STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

ERIC BOYETTE
SECRETARY

October 27, 2021

MEMORANDUM TO:	Preston Hunter, P.E. Division 2 Engineer
ATTENTION:	Jeff Cabaniss, P.E. Division Project Development Engineer
FROM:	David Hering, L.G., P.E. Assistant State Geotechnical Engineer - Eastern Region
STATE PROJECT:	45569.1.2 (B-5614)
COUNTY:	BEAUFORT
DESCRIPTION:	Bridge #9 on SR 1112 (Mouth of the Creek Rd) over Blount Creek
SUBJECT:	Structure Foundation Recommendations

DS JRB

DocuSigned by: David Hering 5A82AFE05A0E460...

The Geotechnical Engineering Unit has reviewed and presents the subsurface investigation and foundation recommendations prepared by Schnabel Engineering for the above referenced project.

- ☒ Structure Inventory (19) pages
- ☒ Foundation Design Recommendation (3) pages
- ☒ Design Scour Memo (2) pages
- ☒ Geotechnical Foundation Table (1) page

Please call Thein T. Zan, PE or James R. Batts, P.E. at (919) 662-4710 if there are any questions concerning this memorandum.

Attachment

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
EASTERN REGIONAL OFFICE
1570 MAIL SERVICE CENTER
RALEIGH, NC 27699-1570

Telephone: (919) 662-4710
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
3301 JONES SAUSAGE RD. SUITE 100
GARNER, NC 27529

FOUNDATION RECOMMENDATIONS

PROJECT	45569.1.2	DESCRIPTION	Bridge 9 over Blounts Creek on
TIP NO.	B-5614		SR 1112 (Mouth of the Creek Rd)
COUNTY	Beaufort		
STATION	22+57.00 -L-		

	INITIALS	DATE
DESIGN	JCW	10/26/21
CHECK	SJN	10/26/21

P.E. SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030395 ENGINEER JACOB C. WESSELL

DocuSigned by:
Jacob C Wessell
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SIGNATURE

10/27/2021

	BENT STATION	FOUNDATION TYPE	FACTORED RESISTANCE	ADDITIONAL INFORMATION
END BENT 1	17+75.88 -L-	Cap on HP 12 x 53 Steel H-Piles	110 Tons/Pile	Bottom of Cap Elev. = 6.29 ft Average Estimated Pile Length = 70 ft Number of Piles/Cap = 7
BENT 1	18+97.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 9.21 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -49 ft Tip No Higher Than Elev. = -98 ft Number of Piers/Cap = 2
BENT 2	20+17.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 11.25 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -50 ft Tip No Higher Than Elev. = -104 ft Number of Piers/Cap = 2
BENT 3	21+37.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 12.36 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -46 ft Tip No Higher Than Elev. = -91 ft Number of Piers/Cap = 2
BENT 4	22+57.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 12.53 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -50 ft Tip No Higher Than Elev. = -96 ft Number of Piers/Cap = 2

BENT 5	23+77.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 11.78 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -49 ft Tip No Higher Than Elev. = -97 ft Number of Piers/Cap = 2
BENT 6	24+97.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 10.09 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -49 ft Tip No Higher Than Elev. = -97 ft Number of Piers/Cap = 2
BENT 7	26+17.00 -L-	Column on 54" Diameter Drilled Pier	655 Tons/Pier	Bottom of Cap Elev. = 7.47 ft Top of Drilled Pier Elev. = 1.0 ft Point of Fixity Elev. = -50 ft Tip No Higher Than Elev. = -103 ft Number of Piers/Cap = 2
END BENT 2	27+38.13 -L-	Cap on HP 12 x 53 Steel H-Piles	110 Tons/Pile	Bottom of Cap Elev. = 3.99 ft Average Estimated Pile Length = 65 ft Number of Piles/Cap = 7

(SEE NOTES ON PLANS AND COMMENTS ON FOLLOWING PAGES.)

FOUNDATION RECOMMENDATIONS NOTES ON PLANS

1. FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

2. DO NOT DEWATER DRILLED PIER EXCAVATIONS AT BENT NOS. 1 THROUGH 7. CLEAN THE BOTTOM OF EXCAVATIONS WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED.

3. SLURRY CONSTRUCTION IS REQUIRED FOR DRILLED PIERS AT BENT NOS. 1 THROUGH 7.

4. OBSERVE A THREE (3) MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

5. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOUNDATION RECOMMENDATIONS SPECIAL NOTES ON PLANS

1. INSTALL PERMANENT STEEL CASINGS AT INTERIOR BENTS BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATIONS -40 FT (BENT NOS. 3, 4, AND 5), -41 FT (BENT NOS. 1, 6, AND 7), AND -43 FT (BENT NO. 2).

FOUNDATION RECOMMENDATIONS COMMENTS

1. BRIDGE END BENT SLOPES OF 1½:1 (H:V) ARE OK WITH SLOPE PROTECTION.

2. A SINGLE ROW WITH 5 PLUMB PILES AND 2 BRACE PILES ARE PROVIDED FOR BOTH END BENTS.

3. THE DESIGN SCOUR ELEVATIONS ARE -15.2 FT AT BENT NO. 1, -23.9 FT AT BENT NO. 2, -21.3 FT AT BENT NO. 3, -21.4 FT AT BENT NO. 4, -19.0 FT AT BENT NO. 5, -17.8 FT AT BENT NO. 6, AND -16.3 FT AT BENT NO. 7.

4. A RESISTANCE FACTOR OF 0.75 WAS USED TO REDUCE REQUIRED DRIVING RESISTANCE BASED ON THE REQUIREMENTS FOR PDA TESTING IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATION.

