



GEOTECHNICAL SUBSURFACE DATA REPORT

S-23-115 over Middle Tyger River
Greenville 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: P043993

FME Project No.: G7100.007—Task 00002

November 07, 2024

November 7, 2024

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

Re: Geotechnical Subsurface Data Report
S-23-115 over Middle Tyger River
Greenville County, South Carolina
SCDOT Project ID: P043993
FME Project No.: G7100.007 – Task 00002

Mr. Harris:

Submitted herein is F&ME Consultants, Inc.'s (FME) Geotechnical Subsurface Data Report for the S-23-115 over Middle Tyger River 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.

A handwritten signature in blue ink that reads 'J. Trey Peterson'.

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

A handwritten signature in blue ink that reads 'Alex M. Abernethy'.

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

A handwritten signature in blue ink that reads 'William J. Gieser'.

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

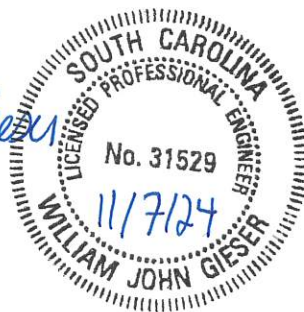


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1. INTRODUCTION

1.1. GENERAL

The project is located approximately three (3) miles east of Highland, South Carolina. We understand that this project will involve the removal of the current bridge and replaced with a new bridge. 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 October 18, 2024.

The field exploration consisted of six (6) Soil Test Borings (STB) with Standard Penetration Testing (SPT), One (1) composite Bulk Soil Sample (BS) was also obtained via Manual Auger Boring (MAB) methodologies. 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 October 21, 2024, through October 22, 2024, six (6) Soil Test Borings (STB) with Standard Penetration Testing (SPT) were performed. Additionally, two (2) Manual Auger Borings (MAB) were performed on site, at locations offset from Soil Test Borings P-2 and P-5, for the purpose of collecting a single, composite, Bulk Soil Sample.

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 Diedrich D50 track mounted drill rig. FME utilized rotary wash drilling techniques to maintain a stable borehole. 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 roller cone refusal was encountered. Refusal is defined as drilling tool and SPT refusal (N-value of 50 blows per 1 inch or less). Once refusal was achieved, 20-foot of rock core was to be retrieved. The following SPT sampling was performed in general accordance with ASTM D1586 to determine the relative densities and consistencies of the subsurface soils, and to collect subsurface soil samples. An automatic hammer with a measured energy transfer ratio of 95.5% was used to perform the SPT's. Copies of the Soil Test Boring Logs are contained within Section 3 in 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 | Soil Depth (ft) | Rock Core Depth (ft) | Total Boring Depth (ft) | Latitude | Longitude | Elevation (ft-MSL) |
|---------------|-----------|-----------------|----------------------|-------------------------|-------------|--------------|--------------------|
| B-1 | STB | 21.5 | 20.3 | 41.8 | 35.10162487 | -82.27139133 | 963.2 |
| B-2 | STB | 40.0 | 19.7 | 59.7 | 35.10213049 | -82.27126104 | 960.7 |
| P-1 | STB | 2.2 | -- | 2.2 | 35.10048100 | -82.27175654 | 976.4 |
| P-2 | STB | 2.1 | -- | 2.1 | 35.10088082 | -82.27166754 | 972.3 |
| P-3 | STB | 1.5 | -- | 1.5 | 35.10126642 | -82.27150953 | 967.1 |
| P-4 | STB | 2.2 | -- | 2.2 | 35.10248070 | -82.27114171 | 961.2 |
| P-5 | STB | 2.2 | -- | 2.2 | 35.10285437 | -82.27098534 | 966.6 |
| P-6 | STB | 2.2 | -- | 2.2 | 35.10324256 | -82.27092245 | 969.1 |
| TOTALS | | 73.9 | 40.0 | 113.9 | | | |

2.2. MANUAL AUGER BORINGS

Two (2) Manual Auger Borings were performed for the purpose of collecting material to form a singular, composite, Bulk Soil Sample. Copies of this Manual Auger Boring Log is contained within Section 4B 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 – Manual Auger Borings (Bulk Soil Samples)

| Test ID | Test Type | Total Boring Depth (ft) | Latitude | Longitude | Elevation (ft-MSL) |
|---------------------------|-----------|-------------------------|-------------|--------------|--------------------|
| BS-1@P-2/P-5 ¹ | MAB | 2.0 | 35.10088801 | -82.27170094 | 971.8 |
| | MAB | 2.0 | 35.10285262 | -82.27097731 | 966.1 |
| TOTALS | | 4.0 | | | |

¹Bulk Soil Sample BS-1@P-2/P-5 was sampled from Soil Test Borings P-2 and P-5 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 | 1191552.194 | 1619656.416 | 35.10162487 | -82.27139133 | 963.2 |
| B-2 | STB | 1191735.759 | 1619697.654 | 35.10213049 | -82.27126104 | 960.7 |
| P-1 | STB | 1191137.175 | 1619542.042 | 35.10048100 | -82.27175654 | 976.4 |
| P-2 | STB | 1191282.381 | 1619570.459 | 35.10088082 | -82.27166754 | 972.3 |
| P-3 | STB | 1191422.154 | 1619619.451 | 35.10126642 | -82.27150953 | 967.1 |
| P-4 | STB | 1191862.796 | 1619734.919 | 35.10248070 | -82.27114171 | 961.2 |
| P-5 | STB | 1191998.233 | 1619783.367 | 35.10285437 | -82.27098534 | 966.6 |
| P-6 | STB | 1192139.303 | 1619803.919 | 35.10324256 | -82.27092245 | 969.1 |
| BS-1@P-2/P-5 ¹ | MAB | 1191285.119 | 1619560.499 | 35.10088801 | -82.27170094 | 971.8 |
| | MAB | 1191997.566 | 1619785.763 | 35.10285262 | -82.27097731 | 966.1 |

¹Bulk Soil Sample BS-1@P-2/P-5 was sampled from Soil Test Borings P-2 and P-5 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, Section 4C and Section 4D within the Appendix of this report.

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

| Type of Test | Quantity | Procedure |
|-------------------------------------|----------|--------------------------------------|
| Moisture Content | 8 | AASHTO T265 (ASTM D2216) |
| Atterberg Limits | 8 | AASHTO T89/T90 (ASTM D4318) |
| Grain-size Distribution w/ Wash 200 | 5 | AASHTO D6913/AASHTO T11 (ASTM D1140) |
| Hydrometer and Grain Size | 3 | 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 |
| Compressive Strength of Rock Cores | 6 | ASTM D7012 – Methods C & D |

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 4C 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-23-115 over Middle Tyger River

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APPENDIX

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| SECTION 1 | SITE LOCATION PLAN |
| SECTION 2 | BORING LOCATION PLAN |
| SECTION 3 | SUBSURFACE EXPLORATION LOGS |
| SECTION 4 | LABORATORY TEST RESULTS |
| SECTION 4A | SPLIT SPOON SAMPLES (SS) |
| SECTION 4B | BULK SOIL SAMPLES (BS) |
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| SECTION 4D | ROCK CORE SAMPLES |
| SECTION 5 | PAVEMENT CORE PHOTOS |
| SECTION 6 | SPT HAMMER CALIBRATION |
| SECTION 7 | GEOSCOPING FORM |
| SECTION 8 | DRILL RIG PHOTOS |

S-23-115 over Middle Tyger River

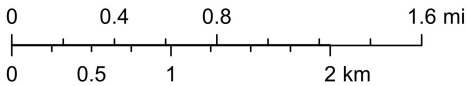
Geotechnical Subsurface Data Report

APPENDIX

SECTION 1 SITE LOCATION PLAN



1:58,000



F&ME CONSULTANTS, INC.
COLUMBIA, SC

| | | | |
|-------|-----|---------------|-------------------------|
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |
| REV. | BY | DATE | DESCRIPTION OF REVISION |
| TOPO. | | DATE | |
| DWG. | CTC | DATE 10.25.24 | GROUP -- -- |
| R/W | | DATE | |

S-23-115 OVER MIDDLE TYGER RIVER
GREENVILLE COUNTY, SOUTH CAROLINA

SITE LOCATION PLAN

SCDOT PROJECT ID: P043993

FME JOB NO. G7100.007 Task 0002

SCALE: AS NOTED

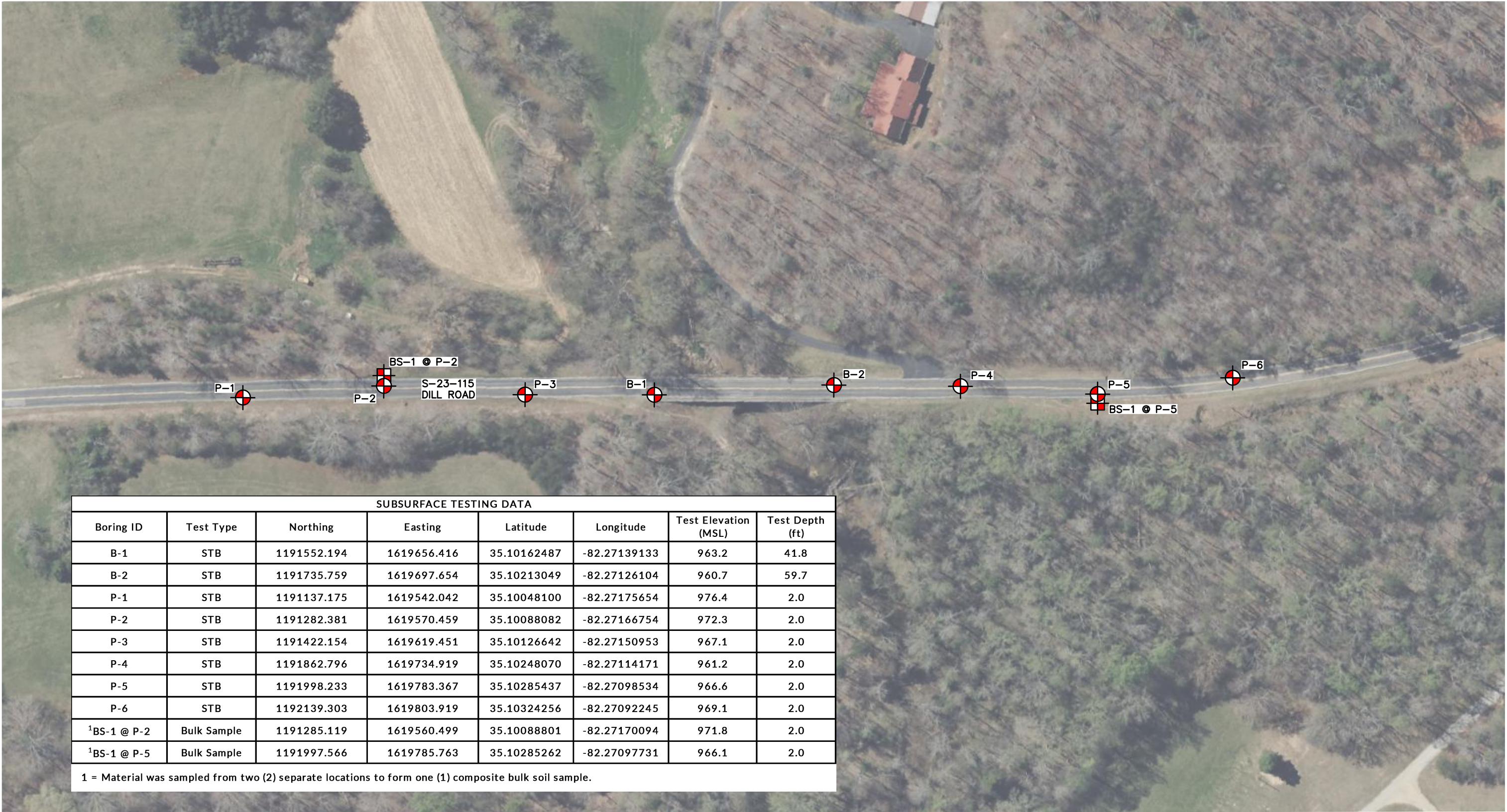
FIGURE 1

S-23-115 over Middle Tyger River

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 | 1191552.194 | 1619656.416 | 35.10162487 | -82.27139133 | 963.2 | 41.8 |
| B-2 | STB | 1191735.759 | 1619697.654 | 35.10213049 | -82.27126104 | 960.7 | 59.7 |
| P-1 | STB | 1191137.175 | 1619542.042 | 35.10048100 | -82.27175654 | 976.4 | 2.0 |
| P-2 | STB | 1191282.381 | 1619570.459 | 35.10088082 | -82.27166754 | 972.3 | 2.0 |
| P-3 | STB | 1191422.154 | 1619619.451 | 35.10126642 | -82.27150953 | 967.1 | 2.0 |
| P-4 | STB | 1191862.796 | 1619734.919 | 35.10248070 | -82.27114171 | 961.2 | 2.0 |
| P-5 | STB | 1191998.233 | 1619783.367 | 35.10285437 | -82.27098534 | 966.6 | 2.0 |
| P-6 | STB | 1192139.303 | 1619803.919 | 35.10324256 | -82.27092245 | 969.1 | 2.0 |
| ¹ BS-1 @ P-2 | Bulk Sample | 1191285.119 | 1619560.499 | 35.10088801 | -82.27170094 | 971.8 | 2.0 |
| ¹ BS-1 @ P-5 | Bulk Sample | 1191997.566 | 1619785.763 | 35.10285262 | -82.27097731 | 966.1 | 2.0 |

1 = Material was sampled from two (2) separate locations to form one (1) composite bulk soil sample.



LEGEND:

 SOIL TEST BORING LOCATION

 MANUAL AUGER BORING

| | | | |
|-------|-----|---------------|-------------------------|
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |
| REV. | BY | DATE | DESCRIPTION OF REVISION |
| TOPO. | | DATE | |
| DWG. | CTC | DATE 10.25.24 | GROUP - |
| R/W | | DATE | |

 F&ME CONSULTANTS, INC.
COLUMBIA, SC

S-23-115 OVER MIDDLE TYGER RIVER
GREENVILLE COUNTY, SOUTH CAROLINA

BORING LOCATION PLAN

| | |
|---------------------------|------------------------------------|
| SCDOT PROJECT ID: P043993 | FME JOB NO. G7100.007 - Task 00002 |
| SCALE: 1" = 100' | FIGURE 2 |

S-23-115 over Middle Tyger River

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 |

| Gravel | 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

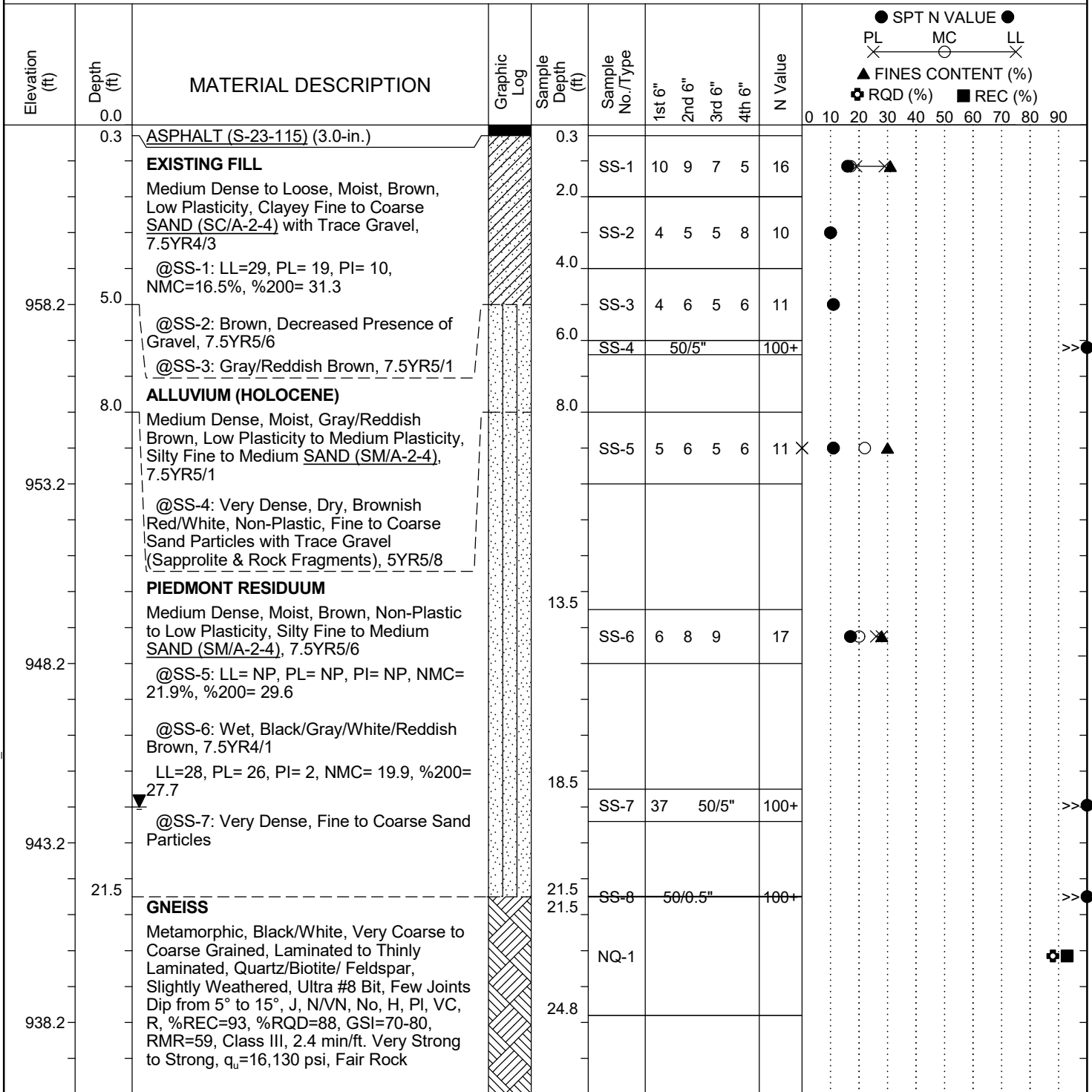
| MAJOR DIVISIONS | | | SYMBOLS | | TYPICAL DESCRIPTIONS |
|----------------------|---|---|---|--------|--|
| | | | GRAPH | LETTER | |
| COARSE GRAINED SOILS | GRAVEL AND GRAVELLY SOILS | CLEAN GRAVELS (LITTLE OR NO FINES) |  | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
|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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|--|----------------------------------|--|-----------------------------|--|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: B-1 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: 963.2 ft | | Latitude: 35.10162487 | | Longitude: -82.27139133 | | Date Started: 10/21/2024 | | |
| Total Depth: 41.8 ft | | Soil Depth: 21.5 ft | | Core Depth: 20.3 ft | | Date Completed: 10/21/2024 | | |
| Bore Hole Diameter (in): 3.8 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: NQ | | Driller: C. Odom | | Groundwater: TOB NE(C.V@33) | | 24HR 19 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: | P043993 | County: | Greenville | Boring No.: | B-1 |
| Site Description: | S-23-115 over Middle Tyger River | | | Route: | S-23-115 |
| Eng./Geo.: | M. Miller | Boring Location: | N/A | Offset: | N/A |
| Elev.: | 963.2 ft | Latitude: | 35.10162487 | Longitude: | -82.27139133 |
| Date Started: | 10/21/2024 | | | | |
| Total Depth: | 41.8 ft | Soil Depth: | 21.5 ft | Core Depth: | 20.3 ft |
| Date Completed: | 10/21/2024 | | | | |
| Bore Hole Diameter (in): | 3.8 | Sampler Configuration | Liner Required: Y (N) | | Liner Used: Y (N) |
| Drill Machine: | Diedrich D-50 | Drill Method: | RW/RC | Hammer Type: | Automatic |
| Energy Ratio: | 95.5% | | | | |
| Core Size: | NQ | Driller: | C. Odom | Groundwater: | TOB |
| NE(C.V.@33) | 24HR | | | | |
| 19 ft | | | | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X MC LL ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|--|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| 933.2 | | @NQ-2: Occasion Joints Dip from 5° to 20, M/VN, PI/Ir, %REC=100, %RQD=88, GSI=45-55, RMR=53, Class III, 3.2 min/ft. q _u = 13,070 psi, Fair Rock | | 29.8 | NQ-2 | | | | | | |
| | | @NQ-3: Coarse Grained, Few Joints Dip from 10° to 20°, No, PI, C, R, %REC=97, %RQD=97, GSI=70-80, RMR= 71, Class II, 2.4min/ft., Medium Strong, q _u =6,040 psi, Good Rock | | | NQ-3 | | | | | | |
| 928.2 | | @NQ-4: Fresh, No Joints, C, %REC=100, %RQD=100, GSI= 90-100, RMR= 84, Class I, 3.2 min/ft., Very Good Rock | | 34.8 | NQ-4 | | | | | | |
| 923.2 | | @NQ-5: No, VC, %REC=75, %RQD=75, RMR=73, GSI=80-90, Class II, 3.5 min/ft., Good Rock | | 39.8 | NQ-5 | | | | | | |
| 41.8 | | Boring Terminated at 41.8-feet. Below the Existing Roadway Surface. Boring Achieved Target Depth. | | | | | | | | | |
| 918.2 | | | | | | | | | | | |
| 913.2 | | | | | | | | | | | |

LEGEND

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

SCDOT Soil Test Log

| | | | | | |
|---------------------------------|----------------------------------|------------------------------|-------------|------------------------|---------------------|
| Project ID: | P043993 | County: | Greenville | Boring No.: | B-2 |
| Site Description: | S-23-115 over Middle Tyger River | | | Route: | S-23-115 |
| Eng./Geo.: | M. Miller | Boring Location: | N/A | Offset: | N/A |
| Elev.: | 960.7 ft | Latitude: | 35.10213049 | Longitude: | -82.27126104 |
| Date Started: | 10/21/2024 | | | | |
| Total Depth: | 59.7 ft | Soil Depth: | 40 ft | Core Depth: | 19.7 ft |
| Date Completed: | 10/22/2024 | | | | |
| Bore Hole Diameter (in): | 3.8 | Sampler Configuration | | Liner Required: | Y (N) |
| Liner Used: | Y (N) | | | | |
| Drill Machine: | Diedrich D-50 | Drill Method: | RW/RC | Hammer Type: | Automatic |
| Energy Ratio: | 95.5% | | | | |
| Core Size: | NQ | Driller: | C. Odom | Groundwater: | TOB Not Encountered |
| 24HR | 30.2 ft | | | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) |
|----------------|------------|---|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.3 | ASPHALT (S-23-115) (3.0-in.) | | 0.3 | | | | | | | |
| | 2.0 | EXISTING FILL Loose, Moist, Red, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6) 10R4/8 | | 2.0 | SS-1 | 4 | 4 | 5 | 4 | 9 | ● |
| | 4.0 | Loose, Moist, Red, Low Plasticity, Silty Fine to Medium SAND (SM/A-4), 10R4/8 @SS-2: LL=40, PL= 31, PI=9, NMC= 23.3, %200= 37.5 @SS-4: Wet, Dark Gray, 10R4/1 | | 4.0 | SS-2 | 5 | 4 | 4 | 4 | 8 | ● ○ × ▲ |
| 955.7 | 6.0 | | | 6.0 | SS-3 | 4 | 3 | 4 | 4 | 7 | ● |
| | 7.8 | | | 7.8 | SS-4 | 3 | 3 | 4 | 3 | 7 | ● |
| | 8.0 | ALLUVIUM Loose, Wet, Dark Gray, Medium Plasticity, Fine to Medium Sandy Lean CLAY (CL/A-7-6), 10R4/1 @SS-5: Reddish Brown, Fine to Coarse Sand Particles with Trace Gravel, 10R3/4 LL= 47, PL= 25, PI= 22, NMC= 25.8, %200= 58.7 | | 8.0 | SS-5 | WOH 4 | 4 | 4 | | 8 | ● ⊕ — × ▲ |
| 950.7 | 13.5 | | | 13.5 | | | | | | | |
| | 13.5 | PIEDMONT RESIDUUM Loose, Wet, Red/Brown, Medium Plasticity, Sandy Fine to Coarse SILT (ML/A-7-6) with Trace Gravel, 10R5/8 & 7.5YR5/8 @SS-6: LL= 45, PL= 33, PI= 12, NMC= 33.1, %200= 51.9 @SS-7: Brownish Red, Fine to Medium Sand Particles with Decreased Presence of Gravel, 10R5/8 LL= 45, PL= 29, PI= 16, NMC= 28.0, %200= 57.0 @SS-8: 10R7/8 | | 13.5 | SS-6 | 2 | 3 | 3 | | 6 | ● ⊕ — × ▲ |
| 945.7 | 18.5 | | | 18.5 | SS-7 | 2 | 3 | 4 | | 7 | ● ⊕ — × ▲ |
| 940.7 | 23.5 | | | 23.5 | SS-8 | 2 | 3 | 5 | | 8 | ● |
| 935.7 | | | | | | | | | | | |

LEGEND

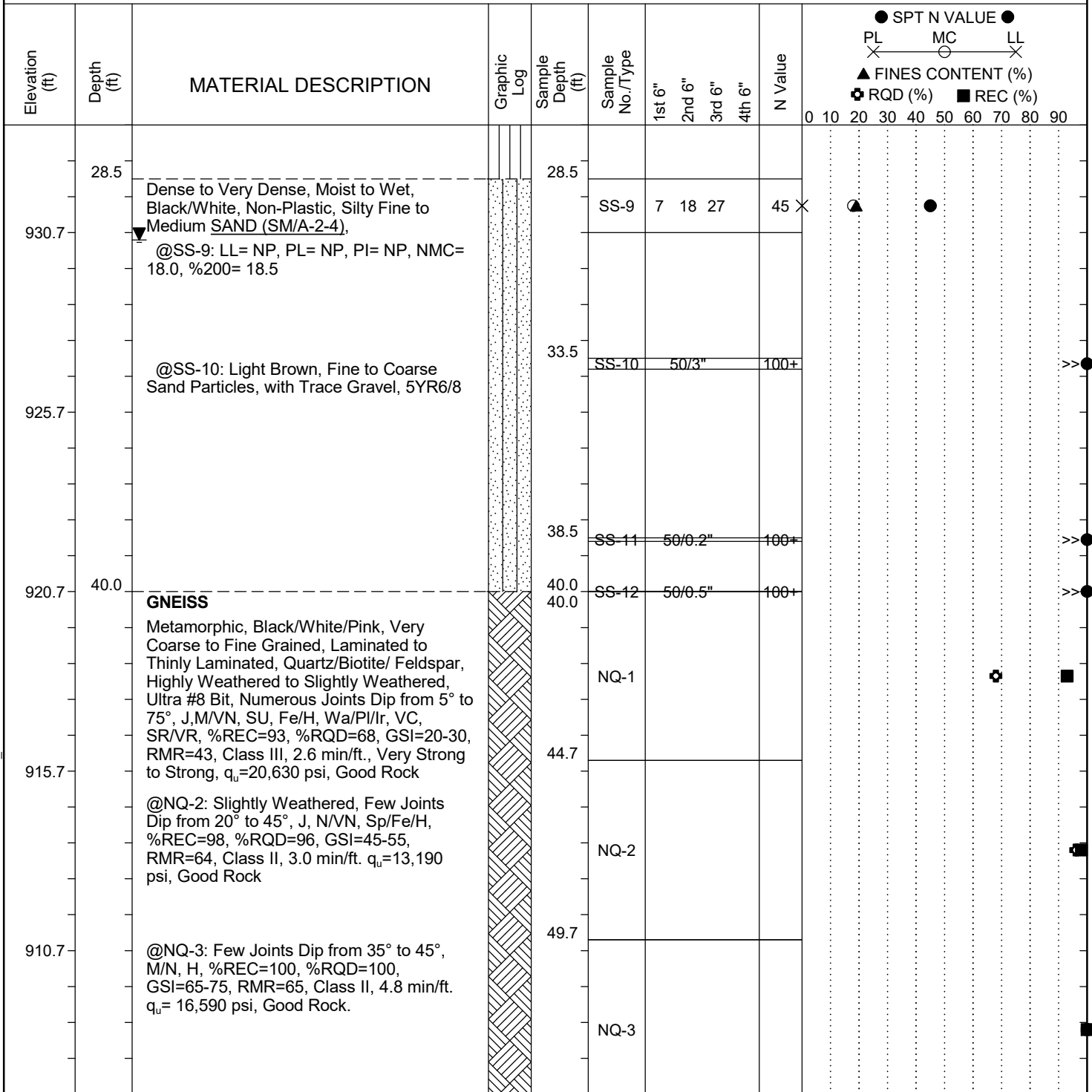
Continued Next Page

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

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|----------|----------------------------------|-------------|----------------------------------|--------------|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: B-2 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: | 960.7 ft | Latitude: | 35.10213049 | Longitude: | -82.27126104 | Date Started: 10/21/2024 | | |
| Total Depth: 59.7 ft | | Soil Depth: 40 ft | | Core Depth: 19.7 ft | | Date Completed: 10/22/2024 | | |
| Bore Hole Diameter (in): 3.8 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: NQ | | Driller: C. Odom | | Groundwater: TOB Not Encountered | | 24HR: 30.2 ft | | |



LEGEND

Continued Next Page

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

SCDOT Soil Test Log

| | | | | | | | | | |
|------------------------------|--|----------------------------------|--|-------------------------|--|-------------------|-----------------|----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: B-2 | | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | | |
| Eng./Geo.: M. Miller | | Boring Location: | | N/A | | Offset: N/A | | Alignment: N/A | |
| Elev.: 960.7 ft | | Latitude: 35.10213049 | | Longitude: -82.27126104 | | Date Started: | | 10/21/2024 | |
| Total Depth: 59.7 ft | | Soil Depth: 40 ft | | Core Depth: 19.7 ft | | Date Completed: | | 10/22/2024 | |
| Bore Hole Diameter (in): 3.8 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: | | 95.5% | |
| Core Size: NQ | | Driller: C. Odom | | Groundwater: TOB | | Not Encountered | | 24HR 30.2 ft | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X MC LL X ▲ FINES CONTENT (%) ⊕ RQD (%) ■ REC (%) | | | | | | | | | | |
|-------------------|---------------|--|----------------|-------------------------|--------------------|--------|--------|--------|--------|---------|---|----|----|----|----|----|----|----|----|----|--|
| | | | | | | | | | | | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | |
| 905.7 | 59.7 | @NQ-4: Fesh to Moderately Weathered, Few Joints Dip from 20° to 35°, N, No/H, %REC=100, %RQD=100, GSI=65-75, RMR=74, Class II, 10.4 min/ft., Good Rock | | 54.7 | NQ-4 | | | | | | | | | | | | | | | | |
| 900.7 | | Boring Terminated at 59.7-ft. Below Existing Ground Surface. Boring Achieved Target Depth. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 895.7 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 890.7 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 885.7 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 880.7 | | | | | | | | | | | | | | | | | | | | | |

LEGEND

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

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | | |
|------------------------------|--|----------------------------------|--|-------------------------|-----------------------|-----------------|-------------------|----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: P-1 | | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | | |
| Eng./Geo.: M. Miller | | Boring Location: | | N/A | | Offset: N/A | | Alignment: N/A | |
| Elev.: 976.4 ft | | Latitude: 35.100481 | | Longitude: -82.27175654 | | Date Started: | | 10/21/2024 | |
| Total Depth: 2 ft | | Soil Depth: 2 ft | | Core Depth: N/A ft | | Date Completed: | | 10/21/2024 | |
| Bore Hole Diameter (in): 3.0 | | Sampler Configuration | | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: | | 95.5% | |
| Core Size: N/A | | Driller: C. Odom | | Groundwater: TOB N/A | | 24HR | | N/A | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|--|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | ASPHALT (2.0-in.) | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.2 | Medium Dense, Moist, Light Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), Micaceous | | 0.2 | | | | | | | |
| | | | | | SS-1 | 8 | 7 | 6 | 5 | 13 | ● |
| | 2.2 | Boring Terminated at 2.2-ft. Below 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 | |

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|----------|----------------------------------|-------------|------------------------|--------------|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: P-2 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: | 972.3 ft | Latitude: | 35.10088082 | Longitude: | -82.27166754 | Date Started: 10/21/2024 | | |
| Total Depth: 2 ft | | Soil Depth: 2 ft | | Core Depth: N/A ft | | Date Completed: 10/21/2024 | | |
| Bore Hole Diameter (in): 3.0 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: N/A | | Driller: C. Odom | | Groundwater: TOB N/A | | 24HR: N/A | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X MC O LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|---|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.1 | ASPHALT (1.5-in.) | | 0.1 | | | | | | | |
| | | Medium Dense, Moist, Brown/White, Non-Plastic, Silty Fine to Coarse SAND (SM/A-2-4) | | | | | | | | | |
| | | | | | SS-1 | 6 | 8 | 6 | 8 | 14 | ● |
| | 2.1 | Boring Terminated at 2.1-ft. Below 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 | |

