

REFERENCE: SF-040156

PROJECT: BPII.R046

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ASHE
 PROJECT DESCRIPTION REPLACE BRIDGE 040156 ON
SR 1169 (PINE SWAMP RD) OVER W. FORK PINE
SWAMP CREEK
 SITE DESCRIPTION -L- STA. 15 + 92.98

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-7	BORE LOG(S) & CORE REPORT(S)
8-II	CORE PHOTOGRAPH(S)
12	LABORATORY RESULTS
13	SITE PHOTOGRAPH(S)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-040156	1	13

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

M. STANBURY, PG

C. STEPHENS, GIT

B. SMITH, PG

SUBTERRA EXP.

INVESTIGATED BY B. SMITH, PG

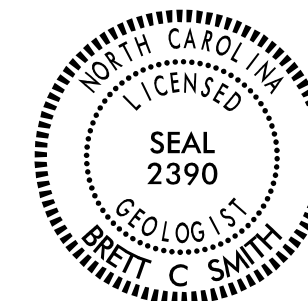
DRAWN BY B. SMITH, PG

CHECKED BY S. JOHNSON, PE, PG

SUBMITTED BY B. SMITH, PG

DATE JUNE, 2024

PREPARED IN THE OFFICE OF:



DocuSigned by:

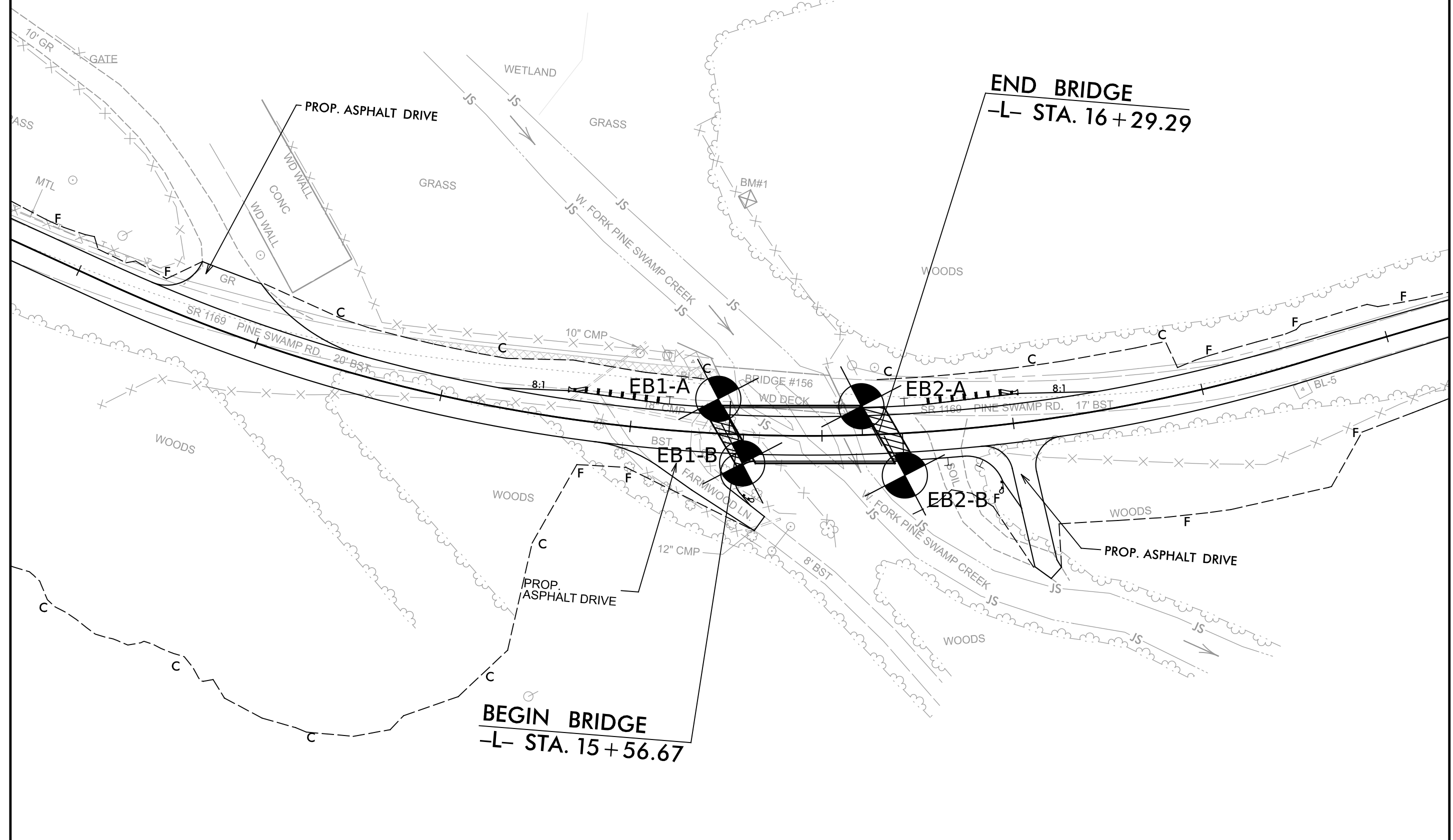
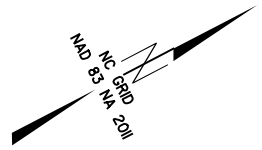
 7/2/2024
 DZAD1A971B6E422 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																																						
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																						
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th colspan="2">A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th colspan="5"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td colspan="5">MUCK, PEAT</td> </tr> <tr> <th>MATERIAL PASSING #40 #200</th> <td>6 MX</td> <td>NP</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td colspan="5">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="5">HIGHLY ORGANIC SOILS</td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td colspan="5"></td> <td colspan="5"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>										<p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table>										ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY				35% AND ABOVE
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<p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p style="text-align: center;">NOTES:</p> <p>FIAD = FILLED IMMEDIATELY AFTER DRILLING</p>																																																																																																																																																																																																																										
<p style="text-align: center;">BENCH MARK: BL-4 (N: 931,514 / E: 1,275,135)</p>										<p style="text-align: center;">ELEVATION: 2,911.84 FEET</p>																																																																																																																																																																																																																										