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-7	110	7.29	70			165	7						
End Bent 2, Piles 1-7	110	4.99	65			150							

*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$^{**}RDR = \frac{Factored\ Resistance + Factored\ Downdrag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Downdrag\ Resistance + \frac{Nominal\ Scour\ Resistance}{Scour\ Resistance\ Factor}$$

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-7	110	8		0.75	6		1.00
End Bent 2, Piles 1-7	110			0.75			1.00

*Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-2	655	-98	5	-18	0.0	99			YES	-41.0	42.0
Bent 2, Piers 1-2	655	-104	10	-26	0.0	105			YES	-43.0	44.0
Bent 3, Piers 1-2	655	-91	5	-24	0.0	92			YES	-40.0	41.0
Bent 4, Piers 1-2	655	-96	10	-24	0.0	97			YES	-40.0	41.0
Bent 5, Piers 1-2	655	-97	10	-21	0.0	98			YES	-40.0	41.0
Bent 6, Piers 1-2	655	-97	5	-20	0.0	98			YES	-41.0	42.0
Bent 7, Piers 1-2	655	-103	5	-19	0.0	104			YES	-41.0	42.0

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1, Piles 1-7	YES	75	2		
End Bent 2, Piles 1-7	YES	70			

*EST = Pile order lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent 1, Piles 1-7				YES	
End Bent 2, Piles 1-7				YES	
TOTAL QTY:				14	

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-2	YES	MAYBE	503	YES	
Bent 2, Piers 1-2	YES	MAYBE	533	YES	
Bent 3, Piers 1-2	YES	MAYBE	468	YES	
Bent 4, Piers 1-2	YES	MAYBE	493	YES	
Bent 5, Piers 1-2	YES	MAYBE	498	YES	
Bent 6, Piers 1-2	YES	MAYBE	498	YES	
Bent 7, Piers 1-2	YES	MAYBE	528	YES	
TOTAL QTY:	14	7	3518	14	

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. B-5614 (45569.1.2)

BEAUFORT COUNTY

STATION: 22+57 -L-

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jacob Wessell, P.E., NC PE 030395) on 10-26-2021.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for CSL Testing when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PRE-SEAL NAME

SIGNATURE DATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

TOTAL SHEETS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5614	1	19

REFERENCE: B-5614

PROJECT: 45569.1.2

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *BEAUFORT*

PROJECT DESCRIPTION *BRIDGE NO.9 OVER BLOUNTS CREEK ON SR1112 (MOUTH OF THE CREEK RD)*

SITE DESCRIPTION

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-16	BORE LOGS, CORE LOGS & CORE PHOTOGRAPHS
17	SOIL TEST RESULTS
18	ROCK TEST RESULTS
19	SITE PHOTOGRAPHS

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 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:
1. 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.
2. 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

J. WESSELL

J. HOLLAND

A. STRICKLAND

MID-ATLANTIC DRILLING

INVESTIGATED BY *J. HOLLAND*

DRAWN BY *A. STRICKLAND*

CHECKED BY *J. WESSELL*

SUBMITTED BY *SCHNABEL ENG.*

DATE *APRIL 2021*

NORTH CAROLINA PROFESSIONAL SEAL 030395 ENGINEER JACOB C. WESSELL

DocuSigned by:

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10/27/2021

SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
B-5614	2

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-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 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 10 MX	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. 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 RESISTENCE (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	4	10	40	60	200	270
OPENING (MM)	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
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- 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
- PW — 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
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — 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
HI. - 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 - 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
- [X] CME-55C
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q2

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)	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 YEILD 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 SLI.)	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 (SLI.)	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 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

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 DISLODGED 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 (RQD) - 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 (SRQD) - 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: N/A

ELEVATION: N/A FEET

NOTES:

FIAD = FILLED IN AFTER DRILLING

TOP OF BORING ELEVATIONS OBTAINED FROM SURVEY-GRADE GPS SUB-CM ACCURACY DATED MARCH 10, 2021 - MARCH 24, 2021

DATE: 4-1-21

PROJECT REFERENCE NO.	SHEET NO.
B-5614	3

SITE PLAN

0 100 200

FEET

BRIDGE #9
SKEW = 75°

NC GRID
NAD 83

REMOVE BRIDGE
REMOVE EXIST GUARDRAIL
BLOUNTS CREEK BRIDGE NO. 9
20
10" HDPE EXACT LOCATION OF TRANSITION FROM 8" PVC TO 8" DIP TO 10" HDPE UNKNOWN
10" HDPE
8" DIP
8" PVC
PROPOSED GUARDRAIL BARRICADE
PROPOSED GUARDRAIL BARRICADE
WD SEAWALL
EXISTING R/W
EXISTING R/W VARIES
EXIST. R/W MON
PK
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RETHA E. LEWIS
DB 1117 PG 466

JAMES D. LEWIS, et ux
DB 776 PG 15

BRUCE D. LEWIS, et ux
DB 740 PG 714

ALPERN P. GERARD, Jr.
DB 1315 PG 555
DB 413 PG 462
ESTATE FILE 95-E-11

SEMA LEDERMAN
DB 1179 PG 223
PC F SLIDE 51-9

WAYNE NICHOLSON
DB 1595 PG 356

WAYNE NICHOLSON
DB 1595 PG 356

WAYNE NICHOLSON
DB 1595 PG 356

ROBERT LAWRENCE
DB 1909 PG 129

JONATHAN KASSNOVE, et al
DB 1907 PG 142

JONATHAN KASSNOVE, et al
DB 1907 PG 142

SHIRLEY STONE
DB 1747 PG 596

NC DEPT OF TRANSPORTATION
DB 912 PG 678

DEPT OF TRANSPORTATION
DB 912 PG 783

DB 917 PG 780

BLOUNTS CREEK LANDING HOMEOWNERS ASSOCIATION
DB 1878 PG 509
PC F SLIDE 51-9

-L-
S 86°44'24.9" E

-DRIVE-
S 13°28'46" E

-Y1-

-L- PC Sta. 10+12.93
BI-B (99.7')
STA.19+06 14'RT

B2-A (101.1')
STA.20+13 12'LT

B3-B (101.3')
STA.21+45 10'RT

B4-A (98.9')
STA.22+55 12'LT

B5-B (100.7')
STA.23+84 12'RT

B6-A (99.9')
STA.25+00 8'LT

B7-B (99.9')
STA.26+23 12'RT

EBI-A (69.4')
STA.17+68 10'LT

EB2-A (74.3')
STA.27+29 10'LT

-L- PC Sta. 16+84.96

-L- PT Sta. 11+90.32
S 16°23'34.8" E
-DRIVE- PT Sta. 12+03.49

-DRIVE- PT Sta. 10+52.27

-DRIVE- PC Sta. 11+40.61

END CONSTRUCTION
-DRIVE- POT Sta. 11+95.00

END CONSTRUCTION
-Y1- POT Sta. 12+50.00

-Y1- PC Sta. 10+05.34
N 3°15'33.1" E

-L- POT Sta. 28+30.52
-Y1- PT Sta. 10+00.00

-Y1- PT Sta. 12+82.24
N 53°26'53.7" W

-Y1- PT Sta. 11+14.22

PC Sta. 29+48.74

TYPE-III GREU,TL-3
2'FDPS
GREU,TL-3
TYPE-III
2'FDPS
GREU,TL-3
TYPE-III
TYPE-III GREU,TL-3

25' TAPER AMD PK
R=30'
CHORD
EXIST R/W
EXIST R/W MON
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EIP TO R/W=0.56'
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EIP TO R/W=1.00'

