



GEOTECHNICAL SUBSURFACE DATA REPORT

S-5-458 over Indian Camp Branch
Bamberg County, South Carolina



PREPARED FOR

SCDOT

955 Park Street

Columbia, South Carolina 29201



PREPARED BY

F&ME Consultants, Inc.

211 Business Park Boulevard

Columbia, South Carolina 29203

SCDOT Project ID: P044315

FME Project No.: G7100.009 - Task 00060

February 12, 2025

February 12, 2025

Mr. Trapp Harris, P.E.
South Carolina Department of Transportation
955 Park Street
Columbia, South Carolina 29201

Re: Geotechnical Subsurface Data Report
S-5-458 over Indian Camp Branch
Bamberg County, South Carolina
SCDOT Project ID: P044315
FME Project No.: G7100.009 – Task 00060

Mr. Harris:

Submitted herein is F&ME Consultants, Inc.'s (FME) Geotechnical Subsurface Data Report for the S-5-458 over Indian Camp Branch project. This report contains findings from our subsurface field exploration and laboratory testing program.

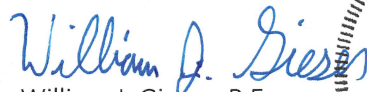
It has been a pleasure working with you on this project and we appreciate the opportunity to be of service. Please notify us if there are any questions or if we can be of further assistance.

Respectfully Submitted,

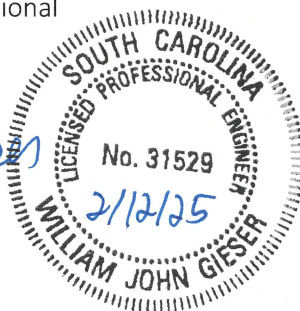
F&ME CONSULTANTS, INC.



J. Trey Peterson, E.I.T.
Geotechnical Staff Professional



William J. Gieser, P.E.
Senior Project Engineer



Alex M. Abernethy, E.I.T.
Materials Laboratory Manager

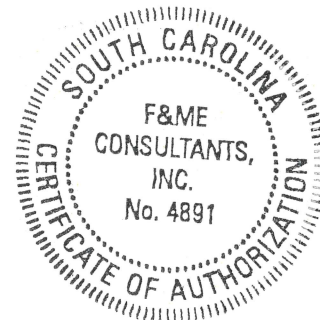


TABLE OF CONTENTS

1. INTRODUCTION.....	3
1.1. GENERAL	3
1.2. SCOPE	3
2. SUBSURFACE EXPLORATION SUMMARY	3
2.1. SOIL TEST BORINGS	3
2.2. BULK SOIL SAMPLES	4
2.3. GROUNDWATER	4
2.4. TEST LOCATION TABLE	5
3. LABORATORY TESTING SUMMARY	5

APPENDIX

Section 1	Site Location Plan
Section 2	Boring Location Plan
Section 3	Subsurface Exploration Logs
Section 3A	Soil Test Boring (STB) Logs
Section 3B	Bulk Soil (BS) Sample Logs
Section 4	Laboratory Test Results
Section 4A	Split-Spoon Soil (SS) Samples
Section 4B	Bulk Soil Samples (BS)
Section 4C	Corrosion Series Testing
Section 5	Pavement Core Photos
Section 6	SPT Hammer Calibration
Section 7	GeoScoping Form
Section 8	Drill Rig Photos

1. INTRODUCTION

1.1. GENERAL

The project is located approximately six (6) miles west of Ehrhardt, South Carolina. We understand that this project will involve the removal of the existing culvert and be replaced with a new bridge on the existing alignment. A Site Location Plan is presented in Section 1 of the Appendix of this report.

1.2. SCOPE

FME performed a geotechnical subsurface exploration and laboratory testing for the project. The South Carolina Department of Transportation (SCDOT) Scope of Services was issued on January 9, 2025. The field exploration consisted of six (8) Soil Test Borings (STB) with Standard Penetration Testing (SPT) and the collection of one (1) Bulk Soil Sample (BS). Field exploration methods and laboratory procedures were conducted in general accordance with the current American Association of State Highway and Transportation Officials (AASHTO), American Society of Testing and Materials (ASTM) Standards. This report was prepared in general accordance with the 2022 SCDOT Geotechnical Design Manual (GDM).

2. SUBSURFACE EXPLORATION SUMMARY

From January 29, through February 3, 2025, FME performed eight (8) Soil Test Borings (STB) with Standard Penetration Testing (SPT). Additionally, one (1) Bulk Soil Sample was collected on site via Auger Probe Boring (AP) methodologies.

The collected soil samples were examined and logged in the field by FME personnel, sealed in plastic bags, and transported to our laboratory for further examination and analyses. The soils were visually classified in the field based upon the Unified Soil Classification System (USCS) in general accordance with ASTM D2488. Testing locations and target exploration depths were provided by the SCDOT. A Boring Location Plan (Figures 2) displaying the test locations performed during the subsurface exploration is contained in Section 2 of the Appendix within this report.

2.1. SOIL TEST BORINGS

Soil Test Borings were performed with a CME 550X ATV mounted drill rig. FME utilized rotary wash drilling techniques for the embankment borings to maintain a stable borehole, whereas hollow stem auger drilling techniques were deployed for the six (6) pavement borings. The Soil Test Borings were sampled continuously through the upper ten (10) feet below the existing ground surface, or to the proposed termination depth. Following the continuous sampling, SPT testing was performed on standard five (5) foot intervals thereafter until termination depth was achieved. An automatic hammer with a measured energy transfer ratio of 89.8% was used to perform the SPT's. Copies of the Soil Test Boring Logs are contained within Section 3A in the Appendix of this report.

Two (2) of the Soil Test Borings (designated as B-1 and B-2) were performed at the proposed bridge abutment locations. FME also conducted six (6) roadway approach Soil Test Borings (designated as P-1 through P-6). Pavement core samples from each Soil Test Boring were bagged and transported to FME's laboratory facility following boring completion. These cores were measured and photographed to document thickness, distress and existing surface conditions. Copies of the Soil Test Boring Logs are

contained within Section 3A of the Appendix of this report. Pavement core photographic documentation is presented within Section 5 of the Appendix of this report.

The locations, depths, and elevations of the Soil Test Borings performed for the subsurface exploration are provided in the following table.

Table 1 – Field Exploration Summary Table – Soil Test Borings

Test ID	Test Type	Total Boring Depth (ft)	Latitude	Longitude	Elevation (ft-MSL)
B-1	STB	100.0	33.14547569	-81.08516686	150.8
B-2	STB	100.0	33.14565690	-81.08523829	151.5
P-1	STB	6.0	33.14504158	-81.08482848	154.5
P-2	STB	6.0	33.14519548	-81.08497992	152.6
P-3	STB	6.0	33.14537974	-81.08504675	151.9
P-4	STB	6.0	33.14590871	-81.08550615	152.7
P-5	STB	6.0	33.14623608	-81.08580975	156.1
P-6	STB	6.0	33.14647560	-81.08620783	156.4
TOTAL		236.0			

2.2. BULK SOIL SAMPLES

A single composite Bulk Soil Sample was collected from the upper six (6) feet of auger cuttings encountered within the six (6) roadway approach Soil Test Borings. Copies of the Soil Test Boring Logs are contained within Section 3B in the Appendix of this report. The following table is a summary of the Bulk Soil Sample designation, depth, location, and surface elevation.

Table 2 – Field Exploration Summary Table – Bulk Soil Samples

Test ID	Test Type	Total Boring Depth (ft)	Latitude ¹	Longitude ¹	Elevation ¹ (ft-MSL)
BS-1	STB/BS	6.0	N/A	N/A	N/A
TOTAL		6.0			

¹Bulk Soil Sample BS-1 was sampled from Soil Test Borings P-1 through P-6 to form one (1) composite bulk soil sample

2.3. GROUNDWATER

Groundwater depths were recorded at the time of boring (TOB) and twenty-four (24) hours following boring completion, where practical. Groundwater depth measurements are noted on the individual Subsurface Exploration Logs in Section 3 of the Appendix.

2.4. TEST LOCATION TABLE

The following table summarizes the state plane coordinates in feet, latitude-longitude in decimal degrees, and existing surface elevations of the test locations for the subsurface exploration.

Table 3 – Test Location Table

Test ID	Test Type	Northing	Easting	Latitude	Longitude	Elevation (ft-MSL)
B-1	STB	477419.730	1973934.649	33.14547569	-81.08516686	150.8
B-2	STB	477485.676	1973912.841	33.14565690	-81.08523829	151.5
P-1 ¹	STB	477261.713	1974038.080	33.14504158	-81.08482848	154.5
P-2 ¹	STB	477317.741	1973991.777	33.14519548	-81.08497992	152.6
P-3 ¹	STB	477384.793	1973971.380	33.14537974	-81.08504675	151.9
P-4 ¹	STB	477577.352	1973830.941	33.14590871	-81.08550615	152.7
P-5 ¹	STB	477696.529	1973738.122	33.14623608	-81.08580975	156.1
P-6 ¹	STB	477783.769	1973616.363	33.14647560	-81.08620783	156.4

¹Bulk Soil Sample BS-1 was sampled from Soil Test Borings P-1 through P-6 to form one (1) composite bulk soil sample

3. LABORATORY TESTING SUMMARY

Following completion of FME's field exploration, draft boring logs were generated and reviewed internally by FME. Based on the data represented in these logs, FME was authorized to designate soil samples for laboratory testing on behalf of the SCDOT. The laboratory testing performed on the soil samples collected from the Soil Test Borings is summarized in the table below. Data sheets containing the results from this testing are provided in Section 4A and Section 4C within the Appendix of this report.

Table 4 – Laboratory Testing Summary Table – Soil Test Boring Samples

Type of Test	Quantity	Procedure
Moisture Content	11	AASHTO T265 (ASTM D2216)
Atterberg Limits	11	AASHTO T89/T90 (ASTM D4318)
Grain-size Distribution w/ Wash 200	5	AASHTO D6913/AASHTO T11 (ASTM D1140)
Hydrometer and Grain Size	6	ASTM D7928/ASTM D6913
pH	2	AASHTO T289 (ASTM G51)
Soil Sulfate Content	2	AASHTO T290 (ASTM C1580)
Soil Chloride Content	2	AASHTO T291
Soil Resistivity	2	AASHTO T288

The laboratory testing performed for the Bulk Soil Samples are summarized in the table below. Data sheets containing the results from this testing are provided in Section 4B of the Appendix attached to this report.

Table 5 – Laboratory Testing Summary Table – Bulk Soil Samples

Type of Test	Quantity	Procedure
Moisture Content	1	AASHTO T265 (ASTM D2216)
Atterberg Limits	1	AASHTO T89/T90 (ASTM D4318)
Grain-size Distribution w/ Wash 200	1	ASTM D6913/AASHTO T11 (ASTM D1140)
Standard Proctor	1	AASHTO T99 (ASTM D698)
California Bearing Ratio Test	1	AASHTO T193

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

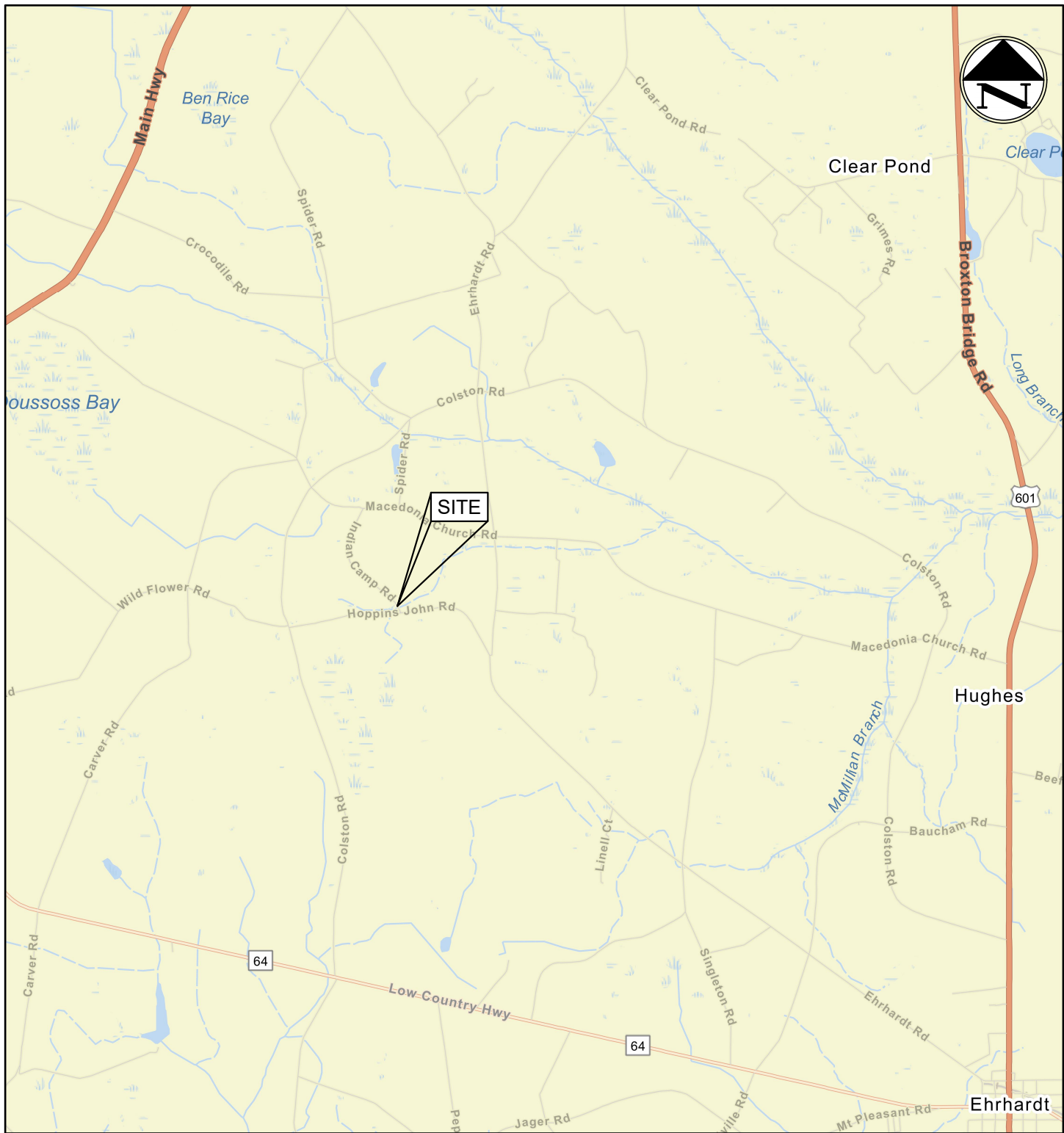
SECTION 1	SITE LOCATION PLAN
SECTION 2	BORING LOCATION PLAN
SECTION 3	SUBSURFACE EXPLORATION LOGS
SECTION 3A	SOIL TEST BORING (STB) LOGS
SECTION 3B	BULK SOIL SAMPLE (BS) LOGS
SECTION 4	LABORATORY TEST RESULTS
SECTION 4A	SPLIT SPOON SAMPLES
SECTION 4B	BULK SOIL SAMPLES
SECTION 4C	CORROSION SERIES TESTING
SECTION 5	PAVEMENT CORE PHOTOS
SECTION 6	ON-SITE DRILL RIG PHOTOS
SECTION 7	SPT HAMMER CALIBRATION
SECTION 8	GEOSCOPING FORM

S-5-458 over Indian Camp Branch

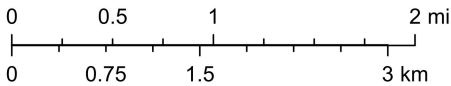
Geotechnical Subsurface Data Report

APPENDIX

SECTION 1 SITE LOCATION PLAN



1:72,000



F&ME CONSULTANTS, INC.
COLUMBIA, SC

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	CTC	DATE 2.10.25	GROUP -- --
R/W		DATE	

S-5-458 OVER INDIAN CAMP BRANCH
BAMBURG COUNTY, SOUTH CAROLINA

SITE LOCATION PLAN

SCDOT PROJECT ID: P044315

FME JOB NO. G7100.009 Task 006

SCALE: AS NOTED

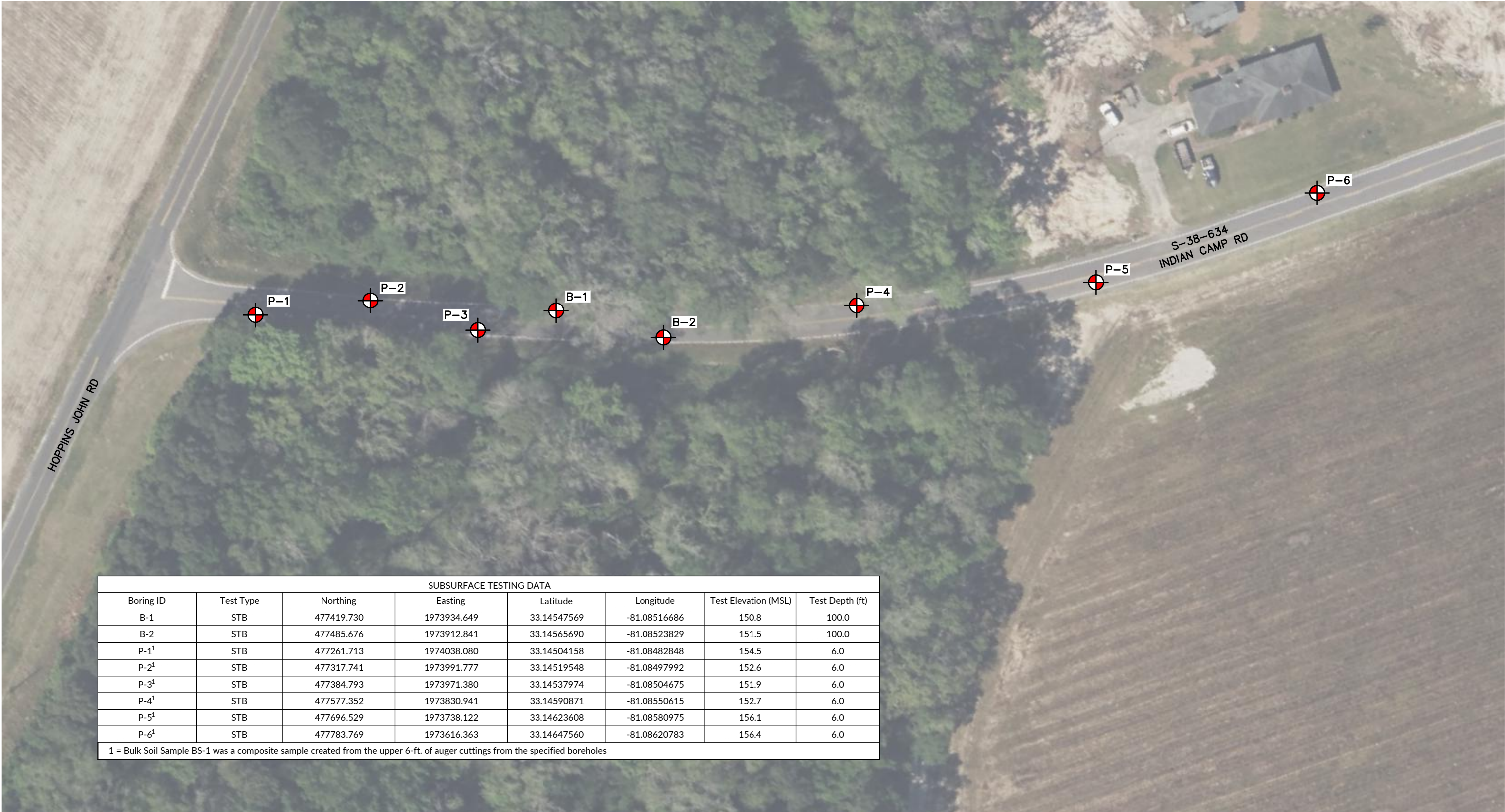
FIGURE 1

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 2 BORING LOCATION PLAN



SUBSURFACE TESTING DATA							
Boring ID	Test Type	Northing	Easting	Latitude	Longitude	Test Elevation (MSL)	Test Depth (ft)
B-1	STB	477419.730	1973934.649	33.14547569	-81.08516686	150.8	100.0
B-2	STB	477485.676	1973912.841	33.14565690	-81.08523829	151.5	100.0
P-1 ¹	STB	477261.713	1974038.080	33.14504158	-81.08482848	154.5	6.0
P-2 ¹	STB	477317.741	1973991.777	33.14519548	-81.08497992	152.6	6.0
P-3 ¹	STB	477384.793	1973971.380	33.14537974	-81.08504675	151.9	6.0
P-4 ¹	STB	477577.352	1973830.941	33.14590871	-81.08550615	152.7	6.0
P-5 ¹	STB	477696.529	1973738.122	33.14623608	-81.08580975	156.1	6.0
P-6 ¹	STB	477783.769	1973616.363	33.14647560	-81.08620783	156.4	6.0

1 = Bulk Soil Sample BS-1 was a composite sample created from the upper 6-ft. of auger cuttings from the specified boreholes



LEGEND:



SOIL TEST BORING LOCATION

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	CTC	DATE 2.10.25	GROUP -
R/W		DATE	



F&ME CONSULTANTS, INC.
COLUMBIA, SC

S-5-458 OVER INDIAN CAMP BRANCH
BAMBURG COUNTY, SOUTH CAROLINA

BORING LOCATION PLAN

SCDOT PROJECT ID: P044315	FME JOB NO. G7100.009 Task 006
SCALE: 1" = 60'	FIGURE 2

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 3 SUBSURFACE EXPLORATION LOGS

Soil Test Boring Log Descriptors

Correlation of Penetration Resistance with Relative Density and Consistency














Coarse Grained Soils (Sands/Gravel)		Fine Grained Soils (Silt/Clay)	
SPT Blow Count	Relative Density	SPT Blow Count	Consistency
≤ 4	Very Loose	≤ 2	Very Soft
5 – 10	Loose	3 – 4	Soft
11 – 30	Medium Dense	5 – 8	Firm
31 – 50	Dense	9 – 15	Stiff
≥ 51	Very Dense	16 – 30	Very Stiff
		≥ 31	Hard

Particle Size Identification
















Gravel	Sieve Size
Fine	#4 to ¾ inch
Coarse	¾ inch to 3 inch

Sand	Sieve Size
Fine	#200 to #40
Medium	#40 to #10
Coarse	#10 to #4

Silt/Clay	Sieve Size
Fines Content	< #200

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

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
FINE GRAINED SOILS	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)			SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 3 SUBSURFACE EXPLORATION LOGS

SECTION 3A SOIL TEST BORING (STB) LOGS

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: B-1	
Site Description:		S-5-458 over Indian Camp Branch				Route: S-5-458	
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.: 150.8 ft		Latitude: 33.14547569		Longitude: -81.08516686		Date Started: 1/30/2025	
Total Depth: 100 ft		Soil Depth: 100 ft		Core Depth: ft		Date Completed: 1/30/2025	
Bore Hole Diameter (in): 3		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 89.8%	
Core Size: N/A		Driller: L. Guempel		Groundwater: TOB 9.2 (Cave at 9.8)		24HR 3 ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
	0.0										0 10 20 30 40 50 60 70 80 90
	0.4	PAVEMENT (S-5-458) (5.0-in)		0.4							
	2.0	EXISTING FILL		2.0	SS-1	6	7	6		13	
		Medium Dense, Moist, Yellowish Brown, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP/A-3), 10YR5/6. No HCl Reaction			SS-2	4	4	3	4	7	
145.8	4.0			4.0							
		Loose, Moist, Gray, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP-SM/A-3) with Silt, 10YR5/1, No HCl Reaction			SS-3	3	3	2	3	5	
	6.0	@SS-3: Dark Gray, Wood in Spoon		6.0							
					SS-4	1	7	7	6	14	
	8.0	Medium Dense, Wet, White, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP/A-3), 10YR8/1, No HCl Reaction		8.0							
140.8					SS-5	3	3	4	7	7 X	
		ALLUVIUM									
		Loose, Wet, Light Gray, Non-Plastic, Fine to Medium Poorly Graded SAND (SP-SM/A-3) with Silt, 10YR8/1, No HCl Reaction									
		@SS-5: LL= NP, PL= NP, PI=NP, NMC=20.8%, %200= 5.8		13.5							
					SS-6	2	4	4		8 X	
135.8		@SS-6: Light Gray, (A-2-4), 10YR7/1									
		LL=NP, PL= NP, PI= NP, NMC= 26.8%, %200= 10.9									
	18.5			18.5							
		Loose, Wet, Dark Gray, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), GLEY1 4/N, No HCl Reaction			SS-7	6	6	3		9 X	
130.8		@SS-7: LL= NP, PL= NP, PI= NP, NMC= 25.5%, %200= 17.6									
	23.5	@SS-8: No Recovery		23.5							
					SS-8	2	4	5		9	
125.8											
	28.5	COASTAL PLAIN (PLEISTOCENE)		28.5							
		Loose, Wet, Dark Greenish Gray, Non-Plastic, Fine to Medium Poorly Graded SAND (SP-SM/A-3) with Silt, 10Y4/1, No HCl Reaction			SS-9	3	4	6		10	
120.8											
	33.5			33.5							

LEGEND

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

Continued Next Page

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	B-1
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	G. Cantele	Boring Location:	N/A	Offset:	N/A
Elev.:	150.8 ft	Latitude:	33.14547569	Longitude:	-81.08516686
Date Started:	1/30/2025				
Total Depth:	100 ft	Soil Depth:	100 ft	Core Depth:	ft
Date Completed:	1/30/2025				
Bore Hole Diameter (in):	3	Sampler Configuration			
Liner Required:	Y	Liner Used:	Y		
Drill Machine:	CME550X	Drill Method:	RW	Hammer Type:	Automatic
Energy Ratio:	89.8%				
Core Size:	N/A	Driller:	L. Guempel	Groundwater:	TOB 9.2 (Cave at 9.8) 24HR 3 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
115.8		Loose, Wet, Dark Greenish Gray, Non-Plastic, Silty Fine to Coarse SAND (SM/A-2-4), 5GY3/1, No HCl Reaction			SS-10	3	4	4		8	●
38.5		Soft, Moist, Very Dark Greenish Gray, Medium Plasticity, Elastic SILT (ML/A-7-6), 5GY3/1, No HCl Reaction		38.5	SS-11	1	2	2		4	●
110.8		@SS-11: LL= 43, PL= 27, PI= 16, NMC= 67.9%, %200= 70.3									
43.5		@SS-12: No Recovery		43.5	SS-12	1	2	1		3	●
105.8											
48.5		SANTEE LIMESTONE FORMATION (EOCENE)		48.5	SS-13	5	5	6		11	●
100.8		Medium Dense to Dense, Moist, Greenish Gray, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP-SM/A-3) with Silt, 5GY5/1, Strong HCl Reaction, Calcareous									
53.5		Medium Dense, Moist, Greenish Gray, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP-SM/A-3) with Silt, 5GY5/1, Strong HCl Reaction, Calcareous		53.5	SS-14	6	7	11		18	●
95.8		@SS-14: LL= NP, PL= NP, PI= NP, NMC= 27.9%, %200= 13.3									
58.5		Medium Dense to Dense, Moist, Greenish Gray, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP-SM/A-3) with Silt, 10GY5/1, Strong HCl Reaction, Calcareous		58.5	SS-15	6	8	10		18	●
90.8											
63.5		@SS-16: Greenish Gray, 5GY6/1		63.5	SS-16	6	8	13		21	●
85.8											