PROJECT REFERENCE NO.	SHEET NO.
SF-040156	3
SITE PLAN	
 0 50 100 FEET	



GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS BP11.R046		TIP SF-040156		COUNTY ASHE		GEOLOGIST Stephens, C.										
SITE DESCRIPTION Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 15+59		OFFSET 15 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,910.1 ft		TOTAL DEPTH 34.3 ft		NORTHING 931,512		EASTING 1,275,193										
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 91% 09/07/2023			DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic											
DRILLER Morgan, M.		START DATE 04/24/24		COMP. DATE 04/25/24		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2915																
2910	2,910.1	0.0	1	2	3									2,910.1	0.0	GROUND SURFACE
2905	2,906.8	3.3	13	15	24									2,903.5	6.6	RESIDUAL brown, gray, and orange, medium stiff to hard, saprolitic, sandy SILT (A-4) with little clay and trace gravel-sized rock fragments
2900	2,901.8	8.3	100/0.3											2,896.8	13.3	WEATHERED ROCK (Amphibolite)
2895	2,896.8	13.3	60/0.0											2,895.8	14.3	CRYSTALLINE ROCK (Amphibolite)
2890														2,885.8	24.3	CRYSTALLINE ROCK (Amphibolite) REC: 93% RQD: 46% GSI: 35-40
2885														2,885.8	24.3	(Amphibolite) REC: 100% RQD: 96% GSI: 50-60
2880														2,875.8	34.3	Boring Terminated at Elevation 2,875.8 ft in Crystalline Rock (Amphibolite) - Alligator Back Formation
																- Advanced Casing to 14.3 feet to begin Coring. - Unconfined Compressive Strength: RS-2 = 2,214 PSI

