

REFERENCE: HB-0051

PROJECT: BPII.R018

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ASHE
PROJECT DESCRIPTION BRIDGE NO. 466 OVER
SOUTH FORK NEW RIVER ON SR 1159
(BOGGS RD)

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE(S)
5-7	CROSS SECTION(S)
8-18	BORE LOGS, CORE REPORTS, & CORE PHOTOGRAPHS
19	LAB TEST RESULTS
20	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0051	1	20

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

CG2 EXPLORATION

P. PERRY, E.I.T.

M. MALISHER, E.I.T.

T. WENNER, P.G.

INVESTIGATED BY CG2, PLLC

DRAWN BY P. PERRY, E.I.T.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY CG2, PLLC

DATE NOVEMBER 2024

Prepared in the Office of:



**CAROLINAS
GEOTECHNICAL
GROUP**
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684



DocuSigned by:
Michael J. Walko 12/02/2024

80BEC14A5D19492 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												
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, VERY STIFF, GRAV, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6												
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-4, A-5	A-6, A-7
SYMBOL												
% PASSING	50 MX 30 MX		50 MX 25 MX	50 MX 10 MX	35 MX 10 MX	35 MX 10 MX	35 MX 10 MX	35 MX 10 MX	36 MN 10 MN	36 MN 10 MN	36 MN 10 MN	36 MN 10 MN
MATERIAL PASSING #40 LL PI	-		-	40 MX 10 MX	41 MN 10 MN	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	41 MN 11 MN
GROUP INDEX	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

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

TEXTURE OR GRAIN SIZE						
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 (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)
GRAIN SIZE MM	305	75	2.0	0.25	0.05	0.005
GRAIN SIZE IN.	12	3				

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

PLASTICITY	
PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5
SLIGHTLY PLASTIC	6-15
MODERATELY PLASTIC	16-25
HIGHLY PLASTIC	26 OR MORE
	VERY LOW
	SLIGHT
	MEDIUM
	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.

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 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
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		

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
	SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST
	SOUNDING ROD		TEST BORING WITH CORE
	SPT N-VALUE		SPT N-VALUE

RECOMMENDATION SYMBOLS			
	UNDERCUT		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
	SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
	UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL		

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 _d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	
e - VOID RATIO	SD. - SAND, SANDY	
F - FINE	SL. - SILT, SILTY	
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	
HI. - HIGHLY	v - VERY	
	S - BULK	
	SS - SPLIT SPOON	
	ST - SHELBY TUBE	
	RS - ROCK	
	RT - RECOMPACTED TRIAXIAL	
	CBR - CALIFORNIA BEARING RATIO	

EQUIPMENT USED ON SUBJECT PROJECT		
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER	
<input type="checkbox"/> CME-550	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	
<input checked="" type="checkbox"/> MOBILE B-29	<input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	
<input checked="" type="checkbox"/> DIEDRICH D-50	<input type="checkbox"/> TRICONE * STEEL TEETH	
	<input type="checkbox"/> TRICONE * TUNG-CARB.	
	<input checked="" type="checkbox"/> CORE BIT	
	<input type="checkbox"/>	
CORE SIZE:	HAND TOOLS:	
<input type="checkbox"/> -B	<input type="checkbox"/> POST HOLE DIGGER	
<input checked="" type="checkbox"/> -N Q	<input type="checkbox"/> HAND AUGER	
	<input checked="" type="checkbox"/> SOUNDING ROD	
	<input type="checkbox"/> VANE SHEAR TEST	
	<input type="checkbox"/>	

ROCK DESCRIPTION	
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)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	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.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.
WEATHERING	
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
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.
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.
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.
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. IF TESTED, WOULD YIELD SPT REFUSAL
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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
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. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF
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.

ROCK HARDNESS	
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	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.
MEDIUM HARD	CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROUDED 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.
VERY SOFT	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.
FRACTURE SPACING	
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	
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.

TERMS AND DEFINITIONS	
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 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 (SRQD)	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.

BENCH MARK:	
ELEVATION:	FEET
NOTES:	
DESIGN FILES PROVIDED BY TGS ENGINEERS DATED JULY 2024.	
BORING COLLAR ELEVATIONS OBTAINED USING CARLSON BRX-7 (SURVEY GRADE GPS).	
CT = CORE TERMINATED	
FIAD = FILLED IN AFTER DRILLING	
REF = REFUSAL	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