FLOW
EBB
BLOUNTS CREEK

PROJECT REFERENCE NO.	SHEET NO.
B-5614	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE:5

▼* ARTESIAN HEAD ELEVATION

EB1-A		B1-B	B2-A	B3-B	B4-A	B5-B	B6-A	B7-B	EB2-A
17+68		19+06	20+13	21+45	22+55	23+84	25+00	26+23	27+29
10' LT		14' RT	12' LT	10' RT	12' LT	12' RT	8' LT	12' RT	24' LT
SS-50		SS-50	SS-26		SS-69		SS-112		SS-126
SS-59		SS-59	SS-28	SS-04	SS-71	SS-100	SS-113	SS-126	ST-02
ST-01		ST-01	B2-A	B3-B	B4-A	B5-B	SS-116	B7-B	EB2-A
B1-B		B1-B	20+13	21+45	22+55	23+84	B6-A	26+23	27+29
19+06		14' RT	12' LT	10' RT	12' LT	12' RT	25+00	12' RT	24' LT
14' RT							8' LT		

EXIST. GROUND

SURFACE WATER

LOOSE TAN AND GRAY SAND, MOIST TO SATURATED (UNDIVIDED COASTAL PLAIN)

VERY SOFT BROWN SILTY CLAY, WET (UNDIVIDED COASTAL PLAIN)

DARK GRAY TO GRAY SILTY AND SANDY CLAY WITH WOOD FRAGMENTS WITH SHELL FRAGMENTS WITH TRACE TO LITTLE ORGANIC MATTER SATURATED (ALLUVIAL)

VERY LOOSE TO LOOSE, TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)

LOOSE TAN AND GRAY SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED (UNDIVIDED COASTAL PLAIN)

VERY LOOSE TO DENSE GRAY AND GREEN SAND

VERY SOFT TO SOFT, GRAY AND GREEN SANDY SILT AND SANDY CLAY WITH SHELL FRAGMENTS

WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)

SATURATED (YORKTOWN FORMATION)

VERY SOFT TO MEDIUM HARD LIGHT GRAY SILTY SAND WITH SHELL FRAGMENTS

LIMESTONE WITH SHELL FRAGMENTS

SATURATED (CASTLE HAYNE FORMATION)

MEDIUM DENSE TO DENSE GREENISH GRAY SAND AND CLAYEY SAND WITH CEMENTED SAND SAND LAYERS AND LIMESTONE LAYERS, SATURATED (CASTLE HAYNE FORMATION)

VERY SOFT TO MEDIUM HARD LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND AND CEMENTED SAND LAYERS, SATURATED (CASTLE HAYNE FORMATION)

Ⓐ LOOSE BROWN SAND WITH GRAVEL, MOIST (ARTIFICIAL FILL)

Ⓑ LOOSE BROWN SAND, MOIST (UNDIVIDED COASTAL PLAIN)

Ⓒ VERY LOOSE TO LOOSE BROWN SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED (UNDIVIDED COASTAL PLAIN)

Ⓓ SOFT TO MEDIUM STIFF, GRAY SILT AND SANDY CLAY WITH SHELL FRAGMENTS SATURATED (YORKTOWN FORMATION)

Ⓔ MEDIUM STIFF, GRAY AND BROWN, SILTY AND SANDY CLAY, WET (UNDIVIDED COASTAL PLAIN)

Ⓕ VERY SOFT TO MEDIUM HARD LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND AND CEMENTED SAND LAYERS, SATURATED (CASTLE HAYNE FORMATION)

NOTES: GROUNDLINE PROFILE OF -L- TAKEN FROM B5614 Rdy PDFLdgn DATED 3/24/2020.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00

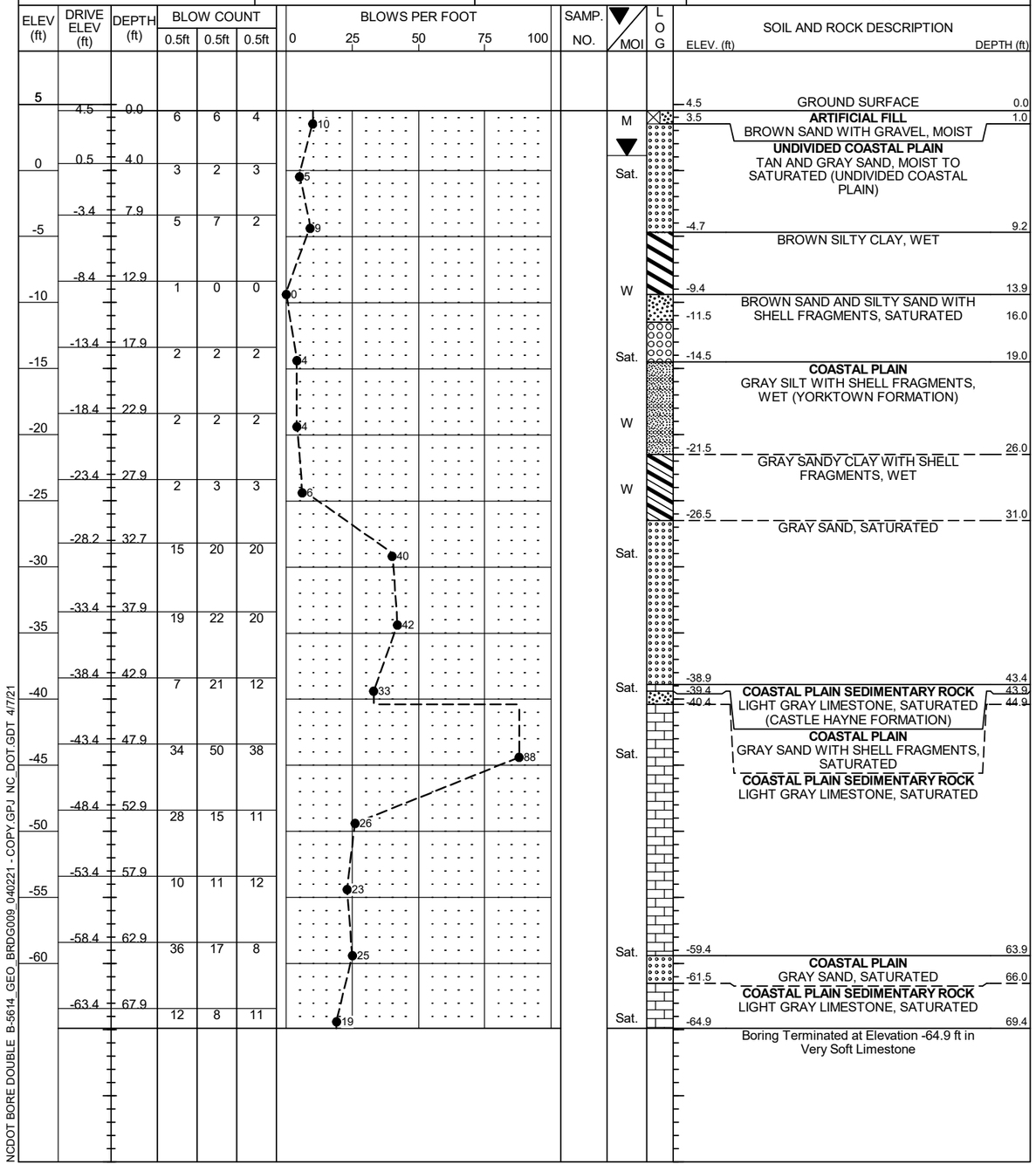
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130