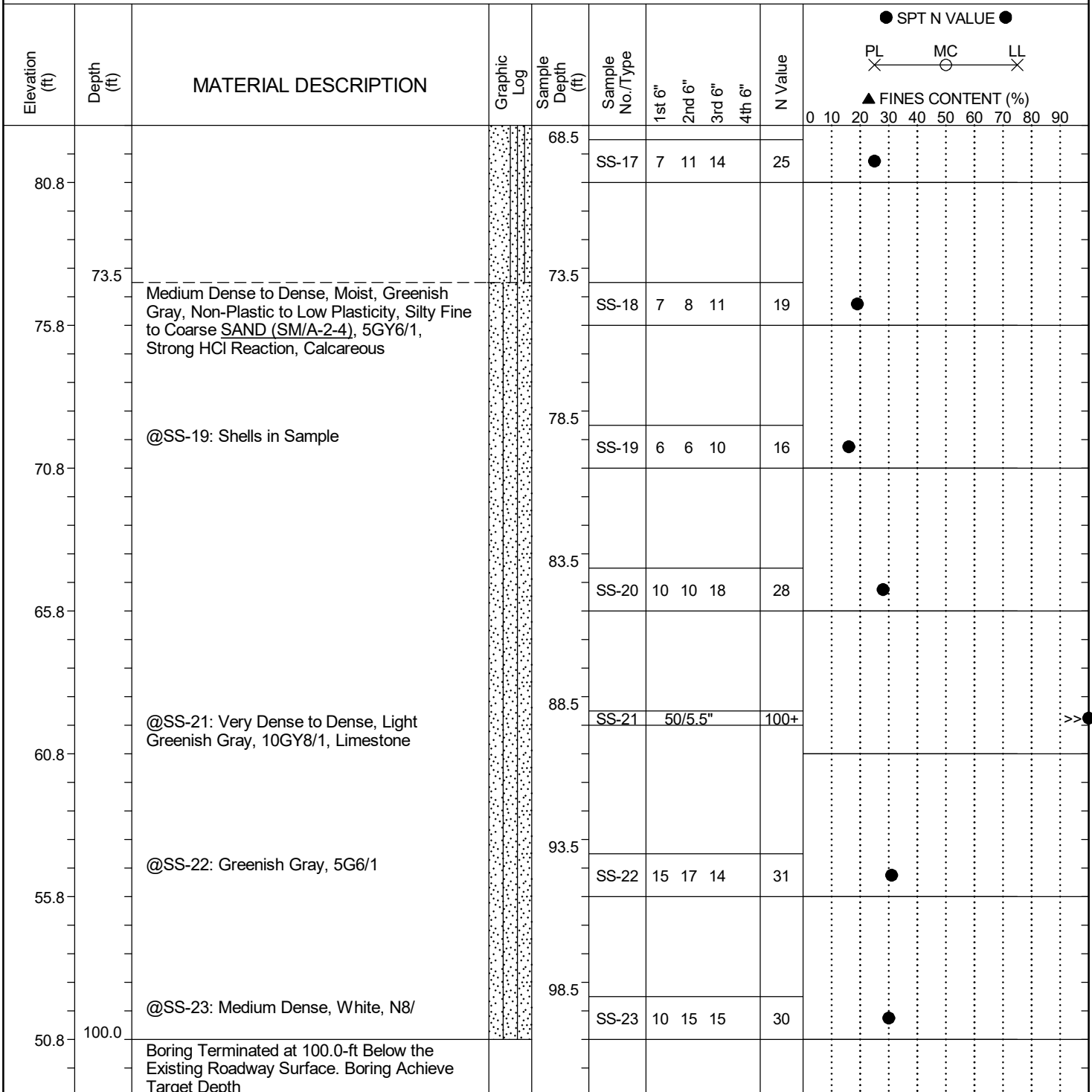
LEGEND

Continued Next Page

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

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: B-1	
Site Description:		S-5-458 over Indian Camp Branch				Route: S-5-458	
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.: 150.8 ft		Latitude: 33.14547569		Longitude: -81.08516686		Date Started: 1/30/2025	
Total Depth: 100 ft		Soil Depth: 100 ft		Core Depth: ft		Date Completed: 1/30/2025	
Bore Hole Diameter (in): 3		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME550X		Drill Method: RW		Hammer Type: Automatic		Energy Ratio: 89.8%	
Core Size: N/A		Driller: L. Guempel		Groundwater: TOB 9.2 (Cave at 9.8)		24HR 3 ft	



LEGEND

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

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	B-2
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	B. Vogel	Boring Location:	N/A	Offset:	N/A
Elev.:	151.5 ft	Latitude:	33.1456569	Longitude:	-81.08523829
Date Started:	1/31/2025				
Total Depth:	100 ft	Soil Depth:	100 ft	Core Depth:	ft
Date Completed:	2/3/2025				
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME550X	Drill Method:	RW
Hammer Type:	Automatic	Energy Ratio:	89.8%	Core Size:	N/A
Driller:	L. Guempel	Groundwater:	TOB N/A	24HR	2.9 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● </div> <div> PL X MC O LL X </div> <div> ▲ FINES CONTENT (%) </div>
0.0	0.0	PAVEMENT (S-5-458) (2.5-in)		0.2							
	0.2	EXISTING FILL									
		Loose to Medium Dense, Moist, Grayish Brown/Yellowish Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 10YR5/2 & 10YR5/6, No HCl Reaction		2.0	SS-1	2	8	7	7		
				4.0	SS-2	4	5	4	5		
146.5	6.0	@SS-2: Gray, 10YR5/1		6.0	SS-3	4	3	3	2		
		@SS-3: Pale Brown, 2.5Y3/4		8.0	SS-4	WOH 1 1/12"				X▲	O
	8.0	ALLUVIUM									
		Very Loose, Moist to Wet, Gray, Non-Plastic, Fine to Medium Poorly Graded SAND (SP/A-3), 10YR5/1, No HCl Reaction			SS-5	WOH 4	4	4		8 X	O
141.5		@SS-4: LL= NP, PL= NP, PI= NP, NMC= 21.8%, %200=4.8									
		Loose to Medium Dense, Moist, Light Pink, Non-Plastic, Fine to Medium Poorly Graded SAND (SP-SM/A-3) with Silt, 7.5R8/2, No HCl Reaction		13.5	SS-6	2	5	6		11	●
136.5		@SS-5: LL= NP, PL= NP, PI= NP, NMC= 22.5%, %200=6.9									
		@SS-6: White, 7.5R8/1		18.5	SS-7	WOH 1	2			3	●▲X
131.5	23.5	Very Loose, Moist, Dark Gray, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), GLEY1 4/N, No HCl Reaction									
		@SS-7: LL= 28, PL= 16, PI= 12, NMC= 28.2%, %200= 17.2		23.5	SS-8	3	5	5		10 X▲	●O
126.5		COASTAL PLAIN (PLEISTOCENE)									
		Loose to Medium Dense, Moist, Dark Gray/Gray, Non-Plastic, Fine to Medium Poorly Graded SAND (SP/A-3), GLEY1 4/N & GLEY1 5/N, No HCl Reaction		28.5	SS-9	4	5	6		11	●
121.5		@SS-8: LL= NP, PL= NP, PI= NP, NMC= 21.5%, %200= 2.6									
33.5	33.5										

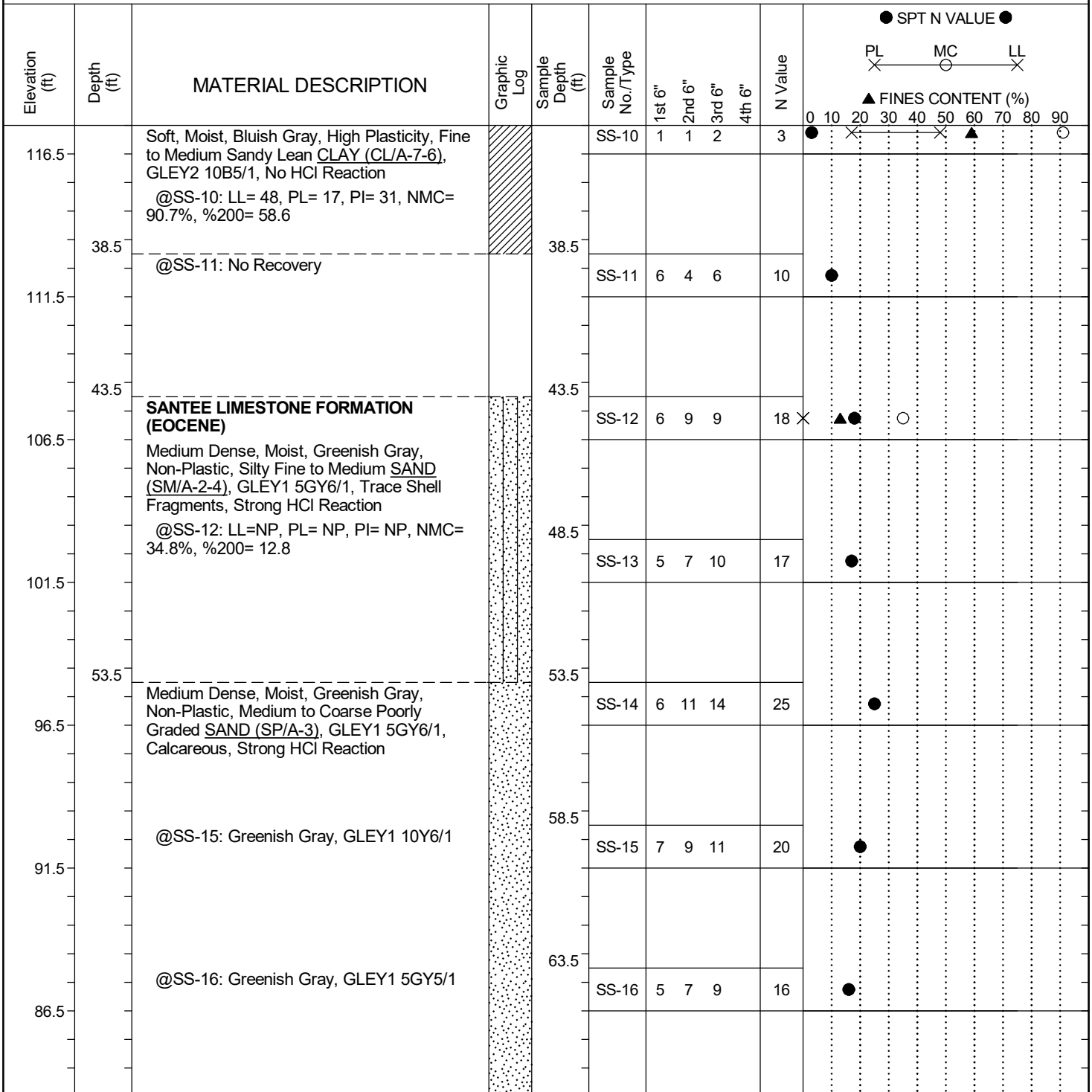
LEGEND

Continued Next Page

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

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	B-2
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	B. Vogel	Boring Location:	N/A	Offset:	N/A
Elev.:	151.5 ft	Latitude:	33.1456569	Longitude:	-81.08523829
Total Depth:	100 ft	Soil Depth:	100 ft	Core Depth:	ft
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)
Drill Machine:	CME550X	Drill Method:	RW	Hammer Type:	Automatic
Core Size:	N/A	Driller:	L. Guempel	Groundwater:	TOB N/A
				Energy Ratio:	89.8%
				24HR	2.9 ft



LEGEND

Continued Next Page

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

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	B-2
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	B. Vogel	Boring Location:	N/A	Offset:	N/A
Elev.:	151.5 ft	Latitude:	33.1456569	Longitude:	-81.08523829
Total Depth:	100 ft	Soil Depth:	100 ft	Core Depth:	ft
Date Started:	1/31/2025				
Date Completed:	2/3/2025				
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME550X	Drill Method:	RW
Hammer Type:	Automatic	Energy Ratio:	89.8%		
Core Size:	N/A	Driller:	L. Guempel	Groundwater:	TOB N/A
24HR	2.9 ft				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
68.5		Medium Dense to Dense, Moist to Wet, Greenish Gray, Non-Plastic to Low Plasticity, Silty Medium to Coarse SAND (SM/A-2-4), GLEY1 5GY6/1, Calcareous, Strong HCl Reaction		68.5	SS-17	9	9	12		21	●
81.5											
73.5		@SS-18: Greenish Gray, GLEY1 5GY5/1		73.5	SS-18	6	8	11		19	●
76.5											
78.5				78.5	SS-19	5	6	9		15	●
71.5											
83.5		@SS-20: Greenish Gray, GLEY1 10GY5/1		83.5	SS-20	5	12	30		42	●
66.5											
88.5		@SS-21: Very Dense, White, 10YR/8/1		88.5	SS-21	50/5"				100+	>>●
61.5											
93.5		@SS-22: Medium Dense to Dense		93.5	SS-22	13	14	14		28	●
56.5											
98.5				98.5	SS-23	12	10	24		34	●
51.5	100.0	Boring Terminated at 100.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: P-1	
Site Description:		S-5-458 over Indian Camp Branch				Route: S-5-458	
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.:	154.5 ft	Latitude:	33.14504158	Longitude:	-81.08482848	Date Started:	1/29/2025
Total Depth:	6 ft	Soil Depth:	6 ft	Core Depth:	ft	Date Completed:	1/29/2025
Bore Hole Diameter (in):		3	Sampler Configuration		Liner Required:	Y (N)	Liner Used: Y (N)
Drill Machine:		CME550X	Drill Method: HSA		Hammer Type:	Automatic	Energy Ratio: 89.8%
Core Size:		N/A	Driller: L. Guempel		Groundwater: TOB	N/A	24HR Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> ● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%) </div>
	0.0	PAVEMENT (S-5-458) (4.0-in)									0 10 20 30 40 50 60 70 80 90
	0.3	Medium Dense, Moist, Yellowish Brown, Non-Plastic, Fine to Medium Poorly Graded SAND (SP/A-3), 10YR5/6, No HCl Reaction		0.3							
					SS-1	7	9	9		18	
	2.0	Loose to Medium Dense, Moist, Light Yellowish Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 2.5Y6/3		2.0							
					SS-2	6	5	4	6	9	
		@SS-3: Light Gray/Brownish Yellow, 10YR7/1 & 10YR5/8		4.0							
					SS-3	6	8	8	9	16	
149.5											
	6.0	Boring Terminated at 6.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: P-2	
Site Description:		S-5-458 over Indian Camp Branch				Route: S-5-458	
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.:	152.6 ft	Latitude:	33.14519548	Longitude:	-81.08497992	Date Started:	1/29/2025
Total Depth: 6 ft		Soil Depth: 6 ft		Core Depth: ft		Date Completed: 1/29/2025	
Bore Hole Diameter (in): 3		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME550X		Drill Method: HSA		Hammer Type: Automatic		Energy Ratio: 89.8%	
Core Size: N/A		Driller: L. Guempel		Groundwater: TOB N/A			24HR Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%)
	0.0										0 10 20 30 40 50 60 70 80 90
	0.2	PAVEMENT (S-5-458) (2.5-in)		0.2							
		Medium Dense, Dry to Moist, Brown, Non-Plastic, Fine to Medium Poorly Graded SAND (SP/A-3), 10YR5/3, No HCl Reaction			SS-1	9	7	8		15	
	2.0	Loose to Medium Dense, Dry to Moist, Yellowish Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 10YR5/8, No HCl Reaction		2.0							
					SS-2	3	4	5	8	9	
	4.0	@SS-3: Light Gray/Yellowish Brown/Red, 10YR7/1 & 10YR5/6 & 10R4/8									
					SS-3	10	7	9	10	16	
	6.0	Boring Terminated at 6.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID:		P044315				County:		Bamberg		Boring No.:		P-3				
Site Description:		S-5-458 over Indian Camp Branch							Route:		S-5-458					
Eng./Geo.:		G. Cantele		Boring Location:		N/A		Offset:		N/A		Alignment:		Existing		
Elev.:		151.9 ft		Latitude:		33.14537974		Longitude:		-81.08504675		Date Started:		1/30/2025		
Total Depth:		6 ft		Soil Depth:		6 ft		Core Depth:		ft		Date Completed:		1/30/2025		
Bore Hole Diameter (in):			3		Sampler Configuration			Liner Required:		Y (N)		Liner Used:			Y (N)	
Drill Machine:		CME550X		Drill Method:		HSA		Hammer Type:		Automatic		Energy Ratio:		89.8%		
Core Size:		N/A		Driller:		L. Guempel		Groundwater:		TOB N/A		24HR		Backfilled		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
	0.0	PAVEMENT (S-5-458) (2.5-in)									0 10 20 30 40 50 60 70 80 90
	0.3	Medium Dense, Dry to Moist, Yellowish Brown, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP/A-3), 10YR5/4, No HCl Reaction		0.3							
					SS-1	5	7	7		14	●
		@SS-2: Grayish Brown, 2.5Y5/2		2.0							
					SS-2	5	6	7	7	13	●
	4.0	Loose, Moist, Gray, Non-Plastic, Fine to Coarse SAND (SP-SM/A-3) with Silt, 10YR5/1, No HCl Reaction		4.0							
146.9					SS-3	4	3	3	1	6	●
	6.0	Boring Terminated at 6.0-ft Below the Existing Ground Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: P-4	
Site Description:		S-5-458 over Indian Camp Branch				Route: S-5-458	
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.:	152.7 ft	Latitude:	33.14590871	Longitude:	-81.08550615	Date Started:	2/3/2025
Total Depth: 6 ft		Soil Depth: 6 ft		Core Depth: ft		Date Completed: 2/3/2025	
Bore Hole Diameter (in): 3		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME550X		Drill Method: HSA		Hammer Type: Automatic		Energy Ratio: 89.8%	
Core Size: N/A		Driller: L. Guempel		Groundwater: TOB N/A			24HR Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
	0.0	PAVEMENT (S-5-458) (4.0-in)									0 10 20 30 40 50 60 70 80 90
	0.3	Very Loose to Loose, Moist to Wet, Dark Yellowish Brown, Non-Plastic, Fine to Coarse Poorly Graded SAND (SP/A-3), 10YR4/6, No HCl Reaction		0.3							
					SS-1	1	6	2	1	8	●
		@SS-2: Light Gray, 2.5Y7/1		2.0							
					SS-2	WOH/24"				WOH	
	4.0	Loose, Moist to Wet, Light Gray, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4), 7.5YR7/1, Saturated SpoonNo HCl Reaction		4.0							
147.7					SS-3	1	2	3	3	5	●
	6.0	Boring Terminated at 6.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	P-5
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	G. Cantele	Boring Location:	N/A	Offset:	N/A
Elev.:	156.1 ft	Latitude:	33.14623608	Longitude:	-81.08580975
Date Started:	2/3/2025				
Total Depth:	6 ft	Soil Depth:	6 ft	Core Depth:	ft
Date Completed:	2/3/2025				
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME550X	Drill Method:	HSA
Hammer Type:	Automatic	Energy Ratio:	89.8%		
Core Size:	N/A	Driller:	L. Guempel	Groundwater:	TOB N/A
24HR	Backfilled				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
	0.0										0 10 20 30 40 50 60 70 80 90
	0.2	PAVEMENT (S-5-458) (3.0-in)		0.2							
		Medium Dense, Moist, Pale Brown, Non-Plastic, Fine to Medium Poorly Graded SAND (SP/A-3), 10YR6/3, No HCl Reaction			SS-1	5	8	6		14	
	2.0	Loose to Medium Dense, Moist, Yellowish Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 10YR5/4, No HCL Reaction		2.0							
					SS-2	3	3	4	4	7	
	4.0	@SS-3: Brownish Yellow, Fine to Coarse Sand Particles 10YR6/6,									
					SS-3	4	5	6	7	11	
151.1	6.0	Boring Terminated at 6.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

SCDOT Soil Test Log

Project ID:	P044315	County:	Bamberg	Boring No.:	P-6
Site Description:	S-5-458 over Indian Camp Branch			Route:	S-5-458
Eng./Geo.:	G. Cantele	Boring Location:	N/A	Offset:	N/A
Elev.:	156.4 ft	Latitude:	33.1464756	Longitude:	-81.08620783
Total Depth:	6 ft	Soil Depth:	6 ft	Core Depth:	ft
Date Started:	2/3/2025				
Date Completed:	2/3/2025				
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME550X	Drill Method:	HSA
Hammer Type:	Automatic	Energy Ratio:	89.8%	Core Size:	N/A
Driller:	L. Guempel	Groundwater:	TOB N/A	24HR	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	<div> <div>● SPT N VALUE ●</div> <div> <div>PL X</div> <div>MC ○</div> <div>LL X</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
	0.0										0 10 20 30 40 50 60 70 80 90
	0.2	PAVEMENT (S-5-458) (3.0-in)		0.3							
		Medium Dense, Moist, Light Gray, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), 2.5Y7/2, No HCl Reaction			SS-1	1	6	8	5	14	●
	2.0	Loose to Medium Dense, Moist, Light Yellowish Brown, Non-Plastic to Low Plasticity, Fine to Medium Sandy SILT (ML/A-4), 2.5Y6/4, No HCl Reaction		2.0							
					SS-2	1	3	3	4	6	●
		@SS-3: Brownish Yellow, 10YR6/6		4.0							
					SS-3	4	5	6	7	11	●
151.4	6.0	Boring Terminated at 6.0-ft Below the Existing Roadway Surface. Boring Achieved Target Depth.									

LEGEND

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

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 3 SUBSURFACE EXPLORATION LOGS

SECTION 3B BULK SOIL SAMPLE (BS) LOGS

SCDOT Soil Test Log

Project ID: P044315				County: Bamberg		Boring No.: BS-1	
Site Description: S-5-458 over Indian Camp Branch				Route: S-5-458			
Eng./Geo.: G. Cantele		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.: N/A ft		Latitude:		Longitude:		Date Started: 2/3/2025	
Total Depth: 6 ft		Soil Depth: 5 ft		Core Depth: ft		Date Completed: 2/3/2025	
Bore Hole Diameter (in): 4.25		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME550X		Drill Method: HSA		Hammer Type: Automatic		Energy Ratio: 89.8%	
Core Size: N/A		Driller: L. Guempel		Groundwater: TOB N/A		24HR Backfilled	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	PAVEMENT (S-5-458) (4.0-in)									
	0.3	Moist, Yellowish Brown, Non-Plastic, Silty SAND (SM/A-2-4), 10YR5/6 @BS-1: LL=NP, PL= NP, PI=NP, NMC= 14.1%, %200=16.2 <i>Composite Bulk Soil Sample BS-1 was Formed Using the Upper 6.0-ft. of Auger Cuttings Encountered within Soil Test Borings P-1 Through P-6.</i>		0.3							
					BS-1						
	6.0	Boring Terminated 5.0-ft Below the Existing Roadway Surface. Boring Acheived Target Depth.									

LEGEND

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

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4

LABORATORY TEST RESULTS

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4A SPLIT SPOON SAMPLES



SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
B-1	10.0	NP	NP	NP	4.76	6	SP-SM	20.8			
B-1	15.0	NP	NP	NP	4.76	11	SP-SM	26.8			
B-1	20.0	NP	NP	NP	4.76	18	SM	25.5			
B-1	40.0	43	27	16	9.51	70	ML	67.9			
B-1	55.0	NP	NP	NP	4.76	13	SM	27.9			
B-2	8.0	NP	NP	NP	2	5	SP	21.8			
B-2	10.0	NP	NP	NP	4.76	7	SP-SM	22.5			
B-2	20.0	28	16	12	4.76	17	SC	28.2			
B-2	25.0	NP	NP	NP	9.51	3	SP	21.5			
B-2	35.0	48	17	31	9.51	59	CL	90.7			
B-2	45.0	NP	NP	NP	19	13	SM	34.8			



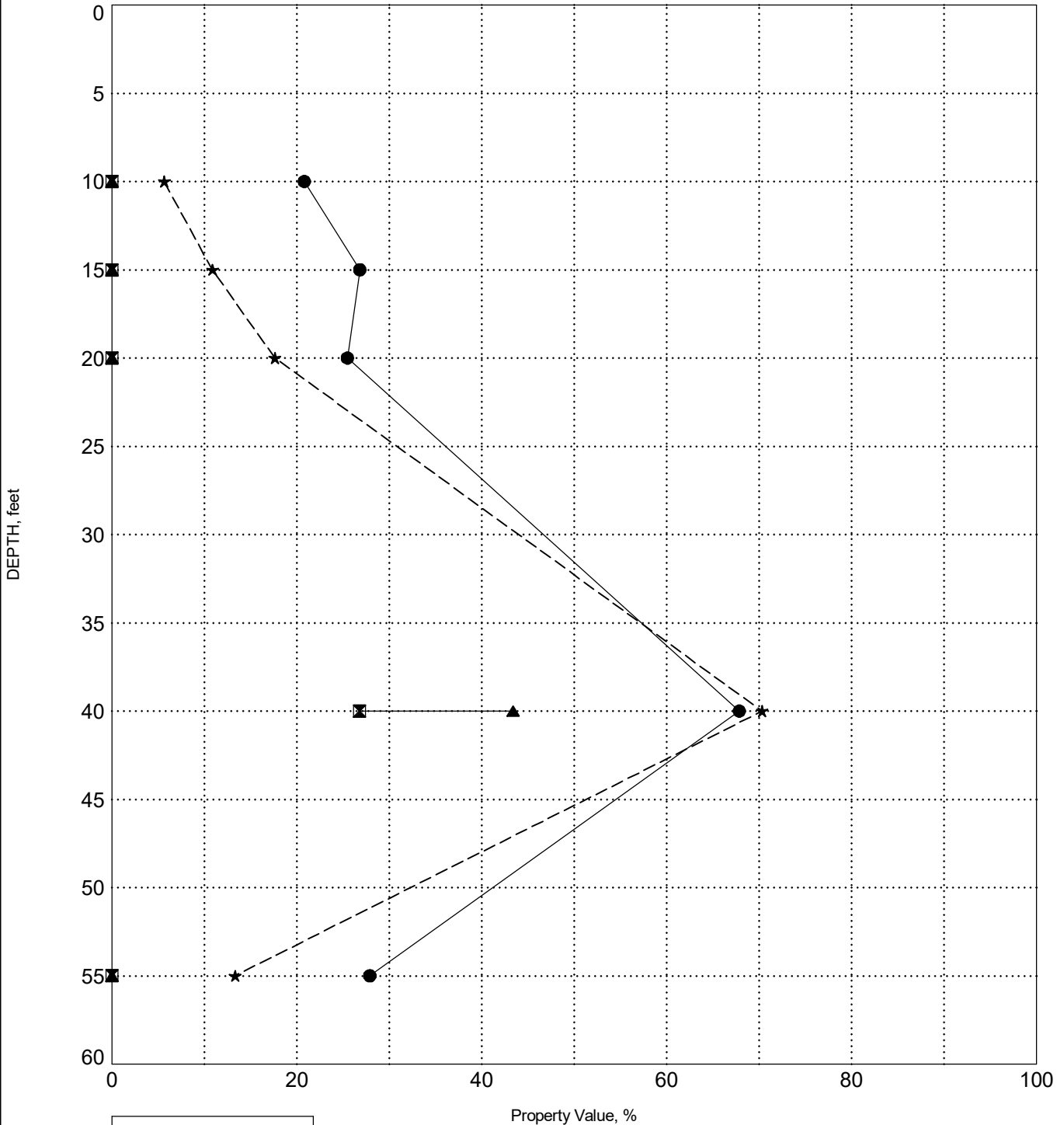
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

