

REFERENCE: BP11.R016.1

PROJECT: BP11.R016

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ASHE
PROJECT DESCRIPTION REPLACE BRIDGE NO.171
ON SR 1100 (CRANBERRY SPRINGS ROAD)
OVER GAP CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11.R016.1	1	6

CAUTION NOTICE

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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.

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- 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

T. WELLS

E. ESTEP

T. PRESTON

INVESTIGATED BY T. WELLS

DRAWN BY T. WELLS

CHECKED BY D. CORLEY

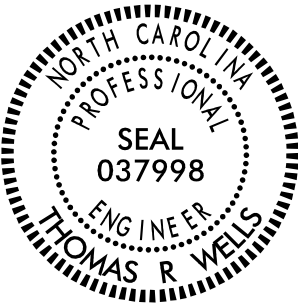
SUBMITTED BY TERRACON

DATE JULY 2024

Prepared in the Office of:



7327 W. FRIENDLY AVENUE, SUITE G
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: P-0869
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:
 07/10/2024
F38C777458854EA SIGNATURE 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	A-6, A-7		
SYMBOL													
% PASSING #10 #40 #200													
MATERIAL PASSING #40 LL PI	— 6 MX		— NP										
GROUP INDEX	0		0		4 MX		8 MX		12 MX		16 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

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 4.76	10 2.00	40 0.42	60 0.25	200 0.075	270 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	LIQUID LIMIT	- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
	PLASTIC LIMIT	- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
	OM SL	OPTIMUM MOISTURE SHRINKAGE LIMIT
		- 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.
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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

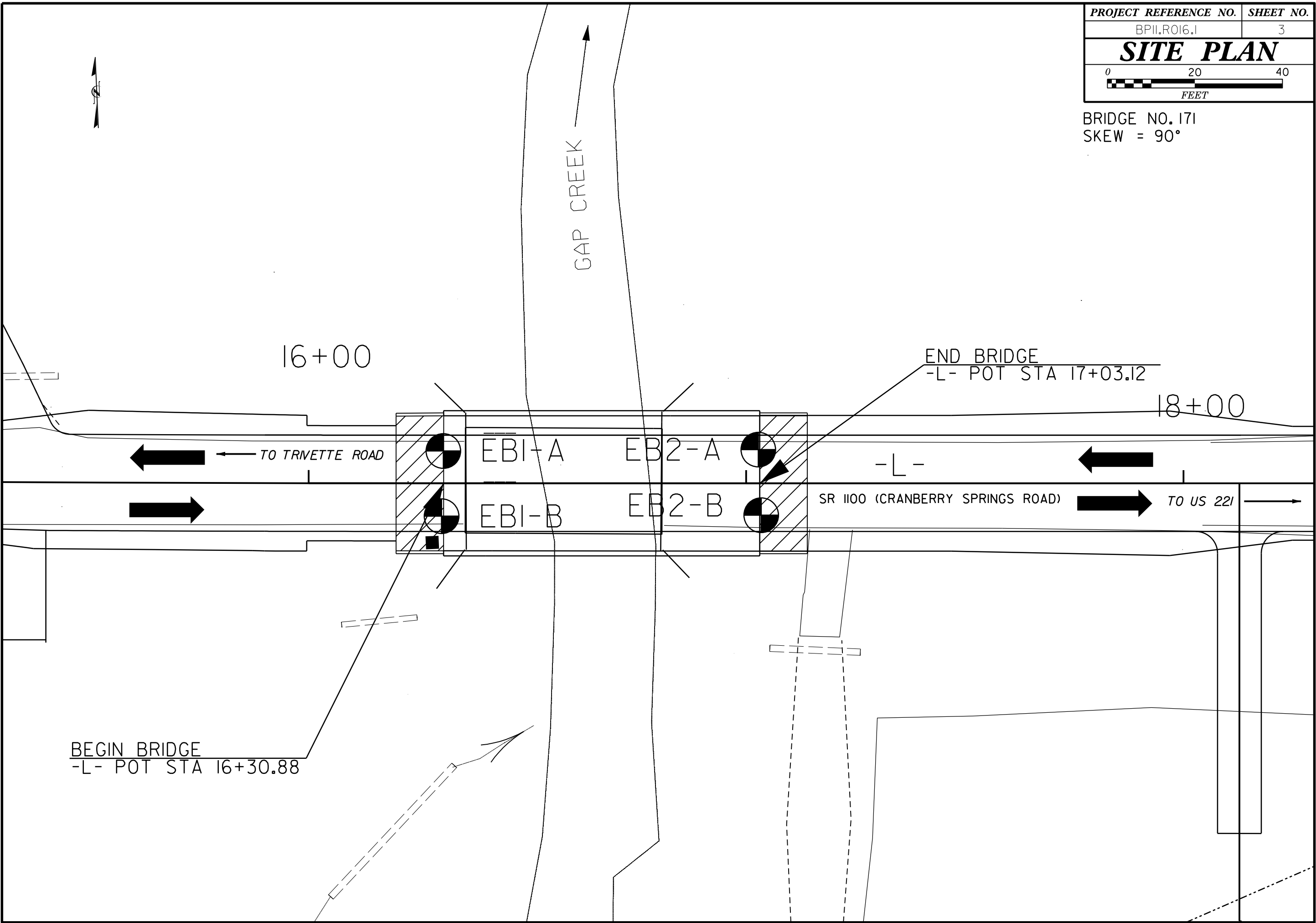
AR - AUGER REFUSAL
BT - BORING TERMINATED
CL - CLAY
CPT - CONE PENETRATION TEST
CSE - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HL - HIGHLY

