

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.108	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.14.R.108 F.A. PROJ. N/A
COUNTY JACKSON
PROJECT DESCRIPTION BRIDGE NO. 103 ON SR 1740 (MOSES CREEK ROAD) OVER MOSES CREEK

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND
3	BORING LOCATION MAP
4-II	BORE LOGS & CORE PHOTOGRAPHS

PERSONNEL

R. DELOST

MIKE MORGAN

INVESTIGATED BY ICA ENGINEERING

CHECKED BY K. BUSSEY

SUBMITTED BY ICA ENGINEERING

DATE NOVEMBER 2013

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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) 250-4088. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

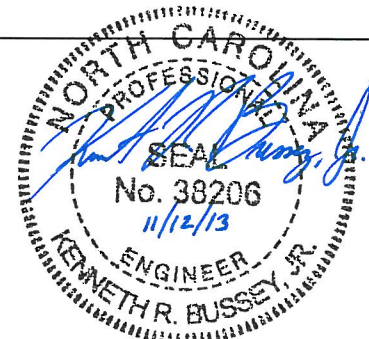
SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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 DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION 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.

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: T. RIDEOUT



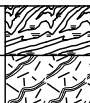
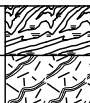
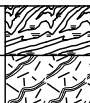
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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 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																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 <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-1, A-2 A-3		A-4, A-5 A-6, A-7													
SYMBOL																															
% PASSING		# 10		# 40		# 200										GRANULAR SOILS		SILT-CLAY SOILS		MUCK, PEAT											
LIQUID LIMIT		50 MX		30 MX		50 MX		51 MN												LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50											
PLASTIC INDEX		6 MX				NP		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN													
GROUP INDEX		0		0		0		4 MX		8 MX		12 MX		16 MX		No MX				HIGHLY ORGANIC SOILS											
USUAL TYPES OF MAJOR MATERIALS		STONE FRAGS, GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS										SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER											
GEN. RATING AS 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																MISCELLANEOUS SYMBOLS															
PRIMARY SOIL TYPE				COMPACTNESS OR CONSISTENCY				RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)				RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION															
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				SOIL SYMBOL															
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				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT															
																INFERRED SOIL BOUNDARY															
																INFERRED ROCK LINE															
																ALLUVIAL SOIL BOUNDARY															
																DIP & DIP DIRECTION OF ROCK STRUCTURES															
																SOUNDING ROD															
TEXTURE OR GRAIN SIZE																ABBREVIATIONS															
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.)		AR - AUGER REFUSAL																	
GRAIN SIZE		305		75		2.0		0.25		0.05		0.005		MED. - MEDIUM																	
IN.		12		3										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																	
SOIL MOISTURE - CORRELATION OF TERMS																EQUIPMENT USED ON SUBJECT PROJECT															
SOIL MOISTURE SCALE (ATTERBERG LIMITS)				FIELD MOISTURE DESCRIPTION				GUIDE FOR FIELD MOISTURE DESCRIPTION				DRILL UNITS:																			
												MOBILE B- _____																			
												BK-51																			
												☒ CME-45C																			
												CME-550																			
												PORTABLE HOIST																			
												☒ CME-45C																			
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		PROJECT REFERENCE NO. 17BP.14.R.108		SHEET NO. 2A												
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: <table><tr><td>WEATHERED ROCK (WR)</td><td></td><td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</td></tr><tr><td>CRYSTALLINE ROCK (CR)</td><td></td><td>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td></tr><tr><td>NON-CRYSTALLINE ROCK (NCR)</td><td></td><td>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.</td></tr><tr><td>COASTAL PLAIN SEDIMENTARY ROCK (CP)</td><td></td><td>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</td></tr></table>			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.	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.	
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 SL.)	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 (SL.)	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, YIELDS SPT N VALUES > 100 BPF</i>															
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. <i>IF TESTED, YIELDS 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 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		BEDDING														
TERM	SPACING	TERM	THICKNESS													
VERY WIDE	MORE THAN 10 FEET	VERY THINLY BEDDED	> 4 FEET	BENCH MARK: ORANGE PAINT CIRCLE LABELED *G* ON NORTHEAST CORNER OF BRIDGE DECK, NEAREST EB2-B ELEVATION: 100 FT.												
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.															
NOTES:																

PROJECT REFERENCE NO.	SHEET
17BP.14.R.108	3
SITE PLAN	
0 50 100  FEET	





WBS 17BP.14.R.108			TIP N/A		COUNTY JACKSON			GEOLOGIST DeLost, R.					
SITE DESCRIPTION Bridge No. 103 on SR 1740 (Moses Creek Road) over Moses Creek							GROUND WTR (ft)						
BORING NO. EB1-A			STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. N/A				
COLLAR ELEV. 100.6 ft			TOTAL DEPTH 13.5 ft		NORTHING 599,475		EASTING 774,193		24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 79% 08/22/2013					DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic					
DRILLER Morgan, M.			START DATE 10/21/13		COMP. DATE 10/21/13		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			
105													
100													
95	95.8	4.8	8	8	10								
90	90.8	9.8	21	79/0.4									
	87.2	13.4	60/0.1										

[illegible]



