

REFERENCE: B-5985

PROJECT: 47749

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROBESON
PROJECT DESCRIPTION BRIDGE NO. 770175 ON -L-
(W. 5TH ST.) OVER LUMBER RIVER AT -L-
STA. 22 + 08.00

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5985	1	10

CAUTION NOTICE

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PERSONNEL

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Thomas Park

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INVESTIGATED BY S.V. HUDSON, LG

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DATE June 2022



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SIGNATURE

06/01/2022

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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-4, A-5	
SYMBOL	A-1-a	A-1-b	A-2-4		A-2-5		A-2-6		A-2-7						A-7-5, A-7-6		A-3	
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT	
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS			
GROUP INDEX	0		0	0	4 MX	8 MX	12 MX	16 MX	NO MX									
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. OF 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	UNSUITABLE			
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
	4.75	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

GRAIN SIZE	MM IN.	305 12	75 3	2.0	0.25	0.05	0.005

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
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM SL	- 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 <td>LL = 31 - 50</td>	LL = 31 - 50
HIGHLY COMPRESSIBLE <td>LL > 50</td>	LL > 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

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

SOIL SYMBOL

ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT

INFERRED SOIL BOUNDARY

INFERRED ROCK LINE

ALLUVIAL SOIL BOUNDARY

DIP & DIP DIRECTION OF ROCK STRUCTURES

TEST BORING

AUGER BORING

CORE BORING

MONITORING WELL

PIEZOMETER INSTALLATION

SLOPE INDICATOR INSTALLATION

CONE PENETROMETER TEST

SOUNDING ROD

TEST BORING WITH CORE

SPT N-VALUE

RECOMMENDATION SYMBOLS

UNDERCUT

SHALLOW UNDERCUT

UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE

UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL - CLAY
CPT - CONE PENETRATION TEST
CSE - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS - FOSSILIFEROUS
FRAC - FRACTURED, FRACTURES
FRAGS - FRAGMENTS
HL - HIGHLY

MED. - MEDIUM
MICA - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRI-CONE REFUSAL
wt - MOISTURE CONTENT
V - VERY

VST - VANE SHEAR TEST
WEA. - WEATHERED
% - UNIT WEIGHT
%g - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
☐ CME-45C
☒ CME-55
☐ CME-550
☐ VANE SHEAR TEST
☐ PORTABLE HOIST
☐ _____
☐ _____

ADVANCING TOOLS:
☐ CLAY BITS
☐ 6" CONTINUOUS FLIGHT AUGER
☐ 8" HOLLOW AUGERS
☐ HARD FACED FINGER BITS
☐ TUNG-CARBIDE INSERTS
☒ CASING
☒ W/ ADVANCER
☒ TRICONE 2 15/16" STEEL TEETH
☐ TRICONE _____ TUNG-CARB.
☐ CORE BIT
☐ _____

HAMMER TYPE:
☒ AUTOMATIC ☐ MANUAL

CORE SIZE:
☐ -B _____ ☐ -H _____
☐ -N _____

HAND TOOLS:
☐ POST HOLE DIGGER
☐ HAND AUGER
☐ SOUNDING ROD
☐ VANE SHEAR TEST
☐ _____

ROCK DESCRIPTION

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)

CRYSTALLINE ROCK (CR)

NON-CRYSTALLINE ROCK (NCR)

COASTAL PLAIN SEDIMENTARY ROCK (CP)

NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.

FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

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. *IF TESTED, WOULD YIELD SPT REFUSAL*

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. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*

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. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*

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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.

SOFT

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.

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

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

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.

TERMS AND DEFINITIONS

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, SUCH 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 (ROD) - 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 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SROD) - 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.

