

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	B-5116	1	9

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 42257.1.1 (B-5116) F.A. PROJ. BRZ-1502(2)  
COUNTY BLADEN  
PROJECT DESCRIPTION BRIDGE NO. 150 ON SR 1502 (MELVINS BRIDGE ROAD) OVER SOUTH RIVER OVERFLOW AT -L- STA. 15 + 97

**CONTENTS**

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	BORE LOGS
8	SOIL TEST RESULTS
9	SCOUR REPORT

**CAUTION NOTICE**

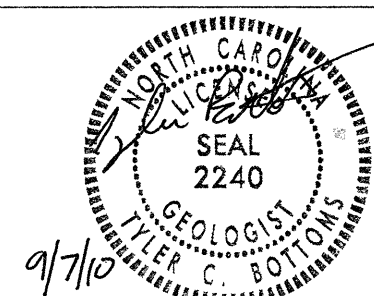
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1909 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PERSONNEL  
J.R. SWARTLEY  
C.M. WRIKE  
R.E. SMITH  
J.M. EDMONDSON

INVESTIGATED BY T.C. BOTTOMS  
CHECKED BY D.N. ARGENBRIGHT  
SUBMITTED BY D.N. ARGENBRIGHT  
DATE SEPTEMBER 2010



**PROJECT: 42257.1.1**  
**ID: B-5116**

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

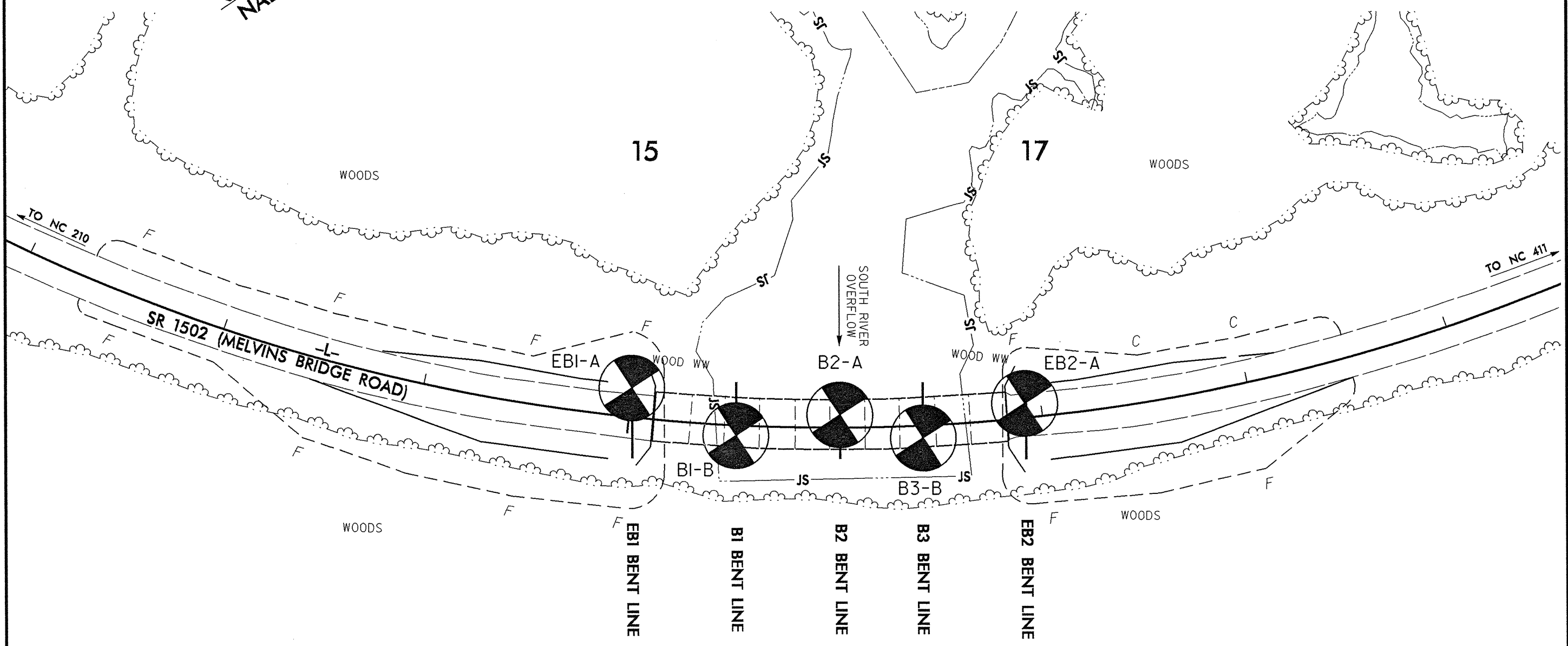
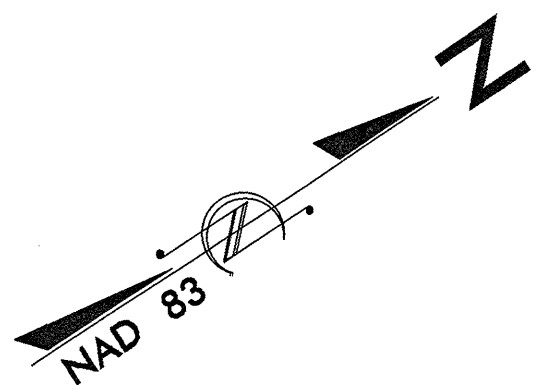
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (ASTM 1206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-5</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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:		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, 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 (SCRC) - 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.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING		ROCK HARDNESS	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		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 YIELD 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.		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 GROUDED 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 GROUDED 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 FINGER NAIL. EXTREMELY INDOURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
COMPRESSION		PERCENTAGE OF MATERIAL		GROUND WATER		MISCELLANEOUS SYMBOLS	
SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		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		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING WITH CORE AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD	
CONSISTENCY OR DENSENESS		TEXTURE OR GRAIN SIZE		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT	
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )		U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053		AR - AUGER REFUSAL MED. - MEDIUM BT - BORING TERMINATED MICA - MICACEOUS CL - CLAY MOD. - MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC CSE. - COARSE ORG. - ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP. - SAPROLITIC e - VOID RATIO SD. - SAND, SANDY F - FINE SL. - SILT, SILTY FOSS. - FOSSILIFEROUS SLI. - SLIGHTLY FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY v - VERY		DRILL UNITS: MOBILE B- BK-51 CME-45B CME-55B PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 6" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 5/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST	
SOIL MOISTURE - CORRELATION OF TERMS		PLASTICITY		FRACTURE SPACING		BEDDING	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL PLASTIC LIMIT WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET		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	
COLOR		INDURATION		BENCH MARK		NOTES	
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDOURATED 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 INDOURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		RR SPIKE IN BASE OF 12" SWEET GUM AT -L- STA. 15+44, 80' LT ELEVATION: 63.52 FT.			

