000g (1) VF1  
 F3 : [528AWJ2] 206.76 PDICAL (1) FF1 A4 (PR): [K1096g] 400 mm/6.4v/5000g (1) VF1

LP	BL#	BC /6"	BPM bpm	FMX kips	VMX f/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %	
33.60	1	5	1.9	27.8	18.9	1.8	23.2	1.2	322.5	92.1	
33.70	2	5	53.8	28.3	19.3	1.5	23.6	1.2	325.6	93.0	
33.80	3	5	54.1	28.3	19.1	1.5	23.6	1.2	324.4	92.7	
33.90	4	5	54.1	28.5	19.1	1.4	23.7	1.2	324.1	92.6	
34.00	5	5	54.1	28.7	19.2	1.4	23.9	1.2	326.1	93.2	
34.08	6	6	54.1	28.5	19.1	1.3	23.7	1.0	327.6	93.6	
34.17	7	6	54.1	28.6	18.9	1.2	23.8	1.0	328.6	93.9	
34.25	8	6	54.0	28.5	18.9	1.2	23.8	1.0	326.1	93.2	
34.33	9	6	54.1	28.4	18.9	1.2	23.7	1.0	326.1	93.2	
34.42	10	6	54.2	28.4	18.9	1.2	23.7	1.0	325.1	92.9	
34.50	11	6	54.1	28.3	18.9	1.1	23.6	1.0	328.5	93.9	
34.57	12	7	54.1	28.5	19.0	1.0	23.7	0.9	331.0	94.6	
34.64	13	7	54.0	28.5	18.9	1.0	23.7	0.9	333.6	95.3	
34.71	14	7	54.2	28.3	18.7	0.9	23.6	0.9	330.9	94.5	
34.79	15	7	54.1	28.3	18.8	1.0	23.6	0.9	327.8	93.6	
34.86	16	7	54.1	28.2	18.9	1.0	23.5	0.9	329.7	94.2	
34.93	17	7	54.0	28.6	18.9	1.0	23.9	0.9	328.3	93.8	
35.00	18	7	53.9	28.4	19.0	0.9	23.6	0.9	321.8	91.9	
Average			54.1	28.4	18.9	1.1	23.7	0.9	328.1	93.7	
Std Dev			0.1	0.1	0.1	0.1	0.1	0.1	2.9	0.8	
Maximum			54.2	28.6	19.1	1.3	23.9	1.0	333.6	95.3	
Minimum			53.9	28.2	18.7	0.9	23.5	0.9	321.8	91.9	
N-value: 13											

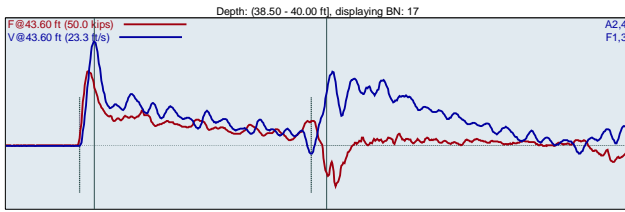
Sample Interval Time: 18.83 seconds.



CME 45C (SN 415104)  
R. KRAL  
B-1

BORING B-1  
Test date: 9/21/2020

AR: 1.20 in<sup>2</sup> SP: 0.492 k/t<sup>3</sup>  
LE: 43.60 ft EM: 30000 ksi  
WS: 16807.9 fts

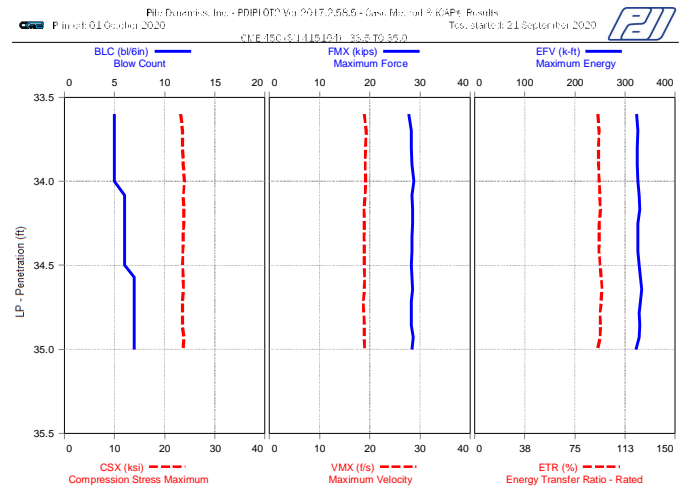
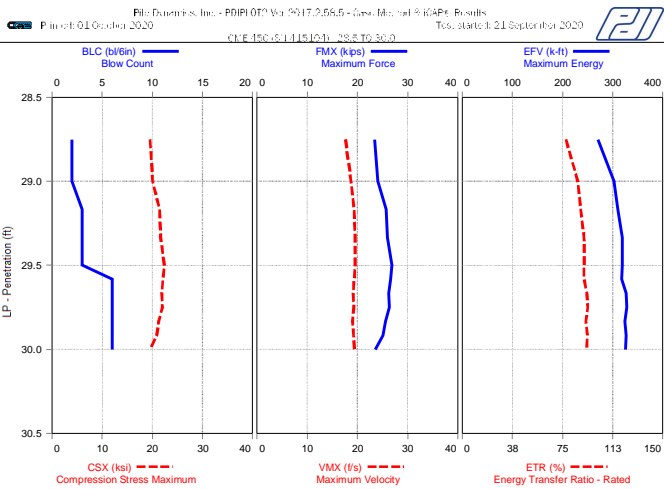


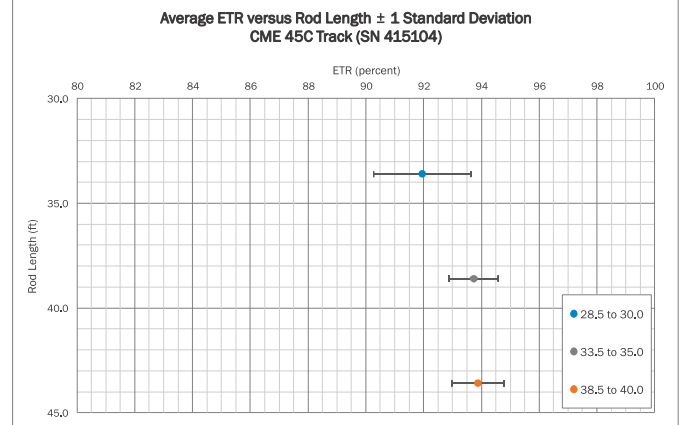
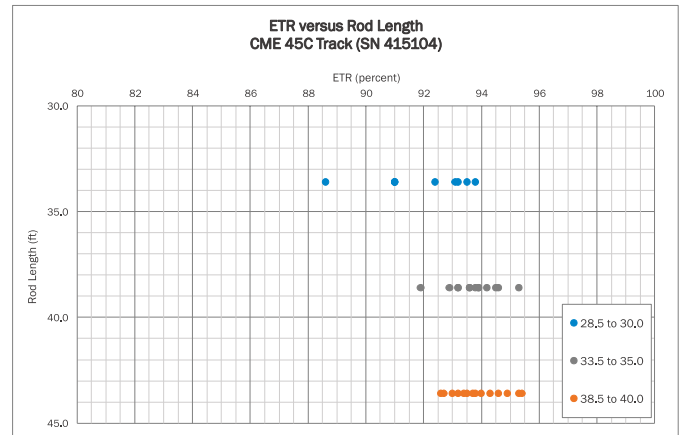
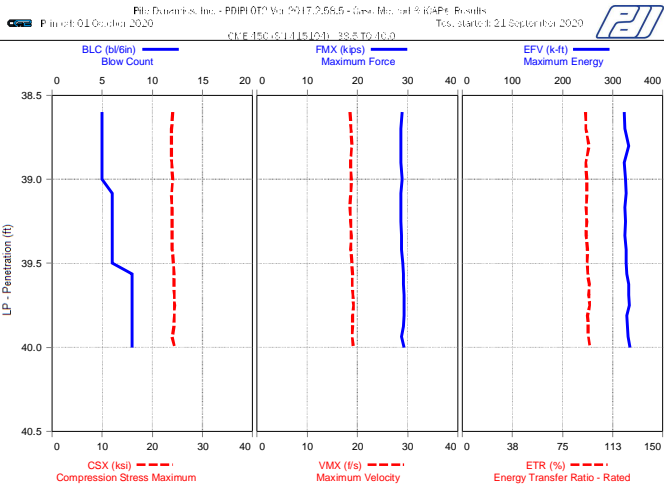
LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
38.60	1	5	62.7	28.9	18.5	1.6	24.1	1.2	322.7	92.2
38.70	2	5	54.5	28.6	18.7	1.4	23.9	1.2	323.6	92.5
38.80	3	5	54.3	28.6	18.9	1.4	23.8	1.2	331.6	94.7
38.90	4	5	54.5	28.6	18.6	1.3	23.9	1.2	323.4	92.4
39.00	5	5	54.3	28.9	18.8	1.3	24.1	1.2	325.6	93.0
39.08	6	6	54.3	28.6	18.7	1.2	23.8	1.0	326.3	93.2
39.17	7	6	54.4	28.7	18.5	1.2	23.9	1.0	324.4	92.7
39.25	8	6	54.3	28.7	18.6	1.1	23.9	1.0	325.4	93.0
39.33	9	6	54.3	28.8	18.8	1.1	24.0	1.0	324.1	92.6
39.42	10	6	54.3	28.8	18.7	1.0	24.0	1.0	327.3	93.5
39.50	11	6	54.3	29.1	18.9	1.0	24.2	1.0	326.8	93.4
39.56	12	8	54.4	29.2	19.0	1.0	24.4	0.7	328.3	93.8
39.63	13	8	54.2	29.2	18.9	0.9	24.3	0.7	332.1	94.9
39.69	14	8	54.3	29.3	19.1	0.9	24.4	0.7	331.2	94.6
39.75	15	8	54.3	29.3	19.2	0.9	24.4	0.7	333.4	95.3
39.81	16	8	54.3	29.2	19.0	0.9	24.4	0.7	327.8	93.7
39.88	17	8	54.2	29.2	19.0	0.8	24.3	0.8	329.1	94.0
39.94	18	8	54.1	28.7	19.0	0.8	23.9	0.7	330.0	94.3
40.00	19	8	54.2	29.3	19.2	0.8	24.5	0.8	333.8	95.4
Average			54.3	29.0	18.9	1.0	24.2	0.9	328.6	93.9
Std Dev			0.1	0.3	0.2	0.1	0.2	0.1	3.1	0.9
Maximum			54.4	29.3	19.2	1.2	24.5	1.0	333.8	95.4
Minimum			54.1	28.6	18.5	0.8	23.8	0.7	324.1	92.6
N-value:			14							

Sample Interval Time: 19.95 seconds.

Summary of SPT Test Results

Project: CME 45C (SN 415104), Test Date: 9/21/2020										CSX: Compression Stress Maximum			
BPM: Blow/Minute										DFN: Final Displacement			
FMX: Maximum Force										EFV: Average Energy			
VMX: Maximum Velocity										ETR: Energy Transfer Ratio - Rated			
DMX: Maximum Displacement													
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
33.60	28.50	30.00	2-3-6	9	14	54.2	25.8	19.3	1.7	21.6	1.3	321.9	92.0
38.60	33.50	35.00	5-6-7	13	20	54.1	28.4	18.9	1.1	23.7	0.9	328.1	93.7
43.60	38.50	40.00	5-6-8	14	21	54.3	29.0	18.9	1.0	24.2	0.9	328.6	93.9
<b>Overall Average Values:</b>						54.2	28.0	19.0	1.2	23.3	1.0	328.7	93.4
<b>Standard Deviation:</b>						0.1	1.4	0.2	0.4	1.2	0.3	4.7	1.4
<b>Overall Maximum Value:</b>						54.4	29.3	19.6	2.4	24.6	2.0	333.8	95.4
<b>Overall Minimum Value:</b>						53.9	23.5	18.5	0.8	19.6	0.7	310.1	88.6





APPENDIX II

SPT Hammer Energy Field Form

**Project:** SPT HAMMER ENERGY  
**Project No.:** 240019016  
**Boring No.:** B-1

**Date:** 9/21/2020  
**Weather:** 60's CLEAR  
**Drill Rod Type:** AWJ

**On-site Personnel**  
 Drilling Company: BRIDGER DRILLING  
 Rig Operator: G. EISTER  
 Eng./Geologist: N/A  
 Client Rep.: N/A  
 Analyzer Oper.: R. KRAL

**Rig/Hammer Info**  
 Drill Rig Make/Model: CME 45C  
 Carrier Type: TRACK  
 Rig Serial No.: 415104  
 Hammer Type/Model: CME  
 Hammer Serial No.: N/A  
 Hammer Drop System: AUTO  
 Lubrication Condition: PER MANUFACTURER  
 Manufacturer Recommended  
 Operation Rate (bpm): 55  
 Drop Height (in.): 30  
 Hammer Weight (lbs): 140  
 Anvil Dimension (in.): 11.5  
 Drilling Method: 2.25 HSA

**Rod Info**  
**(A + E)** Impact Surface to Gages Length: 1.36 ft  
**(B)** Instr. Rod Length below Gages: 0.70 ft  
**(A) + (B)** Instr. Rod Length: 2.00 ft  
**(D)** Spoon Length: 2.85 ft  
**(E)** Rod Length Above Instr. Rod (if applicable): 0.06 ft  
 Instr. Rod S/N: 528AWJ  
 Instr. Rod Outside Dia.: 1.75 in.  
 Instr. Rod Area: 1.20 in<sup>2</sup>  
 PDA Make/Model: SPT-8  
 PDA Serial No.: 4549 TB  
 Calib. Pulse Test (y/n): Y

**Gage Info**

Gage	Serial No.	Calibration No.
Accel. A3	K10959	398
A4	K10960	400
Strain F3	528AWJ-1	206.98
F4	528AWJ-2	206.76

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				Drop Height in Tolerance (y/n)	Soil Class.
						6"	12"	18"	N-Value		
21-Sep	28.5 TO 30.0	1040/1040	30	33.6	54	2	3	6	9	Y	SI
21-Sep	33.5 TO 35.0	1048/1048	35	38.6	54	5	6	7	13	Y	SI
21-Sep	38.5 TO 40.0	1058/1058	40	43.6	54	5	6	8	14	Y	SI

Notes:  
 TESTING PERFORMED AT THE THE US 70 AND NC 42 INTERCHANGE IN CLAYTON, NORTH CAROLINA (JOHNSTON COUNTY). THE APPROXIMATE COORDINATES ARE 35.6235578, -78.5120418.

