

REFERENCE: R-5021

PROJECT: 41582

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY BRUNSWICK  
PROJECT DESCRIPTION NC 211 FROM SR 1500  
(MIDWAY ROAD) TO NC 87

SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259  
ON NC 211 OVER DUTCHMAN CREEK

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-8	CROSS SECTIONS)
9-19	BORE LOG(S)
20-21	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5021	1	21

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:
- 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

C. WANG

S. DAVIS

W. SHENBERGER

D. JENKS

INVESTIGATED BY F&R Inc.

DRAWN BY T.T. WALKER

CHECKED BY P. ALTON

SUBMITTED BY P. ALTON

DATE SEPTEMBER 2015



DocuSigned by:

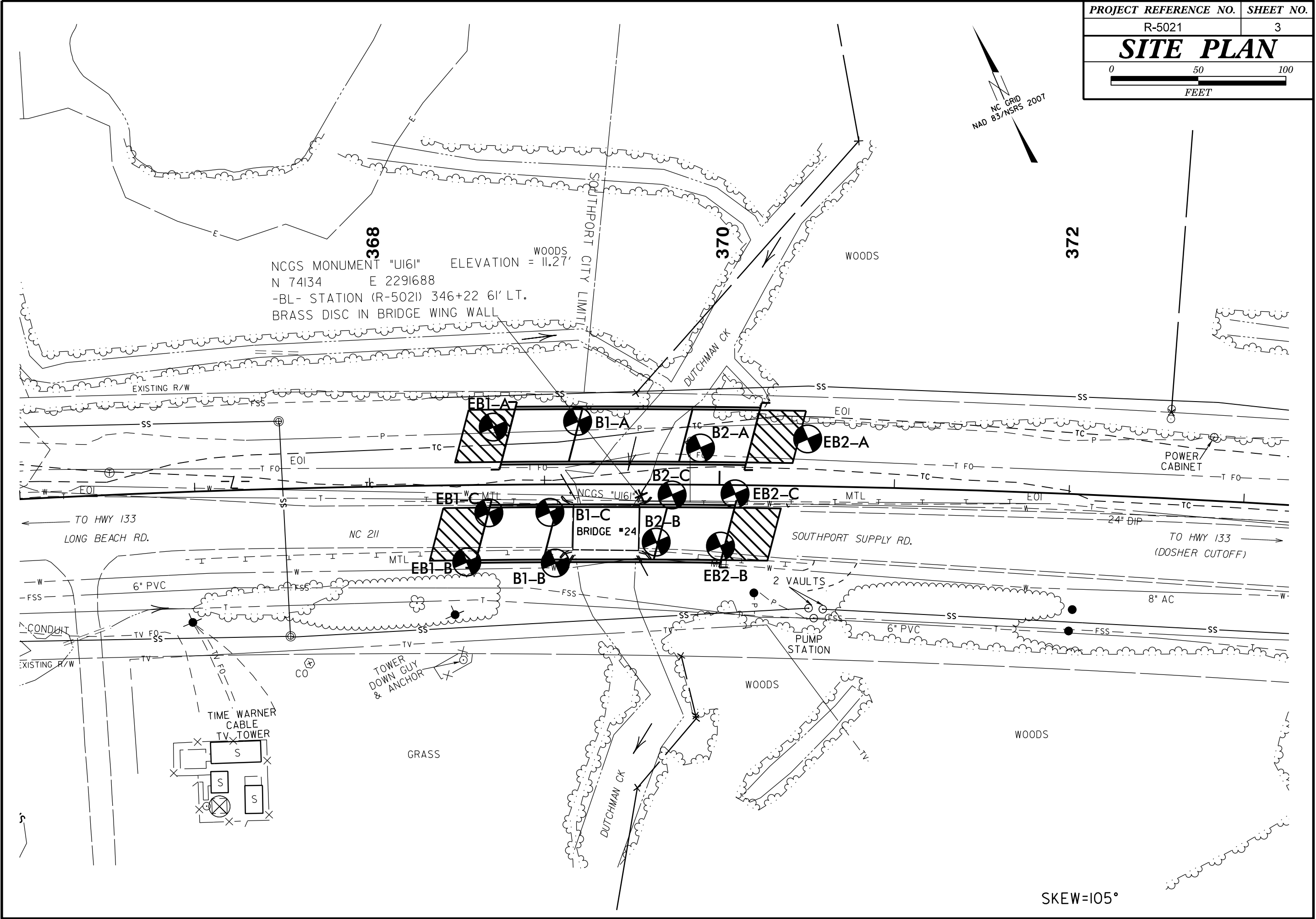
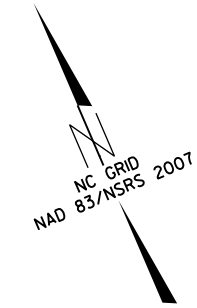
W. Patrick Alton, P.E. 12/3/2015

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SIGNATURE

DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS. Includes sub-tables for SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, and NOTES.



**368**  
 NCGS MONUMENT "UI61" ELEVATION = 11.27'  
 N 74134 E 2291688  
 -BL- STATION (R-5021) 346+22 6' LT.  
 BRASS DISC IN BRIDGE WING WALL

SOUTHPORT CITY LIMIT

**370**

**372**

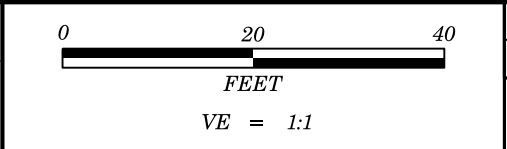
TO HWY 133  
LONG BEACH RD.

