

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.102 (44-0215)	1	17

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.14.R.102 F.A. PROJ. 44-0215
COUNTY HENDERSON
PROJECT DESCRIPTION BRIDGE NO. 215 OVER MIDDLE FORK CREEK ON SR 1605
SITE DESCRIPTION _____

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PERSONNEL

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M. BAHIRADHAN
S. BUCHANAN
RED DOG DRLLG.

INVESTIGATED BY RED DOG DRLLG.

CHECKED BY M. BAHIRADHAN

SUBMITTED BY SCHNABEL ENG.

DATE JUNE 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.

DRAWN BY: S. BUCHANAN



[Handwritten Signature]
8/7/15

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

SOIL DESCRIPTION										GRADATION									
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 T296, 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: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION									
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-7.5, A-7.6, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, A-17, A-18, A-19, A-20, A-21, A-22, A-23, A-24, A-25, A-26, A-27, A-28, A-29, A-30, A-31, A-32, A-33, A-34, A-35, A-36, A-37, A-38, A-39, A-40, A-41, A-42, A-43, A-44, A-45, A-46, A-47, A-48, A-49, A-50, A-51, A-52, A-53, A-54, A-55, A-56, A-57, A-58, A-59, A-60, A-61, A-62, A-63, A-64, A-65, A-66, A-67, A-68, A-69, A-70, A-71, A-72, A-73, A-74, A-75, A-76, A-77, A-78, A-79, A-80, A-81, A-82, A-83, A-84, A-85, A-86, A-87, A-88, A-89, A-90, A-91, A-92, A-93, A-94, A-95, A-96, A-97, A-98, A-99, A-100, A-101, A-102, A-103, A-104, A-105, A-106, A-107, A-108, A-109, A-110, A-111, A-112, A-113, A-114, A-115, A-116, A-117, A-118, A-119, A-120, A-121, A-122, A-123, A-124, A-125, A-126, A-127, A-128, A-129, A-130, A-131, A-132, A-133, A-134, A-135, A-136, A-137, A-138, A-139, A-140, A-141, A-142, A-143, A-144, A-145, A-146, A-147, A-148, A-149, A-150, A-151, A-152, A-153, A-154, A-155, A-156, 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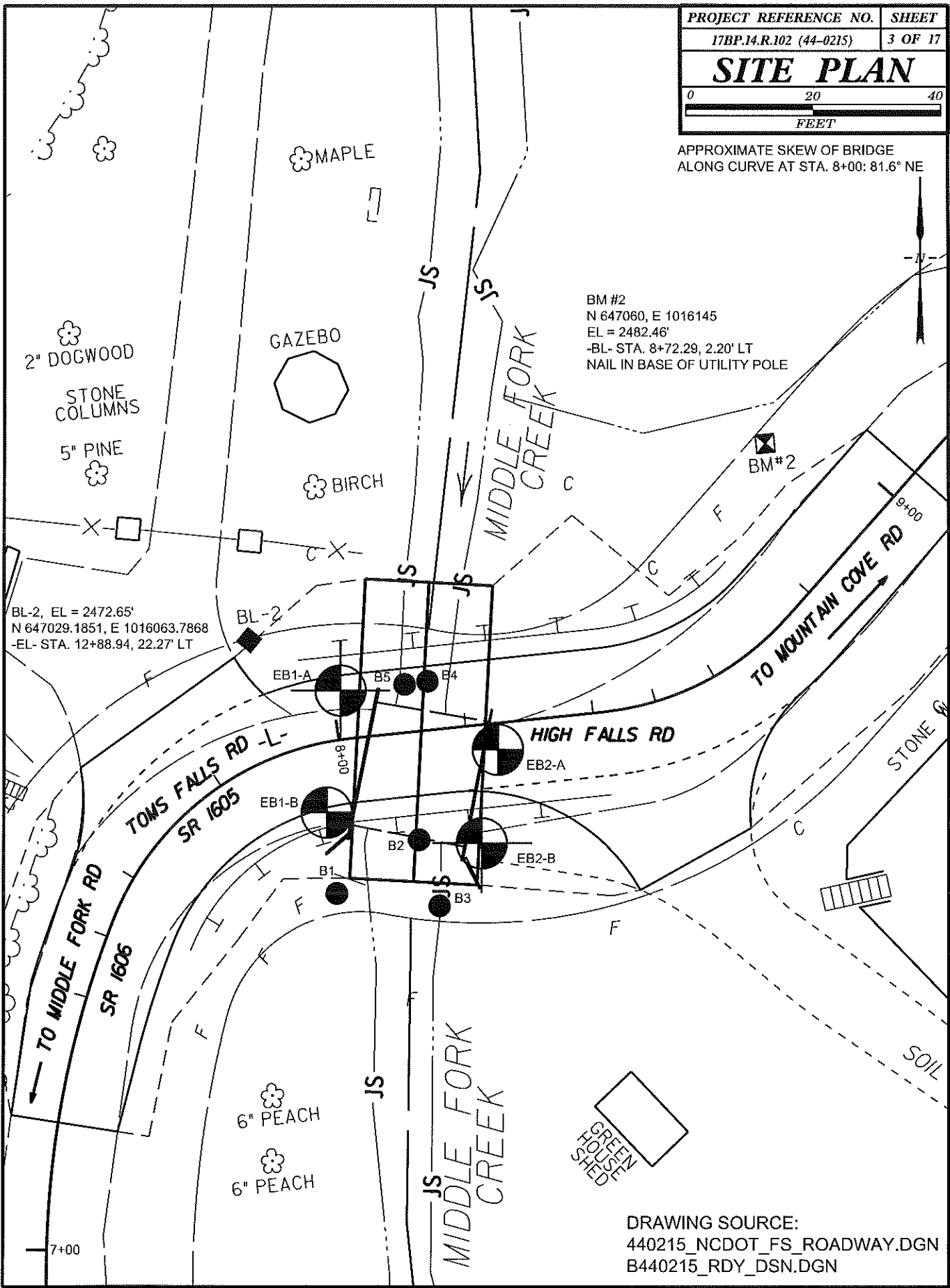
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
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:		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. FISSELE - 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.	
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 (INCR)		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 SLT.)	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 (SLT.)	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. COUGES 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 COUGED 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 COUGED 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 FINGER NAIL.		
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 FEET	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 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.		
BENCH MARK: BL-2, N 647029.1851, E 1016063.7868, -EL- STA. 12+88.94, 22.27' LT		ELEVATION: 2472.65 FT.	
NOTES: FIAD = FILLED IMMEDIATELY AFTER DRILLING			

