

REFERENCE: B-5699

PROJECT: 45653

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5699	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY COLUMBUS
PROJECT DESCRIPTION BRIDGE NO. 77 ON NC 214 OVER
GREEN SWAMP

ADDENDUM

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND
3	SITE PLAN
4-12	BORE LOG(S)

PERSONNEL

J.K. CRENSHAW

CATLIN, INC.

INVESTIGATED BY T.C. BOTTOMS

DRAWN BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2016

CAUTION NOTICE

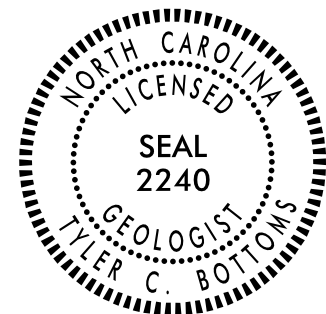
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 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.

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 THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
- 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.



DocuSigned by:

Tyler Bottoms

3/14/2016

SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

B-5699

2

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

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 1 OF 2)

SOIL DESCRIPTION

SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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-3	A-4, A-5	A-6, A-7		
SYMBOL													
% PASSING	#10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	50 MN 35 MX 10 MX	35 MX 35 MX 35 MX	35 MX 35 MX 35 MX	35 MX 35 MX 35 MX	35 MN 35 MN 35 MN	35 MN 35 MN 35 MN	35 MN 35 MN 35 MN	35 MN 35 MN 35 MN	35 MN 35 MN 35 MN	
MATERIAL PASSING #40													
LL													
PI													
GROUP INDEX													
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 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/FT ²)
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 0.5 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
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL 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 SL	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	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.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

	UNDERCUT		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL
	SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		

ABBREVIATIONS

AR - AUGER REFUSAL	MED. - MEDIUM	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 _d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS
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 - RECOMPACT 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:
☐ CME-45C	☐ CLAY BITS	☒ AUTOMATIC ☐ MANUAL
☐ CME-55	☐ 6" CONTINUOUS FLIGHT AUGER	
☐ CME-550	☐ 8" HOLLOW AUGERS	CORE SIZE:
☐ VANE SHEAR TEST	☐ HARD FACED FINGER BITS	☐ -B ☐ -H
☐ PORTABLE HOIST	☐ TUNG-CARBIDE INSERTS	☐ -N
☒ CME-45B	☒ CASING ☐ W/ ADVANCER	HAND TOOLS:
☐	☐ TRICONE _____ * STEEL TEETH	☐ POST HOLE DIGGER
☐	☐ TRICONE _____ * TUNG.-CARB.	☐ HAND AUGER
☐	☐ CORE BIT	☐ SOUNDING ROD
☐	☒ DRAG BIT	☐ VANE SHEAR TEST
		☒ PUSH PROBE

