STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.8.R.70(SF-750212)	1	22

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.8.R.70 (SF-750212) F.A. PROJ. N/A

COUNTY RANDOLPH

PROJECT DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK

CONTENTS

PERSONNEL

HAMM, J. R.

HUNSBERGER, W. S.

EVANS, T. E.

TRIGON EXPLORATION

INVESTIGATED BY HUNSBERGER, W. S.

CHECKED BY HAMM, J. R.

SUBMITTED BY FALCON

DATE MAY 2014

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. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

NORTH CAROLINA PROFESSIONAL SEAL 040786 ENGINEER THOMAS E. EVANS 5/15/2014

DRAWN BY: EVANS, T. E.

PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.70 (SF-750212)	2

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

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, 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-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 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				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (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 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE							
MM	305	75	2.0	0.25	0.05	0.005
IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

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
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF SPT REFUSAL

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
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B- ___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-55
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [X] -N Q2
- [ ] -H _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.70 (SF-750212)	2A

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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 YEILD 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, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS 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 GROOVED 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 GROVED 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 FEET
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 THE 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, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

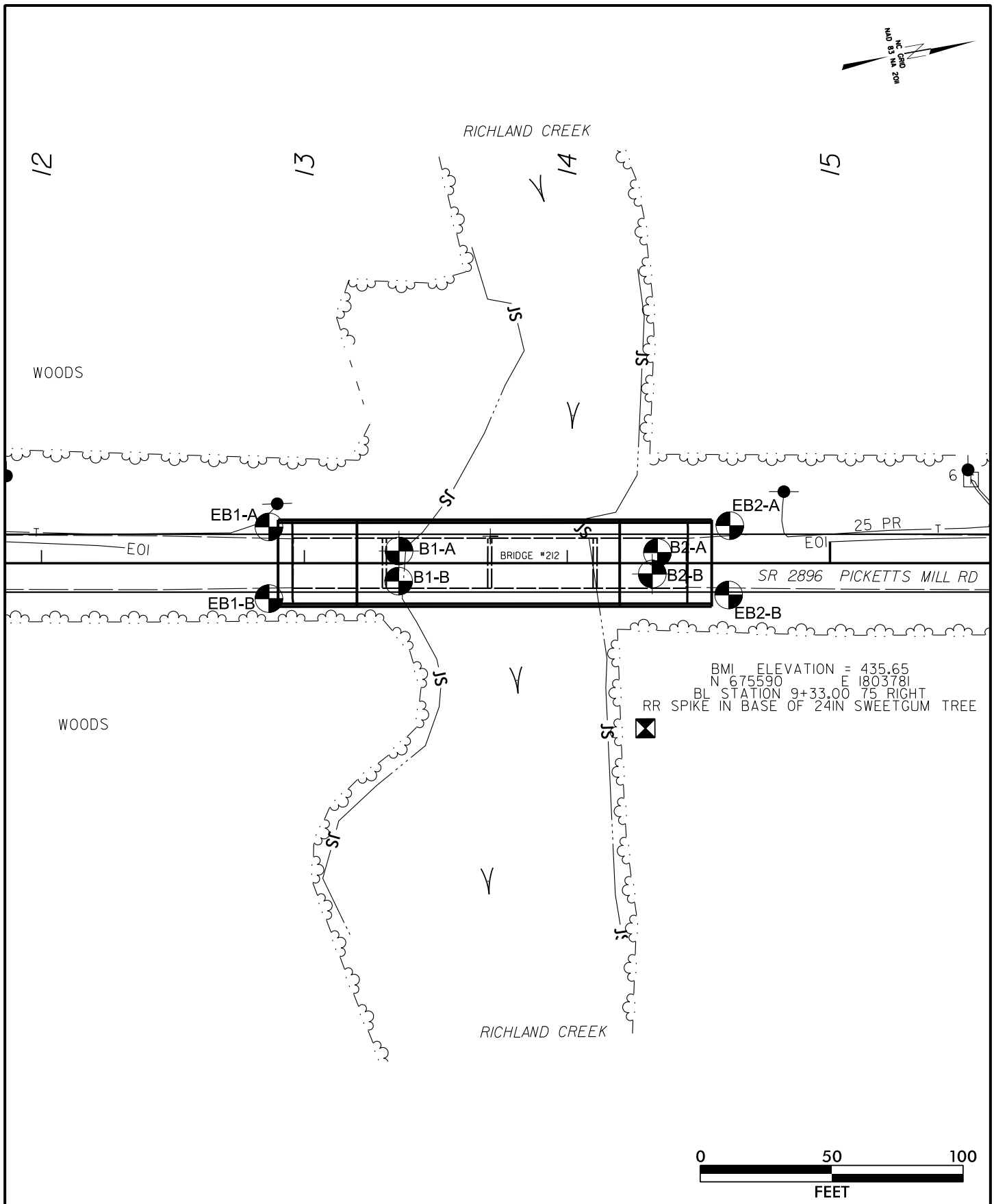
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM#1 BL STATION 9+33, 75' RT
(RR SPIKE IN BASE OF 24" SWEETGUM TREE)
N: 675590 FT E: 1803781FT ELEVATION: 435.65 FT.

NOTES:
FIAD - "FILLED IMMEDIATELY AFTER DRILLING"

REVISED 09/23/09



NOTES:

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEOTECHNICAL UNIT IN MARCH 2014
- APPROXIMATE BRIDGE SKEW: 90 DEGREES