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

VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d -

PROJECT REFERENCE NO.	SHEET NO.
BP11.R016.1	3
SITE PLAN	
 0 20 40 FEET	

BRIDGE NO. 171
SKEW = 90°



NCDOT BORE DOUBLE BP11.R016.1 GEO BRDG GINT.GPJ NC DOT.GDT 7/5/24

WBS BP11.R016.1			TIP N/A			COUNTY ASHE			GEOLOGIST Wells, T. R.				
SITE DESCRIPTION Replace Bridge No. 171 on SR 1100 over Gap Creek									GROUND WTR (ft)				
BORING NO. EB1-B			STATION 16+31			OFFSET 7 ft RT			ALIGNMENT -L-			0 HR. 11.2	
COLLAR ELEV. 2,931.4 ft			TOTAL DEPTH 54.4 ft			NORTHING 923,158			EASTING 1,262,925			24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 89% 05/13/2024						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic				
DRILLER Estep. E.			START DATE 06/18/24			COMP. DATE 06/18/24			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			
2935													
2930	2,930.4	1.0	7	2	1	1							2,931.4 GROUND SURFACE 0.0
	2,927.9	3.5	1	1	1	2							2,930.4 ROADWAY EMBANKMENT 1.0
2925	2,925.4	6.0	3	2	3	5							SOFT TO MEDIUM STIFF, GRAY AND BROWN, COARSE TO FINE SANDY SILT, TRACE MICA, TRACE GRAVEL (A-4)
	2,922.9	8.5	4	3	2	5							
2920	2,917.9	13.5	2	3	4	7							2,920.9 ALLUVIAL 10.5
2915	2,912.9	18.5	1	1	2	3							LOOSE, GRAY, FINE TO COARSE SANDY GRAVEL (A-1-b)
2910	2,907.9	23.5	1	2	2	4							2,914.4 RESIDUAL 17.0
2905	2,902.9	28.5	2	1	2	3							VERY LOOSE TO DENSE, WHITE, GRAY, BROWN, DARK BROWN, SILTY FINE TO COARSE SAND, TRACE MICA (A-2-4)
2900	2,897.9	33.5	3	5	7	12							
2895	2,892.9	38.5	4	10	24	34							
2890	2,887.9	43.5	21	45	55/0.3								2,888.9 WEATHERED ROCK 42.5
2885	2,882.9	48.5	16	43	57/0.3								GRAY (MICA SCHIST)
2880	2,877.9	53.5	28	72/0.4									
													2,877.0 Boring Terminated at Elevation 2,877.0 ft in WEATHERED ROCK (MICA SCHIST) 54.4

