

REFERENCE: DF18314.2045181

PROJECT: N/A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18314.2045181	1	

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

STRUCTURE

SUBSURFACE INVESTIGATION

COUNTY HENDERSON

PROJECT DESCRIPTION ROADWAY REPAIRS ON
SR 1188 (DAVIS MOUNTAIN RD) FROM SR 1171
(HEBRON RD) TO OLD ORCHARD RD

SITE DESCRIPTION CULVERT ON SR 1188 OVER
NORTH FORK BIG WILLOW CREEK
-L1- STA. 10 + 86

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2, 2A	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-7	BORELOGS
8	SOIL TEST RESULTS

PERSONNEL
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CG2 EXPLORATION

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SUBMITTED BY CG2, PLLC
DATE JULY 2025

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Prepared in the Office of:



**CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684



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

(PAGE 1 OF 2)

SOIL DESCRIPTION												
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>												
SOIL LEGEND AND AASHTO CLASSIFICATION												
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS	
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7
SYMBOL												
% PASSING	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS
MATERIAL PASSING #40												
LL			40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN		
PI			6 MX	NP	10 MX	11 MN	10 MX	11 MN	10 MX	11 MN		
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR		FAIR TO POOR	POOR	UNSUITABLE	
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30												

GRADATION			
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.			
ANGULARITY OF GRAINS			
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.			
MINERALOGICAL COMPOSITION			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.			
COMPRESSIBILITY			
SLIGHTLY COMPRESSIBLE	LL < 31		
MODERATELY COMPRESSIBLE	LL = 31 - 50		
HIGHLY COMPRESSIBLE	LL > 50		
PERCENTAGE OF MATERIAL			
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
			1 - 10%
			10 - 20%
			20 - 35%
			35 AND ABOVE
GROUND WATER			
	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		
	STATIC WATER LEVEL AFTER 24 HOURS		
	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA		
	SPRING OR SEEP		

CONSISTENCY OR DENSENESS			
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

MISCELLANEOUS SYMBOLS			
	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		DIP & DIP DIRECTION OF ROCK STRUCTURES
	SOIL SYMBOL		TEST BORING
	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		AUGER BORING
	INFERRED SOIL BOUNDARY		CORE BORING
	INFERRED ROCK LINE		MONITORING WELL
	ALLUVIAL SOIL BOUNDARY		PIEZOMETER INSTALLATION
			SOUNDING ROD
			TEST BORING WITH CORE
			SPT N-VALUE

TEXTURE OR GRAIN SIZE							
U.S. STD. SIEVE SIZE	4	10	40	60	200	270	
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053	
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	
GRAIN SIZE	MM IN.	305 12	75 3	2.0	0.25	0.05	0.005

RECOMMENDATION SYMBOLS		
	UNDERCUT	
	SHALLOW UNDERCUT	

SOIL MOISTURE - CORRELATION OF TERMS		
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

ABBREVIATIONS		
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED
CL - CLAY	MOD. - MODERATELY	U - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	U _g - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE
FOSS. - FOSSILIFEROUS	SLL. - SLIGHTLY	RS - ROCK
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO
HI. - HIGHLY	v - VERY	

PLASTICITY		
	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH
COLOR		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		

EQUIPMENT USED ON SUBJECT PROJECT		
<input type="checkbox"/> CME-45C	ADVANCING TOOLS:	HAMMER TYPE:
<input type="checkbox"/> CME-55	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL
<input type="checkbox"/> CME-550X	<input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER	CORE SIZE:
<input type="checkbox"/> VANE SHEAR TEST	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N _____
	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:
	CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER
	TRICONE _____ * STEEL TEETH	<input type="checkbox"/> HAND AUGER
	TRICONE _____ * TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD
	CORE BIT	<input type="checkbox"/> VANE SHEAR TEST

