REFERENCE 80 B

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PROFILE

LEGEND (SOIL & ROCK)

BORE LOGS AND CORE REPORT

SHEET NO.

5-9

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY BRUNSWICK

PROJECT DESCRIPTION BRIDGE NO. 104 ON -L- (NC 906) OVER MIDDLE SWAMP AT -L- STA. 20+18

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-090104	1	10

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 1991 707-6550. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 SORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU INN-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 INTERRETATIONS 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 HINSELF AS TO CONDITIONS TO BE ENCOUNTERED OF 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.

- IES:
 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.

S.N. ZIMARINO C.J. CORNETTE R.E. SMITH J.M. EDMONDSON

PERSONNEL

INVESTIGATED BY __T.C. BOTTOMS

DRAWN BY _S.N. ZIMARINO

CHECKED BY __D.N. ARGENBRIGHT

DATE APRIL 2021



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

PROJECT REFERENCE NO. SHEET NO.

SF-090104

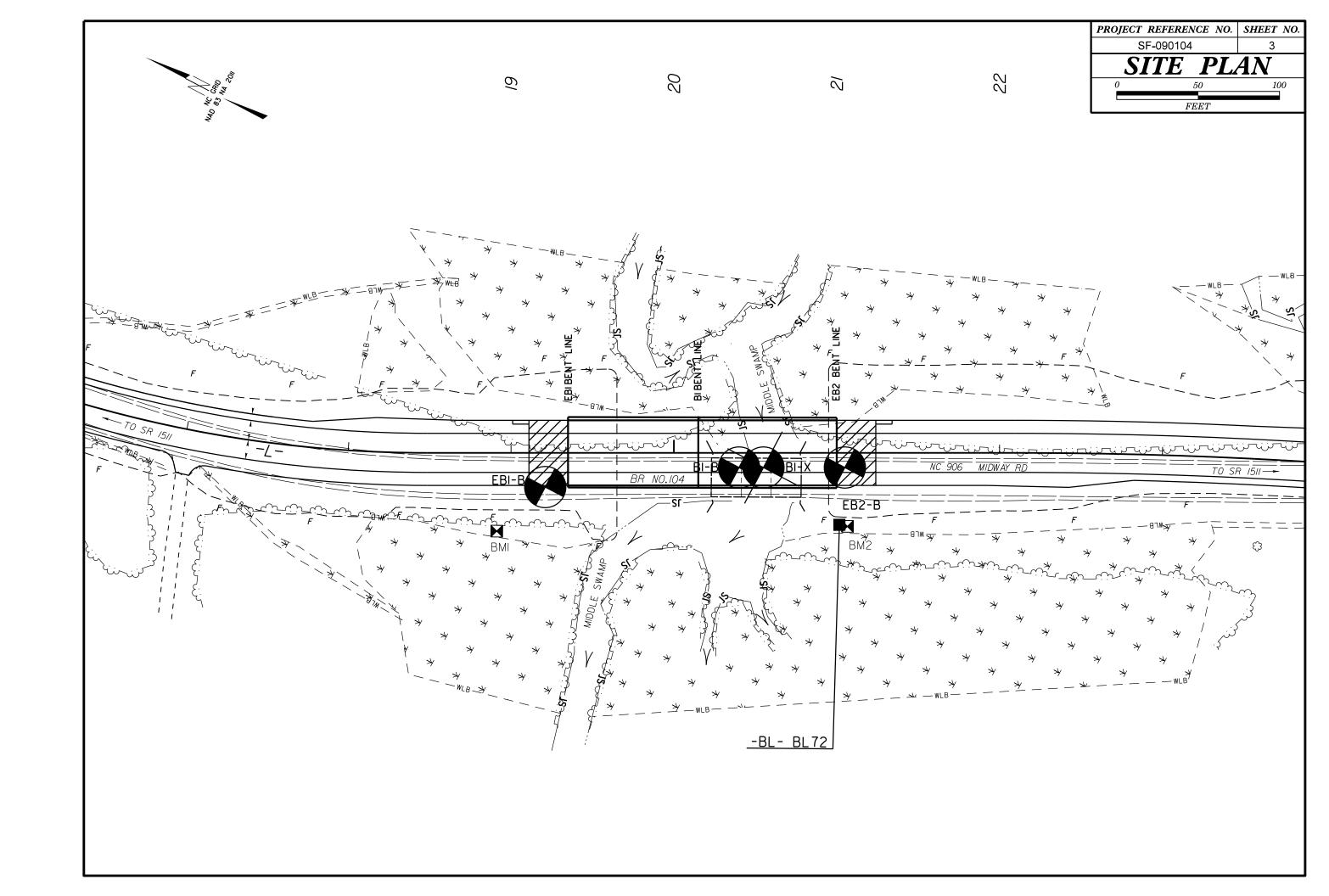
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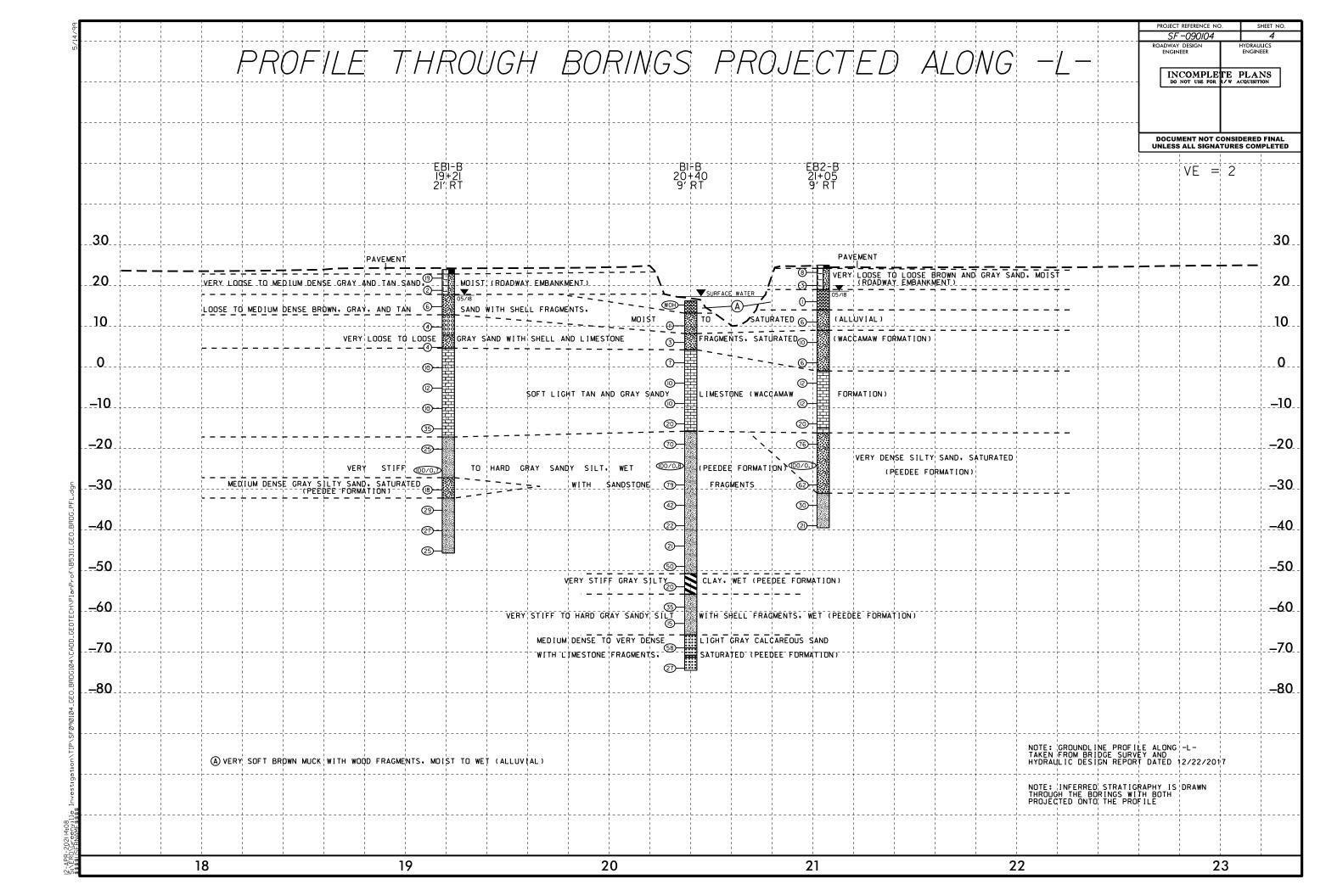
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
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	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.	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.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, <u>SUBANGULAR, SUBROUNDED</u> , OR <u>ROUNDED</u> .	WEATHERED // NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTALLINE CRYSTALLINE	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