FALCON ENGINEERING

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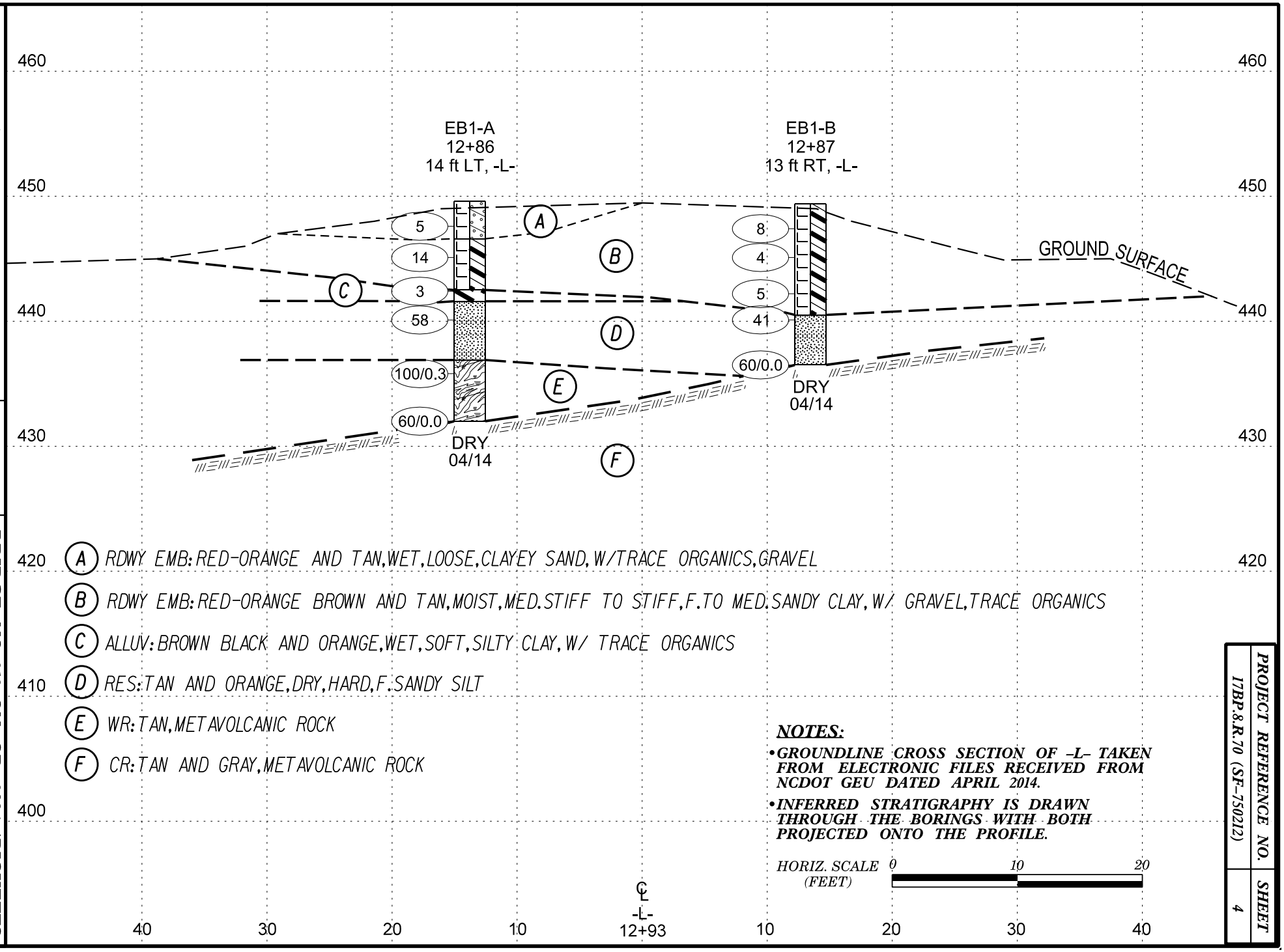
BORING LOCATION PLAN

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL RD) OVER RICHLAND CREEK
RANDOLPH COUNTY, NORTH CAROLINA
WBS.: 17BP.8.R.70, TIP.: SF-750212
FALCON PROJECT NO.: G14014.00



(A) RDWY EMB: RED-ORANGE AND TAN, WET, LOOSE, CLAYEY SAND, W/TRACE ORGANICS, GRAVEL

(B) RDWY EMB: RED-ORANGE BROWN AND TAN, MOIST, MED. STIFF TO STIFF, F. TO MED. SANDY CLAY, W/ GRAVEL, TRACE ORGANICS

(C) ALLUV: BROWN BLACK AND ORANGE, WET, SOFT, SILTY CLAY, W/ TRACE ORGANICS

(D) RES: TAN AND ORANGE, DRY, HARD, F. SANDY SILT

(E) WR: TAN, METAVOLCANIC ROCK

(F) CR: TAN AND GRAY, METAVOLCANIC ROCK

NOTES:

- ***GROUNDLINE CROSS SECTION OF –L– TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU DATED APRIL 2014.***
- ***INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.***