NCDOT BORE DOUBLE BP11.R016.1 GEO BRDG GINT.GPJ NC DOT.GDT 7/5/24

WBS				BP11.R016.1				TIP				N/A				COUNTY				ASHE				GEOLOGIST				Wells, T. R.																																											
SITE DESCRIPTION																				Replace Bridge No. 171 on SR 1100 over Gap Creek										GROUND WTR (ft)																																									
BORING NO.						EB2-B						STATION						17+03						OFFSET						7 ft RT						ALIGNMENT						-L-						0 HR.		N/A																					
COLLAR ELEV.						2,931.5 ft						TOTAL DEPTH						63.5 ft						NORTHING						923,155						EASTING						1,262,998						24 HR.		11.1																					
DRILL RIG/HAMMER EFF./DATE												TRI9435 CME-55 89% 05/13/2024												DRILL METHOD								Mud Rotary								HAMMER TYPE								Automatic																							
DRILLER								Estep. E.								START DATE								06/17/24								COMP. DATE								06/17/24								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																																																														
2935																																																																							
2930		2,930.5		1.0		15 10 5			15																GROUND SURFACE 0.0																																														
																									ROADWAY EMBANKMENT 0.8																																														
		2,928.0		3.5		21 17 14			31																ASPHALT (0.0 TO 0.8 FT) 3.0																																														
2925		2,925.5		6.0		2 1 1			2																VERY STIFF, BROWN, GRAY, COARSE TO FINE SANDY SILT, TRACE GRAVEL (A-4) 5.5																																														
		2,923.0		8.5		1 0 3			3																DENSE, LIGHT BROWN, BROWN, SILTY FINE TO COARSE SAND, TRACE GRAVEL (A-2-4) 8.0																																														
2920		2,918.0		13.5		5 2 2			4																ALLUVIAL LOOSE, BLACK AND GRAY, COARSE SANDY GRAVEL (A-1-b) 12.0																																														
																									VERY LOOSE, DARK BROWN, FINE SAND (A-3) 17.0																																														
2915		2,913.0		18.5		3 2 2			4																LOOSE, BLACK AND GRAY, COARSE SANDY GRAVEL (A-1-b) 17.0																																														
2910		2,908.0		23.5		1 2 2			4																RESIDUAL LOOSE TO MEDIUM DENSE, GRAY, BROWN, SILTY FINE TO COARSE SAND, TRACE MICA (A-2-4)																																														
2905		2,903.0		28.5		2 3 3			6																																																														
2900		2,898.0		33.5		5 6 7			13																																																														
2895		2,893.0		38.5		3 3 4			7																																																														
2890		2,888.0		43.5		25 51 49/0.3			100/0.8																WEATHERED ROCK GRAY, WHITE (GNEISS) 43.0																																														
2885		2,883.0		48.5		8 3 4			7																RESIDUAL LOOSE, GRAY, BLACK, SILTY FINE TO COARSE SAND, TRACE MICA (A-2-4) 47.5																																														
2880		2,878.0		53.5		60/0.1			60/0.1																WEATHERED ROCK (GNEISS) 52.5																																														
2875		2,873.0		58.5		40 60/0.1			100/0.6																CRYSTALLINE ROCK (GNEISS) 55.0																																														
2870		2,868.0		63.5		60/0.0			60/0.0																WEATHERED ROCK GRAY, BLACK (GNEISS) 62.5																																														
																									CRYSTALLINE ROCK (GNEISS) 63.5																																														
																									Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,868.0 ft in CRYSTALLINE ROCK (GNEISS)																																														

SITE PHOTOGRAPHS

REPLACE BRIDGE NO. 171 ON SR 1100 OVER GAP CREEK

PROJECT REFERENCE NO.	SHEET NO.
BP11.R016.1	6



VIEW FROM WEST OF EXISTING BRIDGE LOOKING EAST ALONG SR 1100



VIEW FROM SOUTH OF EXISTING BRIDGE LOOKING NORTH