

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	46056.1.1 (B5342)	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 46056.1.1 (B-5342) F.A. PROJ. BRSTP-1148(5)
COUNTY ALAMANCE
PROJECT DESCRIPTION BRIDGE NO. 169 ON SR 1148 OVER
GUM CREEK

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
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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 1939 TOT-6650. 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.

PROJECT: 46056.1.1 ID: B-5342

PERSONNEL

J. MUESSEN

TRIGON:

R. TOOTHMAN

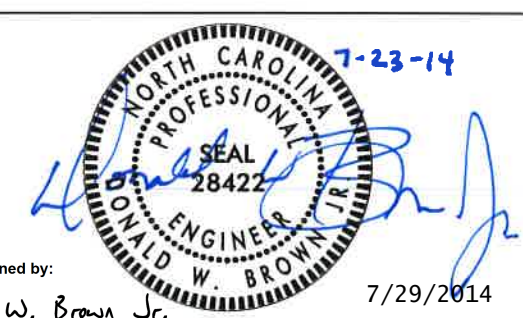
E. ESTEP

INVESTIGATED BY D. BROWN

CHECKED BY J. MUESSEN

SUBMITTED BY D. BROWN

DATE JULY 2014



DocuSigned by:

Donald W. Brown Jr.

7/29/2014

DRAWN BY: D. BROWN / J. MUESSEN

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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 DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

