

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	17BP.14R.158	1	7

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 17BP.14.R.158 F.A. PROJ. N/A

COUNTY MACON

PROJECT DESCRIPTION DIVISION 14 - LOW IMPACT BRIDGE  
REPLACEMENT PROGRAM

SITE DESCRIPTION BRIDGE NO. 550009 ON SR 1001  
ELLIJAY ROAD) OVER ELLIJAY CREEK.

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2,2a	LEGEND
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**PERSONNEL**

C. MEATYARD

D. BURLISON

J. SKYTТА, P.E.

E. ROBERTS

INVESTIGATED BY STV ENGINEERS

CHECKED BY J. SKYTТА, P.E.

SUBMITTED BY STV ENGINEERS

DATE JUNE, 2016

**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.

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DRAWN BY: J. SKYTТА, P.E.



# 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 (ASTM 1286, 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, DARK SILTY CLAY, HIGH PI, REFERRED TO THE SAND LATERALITY RADIOLITE

#### GRADATION

**WELL GRADED** - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  
**POORLY GRADED** - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, ALSO  
**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**.

#### SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS											
	A-1		A-3		A-2		A-4		A-5		A-7		A-1, A-2, A-3			A-4, A-5, A-6, A-7								
GROUP CLASS.	A-1-a		A-1-b		A-2-4		A-2-5		A-2-6		A-2-7		A-4		A-5		A-7		A-1, A-2, A-3			A-4, A-5, A-6, A-7		
SYMBOL	[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]			[Pattern]			[Pattern]			[Pattern]		
% PASSING	100		75		50		25		10		5		5			5			5			5		
LIQUID LIMIT PLASTIC LIMIT	0-5		6-10		11-15		16-20		21-25		26-30		31-40			41-50			51-60			61-70		
GROUP INDEX	0		0		0		1		2		3		4			5			6			7		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAG. GRAVEL AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS			MUCK, PEAT			HIGHLY ORGANIC SOILS				
BEARING AS A SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR			POOR			UNSATURABLE					

#### 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

	GRANULAR SOILS		SILT - CLAY SOILS		OTHER MATERIAL	
	ORGANIC MATERIAL	NON-ORGANIC	ORGANIC MATERIAL	NON-ORGANIC	TRACE	1 - 10%
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	3 - 5%	5 - 12%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	5 - 12%	12 - 20%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	12 - 20%	>20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	>20%		HIGHLY	35% AND ABOVE

#### GROUND WATER

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

#### CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (q-value)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	N/A
	DENSE	30 TO 50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4

#### MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRERD SOIL BOUNDARY
- INFERRERD ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- SPT REFUSAL

#### TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING DIA.	4.75	2.00	0.42	0.25	0.075	0.053

BOULDER (BLD)	COBBLE (COB)	GRAVEL (GRL)	COARSE SAND (CS.SD)	FINE SAND (F.SD)	SILT (SL)	CLAY (CL)
GRAIN SIZE IN.	300	75	2.0	0.25	0.05	0.002

#### ABBREVIATIONS

- AR - AUGER REFUSAL
- BT - BORING TERMINATED
- CL - CLAY
- CPT - CONE PENETRATION TEST
- CSE - COARSE
- DMT - DILATOMETER TEST
- DPT - DYNAMIC PENETRATION TEST
- o - VOID RATIO
- F - FINE
- FOSS - FOSSILIFEROUS
- FRAC - FRACTURED, FRACTURES
- FRAG. - FRAGMENTS
- HI - HIGHLY
- MED. - MEDIUM
- MICA - MICACEOUS
- MOD. - MODERATELY
- MP - NON PLASTIC
- ORG. - ORGANIC
- PMT - PRESSUREMETER TEST
- SAP. - SAPROLITIC
- SD. - SAND, SANDY
- SL. - SILT, SILTY
- SLI. - SLIGHTLY
- TRC. - TRICONE REFUSAL
- w - MOISTURE CONTENT
- v - VERY
- VST - VANE SHEAR TEST
- WEA. - WEATHERED
- UNIT WEIGHT
- DRY UNIT WEIGHT

#### SOIL MOISTURE - CORRELATION OF TERMS

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

#### PLASTICITY

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

#### EQUIPMENT USED ON SUBJECT PROJECT

- | DRILL UNITS:                                | ADVANCING TOOLS:   | HAMMER TYPE:  |
|---|--|---|
| <input type="checkbox"/> MOBILE B-___       | <input type="checkbox"/> CLAY BITS                                   | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL |
| <input type="checkbox"/> BK-SI              | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER                  |   |
| <input type="checkbox"/> CME-45C            | <input type="checkbox"/> 6" MELLOW AUGERS                            |   |
| <input checked="" type="checkbox"/> CME-55B | <input type="checkbox"/> HARD FACED FINGER BITS                      |   |
| <input type="checkbox"/> PORTABLE MOIST     | <input type="checkbox"/> TUNG-CARBIDE INSERTS                        |   |
|   | <input 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                                    |   |
|   | <input checked="" type="checkbox"/> 3-1/4" HSA                       |   |
|   |  | <b>HAND TOOLS:</b>  |
|   |  | <input type="checkbox"/> POST HOLE DIGGER                                     |
|   |  | <input type="checkbox"/> HAND AUGER   |
|   |  | <input type="checkbox"/> SOUNDING ROD   |
|   |  | <input type="checkbox"/> VANE SHEAR TEST                                      |

