

REFERENCE: SF-960419

PROJECT: 17BP.11.R.153

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-960419	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY WILKES
PROJECT DESCRIPTION BRIDGE NO. 419 ON SR 1148
(RED TOP RD.) OVER NAKED CREEK

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PERSONNEL
J.K. STICKNEY
B.E. FOSTER
C.L. SMITH

INVESTIGATED BY C.R. LAVENDER, III, LG
DRAWN BY N.D. MOHS, LG
CHECKED BY K.B. MILLER, LG
SUBMITTED BY C.R. LAVENDER, III, LG
DATE MARCH 2020

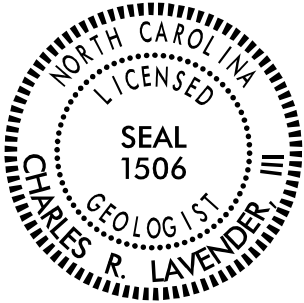
CAUTION NOTICE

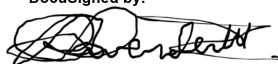
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING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

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

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

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



DocuSigned by:

8EEA8D4BBA2E438...
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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for General Class., Group Class., Symbol, % Passing #10, #40, #200, Material Passing #40 LL, PI, Group Index, Usual Types of Major Materials, and Gen. Rating as Subgrade. Includes sub-headers for Granular Materials, Silt-Clay Materials, and Organic Materials.

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

Table showing percentages for Organic Material, Granular Soils, Silt-Clay Soils, and Other Material across different categories like Trace, Little, Moderately, and Highly Organic.

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

Table correlating Primary Soil Type, Compactness or Consistency, Range of Standard Penetration Resistance (N-value), and Range of Unconfined Compressive Strength (tons/ft²).

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 and dip direction of rock structures
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

TEXTURE OR GRAIN SIZE

Table showing U.S. Std. Sieve Size (mm) and corresponding values for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

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

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
gamma - Unit Weight
gamma_d - Dry Unit Weight

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating Soil Moisture Scale (Atterberg Limits), Field Moisture Description, and Guide for Field Moisture Description (Saturated, Wet, Moist, Dry).

EQUIPMENT USED ON SUBJECT PROJECT

- Drill Units: CME-45C, CME-55, CME-550, Vane Shear Test, Portable Hoist
Advancing Tools: Clay Bits, 6' Continuous Flight Auger, 8' Hollow Augers, Hard Faced Finger Bits, Tung-Carbide Inserts, Casings w/ Advancer, Tricone (Steel Teeth, Tung-Carb), Core Bit
Hammer Type: Automatic, Manual
Core Size: B, H, N
Hand Tools: Post Hole Digger, Hand Auger, Sounding Rod, Vane Shear Test

PLASTICITY

Table showing Plasticity Index (PI) and Dry Strength for Non Plastic, Slightly Plastic, Moderately Plastic, and Highly Plastic soils.





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.