5/14/99

13-APR-2021 14:43
H:\Projects\2021\21C19013.01 B-5614 Brdg 9 over Blounts Creek\03-SE Products\B5614_GEO_BRDG0009\CADD_GEOTECH\Site&Sub\B5614_GEO_PFL_004.dgn
Default
A1 ANSI D (34.00 x 22.00 Inches)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** Argenbright, D. N.	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 17+68	**OFFSET** 10 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 4.5 ft	**TOTAL DEPTH** 69.4 ft	**NORTHING** 618,530	**EASTING** 2,604,026	**24 HR.** 3.4
DRILL RIG/HAMMER EFF./DATE GFO0075 CME-45C 89% 08/19/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Smith, R. E.	**START DATE** 06/10/20	**COMP. DATE** 06/10/20	**SURFACE WATER DEPTH** N/A	



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 19+06	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -3.4 ft	**TOTAL DEPTH** 99.7 ft	**NORTHING** 618,498	**EASTING** 2,604,162	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/12/21	**COMP. DATE** 03/15/21	**SURFACE WATER DEPTH** 3.0ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
0											
	-3.4	0.0	WOR	WOR	WOR	0		Sat.		-3.4 GROUND SURFACE	0.0
-5	-6.9	3.5	WOR	WOR	WOR	0				**ALLUVIAL** DARK GRAY SILTY CLAY WITH WOOD FRAGMENTS, WITH TRACE ORGANICS, SATURATED	
-10	-11.9	8.5	WOR	WOR	WOR	0					
-15	-16.9	13.5	WOR	WOR	WOR	0					
-20	-22.0	18.6	WOH	WOH	WOH	0				-23.4	20.0
-25	-27.0	23.6	2	4	2	6		28%		**COASTAL PLAIN** GRAY AND DARK GRAY SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)	
-30	-32.0	28.6	3	2	1	3	SS-050	58%		-33.5	30.1
-35	-37.0	33.6	4	7	6	13				-39.9 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)	36.5
-40	-42.0	38.6	44	42	40	82		Sat.			
-45	-47.1	43.7	19	26	22	48				-48.6	45.2
-50	-52.1	48.7	3	7	8	15		Sat.		**COASTAL PLAIN** GREENISH GRAY SAND WITH TRACE SILT, WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED	
-55	-56.6	53.2	11	11	32	43					
-60	-61.7	58.3	16	8	8	16					
-65	-66.7	63.3	7	13	13	26					
-70	-71.7	68.3	6	8	8	16					
-75	-76.7	73.3	5	5	5	10	SS-059	33%		-74.2 GREENISH GRAY CLAYEY SAND, WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED	70.8
-80										-79.4	76.0

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 19+06	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -3.4 ft	**TOTAL DEPTH** 99.7 ft	**NORTHING** 618,498	**EASTING** 2,604,162	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/12/21	**COMP. DATE** 03/15/21	**SURFACE WATER DEPTH** 3.0ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-80						Match Line				
	-81.7	78.3	4	33	44	77		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND LAYERS, SATURATED *(continued)*
-85	-86.6	83.2	53	80	20/0.3	100/0.8				
-90	-91.6	88.2	11	11	16	27				
-95	-96.6	93.2	14	13	15	28				
-100	-101.6	98.2	13	31	43	74				-103.1 99.7
										Boring Terminated at Elevation -103.1 ft in Soft Limestone
										Other Samples: ST-01 (20.1 - 22.1)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 20+13	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -11.5 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 618,518	**EASTING** 2,604,270	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER T.J. Strickland	**START DATE** 03/11/21	**COMP. DATE** 03/11/21	**SURFACE WATER DEPTH** 11.0ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
-10											
	-11.5	0.0	WOR	WOR	WOR	0		Sat.		-11.5 GROUND SURFACE	0.0
-15	-15.0	3.5	WOR	WOR	WOR	0				**ALLUVIAL** DARK GRAY SILTY CLAY WITH TRACE ORGANICS, SATURATED	
	-17.3	5.8	WOR	WOR	WOR	0				-18.0 GRAY SANDY CLAY WITH WOOD FRAGMENTS, SATURATED	6.5
-20											
	-22.0	10.5	WOR	WOH	2	2		Sat.		-24.5 **COASTAL PLAIN** GRAY SILT WITH LITTLE FINE SAND, SATURATED (YORKTOWN FORMATION)	13.0
-25											
	-27.0	15.5	1	1	3	4	SS-026	25%			
-30											
	-32.0	20.5	3	6	5	11				-32.2 GRAY AND BROWN SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED	20.7
-35										-34.5	23.0
	-37.0	25.5	4	9	12	21	SS-028	39%			
-40											
	-42.0	30.5	14	32	40	72				-42.3 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)	30.8
-45											
	-46.7	35.2	16	17	11	28		Sat.			
-50											
	-51.7	40.2	9	11	10	21					
-55										-54.2 **COASTAL PLAIN** GREENISH GRAY SAND, WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED	42.7
	-56.7	45.2	5	7	8	15		Sat.			
-60											
	-61.6	50.1	9	10	11	21					
-65										-64.0 LIGHT GREENISH GRAY CLAYEY SAND WITH CEMENTED SAND AND LIMESTONE LAYERS,SATURATED	52.5
	-66.5	55.0	8	6	9	15		Sat.			
-70										-69.0 GREENISH GRAY SILTY SAND WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED	57.5
	-71.5	60.0	8	7	7	14		Sat.			
-75											
	-76.6	65.1	8	6	7	13					
-80										-79.2 LIGHT GREENISH GRAY CLAYEY SAND WITH SHELL FRAGMENTS, SATURATED	67.7
	-81.7	70.2	15	10	11	21		Sat.			
-85										-83.7 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND LAYERS,SATURATED	72.2
	-85.7	74.2	34	36	64/0.4	100/0.4		Sat.			
-90											