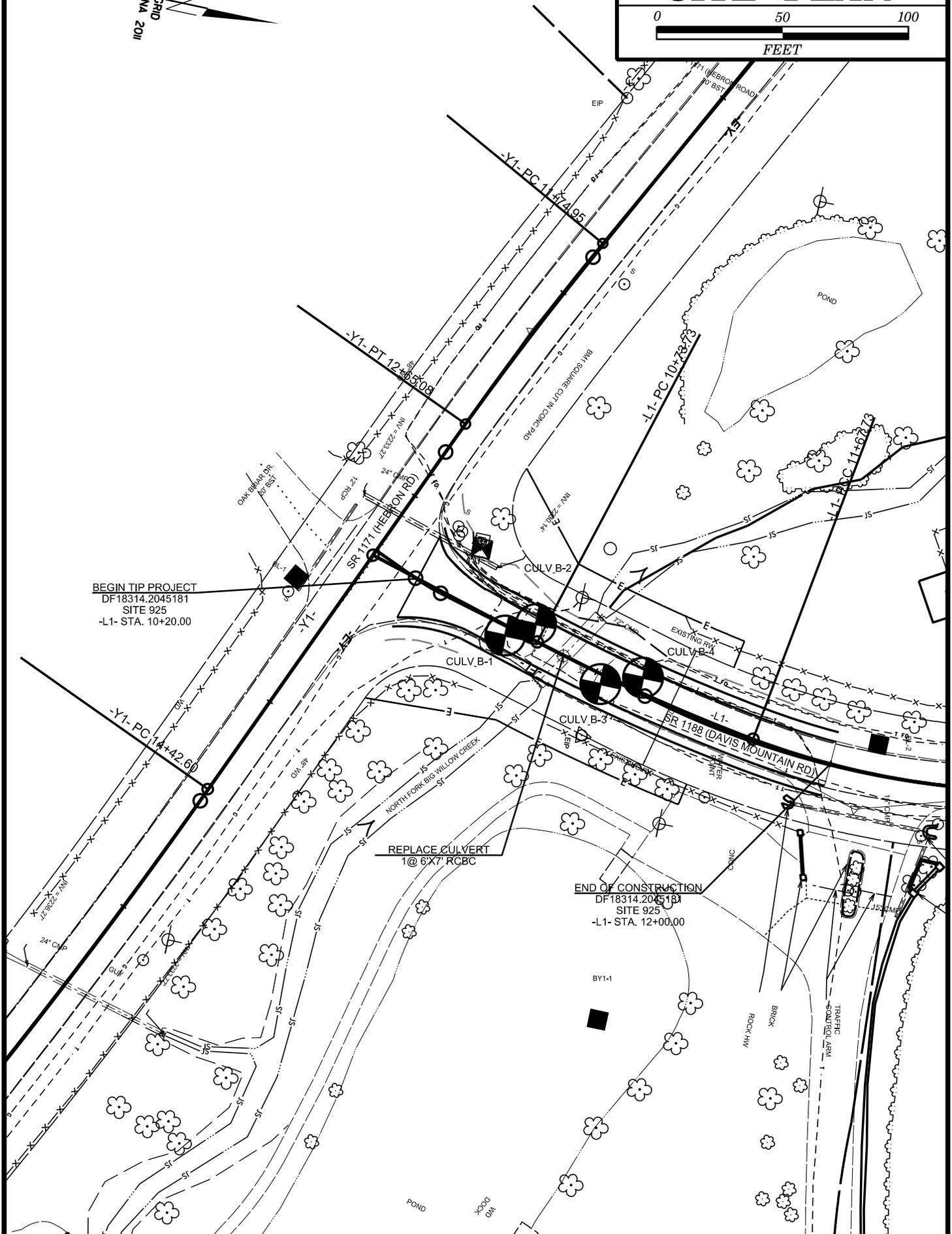
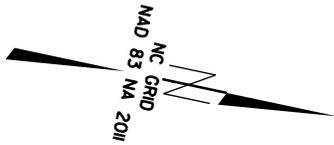
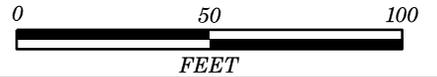
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<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 (ROD) - 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 IN 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>WEATHERED ROCK (WR)</p>		<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>	
<p>CRYSTALLINE ROCK (CR)</p>		<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>	
<p>NON-CRYSTALLINE ROCK (NCR)</p>		<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>	
<p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p>		<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	
WEATHERING			
<p>FRESH</p>	<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>		
<p>VERY SLIGHT (V SL.)</p>	<p>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 (SL.)</p>	<p>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.)</p>	<p>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.)</p>	<p>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.)</p>	<p>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.)</p>	<p>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</p>	<p>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>		
ROCK HARDNESS			
<p>VERY HARD</p>	<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>		
<p>HARD</p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>		
<p>MODERATELY HARD</p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>		
<p>MEDIUM HARD</p>	<p>CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>		
<p>SOFT</p>	<p>CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p>		
<p>VERY SOFT</p>	<p>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.</p>		
FRACTURE SPACING		BEDDING	
<p>TERM</p>	<p>SPACING</p>	<p>TERM</p>	<p>THICKNESS</p>
<p>VERY WIDE</p>	<p>MORE THAN 10 FEET</p>	<p>VERY THICKLY BEDDED</p>	<p>4 FEET</p>
<p>WIDE</p>	<p>3 TO 10 FEET</p>	<p>THICKLY BEDDED</p>	<p>1.5 - 4 FEET</p>
<p>MODERATELY CLOSE</p>	<p>1 TO 3 FEET</p>	<p>THINLY BEDDED</p>	<p>0.16 - 1.5 FEET</p>
<p>CLOSE</p>	<p>0.16 TO 1 FOOT</p>	<p>VERY THINLY BEDDED</p>	<p>0.03 - 0.16 FEET</p>
<p>VERY CLOSE</p>	<p>LESS THAN 0.16 FEET</p>	<p>THICKLY LAMINATED</p>	<p>0.008 - 0.03 FEET</p>
		<p>THINLY LAMINATED</p>	<p>< 0.008 FEET</p>
INDURATION			
<p>FRIABLE</p>	<p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>		
<p>MODERATELY INDURATED</p>	<p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>		
<p>INDURATED</p>	<p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>		
<p>EXTREMELY INDURATED</p>	<p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>		
<p>BENCH MARK:</p> <p style="text-align: right;">ELEVATION: FEET</p>			
<p>NOTES: HORIZONTAL AND VERTICAL BORING LOCATIONS OBTAINED USING CARLSON BRX7 (SURVEY GRADE GPS). DESIGN FILES PROVIDED BY JMT, MAY 2025. FIAD = FILLED IN AFTER DRILLING</p>			

