

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.109	1	11

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

**STRUCTURE  
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 17BP.14.R.109 F.A. PROJ. NA  
COUNTY MACON  
PROJECT DESCRIPTION BRIDGE NO. 310 ON SR 1635 OVER SMART  
BRANCH

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INVESTIGATED BY HUNSBERGER, W. S.  
CHECKED BY NORVILLE, C. V.  
SUBMITTED BY FALCON ENG  
DATE OCTOBER 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: HUNSBERGER, W. S.



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

**SOIL DESCRIPTION**

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  
*VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

**GRADATION**

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

**ANGULARITY OF GRAINS**

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

**SOIL LEGEND AND AASHTO CLASSIFICATION**

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5		
SYMBOL												
% PASSING	50 MX	30 MX	50 MX	51 MN	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN
LIQUID LIMIT	6 MX	NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	
PLASTIC INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	No MX	HIGHLY ORGANIC SOILS		
GROUP INDEX	EXCELLENT TO GOOD		FAIR TO POOR				FAIR TO POOR		POOR		UNSUITABLE	
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS			
GEN. RATING AS A SUBGRADE												

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

**MINERALOGICAL COMPOSITION**

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

**COMPRESSIBILITY**

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

**PERCENTAGE OF MATERIAL**

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

**CONSISTENCY OR DENSENESS**

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

**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

**TEXTURE OR GRAIN SIZE**

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

**MISCELLANEOUS SYMBOLS**

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)
GRAIN SIZE	MM 305 IN. 12	75 3	2.0	0.25	0.05	0.005

**ABBREVIATIONS**

AR - AUGER REFUSAL	MOD. - MODERATELY	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED
CL. - CLAY	MOD. - MODERATELY	γ - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ <sub>d</sub> - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	<b>SAMPLE ABBREVIATIONS</b>
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO
HI. - HIGHLY	V - VERY	

**SOIL MOISTURE - CORRELATION OF TERMS**

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

**EQUIPMENT USED ON SUBJECT PROJECT**

<b>DRILL UNITS:</b> <input type="checkbox"/> MOBILE B- _____ <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input type="checkbox"/> _____ <input type="checkbox"/> _____	<b>ADVANCING TOOLS:</b> <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 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 type="checkbox"/> _____	<b>HAMMER TYPE:</b> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL  <b>CORE SIZE:</b> <input type="checkbox"/> -B _____ <input type="checkbox"/> -N _____ <input type="checkbox"/> -H _____  <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 <input type="checkbox"/> _____
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**PLASTICITY**

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

**COLOR**

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

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ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<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 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:</p>		<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <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.  <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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <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.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <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.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</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 IGNEOUS 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 (CP)</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			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <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 &gt; 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 &lt; 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	
<b>TERM</b>	<b>SPACING</b>	<b>TERM</b>	<b>THICKNESS</b>
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
<p><b>BENCH MARK:</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p align="right">ELEVATION: _____ FT.</p>			
<p><b>NOTES:</b></p> <p>F.I.A.D. - FILLED IMMEDIATELY AFTER DRILLING</p>			
INDURATION			
<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>			
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.		

# FOUNDATION RECOMMENDATIONS

WBS # 17BP.14.R.109 DESCRIPTION Bridge No. 310 on SR 1635  
 T.I.P. NO. SF-550310 over Smart Branch  
 COUNTY Macon  
 STATION 12+35.30 -L-

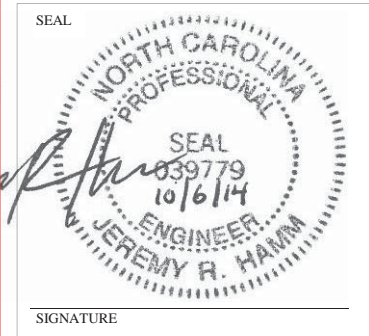
	INITIALS	DATE
DESIGN	WSH	9/30/2014
CHECK	JRH	10/6/2014
APPROVAL		