BENCH MARK: BORINGS LOCATED WITH REAL TIME KINEMATIC (RTK)

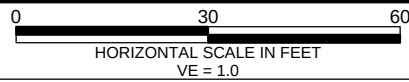
GLOBAL POSITIONING SYSTEM (GPS) TO NORTH CAROLINA STATE PLANE

NORTH AMERICAN DATUM 1983 ELEVATION: FEET

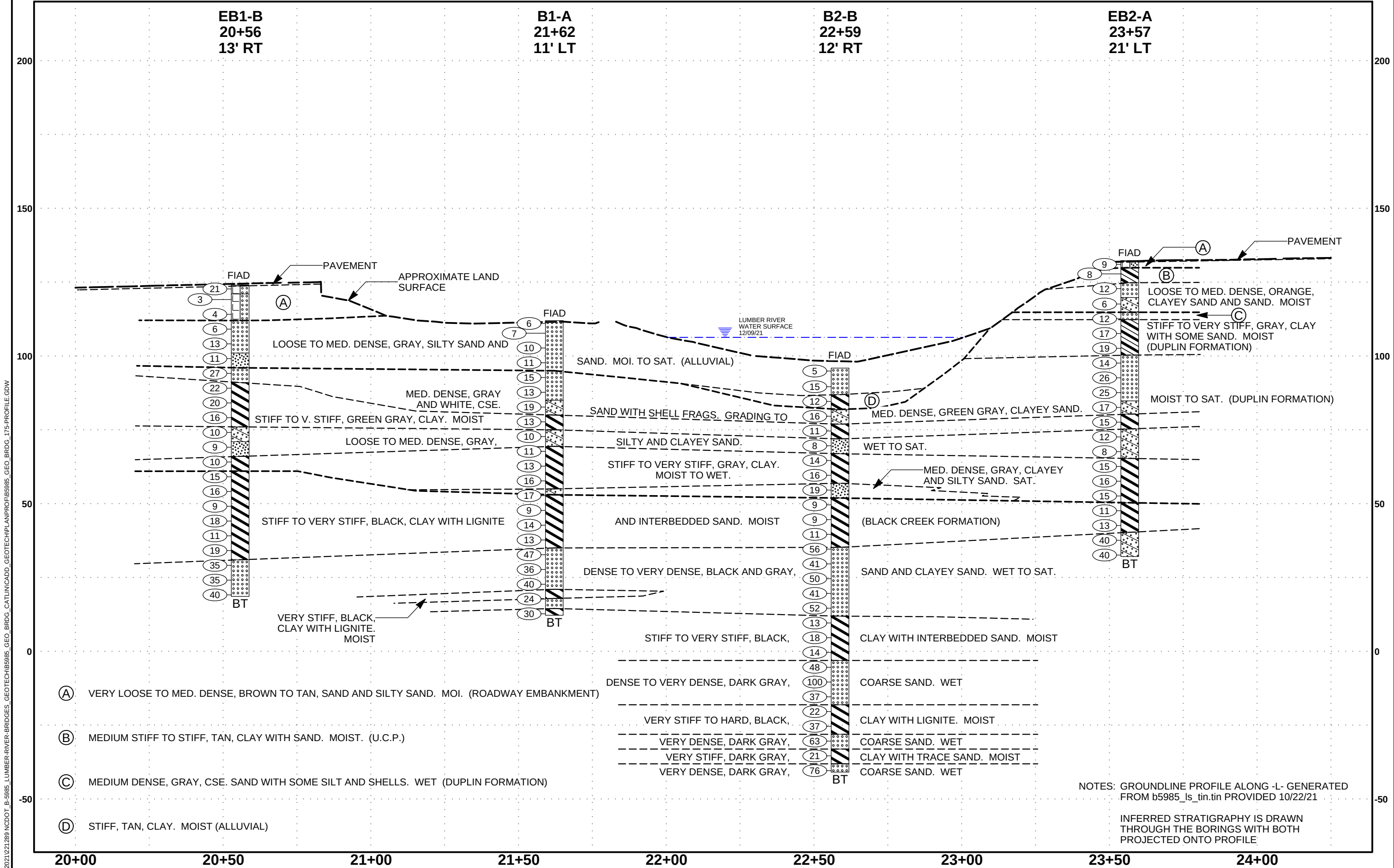
NOTES:

FIAD = FILLED IMMEDIATELY AFTER DRILLING

U.C.P. = UNDIVIDED COASTAL PLAIN

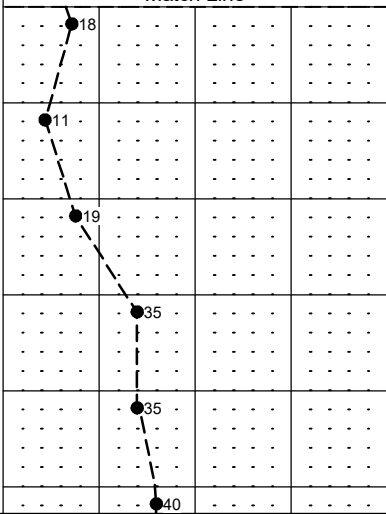
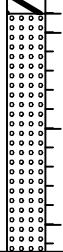
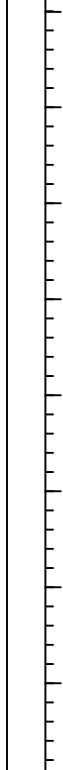


PROFILE THROUGH BORINGS PROJECTED ALONG -L-



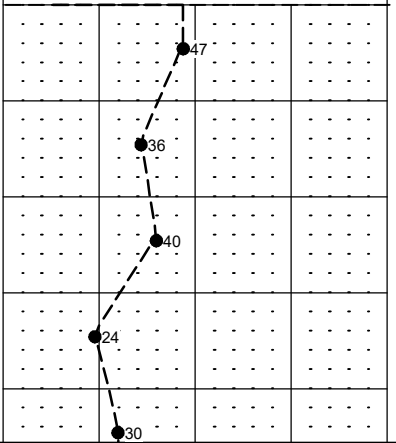
221289		<i>PROJECT REFERENCE</i>	<i>SHEET</i>
		B-5985	5

NCDOT BORE DOUBLE B5985 GEO BRDG CATLIN-TEMPLATE.GPJ NCDOT CATLIN.GDT 1/7/22

WBS: 47749.1.1				TIP: B-5985				COUNTY: ROBESON				GEOLOGIST: THOMAS PARK					
SITE DESCRIPTION: BRIDGE NO. 770175 ON -L- (W. 5TH ST) OVER LUMBER RIVER AT -L- STA. 22+08.00												GROUND WTR (ft)					
BORING NO.: EB1-B				STATION: 20+56				OFFSET: 13 ft RT				ALIGNMENT: -L-				0 HR. 2.0	
COLLAR ELEV.: 124.0 ft				TOTAL DEPTH: 105.4 ft				NORTHING: 316,695				EASTING: 1,996,600				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 83.7% 03/10/2021								DRILL METHOD: MUD ROTARY				HAMMER TYPE: AUTOMATIC					
DRILLER: J. EDMONDSON				START DATE: 12/13/21				COMP. DATE: 12/13/21				SURFACE WATER DEPTH: N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
45						Match Line											
																	
40	40.1	83.9	3	4	7							M		COASTAL PLAIN BLACK, CLAY WITH LIGNITE AND INTERBEDDED SAND. HIGH PLASTICITY (BLACK CREEK) (continued)			
												M					
35	35.1	88.9	3	9	10							M					
												M					
30	30.1	93.9	11	20	15							W			31.0 ----- 93.0 BLACK, CSE. SAND		
												W					
25	25.1	98.9	10	17	18							M					
												M					
20	20.1	103.9	21	21	19							M					
												M		18.6 ----- 105.4 Boring Terminated at Elevation 18.6 ft IN DENSE, CSE. SAND. (BLACK CREEK FORMATION)			