LLASS. (≤ 35% PASSING "2001) (> 35% PASSING "2001)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE. <u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-6 A-2-7 A-4, A-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
7. PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	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.
*10 50 MX GRANULAR SIL1- MUCK,	PERCENTAGE OF MATERIAL	CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
#40 30 MX 50 MX 51 MN PEAT SOILS PEAT SOILS SOILS PEAT	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 40 MX 41 MN LITTLE OR PI 6 MX NP 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOULS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	√ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN PATING	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30	-	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTINESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES SPT ← SLOPE INDICATOR	SEVERE 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	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4 GRANULAR LOOSE 4 TO 10	SOIL SYMBOL SOIL SYMBOL SUPPTIONT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) 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>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	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
MATERIAL STIFF 8 TO 15 1 TO 2 COHESIVE) VERY STIFF 15 TO 30 2 TO 4	PIEZOMETER COT NO MANUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	****** ALLUVIAL SOIL BOUNDARY \(\triangle \text{ INSTALLATION } \) SPT N-VALUE	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	LICED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER	ONDERCOT COMPANIE DEGRAPABLE NOCK	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE, SD.) (F SD.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY γ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOLI MOISTURE SCALE FIELD MOISTURE	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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
(SAT.) FROM BELOW THE GROUND WATER TABLE LL _ LIQUID LIMIT	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING TERM SPACING TERM THICKNESS	BENCH MARK: BMI
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	N=IIII29.6175 E=2256442.5450
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
PEOLITES ADDITIONAL WATER TO	X CME-45C CLAY BITS X AUTOMATIC MANUAL	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	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8' HOLLOW AUGERSBH	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS X-N W	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST UNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2 15/6 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG,-CARB, SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CORE BIT VANE SHEAR TEST	CHARD HANNED DI DIE BEGINDED TO BREAK CAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHAPE BREAKS ACROSS GRAINS.	DATE: 8-15-14