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|--|----------------------------------|--|-------------------------|--|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: P-3 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: 967.1 ft | | Latitude: 35.10126642 | | Longitude: -82.27150953 | | Date Started: 10/21/2024 | | |
| Total Depth: 2 ft | | Soil Depth: 2 ft | | Core Depth: N/A ft | | Date Completed: 10/21/2024 | | |
| Bore Hole Diameter (in): 3.0 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: N/A | | Driller: C. Odom | | Groundwater: TOB N/A | | 24HR: N/A | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|---|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | ASPHALT (2.5-in.) | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.2 | Very Dense, Dry, Black/White, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Sapprolite | | 0.2 | | | | | | | |
| | 1.5 | Boring Terminated at 1.5-ft. Below Existing Ground Surface. Boring Achieved Target Depth. | | | SS-1 | 7 | 21 | 50/4" | | 100+ | >>● |

LEGEND

| SAMPLER TYPE | | DRILLING METHOD | |
|-------------------------|------------------------|--------------------------------|------------------|
| SS - Split Spoon | NQ - Rock Core, 1-7/8" | HSA - Hollow Stem Auger | RW - Rotary Wash |
| 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: | P043993 | | | | County: | Greenville | | Boring No.: | P-4 | |
| Site Description: | S-23-115 over Middle Tyger River | | | | | | | Route: | S-23-115 | |
| Eng./Geo.: | M. Miller | | Boring Location: | | | N/A | | Offset: | N/A | |
| Alignment: | | | | | | | | | | N/A |
| Elev.: | 961.2 ft | | Latitude: | 35.1024807 | | Longitude: | -82.27114171 | | Date Started: | 10/21/2024 |
| Total Depth: | 2 ft | | Soil Depth: | 2 ft | | Core Depth: | N/A ft | | Date Completed: | 10/21/2024 |
| Bore Hole Diameter (in): | 3.0 | | Sampler Configuration | | | Liner Required: | Y (N) | | Liner Used: | Y (N) |
| Drill Machine: | Diedrich D-50 | | Drill Method: | RW/RC | | Hammer Type: | Automatic | | Energy Ratio: | 95.5% |
| Core Size: | N/A | | Driller: | C. Odom | | Groundwater: | TOB | N/A | | 24HR |
| | | | | | | | | | | N/A |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|--|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | ASPHALT (2.5-in.) | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.2 | EXISTING FILL Medium Dense, Moist, Brownish Red, Medium Plasticity, Clayey fine to Medium SAND (SC/A-2-6), 5YR5/8 | | 0.2 | | | | | | | |
| | | | | | SS-1 | 5 | 9 | 10 | 8 | 19 | ● |
| | 2.2 | Boring Terminated at 2.2-ft. Below 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 | |

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|----------|----------------------------------|-------------|------------------------|--------------|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: P-5 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: | 966.6 ft | Latitude: | 35.10285437 | Longitude: | -82.27098534 | Date Started: 10/21/2024 | | |
| Total Depth: 2 ft | | Soil Depth: 2 ft | | Core Depth: N/A ft | | Date Completed: 10/21/2024 | | |
| Bore Hole Diameter (in): 3.0 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: N/A | | Driller: C. Odom | | Groundwater: TOB N/A | | 24HR: N/A | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|--|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | ASPHALT (2.5-in.) | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.2 | EXISTING FILL Medium Dense, Moist, Brownish Red, Medium Plasticity, Clayey fine to Medium SAND (SC/A-2-6), 5YR5/8 | | 0.2 | | | | | | | |
| | 2.2 | Boring Terminated at 2.2-ft. Below Existing Ground Surface. Boring Achieved Target Depth. | | | SS-1 | 6 | 8 | 11 | 11 | 19 | ● |

LEGEND

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

SC DOT G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT_DATATEMPLATE.GDT 11/7/24

SCDOT Soil Test Log

| | | | | | | | | |
|------------------------------|----------|----------------------------------|-------------|------------------------|--------------|----------------------------|-----------------|--|
| Project ID: P043993 | | | | County: Greenville | | Boring No.: P-6 | | |
| Site Description: | | S-23-115 over Middle Tyger River | | | | | Route: S-23-115 | |
| Eng./Geo.: M. Miller | | Boring Location: N/A | | Offset: N/A | | Alignment: N/A | | |
| Elev.: | 969.1 ft | Latitude: | 35.10324256 | Longitude: | -82.27092245 | Date Started: 10/21/2024 | | |
| Total Depth: 2 ft | | Soil Depth: 2 ft | | Core Depth: N/A ft | | Date Completed: 10/21/2024 | | |
| Bore Hole Diameter (in): 3.0 | | Sampler Configuration | | Liner Required: Y (N) | | Liner Used: Y (N) | | |
| Drill Machine: Diedrich D-50 | | Drill Method: RW/RC | | Hammer Type: Automatic | | Energy Ratio: 95.5% | | |
| Core Size: N/A | | Driller: C. Odom | | Groundwater: TOB N/A | | 24HR: N/A | | |

| Elevation (ft) | Depth (ft) | MATERIAL DESCRIPTION | Graphic Log | Sample Depth (ft) | Sample No./Type | 1st 6" | 2nd 6" | 3rd 6" | 4th 6" | N Value | ● SPT N VALUE ● PL X — MC — LL X ▲ FINES CONTENT (%) + RQD (%) ■ REC (%) |
|----------------|------------|---|-------------|-------------------|-----------------|--------|--------|--------|--------|---------|---|
| | 0.0 | ASPHALT (2.5-in.) | | | | | | | | | 0 10 20 30 40 50 60 70 80 90 |
| | 0.3 | Medium Dense, Moist, Brownish Red, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), 5YR5/8 | | 0.3 | | | | | | | |
| | | | | | SS-1 | 8 | 8 | 10 | 11 | 18 | ● |
| | 2.3 | Boring Terminated at 2.2-ft. Below 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 | |

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

S-23-115 over Middle Tyger River

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 P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

| Borehole | Depth | Liquid Limit | Plastic Limit | Plasticity Index | Maximum Size (mm) | %<#200 Sieve | Classification | Water Content (%) | Dry Density (pcf) | Saturation (%) | Void Ratio |
|----------|-------|--------------|---------------|------------------|-------------------|--------------|----------------|-------------------|-------------------|----------------|------------|
| B-1 | 2.0 | 29 | 19 | 10 | 19 | 31 | SC | 16.5 | | | |
| B-1 | 10.0 | NP | NP | NP | 25 | 30 | SM | 21.9 | | | |
| B-1 | 15.0 | 28 | 26 | 2 | 19 | 28 | SM | 19.9 | | | |
| B-2 | 4.0 | 40 | 31 | 9 | 9.51 | 37 | SM | 23.3 | | | |
| B-2 | 10.0 | 47 | 25 | 22 | 19 | 59 | CL | 25.8 | | | |
| B-2 | 15.0 | 45 | 33 | 12 | 19 | 52 | ML | 33.1 | | | |
| B-2 | 20.0 | 45 | 29 | 16 | 19 | 57 | ML | 28.0 | | | |
| B-2 | 30.0 | NP | NP | NP | 19 | 18 | SM | 18.0 | | | |



INDEX PROPERTIES VERSUS DEPTH

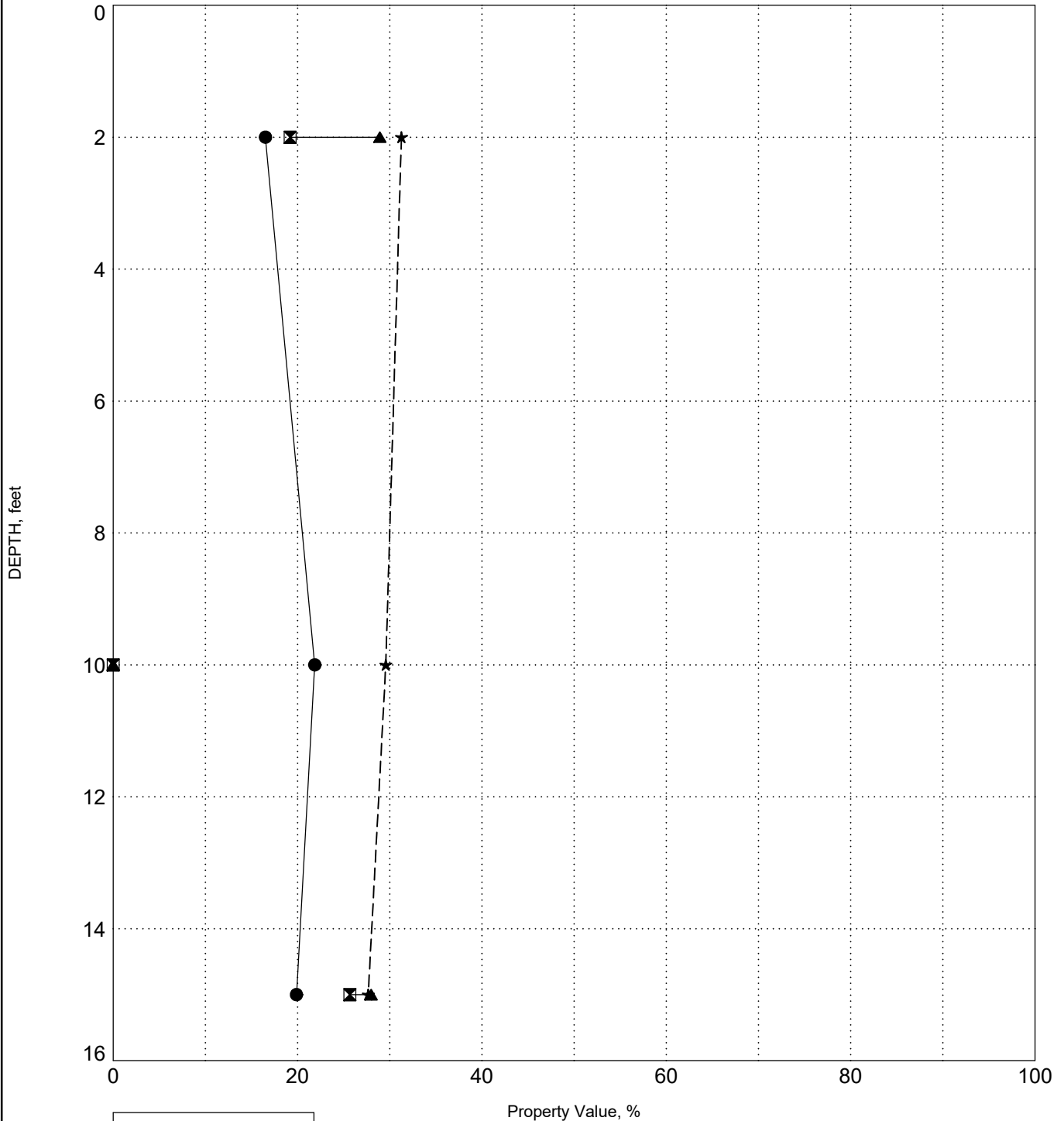
PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

SURFACE ELEVATION: 963.2

BORING B-1

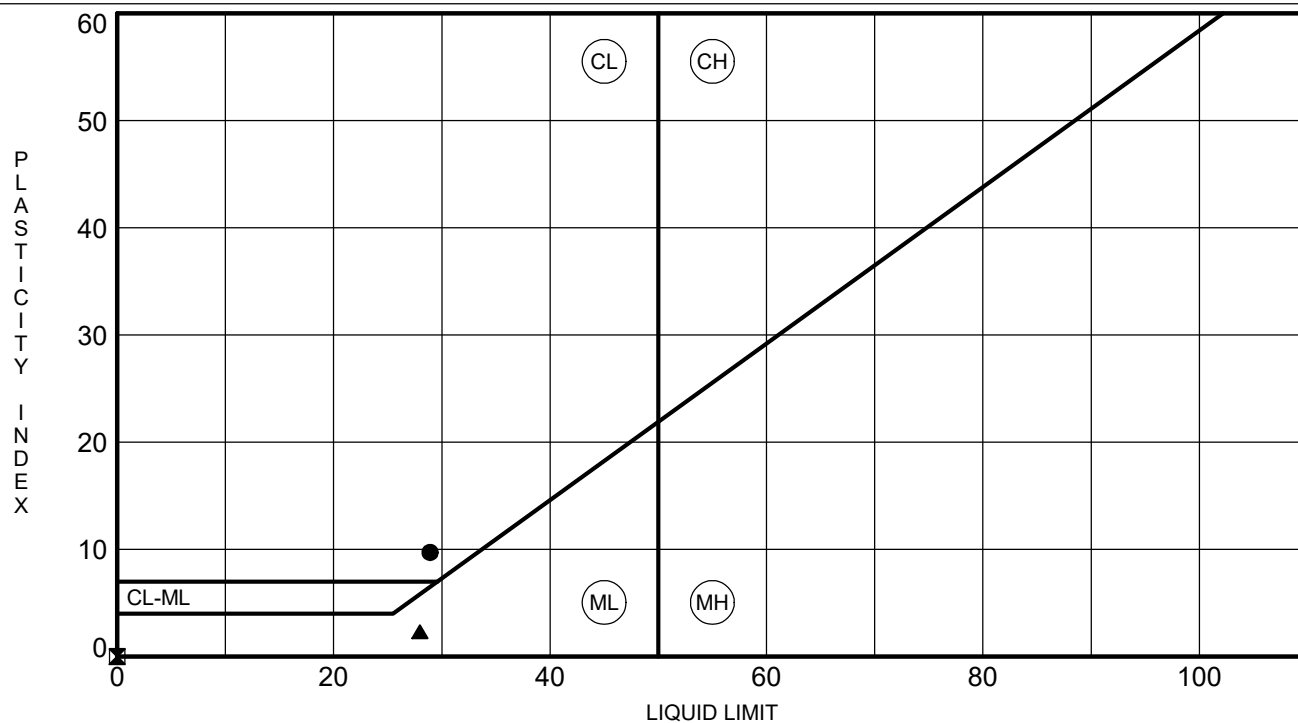


| LEGEND | |
|--------|---------------|
| ● | Water Content |
| ⊠ | Plastic Limit |
| ▲ | Liquid Limit |
| ★ | Fines |



PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

[illegible]

ANTTERBERG LIMITS G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT DATA TEMPLATE_01 30 2015.GDT 11/1/24

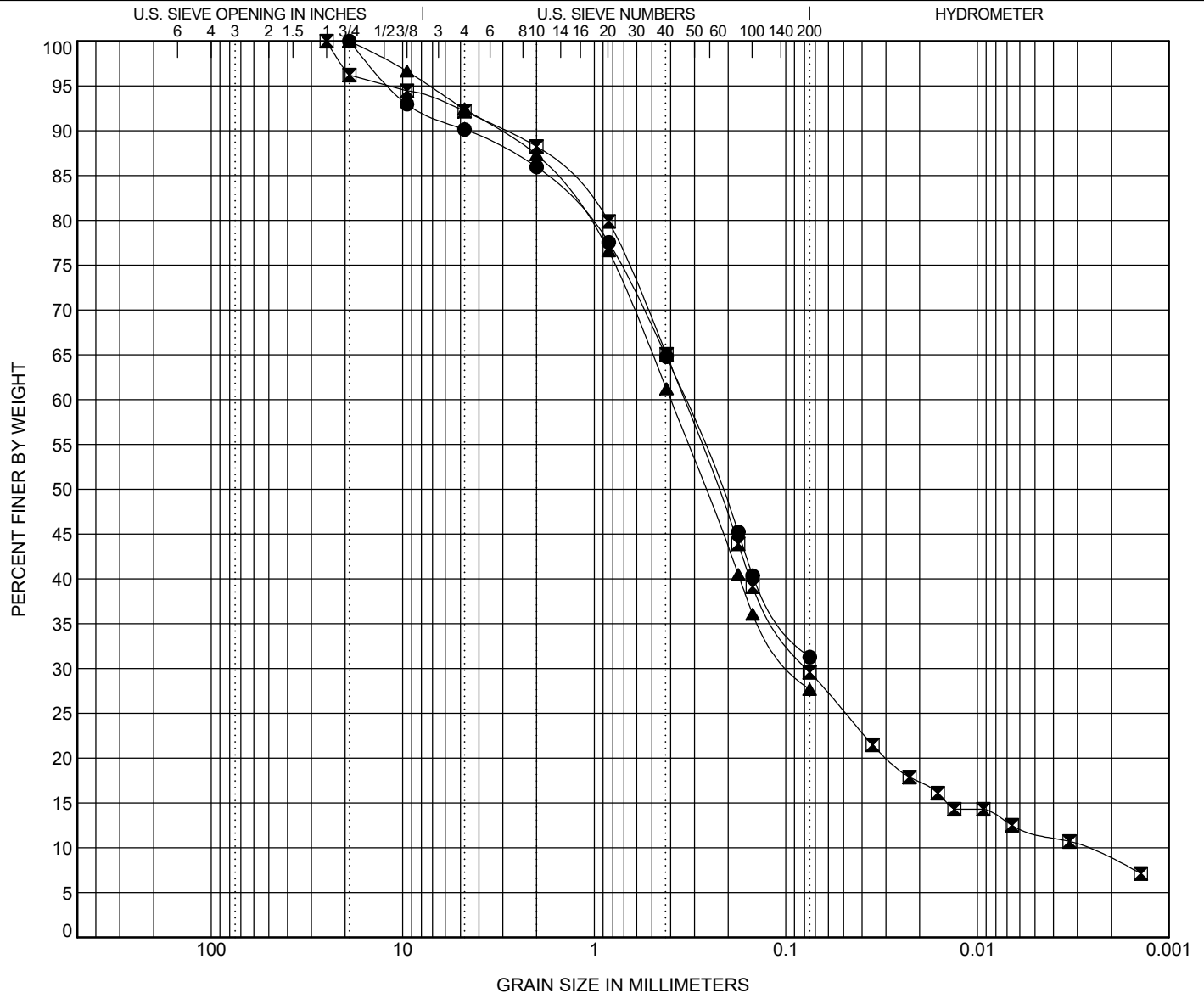


GRAIN SIZE DISTRIBUTION

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville



F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

| | | | |
|-----------------------------|----------------------------------|--------------------------|------------|
| PROJECT: | S-23-115 over Middle Tyger River | SCDOT PROJECT ID: | P043993 |
| SAMPLE NUMBER: | 24-3777 | DATE REQUESTED: | 10/24/2024 |
| DESCRIPTION OF SOIL: | Various | | |
| TESTED BY: | AAB | DATE OF TESTING: | 10/25/2024 |
| WEIGHED BY: | AC | DATE OF WEIGHING: | 10/28/2024 |

| | | | | | |
|-------------------|-----------|------------|-------------|--|--|
| BORING NO. | B-1 | B-1 | B-1 | | |
| SAMPLE NO. | SS-1 | SS-5 | SS-6 | | |
| SAMPLE DEPTH | 0.0 - 2.0 | 8.0 - 10.0 | 13.5 - 15.0 | | |
| WATER CONTENT, W% | 16.5 | 21.9 | 19.9 | | |

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

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

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



INDEX PROPERTIES VERSUS DEPTH

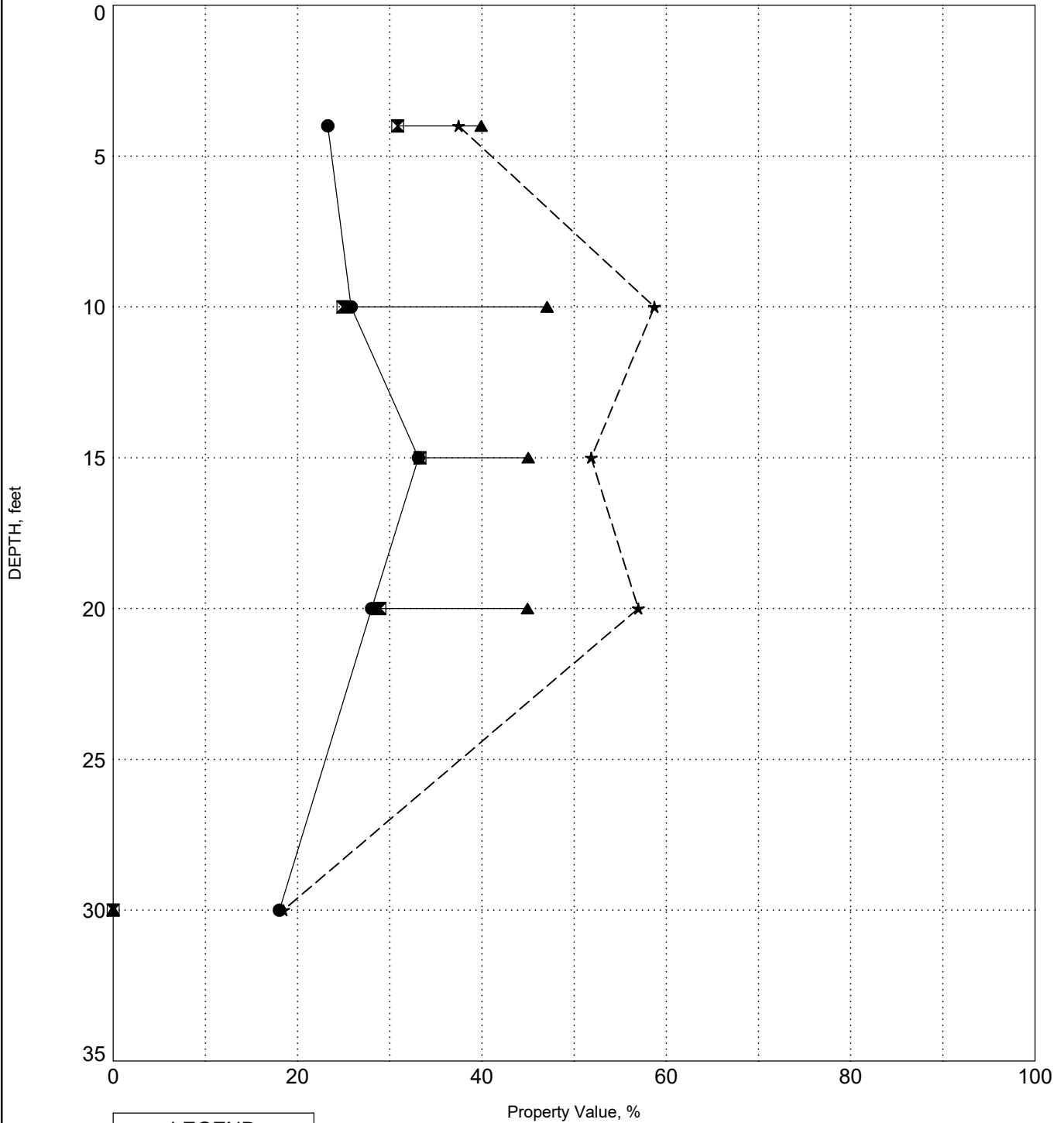
PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

SURFACE ELEVATION: 960.7

BORING B-2

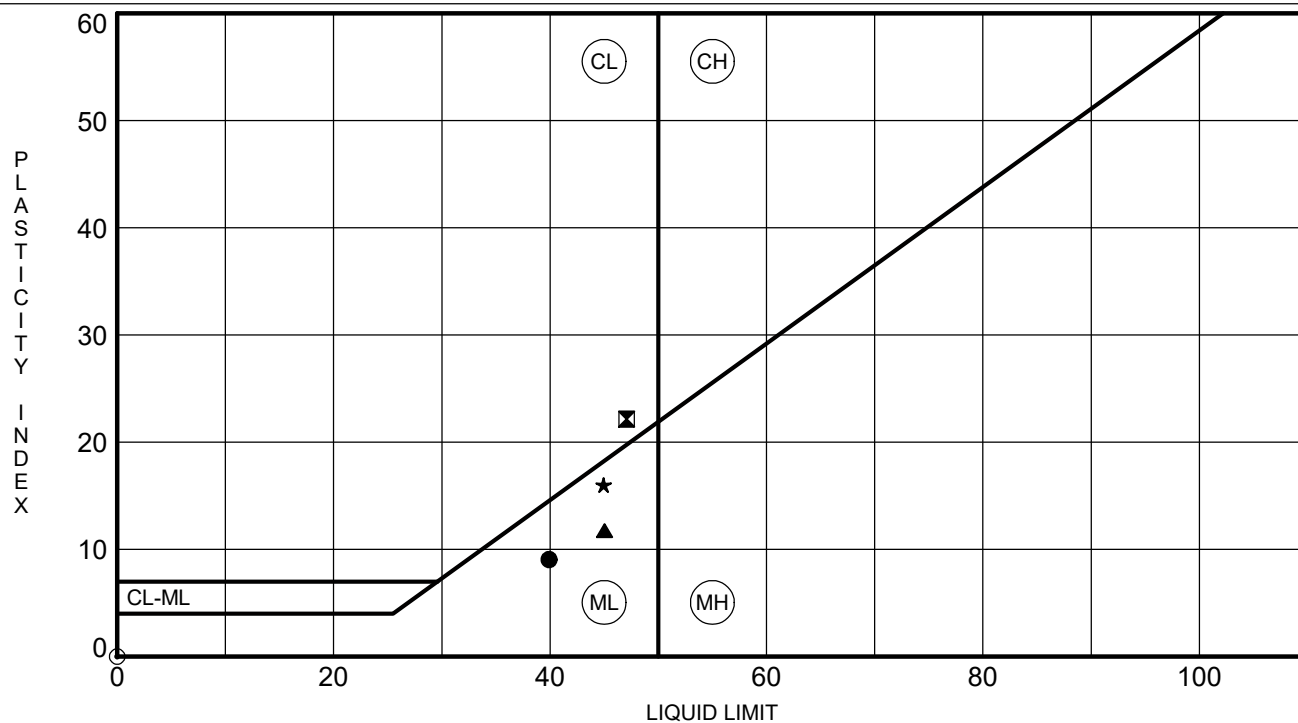


| LEGEND | |
|--------|---------------|
| ● | Water Content |
| ⊠ | Plastic Limit |
| ▲ | Liquid Limit |
| ★ | Fines |



PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

[illegible]

ATTERBERG LIMITS G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT DATA TEMPLATE 01 30 2015.GDT 11/1/24

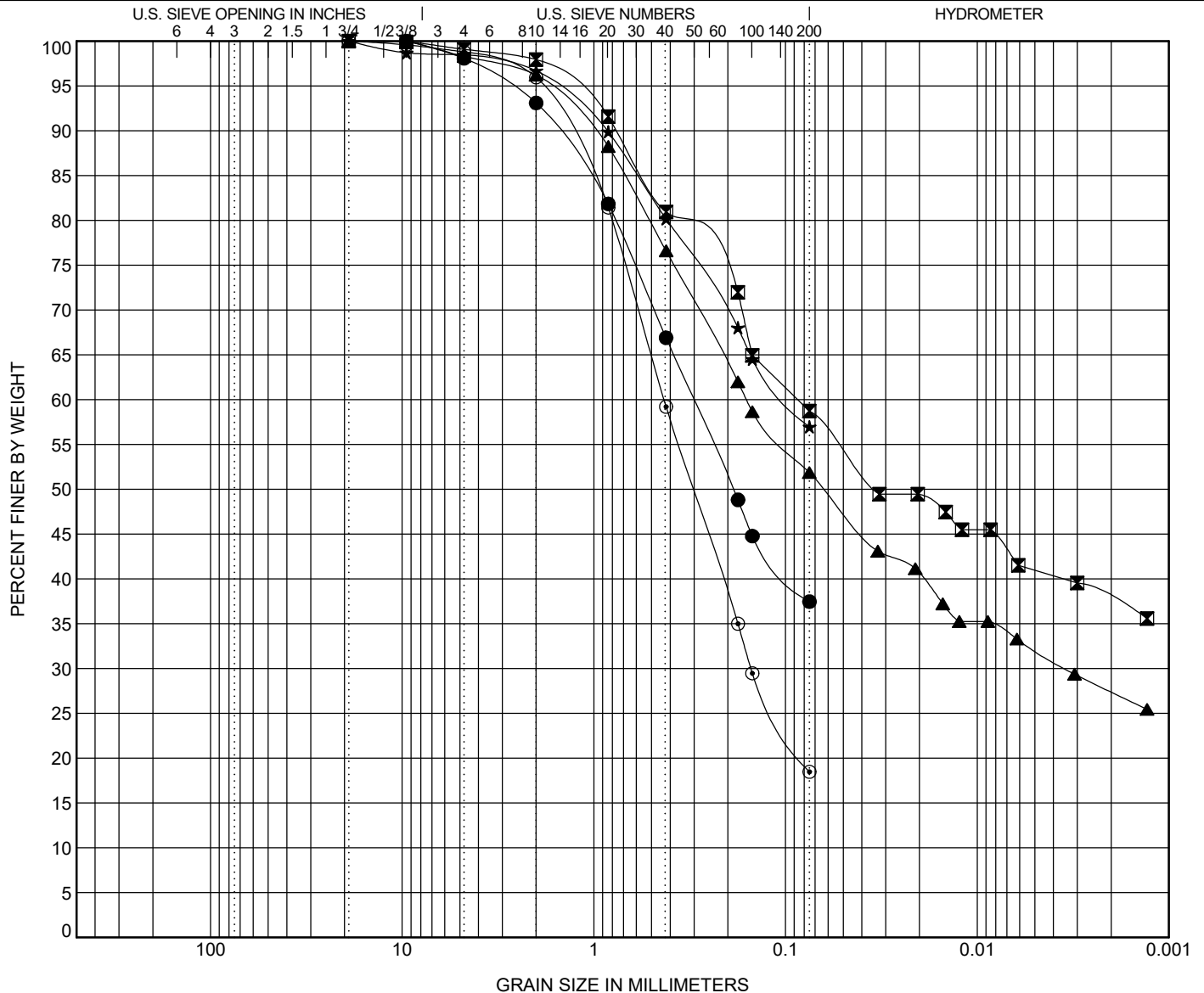


GRAIN SIZE DISTRIBUTION

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville



| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
| | coarse | fine | coarse | medium | fine | |

| BOREHOLE | DEPTH | Classification | | | | | LL | PL | PI | Cc | Cu |
|----------|-------|----------------------------|-------|-------|-----|---------|-------|-------|----|-------|----|
| ● B-2 | 4.0 | SILTY SAND (SM/A-4) | | | | | 40 | 31 | 9 | | |
| ■ B-2 | 10.0 | SANDY LEAN CLAY (CL/A-7-6) | | | | | 47 | 25 | 22 | | |
| ▲ B-2 | 15.0 | SANDY SILT (ML/A-7-5) | | | | | 45 | 33 | 12 | | |
| ★ B-2 | 20.0 | SANDY SILT (ML/A-7-6) | | | | | 45 | 29 | 16 | | |
| ⊙ B-2 | 30.0 | SILTY SAND (SM/A-2-4) | | | | | NP | NP | NP | | |
| BOREHOLE | DEPTH | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | | %Clay | |
| ● B-2 | 4.0 | 9.51 | 0.302 | | | 1.9 | 60.6 | 37.5 | | | |
| ■ B-2 | 10.0 | 19 | 0.086 | | | 0.9 | 40.4 | 17.7 | | 41.0 | |
| ▲ B-2 | 15.0 | 19 | 0.16 | 0.003 | | 1.7 | 46.4 | 19.8 | | 32.1 | |
| ★ B-2 | 20.0 | 19 | 0.099 | | | 1.5 | 41.5 | 57.0 | | | |
| ⊙ B-2 | 30.0 | 19 | 0.431 | 0.152 | | 1.2 | 80.3 | 18.5 | | | |

F&ME CONSULTANTS, INC
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Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

| | | | |
|-----------------------------|----------------------------------|--------------------------|------------|
| PROJECT: | S-23-115 over Middle Tyger River | SCDOT PROJECT ID: | P043993 |
| SAMPLE NUMBER: | 24-3778 | DATE REQUESTED: | 10/24/2024 |
| DESCRIPTION OF SOIL: | Various | | |
| TESTED BY: | AAB | DATE OF TESTING: | 10/25/2024 |
| WEIGHED BY: | AC | DATE OF WEIGHING: | 10/28/2024 |

| | | | | | |
|-------------------|-----------|------------|-------------|-------------|-------------|
| BORING NO. | B-2 | B-2 | B-2 | B-2 | B-2 |
| SAMPLE NO. | SS-2 | SS-5 | SS-6 | SS-7 | SS-9 |
| SAMPLE DEPTH | 2.0 - 4.0 | 8.0 - 10.0 | 13.5 - 15.0 | 18.5 - 20.0 | 28.5 - 30.0 |
| WATER CONTENT, W% | 23.3 | 25.8 | 33.1 | 33.1 | 18 |