SKEW = 90°



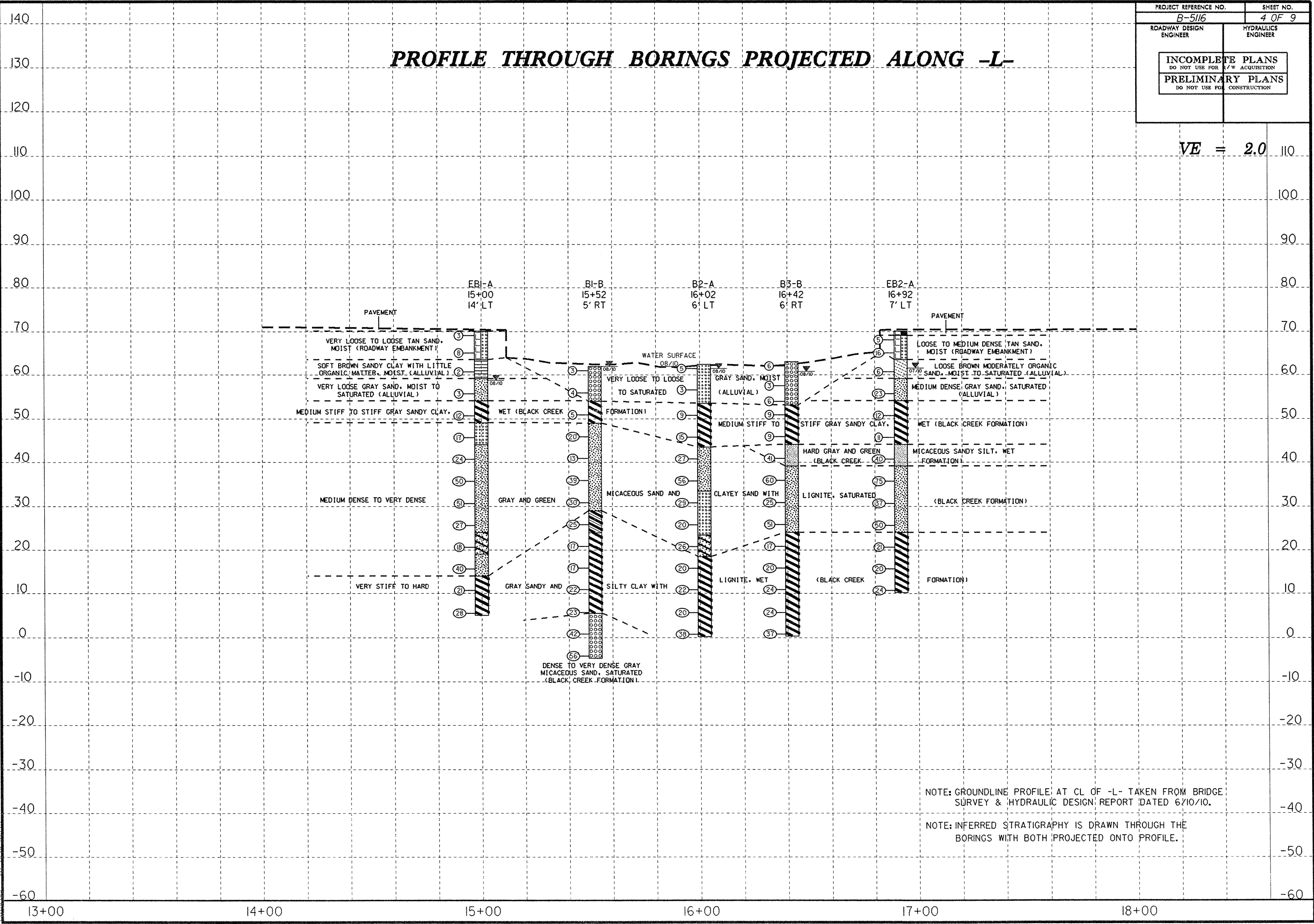
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PROJECT REFERENCE NO. <b>B-5116</b>	SHEET NO. <b>4 OF 9</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.0