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENG. UNIT-WRO

- ACCEPTED
- ACCEPTED AS NOTED
- RETURNED FOR CORRECTIONS
- SEE LETTER

BY: Jonathan Almond, PE

DATE: 10/14/2014



	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT NO. 1	12+15.30 -L-	Cap on HP 12x53 Steel Piles	70 tons/pile	Average Bottom of Cap Elev. = 2176.8 ± ft Average Estimated Pile Length = 25 ft (left) 15 ft (right) Number of Vertical Piles = 5 Pile Spacing = 8 feet 6 inches
END BENT NO. 2	12+55.30 -L-	Cap on HP 12x53 Steel Piles	70 tons/pile	Average Bottom of Cap Elev. = 2178.0 ± ft Average Estimated Pile Length = 25 ft (left) 15 ft (right) Number of Vertical Piles = 5 Pile Spacing = 8 feet 6 inches

TIP # SF-550310

County Macon

**FOUNDATION RECOMMENDATION NOTES ON PLANS**

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.
3. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.
4. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
5. PILE EXCAVATION MAY BE REQUIRED AT END BENT NO. 1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2167 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
6. PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.
8. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
9. ~~PREDRILLING FOR PILES MAY BE REQUIRED AT END BENT NO. 2. IF NECESSARY, PREDRILL PILE LOCATIONS TO ELEVATION~~
10. ~~2163 FT WITH EQUIPMENT THAT WILL RESULT IN A MAXIMUM PREDRILLING DIAMETER OF 12". FOR PREDRILLING FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS~~
11. PILE EXCAVATION MAY BE REQUIRED AT END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2168 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

2163 FT. (PILES 1-2) AND 2168 FT. (PILES 3-5)

**FOUNDATION RECOMMENDATION COMMENTS**

1. Bridge end bent slopes of 1.5:1 (H:V) are ok with slope protection.
2. Bridge approach fills for subregional tier bridges are required for both end bents (in accordance with 2012 Roadway Standard Drawing No. 422.11).
3. The average factored axial load at End Bent No. 1 is 70 tons per pile.
4. The average factored axial load at End Bent No. 2 is 70 tons per pile.

**N.C. DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENG. UNIT-WRO**

ACCEPTED  
 ACCEPTED AS NOTED  
 RETURNED FOR CORRECTIONS  
 SEE LETTER

**BY:** Jonathan Almond, PE

**DATE:** 10/14/2014

## PILE PAY ITEMS

(Revised 8/15/12)

WBS ELEMENT 17BP.14.R.109

TIP NO. SF-550310

COUNTY Macon

STATION 12+35.30 -L-

DATE 9/30/2014

DESIGNED BY WSH

CHECKED BY JRH

DESCRIPTION Bridge No. 310 on SR 1635  
over Smart Branch

NUMBER OF BENTS WITH PILES _____	}	Only required for "Predrilling for Piles" & "Pile Excavation" pay items
NUMBER OF PILES PER BENT _____		
NUMBER OF END BENTS WITH PILES <u>2</u>		
NUMBER OF PILES PER END BENT <u>5</u>		

Bent # or End Bent #	PILE PAY ITEM QUANTITIES						PDA Testing (per each)		
	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	*Pile Excavation (per linear ft)				
					In Soil	Not In Soil			
End Bent No. 1	yes				<u>22</u>	<del>18</del>	7	X	
End Bent No. 2	yes		<del>38</del>		<u>39</u>	<del>12</del>	<u>18</u>		<del>13</del>
TOTALS	X	X	<del>38</del>	0	<u>61</u>	<del>30</del>	<u>25</u>	<del>20</del>	0

Notes:

\* Pile Excavation quantities shown should be included as a contingency only.