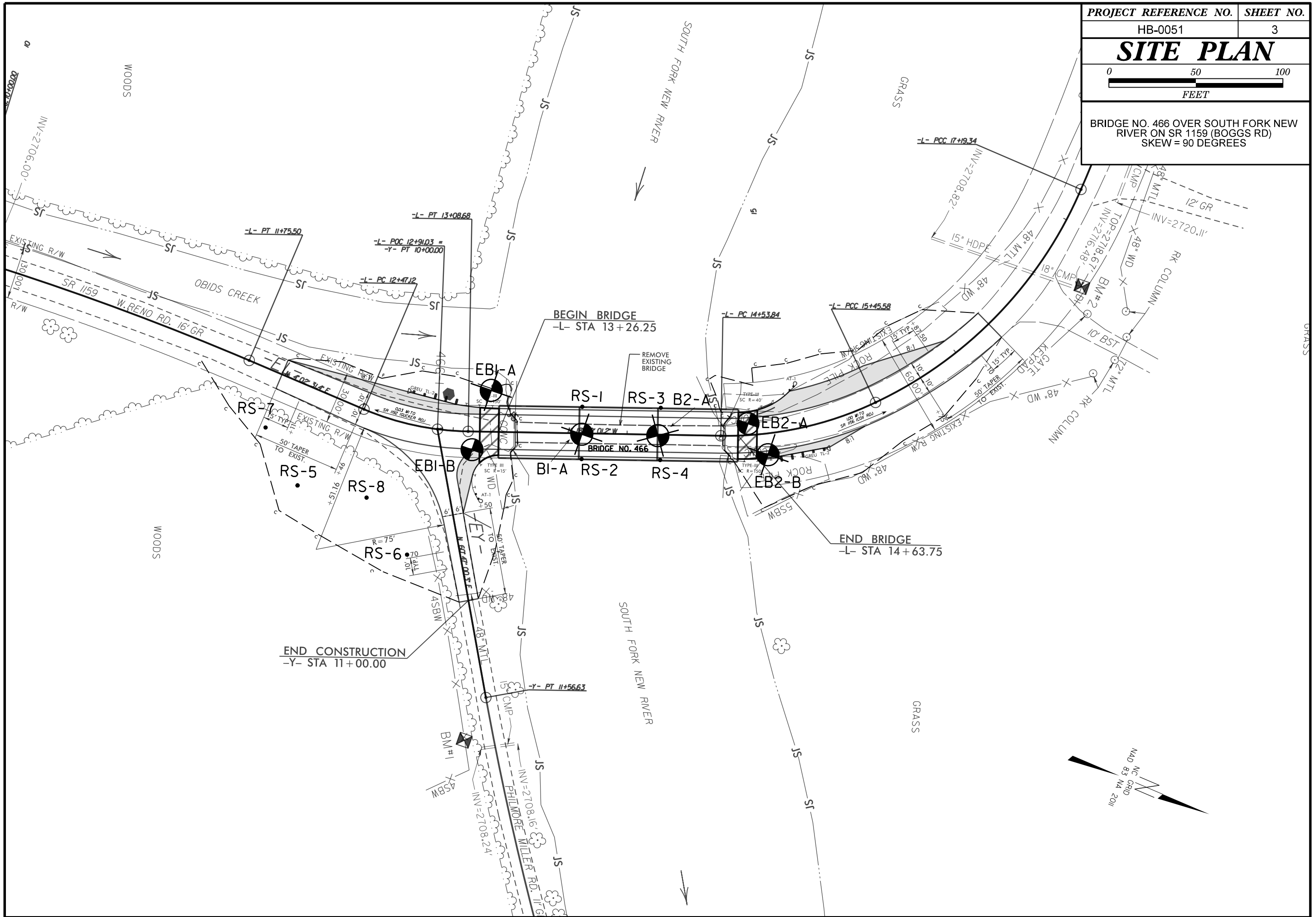
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

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)						
<p>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.</p>		<p>VERY GOOD Very rough, fresh unweathered surfaces</p> <p>GOOD Rough, slightly weathered, iron stained surfaces</p> <p>FAIR Smooth, moderately weathered and altered surfaces</p> <p>POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments</p> <p>VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings</p>					<p>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.</p>		<p>VERY GOOD - Very Rough, fresh unweathered surfaces</p> <p>GOOD - Rough, slightly weathered surfaces</p> <p>FAIR - Smooth, moderately weathered and altered surfaces</p> <p>POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments</p> <p>VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings</p>						
														STRUCTURE	
INTERLOCKING OF ROCK PIECES															
	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								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									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									D. Siltstone or silty shale with sandstone layers	40				
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces									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									F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure	20				
										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



5/14/99

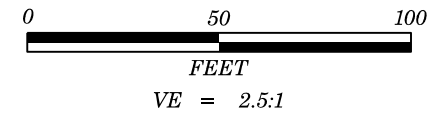
-L-

EXISTING GROUND LINE ALONG -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.

Prepared in the Office of:



CAROLINAS GEOTECHNICAL GROUP

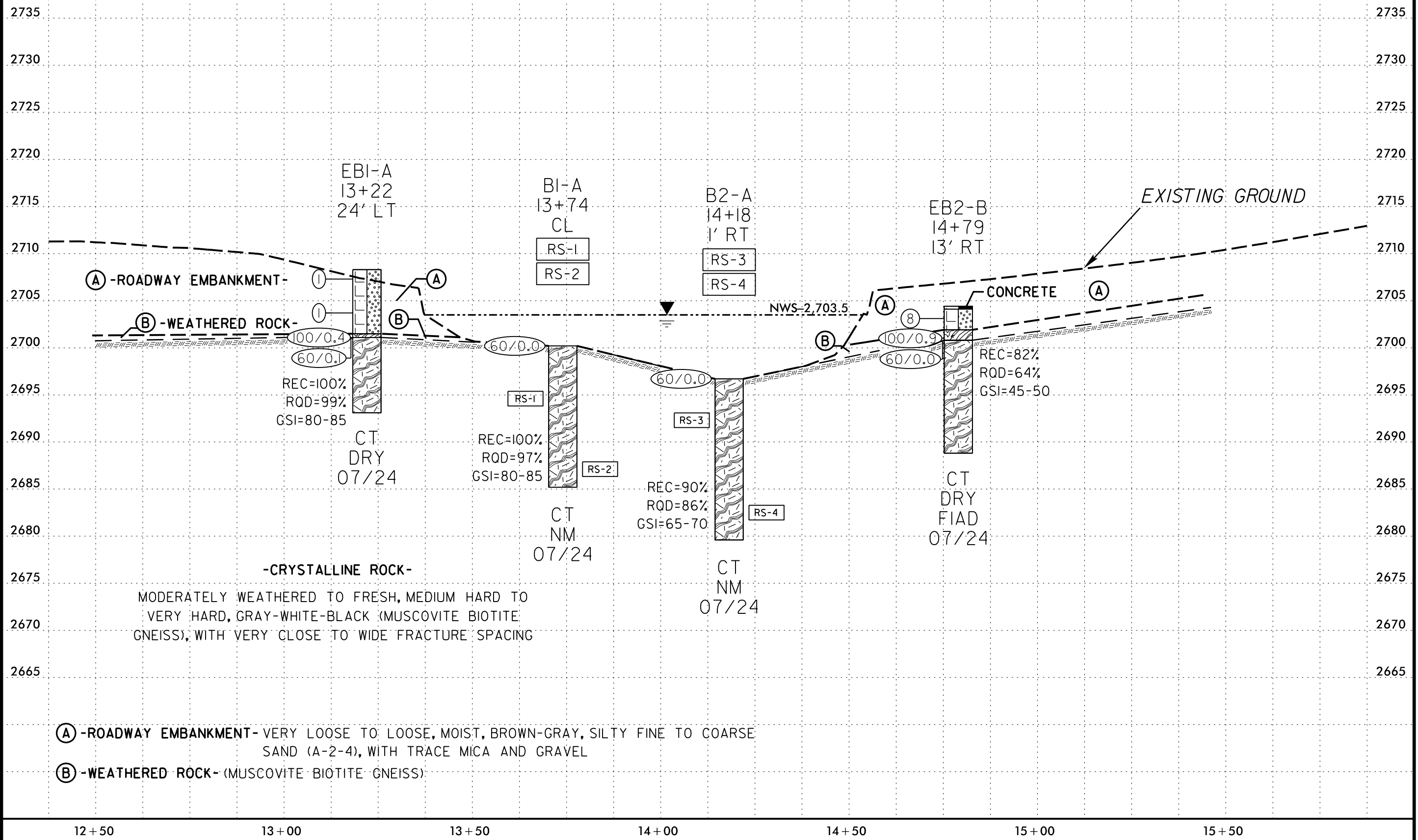


PROJECT REFERENCE NO. SHEET NO.