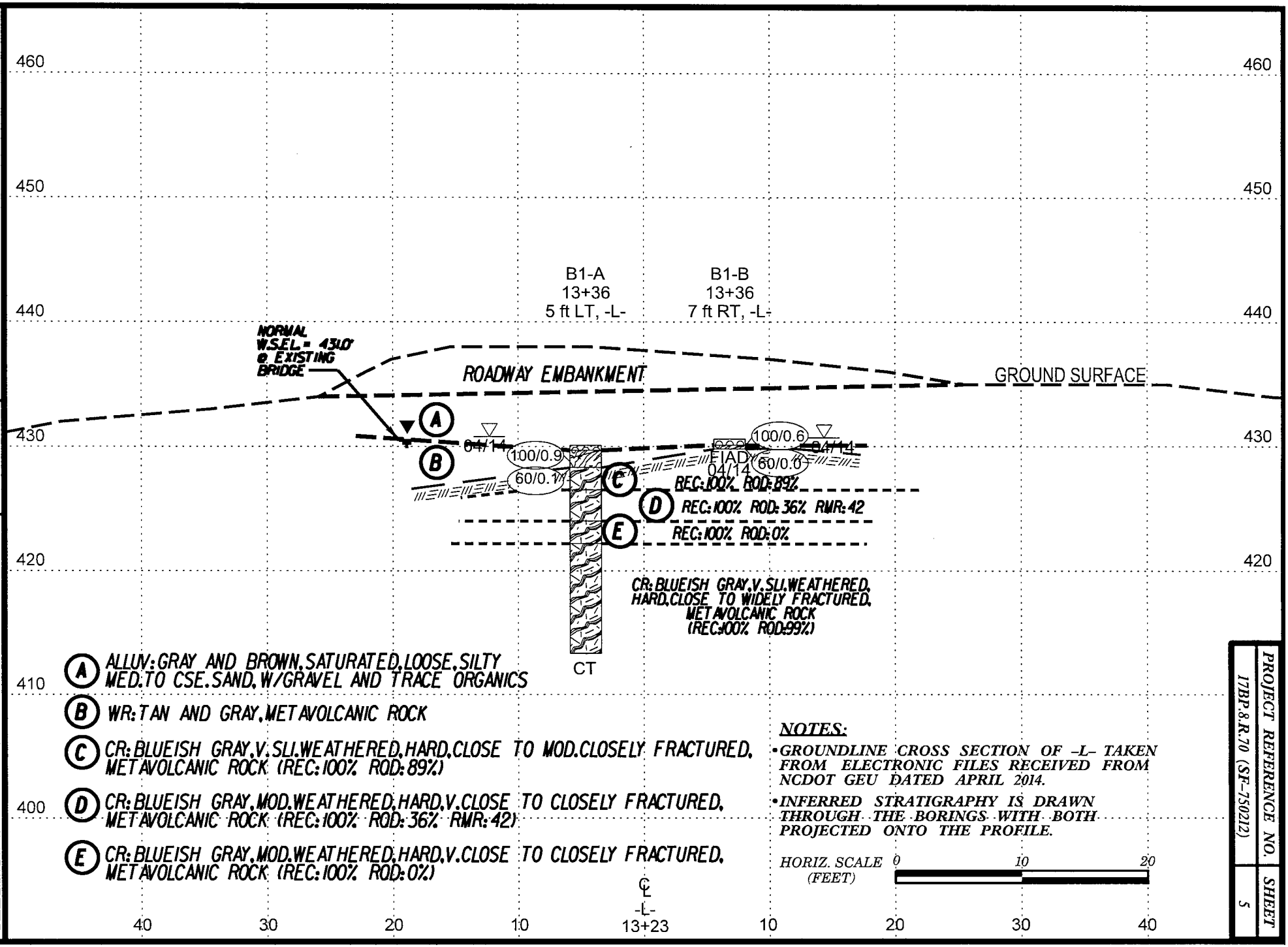
HORIZ. SCALE (FEET) 0 10 20

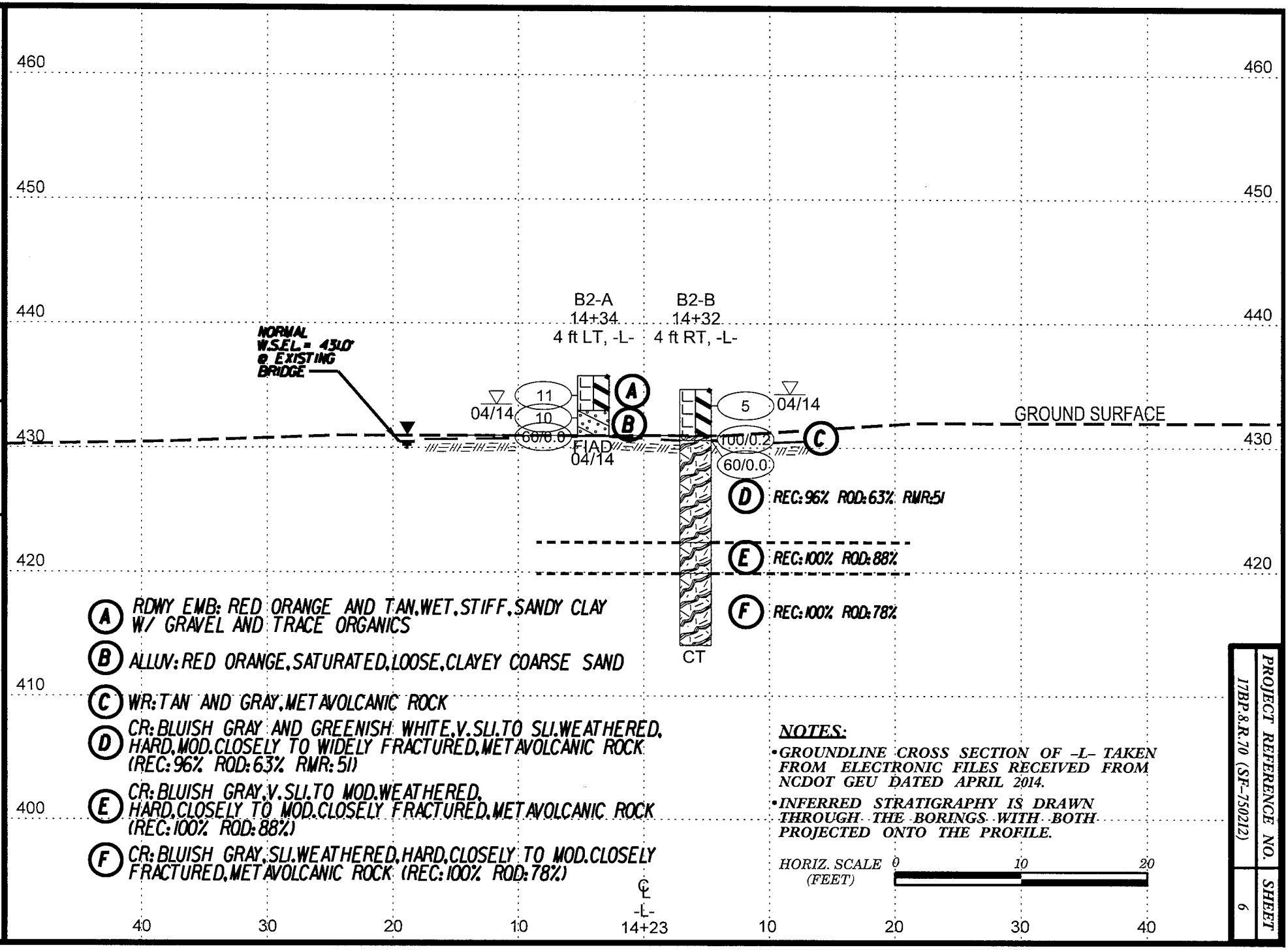
VERT. SCALE (FEET) 0 10 20

VE = 1:1

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK

PROJECT REFERENCE NO.	SHEET
17BP.8.R.70 (SF-750212)	4

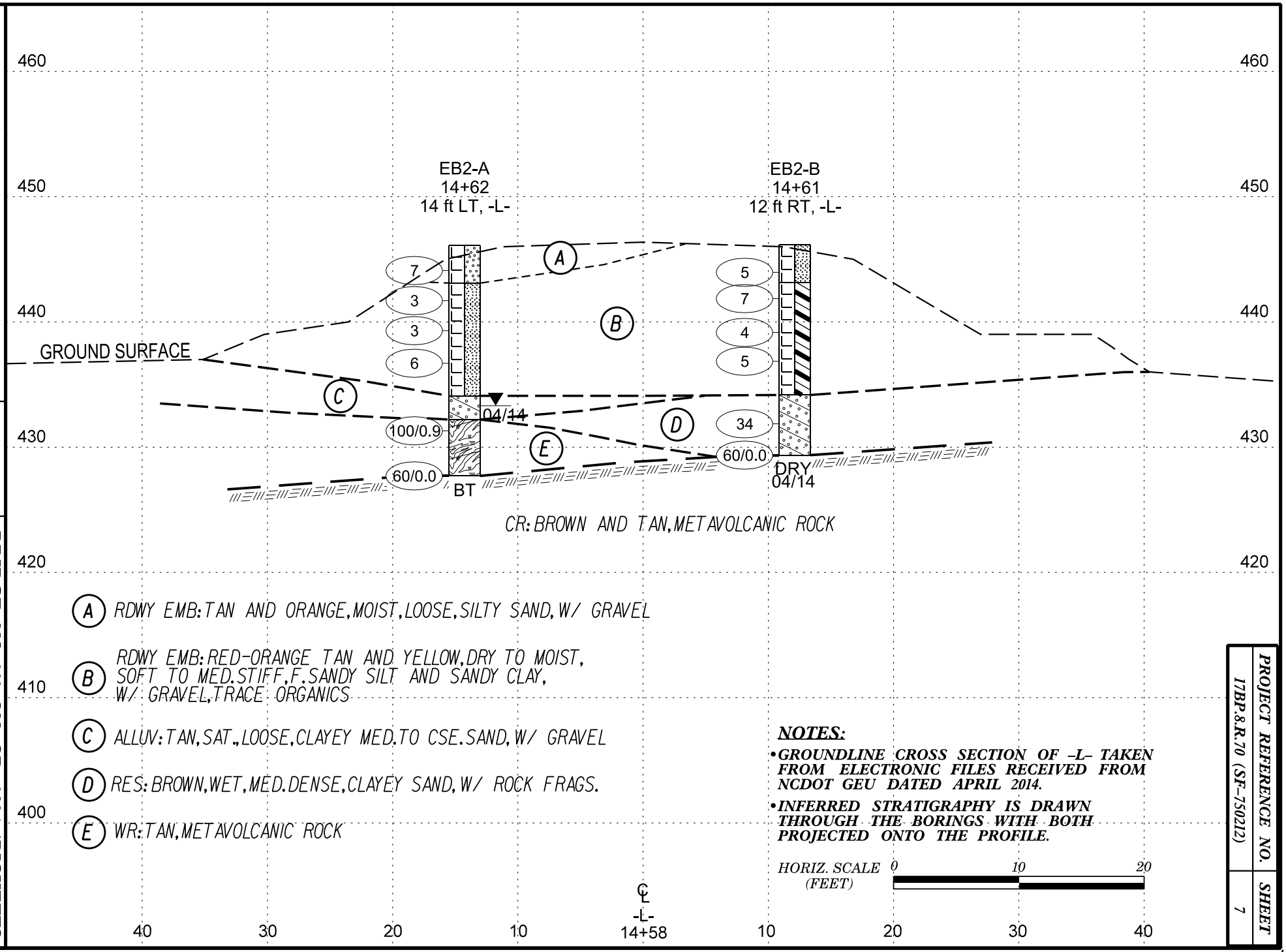

VERT. SCALE (FEET)
0
10
20
VE = 1:1
460
450
440
430
420
410
400
B1-A
13+36
5 ft LT, -L-
B1-B
13+36
7 ft RT, -L-
NORMAL W.S.EL. = 431.0' @ EXISTING BRIDGE
ROADWAY EMBANKMENT
GROUND SURFACE
A
B
C
D
E
04/14
100/0.9
60/0.1
100/0.6
60/0.0
FIAD
REC:100% ROD:89%
REC:100% ROD:36% RMR:42
REC:100% ROD:0%
CR: BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO WIDELY FRACTURED, METAVOLCANIC ROCK (REC:100% ROD:99%)
CT
℄ -L- 13+23
40
30
20
10
10
20
30
40
A ALLUV: GRAY AND BROWN, SATURATED, LOOSE, SILTY MED. TO CSE. SAND, W/GRAVEL AND TRACE ORGANICS
B WR: TAN AND GRAY, METAVOLCANIC ROCK
C CR: BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK (REC: 100% ROD: 89%)
D CR: BLUEISH GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METAVOLCANIC ROCK (REC: 100% ROD: 36% RMR: 42)
E CR: BLUEISH GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METAVOLCANIC ROCK (REC: 100% ROD: 0%)
NOTES:
• GROUNDLINE CROSS SECTION OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU DATED APRIL 2014.
• INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
HORIZ. SCALE (FEET)
0
10
20
BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK
PROJECT REFERENCE NO.
17BP.8.R.70 (SF-750212)
SHEET
5



BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK

PROJECT REFERENCE NO. 17BP.8.R.70 (SF-750212)

SHEET 6



(A) RDWY EMB: TAN AND ORANGE, MOIST, LOOSE, SILTY SAND, W/ GRAVEL

(B) RDWY EMB: RED-ORANGE TAN AND YELLOW, DRY TO MOIST, SOFT TO MED. STIFF, F. SANDY SILT AND SANDY CLAY, W/ GRAVEL, TRACE ORGANICS

(C) ALLUV: TAN, SAT., LOOSE, CLAYEY MED. TO CSE. SAND, W/ GRAVEL

(D) RES: BROWN, WET, MED. DENSE, CLAYEY SAND, W/ ROCK FRAGS.

(E) WR: TAN, METAVOLCANIC ROCK

NOTES:

- ***GROUNDLINE CROSS SECTION OF –L– TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU DATED APRIL 2014.***
- ***INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.***

HORIZ. SCALE (FEET) 0 10 20

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK

