

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.180	1	7

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.14.R.180 F.A. PROJ. N/A
COUNTY POLK
PROJECT DESCRIPTION LOW IMPACT BRIDGE REPLACEMENT:
DIVISION 14

SITE DESCRIPTION BRIDGE NO. 740063 OVER SKYUKA CREEK
ON SR 1543 (CAPPS ROAD)

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DATE MARCH 2017

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) 707-6850. 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.

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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.

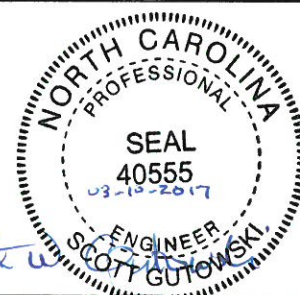
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PROJECT REFERENCE NO. 17BP.14.R.180	SHEET NO. 2
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

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, GRN, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A76

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-6	A-7	A-1	A-2	A-4	A-5	A-6	A-7	A-1	A-2	A-4	A-5			
GROUP CLASS.	A-1	A-1-1	A-2	A-2-1	A-2-2	A-2-3	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-4	A-5			
SYMBOL	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]			
% PASSING	50	30	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50			
LIQUID LIMIT	6	NP	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55			
PLASTIC INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
GROUP INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS				CLAYEY SOILS				MUCK, PEAT						
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR			POOR			UNSATISFACTORY		

PI OF A-7-5 SUBGROUP IS LL - 30 + PI OF A-7-6 SUBGROUP IS LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FF)
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

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	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.)
GRAIN SIZE MM	305	75	2.0	0.25	0.05	0.005
SIZE IN.	12	3				

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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- 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
	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.

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.

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

PERCENTAGE OF 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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		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		





ABBREVIATIONS

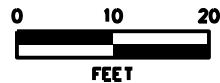
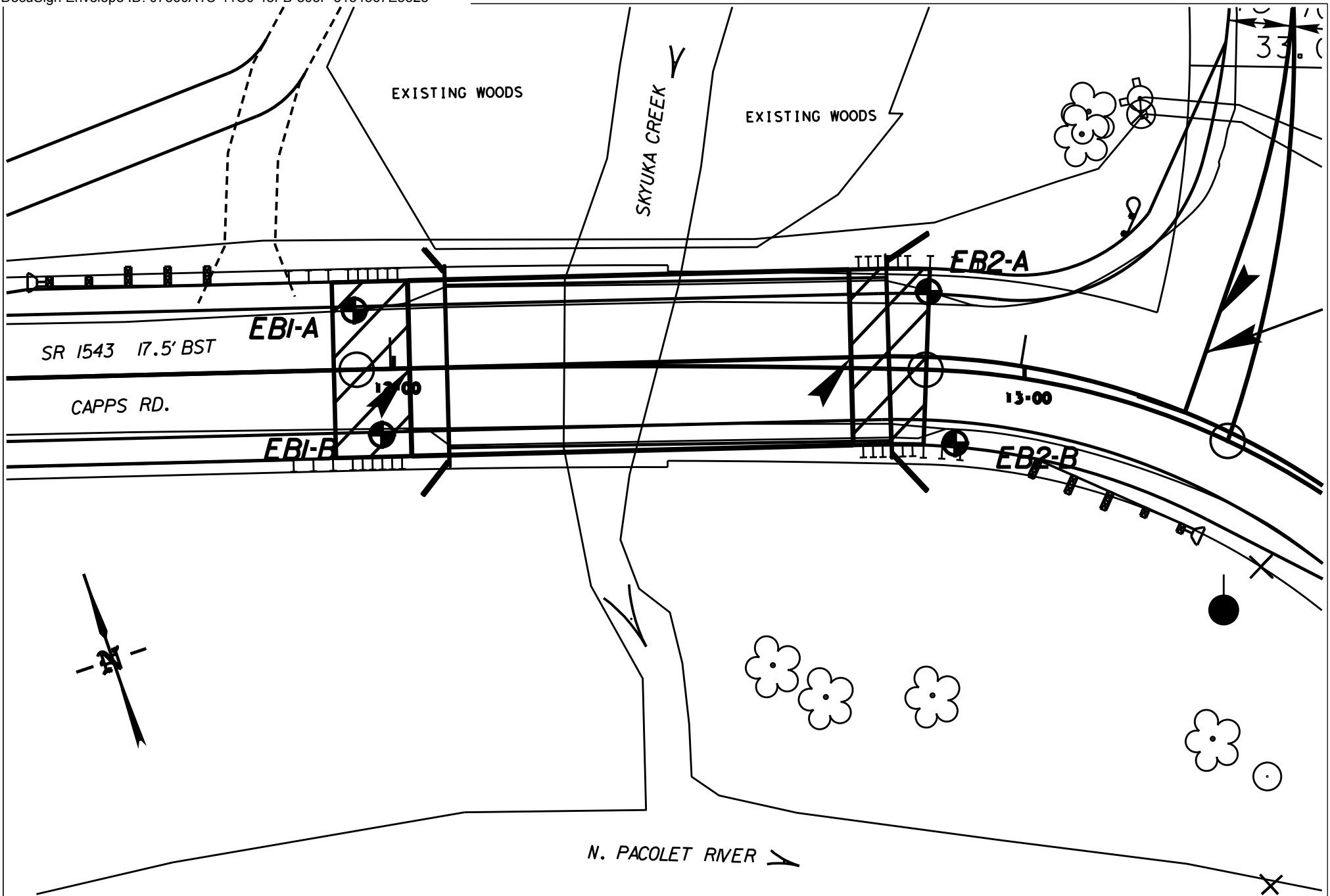
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED
CL - CLAY	MOD. - MODERATELY	U. - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	% - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE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