BORING B-1



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

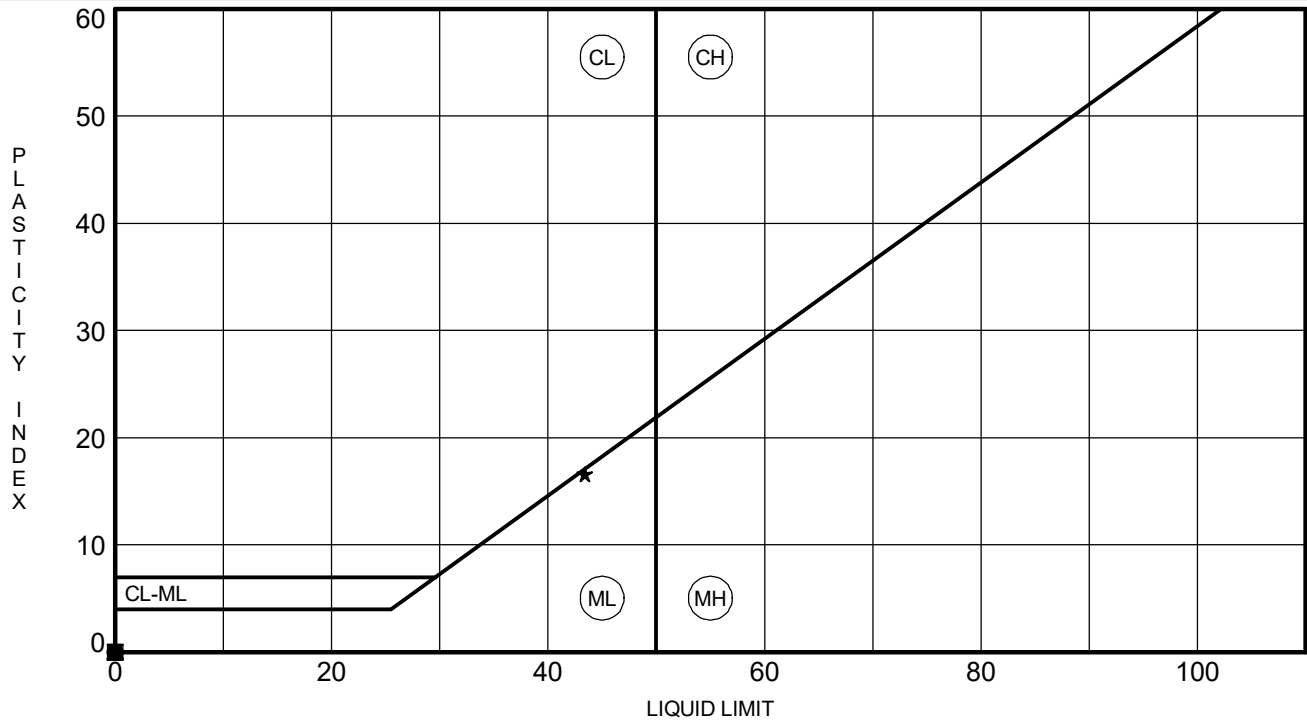


ATTERBERG LIMITS' RESULTS

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg



ATTERBERG LIMITS G7100.009 - TASK 00060 - S-5-458 OVER INDIAN CAMP BRANCH.GPJ SCDOT DATA TEMPLATE 01_30_2015.GDT 2/8/25

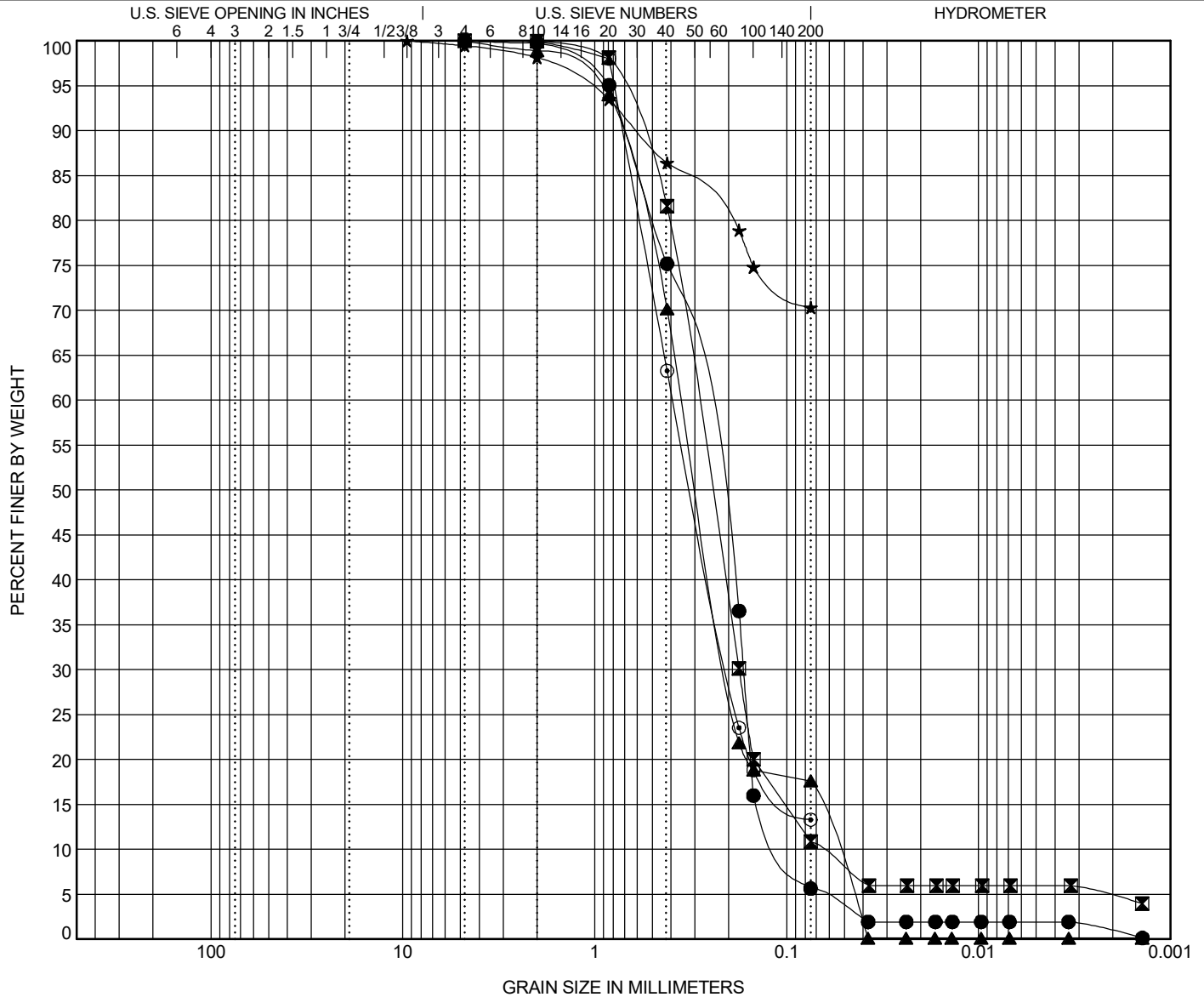


GRAIN SIZE DISTRIBUTION

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification					LL	PL	PI	Cc	Cu
●	B-1	10.0	POORLY GRADED SAND with SILT (SP-SM/A-3)					NP	NP	NP	0.94	2.99
☒	B-1	15.0	POORLY GRADED SAND with SILT (SP-SM/A-2-4)					NP	NP	NP	1.61	4.42
▲	B-1	20.0	SILTY SAND (SM/A-2-4)					NP	NP	NP	2.15	6.30
★	B-1	40.0	SILT with SAND (ML/A-7-6)					43	27	16		
⊙	B-1	55.0	SILTY SAND (SM/A-2-4)					NP	NP	NP		
BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	B-1	10.0	4.76	0.299	0.168	0.1	0.0	94.3	3.7	1.9		
☒	B-1	15.0	4.76	0.292	0.177	0.066	0.0	89.1	4.9	6.0		
▲	B-1	20.0	4.76	0.35	0.205	0.056	0.0	82.4	17.5	0.1		
★	B-1	40.0	9.51				0.5	29.2	70.3			
⊙	B-1	55.0	4.76	0.391	0.204		0.0	86.7	13.3			

F&ME CONSULTANTS, INC.**MOISTURE CONTENT DETERMINATION
(AASHTO T265)**

PROJECT:	S-5-458 over Indian Camp Branch	SCDOT PROJECT No.:	P044315
SAMPLE NUMBER:	25-0244	DATE SAMPLE RECEIVED:	1/30/2025
DESCRIPTION OF SOIL:	Various		
TESTED BY:	ABB	DATE SETUP:	1/31/2025
WEIGHED BY:	AGB	DATE OF WEIGHING:	2/3/2025

BORING NO.	B-1	B-1	B-1	B-1	B-1
SAMPLE NO.	SS-4	SS-6	SS-7	SS-9	SS-12
SAMPLE DEPTH (FT.)	6.0 - 8.0	135.5 - 15.0	18.5 - 20.0	38.5 - 40.0	53.5 - 55.0
WATER CONTENT, W%	20.8	26.8	25.5	67.9	27.9

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					



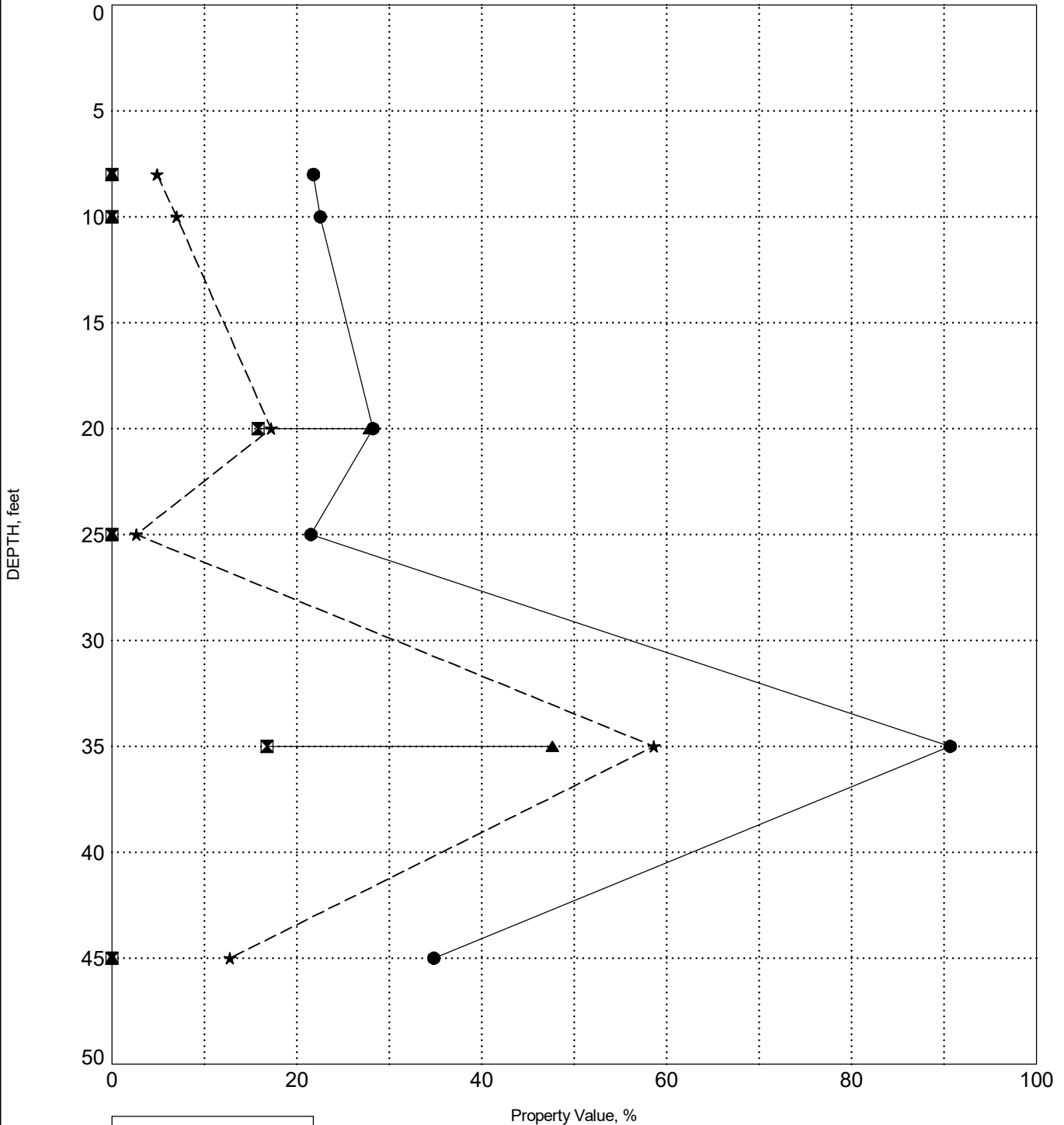
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

BORING B-2



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

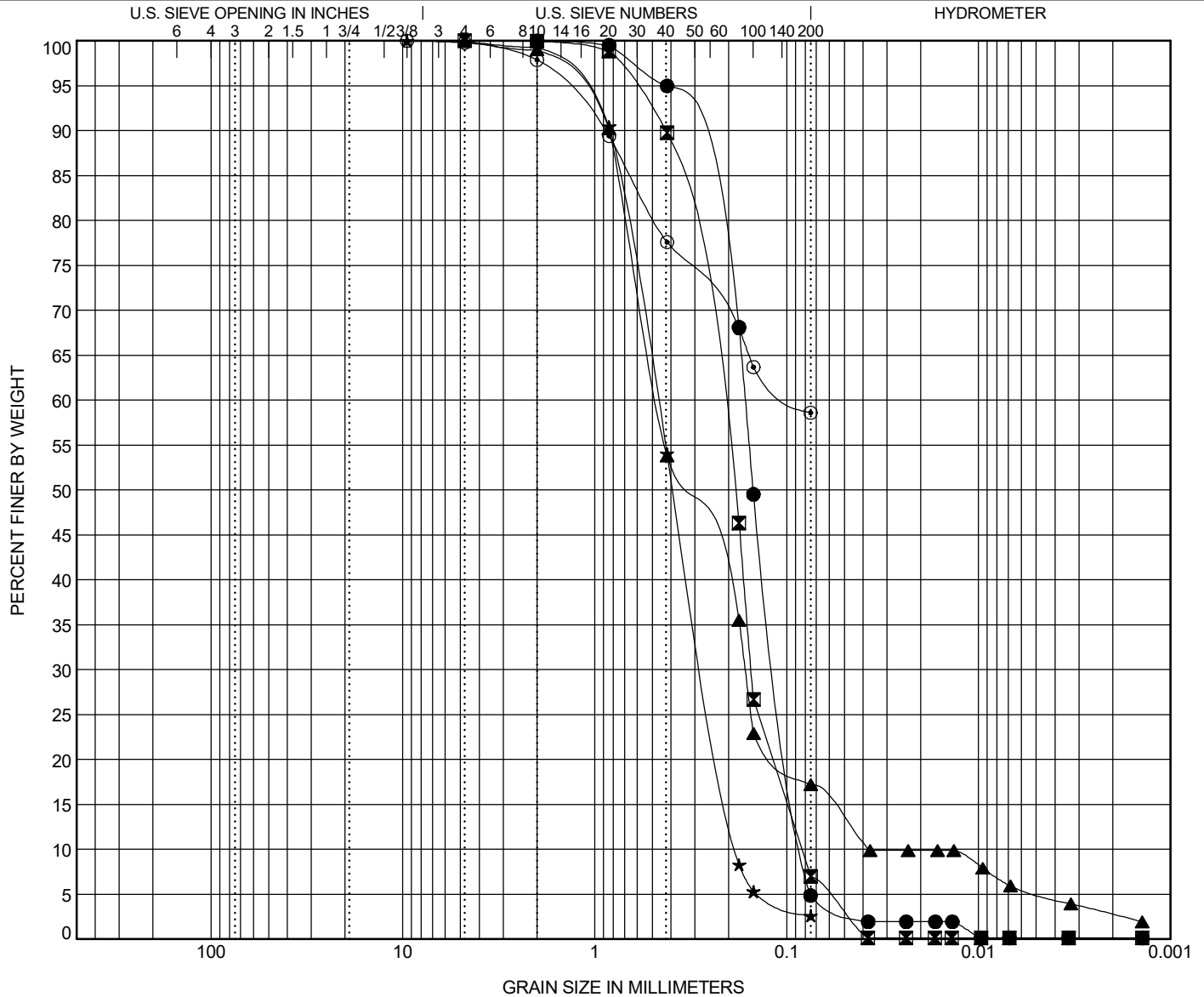


GRAIN SIZE DISTRIBUTION

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu	
●	B-2	8.0	POORLY GRADED SAND (SP/A-3)					NP	NP	NP	0.91	2.02
☒	B-2	10.0	POORLY GRADED SAND with SILT (SP-SM/A-3)					NP	NP	NP	1.22	2.79
▲	B-2	20.0	CLAYEY SAND (SC/A-2-6)					28	16	12	1.54	12.75
★	B-2	25.0	POORLY GRADED SAND (SP/A-3)					NP	NP	NP	0.83	2.57
◎	B-2	35.0	SANDY LEAN CLAY (CL/A-7-6)					48	17	31		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
●	B-2	8.0	2	0.164	0.11	0.081	0.0	95.1	4.7	0.1		
☒	B-2	10.0	4.76	0.232	0.153	0.083	0.0	93.0	6.8	0.1		
▲	B-2	20.0	4.76	0.473	0.164	0.037	0.0	82.8	12.1	5.1		
★	B-2	25.0	9.51	0.471	0.267	0.183	0.1	97.3	2.6			
◎	B-2	35.0	9.51	0.09			0.2	41.2	58.6			

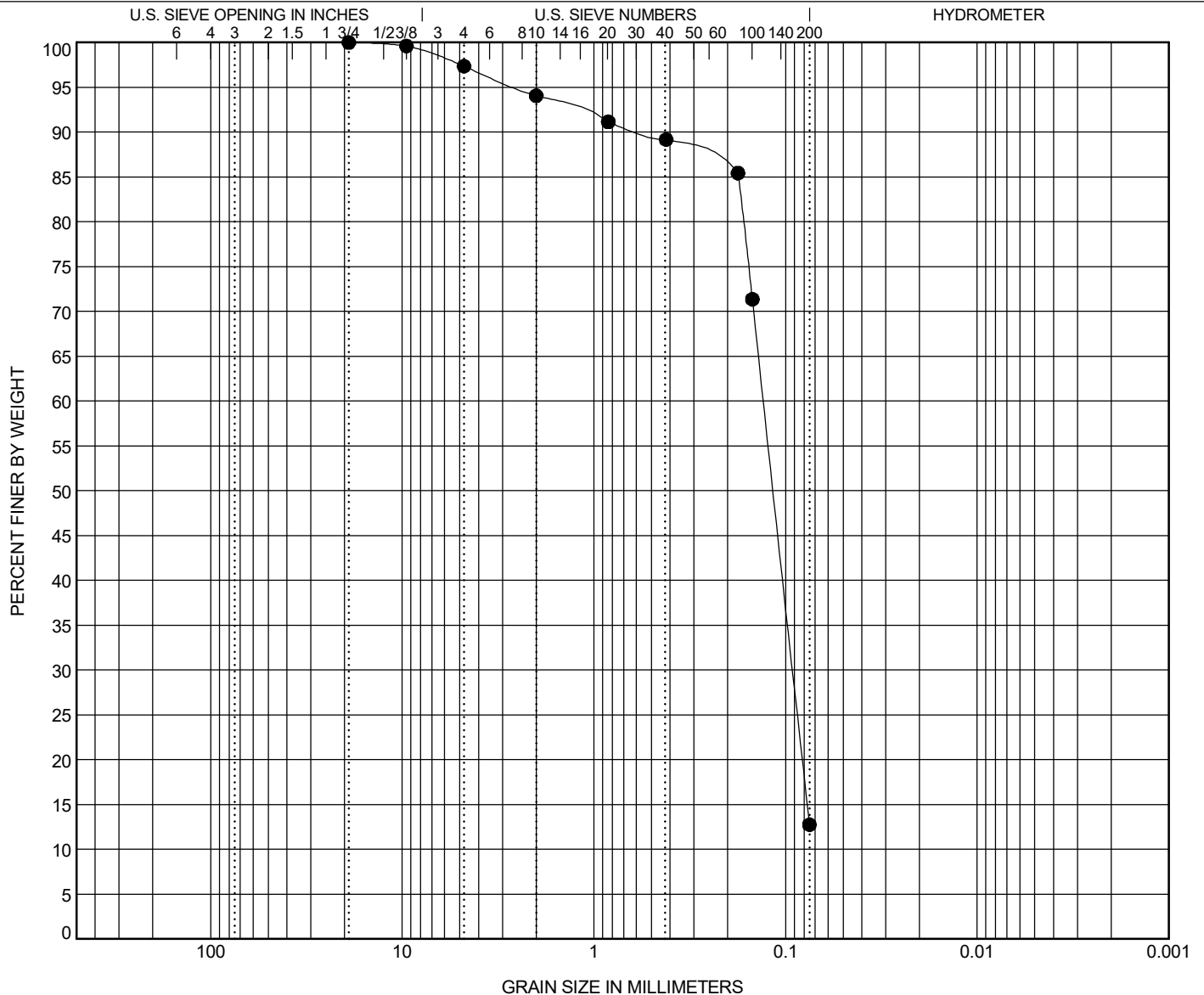


GRAIN SIZE DISTRIBUTION

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

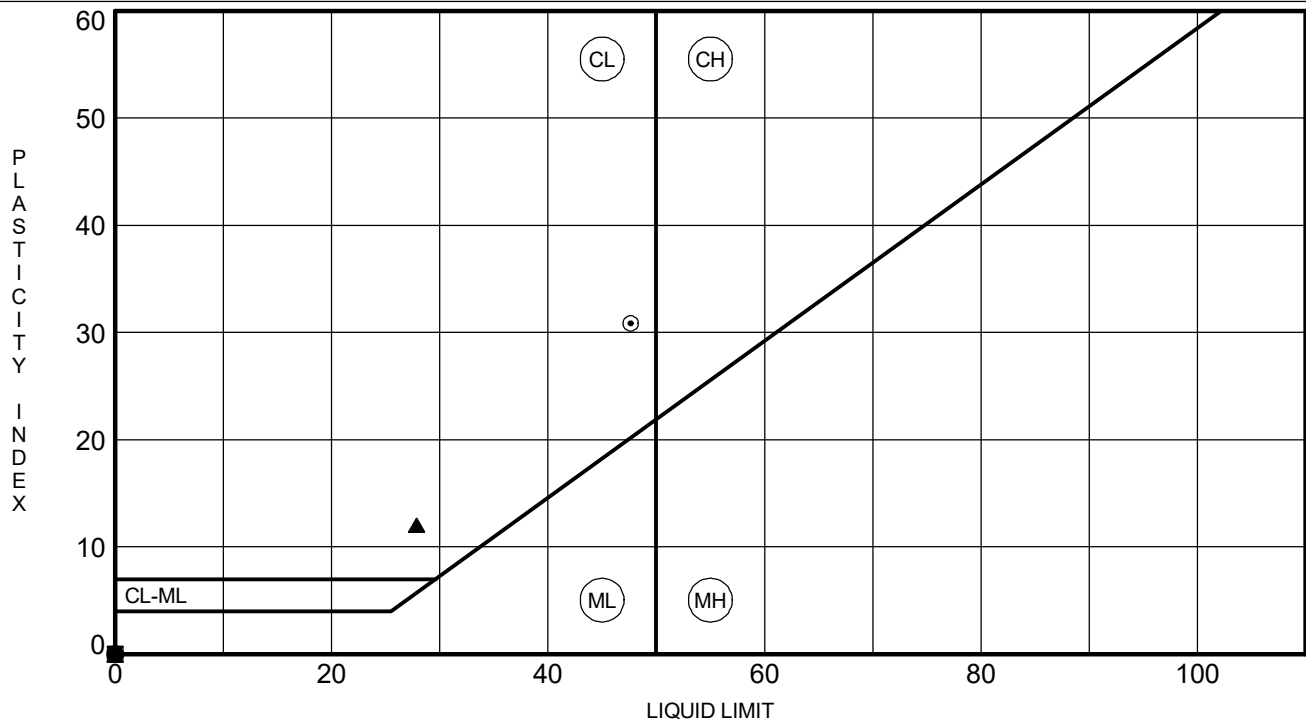
BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-2	45.0	SILTY SAND (SM/A-2-4)					NP	NP	NP		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● B-2	45.0	19	0.13	0.092		2.6	84.6	12.8			

ATTERBERG LIMITS' RESULTS

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

[illegible]

F&ME CONSULTANTS, INC.**MOISTURE CONTENT DETERMINATION
(AASHTO T265)****PROJECT:** S-5-458 over Indian Camp Branch**SCDOT PROJECT NO.:** P044315**SAMPLE NUMBER:** 25-0287**DATE SAMPLE RECEIVED:** 1/31/2025**DESCRIPTION OF SOIL:****TESTED BY:** AG & JM**DATE SETUP:** 2/4/2025**WEIGHED BY:** LJ**DATE OF WEIGHING:** 2/5/2025

BORING NO.	B-2	B-2	B-2	B-2	B-2
SAMPLE NO.	SS-4	SS-5	SS-7	SS-8	SS-10
SAMPLE DEPTH (FT.)	6.0 - 8.0	8.0 - 10.0	18.5 - 20.0	23.5 - 25.0	33.5 - 35.0
WATER CONTENT, W%	21.8	22.5	28.2	21.5	90.7

BORING NO.	B-2				
SAMPLE NO.	SS-12				
SAMPLE DEPTH (FT.)	43.5 - 45.0				
WATER CONTENT, W%	34.8				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4B BULK SOIL SAMPLES



SUMMARY OF LABORATORY RESULTS

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

Boring No.	Sample Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	%<#200 Sieve	Soil Classification	Moisture Content (%)	Max Dry Density (PCF)	Optimum Moisture Content (%)	C (psi)	ϕ (Degrees)	C' (psi)	ϕ' (Degrees)
BS-1	0.0 – 6.0	NP	NP	NP	16.2	SM	14.1	120.9	11.4	--	--	--	--