NC 211

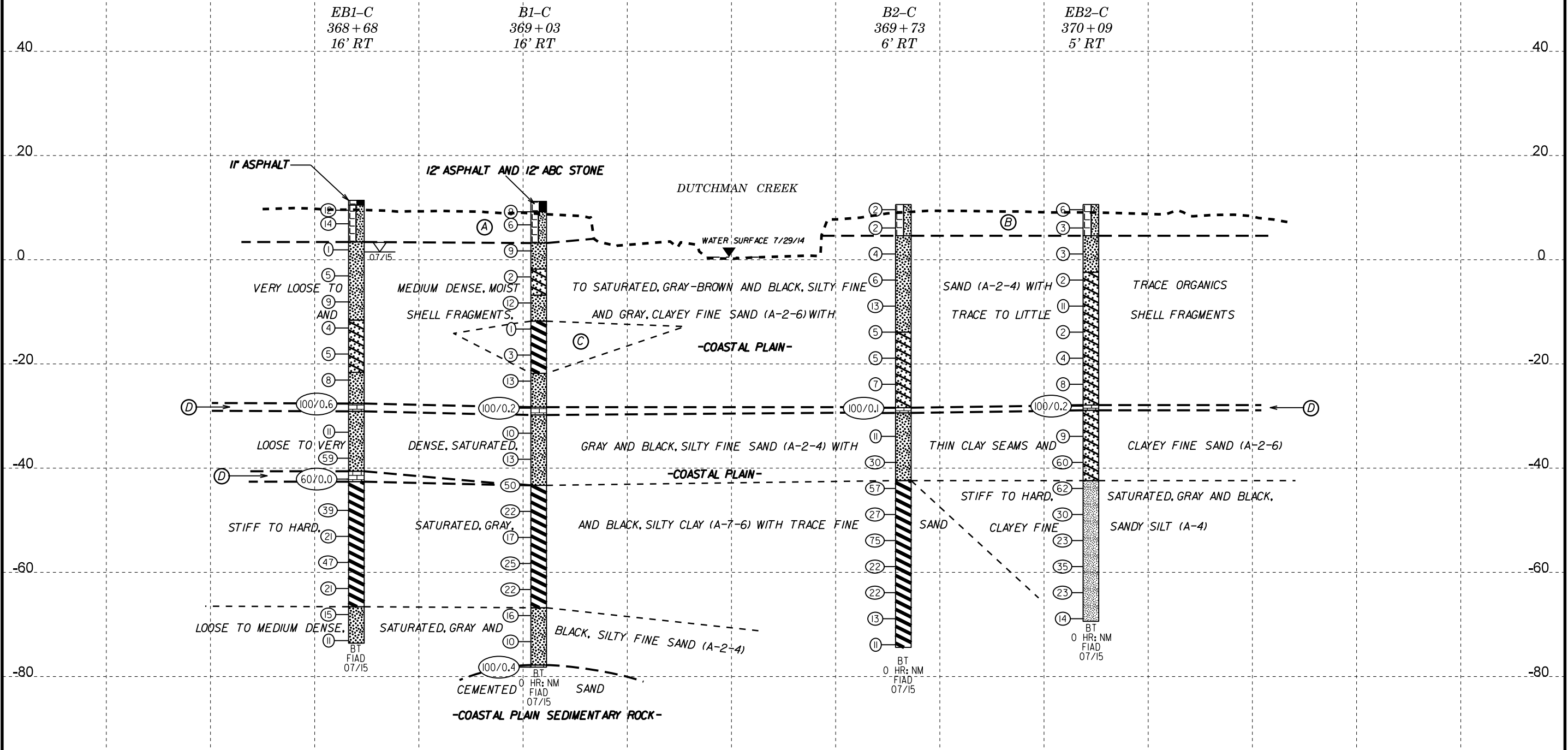
SOUTHPORT SUPPLY RD.

TO HWY 133  
(DOSHER CUTOFF)

SKEW=105°



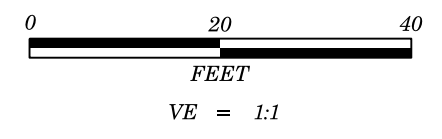
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
R-5021	4
<b>PROFILE BORINGS PROJECTED ALONG -L-</b>	



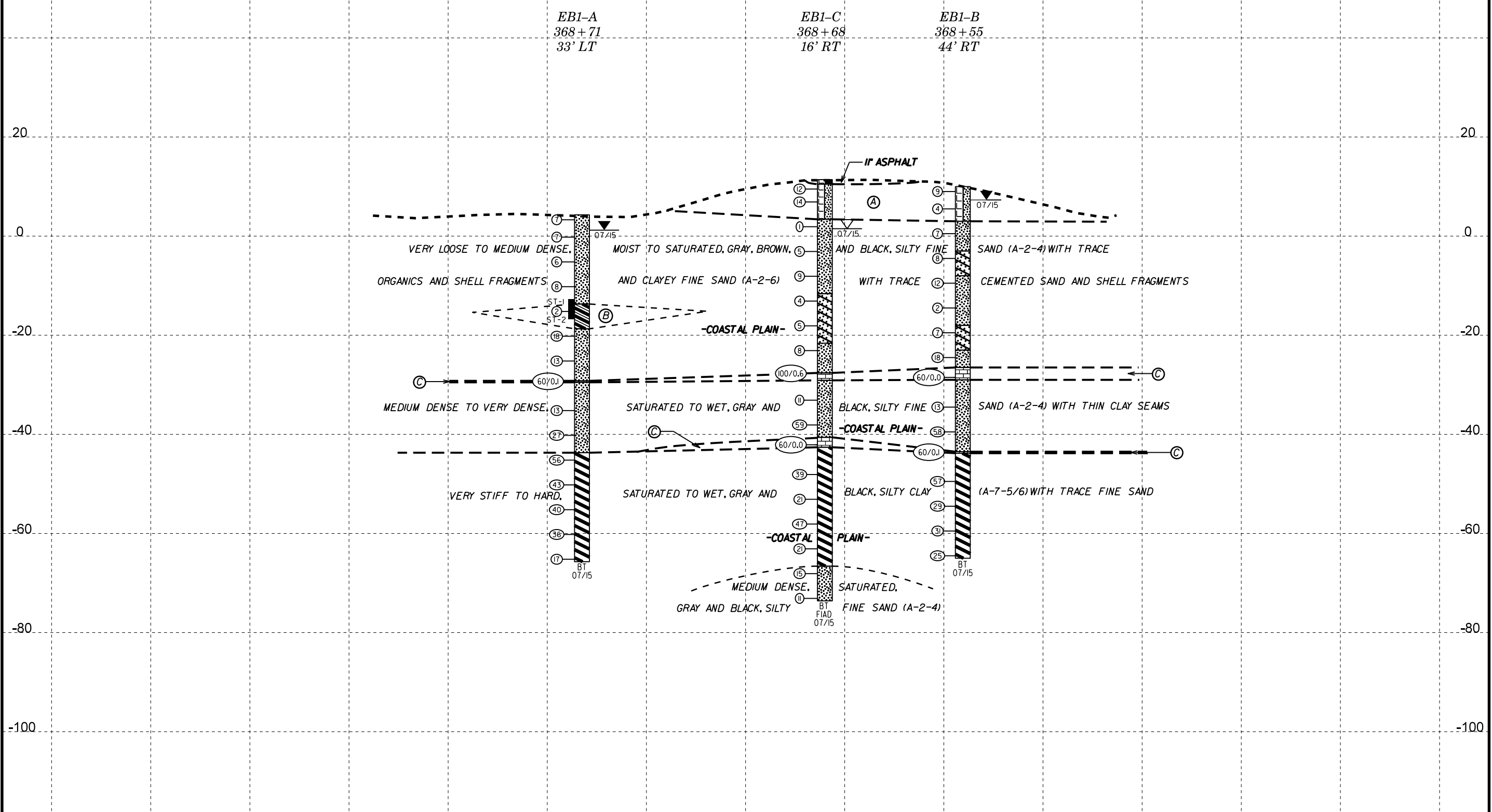
- (A) MEDIUM DENSE TO LOOSE, MOIST, GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE TO LITTLE GRAVEL -ROADWAY EMBANKMENT-
- (B) LOOSE, MOIST TO WET, GRAY, BROWN, AND BLACK, SILTY FINE SAND (A-2-4) WITH SHELL FRAGMENTS AND TRACE ORGANICS (ROOTS) -COASTAL PLAIN-
- (C) VERY SOFT TO SOFT, SATURATED, GRAY, SILTY CLAY (A-7-6) WITH LITTLE FINE SAND AND TRACE SHELL FRAGMENTS -COASTAL PLAIN-
- (D) CEMENTED SAND -COASTAL PLAIN SEDIMENTARY ROCK-