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.

Digitally signed by: Robert E. Kral  
 Prepared By (print/signature): \_\_\_\_\_ Date: 9/21/2020

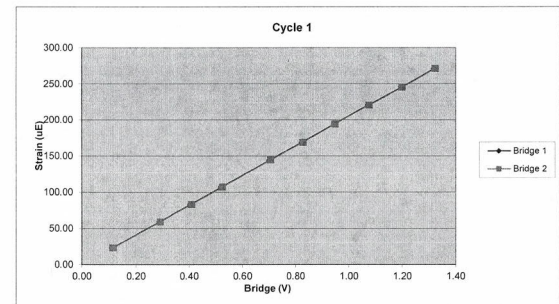
APPENDIX III



Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	814.94	23.02	0.11	0.11
3	2078.95	59.17	0.29	0.29
4	2985.94	83.33	0.41	0.41
5	3871.69	108.81	0.52	0.52
6	5239.36	144.39	0.70	0.70
7	6143.01	168.97	0.82	0.83
8	7038.20	194.12	0.94	0.95
9	7968.01	220.32	1.07	1.08
10	8907.07	245.36	1.20	1.20
11	9819.96	271.24	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7475.73	Force Calibration (lb/V)	7472.58
Offset	-34.31	Offset	-50.84
Correlation	0.999983	Correlation	0.999985
Strain Calibration (µE/V)	205.33	Strain Calibration (µE/V)	205.24
Offset	0.04	Offset	-0.42
Correlation	0.999995	Correlation	0.999994

Force Strain Calibration	
EA (Kips)	36408.54
Offset	-35.51
Correlation	0.999975

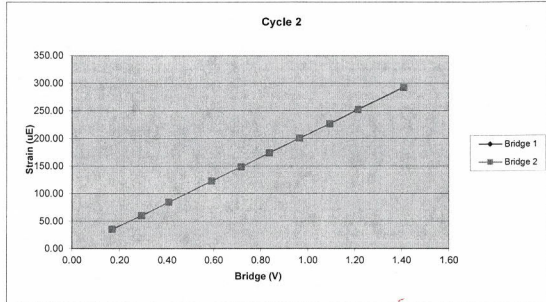




528AWJ		Cycle 2		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1272.86	35.53	0.17	0.17
3	2189.89	60.25	0.29	0.29
4	3040.82	84.44	0.41	0.41
5	4400.23	122.78	0.59	0.59
6	5282.83	148.44	0.72	0.72
7	6127.08	173.74	0.84	0.84
8	7109.21	200.48	0.96	0.96
9	8105.31	226.31	1.09	1.09
10	9037.68	251.95	1.21	1.22
11	10474.20	292.29	1.41	1.41

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7413.29	Force Calibration (lb/V)	7396.31
Offset	1.83	Offset	12.79
Correlation	0.999916	Correlation	0.999927
Strain Calibration (µE/V)	207.56	Strain Calibration (µE/V)	207.08
Offset	-0.03	Offset	0.28
Correlation	0.999996	Correlation	0.999995

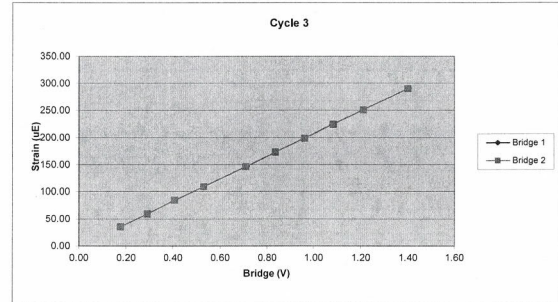
Force Strain Calibration	
EA (Kips)	35716.33
Offset	2.95
Correlation	0.999912



528AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1303.94	35.42	0.18	0.18
3	2131.46	59.01	0.29	0.29
4	3017.21	84.17	0.41	0.41
5	3836.57	109.27	0.53	0.53
6	5260.21	146.66	0.71	0.71
7	6193.56	172.96	0.83	0.83
8	7136.75	198.87	0.96	0.96
9	8038.83	224.32	1.08	1.08
10	8993.42	251.05	1.21	1.21
11	10374.47	289.91	1.40	1.40

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7427.04	Force Calibration (lb/V)	7423.76
Offset	-4.66	Offset	-4.26
Correlation	0.999997	Correlation	0.999998
Strain Calibration (µE/V)	208.05	Strain Calibration (µE/V)	207.96
Offset	-0.93	Offset	-0.91
Correlation	0.999997	Correlation	0.999995

Force Strain Calibration	
EA (Kips)	35697.87
Offset	28.42
Correlation	0.999996



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

Calibration Factors		528AWJ	
Bridge 1 (µE/V)	206.98	Bridge 2 (µE/V)	206.76
EA Factor (Kips)	35940.92	Area (in <sup>2</sup> )	1.20

Calibrated by: *[Signature]*  
Calibrated Date: 12/19/2018

Pile Dynamics Inc  
30725 Aurora Rd  
Solon, OH 44139

Traceable to N.I.S.T.

OBTA: ON [ALT-F1/98=60] Pile Dynamics, Inc. TG F1 DPF

File Dynamics FS BN 236 PJ: A 4 -- US  
2019-01-07 14:40 LO SL 578/ 3440/ 99 PN: HOPBAR F 2 3.3

LE 17.0 ft  
RR 1.7 in2  
EM 30000 Ks1  
SP 0.492 K/ft3  
MS 16910 ft/s  
MC 7312 ft/s

JC 0.40  
FM 1.00  
UH 1.00

EA/C 30.3 Ks/ft  
EN 3135.0  
FR 20000 RB 90

DL -42  
UT -1 IP 0.00  
PK 1 TH-PEAK

F1/2 500/ 213  
F3/4 213/ 213  
A1/2 999/ 999 TS 12  
A3/4 999/ 398 TB 8.0

E B PD: k10959  
L/C 4.7 UA 1000 UE 1024 LP 0.00 ft  
TI 9.8 2L/C 4.7

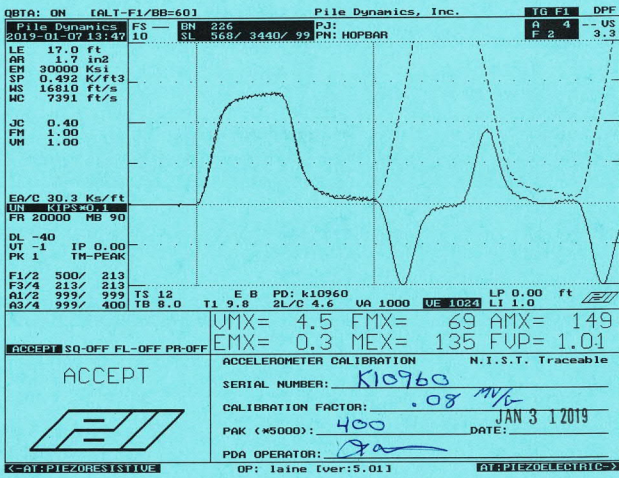
UMX= 4.4 FMX= 67 AMX= 149  
EMX= 0.3 MEX= 131 FUP= 0.99

ACCEPT SQ-OFF FL-OFF PR-OFF

ACCEPT ACCELEROMETER CALIBRATION N.I.S.T. Traceable  
SERIAL NUMBER: K10959  
CALIBRATION FACTOR: .0796 M/G  
PAK (#5000): 398 DATE: JAN 3 1 2019  
PDA OPERATOR: *[Signature]*  
OP: laine (ver:5.01)

Smart Sensor

Smart Chip Programmed By *J.W.* on \_\_\_\_\_ CRC Value *B50A*



APPENDIX IV

Smart Sensor

Smart Chip Programmed By J.W. on \_\_\_\_\_ CRC Value D398





Mr. Scott Rist  
 Terracon Consultants, Inc.  
 2401 Brentwood Road, Suite 107  
 Raleigh, NC 27604

**Re: Standard Penetration Test Energy Measurements** GRL Job No. 219033-1  
 Geoprobe 3230DT Drill Rig – S/N 3230DT1810012  
 North Wilkesboro, North Carolina

Dear Mr. Rist:

This revised report presents results of energy measurements obtained on September 9, 2021, during Standard Penetration Test (SPT) sampling with an automatic hammer mounted on a Geoprobe 3230DT drill rig. The dynamic testing was performed on AW drill rods having J threads. GRL Engineers, Inc. obtained the dynamic measurements with an instrumented AW-J subsection and an 8G Model Pile Driving Analyzer®. This report describes the testing procedures and summarizes the test results. Appendix A describes our measurement and analysis methods, Appendix B contains the instrumentation calibrations and certificates, Appendix C contains a summary of the field data, and Appendix D contains plots of the force and velocity measurements.

**PURPOSE AND SCOPE OF WORK**

At the request of Terracon Consultants, Inc., GRL Engineers conducted SPT energy measurements according to ASTM D4633-10 at the culinary water treatment plant in North Wilkesboro, North Carolina. Energy measurements on the rig were taken during five sampling events in a dummy soil boring referred to as boring B-3A.

**EQUIPMENT**

**Drilling and SPT Hammer Equipment**

**Geoprobe 3230DT Drill Rig (Serial Number 3230DT1810012)**

The Geoprobe 3230DT self-contained, tracked drill rig was equipped with a Geoprobe DH105 automatic SPT hammer. The first sample taken had 34.0 feet of AW-J rod and sampler below the sensors. The final sample had 54.0 feet of rod and sampler below the sensors.

**Instrumentation**

An 8G Model Pile Driving Analyzer (PDA) data acquisition system was used to collect and process the dynamic measurements of force and velocity. A two foot long subsection of AWJ rod was instrumented with two full-bridge, foil resistance strain gages and two piezoresistive accelerometers mounted at the midpoint location of the instrumented rod.

Analog signals from the strain gages and accelerometers were conditioned, digitized, processed, and stored with the PDA. Selected output from the PDA for each recorded impact included the maximum energy transfer by the FV method as recommended by



**GRL**  
 engineers, inc.

SPT Energy Calibration Services

GRL Job No. 219033-1

Project: Standard Penetration Test Energy Measurements  
 Geoprobe 3230DT Drill Rig  
 North Wilkesboro, North Carolina

September 21, 2021

Prepared For: Terracon Consultants, Inc.

www.grlengineers.com

By: Mark A. Rawlings & Scott D. Webster, P.E.

4350 Main Street, Suite 211 • Harrisburg, NC 28075 USA  
 704.456.7215 • fax 980.258.0201 • www.GRLengineers.com

California • Colorado • Florida • Georgia • Illinois • Louisiana  
 North Carolina • Ohio • Pennsylvania • Texas • Washington

ASTM D4633-16, (EFV); the energy transfer ratio (ETR) which is defined as the ratio of the EFV value divided by the theoretical hammer potential energy of 350 ft-lbs (i.e., computed from the 140 pound SPT hammer and the standard 30 inch drop as specified by ASTM D1586-11); the maximum rod top force, (FMX); maximum rod top velocity, (VMX); the hammer operating rate, (BPM); the maximum computed displacement, (DMS); the final displacement, (DFN); and the maximum compressive stress at the gage location, (CSX). These results are presented in graphical form and as a function of blow number and depth in tabular form in Appendix C.

**TESTING SEQUENCE**

SPT samples were driven for a total of three, 6 inch increments, or 1.5 feet. The blow count for each of the increments was recorded. The starting depth for the first sample was 28.5 feet below the existing ground surface. Samples were then taken at 5 foot intervals. The ending depth for the fifth sample was at 48.8 feet due to sampler refusal. The SPT N-value blow counts during the five sampling events ranged from 12 to 50 for 4 inches of penetration. ASTM D4633-16 recommends that the N-value blow count be between 8 and 50. The fourth and fifth sampling events had N-value blow counts more than 50. Results from these samples are presented but are not included in the drill rig calibration final results. The soil retrieved was generally classified as red-orange, tan, and brown silt, sandy silt, or silty sand.

**RESULTS**

The records collected by the PDA were checked for consistency and accuracy during preparation of the final report. For example, records from very weak startup of final impacts were not included in average results as determined appropriate. The table below and Table 1 summarize the average transferred energy values calculated by the EFV method over the last 12 inches (i.e., N value) at each dynamically monitored sampling depth.

Drill Rig	Average EFV (ft-lbs)	Average ETR (%)
Geoprobe 3230DT S/N 3230DT1810012	327	93

Please review both ASTM D4633-10 and ASTM D1586-99 prior to applying these test results. The energy calibrations reported herein are valid for the same hammer/drill rig, with the same drill operator, same anvil dimensions, and same drilling methods.

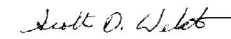
We appreciate the opportunity to be of assistance to you on this project. Please contact our office should you have any questions regarding this submittal, require additional information, or if we may be of further service.

Sincerely,

GRL Engineers, Inc.



Mark Rawlings



Scott D. Webster, P.E.