PROJECT REFERENCE NO.	SHEET
17BP.8.R.70 (SF-750212)	7

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 12+86	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 449.6 ft	**TOTAL DEPTH** 17.6 ft	**NORTHING** 675,463	**EASTING** 1,803,680	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/04/14	**COMP. DATE** 04/04/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450										449.6 GROUND SURFACE: 0.2 TOPSOIL	0.0
	448.6	1.0	2	3	2	5		W		**ROADWAY EMBANKMENT** RED-ORANGE AND TAN, CLAYEY SAND (A-2-6) W/ GRAVEL, TRACE ORGANICS	
	446.1	3.5	3	5	9	14		M		446.6 RED-ORANGE, SANDY CLAY (A-6) W/ GRAVEL	3.0
445	443.4	6.2	2	1	2	3		W		442.5	7.1
	441.1	8.5	10	22	36	58		D		441.6 **ALLUVIAL** BROWN BLACK AND ORANGE, SILTY CLAY (A-7) W/ TRACE ORGANICS	8.0
440										**RESIDUAL** 436.9 TAN, F. SANDY SILT (A-4)	12.7
	436.1	13.5	100/0.3			100/0.3				**WEATHERED ROCK** TAN, METAVOLCANIC ROCK	
435	432.0	17.6	60/0.0			60/0.0				432.0	17.6

Boring Terminated with Standard Penetration Test Refusal at Elevation 432.0 ft on CR: Metavolcanic Rock

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 12+87	**OFFSET** 13 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 449.4 ft	**TOTAL DEPTH** 12.9 ft	**NORTHING** 675,458	**EASTING** 1,803,707	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/04/14	**COMP. DATE** 04/04/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450										449.4 GROUND SURFACE: 0.1 TOPSOIL	0.0
	448.4	1.0								**ROADWAY EMBANKMENT**	
			2	2	6	8		M		RED-ORANGE BROWN AND TAN, F. SANDY CLAY (A-6) W/ GRAVEL, TRACE ORGANICS	
	446.1	3.3									
445			1	2	2	4		M		(NOTE: LOW RECOVERY FROM 1' - 2.5' DUE TO GRAVEL IN SPOON)	
	443.2	6.2									
			1	3	2	5		M			
	441.1	8.3								440.5	8.9
440			3	9	32	41		D		**RESIDUAL** TAN AND ORANGE, SILT (A-4)	
	436.5	12.9								436.5	12.9
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 436.5 ft on CR: Metavolcanic Rock	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 13+36	**OFFSET** 5 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 430.1 ft	**TOTAL DEPTH** 16.8 ft	**NORTHING** 675,510	**EASTING** 1,803,698	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/09/14	**COMP. DATE** 04/09/14	**SURFACE WATER DEPTH** 0.7ft