369+00

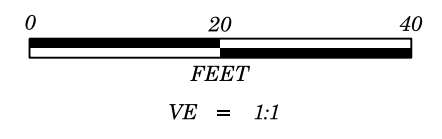
370+00



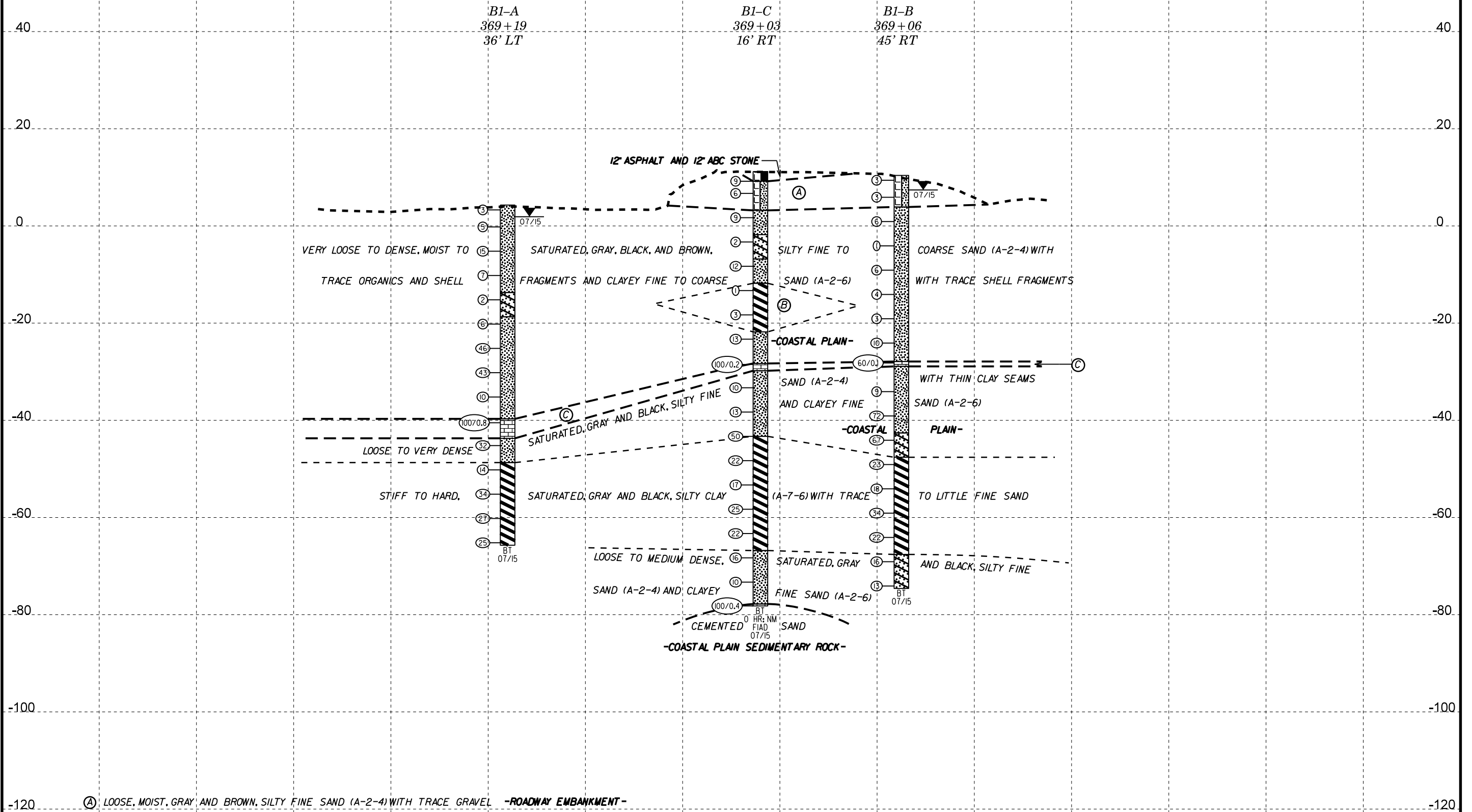
PROJECT REFERENCE NO.	SHEET NO.
R-5021	5
CROSS SECTION THROUGH END BENT 1	



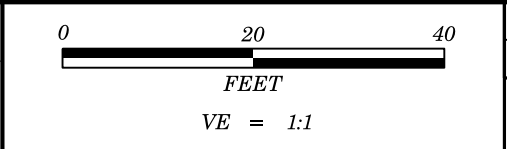
- Ⓐ MEDIUM DENSE, MOIST, GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE TO LITTLE GRAVEL -ROADWAY EMBANKMENT-
- Ⓑ VERY SOFT TO SOFT, WET, GRAY, SILTY FINE SANDY CLAY (A-6) WITH TRACE SHELL FRAGMENTS, INTERLAYERED WITH THIN SEAMS OF SILTY FINE SAND (A-2-4) -COASTAL PLAIN-
- Ⓒ CEMENTED SAND -COASTAL PLAIN SEDIMENTARY ROCK-



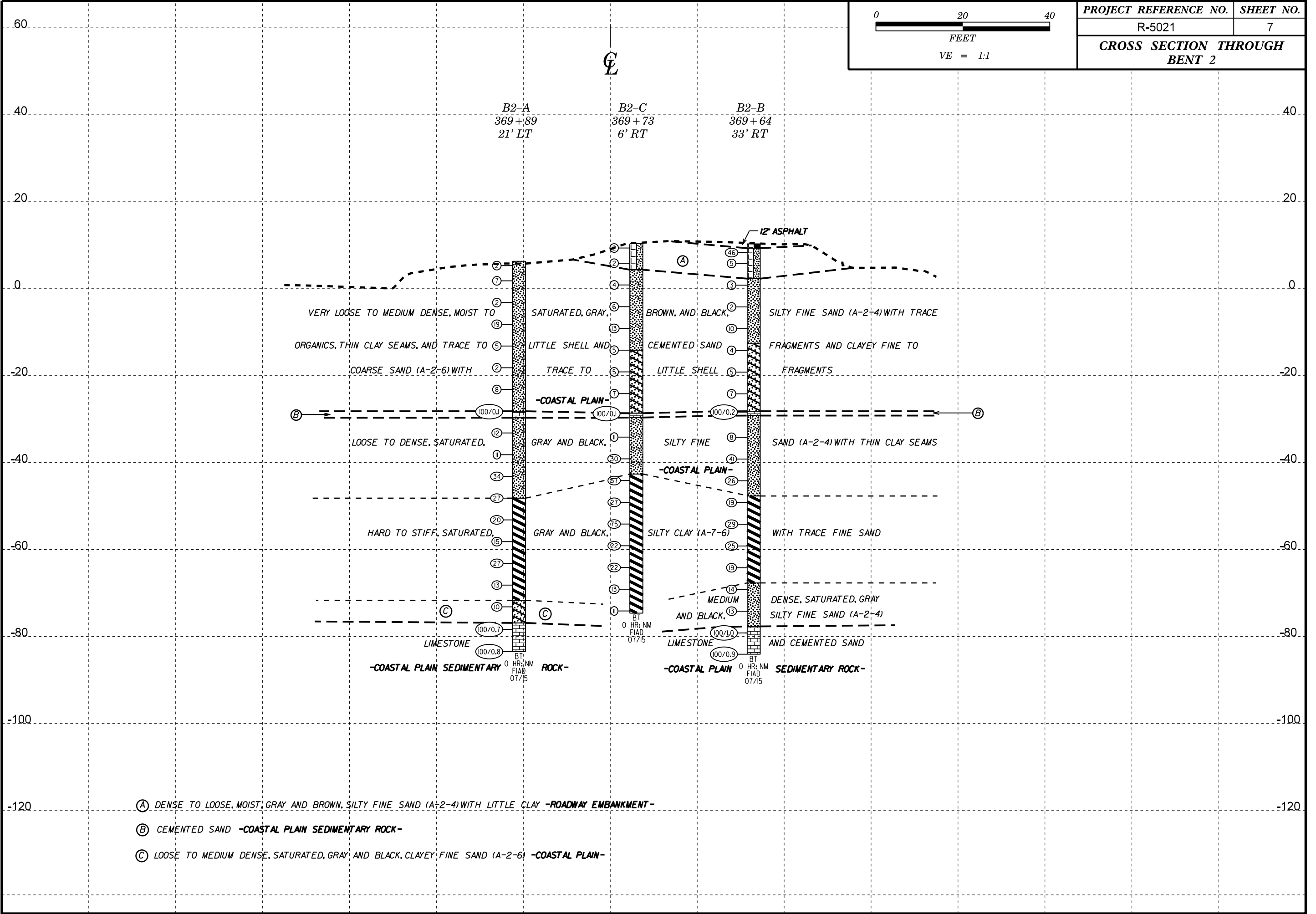
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R-5021	6
<b>CROSS SECTION THROUGH BENT 1</b>	