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 6

WBS 17BP.14.R.108				TIP N/A		COUNTY JACKSON				GEOLOGIST DeLost, R.			
SITE DESCRIPTION Bridge No. 103 on SR 1740 (Moses Creek Road) over Moses Creek										GROUND WTR (ft)			
BORING NO. EB1-B				STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. N/A			
COLLAR ELEV. 101.0 ft				TOTAL DEPTH 14.4 ft		NORTHING 599,470		EASTING 774,209		24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 79% 08/22/2013						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic				
DRILLER Morgan, M.				START DATE 10/21/13		COMP. DATE 10/21/13		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2				TOTAL RUN 5.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
91.6											Begin Coring @ 9.4 ft		
90	91.6	9.4	5.0	N=60/0.0 3:48 3:14 2:15 3:14 3:05	(4.8) 96%	(2.3) 46%		(4.8) 96%	(2.3) 46%		91.6 CRYSTALLINE ROCK	9.4	
											White, black & red, sli. to mod. sev. weathered, hard to mod. hard, v. close to closely spaced, mod. sev. to v. sev. weathered frac. faces, biotite, quartz Gneiss w/disseminated garnets w/possible areas of amphibolites.		
	86.6	14.4									86.6	14.4	
Boring Terminated at Elevation 86.6 ft in Crystalline Rock (Gneiss).													
FIAD = Boring filled in after drilling.													

CORE PHOTOGRAPHIC RECORD

SHEET 7

Bridge #103 on SR 1740
(Moses Creek Road) over Moses Creek



EB1-B Box 1 of 1



WBS 17BP.14.R.108			TIP N/A			COUNTY JACKSON			GEOLOGIST DeLost, R.				
SITE DESCRIPTION Bridge No. 103 on SR 1740 (Moses Creek Road) over Moses Creek									GROUND WTR (ft)				
BORING NO. EB2-A			STATION N/A			OFFSET N/A			ALIGNMENT N/A			0 HR. N/A	
COLLAR ELEV. 99.5 ft			TOTAL DEPTH 10.1 ft			NORTHING 599,499			EASTING 774,191			24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 79% 08/22/2013						DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic				
DRILLER Morgan, M.			START DATE 10/21/13			COMP. DATE 10/21/13			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			
100													
95	94.5	5.0	8	15	12							GROUND SURFACE	0.0
90	89.5	10.0										RESIDUAL	
												Brown & tan-red, micaceous, f. to cse. sand w/gravel size rock frags.	
												CRISTALLINE ROCK	
												Crystalline rock (Gneiss)	
												Boring Terminated with Standard Penetration Test Refusal at Elevation 89.4 ft in Crystalline Rock (Gneiss).	
												FIAD = Boring filled in after drilling.	



WBS 17BP.14.R.108				TIP N/A		COUNTY JACKSON		GEOLOGIST DeLost, R.					
SITE DESCRIPTION Bridge No. 103 on SR 1740 (Moses Creek Road) over Moses Creek								GROUND WTR (ft)					
BORING NO. EB2-B		STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. N/A					
COLLAR ELEV. 99.9 ft		TOTAL DEPTH 11.1 ft		NORTHING 599,198		EASTING 774,206		24 HR. FIAD					
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 79% 08/22/2013				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic							
DRILLER Morgan, M.		START DATE 10/21/13		COMP. DATE 10/21/13		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) DEPTH (ft)
100													99.9 GROUND SURFACE 0.0
95	95.2	4.7											COLLUVIAL Gray & brown, f. to cse. sand w/gravel sized rock frags.
	93.9	6.0	100/0.3							100/0.3			94.9 5.0 93.9 6.0 93.8 6.1
90			60/0.1										WEATHERED ROCK Weathered rock (Gneiss)
													CRYSTALLINE ROCK Crystalline rock (Gneiss)
													CRYSTALLINE ROCK Crystalline rock (Gneiss)
													88.8 11.1 Boring Terminated at Elevation 88.8 ft in Crystalline Rock (Gneiss). FIAD = Boring filled in after drilling.



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 10

WBS 17BP.14.R.108				TIP N/A		COUNTY JACKSON				GEOLOGIST DeLost, R.			
SITE DESCRIPTION Bridge No. 103 on SR 1740 (Moses Creek Road) over Moses Creek										GROUND WTR (ft)			
BORING NO. EB2-B				STATION N/A				OFFSET N/A		ALIGNMENT N/A		0 HR. N/A	
COLLAR ELEV. 99.9 ft				TOTAL DEPTH 11.1 ft				NORTHING 599,198		EASTING 774,206		24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 79% 08/22/2013						DRILL METHOD NW Casing W/SPT & Core				HAMMER TYPE Automatic			
DRILLER Morgan, M.				START DATE 10/21/13				COMP. DATE 10/21/13		SURFACE WATER DEPTH N/A			
CORE SIZE NQ2				TOTAL RUN 5.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS		
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		ELEV. (ft)	DEPTH (ft)	
93.8											Begin Coring @ 6.1 ft		
90	93.8	6.1	5.0	4:44 4:03 3:42 2:57 2:49	(4.5) 90%	(3.3) 66%		(4.3) 86%	(3.3) 66%		93.8	6.1	
	88.8	11.1									88.8	11.1	
White, black & orange, sli. to mod. sev. weathered, hard to mod. hard, v. closely spaced, mod. sev. to sev. weathered frac. faces, biotite feldspar, quartz Gneiss.													
Boring Terminated at Elevation 88.8 ft in Crystalline Rock (Gneiss).													
FIAD = Boring filled in after drilling.													

CORE PHOTOGRAPHIC RECORD

SHEET 11

Bridge #103 on SR 1740
(Moses Creek Road) over Moses Creek



EB2-B Box 1 of 1