WBS BP11.R046		TIP SF-040156		COUNTY ASHE		GEOLOGIST Stephens, C.													
SITE DESCRIPTION Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek							GROUND WTR (ft)												
BORING NO. EB1-B		STATION 15+59		OFFSET 15 ft RT		ALIGNMENT -L-													
COLLAR ELEV. 2,910.1 ft		TOTAL DEPTH 34.3 ft		NORTHING 931,512		EASTING 1,275,193													
DRILL RIG/HAMMER EFF./DATE SEL0435 DIEDRICH D-50 91% 09/07/2023			DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic														
DRILLER Morgan, M.		START DATE 04/24/24		COMP. DATE 04/25/24		SURFACE WATER DEPTH N/A													
CORE SIZE NQ-2		TOTAL RUN 20.0 ft		RUN		STRATA		LOG	DESCRIPTION AND REMARKS										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.			REC. (ft) %	RQD (ft) %	ELEV. (ft)	DEPTH (ft)						
2895.8																			
2895	2,895.8	14.3	5.0	1:41/1.0 1:35/1.0 1:59/1.0 2:13/1.0 2:30/1.0	(5.0) 100%	(2.1) 42%		(9.3) 93%	(4.6) 46%	2,895.8	14.3		Begin Coring @ 14.3 ft CRYSTALLINE ROCK Light to dark gray, white, and brown, very slight to moderate weathering, soft to hard, close fracture spacing, AMPHIBOLITE. Well foliated with persistent schistosity. Some iron-oxide staining, especially near fractures. Geological Strength Index (GSI) = 35-40.						
2890	2,890.8	19.3	5.0	1:39/1.0 1:11/1.0 1:08/1.0 1:06/1.0 1:14/1.0	(4.3) 86%	(2.5) 50%	RS-2			2,885.8	24.3								
2885	2,885.8	24.3	5.0	1:50/1.0 1:33/1.0 1:40/1.0 1:53/1.0 2:08/1.0	(5.0) 100%	(4.9) 98%		(10.0) 100%	(9.6) 96%	2,885.8	24.3		Light to dark gray, white, and black, fresh to very slight weathering, hard to very hard, moderately close fracture spacing, AMPHIBOLITE. Well foliated with persistent schistosity. The rock fractures easily along foliation planes and is significantly weaker in those orientations. Geological Strength Index (GSI) = 50-60.						
2880	2,880.8	29.3	5.0	2:03/1.0 1:59/1.0 1:53/1.0 2:14/1.0 2:05/1.0	(5.0) 100%	(4.7) 94%				2,875.8	34.3		Boring Terminated at Elevation 2,875.8 ft in Crystalline Rock (Amphibolite) - Alligator Back Formation						
	2,875.8	34.3											- Advanced Casing to 14.3 feet to begin Coring. - Unconfined Compressive Strength: RS-2 = 2,214 PSI						

NCDOT BORE DOUBLE SF040156_GEO_BRDG0156_BH.GPJ NC_DOT.GDT 6/6/24

NCDOT CORE DOUBLE SF040156_GEO_BRDG0156_BH.GPJ NC_DOT.GDT 6/6/24

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP11.R046		TIP SF-040156		COUNTY ASHE		GEOLOGIST Stephens, C.										
SITE DESCRIPTION Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 16+42		OFFSET 22 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,908.4 ft		TOTAL DEPTH 29.9 ft		NORTHING 931,584		EASTING 1,275,238										
DRILL RIG/HAMMER EFF./DATE SEL0435 DIETRICH D-50 91% 09/07/2023			DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic											
DRILLER Morgan, M.		START DATE 04/25/24		COMP. DATE 04/25/24		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2910	2,908.4	0.0	1	0	1									2,908.4	GROUND SURFACE	0.0
2905	2,904.5	3.9	32	52	48/0.3						SS-22	23%		2,906.4	ALLUVIAL brown, very loose, silty SAND (A-2-4)	2.0
2900	2,899.5	8.9	60/0.0											2,904.0	RESIDUAL gray and brown, very stiff to hard, saprolitic, sandy SILT (A-4)	4.4
2895														2,901.4	WEATHERED ROCK (Amphibolite)	7.0
2890														2,898.5	CRYSTALLINE ROCK (Amphibolite)	9.9
2885											RS-4				CRYSTALLINE ROCK (Amphibolite)	
2880															REC: 99% RQD: 73% GSI: 40-50	
														2,888.5	(Amphibolite)	19.9
															REC: 100% RQD: 100% GSI: 50-60	
														2,878.5	Boring Terminated at Elevation 2,878.5 ft in Crystalline Rock (Amphibolite) - Alligator Back Formation	29.9
<p style="text-align: center;">- Advanced Casing to 9.9 feet to begin Coring.</p> <p style="text-align: center;">- Unconfined Compressive Strength: RS-4 = 4,338 PSI</p>																