B-5699

2A

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

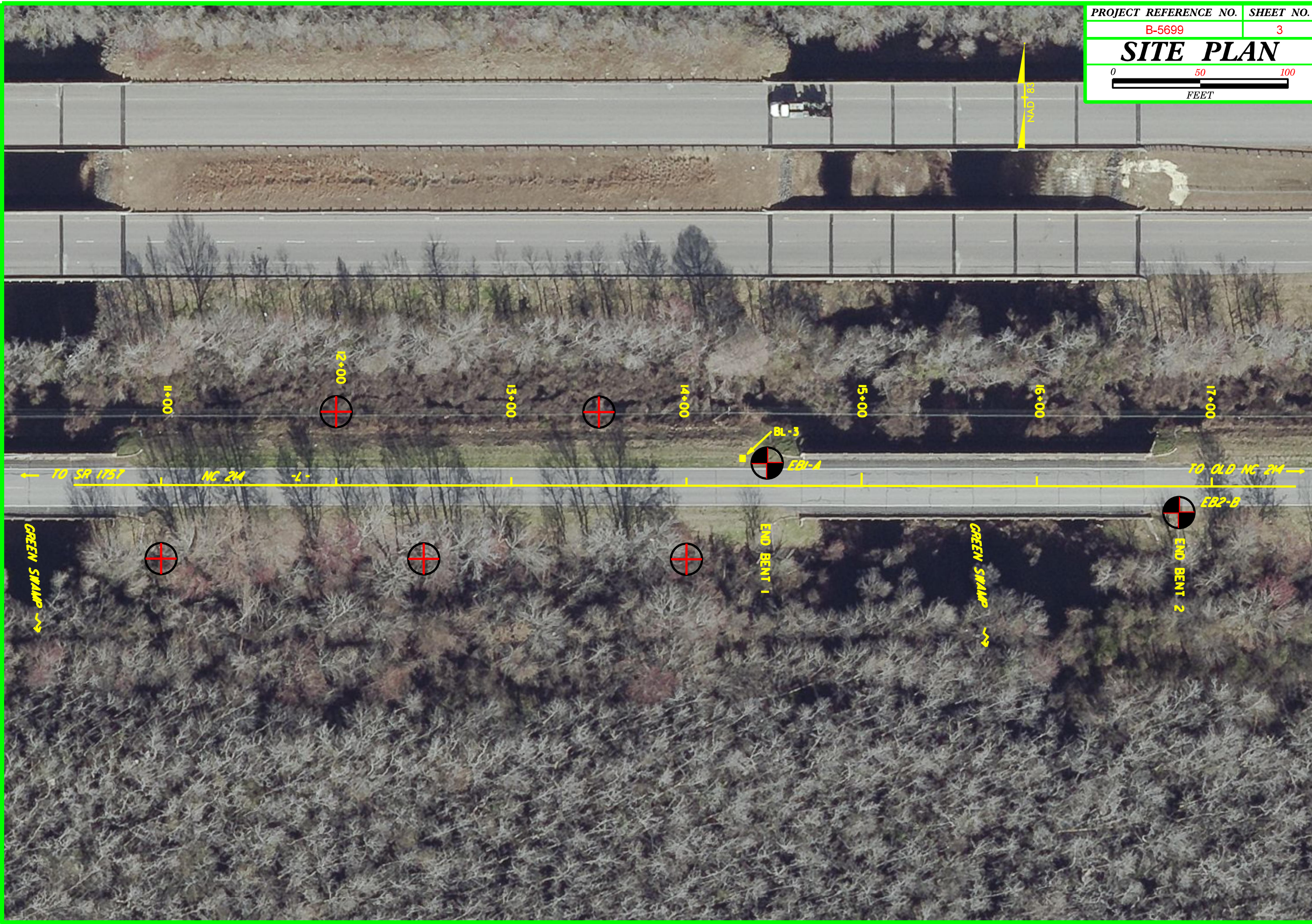
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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:			
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>		
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. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>		
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.		
FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY 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 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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.		
BENCH MARK: BL-3		NORTHING: 208621056 EASTING: 2160646.943	
		ELEVATION: 52.08 FEET	
NOTES:			
TOP OF RAIL EL. - WEST END OF BRIDGE (EB1-B): 55.18'			
TOP OF RAIL EL. - EAST END OF BRIDGE (EB2-B): 54.13'			

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5699	3
SITE PLAN	
0 50 100 FEET	



GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 5 OF 12

WBS 45653.1.1				TIP B-5699		COUNTY COLUMBUS				GEOLOGIST Bottoms, T. C.					
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM										GROUND WTR (ft)					
BORING NO. 12+00 42' LT				STATION 12+00			OFFSET 42 ft LT			ALIGNMENT -L-					
COLLAR ELEV. N/A				TOTAL DEPTH 7.5 ft			NORTHING 208,648			EASTING 2,160,415					
DRILL RIG/HAMMER EFF./DATE N/A						DRILL METHOD Hand Auger				HAMMER TYPE N/A					
DRILLER N/A				START DATE 03/01/16			COMP. DATE 03/01/16			SURFACE WATER DEPTH 1.0ft					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	 MOI	L O G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
															GROUND SURFACE 0.0
															ALLUVIAL VERY SOFT BROWN MUCK WITH WOOD FRAGMENTS, WET 6.5
															COASTAL PLAIN MEDIUM DENSE GRAY SAND, SATURATED (PEEDEE FORMATION) Boring Terminated at Depth 7.5 ft in Medium Dense Sand 7.5