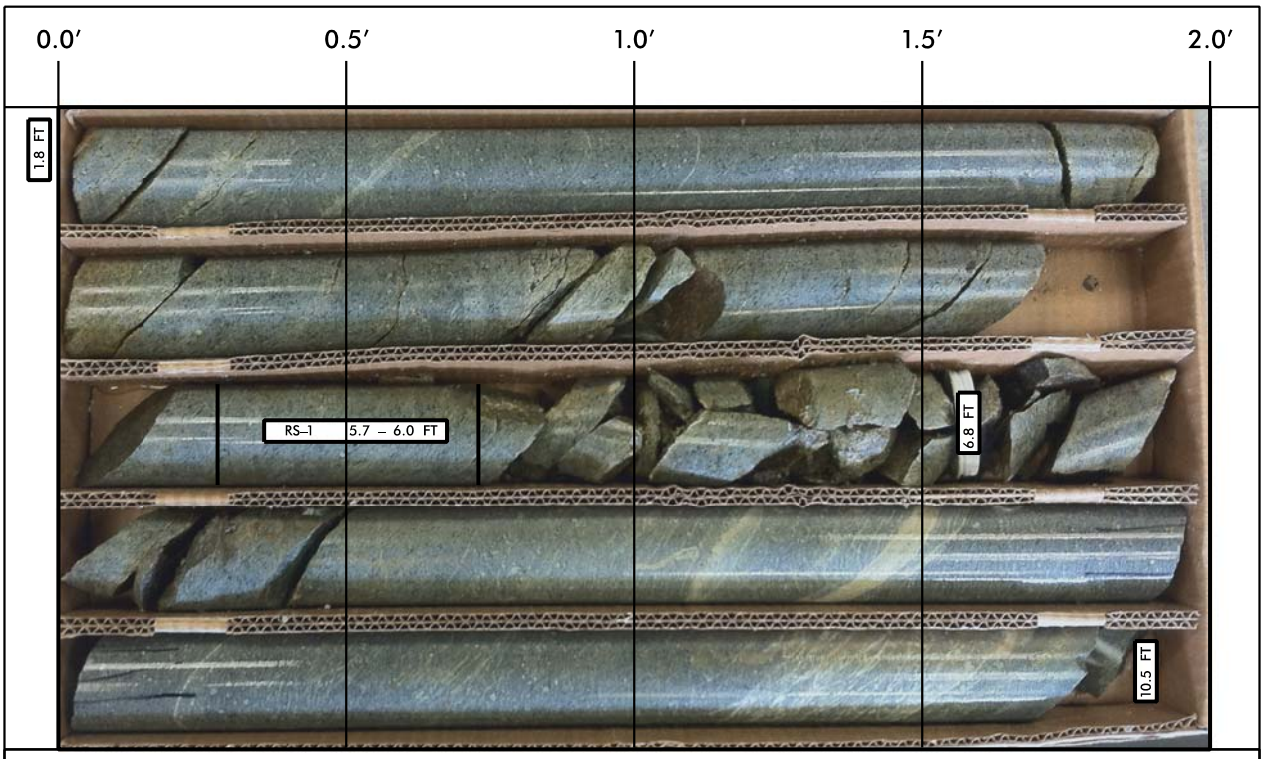
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
435											
430										430.1 GROUND SURFACE	0.0
	429.7	0.4								429.7	0.4
	428.3	1.8	4	96/0.4		100/0.9				428.3 **ALLUVIAL** GRAY, SILTY CSE. SAND (A-1-b) W/ GRAVEL	1.8
			60/0.1			60/0.1				426.5 **WEATHERED ROCK** TAN AND GRAY, METAVOLCANIC ROCK	3.6
425										424.0 **CRYSTALLINE ROCK** BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK	6.1
							RS-1			422.2 **CRYSTALLINE ROCK** BLUEISH GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METAVOLCANIC ROCK	7.9
420											
415										413.3 **CRYSTALLINE ROCK** BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO WIDELY FRACTURED, METAVOLCANIC ROCK	16.8