GRL Engineers, Inc. - NC  
 PE License Number C-2391



**TABLE 1: Summary of SPT Energy Measurements**  
**Terracon Geoprobe 3230DT - S/N 3230DT1810012**  
**North Wilkesboro, NC - September 9, 2021**

Soil Sample	Reported Sample Depth (feet)	Reported Rod Length <sup>(1)</sup> (feet)	Reported Blow Count (blows/6")	SPT Field N Value	Average Energy To Rod <sup>(2)</sup> (ft-lbs)	Average Energy Transfer Ratio <sup>(3)</sup> (%)	SPT Hammer Operating Rate (blows / min.)	SPT N Value Corrected for 60% Energy <sup>(4)</sup> N60
<b>CME Auto Hammer - AW-J Rod</b>								
1	28.5 - 30.0	34.0	4-5-7	12	323	92	52.2	18
2	33.5 - 35.0	39.0	6-15-22	37	325	93	52.2	57
3	38.5 - 40.0	44.0	8-13-21	34	330	94	52.1	53
4*	43.5 - 45.0	49.0	9-19-36	55	326	93	51.4	85
5*	48.5 - 48.8	54.0	50 / 4 in.	50 / 4 in.	331	95	50.6	---
<b>Average</b>					<b>327</b>	<b>93</b>	<b>52.2</b>	
<b>Standard Deviation</b>					<b>4</b>	<b>2</b>	<b>0.2</b>	

- 1) Below the testing gauge location. Add 1.0 foot for total rod length.
- 2) Average energy transfer over second and third increment from FV Method.
- 3) Energy calculated by FV method divided by 350 ft-lbs (140 pound ram dropped 2.5 feet).
- 4) SPT N value corrected for 60% energy using the Seed Correction Method.

\* Sample does not meet blow count recommendations; results are not included

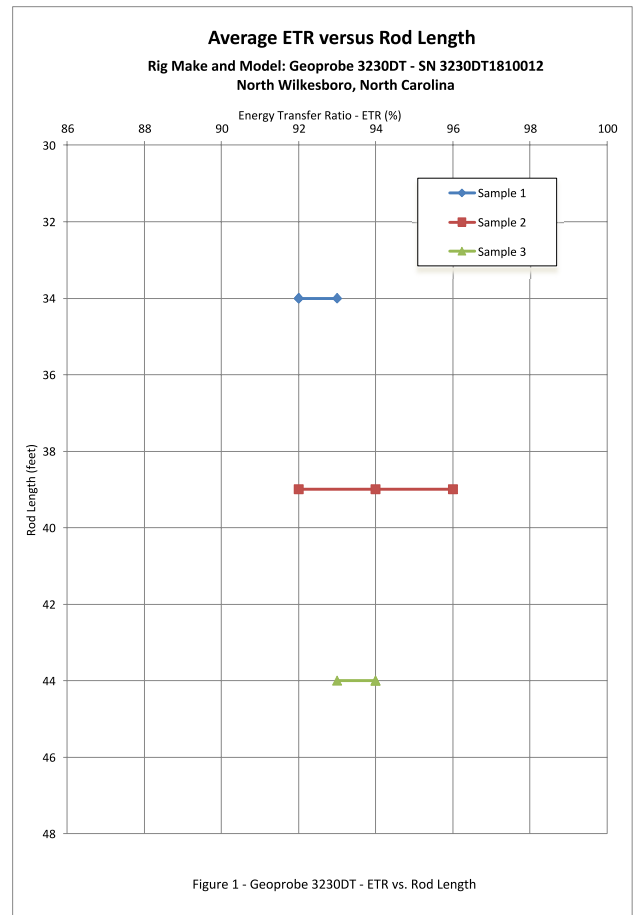


Figure 1 - Geoprobe 3230DT - ETR vs. Rod Length

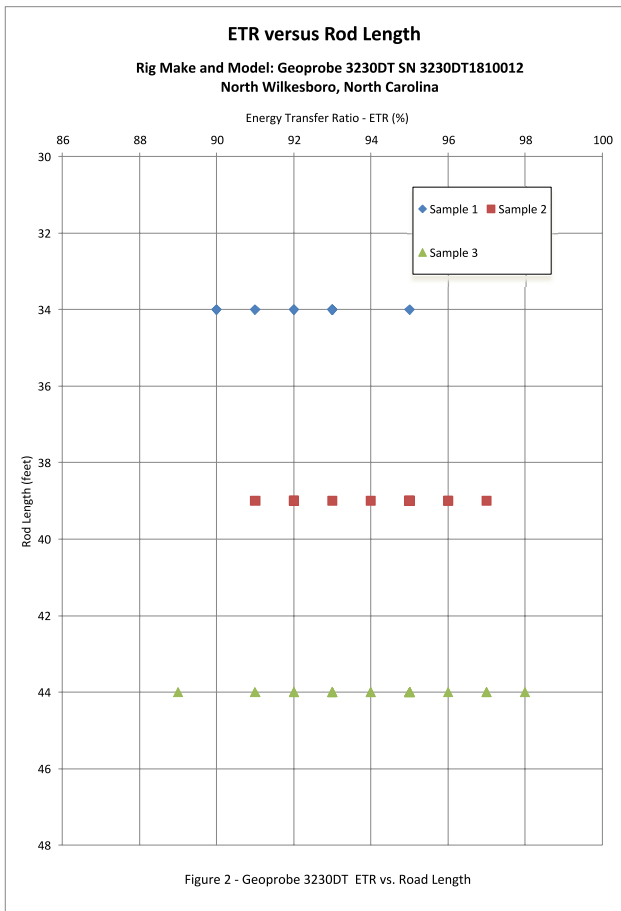


Figure 2 - Geoprobe 3230DT ETR vs. Rod Length

## APPENDIX A

### An Introduction Into SPT Dynamic Testing Methods

**APPENDIX A**  
**AN INTRODUCTION INTO SPT DYNAMIC PILE TESTING**

The following has been written by GRL Engineers, Inc. and may only be copied with its written permission.

**1. BACKGROUND**

The Standard Penetration Test is frequently conducted as an in-situ assessment of soil strength. This test requires that a 140 lb weight is dropped 30 inches onto a drive rod at whose bottom a sampler is usually installed. The sampler is driven for 18 inches; the number of blows required for the last 12 inches of driving is the so-called N-value. The N-value may be used as a strength indicator for foundation design or as a means of assessing the liquefaction potential of soils.

Obviously, the SPT hammer efficiency is an important consideration when using the N-values for design purposes. Measurements have indicated that the energy in the drive rod is sometimes only 30% and may reach 90% of the potential or rated energy of the SPT hammer (E-rated = 0.35 kip-ft or 0.475 kJ). The type of hammer used to drive the rod is the main reason for these variations. On the average, the energy in the drive rod is 60% of the standard rated energy.

Because of the variability of energy, methods based on N-values are considered unreliable. However, measurements during SPT testing using the Case Method can be done on a routine basis and these measurements yield the transferred energy values. With measured energy, EMX, known, an adjustment of the measured N-value,  $N_m$ , can be made as follows.

$$N_{60} = N_m [E_m / (0.6E_r)] \quad (1)$$

Thus, if the measured energy value is equal to the normally expected transferred energy of 60% of E-rated then the adjusted and measured N-values are identical. On the other hand, if the measured energy is only 30% then the adjusted blow count will be reduced by 50%.

**2. DYNAMIC TESTING AND ANALYSIS METHODS APPLIED TO SPT**

The Case Method of dynamic pile testing, named after the Case Institute of Technology where it was developed between 1964 and 1975, requires that a substantial ram mass (e.g. a pile driving hammer) impacts the pile top such that the pile undergoes at least a small permanent set. Thus, the method is also referred to as a "High Strain Method". The Case Method requires dynamic measurements on the pile or shaft under the ram impact and then a calculation of various quantities. Conveniently, for SPT applications, the measurements and analyses are done by a single piece of equipment: the SPT Analyzer (SPTA). The Pile Driving Analyzer® (PDA) is also suitable to perform these measurements and data processing.

A related analysis method is the "Wave Equation Analysis" which calculates a relationship between bearing capacity, pile stresses, transferred energy and field blow count. The GRLWEAP™ program performs this analysis and provides a complete set of helpful information and input data. This program can be used very effectively to simulate the SPT driving process.

**3. MEASUREMENTS**

GRL uses equipment manufactured by Pile Dynamics, Inc. The system includes either an SPT Analyzer™ (SPTA) or a Pile Driving Analyzer® (PDA), an instrumented rod section and two accelerometers. SPT energy testing is very closely related to and borrows procedures from dynamic pile testing. Those interested in the basis of the SPT energy testing method may obtain extensive literature on dynamic pile testing from GRL Engineers, Inc.

**3.1 SPT Analyzer or Pile Driving Analyzer**

The basis for the results calculated by the SPTA or PDA are strain and acceleration measured in an instrumented rod section. These signals are

A-1

holds if the wave does not encounter a disturbance prior to reflecting off the pile toe. Such disturbances include a change in cross sectional area, an open or loose splice or joint, or resistance along the shaft.

- Using only one force measurement precludes a data quality check based on the proportionality between force and velocity. Thus, a force measurement that is for some reason in error may not be detectable, which will lead to errors in the EF2 value. Data quality checks will be discussed further in Section 5.

The use of EF2 is therefore not recommended but it is often included in result presentations for the sake of completeness.

**4.2 STRESSES**

During SPT monitoring, it is also of interest to monitor compressive stresses at both the top of the drive rod and at its bottom.

At the pile top (location of sensors) the maximum compression stress averaged over the rod's cross section, **CSX**, is directly obtained from the measurements. Note that this stress value refers to the instrumented section. If the rod has a different cross sectional area then the stress in the rod will be different from CSX.

The SPTA or PDA can also calculate, in an approximate manner, the force at the rod bottom, **CFB**. To obtain the corresponding stress, this force value should be divided by the appropriate cross sectional area, e.g. by the rod area just above the sampler or by the sampler area itself. Of course, non-uniform stress components as they might occur at the sampler tip due to a sloping rock are not considered in this calculation.

**5. DATA QUALITY CHECKS**

Quality data is the first and foremost requirement for accurate dynamic testing results. It is therefore important that the measurement engineer performing SPTA or PDA tests has the experience necessary to recognize measurement problems and take appropriate corrective action should problems develop. Fortunately, dynamic pile testing allows for

A-3

converted to rod top force, F(t), and rod top velocity, v(t). The SPTA or PDA conditions, calibrates and displays these signals and immediately computes average pile force and velocity thereby eliminating bending effects. The product of these two measurements is then integrated over time which yields the energy transferred to the instrumented section as a function of time (see Section 4.1).

For convenience and accuracy, strain measurements are usually taken on an instrumented section of SPT drive rod. Ideally, the section properties of the instrumented rod and those of the drive rod are the same, however, using subs, other sections can also be utilized.

For the instrumented section, PDI provides a force calibration in such a way that the output of the instrumented rod is directly calculated without the need for an accurate elastic modulus or cross sectional area of the rod section.

The acceleration measurements are often demanding in the SPT environment, because of high frequency and high acceleration motion components. An experienced measurement engineer, therefore, has to evaluate the quality of this data before final conclusions are drawn from the numerical results calculated by SPTA or PDA.

SPTA or PDA records are taken while the standard N-value is acquired in the conventional manner. This then allows a direct correlation between N-value and average transferred energy.

**3.2 HPA**

The SPT hammer's ram velocity may be directly obtained using radar technology in the Hammer Performance Analyzer™. The impact velocity results can be automatically processed with a PC or recorded on a strip chart. HPA measurements yield a hammer kinetic energy, but not the energy transferred to the drive rod.

**4 RECORD EVALUATION BY SPTA OR PDA**

**4.1 HAMMER PERFORMANCE**

The PDA calculates the energy transferred to the pile top from:

$$E(t) = \int_0^t F(\tau)v(\tau) d\tau \quad (2)$$

The maximum of the E(t) curve is often called **ENTHRU** or **EMX**; it is the most important quantity for an overall evaluation of the performance of a hammer and driving system. **EMX** allows for a classification of the hammer's performance when presented as,  $e_r$ , the rated transfer efficiency, also called energy transfer ratio (**ETR**) or global efficiency.

$$e_r = EMX/E_R \quad (3)$$

where  $E_R$  is the hammer manufacturer's rated energy value or 0.35 kip-ft (0.475 kJ) in the case of the SPT hammer.

Often in the SPT literature one finds also reference to the EF2 energy. This evaluation is based on assumed proportionality between force and velocity (see also Section 5):

$$v(t) = F(t) / Z \quad (4)$$

where  $Z = EA/c$  is the pile impedance, E is the elastic modulus, A is the cross sectional area and c is the speed of the stress wave in the pile material.