HB-0051

4

PROFILE ALONG CENTERLINE OF -L-

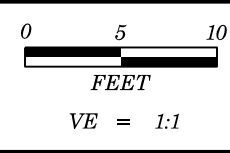


- (A) -ROADWAY EMBANKMENT- VERY LOOSE TO LOOSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA AND GRAVEL
- (B) -WEATHERED ROCK- (MUSCOVITE BIOTITE GNEISS)

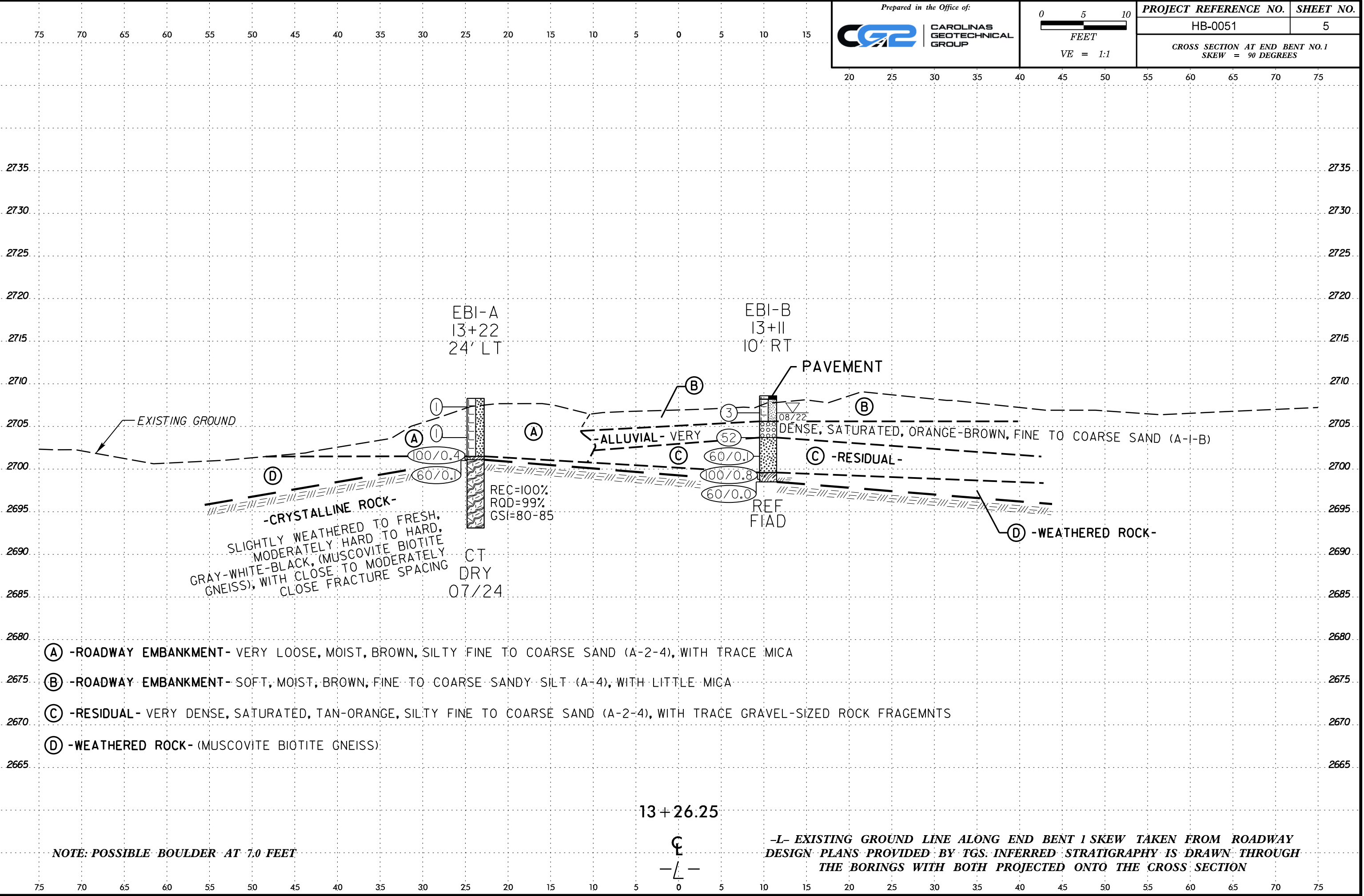
28-OCT-2024 16:28 C:\Users\N... Perry\Carolin... Geotechnical Group, PLLC\Matt Brewer - Projects\0139 - Ashe 466.TGS\CADD_GEO\TECH\Site&Sub\Ashe466_GEO_BRDC_L_PFI.dgn

6/23/16
28-OCT-2024 16:28
C:\Users\perry\OneDrive\Documents\Projects\0139 - Ashe 466_TGS\CADD\GEO\TECH\asc\Ahe466_GEO_XSI.dgn
Perry, Matt Brewer - Projects\0139 - Ashe 466_TGS\CADD\GEO\TECH\asc\Ahe466_GEO_XSI.dgn

Prepared in the Office of:
CGE CAROLINAS
GEOLOGICAL
GROUP



PROJECT REFERENCE NO.	SHEET NO.
HB-0051	5
CROSS SECTION AT END BENT NO. 1 SKEW = 90 DEGREES	



EBI-A
13+22
24' LT

EBI-B
13+11
10' RT

-CRYSTALLINE ROCK-
SLIGHTLY WEATHERED TO FRESH,
MODERATELY HARD TO HARD,
GRAY-WHITE-BLACK, (MUSCOVITE BIOTITE
GNEISS), WITH CLOSE TO MODERATELY
CLOSE FRACTURE SPACING