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 8 OF 12

WBS 45653.1.1				TIP B-5699		COUNTY COLUMBUS				GEOLOGIST Bottoms, T. C.						
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM										GROUND WTR (ft)						
BORING NO. 14+00 42' RT				STATION 14+00				OFFSET 42 ft RT		ALIGNMENT -L-		0 HR. N/A				
COLLAR ELEV. N/A				TOTAL DEPTH 7.0 ft				NORTHING 208,564		EASTING 2,160,615		24 HR. N/A				
DRILL RIG/HAMMER EFF./DATE N/A								DRILL METHOD Hand Auger				HAMMER TYPE N/A				
DRILLER N/A				START DATE 03/01/16				COMP. DATE 03/01/16		SURFACE WATER DEPTH 1.0ft						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	 MOI	L O G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
																GROUND SURFACE 0.0
																ALLUVIAL VERY SOFT BROWN MUCK WITH WOOD FRAGMENTS, WET 6.0 7.0
																COASTAL PLAIN MEDIUM DENSE GRAY SAND, SATURATED (PEEDEE FORMATION) Boring Terminated at Depth 7.0 ft in Medium Dense Sand

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 9 OF 12

WBS 45653.1.1			TIP B-5699			COUNTY COLUMBUS			GEOLOGIST Crenshaw, J. K.					
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM									GROUND WTR (ft)					
BORING NO. EB1-A			STATION 14+46			OFFSET 13 ft LT			ALIGNMENT -L-			0 HR. N/A		
COLLAR ELEV. 52.6 ft			TOTAL DEPTH 100.3 ft			NORTHING 208,620			EASTING 2,160,661			24 HR. 7.9		
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER Contract Driller			START DATE 02/25/16			COMP. DATE 02/26/16			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)
55														
	52.6	0.0	1	2	5	7							52.6	0.0
50														
	48.5	4.1	WOH	WOH	WOH								49.6	3.0
45														
	43.8	8.8	WOH	WOH	WOH									
40														
	38.8	13.8	WOH	WOH	1	1							39.6	13.0
35														
	33.8	18.8	3	2	5	7							35.6	17.0
30														
	28.8	23.8	WOH	WOH	2	2							30.6	22.0
	27.3	25.3	3	4	5	2							27.5	25.1
25														
	25.8	26.8	1	2	2	4								
	23.8	28.8	5	4	4	8								
20														
	18.8	33.8	6	11	21	32							20.6	32.0
15														
	13.8	38.8	3	5	7	12								
10														
	8.8	43.8	3	3	5	8								
5														
	3.8	48.8	4	7	8	15								
0														
	-1.2	53.8	8	8	10	18							0.6	52.0
-5														
	-6.2	58.8	26	18	20	38								
-10														
	-11.2	63.8	3	4	5	9								
-15														
	-16.2	68.8	3	5	5	10								
-20														
	-21.2	73.8	4	6	8	14							-19.4	72.0
-25														