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-90						Match Line				
	-90.7	79.2	25	12	15	27				**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND LAYERS,SATURATED *(continued)*
-95										
	-95.7	84.2	15	12	13	25				
-100										
	-101.7	90.2	21	20	13	33				
-105										
	-106.7	95.2	24	45	47	92				
-110										
	-111.8	100.3	25	100/0.3		100/0.3				-112.6 Boring Terminated at Elevation -112.6 ft in Soft Limestone 101.1

NCDOT BORE DOUBLE B-5614_GEO_BRDG009_040221 - COPY.GPJ NC_DOT.GDT 4/7/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 21+45	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -11.1 ft	**TOTAL DEPTH** 101.3 ft	**NORTHING** 618,497	**EASTING** 2,604,392	**24 HR.** Artesian
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/09/21	**COMP. DATE** 03/11/21	**SURFACE WATER DEPTH** 10.8ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
-10										
	-11.1	0.0	WOR	WOR	WOR	0		Sat.		-11.1 0.0 GROUND SURFACE **ALLUVIAL** DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, WITH WOOD FRAGMENTS, SATURATED
-15	-14.6	3.5	WOR	WOR	WOR	0				
-20	-19.6	8.5	WOR	WOR	WOR	0				
-25	-22.1	11.0								**COASTAL PLAIN** GRAY AND BROWN SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
	-24.6	13.5	5	3	5	8	SS-004	23%		
	-26.8	15.7	17	13	3	16				
-30	-31.9	20.8	2	3	3	6				
-35	-34.4	23.3								
	-36.9	25.8	3	5	14	19				
-40	-39.4	28.3								**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)
	-41.9	30.8	23	35	65/0.4	100/0.9		Sat.		
-45	-46.9	35.8	17	12	7	19				
-50	-49.4	38.3								**COASTAL PLAIN** GREENISH GRAY SAND WITH TRACE TO LITTLE SILT, WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED
	-51.9	40.8	10	12	17	29				
-55	-57.1	46.0	7	7	4	11				
-60	-62.1	51.0	15	17	16	33				
-65	-64.7	53.6								**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY AND GREENISH GRAY LIMESTONE WITH SAND AND CEMENTED SAND LAYERS, SATURATED
	-67.3	56.2	13	17	83/0.3	100/0.8		Sat.		
-70	-72.4	61.3	8	7	17	24				
-75	-77.4	66.3	6	6	6	12				
-80	-79.5	68.4								**COASTAL PLAIN** GREENISH GRAY SAND WITH SHELL FRAGMENTS, WITH TRACE SILT WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED
	-81.5	70.4	6	6	41	47		Sat.		
-85	-86.6	75.5	24	25	75/0.4	100/0.9				
-90	-87.9	76.8								

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 21+45	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -11.1 ft	**TOTAL DEPTH** 101.3 ft	**NORTHING** 618,497	**EASTING** 2,604,392	**24 HR.** Artesian
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/09/21	**COMP. DATE** 03/11/21	**SURFACE WATER DEPTH** 10.8ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-90						Match Line				
	-91.6	80.5	25	13	16	29		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED *(continued)*
-95	-96.7	85.6	12	13	18	31				
-100	-101.8	90.7	10	30	38	68				
-105	-106.7	95.6	25	30	50	80				
-110	-111.6	100.5	60	100/0.3		100/0.3				-112.4 101.3 Boring Terminated at Elevation -112.4 ft in Soft Limestone Note: ARTESIAN groundwater measured at Elevation 5.8 feet, 12 hours after drilling. Boring sealed with bentonite.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 22+55	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -8.6 ft	**TOTAL DEPTH** 98.9 ft	**NORTHING** 618,504	**EASTING** 2,604,512	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER T.J. Strickland	**START DATE** 03/17/21	**COMP. DATE** 03/17/21	**SURFACE WATER DEPTH** 8.7ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
-8.6		0.0	WOR	WOR	WOR	0		Sat.		-8.6 0.0 GROUND SURFACE
										ALLUVIAL DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, SATURATED
-12.1		3.5	WOR	WOR	WOR	0				
-17.1		8.5	WOR	WOR	WOR	0				
-22.1		13.5	1	1	1	2				-24.6 16.0 **COASTAL PLAIN** GRAY AND DARK GRAY SAND AND SILTY SAND, WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
-26.5		17.9	1	0	1	1	SS-069	24%		
-31.5		22.9	1	1	1	2				
-36.5		27.9	2	1	3	4	SS-071	26%		-36.5 27.9 -39.1 30.5 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)
-41.6		33.0	23	37	30	67		Sat.		
-46.6		38.0	10	14	18	32				-49.6 41.0 **COASTAL PLAIN** GREENISH GRAY SAND WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED
-51.6		43.0	8	8	14	22		Sat.		
-56.6		48.0	5	8	8	16				
-61.7		53.1	20	13	8	21				
-66.7		58.1	9	12	12	24				
-71.7		63.1	6	6	8	14				
-76.7		68.1	6	5	6	11				
-81.6		73.0	7	8	7	15				-83.6 75.0

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 22+55	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -8.6 ft	**TOTAL DEPTH** 98.9 ft	**NORTHING** 618,504	**EASTING** 2,604,512	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER T.J. Strickland	**START DATE** 03/17/21	**COMP. DATE** 03/17/21	**SURFACE WATER DEPTH** 8.7ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-85						Match Line				
-86.4		77.8	23	47	18	65		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED *(continued)*
-91.1		82.5	100/0.4			100/0.4				
-96.1		87.5	12	15	13	28				
-101.0		92.4	14	18	16	34				
-106.0		97.4	17	37	48	85				-107.5 98.9 Boring Terminated at Elevation -107.5 ft in Soft Limestone