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PROJECT REFERENCE NO.	SHEET
17BP.14.R.102 (44-0215)	3 OF 17
SITE PLAN	
0 20 40 FEET	

APPROXIMATE SKEW OF BRIDGE
ALONG CURVE AT STA. 8+00: 81.6° NE



DRAWING SOURCE:
440215_NCDOT_FS_ROADWAY.DGN
B440215_RDY_DSN.DGN

[illegible]



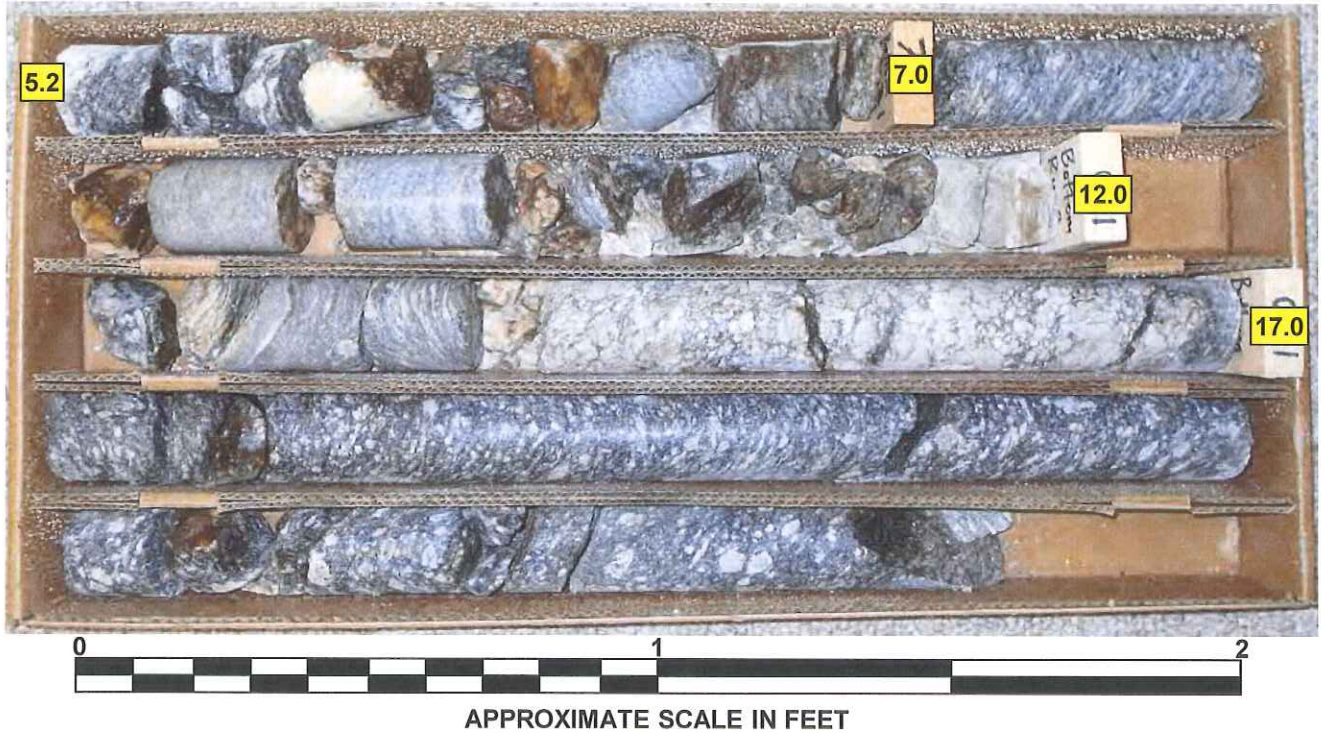
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 5 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan						
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605							GROUND WTR (ft)					
BORING NO. EB1-A		STATION 8+01		OFFSET 8 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 2,472.5 ft		TOTAL DEPTH 22.0 ft		NORTHING 647,021		EASTING 1,016,078						
DRILL RIG/HAMMER EFF./DATE Red Dog Drilling CME-45		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic								
DRILLER M. Seiler		START DATE 05/06/14		COMP. DATE 05/06/14		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 16.8 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
2467.37	2,467.37	5.2	1.8	2:07/1.0	(1.4)	(0.0)		(4.1)	(0.5)		Begin Coring @ 5.1 ft	
2465	2,465.5	7.0	5.0	1:45/0.8	78%	0%		38%	5%		CRYSTALLINE ROCK	5.1
				1:37/1.0	(2.1)	(0.5)					BROWNISH GRAY AND WHITE, MODERATE WEATHERED, MODERATELY HARD, VERY CLOSE FRACTURED, GNEISS (LAYERED ROCK AND SEDIMENT, PROBABLE COLLUVIUM DEPOSIT)	
				1:35/1.0	42%	10%						
				1:20/1.0								
				0:47/1.0								
2460	2,460.5	12.0	5.0	1:13/1.0								
				1:04/1.0	(1.8)	(1.1)						
				0:56/1.0	36%	22%						
				0:58/1.0								
				1:38/1.0								
2455	2,455.5	17.0	5.0	1:41/1.0				(5.6)	(3.8)		CRYSTALLINE ROCK	15.8
				1:44/1.0	(4.4)	(2.7)		90%	61%		PINKISH WHITE AND GRAY, FRESH WEATHERED, HARD, MODERATELY CLOSE TO CLOSE FRACTURED, GNEISS	
				1:31/1.0	88%	54%					4 FRACTURES OF 30, 50, AND 70 DEGREES WITH IRON-STAIN INFILLING	
				1:20/1.0								
				1:26/1.0								
	2,450.5	22.0		0:34/1.0								22.0
Boring Terminated at Elevation 2,450.5 ft in Crystalline Rock (Gneiss)												