Boring Terminated at Elevation 413.3 ft in CR: Metavolcanic Rock

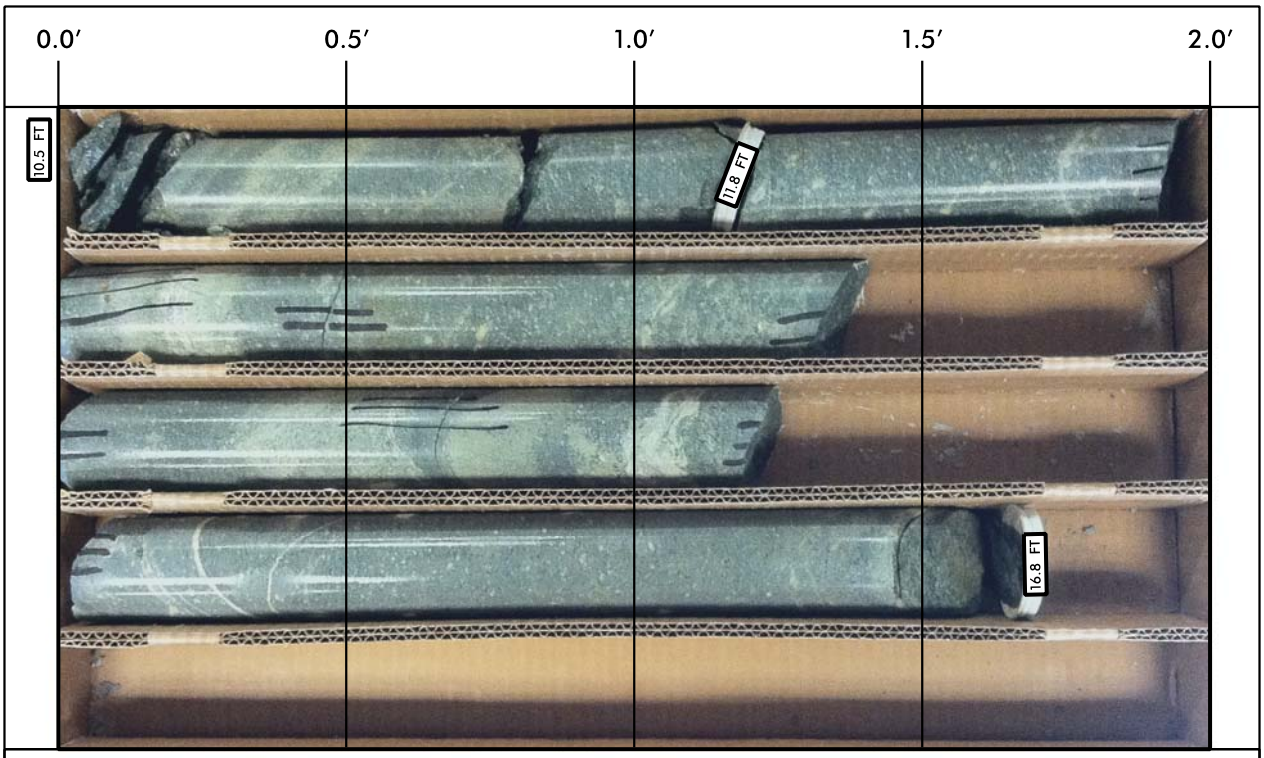
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 13+36	**OFFSET** 5 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 430.1 ft	**TOTAL DEPTH** 16.8 ft	**NORTHING** 675,510	**EASTING** 1,803,698	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/09/14	**COMP. DATE** 04/09/14	**SURFACE WATER DEPTH** 0.7ft
CORE SIZE NQ2	**TOTAL RUN** 15.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
428.3											Begin Coring @ 1.8 ft
	428.3	1.8	5.0	4:04/1.0 3:18/1.0 2:02/1.0 2:06/1.0 2:30/1.0	(5.0) 100%	(2.6) 52%		(1.8) 100% (2.5) 100%	(1.6) 89% (0.9) 36%		428.3 / 1.8 — **CRYSTALLINE ROCK** BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK
425											426.5 / 3.6
	423.3	6.8	5.0	3:06/1.0 3:10/1.0 2:42/1.0 2:11/1.0 1:29/1.0	(5.0) 100%	(4.0) 80%	RS-1	(1.8) 100% (8.9) 100%	(0.0) 0% (8.8) 99%		424.0 / 6.1 — **CRYSTALLINE ROCK** BLUEISH GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METAVOLCANIC ROCK R1=7, R2=3, R3=8, R4=20, R5=4, RMR=42 CLASS=III, TYPE=E
420											422.2 / 7.9
	418.3	11.8	5.0	1:56/1.0 1:59/1.0 1:56/1.0 2:23/1.0 2:38/1.0	(4.8) 96%	(4.7) 94%					**CRYSTALLINE ROCK** BLUEISH GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METAVOLCANIC ROCK
415											
	413.3	16.8									413.3 / 16.8 — **CRYSTALLINE ROCK** BLUEISH GRAY, V. SLI. WEATHERED, HARD, CLOSE TO WIDELY FRACTURED, METAVOLCANIC ROCK
											Boring Terminated at Elevation 413.3 ft in CR: Metavolcanic Rock



BORING B1–A, BOX 1 OF 2, 1.8 FEET TO 10.5 FEET.



BORING B1–A, BOX 2 OF 2, 10.5 FEET TO 16.8 FEET.

0 4″ 8″
INCHES

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

ROCK CORE PHOTOS

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK
RANDOLPH COUNTY, NORTH CAROLINA
WBS.: 17BP.8.R.70 TIP.: SF–750212
FALCON PROJECT NO.: G14014.00

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 13+36	**OFFSET** 7 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 430.6 ft	**TOTAL DEPTH** 0.8 ft	**NORTHING** 675,507	**EASTING** 1,803,709	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/04/14	**COMP. DATE** 04/04/14	**SURFACE WATER DEPTH** 0.1ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
435											
430	430.6	0.0								430.6 GROUND SURFACE	0.0
	429.8	0.8	8	92/0.1		100/0.6				430.1 **ALLUVIAL** BROWN, SILTY MED. TO CSE. SAND (A-1-b) W/ TRACE ORGANICS	0.5
			60/0.0			60/0.0				429.8 **WEATHERED ROCK** TAN, METAVOLCANIC ROCK	0.8

Boring Terminated with Standard Penetration Test Refusal at Elevation 429.8 ft in CR: Metavolcanic Rock

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 14+34	**OFFSET** 4 ft LT	**ALIGNMENT** -L-	**0 HR.** 2.3
COLLAR ELEV. 435.8 ft	**TOTAL DEPTH** 4.9 ft	**NORTHING** 675,606	**EASTING** 1,803,716	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/08/14	**COMP. DATE** 04/08/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
440											
435	435.2	0.6								435.8 GROUND SURFACE	0.0
	433.4	2.4	6	6	5	11		W		433.0 **ROADWAY EMBANKMENT** REDDISH ORANGE AND TAN, SANDY CLAY (A-7) W/ GRAVEL AND TRACE ORGANICS	2.8
	430.9	4.9	4	4	6	10		Sat.		430.9 **ALLUVIAL** RED ORANGE, CLAYEY CSE. SAND (A-2-6)	4.9
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 430.9 ft on CR: Metavolcanic Rock	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 14+32	**OFFSET** 4 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.4
COLLAR ELEV. 434.7 ft	**TOTAL DEPTH** 20.6 ft	**NORTHING** 675,603	**EASTING** 1,803,723	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/08/14	**COMP. DATE** 04/08/14	**SURFACE WATER DEPTH** N/A