NOTE: GROUNDLINE PROFILE AT CL OF -L- TAKEN FROM BRIDGE SURVEY & HYDRAULIC DESIGN REPORT DATED 6/10/10.

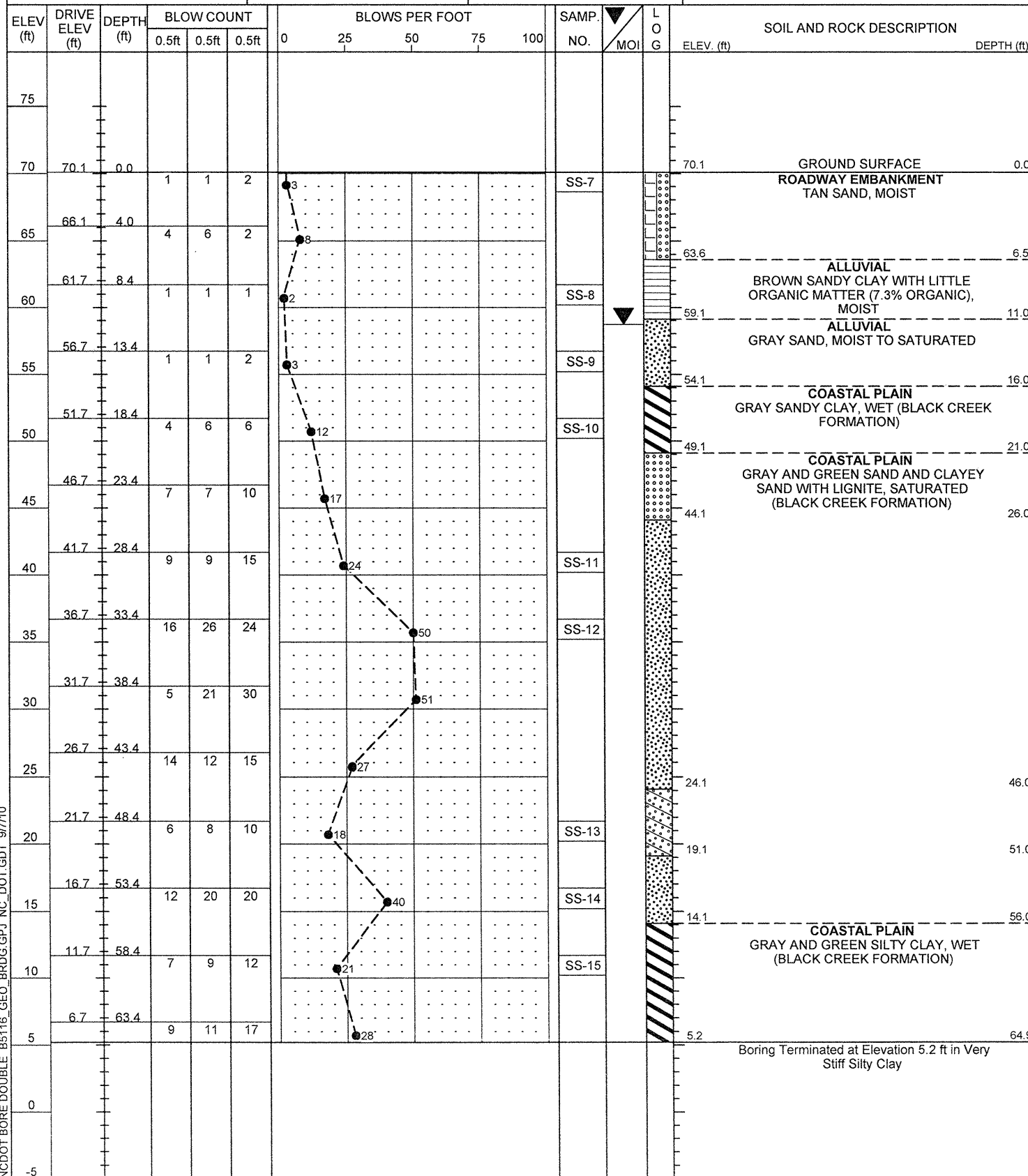
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.