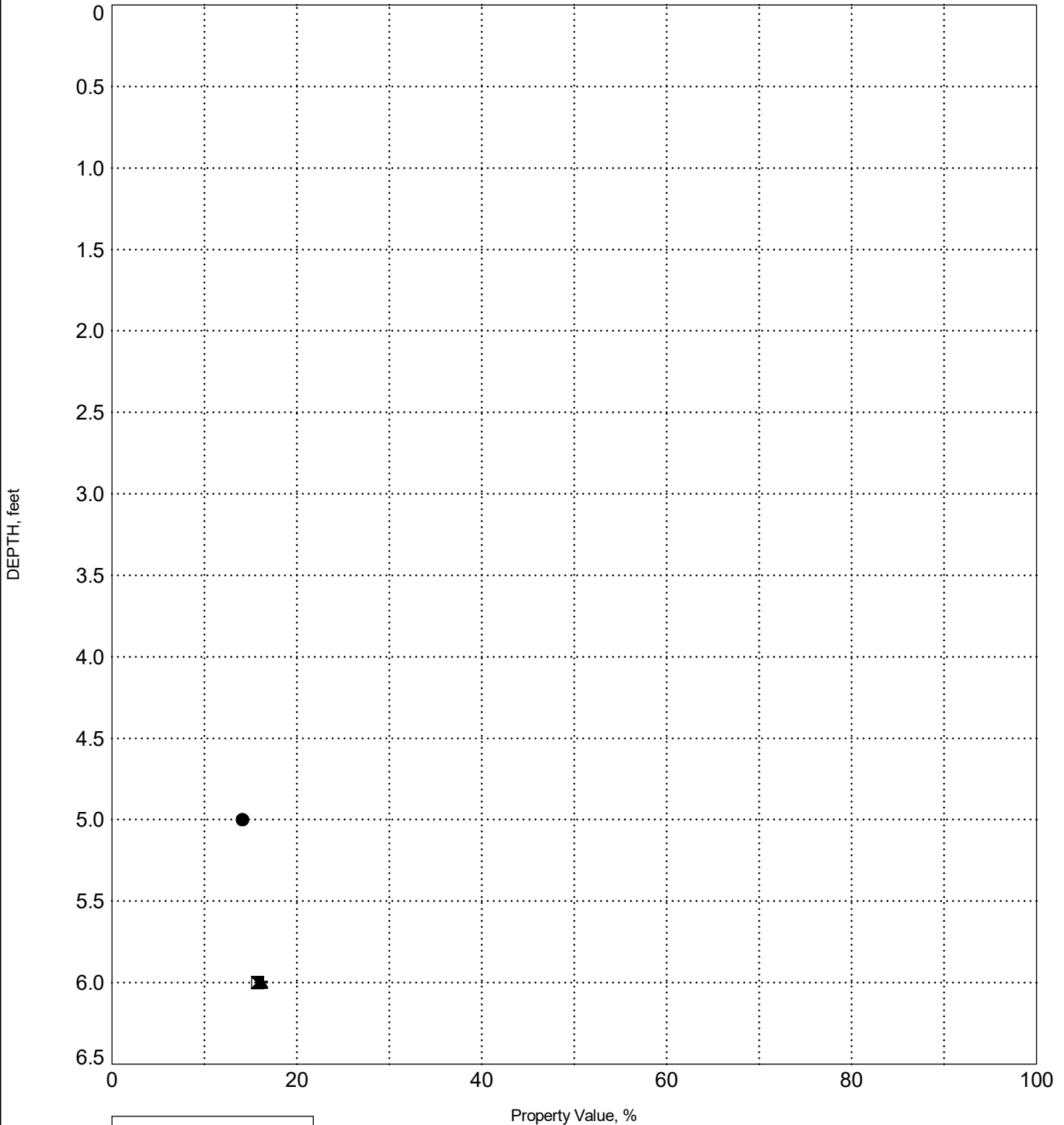
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

BORING BS-1



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

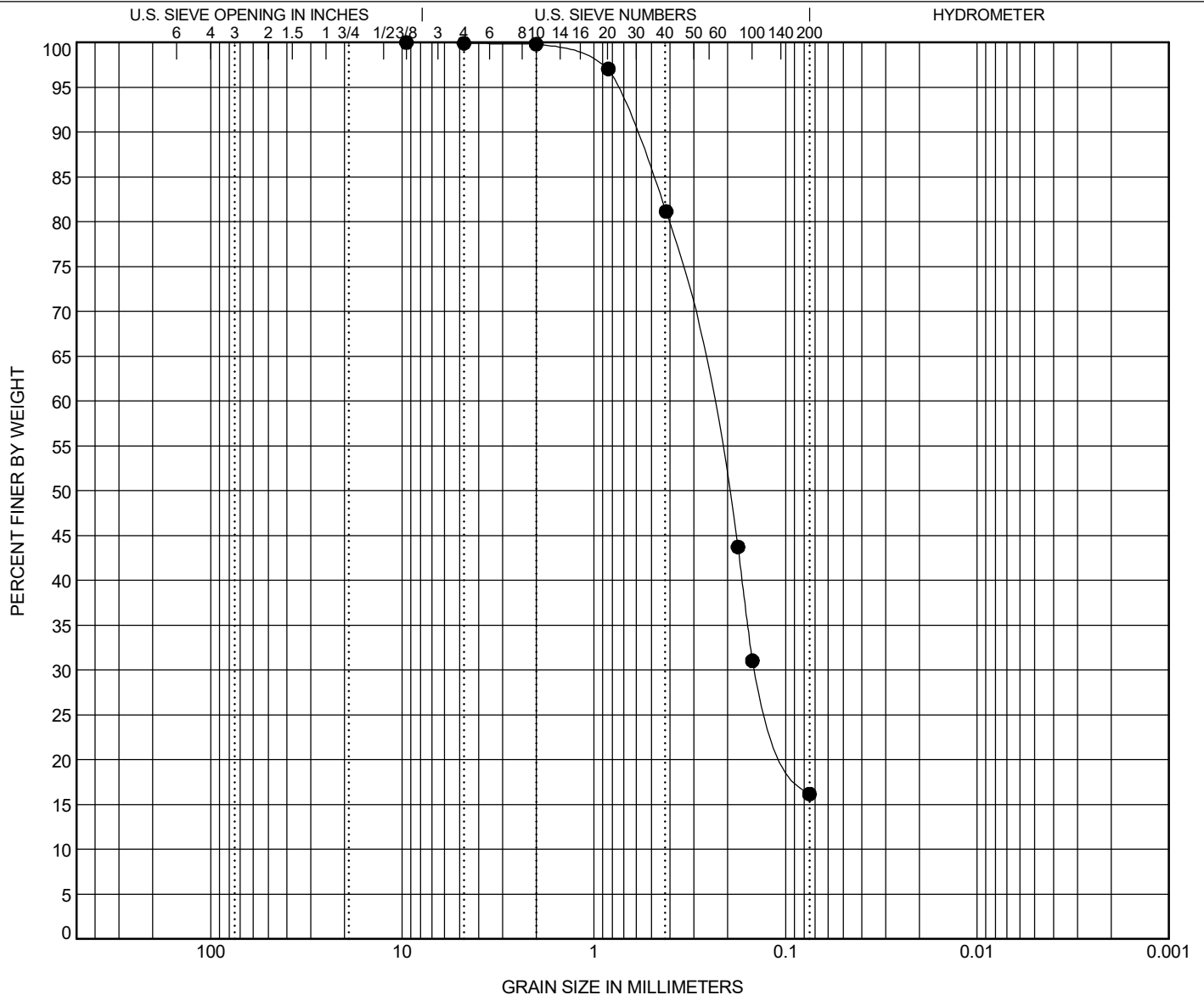


GRAIN SIZE DISTRIBUTION

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

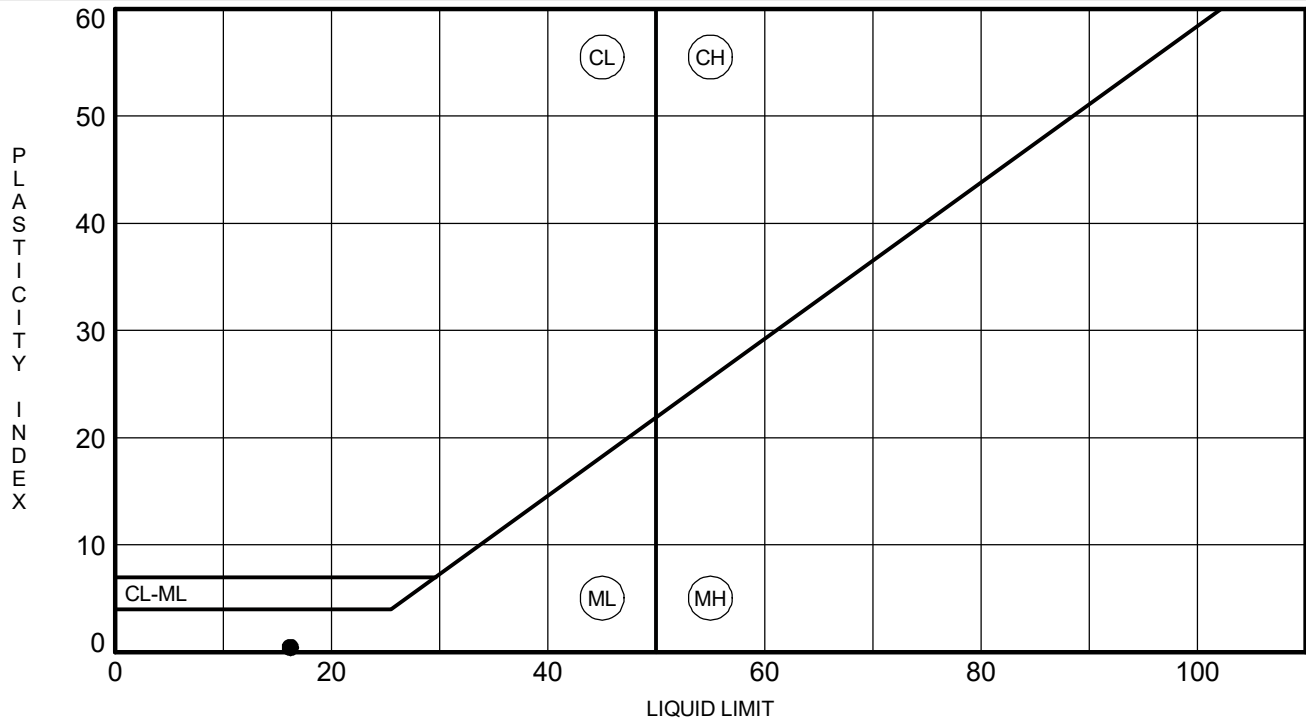


ATTERBERG LIMITS' RESULTS

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

[illegible]

F&ME CONSULTANTS, INC.**MOISTURE CONTENT DETERMINATION
(AASHTO T265)**

PROJECT:	S-5-458 over Indian Camp Branch	SCDOT PROJECT NO.:	P044315
SAMPLE NUMBER:	25-0245	DATE SAMPLE RECEIVED:	2/4/2025
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	LJ	DATE SETUP:	2/4/2025
WEIGHED BY:	AGB	DATE OF WEIGHING:	2/5/2025

BORING NO.	BS-1				
SAMPLE NO.	--				
SAMPLE DEPTH (FT.)	0.0 - 6.0				
WATER CONTENT, W%	14.1				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH (FT.)					
WATER CONTENT, W%					

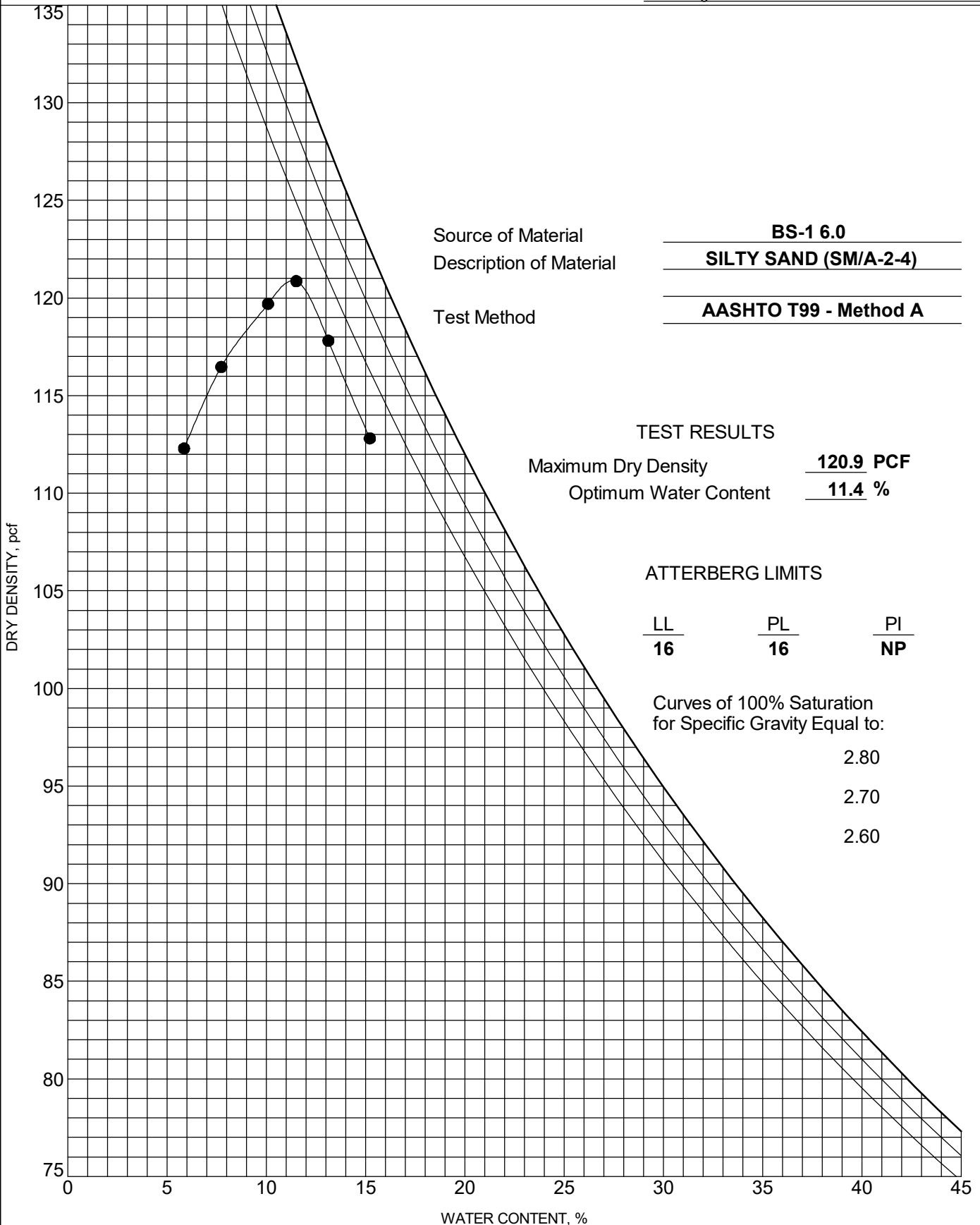


MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg



CALIFORNIA BEARING RATIO (CBR) AASHTO T193

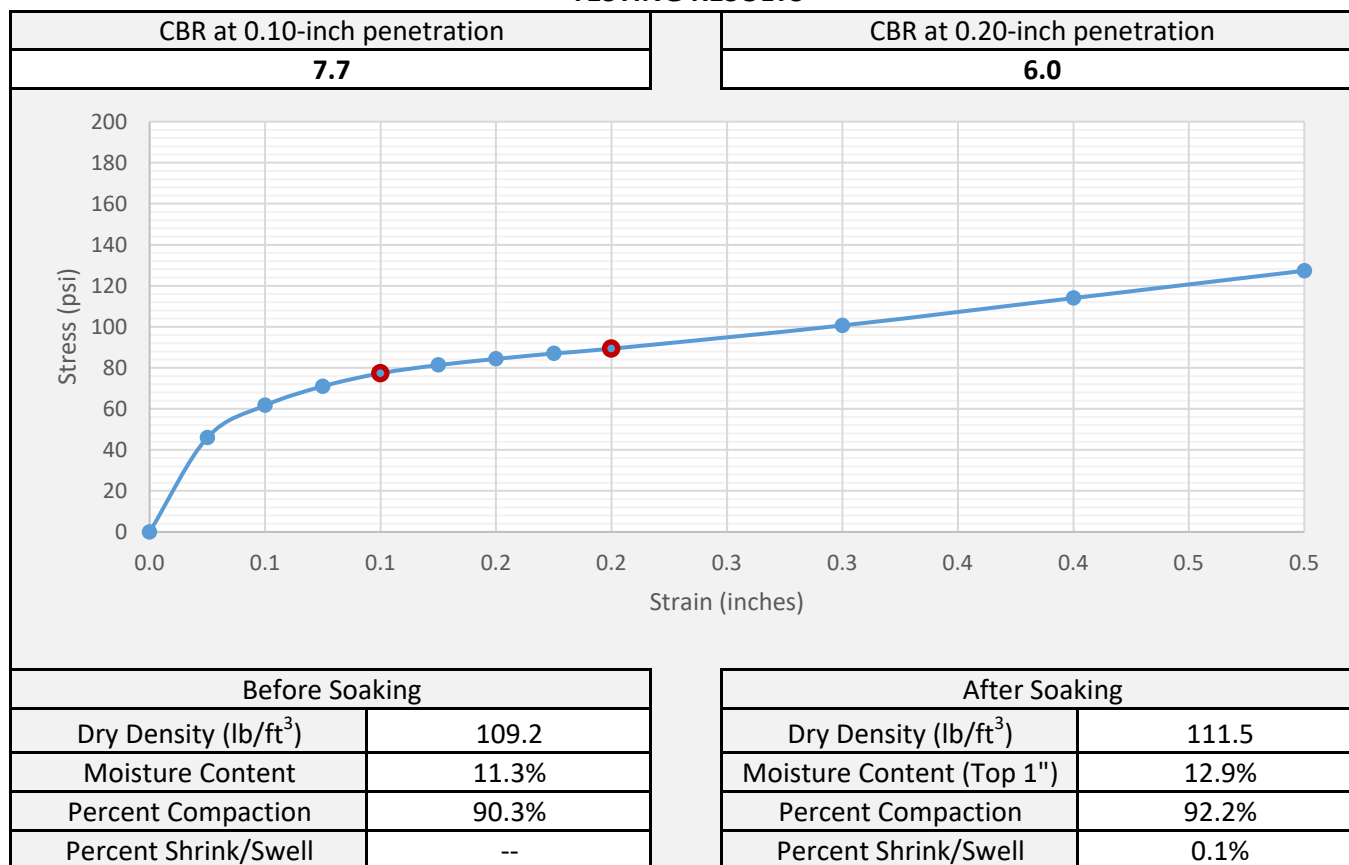
SAMPLE INFORMATION

Project Name	S-5-458 over Indian Camp Branch			Project No.	G7100.009 - Task 00060
Sample Location	BS-1			FME Lab ID	25-0245
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 6.0
Date Sampled	--	Sampled By:	FME	Date Received	1/30/2025
Date Test Began	2/6/2025	Date Completed	2/10/2025	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft ³)	120.9	Optimum Moisture Content (%)	11.4
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS



ADDITIONAL COMMENTS

Target %Compaction = 90%

	F&ME Consultants, Inc. <small>211 Business Park Blvd., Columbia, South Carolina 29203</small>	 <hr/> Reviewed By	<hr/> 2/11/2025 Date
---	---	---	-------------------------

CALIFORNIA BEARING RATIO (CBR) AASHTO T193

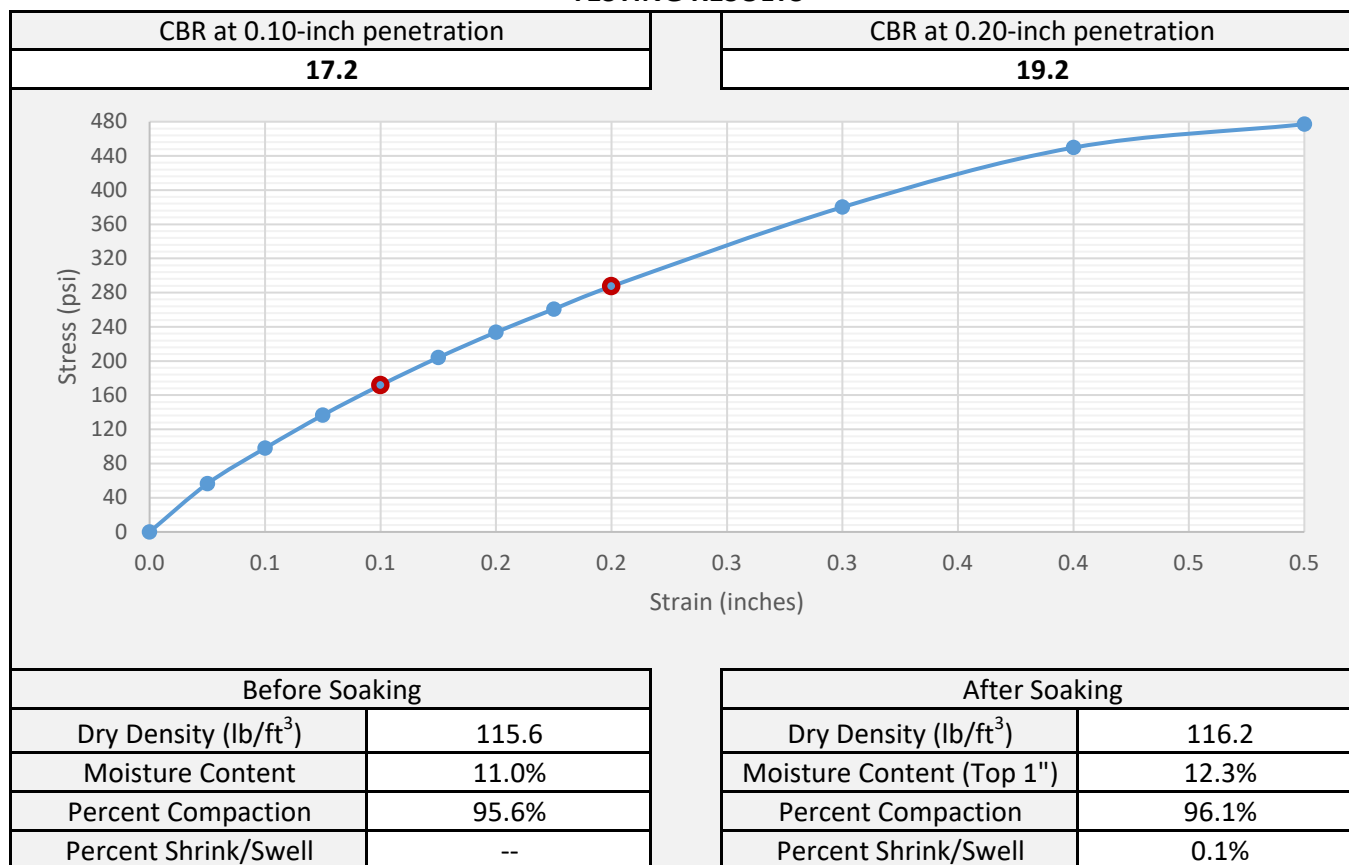
SAMPLE INFORMATION

Project Name	S-5-458 over Indian Camp Branch			Project No.	G7100.009 - Task 00060
Sample Location	BS-1			FME Lab ID	25-0245
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 6.0
Date Sampled	--	Sampled By:	FME	Date Received	1/30/2025
Date Test Began	2/6/2025	Date Completed	2/10/2025	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft ³)	120.9	Optimum Moisture Content (%)	11.4
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS



ADDITIONAL COMMENTS

Target %Compaction = 95%

	F&ME Consultants, Inc. 211 Business Park Blvd., Columbia, South Carolina 29203		2/11/2025
		Reviewed By	Date

CALIFORNIA BEARING RATIO (CBR) AASHTO T193

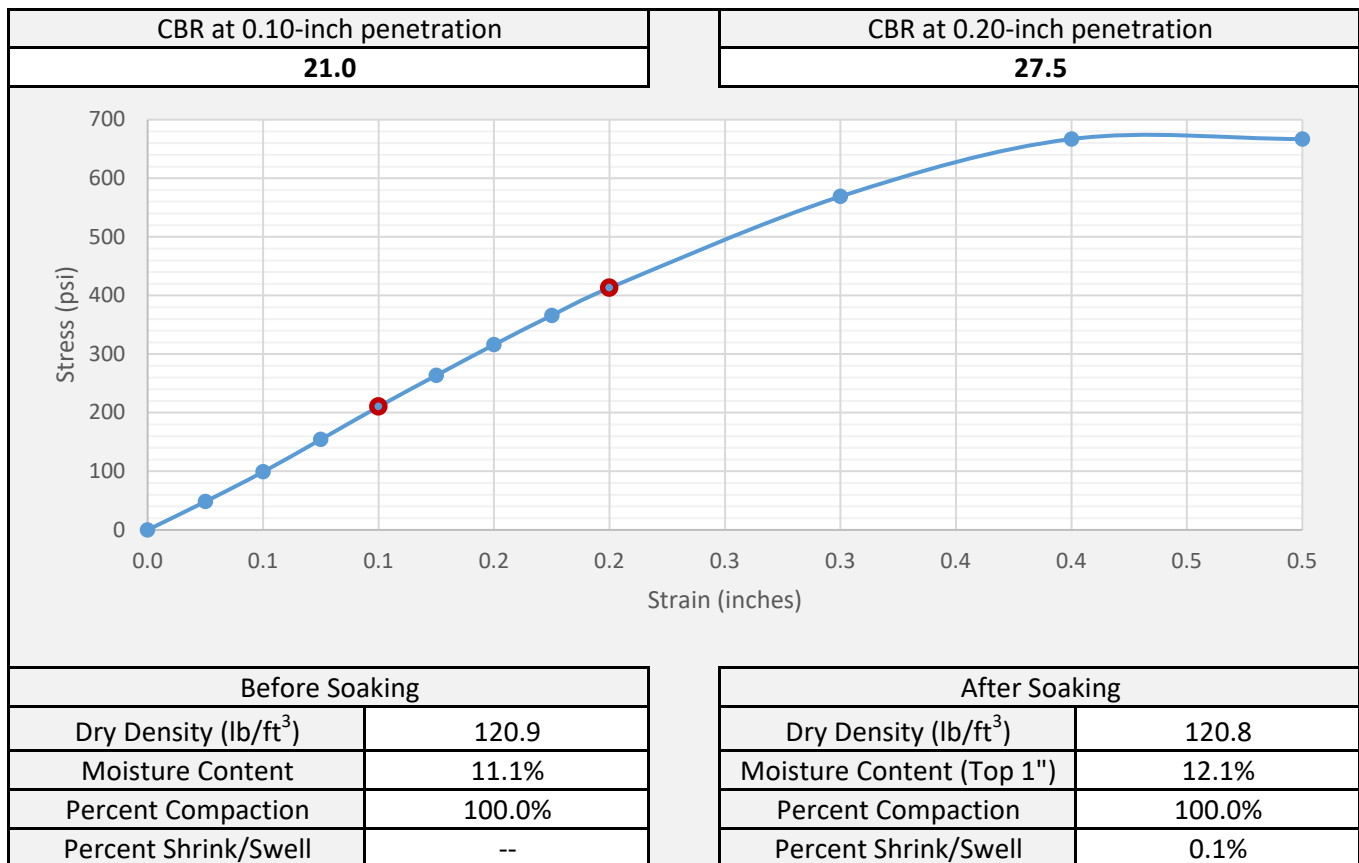
SAMPLE INFORMATION

Project Name	S-5-458 over Indian Camp Branch			Project No.	G7100.009 - Task 00060
Sample Location	BS-1			FME Lab ID	25-0245
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 6.0
Date Sampled	--	Sampled By:	FME	Date Received	1/30/2025
Date Test Began	2/6/2025	Date Completed	2/10/2025	Tested By	DH

MOLDING CHARACTERISTICS


Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft ³)	120.9	Optimum Moisture Content (%)	11.4
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS



ADDITIONAL COMMENTS

Target %Compaction = 100%

	F&ME Consultants, Inc. <small>211 Business Park Blvd., Columbia, South Carolina 29203</small>	 <hr/> Reviewed By	2/11/2025 <hr/> Date
---	---	---	-------------------------