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

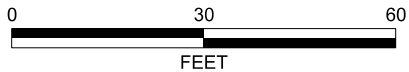
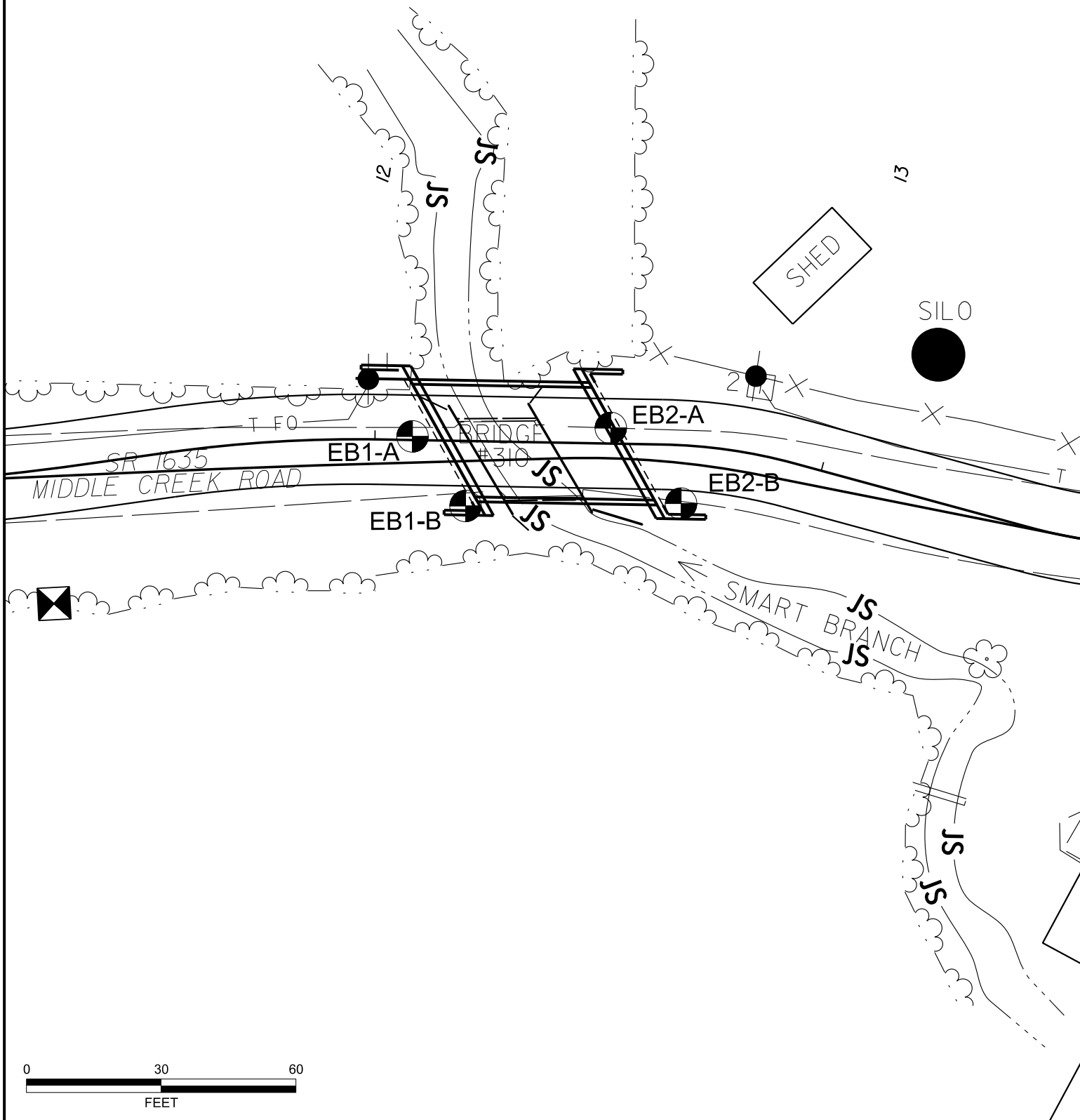
Show quantity of "PDA Testing" on the plans as total only.

If quantity of "PDA Testing" is 3 or less, reference "Pile Driving Criteria" provision in PDA notes on plans and include "Pile Driving Criteria" provision in the contract.