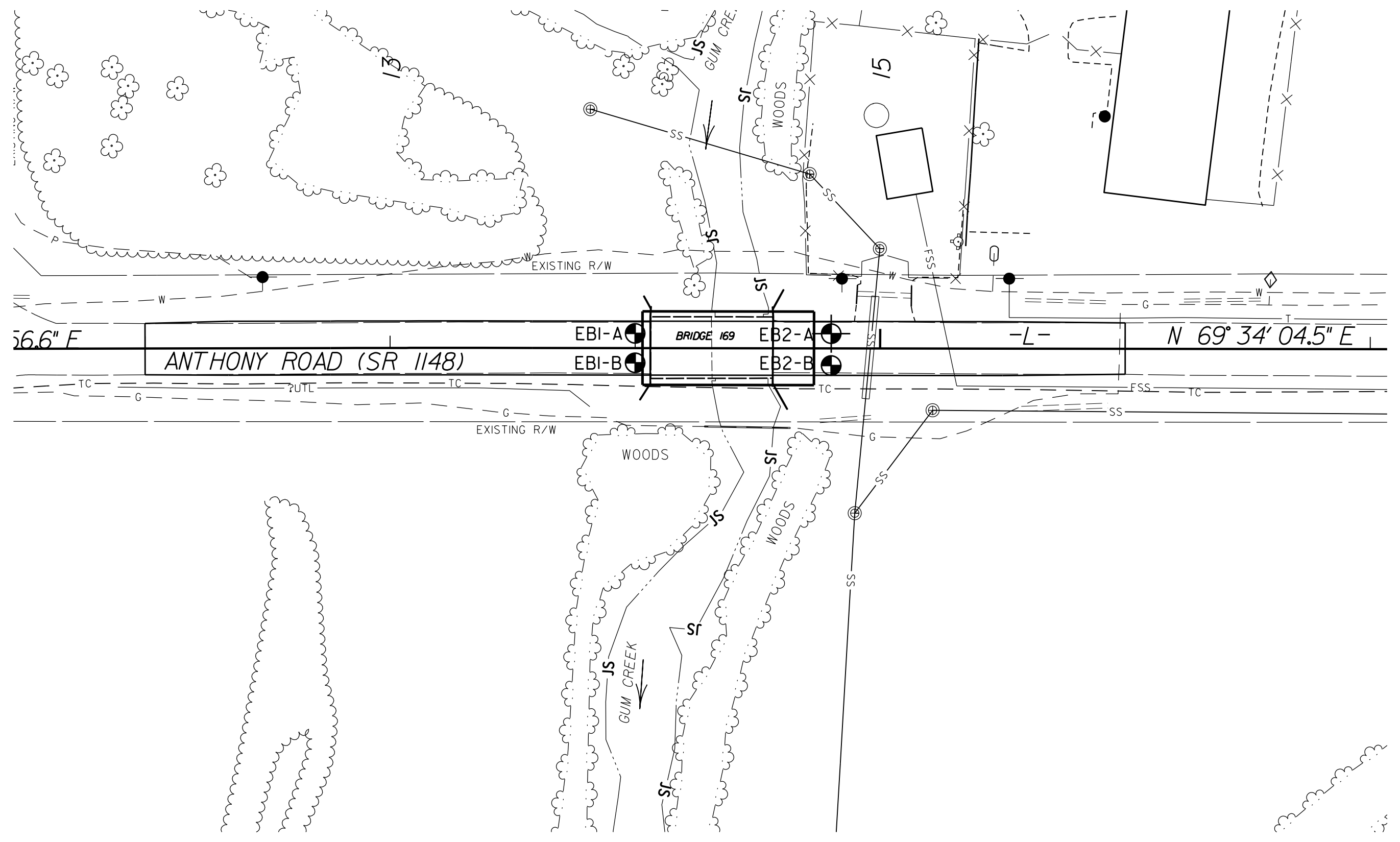
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
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: <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.		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. 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 INTRUDER 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 (SRC.) - 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.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
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.		WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)			
GROUP CLASS. A-1, A-3, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		COMPRESSIBILITY		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. 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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			
SYMBOL		ANGULARITY OF GRAINS		WEATHERING			
% PASSING 10 40 200		THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		FRESH VERY SLIGHT (V SLI.) SLIGHT (SLI.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
LIQUID LIMIT PLASTIC INDEX		PERCENTAGE OF MATERIAL		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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. 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. 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. ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.			
GROUP INDEX		GROUND WATER					
USUAL TYPES OF MAJOR MATERIALS		ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL					
GEN. RATING AS A SUBGRADE		TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10%		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MISCELLANEOUS SYMBOLS					
CONSISTENCY OR DENSENESS		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES		SPT DPT DMT VST PMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP					
GENERAL GRANULAR MATERIAL (NON-COHESIVE)		ABBREVIATIONS		ROCK HARDNESS			
GENERAL SILT-CLAY MATERIAL (COHESIVE)		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		VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT			
TEXTURE OR GRAIN SIZE		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		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. 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. 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. 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.			
U.S. STD. SIEVE SIZE OPENING (MM)		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					
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING		BEDDING	
GRAIN SIZE MM IN.		DRILL UNITS: <input checked="" type="checkbox"/> MOBILE B-57 <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST		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		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	
SOIL MOISTURE - CORRELATION OF TERMS		ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG.-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG.-CARB. <input type="checkbox"/> CORE BIT		INDURATION			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B <input checked="" type="checkbox"/> -N O <input type="checkbox"/> -H HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST		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.			
LL LIQUID LIMIT PL PLASTIC LIMIT OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT		FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY				BENCH MARK: BM 1 AT STATION -L- 10+12.36 FT LT ELEVATION: 544.67 FT.	
PLASTICITY INDEX (PI) DRY STRENGTH		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.				NOTES:	
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH							
COLOR							

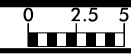
PROJECT REFERENCE NO. 46056JJ (B5342)	SHEET NO. 3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

0 20 40
FEET
SKEW = 90 DEG.

