

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33615.1.1 (B-4274)	1	8

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33615.1.1 F.A. PROJ. BRSTP-1405(5)
COUNTY SCOTLAND
PROJECT DESCRIPTION BRIDGE 14 ON NC 144 OVER
BIG SHOE HEEL CREEK

SITE DESCRIPTION _____

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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 1910 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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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.

PROJECT: 33615.1.1 ID: B-4274

PERSONNEL

C. C. MURRAY

J. E. ESTEP

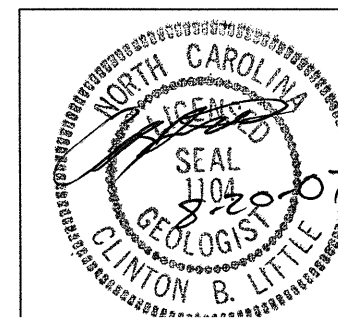
L. N. HARPER

INVESTIGATED BY C. B. LITTLE

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE AUGUST 2007



DRAWN BY: C. E. BURRIS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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

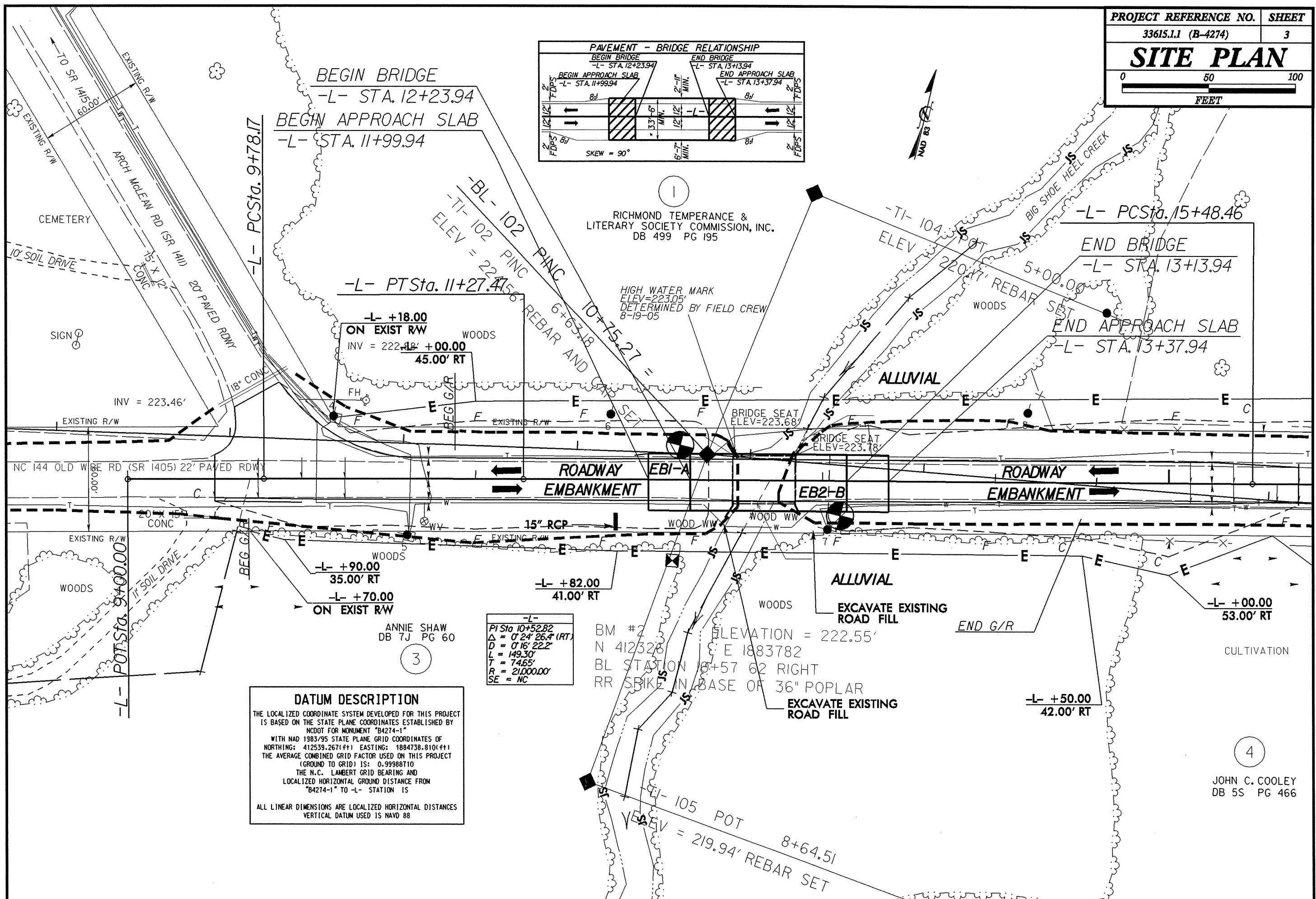
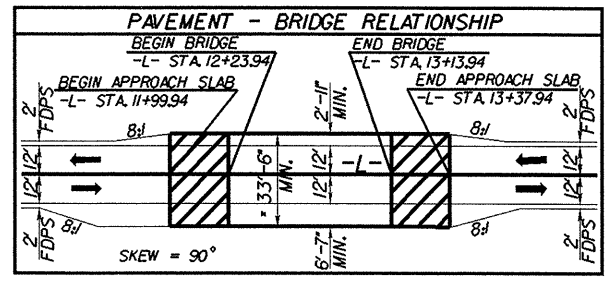
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																																																				
<p>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 (AASHTO T206, 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. EXAMPLES:</p> <p>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p>		<p>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)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>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 SPON 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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (ROQ) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>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.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																				