SITE PLAN



GEOTECHNICAL BORING REPORT

BORE LOG

WBS DF18314.2045181		TIP N/A		COUNTY HENDERSON		GEOLOGIST M. Malisher											
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925							GROUND WTR (ft)										
BORING NO. CULV_B-1		STATION 10+61		OFFSET 4 ft RT		ALIGNMENT -L1-	0 HR. 8.7										
COLLAR ELEV. 2,234.2 ft		TOTAL DEPTH 28.5 ft		NORTHING 585,280		EASTING 944,347	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Estep		START DATE 04/21/25		COMP. DATE 04/21/25		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2235															2,234.2	0.0	GROUND SURFACE
	2,233.2	1.0	5	6	4								M		2,231.7	2.5	ROADWAY EMBANKMENT Asphalt (0.2')
2230	2,230.5	3.7	2	4	6								M		2,228.7	5.5	Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)
	2,228.2	6.0	1	1	0								Sat.		2,226.2	8.0	Stiff, Brown, Fine Sandy SILT (A-4), with trace gravel
2225	2,225.5	8.7	8	10	10								Sat.		2,222.2	12.0	ALLUVIAL Very Loose, Gray, Silty Fine SAND (A-2-4)
	2,220.5	13.7	3	4	5										2,215.0	19.2	RESIDUAL Medium Dense, Brown-Gray, Fine to Coarse Sandy GRAVEL (A-1-a)
2220	2,215.5	18.7	14	40	60/0.4								W		2,210.5	23.7	RESIDUAL Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica
	2,209.2	25.0	67	33/0.4						100/0.9					2,205.7	28.5	WEATHERED ROCK Brown-Gray-White (Granitic Gneiss)
2210	2,205.7	28.5	60/0.0							100/0.3							Boring Terminated with Standard Penetration Test Refusal at Elevation 2,205.7 ft On Crystalline Rock (Granitic Gneiss)