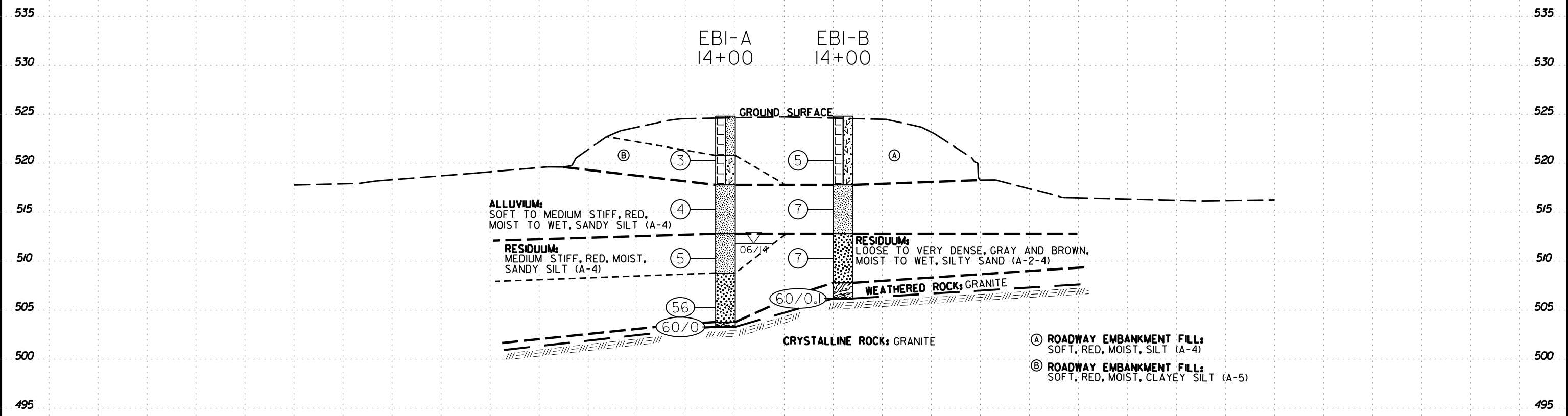
NAD 83/NSRS 2007



8/23/99



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



ALLUVIUM:
SOFT TO MEDIUM STIFF, RED,
MOIST TO WET, SANDY SILT (A-4)

RESIDIUM:
MEDIUM STIFF, RED, MOIST,
SANDY SILT (A-4)

RESIDIUM:
LOOSE TO VERY DENSE, GRAY AND BROWN,
MOIST TO WET, SILTY SAND (A-2-4)

WEATHERED ROCK: GRANITE

CRYSTALLINE ROCK: GRANITE

Ⓐ **ROADWAY EMBANKMENT FILL:**
SOFT, RED, MOIST, SILT (A-4)

Ⓑ **ROADWAY EMBANKMENT FILL:**
SOFT, RED, MOIST, CLAYEY SILT (A-5)

14 + 03.00

NOTE: GROUND SURFACE PROFILE OF -1- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU, DATED 6/10/14. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

-L-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

DATE PLOTTED: 8/23/99
DRAWN BY: [unreadable]
CHECKED BY: [unreadable]
SCALE: AS SHOWN
PROJECT: [unreadable]

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 46056.1.1	TIP B-5342	COUNTY ALAMANCE	GEOLOGIST J. Muessen
SITE DESCRIPTION BRIDGE NO 169 ON SR 1148 OVER GUM CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 14+00	OFFSET 6 ft LT	ALIGNMENT -L-
COLLAR ELEV. 524.8 ft	TOTAL DEPTH 21.5 ft	NORTHING 836,336	EASTING 1,863,646
DRILL RIG/HAMMER EFF./DATE GFO0044 Mobile-B57 73% 11/24/2009		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. Toothman	START DATE 06/23/14	COMP. DATE 06/23/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
525													524.8	ROADWAY SURFACE	0.0
														ROADWAY EMBANKMENT	
	521.3	3.5	2	2	1							M	520.8	GRAY, SILT WITH GRAVEL	4.0
520													517.8	RED, CLAYEY SILT	7.0
														ALLUVIAL	
	516.3	8.5	2	2	2							M	512.8	RED, SANDY SILT	12.0
515														RESIDUAL	
	511.3	13.5	1	2	3							M	508.8	RED, SANDY SILT WITH CLAY	18.0
510													506.3	GRAY, SILTY SAND WITH GRAVEL	18.5
	506.3	18.5	21	34	22								503.8	WEATHERED ROCK	21.0
505													503.3	GRANITE	21.5
	503.3	21.5	60/0											Boring Terminated with Standard Penetration Test Refusal at Elevation 503.3 ft on Crystalline Rock (Granite)	