GEOTECHNICAL BORING REPORT BORE LOG

								UKE L				
WBS	17BP.	.3.R.80			TI	P SF-090104	COUNT	Y BRUNSW	ICK		GEOLOGIST Cornette, C. J.	
SITE	DESCR	IPTION	BRID	OGE N	O. 104	ON -L- (NC 906) O\	ER MIDDI	E SWAMP				GROUND WTR (ft)
BORI	NG NO.	EB1-E	3		ST	TATION 19+21		OFFSET 2	1 ft RT		ALIGNMENT -L-	0 HR. N/A
COLI	AR ELE	EV . 23	.9 ft		Т	OTAL DEPTH 69.6	ft	NORTHING	111.116		EASTING 2,256,480	24 HR. 6.3
				E GFO		DME-45C 84% 08/21/2017			DRILL METHO	ID Muc		ER TYPE Automatic
						TART DATE 05/22/		COMP DAT	E 05/22/18		SURFACE WATER DEPTH N/A	
	LER SI DRIVE			NA 00		1 1				<u> </u>	SURFACE WATER DEPTH N//	A
(ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	0.5ft	0 25	PER FOOT 50	75 100	NO. MO	0	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)
25	-										23.9 GROUND SURFA	ACE 0.0
	22.8 -	1.1	4	10	9						ROADWAY EMBANI	
20	19.8 -	4.1				· · · · · · · · · ·					GRAY AND TAN SANI	D, MOIST
		-	2	1	1	1 1 2 · · · ·					17.8	6.1
	450	ļ , ,				\frac{1}{2}; \cdot :					ALLUVIAL	
15	15.8 - -	8.1	1	2	4	6					BROWN AND TAN SAND SATURATED	
	-	<u> </u>				[: : : : : : :					12.8	11.1
	10.8	13.1				[000	COASTAL PLA GRAY SAND WITH	in
10	10.0 -	- 13.1	4	3	1	4	ļ::::	1		0000	- FRAGEMENTS, SATU	URATED
	-	‡				[:::: :::::				000	(WACCAMAW FORM	
_	5.8 -	18.1		L		:::: ::::					COASTAL PLA GRAY SAND WITH LIN	
5	_	-	3	3	1	4	ļ				_4.6 FRAGMENTS, SATU	JRATED 19.3
	-	ļ				1/ : : : : : : :	: : : :			甘	(WACCAMAW FORM COASTAL PLAIN SEDIME	
	0.8	23.1				:\::: ::::				井井	SOFT LIGHT TAN AND G	RAY SANDY
0	_	-	3	3	7	10	+	+			LIMESTONE (WACCAMAW	I ORIVIATION)
		F				:\:: ::::						
_	-4.2	28.1			<u> </u>	:i:: ::::				田		
-5	_	-	6	8	4	12-	+	 			-	
	-	Į l				:;;:: :::::	: : : :			H		
, ,	-9.2 -	33.1				:i:: ::::						
-10	-	<u> </u>	5	3	7	10-	+	+			-	
	-	-					-	-		Ħ	-11.7	35.6
15	-14.2 -	38.1		00				_ : : : :			-14.2	38.1
-15	-	<u> </u>	7	28		35	1				-	
	-	-				;/					- <u>-17.2</u>	<u> </u>
20	-19.2 -	43.1	45	40	10	:::: /::::					GRAY SANDY SILT, WE	T (PEEDEE
-20	-	<u> </u>	15	12	13	25	 				- FORMATION)
	-	+										
-25	-24.2	48.1	24	78	22/0.2	:::: ::::	::```	+:				
-23	-	‡	_ 	10	22/0.2		 	100/0.7			-	
	-	t l									- <u>-27.2</u> — — — — — — — — — — — — — — — — — — —	<u> 51.1</u>
-30	-29.2	53.1	11	7	11		- - - - - - - - - -				GRAY SILTY SAND, SA	TURATED
- 55	-	ļ	''	′	''	18	1				- (PEEDEE FORMA	
	-	<u> </u>				: : : :\ : : : :				##	-32.2 COASTAL PLA	<u> 56</u> .1
-35	-34.2 -	58.1	8	13	16	\					GRAY SANDY SILT WI FRAGMENTS, WET (TH SHELL
	-	F				29					FORMATION	
	-	‡				:::: ::::	: : : :					
-40	-39.2 -	63.1	9	13	14	<u> </u>	<u></u>				_	
	-	F				27				F	-	
	-	‡ <u> </u>				::::: :::::				S t		
-45	-44.2 -	68.1	7	11	14	25	ļ ·			W Ł	- 45 7	60.0
	-	-				<u> </u>			 	F	45.7 Boring Terminated at Eleva	
	-	ļ ļ									Very Stiff Sandy	Silt
	-	ļ									-	
	-	t l								1 +		
	-	-								F		
	-	+	l	İ	1	l			1 1	1 F		



GROUND WTR (ft)

