

PROJECT: BP2.R021

REFERENCE: SF-510072

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

COUNTY JONES

PROJECT DESCRIPTION BRIDGE NO. 72 ON -L- (SR 1155)

OVER JOSHUA CREEK AT STA. 19+42

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-510072	1	6

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. 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 BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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.

PERSONNEL
<u>S.N. ZIMARINO</u>
<u>T.W. MILLER</u>
<u>C.M. WALKER</u>

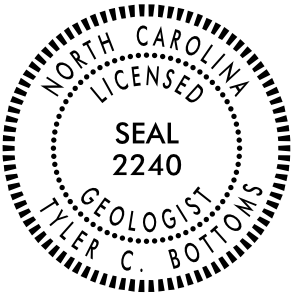
INVESTIGATED BY T.C. BOTTOMS

DRAWN BY T.W. MILLER

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2023



DocuSigned by:
Tyler Bottoms
48A2B35030A000000000000000000000

05/24/2023
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											
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 35 MX 35 MX 35 MX 35 MX 35 MX	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	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS
GROUP INDEX	0			0	4 MX	8 MX	12 MX	16 MX	NO MX		
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	UNSUITABLE

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	305	75	2.0	0.25	0.05	0.005
MM	12	3				
IN.						

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL PLASTIC RANGE (PI) PL	LIQUID LIMIT	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
	PLASTIC LIMIT	
OM SL	OPTIMUM MOISTURE SHRINKAGE LIMIT	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- SATURATED - (SAT.)	
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
	- MOIST - (M)	
	- 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	MODERATELY COMPRESSIBLE	HIGHLY COMPRESSIBLE
LL < 31			
LL = 31 - 50			
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

UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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