NCDOT BORE SINGLE GEO_DAVIS MOUNTAIN ROADWAY REPAIRS GTM.GPJ NC_DOT.GDT 7/28/25

GEOTECHNICAL BORING REPORT

BORE LOG

WBS DF18314.2045181		TIP N/A		COUNTY HENDERSON		GEOLOGIST M. Malisher											
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925							GROUND WTR (ft)										
BORING NO. CULV_B-2		STATION 10+70		OFFSET 6 ft LT		ALIGNMENT -L1-	0 HR. 8.5										
COLLAR ELEV. 2,234.0 ft		TOTAL DEPTH 25.7 ft		NORTHING 585,291		EASTING 944,340	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Estep		START DATE 04/21/25		COMP. DATE 04/21/25		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)		
2235															2,234.0	0.0	GROUND SURFACE
	2,233.0	1.0	5	5	6										2,233.0	0.3	ROADWAY EMBANKMENT Asphalt (0.3')
2230	2,230.3	3.7	1	2	2										2,228.5	5.5	Soft to Stiff, Brown-Red, Moderately Plastic Fine to Coarse Sandy CLAY (A-6(6)), with trace gravel
	2,228.0	6.0	2	1	1										2,226.0	8.0	ALLUVIAL Very Loose, Gray, Silty Fine to Coarse SAND (A-2-4)
2225	2,225.3	8.7	7	10	9										2,222.0	12.0	RESIDUAL Medium Dense, Brown-Gray, Fine to Coarse Sandy GRAVEL (A-1-a)
2220	2,220.3	13.7	5	9	10										2,215.3	18.7	RESIDUAL Medium Dense, Brown-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica
2215	2,215.3	18.7	100/0.4												2,208.3	25.7	WEATHERED ROCK Brown (Granitic Gneiss)
2210	2,208.3	25.7	60/0.0												2,208.3	25.7	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,208.3 ft On Crystalline Rock (Granitic Gneiss)

NCDOT BORE SINGLE GEO_DAVIS MOUNTAIN ROADWAY REPAIRS GTM.GPJ NC_DOT.GDT 7/28/25

GEOTECHNICAL BORING REPORT

BORE LOG

WBS DF18314.2045181		TIP N/A		COUNTY HENDERSON		GEOLOGIST M. Malisher											
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925							GROUND WTR (ft)										
BORING NO. CULV_B-3		STATION 11+04		OFFSET 4 ft RT		ALIGNMENT -L1-	0 HR. 7.2										
COLLAR ELEV. 2,233.8 ft		TOTAL DEPTH 36.4 ft		NORTHING 585,321		EASTING 944,358	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Estep		START DATE 04/21/25		COMP. DATE 04/21/25		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2235															2,233.8	GROUND SURFACE	0.0
	2,232.8	1.0	2	3	3											ROADWAY EMBANKMENT	
																Asphalt (0.2')	
2230	2,229.8	4.0	2	1	1											Soft to Medium Stiff, Red, Moderately Plastic Fine to Coarse Sandy CLAY (A-6(7))	5.5
	2,227.8	6.0	2	1	0											ALLUVIAL	
																Very Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4)	7.0
2225	2,224.8	9.0	5	14	17											Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	
																RESIDUAL	
2220	2,219.8	14.0	2	3	3											Medium Stiff to Very Stiff, Gray-White-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica	12.0
2215	2,214.8	19.0	7	9	7												
2210	2,209.8	24.0	55	45/0.2						100/0.7						WEATHERED ROCK	24.0
																Gray-Brown (Granitic Gneiss)	
2205	2,204.8	29.0	40	46	18											RESIDUAL	27.0
																Very Dense, Gray-White-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica	
2200	2,199.8	34.0	16	84/0.4						100/0.9						WEATHERED ROCK	34.0
																Gray-White (Granitic Gneiss)	
	2,197.4	36.4	60/0.0							60/0.0						Boring Terminated with Standard Penetration Test Refusal at Elevation 2,197.4 ft On Crystalline Rock (Granitic Gneiss)	36.4