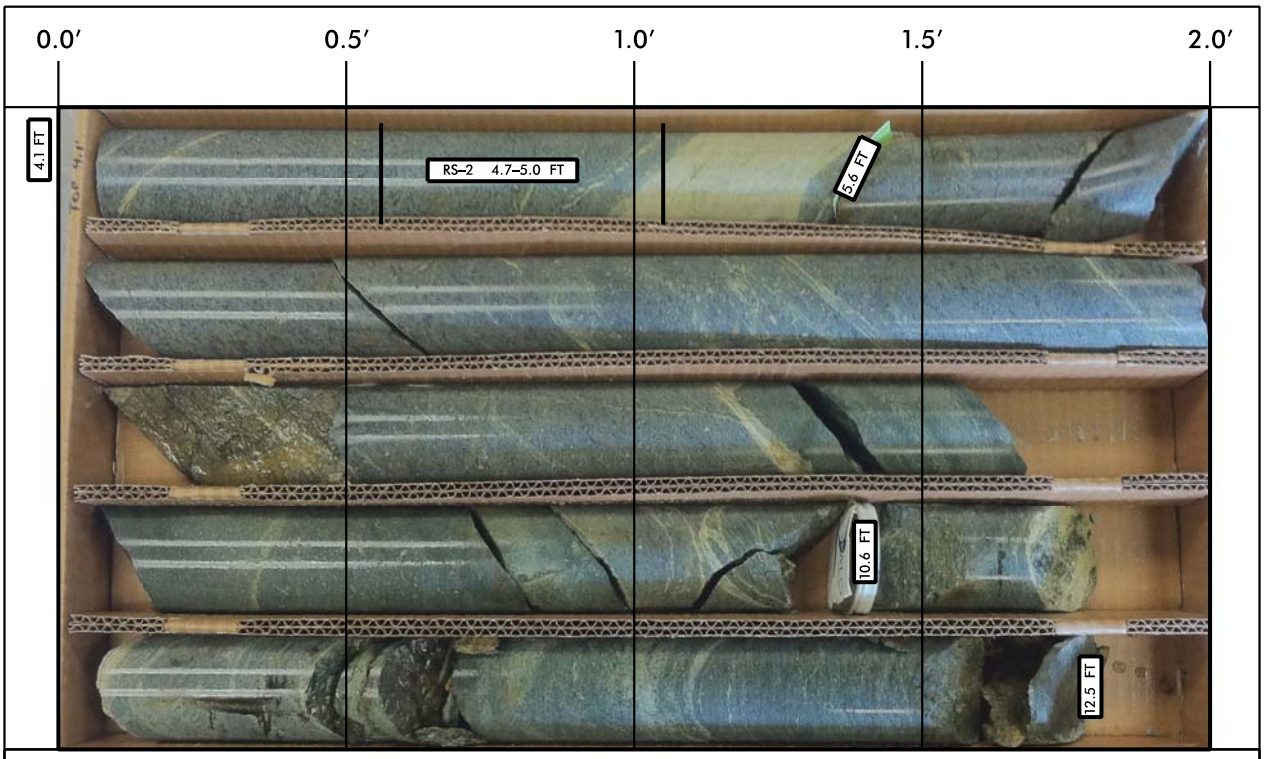
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
435										434.7 GROUND SURFACE	0.0
	434.4	0.3	10	3	2	5		W		**ROADWAY EMBANKMENT** REDDISH ORANGE AND BROWN, CSE. SANDY CLAY (A-7) W/ GRAVEL AND TRACE ORGANICS	
	430.9	3.8								430.9	3.8
430	430.6	4.1	100/0.2 60/0.0			100/0.2 60/0.0	RS-2			430.6 **WEATHERED ROCK** TAN AND GRAY, METAVOLCANIC ROCK	4.1
425										**CRYSTALLINE ROCK** BLUEISH GRAY AND GREENISH WHITE, V. SLI. TO SLI. WEATHERED, HARD, MOD. CLOSELY TO WIDELY FRACTURED, METAVOLCANIC ROCK	
										422.4	12.3
420										**CRYSTALLINE ROCK** BLUEISH GRAY, V. SLI. TO MOD. WEATHERED, HARD, CLOSELY TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK	
										419.9	14.8
415										**CRYSTALLINE ROCK** BLUEISH GRAY, SLI. WEATHERED, HARD, CLOSELY TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK	
										414.1	20.6

Boring Terminated at Elevation 414.1 ft in CR: Metavolcanic Rock

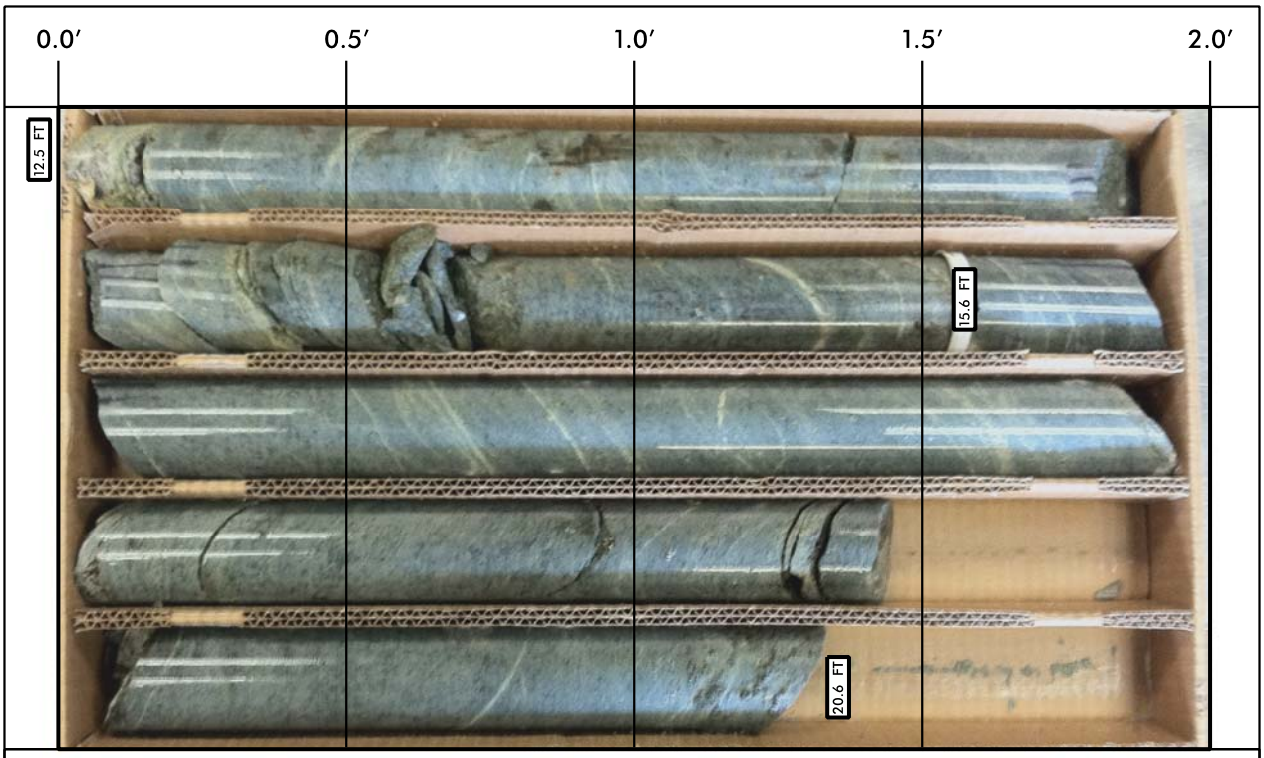
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 14+32	**OFFSET** 4 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.4
COLLAR ELEV. 434.7 ft	**TOTAL DEPTH** 20.6 ft	**NORTHING** 675,603	**EASTING** 1,803,723	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/08/14	**COMP. DATE** 04/08/14	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 16.5 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS (ELEV. (ft) / DEPTH (ft))
430.6											Begin Coring @ 4.1 ft
430	430.6	4.1	1.5	1:51/0.5	(1.3)	(1.3)		(7.9)	(5.2)		430.6 / 4.1 **CRYSTALLINE ROCK** BLUEISH GRAY AND GREENISH WHITE, V. SLI. TO SLI. WEATHERED, HARD, MOD. CLOSELY TO WIDELY FRACTURED, METAVOLCANIC ROCK
	429.1	5.6	5.0	4:12/1.0	87%	87%	RS-2	96%	63%		
				2:53/1.0							
				3:12/1.0	(4.9)	(3.6)					
				2:38/1.0	98%	72%					
				2:17/1.0							
425				2:15/1.0							R1=4, R2=13, R3=10, R4=20, R5=4, RMR=51 CLASS=III, TYPE=E
	424.1	10.6	5.0	2:45/1.0	(5.0)	(3.3)					422.4 / 12.3
				1:54/1.0	100%	66%					**CRYSTALLINE ROCK**
				2:46/1.0				(2.5)	(2.2)		BLUEISH GRAY, V. SLI. TO MOD. WEATHERED, HARD, CLOSELY TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK
				2:27/1.0				100%	88%		
420				2:55/1.0							419.9 / 14.8
	419.1	15.6	5.0	2:45/1.0	(5.0)	(3.7)		(5.8)	(4.5)		**CRYSTALLINE ROCK**
				2:54/1.0	100%	74%		100%	78%		BLUEISH GRAY, SLI. WEATHERED, HARD, CLOSELY TO MOD. CLOSELY FRACTURED, METAVOLCANIC ROCK
				2:21/1.0							
				2:42/1.0							
415				2:31/1.0							
	414.1	20.6									414.1 / 20.6
											Boring Terminated at Elevation 414.1 ft in CR: Metavolcanic Rock