WBS 46056.1.1	TIP B-5342	COUNTY ALAMANCE	GEOLOGIST J. Muessen
SITE DESCRIPTION BRIDGE NO 169 ON SR 1148 OVER GUM CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 14+00	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 524.8 ft	TOTAL DEPTH 18.6 ft	NORTHING 836,325	EASTING 1,863,651
DRILL RIG/HAMMER EFF./DATE GFO0044 Mobile-B57 73% 11/24/2009		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. Toothman	START DATE 06/23/14	COMP. DATE 06/23/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
525													524.8	ROADWAY SURFACE	0.0
														ROADWAY EMBANKMENT	
	521.3	3.5	2	2	3							M	517.8	RED, CLAYEY SILT	7.0
520														ALLUVIAL	
	516.3	8.5	2	5	2							W	512.8	RED, SANDY SILT WITH CLAY	12.0
515														RESIDUAL	
	511.3	13.5	3	4	3							W	507.8	BROWN, SILTY SAND	17.0
510													506.3	WEATHERED ROCK	18.6
	506.3	18.5	60/0.1										506.2	GRANITE	18.6
														Boring Terminated with Standard Penetration Test Refusal at Elevation 506.2 ft in Crystalline Rock (Granite)	

NCDOT BORE DOUBLE B5342_GEO_BRDG0169_BH.GPJ NC_DOT.GDT 07/23/14

WBS 46056.1.1		TIP B-5342		COUNTY ALAMANCE		GEOLOGIST J. Muessen								
SITE DESCRIPTION BRIDGE NO 169 ON SR 1148 OVER GUM CREEK							GROUND WTR (ft)							
BORING NO. EB2-A		STATION 14+80		OFFSET 6 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 525.1 ft		TOTAL DEPTH 23.5 ft		NORTHING 836,364		EASTING 1,863,721								
DRILL RIG/HAMMER EFF./DATE GFO0044 Mobile-B57 73% 11/24/2009		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 06/23/14		COMP. DATE 06/23/14		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75					100
530														
525												525.1 ROADWAY SURFACE ROADWAY EMBANKMENT	0.0	
520	521.6	3.5	1	2	2						M	RED, CLAYEY SILT		
515	516.6	8.5	1	2	3						M	RESIDUAL RED, SANDY SILT WITH CLAY	7.0	
510	511.6	13.5	60/0									WEATHERED ROCK GRANITE CRYSTALLINE ROCK	12.0 13.5	
505												WHITE, GRANITE		
													501.6 Boring Terminated at Elevation 501.6 ft in Crystalline Rock (Granite)	23.5

NCDOT CORE SINGLE B5342_GEO_BRDGG0169_BH.GPJ NC_DOT_GDT 07/23/14

WBS 46056.1.1		TIP B-5342		COUNTY ALAMANCE		GEOLOGIST J. Muessen						
SITE DESCRIPTION BRIDGE NO 169 ON SR 1148 OVER GUM CREEK							GROUND WTR (ft)					
BORING NO. EB2-A		STATION 14+80		OFFSET 6 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 525.1 ft		TOTAL DEPTH 23.5 ft		NORTHING 836,364		EASTING 1,863,721						
DRILL RIG/HAMMER EFF./DATE GFO0044 Mobile-B57 73% 11/24/2009		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER R. Toothman		START DATE 06/23/14		COMP. DATE 06/23/14		SURFACE WATER DEPTH N/A						
CORE SIZE NQ		TOTAL RUN 10.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft) %	RQD (ft) %		REC (ft) %	RQD (ft) %			
511.6											Begin Coring @ 13.5 ft	
510	511.6	13.5	3.0	N=60/0 04:06/1.0 04:19/1.0 03:00/1.0	(2.8) 93%	(2.4) 80%		(8.6) 86%	(6.9) 69%		CRYSTALLINE ROCK	13.5
	508.6	16.5									VERY SLIGHTLY WEATHERED, HARD, WHITE GRANITE WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING.	
	506.6	18.5	2.0	04:40/1.0 04:19/1.0	(1.8) 90%	(0.9) 45%						
505			5.0	03:47/1.0 02:44/1.0 03:34/1.0 03:01/1.0 04:19/1.0	(4.0) 80%	(3.6) 72%						
	501.6	23.5									Boring Terminated at Elevation 501.6 ft in Crystalline Rock (Granite)	23.5