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**ROCK DESCRIPTION**

<p>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 6.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>	
<p><b>WEATHERED ROCK (WR)</b></p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>
<p><b>CRYSTALLINE ROCK (CR)</b></p> 	<p>FINE TO COARSE GRAIN IGDIOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>
<p><b>NON-CRYSTALLINE ROCK (NCR)</b></p> 	<p>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.</p>
<p><b>COASTAL PLAIN SEDIMENTARY ROCK (CPS)</b></p> 	<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>

**WEATHERING**

<p><b>FRESH</b></p>	<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>
<p><b>VERY SLIGHT (V SL)</b></p>	<p>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.</p>
<p><b>SLIGHT (SL)</b></p>	<p>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.</p>
<p><b>MODERATE (MOD)</b></p>	<p>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.</p>
<p><b>MODERATELY SEVERE (MOD. SEV.)</b></p>	<p>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></p>
<p><b>SEVERE (SEV.)</b></p>	<p>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 &gt; 100 BPF.</i></p>
<p><b>VERY SEVERE (V SEV.)</b></p>	<p>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 &lt; 100 BPF.</i></p>
<p><b>COMPLETE</b></p>	<p>ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DINKS OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>

**ROCK HARDNESS**

<p><b>VERY HARD</b></p>	<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>
<p><b>HARD</b></p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HAND HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>
<p><b>MODERATELY HARD</b></p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK, COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HAND BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>
<p><b>MEDIUM HARD</b></p>	<p>CAN BE GROVED OR GOUGED 0.45 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.</p>
<p><b>SOFT</b></p>	<p>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.</p>
<p><b>VERY SOFT</b></p>	<p>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.</p>

**FRACTURE SPACING**

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.45 TO 1 FEET
VERY CLOSE	LESS THAN 0.15 FEET

**BEDDING**

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.15 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.15 FEET
THICKLY LAMINATED	0.000 - 0.03 FEET
THINLY LAMINATED	< 0.000 FEET

**INDURATION**

<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>	
<p><b>FRIABLE</b></p>	<p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>
<p><b>MODERATELY INDURATED</b></p>	<p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>
<p><b>INDURATED</b></p>	<p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>
<p><b>EXTREMELY INDURATED</b></p>	<p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>

**TERMS AND DEFINITIONS**

<p><b>ALLUVIUM (ALLOY)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p>
<p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p>
<p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p>
<p><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p>
<p><b>ARTESIAN</b> - 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.</p>
<p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p>
<p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p>
<p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p>
<p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p>
<p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p>
<p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p>
<p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p>
<p><b>FIBRILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p>
<p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.</p>
<p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p>
<p><b>FORMATION (FL)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p>
<p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p>
<p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p>
<p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p>
<p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p>
<p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p>
<p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p>
<p><b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.</p>
<p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p>
<p><b>SILL</b> - 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.</p>
<p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p>
<p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 6.1 FOOT PER 60 BLOWS.</p>
<p><b>STRATA CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p>
<p><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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.</p>
<p><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>

**BENCH MARK: BL-2**  
**ELEVATION: 2277.37 feet**

**NOTES:**  
Boring elevations determined by normal surveying techniques with reference to BL-2, Elev. 2277.37 feet.



**Date of Aerial Photograph: April 2014**  
**Obtained from Google Earth**

**Boring Locations**

Bridge No. 550009  
over Ellijay Creek  
on SR 1001 (Ellijay Rd.)  
Macon Co., North Carolina

State Project No. 17BP.14.R.158



**STV Engineers, Inc.**

Scale: 1"= 40' (approx.)  
Date: August 2016  
Project: 4017927-1004

SHEET 3



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.158	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550009 on SR 1001 (Ellijay Road) over Ellijay Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 16+82	OFFSET CL	ALIGNMENT -L-
COLLAR ELEV. 2,275.5 ft	TOTAL DEPTH 8.5 ft	NORTHING 725,447	EASTING 556,822
DRILL RIG/HAMMER EFF/DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 06/22/16	COMP. DATE 06/22/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2280																
2275	2,274.5	1.0														
	2,272.0	3.5	2	3	2	5					SS-1	M				
2270	2,269.5	6.0	2	3	8	11					SS-2	W				
	2,267.0	8.5	16	20	21	41					SS-3	Sat.				
		50/0.0														