Combining equations 2 and 4 leads to

$$EF(t) = \int_0^t F(\tau)^2 / Z d\tau \quad (5)$$

The EF2 transferred energy value is the EF-value at the time  $t = 2L/c$ , where L is the drive rod length and c is the stress wave speed in steel (16,800 ft/s or 5,124 m/s). Since the force is easier to measure than both force and velocity, Equation 5 is preferred by some test engineers. However, the EF method is fraught with errors and certain correction factors have to be applied to make it approximately correct. Among the error sources are the following:

- Proportionality is often violated prior to time 2L/c. The proportionality between force and velocity in a downward traveling wave only

A-2

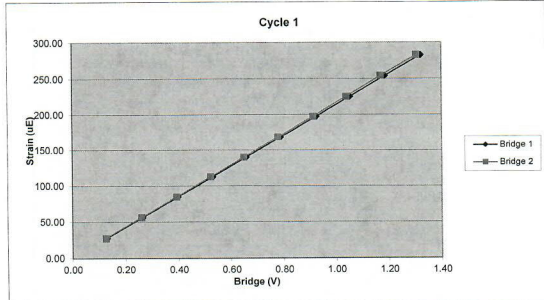
**APPENDIX B**

**Instrumentation Calibration Information**

168AWJ		Cycle 1		
Sample	Force (lb)	Strain ( $\mu\text{E}$ )	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	976.26	27.36	0.13	0.13
3	1995.71	56.24	0.26	0.26
4	3001.77	84.90	0.40	0.39
5	3992.79	112.54	0.53	0.52
6	4990.74	140.11	0.66	0.65
7	5981.14	168.48	0.79	0.78
8	6996.22	197.43	0.92	0.91
9	7967.14	224.99	1.05	1.04
10	8979.04	254.09	1.19	1.17
11	9988.72	282.42	1.32	1.30

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7569.30	Force Calibration (lb/V)	7662.84
Offset	-8.44	Offset	0.96
Correlation	0.999999	Correlation	0.999997
Strain Calibration ( $\mu\text{E/V}$ )	214.26	Strain Calibration ( $\mu\text{E/V}$ )	216.91
Offset	-0.54	Offset	-0.27
Correlation	0.999997	Correlation	0.999994

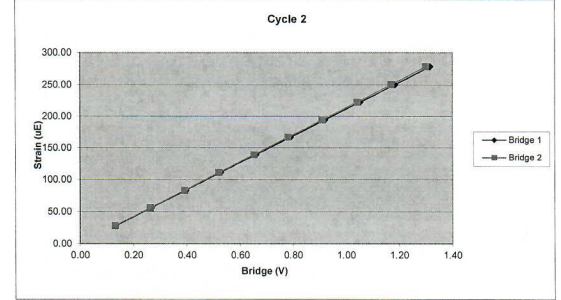
Force Strain Calibration	
EA (Kips)	35327.39
Offset	10.66
Correlation	0.999998



168AWJ		Cycle 2		
Sample	Force (lb)	Strain ( $\mu\text{E}$ )	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	996.29	28.02	0.13	0.13
3	2006.95	55.58	0.27	0.26
4	2990.14	82.94	0.40	0.39
5	3988.83	110.81	0.53	0.52
6	4994.75	138.96	0.66	0.65
7	5984.10	166.64	0.79	0.78
8	6972.67	194.62	0.92	0.91
9	7983.33	222.39	1.05	1.04
10	8975.72	249.98	1.18	1.17
11	9973.67	277.89	1.32	1.30

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7588.06	Force Calibration (lb/V)	7679.83
Offset	-6.95	Offset	-8.81
Correlation	1.000000	Correlation	0.999999
Strain Calibration ( $\mu\text{E/V}$ )	211.55	Strain Calibration ( $\mu\text{E/V}$ )	214.11
Offset	-0.37	Offset	-0.42
Correlation	0.999997	Correlation	0.999997

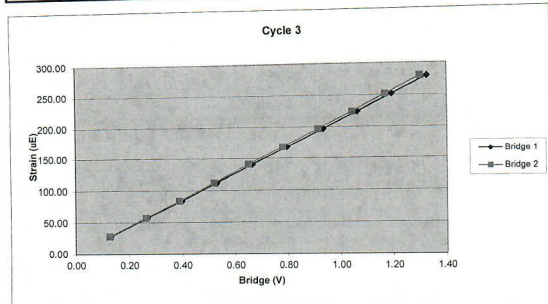
Force Strain Calibration	
EA (Kips)	35868.22
Offset	6.42
Correlation	0.999996



168AWJ		Cycle 3		
Sample	Force (lb)	Strain ( $\mu\text{E}$ )	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	973.72	28.00	0.13	0.13
3	2007.92	57.38	0.27	0.26
4	2965.62	84.01	0.40	0.39
5	3969.04	111.99	0.53	0.52
6	4972.56	140.48	0.67	0.65
7	5978.24	168.25	0.80	0.78
8	6998.57	196.66	0.93	0.91
9	7984.60	224.37	1.06	1.04
10	8950.60	251.78	1.19	1.17
11	9954.13	279.64	1.33	1.30

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7512.33	Force Calibration (lb/V)	7665.50
Offset	-13.13	Offset	-8.89
Correlation	0.999997	Correlation	0.999999
Strain Calibration ( $\mu\text{E/V}$ )	210.37	Strain Calibration ( $\mu\text{E/V}$ )	214.66
Offset	0.58	Offset	0.70
Correlation	0.999997	Correlation	0.999998

Force Strain Calibration	
EA (Kips)	35710.15
Offset	-33.72
Correlation	0.999998



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

Calibration Factors	168AWJ	Bridge 2 ( $\mu\text{E/V}$ )	215.23
Bridge 1 ( $\mu\text{E/V}$ )	212.06	Area (in <sup>2</sup> )	1.19
EA Factor (Kips)	35635.25		

Calibrated by: *David Bennett*  
Calibrated Date: 12/6/2019

Pile Dynamics Inc  
30725 Aurora Rd  
Solon, OH 44139

Traceable to N.I.S.T.

# Accelerometer Calibration Certificate

## Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 25Apr2020

Serial No: K2081      Temperature: 22.0 °C  
Model: PR      Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

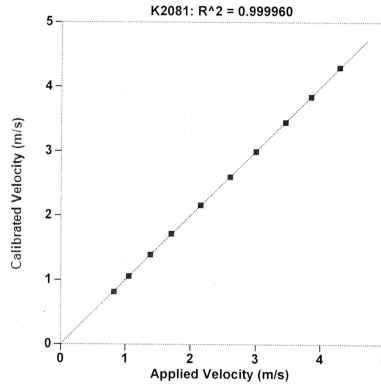
**PDA CALIBRATION FACTOR**  
**356.9 mv/5000g**  
(71.4 μv/g)  
R<sup>2</sup>: 0.999960 [Chip programmed]

Operator: William

*William*  
Signed

Ref Acc 1: 65538!      Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648!      Cal on: 27Jan2020  
984 g's/volt

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



Reference Velocity	S/N K2081 Velocity
m/s	m/s
0.825	0.817
1.055	1.057
1.383	1.386
1.705	1.717
2.153	2.161
2.605	2.600
3.001	2.995
3.457	3.448
3.848	3.844
4.291	4.300

Maximum Acceleration: 925 g's

Date printed: 25Apr2020, version: 2020.30.170.0.11

SPT Rod Calibration

English	SI
EA Product	35.635.25 kips
Rod Serial #:	30100
Calibration Factor (mm/V):	1.19 in/V
Calibration Date:	2017-07-06
Calibration Due:	6-Dec-19

Made in USA

SPT Rod Calibration

English	SI
EA Product	35.635.25 kips
Rod Serial #:	30100
Calibration Factor (mm/V):	1.19 in/V
Calibration Date:	2017-07-06
Calibration Due:	6-Dec-19

Made in USA

Print to fit and it looks okay!

168 AWJ-1  
168 AWJ-2

35635.25  
212.06  
215.23  
6-Dec-19

Bridge 1	168 AWJ-1
Bridge 2	168 AWJ-2
EA Factor	35635.25
Calibration 1	212.06
Calibration 2	215.23
Date Cal	6-Dec-19

168 AWJ	Number
1	1
2	1

# Accelerometer Calibration Certificate

## Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 25Apr2020

Serial No: K2082      Temperature: 22.0 °C  
Model: PR      Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

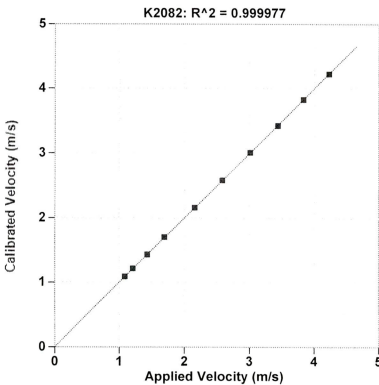
**PDA CALIBRATION FACTOR**  
**328.0 mv/5000g**  
(65.6 μv/g)  
R<sup>2</sup>: 0.999977 [Chip programmed]

Operator: William

*William*  
Signed

Ref Acc 1: 65538!      Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648!      Cal on: 27Jan2020  
984 g's/volt

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



Reference Velocity	S/N K2082 Velocity
m/s	m/s
1.087	1.090
1.211	1.214
1.431	1.431
1.692	1.701
2.158	2.162
2.577	2.584
3.008	3.011
3.435	3.430
3.832	3.829
4.230	4.223

Maximum Acceleration: 909 g's

Date printed: 25Apr2020, version: 2020.30.170.0.72

This documents that  
**Mark Rawlings**  
**GRL Engineers, Inc.**  
has on January 26, 2017 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](http://www.PDAProficiencytest.com).

Steven A. Hall, Executive Director  
Pile Driving Contractors Association

Garland Likins, Senior Partner  
Pile Dynamics, Inc.

No. 2181





This documents that  
**Scott Webster**  
**GRL Engineers, Inc.**



has on February 6, 2015 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 five 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](http://www.PDAproficiencytest.com).

*Steven A. Hall*  
Steven A. Hall, Executive Director  
Pile Driving Contractors Association

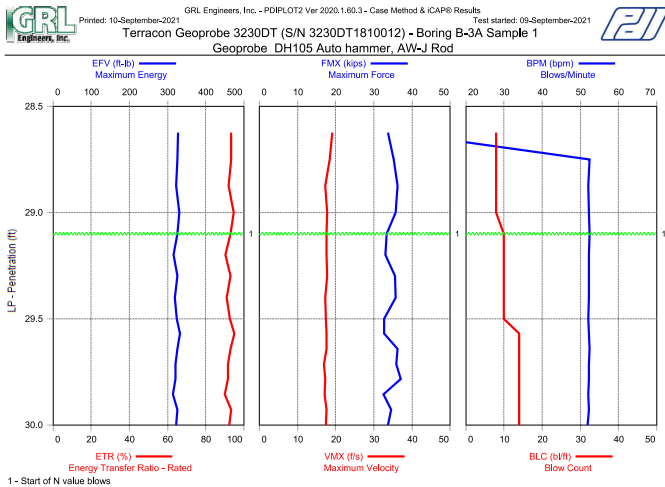


*Gailand Likins*  
Gailand Likins, President  
Pile Dynamics, Inc.

No. 821

**APPENDIX C**

**Dynamic Energy Measurement Results**



GRL Engineers, Inc. Page 1  
PDILOT2 2020.1.60.3 Printed 10-September-2021  
Case Method & iCAP® Results  
Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 1 Geoprobe DH105 Auto hammer, AW-J Rod  
OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 klf<sup>2</sup>  
LE: 34.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s IC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
FMX: Maximum Force CSX: Compression Stress Maximum  
VMX: Maximum Velocity AMX: Maximum Acceleration  
BPM: Blows/Minute

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g/s
5	29.10	10	326	93	33	18	52.4	1.7	1.2	28.0	3,772
6	29.20	10	316	90	33	18	52.3	1.7	1.2	27.8	3,842
7	29.30	10	326	93	35	18	52.2	1.6	1.2	29.8	4,099
8	29.40	10	319	91	36	17	52.3	1.5	1.2	29.9	3,947
9	29.50	10	325	93	33	17	52.1	1.6	1.2	27.4	3,938
10	29.57	14	333	95	33	18	52.2	1.6	0.9	27.5	4,112
11	29.64	14	325	93	36	18	52.4	1.4	0.9	30.5	4,316
12	29.71	14	321	92	36	17	52.2	1.2	0.9	30.1	4,146
13	29.79	14	321	92	37	17	52.2	1.1	0.9	31.1	4,226
14	29.86	14	315	90	32	17	52.1	1.2	0.9	27.3	3,840
15	29.93	14	326	93	34	18	52.3	1.0	0.9	29.0	3,897
16	30.00	14	323	92	34	17	51.9	1.2	0.9	28.3	4,043
Average		323	92	34	17	52.2	1.4	1.0	28.9	4,015	
Std. Dev.		5	1	2	0	0.1	0.2	0.2	1.3	162	
Maximum		333	95	37	18	52.4	1.7	1.2	31.1	4,316	
Minimum		315	90	32	17	51.9	1.0	0.9	27.3	3,772	
Total number of blows analyzed: 12											

BL# Sensors  
1-16 F3: [168AWJ1] 212,1 (1.00); F4: [168AWJ2] 215,2 (1.00); A1: [K2081] 356,9 (1.00); A2: [K2082] 328,0 (1.00)

BL# Comments  
5 Start of N value blows

Time Summary  
Drive 17 seconds 10:27 AM - 10:27 AM BN 1 - 16

GRL Engineers, Inc. Page 1  
 PDIPLOT2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 1 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/ft<sup>2</sup>  
 LE: 34.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s IC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration  
 BPM: Blows/Minute

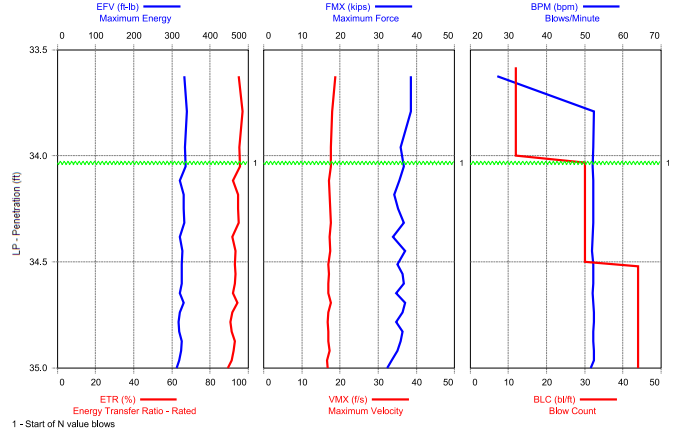
BL#	Depth ft	BLC bl/ft	TYPE	EFV ft-lb	ETR (%)	FMX kips	VMX f/s	BPM bpm	DMX in	DFN in	CSX ksi	AMX g's
4	29.00	8	AV4	327	93	35	18	39.7	2.0	1.5	29.6	3,900
			STD	3	1	1	21.8	0.4	0.0	0.8	3.10	
			MAX	331	95	36	19	52.4	2.6	1.5	30.4	4,228
			MIN	322	92	34	17	1.9	1.7	27.4	3,391	
9	29.50	10	AV5	322	92	34	18	52.3	1.6	1.2	28.6	3,919
			STD	4	1	0	0.1	0.0	0.0	1.1	110	
			MAX	326	93	36	18	52.4	1.7	1.2	29.9	4,099
			MIN	316	90	33	17	52.1	1.5	1.2	27.4	3,772
16	30.00	14	AV7	324	92	35	17	52.2	1.2	0.9	29.1	4,083
			STD	5	1	2	0	0.2	0.0	0.0	1.4	158
			MAX	333	95	37	18	52.4	1.6	0.9	31.1	4,316
			MIN	315	90	32	17	51.9	1.0	0.9	27.3	3,840
			Average	324	93	35	18	49.1	1.5	1.1	29.1	3,986
			Std. Dev.	5	1	1	12.2	0.4	0.3	1.2	215	
			Maximum	333	95	37	19	52.4	2.6	1.5	31.1	4,316
			Minimum	315	90	32	17	51.9	1.0	0.9	27.3	3,391