NCDOT BORE DOUBLE B5342_GEO_BRDGG0169_BH.GPJ NC_DOT_GDT 07/23/14

CORE PHOTOGRAPH

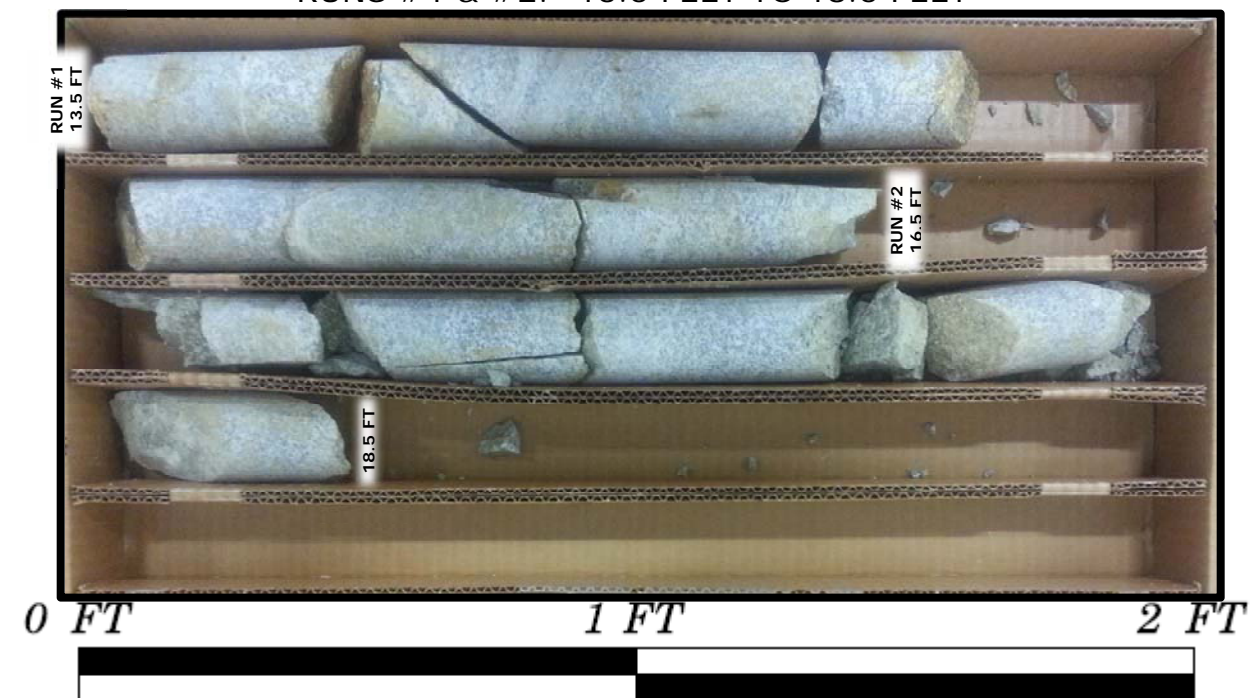
WBS NO.: 46056.1.1

TIP NO.: B-5342

DESCRIPTION: BRIDGE 169 ON SR 1148 OVER GUM CREEK
ALAMANCE COUNTY

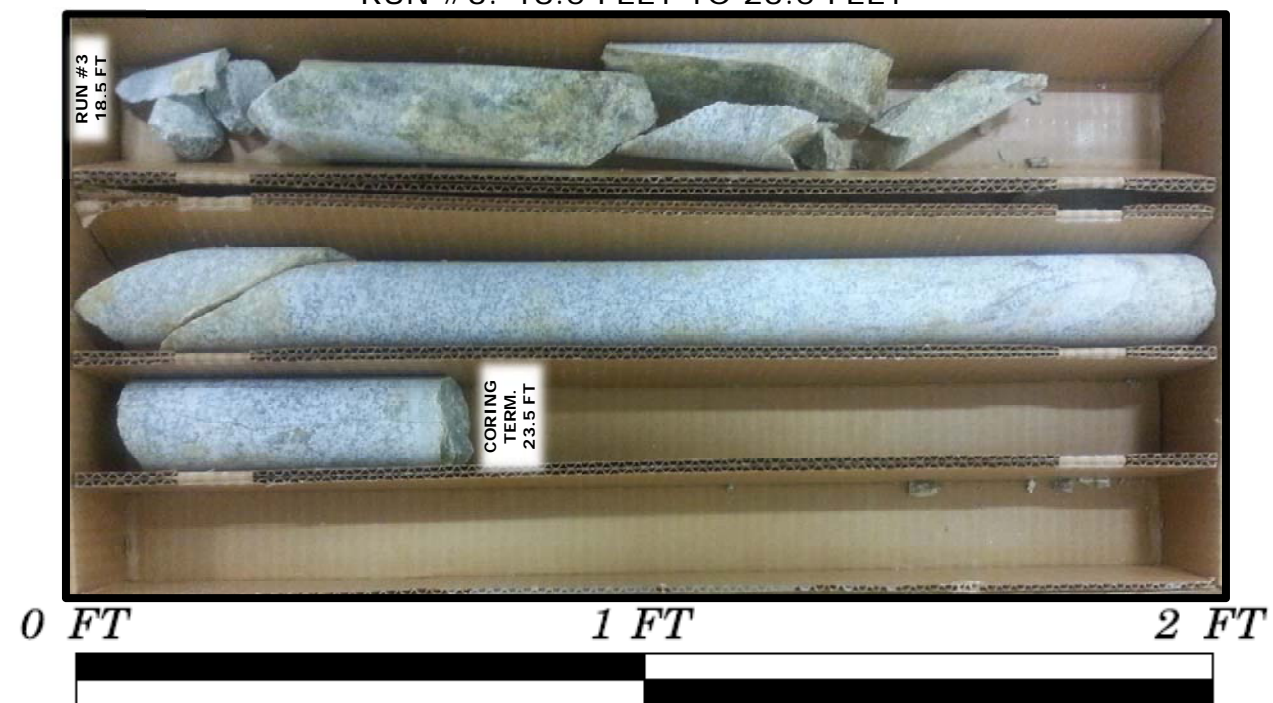
EB2-A

RUNS #1 & #2: 13.5 FEET TO 18.5 FEET



EB2-A

RUN #3: 18.5 FEET TO 23.5 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 46056.1.1		TIP B-5342		COUNTY ALAMANCE		GEOLOGIST J. Muessen										
SITE DESCRIPTION BRIDGE NO 169 ON SR 1148 OVER GUM CREEK							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 14+80		OFFSET 7 ft RT		ALIGNMENT -L-	0 HR. Dry									
COLLAR ELEV. 525.1 ft		TOTAL DEPTH 15.5 ft		NORTHING 836,352		EASTING 1,863,726	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE GFO0044 Mobile-B57 73% 11/24/2009				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 06/23/14		COMP. DATE 06/23/14		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)	DEPTH (ft)		
530																
525														525.1	ROADWAY SURFACE	0.0
															ROADWAY EMBANKMENT	
															RED, CLAYEY SILT	
520	521.6	3.5	1	2	2							M		519.1	RESIDUAL	6.0
															ORANGE, CLAYEY SILT	
515	516.6	8.5	2	4	4							M		513.1	WEATHERED ROCK	12.0
															GRAY GRANITE	
510	511.6	13.5	7	60/0.5								M		509.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 509.6 ft on Crystalline Rock (Granite)	15.5
	509.6	15.5	60/0													

NCDOT BORE DOUBLE B5342_GEO_BRDG0169_BH.GPJ NC_DOT.GDT 07/28/14



PHOTOGRAPH 1: BRIDGE 169 ON SR 1148 (-L-) OVER GUM CREEK (LOOKING WEST FROM NORTH SIDE).