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4C CORROSION SERIES TESTING

CORROSION SERIES SUMMARY

PAGE 1 OF 1



PROJECT ID P044315

PROJECT NAME S-5-458 over Indian Camp Branch

PROJECT COUNTY Bamberg

Borehole	Sample No.	Sample Depth (ft.)	pH of Soil in Distilled Water	Electrical Resistivity (Ω -cm)	Chloride Content (mg/kg (ppm))	Sulfate Content (mg/kg (ppm))
B-1	SS-3/SS-4	4.0 – 8.0	6.8	36,649	30.84	61.1
B-2	SS-2/SS-3	2.0 – 6.0	5.4	8,375	8.97	47.1

**pH DETERMINATION
(AASHTO T289)**

Project Name:	S-5-458 over Indian Camp Branch	SCDOT Project Number:	P044315
FME Project No.:	G7100.009 - Task 00060	FME Lab ID No.:	25-0244
Description:	Soil (Composite)	Date Received	1/30/2025
Tested By:	A. Grier	Date Tested:	2/3/2025

Boring ID	B-1
Sample ID	SS-3/SS-4
Sample Depth	4.0 - 8.0
pH Value	6.8
Temperature (°C)	20.2

Date Reviewed: 2/3/2025Reviewed By: A. Abernethy

**SOIL RESISTIVITY
(AASHTO T288)**

Project Name:	S-5-458 over Indian Camp Branch	SCDOT Project ID:	P044315
Location:	B-1	FME Lab ID No.:	25-0244
Sampled By:	FME (G. Cantele)	Date Sampled:	1/30/2025
Soil Description:	Soil (Composite)	Date Received:	1/30/2025
Tested By:	A. Broskey	Date Tested:	2/4/2025

Sample Number	Sample Depth (ft.)	Minimum Soil Resistivity, Ω -cm
SS-3/SS-4	4.0 - 8.0	36,649

Date Reviewed: 2/4/2025 Reviewed By: A. Abernethy

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: F&ME Consultants, Inc.
 Client Reference: Indian Camp Branch G7100.009
 Project No.: 2025-085-001
 Lab ID: 2025-085-001-001

Boring No.: B-1
 Depth (ft): 4.0-8.0'
 Sample No.: SS-3/SS-4
 Description: Dark Brown & Gray
 (- # 10 Sieve material)

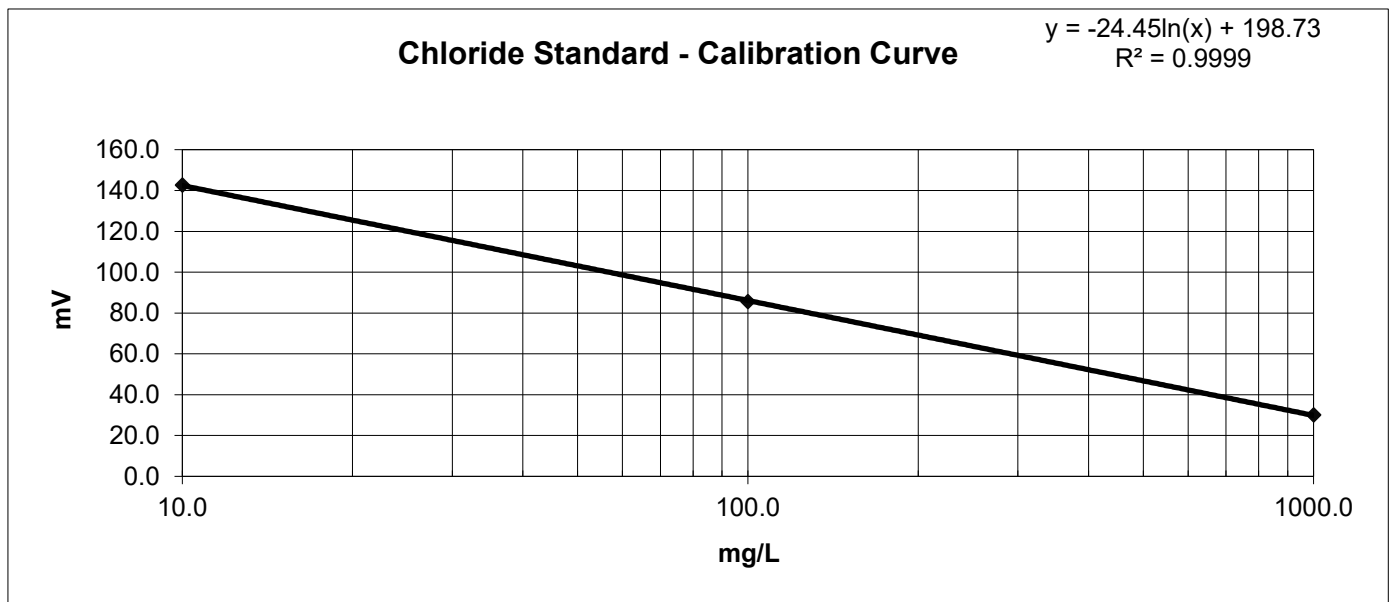
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD	MILLIVOLTS (mV)
10.0 mg/L	142.7
100.0 mg/L	85.6
1000.0 mg/L	30.1

MEASUREMENT OF CHLORIDES

Sample Weight (g):	100.0	CONCENTRATION	CONCENTRATION
Water added to Sample (ml):	100.0	(mg/L)	(mg/kg)
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	114.9	30.84	30.84

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO₃ solution (1:1 volume).
 2) Samples were dried for a minimum of 12 hours at 110 °/ 5°C.



Notes:

Tested By JAM Date 2/11/25 Checked By EG Date 2/12/25

Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.: B-1
Client Reference:	Indian Camp Branch G7100.009	Depth (ft): 4.0-8.0'
Project No.:	2025-085-001	Sample No.: SS-3/SS-4
Lab ID:	2025-085-001-001	Soil Description: Dark Brown & Gray

Sulfate Standard - Calibration Curve Spectrophotometer Readings

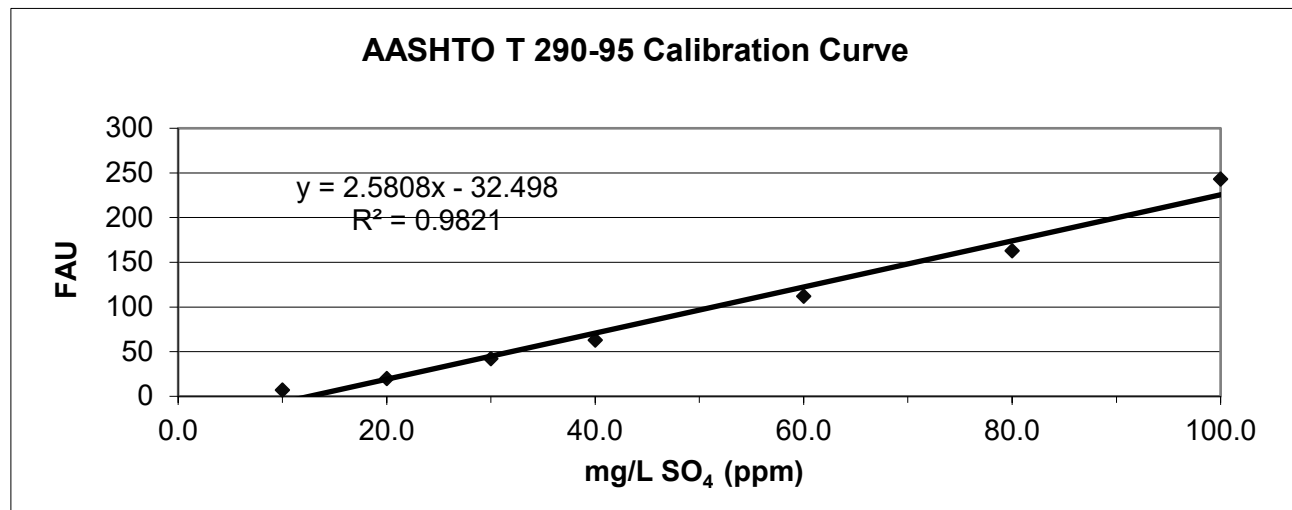
<u>Sulfate Ion Concentrations (mg/L)</u>								
0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0
<u>Spectrophotometer Readings (FAU)</u>								
Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl₂·2H₂O)

<p>Sample Weight (g): 100.0</p> <p>Water added to Sample (mL): 300.0</p> <p>Size of Sample Aliquot (mL): 50.0</p> <p>Sample Reading (FAU): 20</p> <p>Sample Diluted: No</p> <p>Sulfate Solution Added (ml): 0</p>	<p><u>Sample Moisture Content</u></p> <p>Tare Number: 1649</p> <p>Weight of Tare & Wet Sample (g): 199.17</p> <p>Weight of Tare & Dry Sample (g): 198.98</p> <p>Weight of Tare (g): 83.12</p> <p>Weight of Water (g): 0.19</p> <p>Weight of Dry Sample (g): 115.86</p> <p>Moisture Content (%): 0.16</p>
---	---

Sample Sulfate Ion Concentration:	20.34	mg/L SO ₄ (ppm)
Sample Sulfate Ion Content:	61.0	mg/Kg SO ₄ (not corrected for moisture)
Sample Sulfate Ion Content:	61.1	mg/Kg SO ₄ (corrected for moisture)



Tested by: JAM	Date: 2/12/25	Checked by: EG	Date: 2/12/2025
----------------	---------------	----------------	-----------------

page 1 of 1 DCN: CT-S87 DATE: 3/5/2020 REVISION: 1

**pH DETERMINATION
(AASHTO T289)**

Project Name:	S-5-458 over Indian Camp Branch	SCDOT Project Number:	P044315
FME Project No.:	G7100.009 - Task 00060	FME Lab ID No.:	25-0287
Description:	Soil (Composite)	Date Received	2/3/2025
Tested By:	A. Grier	Date Tested:	2/4/2025

Boring ID	B-2
Sample ID	SS-2/SS-3
Sample Depth	2.0 - 6.0
pH Value	5.43
Temperature (°C)	20.2

Date Reviewed: 2/4/2025Reviewed By: A. Abernethy

**SOIL RESISTIVITY
(AASHTO T288)**

Project Name:	S-5-458 over Indian Camp Branch	SCDOT Project ID:	P044315
Location:	B-2	FME Lab ID No.:	25-0287
Sampled By:	FME (G. Cantele)	Date Sampled:	2/3/2025
Soil Description:	Soil (Composite)	Date Received:	2/3/2025
Tested By:	A. Broskey	Date Tested:	2/4/2025

Sample Number	Sample Depth (ft.)	Minimum Soil Resistivity, Ω -cm
SS-2/SS-3	2.0 - 6.0	8,375

Date Reviewed: 2/4/2025 Reviewed By: A. Abernethy

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: F&ME Consultants, Inc.
 Client Reference: Indian Camp Branch G7100.009
 Project No.: 2025-085-001
 Lab ID: 2025-085-001-002

Boring No.: B-2
 Depth (ft): 2.0-6.0'
 Sample No.: SS-2/SS-3
 Description: Dark Brown & Gray
 (- # 10 Sieve material)

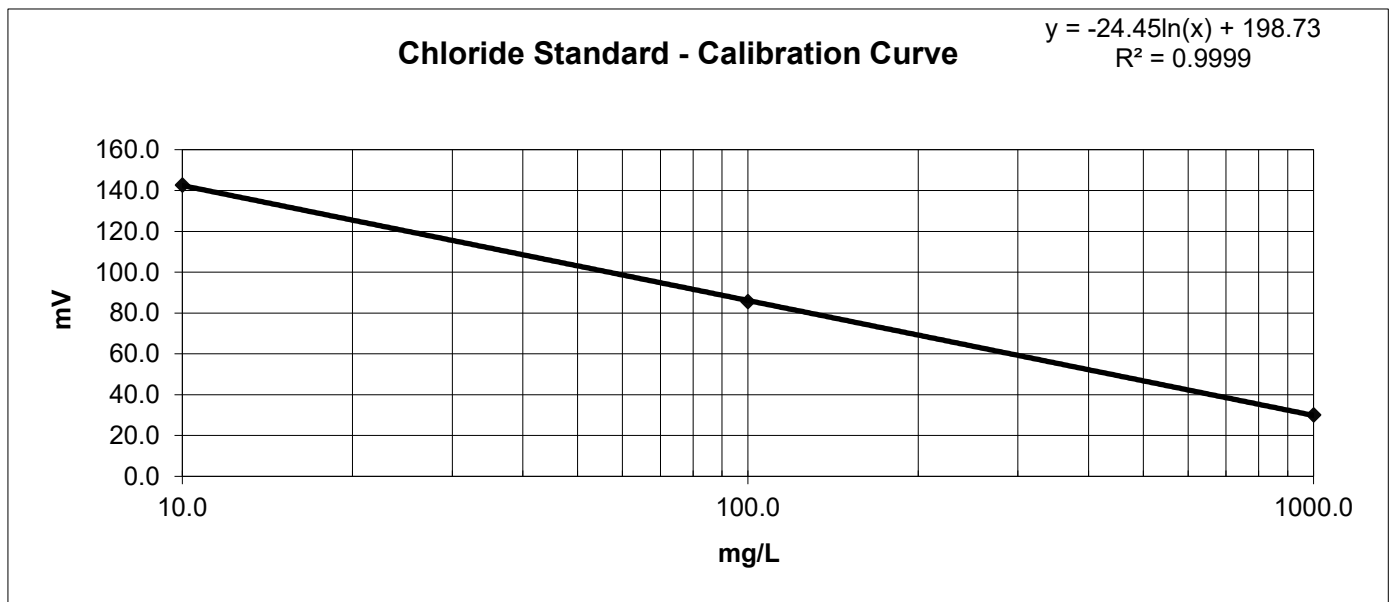
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD	MILLIVOLTS (mV)
10.0 mg/L	142.7
100.0 mg/L	85.6
1000.0 mg/L	30.1

MEASUREMENT OF CHLORIDES

Sample Weight (g):	100.0	CONCENTRATION	CONCENTRATION
Water added to Sample (ml):	100.0	(mg/L)	(mg/kg)
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	145.1	8.97	8.97

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO₃ solution (1:1 volume).
 2) Samples were dried for a minimum of 12 hours at 110 °F. 5°C.



Notes:

Tested By JAM Date 2/11/25 Checked By EG Date 2/12/25

Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.: B-2
Client Reference:	Indian Camp Branch G7100.009	Depth (ft): 2.0-6.0'
Project No.:	2025-085-001	Sample No.: SS-2/SS-3
Lab ID:	2025-085-001-002	Soil Description: Dark Brown & Gray

Sulfate Standard - Calibration Curve Spectrophotometer Readings

<u>Sulfate Ion Concentrations (mg/L)</u>								
0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0
<u>Spectrophotometer Readings (FAU)</u>								
Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl₂·2H₂O)

Sample Weight (g): 100.0
Water added to Sample (mL): 300.0
Size of Sample Aliquot (mL): 50.0
Sample Reading (FAU): 8

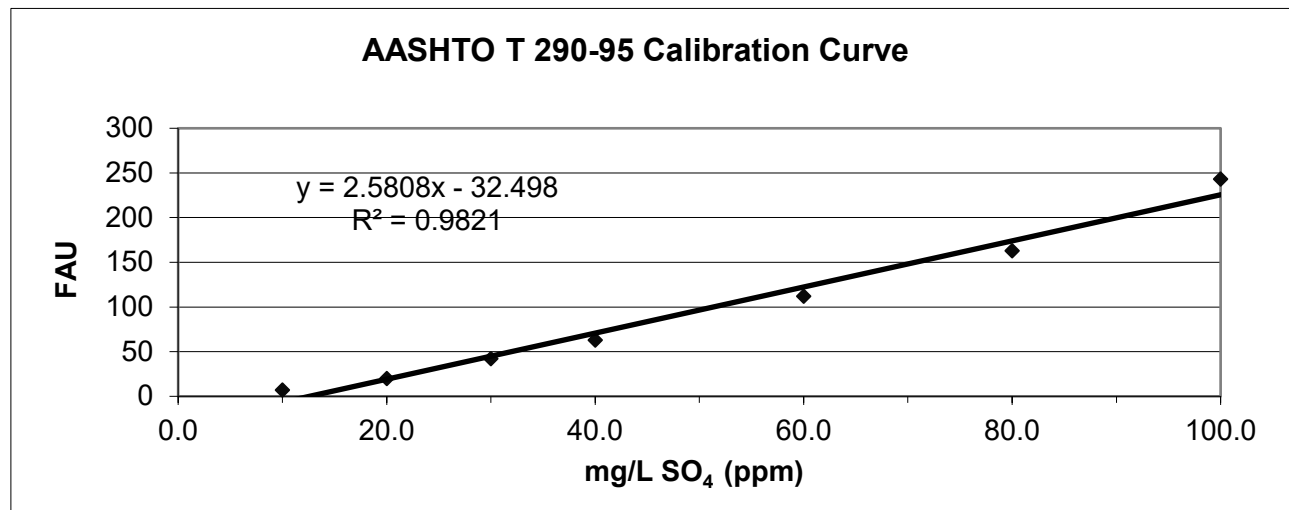
Sample Diluted: No

Sulfate Solution Added (ml): 0

Sample Moisture Content

Tare Number: 579
Weight of Tare & Wet Sample (g): 185.74
Weight of Tare & Dry Sample (g): 185.62
Weight of Tare (g): 82.51
Weight of Water (g): 0.12
Weight of Dry Sample (g): 103.11
Moisture Content (%): 0.12

Sample Sulfate Ion Concentration:	15.69	mg/L SO₄ (ppm)
Sample Sulfate Ion Content:	47.1	mg/Kg SO₄ (not corrected for moisture)
Sample Sulfate Ion Content:	47.1	mg/Kg SO₄ (corrected for moisture)



Tested by: JAM Date: 2/12/25 Checked by: EG Date: 2/12/2025

S-5-458 over Indian Camp Branch

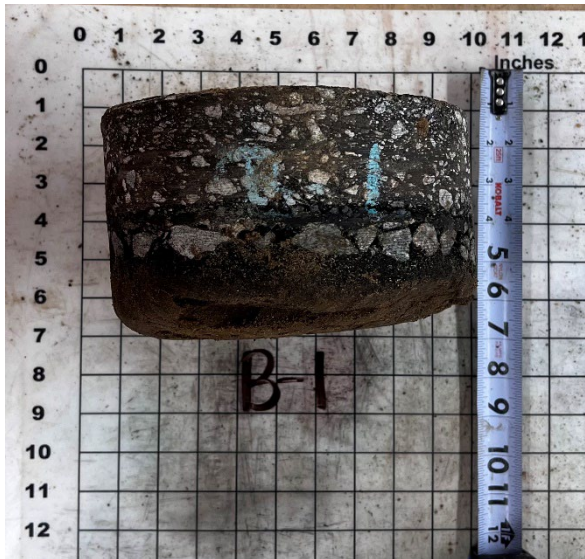
Geotechnical Subsurface Data Report

APPENDIX

SECTION 5

PAVEMENT CORE PHOTOS

Pavement Core Photos



B-1 (Side 1)



B-1 (Side 2)



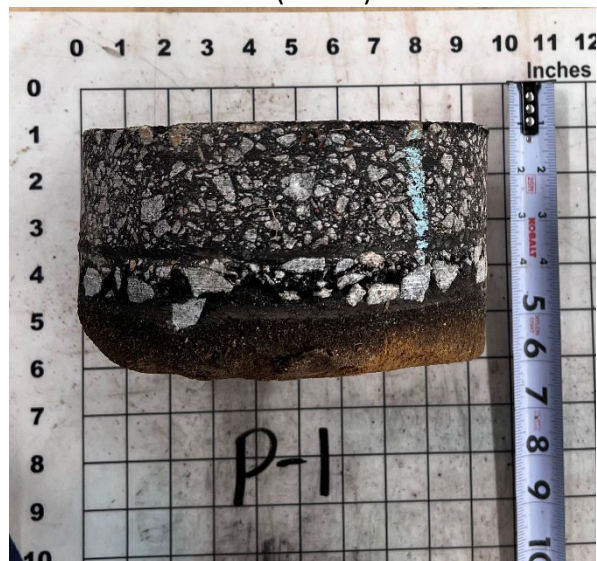
B-2 (Side 1)



B-2 (Side 2)

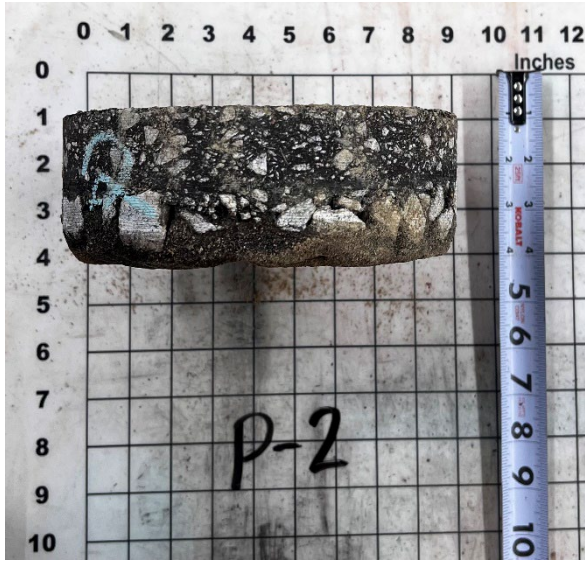


P-1 (Side 1)

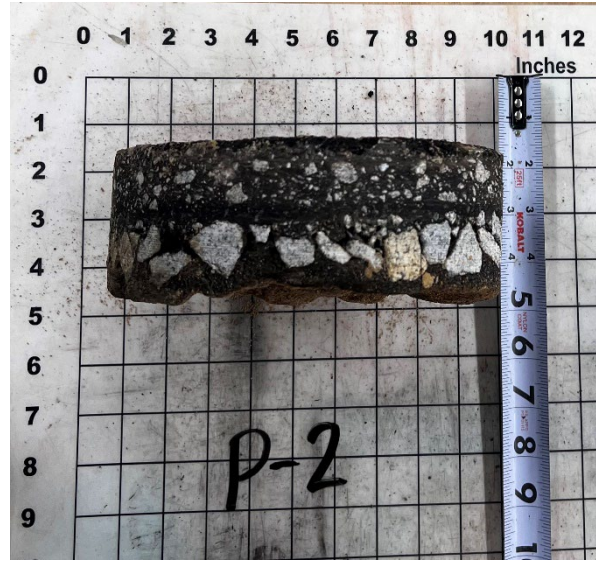


P-1 (Side 2)

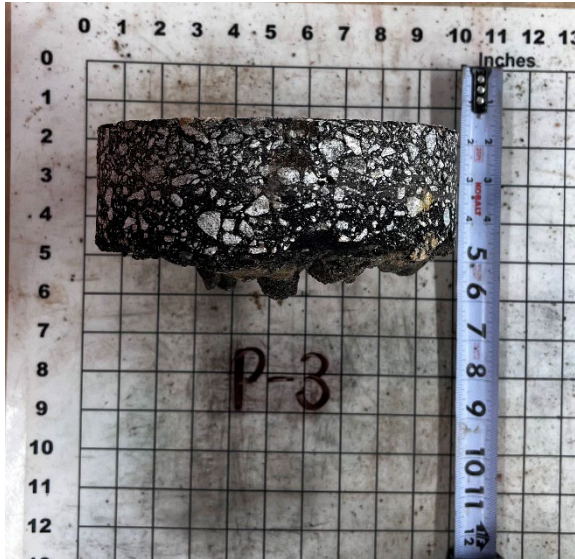
Pavement Core Photos



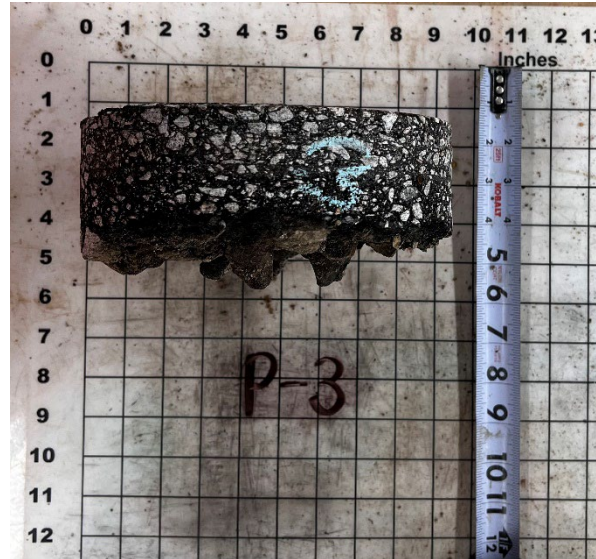
P-2 (Side 1)



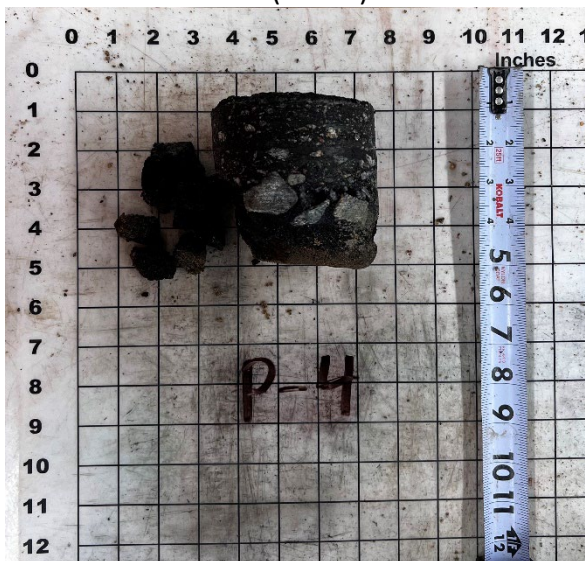
P-2 (Side 2)



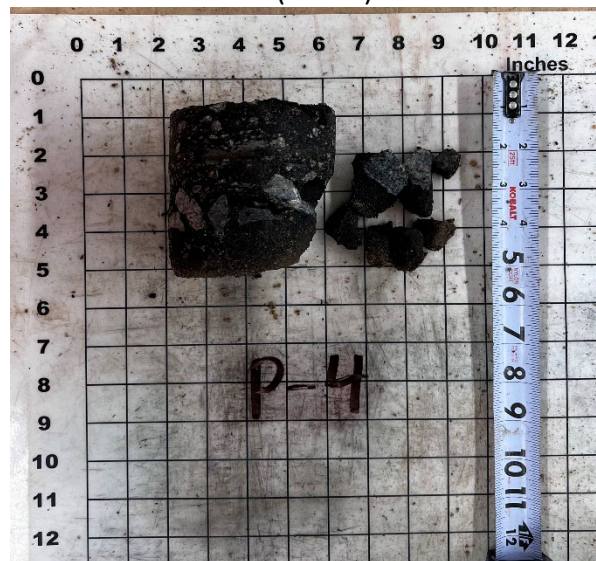
P-3 (Side 1)



P-3 (Side 2)

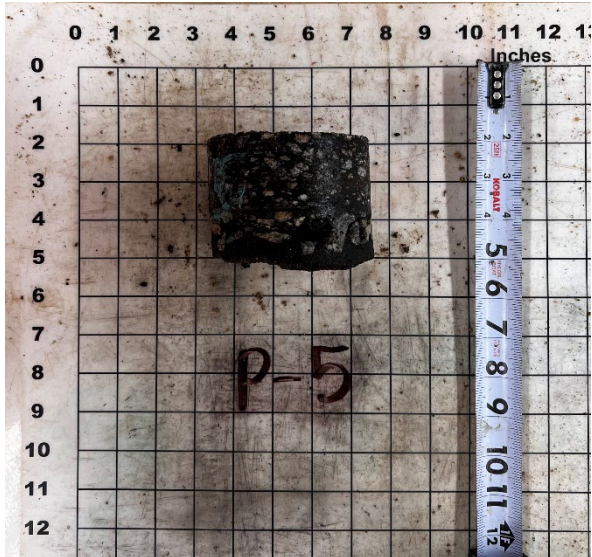


P-4 (Side 1)