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 23+84	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -8.3 ft	**TOTAL DEPTH** 100.7 ft	**NORTHING** 618,473	**EASTING** 2,604,639	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/18/21	**COMP. DATE** 03/18/21	**SURFACE WATER DEPTH** 7.1ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
-5										
	-8.3	0.0	WOR	WOR	WOR	0		Sat.		-8.3 GROUND SURFACE 0.0
-10										**ALLUVIAL**
	-11.8	3.5	WOR	WOR	WOR	0				DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, WITH WOOD FRAGMENTS, SATURATED
-15										
	-16.8	8.5	WOH	0	0	0				
-20										
	-22.8	14.5	WOH	0	0	0				
-25										-25.3 17.0
	-27.8	19.5	1	3	1	4		Sat.		**COASTAL PLAIN**
-30										DARK GRAY SAND AND SILTY SAND WITH TRACE CLAY, WITH WOOD FRAGMENTS, WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
	-32.7	24.4	3	2	2	4				
-35										-35.2 26.9
	-37.6	29.3	2	3	4	7				
-40										-38.9 30.6
	-42.6	34.3	38	41	48	89		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK**
-45										LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED (CASTLE HAYNE FORMATION)
	-47.6	39.3	20	14	11	25				
-50										-50.1 41.8
	-52.6	44.3	15	12	9	21		Sat.		**COASTAL PLAIN**
-55										GREENISH GRAY SAND WITH TRACE TO LITTLE SILT, WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED
	-57.5	49.2	7	9	7	16				
-60										
	-62.5	54.2	5	6	6	12				
-65										
	-67.4	59.1	13	12	10	22				
-70										
	-72.4	64.1	6	10	11	21				
-75										
	-77.4	69.1	5	5	7	12	SS-100	24%		
-80										
	-82.4	74.1	14	16	20	36				
-85										

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 23+84	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -8.3 ft	**TOTAL DEPTH** 100.7 ft	**NORTHING** 618,473	**EASTING** 2,604,639	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/18/21	**COMP. DATE** 03/18/21	**SURFACE WATER DEPTH** 7.1ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-85						Match Line				
	-87.4	79.1	8	9	14	23				
-90										
	-92.4	84.1	100/0.4			100/0.4		Sat.		
-95										
	-97.5	89.2	8	18	18	36				
-100										
	-102.5	94.2	15	22	20	42				
-105										
	-107.5	99.2	19	30	38	68				

-88.8 80.5
COASTAL PLAIN SEDIMENTARY ROCK
LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED

-109.0 100.7
Boring Terminated at Elevation -109.0 ft in Soft Limestone

NCDOT BORE DOUBLE B-5614_GEO_BRDG009_040221 - COPY.GPJ NC_DOT.GDT 4/7/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 25+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -5.7 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 618,486	**EASTING** 2,604,756	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/18/21	**COMP. DATE** 03/23/21	**SURFACE WATER DEPTH** 5.9ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5										
	-5.7	0.0	WOR	WOR	WOR	0		Sat.		ELEV. (ft) -5.7 GROUND SURFACE DEPTH (ft) 0.0
-10	-9.2	3.5	WOR	WOR	WOR	0				**ALLUVIAL** DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, SATURATED
-15	-14.2	8.5	WOR	WOR	WOR	0				
-20	-19.2	13.5	WOH	WOH	WOH	0				-21.7 16.0
-25	-24.2	18.5	WOH	1	0	1		Sat.		**COASTAL PLAIN** GRAY SANDY CLAY WITH WOOD FRAGMENTS, WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
-30	-29.2	23.5	1	0	1	1	SS-112	47%		
	-32.5	26.8	2	2	2	4	SS-113	25%		-31.7 26.0 BROWN AND GRAY SAND WITH SHELL FRAGMENTS, SATURATED
-35										
	-37.5	31.8	8	17	23	40				
-40										-40.1 34.4
	-42.5	36.8	25	23	23	46		Sat.		**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)
-45										
	-47.5	41.8	9	9	6	15				
-50										
	-52.5	46.8	6	6	5	11				
-55										-55.0 49.3
	-57.5	51.8	6	8	11	19		Sat.		**COASTAL PLAIN** GREENISH GRAY SAND WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED
-60										
	-62.5	56.8	12	18	14	32				
-65										
	-67.5	61.8	9	9	15	24				
-70										
	-72.5	66.8	12	16	15	31				
-75										
	-77.5	71.8	7	6	8	14				
-80										
	-82.5	76.8	14	100/0.3		100/0.3				-83.3 77.6
-85										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-85						Match Line				
-90										
	-94.1	88.4	12	10	13	23	RS-01			**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY AND TAN, FRIABLE TO INDURATED LIMESTONE WITH SAND LAYERS (CASTLE HAYNE FORMATION) RS-01: 86.4'-87.1' REC=20% RQD=19% RMR= 12 *(continued)*
-95							SS-124	17%		-94.1 88.4
-100	-99.1	93.4	14	14	21	35				
	-104.1	98.4	17	22	22	44				-105.6 99.9 Boring Terminated at Elevation -105.6 ft in Very Soft Limestone
-105										

NCDOT BORE DOUBLE B-5614_GEO_BRDG009_040221 - COPY.GPJ NC_DOT.GDT 4/7/21

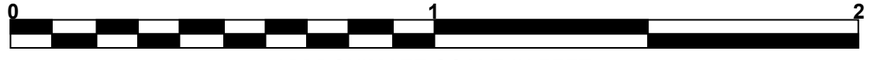
GEOTECHNICAL BORING REPORT
CORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 25+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -5.7 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 618,486	**EASTING** 2,604,756	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER T.J. Strickland	**START DATE** 03/18/21	**COMP. DATE** 03/23/21	**SURFACE WATER DEPTH** 5.9ft	
CORE SIZE NQ2	**TOTAL RUN** 10.8 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
-83.3											Begin Coring @ 77.6 ft
-85	-83.3 -84.1	77.6 78.4	0.8 5.0	1:15/0.8 1:07/1.0	(0.4) 50%	(0.4) 50%		(2.2) 20%	(2.0) 19%		-83.3 **COASTAL PLAIN SEDIMENTARY ROCK** 77.6 LIGHT GRAY AND TAN, FRIABLE TO INDURATED LIMESTONE WITH SAND LAYERS (CASTLE HAYNE FORMATION) RS-01: 86.4'-87.1'
				:46/1.0 :34/1.0 :51/1.0 1:23/1.0	(1.1) 22%	(0.6) 12%					
-90	-89.1	83.4	5.0	1:40/1.0 2:04/1.0 1:16/1.0 3:14/1.0	(1.8) 36%	(1.0) 20%					RMR= 12
-95	-94.1	88.4		:57/1.0 *N=23*			RS-01 *SS-124*				-94.1 88.4
-100				*N=35*							
-105				*N=44*							-105.6 99.9
											Boring Terminated at Elevation -105.6 ft in Very Soft Limestone