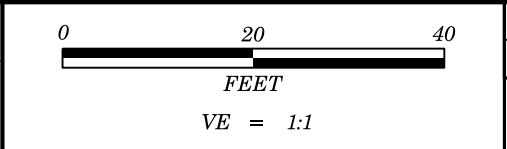


- Ⓐ LOOSE, MOIST, GRAY AND BROWN, SILTY FINE SAND (A-2-4) WITH TRACE GRAVEL -ROADWAY EMBANKMENT-
- Ⓑ VERY SOFT TO SOFT, SATURATED, GRAY, SILTY CLAY (A-7-6) WITH LITTLE FINE SAND AND TRACE SHELL FRAGMENTS -COASTAL PLAIN-
- Ⓒ CEMENTED SAND -COASTAL PLAIN SEDIMENTARY ROCK-

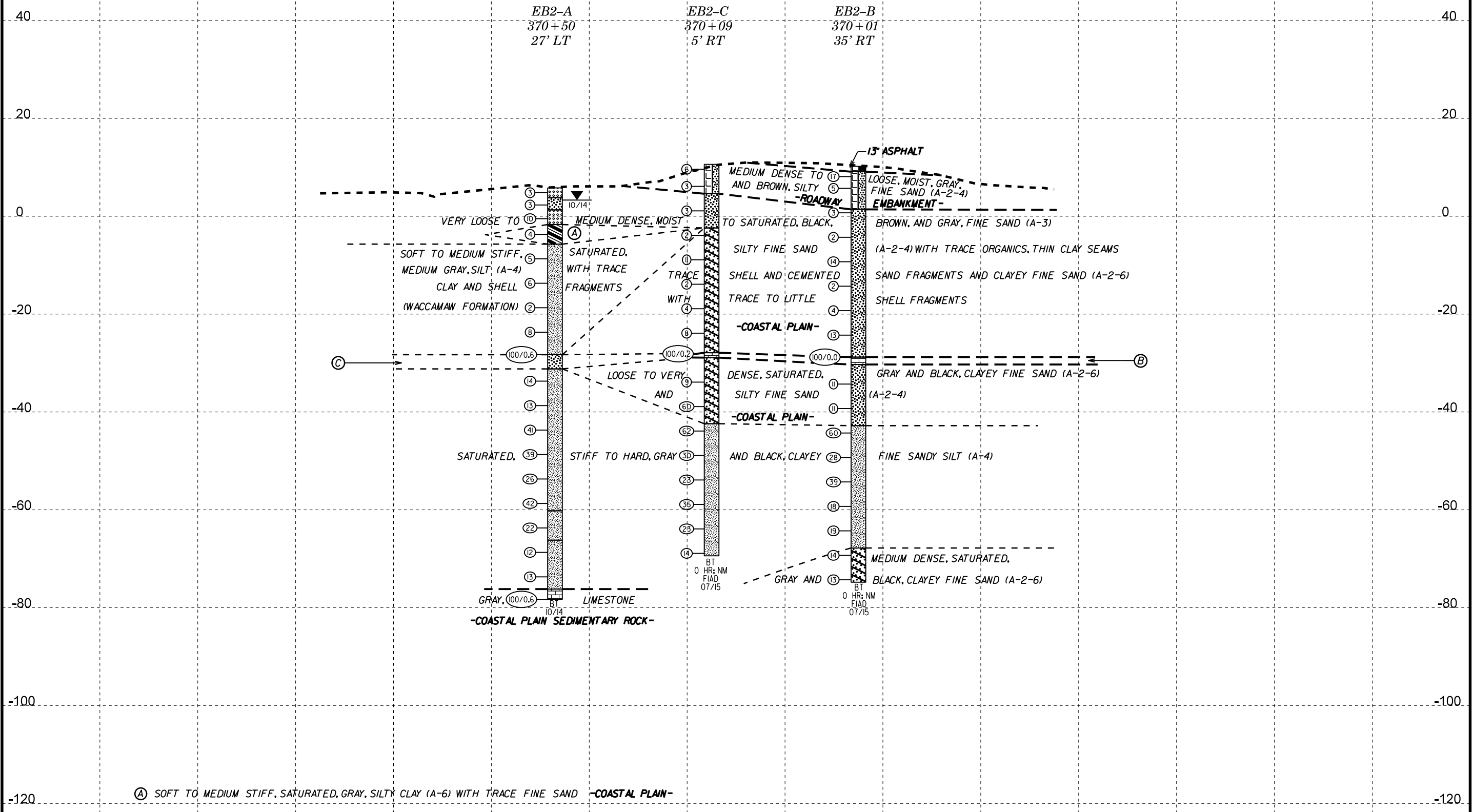


PROJECT REFERENCE NO.	SHEET NO.
R-5021	7
<b>CROSS SECTION THROUGH BENT 2</b>	





PROJECT REFERENCE NO.	SHEET NO.
R-5021	8
<b>CROSS SECTION THROUGH END BENT 2</b>	



- Ⓐ SOFT TO MEDIUM STIFF, SATURATED, GRAY, SILTY CLAY (A-6) WITH TRACE FINE SAND -COASTAL PLAIN-
- Ⓑ GRAY, CEMENTED SAND -COASTAL PLAIN SEDIMENTARY ROCK-
- Ⓒ VERY DENSE, SATURATED, MEDIUM GRAY, SILTY FINE SAND WITH CEMENTED SAND FRAGMENTS -COASTAL PLAIN-



WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG							
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)						
BORING NO. EB1-A		STATION 368+71		OFFSET 33 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 4.3 ft		TOTAL DEPTH 70.0 ft		NORTHING 74,203		EASTING 2,291,626							
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER S. DAVIS		START DATE 07/07/15		COMP. DATE 07/08/15		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			
5	4.3	0.0											GROUND SURFACE 0.0
0	0.8	3.5	4	3	4	7						M	COASTAL PLAIN GRAY AND BLACK, SILTY FINE SAND (A-2-4) WITH TRACE ORGANICS (ROOTS), COARSE SAND AND SHELL FRAGMENTS
			4	4	3							Sat.	
-5	-4.2	8.5	2	3	3	6						Sat.	
-10	-9.2	13.5	2	2	6	8						Sat.	
-15	-14.2	18.5	1	1	1	2						40% W	GRAY, SILTY FINE SANDY CLAY (A-6) WITH TRACE SHELL FRAGMENTS, INTERLAYERED WITH THIN SEAMS OF SILTY FINE SAND (A-2-4)
												66%	
-20	-19.2	23.5	12	14	4	18						Sat.	GRAY, SILTY FINE SAND (A-2-4) WITH TRACE CEMENTED SAND AND SHELL FRAGMENTS
-25	-24.2	28.5	3	5	8	13						Sat.	
-30	-29.2	33.5	60/0.1			60/0.1							COASTAL PLAIN SEDIMENTARY ROCK CEMENTED SAND
													COASTAL PLAIN GRAY AND BLACK, SILTY FINE SAND (A-2-4) WITH THIN CLAY SEAMS
-35	-34.2	38.5	5	7	6	13						Sat.	
-40	-39.2	43.5	4	9	18	27						W	
-45	-44.2	48.5	21	26	30	56						W	GRAY AND BLACK, FINE SANDY SILTY CLAY (A-7-5)
-50	-49.2	53.5	15	10	33	43						SS-18 34%	
-55	-54.2	58.5	18	18	22	40						W	
-60	-59.2	63.5	15	17	19	36						W	
-65	-64.2	68.5	6	8	9	17						W	
													Boring Terminated at Elevation -65.7 ft in CLAY (COASTAL PLAIN)
													Other Samples: ST-1 (17.0 - 19.0) ST-2 (19.0 - 21.0)

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG									
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)								
BORING NO. EB1-C		STATION 368+68		OFFSET 16 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 11.4 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,159		EASTING 2,291,605									
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER S. DAVIS		START DATE 07/13/15		COMP. DATE 07/14/15		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
20															
15															
10	10.5	0.9	8	7	5									11.4	0.0
	7.9	3.5	8	6	8									10.5	0.9
5															
	2.9	8.5	WOH	WOH	1										
0															
	-2.1	13.5	3	3	2										
-5															
	-7.1	18.5	3	2	7										
-10															
	-12.1	23.5	3	2	2										
-15															
	-17.1	28.5	2	2	3										
-20															
	-22.1	33.5	5	4	4										
-25															
	-27.1	38.5	7	100/0.1											
-30															
	-32.1	43.5	6	5	6										
-35															
	-37.1	48.5	5	14	45										
-40															
	-42.1	53.5	60/0.0												
-45															
	-47.1	58.5	9	20	19										
-50															
	-52.1	63.5	6	10	11										
-55															
	-57.1	68.5	16	25	22										
-60															

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG									
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)								
BORING NO. EB1-C		STATION 368+68		OFFSET 16 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 11.4 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,159		EASTING 2,291,605									
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic									
DRILLER S. DAVIS		START DATE 07/13/15		COMP. DATE 07/14/15		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-60															
	-62.1	73.5	7	9	12										
-65															
	-67.1	78.5	7	7	8										
-70															
	-72.1	83.5	4	5	6										

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRD0024.GPJ NC\_DOT.GDT 10/8/15

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)
BORING NO. EB1-B		STATION 368+55		OFFSET 44 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 10.0 ft		TOTAL DEPTH 75.0 ft		NORTHING 74,138		EASTING 2,291,582	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER S. DAVIS		START DATE 07/08/15		COMP. DATE 07/08/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
10	10.0	0.0	1	4	5							M	GROUND SURFACE	0.0
	6.5	3.5	3	2	2							M	ROADWAY EMBANKMENT GRAY AND BROWN, SILTY FINE SAND (A-2-4) WITH TRACE ORGANICS	
5												W	COASTAL PLAIN GRAY AND BROWN, SILTY FINE SAND (A-2-4) WITH TRACE ORGANICS	7.0
	1.5	8.5	1	3	4							Sat.	GRAY, CLAYEY FINE SAND (A-2-6) WITH TRACE COARSE SAND	13.0
0												Sat.	GRAY, SILTY COARSE TO FINE SAND (A-2-4) WITH THIN CLAY SEAMS	18.0
	-3.5	13.5	1	2	6							Sat.	GRAY, CLAYEY FINE SAND (A-2-6) WITH TRACE CEMENTED SAND AND SHELL FRAGMENTS	28.0
-5												Sat.	GRAY, SILTY FINE SAND (A-2-4) WITH TRACE SHELL FRAGMENTS AND CEMENTED SAND	33.0
	-8.5	18.5	4	4	8							Sat.	COASTAL PLAIN SEDIMENTARY ROCK CEMENTED SAND	39.0
-10												Sat.	COASTAL PLAIN GRAY AND BLACK, SILTY FINE SAND (A-2-4)	
	-13.5	23.5	WOH	1	1							Sat.	COASTAL PLAIN SEDIMENTARY ROCK CEMENTED SAND	53.5
-15												Sat.	COASTAL PLAIN GRAY AND BLACK, SILTY CLAY (A-7-6) WITH TRACE FINE SAND	53.8
	-18.5	28.5	1	3	4							Sat.		
-20												Sat.		
	-23.5	33.5	5	7	11							Sat.		
-25												Sat.		
	-28.5	38.5	60/0.0									Sat.		
-30												Sat.		
	-33.5	43.5	2	4	9							Sat.		
-35												Sat.		
	-38.5	48.5	22	29	29							Sat.		
-40												Sat.		
	-43.5	53.5	60/0.1									Sat.		
-45												Sat.		
	-48.5	58.5	8	24	33							Sat.		
-50												Sat.		
	-53.5	63.5	8	11	18							Sat.		
-55												Sat.		
	-58.5	68.5	10	14	17							Sat.		
-60												Sat.		
	-63.5	73.5	6	10	15							Sat.		
-65												Sat.		