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

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

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

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4B BULK SOIL SAMPLES



SUMMARY OF LABORATORY RESULTS

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

| 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@P-2/P-5 | 0.0 – 2.0 | 34 | 26 | 8 | 40.6 | SM | 13.3 | 106.5 | 17.9 | -- | -- | -- | -- |



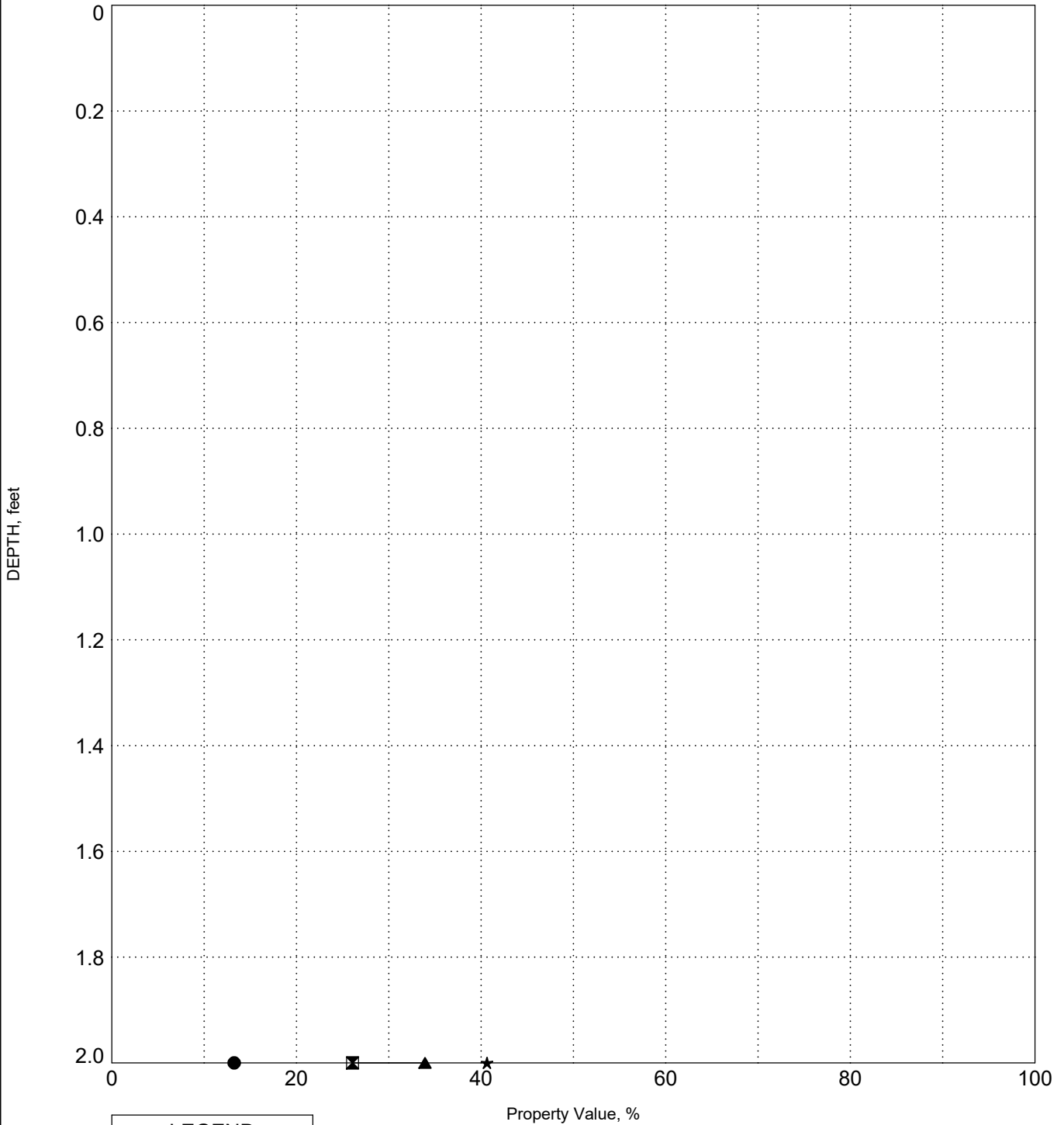
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

BORING BS-1 @ P-2/P-5

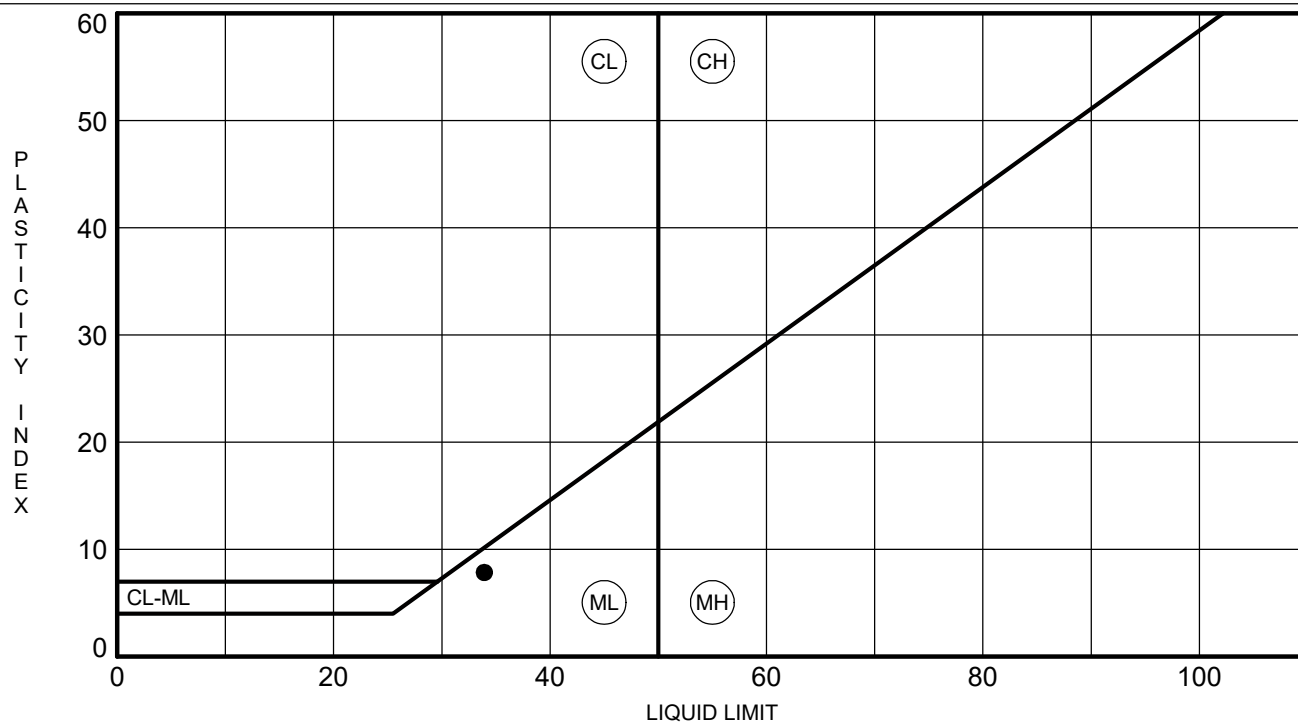


| LEGEND | |
|--------|---------------|
| ● | Water Content |
| ☒ | Plastic Limit |
| ▲ | Liquid Limit |
| ★ | Fines |



PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

[illegible]

ATTERBERG LIMITS G7100.007 - TASK 00002 - S-115 RBO M TYGER RIVER.GPJ SCDOT DATA TEMPLATE 01 30 2015.GDT 11/1/24

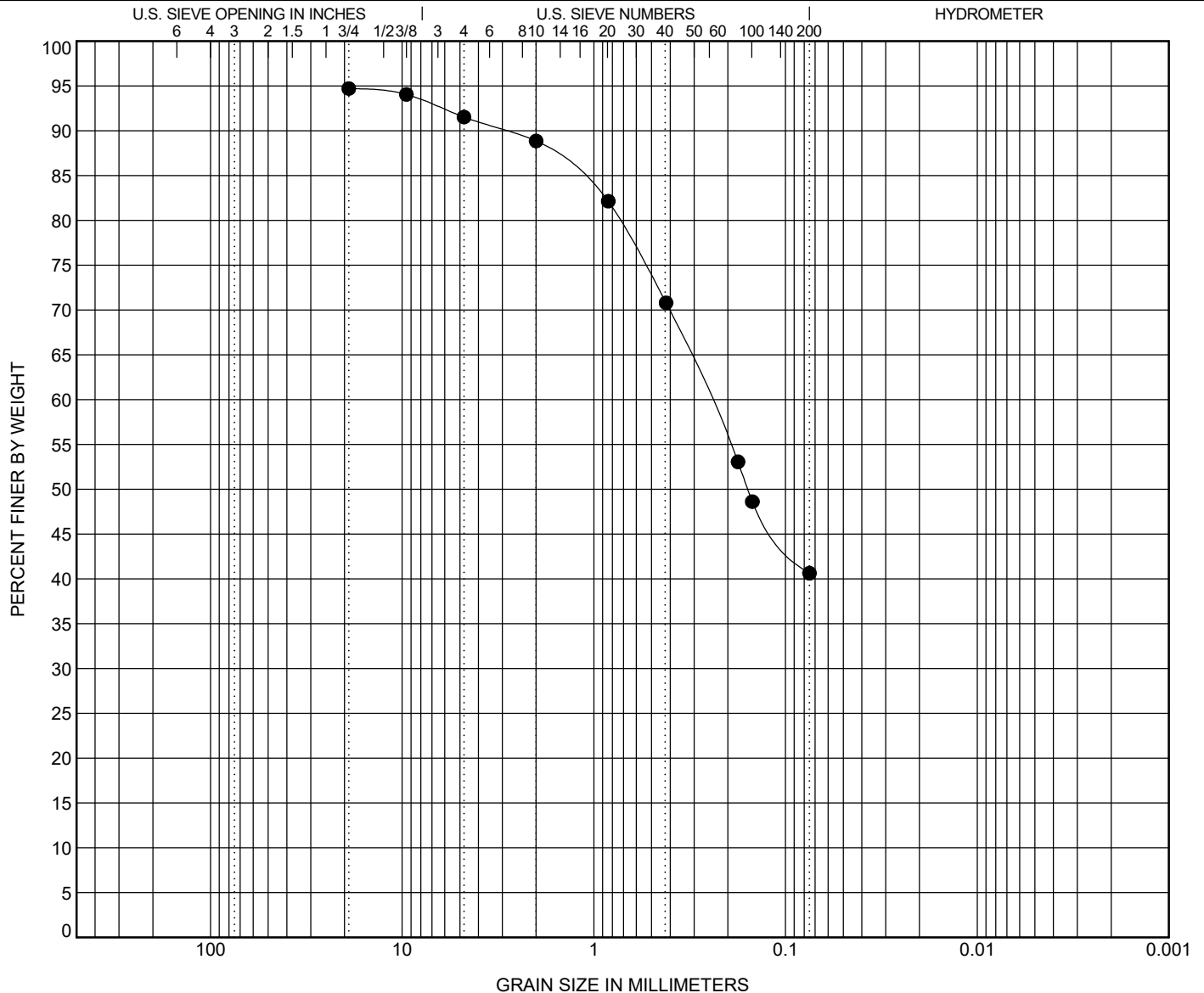


GRAIN SIZE DISTRIBUTION

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville



| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
| | coarse | fine | coarse | medium | fine | |

| BOREHOLE | DEPTH | Classification | | | | | LL | PL | PI | Cc | Cu |
|------------------|-------|---------------------|-------|-----|-----|---------|-------|-------|----|-------|----|
| ● BS-1 @ P-2/P-5 | 2.0 | SILTY SAND (SM/A-4) | | | | | 34 | 26 | 8 | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| BOREHOLE | DEPTH | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | | %Clay | |
| ● BS-1 @ P-2/P-5 | 2.0 | 19 | 0.248 | | | 3.2 | 50.9 | 40.6 | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

| | | | |
|-----------------------------|----------------------------------|--------------------------|------------|
| PROJECT: | S-23-115 over Middle Tyger River | SCDOT PROJECT ID: | P043993 |
| SAMPLE NUMBER: | 24-3775 | DATE REQUESTED: | 10/24/2024 |
| DESCRIPTION OF SOIL: | Silty SAND (SM/A-4) | | |
| TESTED BY: | AAB | DATE OF TESTING: | 10/25/2024 |
| WEIGHED BY: | AC | DATE OF WEIGHING: | 10/28/2024 |

| | | | | | |
|-------------------|----------------|--|--|--|--|
| BORING NO. | BS-1 @ P-2/P-5 | | | | |
| SAMPLE NO. | -- | | | | |
| SAMPLE DEPTH | 0.0 - 2.0 | | | | |
| WATER CONTENT, W% | 13.3 | | | | |

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

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

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

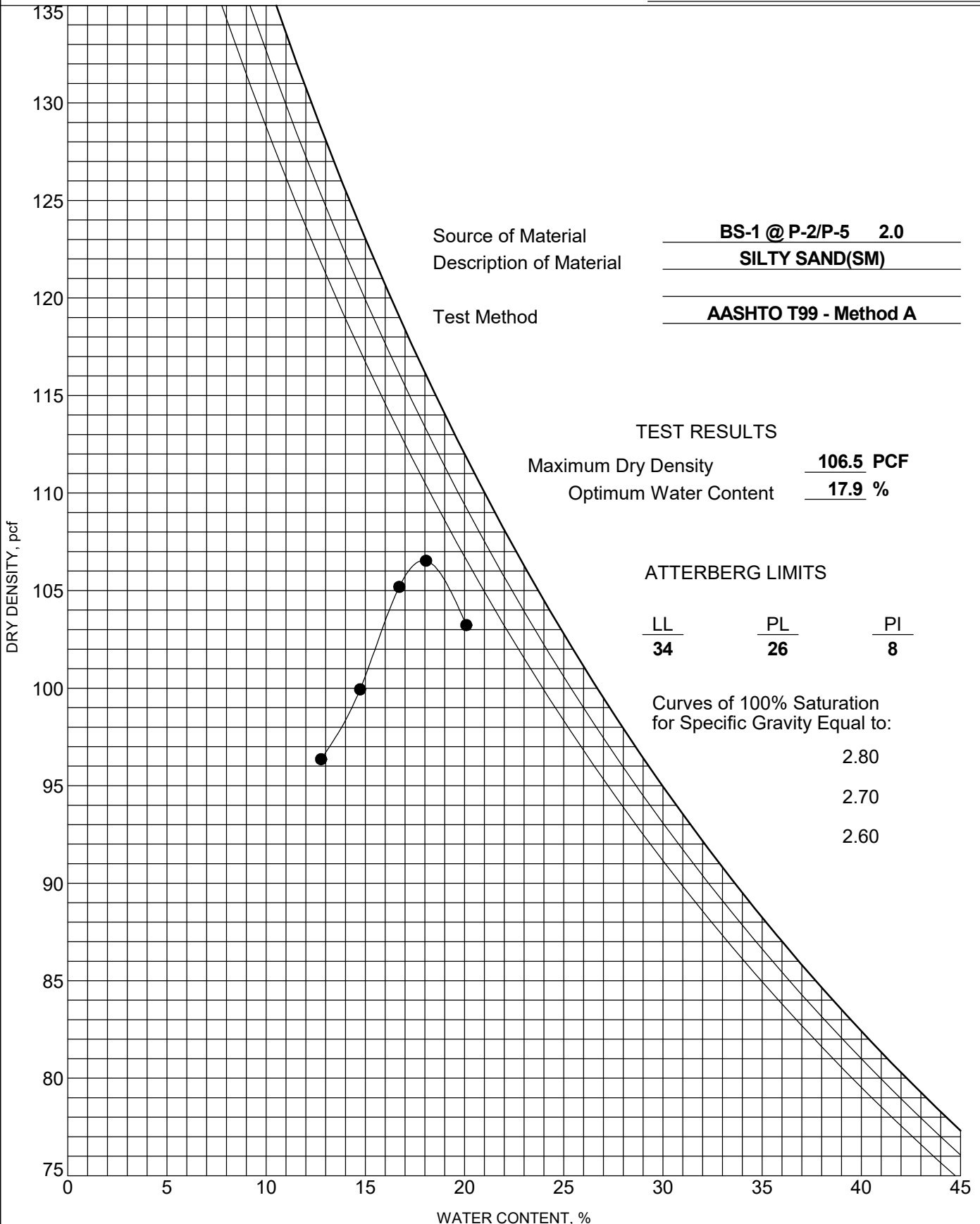


MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville



CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

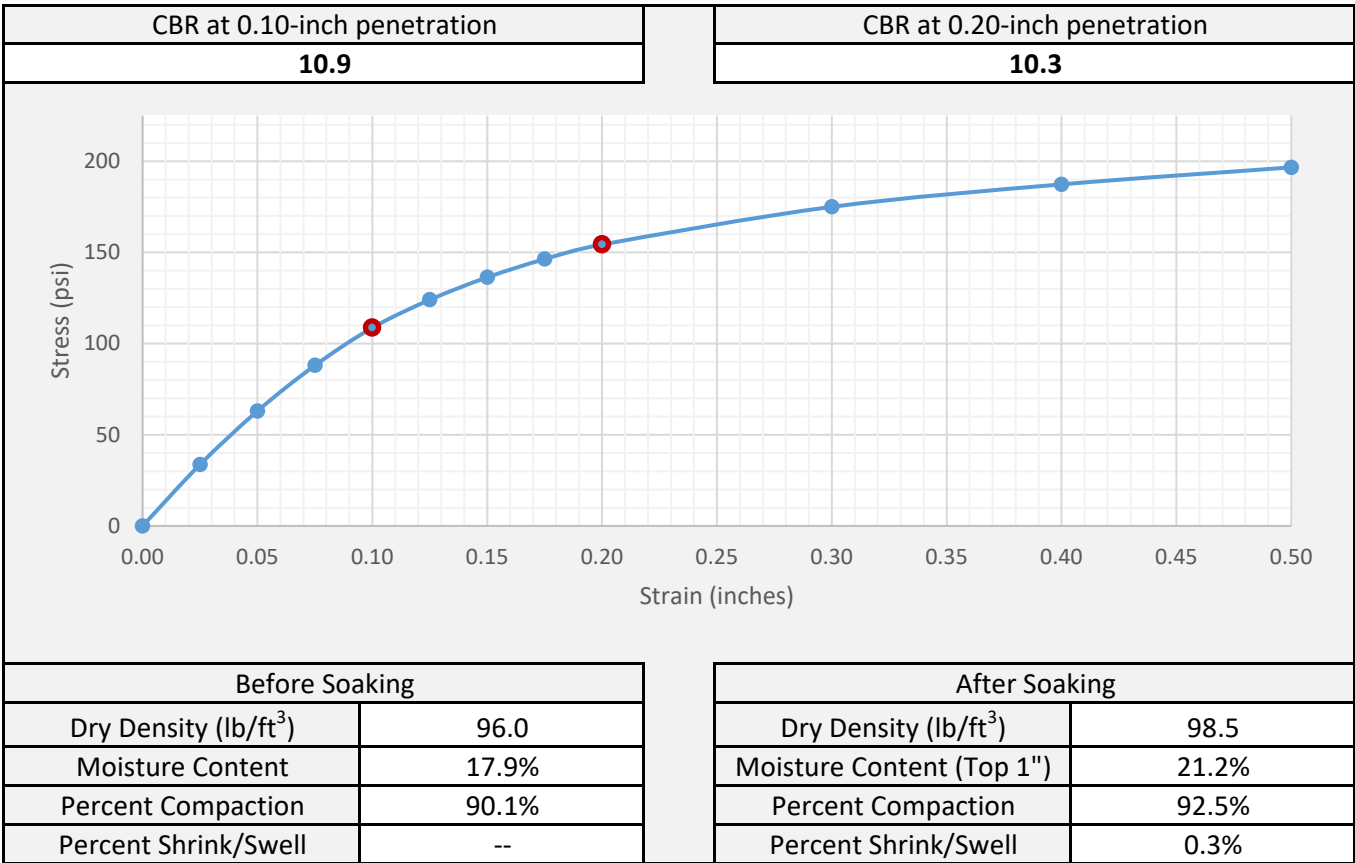
SAMPLE INFORMATION

| | | | | | |
|------------------|----------------------------------|----------------|---------|---------------|-----------------------|
| Project Name | S-23-115 over Middle Tyger River | | | Project No. | G7100.007 - Task00002 |
| Sample Location | BS-1 @ P-2/P-5 | | | FME Lab ID | 24-3775 |
| Soil Description | Silty SAND (SM/A-4) | | | Depth/Elev. | 0.0 - 2.0 |
| Date Sampled | -- | Sampled By: | F&ME | Date Received | 10/22/2024 |
| Date Test Began | 11/1/2024 | Date Completed | 11/5/24 | Tested By | DH |

MOLDING CHARACTERISTICS

| | | | |
|---------------------------------------|-----------------------|------------------------------|------|
| Method | AASHTO T99 - Method A | % Retained on 3/4" Sieve | 0% |
| Max Dry Density (lb/ft ³) | 106.5 | Optimum Moisture Content (%) | 17.9 |
| Soak Time (hr) | 96 | Surcharge Weight (lb) | 10.0 |

TESTING RESULTS



ADDITIONAL COMMENTS

Target %Compaction = 90%

| | | |
|---|--|---------|
|  <div>F&ME Consultants, Inc. 211 Business Park Blvd., Columbia, South Carolina 29203</div> |  | 11/6/24 |
| | Reviewed By | Date |

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

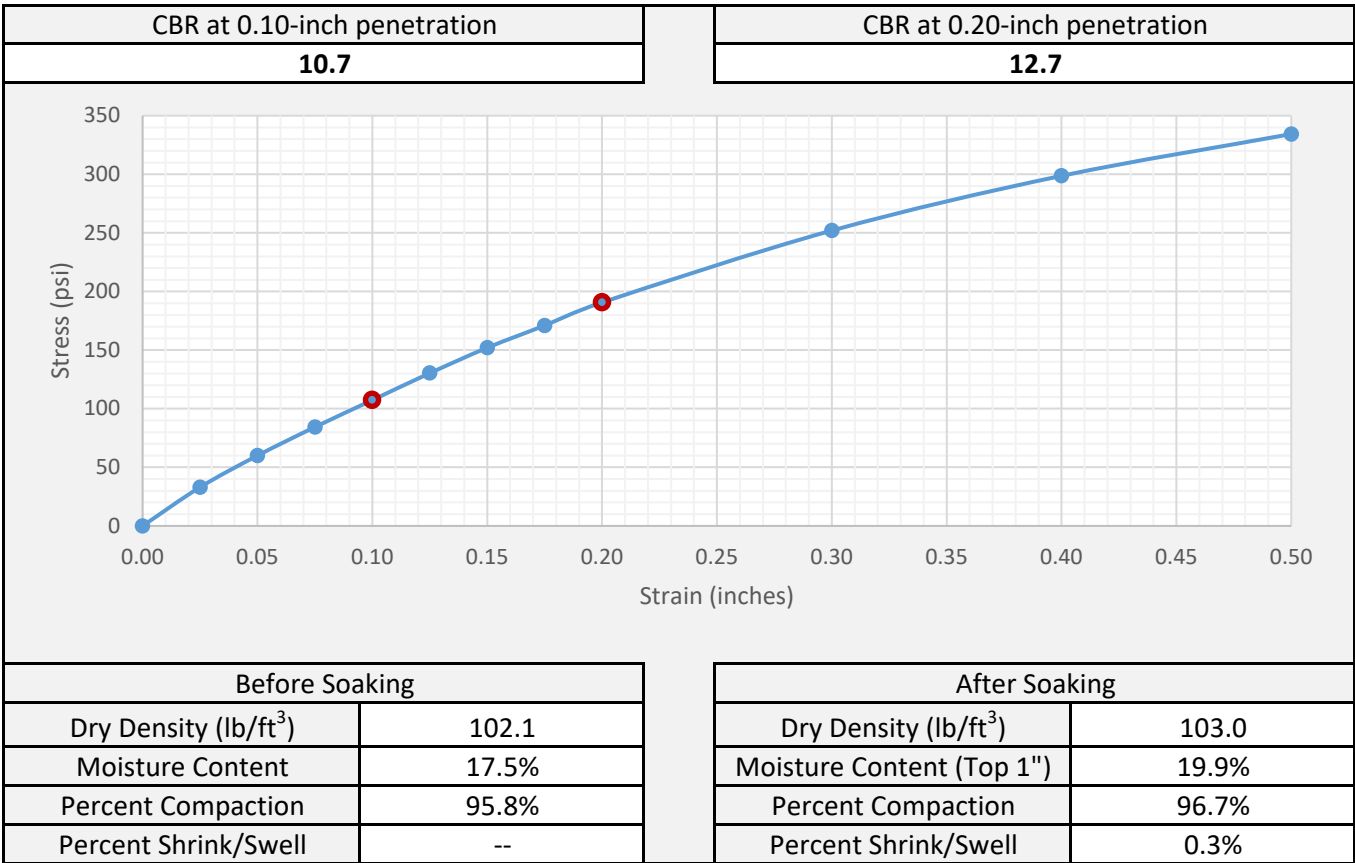
SAMPLE INFORMATION

| | | | | | |
|------------------|----------------------------------|----------------|---------|---------------|------------------------|
| Project Name | S-23-115 over Middle Tyger River | | | Project No. | G7100.007 - Task 00002 |
| Sample Location | BS-1 | | | FME Lab ID | 24-3775 |
| Soil Description | Silty SAND (SM/A-4) | | | Depth/Elev. | 0.0 - 2.0 |
| Date Sampled | -- | Sampled By: | F&ME | Date Received | 10/22/2024 |
| Date Test Began | 11/1/2024 | Date Completed | 11/5/24 | Tested By | DH |

MOLDING CHARACTERISTICS

| | | | |
|---------------------------------------|-----------------------|------------------------------|------|
| Method | AASHTO T99 - Method A | % Retained on 3/4" Sieve | 0% |
| Max Dry Density (lb/ft ³) | 106.5 | Optimum Moisture Content (%) | 17.9 |
| Soak Time (hr) | 96 | Surcharge Weight (lb) | 10.0 |

TESTING RESULTS



ADDITIONAL COMMENTS

Target %Compaction = 95%

| | | |
|---|--|---------|
|  <div>F&ME Consultants, Inc. 211 Business Park Blvd., Columbia, South Carolina 29203</div> |  | 11/6/24 |
| | Reviewed By | Date |

CALIFORNIA BEARING RATIO (CBR) AASHTO T193

SAMPLE INFORMATION

| | | | | | |
|------------------|----------------------------------|----------------|---------|---------------|-----------------------|
| Project Name | S-23-115 over Middle Tyger River | | | Project No. | G7100.007 - Task00002 |
| Sample Location | BS-1 @ P-2/P-5 | | | FME Lab ID | 24-3775 |
| Soil Description | Silty SAND (SM/A-4) | | | Depth/Elev. | 0.0 - 2.0 |
| Date Sampled | -- | Sampled By: | F&ME | Date Received | 10/22/2024 |
| Date Test Began | 11/1/2024 | Date Completed | 11/5/24 | Tested By | DH |

MOLDING CHARACTERISTICS

| | | | |
|---------------------------------------|-----------------------|------------------------------|------|
| Method | AASHTO T99 - Method A | % Retained on 3/4" Sieve | 0% |
| Max Dry Density (lb/ft ³) | 106.5 | Optimum Moisture Content (%) | 17.9 |
| Soak Time (hr) | 96 | Surcharge Weight (lb) | 10.0 |

TESTING RESULTS

| Corrected CBR at 0.10-inch penetration | | Corrected CBR at 0.20-inch penetration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------|--|--------|-----------------|--------------|------|---|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| 6.5 | | 9.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><thead><tr><th>Strain (inches)</th><th>Stress (psi)</th></tr></thead><tbody><tr><td>0.00</td><td>0</td></tr><tr><td>0.02</td><td>10</td></tr><tr><td>0.04</td><td>25</td></tr><tr><td>0.06</td><td>40</td></tr><tr><td>0.08</td><td>55</td></tr><tr><td>0.10</td><td>60</td></tr><tr><td>0.12</td><td>75</td></tr><tr><td>0.14</td><td>90</td></tr><tr><td>0.16</td><td>105</td></tr><tr><td>0.18</td><td>120</td></tr><tr><td>0.20</td><td>130</td></tr><tr><td>0.30</td><td>210</td></tr><tr><td>0.40</td><td>290</td></tr><tr><td>0.50</td><td>370</td></tr></tbody></table> | | | | Strain (inches) | Stress (psi) | 0.00 | 0 | 0.02 | 10 | 0.04 | 25 | 0.06 | 40 | 0.08 | 55 | 0.10 | 60 | 0.12 | 75 | 0.14 | 90 | 0.16 | 105 | 0.18 | 120 | 0.20 | 130 | 0.30 | 210 | 0.40 | 290 | 0.50 | 370 |
| Strain (inches) | Stress (psi) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.00 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.02 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.04 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.06 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.08 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.10 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.12 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.14 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.16 | 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.18 | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.20 | 130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.30 | 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.40 | 290 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.50 | 370 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Before Soaking | | After Soaking | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dry Density (lb/ft ³) | 107.3 | Dry Density (lb/ft ³) | 106.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Moisture Content | 17.7% | Moisture Content (Top 1") | 20.2% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percent Compaction | 100.7% | Percent Compaction | 100.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percent Shrink/Swell | -- | Percent Shrink/Swell | 0.4% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ADDITIONAL COMMENTS

Target %Compaction = 100%

The 100% CBR values for this sample were less than the CBR Values for the 90% and 95% compactions.

Engineers should use this 100% compaction CBR value with care.