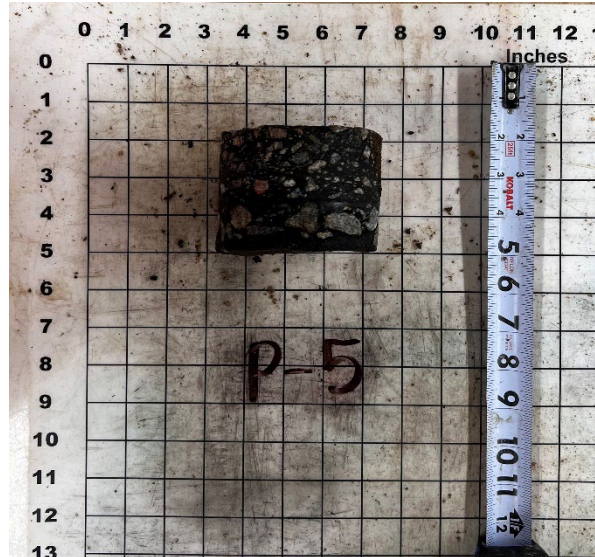


P-4 (Side 2)

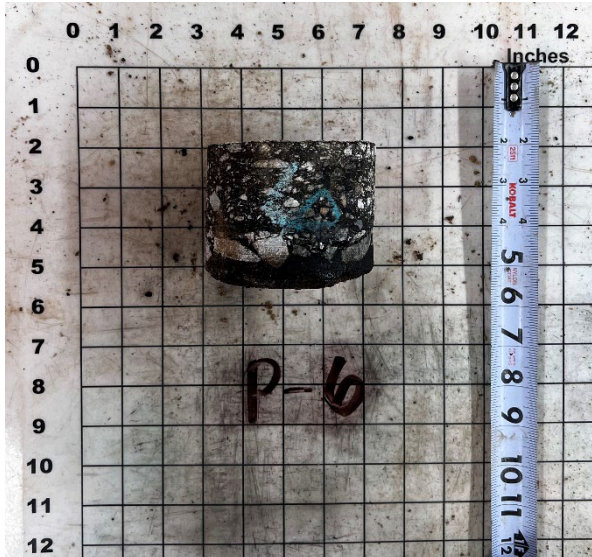
Pavement Core Photos



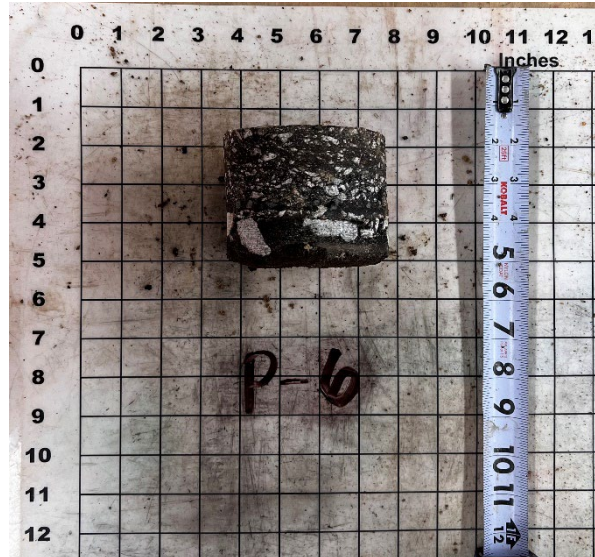
P-5 (Side 1)



P-5 (Side 2)



P-6 (Side 1)



P-6 (Side 2)

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 6

ON-SITE DRILL RIG PHOTOS

Drill Photos



B-1



B-2

Drill Photos



P-1



P-2

Drill Photos



P-3

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 7

SPT HAMMER CALIBRATION

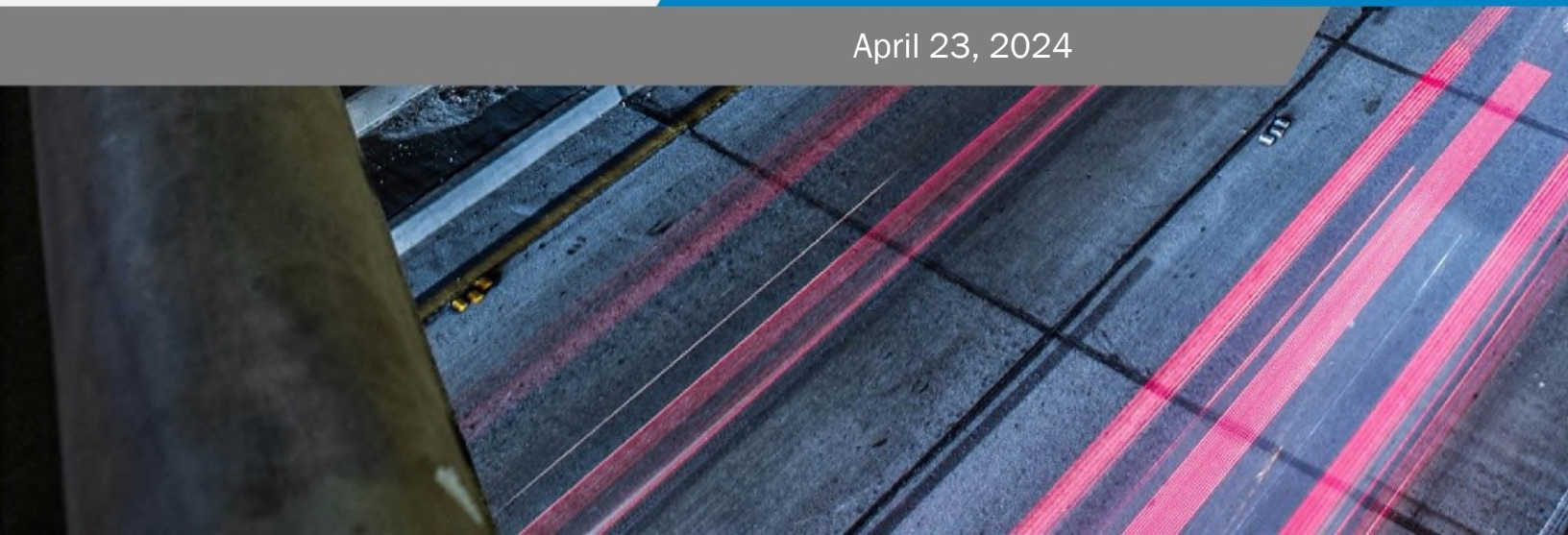


CAROLINAS
GEOTECHNICAL
GROUP

Report of SPT Hammer Energy

Prepared for:
Breccia Construction, LLC
620-B Industrial Way
Chester, South Carolina 29706

April 23, 2024





2400 Crownpoint Executive Drive
Suite 800
Charlotte, NC 28227



(980) 339-8684



contact@carolinasgeotech.com



www.carolinasgeotech.com

April 23, 2024

Mr. Adam J. Shannon
Breccia Construction, LLC
620-B Industrial Way
Chester, South Carolina 29706

SUBJECT: **Report of SPT Hammer Energy**
Breccia Construction, LLC CME 550X ATV Rig (SN 294593)
Chester, South Carolina
CG2 Project No.: 240021095

Dear Mr. Shannon:

Carolinas Geotechnical Group, PLLC (CG2) has completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer mounted on a Breccia Construction, LLC (Breccia) CME 550X ATV-mounted drill rig with a serial number of 294593, see attached Drill Rig Photo Log. This service was performed by Mr. Robert E. Kral, PE on April 12, 2024. 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 Breccia submit this Report of SPT Hammer Energy to the NCDOT Geotechnical Engineering Unit at SPT_Hammer_Energy_Submittal@ncdot.gov for review and approval no later than May 10, 2024.

DYNAMIC TESTING METHODOLOGY

Testing was performed using a model SPT (Serial No. 4553 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 728AWJ) internally instrumented with two strain transducers. The instrumented AWJ drill rod has a cross-sectional area of 1.13 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 Appendix III.

Report of SPT Hammer Energy

Chester, South Carolina

CG2 Project No.: 240021095

TESTING AND OBSERVATIONS

CG2 personnel was on site April 12, 2024 to observe and perform high-strain dynamic testing during SPT sampling on the CME 550X ATV-mounted drill rig operated by L. Guempel of Breccia. The measurements were taken during drilling operations at 1817 Lowrys Highway in Chester, South Carolina (Chester County). The approximate coordinates (not professionally surveyed) for the test location are 34.7704428, -81.2454626. 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	550X
Serial Number	294593
Operator	L. Guempel
Carrier	ATV
Hammer Information	
Model / Type	CME / Auto
Serial Number	N/A
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 ²)	1.13
Typical Lengths (feet)	5
Instrumented Rod Type	AWJ (SN 728)
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in ²)	1.13
Total Instrumented Rod Length (feet)	2.00
Length Below Gages (feet)	0.70
Split-Spoon Length (feet)	2.85

Report of SPT Hammer Energy

Chester, South Carolina

CG2 Project No.: 240021095

DYNAMIC TESTING RESULTS

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 550X ATV-mounted drill rig operated at a rate of about 52.3 to 59.6 blows per minute (BPM) during dynamic testing. The measured transferred hammer energy (EFV) ranged from 285.7 to 331.4 foot-pounds, which corresponds to Energy Transfer Ratio (ETR) values of 81.6 to 94.7%, respectively. These data ranges are based on the overall minimum and maximum values for the last 12 inches of each sample interval.

The SPT Energy Measurement Data Summary tables in Appendix I 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, a summary of the test data, and average computed BPM, EFV, and ETR values are provided in Table 2. The BPM, EFV, and ETR values presented in Table 2 were computed by averaging data from the last 12 inches of each sample interval. Plots and tables of the following are also included in Appendix I and present the test data with depth for each test interval:

- Penetration vs. BLC
- Penetration vs. CSX
- Average ETR vs. Rod Length
- Penetration vs. FMX
- Penetration vs. VMX
- ETR vs. Rod Length
- Penetration vs. EFV
- Penetration vs. ETR

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 (Piedmont Residual)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	28½ - 30	30	33.6	3-6-9 / 15	SA SILT	59.2	318.5	91.0
2	33½ - 35	35	38.6	2-4-6 / 10	SA SILT	54.9	300.5	85.9
3	38½ - 40	40	43.6	3-5-9 / 14	SA SILT	56.1	319.7	91.3
Overall Average						57.0	314.3	89.8

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 550X ATV-mounted drill rig (for the depth intervals presented in Table 2) was 314.3 foot-pounds, with an average ETR of 89.8%.

Report of SPT Hammer Energy

Chester, South Carolina

CG2 Project No.: 240021095

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

DocuSigned by:


F926DBFBA80F4FE...
Pressley M. Perry, EIT
Staff Professional

DocuSigned by:


8AD703B2A8484F4...
Robert E. Kral, PE
Geotechnical Design Manager
NC Registration No. 042642



Appendices:

- Appendix I - CME 550X ATV Rig (SN 294593) SPT Energy Measurements Summary Plots and Tables
- Appendix II - SPT Hammer Energy Field Form (Field Log) and Drill Rig Photo Log
- Appendix III - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix IV - Certificate of Proficiency



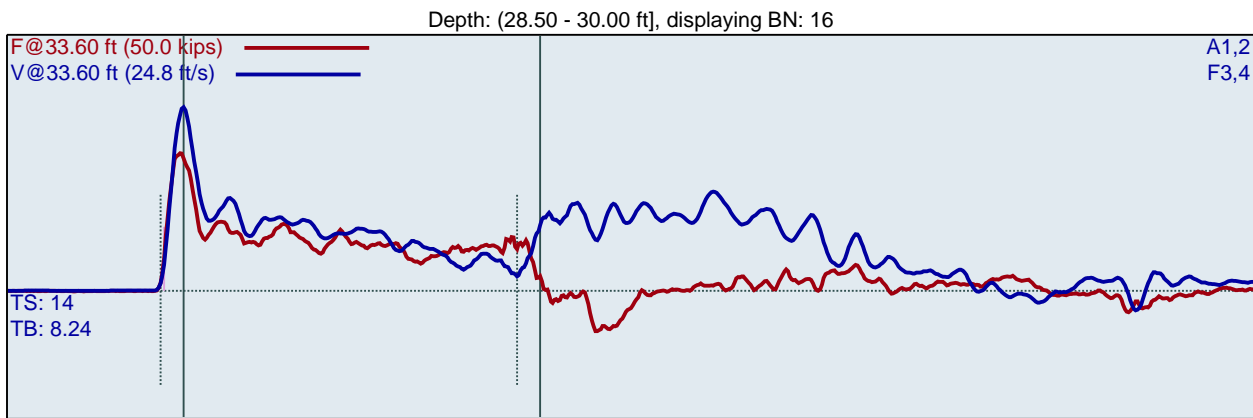
APPENDIX I

CME 550X (SN 294593)
REK
B-1

B-1
Interval start: 4/12/2024

AR: 1.13 in²
LE: 33.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute

FMX: Maximum Force

VMX: Maximum Velocity

DMX: Maximum Displacement

CSX: Compression Stress Maximum

DFN: Final Displacement

EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
28.67	1	3	61.3	28.2	17.7	2.0	25.0	2.0	296.2	84.6
28.83	2	3	56.1	28.3	18.4	2.0	25.1	2.0	314.9	90.0
29.00	3	3	56.9	28.5	18.4	2.0	25.2	2.0	317.3	90.7
29.08	4	6	58.7	28.7	18.6	1.2	25.4	1.0	310.7	88.8
29.17	5	6	59.0	28.7	18.5	1.2	25.4	1.0	320.5	91.6
29.25	6	6	58.8	28.8	18.7	1.2	25.5	1.0	328.6	93.9
29.33	7	6	59.1	29.1	18.4	1.1	25.7	1.0	311.1	88.9
29.42	8	6	58.9	29.0	18.3	1.1	25.7	1.0	310.6	88.8
29.50	9	6	59.4	29.1	18.3	1.0	25.8	1.0	318.2	90.9
29.56	10	9	59.2	28.8	18.3	0.9	25.4	0.7	318.6	91.0
29.61	11	9	59.1	28.1	17.9	0.8	24.9	0.7	315.6	90.2
29.67	12	9	59.5	28.1	18.1	0.9	24.9	0.7	318.1	90.9
29.72	13	9	59.0	28.2	18.0	0.8	24.9	0.7	314.6	89.9
29.78	14	9	59.4	27.9	18.0	0.9	24.7	0.7	331.4	94.7
29.83	15	9	59.2	27.7	18.3	0.8	24.5	0.7	325.5	93.0
29.89	16	9	59.6	26.9	17.8	0.8	23.8	0.7	318.9	91.1
29.94	17	9	59.0	27.0	17.9	0.7	23.9	0.7	322.3	92.1
30.00	18	9	59.5	27.2	17.8	0.7	24.1	0.7	312.8	89.4
Average			59.2	28.2	18.2	0.9	25.0	0.8	318.5	91.0
Std Dev			0.3	0.7	0.3	0.2	0.6	0.2	6.2	1.8
Maximum			59.6	29.1	18.7	1.2	25.8	1.0	331.4	94.7
Minimum			58.7	26.9	17.8	0.7	23.8	0.7	310.6	88.8

N-value: 15

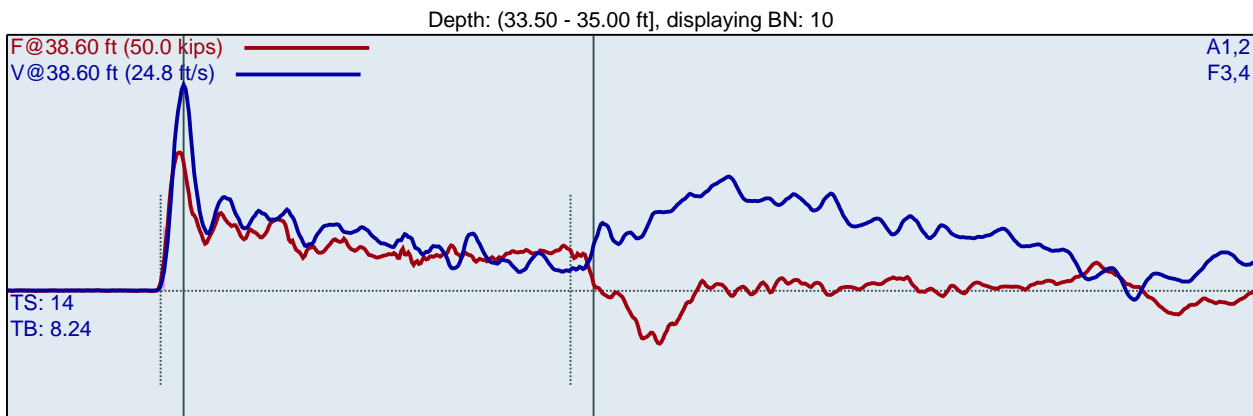
Sample Interval Time: 17.36 seconds.

CME 550X (SN 294593)
REK
B-1

B-1
Interval start: 4/12/2024

AR: 1.13 in²
LE: 38.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
33.75	1	2	1.9	26.2	17.4	3.0	23.2	3.0	287.1	82.0
34.00	2	2	48.1	26.7	18.6	3.0	23.6	3.0	321.2	91.8
34.13	3	4	52.3	27.1	18.6	1.5	24.0	1.5	285.7	81.6
34.25	4	4	52.3	26.5	18.4	1.5	23.5	1.5	299.0	85.4
34.38	5	4	54.1	26.9	19.2	1.5	23.8	1.5	298.6	85.3
34.50	6	4	55.3	27.1	19.8	1.5	24.0	1.5	296.8	84.8
34.58	7	6	56.3	26.7	20.0	1.1	23.7	1.0	300.1	85.7
34.67	8	6	55.6	27.2	19.6	1.1	24.1	1.0	299.6	85.6
34.75	9	6	55.8	26.8	19.7	1.1	23.7	1.0	300.6	85.9
34.83	10	6	55.8	27.0	19.9	1.1	23.9	1.0	305.7	87.3
34.92	11	6	56.0	26.3	20.3	1.1	23.2	1.0	311.8	89.1
35.00	12	6	55.8	26.4	20.0	1.0	23.3	1.0	307.0	87.7
Average			54.9	26.8	19.6	1.3	23.7	1.2	300.5	85.9
Std Dev			1.4	0.3	0.6	0.2	0.3	0.2	6.6	1.9
Maximum			56.3	27.2	20.3	1.5	24.1	1.5	311.8	89.1
Minimum			52.3	26.3	18.4	1.0	23.2	1.0	285.7	81.6

N-value: 10

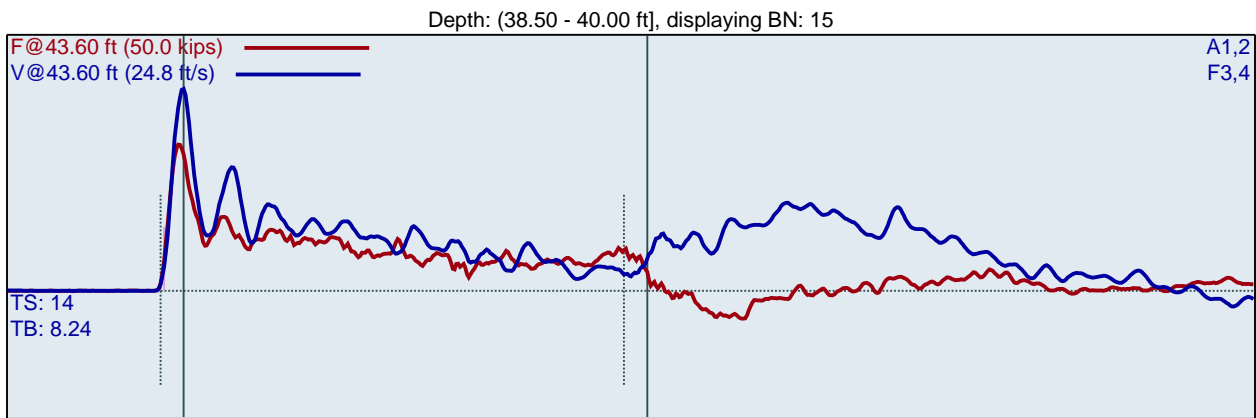
Sample Interval Time: 12.20 seconds.

CME 550X (SN 294593)
REK
B-1

B-1
Interval start: 4/12/2024

AR: 1.13 in²
LE: 43.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft³
EM: 30000 ksi



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
38.67	1	3	1.9	27.7	19.3	2.5	24.5	2.0	320.5	91.6
38.83	2	3	50.9	27.5	19.5	2.1	24.4	2.0	310.0	88.6
39.00	3	3	52.4	27.8	19.9	2.2	24.6	2.0	322.8	92.2
39.10	4	5	54.3	27.1	20.2	1.8	24.0	1.2	317.2	90.6
39.20	5	5	54.4	26.9	20.9	1.6	23.8	1.2	315.5	90.1
39.30	6	5	55.1	26.9	19.4	1.5	23.8	1.2	316.1	90.3
39.40	7	5	56.5	26.7	20.8	1.3	23.7	1.2	324.6	92.7
39.50	8	5	56.3	26.8	20.5	1.3	23.7	1.2	323.6	92.5
39.56	9	9	56.7	26.9	20.2	1.1	23.8	0.7	318.2	90.9
39.61	10	9	55.9	27.1	20.1	1.0	24.0	0.7	325.1	92.9
39.67	11	9	56.5	27.4	20.0	1.0	24.2	0.7	324.0	92.6
39.72	12	9	56.2	27.5	20.0	0.9	24.4	0.7	324.4	92.7
39.78	13	9	56.9	27.6	19.5	0.8	24.5	0.7	315.7	90.2
39.83	14	9	56.5	28.3	19.5	0.9	25.0	0.7	325.3	92.9
39.89	15	9	56.4	28.5	19.6	0.8	25.3	0.7	320.5	91.6
39.94	16	9	56.5	28.2	19.8	0.9	24.9	0.7	319.8	91.4
40.00	17	9	56.5	27.9	19.1	0.8	24.7	0.7	305.9	87.4
Average			56.1	27.4	20.0	1.1	24.3	0.9	319.7	91.3
Std Dev			0.8	0.6	0.5	0.3	0.5	0.3	5.3	1.5
Maximum			56.9	28.5	20.9	1.8	25.3	1.2	325.3	92.9
Minimum			54.3	26.7	19.1	0.8	23.7	0.7	305.9	87.4

N-value: 14

Sample Interval Time: 17.34 seconds.

Summary of SPT Test Results

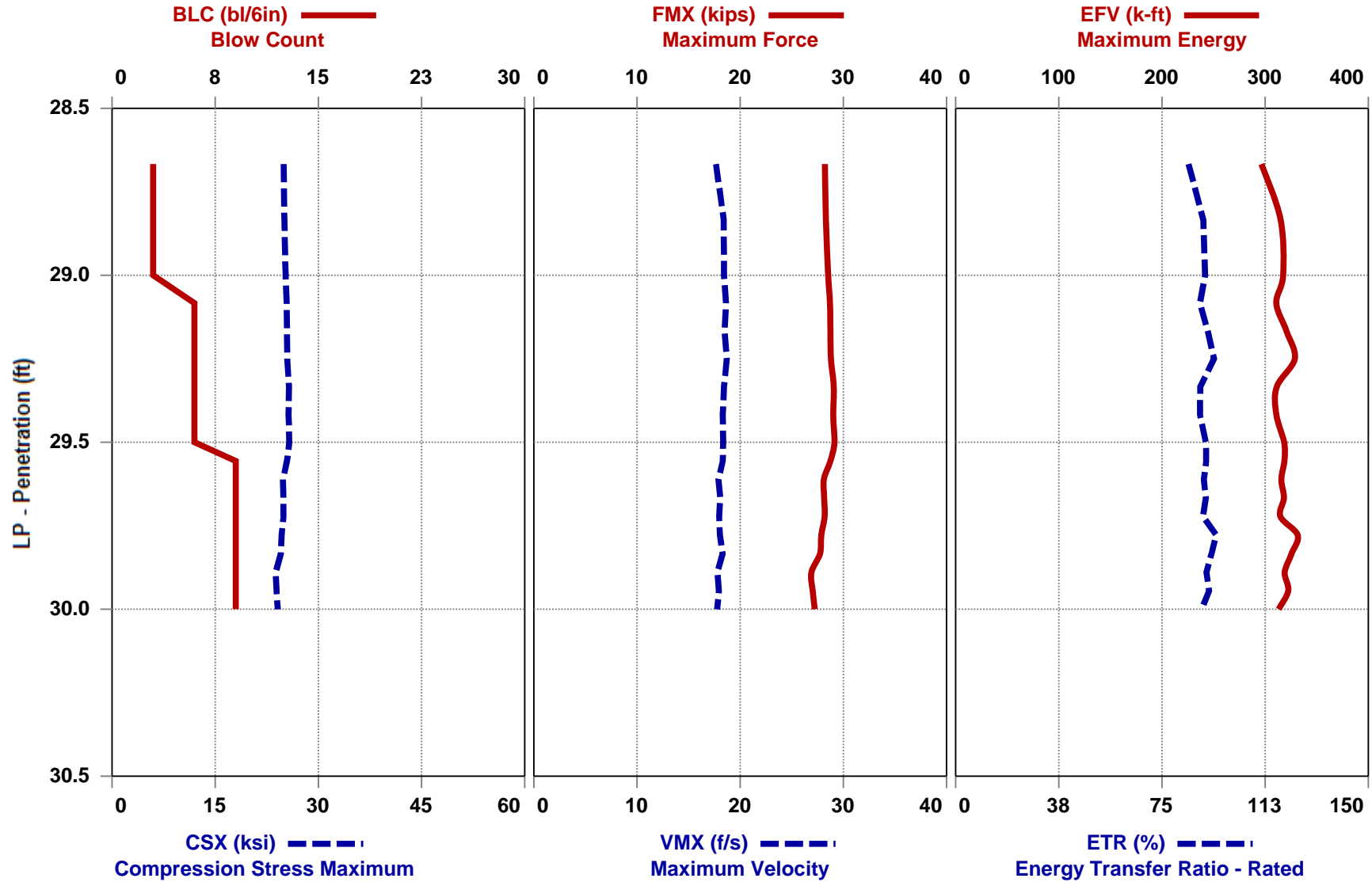
Project: CME 550X (SN 294593), Test Date: 4/12/2024

BPM: Blows/Minute											CSX: Compression Stress Maximum		
FMX: Maximum Force											DFN: Final Displacement		
VMX: Maximum Velocity											EFV: Maximum Energy		
DMX: Maximum Displacement											ETR: Energy Transfer Ratio - Rated		
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	N Value	N60 Value	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
33.60	28.50	30.00	3-6-9	15	22	59.2	28.2	18.2	0.9	25.0	0.8	318.5	91.0
38.60	33.50	35.00	2-4-6	10	14	54.9	26.8	19.6	1.3	23.7	1.2	300.5	85.9
43.60	38.50	40.00	3-5-9	14	20	56.1	27.4	20.0	1.1	24.3	0.9	319.7	91.3
Overall Average Values:						57.0	27.6	19.2	1.1	24.4	0.9	314.3	89.8
Standard Deviation:						2.0	0.8	0.9	0.3	0.7	0.3	10.1	2.9
Overall Maximum Value:						59.6	29.1	20.9	1.8	25.8	1.5	331.4	94.7
Overall Minimum Value:						52.3	26.3	17.8	0.7	23.2	0.7	285.7	81.6