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC\_DOT.GDT 10/8/15

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)
BORING NO. B1-A		STATION 369+19		OFFSET 36 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 4.3 ft		TOTAL DEPTH 70.0 ft		NORTHING 74,187		EASTING 2,291,672	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER S. DAVIS		START DATE 07/06/15		COMP. DATE 07/07/15		SURFACE WATER DEPTH N/A	

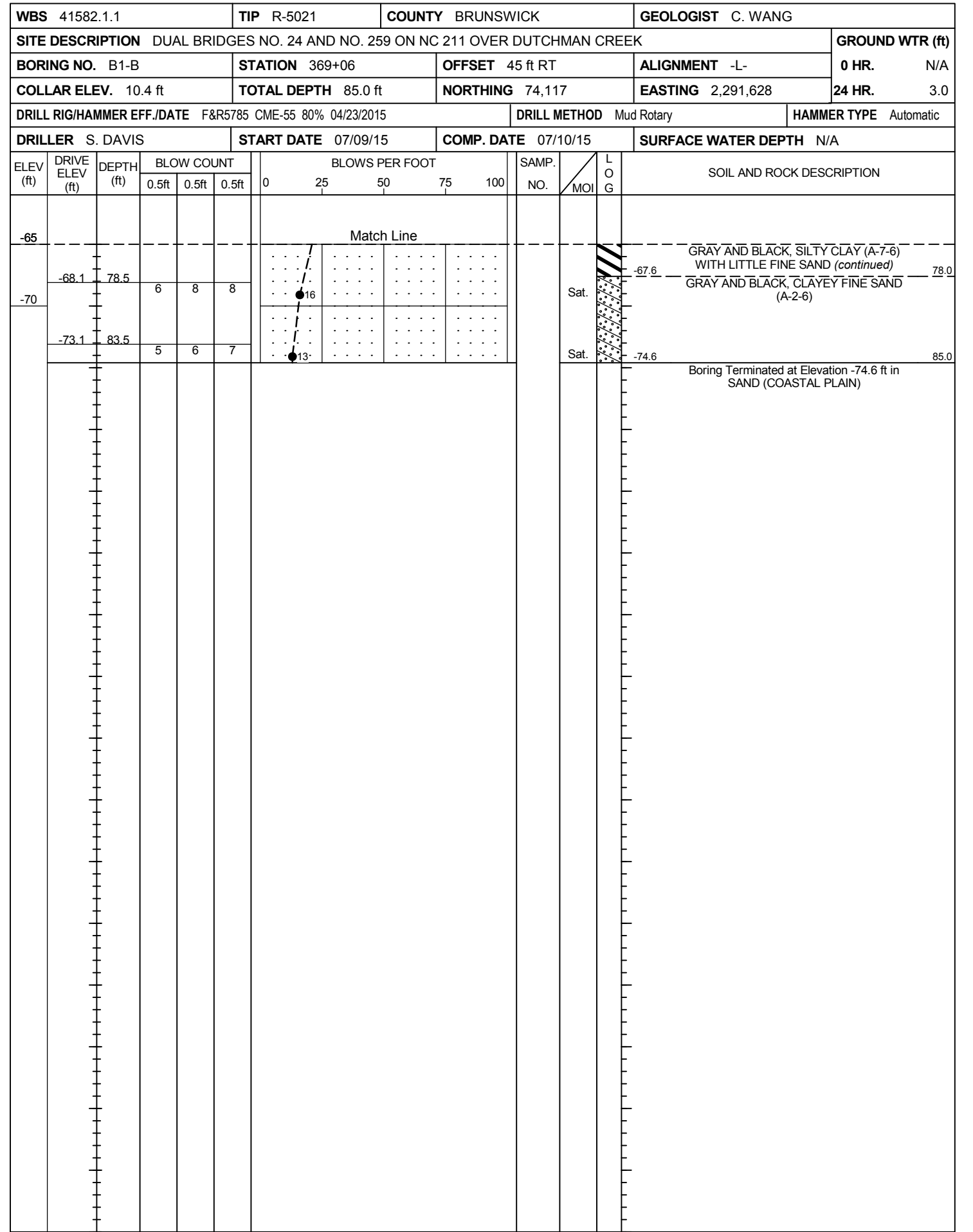
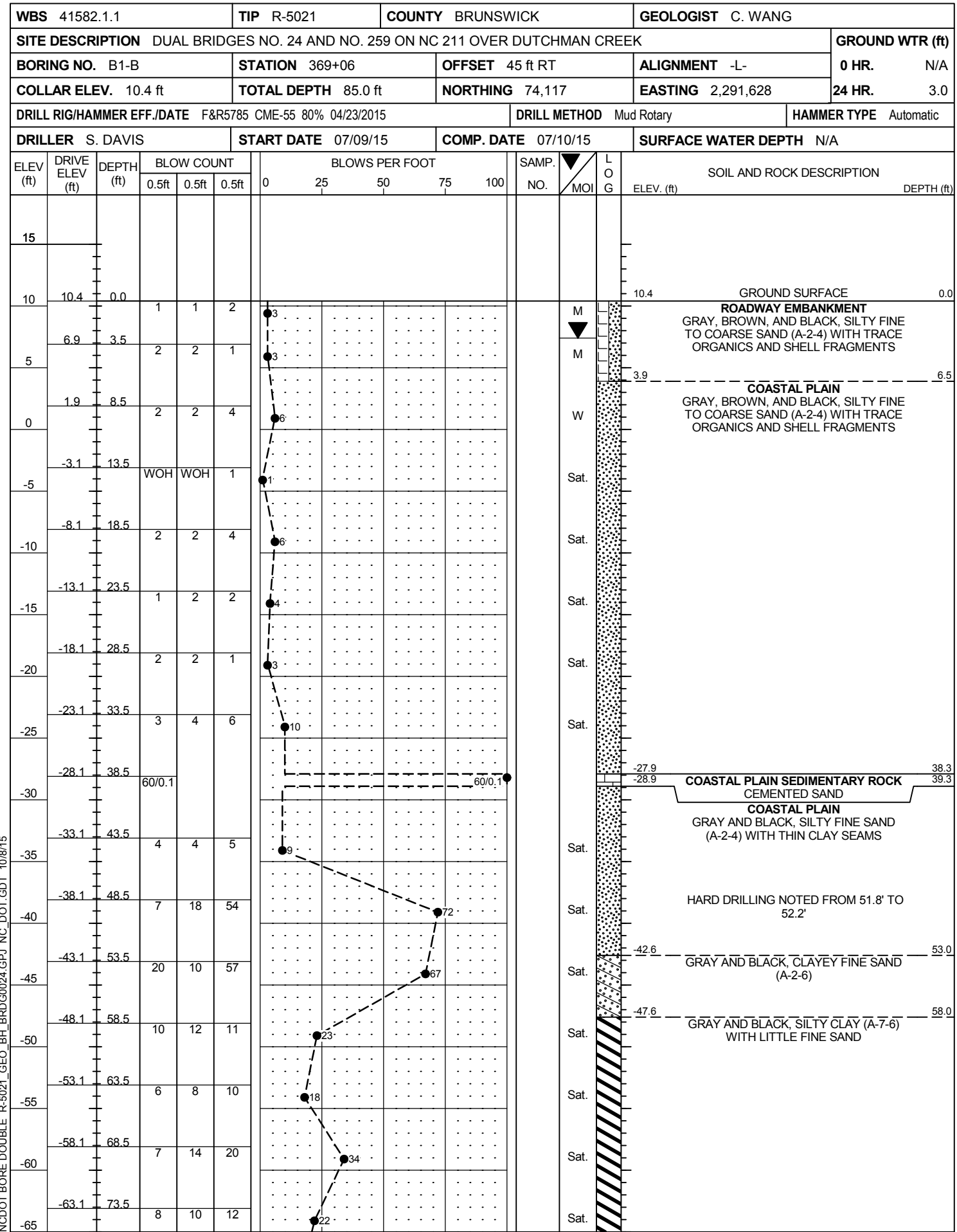
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
5	4.3	0.0	2	1	2							M	GROUND SURFACE	0.0
	0.8	3.5	3	2	3							W	COASTAL PLAIN GRAY AND BLACK, SILTY FINE SAND (A-2-4) WITH TRACE ORGANICS	
0												Sat.	GRAY, CLAYEY FINE TO COARSE SAND (A-2-6) WITH TRACE SHELL FRAGMENTS	18.0
	-4.2	8.5	3	7	8							Sat.	GRAY, SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE SHELL FRAGMENTS AND TRACE TO LITTLE CEMENTED SAND FRAGMENTS	23.0
-5												Sat.		
	-9.2	13.5	2	4	3							Sat.		
-10												Sat.		
	-14.2	18.5	WOH	1	1							Sat.		
-15												Sat.		
	-19.2	23.5	2	3	3							Sat.		
-20												Sat.		
	-24.2	28.5	5	10	36							Sat.		
-25												Sat.		
	-29.2	33.5	37	21	22							Sat.		
-30												Sat.		
	-34.2	38.5	4	4	6							Sat.		
-35												Sat.		
	-39.2	43.5	4	50	50/0.3							Sat.		
-40												Sat.		
	-44.2	48.5	14	14	18							Sat.		
-45												Sat.		
	-49.2	53.5	5	6	8							Sat.		
-50												Sat.		
	-54.2	58.5	8	17	17							Sat.		
-55												Sat.		
	-59.2	63.5	5	11	16							Sat.		
-60												Sat.		
	-64.2	68.5	4	7	18							Sat.		
-65												Sat.		