F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alex M. Almalikhy

Reviewed By

11/6/24

Date

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4C CORROSION SERIES TESTING



CORROSION SERIES SUMMARY

PAGE 1 OF 1

PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

| 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-2/SS-3 | 2.0 – 6.0 | 5.41 | 15,209 | 41.79 | 46.8 |
| B-2 | SS-3/SS-4 | 4.0 – 8.0 | 5.41 | 35,242 | 13.21 | 47.2 |

**pH DETERMINATION
(AASHTO T289)**

| | | | |
|------------------------|----------------------------------|-------------------------|------------------------|
| Project Name: | S-23-115 over Middle Tyger River | Project Number: | G7100.007 - Task 00002 |
| Sample Location: | B-1 | Sample Elevation/Depth: | 2.0 - 6.0 |
| Description of Sample: | Soil (Composite) | Date Received | 10/22/2024 |
| Tested By: | L. Johnson | Date Tested: | 10/30/2024 |

| | | | | |
|------------------|-----------|--|--|--|
| SCDOT Sample ID | B-1 | | | |
| Boring Depth | 2.0 - 6.0 | | | |
| FME Lab ID No. | 24-3777 | | | |
| pH Value | 5.41 | | | |
| Temperature (°C) | 21.50 | | | |

Date Reviewed: 11/4/2024Reviewed By: J.Hiers

**SOIL RESISTIVITY
(AASHTO T288)**

| | | | |
|-------------------|----------------------------------|-----------------|------------|
| Project Name: | S-23-115 over Middle Tyger River | Project ID: | P043993 |
| Location: | B-1 | FME Lab ID No.: | 24-3777 |
| Sampled By: | MM | Date Sampled: | 10/22/2024 |
| Soil Description: | SILTY SAND (SM/A-2-4) | Date Received: | 10/22/2024 |
| Tested By: | AGB | Date Tested: | 10/31/2024 |

| Boring No. | Sample Depth (ft.) | Minimum Soil Resistivity, Ω -cm |
|------------|--------------------|---|
| B-1 | 2.0 - 6.0 | 15,209 |

Date Reviewed: 11/4/2024 Reviewed By: J. Hiers

CHLORIDE ION CONTENT IN SOILS

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

Client: F&ME Consultants, Inc.
 Client Reference: Tyger River G7100.007
 Project No.: 2024-797-001
 Lab ID: 2024-797-001-001

Boring No.: B-1
 Depth (ft): 2.0-6.0'
 Sample No.: SS-2/SS-3
 Description: Brown Soil

(- # 10 Sieve material)

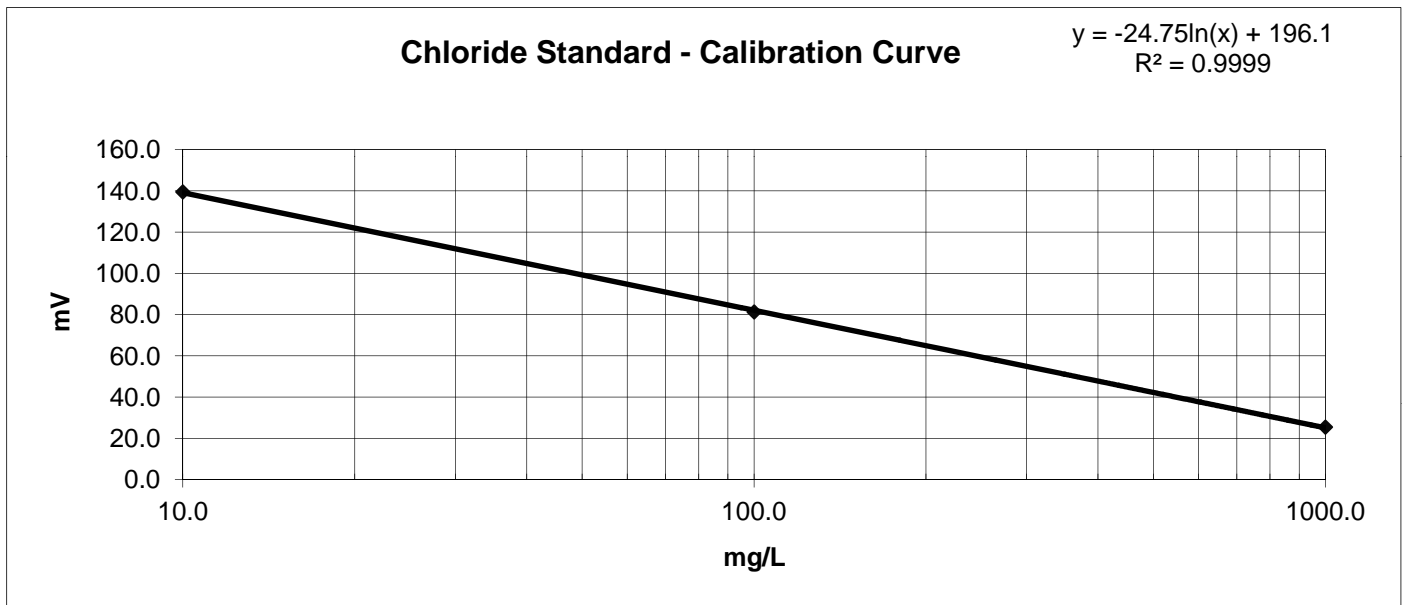
CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD | MILLIVOLTS (mV) |
|-------------|--------------------|
| 10.0 mg/L | 139.5 |
| 100.0 mg/L | 81.3 |
| 1000.0 mg/L | 25.5 |

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): | 103.7 | 41.79 | 41.79 |

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 11/1/24 Checked By JLK Date 11/1/24

Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client: F&ME Consultants, Inc.
 Client Reference: Tyger River G7100.007
 Project No.: 2024-797-001
 Lab ID: 2024-797-001-001

Boring No.: B-1
 Depth (ft): 2.0-6.0'
 Sample No.: SS-2/SS-3
 Soil Description: Brown Soil

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

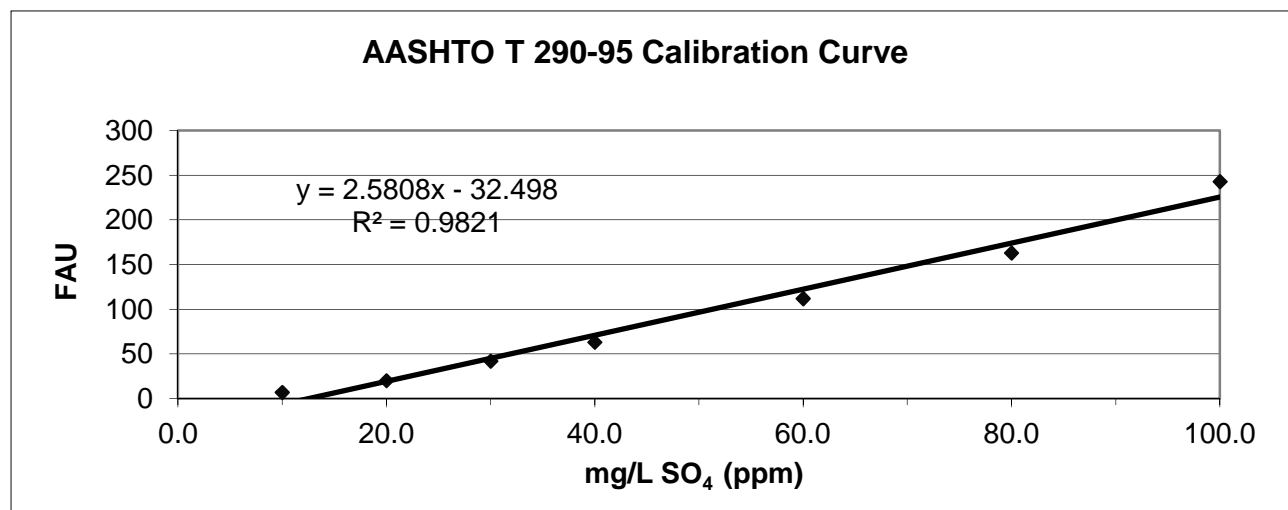
Sample Diluted: No

Sulfate Solution Added (ml): 5

Sample Moisture Content

Tare Number: 474
 Weight of Tare & Wet Sample (g): 206.67
 Weight of Tare & Dry Sample (g): 203.89
 Weight of Tare (g): 98.77
 Weight of Water (g): 2.78
 Weight of Dry Sample (g): 105.12
 Moisture Content (%): 2.64

| | | |
|-----------------------------------|-------|--|
| Sample Sulfate Ion Concentration: | 15.19 | mg/L SO ₄ (ppm) |
| Sample Sulfate Ion Content: | 45.6 | mg/Kg SO ₄ (not corrected for moisture) |
| Sample Sulfate Ion Content: | 46.8 | mg/Kg SO ₄ (corrected for moisture) |



Tested by: JAM Date: 10/31/24 Checked by: JLK Date: 11/1/24

**pH DETERMINATION
(AASHTO T289)**

| | | | |
|------------------------|----------------------------------|-------------------------|------------------------|
| Project Name: | S-23-115 over Middle Tyger River | Project Number: | G7100.007 - Task 00002 |
| Sample Location: | B-2 | Sample Elevation/Depth: | 2.0 - 6.0 |
| Description of Sample: | Soil (Composite) | Date Received | 10/22/2024 |
| Tested By: | L. Johnson | Date Tested: | 10/30/2024 |

| | | | | |
|------------------|-----------|--|--|--|
| SCDOT Sample ID | B-2 | | | |
| Boring Depth | 4.0 - 8.0 | | | |
| FME Lab ID No. | 24-3778 | | | |
| pH Value | 5.41 | | | |
| Temperature (°C) | 21.3 | | | |

Date Reviewed: 11/4/2024Reviewed By: J.Hiers

**SOIL RESISTIVITY
(AASHTO T288)**

| | | | |
|-------------------|----------------------------------|-----------------|------------------------|
| Project Name: | S-23-115 over Middle Tyger River | Project ID: | G7100.007 - Task 00002 |
| Location: | B-2 | FME Lab ID No.: | 24-3778 |
| Sampled By: | MM | Date Sampled: | 10/22/2024 |
| Soil Description: | SILTY SAND (SM/A-4) | Date Received: | 10/22/2024 |
| Tested By: | JM | Date Tested: | 10/31/2024 |

| Boring No. | Sample Depth (ft.) | Minimum Soil Resistivity, Ω -cm |
|------------|--------------------|---|
| B-2 | 4.0 - 8.0 | 35,242 |

Date Reviewed: 11/4/2024 Reviewed By: J. Hiers

CHLORIDE ION CONTENT IN SOILS

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

Client: F&ME Consultants, Inc.
 Client Reference: Tyger River G7100.007
 Project No.: 2024-797-001
 Lab ID: 2024-797-001-002

Boring No.: B-2
 Depth (ft): 4.0-8.0'
 Sample No.: SS-3/SS-4
 Description: Brown Soil

(- # 10 Sieve material)

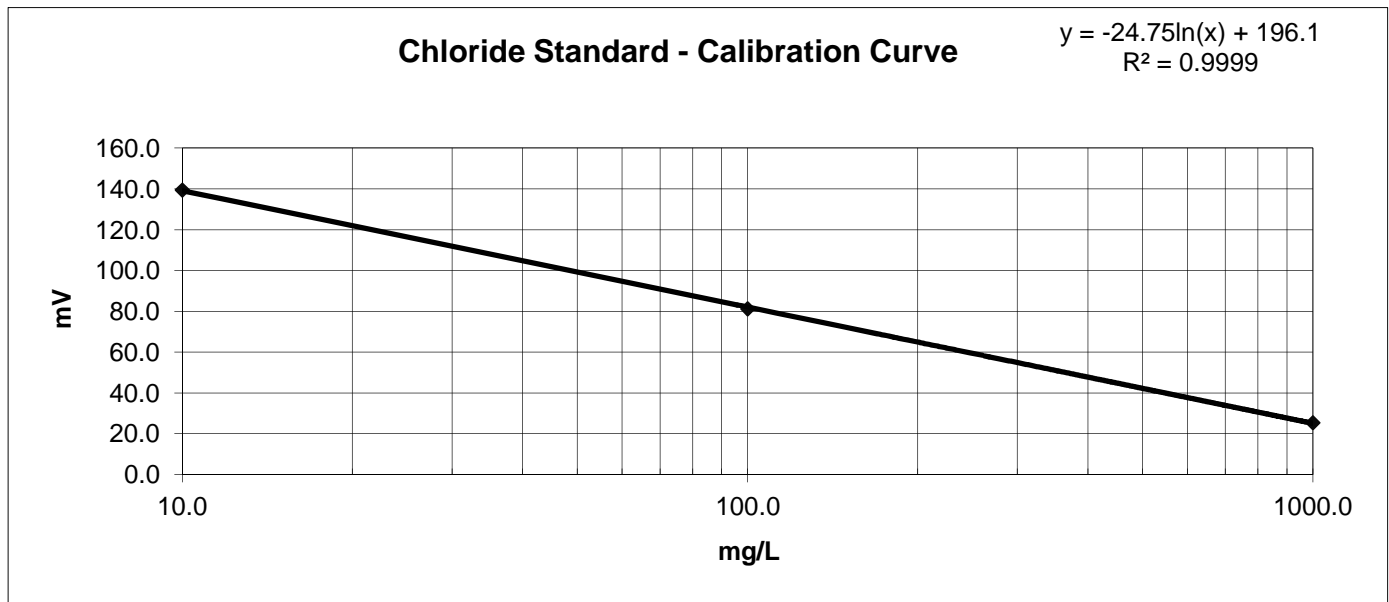
CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD | MILLIVOLTS (mV) |
|-------------|--------------------|
| 10.0 mg/L | 139.5 |
| 100.0 mg/L | 81.3 |
| 1000.0 mg/L | 25.5 |

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): | 132.2 | 13.21 | 13.21 |

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 11/1/24 Checked By JLK Date 11/1/24

Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client: F&ME Consultants, Inc.
 Client Reference: Tyger River G7100.007
 Project No.: 2024-797-001
 Lab ID: 2024-797-001-002

Boring No.: B-2
 Depth (ft): 4.0-8.0'
 Sample No.: SS-3/SS-4
 Soil Description: Brown Soil

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): 9

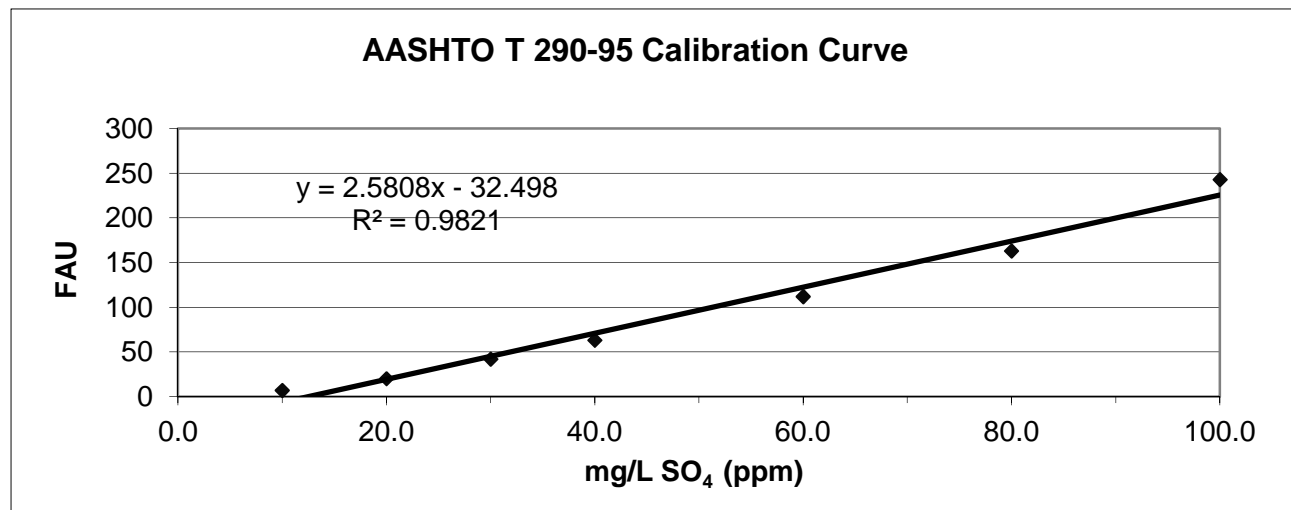
Sample Diluted: No

Sulfate Solution Added (ml): 5

Sample Moisture Content

Tare Number: 479
 Weight of Tare & Wet Sample (g): 211.24
 Weight of Tare & Dry Sample (g): 210.11
 Weight of Tare (g): 97.71
 Weight of Water (g): 1.13
 Weight of Dry Sample (g): 112.40
 Moisture Content (%): 1.01

| | | |
|-----------------------------------|-------|--|
| Sample Sulfate Ion Concentration: | 15.58 | mg/L SO ₄ (ppm) |
| Sample Sulfate Ion Content: | 46.7 | mg/Kg SO ₄ (not corrected for moisture) |
| Sample Sulfate Ion Content: | 47.2 | mg/Kg SO ₄ (corrected for moisture) |



Tested by: JAM Date: 10/31/24 Checked by: JLK Date: 11/1/24

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 4 LABORATORY TEST RESULTS

SECTION 4D ROCK CORE SAMPLES



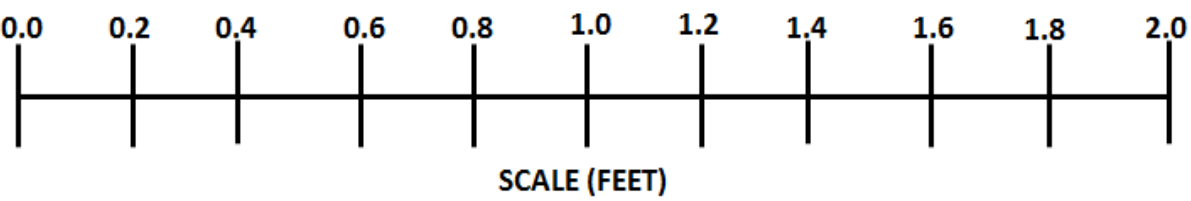
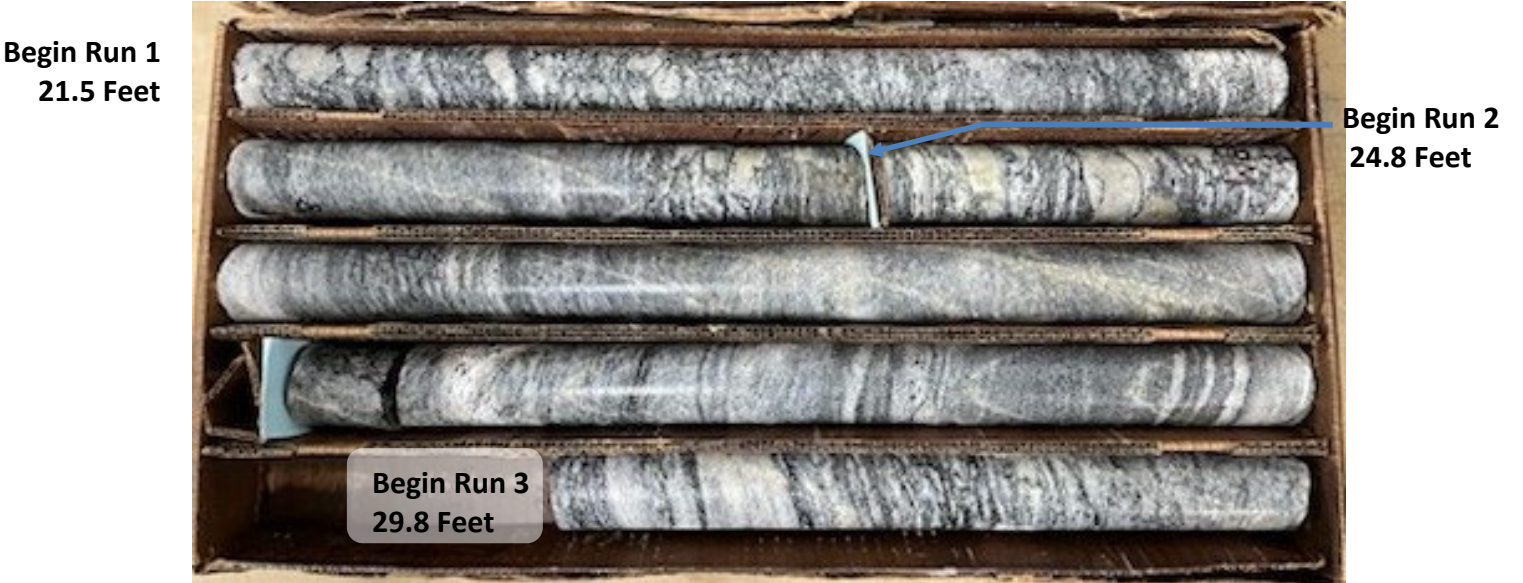
PROJECT ID P043993

PROJECT NAME S-23-115 over Middle Tyger River

PROJECT COUNTY Greenville

| Borehole | Core Run Number | Core Run Top Depth | REC (%) | RQD (%) | q _u (psi) | Poisson's Ratio | Elastic Modulus (ksi) | Unit Weight (pcf) | RMR | GSI |
|----------|-----------------|--------------------|---------|---------|----------------------|-----------------|-----------------------|-------------------|-----|-----|
| B-1 | NQ-1 | 21.5 | 93 | 88 | 16,130 | 0.17 | 3,150 | 168 | 59 | 75 |
| B-1 | NQ-2 | 24.8 | 100 | 88 | 13,070 | 0.16 | 5,630 | 164 | 53 | 50 |
| B-1 | NQ-3 | 29.8 | 97 | 97 | 6,040 | 0.10 | 3,120 | 170 | 71 | 75 |
| B-1 | NQ-4 | 34.8 | 100 | 100 | | | | | 84 | 95 |
| B-1 | NQ-5 | 39.8 | 75 | 75 | | | | | 73 | 85 |
| B-2 | NQ-1 | 40.0 | 93 | 68 | 20,630 | 0.15 | 4,310 | 163 | 43 | 25 |
| B-2 | NQ-2 | 44.7 | 98 | 96 | 13,190 | 0.15 | 3,410 | 168 | 64 | 50 |
| B-2 | NQ-3 | 49.7 | 100 | 100 | 16,590 | 0.16 | 4,950 | 166 | 65 | 70 |
| B-2 | NQ-4 | 54.7 | 100 | 100 | | | | | 74 | 60 |

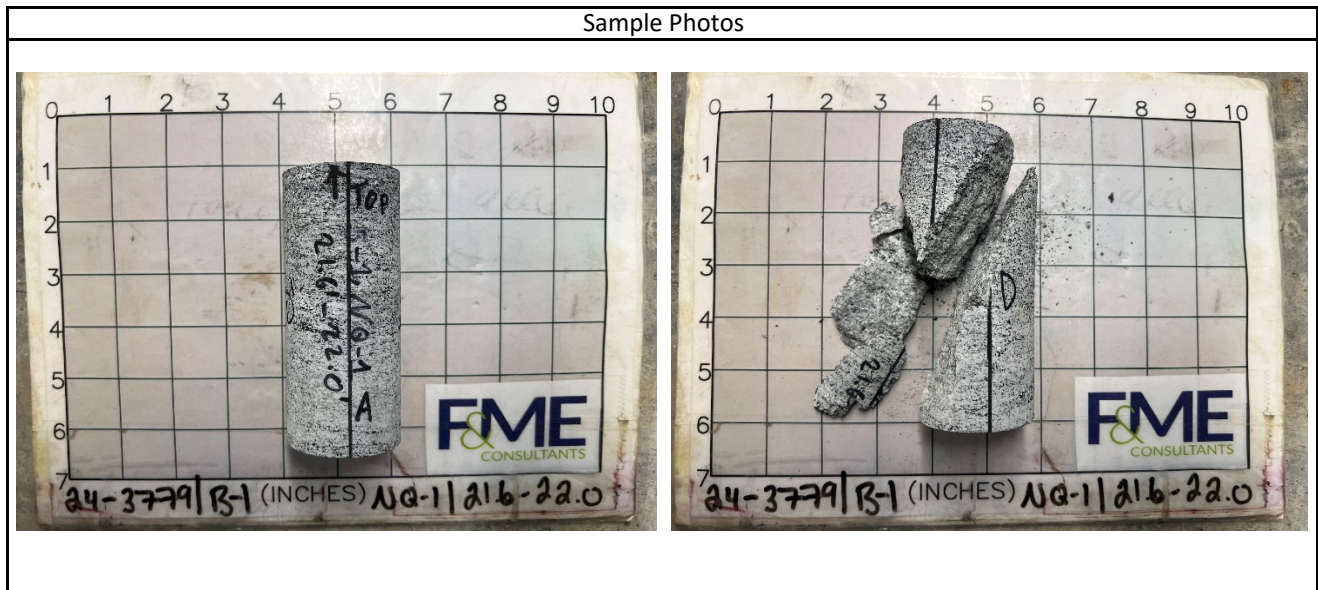
**S-23-115 OVER MIDDLE TYGER RIVER
CORE PHOTOGRAPHS: B-1**



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.87 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.48 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 167.5 | Core Size | NQ |
| Sample No. | NQ-1 / 24-3779 | L/D Ratio | 2.40 | Recovery | 93% |
| Depth | 21.6' - 22.0' | Load Rate (psi/sec) | 20 | RQD | 88% |
| Description | Black/White Gneiss | | | | |

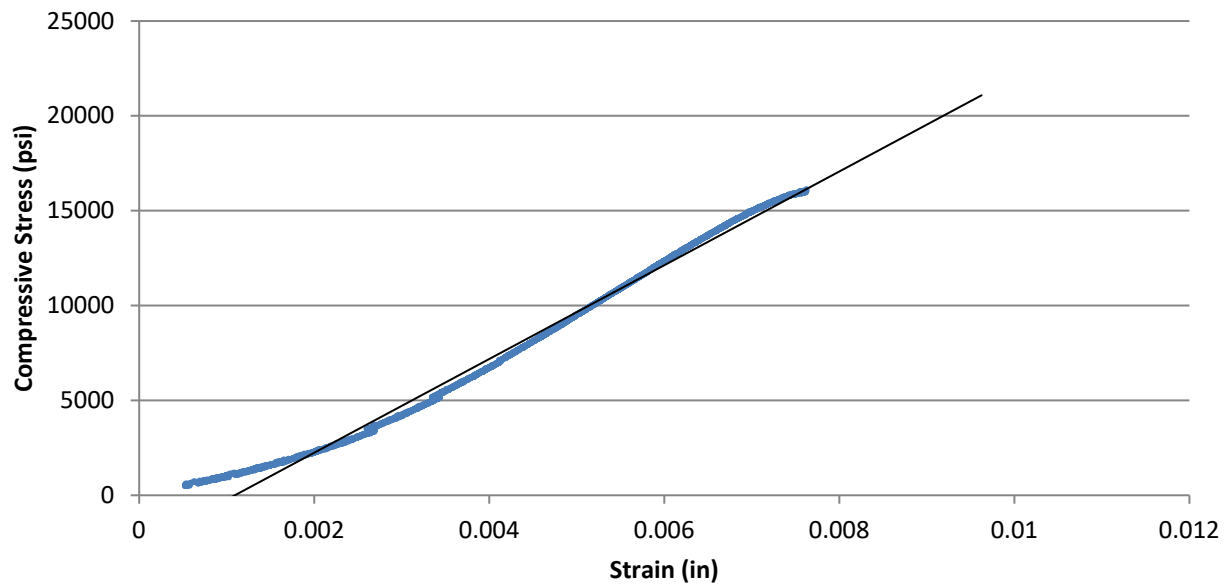
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -1477 | 143 | 4,425 | 1,611 | 2.18 | 0.10 |
| 20% | -2612 | 342 | 8,866 | 3,228 | 2.47 | 0.13 |
| 30% | -3307 | 538 | 13,298 | 4,842 | 2.93 | 0.16 |
| 40% | -3896 | 733 | 17,729 | 6,455 | 3.31 | 0.19 |
| 50% | -4485 | 948 | 22,156 | 8,067 | 3.60 | 0.21 |
| 60% | -5063 | 1194 | 26,588 | 9,681 | 3.82 | 0.24 |
| 70% | -5632 | 1494 | 31,011 | 11,291 | 4.01 | 0.27 |
| 80% | -6195 | 1899 | 35,448 | 12,907 | 4.17 | 0.31 |
| 90% | -6813 | 2653 | 39,885 | 14,522 | 4.26 | 0.39 |
| 100% | -7623 | 6789 | 44,313 | 16,135 | | |



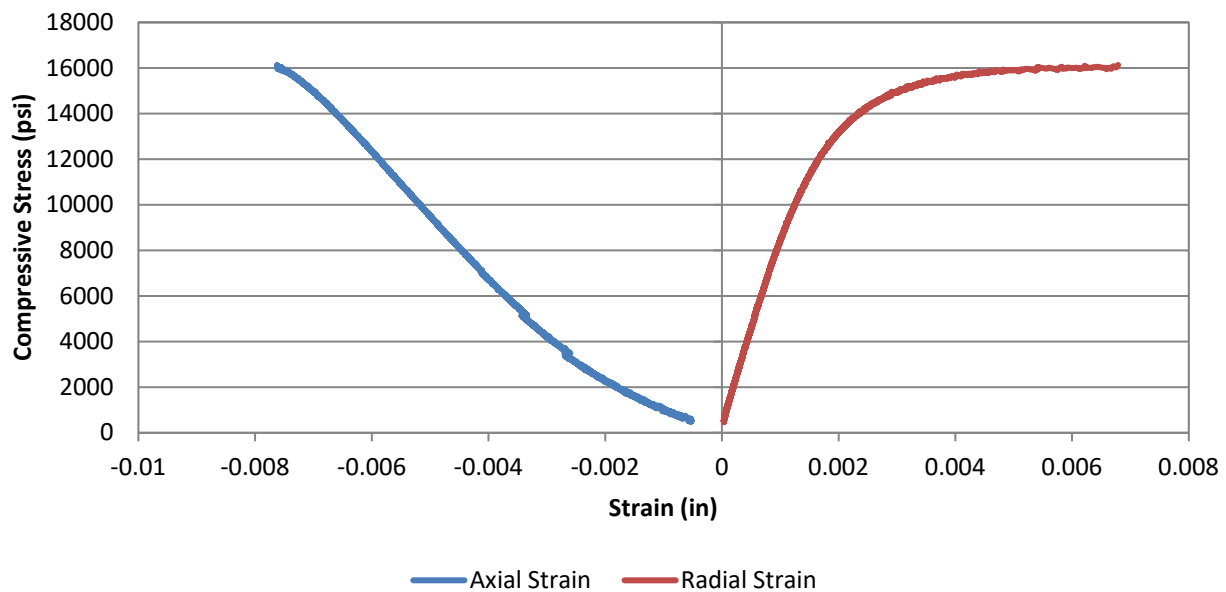
| Test Results | | | |
|---------------------------------------|--|---------------|----------------------------------|
| Unconfined Compressive Strength (psi) | | 16,130 | Elastic Modulus (psi) |
| | | | 3.15E+06 |
| | | | Poisson's Ratio in Elastic Range |
| | | | 0.17 |
| Comments | Elastic range was taken as between 0.002 and 0.005 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.87 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.48 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 167.5 | Core Size | NQ |
| Sample No. | NQ-1 / 24-3779 | L/D Ratio | 2.40 | Recovery | 93% |
| Depth | 21.6' - 22.0' | Load Rate (psi/sec) | 20 | RQD | 88% |
| Description | Black/White Gneiss | | | | |

Axial Stress vs. Strain



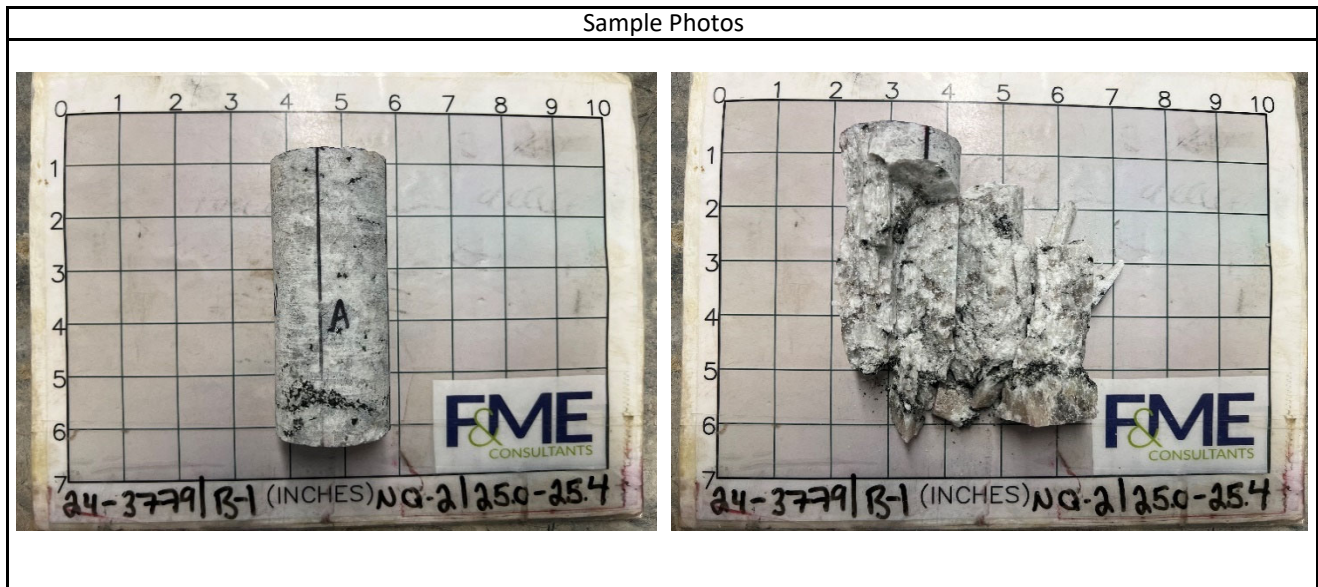
Stress vs. Strain



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.867 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.543 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 164.0 | Core Size | NQ |
| Sample No. | NQ-2 / 24-3779 | L/D Ratio | 2.43 | Recovery | 100% |
| Depth | 25.0' - 25.4' | Load Rate (psi/sec) | 20 | RQD | 88% |
| Description | Black/White Gneiss | | | | |