NCDOT BORE SINGLE B-5699_GEO_BRDG.GPJ NC_DOT.GDT 3/14/16

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 10 OF 12

WBS 45653.1.1			TIP B-5699			COUNTY COLUMBUS			GEOLOGIST Crenshaw, J. K.		
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM									GROUND WTR (ft)		
BORING NO. EB1-A			STATION 14+46			OFFSET 13 ft LT			ALIGNMENT -L-		
COLLAR ELEV. 52.6 ft			TOTAL DEPTH 100.3 ft			NORTHING 208,620			EASTING 2,160,661		
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013									DRILL METHOD Mud Rotary		
DRILLER Contract Driller									START DATE 02/25/16		
COMP. DATE 02/26/16									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				
-25						Match Line								
-30	-26.2	78.8	11	9	14									
-35	-31.2	83.8	10	11	13									
-40	-36.2	88.8	6	7	11									
-45	-41.2	93.8	6	7	9									
-46.2	-46.2	98.8	7	11	17									

COASTAL PLAIN
GRAY SILTY CLAY, WET

COASTAL PLAIN
GRAY SAND WITH SHELL FRAGMENTS,
SATURATED

Boring Terminated at Elevation -47.7 ft in
Medium Dense Sand

87.0

97.0

100.3

GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 11 OF 12

WBS 45653.1.1			TIP B-5699			COUNTY COLUMBUS			GEOLOGIST Crenshaw, J. K.						
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM									GROUND WTR (ft)						
BORING NO. EB2-B			STATION 16+81			OFFSET 15 ft RT			ALIGNMENT -L-			0 HR.	N/A		
COLLAR ELEV. 51.0 ft			TOTAL DEPTH 104.6 ft			NORTHING 208,592			EASTING 2,160,896			24 HR.	6.6		
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic						
DRILLER Contract Driller			START DATE 02/26/16			COMP. DATE 02/26/16			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)
55															
50	51.0	0.0	2	2	3	5								51.0	0.0
45	47.1	3.9	WOH	WOH	1	1								48.0	3.0
	42.4	8.6	WOH	WOH	1	1								41.1	9.9
40	37.4	13.6	WOH	1	1	2								39.0	12.0
35	32.4	18.6	6	4	2	6									
30	27.4	23.6	WOH	WOH	2	2								26.3	24.7
25	22.4	28.6	2	2	2	4									
20	17.4	33.6	6	13	24	37								19.0	32.0
15	12.4	38.6	4	4	8	12									
10	7.4	43.6	3	4	6	10									
5	2.2	48.8	4	5	8	13									
0	-2.8	53.8	5	8	9	17								-1.0	52.0
-5	-7.8	58.8	7	12	9	21									
-10	-12.8	63.8	3	4	4	6								-16.0	67.0
-15	-17.8	68.8	6	5	7	12								-21.0	72.0
-20	-22.8	73.8	5	9	18	27									
-25															

NCDOT BORE SINGLE B-5699_GEO_BRDG.GPJ NC_DOT.GDT 3/14/16

WBS 45653.1.1			TIP B-5699			COUNTY COLUMBUS			GEOLOGIST Crenshaw, J. K.				
SITE DESCRIPTION BRIDGE NO. 77 ON -L- (NC 214) OVER GREEN SWAMP - ADDENDUM									GROUND WTR (ft)				
BORING NO. EB2-B			STATION 16+81			OFFSET 15 ft RT			ALIGNMENT -L-				
COLLAR ELEV. 51.0 ft			TOTAL DEPTH 104.6 ft			NORTHING 208,592			EASTING 2,160,896				
									0 HR. N/A				
									24 HR. 6.6				
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic				
DRILLER Contract Driller			START DATE 02/26/16			COMP. DATE 02/26/16			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)
-25						Match Line							
	-27.8	78.8	6	6	14								COASTAL PLAIN GRAY SAND, SATURATED (continued)
-30												-31.0	82.0
	-32.8	83.8	7	8	13								COASTAL PLAIN GRAY SILTY CLAY, WET
-35													
	-37.8	88.8	7	25	13								
-40													
	-42.8	93.8	6	9	11							-46.0	97.0
-45													COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SATURATED
	-47.8	98.8	7	12	18								
-50													
	-52.8	103.8	76	100/0.3								-53.6	104.6
												Boring Terminated at Elevation -53.6 ft in Very Dense Sand	