N/A

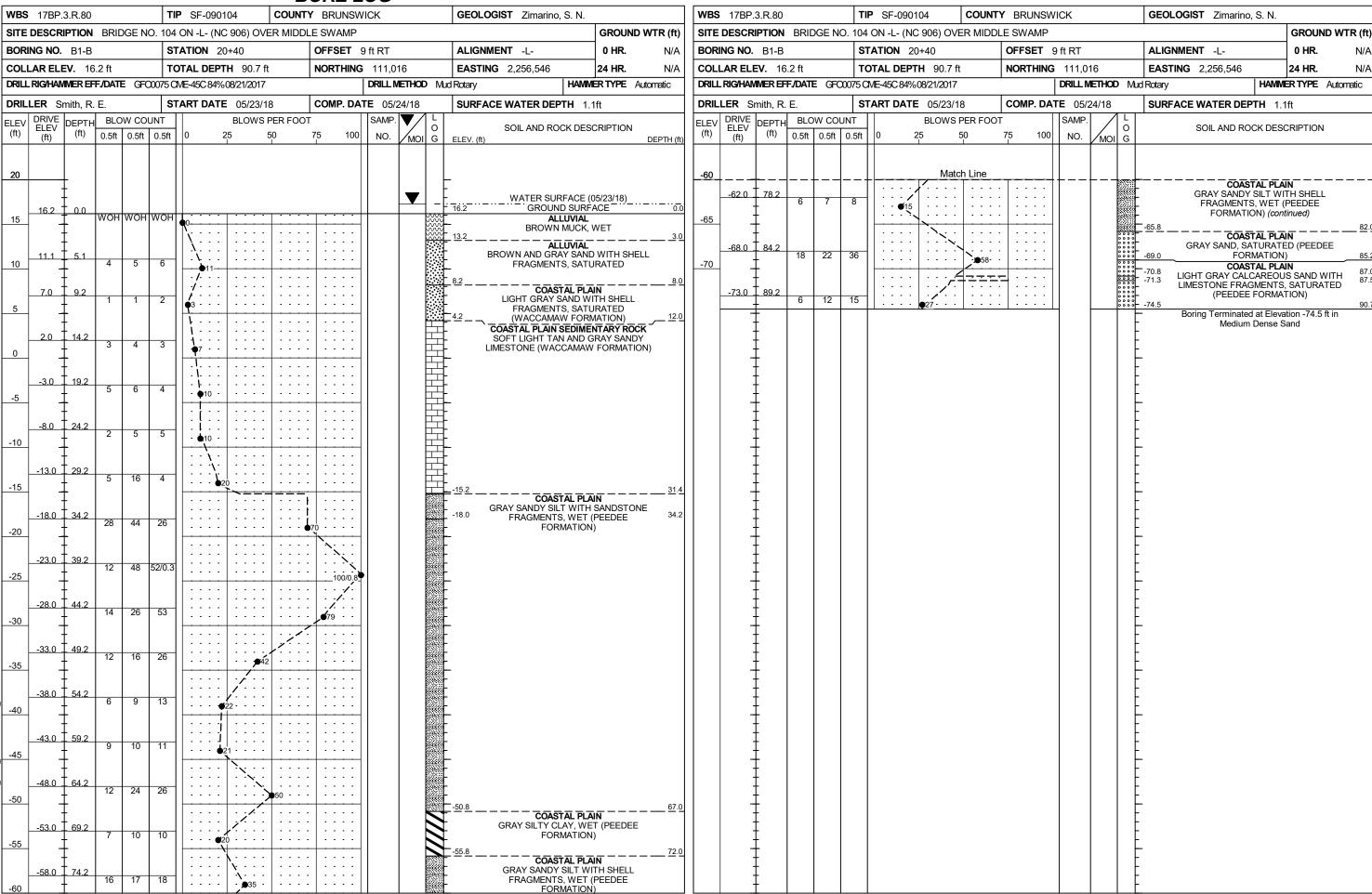
N/A

0 HR.

24 HR.

HAMMER TYPE Automatic

GEOTECHNICAL BORING REPORT **BORE LOG**



GEOTECHNICAL BORING REPORT BORE LOG

VBS 17BP.3.R.80	TIP SF-090104	COUNTY BRUNSV	/ICK	GEOLOGIST Bottoms, T. C.	
SITE DESCRIPTION BRIDGE N). 104 ON -L- (NC 906) O\	/ER MIDDLE SWAMP			GROUND WTR (ft)
BORING NO. B1-X	STATION 20+55	OFFSET	9 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 9.4 ft	TOTAL DEPTH 28.6	ft NORTHIN	111,003	EASTING 2,256,553	24 HR . N/A
DRILL RIG/HAMMER EFF/DATE RFC	0074 CME-55 86% 11/17/2017	<u>'</u>	DRILL METHOD Mu	d Rotary HAMI	WIER TYPE Automatic
DRILLER Pinter, D. G.	START DATE 06/04/	18 COMP. DA	TE 06/04/18	SURFACE WATER DEPTH 7	.3ft
LEV DRIVE DEPTH BLOW COL	NT BLOWS	PER FOOT	SAMP. V L	COIL AND DOOK DEG	COURTION
(ft) (ft) (ft) 0.5ft 0.5ft	0.5ft 0 25	50 75 100	NO. MOI G	SOIL AND ROCK DES	DEPTH (fi
15				WATER SURFACE	(06/04/18)
10				−9.4	FACE 0.0
6.8 2.6 5 5	5 . •10		0 0 0 0 0 0 0	COASTAL PL GRAY SAND WITH SHELI SATURATED (WAC FORMATIOI	AIN L FRAGMENTS, CCAMAW
<u> </u>			0000	COASTAL PLAIN SEDIME	ENTARY BOOK 6
1.8 + 7.6 3 2	7			SOFT LIGHT TAN A	ND GRAY
	1			0.2 LIMESTONE (WACCAMAN	W FORMATION) 9.
-5 ‡	• • • • • •			-	
-10 +				· ·	
+				_ ,	
-15 +	• • • • • • • • • • • • • • • •			-	
				•	
<u> </u>				-18.6 -19.2 COASTAL PL	ΔIN — — — — 28.
				FORMATIOI Boring Terminated at Elev Hard Sandy \$	

SHEET 7 OF 10

GEOTECHNICAL BORING REPORT CORE LOG

											KE L	00							
	17BP.				<u> </u>	SF-09		!			RUNSW	/ICK		GE	OLOGIST	Bottoms	, T. C.	1	
SITE DESCRIPTION BRIDGE NO.				104 ON -L- (NC 906) OVER MIDDL						LE SWAMP							GROUI	ND WTR (ft)	