CORE PHOTOGRAPH
BRIDGE NO. 9 OVER BLOUNTS CREEK ON SR 1112 (MOUTH OF CREEK RD)

B6-A
BOX 1 OF 1: 77.6 - 88.4 FEET



APPROXIMATE SCALE IN FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 26+23	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -5.0 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 618,461	**EASTING** 2,604,881	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/23/21	**COMP. DATE** 03/24/21	**SURFACE WATER DEPTH** 5.7ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
-5										
	-5.0	0.0	WOR	WOR	WOR	0		Sat.		-5.0 GROUND SURFACE 0.0 **ALLUVIAL** DARK GRAY SILTY CLAY WITH SOME SAND, SATURATED
	-8.5	3.5	WOH	WOH	WOH	0				
-10										-11.0 6.0 DARK GRAY CLAYEY SAND WITH SOME SILT, WITH WOOD FRAGMENTS, SATURATED
	-13.5	8.5	WOH	WOH	WOH	0		Sat.		
-15										-17.0 12.0 **COASTAL PLAIN** GREEN SANDY CLAY WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
	-18.5	13.5	1	1	1	2				
-20								28%		
	-22.9	17.9	3	2	2	4				
-25										
	-27.9	22.9	8	8	12	20				-28.5 23.5 GREENISH GRAY SAND WITH SHELL FRAGMENTS, SATURATED
-30										
	-32.9	27.9	12	17	18	35				
-35										
	-37.8	32.8	10	10	20	30	SS-134	20%		
-40										-40.0 35.0 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE, SATURATED (CASTLE HAYNE FORMATION)
	-42.8	37.8	55	45	47	92		Sat.		-44.2 39.2
-45										**COASTAL PLAIN** GREENISH GRAY SAND WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED REC=0% RQD=0%
	-45.3	40.3	5	30	30	60		Sat.		
	-47.9	42.9	6	7	13	20				
-50										
	-53.0	48.0	13	9	9	18				
-55										
	-58.0	53.0	9	11	11	22				
-60										
	-63.0	58.0	9	9	7	16				
-65										
	-68.1	63.1	7	7	8	15				
-70										
	-73.2	68.2	7	10	22	32				
-75										
	-78.2	73.2	7	6	6	12				
-80										
	-83.2	78.2	36	70	30/0.2	100/0.7		Sat.		-82.5 77.5

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 26+23	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -5.0 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 618,461	**EASTING** 2,604,881	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic
DRILLER T.J. Strickland	**START DATE** 03/23/21	**COMP. DATE** 03/24/21	**SURFACE WATER DEPTH** 5.7ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-85						Match Line				
	-85.4	80.4	84	22	10	32				**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED REC=0% RQD=0% *(continued)*
	-88.1	83.1	33	43	57/0.4	100/0.9				
-90										
	-93.2	88.2	15	17	15	32				
-95										
	-98.2	93.2	10	15	19	34				
-100										
	-103.4	98.4	13	15	15	30				-104.9 99.9 Boring Terminated at Elevation -104.9 ft in Very Soft Limestone Other Samples: ST-02 (15.0 - 17.0)

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** J. Holland	
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 26+23	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** FIAD
COLLAR ELEV. -5.0 ft	**TOTAL DEPTH** 99.9 ft	**NORTHING** 618,461	**EASTING** 2,604,881	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE 742018 CME-55C 90% 03/16/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER T.J. Strickland	**START DATE** 03/23/21	**COMP. DATE** 03/24/21	**SURFACE WATER DEPTH** 5.7ft	
CORE SIZE NQ2	**TOTAL RUN** 2.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
-44.3											Begin Coring @ 39.3 ft
-45	-44.3 -45.3	39.3 40.3	1.0	:54/1.0 *N=60*	(0.0) 0%	(0.0) 0%					**COASTAL PLAIN** GREENISH GRAY SAND WITH SHELL FRAGMENTS, WITH CEMENTED SAND AND LIMESTONE LAYERS, SATURATED *(continued)*
-50				*N=20*							
-55				*N=18*							
-60				*N=22*							
-65				*N=16*							
-70				*N=15*							
-75				*N=32*							
-80				*N=12*							
-82.5											77.5
-85	-84.4 -85.4	79.4 80.4	1.0	*N=100/0.7* 1:12/1.0 *N=32*	(0.0) 0%	(0.0) 0%					**COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY, FRIABLE LIMESTONE WITH SAND LAYERS, SATURATED
-90				*N=100/0.9*							
-95				*N=32*							
-100				*N=34*							
-104.9				*N=30*							99.9
											Boring Terminated at Elevation -104.9 ft in Very Soft Limestone

Other Samples:
ST-02 (15.0 - 17.0)

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** Argenbright, D. N.
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+29	**OFFSET** 24 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.8 ft	**TOTAL DEPTH** 74.3 ft	**NORTHING** 618,489	**EASTING** 2,604,986	**24 HR.** 9.9
DRILL RIG/HAMMER EFF./DATE GFO0075 CME-45C 89% 08/19/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 06/08/20	**COMP. DATE** 06/08/20	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
15										
10	10.8	0.0	1	0	1	1		M		10.8 — GROUND SURFACE — 0.0 **UNDIVIDED COASTAL PLAIN** TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)
5	6.8	4.0	2	2	3	5				
0	3.0	7.8	3	4	3	7		W		2.4 — 8.4 GRAY AND BROWN SILTY CLAY, WET
-5	-2.0	12.8	3	3	3	6				-2.2 — 13.0 TAN AND GRAY SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED
-10	-7.0	17.8	WOH	3	5	8		Sat.		-5.2 — 16.0
-15	-12.0	22.8	3	3	4	7				-15.2 — 26.0 **COASTAL PLAIN** GRAY SANDY SILT, WET (YORKTOWN FORMATION)
-20	-17.0	27.8	2	1	3	4		W		
-25	-22.0	32.8	2	3	3	6				-22.3 — 33.1 GRAY SAND AND SILTY SAND WITH SHELL FRAGMENTS, SATURATED
-30	-27.0	37.8	3	9	12	21		Sat.		-25.2 — 36.0
-35	-32.0	42.8	7	8	10	18				-30.9 — 41.7 -31.0 — **COASTAL PLAIN SEDIMENTARY ROCK** — 41.8 LIGHT GRAY LIMESTONE, SATURATED
-40	-37.0	47.8	18	25	19	44		Sat.		**COASTAL PLAIN** GRAY SAND, SATURATED
-45	-42.0	52.8	100/0.5			100/0.5				-39.7 — 50.5 **COASTAL PLAIN SEDIMENTARY ROCK** LIGHT GRAY LIMESTONE WITH SAND LAYERS, SATURATED (CASTLE HAYNE FORMATION)
-50	-47.0	57.8	14	15	14	29		Sat.		
-55	-52.0	62.8	12	12	11	23				-55.2 — 66.0 **COASTAL PLAIN** GRAY SAND WITH LIMESTONE LAYERS, SATURATED
-60	-57.0	67.8	9	7	7	14		Sat.		
	-62.0	72.8	5	5	5	10				-63.5 — 74.3 Boring Terminated at Elevation -63.5 ft in