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-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:
<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -B
<input type="checkbox"/> CME-950	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N
<input type="checkbox"/> PORTABLE MOIST	<input type="checkbox"/> TUNG. -CARBIDE INSERTS	<input type="checkbox"/> -H
<input checked="" type="checkbox"/> CME-550X	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	HAND TOOLS:
<input type="checkbox"/>	<input type="checkbox"/> TRICONE _____ STEEL TEETH	<input type="checkbox"/> POST HOLE DIGGER
<input type="checkbox"/>	<input type="checkbox"/> TRICONE _____ TUNG. -CARB.	<input type="checkbox"/> HAND AUGER
<input type="checkbox"/>	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> SOUNDING ROD
<input type="checkbox"/>		<input type="checkbox"/> VANE SHEAR TEST

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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 60 BLOWS PER FOOT 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>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 DISLOGGED 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 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SPEC.) - 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.</p>	
<p>WEATHERED ROCK (WR)</p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>		
<p>CRYSTALLINE ROCK (CR)</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>NON-CRYSTALLINE ROCK (NCR)</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>COASTAL PLAIN SEDIMENTARY ROCK (CP)</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>FRESH</p>	<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>		
<p>VERY SLIGHT (V SL.)</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>SLIGHT (SL.)</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>MODERATE (MOD.)</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>MODERATELY SEVERE (MOD. SEV.)</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>SEVERE (SEV.)</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 > 100 BPF.</i></p>		
<p>VERY SEVERE (V SEV.)</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 < 100 BPF.</i></p>		
<p>COMPLETE</p>	<p>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.</p>		
ROCK HARDNESS			
<p>VERY HARD</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>HARD</p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>		
<p>MODERATELY HARD</p>	<p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES OF 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>		
<p>MEDIUM HARD</p>	<p>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.</p>		
<p>SOFT</p>	<p>CAN BE GROOVED 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>VERY SOFT</p>	<p>CAN BE CARRIED 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		BEDDING	
<p>TERM</p>	<p>SPACING</p>	<p>TERM</p>	<p>THICKNESS</p>
<p>VERY WIDE</p>	<p>MORE THAN 10 FEET</p>	<p>VERY THICKLY BEDDED</p>	<p>> 4 FEET</p>
<p>WIDE</p>	<p>3 TO 10 FEET</p>	<p>THICKLY BEDDED</p>	<p>1.5 - 4 FEET</p>
<p>MODERATELY CLOSE</p>	<p>1 TO 3 FEET</p>	<p>THINLY BEDDED</p>	<p>0.16 - 1.5 FEET</p>
<p>CLOSE</p>	<p>0.16 TO 1 FEET</p>	<p>VERY THINLY BEDDED</p>	<p>0.03 - 0.16 FEET</p>
<p>VERY CLOSE</p>	<p>LESS THAN 0.16 FEET</p>	<p>THICKLY LAMINATED</p>	<p>0.008 - 0.03 FEET</p>
		<p>THINLY LAMINATED</p>	<p>< 0.008 FEET</p>
INDURATION			
<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>			
<p>FRIABLE</p>	<p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>		
<p>MODERATELY INDURATED</p>	<p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>		
<p>INDURATED</p>	<p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>		
<p>EXTREMELY INDURATED</p>	<p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>		
<p>NOTES: FIAD - FILLED IN AFTER DRILLING</p>			
<p>BENCH MARK: BM#2 (N: 553809.14, E: 1034910.26) ELEVATION: 918.97 FT.</p>			