CME 550X (SN 294593) - 28.5 TO 30.0

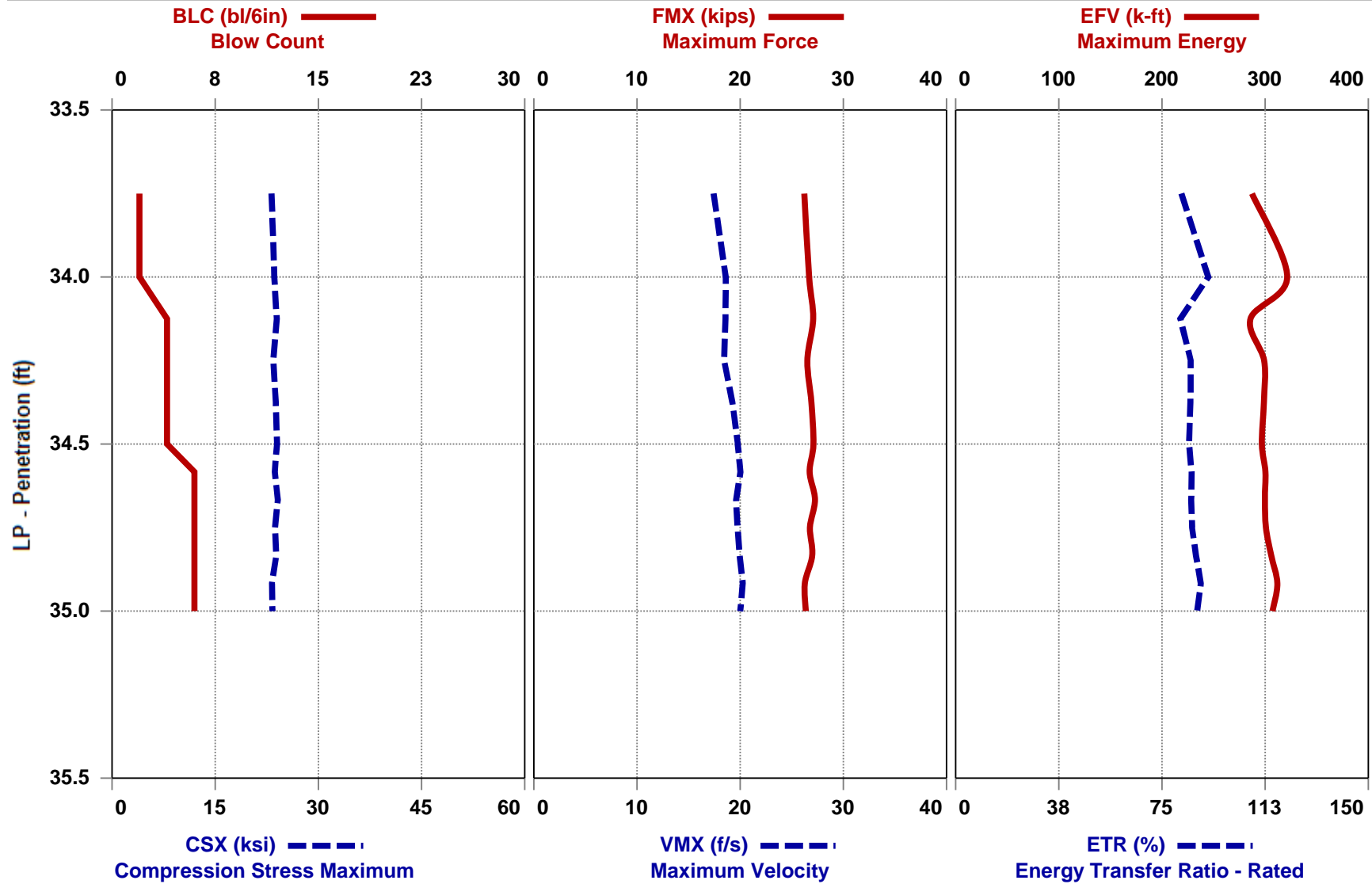
B-1





CME 550X (SN 294593) - 33.5 TO 35.0

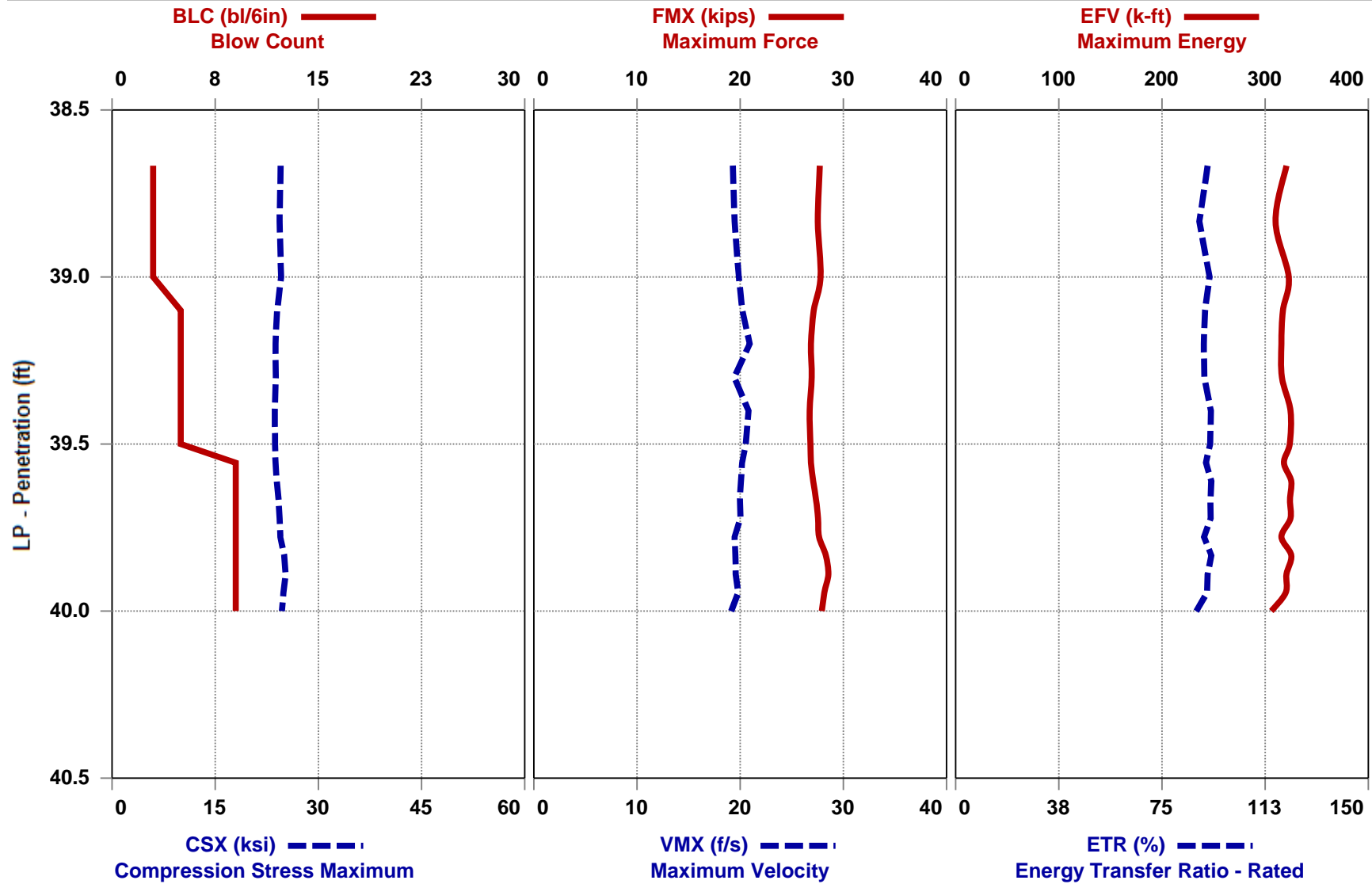
B-1

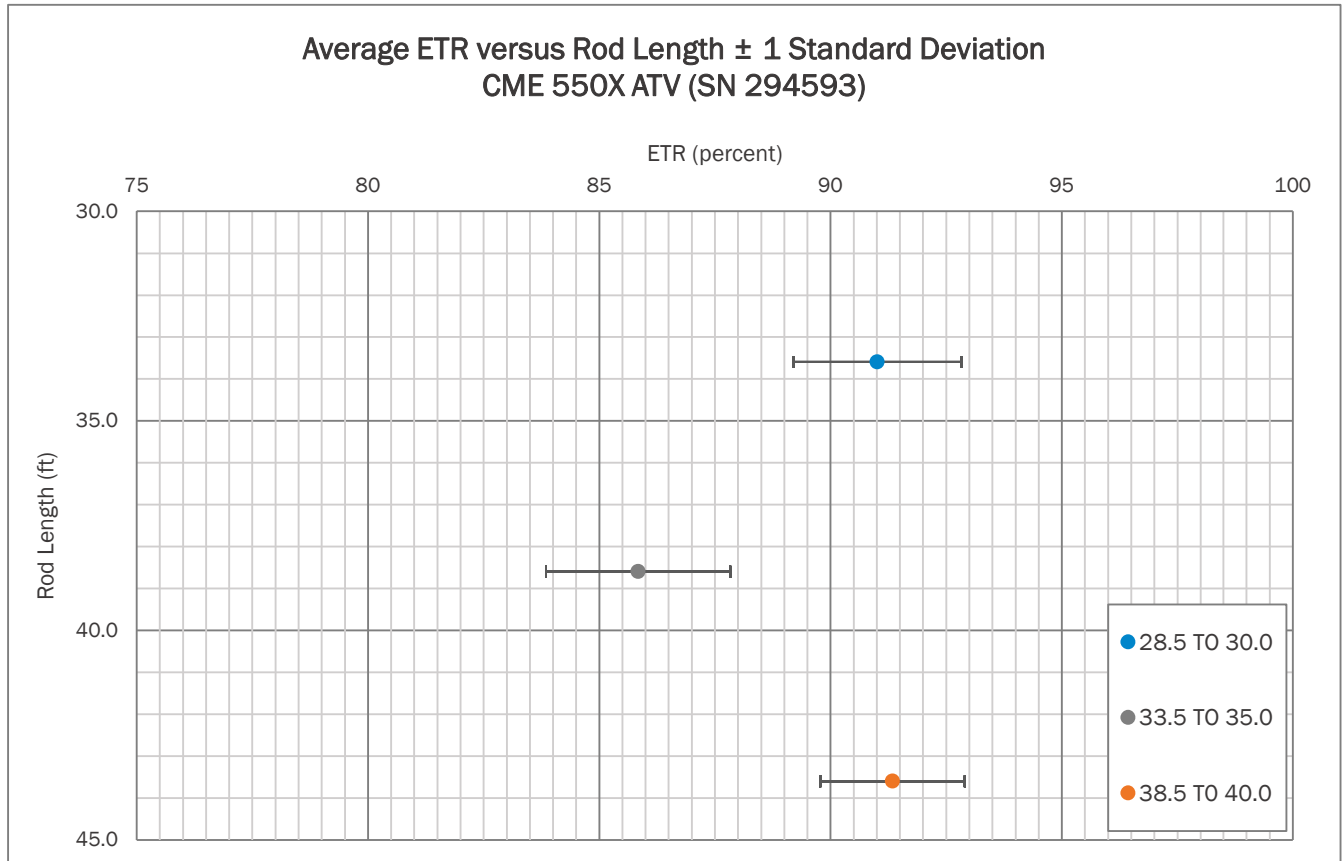
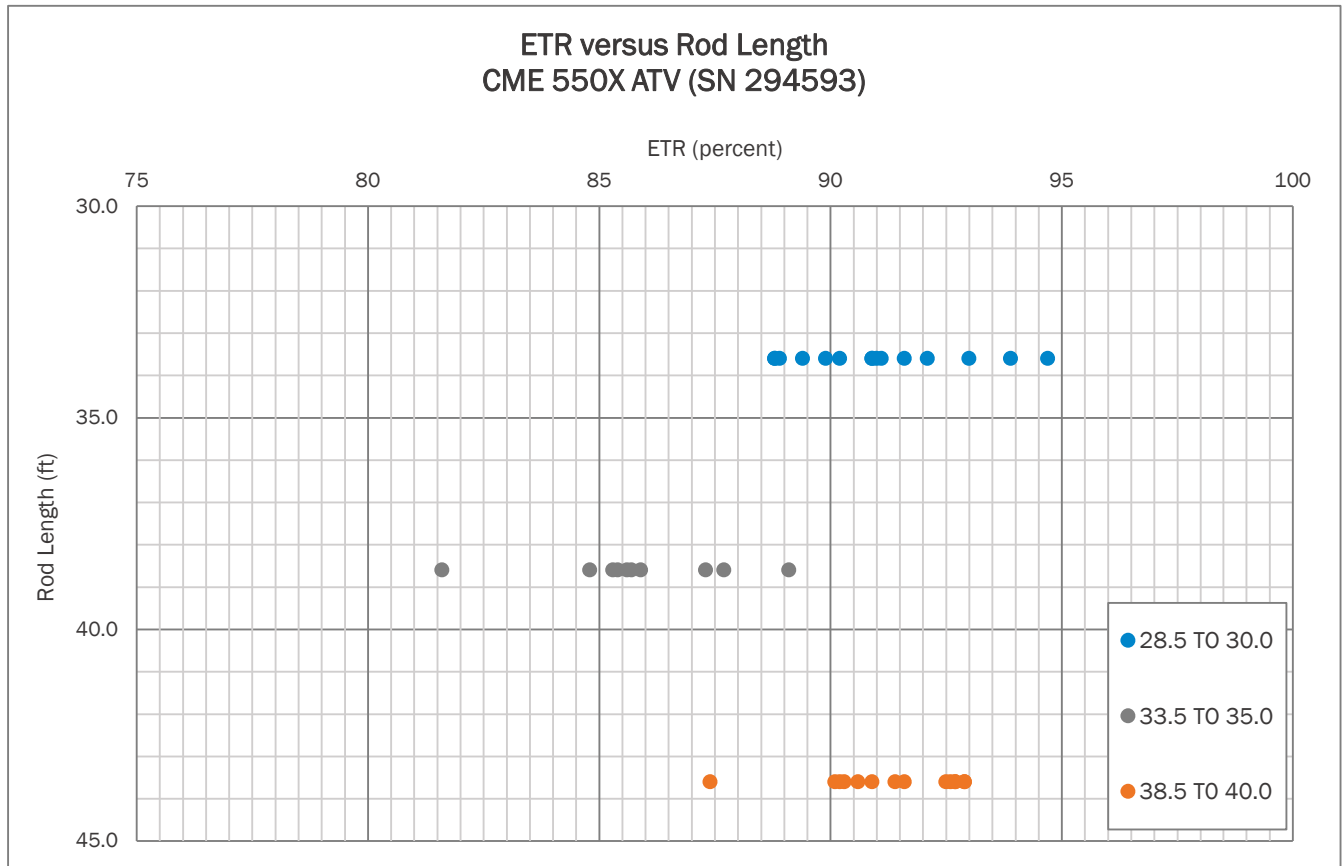




CME 550X (SN 294593) - 38.5 TO 40.0

B-1







APPENDIX II

SPT Hammer Energy Field Form

Project: SPT HAMMER ENERGY
Project No.: 240021095
Boring No.: B-1

Date: 4/12/2024
Weather: 50's CLEAR
Drill Rod Type: AWJ

On-site Personnel

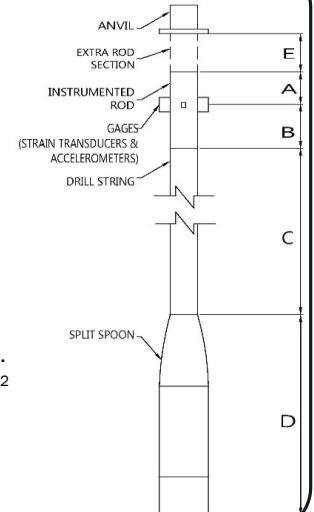
Drilling Company: BRECCIA CONSTRUCTION, LLC
 Rig Operator: L. GUEMPEL
 Engr/Geologist: N/A
 Client Rep.: N/A
 Analyzer Oper.: R. KRAL

Rig/Hammer Info

Drill Rig Make/Model: CME 550X
 Carrier Type: ATV
 Rig Serial No.: 294593
 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: 728AWJ
 Instr. Rod Outside Dia.: 1.75 in.
 Instr. Rod Area: 1.13 in²
 PDA Make/Model: SPT
 PDA Serial No.: 4553 TB
 Calib. Pulse Test (y/n): Y



Gage Info

Gage		Serial No.	Calibration No.
Accel.	A3	K10959	413.83
	A4	K10960	419.89
Strain	F3	728AWJ-1	224.65
	F4	728AWJ-2	224.14

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		
12-Apr	28.5 TO 30.0	0820/0821	30	33.6	59	3	6	9	15	Y	SA SI
12-Apr	33.5 TO 35.0	0825/0825	35	38.6	55	2	4	6	10	Y	SA SI
12-Apr	38.5 TO 40.0	0832/0832	40	43.6	56	3	5	9	14	Y	SA SI

Notes:

TESTING PERFORMED AT 1817 LOWRYS HIGHWAY IN CHESTER, SOUTH CAROLINA (CHESTER COUNTY). THE APPROXIMATE COORDINATES ARE 34.7704428, -81.2454626.

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


 Prepared By (print/signature)

4/12/2024
 Date



Figure No. 1: Rear View of Drill Rig



Figure No. 2: Side View of Drill Rig

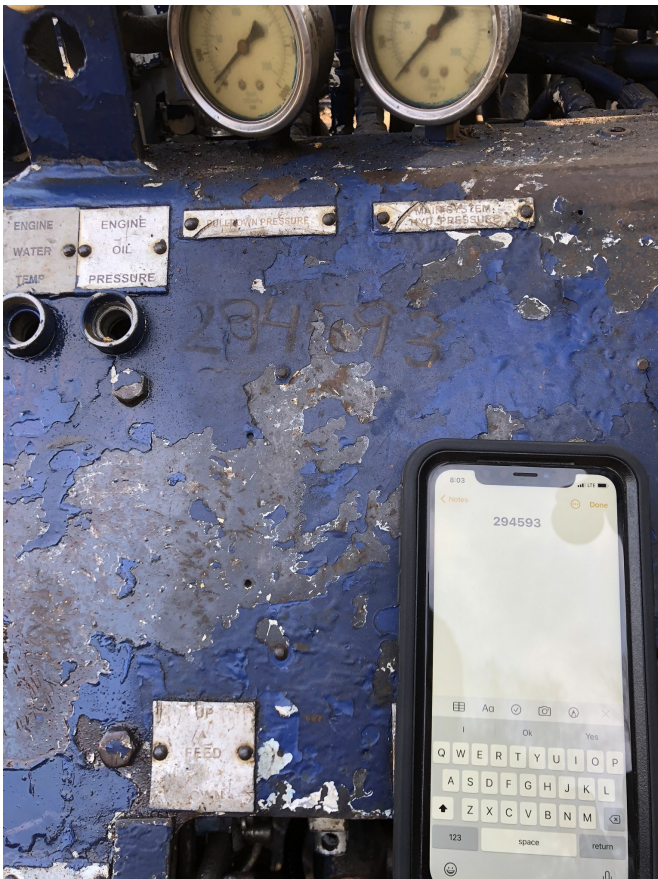


Figure No. 3: Serial Number Plate



Figure No. 4: Automatic Hammer



APPENDIX III

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4553 TB

was calibrated on 18 December 2023
using a PDA Calibration Box whose output was calibrated with test equipment
traceable to NIST.

This certificate is valid for 2 years from above date.



Tested by [Signature]

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



Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4549 TB

was calibrated on 14 July 2022

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

This certificate is valid for 2 years from above date.



Tested by

MCQ

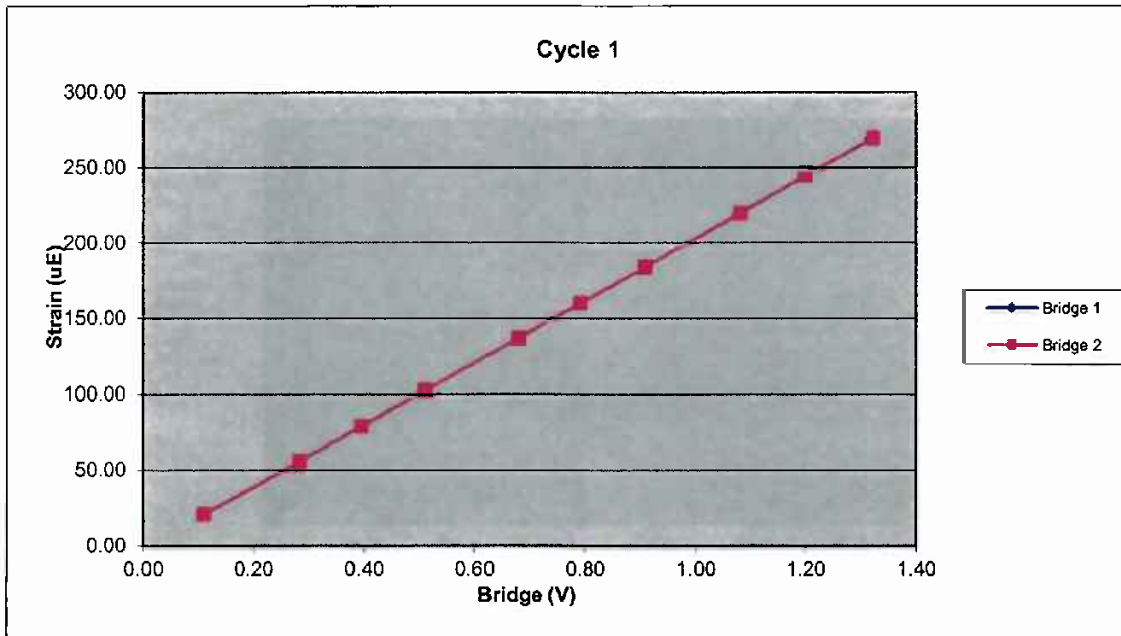


Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

528AWJ		Cycle 1		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	803.20	21.15	0.11	0.11
3	2080.73	56.33	0.28	0.28
4	2904.01	79.79	0.39	0.39
5	3765.89	103.49	0.51	0.51
6	5005.11	138.03	0.68	0.68
7	5828.59	161.56	0.79	0.79
8	6692.71	185.68	0.91	0.91
9	7962.93	221.03	1.08	1.08
10	8831.54	245.89	1.20	1.20
11	9736.80	270.68	1.32	1.32

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7358.13	Force Calibration (lb/V)	7351.82
Offset	3.52	Offset	6.26
Correlation	0.999999	Correlation	0.999999
Strain Calibration ($\mu\text{E/V}$)	205.90	Strain Calibration ($\mu\text{E/V}$)	205.73
Offset	-1.56	Offset	-1.48
Correlation	0.999995	Correlation	0.999996

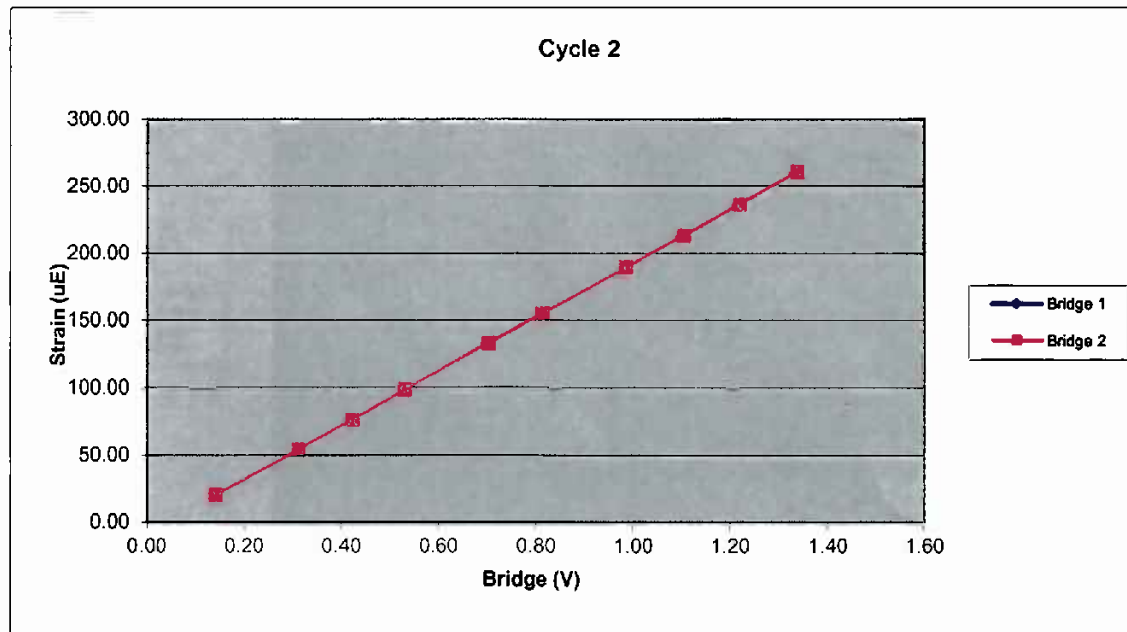
Force Strain Calibration	
EA (Kips)	35735.87
Offset	59.29
Correlation	0.999995



528AWJ		Cycle 2		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1038.71	19.60	0.14	0.14
3	2288.25	53.30	0.31	0.31
4	3093.11	75.49	0.42	0.42
5	3893.00	97.84	0.53	0.53
6	5167.50	132.26	0.70	0.70
7	5988.25	154.39	0.81	0.81
8	7248.72	188.87	0.98	0.98
9	8125.71	212.29	1.10	1.10
10	8976.19	235.45	1.22	1.22
11	9854.85	259.50	1.33	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7381.92	Force Calibration (lb/V)	7365.94
Offset	-0.76	Offset	4.69
Correlation	0.999998	Correlation	0.999999
Strain Calibration (μ E/V)	200.83	Strain Calibration (μ E/V)	200.40
Offset	-8.59	Offset	-8.44
Correlation	0.999997	Correlation	0.999996