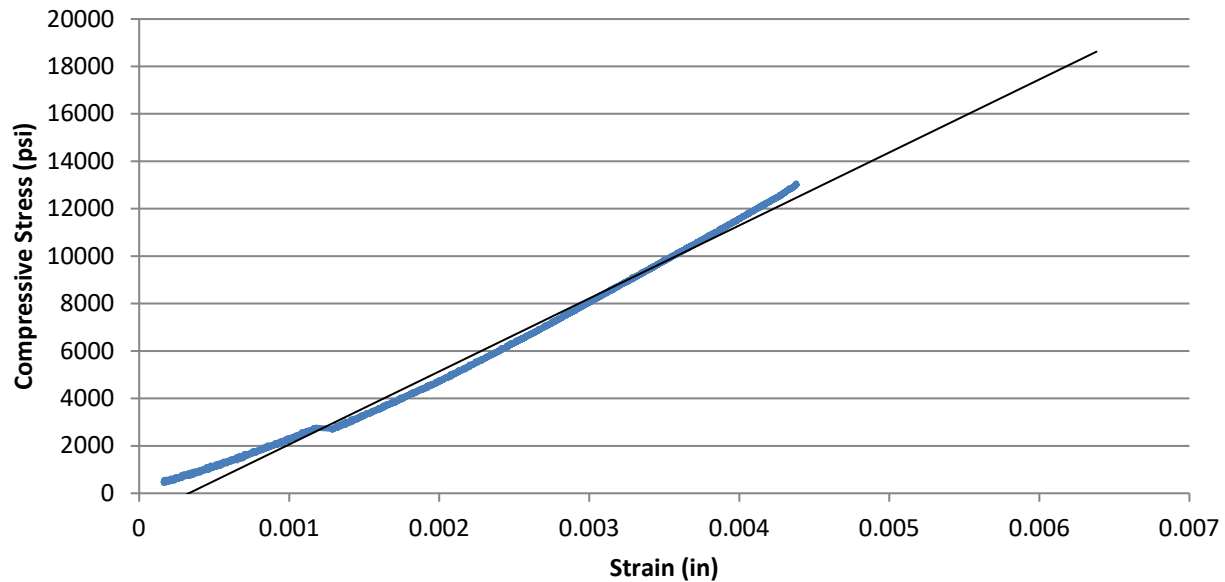
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -581 | 55 | 3,577 | 1,307 | 4.50 | 0.09 |
| 20% | -1132 | 132 | 7,156 | 2,614 | 4.62 | 0.12 |
| 30% | -1724 | 208 | 10,733 | 3,921 | 4.55 | 0.12 |
| 40% | -2150 | 281 | 14,269 | 5,212 | 4.85 | 0.13 |
| 50% | -2556 | 363 | 17,884 | 6,532 | 5.11 | 0.14 |
| 60% | -2936 | 438 | 21,460 | 7,839 | 5.34 | 0.15 |
| 70% | -3311 | 520 | 25,034 | 9,144 | 5.52 | 0.16 |
| 80% | -3683 | 626 | 28,606 | 10,449 | 5.67 | 0.17 |
| 90% | -4052 | 737 | 32,192 | 11,759 | 5.80 | 0.18 |
| 100% | -4380 | 1002 | 35,769 | 13,065 | | |



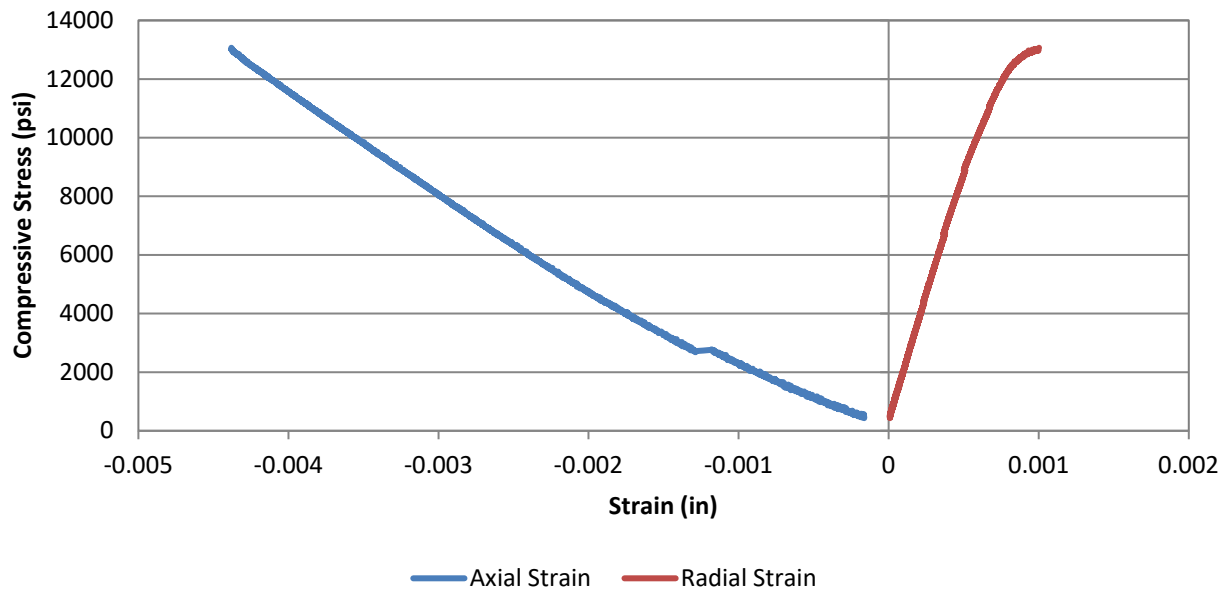
| Test Results | | | | |
|---------------------------------------|--|--------|----------------------------------|----------|
| Unconfined Compressive Strength (psi) | | 13,070 | Elastic Modulus (psi) | 5.63E+06 |
| | | | Poisson's Ratio in Elastic Range | 0.16 |
| Comments | Elastic range was taken as between 0.0015 and 0.0035 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.867 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.543 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 164.0 | Core Size | NQ |
| Sample No. | NQ-2 / 24-3779 | L/D Ratio | 2.43 | Recovery | 100% |
| Depth | 25.0' - 25.4' | Load Rate (psi/sec) | 20 | RQD | 88% |
| Description | Black/White Gneiss | | | | |

Axial Stress vs. Strain



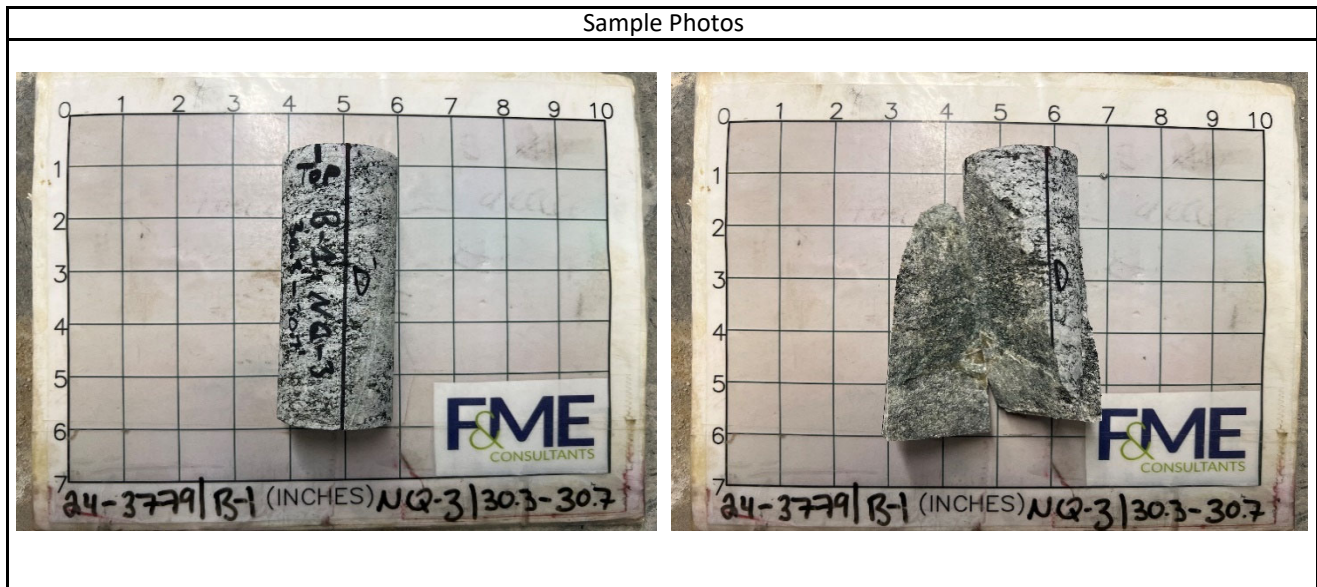
Stress vs. Strain



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.865 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.338 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 169.6 | Core Size | NQ |
| Sample No. | NQ-3 / 24-3779 | L/D Ratio | 2.33 | Recovery | 97% |
| Depth | 30.3' - 30.7' | Load Rate (psi/sec) | 20 | RQD | 97% |
| Description | Black/White Gneiss | | | | |

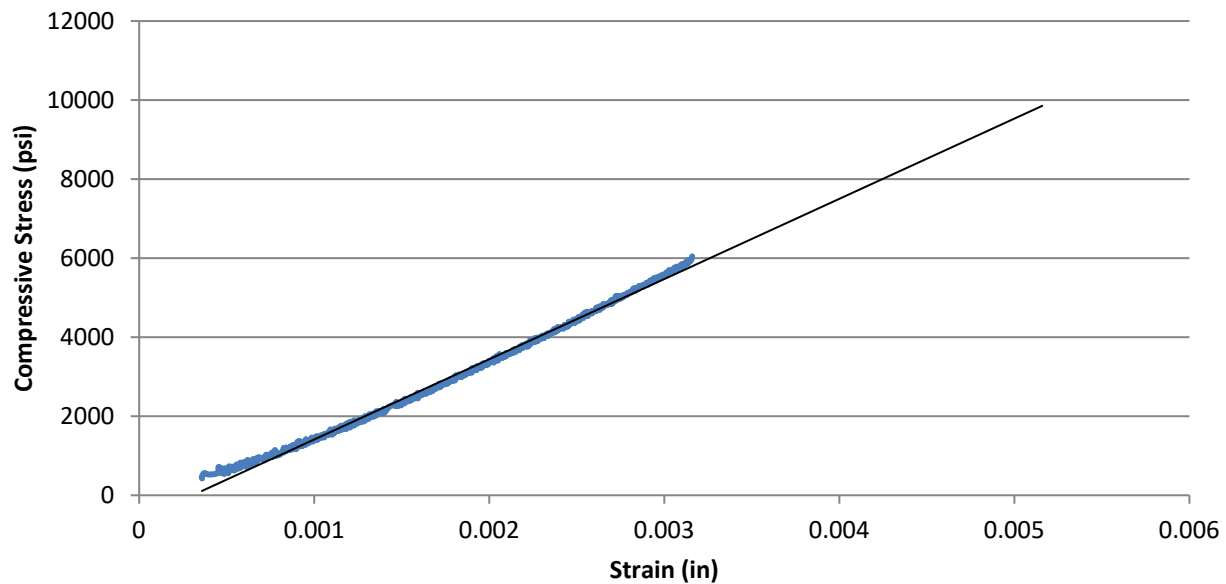
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -477 | 31 | 1,648 | 603 | 2.53 | 0.07 |
| 20% | -837 | 65 | 3,297 | 1,207 | 2.88 | 0.08 |
| 30% | -1243 | 115 | 4,943 | 1,810 | 2.91 | 0.09 |
| 40% | -1538 | 158 | 6,603 | 2,417 | 3.14 | 0.10 |
| 50% | -1836 | 206 | 8,246 | 3,018 | 3.29 | 0.11 |
| 60% | -2135 | 272 | 9,909 | 3,627 | 3.40 | 0.13 |
| 70% | -2406 | 327 | 11,554 | 4,230 | 3.52 | 0.14 |
| 80% | -2671 | 383 | 13,200 | 4,832 | 3.62 | 0.14 |
| 90% | -2939 | 443 | 14,854 | 5,437 | 3.70 | 0.15 |
| 100% | -3159 | 493 | 16,507 | 6,042 | | |



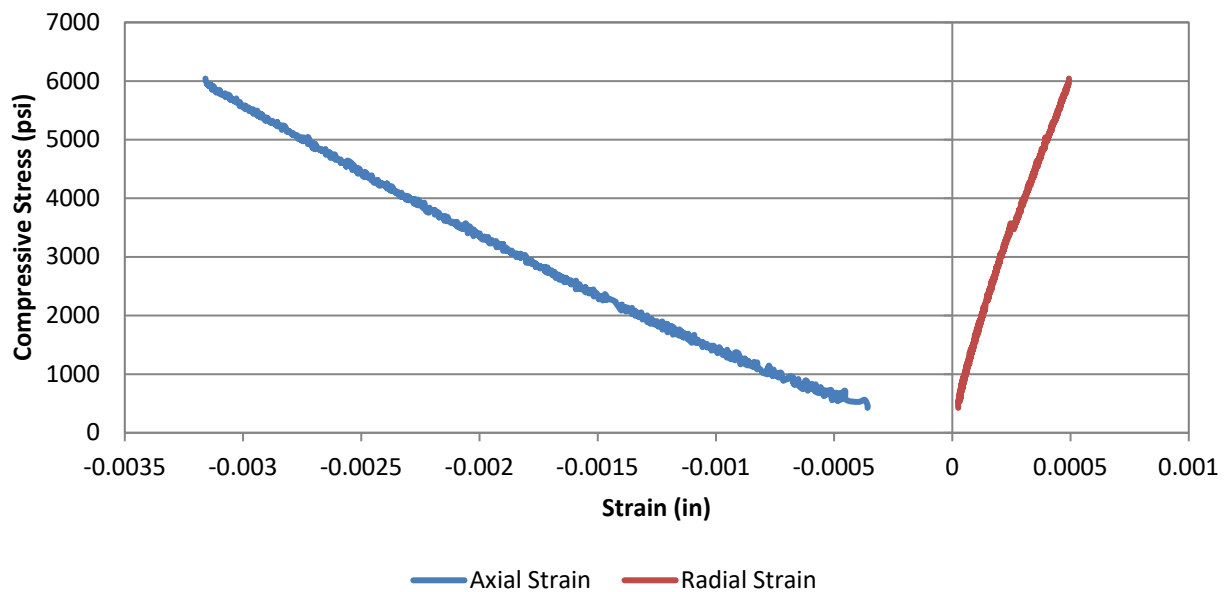
| Test Results | | | | |
|---------------------------------------|--|-------|----------------------------------|----------|
| Unconfined Compressive Strength (psi) | | 6,040 | Elastic Modulus (psi) | 3.12E+06 |
| | | | Poisson's Ratio in Elastic Range | 0.10 |
| Comments | Elastic range was taken as between 0.001 and 0.002 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | | |
| | | | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.865 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.338 | Reviewed By | WJG |
| Boring | B-1 | Unit Weight (pcf) | 169.6 | Core Size | NQ |
| Sample No. | NQ-3 / 24-3779 | L/D Ratio | 2.33 | Recovery | 97% |
| Depth | 30.3' - 30.7' | Load Rate (psi/sec) | 20 | RQD | 97% |
| Description | Black/White Gneiss | | | | |

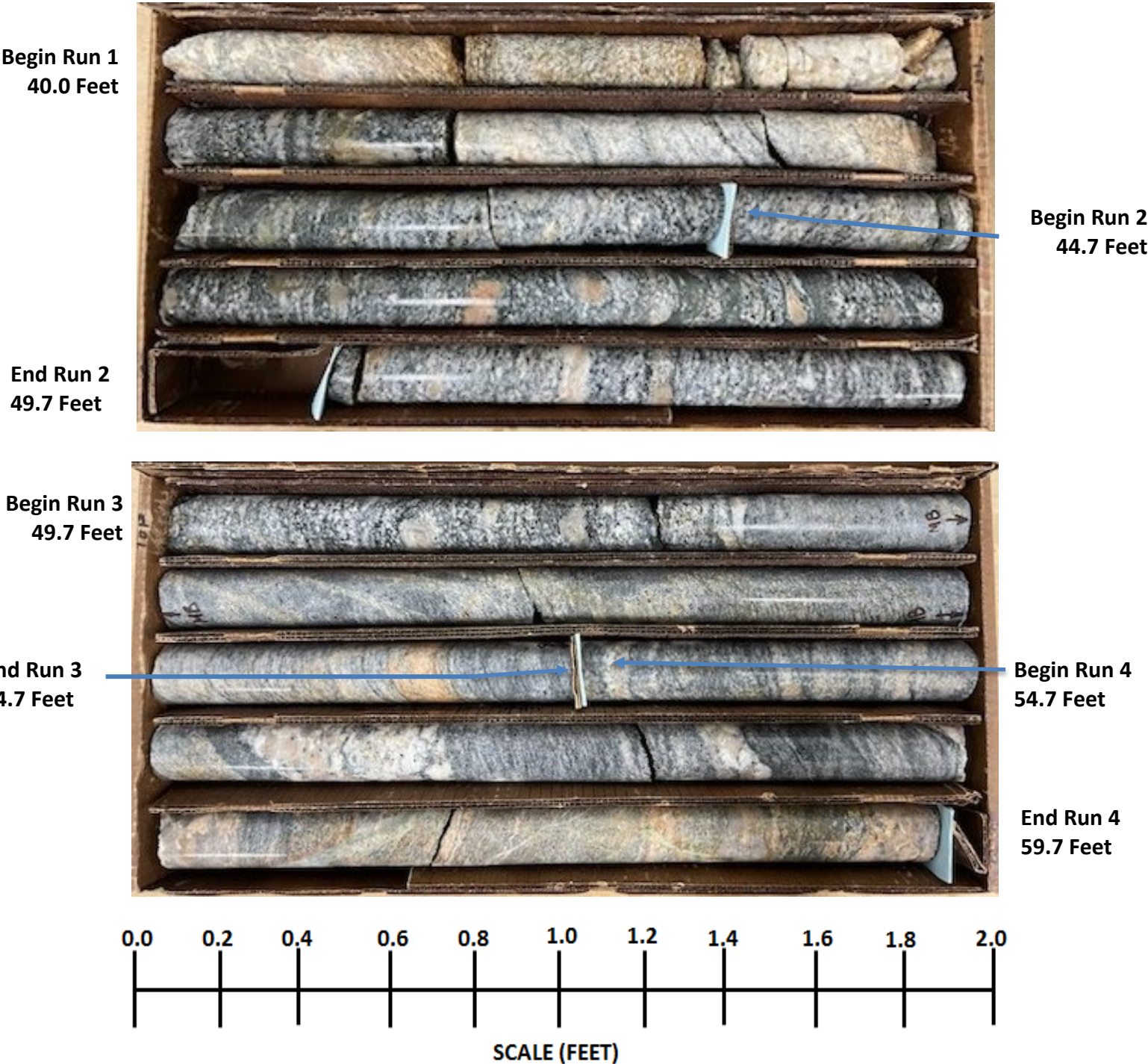
Axial Stress vs. Strain



Stress vs. Strain



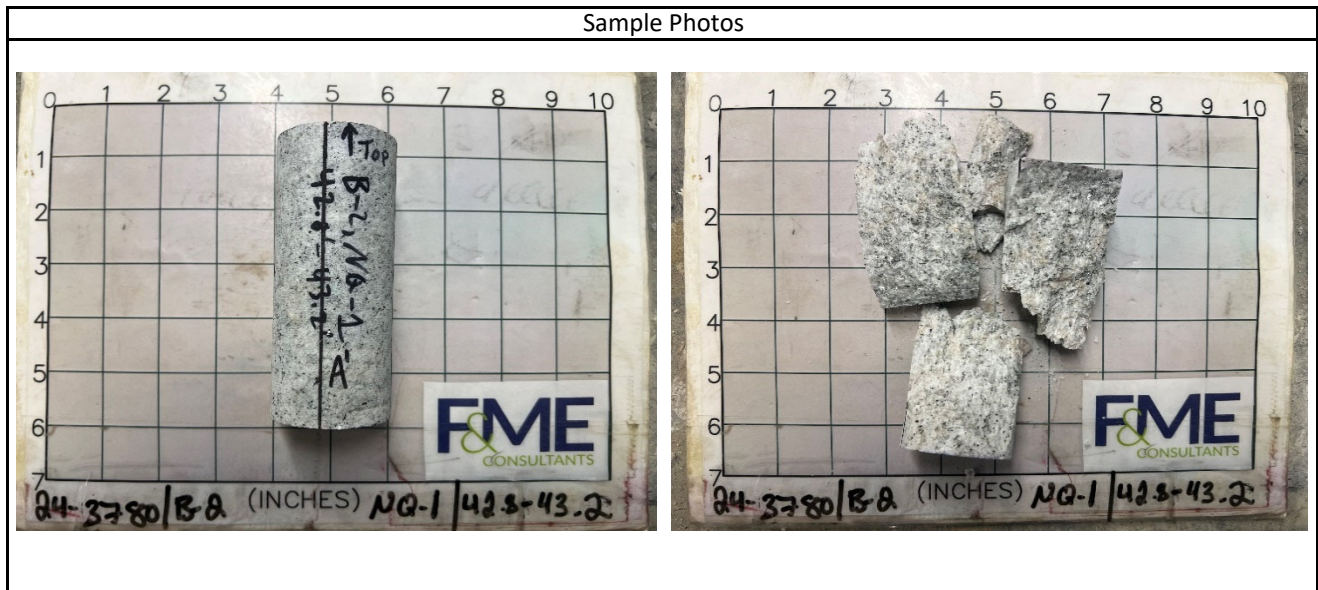
**S-23-115 OVER MIDDLE TYGER RIVER
CORE PHOTOGRAPHS: B-2**



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.873 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.448 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 163.2 | Core Size | NQ |
| Sample No. | NQ-1 / 24-3780 | L/D Ratio | 2.37 | Recovery | 93% |
| Depth | 42.8' - 43.2' | Load Rate (psi/sec) | 20 | RQD | 68% |
| Description | Black/White/Pink Gneiss | | | | |

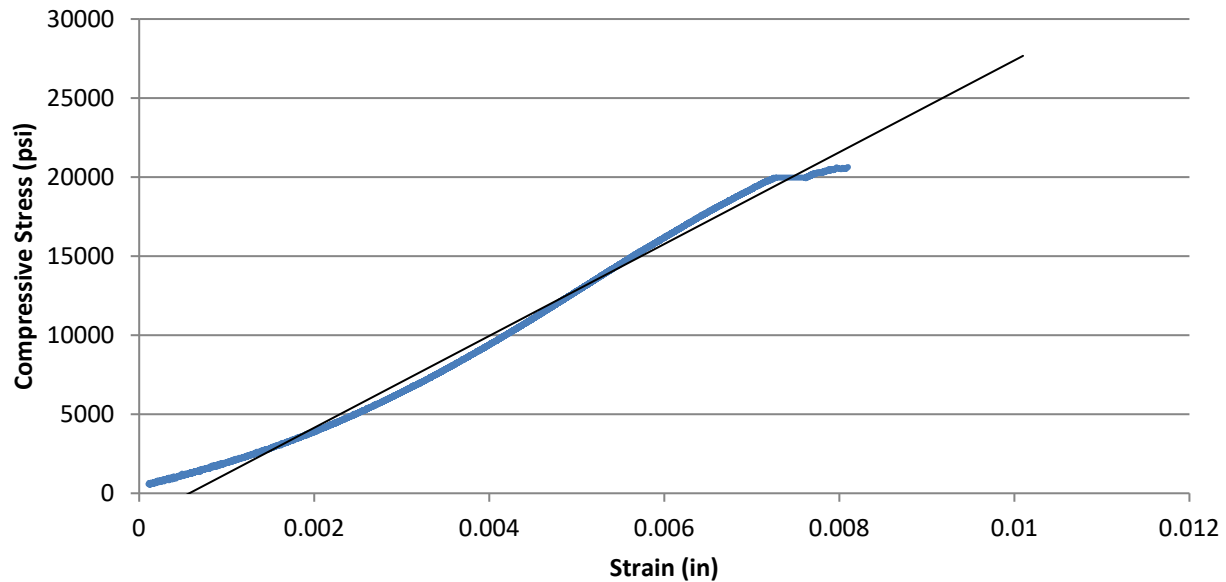
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -1081 | 106 | 5,688 | 2,064 | 3.82 | 0.10 |
| 20% | -2109 | 263 | 11,366 | 4,125 | 3.91 | 0.12 |
| 30% | -2924 | 432 | 17,051 | 6,189 | 4.23 | 0.15 |
| 40% | -3634 | 615 | 22,731 | 8,250 | 4.54 | 0.17 |
| 50% | -4284 | 823 | 28,432 | 10,319 | 4.82 | 0.19 |
| 60% | -4891 | 1061 | 34,111 | 12,380 | 5.06 | 0.22 |
| 70% | -5475 | 1355 | 39,790 | 14,441 | 5.28 | 0.25 |
| 80% | -6096 | 1790 | 45,475 | 16,505 | 5.41 | 0.29 |
| 90% | -6760 | 2554 | 51,146 | 18,563 | 5.49 | 0.38 |
| 100% | -8098 | 8167 | 56,845 | 20,631 | | |



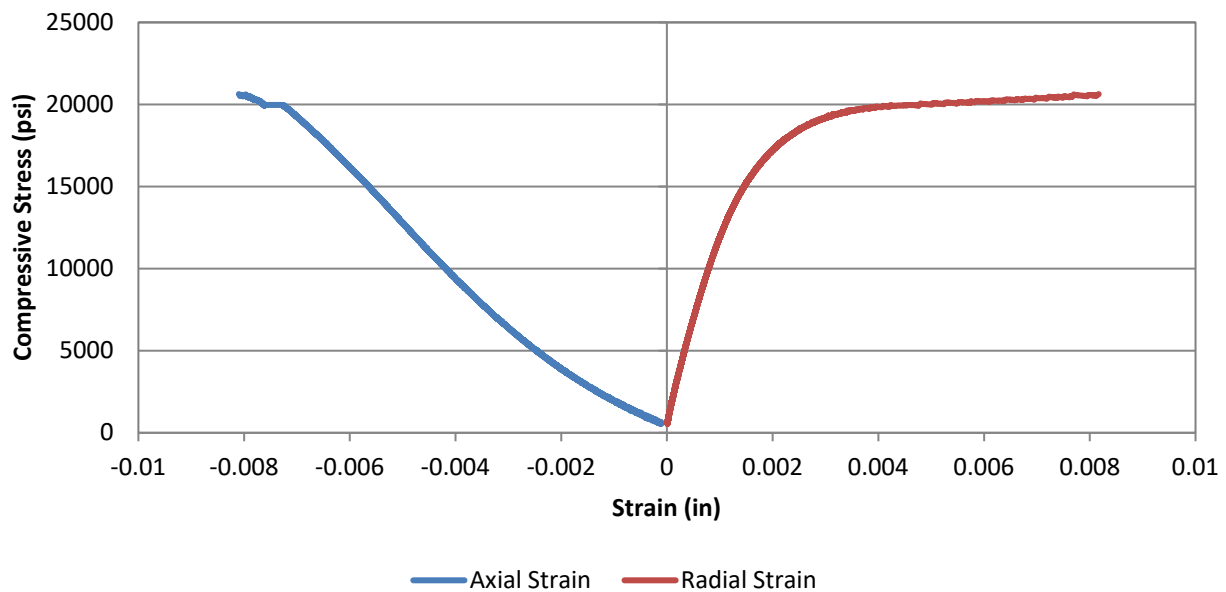
| Test Results | | | |
|---------------------------------------|--|--------|----------------------------------|
| Unconfined Compressive Strength (psi) | | 20,630 | Elastic Modulus (psi) |
| | | | Poisson's Ratio in Elastic Range |
| | | | 0.15 |
| Comments | Elastic range was taken as between 0.002 and 0.004 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.873 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.448 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 163.2 | Core Size | NQ |
| Sample No. | NQ-1 / 24-3780 | L/D Ratio | 2.37 | Recovery | 93% |
| Depth | 42.8' - 43.2' | Load Rate (psi/sec) | 20 | RQD | 68% |
| Description | Black/White/Pink Gneiss | | | | |

Axial Stress vs. Strain



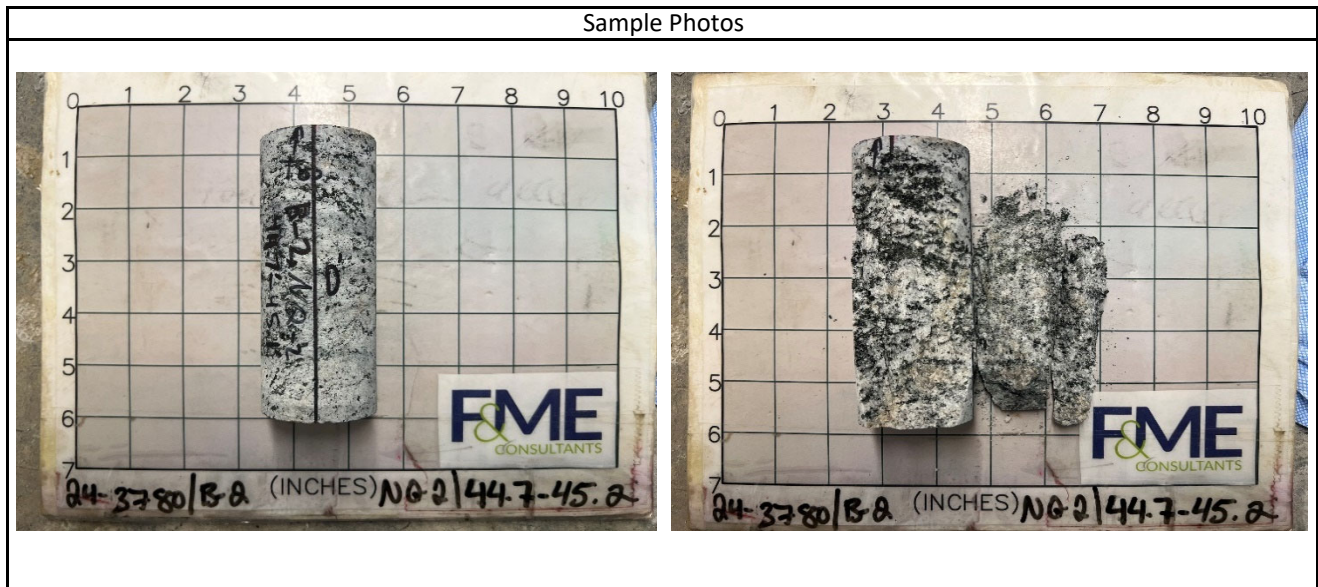
Stress vs. Strain



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.867 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.5 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 168.0 | Core Size | NQ |
| Sample No. | NQ-2 / 24-3780 | L/D Ratio | 2.41 | Recovery | 98% |
| Depth | 44.7' - 45.2' | Load Rate (psi/sec) | 20 | RQD | 96% |
| Description | Black/White/Pink Gneiss | | | | |

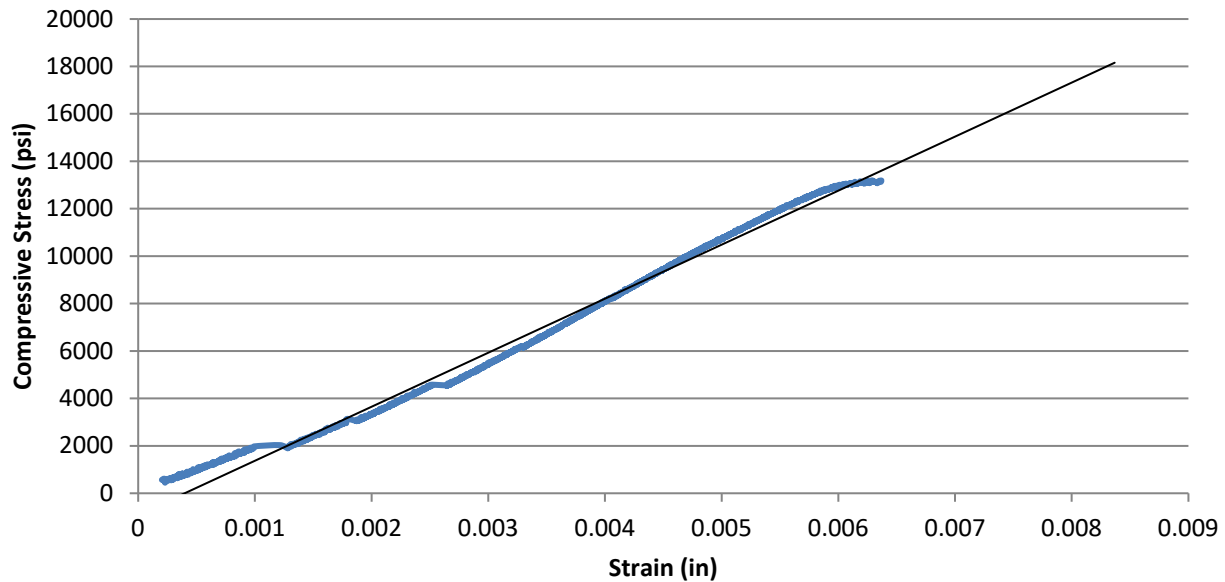
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -686 | 94 | 3,613 | 1,320 | 3.85 | 0.14 |
| 20% | -1581 | 218 | 7,171 | 2,620 | 3.31 | 0.14 |
| 30% | -2271 | 347 | 10,835 | 3,958 | 3.48 | 0.15 |
| 40% | -2934 | 477 | 14,448 | 5,277 | 3.60 | 0.16 |
| 50% | -3453 | 620 | 18,055 | 6,595 | 3.82 | 0.18 |
| 60% | -3934 | 789 | 21,668 | 7,915 | 4.02 | 0.20 |
| 70% | -4422 | 985 | 25,277 | 9,233 | 4.18 | 0.22 |
| 80% | -4935 | 1245 | 28,893 | 10,554 | 4.28 | 0.25 |
| 90% | -5468 | 1681 | 32,501 | 11,872 | 4.34 | 0.31 |
| 100% | -6369 | 4803 | 36,116 | 13,192 | | |