WBS BP11.R046		TIP SF-040156		COUNTY ASHE		GEOLOGIST Stephens, C.						
SITE DESCRIPTION Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek							GROUND WTR (ft)					
BORING NO. EB2-B		STATION 16+42		OFFSET 22 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 2,908.4 ft		TOTAL DEPTH 29.9 ft		NORTHING 931,584		EASTING 1,275,238						
DRILL RIG/HAMMER EFF./DATE SEL0435 DIETRICH D-50 91% 09/07/2023			DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic							
DRILLER Morgan, M.		START DATE 04/25/24		COMP. DATE 04/25/24		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		ELEV. (ft)	DEPTH (ft)
2898.5	2,898.5	9.9	5.0	1:45/1.0 1:41/1.0 1:59/1.0 1:06/1.0 1:33/1.0	(4.9) 98%	(3.6) 72%	RS-4	(9.9) 99%	(7.3) 73%		2,898.5	Begin Coring @ 9.9 ft
2895	2,893.5	14.9	5.0	1:23/1.0 1:26/1.0 1:12/1.0 1:08/1.0 1:25/1.0	(5.0) 100%	(3.7) 74%					2,895	CRYSTALLINE ROCK Light to dark gray, white, black, and brown, fresh to moderately severe weathering, soft to hard, close fracture spacing, AMPHIBOLITE. Well foliated with persistent schistosity. The rock fractures easily along foliation planes and is significantly weaker in those orientations. Moderately severe weathering with significant iron-oxide staining from 14.0 - 14.9 & 17.9 - 18.5 feet. Geological Strength Index (GSI) = 40-50.
2890	2,888.5	19.9	5.0	1:21/1.0 1:22/1.0 1:23/1.0 1:26/1.0 1:27/1.0	(5.0) 100%	(5.0) 100%		(10.0) 100%	(10.0) 100%		2,888.5	CRYSTALLINE ROCK (Amphibolite) Light to dark gray, white, and black, fresh to very slight weathering, hard, wide fracture spacing, AMPHIBOLITE. Well foliated with persistent schistosity. The rock fractures easily along foliation planes and is significantly weaker in those orientations. Geological Strength Index (GSI) = 50-60.
2885	2,883.5	24.9	5.0	1:36/1.0 1:29/1.0 1:29/1.0 1:38/1.0 1:48/1.0	(5.0) 100%	(5.0) 100%					2,885	
2880	2,878.5	29.9									2,880	
<p style="text-align: center;">Boring Terminated at Elevation 2,878.5 ft in Crystalline Rock (Amphibolite) - Alligator Back Formation</p> <p style="text-align: center;">- Advanced Casing to 9.9 feet to begin Coring.</p> <p style="text-align: center;">- Unconfined Compressive Strength: RS-4 = 4,338 PSI</p>												

