

PROJECT: 17BP.14.R.212 REFERENCE: SF-490159

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-490159	1	9

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-5	CROSS SECTIONS
6-8	BORE LOGS & CORE REPORT
9	CORE PHOTOGRAPH

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY JACKSON
 PROJECT DESCRIPTION REPLACE BRIDGE #159 ON SR 1336
(MONTEITH GAP RD.) OVER CULLOWHEE CREEK

SITE DESCRIPTION _____

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 1919 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:
1. 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.
 2. 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

CD JOHNSON

DO CHEEK

CJ COFFEY

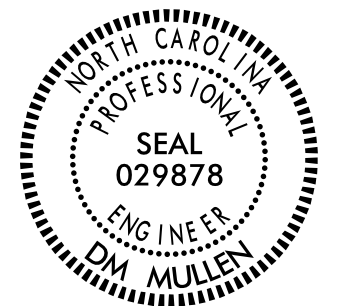
INVESTIGATED BY DM MULLEN

DRAWN BY DM MULLEN

CHECKED BY JC KUHNE

SUBMITTED BY JC KUHNE

DATE 5/31/2019



DocuSigned by:
D Matt Mullen 6/21/2019

18909BD36B5440C... 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																																																																																																																																																																											
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>				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.				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: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)				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 DISLOGGED 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.																																																																																																																																																																											
SOIL LEGEND AND AASHTO CLASSIFICATION <table border="1"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="6">GRANULAR MATERIALS ($\leq 35\%$ PASSING #200)</th> <th colspan="6">SILT-CLAY MATERIALS ($> 35\%$ PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th colspan="2">A-1</th> <th colspan="2">A-2</th> <th colspan="2">A-3</th> <th colspan="2">A-4</th> <th colspan="2">A-5</th> <th colspan="2">A-6</th> <th colspan="2">A-7</th> <th colspan="3">A-1, A-2 A-3 A-4, A-5 A-6, A-7</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> <td></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 Mx 30 Mx 15 Mx</td> <td>50 Mx 25 Mx 10 Mx</td> <td>51 Mx 35 Mx 10 Mx</td> <td>35 Mx 35 Mx 10 Mx</td> <td>35 Mx 35 Mx 10 Mx</td> <td>35 Mx 35 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>36 Mx 36 Mx 10 Mx</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td colspan="17"></td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="17"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="17"></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="17"></td> </tr> </thead> </table>				GENERAL CLASS.	GRANULAR MATERIALS ($\leq 35\%$ PASSING #200)						SILT-CLAY MATERIALS ($> 35\%$ PASSING #200)						ORGANIC MATERIALS			GROUP CLASS.	A-1		A-2		A-3		A-4		A-5		A-6		A-7		A-1, A-2 A-3 A-4, A-5 A-6, A-7			SYMBOL																			% PASSING #10 #40 #200	50 Mx 30 Mx 15 Mx	50 Mx 25 Mx 10 Mx	51 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		MATERIAL PASSING #40 LL PI																		GROUP INDEX																		USUAL TYPES OF MAJOR MATERIALS																		GEN. RATING AS SUBGRADE																		ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .				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 <table border="1"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table>				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE
GENERAL CLASS.	GRANULAR MATERIALS ($\leq 35\%$ PASSING #200)						SILT-CLAY MATERIALS ($> 35\%$ PASSING #200)						ORGANIC MATERIALS																																																																																																																																																																										
GROUP CLASS.	A-1		A-2		A-3		A-4		A-5		A-6		A-7		A-1, A-2 A-3 A-4, A-5 A-6, A-7																																																																																																																																																																								
SYMBOL																																																																																																																																																																																							
% PASSING #10 #40 #200	50 Mx 30 Mx 15 Mx	50 Mx 25 Mx 10 Mx	51 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	35 Mx 35 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	36 Mx 36 Mx 10 Mx	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT																																																																																																																																																																						
MATERIAL PASSING #40 LL PI																																																																																																																																																																																							
GROUP INDEX																																																																																																																																																																																							
USUAL TYPES OF MAJOR MATERIALS																																																																																																																																																																																							
GEN. RATING AS SUBGRADE																																																																																																																																																																																							
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																																																				
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																																																																																																																																				
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																																																																																																																																				
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																																																																																																																																				
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																																																																																																				
CONSISTENCY OR DENSENESS <table border="1"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </tbody> </table>				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-COESIVE)	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 (COESIVE)	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 SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE																																																																																																																																																																							
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-COESIVE)	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 (COESIVE)	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																																																																																																																																																																																				
TEXTURE OR GRAIN SIZE <table border="1"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <td>4</td> <td>10</td> <td>40</td> <td>60</td> <td>200</td> <td>270</td> </tr> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CS.E. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <th>GRAIN SIZE</th> <td>MM 305 IN. 12</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </thead> </table>				U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.75	2.00	0.42	0.25	0.075	0.053	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CS.E. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	GRAIN SIZE	MM 305 IN. 12	75	2.0	0.25	0.05	0.005	RECOMMENDATION SYMBOLS UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL																																																																																																																																																							