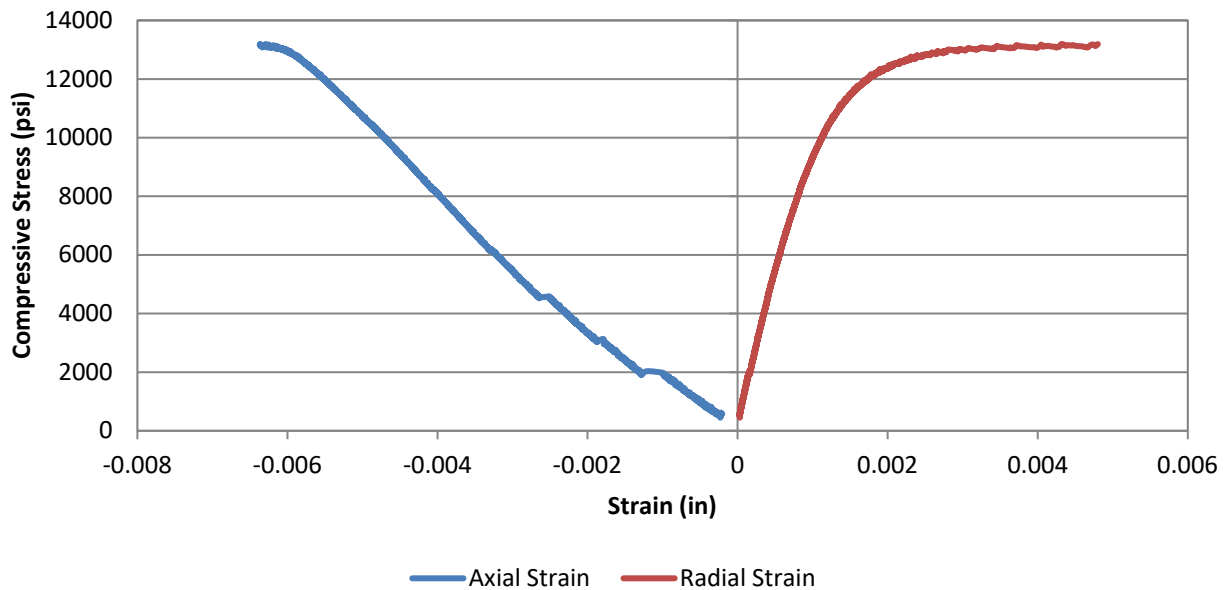
| Test Results | | | |
|---------------------------------------|--|---------------|----------------------------------|
| Unconfined Compressive Strength (psi) | | 13,190 | Elastic Modulus (psi) |
| | | | 3.41E+06 |
| | | | Poisson's Ratio in Elastic Range |
| | | | 0.15 |
| Comments | Elastic range was taken as between 0.001 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.867 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.5 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 168.0 | Core Size | NQ |
| Sample No. | NQ-2 / 24-3780 | L/D Ratio | 2.41 | Recovery | 98% |
| Depth | 44.7' - 45.2' | Load Rate (psi/sec) | 20 | RQD | 96% |
| Description | Black/White/Pink Gneiss | | | | |

Axial Stress vs. Strain



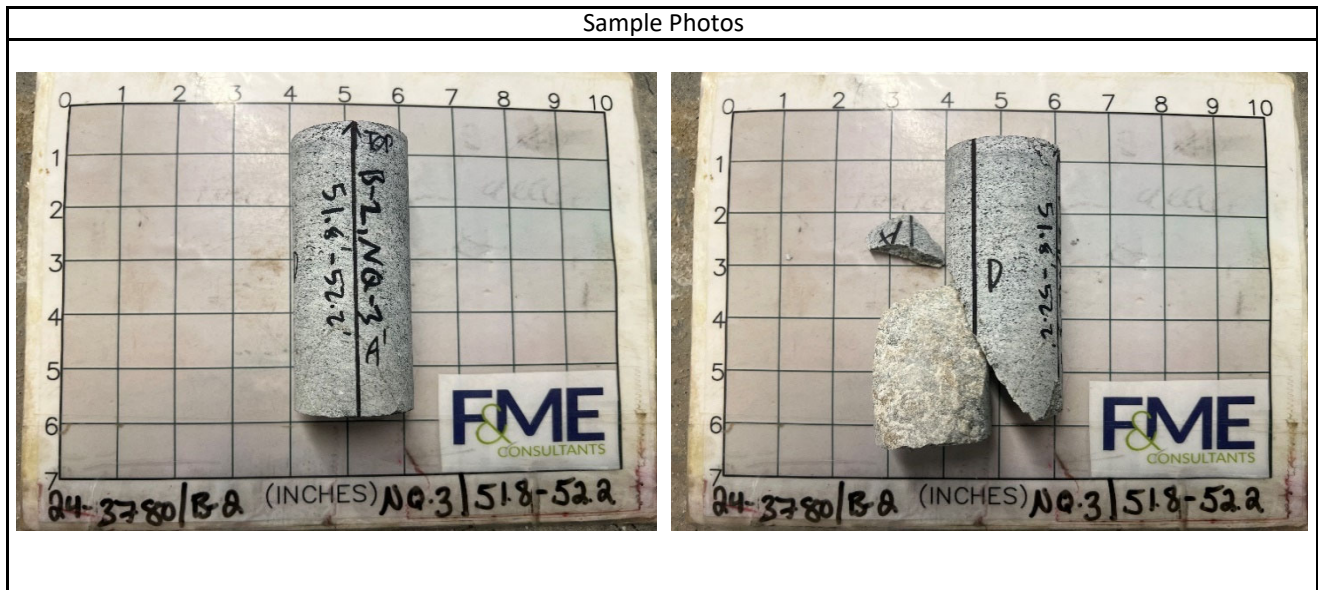
Stress vs. Strain



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.87 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.398 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 165.6 | Core Size | NQ |
| Sample No. | NQ-3 / 24-3780 | L/D Ratio | 2.35 | Recovery | 100% |
| Depth | 51.8' - 52.2' | Load Rate (psi/sec) | 20 | RQD | 100% |
| Description | Black/White/Pink Gneiss | | | | |

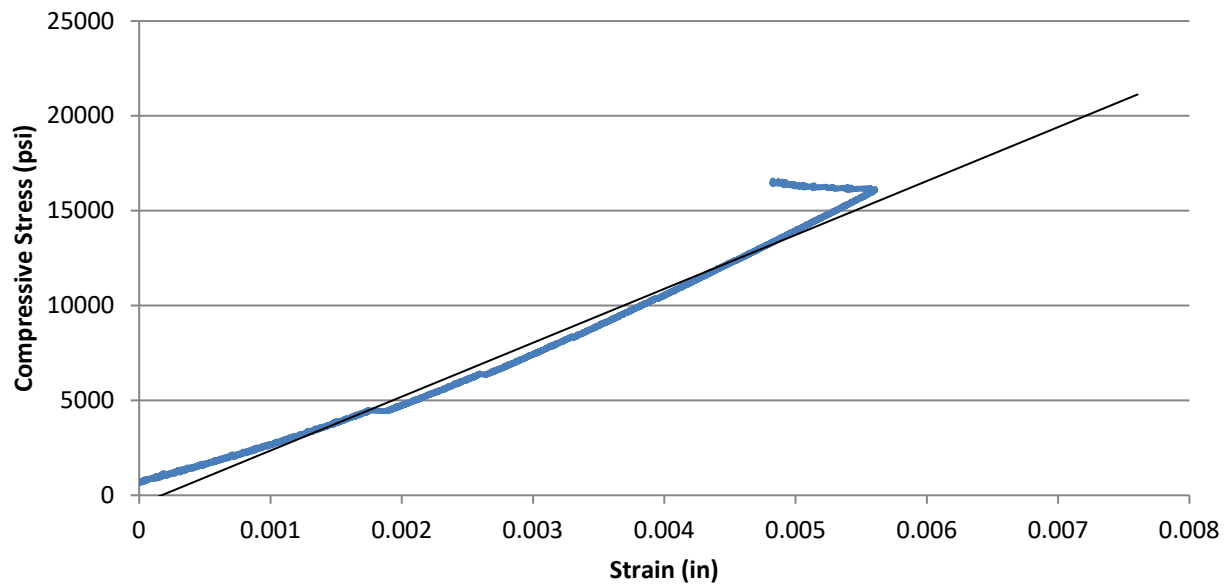
| Test Data | | | | | | |
|-------------------------|----------------------|--------|------------|--------------------------|------------------------------------|-----------------|
| Percent of Failure Load | Strain (10^{-6}) | | Load (lbs) | Compressive Stress (psi) | Secant Modulus $\times 10^6$ (psi) | Poisson's Ratio |
| | Axial | Radial | | | | |
| 10% | -515 | 69 | 4,557 | 1,659 | 6.44 | 0.13 |
| 20% | -1288 | 190 | 9,117 | 3,320 | 5.15 | 0.15 |
| 30% | -2083 | 317 | 13,667 | 4,976 | 4.78 | 0.15 |
| 40% | -2749 | 459 | 18,224 | 6,635 | 4.83 | 0.17 |
| 50% | -3279 | 597 | 22,784 | 8,296 | 5.06 | 0.18 |
| 60% | -3822 | 759 | 27,335 | 9,953 | 5.21 | 0.20 |
| 70% | -4325 | 935 | 31,893 | 11,613 | 5.37 | 0.22 |
| 80% | -4807 | 1141 | 36,459 | 13,275 | 5.52 | 0.24 |
| 90% | -5283 | 1409 | 41,014 | 14,933 | 5.65 | 0.27 |
| 100% | -4826 | 2662 | 45,571 | 16,593 | | |



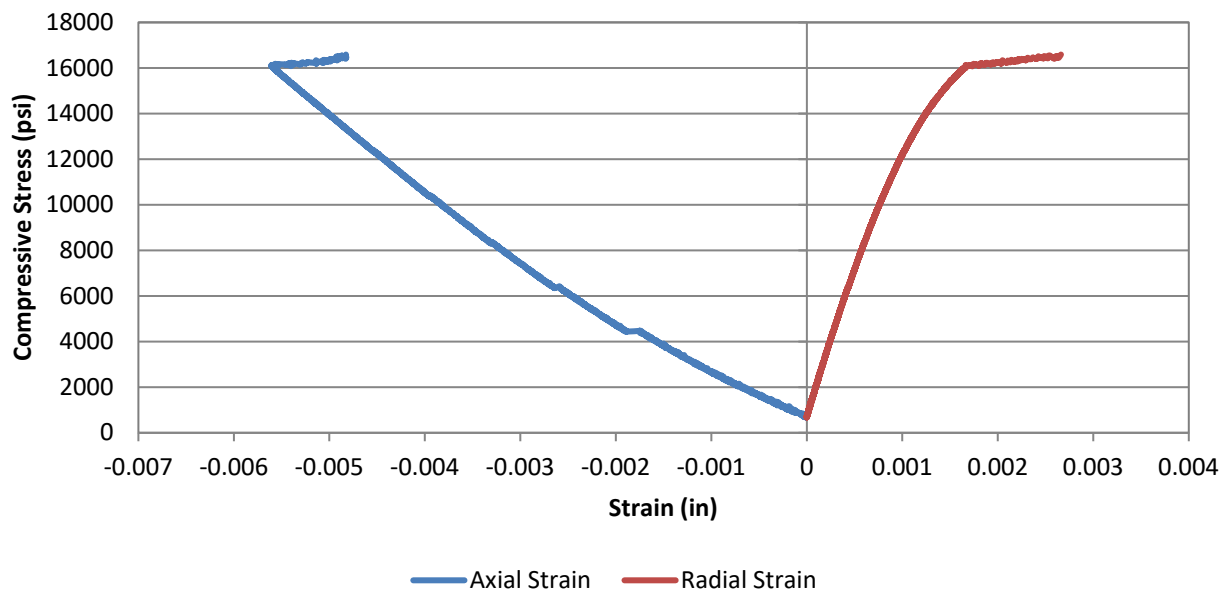
| Test Results | | | |
|---------------------------------------|--|---------------|----------------------------------|
| Unconfined Compressive Strength (psi) | | 16,590 | Elastic Modulus (psi) |
| | | | 4.95E+06 |
| | | | Poisson's Ratio in Elastic Range |
| | | | 0.16 |
| Comments | Elastic range was taken as between 0.001 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range. | | |

| | | | | | |
|-------------|----------------------------------|-----------------------|-------|-------------|------------|
| Project | S-23-115 over Middle Tyger River | | | Date | 10/31/2024 |
| Project No. | G7100.007 - Task 00002 | Sample Diameter (in.) | 1.87 | Tested By | TP |
| SCDOT ID | P043993 | Sample Length (in.) | 4.398 | Reviewed By | WJG |
| Boring | B-2 | Unit Weight (pcf) | 165.6 | Core Size | NQ |
| Sample No. | NQ-3 / 24-3780 | L/D Ratio | 2.35 | Recovery | 100% |
| Depth | 51.8' - 52.2' | Load Rate (psi/sec) | 20 | RQD | 100% |
| Description | Black/White/Pink Gneiss | | | | |

Axial Stress vs. Strain



Stress vs. Strain



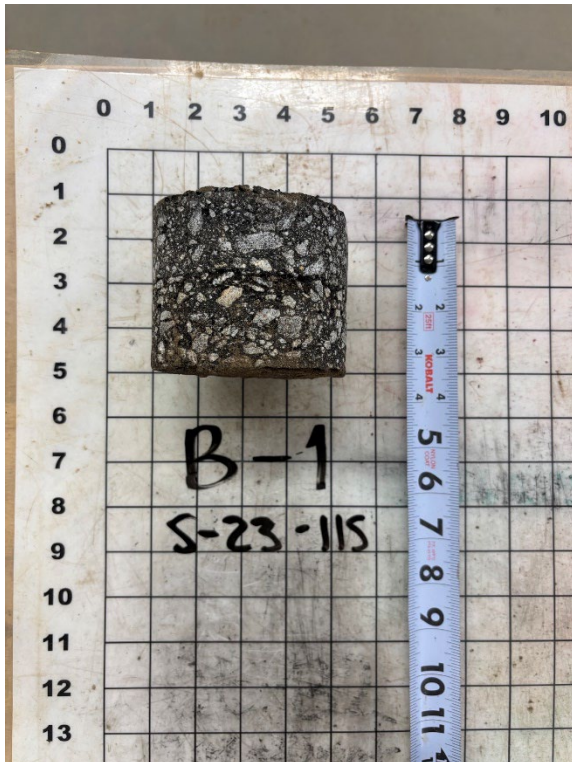
S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

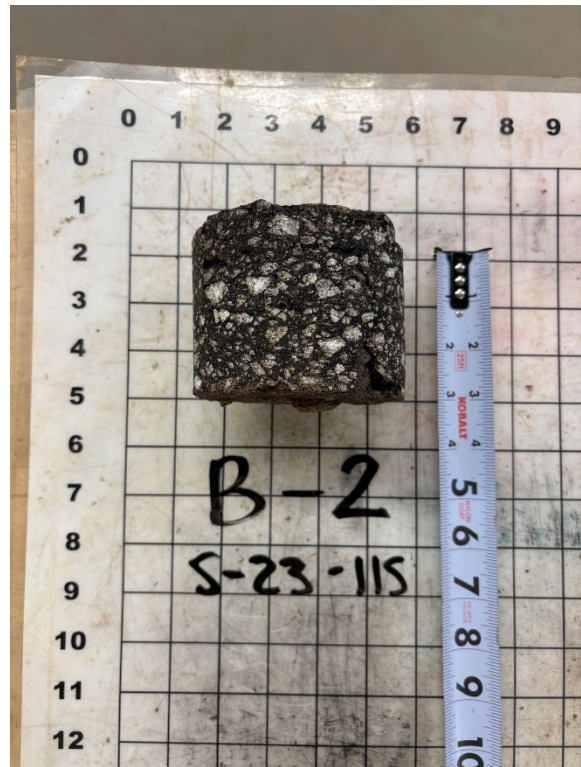
APPENDIX

SECTION 5 PAVEMENT CORE PHOTOS

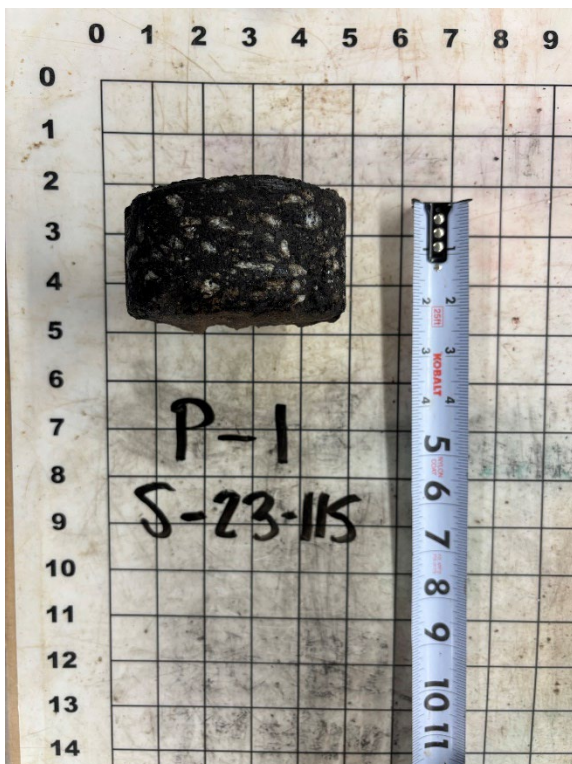
Pavement Core Photos



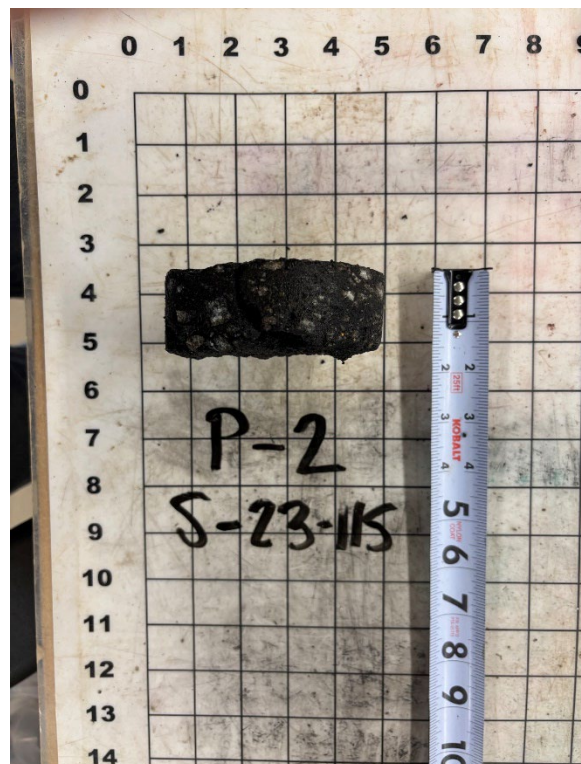
B-1



B-2

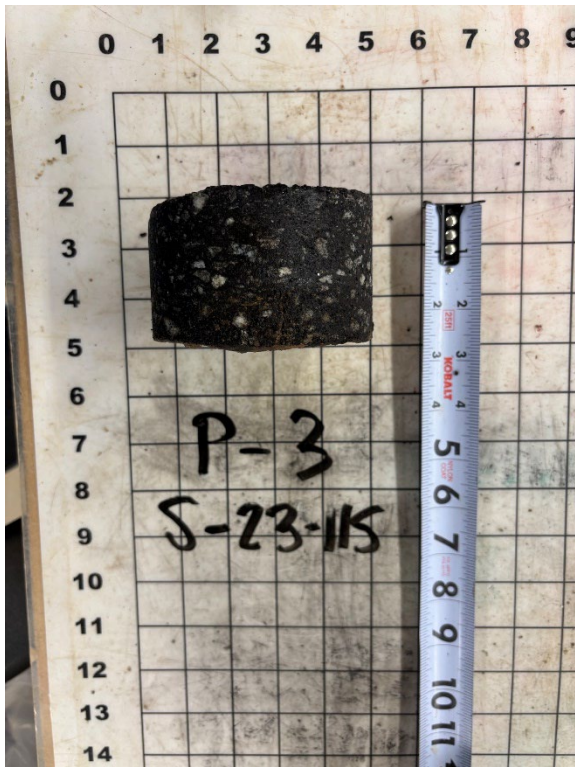


P-1

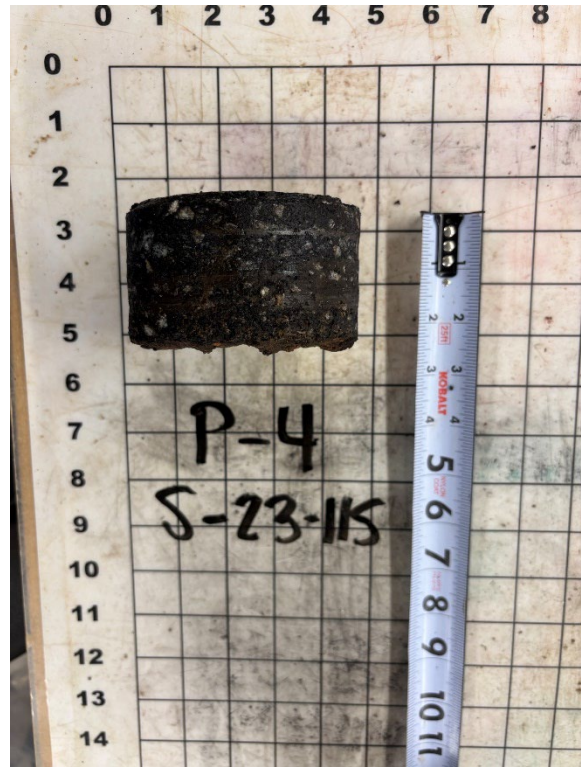


P-2

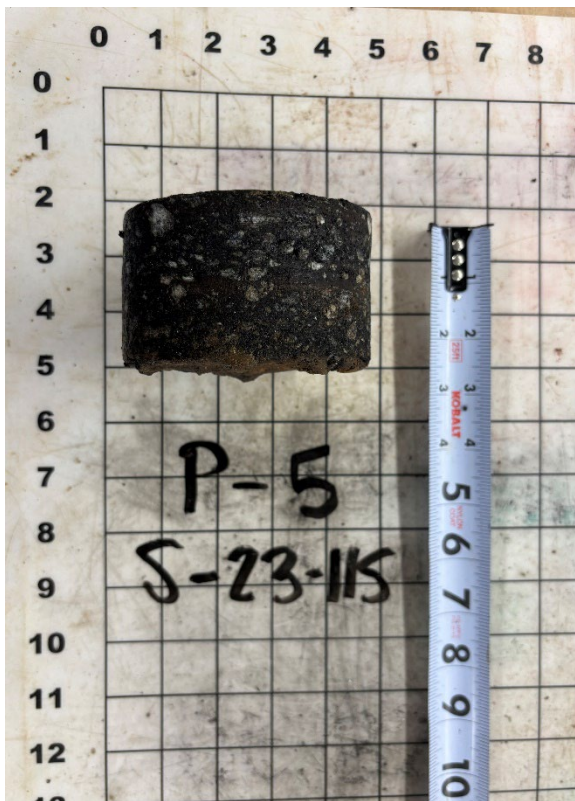
Pavement Core Photos



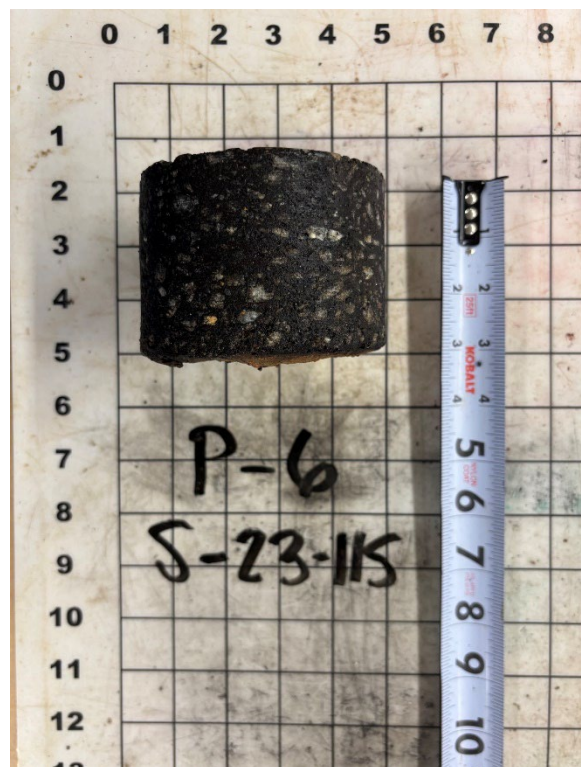
P-3



P-4



P-5



P-6

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 6

SPT HAMMER CALIBRATION

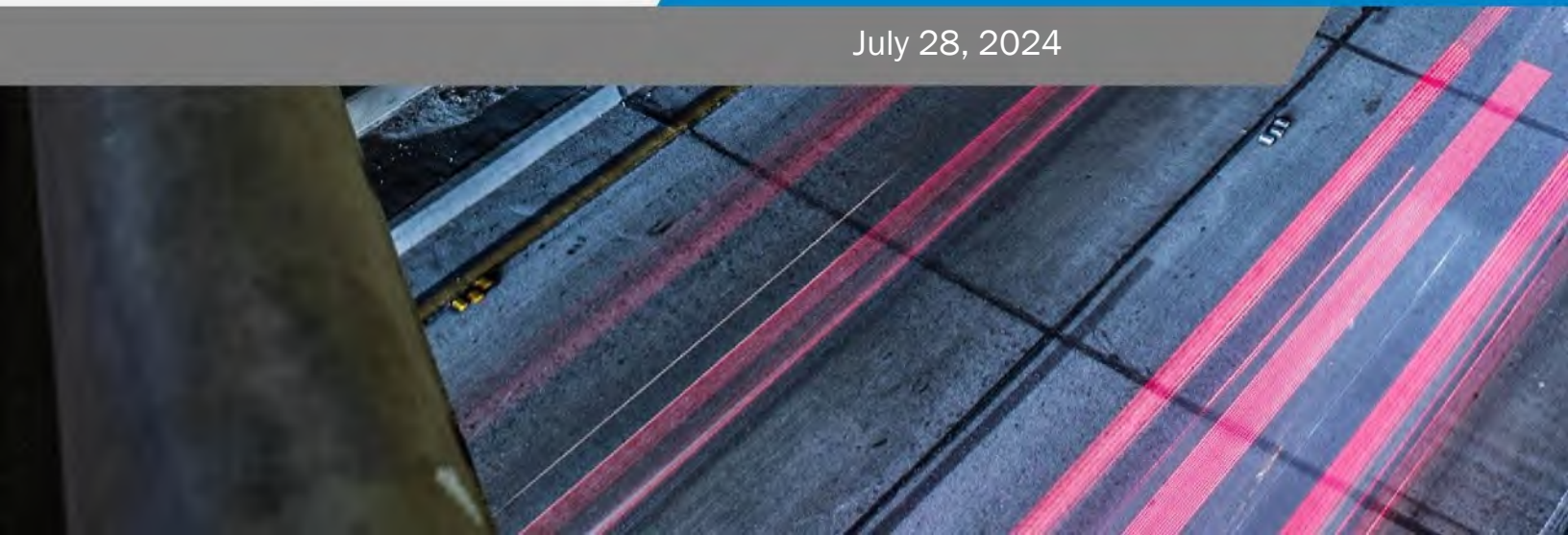


**CAROLINAS
GEOTECHNICAL
GROUP**

Report of SPT Hammer Energy

Prepared for:
Geologic Exploration, Inc.
176 Commerce Blvd.
Statesville, North Carolina 28625

July 28, 2024





2400 Crownpoint Executive Drive
Suite 800
Charlotte, NC 28227



(980) 339-8684



contact@carolinasgeotech.com



www.carolinasgeotech.com

July 28, 2024

Mr. Jason Mantak
Geologic Exploration, Inc.
176 Commerce Blvd.
Statesville, North Carolina

SUBJECT: **Report of SPT Hammer Energy**
Geologic Diedrich D-50 Track Rig (SN 366)
Charlotte, North Carolina
CG2 Project No.: 240019025

Dear Mr. Mantak:

Carolinas Geotechnical Group, PLLC (CG2) has completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer mounted on a Geologic Exploration, Inc. (Geologic) Diedrich D-50 track-mounted drill rig with a serial number of 366, see attached Drill Rig Photo Log. This service was performed by Mr. Robert E. Kral, PE on July 26, 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 Geologic submit this Report of SPT Hammer Energy and data to the NCDOT Geotechnical Engineering Unit for review and approval no later than August 23, 2024.

DYNAMIC TESTING METHODOLOGY

Testing was performed using a model SPT (Serial No. 4549 TB) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K10959 and K10960) bolted to a 2-foot long AWJ drill rod (SN 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 estimated 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

Charlotte, North Carolina

CG2 Project No.: 240019025

TESTING AND OBSERVATIONS

CG2 personnel was on site July 26, 2024 to observe and perform high-strain dynamic testing during SPT sampling on the Diedrich D-50 track-mounted drill rig rented and operated by C. Odom of CG2 Exploration, LLC. The measurements were taken during drilling operations at a test site located at 327 Old Hebron Road in Charlotte, North Carolina (Mecklenburg County). The approximate coordinates (not professionally surveyed) for the test location are 35.1310233, -80.8858186. No Soil Test Boring Log was provided. SPT energy measurements were recorded during three intervals at depths of approximately 28½, 33½, and 38½ feet below the existing ground surface. Drop height of the weight could not be observed due to lack of observations windows in the steel hammer case. 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 | Diedrich |
| Model | D-50 |
| Serial Number | 366 |
| Operator | C. Odom of CG2 Exploration, LLC |
| Carrier | Track |
| Hammer Information | |
| Model / Type | Diedrich / Auto |
| Serial Number | N/A |
| Anvil Height (inches) | 30 |
| 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

Charlotte, North Carolina

CG2 Project No.: 240019025

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 Diedrich D-50 track-mounted drill rig operated at a rate of about 48.6 to 49.5 blows per minute (BPM) during dynamic testing. The measured transferred hammer energy (EFV) ranged from 314.3 to 356.7 foot-pounds, which corresponds to Energy Transfer Ratio (ETR) values of 89.8 to 101.9%, 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 | 3-4-5 / 9 | SA SILT | 49.1 | 326.3 | 93.2 |
| 2 | 35½ - 35 | 35 | 38.6 | 4-4-6 / 10 | SA SILT | 48.9 | 338.3 | 96.7 |
| 3 | 38½ - 40 | 40 | 43.6 | 5-7-9 / 16 | SA SILT | 49.0 | 336.1 | 96.0 |
| Overall Average | | | | | | 49.0 | 334.2 | 95.5 |

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 Diedrich D-50 track-mounted drill rig (for all the depth intervals tested in Table 2) was 334.2 foot-pounds, with an average ETR of 95.5%.

Report of SPT Hammer Energy

Charlotte, North Carolina

CG2 Project No.: 240019025

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:

Robert E. Kral

8AD703B2A8484F4...