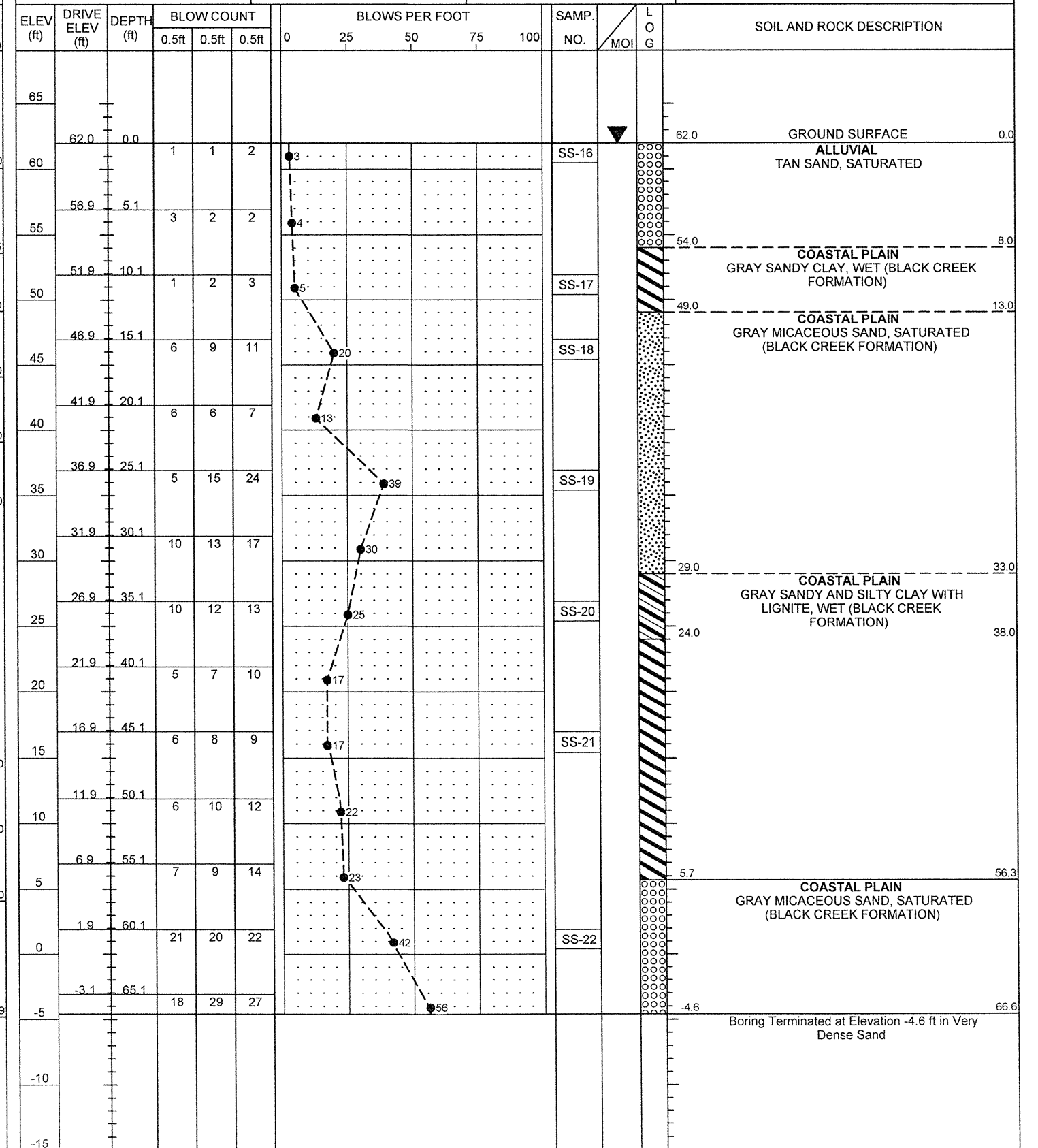
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

PROJECT NO. 42257.1.1	ID. B-5116	COUNTY BLADEN	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW			GROUND WTR (ft)
BORING NO. EB1-A	STATION 15+00	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 70.1 ft	TOTAL DEPTH 64.9 ft	NORTHING 395,096	EASTING 2,154,530
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, R. E.	START DATE 08/03/10	COMP. DATE 08/03/10	SURFACE WATER DEPTH N/A



PROJECT NO. 42257.1.1	ID. B-5116	COUNTY BLADEN	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW			GROUND WTR (ft)
BORING NO. B1-B	STATION 15+52	OFFSET 5 ft RT	ALIGNMENT -L-
COLLAR ELEV. 62.0 ft	TOTAL DEPTH 66.6 ft	NORTHING 395,125	EASTING 2,154,576
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, R. E.	START DATE 08/03/10	COMP. DATE 08/03/10	SURFACE WATER DEPTH N/A