WBS 45569.1.2	**TIP** B-5614	**COUNTY** BEAUFORT	**GEOLOGIST** Argenbright, D. N.
SITE DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1112) OVER BLOUNTS CREEK			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+29	**OFFSET** 24 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.8 ft	**TOTAL DEPTH** 74.3 ft	**NORTHING** 618,489	**EASTING** 2,604,986	**24 HR.** 9.9
DRILL RIG/HAMMER EFF./DATE GFO0075 CME-45C 89% 08/19/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 06/08/20	**COMP. DATE** 06/08/20	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				Medium Dense Sand

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BRIDGE NO. 9 OVER BLOUNTS CREEK ON SR 1112 (MOUTH OF CREEK RD)

SOIL TEST RESULTS

BORING	SAMPLE			DEPTH INTERVAL	AASHTO	LIQUID	PLASTICITY	% BY WEIGHT				% PASSING (SIEVES)			%	%
NO.	NO.	STATION	OFFSET	(FEET)	CLASS.	LIMIT	INDEX	GRAVEL	C.SAND	F.SAND	SILT & CLAY	10	40	200	MOISTURE	ORGANIC
B1-B	SS-050	19+06	14' RT	28.6-30.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	58.0	-
B1-B	SS-059	19+06	14' RT	73.3-74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	33.0	-
B2-A	SS-026	20+13	12' LT	15.5-17.0	A-4	23	5	0.00	0.20	50.11	49.70	100.00	99.80	49.70	24.7	-
B2-A	SS-028	20+13	12' LT	25.5-27.0	A-1-B	0	0	3.31	50.27	40.19	6.23	96.69	46.42	6.23	38.6	-
B3-B	SS-004	21+45	10' RT	13.5-15.0	A-2-4	0	0	0.00	0.41	82.00	17.58	100.00	99.59	17.58	23.1	-
B4-A	SS-069	22+55	12' LT	17.9-19.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23.8	-
B4-A	SS-071	22+55	12' LT	27.9-29.4	A-1-B	0	0	0.15	55.45	35.15	9.25	99.85	44.40	9.25	26.0	-
B5-B	SS-100	23+84	12' RT	69.1-70.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23.5	-
B6-A	SS-112	25+00	8' LT	23.5-25.0	A-6	30	14	0.00	0.41	37.63	61.96	100.00	99.59	61.96	47.3	-
B6-A	SS-113	25+00	8' LT	26.8-28.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24.6	-
B6-A	SS-124	25+00	8' LT	88.4-89.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16.9	-
B7-B	SS-134	26+23	12' RT	32.8-34.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8	-
B1-B	ST-01	19+06	14' RT	20.1-22.1	A-2-4	0	0	0.00	0.46	73.76	25.78	100.00	99.54	25.78	28.2	-
B7-B	ST-02	26+23	12' RT	15.0-17.0	A-2-6	29	11	0.48	37.86	43.10	18.57	99.52	61.66	18.57	27.7	-

BRIDGE NO. 9 ON SR 1112 OVER BLOUNTS CREEK (MOUTH OF CREEK RD)

ROCK TEST RESULTS

BORING	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL (ft)	LENGTH (in.)	DIAMETER (in.)	AREA (sq. in.)	VOLUME ($in.^3$)	VOLUME (cf)	UNIT WEIGHT (pcf)	COMPRESSIVE STRENGTH (psi)	TESTING METHOD
B6-A	**RS-01**	**25+00**	**8FT LT**	**86.4 - 87.1**	**4.94**	**1.95**	**2.97**	**14.7**	**0.01**	**106.9**	**400**	**ASTM D-7012-14 METHOD C**

SITE PHOTOGRAPHS
BRIDGE NO. 9 OVER BLOUNTS CREEK ON SR 1112 (MOUTH OF CREEK ROAD)

View of SR 1112 looking northeast.

View of proposed SR 1112 looking east.

View of Blounts Creek looking northwest.

Schnabel ENGINEERING

Schnabel Engineering South, P.C.
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T 910.769.1621
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April 5, 2021

Memorandum to: J. L. Pilipchuk, L.G., P.E.
State Geotechnical Engineer

WBS Element: 45569.1.2
TIP: B-5614
County: BEAUFORT
Description: Bridge 9 over Blounts Creek on SR 1112 (Mouth of the Creek Rd)

Subject: Design Scour Elevations

After a review of site flooding history, historical scour depth, and geologic conditions encountered at the site, Schnabel Engineering, has determined the design scour elevations (DSE), and presents the following:

Location	Theoretical Scour Elevation	Historical Scour Elevation	Design Scour Elevation	Does DSE impact end bents?
Bent 1	-15.2 feet	-23.4 feet	-15.2 feet	No
Bent 2	-23.9 feet	-24.5 feet	-23.9 feet	No
Bent 3	-21.3 feet	-22.1 feet	-21.3 feet	No
Bent 4	-21.4 feet	-24.6 feet	-21.4 feet	No
Bent 5	-19.0 feet	-25.3 feet	-19.0 feet	No
Bent 6	-17.8 feet	-21.7 feet	-17.8 feet	No
Bent 7	-16.3 feet	-17.0 feet	-16.3 feet	No

The Theoretical Scour Elevation is from the Bridge Survey and Hydraulic Design Report dated 2/5/2021. The Design Scour Elevation is the same as the Theoretical Scour Elevation. The subsurface investigation revealed Alluvial materials consisting of silty/sandy clay and clayey sand generally extending deeper than the Theoretical Scour Elevations at each bent. These materials are not resistant to scour.

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