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																																																																																																	
	4.75	2.00	0.42	0.25	0.075	0.053																																																																																																																																																																																	
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CS.E. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)																																																																																																																																																																																	
GRAIN SIZE	MM 305 IN. 12	75	2.0	0.25	0.05	0.005																																																																																																																																																																																	
SOIL MOISTURE - CORRELATION OF TERMS <table border="1"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL</td> <td>LIQUID LIMIT</td> <td></td> </tr> <tr> <td>PL</td> <td>PLASTIC LIMIT</td> <td></td> </tr> <tr> <td>OM</td> <td>OPTIMUM MOISTURE</td> <td></td> </tr> <tr> <td>SL</td> <td>SHRINKAGE LIMIT</td> <td></td> </tr> <tr> <td></td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td></td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table>				SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL	LIQUID LIMIT		PL	PLASTIC LIMIT		OM	OPTIMUM MOISTURE		SL	SHRINKAGE LIMIT			- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE		- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																																																																																																																																																								
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																																																																																					
LL	LIQUID LIMIT																																																																																																																																																																																						
PL	PLASTIC LIMIT																																																																																																																																																																																						
OM	OPTIMUM MOISTURE																																																																																																																																																																																						
SL	SHRINKAGE LIMIT																																																																																																																																																																																						
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																																																																																					
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																					
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																																																																					
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																					
PLASTICITY <table border="1"> <thead> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td></td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </tbody> </table>				NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH		0-5		VERY LOW	SLIGHTLY PLASTIC	6-15		SLIGHT	MODERATELY PLASTIC	16-25		MEDIUM	HIGHLY PLASTIC	26 OR MORE		HIGH	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: <input checked="" type="checkbox"/> CME-45C <input type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG-CARB. <input type="checkbox"/> CORE BIT HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input checked="" type="checkbox"/> -N XWL HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST																																																																																																																																																															
NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																																				
	0-5		VERY LOW																																																																																																																																																																																				
SLIGHTLY PLASTIC	6-15		SLIGHT																																																																																																																																																																																				
MODERATELY PLASTIC	16-25		MEDIUM																																																																																																																																																																																				
HIGHLY PLASTIC	26 OR MORE		HIGH																																																																																																																																																																																				
FRACURE SPACING <table border="1"> <thead> <tr> <th>TERM</th> <th>SPACING</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table>				TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	BEDDING <table border="1"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </tbody> </table>				TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET																																																																																																																																																						
TERM	SPACING																																																																																																																																																																																						
VERY WIDE	MORE THAN 10 FEET																																																																																																																																																																																						
WIDE	3 TO 10 FEET																																																																																																																																																																																						
MODERATELY CLOSE	1 TO 3 FEET																																																																																																																																																																																						
CLOSE	0.16 TO 1 FOOT																																																																																																																																																																																						
VERY CLOSE	LESS THAN 0.16 FEET																																																																																																																																																																																						
TERM	THICKNESS																																																																																																																																																																																						
VERY THICKLY BEDDED	4 FEET																																																																																																																																																																																						
THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																																						
THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																																						
VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																																						
THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																																						
THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																																						
INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				NOTES: BENCH MARK: BM2 ELEVATION: 2062.68 FEET																																																																																																																																																																																			
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.																																																																																																																																																																																							