REC=100%
RQD=99%
GSI=80-85
CT
DRY
07/24

REF
FIAD

PAVEMENT

DENSE, SATURATED, ORANGE-BROWN, FINE TO COARSE SAND (A-I-B)

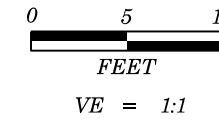
- (A) -ROADWAY EMBANKMENT- VERY LOOSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA
- (B) -ROADWAY EMBANKMENT- SOFT, MOIST, BROWN, FINE TO COARSE SANDY SILT (A-4), WITH LITTLE MICA
- (C) -RESIDUAL- VERY DENSE, SATURATED, TAN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENT
- (D) -WEATHERED ROCK- (MUSCOVITE BIOTITE GNEISS)

NOTE: POSSIBLE BOULDER AT 7.0 FEET

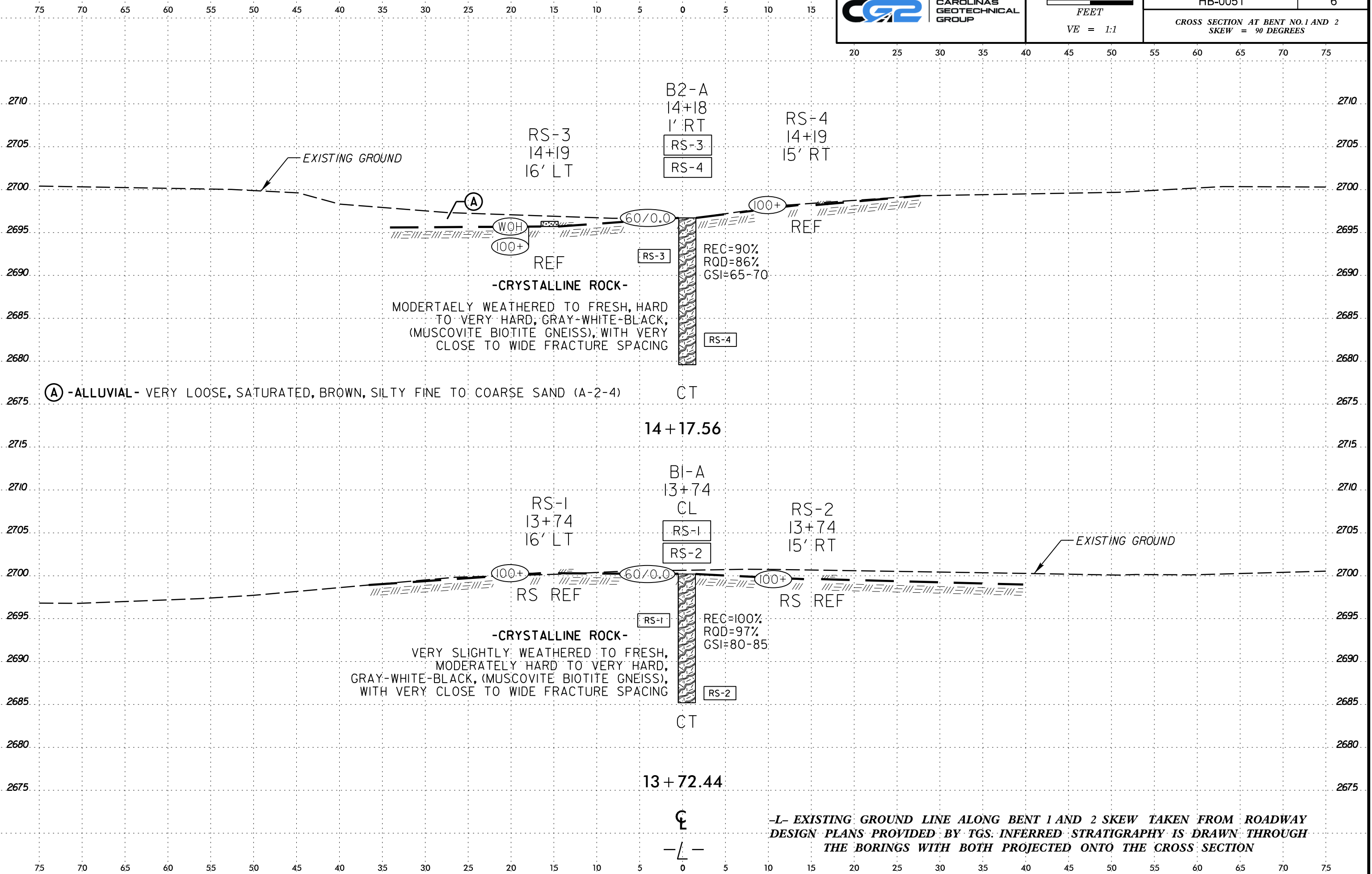
-L- EXISTING GROUND LINE ALONG END BENT 1 SKEW TAKEN FROM ROADWAY
DESIGN PLANS PROVIDED BY TGS. INFERRED STRATIGRAPHY IS DRAWN THROUGH
THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

6/23/16

Prepared in the Office of:

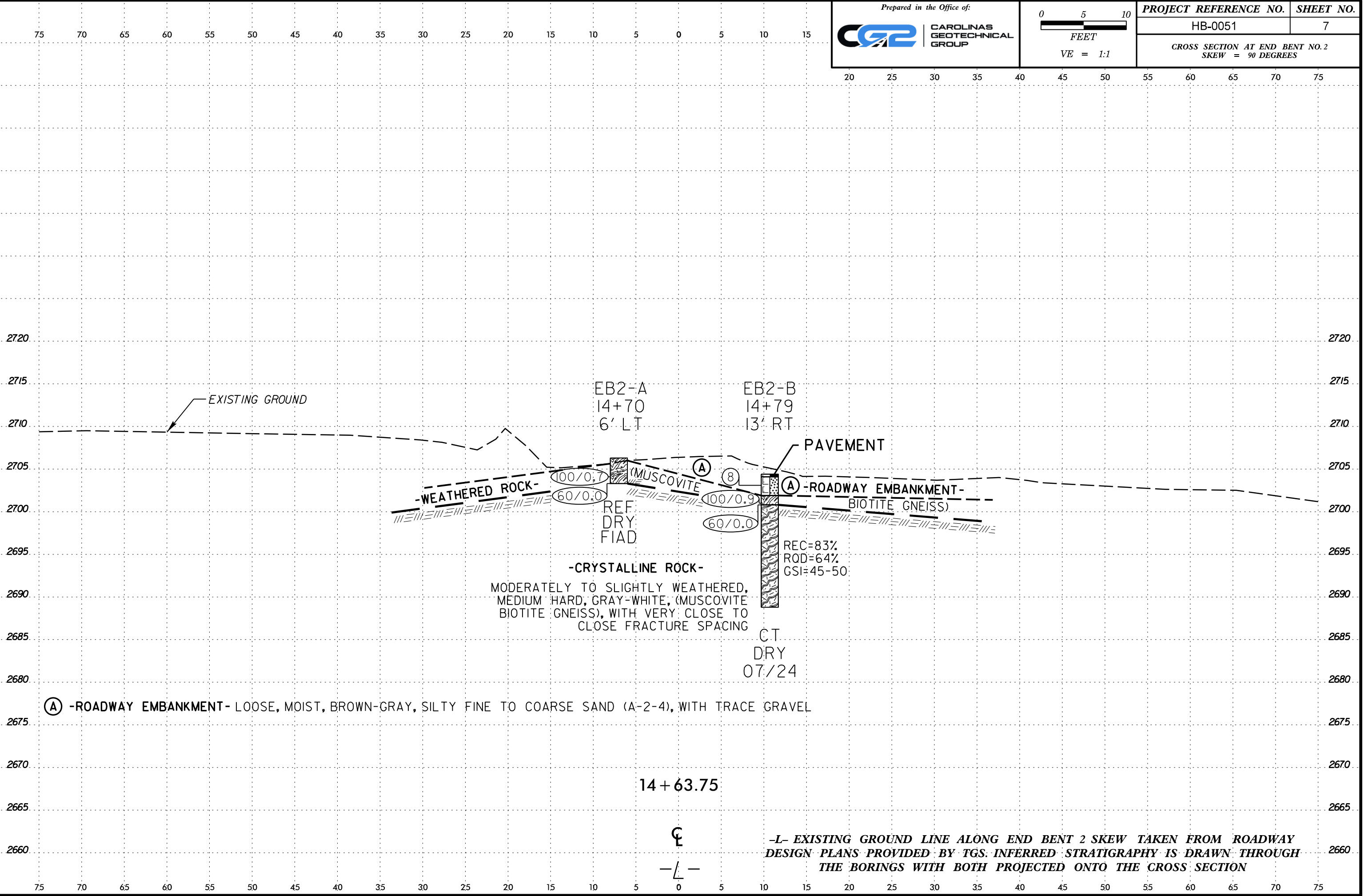


PROJECT REFERENCE NO.	SHEET NO.
HB-0051	6
CROSS SECTION AT BENT NO. 1 AND 2 SKEW = 90 DEGREES	



28-OCT-2024 16:28 C:\Users\perry\OneDrive\Documents\Projects\0139 - Ashe 466 - TGS\CADD\GEO\TECH\asc\Ahe466_GEO_XSI.dgn

6/23/16
28-OCT-2024 16:28
C:\Users\perry\OneDrive\Documents\Projects\0139 - Ashe 466_TGS\CADD\GEO\GEO\GEO_XSI.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$



-L- EXISTING GROUND LINE ALONG END BENT 2 SKEW TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT BORE LOG

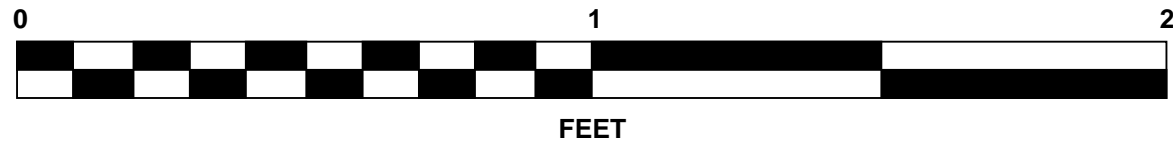
GEOTECHNICAL BORING REPORT CORE LOG

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST M. Malisher									
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 13+22		OFFSET 24 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2,708.3 ft		TOTAL DEPTH 15.2 ft		NORTHING 953,773		EASTING 1,291,915									
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic									
DRILLER M. Brewer		START DATE 07/15/24		COMP. DATE 07/16/24		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2710	2,708.3	0.0	WOH	WOH	1							M	GROUND SURFACE	2,708.3	0.0
2705	2,704.7	3.6	WOH	WOH	1							M	ROADWAY EMBANKMENT Very Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica		
2700	2,701.5	6.8											WEATHERED ROCK Gray, (Muscovite Biotite Gneiss)	2,701.5	6.8
	2,701.1	7.2											CRYSTALLINE ROCK Gray-White-Black, (Muscovite Biotite Gneiss)	2,701.1	7.2
2695													REC=100% RQD=99% GSI=80-85	2,693.1	15.2
													Boring Terminated at Elevation 2,693.1 ft In Crystalline Rock (Muscovite Biotite Gneiss)		

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST M. Malisher						
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)					
BORING NO. EB1-A		STATION 13+22		OFFSET 24 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 2,708.3 ft		TOTAL DEPTH 15.2 ft		NORTHING 953,773		EASTING 1,291,915						
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic						
DRILLER M. Brewer		START DATE 07/15/24		COMP. DATE 07/16/24		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN 8.0 ft		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
2701.06											Begin Coring @ 7.2 ft	
2700	2,701.1	7.2	3.0	5:12/1.0 N=60/0.1	(3.0)	(3.0)		(8.0)	(7.9)		CRYSTALLINE ROCK	2,701.1
	2,698.1	10.2	5.0	5:12/1.0 3:42/1.0	(5.0)	(4.9)					Slightly Weathered to Fresh, Moderately Hard to Hard, Gray-White-Black (Muscovite Biotite Gneiss), with Close to Moderately Close Fracture Spacing	
2695				3:54/1.0 3:55/1.0 2:29/1.0 2:08/1.0 3:08/1.0	100%	98%					GSI = 80-85	
	2,693.1	15.2									Boring Terminated at Elevation 2,693.1 ft In Crystalline Rock (Muscovite Biotite Gneiss)	15.2