SCALE: 1 : 20 DATE: MARCH 2017 DRAWN BY: NGD APPROVED BY: SWG	PROJ. REFERENCE NUMBER: 17BP.14.R.180 BRIDGE NUMBER: 740063 COUNTY: POLK TERRACON PROJECT: 71165127	2020 STARITA ROAD, SUITE E CHARLOTTE, NC 28206 PH. (704) 509-1777 FAX. (704) 509-1888	BORING LOCATION DIAGRAM BRIDGE NO. 740063 OVER SKYUKA CREEK ON SR 1543 (CAPPS ROAD)	SHEET 3
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NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.180		TIP 740063		COUNTY POLK		GEOLOGIST Weritz, M										
SITE DESCRIPTION Bridge No. 740063 over Skyuka Creek on SR 1543 (Capps Road)							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 11+94		OFFSET 9 ft LT		ALIGNMENT -L-	0 HR. 13.3									
COLLAR ELEV. 915.4 ft		TOTAL DEPTH 17.5 ft		NORTHING 553,794		EASTING 1,034,731	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 92% 12/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER C. Odom		START DATE 02/10/17		COMP. DATE 02/10/17		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)	
920																
915	914.4	1.0	2	1	2									915.4	0.0	GROUND SURFACE
	911.9	3.5	3	3	4						SS-1	M		912.4	3.0	ARTIFICIAL FILL Soft, reddish brown sandy LEAN CLAY (A-6)
910	909.4	6.0	12	4	3						SS-2	M		909.9	5.5	Medium stiff, brown sandy SILT (A-4)
	906.9	8.5	3	3	6						SS-3	M				ALLUVIAL Medium stiff to stiff, brown sandy LEAN CLAY (A-6)
905											SS-4	M				
	901.9	13.5	5	8	18									903.9	11.5	RESIDUAL Medium dense, brown sandy SILT (A-4)
900											SS-5	M				
	897.9	17.5												897.9	17.5	Boring Terminated by Auger Refusal at Elevation 897.9 ft on Crystalline Rock
			60/0'								SS-6					

NCDOT BORE SINGLE BRIDGE 740063.GPJ NC_DOT.GDT 3/9/17



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.180		TIP 740063		COUNTY POLK		GEOLOGIST Weritz, M										
SITE DESCRIPTION Bridge No. 740063 over Skyuka Creek on SR 1543 (Capps Road)							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 11+98		OFFSET 10 ft RT		ALIGNMENT -L-	0 HR. 14.4									
COLLAR ELEV. 915.3 ft		TOTAL DEPTH 18.5 ft		NORTHING 553,774		EASTING 1,034,731	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 92% 12/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER C. Odom		START DATE 02/10/17		COMP. DATE 02/10/17		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)	
920																
915	914.3	1.0	2	2	2									915.3	GROUND SURFACE	0.0
	911.8	3.5	5	11	10									912.3	ARTIFICIAL FILL Soft to medium stiff, reddish brown sandy LEAN CLAY (A-6)	3.0
910	909.3	6.0	2	1	2									907.8	Very loose to medium dense, brown to grayish brown silty SAND with trace gravel (A-2-4)	7.5
	906.8	8.5	0	2	1									902.8	Soft, dark grayish brown sandy LEAN CLAY (A-6)	12.5
905																
	901.8	13.5	0	0	3									898.3	ALLUVIAL soft, brown to grayish brown sandy LEAN CLAY (A-6)	17.0
900																
	896.8	18.5	60/0											896.8	WEATHERED ROCK (Granite Gneiss)	18.5