NCDOT BORE DOUBLE SF040156_GEO_BRDG0156_BH.GPJ NC_DOT.GDT 6/6/24

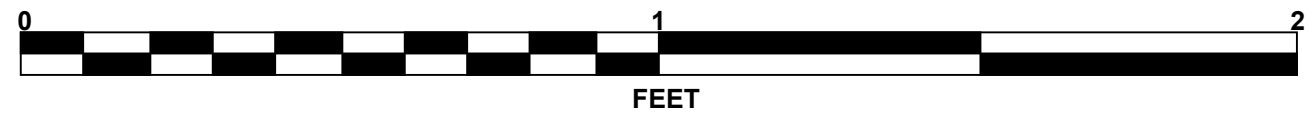
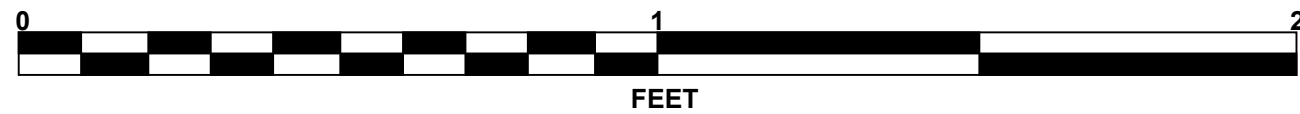
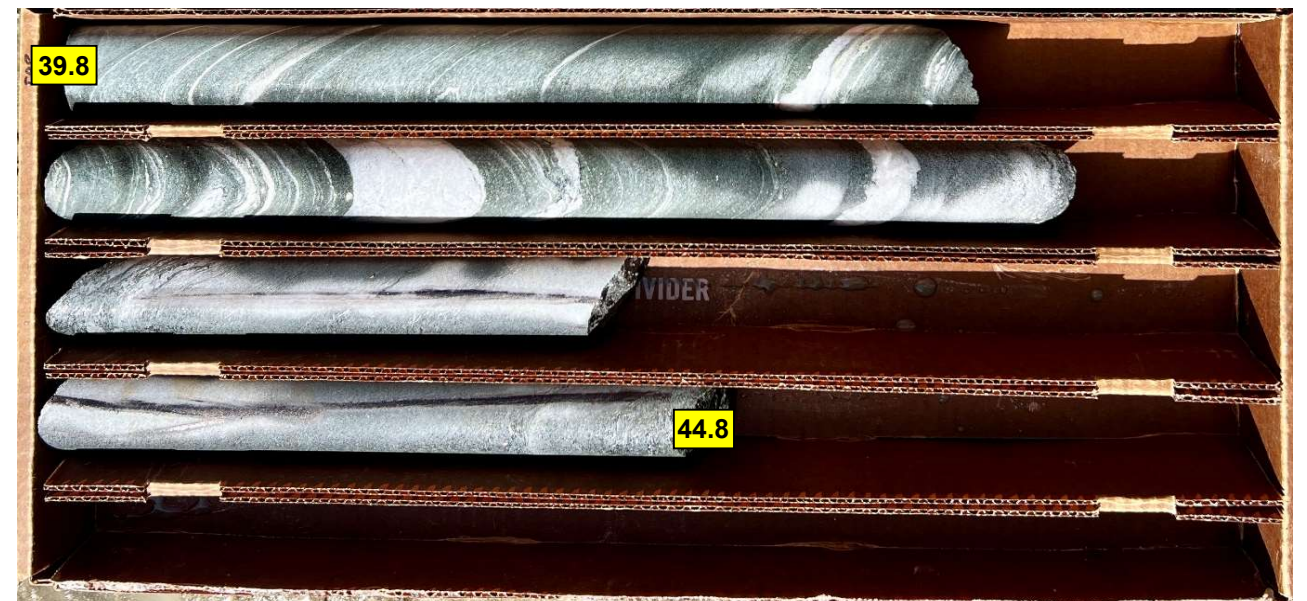
NCDOT CORE DOUBLE SF040156_GEO_BRDG0156_BH.GPJ NC_DOT.GDT 6/6/24