NCDOT BORE SINGLE GEO_DAVIS MOUNTAIN ROADWAY REPAIRS GTM.GPJ NC_DOT.GDT 7/28/25

GEOTECHNICAL BORING REPORT

BORE LOG

WBS DF18314.2045181		TIP N/A		COUNTY HENDERSON		GEOLOGIST M. Malisher											
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925							GROUND WTR (ft)										
BORING NO. CULV_B-4		STATION 11+18		OFFSET 6 ft LT		ALIGNMENT -L1-	0 HR. 8.8										
COLLAR ELEV. 2,233.9 ft		TOTAL DEPTH 35.4 ft		NORTHING 585,337		EASTING 944,352	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Estep		START DATE 04/21/25		COMP. DATE 04/21/25		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2235															2,233.8	GROUND SURFACE	0.0
	2,232.9	1.0	3	4	4								M		2,233.8	ROADWAY EMBANKMENT Asphalt (0.3')	
2230	2,230.1	3.8	8	6	6								M		2,230.4	Medium Stiff, Gray-Red, Fine to Coarse Sandy CLAY (A-6), with trace gravel	3.5
	2,227.9	6.0	WOH	WOH	WOH								Sat.		2,228.4	Medium Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	5.5
2225	2,225.1	8.8	10	17	12								Sat.		2,225.9	ALLUVIAL Very Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	8.0
													Sat.		2,221.9	Medium Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	12.0
2220	2,220.1	13.8	2	3	5								W			RESIDUAL Medium Stiff to Stiff, Brown-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica	
2215	2,215.1	18.8	5	5	6								W				
2210	2,210.1	23.8	4	3	2								W		2,211.9	Loose Orange-White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica	22.0
2205	2,205.1	28.8	100/0.3												2,205.1	WEATHERED ROCK Brown-Gray (Granitic Gneiss)	28.8
2200	2,200.1	33.8	100/0.2														
	2,198.5	35.4	60/0.0												2,198.5	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,198.5 ft On Crystalline Rock (Granitic Gneiss)	35.4

NCDOT BORE SINGLE GEO_DAVIS MOUNTAIN ROADWAY REPAIRS GTM.GPJ NC_DOT.GDT 7/28/25

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SOIL TEST RESULTS

BORING ID	SAMPLE NO.	OFFSET	STATION	NORTHING	EASTING	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
										C. SAND	F. SAND	SILT	CLAY	10	40	200		
CULV B-02	SS-1329	6' LT	10+70 -LI-	585291	944340	1.0 - 2.5'	A-6(6)	36	16	20.6	25.2	21.7	32.5	94.5	83.0	55.3	17.0	ND
CULV B-03	SS-1346	4' RT	11+04 -LI-	585321	944358	1.0 - 2.5'	A-6(7)	38	17	21.6	24.9	21.0	32.5	95.8	83.0	55.4	25.4	ND



 AUTHORIZED SIGNATURE
 NCDOT CERT NO. 130-04-0212

Prepared in the Office of:

F&ME CONSULTANTS, INC.
COLUMBIA, SOUTH CAROLINA
NCDOT LAB CERT. NO. 130-0212