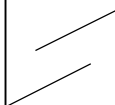

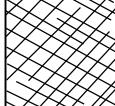
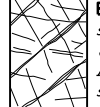



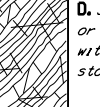

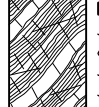


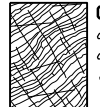
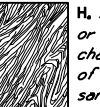
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

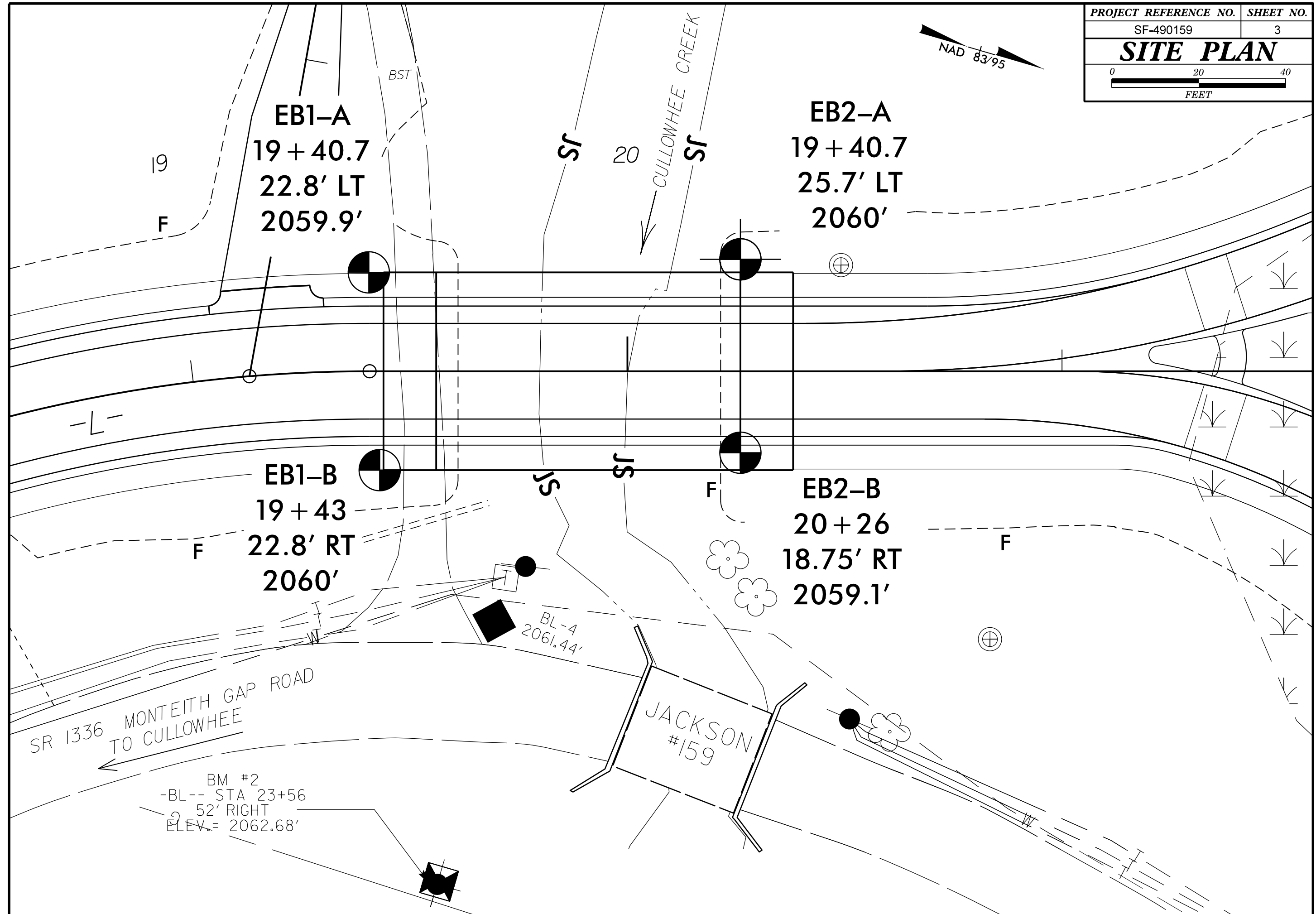
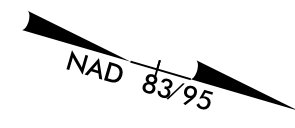
SUBSURFACE INVESTIGATION