BORING NO. B1-X				STA	TION	20+55			OFFSET 9 ft RT				AL	ALIGNMENT -L-			0 HR. N/A		
COLI	AR ELI	R ELEV. 9.4 ft				TOTAL DEPTH 28.6 ft						NORTHING 111,003				6,553		24 HR.	N/A
DRILL	RIG/HAN	IMER EF	F./DAT	E RFO00	74 CME	-55 86%	6 11/17/20	17				DRILL M	ETHOD M	ud Rota	ary	ER TYPE	Automatic		
DRIL	LER P	inter, D.	. G.		STA	RT DA	TE 06/0	4/18		CC	MP. DA	TE 06/0	4/18	SU	IRFACE WAT	TER DE	PTH 7.3	3ft	
CORI	E SIZE	NW			тот	AL RUI	1 19.0 f	t											
ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	UN I RQD	SAMP.	STR REC.	RATA	L				DESCI	RIPTION AND	DEMAD	V.C.		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	AL RUI UN RQD (ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (1	ft)		DLGCI	INIF HON AND	INLIVIAIN			DEPTH (ft)
-0.23														Ве	egin Coring @	9.6 ft			
	-0.2 ₋	9.6	4.0	00:12/1.0 00:10/1.0	8%	(0.0) 0%		(3.2) 17%	(0.0) 0%	井	0.2 -	5	OFT LIGHT	ΓTAN	AND GRAY LI FORMATION		NE (WAC	CAMAW	9.6
_	-4.2	13.6		00:08/1.0 00:07/1.0	1					片	-								
-5	-	<u> </u>	5.0	00:08/1.0 00:04/1.0	(0.5)	(0.0)				\pm	_								
		<u> </u>		00:01/1.0 00:01/1.0	1						_								
-10	-9.2	18.6	5.0	00:01/1.0	(1.1)	(0.0)				H	_								
		ŧ		00:04/1.0 00:04/1.0 00:02/1.0	22%	`0%′				H									
	-14.2	23.6		00:06/1.0						Ħ	_								
-15	-		5.0	00:04/1.0	(1.3)	(0.0) 0%				Ħ									
	-	Ĺ		00:03/1.0 00:09/1.0	1					Ħ	10.6								20.0
	-19.2	28.6		00:05/1.0						200000	- <u>-18.6</u> - <u>-19.2</u>	<u></u>		- — —	COASTAL P	LAIN			$\frac{28.0}{1}$
		<u> </u>													LT, WET (WA				
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SHEET 8 OF 10