GROUND SURFACE 0.0

PAVEMENT 0.5  
3 inches asphalt on 3 inches stone

ROADWAY EMBANKMENT 4.5  
Very soft orange brown slightly clayey fine to medium sandy SILT, trace organics, fine gravel

ROADWAY EMBANKMENT 8.5  
Soft dark brown fine to coarse sandy clayey SILT, with organics, fine gravel

Boring Terminated by Auger Refusal at Elevation 2,267.0 ft

NCDOT BORE SINGLE DIV 14 BR 009 GPJ NC\_DOT\_GDT 9/7/16

**NC DOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

<b>WBS</b> 17BP.14.R.158	<b>TIP</b> N/A	<b>COUNTY</b> Macon	<b>GEOLOGIST</b> J. Skytta, PE
<b>SITE DESCRIPTION</b> Bridge 550009 on SR 1001 (Elijay Road) over Elijay Creek			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-B	<b>STATION</b> 16+99	<b>OFFSET</b> 15 ft RT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 2,276.3 ft	<b>TOTAL DEPTH</b> 7.8 ft	<b>NORTHING</b> 725,458	<b>EASTING</b> 556,846
<b>DRILL RIG/HAMMER EFF/DATE</b> CME-55/93%/2-22-15		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> AmeriDrill	<b>START DATE</b> 06/22/16	<b>COMP. DATE</b> 06/22/16	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2280																
2275	2,275.3	1.0	6	10	4									2,276.3	GROUND SURFACE	0.0
														2,273.7	PAVEMENT	0.6
	2,272.8	3.5	2	2	2						SS-1	M			4 inches asphalt on 3 inches stone	
														2,272.3	ROADWAY EMBANKMENT	4.0
2270	2,270.3	6.0	11	19	17						SS-2	M			Stiff orange brown fine to medium sandy SILT	6.0
														2,270.3	ROADWAY EMBANKMENT	6.0
	2,268.5	7.8	50/0.0								SS-3	D		2,268.5	Very loose dark brown silty fine to coarse SAND	7.8
															RESIDUAL	
															Dense orange brown slightly silty fine to coarse SAND, with fragmented rock	
															Boring Terminated by Auger Refusal at Elevation 2,268.5 ft	

NC DOT BORE SINGLE DIV 14 BR 009 GPJ NC DOT GDT 9/7/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.158	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550009 on SR 1001 (Ellijay Road) over Ellijay Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION 17+40	OFFSET 2 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,277.8 ft	TOTAL DEPTH 12.2 ft	NORTHING 725,438	EASTING 556,868
DRILL RIG/HAMMER EFF/DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 06/22/16	COMP. DATE 06/22/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2280																
	2,276.8	1.0													2,277.8	GROUND SURFACE
																8.9
2275	2,274.3	3.5	WOH	1	1						SS-1	M				PAVEMENT 2 inches asphalt on 2 inches stone
	2,271.8	6.0		1	1	2					SS-2	M			2,271.8	ROADWAY EMBANKMENT Very soft orange brown fine to medium sandy SILT
2270	2,269.3	8.5	WOH	2	2						SS-3	Sat.				ROADWAY EMBANKMENT Very loose to medium dense orange brown silty fine to coarse SAND, with rock pieces
	2,267.6			10	9	12					SS-4	W			2,267.6	WEATHERED ROCK Medium dense light gray brown FRAGMENTED WEATHERED ROCK (classification based on observing degree of drilling difficulty)
	2,265.6	12.2													2,265.6	12.2
			50/0.0													

NCDOT BORE SINGLE DIV 14 BR 009.GPJ NC\_DOT\_GDT 9/7/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.158	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550009 on SR 1001 (Elijay Road) over Elijay Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 17+56	OFFSET 12 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,278.4 ft	TOTAL DEPTH 10.0 ft	NORTHING 725,451	EASTING 556,895
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 06/22/16	COMP. DATE 06/22/16	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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2280																
	2,277.4	1.0														
	2,274.9	3.5	4	9	15											
2275	2,272.4	6.0	14	19	12											
	2,269.9	8.5	8	5	6											
2270	2,268.4	10.0	5	15	85/0.3											
			50/0.0													

	2,278.4		GROUND SURFACE	0.0
	2,277.8		PAVEMENT	0.6
			4 inches asphalt on 3 inches stone	
			ROADWAY EMBANKMENT	
	2,273.4		Very dense green gray fine to medium SAND and FRAGMENTED ROCK	5.0
			RESIDUAL	
			Medium dense orange brown slightly silty medium to coarse SAND and FRAGMENTED ROCK	
	2,268.9		WEATHERED ROCK	9.5
	2,268.4		Sampled as brown orange gray FRAGMENTED ROCK	10.0
			Boring Terminated by Auger Refusal at Elevation 2,268.4 ft	

NCDOT BORE SINGLE DIV 14 BR 008 GPU NC\_DOT\_GDT 9/7/16