CORE PHOTOGRAPHS

EB1-A
BOXES 1 & 2: 24.8 - 39.8 FEET



EB1-A
BOX 3: 39.8 - 44.8 FEET



CORE PHOTOGRAPHS

EB1-B

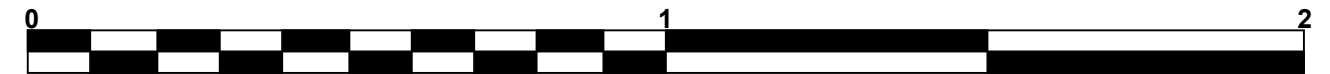
BOXES 1 & 2: 14.3 - 29.3 FEET



FEET

EB1-B

BOX 3: 29.3 - 34.3 FEET

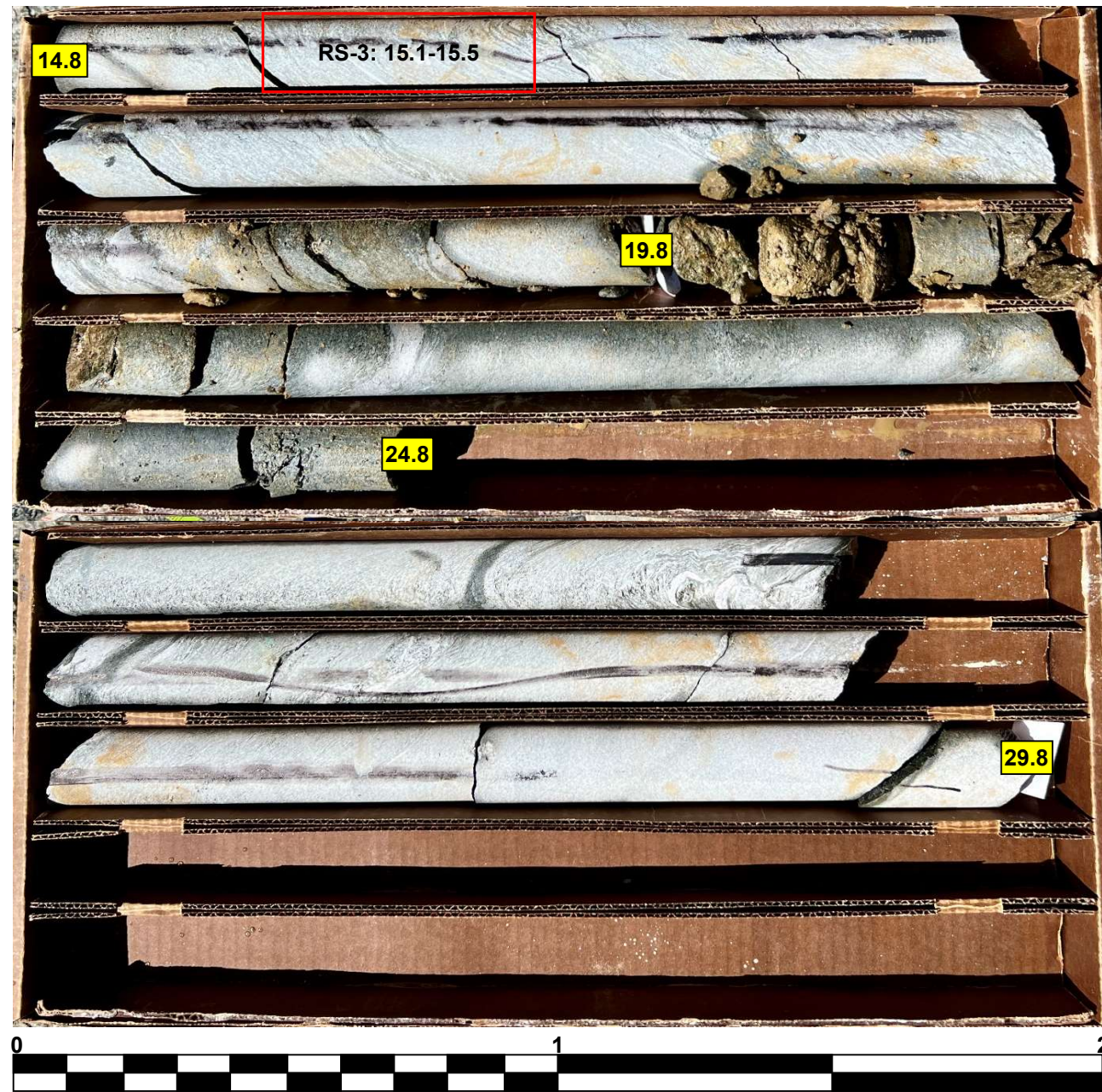


FEET

CORE PHOTOGRAPHS

EB2-A

BOXES 1 & 2: 14.8 - 29.8 FEET



EB2-A

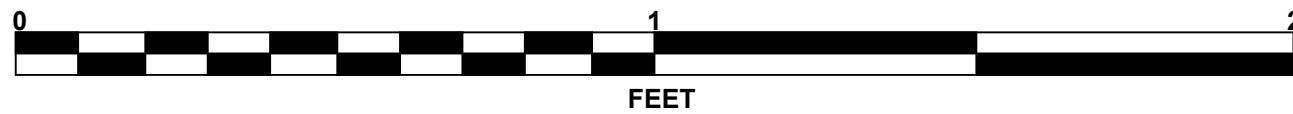
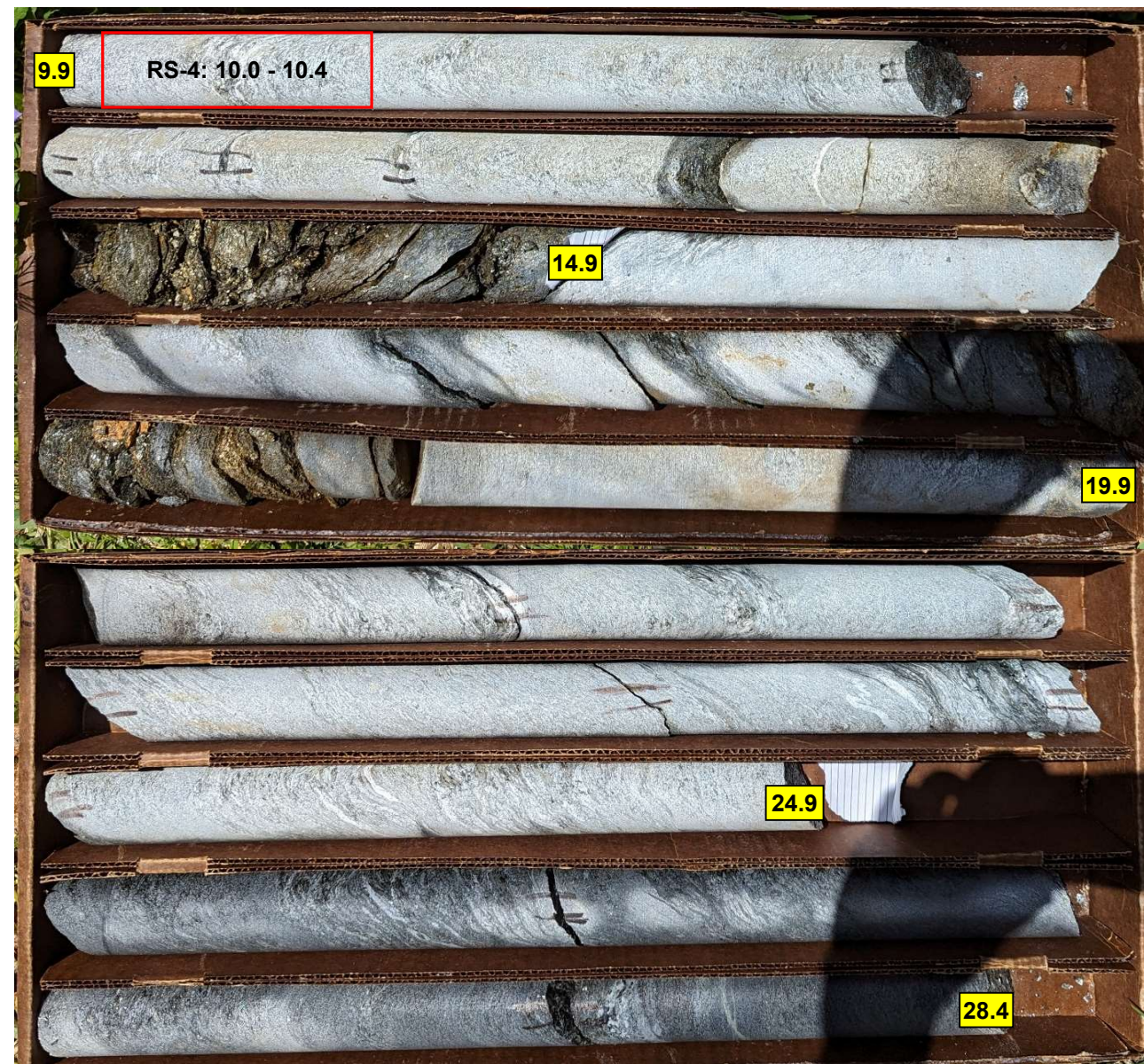
BOX 3: 29.8 - 34.8 FEET