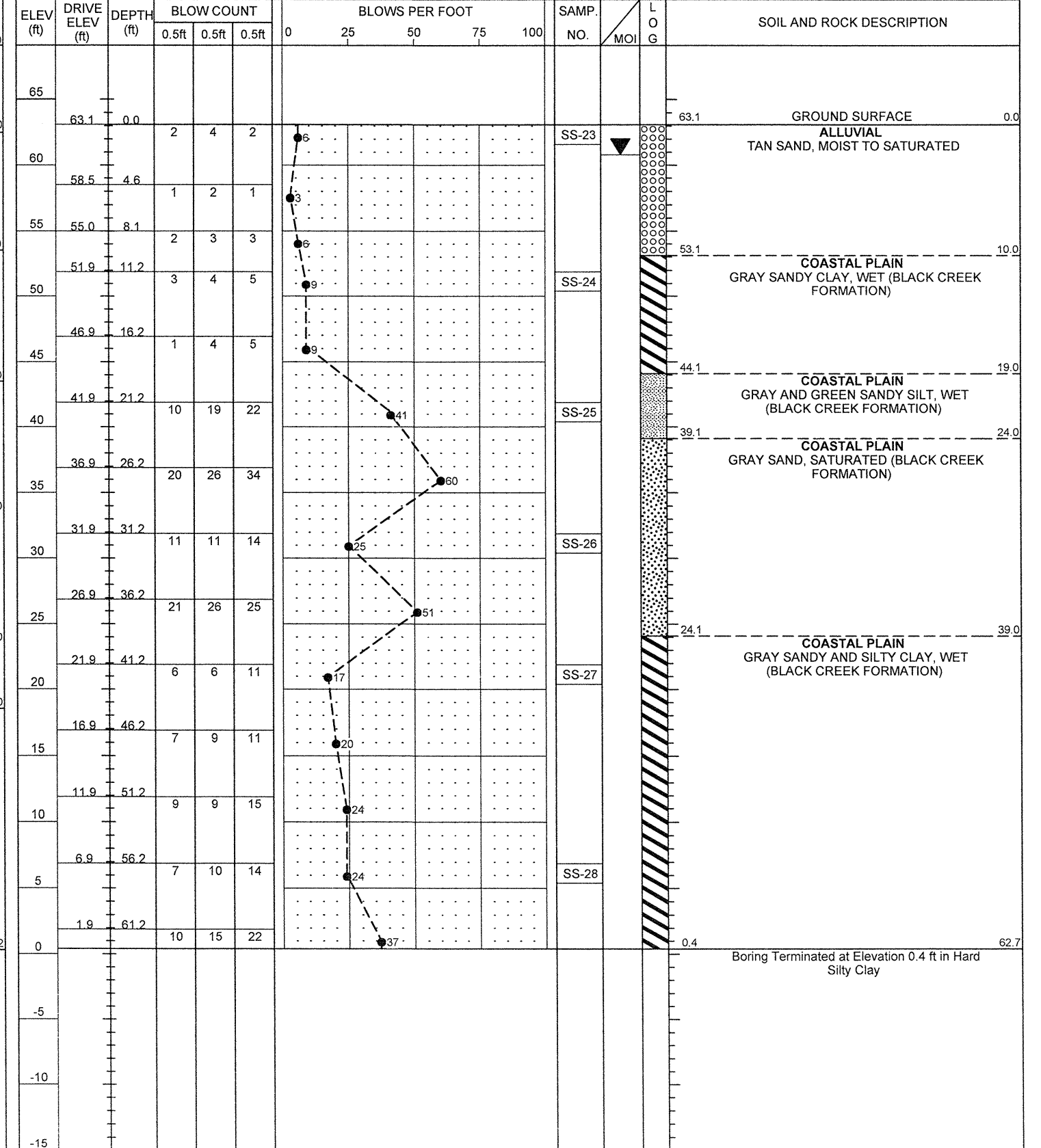