221289		<i>PROJECT REFERENCE</i>	<i>SHEET</i>
		B-5985	6

NCDOT BORE DOUBLE B5985 GEO BRDG CATLIN-TEMPLATE.GPJ NCDOT CATLIN.GDT 1/7/22

WBS: 47749.1.1				TIP: B-5985			COUNTY: ROBESON			GEOLOGIST: THOMAS PARK					
SITE DESCRIPTION: BRIDGE NO. 770175 ON -L- (W. 5TH ST) OVER LUMBER RIVER AT -L- STA. 22+08.00										GROUND WTR (ft)					
BORING NO.: B1-A				STATION: 21+62			OFFSET: 11 ft LT			ALIGNMENT: -L-		0 HR.	0.0		
COLLAR ELEV.: 112.0 ft				TOTAL DEPTH: 99.8 ft			NORTHING: 316,716			EASTING: 1,996,707		24 HR.	FIAD		
DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 83.7% 03/10/2021							DRILL METHOD: NW Casing w/ Advancer			HAMMER TYPE: AUTOMATIC					
DRILLER: J. EDMONDSON				START DATE: 12/07/21			COMP. DATE: 12/07/21			SURFACE WATER DEPTH: N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
35						Match Line									
30	33.7	78.3		7	21	26							M		DARK GRAY, CSE. SAND
	28.7	83.3		16	16	20							W		
25	23.7	88.3		11	16	24							W		
20	18.7	93.3		3	9	15							M		21.0 BLACK, CLAY, WITH LIGNITE. HIGH PLASTICITY 91.0
15	13.7	98.3		8	12	18									17.9 BLACK, CSE. SAND 94.1
													W		14.5 BLACK, CLAY, WITH INTERBEDDED LAYERS OF SAND. HIGH PLASTICITY 97.5
															12.2 Boring Terminated at Elevation 12.2 ft IN VERY STIFF, CLAY. (BLACK CREEK FORMATION) 99.8

221289		<i>PROJECT REFERENCE</i>	<i>SHEET</i>
		B-5985	7

NCDOT BORE DOUBLE B5985 GEO BRDG CATLIN-TEMPLATE.GPJ NCDOT CATLIN.GDT 1/7/22

WBS: 47749.1.1			TIP: B-5985			COUNTY: ROBESON			GEOLOGIST: THOMAS PARK					
SITE DESCRIPTION: BRIDGE NO. 770175 ON -L- (W. 5TH ST) OVER LUMBER RIVER AT -L- STA. 22+08.00												GROUND WTR (ft)		
BORING NO.: B2-B			STATION: 22+59			OFFSET: 12 ft RT			ALIGNMENT: -L-			0 HR.	FIAD	
COLLAR ELEV.: 95.9 ft			TOTAL DEPTH: 136.8 ft			NORTHING: 316,690			EASTING: 1,996,803			24 HR.	FIAD	
DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 83.7% 03/10/2021								DRILL METHOD: NW Casing w/ Advancer			HAMMER TYPE: AUTOMATIC			
DRILLER: J. EDMONDSON			START DATE: 12/09/21			COMP. DATE: 12/10/21			SURFACE WATER DEPTH: 10.4ft					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
20						Match Line								
15	15.6	80.3	16	20	21								W	BLACK AND GRAY, SAND (continued)
10	10.6	85.3	20	24	28								W	
5	5.6	90.3	5	6	7						SS-10 A-7-6(49)		M	11.9 BLACK, CLAY, WITH INTERBEDDED SAND. HIGH PLASTICITY 84.0
0	0.6	95.3	6	8	10								W	
-5	-4.4	100.3	5	5	9								M	
-10	-9.4	105.3	17	23	25								W	-3.1 DARK GRAY, CSE. SAND 99.0
-15	-14.4	110.3	61	57	43								W	
-20	-19.4	115.3	14	17	20								W	
-25	-24.4	120.3	4	11	11						SS-11 A-7-6(38)		M	-18.1 BLACK, CLAY, WITH LIGNITE. HIGH PLASTICITY 114.0
-30	-29.4	125.3	10	14	23								M	
-35	-34.4	130.3	32	31	32								W	-28.1 DARK GRAY, CSE. SAND 124.0
-40	-39.4	135.3	7	10	11						SS-12 A-7-6(35)		M	-33.1 DARK GRAY, CLAY, WITH TR. SAND. HIGH PLASTICITY 129.0
			27	34	42								W	-38.1 DARK GRAY, CSE. SAND 134.0
														-40.9 Boring Terminated at Elevation -40.9 ft IN VERY DENSE, CSE. SAND. (BLACK CREEK FORMATION) 136.8