CORE PHOTOGRAPHS
BRIDGE NO. 215 OVER MIDDLE FORK CREEK ON SR 1605

EB1-A
BOX 1: 5.2 - 20.8 FEET



EB1-A
BOX 2: 20.8 - 22.0 FEET







NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 8 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan								
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605						GROUND WTR (ft)								
BORING NO. EB2-A		STATION 8+25		OFFSET 4 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 2,473.0 ft		TOTAL DEPTH 23.5 ft		NORTHING 646,997		EASTING 1,016,103								
DRILL RIG/HAMMER EFF./DATE Red Dog Drilling CME-45				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER M. Seiler		START DATE 05/07/14		COMP. DATE 05/07/14		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
2475														
	2,472.5	0.5	9	5	2									GROUND SURFACE 2,473.9
	2,471.0	2.0	2	1	1									ARTIFICIAL FILL ASPHALT
2470	2,469.5	3.5												ROADWAY EMBANKMENT
	2,468.0	5.0	1	1	3									LIGHT BROWNISH GRAY TO BROWN,
	2,466.5	6.5	7	15	7									SILTY FINE TO COARSE GRAINED SAND,
	2,465.0	8.0	4	6	7									SOME ANGULAR ROCK FRAGMENTS
2465	2,463.5	9.5	12	8	15									RESIDUAL
			19	57	12									BROWN AND GRAY, SILTY FINE TO
														COARSE GRAINED SAND, WITH LITTLE
														ROCK FRAGMENTS
2460	2,459.5	13.5	2	2	3									AT 13.5FT: ORANGISH BROWN, FINE
														GRAINED SAND
2455	2,454.5	18.5												WEATHERED ROCK (GNEISS)
			100/0.3											
2450	2,449.5	23.5												
			60/0.0											Boring Terminated with Standard
														Penetration Test Refusal at Elevation
														2,449.5 ft on Crystalline Rock (Gneiss)



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET 9 OF 17

WBS 17BP.14.R.102			TIP 44-0215			COUNTY HENDERSON			GEOLOGIST S. Buchanan		
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605									GROUND WTR (ft)		
BORING NO. EB2-B			STATION 8+21			OFFSET 18 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 2,472.4 ft			TOTAL DEPTH 36.0 ft			NORTHING 647,012			EASTING 1,016,100		
DRILL RIG/HAMMER EFF./DATE Red Dog Drilling CME-45			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic			0 HR. 8.9		
DRILLER M. Seiler			START DATE 05/06/14			COMP. DATE 05/06/14			24 HR. 7.5		
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					
2475															
	2,472.4	0.0	3	5	1									2,472.4	0.0
2470	2,470.9	1.5	WOH	1	1										
	2,469.4	3.0	1	3	4										
	2,467.9	4.5	1	6	7										
	2,466.4	6.0	3	7	7										
2465	2,464.9	7.5	5	17	14									2,464.4	8.0
	2,463.4	9.0	12	26	32										
2460	2,458.9	13.5	24	27	9										
2455	2,453.9	18.5	4	8	11										
2450	2,448.9	23.5	100/0.3											2,448.9	23.5
2445	2,445.4	27.0	60/0.0											2,445.4	27.0
2440														2,436.4	36.0
Boring Terminated at Elevation 2,436.4 ft in Crystalline Rock (Gneiss)															