Total number of blows analyzed: 16

BL# Sensors  
 1-16 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

BL# Comments  
 5 Start of N value blows

Time Summary  
 Drive 17 seconds 10:27 AM - 10:27 AM BN 1 - 16



GRL Engineers, Inc. Page 1  
 PDIPLOT2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 2 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/ft<sup>2</sup>  
 LE: 34.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s IC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration  
 BPM: Blows/Minute

BL#	Depth ft	BLC bl/ft	EFV ft-lb	ETR (%)	FMX kips	VMX f/s	BPM bpm	DMX in	DFN in	CSX ksi	AMX g's	
7	34.03	30	339	97	38	18	52.3	1.1	0.4	32.3	4,392	
8	34.07	30	331	95	35	17	51.9	0.9	0.4	29.4	3,944	
9	34.10	30	322	92	36	17	52.7	0.7	0.4	30.0	4,026	
10	34.13	30	321	92	35	17	51.9	0.7	0.4	29.8	4,022	
11	34.17	30	338	96	34	17	52.4	1.0	0.4	28.3	3,565	
12	34.20	30	326	93	35	17	52.1	0.8	0.4	29.1	3,916	
13	34.23	30	330	94	33	17	52.2	0.8	0.4	27.6	3,788	
14	34.27	30	333	95	38	18	52.2	0.7	0.4	31.6	4,448	
15	34.30	30	334	95	36	18	52.2	0.7	0.4	30.7	4,409	
16	34.33	30	332	95	37	18	52.2	0.5	0.4	30.9	4,452	
17	34.37	30	321	92	33	17	52.2	0.5	0.4	27.4	4,097	
18	34.40	30	322	92	35	17	52.1	0.5	0.4	29.5	4,240	
19	34.43	30	320	91	35	17	52.1	0.6	0.4	29.5	4,149	
20	34.47	30	335	96	39	18	51.9	0.6	0.4	32.9	4,557	
21	34.50	30	323	92	38	17	52.3	0.5	0.4	32.1	4,232	
22	34.52	44	329	94	32	17	52.2	0.5	0.3	26.7	3,656	
23	34.55	44	317	91	34	17	52.3	0.5	0.3	28.9	3,674	
24	34.57	44	336	96	39	17	52.2	0.6	0.3	32.4	4,421	
25	34.59	44	329	94	37	17	52.1	0.7	0.3	31.0	4,171	
26	34.61	44	323	92	36	17	52.2	0.5	0.3	30.6	4,290	
27	34.64	44	323	92	35	17	51.9	0.6	0.3	29.3	4,067	
28	34.66	44	321	92	35	17	52.4	0.5	0.3	29.0	3,938	
29	34.68	44	326	93	36	17	52.4	0.4	0.3	30.1	4,160	
30	34.70	44	335	96	38	18	52.1	0.5	0.3	32.1	4,425	
31	34.73	44	316	90	35	17	52.7	0.4	0.3	29.6	4,064	
32	34.75	44	325	93	38	17	52.2	0.5	0.3	31.7	4,185	
33	34.77	44	321	92	37	17	52.4	0.4	0.3	31.4	4,370	
34	34.80	44	313	89	32	16	52.3	0.4	0.3	27.0	3,801	
35	34.82	44	321	92	37	17	52.5	0.5	0.3	31.1	4,074	
36	34.84	44	318	91	36	17	52.0	0.4	0.3	30.1	4,126	
37	34.86	44	333	95	38	17	52.5	0.5	0.3	31.5	4,276	
38	34.89	44	318	91	34	16	52.0	0.4	0.3	28.6	4,022	
39	34.91	44	323	92	37	17	52.2	0.4	0.3	31.5	4,289	
40	34.93	44	325	93	33	17	52.5	0.5	0.3	27.4	4,050	
41	34.95	44	324	93	35	17	52.4	0.5	0.3	29.5	4,171	
42	34.98	44	315	90	32	16	52.3	0.4	0.3	26.9	3,667	
43	35.00	44	313	89	32	17	51.6	0.6	0.3	27.2	3,726	
			Average	325	93	36	17	52.2	0.6	0.3	29.9	4,104
			Std. Dev.	7	2	2	0	0.2	0.2	0.1	1.7	253
			Maximum	339	97	39	18	52.7	1.1	0.4	32.9	4,557
			Minimum	313	89	32	16	51.6	0.4	0.3	26.7	3,565

Total number of blows analyzed: 37

BL# Sensors  
 1-43 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

BL# Comments  
 7 Start of N value blows

GRL Engineers, Inc. Page 2  
 PDIPLOT2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 2 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

Time Summary  
 Drive 48 seconds 10:39 AM - 10:39 AM BN 1 - 43



GRL Engineers, Inc. Page 1  
 PDIPL0T2 2020.1,60,3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 2 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/m<sup>2</sup>  
 LE: 44.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s IC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration  
 BPM: Blows/Minute

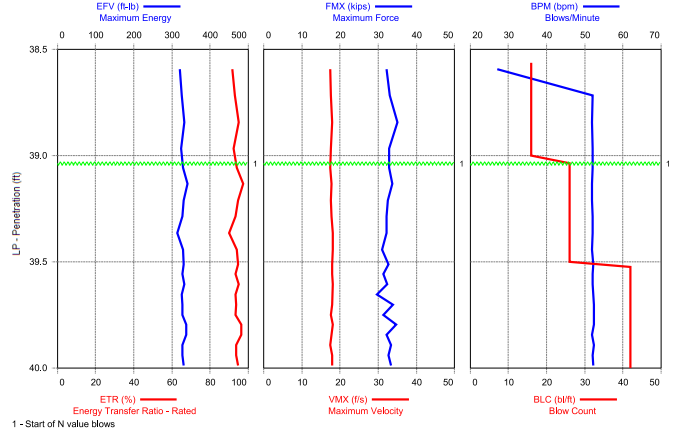
BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
6	34.00	12	AV6	335	96	38	18	43.9	1.4	1.0	31.6	4.261
			STD	6	2	1	1	16.8	0.3	0.0	7.3	289
			MAX	349	100	40	19	52.3	1.6	1.0	33.4	4.708
			MIN	330	94	35	17	1.9	1.0	29.7	3.829	
21	34.50	30	AV15	328	94	36	17	52.2	0.7	0.4	30.1	4.149
			STD	6	2	2	0	0.2	0.2	0.0	1.6	270
			MAX	339	97	39	18	52.7	1.1	0.4	32.9	4.557
			MIN	320	91	33	17	51.9	0.5	0.4	27.4	3.565
43	35.00	44	AV22	323	92	35	17	52.2	0.5	0.3	29.7	4.074
			STD	7	2	2	0	0.2	0.1	0.0	1.8	236
			MAX	336	96	39	18	52.7	0.7	0.3	32.4	4.425
			MIN	313	89	32	16	51.6	0.4	0.3	26.7	3.656
			Average	327	93	36	17	51.0	0.7	0.4	30.1	4.126
			Std. Dev.	8	2	2	1	7.6	0.3	0.2	1.8	264
			Maximum	349	100	40	19	52.7	1.6	1.0	33.4	4.708
			Minimum	313	89	32	16	51.9	0.4	0.3	26.7	3.565

Total number of blows analyzed: 43

BL# Sensors  
 1-43 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

BL# Comments  
 7 Start of N value blows

Time Summary  
 Drive 48 seconds 10:39 AM - 10:39 AM BN 1 - 43



GRL Engineers, Inc. Page 1  
 PDIPL0T2 2020.1,60,3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 3 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/m<sup>2</sup>  
 LE: 44.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s IC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration  
 BPM: Blows/Minute

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
9	39.04	26	327	93	33	17	52.0	0.8	0.5	27.6	4.033	
10	39.08	26	331	95	33	18	52.0	0.8	0.5	27.6	3.915	
11	39.12	26	342	98	32	18	51.9	1.0	0.5	26.6	3.770	
12	39.15	26	339	97	36	18	52.0	0.7	0.5	29.9	4.085	
13	39.19	26	340	97	32	18	51.9	1.0	0.5	27.2	3.782	
14	39.23	26	323	92	33	17	52.0	0.8	0.5	27.5	3.966	
15	39.27	26	326	93	31	18	52.0	0.9	0.5	26.2	4.064	
16	39.31	26	328	94	33	18	52.0	0.6	0.5	27.8	4.302	
17	39.35	26	310	89	33	18	52.0	0.5	0.4	28.0	4.267	
18	39.38	26	320	92	31	19	52.0	0.5	0.5	26.1	3.907	
19	39.42	26	326	93	28	18	52.4	0.7	0.5	23.8	3.876	
20	39.46	26	332	95	34	18	51.5	0.6	0.5	28.3	4.123	
21	39.50	26	331	95	32	18	52.3	0.6	0.5	26.7	3.849	
22	39.52	42	331	95	34	18	52.2	0.6	0.3	28.2	4.113	
23	39.55	42	335	96	33	18	51.9	0.6	0.3	27.5	3.991	
24	39.57	42	318	91	30	18	52.2	0.4	0.3	25.0	3.720	
25	39.60	42	331	94	32	18	52.2	0.6	0.3	27.0	3.995	
26	39.62	42	334	95	32	18	51.9	0.6	0.3	27.3	3.951	
27	39.64	42	324	93	27	18	52.2	0.6	0.3	23.0	3.572	
28	39.67	42	330	94	32	18	52.2	0.6	0.3	26.9	3.915	
29	39.69	42	328	94	33	18	52.2	0.7	0.3	27.7	4.008	
30	39.71	42	328	94	35	18	52.5	0.6	0.3	29.3	4.096	
31	39.74	42	325	93	30	18	52.4	0.5	0.3	25.6	3.807	
32	39.76	42	330	94	32	18	52.5	0.7	0.3	27.2	3.951	
33	39.79	42	341	97	35	18	52.5	0.6	0.3	29.6	4.230	
34	39.81	42	335	96	34	18	52.2	0.8	0.3	28.7	4.143	
35	39.83	42	329	94	32	18	51.7	0.8	0.3	26.8	3.844	
36	39.86	42	346	99	32	17	52.2	0.7	0.3	27.3	3.873	
37	39.88	42	329	94	31	18	52.3	0.7	0.3	26.1	3.660	
38	39.90	42	327	93	36	17	52.4	0.7	0.3	29.9	3.795	
39	39.93	42	334	96	35	18	52.3	0.8	0.3	29.4	3.877	
40	39.95	42	322	92	30	18	51.7	0.6	0.3	25.5	3.667	
41	39.98	42	329	94	31	18	52.3	0.7	0.3	26.1	3.671	
42	40.00	42	333	95	36	19	52.1	0.7	0.3	30.1	3.916	
			Average	330	94	32	18	52.1	0.7	0.4	27.3	3.931
			Std. Dev.	7	2	2	0	0.2	0.1	1.6	176	
			Maximum	346	99	36	19	52.6	1.0	0.5	30.1	4.302
			Minimum	310	89	27	17	51.5	0.4	0.3	23.0	3.572

Total number of blows analyzed: 34

BL# Sensors  
 1-42 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

BL# Comments  
 9 Start of N value blows

GRL Engineers, Inc. Page 2  
 PDIPL0T2 2020.1,60,3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 3 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

Time Summary  
 Drive 47 seconds 10:51 AM - 10:52 AM BN 1 - 42

GRL Engineers, Inc. Page 1  
 PDIPL0T2 2020,1,60,3 Printed 10-September-2021

Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 3 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/m<sup>2</sup>  
 LE: 44.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s JC: 0.00

Case Method & iCAP® Results

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
8	39.00	16	AV8	326	93	33	18	45.8	0.9	0.7	28.0	3,984
			STD	7	2	2	0	16.6	0.2	0.0	1.6	314
			MAX	337	96	38	18	52.1	1.6	0.8	31.7	4,670
			MIN	315	90	31	17	1.9	0.8	0.7	26.4	3,529
21	39.50	26	AV13	329	94	32	18	52.2	0.7	0.5	27.2	3,988
			STD	8	2	2	0	0.2	0.1	0.0	1.4	169
			MAX	342	98	36	19	52.4	1.0	0.5	29.9	4,302
			MIN	310	89	28	17	51.5	0.5	0.4	23.8	3,770
42	40.00	42	AV21	330	94	33	18	52.2	0.7	0.3	27.3	3,895
			STD	6	2	2	0	0.2	0.1	0.0	1.8	171
			MAX	346	99	36	18	52.6	0.8	0.3	30.1	4,230
			MIN	318	91	27	17	51.7	0.4	0.3	23.0	3,572
			Average	329	94	33	18	50.9	0.7	0.4	27.4	3,941
			Std. Dev.	7	2	2	0	7.7	0.2	0.2	1.6	211
			Maximum	346	99	36	19	52.6	1.6	0.8	31.7	4,670
			Minimum	310	89	27	17	1.9	0.4	0.3	23.0	3,529

DMX: Maximum Displacement  
 DFN: Final Displacement  
 CSX: Compression Stress Maximum  
 AMX: Maximum Acceleration

Total number of blows analyzed: 42

BL# Sensors  
 1-42 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

BL# Comments  
 9 Start of N value blows

Time Summary  
 Drive 47 seconds 10:51 AM - 10:52 AM BN 1 - 42

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 PDIPL0T2 2020,1,60,3 Printed 10-September-2021

Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 4 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kN/m<sup>2</sup>  
 LE: 49.00 ft EM: 30,000 ksi  
 WS: 16,807.9 f/s JC: 0.00