221289		<i>PROJECT REFERENCE</i>	<i>SHEET</i>
		B-5985	8

NCDOT BORE DOUBLE B5985 GEO BRDG CATLIN-TEMPLATE.GPJ NCDOT CATLIN.GDT 1/7/22

WBS: 47749.1.1			TIP: B-5985			COUNTY: ROBESON			GEOLOGIST: THOMAS PARK								
SITE DESCRIPTION: BRIDGE NO. 770175 ON -L- (W. 5TH ST) OVER LUMBER RIVER AT -L- STA. 22+08.00									GROUND WTR (ft)								
BORING NO.: EB2-A			STATION: 23+57			OFFSET: 21 ft LT			ALIGNMENT: -L-			0 HR. 5.5					
COLLAR ELEV.: 132.3 ft			TOTAL DEPTH: 100.2 ft			NORTHING: 316,720			EASTING: 1,996,902			24 HR. FIAD					
DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 83.7% 03/10/2021						DRILL METHOD: MUD ROTARY			HAMMER TYPE: AUTOMATIC								
DRILLER: J. EDMONDSON			START DATE: 12/06/21			COMP. DATE: 12/06/21			SURFACE WATER DEPTH: N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. #	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100	RESULT			MOI			
55						Match Line											
	53.6	78.7		5	6	9								GRAY, CLAY. HIGH PLASTICITY (continued)			
50														50.3	82.0		
	48.6	83.7		3	4	7											COASTAL PLAIN BLACK, CLAY, HIGH PLASTICITY (BLACK CREEK FORMATION)
45																	
	43.6	88.7		4	6	7											
40																	
	38.6	93.7		17	19	21											GRAY, CLAYEY SAND
35																	
	33.6	98.7		14	21	19											
																	Boring Terminated at Elevation 32.1 ft IN DENSE, CLAYEY SAND. (BLACK CREEK FORMATION)

REFERENCE: B-5985

PROJECT: 47749

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

STRUCTURE
SUBSURFACE INVESTIGATION
LABORATORY RESULTS

B2-B SOIL TEST RESULTS															
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-01	12 ft RT	22+59	10.3 - 11.8	A-7-6(18)	54	39	29.3	18.2	28.0	24.5	91.2	78	57	-	-
SS-02	12 ft RT	22+59	15.3 - 16.8	A-2-6(0)	27	11	51.6	29.2	12.1	7.1	97.8	69	21	-	-
SS-03	12 ft RT	22+59	20.3 - 21.8	A-7-6(50)	74	52	3.0	15.3	25.8	55.9	100	98	88	-	-
SS-04	12 ft RT	22+59	25.8 - 26.8	A-2-4(0)	NP	NP	72.9	15.1	2.6	9.4	99.3	57	13	-	-
SS-05	12 ft RT	22+59	30.3 - 31.8	A-7-6(35)	55	40	1.3	20.1	29.0	49.6	100	100	84	-	-
SS-06	12 ft RT	22+59	40.3 - 41.8	A-2-4(0)	26	6	1.8	73.9	11.8	12.5	100	99	33	-	-
SS-07	12 ft RT	22+59	45.3 - 46.8	A-7-6(53)	73	45	0.6	0.8	84.2	14.4	99.9	100	99	-	-
SS-08	12 ft RT	22+59	55.3 - 56.8	A-7-6(55)	73	49	2.4	1.7	38.2	57.7	100	99	97	-	-
SS-09	12 ft RT	22+59	65.3 - 66.8	A-3(0)	NP	NP	74.8	17.7	3.0	4.6	99.1	51	9	-	-
SS-10	12 ft RT	22+59	85.3 - 86.8	A-7-6(49)	69	44	2.7	1.9	38.2	57.2	100	98	96	-	-
SS-11	12 ft RT	22+59	115.3 - 116.8	A-7-6(38)	59	37	3.1	6.5	33.9	56.6	99.3	98	93	-	-
SS-12	12 ft RT	22+59	130.3 - 131.8	A-7-6(35)	56	35	3.0	7.5	33.0	56.5	99.2	98	92	-	-



NEAR BENT 1 FACING WEST
TO END BENT 1



NEAR BENT 1 FACING EAST
TO END BENT 2



NEAR END BENT 1
LEFT OF -L- FACING EAST
TO END BENT 2



DOWNSTREAM (RIGHT) OF -L-
FACING NORTH

10-JAN-2022 10:44
P:\2021\221289_NCDOT_B-5985_LUMBER-RIVER-BRIDGES_GEOBRDG_175\CADD_GEOBRDG_175\GEOBRDG_PHOTOS_175.dgn
shudson