TCL. - TRICONE REFUSAL

w - MOISTURE CONTENT

V - VERY

VST - VANE SHEAR TEST

WEA. - WEATHERED

γ - UNIT WEIGHT

γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK

SS - SPLIT SPOON

ST - SHELBY TUBE

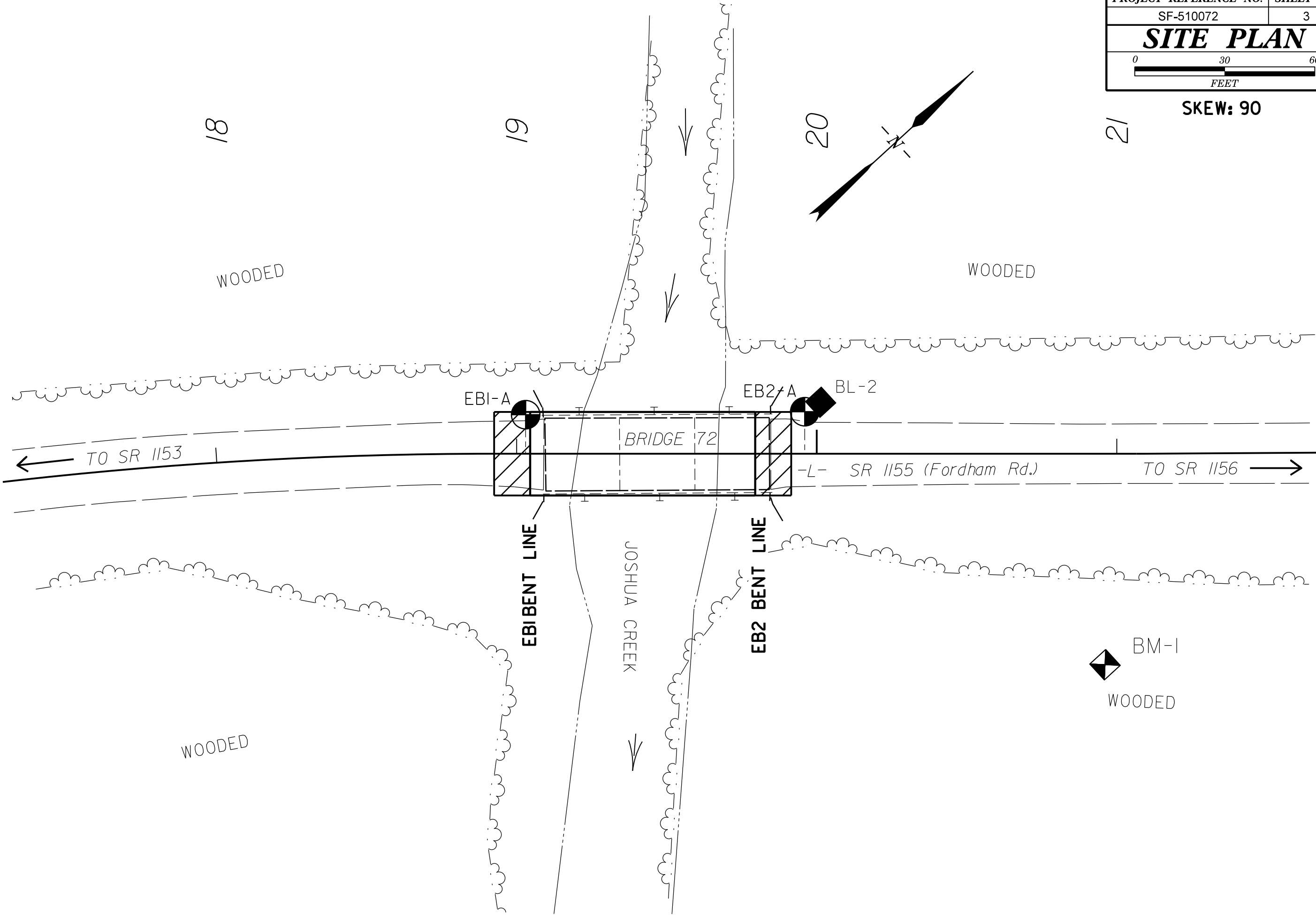
RS - ROCK

RT - RECOMPACTED TRIAXIAL

CBR - CALIFORNIA BEARING RATIO

PROJECT REFERENCE NO.	SHEET NO.
SF-510072	3
SITE PLAN	
03060 FEET	

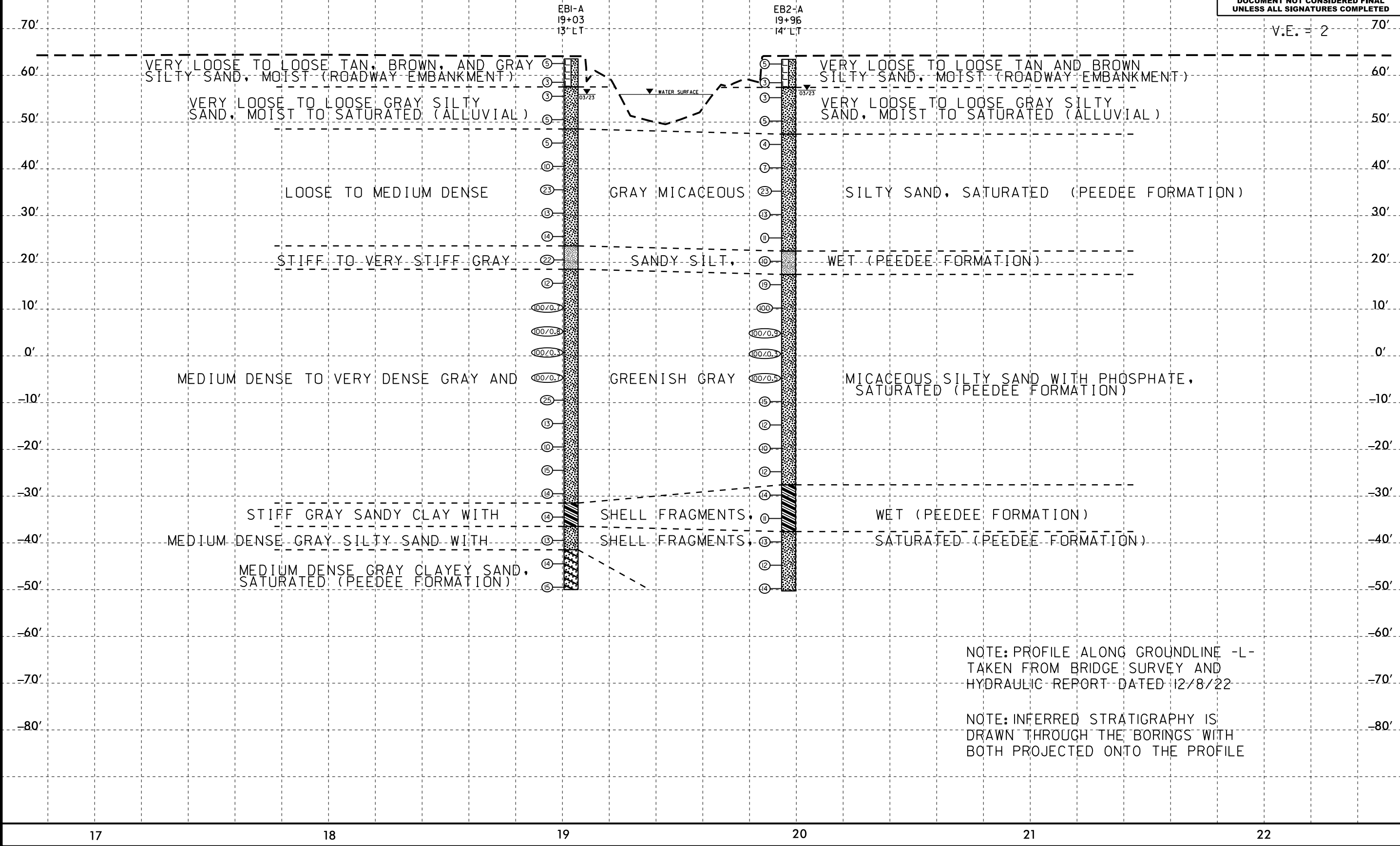
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PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. SF-510072		SHEET NO. 4	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