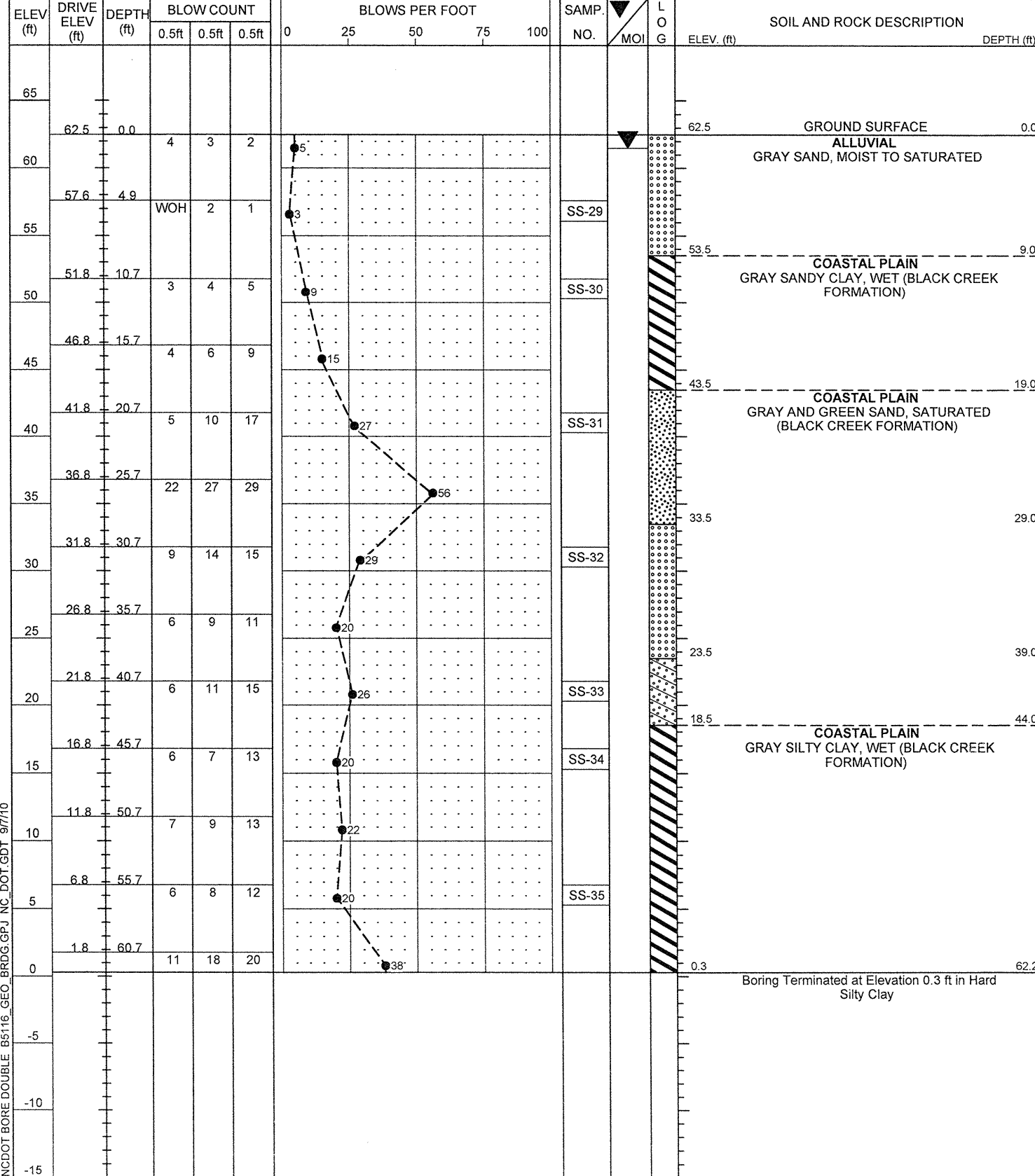