Case Method & iCAP® Results

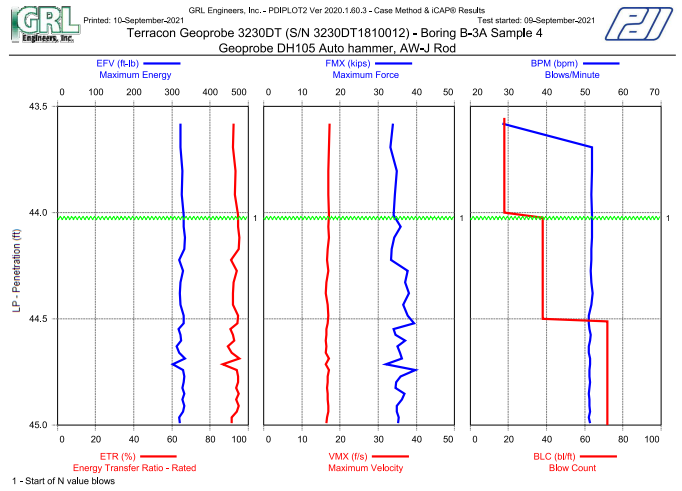
BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's
10	44.03	38	329	94	35	17	51.8	0.6	0.3	29.5	3,581
11	44.05	38	328	94	35	17	51.8	0.6	0.3	29.8	3,774
12	44.08	38	334	95	36	17	51.9	0.8	0.3	30.5	3,842
13	44.11	38	343	98	34	17	51.8	0.8	0.3	28.7	3,529
14	44.13	38	326	93	34	17	51.9	0.6	0.3	28.7	3,632
15	44.16	38	341	97	33	16	51.7	0.9	0.3	27.5	3,565
16	44.18	38	325	93	34	17	51.7	0.6	0.3	28.8	3,561
17	44.21	38	319	91	34	17	51.6	0.5	0.3	28.6	3,624
18	44.24	38	319	91	32	17	51.7	0.6	0.3	27.3	3,772
19	44.26	38	340	97	40	17	51.7	0.6	0.3	33.7	4,161
20	44.29	38	318	91	36	17	51.5	0.5	0.3	29.9	3,748
21	44.32	38	319	91	36	16	51.6	0.5	0.3	29.9	3,657
22	44.34	38	327	93	38	16	51.9	0.6	0.3	32.3	3,649
23	44.37	38	322	92	39	16	52.2	0.4	0.3	32.5	3,721
24	44.39	38	321	92	37	16	51.8	0.5	0.3	31.4	3,654
25	44.42	38	327	93	38	17	52.1	0.4	0.3	31.8	3,875
26	44.45	38	317	91	35	17	51.5	0.4	0.3	29.6	3,632
27	44.47	38	334	95	39	17	50.8	0.5	0.3	32.9	3,915
28	44.50	38	328	94	36	17	51.2	0.6	0.3	30.6	3,648
29	44.51	72	335	96	40	17	51.0	0.4	0.2	33.3	3,931
30	44.53	72	328	93	39	16	51.2	0.4	0.2	33.0	3,800
31	44.54	72	321	92	32	17	51.2	0.4	0.2	26.8	3,527
32	44.56	72	313	90	36	16	51.2	0.3	0.2	30.4	3,869
33	44.57	72	314	90	31	16	51.7	0.5	0.2	26.4	3,594
34	44.58	72	330	94	38	17	51.5	0.4	0.2	31.6	3,883
35	44.60	72	322	92	36	16	51.4	0.5	0.2	30.6	3,642
36	44.61	72	327	93	38	16	51.2	0.9	0.2	31.7	3,676
37	44.63	72	314	90	35	16	51.2	0.3	0.2	29.8	3,804
38	44.64	72	313	89	35	16	50.9	0.3	0.2	29.1	3,546
39	44.65	72	328	94	40	16	50.8	0.3	0.2	33.7	3,945
40	44.67	72	311	89	31	16	51.4	0.3	0.2	26.3	3,443
41	44.68	72	329	94	36	17	51.4	0.7	0.2	30.5	3,815
42	44.69	72	339	97	36	17	51.3	0.5	0.2	30.2	3,691
43	44.71	72	309	88	36	16	51.5	0.3	0.2	30.3	3,636
44	44.72	72	297	85	28	16	51.4	0.3	0.2	23.4	3,323
45	44.74	72	325	93	40	16	51.2	0.3	0.2	33.5	3,877
46	44.75	72	333	95	40	18	51.4	0.3	0.2	33.2	4,133
47	44.76	72	330	94	38	17	51.3	0.5	0.2	32.0	3,890
48	44.78	72	333	95	34	17	51.2	0.5	0.2	28.3	3,489
49	44.79	72	328	94	37	17	51.3	0.4	0.2	31.1	3,697
50	44.81	72	334	96	32	17	51.4	0.5	0.2	27.2	3,631
51	44.82	72	335	96	39	17	51.1	0.4	0.2	33.0	3,900
52	44.83	72	320	91	30	16	51.4	0.3	0.2	25.1	3,601
53	44.85	72	340	97	37	17	51.0	0.5	0.2	31.0	3,832
54	44.86	72	326	93	37	16	51.3	0.7	0.2	31.0	3,747
55	44.88	72	325	93	38	17	51.0	0.4	0.2	31.6	3,744
56	44.89	72	330	94	35	17	51.4	0.4	0.2	29.2	3,671
57	44.90	72	330	94	35	17	51.2	0.4	0.2	29.7	3,557
58	44.92	72	337	96	34	17	51.2	0.5	0.2	28.8	3,549
59	44.93	72	329	94	34	17	51.3	0.4	0.2	28.6	3,290
60	44.94	72	330	94	36	17	51.5	0.3	0.2	29.9	3,559
61	44.96	72	316	90	34	17	51.0	0.3	0.2	28.6	3,376
62	44.97	72	325	93	37	16	51.2	0.3	0.2	30.8	3,485
63	44.99	72	317	91	35	16	51.5	0.3	0.2	29.5	3,464

DMX: Maximum Displacement  
 DFN: Final Displacement  
 CSX: Compression Stress Maximum  
 AMX: Maximum Acceleration

Total number of blows analyzed: 55

BL# Sensors  
 1-64 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

Time Summary  
 Drive 1 minute 13 seconds 11:04 AM - 11:05 AM BN 1 - 64



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 PDIPL0T2 2020,1,60,3 Printed 10-September-2021

Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 4 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
64	45.00	72	323	92	35	17	51.2	0.4	0.2	31.2	3,593	
			Average	326	93	36	17	51.4	0.5	0.2	30.0	3,685
			Std. Dev.	9	3	3	0	0.3	0.1	2.2	175	
			Maximum	343	98	40	18	52.2	0.9	0.3	33.7	4,161
			Minimum	297	85	28	16	50.8	0.3	0.2	23.4	3,290

DMX: Maximum Displacement  
 DFN: Final Displacement  
 CSX: Compression Stress Maximum  
 AMX: Maximum Acceleration

Total number of blows analyzed: 55

BL# Sensors  
 1-64 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

Time Summary  
 Drive 1 minute 13 seconds 11:04 AM - 11:05 AM BN 1 - 64

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 PDIPL0T2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 4 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kWh<sup>2</sup>  
 LE: 49.00 ft EM: 30,000 ksi  
 WS: 16.807 g/s JC: 0.00

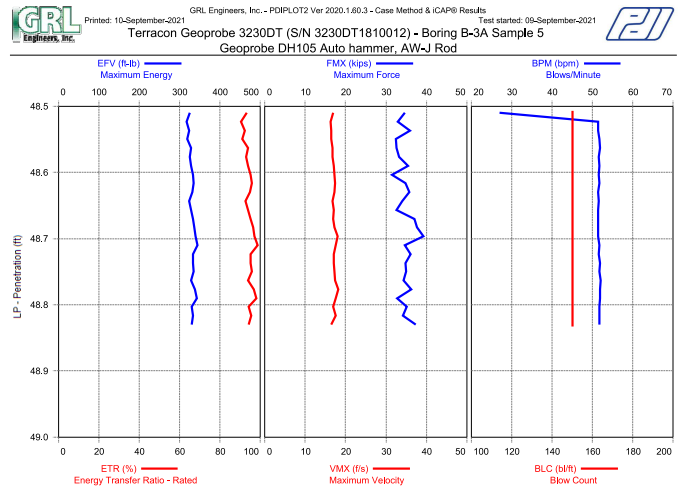
EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
9	44.00	18	AV9	325	93	34	17	46.6	1.0	0.7	28.5	3,610
			STD	6	2	1	0	14.8	0.3	0.0	1.2	170
			MAX	335	96	37	17	52.1	1.7	0.7	30.8	3,919
			MIN	316	90	32	17	4.7	0.7	0.7	26.8	3,390
28	44.50	38	AV19	327	93	36	17	51.3	0.6	0.3	30.2	3,713
			STD	8	2	2	0	0.3	0.1	0.0	1.8	150
			MAX	343	98	40	17	52.2	0.9	0.3	33.7	4,161
			MIN	317	91	32	16	50.8	0.4	0.3	27.3	3,529
64	45.00	72	AV36	325	93	36	17	51.3	0.4	0.2	30.0	3,670
			STD	9	3	3	0	0.2	0.1	0.0	2.4	186
			MAX	340	97	40	18	51.7	0.9	0.2	33.7	4,133
			MIN	297	85	28	16	50.8	0.3	0.2	23.4	3,290
			Average	326	93	36	17	50.7	0.5	0.3	29.8	3,674
			Std. Dev.	9	2	3	0	5.8	0.2	0.2	2.1	177
			Maximum	343	98	40	18	52.2	1.7	0.7	33.7	4,161
			Minimum	297	85	28	16	4.7	0.3	0.2	23.4	3,290

Total number of blows analyzed: 64

BL# Sensors  
 1-64 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

Time Summary  
 Drive 1 minute 13 seconds 11:04 AM - 11:05 AM BN 1 - 64



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 PDIPL0T2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 5 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kWh<sup>2</sup>  
 LE: 54.00 ft EM: 30,000 ksi  
 WS: 16.807 g/s JC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration

BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX	
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's	
1	48.51	150	325	93	34	17	1.9	1.1	0.1	28.5	3,506	
2	48.51	150	327	93	35	17	52.0	0.4	0.1	29.7	3,761	
3	48.52	150	313	89	34	16	51.4	0.4	0.1	28.2	3,488	
4	48.53	150	320	92	32	16	51.3	0.4	0.1	27.0	3,260	
5	48.53	150	318	91	33	16	51.5	0.3	0.1	27.9	3,351	
6	48.54	150	328	94	39	17	51.3	0.3	0.1	32.6	3,746	
7	48.55	150	317	90	32	16	51.7	0.3	0.1	27.3	3,393	
8	48.55	150	320	92	32	16	51.7	0.3	0.1	27.2	3,344	
9	48.56	150	322	92	32	17	51.9	0.3	0.1	27.3	3,391	
10	48.57	150	336	96	33	17	51.8	0.4	0.1	27.6	3,617	
11	48.57	150	322	92	33	17	51.8	0.3	0.1	27.5	3,375	
12	48.58	150	327	94	34	17	51.4	0.3	0.1	28.3	3,510	
13	48.59	150	325	93	36	17	51.7	0.3	0.1	30.3	3,683	
14	48.59	150	332	95	35	17	51.7	0.4	0.1	29.4	3,636	
15	48.60	150	345	98	33	18	51.5	0.7	0.1	27.9	3,695	
16	48.61	150	323	92	30	17	51.5	0.5	0.1	24.9	3,118	
17	48.61	150	338	97	32	18	51.5	0.6	0.1	27.3	3,662	
18	48.62	150	332	95	37	17	51.8	0.3	0.1	31.3	4,011	
19	48.63	150	334	95	38	18	51.2	0.3	0.1	31.6	4,112	
20	48.63	150	330	94	34	17	51.6	0.4	0.1	28.4	3,672	
21	48.64	150	319	91	31	17	51.5	0.4	0.1	26.0	3,208	
22	48.65	150	329	94	37	17	51.6	0.3	0.1	31.2	3,805	
23	48.65	150	331	95	32	17	51.3	0.4	0.1	26.8	3,487	
24	48.66	150	325	93	33	17	51.6	0.3	0.1	28.1	3,614	
25	48.67	150	332	95	36	17	51.4	0.4	0.1	29.9	3,559	
26	48.67	150	335	96	38	17	51.3	0.3	0.1	32.3	3,929	
27	48.68	150	337	96	35	17	51.5	0.5	0.1	29.4	3,654	
28	48.69	150	338	96	30	17	51.3	0.3	0.1	34.0	4,064	
29	48.69	150	344	98	40	18	51.3	0.3	0.1	33.3	4,384	
30	48.70	150	336	96	39	18	51.5	0.3	0.1	32.8	4,105	
31	48.71	150	346	99	36	18	51.7	0.5	0.1	30.0	3,852	
32	48.71	150	344	98	34	18	51.6	0.4	0.1	28.4	3,814	
33	48.72	150	332	95	37	17	51.7	0.3	0.1	31.0	3,677	
34	48.73	150	335	96	35	17	51.5	0.3	0.1	29.6	3,528	
35	48.73	150	335	96	36	17	51.8	0.3	0.1	30.2	3,637	
36	48.74	150	332	95	34	17	51.8	0.4	0.1	28.3	3,541	
37	48.75	150	332	95	37	17	51.8	0.3	0.1	30.9	3,749	
38	48.75	150	338	97	33	17	51.7	0.3	0.1	28.0	3,606	
39	48.76	150	327	94	37	18	51.9	0.3	0.1	31.1	4,013	
40	48.77	150	331	95	32	17	52.1	0.7	0.1	26.5	3,358	
41	48.77	150	341	97	33	18	51.8	0.4	0.1	27.8	3,569	
42	48.78	150	337	96	39	18	51.8	0.3	0.1	33.1	4,444	
43	48.79	150	340	97	33	17	51.8	0.6	0.1	27.8	3,628	
44	48.79	150	346	99	32	18	51.9	0.9	0.1	27.2	3,590	
45	48.80	150	326	93	36	17	51.9	0.3	0.1	29.9	3,805	
46	48.81	150	334	95	35	17	51.6	0.5	0.1	29.1	3,660	
47	48.81	150	342	98	35	18	51.6	0.7	0.1	29.1	3,768	
48	48.82	150	328	93	34	17	51.7	0.3	0.1	28.3	3,615	
49	48.83	150	337	96	37	17	51.7	0.4	0.1	31.2	3,750	
50	48.83	150	322	92	38	16	51.6	0.3	0.1	31.6	3,607	
			Average	331	95	35	17	50.6	0.4	0.1	29.3	3,667
			Std. Dev.	8	2	2	0	7.0	0.2	0.0	2.1	265
			Maximum	346	99	40	18	52.1	1.1	0.1	34.0	4,444
			Minimum	313	89	30	16	1.9	0.3	0.1	24.9	3,118