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ACCEPTED  
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 SEE LETTER

**BY:** Jonathan Almond, PE  
**DATE:** 10/14/2014



**NOTES:**

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM LOUIS BERGER GROUP IN SEPTEMBER 2014.
- BRIDGE SKEW: 60°



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

**BORING LOCATION PLAN**

BRIDGE NO. 310 ON SR 1635  
OVER SMART BRANCH  
MACON COUNTY, NC  
PROJECT NO.: 17BP,14,R,109



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.F€J	TIP N/A	COUNTY MACON	GEOLOGIST Norville, C.V.
SITE DESCRIPTION Bridge No. 310 on SR1635 over Smart Branch			GROUND WTR (ft)
BORING NO. EB1-A	STATION 13+82	OFFSET 9 ft LT	ALIGNMENT -BL-
COLLAR ELEV. 2,183.0 ft	TOTAL DEPTH 53.6 ft	NORTHING 498,224	EASTING 696,212
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Gower, S.	START DATE 01/23/14	COMP. DATE 01/23/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2185													2" TOPSOIL	0.0
2180	2,182.0	1.0	2	3	3	6					M		ROADWAY EMBANKMENT BROWN, SILTY F. SAND (A-2-4)	
	2,179.5	3.5	1	2	1	3					M			
2175	2,177.0	6.0	2	6	18	24							RESIDUAL TAN BROWN AND GRAY, SILTY F. TO MED. SAND (A-2-4) W/ ROCK FRAGS. AND LITTLE MICA	5.0
	2,174.5	8.5				18					M			
2170	2,169.5	13.5				13					M			
	2,164.5	18.5				33					M			
2160	2,159.5	23.5				59					M			
	2,156.0	28.5				100/0.3							WEATHERED ROCK GRAY AND TAN, MUSCOVITE-BIOTITE GNEISS	27.0
2150	2,149.5	33.5				100/0.4								
	2,148.0	35.0											RESIDUAL GRAY, SILTY F. SAND (A-2-4) HIGHLY MICACEOUS	35.0
2145	2,144.5	38.5				32					M			
2140	2,139.5	43.5				59					M			
2135	2,134.5	48.5				20					M			
2130	2,129.5	53.5				60/0.1							WEATHERED ROCK GRAY AND TAN, MUSCOVITE BIOTITE GNEISS	51.0
	2,129.4	53.6											CRYSTALLINE ROCK MUSCOVITE BIOTITE GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,129.4 ft in CR: Muscovite Biotite Gneiss	53.6

NCDOT BORE SINGLE 000\_GEO\_BRDG0310\_GINT LOG.GPJ NC\_DOT.GDT 9/30/14





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.F€J	TIP N/A	COUNTY MACON	GEOLOGIST Hunsberger, W. S.
SITE DESCRIPTION Bridge No. 310 on SR1635 over Smart Branch			GROUND WTR (ft)
BORING NO. EB1-B	STATION 13+93	OFFSET 8 ft RT	ALIGNMENT -BL-
0 HR. N/A			
COLLAR ELEV. 2,183.0 ft	TOTAL DEPTH 17.1 ft	NORTHING 249,435	EASTING 498,230
24 HR. 9.1 FIAD			
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Gower, S.	START DATE 01/27/14	COMP. DATE 01/27/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2185																	
	2,182.0	1.0	3	2	2									2,183.0	2" TOPSOIL	0.0	
2180	2,179.5	3.5	4	5	7									2,180.0	<b>ROADWAY EMBANKMENT</b> TAN AND BROWN, F. SANDY SILT (A-4) W/ TRACE MICA	3.0	
	2,177.0	6.0	9	12	8										TAN BROWN AND DK. GRAY, SILTY F. TO MED. SAND (A-2-4) W/ GRAVEL AND TRACE MICA		
2175	2,174.5	8.5	6	13	22									2,175.0	<b>RESIDUAL</b> TAN AND BROWN, SILTY F. SAND (A-2-4) HIGHLY MICACEOUS	8.0	
2170	2,169.5	13.5	60	40/0.1										2,169.5	<b>WEATHERED ROCK</b> BROWN TAN AND GRAY, MUSCOVITE BIOTITE GNEISS	13.5	
	2,165.9	17.1	60/0.0											2,165.9		17.1	
															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,165.9 ft on CR: Muscovite Biotite Gneiss		