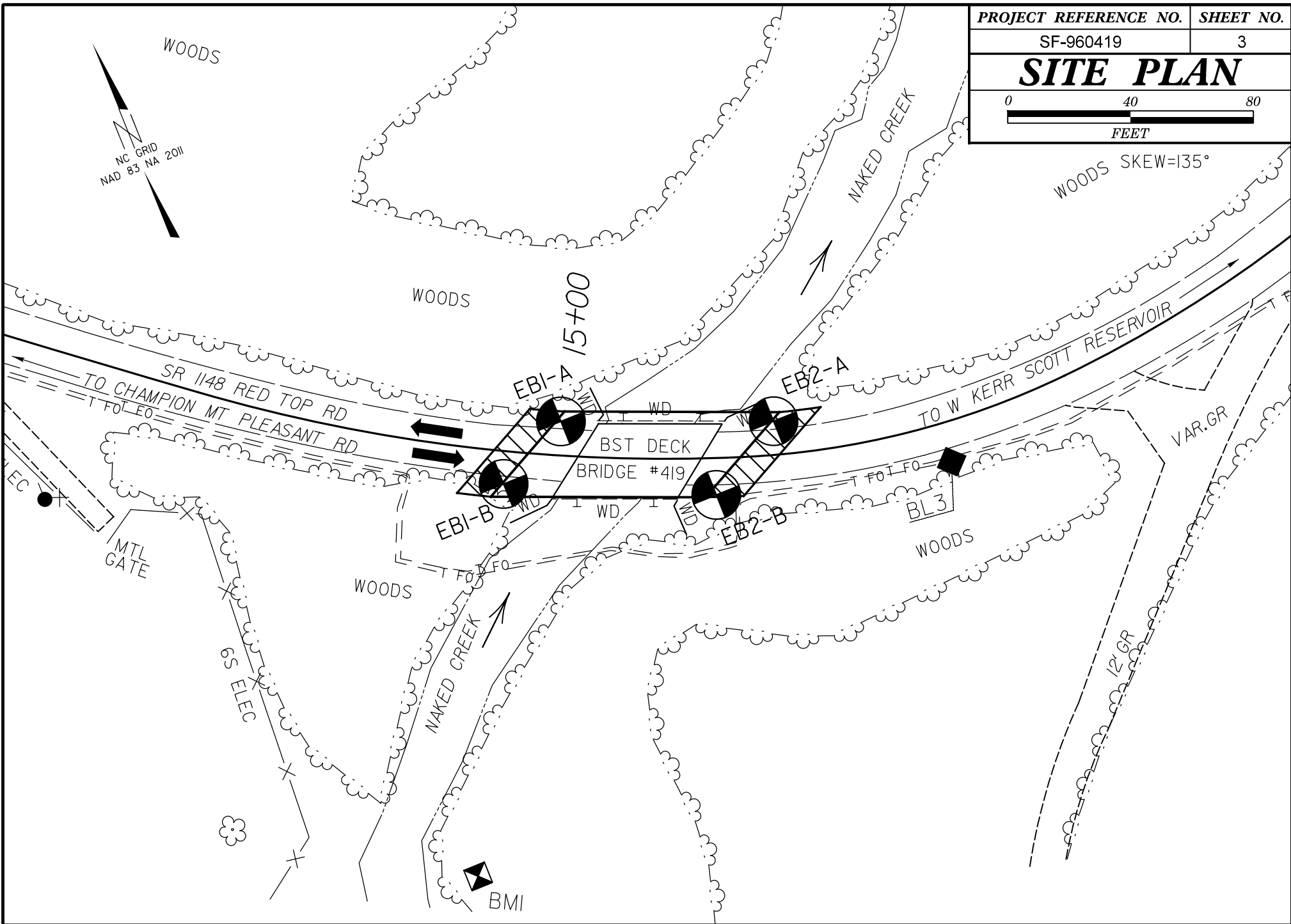
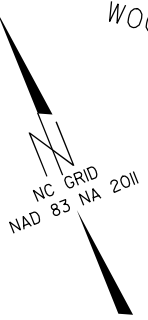
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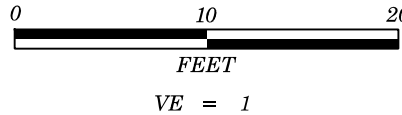
SUBSURFACE INVESTIGATION

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 (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.</p>	
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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>		
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>		
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 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.		
SOFT	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.		
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		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 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.		
<p>BENCH MARK: BM#1: -L- STA. 14+83, I39' RT N: 872557, E: I31518 ELEVATION: I130.12 FEET</p>			
NOTES:			
FIAD: FILLED IMMEDIATELY AFTER DRILLING			
DATE: 8-15-14			