WBS: BP11.R018 - Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)
Ashe County, North Carolina
Rock Core Photographs
Boring - EB1-A
7.2 to 15.2 Feet



GEOTECHNICAL BORING REPORT

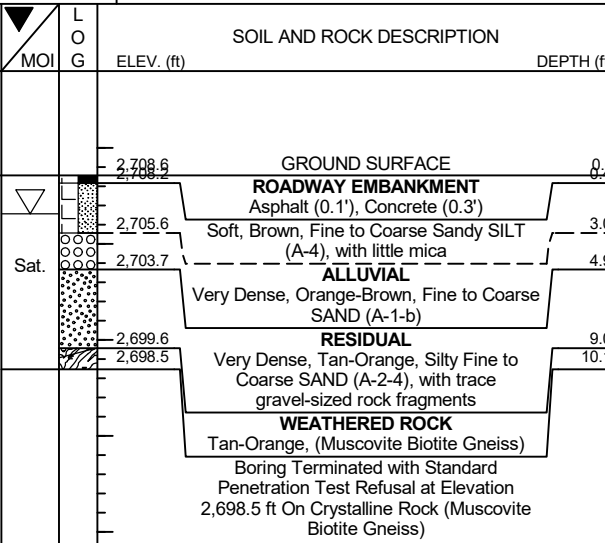
BORE LOG

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST T. Wenner	
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)
BORING NO. EB1-B		STATION 13+11		OFFSET 10 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,708.6 ft		TOTAL DEPTH 10.1 ft		NORTHING 953,773		EASTING 1,291,951	
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic	
DRILLER C. Odom		START DATE 08/23/22		COMP. DATE 08/23/22		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					
2710															
	2,707.6	1.0		3	2	1									
2705	2,704.7	3.9		3	3	49									
	2,701.6	7.0		60/0.1											
2700	2,700.1	8.5		16	25	75/0.3									
	2,698.5	10.1		60/0.0											

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST P. Perry	
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)
BORING NO. RS-1		STATION 13+74		OFFSET 16 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 2,700.3 ft		TOTAL DEPTH 0.0 ft		NORTHING 953,825		EASTING 1,291,907	
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD Rod Sounding			HAMMER TYPE Manual	
DRILLER M. Brewer		START DATE 07/18/24		COMP. DATE 07/18/24		SURFACE WATER DEPTH 2.4ft	

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					
2705															
	2,700.3	0.0		100+											



Notes:
Possible Boulder at 7.0'

NCDOT BORE DOUBLE ASHE466_2024.GPJ NC_DOT.GDT 10/28/24

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST P. Perry										
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)									
BORING NO. B1-A		STATION 13+74		OFFSET CL		ALIGNMENT -L-										
COLLAR ELEV. 2,700.2 ft		TOTAL DEPTH 15.0 ft		NORTHING 953,830		EASTING 1,291,922										
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic										
DRILLER M. Brewer		START DATE 07/17/24		COMP. DATE 07/17/24		SURFACE WATER DEPTH 2.7ft										
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)	
2705																
																WATER SURFACE (07/17/24)
2700	2,700.2	0.0														GROUND SURFACE
			60/0.0													2,700.2
2695																2,695.2
																CRYSTALLINE ROCK Gray-White-Black, (Muscovite Biotite Gneiss)
																REC=100% RQD=97% GSI=80-85
																RS-1
2690																RS-2
																2,685.2
																15.0
																Boring Terminated at Elevation 2,685.2 ft In Crystalline Rock (Muscovite Biotite Gneiss)

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST P. Perry				
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)			
BORING NO. B1-A		STATION 13+74		OFFSET CL		ALIGNMENT -L-				
COLLAR ELEV. 2,700.2 ft		TOTAL DEPTH 15.0 ft		NORTHING 953,830		EASTING 1,291,922				
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic				
DRILLER M. Brewer		START DATE 07/17/24		COMP. DATE 07/17/24		SURFACE WATER DEPTH 2.7ft				
CORE SIZE NQ		TOTAL RUN 15.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (%)	RQD (%)	REC. (%)	RQD (%)		
2700.6	2,700.2	0.0	5.0	N=60/0.0 4:30/1.0 2:27/1.0 3:34/1.0 4:52/1.0 4:57/1.0	(5.0)	(4.6)	(15.0)	(14.5)		Ground Surface
2695	2,695.2	5.0	5.0	3:44/1.0 3:18/1.0 5:45/1.0 4:26/1.0 4:17/1.0	100%	100%				CRYSTALLINE ROCK Very Slightly Weathered to Fresh, Moderately Hard to Very Hard, Gray-White-Black, (Muscovite Biotite Gneiss), with Very Close to Wide Fracture Spacing
										RS-1: 5.2-6.0' Unit Weight: 176.7 pcf Unconfined Compressive Strength: 5,330 psi (763 ksf)
2690	2,690.2	10.0	5.0	3:46/1.0 6:26/1.0 4:58/1.0 3:22/1.0 4:49/1.0	(5.0)	(4.9)				RS-2: 12.6-13.6' Unit Weight: 178.5 pcf Unconfined Compressive Strength: 3,900 psi (561 ksf)
										GSI = 80-85
										Boring Terminated at Elevation 2,685.2 ft In Crystalline Rock (Muscovite Biotite Gneiss)



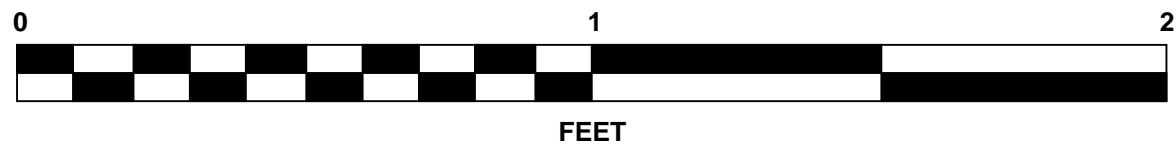
WBS: BP11.R018 - Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)