Total number of blows analyzed: 50

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 PDIPL0T2 2020.1,60.3 Printed 10-September-2021

Case Method & iCAP® Results  
 Terracon Geoprobe 3230DT (S/N 3230DT1810012) - Boring B-3A Sample 5 Geoprobe DH105 Auto hammer, AW-J Rod  
 OP: MR Date: 09-September-2021

AR: 1.19 in<sup>2</sup> SP: 0.492 kWh<sup>2</sup>  
 LE: 54.00 ft EM: 30,000 ksi  
 WS: 16.807 g/s JC: 0.00

EFV: Maximum Energy DMX: Maximum Displacement  
 ETR: Energy Transfer Ratio - Rated DFN: Final Displacement  
 FMX: Maximum Force CSX: Compression Stress Maximum  
 VMX: Maximum Velocity AMX: Maximum Acceleration

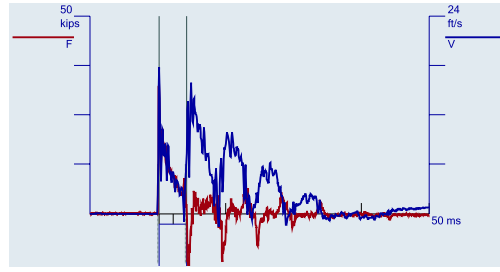
BL#	Depth	BLC	EFV	ETR	FMX	VMX	BPM	DMX	DFN	CSX	AMX
	ft	bl/ft	ft-lb	(%)	kips	f/s	bpm	in	in	ksi	g's

BL# Sensors  
 1-50 F3: [168AWJ1] 212.1 (1.00); F4: [168AWJ2] 215.2 (1.00); A1: [K2081] 356.9 (1.00); A2: [K2082] 328.0 (1.00)

Time Summary  
 Drive 56 seconds 11:19 AM - 11:20 AM BN 1 - 50

APPENDIX D

Force and Velocity Plots

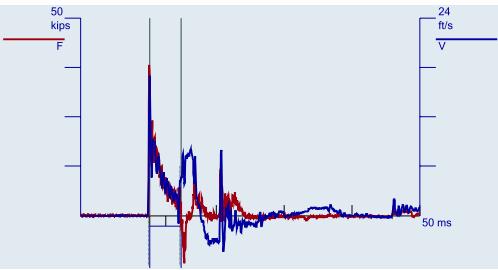


BN 9  
 09Sep2021 10:27:12 AM

EFV	325 ft-lb
ETR	93 %
BPM	52.1 bpm
VMX	17 ft/s
FMX	33 kips
DFN	1.2 in
AMX	3938 g/s
FVP	0.8
CSX	27.4 ksi
LE	34.00 ft
AR	1.19 in <sup>2</sup>
EM	30000 ksi
SP	0.492 k/ft <sup>3</sup>
WS	16807.9 ft/s
WC	16748.8 ft/s
JC	0.50
JF	1.00

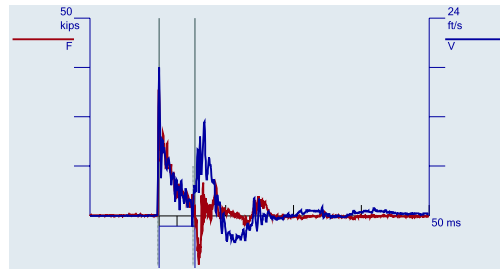
A1 (PR): [K2081]	356,944 mv/6.4v/5000g (1) VF1
A2 (PR): [K2082]	327,962 mv/6.4v/5000g (1) VF1
F3: [168AWJ1]	212.06 PDICAL (1) FF1
F4: [168AWJ2]	215.23 PDICAL (1) FF1



BN 21  
 09Sep2021 10:39:26 AM

EFV	323 ft-lb
ETR	92 %
BPM	52.3 bpm
VMX	17 ft/s
FMX	38 kips
DFN	0.4 in
AMX	4232 g/s
FVP	0.8
CSX	32.1 ksi
LE	39.00 ft
AR	1.19 in <sup>2</sup>
EM	30000 ksi
SP	0.492 k/ft <sup>3</sup>
WS	16807.9 ft/s
WC	16738.2 ft/s
JC	0.50
JF	1.00

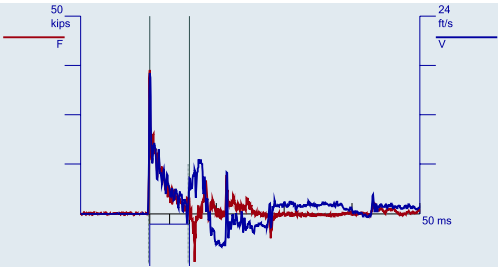
A1 (PR): [K2081]	356,944 mv/6.4v/5000g (1) VF1
A2 (PR): [K2082]	327,962 mv/6.4v/5000g (1) VF1
F3: [168AWJ1]	212.06 PDICAL (1) FF1
F4: [168AWJ2]	215.23 PDICAL (1) FF1



BN 21  
 09Sep2021 10:52:16 AM

EFV	331 ft-lb
ETR	95 %
BPM	52.3 bpm
VMX	18 ft/s
FMX	32 kips
DFN	0.5 in
AMX	3849 g/s
FVP	0.8
CSX	26.7 ksi
LE	44.00 ft
AR	1.19 in <sup>2</sup>
EM	30000 ksi
SP	0.492 k/ft <sup>3</sup>
WS	16807.9 ft/s
WC	16793.9 ft/s
JC	0.50
JF	1.00

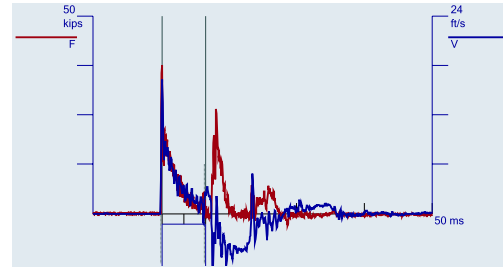
A1 (PR): [K2081]	356,944 mv/6.4v/5000g (1) VF1
A2 (PR): [K2082]	327,962 mv/6.4v/5000g (1) VF1
F3: [168AWJ1]	212.06 PDICAL (1) FF1
F4: [168AWJ2]	215.23 PDICAL (1) FF1



BN 28  
 09Sep2021 11:04:35 AM

EFV 328 ft-lb  
 ETR 94 %  
 BPM 51.2 bpm  
 VMX 17 ft/s  
 FMX 36 kips  
 DFN 0.3 in  
 AMX 3648 g/s  
 FVP 0.8  
 CSX 30.6 ksi  
 LE 49.00 ft  
 AR 1.19 in<sup>2</sup>  
 EM 30000 ksi  
 SP 0.492 k/ft<sup>3</sup>  
 WS 16807.9 ft/s  
 WC 16780.8 ft/s  
 JC 0.50  
 JF 1.00

A1 (PR): [K2081] 356,944 mv/6.4v/5000g (1) VF1  
 A2 (PR): [K2082] 327,962 mv/6.4v/5000g (1) VF1  
 F3: [168AWJ1] 212.06 PDICAL (1) FF1  
 F4: [168AWJ2] 215.23 PDICAL (1) FF1



BN 50  
 09Sep2021 11:20:39 AM

EFV 322 ft-lb  
 ETR 92 %  
 BPM 51.6 bpm  
 VMX 16 ft/s  
 FMX 38 kips  
 DFN 0.1 in  
 AMX 3607 g/s  
 FVP 0.8  
 CSX 31.6 ksi  
 LE 54.00 ft  
 AR 1.19 in<sup>2</sup>  
 EM 30000 ksi  
 SP 0.492 k/ft<sup>3</sup>  
 WS 16807.9 ft/s  
 WC 16770.2 ft/s  
 JC 0.50  
 JF 1.00

A1 (PR): [K2081] 356,944 mv/6.4v/5000g (1) VF1  
 A2 (PR): [K2082] 327,962 mv/6.4v/5000g (1) VF1  
 F3: [168AWJ1] 212.06 PDICAL (1) FF1  
 F4: [168AWJ2] 215.23 PDICAL (1) FF1

# SPT AUTOMATIC HAMMER ENERGY MEASUREMENT REPORT

Drill Rig Model: Diedrich D-50  
Serial Number: 472

Terracon Drill Rig Asset Number: DR# Rental



Prepared for:  
Terracon Consultants, Inc.  
Rochester Exploration Services

Prepared by:  
Terracon Consultants, Inc.  
Exploration Services Group



July 12, 2021

Terracon Consultants, Inc.  
461 Tonawanda Street  
Buffalo, NY 14207-2627

Attn: Mr. Frank Minnolera  
E: frank.minnolera@terracon.com

Re: SPT Automatic Hammer Energy Measurement Report  
Terracon Drill Rig DR# Rental; Diedrich D50  
Terracon Project Number: BUX0500

Dear Mr. Frank Minnolera:

This report provides the Energy Transfer Ratio (ETR) for the SPT automatic hammer found on drill rig model Diedrich D50; Terracon Drill Rig Asset Number DR# Rental (Serial Number: 472).

Table 1: Hammer Efficiency Summary

Drill Rig Model	Serial No.	Drill Rig Year	Drill Rig No.	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (C <sub>e</sub> )
Diedrich D50	472	2021	DR# Rental	87.2% ± 4.2%	1.45

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Sincerely,  
Terracon Consultants, Inc.

James Smith  
National Exploration Manager

Shawn Poff, PG  
Regional Exploration Manager

Attachments:  
Exhibit A: Measurement Information  
Exhibit B: PDA SPT Analyzer Results

Terracon Consultants, Inc. 10841 S. Ridgeview Road Olathe, KS 66061  
P (407) 446 2527 terracon.com

terracon.com



Environmental Facilities Geotechnical Materials

Environmental Facilities Geotechnical Materials

## Exhibit A MEASUREMENT INFORMATION

### MEASUREMENT INFORMATION

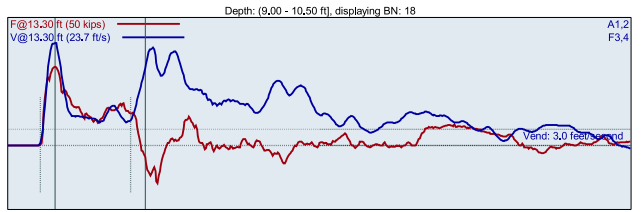
ITEM	DESCRIPTION
Drill Rig Identification	Drill Rig Model: Diedrich D50 Drill Rig Year: 2021 Terracon Drill Rig Asset No.: DR# Rental; Serial No. 472
Drill Rig Owner	Terracon Consultants, Inc. – Rochester, NY
Drill Rig Operator	Joel Rauscher; Rochester Exploration
Testing Date	07/08/2021
Testing Location	New York project site
Boring Identification	B-1
Hammer Type	140 pounds (automatic)
Boring Method	Hollow Stem Auger
Drill Rods	<ul style="list-style-type: none"> <li>■ AWJ</li> <li>■ 1 3/4" outside diameter</li> <li>■ 3/16" wall thickness</li> </ul>
Testing Equipment	<ul style="list-style-type: none"> <li>■ 2 foot AWJ rod instrumented w/ 2 strain gauges and 2 accelerometers</li> <li>■ Model SPT Analyzer™ (PDA)</li> </ul>
ASTM Methods Used	<p>ASTM D1586, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils</p> <p>ASTM D4633-16, Standard Method for Energy Measurement for Dynamic Penetrometers</p>
SPT Personnel	Shawn Poff – Regional Exploration Manager - Terracon Consultants, Inc.



# Exhibit B PDA SPT ANALYZER RESULTS

DR565  
J. Rauscher/S. Poff/S. Poff  
AR: 1.18 in<sup>2</sup>  
LE: 13.30 ft  
WS: 16807.9 fts

9.0-10.5  
Test date: 7/7/2021  
SP: 0.492 klf/3  
EM: 30000 ksi



F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6,4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4w/5000g (1) VF1

FMX: Maximum Force  
VMX: Maximum Velocity  
BPM: Blows/Minute  
EFV: Maximum Energy  
ETR: Energy Transfer Ratio - Rated

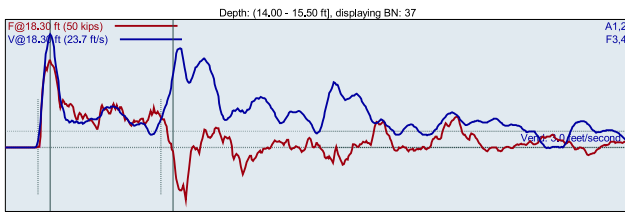
BL#	BC /6"	FMX kips	VMX fts	BPM	EFV ft-lb	ETR %
1	5	31	20,4	1,9	267	82,0
2	5	31	20,8	50,1	315	90,0
3	5	32	20,7	49,5	320	91,4
4	5	32	20,7	48,9	320	91,3
5	5	32	19,7	49,5	333	95,0
6	7	32	20,4	48,2	316	90,4
7	7	31	19,1	49,2	327	93,4
8	7	31	19,2	49,4	329	93,9
9	7	31	19,1	49,4	325	92,8
10	7	32	19,5	49,4	343	98,0
11	7	31	19,3	49,3	320	91,4
12	7	31	19,2	49,2	329	94,1
13	8	31	19,0	49,4	310	88,4
14	8	30	18,8	49,3	326	93,2
15	8	30	19,0	49,5	293	83,6
16	8	30	19,0	49,1	316	90,1
17	8	30	19,1	49,0	319	91,3
18	8	31	19,0	49,2	297	84,9
19	8	31	19,0	49,2	305	87,1
20	8	31	19,0	48,8	299	85,4
Average		31	19,2	49,2	317	90,5
Std Dev		0	0,4	0,2	14	3,9
Maximum		32	20,4	49,5	343	98,0
Minimum		30	18,8	48,8	293	83,6
N-value: 15						

Sample Interval Time: 23,19 seconds.