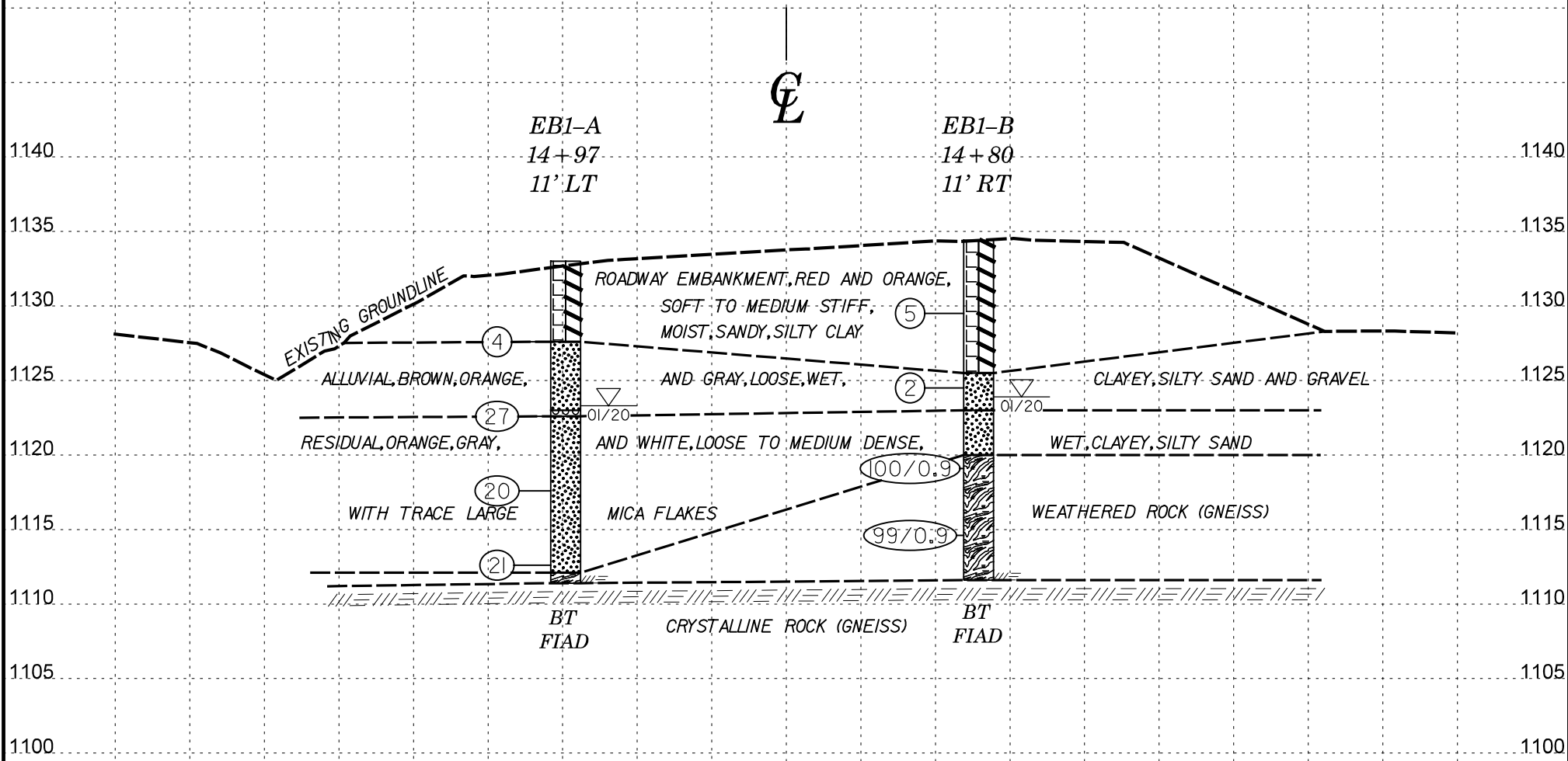
PROJECT REFERENCE NO.	SHEET NO.
SF-960419	3
SITE PLAN	