Ashe County, North Carolina

Rock Core Photographs

Boring - B1-A

0.0 to 15.0 Feet





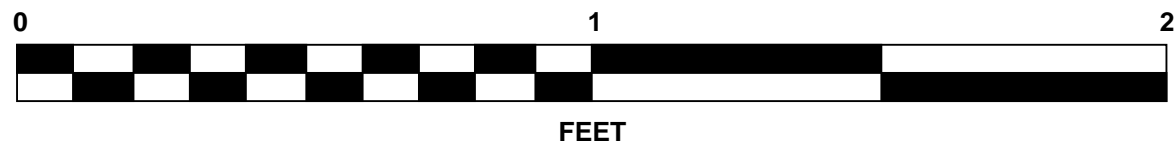
WBS: BP11.R018 - Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)

Ashe County, North Carolina

Rock Core Photographs

Boring - B2-A

0.0 to 17.1 Feet



GEOTECHNICAL BORING REPORT

BORE LOG

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST P. Perry										
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)									
BORING NO. RS-4		STATION 14+19		OFFSET 15 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,698.2 ft		TOTAL DEPTH 0.0 ft		NORTHING 953,877		EASTING 1,291,922										
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024				DRILL METHOD Rod Sounding		HAMMER TYPE Manual										
DRILLER M. Brewer		START DATE 07/18/24		COMP. DATE 07/18/24		SURFACE WATER DEPTH 4.5ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2700	2,698.2	0.0														2,698.2 GROUND SURFACE 0.0
			100+													

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST T. Wenner										
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 14+70		OFFSET 6 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,706.3 ft		TOTAL DEPTH 3.0 ft		NORTHING 953,919		EASTING 1,291,886										
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER C. Odom		START DATE 08/23/22		COMP. DATE 08/23/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2710																2,706.3 GROUND SURFACE 0.0
2705	2,704.8	1.5														2,703.3 WEATHERED ROCK 3.0
	2,703.3	3.0														2,703.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,703.3 ft On Crystalline Rock (Muscovite Biotite Gneiss)

NCDOT BORE DOUBLE ASHE466_2024.GPJ NC_DOT.GDT 10/28/24

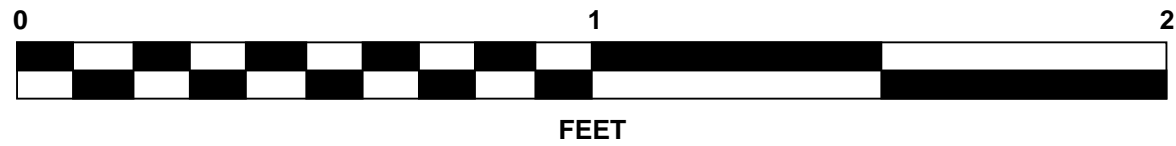
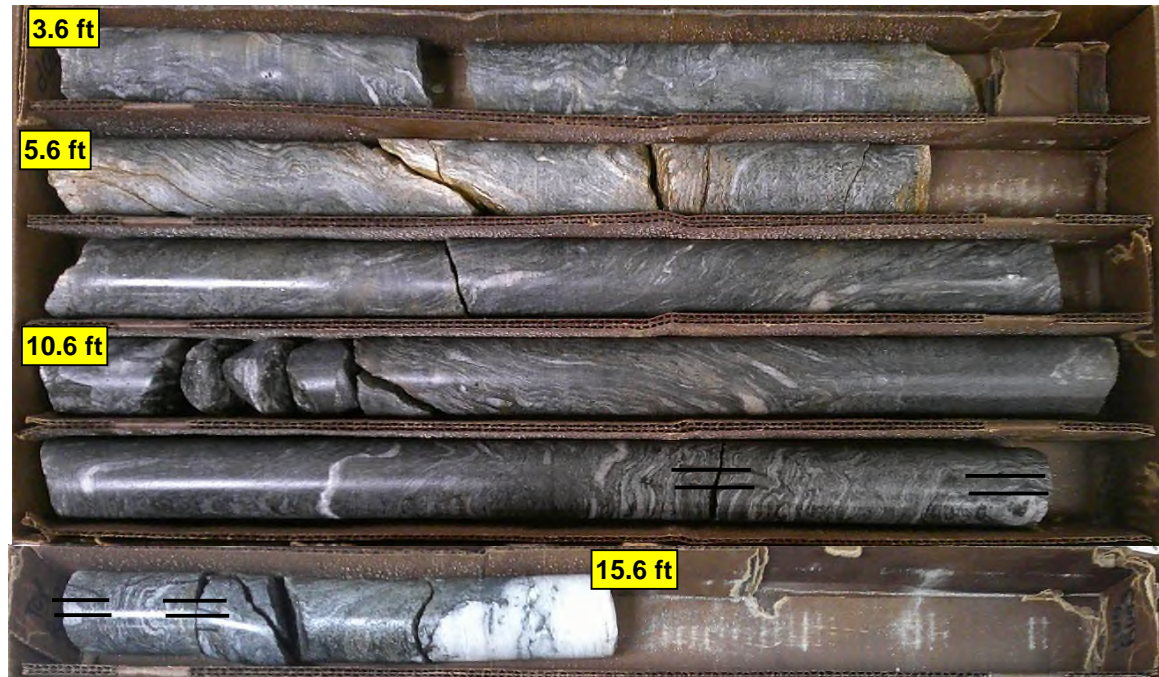
GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST M. Malisher									
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 14+79		OFFSET 13 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,704.4 ft		TOTAL DEPTH 15.6 ft		NORTHING 953,935		EASTING 1,291,899									
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic										
DRILLER M. Brewer		START DATE 07/15/24		COMP. DATE 07/15/24		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2705	2,704.1	0.3	1	2	6									GROUND SURFACE	0.0
	2,701.9	2.5												ROADWAY EMBANKMENT Concrete (0.3')	2.5
2700	2,700.8	3.6	8	92/0.4										Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	3.6
			60/0.0											WEATHERED ROCK Brown, (Muscovite Biotite Gneiss)	
														CRYSTALLINE ROCK Gray-White, (Muscovite Biotite Gneiss)	
2695														REC=83% RQD=64% GSI=45-50	
2690															
															Boring Terminated at Elevation 2,688.8 ft In Crystalline Rock (Muscovite Biotite Gneiss)