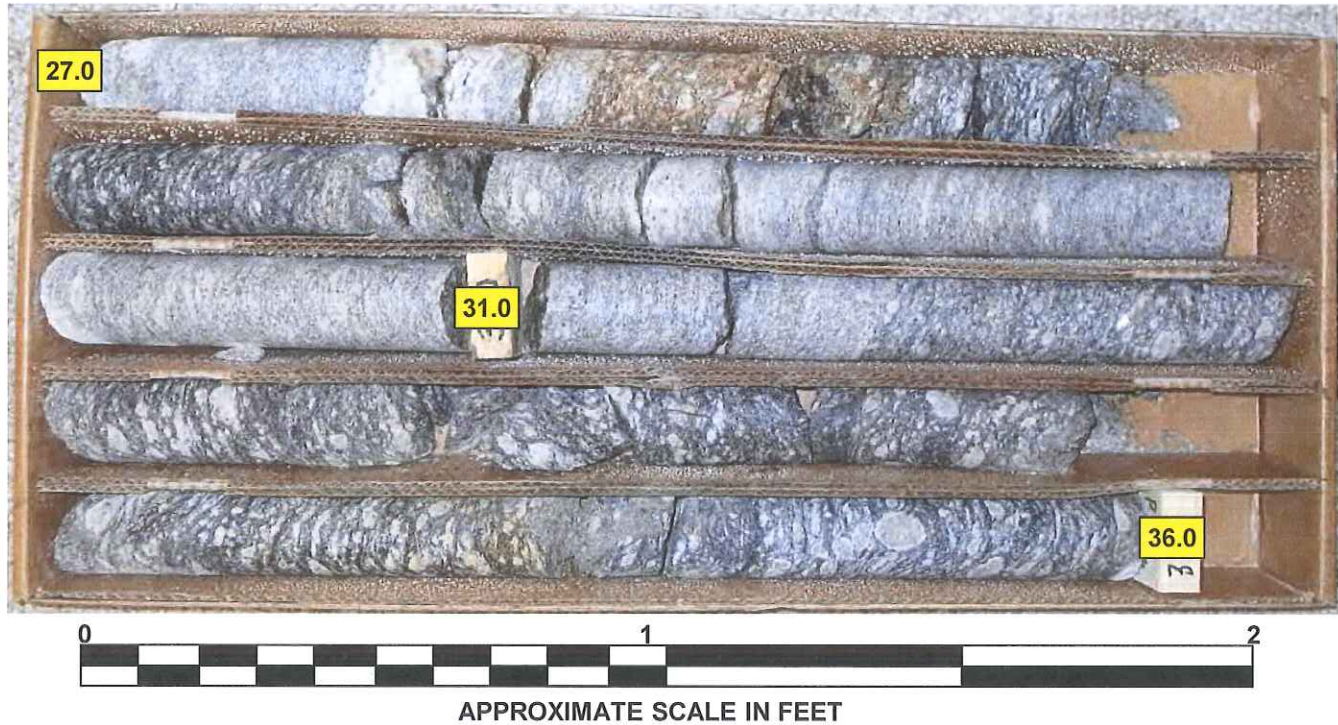
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 10 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan						
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605							GROUND WTR (ft)					
BORING NO. EB2-B		STATION 8+21		OFFSET 18 ft RT		ALIGNMENT -L-		0 HR. 8.9				
COLLAR ELEV. 2,472.4 ft		TOTAL DEPTH 36.0 ft		NORTHING 647,012		EASTING 1,016,100		24 HR. 7.5				
DRILL RIG/HAMMER EFF./DATE Red Dog Drilling CME-45				DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic					
DRILLER M. Seiler		START DATE 05/06/14		COMP. DATE 05/06/14		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 9.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
2445.29											Begin Coring @ 27.0 ft	
2445.4	2,445.4	27.0	4.0	2:19/1.0 1:28/1.0 1:15/1.0 1:56/1.0	(4.0) 100%	(2.3) 58%		(8.5) 94%	(5.0) 56%		CRYSTALLINE ROCK LIGHT GRAY AND WHITE, FRESH TO SLIGHT WEATHERED, MODERATE HARD TO HARD, MODERATE CLOSE TO CLOSE FRACTURED, GNEISS	27.0
2440	2,441.4	31.0	5.0	1:31/1.0 1:13/1.0 1:18/1.0 0:47/1.0 1:14/1.0	(4.7) 94%	(2.7) 54%						
	2,436.4	36.0									Boring Terminated at Elevation 2,436.4 ft in Crystalline Rock (Gneiss)	36.0