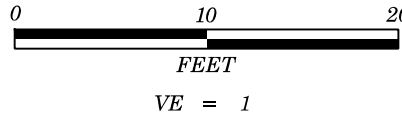


PROJECT REFERENCE NO.	SHEET NO.
SF-960419	4
END BENT 1 CROSS SECTION	

SKEW = 135°

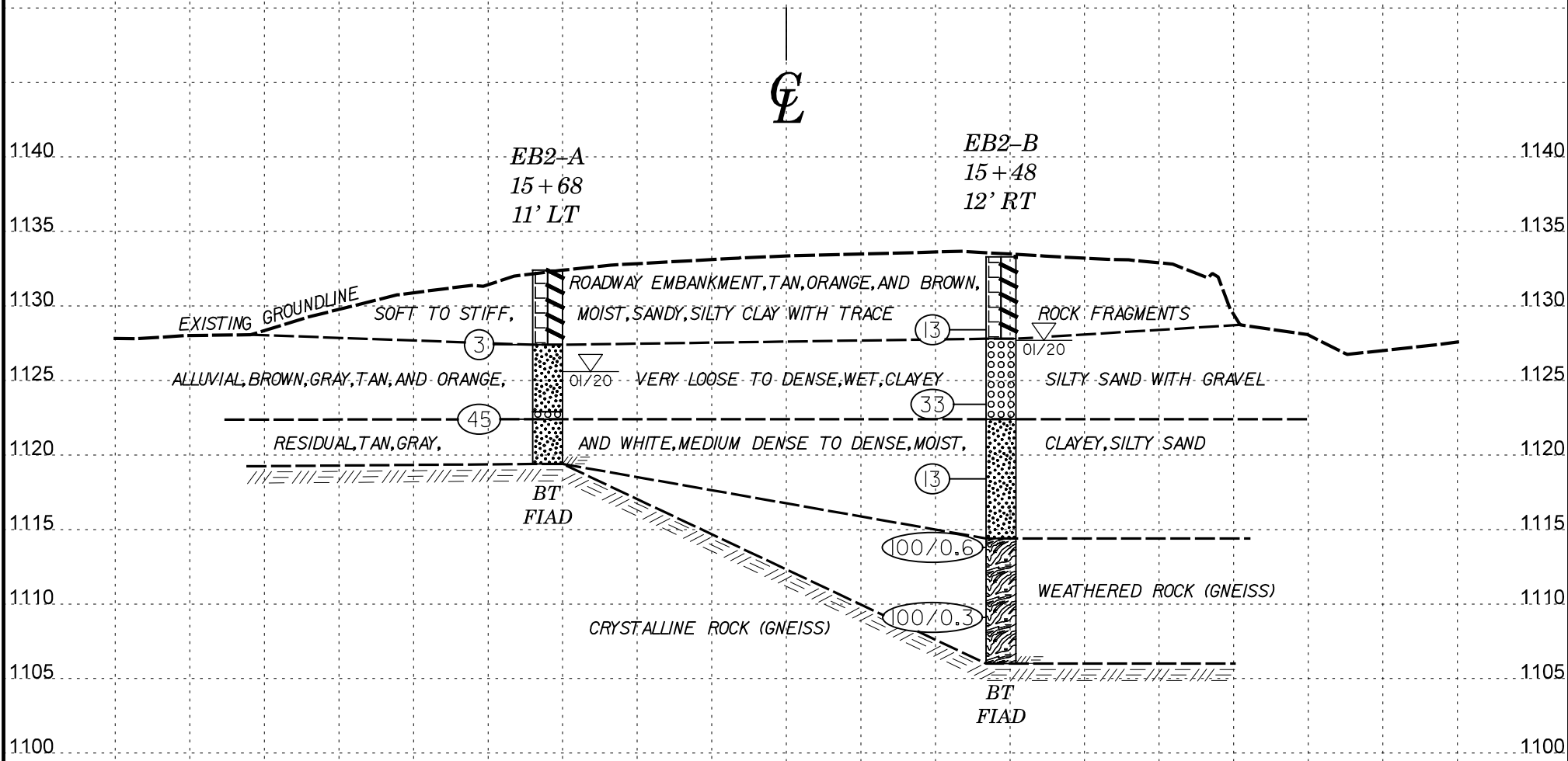


NOTE: EXISTING GROUND SURFACE CROSS SECTION OF END BENT 1
TAKE FROM ELECTRONIC FILES RECEIVED FROM NCDOT. GEU INFERRED.
STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED
ONTO THE CROSS SECTION.



PROJECT REFERENCE NO.	SHEET NO.
SF-960419	5
END BENT 2 CROSS SECTION	

SKEW=135°



NOTE: EXISTING GROUND SURFACE CROSS SECTION OF END BENT 2
TAKE FROM ELECTRONIC FILES RECEIVED FROM MCDOT GEU. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED
ONTO THE CROSS SECTION.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.11.R.153	TIP SF-960419	COUNTY WILKES	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 419 on SR-1148 (Red Top Rd.) over Naked Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 14+97	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 1,133.0 ft	TOTAL DEPTH 21.6 ft	NORTHING 872,684	EASTING 1,311,599
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 89% 12/16/2019		DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic
DRILLER Foster, B. E.	START DATE 01/28/20	COMP. DATE 01/28/20	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1135																
														1,133.0	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT Red And Orange Sandy, Silty CLAY	
1130	1,128.6	4.4	1	2	2								1,127.6	5.4	ALLUVIAL Brown And Gray Clayey, Silty SAND	
1125	1,123.6	9.4	5	14	13								1,123.0	10.0	RESIDUAL Gray And Orange Silty, Sandy GRAVEL	10.4
1120	1,118.6	14.4	4	8	12								1,122.6	10.4	RESIDUAL Gray And White Clayey, Silty SAND with Trace of Large Mica Flakes	
1115	1,113.6	19.4	5	7	14								1,112.1	20.9	WEATHERED ROCK Gray And White (GNEISS)	21.6
													1,111.4	21.6	CRYSTALLINE ROCK (GNEISS) Boring Terminated with Casing Advancer Refusal at Elevation 1,111.4 ft on CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE SINGLE 96_GEO_BRD0419_WILKES_BL.GPJ NC_DOT.GDT 3/3/20