Responsive ■ Resourceful ■ Reliable

DR565  
J. Rauscher/S. Poff/S. Poff  
AR: 1.18 in<sup>2</sup>  
LE: 18.30 ft  
WS: 16807.9 fts

9.0-10.5  
Test date: 7/7/2021  
SP: 0.492 klf/3  
EM: 30000 ksi



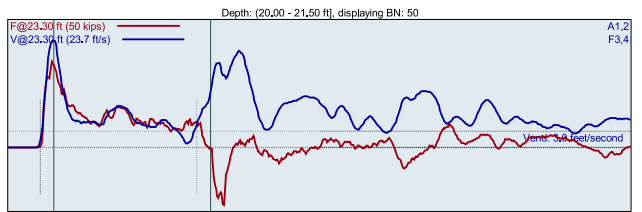
F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6,4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX fts	BPM	EFV ft-lb	ETR %
22	4	33	20,2	50,5	280	82,9
23	4	33	19,9	49,8	288	82,4
24	4	31	19,7	49,6	278	79,4
25	4	32	20,2	50,0	296	84,5
26	6	34	20,4	49,1	292	83,5
27	6	32	19,6	50,1	282	80,6
28	6	32	19,6	50,1	271	77,5
29	6	33	20,4	49,5	291	83,2
30	6	34	20,7	49,4	289	82,5
31	6	32	19,4	50,0	274	78,4
32	8	33	20,4	49,3	280	79,9
33	8	34	20,9	49,5	288	82,2
34	8	33	20,2	49,5	280	80,1
35	8	33	20,0	50,3	277	79,1
36	8	32	19,7	49,2	276	79,3
37	8	34	21,0	49,7	291	83,1
38	8	34	20,6	50,2	289	82,6
39	8	35	21,0	49,2	290	82,9
Average		33	20,3	49,7	284	81,1
Std Dev		1	0,5	0,4	7	1,9
Maximum		35	21,0	50,3	292	83,5
Minimum		32	19,4	49,1	271	77,5
N-value: 14						

Sample Interval Time: 20,55 seconds.

DR565  
J. Rauscher/S. Poff/S. Poff  
AR: 1.18 in<sup>2</sup>  
LE: 23.30 ft  
WS: 16807.9 fts

9.0-10.5  
Test date: 7/7/2021  
SP: 0.492 klf/3  
EM: 30000 ksi



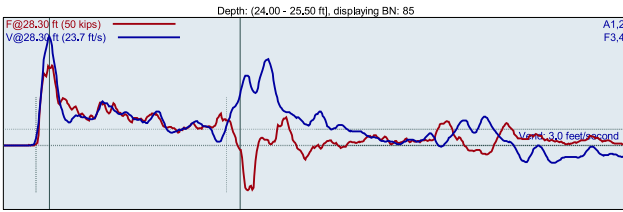
F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1  
A1 (PR): [K4484] 361,048 mv/6,4w/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4w/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX fts	BPM	EFV ft-lb	ETR %
40	4	35	20,3	49,1	304	86,8
41	4	34	20,4	49,2	302	86,2
42	5	35	21,2	49,1	309	88,2
43	5	35	20,7	48,7	309	88,0
44	5	35	20,7	48,7	306	87,3
45	5	35	20,8	49,2	306	87,5
46	7	34	19,9	48,7	298	85,0
47	7	33	19,3	49,1	292	83,5
48	7	34	20,5	48,7	299	85,6
49	7	33	19,9	48,9	296	84,6
50	7	33	19,9	49,1	296	84,5
51	7	34	19,7	49,2	290	82,8
52	7	35	20,1	48,6	296	84,5
Average		34	20,2	48,9	300	85,6
Std Dev		1	0,5	0,2	5	1,8
Maximum		35	21,2	49,2	309	88,2
Minimum		33	19,3	48,6	290	82,8
N-value: 11						

Sample Interval Time: 17,20 seconds.

DR565  
J. Rauscher/S. Poff/S. Poff  
AR: 1.18 in<sup>2</sup>  
LE: 28.30 ft  
WS: 16807.9 fts

9.0-10.5  
Test date: 7/7/2021  
SP: 0.492 klf/3  
EM: 30000 ksi



F3 : [512AWJ1] 207,11 PDICAL (1) FF1  
F4 : [512AWJ2] 208,48 PDICAL (1) FF1

A1 (PR): [K4484] 361,048 mv/6,4v/5000g (1) VF1  
A2 (PR): [K10492] 421,636 mv/6,4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX fts	BPM bpm	EFV ft-lb	ETR %
53	6	32	19,8	1,9	290	82,9
54	6	31	18,6	48,4	302	86,2
55	6	32	19,9	48,6	313	89,5
56	6	32	20,6	48,2	317	90,6
57	6	33	20,4	48,6	324	92,5
58	6	33	19,9	48,3	321	91,8
59	12	33	19,9	48,7	319	91,2
60	12	33	19,9	48,3	319	91,2
61	12	32	20,2	48,2	322	91,9
62	12	32	20,0	48,5	316	90,3
63	12	32	19,6	48,5	315	89,9
64	12	32	19,5	48,3	314	89,8
65	12	32	19,8	48,4	317	90,4
66	12	32	19,8	48,3	320	91,3
67	12	32	19,5	48,3	317	90,5
68	12	32	19,8	48,3	316	90,3
69	12	31	20,0	48,2	320	91,4
70	12	31	19,6	48,4	313	89,5
71	17	31	20,0	48,3	308	88,1
72	17	30	19,7	48,6	305	87,3
73	17	30	19,9	48,5	296	84,6
74	17	31	19,1	48,0	310	88,7
75	17	31	19,0	48,5	306	87,5
76	17	31	19,5	48,4	307	87,9
77	17	30	19,1	48,6	301	86,1
78	17	31	19,2	48,3	307	87,8
79	17	31	19,8	48,5	307	87,8
80	17	31	19,4	48,3	305	87,2
81	17	31	19,8	48,7	305	87,0
82	17	31	20,2	48,0	317	90,7
83	17	31	19,7	48,6	315	89,9
84	17	30	20,2	48,5	307	87,7

85	17	31	20,1	48,3	310	88,5
86	17	31	19,9	48,6	303	86,6
87	17	31	19,9	48,4	309	88,4
Average		31	19,7	48,4	311	88,9
Std Dev		1	0,4	0,2	6	1,8
Maximum		33	20,2	48,7	322	91,9
Minimum		30	18,9	48,0	296	84,6
N-value:			29			

Sample Interval Time: 42,16 seconds.

Summary of SPT Test Results

Project: DR565, Test Date: 7/7/2021

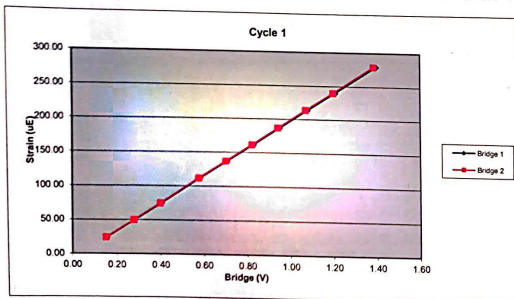
BM#	Blows/Minute	FMX	VMX	BPM	EFV	ETR		
ft	Applied /6"	Value	Value	kips	fts	bpm	ft-lb	%
13.30	5-7-8	15	21	31	19,2	48,2	317	90,5
18.30	4-6-8	14	28	33	20,3	48,7	294	81,1
23.30	4-6-7	12	17	34	20,2	48,9	300	85,6
28.30	6-12-17	29	42	31	19,7	48,4	311	88,9
Overall Average Values:				32	19,8	48,9	305	87,2
Standard Deviation:				1	0,6	0,8	15	4,2
Overall Maximum Value:				35	21,2	50,3	343	98,9
Overall Minimum Value:				30	18,8	48,0	271	77,5



S12AWJ		Cycle 1		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1132.67	23.60	0.15	0.15
3	2056.55	49.37	0.28	0.28
4	2942.12	73.95	0.40	0.40
5	4252.09	111.17	0.58	0.58
6	5167.88	136.67	0.71	0.70
7	6050.66	161.33	0.83	0.82
8	6943.89	186.76	0.95	0.94
9	7832.53	213.51	1.08	1.07
10	8843.21	239.49	1.21	1.20
11	10231.85	279.04	1.40	1.39

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7321.84	Force Calibration (lb/V)	7373.41
Offset	-3.28	Offset	2.70
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	205.55	Strain Calibration (µE/V)	206.99
Offset	-8.48	Offset	-8.31
Correlation	0.999994	Correlation	0.999994

Force Strain Calibration	
EA (Kips)	35620.86
Offset	298.68
Correlation	0.999995

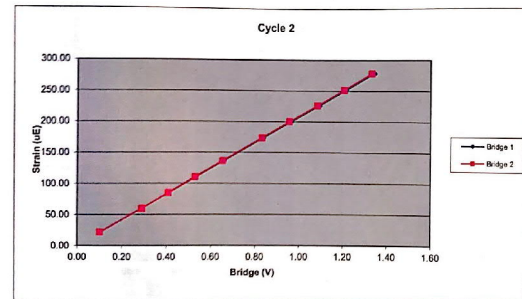


Scanned with CamScanner

S12AWJ		Cycle 2		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	755.93	21.36	0.10	0.10
3	2128.00	59.46	0.29	0.29
4	2995.73	84.22	0.41	0.41
5	3875.45	109.91	0.53	0.53
6	4788.75	135.82	0.65	0.65
7	6105.11	172.95	0.83	0.83
8	7031.52	199.34	0.96	0.95
9	7977.23	225.43	1.09	1.08
10	8890.97	251.05	1.21	1.21
11	9837.56	278.10	1.34	1.33

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7327.32	Force Calibration (lb/V)	7374.95
Offset	3.43	Offset	-7.02
Correlation	0.999998	Correlation	0.999998
Strain Calibration (µE/V)	207.37	Strain Calibration (µE/V)	208.71
Offset	-0.85	Offset	-0.34
Correlation	0.999993	Correlation	0.999989

Force Strain Calibration	
EA (Kips)	35334.52
Offset	5.22
Correlation	0.999988

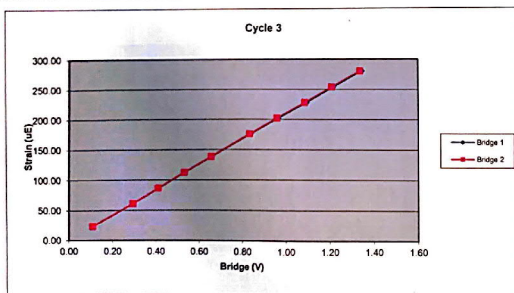


Scanned with CamScanner

S12AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	801.06	22.89	0.11	0.11
3	2155.39	60.77	0.29	0.30
4	3014.93	86.31	0.41	0.41
5	3905.47	112.48	0.53	0.53
6	4819.01	138.25	0.66	0.65
7	6132.21	175.76	0.84	0.83
8	7063.59	201.72	0.96	0.96
9	8011.25	227.50	1.09	1.09
10	8917.39	253.42	1.22	1.21
11	9861.64	280.02	1.34	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7338.67	Force Calibration (lb/V)	7385.24
Offset	-3.63	Offset	-15.94
Correlation	0.999999	Correlation	0.999998
Strain Calibration (µE/V)	208.41	Strain Calibration (µE/V)	209.73
Offset	0.50	Offset	0.15
Correlation	0.999958	Correlation	0.999961

Force Strain Calibration	
EA (Kips)	35209.93
Offset	-20.75
Correlation	0.999980



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Bridge Excitation (V) 5  
Shunt Resistor (ohm) 60 k

Calibration Factors		S12AWJ	
Bridge 1 (µE/V)		207.11	Bridge 2 (µE/V) 208.48
EA Factor (Kips)		35388.44	Area (in <sup>2</sup> ) 1.18

Calibrated by: *Det Spas*  
Calibrated Date: 11/12/2020

Pile Dynamics Inc  
30725 Aurora Rd  
Solon, OH 44139

Traceable to N.I.S.T.

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# Accelerometer Calibration Certificate

## Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

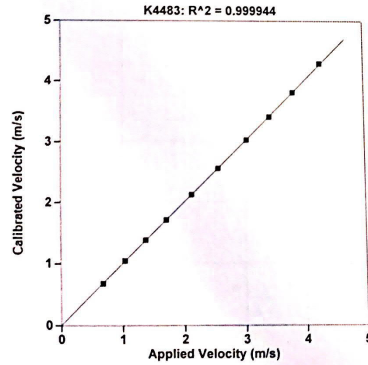
Serial No: K4483 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

**PDA CALIBRATION FACTOR**  
406.4 mv/5000g  
(81.3  $\mu$ v/g)  
R<sup>2</sup>: 0.999944 [Chip programmed]

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

Operator: Will  
*Will*  
Signed

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



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# Accelerometer Calibration Certificate

## Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.  
Calibration performed on 21Apr2020

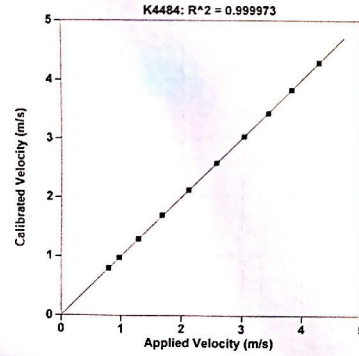
Serial No: K4484 Temperature: 22.3 °C  
Model: PR Humidity: 28%  
Calibrated on: Channel 3 on 8G 5061 LE

**PDA CALIBRATION FACTOR**  
360.6 mv/5000g  
(72.1  $\mu$ v/g)  
R<sup>2</sup>: 0.999973 [Chip programmed]

Ref Acc 1: 65538! Cal on: 27Jan2020  
1040 g's/volt  
Ref Acc 2: 64648! Cal on: 27Jan2020  
984 g's/volt

Operator: Will  
*Will*  
Signed

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



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