CORE PHOTOGRAPHS
BRIDGE NO. 215 OVER MIDDLE FORK CREEK ON SR 1605

EB2-B
BOX 1: 27.0 - 36.0 FEET





NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 12 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan									
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605						GROUND WTR (ft)									
BORING NO. B1		STATION 7+92		OFFSET 23 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2,466.5 ft		TOTAL DEPTH 3.6 ft		NORTHING 646,990		EASTING 1,016,078									
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Rod Sounding		HAMMER TYPE N/A									
DRILLER N/A		START DATE 04/28/14		COMP. DATE 04/28/14		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					ELEV. (ft)
2470															
2465	2,466.5	0.0												2,466.5	0.0
	2,465.5	1.0	N/A	1	1										
	2,464.5	2.0	N/A	2	7										
	2,463.5	3.0	N/A	6	15									2,462.9	3.6
			N/A	9	60/0.1									Boring Terminated at Elevation 2,462.9 ft	



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 13 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan								
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605						GROUND WTR (ft)								
BORING NO. B2		STATION 8+11		OFFSET 17 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 2,464.7 ft		TOTAL DEPTH 4.2 ft		NORTHING 646,998		EASTING 1,016,090								
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Rod Sounding		HAMMER TYPE N/A								
DRILLER N/A		START DATE 04/28/14		COMP. DATE 04/28/14		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			
			0.5ft	0.5ft	0.5ft	0	25	50				75	100	ELEV. (ft)
2465	2,464.7	0.0	N/A	1	16						2,464.7	GROUND SURFACE	0.0	
	2,463.7	1.0	N/A	16	35									
	2,462.7	2.0	N/A	18	34									
	2,461.7	3.0	N/A	19	42									
	2,460.7	4.0	N/A	100/0.2								2,460.5	Boring Terminated at Elevation 2,460.5 ft	4.2



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 14 OF 17

WBS 17BP.14.R.102		TIP 44-0215		COUNTY HENDERSON		GEOLOGIST S. Buchanan					
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605							GROUND WTR (ft)				
BORING NO. B3		STATION 8+13		OFFSET 27 ft LT		ALIGNMENT -L-	0 HR. N/A				
COLLAR ELEV. 2,464.4 ft		TOTAL DEPTH 3.0 ft		NORTHING 646,988		EASTING 1,016,094	24 HR. N/A				
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Rod Sounding		HAMMER TYPE N/A					
DRILLER N/A		START DATE 04/28/14		COMP. DATE 04/28/14		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				
2465											
	2,464.4	0.0								2,464.4	0.0
	2,463.4	1.0	N/A	2	17						
	2,462.4	2.0	N/A	9	12						
			N/A	8	92					2,461.4	3.0
Boring Terminated at Elevation 2,461.4 ft											
Rod sounding terminated at selected depth (probable weathered rock) at 3.0 feet.											