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)					
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		VERY GOOD	GOOD	FAIR	POOR	VERY POOR	
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE							
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A		A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.	70					
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80	70					B. Sandstone with thin inter-layers of siltstone	60					
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		60	50				C. Sandstone and siltstone in similar amounts		50				
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40				D. Siltstone or silty shale with sandstone layers			40			
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				30			E. Weak siltstone or clayey shale with sandstone layers				30		
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			20		F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure					20	
						10		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers						10
								H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.						
							→ Means deformation after tectonic disturbance							



EB1-A
 19 + 40.7
 22.8' LT
 2059.9'

EB2-A
 19 + 40.7
 25.7' LT
 2060'

EB1-B
 19 + 43
 22.8' RT
 2060'

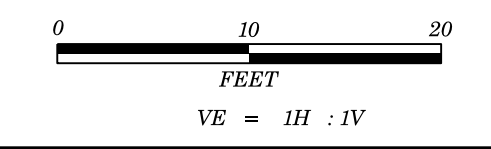
EB2-B
 20 + 26
 18.75' RT
 2059.1'

SR 1336 MONTEITH GAP ROAD
 TO CULLOWHEE

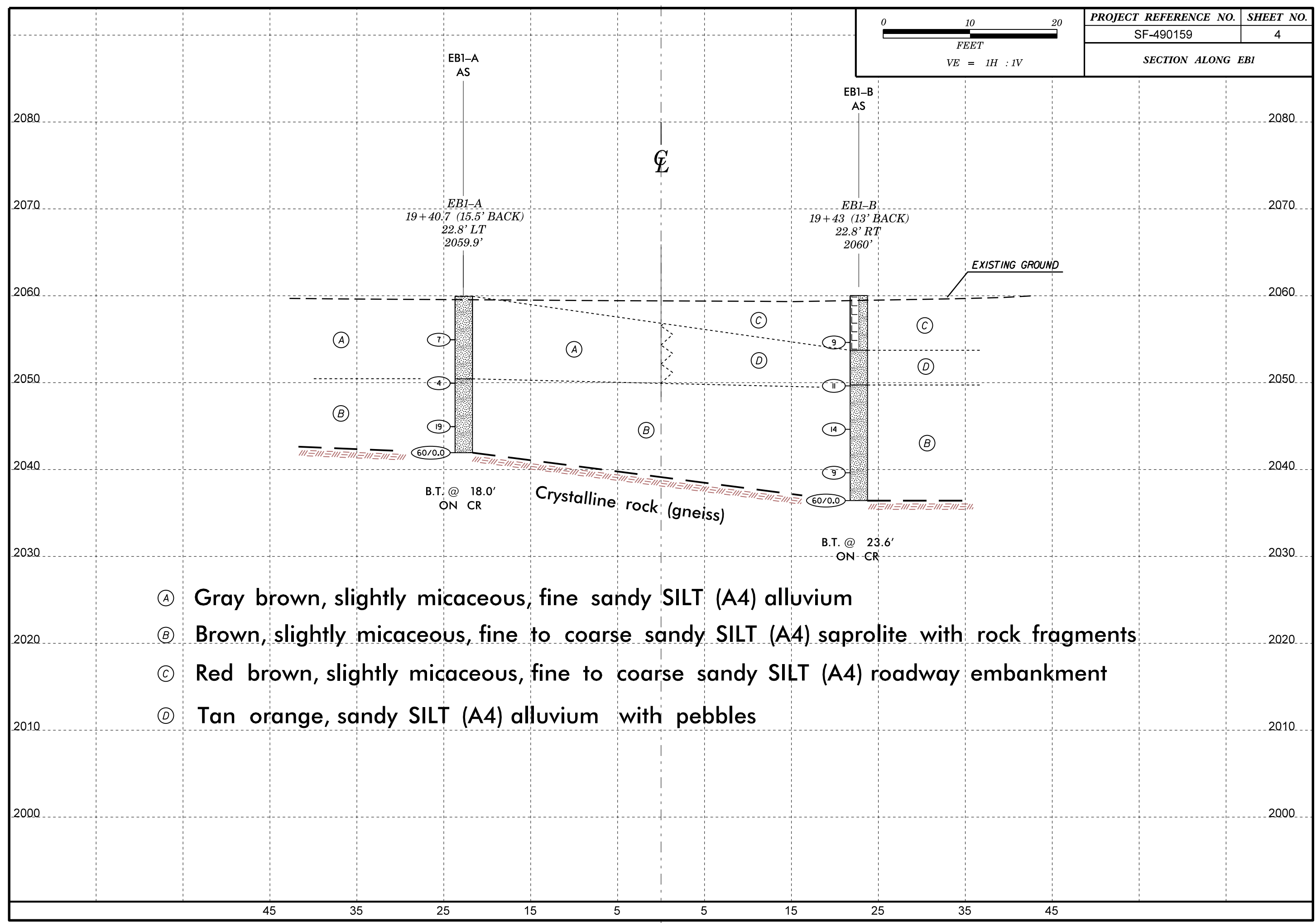
JACKSON
 #159

BM #2
 -BL-- STA 23+56
 52' RIGHT
 ELEV. = 2062.68'

BL-4
 2061.44'