Boring Terminated at Elevation -65.7 ft in CLAY (COASTAL PLAIN)



# GEOTECHNICAL BORING REPORT

## BORE LOG



NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC\_DOT.GDT 10/8/15

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)
BORING NO. B2-A		STATION 369+89		OFFSET 21 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 6.3 ft		TOTAL DEPTH 89.8 ft		NORTHING 74,145		EASTING 2,291,730	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER S. DAVIS		START DATE 07/21/15		COMP. DATE 07/21/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
15																
10																
5	6.3	0.0	WOH	1	1										6.3	GROUND SURFACE
0	2.8	3.5		3	3	4										
-5	-2.2	8.5		2	1	1										
-10	-7.2	13.5		8	9	10										
-15	-12.2	18.5		2	3	2										
-20	-17.2	23.5	WOH	1	1											
-25	-22.2	28.5		4	4	4										
-30	-27.2	33.5		5	9	100/0.1										
-35	-32.2	38.5		7	6	6										
-40	-37.2	43.5		4	5	6										
-45	-42.2	48.5		12	15	19										
-50	-47.2	53.5		8	10	17										
-55	-52.2	58.5		6	8	12										
-60	-57.2	63.5		6	7	8										
-65	-62.2	68.5		6	11	16										

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)
BORING NO. B2-A		STATION 369+89		OFFSET 21 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 6.3 ft		TOTAL DEPTH 89.8 ft		NORTHING 74,145		EASTING 2,291,730	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER S. DAVIS		START DATE 07/21/15		COMP. DATE 07/21/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65																
-70	-67.2	73.5		6	6	7										
-75	-72.2	78.5		5	5	5										
-80	-77.2	83.5		32	59	41/0.2										
	-82.2	88.5		28	32	68/0.3										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65																
-70	-67.2	73.5		6	6	7										
-75	-72.2	78.5		5	5	5										
-80	-77.2	83.5		32	59	41/0.2										
	-82.2	88.5		28	32	68/0.3										

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC\_DOT.GDT 10/8/15

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK						GROUND WTR (ft)	
BORING NO. B2-C		STATION 369+73		OFFSET 6 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 10.6 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,127		EASTING 2,291,705	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER S. DAVIS		START DATE 07/20/15		COMP. DATE 07/21/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
15															
10	10.6	0.0	WOH	1	1										
5	7.1	3.5	1	1	1										
0	2.1	8.5	WOH	1	3										
-5	-2.9	13.5	1	4	2										
-10	-7.9	18.5	6	5	8										
-15	-12.9	23.5	4	3	2										
-20	-17.9	28.5	1	2	3										
-25	-22.9	33.5	2	3	4										
-30	-27.9	38.5	17	100/0.1											
-35	-32.9	43.5	6	6	5										
-40	-37.9	48.5	6	8	22										
-45	-42.9	53.5	21	20	37										
-50	-47.9	58.5	7	14	13										
-55	-52.9	63.5	23	48	27										
-60	-57.9	68.5	7	8	14										
-65	-62.9	73.5	8	9	13										

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC DOT.GDT 10/8/15

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG	
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK						GROUND WTR (ft)	
BORING NO. B2-C		STATION 369+73		OFFSET 6 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 10.6 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,127		EASTING 2,291,705	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER S. DAVIS		START DATE 07/20/15		COMP. DATE 07/21/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-65															
-70	-67.9	78.5	5	6	7										
-74.4	-72.9	83.5	5	5	6										

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC DOT.GDT 10/8/15

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 41582.1.1	TIP R-5021	COUNTY BRUNSWICK	GEOLOGIST C. WANG		
<b>SITE DESCRIPTION</b> DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK					<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B2-B	<b>STATION</b> 369+64	<b>OFFSET</b> 33 ft RT	<b>ALIGNMENT</b> -L-	<b>0 HR.</b>	N/A
<b>COLLAR ELEV.</b> 10.3 ft	<b>TOTAL DEPTH</b> 94.4 ft	<b>NORTHING</b> 74,106	<b>EASTING</b> 2,291,686	<b>24 HR.</b>	FIAD
<b>DRILL RIG/HAMMER EFF./DATE</b> F&R5785 CME-55 80% 04/23/2015		<b>DRILL METHOD</b> Mud Rotary		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> S. DAVIS		<b>START DATE</b> 07/15/15	<b>COMP. DATE</b> 07/16/15	<b>SURFACE WATER DEPTH</b> 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				ELEV. (ft)	DEPTH (ft)	
15																
10	9.3	1.0														
	6.8	3.5														
5																
	1.8	8.5														
0																
	-3.2	13.5														
-5																
	-8.2	18.5														
-10																
	-13.2	23.5														
-15																
	-18.2	28.5														
-20																
	-23.2	33.5														
-25																
	-28.2	38.5														
-30																
	-33.2	43.5														
-35																
	-38.2	48.5														
-40																
	-43.2	53.5														
-45																
	-48.2	58.5														
-50																
	-53.2	63.5														
-55																
	-58.2	68.5														
-60																
	-63.2	73.5														
-65																

WBS 41582.1.1	TIP R-5021	COUNTY BRUNSWICK	GEOLOGIST C. WANG		
<b>SITE DESCRIPTION</b> DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK					<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B2-B	<b>STATION</b> 369+64	<b>OFFSET</b> 33 ft RT	<b>ALIGNMENT</b> -L-	<b>0 HR.</b>	N/A
<b>COLLAR ELEV.</b> 10.3 ft	<b>TOTAL DEPTH</b> 94.4 ft	<b>NORTHING</b> 74,106	<b>EASTING</b> 2,291,686	<b>24 HR.</b>	FIAD
<b>DRILL RIG/HAMMER EFF./DATE</b> F&R5785 CME-55 80% 04/23/2015		<b>DRILL METHOD</b> Mud Rotary		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> S. DAVIS		<b>START DATE</b> 07/15/15	<b>COMP. DATE</b> 07/16/15	<b>SURFACE WATER DEPTH</b> 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				ELEV. (ft)	DEPTH (ft)	
-65																
	-68.2	78.5														
-70																
	-73.2	83.5														
-75																
	-78.2	88.5														
-80																
	-83.2	93.5														