NCDOT BORE DOUBLE B5116\_GEO\_BRDG.GPJ NC\_DOT.GDT 9/7/10



PROJECT NO. 42257.1.1	ID. B-5116	COUNTY BLADEN	GEOLOGIST Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW			GROUND WTR (ft)	
BORING NO. B2-A	STATION 16+02	OFFSET 6 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 62.5 ft	TOTAL DEPTH 62.2 ft	NORTHING 395,172	EASTING 2,154,596	24 HR. 1.0
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic		
DRILLER Smith, R. E.	START DATE 08/05/10	COMP. DATE 08/05/10	SURFACE WATER DEPTH N/A	

PROJECT NO. 42257.1.1	ID. B-5116	COUNTY BLADEN	GEOLOGIST Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW			GROUND WTR (ft)	
BORING NO. B3-B	STATION 16+42	OFFSET 6 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 63.1 ft	TOTAL DEPTH 62.7 ft	NORTHING 395,200	EASTING 2,154,627	24 HR. 2.3
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic		
DRILLER Smith, R. E.	START DATE 08/04/10	COMP. DATE 08/04/10	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE B5116\_GEO\_BRDG.GPJ NC\_DOT\_GDT\_9/7/10

**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 42257.1.1	ID. B-5116	COUNTY BLADEN	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+92	OFFSET 7 ft LT	ALIGNMENT -L-
COLLAR ELEV. 70.1 ft	TOTAL DEPTH 59.9 ft	NORTHING 395,250	EASTING 2,154,640
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, R. E.	START DATE 07/29/10	COMP. DATE 07/29/10	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
75														
70														
69.1	69.1	1.0												GROUND SURFACE 0.0
66.1	66.1	4.0	2	3	2									PAVEMENT 1.0
65														ROADWAY EMBANKMENT TAN SAND, MOIST
63.6														63.6
61.7	61.7	8.4	1	4	12									6.5
60			WOH	2	4									ALLUVIAL BROWN MODERATELY ORGANIC SAND (5.7% ORGANIC), MOIST TO SATURATED
59.1														11.0
56.7	56.7	13.4	6	11	12									ALLUVIAL GRAY SAND, SATURATED
55														59.1
54.1	54.1	18.4	3	5	7									16.0
50														COASTAL PLAIN GRAY SANDY CLAY, WET (BLACK CREEK FORMATION)
46.7	46.7	23.4	4	5	6									54.1
45														44.1
41.7	41.7	28.4	8	19	21									26.0
40														COASTAL PLAIN GRAY AND GREEN MICACEOUS SANDY SILT, WET (BLACK CREEK FORMATION)
39.1	39.1	33.4	17	31	44									31.0
35														COASTAL PLAIN GRAY AND GREEN SAND, SATURATED (BLACK CREEK FORMATION)
31.7	31.7	38.4	10	15	22									39.1
30														24.1
26.7	26.7	43.4	17	30	20									COASTAL PLAIN GRAY SANDY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)
25														46.0
21.7	21.7	48.4	6	9	12									24.1
20														COASTAL PLAIN GRAY SANDY CLAY WITH LIGNITE, WET (BLACK CREEK FORMATION)
16.7	16.7	53.4	6	8	12									20
15														10.2
11.7	11.7	58.4	4	10	14									46.0
10														10.2
														Boring Terminated at Elevation 10.2 ft in Very Stiff Sandy Clay
5														
0														
-5														

NCDOT BORE DOUBLE B5116\_GEO\_BRDG.GPJ NC\_DOT\_GDT 9/7/10

42257.1.1

B-5116

BRIDGE NO. 150 ON SR 1502 (MELVINS BRIDGE ROAD) OVER SOUTH RIVER OVERFLOW AT -L- STA. 15+97

EB1-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	14' LT	15+00	1.0-1.5	A-3(0)	19	NP	50.1	40.3	1.3	8.4	100	84	10	-	-
SS-8	14' LT	15+00	8.4-9.9	A-6(3)	34	12	8.6	45.0	23.4	23.0	98	93	51	-	7.3
SS-9	14' LT	15+00	13.4-14.9	A-2-4(0)	23	NP	14.0	68.2	5.2	12.6	100	99	21	-	-
SS-10	14' LT	15+00	18.4-19.9	A-7-6(36)	62	42	1.5	23.2	20.8	54.5	100	99	82	-	-
SS-11	14' LT	15+00	28.4-29.9	A-2-4(0)	31	9	25.9	49.3	8.1	16.8	100	91	35	-	-
SS-12	14' LT	15+00	33.4-34.9	A-2-4(0)	32	NP	2.5	86.4	5.9	5.2	100	99	31	-	-
SS-13	14' LT	15+00	48.4-49.9	A-2-7(4)	51	36	58.5	14.8	5.8	20.9	99	61	30	-	-
SS-14	14' LT	15+00	53.4-54.9	A-2-4(0)	28	NP	51.9	35.2	8.7	4.2	100	81	19	-	-
SS-15	14' LT	15+00	58.4-59.9	A-7-6(52)	75	55	2.9	18.6	26.1	52.4	100	99	87	-	-

B1-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-16	5' RT	15+52	1.0-1.5	A-1-b(0)	17	NP	75.9	19.0	3.0	2.1	92	44	6	-	-
SS-17	5' RT	15+52	10.1-11.6	A-7-6(29)	58	37	0.6	28.1	21.0	50.3	96	95	77	-	-
SS-18	5' RT	15+52	15.1-16.6	A-2-4(0)	27	NP	2.4	82.5	2.5	12.6	100	99	17	-	-
SS-19	5' RT	15+52	25.1-26.6	A-2-4(0)	26	NP	32.4	55.2	5.1	7.3	100	84	23	-	-
SS-20	5' RT	15+52	35.1-36.6	A-6(6)	39	21	6.8	54.8	11.2	27.2	100	99	49	-	-
SS-21	5' RT	15+52	45.1-46.6	A-7-6(56)	76	55	1.5	13.8	28.2	56.5	100	99	92	-	-
SS-22	5' RT	15+52	60.1-61.6	A-1-b(0)	21	NP	84.5	10.8	0.6	4.1	98	37	6	-	-

B2-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-29	6' LT	16+02	4.9-6.4	A-3(0)	25	NP	82.3	16.7	0.9	0.0	100	65	2	-	-
SS-30	6' LT	16+02	10.7-12.2	A-7-6(29)	54	38	1.9	27.6	20.2	50.3	100	99	78	-	-
SS-31	6' LT	16+02	20.7-22.2	A-2-4(0)	28	NP	21.7	58.0	7.7	12.6	100	93	32	-	-
SS-32	6' LT	16+02	30.7-32.2	A-3(0)	21	NP	67.2	27.9	1.8	3.1	100	74	8	-	-
SS-33	6' LT	16+02	40.7-42.2	A-2-6(1)	35	19	62.6	16.0	5.7	15.7	99	57	24	-	-
SS-34	6' LT	16+02	45.7-47.2	A-7-6(56)	78	59	5.0	15.9	26.7	52.4	100	96	87	-	-
SS-35	6' LT	16+02	55.7-57.2	A-7-6(53)	76	55	4.0	13.2	24.2	58.6	99	97	88	-	-