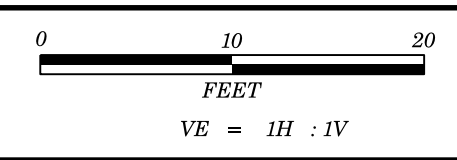


PROJECT REFERENCE NO.	SHEET NO.
SF-490159	4
SECTION ALONG EBI	

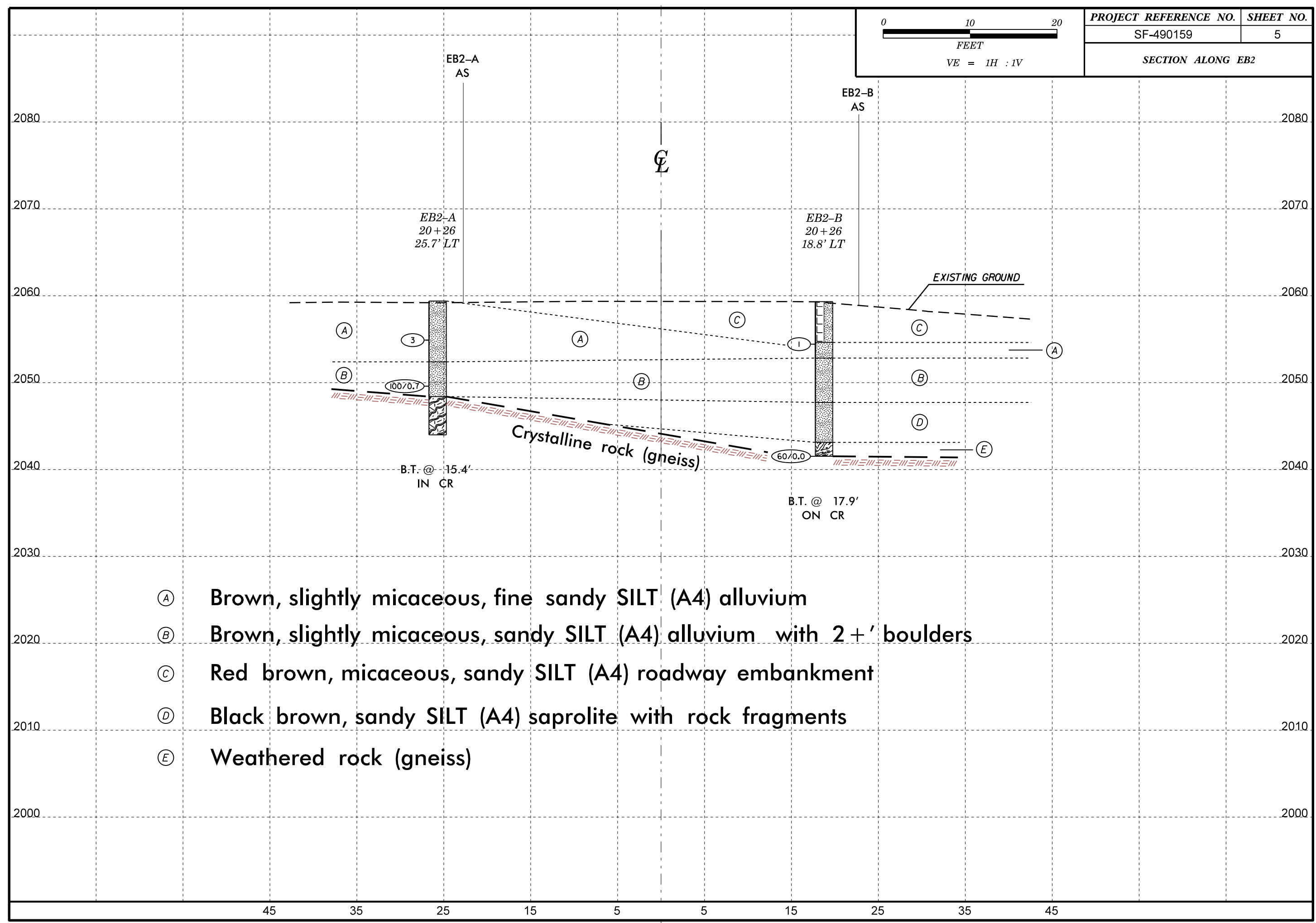


- Ⓐ Gray brown, slightly micaceous, fine sandy SILT (A4) alluvium
- Ⓑ Brown, slightly micaceous, fine to coarse sandy SILT (A4) saprolite with rock fragments
- Ⓒ Red brown, slightly micaceous, fine to coarse sandy SILT (A4) roadway embankment
- Ⓓ Tan orange, sandy SILT (A4) alluvium with pebbles

45 35 25 15 5 5 15 25 35 45



PROJECT REFERENCE NO.	SHEET NO.
SF-490159	5
SECTION ALONG EB2	



- Ⓐ Brown, slightly micaceous, fine sandy SILT (A4) alluvium
- Ⓑ Brown, slightly micaceous, sandy SILT (A4) alluvium with 2+' boulders
- Ⓒ Red brown, micaceous, sandy SILT (A4) roadway embankment
- Ⓓ Black brown, sandy SILT (A4) saprolite with rock fragments
- Ⓔ Weathered rock (gneiss)

45 35 25 15 5 5 15 25 35 45

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.14.R.212		TIP SF-490159		COUNTY JACKSON		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION N/A							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 19+41		OFFSET 23 ft LT		ALIGNMENT L										
COLLAR ELEV. 2,059.9 ft		TOTAL DEPTH 18.0 ft		NORTHING 596,531		EASTING 753,371										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 05/20/19		COMP. DATE 05/20/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2060														2,059.9	0.0	GROUND SURFACE
																ALLUVIAL Gray-brown, slightly micaceous, Fine sandy SILT
2055	2,054.9	5.0	2	2	5											
2050	2,049.9	10.0	2	3	1									2,050.4	9.5	SAPROLITE Brown, slightly micaceous, fine to coarse sandy SILT with rock fragments
2045	2,044.9	15.0	8	11	8									2,041.9	18.0	CRYSTALLINE ROCK Gneiss Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,041.9 ft ON CR
	2,041.9	18.0	60/0.0													