WBS BP11.R018		TIP HB-0051		COUNTY ASHE		GEOLOGIST M. Malisher						
SITE DESCRIPTION Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)							GROUND WTR (ft)					
BORING NO. EB2-B		STATION 14+79		OFFSET 13 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 2,704.4 ft		TOTAL DEPTH 15.6 ft		NORTHING 953,935		EASTING 1,291,899						
DRILL RIG/HAMMER EFF./DATE CG29022 Mobile B-29 92% 04/09/2024			DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic							
DRILLER M. Brewer		START DATE 07/15/24		COMP. DATE 07/15/24		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2700.79												
2700	2,700.8	3.6	2.0	N=60/0.0 4:21/1.0 3:31/1.0	(1.6)	(1.6)		(9.9)	(7.7)		Begin Coring @ 3.6 ft	
	2,698.8	5.6	5.0	1:36/1.0 1:42/1.0 2:57/1.0 6:01/1.0 4:46/1.0	78%	78%		83%	64%		CRYSTALLINE ROCK Moderately to Slightly Weathered, Medium Hard, Gray-White, (Muscovite Biotite Gneiss), with Very Close to Close Fracture Spacing	3.6
2695	2,693.8	10.6	5.0	3:11/1.0 4:35/1.0 7:15/1.0 3:29/1.0 3:04/1.0	68%	50%					GSI = 45-50	
2690	2,688.8	15.6			97%	71%						
											Boring Terminated at Elevation 2,688.8 ft In Crystalline Rock (Muscovite Biotite Gneiss)	15.6

**WBS: BP11.R018 - Bridge No. 466 over South Fork New River on SR 1159 (Boggs Road)
Ashe County, North Carolina
Rock Core Photographs
Boring - EB2-B
3.6 to 15.6 Feet**



ROCK TEST RESULTS

SAMPLE NO.	BORING	STATION	OFFSET	DEPTH INTERVAL	ROCK TYPE	UNIT WEIGHT (PCF)	UNCONFINED COMPRESSIVE STRENGTH
RS-1	B1-A	13+74 -L-	CL	5.2' - 6.0'	MUSCOVITE BIOTITE GNEISS	176.7	5,330 psi / 763 ksf
RS-2	B1-A	13+74 -L-	CL	12.6' - 13.6'	MUSCOVITE BIOTITE GNEISS	178.5	3,900 psi / 561 ksf
RS-3	B2-A	14+18 -L-	1' RT	4.1' - 4.7'	MUSCOVITE BIOTITE GNEISS	176.7	5,190 psi / 747 ksf
RS-4	B2-A	14+18 -L-	1' RT	14.0' - 14.5'	MUSCOVITE BIOTITE GNEISS	173.5	3,860 psi / 555 ksf

Alex M. Atkinson

 AUTHORIZED SIGNATURE
 NCDOT CERT NO. 130-0212

SITE PHOTOS



PHOTO #1: END BENT NO. 1 OF EXISTING BRIDGE LOOKING NORTH WEST (UPSTATION).



PHOTO #2: END BENT NO. 2 OF EXISTING BRIDGE LOOKING SOUTH EAST (DOWNSTATION).

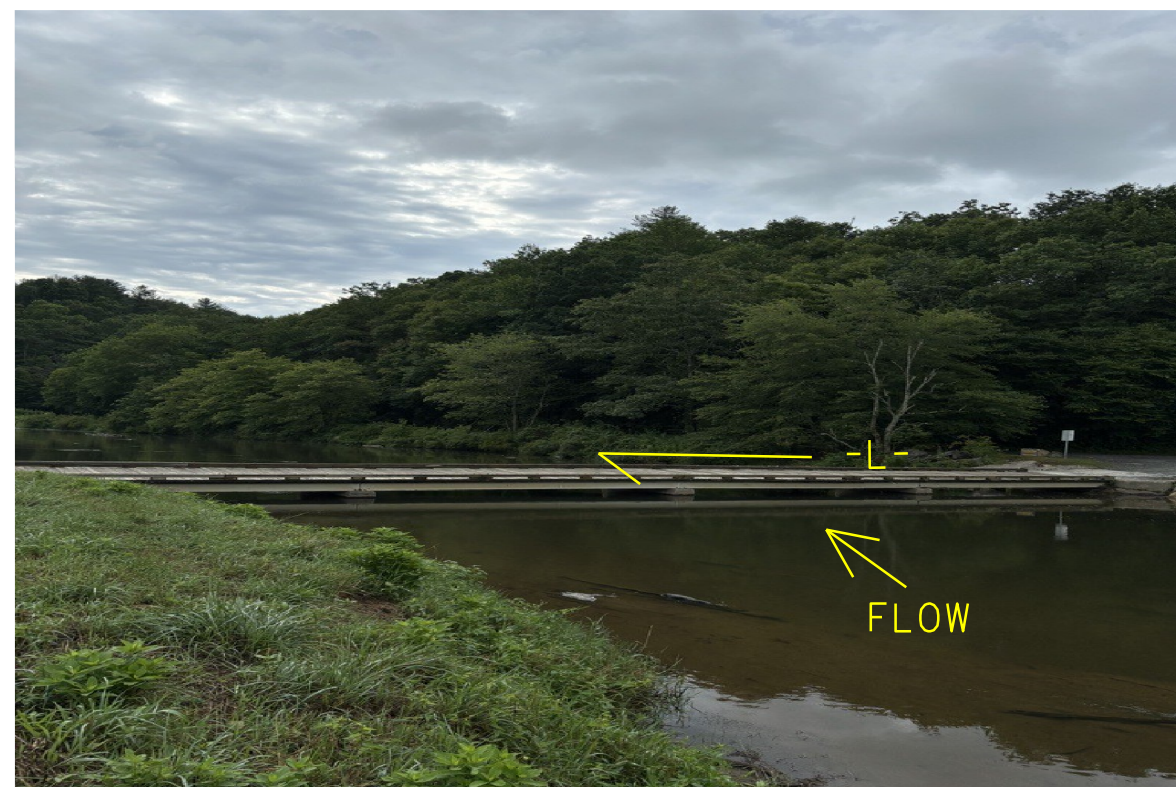


PHOTO #3: UPSTREAM OF EXISTING BRIDGE.



PHOTO #4: DOWNSTREAM OF EXISTING BRIDGE.