NCDOT BORE SINGLE BRIDGE 740063.GPJ NC_DOT.GDT 3/9/17



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.180		TIP 740063		COUNTY POLK		GEOLOGIST Weritz, M	
SITE DESCRIPTION Bridge No. 740063 over Skyuka Creek on SR 1543 (Capps Road)							GROUND WTR (ft)
BORING NO. EB2-A		STATION 12+84		OFFSET 12 ft LT		ALIGNMENT -L-	0 HR. 13.0
COLLAR ELEV. 915.3 ft		TOTAL DEPTH 34.2 ft		NORTHING 553,777		EASTING 1,034,820	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 92% 12/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic	

DRILLER C. Odom		START DATE 02/10/17		COMP. DATE 02/10/17		SURFACE WATER DEPTH N/A	
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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)	
920																
915															915.3	GROUND SURFACE
	914.3	1.0	1	2	1							SS-1	M	[Reddiagonal hatching]		ARTIFICIAL FILL Soft to medium stiff, reddish brown sandy LEAN CLAY (A-6)
	911.8	3.5	3	1	4							SS-2	M		910.3	5.0
910	909.3	6.0	2	2	4							SS-3	M	[Yellow dotted pattern]		ALLUVIAL Loose, brown to reddish brown silty SAND with trace clay (A-2-4)
	906.8	8.5	2	2	4							SS-4	M		903.3	12.0
905																
	901.8	13.5	2	2	4							SS-5	W	[Green dotted pattern]		RESIDUAL Loose, dark gray micaceous silty SAND (A-2-4)
900	896.8	18.5	2	6	2							SS-6	W		896.3	19.0
895																
	891.8	23.5	58	42/0.4'					100/0.9'			SS-7		[Brown hatched pattern]		WEATHERED ROCK (Granite Gneiss)
890	886.8	28.5	20	39	61/0.4'				100/0.9'			SS-8			891.8	23.5
	881.8	33.5	100/0.1'						100/0.1'			SS-9		[Cross-hatched pattern]		Boring Terminated by Auger Refusal at Elevation 881.1 ft on Crystalline Rock
885	881.1	34.2	60/0'						60/0'			SS-10			881.1	

NCDOT BORE SINGLE BRIDGE 740063.GPJ NC_DOT.GDT 3/9/17



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.180		TIP 740063		COUNTY POLK		GEOLOGIST Weritz, M											
SITE DESCRIPTION Bridge No. 740063 over Skyuka Creek on SR 1543 (Capps Road)							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 12+90		OFFSET 11 ft RT		ALIGNMENT -L-	0 HR. 14.1										
COLLAR ELEV. 915.0 ft		TOTAL DEPTH 39.3 ft		NORTHING 553,752		EASTING 1,034,819	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE HPC2473 CME-550 92% 12/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER C. Odom		START DATE 02/10/17		COMP. DATE 02/10/17		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)		
915															915.0	0.0	GROUND SURFACE
	914.0	1.0	2	2	2							SS-1	M				ARTIFICIAL FILL Soft to medium stiff, reddish brown sandy LEAN CLAY (A-6)
	911.5	3.5	2	1	2							SS-2	M				Very loose, brown silty SAND with trace gravel (A-2-4)
910															909.5	5.5	
	909.0	6.0	2	4	3							SS-3	M				ALLUVIAL Loose, brown silty SAND with trace clay (A-2-4)
	906.5	8.5	1	2	3							SS-4	M				
905																	
	901.5	13.5	2	1	2							SS-5	W				RESIDUAL Soft to very stiff, brown micaceous sandy SILT with trace gravel (A-4)
900																	
	896.5	18.5	6	9	6							SS-6	W				
895																	
	891.5	23.5	9	10	11							SS-7	M				Medium dense to dense, brown silty SAND (A-2-4)
890																	
	886.5	28.5	6	15	18							SS-8	M				
885																	
	881.5	33.5	27	65	35/0.2							SS-9					WEATHERED ROCK (Granite Gneiss)
880																	
	876.5	38.5	100/0.2									SS-10					
	875.7	39.3	60/0'									SS-11					Boring Terminated by Auger Refusal at Elevation 875.7 ft on Crystalline Rock

NCDOT BORE SINGLE BRIDGE 740063.GPJ NC_DOT.GDT 3/9/17