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC\_DOT.GDT 10/8/15







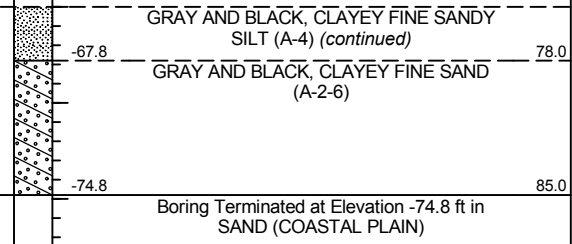
# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG										
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 370+01		OFFSET 35 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 10.2 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,089		EASTING 2,291,719										
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. DAVIS		START DATE 07/16/15		COMP. DATE 07/17/15		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
15																
10	9.1	1.1														
5	6.7	3.5	10	8	9											
0	1.7	8.5	2	2	1											
-5	-3.3	13.5	1	1	1											
-10	-8.3	18.5	3	6	8											
-15	-13.3	23.5	1	1	1											
-20	-18.3	28.5	1	2	2											
-25	-23.3	33.5	5	5	8											
-30	-28.3	38.5	30	100/0.0												
-35	-33.3	43.5	5	5	6											
-40	-38.3	48.5	4	6	5											
-45	-43.3	53.5	10	40	20											
-50	-48.3	58.5	19	13	15											
-55	-53.3	63.5	6	15	24											
-60	-58.3	68.5	5	8	10											
-65	-63.3	73.5	6	9	10											

NCDOT BORE DOUBLE R-5021\_GEO\_BH\_BRDG0024.GPJ NC\_DOT.GDT 10/8/15

WBS 41582.1.1		TIP R-5021		COUNTY BRUNSWICK		GEOLOGIST C. WANG										
SITE DESCRIPTION DUAL BRIDGES NO. 24 AND NO. 259 ON NC 211 OVER DUTCHMAN CREEK							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 370+01		OFFSET 35 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 10.2 ft		TOTAL DEPTH 85.0 ft		NORTHING 74,089		EASTING 2,291,719										
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 04/23/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. DAVIS		START DATE 07/16/15		COMP. DATE 07/17/15		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65																
-70	-68.3	78.5	6	7	7											
	-73.3	83.5	5	6	7											



**North Carolina Department of Transportation  
Division of Highways  
Materials and Test Unit  
Soils Laboratory**

T.I.P. ID NO.: R-5021  
DESCRIPTION: Dual Bridges Nos. 24 and 259 on NC 211 over Dutchman Creek

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: <u>41582.1.1</u>	COUNTY: <u>Brunswick</u>
DATE SAMPLED: <u>7/15</u>	RECEIVED: <u>8/15</u>
SAMPLED FROM: <u>-L-</u>	REPORTED: <u>8/15</u>
SUBMITTED BY: <u>P. Alton, PE</u>	BY: <u>D. Jenks</u> <u>Cert No. 101-02-0603</u>

**TEST RESULTS**

PROJ. SAMPLE NO.	SS-18	ST-2	ST-2	SS-23	SS-81											
BORING NO.	EB1-A	EB1-A	EB1-A	EB1-B	EB2-B											
Retained #4 Sieve %	0.9	0.0	0.0	0.1	0.0											
Passing #10 Sieve %	99.1	99.7	100.0	99.8	100.0											
Passing #40 Sieve %	95.6	98.7	98.2	88.1	97.9											
Passing #200 Sieve %	74.8	16.2	51.5	31.6	71.0											

SOIL MORTAR - 100%																
Coarse Sand Ret - #60 %	5.0	2.7	3.6	29.8	3.2											
Fine Sand Ret - #270 %	33.4	81.6	45.8	40.3	42.3											
Silt 0.053 - 0.010 mm %	26.7	4.5	21.2	9.0	29.9											
Clay < 0.010 mm %	34.9	11.3	29.4	20.9	24.6											
L.L.	57	22	38	24	38											
P.L.	33	NP	19	18	30											
P.I.	24	NP	19	6	8											
AASHTO Classification	A-7-5 (2)	A-2-4 (0)	A-6 (7)	A-2-4 (0)	A-4 (6)											
Station	368+84	368+84	368+84	368+63	370+03											
Offset	37' Lt	37' Lt	37' Lt	40' Rt	47' Rt											
Depth (ft)	53.5	19.5	18.5	23.5	53.5											
to	55.0	20.0	19.0	25.0	55.0											
Moisture Content (%)	34.4	65.8	40.3	40.7	35.5											
Organic Content (%)	NT	NT	NT	NT	NT											

NP=Not plastic  
NT=Not tested  
ND = Not Determined  
CL = Centerline

W.P. Alton, PE  
Soils Engineer

**North Carolina Department of Transportation  
Division of Highways  
Materials and Test Unit  
Soils Laboratory**

T.I.P. ID NO.: R-5021  
DESCRIPTION: NC 211 from west of SR 1500 (Midway Road) to east of NC 87

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: <u>41582.1.1</u>	COUNTY: <u>Brunswick</u>
DATE SAMPLED: <u>10/13/14</u>	RECEIVED: <u>N/A</u>
SAMPLED FROM: <u>-L-</u>	REPORTED: <u>9/30/15</u>
SUBMITTED BY: <u>P. Alton, PE</u>	BY: <u>Catlin</u>

**TEST RESULTS**

PROJ. SAMPLE NO.	SS-13	SS-14	SS-15												
BORING NO.	L_37050	L_37050	L_37050												
	(EB2-A)	(EB2-A)	(EB2-A)												
Retained #4 Sieve %	0.0	0.5	0.0												
Passing #10 Sieve %	100.0	99.2	100.0												
Passing #40 Sieve %	67.0	99.0	99.0												
Passing #200 Sieve %	3.0	48.0	39.0												

SOIL MORTAR - 100%															
Coarse Sand Ret - #60 %	68.3	2.1	1.1												
Fine Sand Ret - #270 %	30.0	50.3	74.2												
Silt 0.053 - 0.010 mm %	1.4	19.8	15.4												
Clay < 0.010 mm %	0.3	27.8	9.4												
L.L.	21	35	28												
P.L.	NP	17	NP												
P.I.	NP	18	NP												
AASHTO Classification	A-3 (0)	A-6 (5)	A-4 (0)												
Station -L-	370+50	370+50	370+50												
Offset	27' Lt.	27' Lt.	27' Lt.												
Depth (ft)	5.3	8.5	33.5												
to	6.8	10.0	34.1												
Moisture Content (%)	28.0	58.0	31.0												
Organic Content (%)	NT	NT	1.1												

NP=Not plastic  
NT=Not tested  
ND = Not Determined  
CL = Centerline