NCDOT BORE SINGLE 000\_GEO\_BRDG0310\_GINT LOG.GPJ NC\_DOT.GDT 9/30/14



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.FEJ	TIP N/A	COUNTY MACON	GEOLOGIST Norville, C.V.
SITE DESCRIPTION Bridge No. 310 on SR1635 over Smart Branch			GROUND WTR (ft)
BORING NO. EB2-A	STATION 14+26	OFFSET 10 ft LT	ALIGNMENT -BL-
COLLAR ELEV. 2,184.0 ft	TOTAL DEPTH 38.9 ft	NORTHING 498,266	EASTING 696,223
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Gower, S.	START DATE 01/23/14	COMP. DATE 01/23/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2185														2,184.0	2" TOPSOIL	0.0	
	2,183.0	1.0	2	1	1										<b>ROADWAY EMBANKMENT</b> RED, F. SANDY CLAYEY SILT (A-5)		
2180	2,180.5	3.5	WOH	WOH	1												
	2,178.0	6.0	11	18	22										TAN AND BROWN, SILTY F. SAND (A-2-4) W/ SOME GRAVEL	5.5	
2175	2,175.5	8.5	2	3	10										<b>ALLUVIAL</b> GRAY F. SANDY SILT (A-4)	8.0	
	2,170.5	13.5	2	8	16										<b>RESIDUAL</b> BROWN AND GRAY, SILTY F. SAND (A-2-4) W/ LITTLE MICA	13.0	
2165	2,165.5	18.5	100/0.3												<b>WEATHERED ROCK</b> GRAY, MUSCOVITE BIOTITE GNEISS	20.0	
2160	2,160.5	23.5	22	25	21										<b>RESIDUAL</b> GRAY, SILTY F. SAND (A-2-4) HIGHLY MICACEOUS	26.0	
2155	2,155.5	28.5	100/0.3												<b>WEATHERED ROCK</b> GRAY, MUSCOVITE BIOTITE GNEISS	26.0	
2150	2,150.5	33.5	100/0.2														
	2,145.5	38.5	100/0.4														
																Boring Terminated with Standard Penetration Test Refusal at Elevation 2,145.1 ft in WR: Muscovite Biotite Gneiss	38.9

NCDOT BORE SINGLE 000\_GEO\_BRDG0310\_GINT LOG.GPJ NC\_DOT.GDT 9/30/14



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS		TIP		COUNTY		GEOLOGIST												
17BP.14.R.F6J		N/A		MACON		Hunsberger, W. S.												
SITE DESCRIPTION							GROUND WTR (ft)											
Bridge No. 310 on SR1635 over Smart Branch							0 HR. N/A											
BORING NO.		STATION		OFFSET		ALIGNMENT												
EB2-B		14+37		6 ft RT		-BL-												
COLLAR ELEV.		TOTAL DEPTH		NORTHING		EASTING												
2,185.0 ft		13.6 ft		249,435		498,276												
DRILL RIG/HAMMER EFF./DATE				DRILL METHOD		HAMMER TYPE												
TRI9435 CME-55 80% 02/15/2013				H.S. Augers		Automatic												
DRILLER		START DATE		COMP. DATE		SURFACE WATER DEPTH												
Gower, S.		01/27/14		01/27/14		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								
2185															2,185.0	0.0	3" ASPHALT 4" ABC STONE	
	2,184.0	1.0	4	5	5												<b>ROADWAY EMBANKMENT</b> BROWN RED ORANGE AND TAN, F. SANDY SILT (A-4) W/ GRAVEL, TRACE ORGANICS AND LITTLE MICA	
2180	2,181.5	3.5	2	2	1													
	2,179.0	6.0	1	2	WOH													
	2,176.5	8.5	WOH	WOH	WOH													
2175	2,171.5	13.5	60/0.1															
																		<b>ALLUVIAL</b> GRAY AND DK. BROWN, SINE SANDY SILT (A-4) W/ TRACE ORGANICS
																		<b>WEATHERED ROCK</b> GRAY AND BROWN, MUSCOVITE BIOTITE GNEISS
																		<b>CRYSTALLINE ROCK</b> GRAY AND BROWN, MUSCOVITE BIOTITE GNEISS
																		Boring Terminated with Standard Penetration Test Refusal at Elevation 2,171.4 ft in CR: Muscovite Biotite Gneiss

NCDOT BORE SINGLE 000\_GEO\_BRDG0310\_GINT LOG.GPJ NC\_DOT.GDT 9/30/14