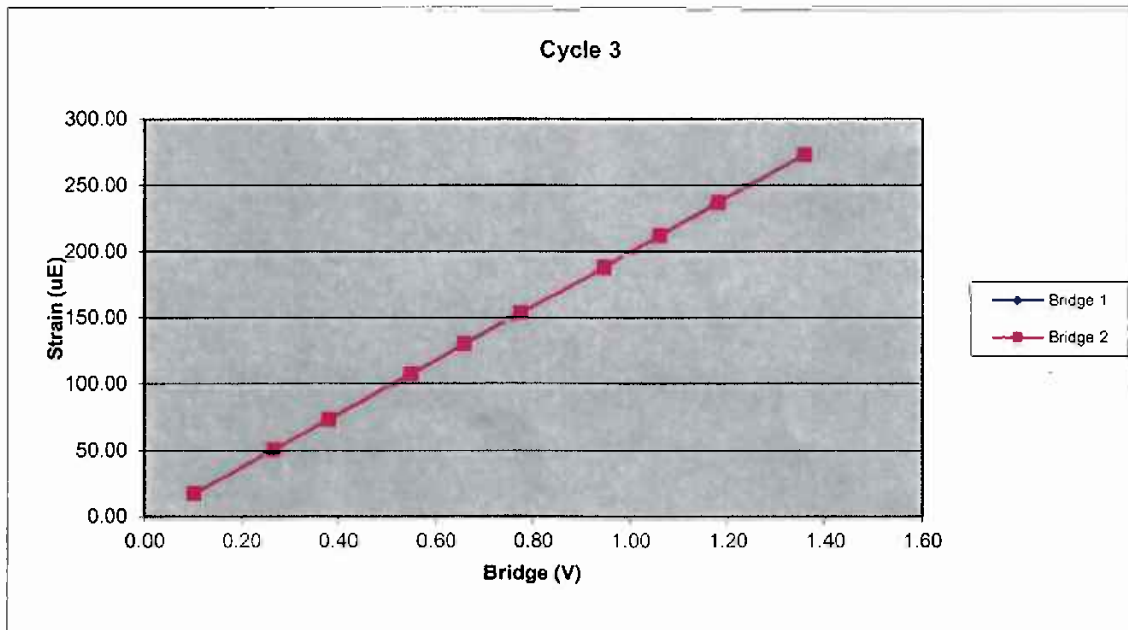
Force Strain Calibration	
EA (Kips)	36756.34
Offset	315.07
Correlation	0.999995



528AWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	734.68	18.74	0.10	0.10
3	1943.58	51.94	0.26	0.26
4	2781.29	75.07	0.38	0.38
5	4027.81	108.88	0.55	0.55
6	4829.55	131.78	0.66	0.66
7	5689.29	155.36	0.77	0.77
8	6956.49	190.12	0.95	0.95
9	7799.46	214.09	1.06	1.06
10	8693.90	238.78	1.18	1.18
11	10007.88	275.06	1.36	1.36

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7366.71	Force Calibration (lb/V)	7364.49
Offset	-6.17	Offset	-9.40
Correlation	0.999998	Correlation	0.999999
Strain Calibration ($\mu\text{E}/\text{V}$)	203.78	Strain Calibration ($\mu\text{E}/\text{V}$)	203.72
Offset	-2.08	Offset	-2.17
Correlation	0.999989	Correlation	0.999993

Force Strain Calibration	
EA (Kips)	36149.33
Offset	69.26
Correlation	0.999994



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

Calibration Factors	528AWJ		
Bridge 1 ($\mu\text{E/V}$)	203.51	Bridge 2 ($\mu\text{E/V}$)	203.28
EA Factor (Kips)	36213.85	Area (in^2)	1.21

Calibrated by:



Calibrated Date:

7/18/2022

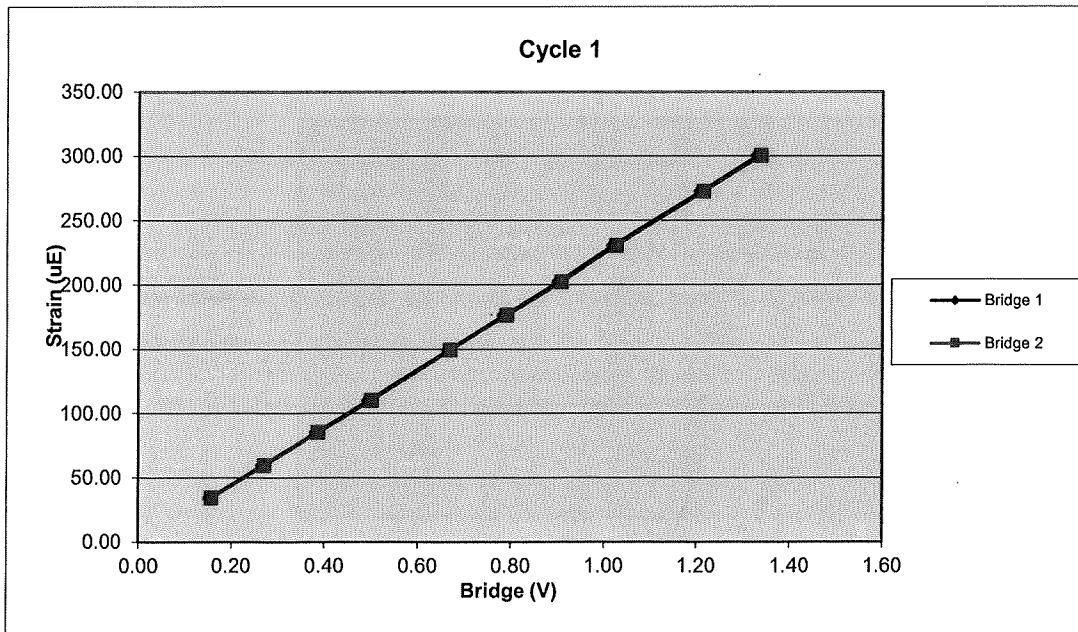
Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

728AWJ	Cycle 1			
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1199.06	34.33	0.16	0.16
3	2052.76	59.72	0.27	0.27
4	2924.20	85.27	0.38	0.39
5	3782.68	110.02	0.50	0.50
6	5074.34	149.22	0.67	0.67
7	5985.06	176.19	0.79	0.79
8	6869.47	202.19	0.90	0.91
9	7768.10	230.48	1.02	1.03
10	9202.28	272.31	1.21	1.22
11	10126.06	300.27	1.33	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7583.03	Force Calibration (lb/V)	7557.58
Offset	20.67	Offset	0.95
Correlation	1.000000	Correlation	0.999999
Strain Calibration (μ E/V)	226.02	Strain Calibration (μ E/V)	225.27
Offset	-1.27	Offset	-1.86
Correlation	0.999984	Correlation	0.999979

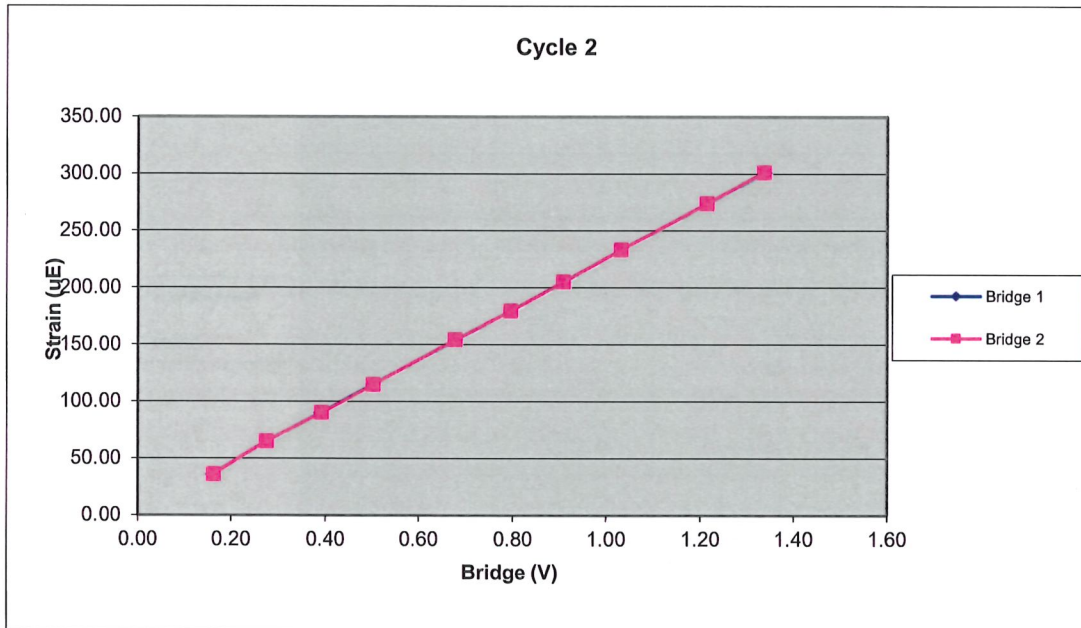
Force Strain Calibration	
EA (Kips)	33548.47
Offset	63.54
Correlation	0.999983



728AWJ		Cycle 2		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	1236.98	35.69	0.16	0.16
3	2108.61	64.71	0.28	0.28
4	2976.64	89.52	0.39	0.39
5	3811.14	114.45	0.50	0.50
6	5141.89	153.54	0.68	0.68
7	6032.24	178.92	0.80	0.80
8	6903.48	204.54	0.91	0.91
9	7825.42	232.64	1.03	1.03
10	9217.58	273.43	1.22	1.22
11	10151.02	300.79	1.34	1.34

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7561.16	Force Calibration (lb/V)	7576.28
Offset	14.33	Offset	4.68
Correlation	0.999997	Correlation	0.999995
Strain Calibration (μ E/V)	223.39	Strain Calibration (μ E/V)	223.84
Offset	1.55	Offset	1.27
Correlation	0.999945	Correlation	0.999943

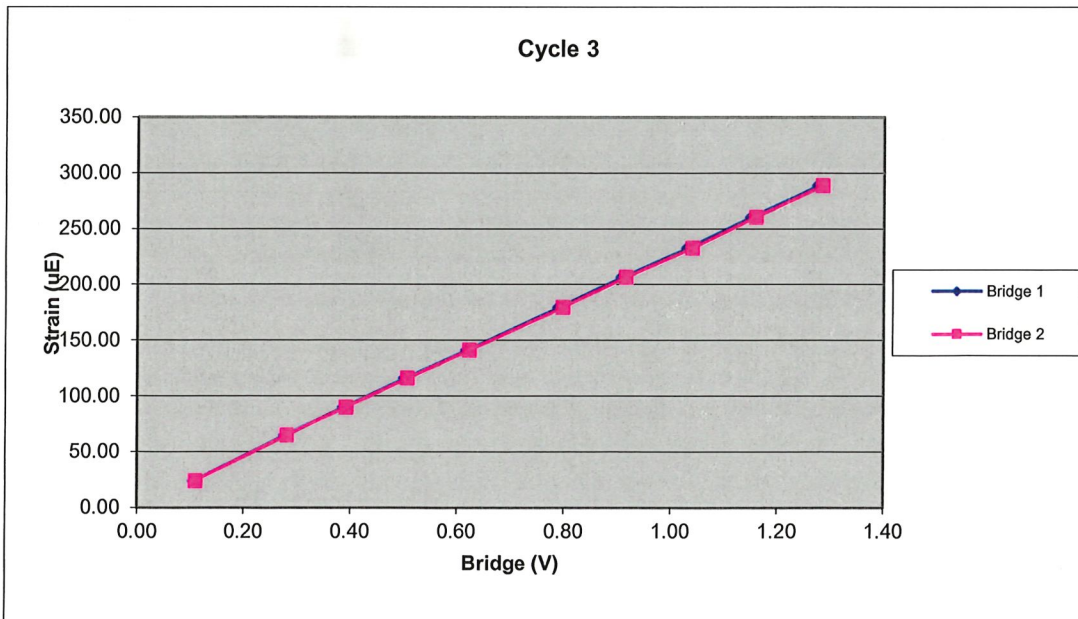
Force Strain Calibration	
EA (Kips)	33843.24
Offset	-37.68
Correlation	0.999950



728AWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	822.90	24.10	0.11	0.11
3	2132.69	64.89	0.28	0.28
4	2972.74	89.98	0.39	0.39
5	3841.65	115.75	0.50	0.51
6	4741.16	141.06	0.62	0.62
7	6043.35	179.33	0.79	0.80
8	6961.58	206.39	0.91	0.92
9	7901.94	232.60	1.03	1.04
10	8816.85	260.36	1.15	1.16
11	9759.65	288.75	1.28	1.29

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7644.24	Force Calibration (lb/V)	7602.69
Offset	-5.25	Offset	-12.15
Correlation	0.999999	Correlation	0.999997
Strain Calibration ($\mu\text{E}/\text{V}$)	224.53	Strain Calibration ($\mu\text{E}/\text{V}$)	223.31
Offset	1.57	Offset	1.37
Correlation	0.999950	Correlation	0.999942

Force Strain Calibration	
EA (Kips)	34041.33
Offset	-58.11
Correlation	0.999945



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

Calibration Factors	728AWJ		
Bridge 1 (μE/V)	224.65	Bridge 2 (μE/V)	224.14
EA Factor (Kips)	33811.01	Area (in^2)	1.13

Calibrated by: Sean Barnes
Calibrated Date: 2/6/2024

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 14Jun2022

Serial No: K10959 Temperature: 79.0 °F

Model: PR Humidity: 50%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

413.8 mv/5000g

(82.8 μ v/g)

R²: 0.999956 [Chip programmed]

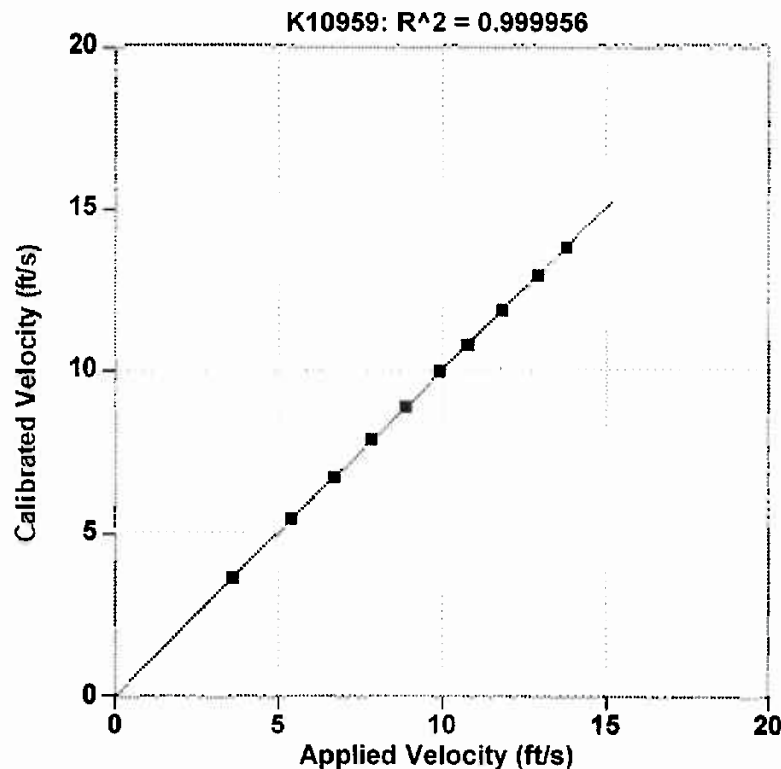
Ref Acc 1: 72517! Cal on: 24Mar2022
1049 g's/volt

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

Operator: William Johnson


Signed

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



Reference Velocity	S/N K10959 Velocity
ft/s	ft/s
3.605	3.589
5.397	5.412
6.705	6.699
7.841	7.862
8.877	8.913
9.904	9.929
10.746	10.721
11.807	11.815
12.910	12.889
13.783	13.762

Maximum Acceleration: 935 g's

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 14Jun2022

Serial No: K10960 Temperature: 79.0 °F

Model: PR Humidity: 50%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

419.9 mv/5000g

(84.0 $\mu\text{v/g}$)

R²: 0.999944 [Chip programmed]

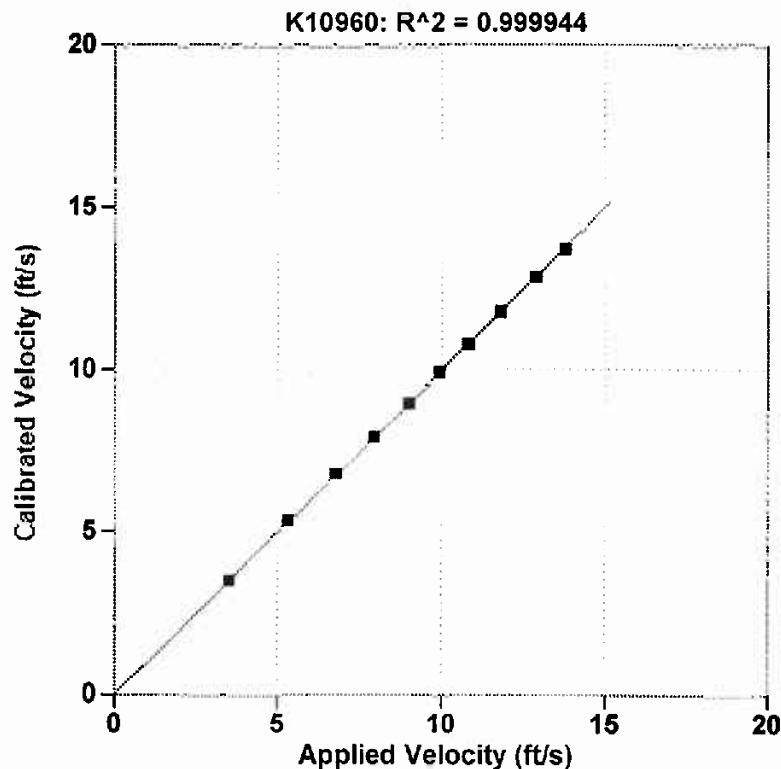
Operator: William Johnson

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

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

Signed

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



Reference Velocity	S/N K10960 Velocity
ft/s	ft/s
3.513	3.540
5.322	5.345
6.769	6.796
7.933	7.937
8.998	9.037
9.912	9.923
10.788	10.775
11.781	11.779
12.877	12.863
13.771	13.732

Maximum Acceleration: 934 g's

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 14Jun2022

Serial No: K11957 Temperature: 79.0 °F

Model: PR Humidity: 50%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

409.6 mv/5000g

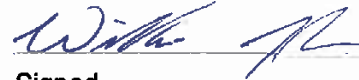
(81.9 μ v/g)

R²: 0.999919 [Chip programmed]

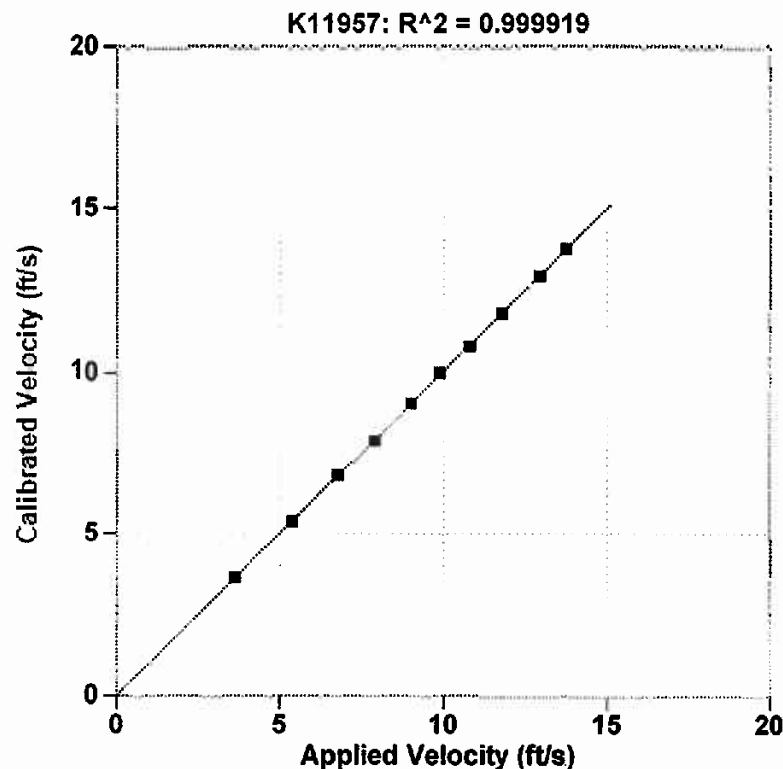
Operator: William Johnson

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

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


Signed

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



Reference Velocity ft/s	S/N K11957 Velocity ft/s
3.643	3.661
5.377	5.363
6.761	6.783
7.895	7.905
8.973	8.989
9.864	9.918
10.780	10.730
11.763	11.749
12.920	12.894
13.735	13.746

Maximum Acceleration: 931 g's



APPENDIX IV



This documents that
Robert E. Kral
Carolinas Geotechnical Group
has on May 20, 2016 achieved the rank of
ADVANCED


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 Advanced level seek Master or Expert levels through additional study within six 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. **This certificate can be verified at www.PDAproficiencytest.com.** 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.


Steven A. Hall, Executive Director
Pile Driving Contractors Association




Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 2072

S-5-458 over Indian Camp Branch

Geotechnical Subsurface Data Report

APPENDIX

SECTION 8 GEOSCOPING FORM

GeoScoping Form

PROJECT INFORMATION	
Project ID: 67100.009 Task 00060	Date of Trip: 1-17-2025
County: Bamberg County	Location: Midpoint b/w Ehrhardt, SC + Olar, SC
Rd/Route: S-5-458	Local Name: Indian Camp Road
Attendees: Benjamin Vogel	

EXISTING BRIDGE INFORMATION	
Bridge Length: <input type="text"/>	Bridge Width: <input type="text"/>
Superstructure Type: <input type="text"/>	Substructure Type: <input type="text"/>
Begin Bridge Sta.: <input type="text"/>	End Bridge Sta.: <input type="text"/>
Begin Bridge Embankment Sta. ¹ : <input type="text"/>	End Bridge Embankment Sta. ¹ : <input type="text"/>
Structure Number: <input type="text"/>	Posted Weight Limit: None observed/present
Crossing: Indian Camp Branch	Skew: 10-20° skew from site estimates + Earth?? in road
Latitude: 33.14540°	Longitude: -81.08510°
Existing Fill Height: <input type="text"/>	Approximate Existing Slope Angle: <input type="text"/>

¹Begin and End Bridge Embankment 100 feet down station or up station from bridge, respectively

EXISTING ROADWAY EMBANKMENT INFORMATION		
Begin Project Sta.: <input type="text"/>	Begin Bridge Embankment Sta. ¹ : <input type="text"/>	
Accessibility Issues: W-side: aside from dirt mounds, car accessible until dropoff, then shallow swamp that needs manual trek - ATV likely to get stuck		
Ground Cover: W-side: fields + woods into swamp; E-side: fields + woods become a flooded forest/swamp, then creek		
Existing Fill Height: <input type="text"/>	Approximate Existing Slope Angle: 90° - 20°	
Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): Under agri. + res.		
Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): Flat + rolling into swamp on both W + E sides		
Traffic Control Necessary (Y/N): No, chain closed road already		
Surface Soil: <input type="text"/>	Muck (Y/N): <input type="text"/>	
Exposed Rock (Y/N): No	In Stream Bed (Y/N): Very possible	In Banks (Y/N): Possible when intact
Wetlands On-Site (Y/N): Swamp to direct west	Wetlands Adjacent (Y/N): Swamp near + flooded forest to E	
Depth EG to Water: W side ~1-3'; E side ~3-4'	Water Depth: W side ~0.5-1.5' ish; E side ~0.5-2.5'	
Depth to Existing Ground: W side: effectively N/A; E side: N/A except for chasm that stretches up road → ~3'		
Scour Condition at EB: Catastrophic	Scour Condition at IB: Catastrophic	
End Bridge Embankment Sta. ¹ : <input type="text"/>	End Project Sta.: <input type="text"/>	
Accessibility Issues: W side: Aside from dirt mounds, car-accessible until dropoff, manual trek for swamp to side but ATV could do it		
Ground Cover: W side: Field into wooded, then swamp; E side: Field into wooded into flooded forest/creek w/ sand bar		
Existing Fill Height: <input type="text"/>	Approximate Existing Slope Angle: 30° → -30° range	
Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): Under agri + res.		
Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): Flat + rolling into swamp on both W + E sides		
Traffic Control Necessary (Y/N): No, chain closed road already		
Surface Soil: <input type="text"/>	Muck (Y/N): <input type="text"/>	
Exposed Rock (Y/N): No	In Stream Bed (Y/N): very possible	In Banks (Y/N): possible when intact
Wetlands On-Site (Y/N): Swamp to direct west	Wetlands Adjacent (Y/N): Swamp near + flooded forest to E	
Depth FG to Water: W side ~1-4'; E side 3.5-4' ish	Water Depth: W side ~0.5-1.5'; E side ~0.5-1'	
Depth to Existing Ground: W side: 1.5' to explicit swamp, N/A otherwise ; E side: 0.5' to approx		
Scour Condition at EB: Catastrophic	Scour Condition at IB: Catastrophic	

★ Big dirt piles both sides between summit w/ ATV?

★ The power lines cross over the road from the W side just before the "structure" begins on the B-1 bank

GeoScoping Form

UTILITIES INFORMATION	
Attached:	None observed
Above Ground/ Overhead:	Power lines/poles adjacent - running on E side → no damage but one pole is flooded at base
Underground:	W side: adjacent - running, orange-marked "Palmetto Rural Telephone" cables → either not exposed or covered w/ stick debris

COMMENTS
<p>This road section is destroyed, although I cannot tell if a bridge or culvert ever existed here from the damage. It looks as if an earth-supported roadway was washed away & collapsed, but I see no visible ruins of a support structure / beams, etc. or pipes or tubes...</p> <p>Utilities appear functional.</p> <p>Same case on Google Earth + Street View</p>

Instructions:

1. Attach boring location plan for bridge and roadway.
2. Attach all photographs taken, photographs to be labeled as to direction looking in and what is being depicted.
3. Fill out GeoScoping Form as completely as possible, using additional sheets as necessary to describe site conditions.
4. If representative of GEC on site during GeoScoping, include GEC representative's name and contact number in Attendees block.

GeoScoping Photos



B-1 Pointing North Toward B-2

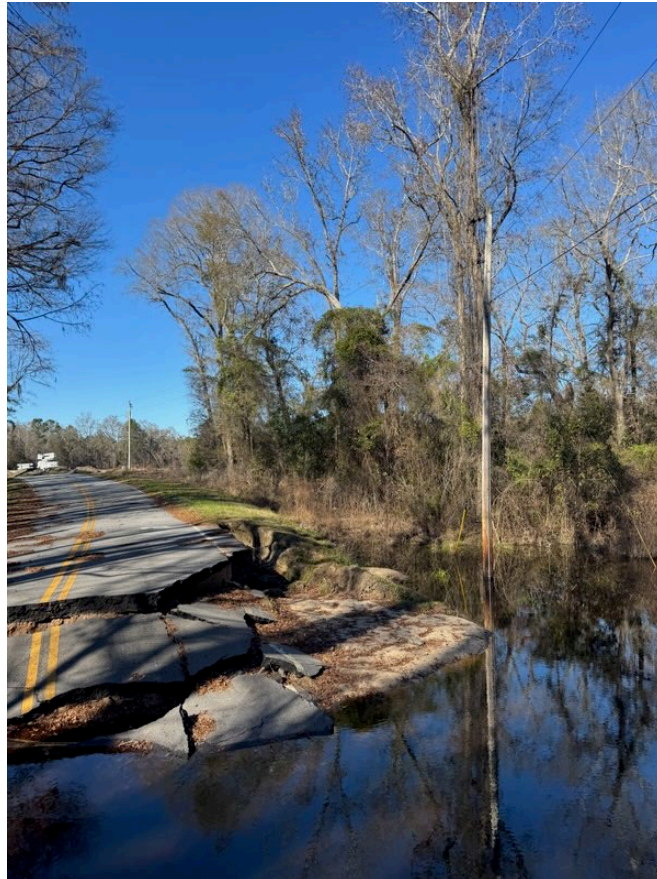


B-2 Pointing South Toward B-1

GeoScoping Photos



Pointing North from B-1 Bank at Palmetto Rural Telephone Cables



Pointing Northeast from B-1 Bank; Cables Adjacent to East Side of Culvert

GeoScoping Photos



Pointing South From B-1; Power Cables Crossing Overhead West to East



Side Profile Pointing Northeast from B-1 Bank

GeoScoping Photos



Side Profile Pointing West From B-1 Bank