CORE PHOTOGRAPHS

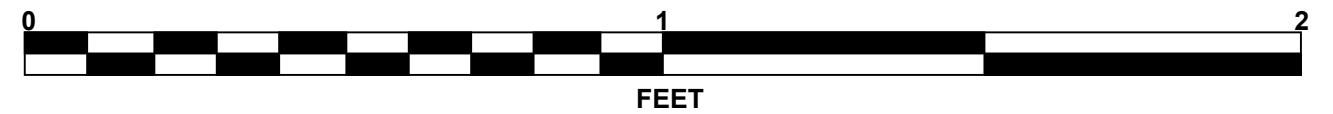
EB2-B

BOXES 1 & 2: 9.9 - 28.4 FEET



EB2-B

BOX 3: 28.4 - 29.9 FEET



Laboratory Testing Summary

Project Number: BP11.R046
TIP Number: SF-040156
County: Ashe
Description: Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek

Boring No.	Sample No.	Station	Offset (feet)	Depth Interval (feet)	Lab ID	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
									Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
EB1-A	SS-7	15+45	18' LT	0.6-2.1	24-1071	A-2-4 (0)	NP	NP	33.7	50.3	9.8	6.2	20.0	71.4	57.1	17	10.6%	
EB1-B	SS-20	15+59	15'RT	0.0-1.5	24-1072	A-4 (0)	NP	NP	12.4	44.6	26.5	16.5	3.7	94.7	90.2	47.1	38.3%	
EB2-A	SS-2	16+21	15'LT	3.8-5.3	24-1073	A-2-4 (0)	NP	NP	33.2	53.1	7.5	6.2	7.4	85.4	71.4	18.2	23.8%	
EB2-B	SS-22	16+42	22'RT	0.0-1.5	24-1074	A-2-4 (0)	NP	NP	32.4	53.4	8.0	6.2	0.0	99.7	90.8	19.3	22.7%	

Boring No.	Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	Lab ID	Rock Type	Geologic Map Unit	Run RQD %	Length (inches)	Diameter (inches)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)
EB1-A	RS-1	-L-	15+45	18' LT	29.1 - 29.5	24-1108	Amphibolite	Zaba	36%	3.96	1.970	176.2	1,845
EB1-B	RS-2	-L-	15+59	15' RT	17.5 - 17.9	24-1109	Amphibolite	Zaba	42%	3.96	1.980	167.1	2,214
EB2-A	RS-3	-L-	16+21	15' LT	15.1 - 15.5	24-1110	Amphibolite	Zaba	86%	3.96	1.970	169.5	1,478
EB2-B	RS-4	-L-	16+42	22' RT	10.0 - 10.4	24-1111	Amphibolite	Zaba	73%	3.97	1.970	169.2	4,338

Chad Hawkins

Certified Lab Technician Signature

147-02-0821

Certification Number

SITE PHOTOGRAPH

Replace Bridge 040156 on SR 1169 (Pine Swamp Rd) over W. Fork Pine Swamp Creek



Standing Near Existing End Bent 2 Looking Back Station towards End Bent 1