NC DOT BORE DOUBLE SF510072 GEO BRDG.GPJ NC_DOT.GDT 3/9/23

WBS BP2.R021.1			TIP SF-510072			COUNTY JONES			GEOLOGIST Zimarino, S. N.					
SITE DESCRIPTION BRIDGE NUMBER 72 ON -L- (SR 1155) OVER JOSHUA CREEK									GROUND WTR (ft)					
BORING NO. EB1-A			STATION 19+03			OFFSET 13 ft LT			ALIGNMENT -L-		0 HR. N/A			
COLLAR ELEV. 63.6 ft			TOTAL DEPTH 113.5 ft			NORTHING 491,681			EASTING 2,426,893		24 HR. 7.6			
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 92% 08/02/2022						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER Walker, C. M.			START DATE 03/06/23			COMP. DATE 03/06/23			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		MOI		
-15						Match Line								
-20	-18.4	82.0	3	4	6	10								GRAY AND GREENISH GRAY SILTY SAND WITH PHOSPHATE, SATURATED (PEEDEE FORMATION) (continued)
-25	-23.4	87.0	5	7	8	15								
-30	-28.4	92.0	4	6	8	14								
-35	-33.4	97.0	3	7	7	14								GRAY SANDY CLAY WITH SHELL FRAGMENTS, WET (PEEDEE FORMATION)
-40	-38.4	102.0	4	5	8	13								GRAY SILTY SAND WITH SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)
-45	-43.4	107.0	4	7	7	14								GRAY CLAYEY SAND WITH SHELL FRAGMENTS, SATURATED (PEEDEE FORMATION)
	-48.4	112.0	5	7	8	15								
														Boring Terminated at Elevation -49.9 ft IN MEDIUM DENSE CLAYEY SAND

NCDOT BORE DOUBLE SF510072 GEO_BRDG.GPJ NC_DOT.GDT 3/9/23

WBS BP2.R021.1			TIP SF-510072			COUNTY JONES			GEOLOGIST Miller, T. W.				
SITE DESCRIPTION BRIDGE NUMBER 72 ON -L- (SR 1155) OVER JOSHUA CREEK									GROUND WTR (ft)				
BORING NO. EB2-A			STATION 19+96			OFFSET 14 ft LT			ALIGNMENT -L-			0 HR. N/A	
COLLAR ELEV. 63.5 ft			TOTAL DEPTH 113.7 ft			NORTHING 491,751			EASTING 2,426,956			24 HR. 6.6	
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 92% 08/02/2022						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic				
DRILLER Walker, C. M.			START DATE 03/07/23			COMP. DATE 03/07/23			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		MOI	
-15						Match Line							
-20	-18.7	82.2	4	4	6	10							GRAY AND GREENISH GRAY MICACEOUS SILTY SAND WITH PHOSPHATE, SATURATED (PEEDEE FORMATION) (continued)
-25	-23.7	87.2	4	5	7	12							
-30	-28.7	92.2	6	6	8	14							GRAY SANDY CLAY WITH SHELL FRAGMENTS, WET (PEEDEE FORMATION)
-35	-33.7	97.2	5	5	6	11							
-40	-38.7	102.2	5	6	7	13							GRAY SILTY SAND, SATURATED (PEEDEE FORMATION)
-45	-43.7	107.2	5	5	7	12							
-50	-48.7	112.2	5	6	8	14							Boring Terminated at Elevation -50.2 ft IN MEDIUM DENSE SILTY SAND