GEOTECHNICAL BORING REPORT BORE LOG

								OKE L				
WBS	17BP.	3.R.80			TII	P SF-090104	COUNT	Y BRUNSW	ICK		GEOLOGIST Zimarino, S. N.	
SITE	DESCR	IPTION	BRID	OGE N	O. 104	ON -L- (NC 90	06) OVER MIDD	LE SWAMP				GROUND WTR (ft)
BORI	NG NO.	EB2-E	3		S1	TATION 21+0	5	OFFSET 9	ft RT		ALIGNMENT -L-	0 HR . N/A
COLL	AR ELI	EV . 25	.0 ft		т	OTAL DEPTH	64.5 ft	NORTHING	110,959		EASTING 2,256,577	24 HR. 6.4
DRILL	RIG/HAN	MER EF	F./DAT	E GFO	00075 C	ME-45C 84%08/2	21/2017		DRILL MET	HOD Mud	Rotary HAMME	ER TYPE Automatic
DRIL	LER S	mith. R.	E.		ST	TART DATE)5/21/18	COMP. DAT	Γ E 05/22/	18	SURFACE WATER DEPTH N/A	Α
ELEV	DRIVE	DEPTH	I	ow co			LOWS PER FOO	1	SAMP.	7/1	· ·	
(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	0 25	50	75 100	NO.	/ O O	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)
	. ,											<i>52.</i> (n)
25											25.0 GROUND SURFA	ACE 0.0
23	24.2	0.8	4	4	4						24.2 ROADWAY EMBANK	
		_	~	-		. • 8 .					PAVEMENT ROADWAY EMBANK	(MENT
20	21.0	4.0	3	2	1	<i>j</i> .					BROWN AND GRAY SAI	
	-	F				7					19.0 ALLUVIAL	6.0
	17.0	8.0	1	1	0					****	BROWN MUCK WITH	
15	_	_	'	'		1					FRAGMENTS, MOIST	
						\\ :					14.0 — — — — — — — — — — — — — — — — — — —	11.0
	12.0	13.0	2	3	3	1 -					GRAY AND BROWN SAND,	, SATURATED
10	_	-				1				<u> </u>	9.0	16.0
	7.0	18.0				[] : : : : [:		: : : : :			GRAY SAND WITH LIMES	<u> </u>
_	7.0	18.0	3	5	5	1 - 10					SHELL FRAGMENTS, SA	ATURATED
5	-	-				 					(WACCAMAW FORM	IATION)
	2.0	L 23.0				-¦ -						
0		-	3	3	3	6 -						
	-	<u> </u>				1 .1					-1.0 COASTAL PLAIN SEDIMEN	26.0
	-3.0	28.0				. † .				臣	SOFT LIGHT GRAY SANDY	LIMESTONE
-5		<u> </u>	2	5	7	- •12				莊	(WACCAMAW FORM	IATION)
	-	-								H		
	-8.0	33.0	7	6	6	:: :: :				芽		
-10	_	_	′	"		- •12						
		_				::\: :				Ħ		
	-13.0	38.0	6	10	10	\. .				丑		
-15	_	-				20.		4			-15.0 -16.2	40.0 41.2
	-18.0	120						.			COASTAL PLAI	N -
20	-10.0	43.0	6	21	55			76			GRAY SILTY SAND, SA (PEEDEE FORMAT	TION)
-20	-											
	-23.0	48.0				:::: :						
-25	-	<u> </u>	10	20	80/0.2			100/0.7	.	<u> </u>		
	-	F						/				
	-28.0	53.0	28	43	19			;{::::				
-30	-	<u> </u>	20	43	19		62					
		<u> </u>				.	:::/ [*] :::	: : : : :			-31.0	
	-33.0	58.0	8	14	16	<u>.</u>	/	-		F	GRAY SANDY SILT, WE' FORMATION)	T (PEEDEE
-35	_	F					30				i Onwation,	·
		‡ <u> </u>				::::/:						
	-38.0	63.0	5	10	11						-39.5	64.5
	-	E				- 	<u> </u>		1		Boring Terminated at Eleva	tion -39.5 ft in
	- - - - - - - - -										Very Stiff Sandy	

SHEET 9 OF 10

CORE PHOTOGRAPH B1-X 9.6' TO 28.6'