WBS 17BP.14.R.212		TIP SF-490159		COUNTY JACKSON		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION N/A							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 19+43		OFFSET 23 ft RT		ALIGNMENT L										
COLLAR ELEV. 2,060.0 ft		TOTAL DEPTH 23.6 ft		NORTHING 596,547		EASTING 753,414										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 05/20/19		COMP. DATE 05/20/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2065																GROUND SURFACE
																ROADWAY EMBANKMENT Red-brown, Slightly micaceous, sandy SILT
2060														2,060.0	0.0	
																ALLUVIAL Tan-orange, sandy SILT w/ pebbles
2055	2,054.6	5.4	1	1	8									2,053.7	6.3	SAPROLITE Brown-black, sandy SILT with a few rock (gneiss) fragments
2050	2,049.6	10.4	6	6	5									2,049.7	10.3	
2045	2,044.6	15.4	3	8	6											
2040	2,039.6	20.4	5	5	4											
	2,036.4	23.6	60/0.0													
																CRYSTALLINE ROCK Gneiss Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,036.4 ft ON CR

NCDOT BORE DOUBLE 17BP.14.R.212_GEO_BORELOGS.GPJ NC_DOT.GDT 5/30/19

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 17BP.14.R.212		TIP SF-490159		COUNTY JACKSON		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION N/A							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 20+26		OFFSET 26 ft LT		ALIGNMENT L										
COLLAR ELEV. 2,059.4 ft		TOTAL DEPTH 15.4 ft		NORTHING 596,613		EASTING 753,344										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 05/21/19		COMP. DATE 05/21/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2060														2,059.4	GROUND SURFACE	0.0
															ALLUVIAL Brown, slightly micaceous, sandy SILT	
2055	2,054.6	4.8														
			1	1	2									2,052.4	ALLUVIAL As above with 2+' boulders	7.0
2050																
														2,048.4	CRYSTALLINE ROCK Gneiss	11.0
2045														2,044.0	GSI : 80 - 90	15.4
															Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,044.0 ft ON CR	

WBS 17BP.14.R.212		TIP SF-490159		COUNTY JACKSON		GEOLOGIST Johnson, C. D.							
SITE DESCRIPTION N/A							GROUND WTR (ft)						
BORING NO. EB2-A		STATION 20+26		OFFSET 26 ft LT		ALIGNMENT L							
COLLAR ELEV. 2,059.4 ft		TOTAL DEPTH 15.4 ft		NORTHING 596,613		EASTING 753,344							
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 05/21/19		COMP. DATE 05/21/19		SURFACE WATER DEPTH N/A							
CORE SIZE NXWL		TOTAL RUN 4.4 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
2048.4	2,048.4	11.0	4.4		(4.4) 100%	(4.4) 100%					2,048.4	Begin Coring @ 11.0 ft CRYSTALLINE ROCK	11.0
2045	2,044.0	15.4									2,044.0	GSI : 80 - 90	15.4
												Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,044.0 ft ON CR	

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.14.R.212		TIP SF-490159		COUNTY JACKSON		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION N/A							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 20+26		OFFSET 19 ft RT		ALIGNMENT L	0 HR. N/A								
COLLAR ELEV. 2,059.1 ft		TOTAL DEPTH 17.9 ft		NORTHING 596,625		EASTING 753,387	24 HR. N/A								
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 05/21/19		COMP. DATE 05/21/19		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					
2060															2,059.1 GROUND SURFACE 0.0
															ROADWAY EMBANKMENT Red-brown, sandy micaceous SILT
2055	2,054.2	4.9													2,054.4 4.7
			1	0	1										2,052.6 ALLUVIAL Tan-orange, sandy SILT 6.5
2050															ALLUVIAL As above with cobbles and boulders
															2,047.5 11.6
2045															SAPROLITE Black-brown, sandy SILT with rock fragments
															2,042.9 16.2
	2,041.3	17.8													2,041.3 WEATHERED ROCK
			60/0.0												CRYSTALLINE ROCK Gneiss Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,041.2 ft ON CR

CORE PHOTOGRAPH

EB2-A

BOX 1 OF 1: 11 - 15.4 FEET

GSI 80 - 90