Robert E. Kral, PE

Geotechnical Design Manager

NC Registration No. 042642



Appendices:

- Appendix I - Diedrich D-50 Track Rig (SN 366) 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



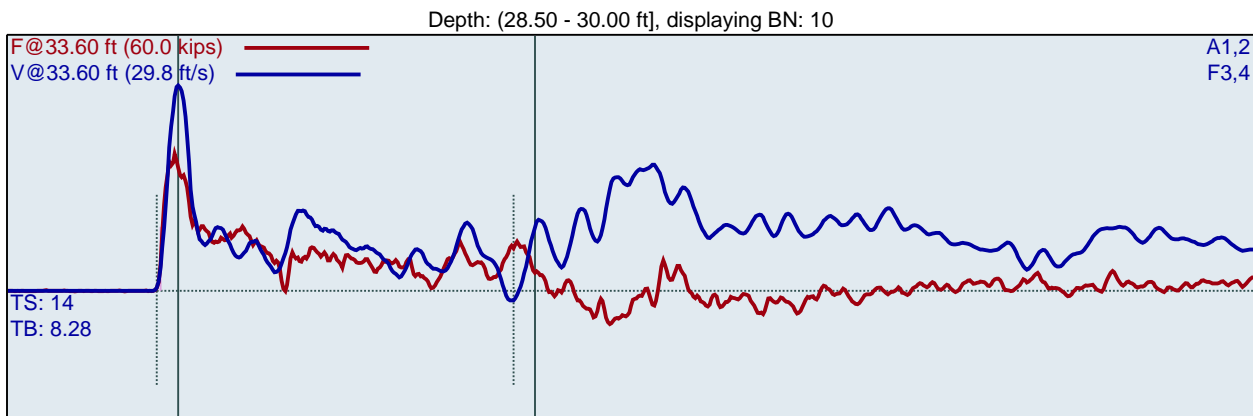
APPENDIX I

DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

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] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 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 | 10.5 | 34.2 | 23.8 | 2.4 | 30.3 | 2.0 | 318.4 | 91.0 |
| 28.83 | 2 | 3 | 48.5 | 34.5 | 24.3 | 2.3 | 30.5 | 2.0 | 327.6 | 93.6 |
| 29.00 | 3 | 3 | 49.4 | 34.3 | 24.7 | 2.3 | 30.3 | 2.0 | 331.8 | 94.8 |
| 29.13 | 4 | 4 | 49.5 | 33.8 | 24.9 | 2.0 | 29.9 | 1.5 | 332.4 | 95.0 |
| 29.25 | 5 | 4 | 48.9 | 33.5 | 25.0 | 1.7 | 29.7 | 1.5 | 329.0 | 94.0 |
| 29.38 | 6 | 4 | 48.8 | 33.0 | 24.8 | 1.6 | 29.2 | 1.5 | 327.2 | 93.5 |
| 29.50 | 7 | 4 | 48.9 | 33.3 | 25.5 | 1.5 | 29.5 | 1.5 | 329.7 | 94.2 |
| 29.60 | 8 | 5 | 49.0 | 33.3 | 25.0 | 1.5 | 29.5 | 1.2 | 325.6 | 93.0 |
| 29.70 | 9 | 5 | 49.3 | 32.5 | 24.8 | 1.5 | 28.8 | 1.2 | 323.3 | 92.4 |
| 29.80 | 10 | 5 | 49.0 | 32.1 | 23.9 | 1.5 | 28.4 | 1.2 | 325.2 | 92.9 |
| 29.90 | 11 | 5 | 49.1 | 31.9 | 24.2 | 1.3 | 28.3 | 1.2 | 325.4 | 93.0 |
| 30.00 | 12 | 5 | 49.5 | 31.2 | 24.2 | 1.2 | 27.6 | 1.2 | 319.1 | 91.2 |
| Average | | | 49.1 | 32.7 | 24.7 | 1.5 | 29.0 | 1.3 | 326.3 | 93.2 |
| Std Dev | | | 0.2 | 0.8 | 0.5 | 0.2 | 0.7 | 0.1 | 3.6 | 1.0 |
| Maximum | | | 49.5 | 33.8 | 25.5 | 2.0 | 29.9 | 1.5 | 332.4 | 95.0 |
| Minimum | | | 48.8 | 31.2 | 23.9 | 1.2 | 27.6 | 1.2 | 319.1 | 91.2 |
| N-value: 9 | | | | | | | | | | |

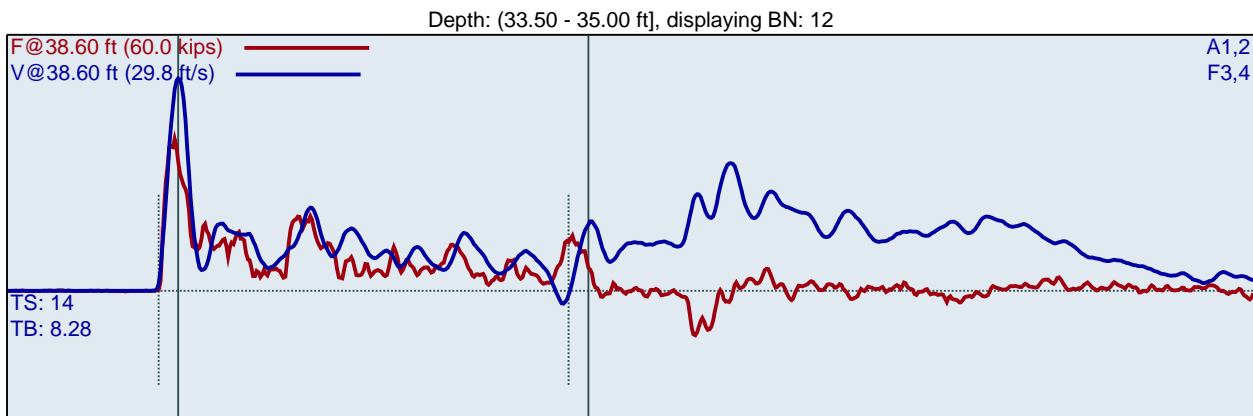
Sample Interval Time: 13.44 seconds.

DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

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] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 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 % |
|-------------|-----|-----------|------------|-------------|-------------|-----------|------------|-----------|--------------|----------|
| 33.63 | 1 | 4 | 49.1 | 35.1 | 25.1 | 2.2 | 31.0 | 1.5 | 340.7 | 97.3 |
| 33.75 | 2 | 4 | 48.9 | 35.2 | 25.1 | 2.1 | 31.1 | 1.5 | 358.9 | 102.5 |
| 33.88 | 3 | 4 | 48.9 | 34.8 | 24.8 | 1.9 | 30.8 | 1.5 | 340.1 | 97.2 |
| 34.00 | 4 | 4 | 48.5 | 34.6 | 25.5 | 1.8 | 30.6 | 1.5 | 351.8 | 100.5 |
| 34.13 | 5 | 4 | 49.1 | 35.0 | 25.2 | 1.7 | 31.0 | 1.5 | 338.3 | 96.7 |
| 34.25 | 6 | 4 | 49.0 | 34.4 | 25.2 | 1.6 | 30.4 | 1.5 | 340.3 | 97.2 |
| 34.38 | 7 | 4 | 48.6 | 34.9 | 24.8 | 1.6 | 30.8 | 1.5 | 337.1 | 96.3 |
| 34.50 | 8 | 4 | 49.1 | 34.6 | 25.0 | 1.5 | 30.6 | 1.5 | 339.8 | 97.1 |
| 34.58 | 9 | 6 | 48.9 | 35.4 | 25.0 | 1.3 | 31.3 | 1.0 | 339.4 | 97.0 |
| 34.67 | 10 | 6 | 48.9 | 34.7 | 24.8 | 1.4 | 30.7 | 1.0 | 334.8 | 95.7 |
| 34.75 | 11 | 6 | 48.9 | 35.5 | 24.6 | 1.2 | 31.5 | 1.0 | 339.7 | 97.1 |
| 34.83 | 12 | 6 | 48.8 | 35.6 | 24.7 | 1.4 | 31.5 | 1.0 | 339.2 | 96.9 |
| 34.92 | 13 | 6 | 48.9 | 34.6 | 24.4 | 1.3 | 30.7 | 1.0 | 338.9 | 96.8 |
| 35.00 | 14 | 6 | 48.6 | 35.3 | 24.5 | 1.3 | 31.3 | 1.0 | 335.5 | 95.9 |
| Average | | | 48.9 | 35.0 | 24.8 | 1.4 | 31.0 | 1.2 | 338.3 | 96.7 |
| Std Dev | | | 0.2 | 0.4 | 0.3 | 0.2 | 0.4 | 0.2 | 1.8 | 0.5 |
| Maximum | | | 49.1 | 35.6 | 25.2 | 1.7 | 31.5 | 1.5 | 340.3 | 97.2 |
| Minimum | | | 48.6 | 34.4 | 24.4 | 1.2 | 30.4 | 1.0 | 334.8 | 95.7 |
| N-value: 10 | | | | | | | | | | |

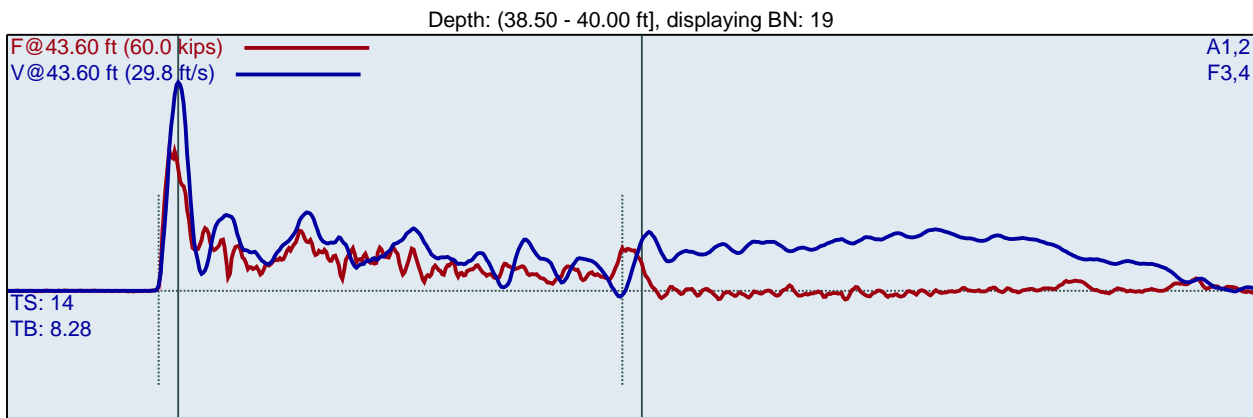
Sample Interval Time: 15.97 seconds.

DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

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] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 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 % |
|----------|-----|-----------|------------|-------------|-------------|-----------|------------|-----------|--------------|----------|
| 38.60 | 1 | 5 | 49.1 | 33.5 | 25.4 | 1.5 | 29.6 | 1.2 | 346.0 | 98.8 |
| 38.70 | 2 | 5 | 48.7 | 33.1 | 25.4 | 1.4 | 29.3 | 1.2 | 347.1 | 99.2 |
| 38.80 | 3 | 5 | 49.2 | 34.2 | 25.9 | 1.5 | 30.2 | 1.2 | 349.7 | 99.9 |
| 38.90 | 4 | 5 | 48.9 | 34.0 | 26.0 | 1.5 | 30.1 | 1.2 | 358.1 | 102.3 |
| 39.00 | 5 | 5 | 49.3 | 33.5 | 25.7 | 1.5 | 29.7 | 1.2 | 346.9 | 99.1 |
| 39.07 | 6 | 7 | 48.8 | 34.2 | 26.0 | 1.4 | 30.2 | 0.9 | 352.2 | 100.6 |
| 39.14 | 7 | 7 | 49.3 | 33.9 | 25.7 | 1.4 | 30.0 | 0.9 | 343.6 | 98.2 |
| 39.21 | 8 | 7 | 48.9 | 33.1 | 25.3 | 1.3 | 29.3 | 0.9 | 347.4 | 99.3 |
| 39.29 | 9 | 7 | 48.7 | 34.3 | 26.0 | 1.3 | 30.4 | 0.9 | 352.5 | 100.7 |
| 39.36 | 10 | 7 | 48.7 | 34.5 | 26.0 | 1.4 | 30.5 | 0.9 | 356.7 | 101.9 |
| 39.43 | 11 | 7 | 49.2 | 32.7 | 25.0 | 1.3 | 28.9 | 0.9 | 336.4 | 96.1 |
| 39.50 | 12 | 7 | 48.8 | 33.1 | 25.1 | 1.3 | 29.3 | 0.9 | 340.6 | 97.3 |
| 39.56 | 13 | 9 | 48.9 | 34.1 | 25.6 | 1.2 | 30.2 | 0.7 | 334.4 | 95.5 |
| 39.61 | 14 | 9 | 49.2 | 34.3 | 25.5 | 1.3 | 30.3 | 0.7 | 341.6 | 97.6 |
| 39.67 | 15 | 9 | 49.1 | 33.6 | 25.4 | 1.2 | 29.8 | 0.7 | 338.5 | 96.7 |
| 39.72 | 16 | 9 | 49.2 | 32.4 | 24.6 | 1.1 | 28.7 | 0.7 | 323.9 | 92.5 |
| 39.78 | 17 | 9 | 49.0 | 32.8 | 24.8 | 1.1 | 29.0 | 0.7 | 331.7 | 94.8 |
| 39.83 | 18 | 9 | 49.0 | 32.8 | 24.4 | 1.1 | 29.1 | 0.7 | 322.1 | 92.0 |
| 39.89 | 19 | 9 | 49.3 | 32.9 | 24.3 | 1.0 | 29.1 | 0.7 | 319.1 | 91.2 |
| 39.94 | 20 | 9 | 48.7 | 32.3 | 24.0 | 1.0 | 28.6 | 0.7 | 321.9 | 92.0 |
| 40.00 | 21 | 9 | 49.1 | 32.6 | 24.1 | 1.0 | 28.9 | 0.7 | 314.3 | 89.8 |
| Average | | | 49.0 | 33.4 | 25.1 | 1.2 | 29.5 | 0.7 | 336.1 | 96.0 |
| Std Dev | | | 0.2 | 0.7 | 0.7 | 0.1 | 0.7 | 0.1 | 12.6 | 3.6 |
| Maximum | | | 49.3 | 34.5 | 26.0 | 1.4 | 30.5 | 0.9 | 356.7 | 101.9 |
| Minimum | | | 48.7 | 32.3 | 24.0 | 1.0 | 28.6 | 0.7 | 314.3 | 89.8 |

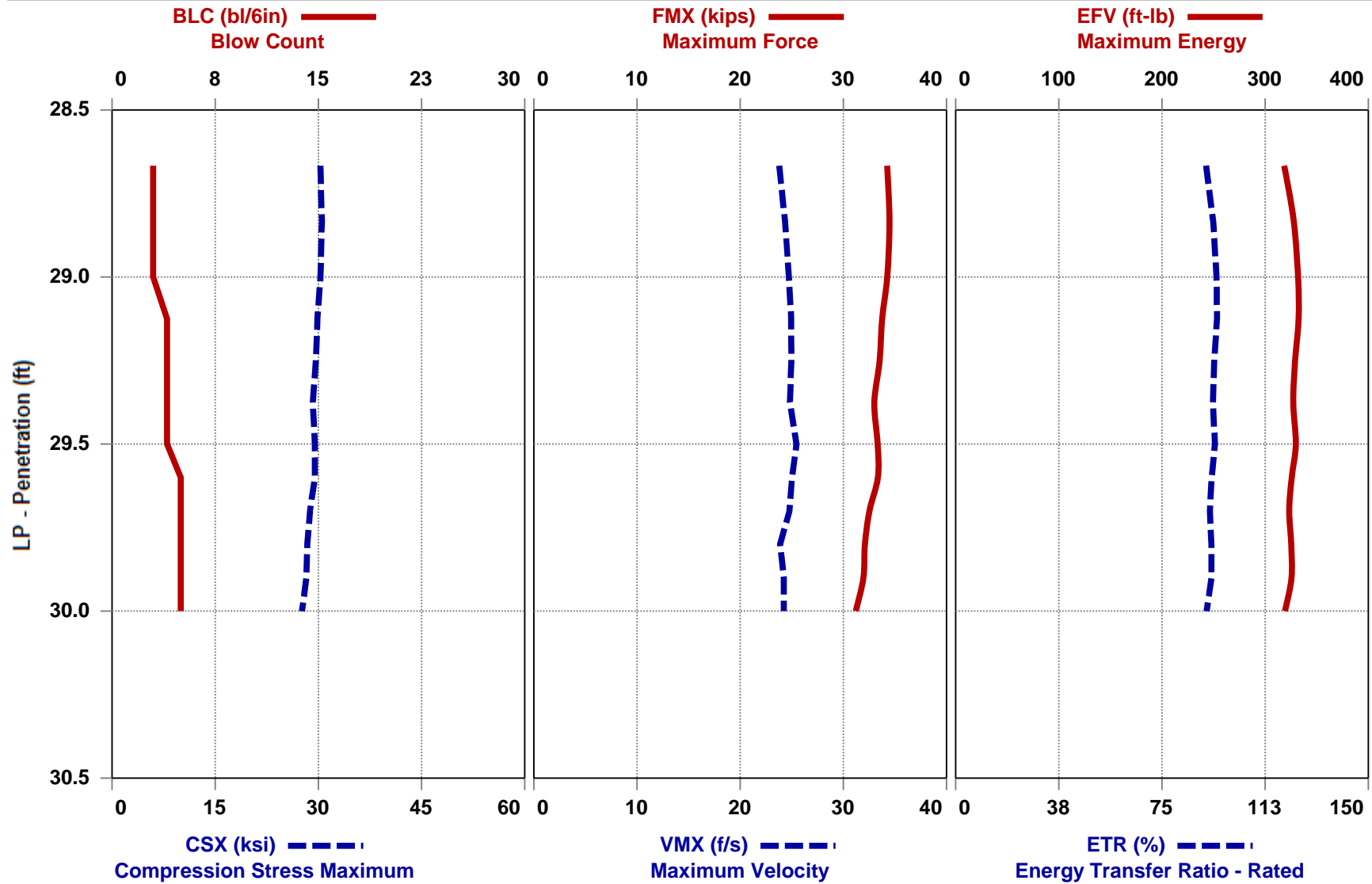
N-value: 16

Sample Interval Time: 24.53 seconds.

Summary of SPT Test Results

Project: DIEDRICH D-50 (SN 366), Test Date: 7/26/2024

| 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 | 3-4-5 | 9 | 14 | 49.1 | 32.7 | 24.7 | 1.5 | 29.0 | 1.3 | 326.3 | 93.2 |
| 38.60 | 33.50 | 35.00 | 4-4-6 | 10 | 15 | 48.9 | 35.0 | 24.8 | 1.4 | 31.0 | 1.2 | 338.3 | 96.7 |
| 43.60 | 38.50 | 40.00 | 5-7-9 | 16 | 25 | 49.0 | 33.4 | 25.1 | 1.2 | 29.5 | 0.7 | 336.1 | 96.0 |
| Overall Average Values: | | | | | | 49.0 | 33.7 | 24.9 | 1.4 | 29.8 | 1.0 | 334.2 | 95.5 |
| Standard Deviation: | | | | | | 0.2 | 1.1 | 0.6 | 0.2 | 1.0 | 0.3 | 10.0 | 2.8 |
| Overall Maximum Value: | | | | | | 49.5 | 35.6 | 26.0 | 2.0 | 31.5 | 1.5 | 356.7 | 101.9 |
| Overall Minimum Value: | | | | | | 48.6 | 31.2 | 23.9 | 1.0 | 27.6 | 0.7 | 314.3 | 89.8 |

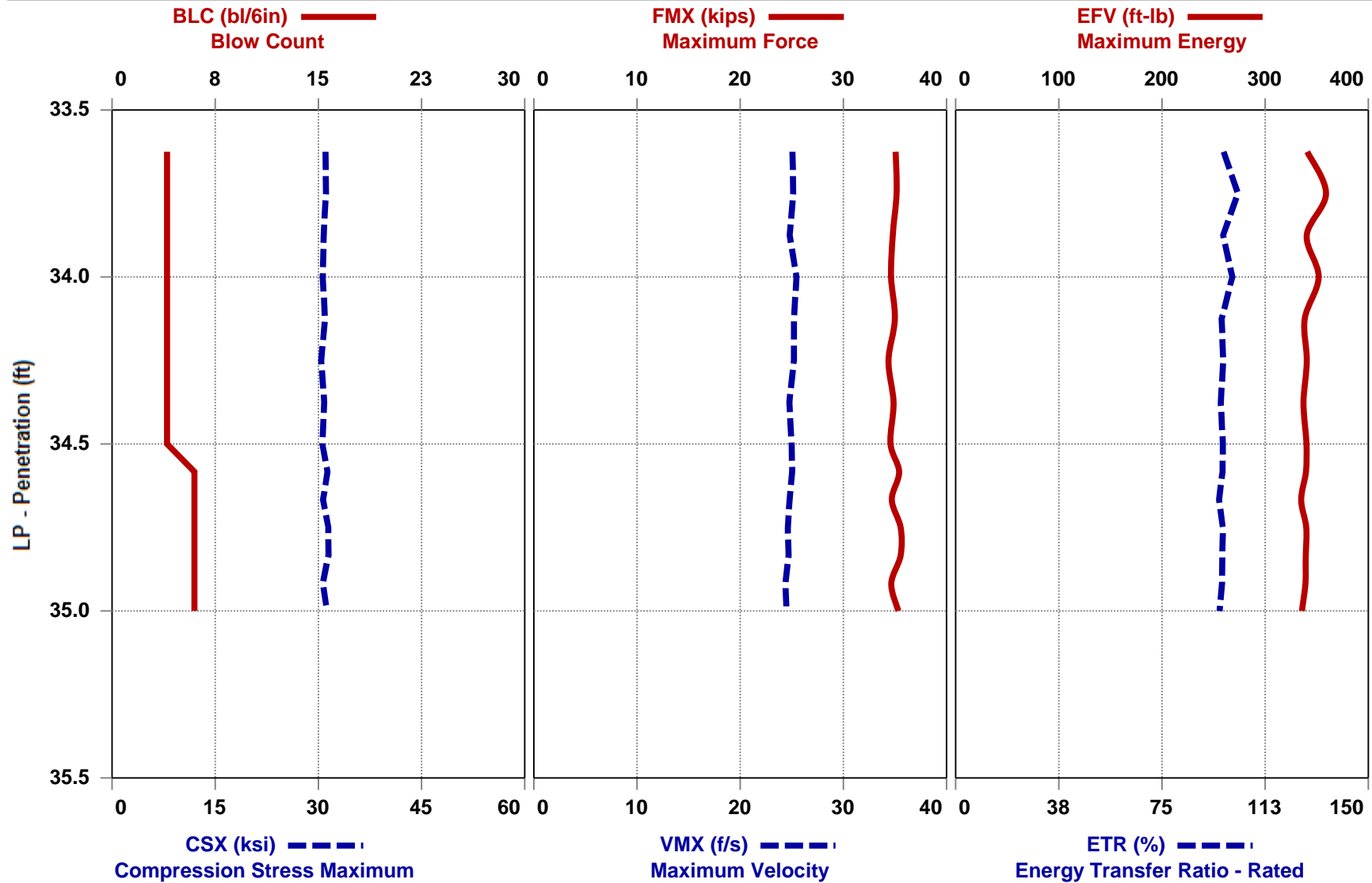


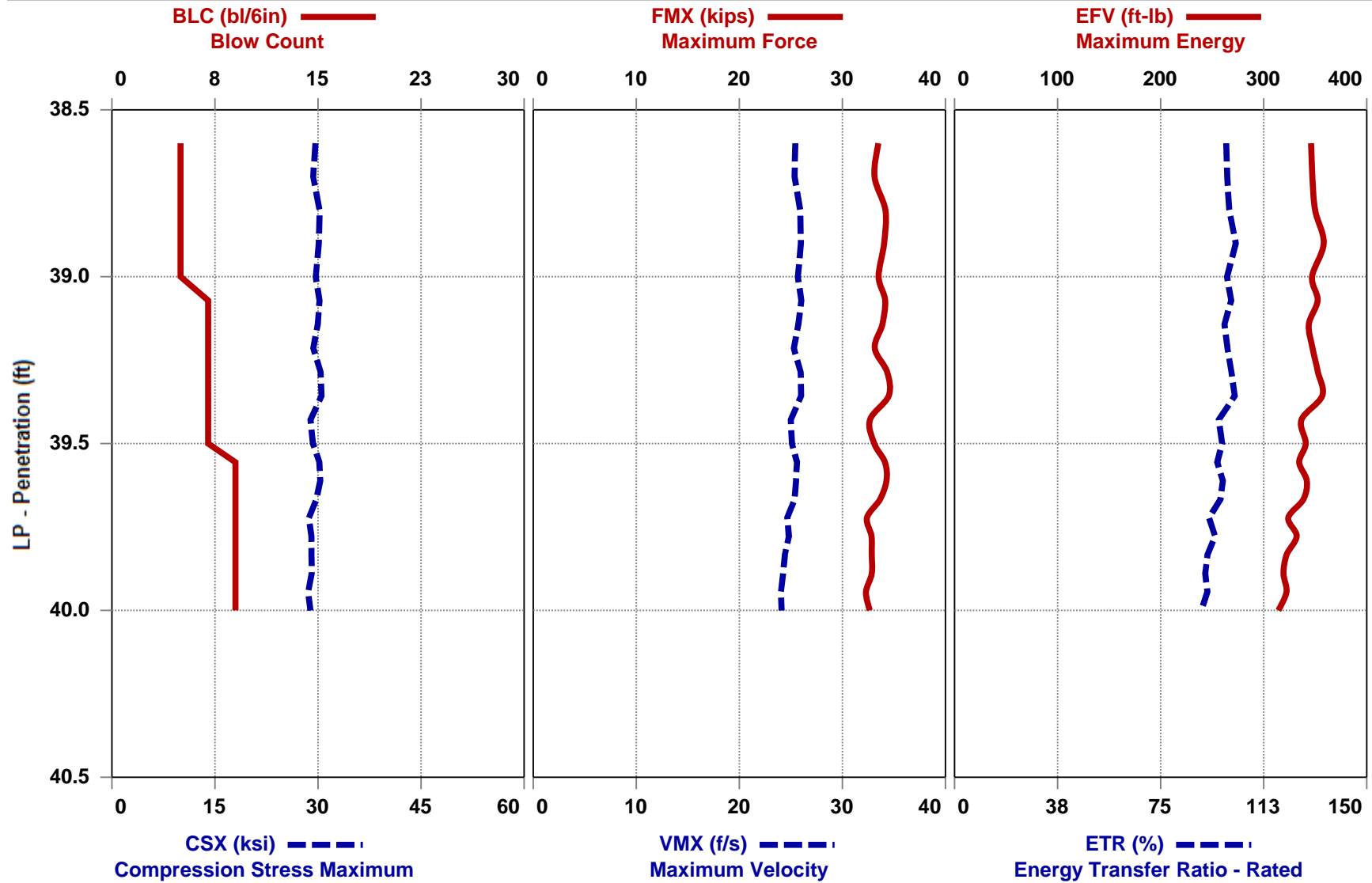


GRL Engineers, Inc. - PDILOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results
Printed: 28-July-2024

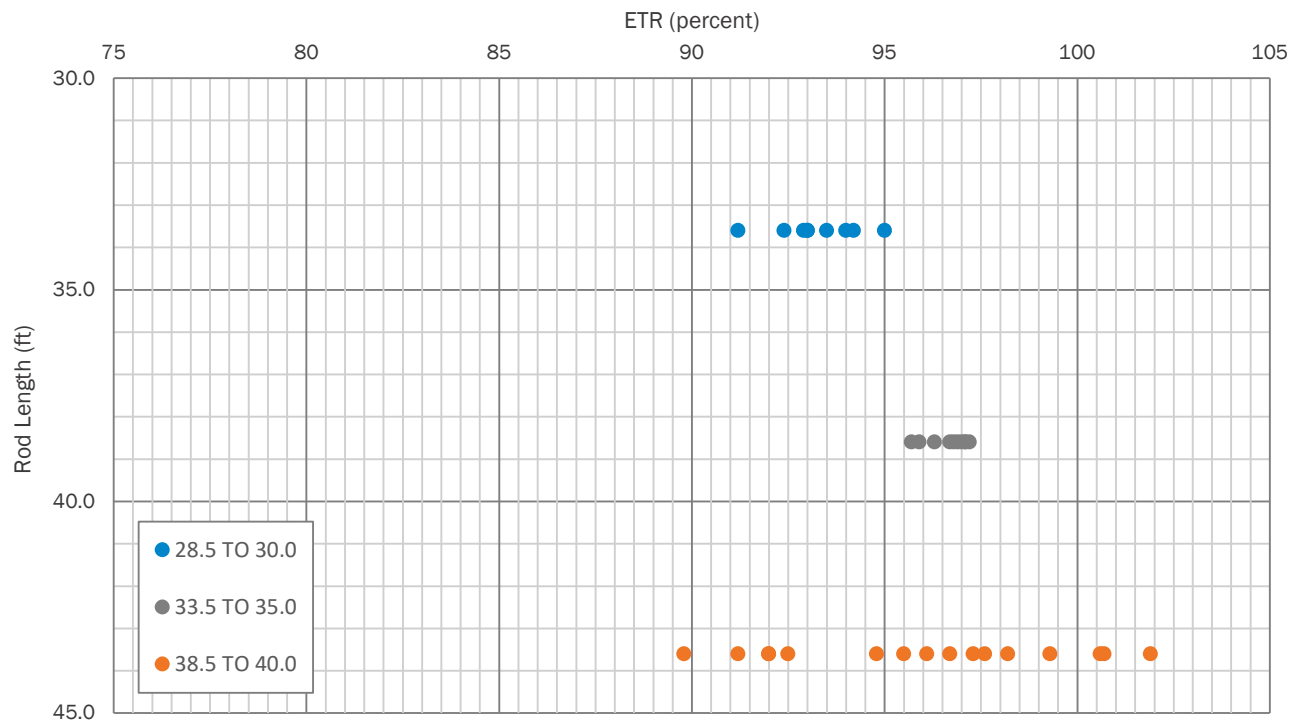
DIEDRICH D-50 (SN 366) - 33.5 TO 35.0
B-18

Test started: 26-July-2024

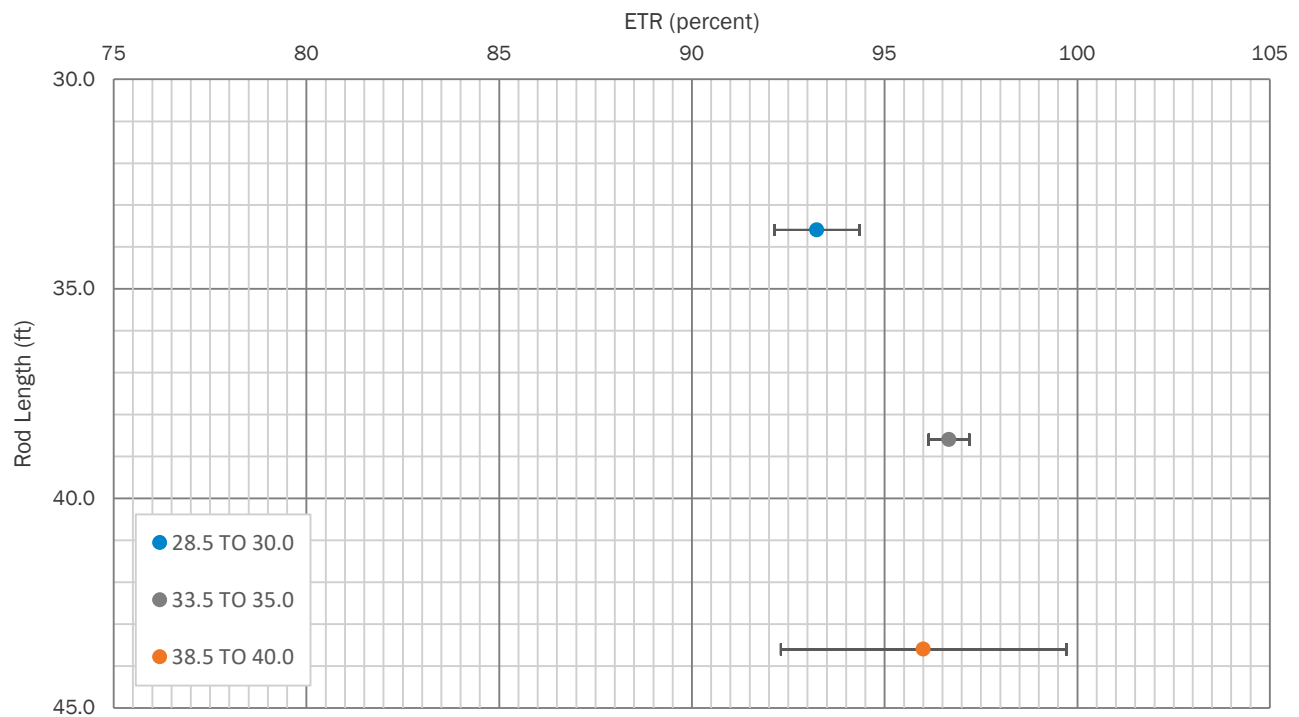




ETR versus Rod Length Diedrich D-50 Track (SN 366)



Average ETR versus Rod Length ± 1 Standard Deviation Diedrich D-50 Track (SN 366)





APPENDIX II

SPT Hammer Energy Field Form

Project: SPT HAMMER ENERGY
Project No.: 240019025 (2024 TESTING)
Boring No.: B-18

Date: 7/26/2024
Weather: 70's / CLEAR
Drill Rod Type: AWJ

On-site Personnel

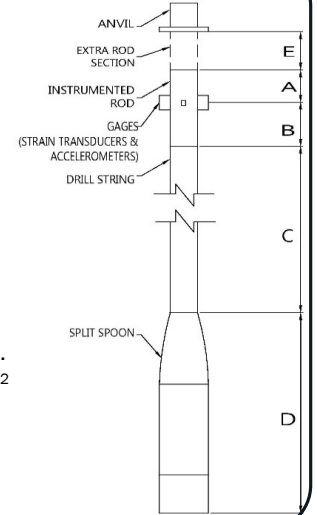
Drilling Company: RENTED TO CG2 EXPLORATION, LLC
 Rig Operator: C. ODOM
 Engr/Geologist: N/A
 Client Rep.: N/A
 Analyzer Oper.: R. KRAL

Rig/Hammer Info

Drill Rig Make/Model: DIEDRICH D-50
 Carrier Type: TRACK
 Rig Serial No.: 366
 Hammer Type/Model: DIEDRICH
 Hammer Serial No.: N/A
 Hammer Drop System: AUTO
 Lubrication Condition: PER MANUFACTURER
 Manufacturer Recommended
 Operation Rate (bpm): 45
 Drop Height (in.): 30
 Hammer Weight (lbs): 140
 Anvil Dimension (in.): 30
 Drilling Method: 2.25 HOLLOW-STEM AUGERS

Rod Info

(A + E) Impact Surface to Gages Length: 1.71 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): 0.41 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.: 4549 TB
 Calib. Pulse Test (y/n): Y



Gage Info

| Gage | | Serial No. | Calibration No. |
|--------|----|------------|-----------------|
| Accel. | A3 | K10959 | 420.00 |
| | A4 | K10960 | 416.30 |
| 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 | | |
| 26-Jul | 28.5 TO 30.0 | 1054/1054 | 30 | 33.6 | 48 | 3 | 4 | 5 | 9 | Unknown | SA SI |
| 26-Jul | 33.5 TO 35.0 | 1102/1102 | 35 | 38.6 | 48 | 4 | 4 | 6 | 10 | Unknown | SA SI |
| 26-Jul | 38.5 TO 40.0 | 1110/1110 | 40 | 43.6 | 49 | 5 | 7 | 9 | 16 | Unknown | SA SI |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:

TESTING PERFORMED AT A SITE LOCATED AT 327 OLD HEBRON ROAD IN, CHARLOTTE, NORTH CAROLINA (MECKLENBURG COUNTY). APPROXIMATE COORDINATES OF THE TESTING SITE ARE 35.1310233, -80.8858186.