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.11.R.153		TIP SF-960419		COUNTY WILKES		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION Bridge No. 419 on SR-1148 (Red Top Rd.) over Naked Creek							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 14+80		OFFSET 11 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 1,134.4 ft		TOTAL DEPTH 22.8 ft		NORTHING 872,672		EASTING 1,311,574									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 89% 12/16/2019				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic									
DRILLER Smith, C. L.		START DATE 01/28/20		COMP. DATE 01/28/20		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1135														GROUND SURFACE	0.0
														ROADWAY EMBANKMENT Red And Orange Sandy, Silty CLAY	
1130	1,130.5	3.9	2	2	3								M		
1125	1,125.5	8.9	1	1	1								W		
1120	1,120.5	13.9	15	54	46/0.4					100/0.9			W		
1115	1,115.5	18.9	8	91/0.4						99/0.9				WEATHERED ROCK Gray And White (GNEISS)	
														CRYSTALLINE ROCK (GNEISS) Boring Terminated with Casing Advancer Refusal at Elevation 1,111.6 ft on CRYSTALLINE ROCK (GNEISS)	22.8

NCDOT BORE SINGLE 96_GEO_BRDG0419_WILKES.BL.GPJ NC_DOT.GDT 3/3/20

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.11.R.153		TIP SF-960419		COUNTY WILKES		GEOLOGIST Stickney, J. K.											
SITE DESCRIPTION Bridge No. 419 on SR-1148 (Red Top Rd.) over Naked Creek							GROUND WTR (ft)										
BORING NO. EB2-A		STATION 15+68		OFFSET 11 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 1,132.4 ft		TOTAL DEPTH 13.0 ft		NORTHING 872,659		EASTING 1,311,663											
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 12/16/2019				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 01/29/20		COMP. DATE 01/29/20		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)		
1135															1,132.4	GROUND SURFACE	0.0
1130															1,127.4	ROADWAY EMBANKMENT Tan, Brown And Orange Sandy, Silty CLAY	5.0
1125	1,128.4	4.0	1	2	1										1,127.4	ALLUVIAL Brown And Gray Clayey, Silty SAND	5.0
1120	1,123.4	9.0	15	15	30										1,122.9	Tan And Orange Sandy, Silty GRAVEL	9.5
															1,122.4	RESIDUAL Gray And White Clayey, Silty Fine SAND	10.0
															1,119.4	CRYSTALLINE ROCK (GNEISS) Boring Terminated with Casing Advancer Refusal at Elevation 1,119.4 ft on CRYSTALLINE ROCK (GNEISS)	13.0

NCDOT BORE SINGLE 96_GEO_BRD0419_WILKES.BL.GPJ NC_DOT.GDT 3/3/20

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.11.R.153		TIP SF-960419		COUNTY WILKES		GEOLOGIST Stickney, J. K.											
SITE DESCRIPTION Bridge No. 419 on SR-1148 (Red Top Rd.) over Naked Creek							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 15+48		OFFSET 12 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 1,133.3 ft		TOTAL DEPTH 27.3 ft		NORTHING 872,643		EASTING 1,311,637											
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 12/16/2019				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 01/29/20		COMP. DATE 01/29/20		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)		
1135															1,133.3	GROUND SURFACE	0.0
1130	1,129.4	3.9	39	9	4									1,127.8	ROADWAY EMBANKMENT Tan, Brown And Orange Sandy, Silty CLAY With Trace of Rock Fragments	5.5	
1125	1,124.4	8.9	5	13	20												
1120	1,119.4	13.9	7	7	6										1,114.4	RESIDUAL Tan, Gray And White Clayey, Silty SAND	18.9
1115	1,114.4	18.9	73	27/0.1											1,114.4	WEATHERED ROCK Tan, Gray And White (GNEISS)	18.9
1110	1,109.4	23.9	100/0.3												1,106.0	CRYSTALLINE ROCK (GNEISS) Boring Terminated with Casing Advancer Refusal at Elevation 1,106.0 ft on CRYSTALLINE ROCK (GNEISS)	27.3

NCDOT BORE SINGLE 96_GEO_BRD0419_WILKES.BL.GPJ NC_DOT.GDT 3/3/20

SITE PHOTOGRAPHS

Bridge No. 419 on -L- (SR 1148) over Naked Creek



Looking South From End Bent 2



Looking South Toward End Bent 1