BORING B2–B, BOX 1 OF 2, 4.1 FEET TO 12.5 FEET.



BORING B2–B, BOX 2 OF 2, 12.5 FEET TO 20.6 FEET.

0 4″ 8″
INCHES

FALCON ENGINEERING
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ROCK CORE PHOTOS

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK
RANDOLPH COUNTY, NORTH CAROLINA
WBS.: 17BP.8.R.70 TIP.: SF–750212
FALCON PROJECT NO.: G14014.00

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 14+62	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.6
COLLAR ELEV. 446.1 ft	**TOTAL DEPTH** 18.4 ft	**NORTHING** 675,635	**EASTING** 1,803,710	**24 HR.** 12.8
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/03/14	**COMP. DATE** 04/03/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450											
										446.1 GROUND SURFACE: 0.2 TOPSOIL	0.0
445	445.1	1.0								**ROADWAY EMBANKMENT**	
			2	3	4	7		M		TAN AND ORANGE, SILTY SAND (A-2-4) W/ GRAVEL	
	442.7	3.4								443.1	3.0
			1	1	2	3		M		RED-ORANGE AND TAN, CLAYEY SILT (A-4) W/ GRAVEL AND TRACE ORGANICS	
440	440.3	5.8									
			1	2	1	3		M			
	437.7	8.4									
			1	2	4	6		D			
435										434.1	12.0
	432.7	13.4								**ALLUVIAL**	
			23	72	28/0.4	100/0.9				432.2 TAN, CLAYEY MEDIUM CSE. SAND (A-2-6) W/ GRAVEL	13.9
430										**WEATHERED ROCK**	
	427.7	18.4								TAN, METAVOLCANIC ROCK	
			60/0.0			60/0.0				427.7	18.4

Boring Terminated with Standard Penetration Test Refusal at Elevation 427.7 ft on CR: Metavolcanic Rock

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 17BP.8.R.70	**TIP** SF-750212	**COUNTY** RANDOLPH	**GEOLOGIST** Hunsberger, W. S.
SITE DESCRIPTION BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 14+61	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 446.2 ft	**TOTAL DEPTH** 16.8 ft	**NORTHING** 675,630	**EASTING** 1,803,736	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Whichard, S. W.	**START DATE** 04/03/14	**COMP. DATE** 04/03/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT (0 25 50 75 100)	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
450										
										446.2 GROUND SURFACE: 0.7 GRAVEL 0.0
445	445.0	1.2								**ROADWAY EMBANKMENT**
			2	2	3	5		M		ORANGE AND TAN, F. SANDY SILT (A-4)
	442.9	3.3								443.2 3.0
			2	2	5	7		D		TAN YELLOW AND ORANGE, F. SANDY CLAY (A-6) W/ GRAVEL, TRACE ORGANICS
440	440.2	6.0								
			2	1	3	4		M		
	437.9	8.3								
			2	2	3	5		D		
435										434.2 12.0
	432.9	13.3								**RESIDUAL**
			5	8	26	34		W		BROWN, CLAYEY SAND (A-2-6) W/ ROCK FRAGS.
430	429.4	16.8								429.4 16.8
			60/0.0			60/0.0				Boring Terminated by Auger Refusal at Elevation 429.4 ft on CR: Metavolcanic Rock

FALCON ENGINEERING 1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

SUMMARY OF ROCK CORE TEST RESULTS

BRIDGE NO. 212 ON SR 2896 (PICKETT MILL ROAD) OVER RICHLAND CREEK

WBS NO.: 17BP.8.R.70 , TIP NO.: SF-750212

RANDOLPH COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G14014.00

Sample No.	Boring	Station	Offset	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Rock Mass Rating (RMR)	Failure
RS-1	B1-A	13+36	6 ft LT	5.7-6.0	METAVOLCANIC ROCK	CZve	81%	0.37	0.16	169.3	10,863	2,532,920	42	
RS-2	B2-B	14+32	6 ft RT	4.7-5.0	METAVOLCANIC ROCK	CZve	84%	0.34	0.16	168.1	6,149	1,556,805	51	

SIGNATURE: **NCDOT No.:** **123-01-0509**

Notes:
- LL = Liquid limit
- PL = Plastic limit
- PI = Plasticity index = LL - PL

PHOTOGRAPH TAKEN FROM NEAR END BENT 2 LOOKING DOWNSTATION AT EXISTING BRIDGE STRUCTURE

PHOTOGRAPH TAKEN FROM UNDERNEATH EXISTING BRIDGE LOOKING AT BEDROCK CONDITIONS NEAR INTERIOR BENT 2.

FALCON ENGINEERING

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SITE PHOTOGRAPHS

BRIDGE NO. 212 ON SR 2896 (PICKETTS MILL ROAD) OVER RICHLAND CREEK
RANDOLPH COUNTY, NORTH CAROLINA
WBS.: 17BP.8.R.70 TIP.: SF-750212
FALCON PROJECT NO.: G14014.00