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)

7/26/2024
 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: 4549 TB

was calibrated on 17 May 2024

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: mg

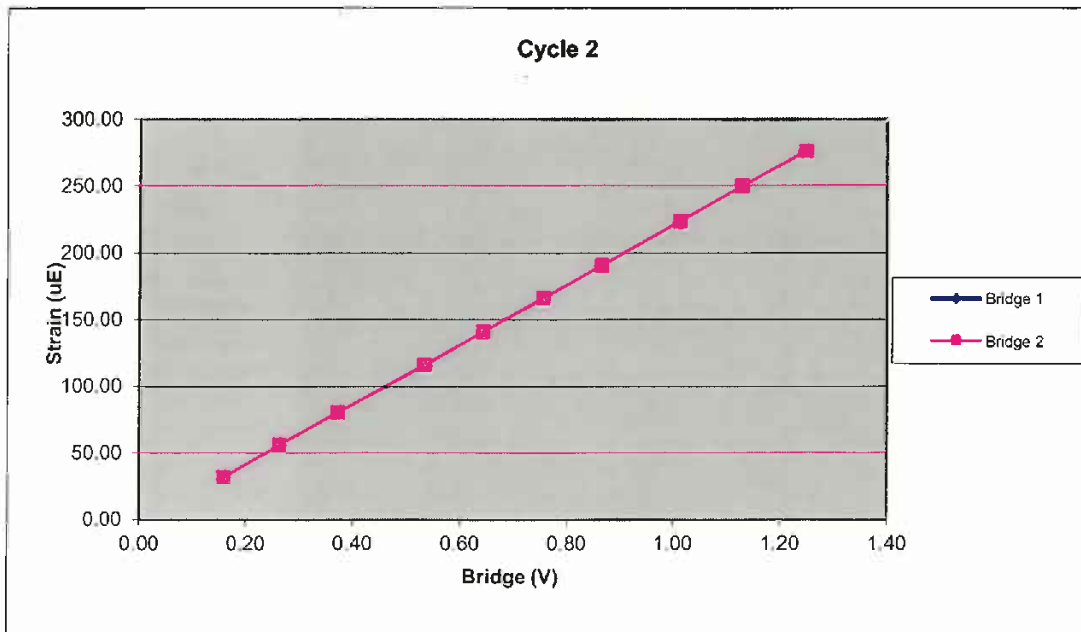


Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

| 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 | 1275.09 | 30.72 | 0.16 | 0.16 |
| 3 | 2117.68 | 54.81 | 0.26 | 0.26 |
| 4 | 3006.08 | 79.31 | 0.37 | 0.37 |
| 5 | 4307.49 | 114.86 | 0.54 | 0.53 |
| 6 | 5174.25 | 139.41 | 0.64 | 0.64 |
| 7 | 6086.83 | 164.67 | 0.76 | 0.76 |
| 8 | 6980.20 | 189.06 | 0.87 | 0.87 |
| 9 | 8159.37 | 222.00 | 1.01 | 1.01 |
| 10 | 9091.83 | 248.52 | 1.13 | 1.13 |
| 11 | 10060.07 | 274.72 | 1.25 | 1.25 |

| Bridge 1 | | Bridge 2 | |
|---------------------------------|----------|---------------------------------|----------|
| Force Calibration (lb/V) | 8074.08 | Force Calibration (lb/V) | 8058.01 |
| Offset | -15.56 | Offset | -1.74 |
| Correlation | 0.999996 | Correlation | 0.999999 |
| Strain Calibration (μ E/V) | 224.12 | Strain Calibration (μ E/V) | 223.67 |
| Offset | -4.79 | Offset | -4.40 |
| Correlation | 0.999991 | Correlation | 0.999992 |

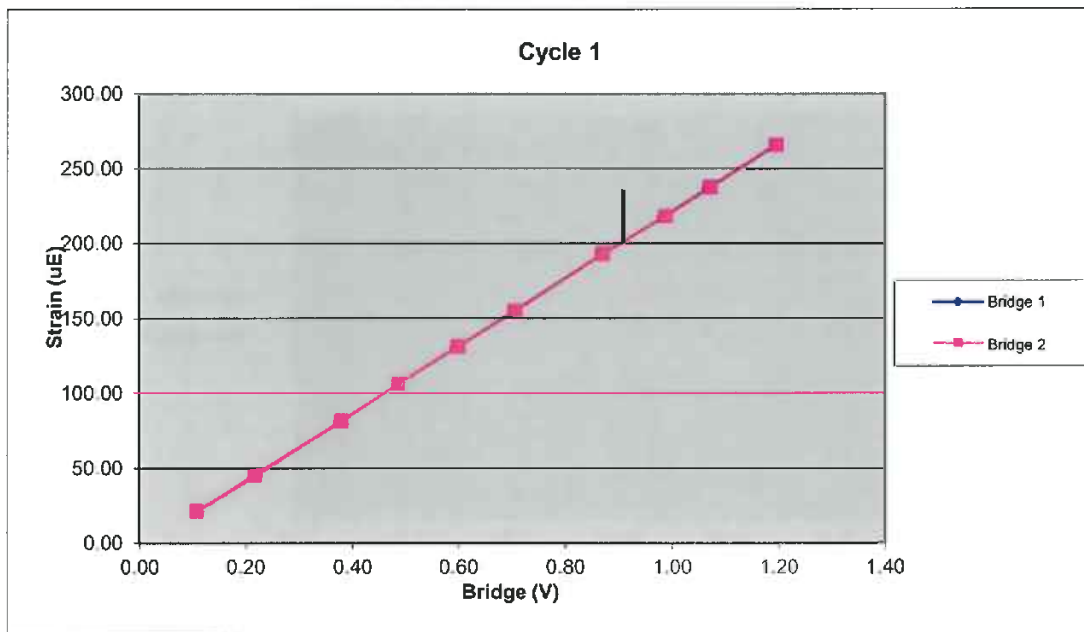
| Force Strain Calibration | |
|--------------------------|----------|
| EA (Kips) | 36025.06 |
| Offset | 156.98 |
| Correlation | 0.999993 |



| 528AWJ | | Cycle 1 | | |
|--------|------------|--------------------------|--------------|--------------|
| Sample | Force (lb) | Strain (μE) | Bridge 1 (V) | Bridge 2 (V) |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 884.31 | 20.98 | 0.11 | 0.11 |
| 3 | 1783.92 | 45.13 | 0.22 | 0.22 |
| 4 | 3073.53 | 80.67 | 0.38 | 0.38 |
| 5 | 3932.89 | 105.36 | 0.49 | 0.49 |
| 6 | 4836.79 | 130.28 | 0.60 | 0.60 |
| 7 | 5716.12 | 154.14 | 0.70 | 0.71 |
| 8 | 7053.40 | 191.99 | 0.87 | 0.87 |
| 9 | 7971.93 | 217.29 | 0.99 | 0.99 |
| 10 | 8671.71 | 236.63 | 1.07 | 1.07 |
| 11 | 9674.35 | 264.84 | 1.20 | 1.20 |

| Bridge 1 | | Bridge 2 | |
|--|----------|--|----------|
| Force Calibration (lb/V) | 8081.78 | Force Calibration (lb/V) | 8061.53 |
| Offset | 10.48 | Offset | 19.76 |
| Correlation | 0.999997 | Correlation | 0.999997 |
| Strain Calibration ($\mu\text{E/V}$) | 224.52 | Strain Calibration ($\mu\text{E/V}$) | 223.96 |
| Offset | -3.88 | Offset | -3.62 |
| Correlation | 0.999994 | Correlation | 0.999991 |

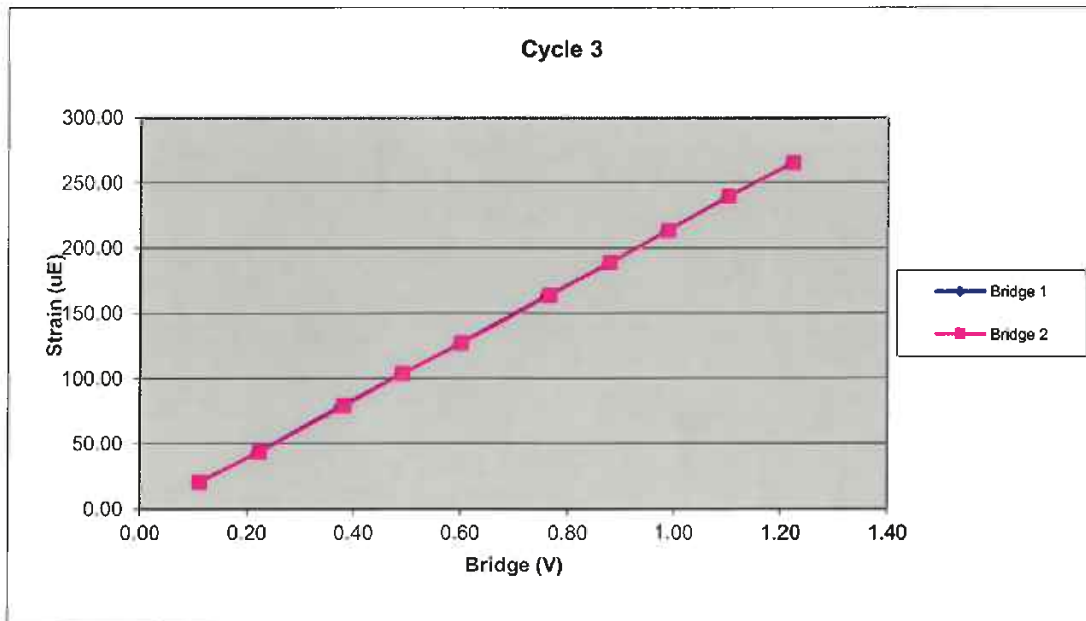
| Force Strain Calibration | |
|--------------------------|----------|
| EA (Kips) | 35995.56 |
| Offset | 150.23 |
| Correlation | 0.999991 |



| 528AWJ | | Cycle 3 | | |
|--------|------------|--------------------------|--------------|--------------|
| Sample | Force (lb) | Strain (μE) | Bridge 1 (V) | Bridge 2 (V) |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 901.56 | 19.94 | 0.11 | 0.11 |
| 3 | 1793.96 | 43.13 | 0.22 | 0.22 |
| 4 | 3064.57 | 78.60 | 0.38 | 0.38 |
| 5 | 3959.40 | 103.11 | 0.49 | 0.49 |
| 6 | 4851.51 | 126.42 | 0.60 | 0.60 |
| 7 | 6166.76 | 162.91 | 0.76 | 0.77 |
| 8 | 7098.54 | 187.86 | 0.88 | 0.88 |
| 9 | 7986.55 | 212.63 | 0.99 | 0.99 |
| 10 | 8919.01 | 238.54 | 1.10 | 1.10 |
| 11 | 9888.22 | 264.36 | 1.22 | 1.23 |

| Bridge 1 | | Bridge 2 | |
|---|----------|---|----------|
| Force Calibration (lb/V) | 8075.82 | Force Calibration (lb/V) | 8080.86 |
| Offset | 7.47 | Offset | -14.23 |
| Correlation | 0.999999 | Correlation | 0.999998 |
| Strain Calibration ($\mu\text{E}/\text{V}$) | 220.19 | Strain Calibration ($\mu\text{E}/\text{V}$) | 220.33 |
| Offset | -5.00 | Offset | -5.59 |
| Correlation | 0.999981 | Correlation | 0.999982 |

| Force Strain Calibration | |
|--------------------------|----------|
| EA (Kips) | 36675.33 |
| Offset | 190.88 |
| Correlation | 0.999985 |



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

| | | | |
|------------------------------|----------|------------------------------|--------|
| Calibration Factors | 528AWJ | | |
| Bridge 1 ($\mu\text{E/V}$) | 222.94 | Bridge 2 ($\mu\text{E/V}$) | 222.65 |
| EA Factor (Kips) | 36231.98 | Area (in^2) | 1.21 |

Calibrated by:

Calibrated Date:



6/17/2024

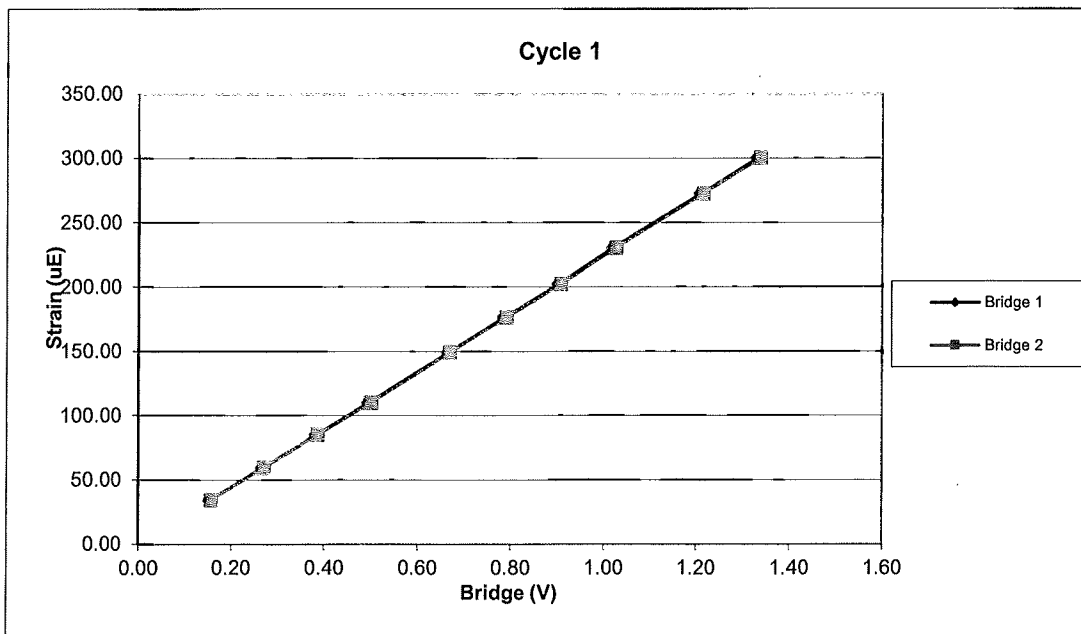
Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

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 |

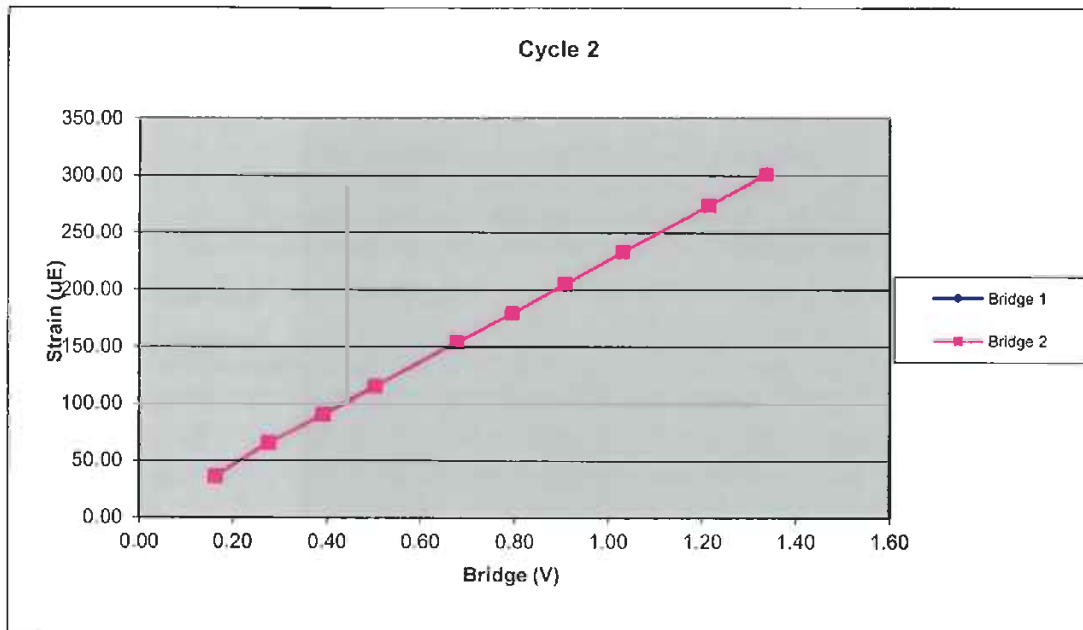
| Force Strain Calibration | |
|--------------------------|----------|
| EA (Kips) | 33548.47 |
| Offset | 63.54 |
| Correlation | 0.999983 |



| 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 |

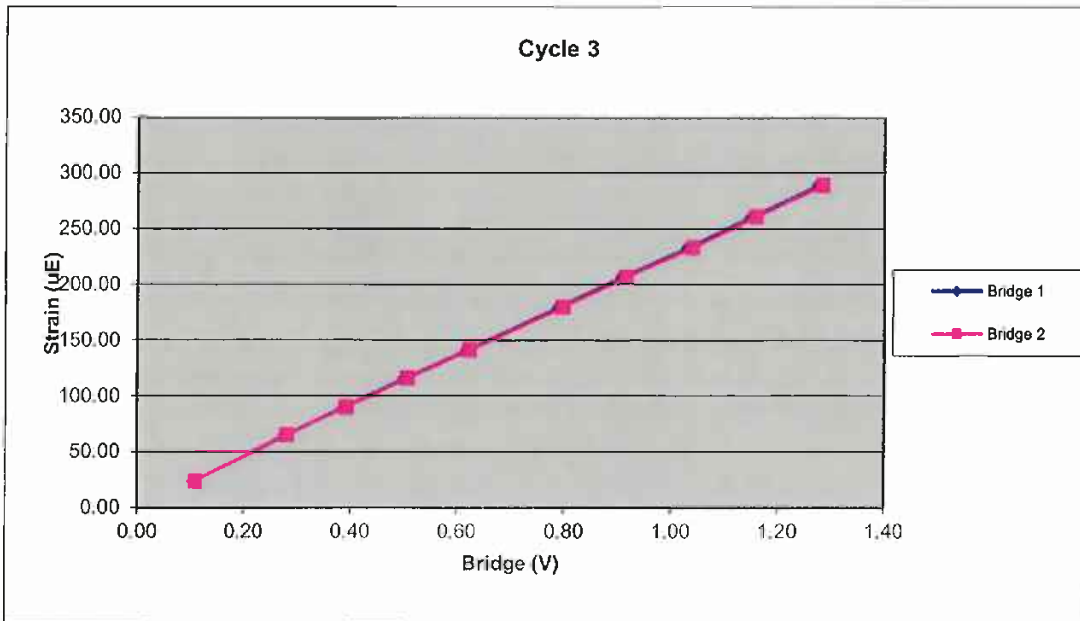
| Force Strain Calibration | |
|--------------------------|----------|
| EA (Kips) | 33843.24 |
| Offset | -37.68 |
| Correlation | 0.999950 |



| 728AWJ | | Cycle 3 | | |
|--------|------------|-------------------|--------------|--------------|
| Sample | Force (lb) | Strain (μ E) | 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 (μ E/V) | 224.53 | Strain Calibration (μ E/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 Banner
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 11Jul2024

Serial No: K11957 Temperature: 24.9 °C

Model: PR Humidity: 54%

Calibrated on: Channel 4 on 8G 5161 LE

PDA CALIBRATION FACTOR

412.3 mv/5000g

(82.5 μ v/g)

R²: 0.999930 [Chip programmed]

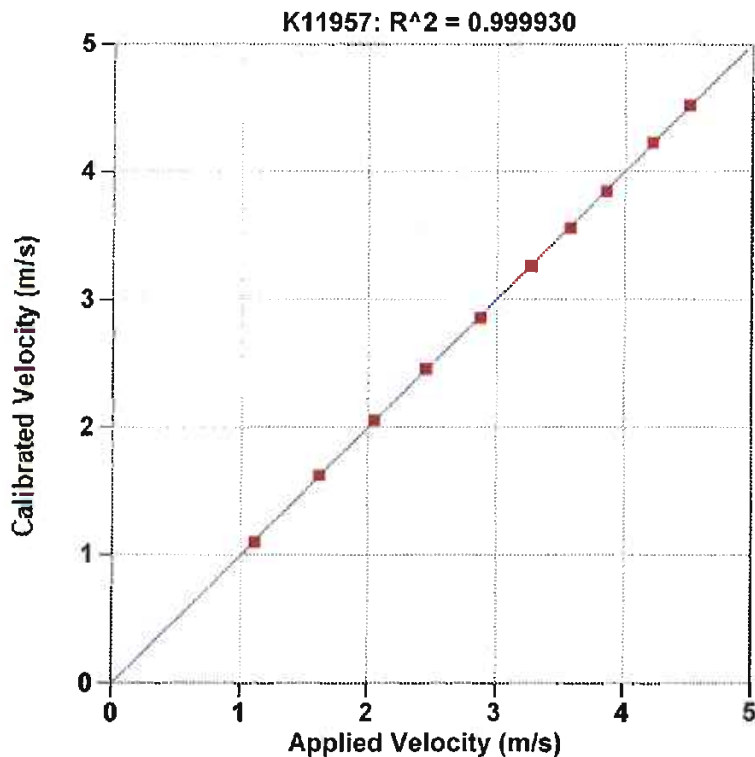
Ref Acc 1: 78270! Cal on: 11Jan2024
971 g's/volt

Ref Acc 2: 78268! Cal on: 11Jan2024
986 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 K11957 Velocity |
|-------------------------------|---------------------|
| m/s | m/s |
| 1.113 | 1.104 |
| 1.621 | 1.626 |
| 2.052 | 2.057 |
| 2.451 | 2.459 |
| 2.874 | 2.861 |
| 3.272 | 3.266 |
| 3.574 | 3.565 |
| 3.858 | 3.850 |
| 4.220 | 4.230 |
| 4.510 | 4.521 |
| Maximum Acceleration: 975 g's | |

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 11Jul2024

Serial No: K10959 Temperature: 24.9 °C

Model: PR Humidity: 55%

Calibrated on: Channel 4 on 8G 5161 LE

PDA CALIBRATION FACTOR

420.0 mv/5000g

(84.0 μ v/g)

R²: 0.999960 [Chip programmed]

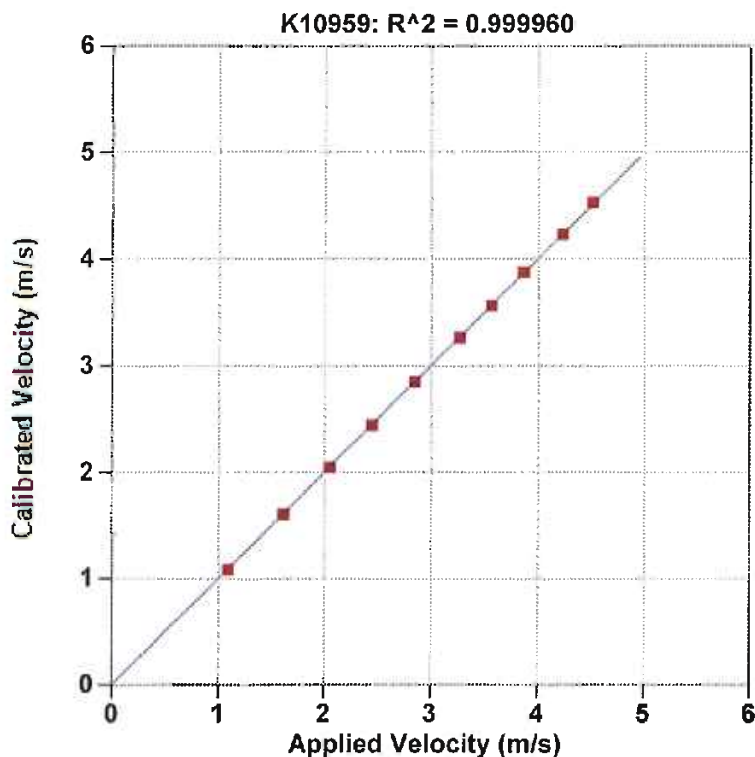
Operator: William Johnson

Ref Acc 1: 782701 Cal on: 11Jan2024
971 g's/volt

Ref Acc 2: 782681 Cal on: 11Jan2024
986 g's/volt

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 |
|-------------------------------|---------------------|
| m/s | m/s |
| 1.091 | 1.084 |
| 1.611 | 1.607 |
| 2.051 | 2.046 |
| 2.449 | 2.442 |
| 2.851 | 2.852 |
| 3.271 | 3.264 |
| 3.571 | 3.564 |
| 3.872 | 3.878 |
| 4.232 | 4.232 |
| 4.516 | 4.531 |
| Maximum Acceleration: 976 g's | |

Accelerometer Calibration Certificate

Pile Dynamics, Inc.



Calibrated by Pile Dynamics, Inc.
Calibration performed on 11Jul2024

Serial No: K10960 Temperature: 24.9 °C

Model: PR Humidity: 55%

Calibrated on: Channel 3 on 8G 5161 LE

PDA CALIBRATION FACTOR

416.3 mv/5000g

(83.3 μ v/g)

R²: 0.999979 [Chip programmed]

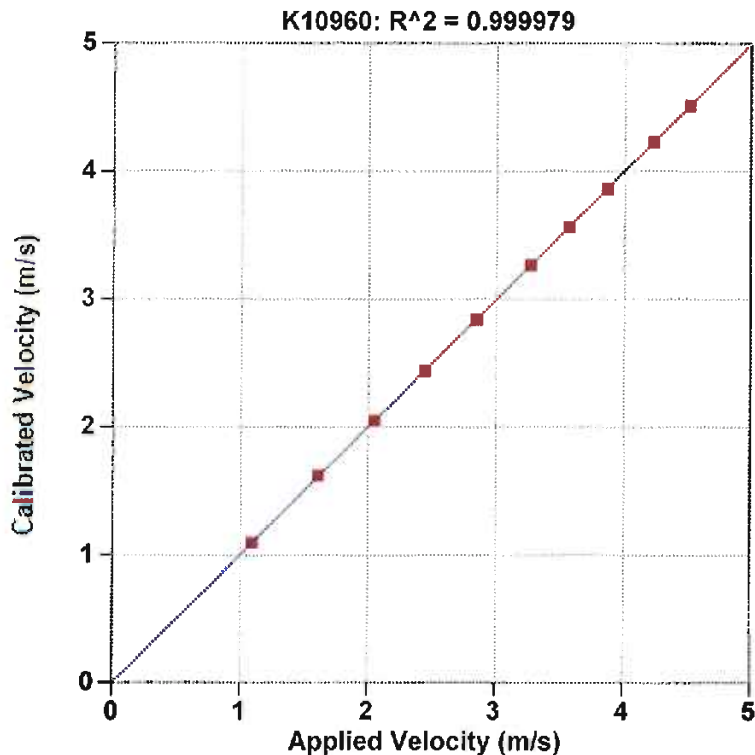
Operator: William Johnson

Ref Acc 1: 78270!
971 g's/volt Cal on: 11Jan2024

Ref Acc 2: 78268!
986 g's/volt Cal on: 11Jan2024


Signed

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



| Reference Velocity | S/N K10960 Velocity |
|-------------------------------|---------------------|
| m/s | m/s |
| 1.091 | 1.095 |
| 1.611 | 1.622 |
| 2.051 | 2.053 |
| 2.449 | 2.443 |
| 2.851 | 2.847 |
| 3.271 | 3.271 |
| 3.571 | 3.571 |
| 3.872 | 3.866 |
| 4.232 | 4.237 |
| 4.516 | 4.517 |
| Maximum Acceleration: 976 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-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 7 GEOSCOPING FORM

GeoScoping Form

| PROJECT INFORMATION | |
|------------------------------------|---------------|
| Project ID: | Date of Trip: |
| County: | Location: |
| Rd/Route: | Local Name: |
| Attendees: Driller, Helper, Logger | |

| EXISTING BRIDGE INFORMATION | |
|---|---|
| Bridge Length: | Bridge Width: |
| Superstructure Type: | Substructure Type: |
| Begin Bridge Sta.: | End Bridge Sta.: |
| Begin Bridge Embankment Sta. ¹ : | End Bridge Embankment Sta. ¹ : |
| Structure Number: | Posted Weight Limit: |
| Crossing: | Skew: |
| Latitude: | Longitude: |
| Existing Fill Height: | Approximate Existing Slope Angle: |

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

| EXISTING ROADWAY EMBANKMENT INFORMATION | | |
|---|---|-----------------|
| Begin Project Sta.: | Begin Bridge Embankment Sta. ¹ : | |
| Accessibility Issues: | | |
| Ground Cover: | | |
| Existing Fill Height: | Approximate Existing Slope Angle: | |
| Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): | | |
| Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): | | |
| Traffic Control Necessary (Y/N): No | | |
| | | |
| Surface Soil: | Muck (Y/N): | |
| Exposed Rock (Y/N): | In Stream Bed (Y/N): | In Banks (Y/N): |
| Wetlands On-Site (Y/N): | Wetlands Adjacent (Y/N): | |
| Depth FG to Water: | Water Depth: | |
| Depth to Existing Ground: | | |
| Scour Condition at EB: | Scour Condition at IB: | |
| End Bridge Embankment Sta. ¹ : | End Project Sta.: | |
| Accessibility Issues: | | |
| Ground Cover: | | |
| Existing Fill Height: | Approximate Existing Slope Angle: | |
| Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): | | |
| Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): | | |
| Traffic Control Necessary (Y/N): | | |
| Surface Soil: | Muck (Y/N): | |
| Exposed Rock (Y/N): | In Stream Bed (Y/N): | In Banks (Y/N): |
| Wetlands On-Site (Y/N): | Wetlands Adjacent (Y/N): | |
| Depth FG to Water: | Water Depth: | |
| Depth to Existing Ground: | | |
| Scour Condition at EB: | Scour Condition at IB: | |

GeoScoping Form

| UTILITIES INFORMATION |
|-------------------------|
| Attached: |
| Above Ground/ Overhead: |
| Underground: |

| COMMENTS | |
|----------|--|
| | |

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.

S-23-115 over Middle Tyger River

Geotechnical Subsurface Data Report

APPENDIX

SECTION 8 DRILL RIG PHOTOS

Drill Rig Photos



B-1



B-2



P-1



P-2

Drill Rig Photos



P-3



P-4



P-5



P-6