B3-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-23	6' RT	16+42	1.0-1.5	A-1-b(0)	18	NP	76.6	19.5	0.7	3.1	87	42	5	-	-
SS-24	6' RT	16+42	11.2-12.7	A-7-6(37)	65	48	1.5	28.8	18.8	50.9	100	99	76	-	-
SS-25	6' RT	16+42	21.2-22.7	A-4(0)	33	NP	0.7	82.2	11.8	5.2	100	100	39	-	-
SS-26	6' RT	16+42	31.2-32.7	A-2-4(0)	26	NP	49.6	40.9	4.2	5.2	100	80	16	-	-
SS-27	6' RT	16+42	41.2-42.7	A-7-6(7)	48	33	37.6	25.3	7.7	29.3	99	75	40	-	-
SS-28	6' RT	16+42	56.2-57.7	A-7-6(60)	81	58	1.7	11.1	22.3	64.9	100	99	92	-	-

EB2-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	7' LT	16+92	1.0-2.5	A-3(0)	16	NP	72.6	22.1	2.2	3.1	98	59	7	-	-
SS-2	7' LT	16+92	8.4-9.9	A-2-4(0)	24	7	22.0	46.1	13.1	18.8	99	96	35	22.6	5.7
SS-3	7' LT	16+92	18.4-19.9	A-7-6(21)	49	33	1.3	31.6	19.0	48.2	90	89	70	46.8	-
SS-4	7' LT	16+92	28.4-29.9	A-4(0)	32	NP	1.5	80.5	10.7	7.3	100	99	40	-	-
SS-5	7' LT	16+92	38.4-39.9	A-2-4(0)	25	4	57.1	27.4	5.0	10.5	100	75	21	-	-
SS-6	7' LT	16+92	48.4-49.9	A-7-6(7)	48	31	39.6	20.7	8.3	31.4	98	73	42	-	-





**FIELD  
 SCOUR REPORT**

WBS: 42257.1.1 TIP: B-5116 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 150 ON -L- (SR 1502) OVER SOUTH RIVER OVERFLOW

**EXISTING BRIDGE**

Information from: Field Inspection  Microfilm \_\_\_\_\_ (reel \_\_\_\_\_ pos: \_\_\_\_\_)  
 Other (explain) \_\_\_\_\_

Bridge No.: 150 Length: 170.5' Total Bents: 11 Bents in Channel: 1 Bents in Floodplain: 10  
 Foundation Type: TIMBER PILES

**EVIDENCE OF SCOUR(2)**

Abutments or End Bent Slopes: APPROX. 2' SCOUR AROUND EB1-B

Interior Bents: APPROX. 1-3' SCOUR POCKETS AROUND ALL BENTS

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

**EXISTING SCOUR PROTECTION**

Type(3): WOODEN END SLOPE AND WOODEN WING WALLS

Extent(4): 10 FEET OUTSIDE BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): FALLEN TREES UPSTREAM IN CHANNEL

**INSTRUCTIONS**

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

**DESIGN INFORMATION**

Channel Bed Material(7): SAND

Channel Bank Material(8): SANDY CLAY WITH LITTLE ORGANIC MATTER AND MODERATLEY ORGANIC SAND

Channel Bank Cover(9): TREES AND SHRUBS

Floodplain Width(10): APPROX. 500'+

Floodplain Cover(11): TREES AND SHRUBS

Stream is(12): Aggrading \_\_\_\_\_ Degrading  Static \_\_\_\_\_

Channel Migration Tendency(13): SLIGHT TENDENCY TO MIGRATE SOUTHWEST TOWARD END BENT 1

Observations and Other Comments: \_\_\_\_\_

**DESIGN SCOUR ELEVATIONS(14)**

Feet  Meters \_\_\_\_\_

**BENTS**

B1	B2	B3												
57.5	57	57.8												

Comparison of DSE to Hydraulics Unit theoretical scour:

Design Scour Elevations agree with the Hydraulic Unit's theoretical overtopping scour elevations proposed in the Hydraulics report dated June 10, 2010.

**SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL**

Bed or Bank														
Sample No.														
Retained #4														
Passed #10														
Passed #40														
Passed #200														
Coarse Sand														
Fine Sand														
Silt														
Clay														
LL														
PI														
AASHTO														
Station														
Offset														
Depth														

See Sheet 8,  
 "Soil Test Results",  
 for samples:  
 Channel Bed: SS-16, SS-23, SS-29  
 Channel Bank: SS-2, SS-8

Reported by: Tyler Bottoms

Date: 9/7/2010