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 15 OF 17

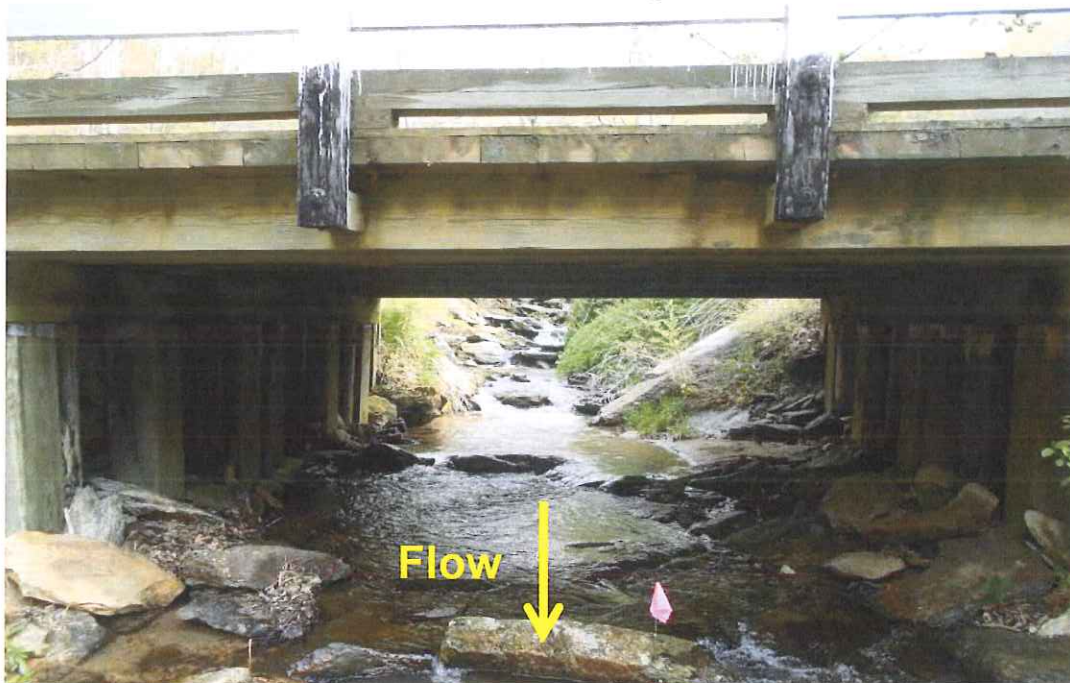
WBS 17BP.14.R.102			TIP 44-0215			COUNTY HENDERSON			GEOLOGIST S. Buchanan						
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605										GROUND WTR (ft)					
BORING NO. B4			STATION 8+15			OFFSET 8 ft RT			ALIGNMENT -L-						
COLLAR ELEV. 2,464.9 ft			TOTAL DEPTH 2.1 ft			NORTHING 647,023			EASTING 1,016,092						
DRILL RIG/HAMMER EFF./DATE N/A										DRILL METHOD Rod Sounding		HAMMER TYPE N/A			
DRILLER N/A			START DATE 04/28/14			COMP. DATE 04/28/14			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2465															
2,464.9	0.0	N/A	6	4											2,464.9 GROUND SURFACE 0.0
2,463.9	1.0	N/A	23	13											2,462.8 2.1
2,462.9	2.0	N/A	60/0.1												Boring Terminated at Elevation 2,462.8 ft

WBS 17BP.14.R.102						TIP 44-0215						COUNTY HENDERSON						GEOLOGIST S. Buchanan																	
SITE DESCRIPTION Bridge No. 215 over Middle Fork Creek on SR 1605																								GROUND WTR (ft)											
BORING NO. B5								STATION 8+11								OFFSET 8 ft RT								ALIGNMENT -L-								0 HR. N/A			
COLLAR ELEV. 2,464.9 ft								TOTAL DEPTH 8.0 ft								NORTHING 647,022								EASTING 1,016,088								24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE N/A												DRILL METHOD Rod Sounding												HAMMER TYPE N/A											
DRILLER N/A								START DATE 04/28/14								COMP. DATE 04/28/14								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 ELEV. (ft) DEPTH (ft)																					
			0.5ft	0.5ft	0.5ft	0	25	50	75	100																									
2465	2464.9	0.0	N/A	4	8									2,464.9 GROUND SURFACE 0.0																					
2460	2463.8	1.0	N/A	20	43	● 12 ● 83								Boring Terminated at Elevation 2,456.9 ft Rod sounding terminated at selected depth (probable weathered rock) at 8.0 feet.																					
	2462.9	2.0	N/A	9	9	● 18 ● 35																													
	2461.9	3.0	N/A	8	9	● 17 ● 66																													
	2460.9	4.0	N/A	10	25	● 93																													
	2459.9	5.0	N/A	21	45	● 100/1.0																													
	2458.9	6.0	N/A	25	68																														
	2457.9	7.0	N/A	32	68																														

SITE PHOTOGRAPHS
BRIDGE NO. 215 OVER MIDDLE FORK CREEK ON SR 1605



View of SR 1605 looking East



View of Bridge No. 215 looking North