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td></td> <td></td> </tr> <tr> <th>LIQUID LIMIT</th> <td>≤ 5</td> <td>≤ 10</td> <td>≤ 15</td> <td>≤ 20</td> <td>≤ 25</td> <td>≤ 30</td> <td>≤ 40</td> <td>≤ 40</td> <td>≤ 40</td> <td>≤ 40</td> <td>≤ 40</td> <td></td> <td></td> </tr> <tr> <th>PLASTIC INDEX</th> <td>≤ 4</td> <td>≤ 7</td> <td>≤ 10</td> <td>≤ 12</td> <td>≤ 15</td> <td>≤ 20</td> <td>≤ 25</td> <td>≤ 25</td> <td>≤ 25</td> <td>≤ 25</td> <td>≤ 25</td> <td></td> <td></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>COMPRESSION</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31</p> <p>MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50</p> <p>HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p>		<p>PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p>WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) 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.</p> <p>SLIGHT (SL.) 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.</p> <p>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.</p> <p>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</p> <p>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, YIELDS SPT N VALUES > 100 BPF</p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF</p> <p>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.</p>	
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<p>GROUND WATER</p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p>▽ STATIC WATER LEVEL AFTER 24 HOURS</p> <p>▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p>○ SPRING OR SEEP</p>		<p>MISCELLANEOUS SYMBOLS</p> <p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p>SOUNDING ROD</p> <p>SPT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>SPT N-VALUE</p> <p>SPT REFUSAL</p>		<p>ABBREVIATIONS</p> <p>AR - AUGER REFUSAL</p> <p>BT - BORING TERMINATED</p> <p>CL - CLAY</p> <p>CPT - CONE PENETRATION TEST</p> <p>CSE - COARSE</p> <p>DMT - DILATOMETER TEST</p> <p>DPT - DYNAMIC PENETRATION TEST</p> <p>o - VOID RATIO</p> <p>F - FINE</p> <p>FOSS. - FOSSILIFEROUS</p> <p>FRAC. - FRACTURED, FRACTURES</p> <p>FRAGS. - FRAGMENTS</p> <p>HI. - HIGHLY</p> <p>MED. - MEDIUM</p> <p>MICA - MICA</p> <p>MOD. - MODERATELY</p> <p>NP - NON PLASTIC</p> <p>ORG. - ORGANIC</p> <p>PMT - PRESSUREMETER TEST</p> <p>SAP. - SAPROLITIC</p> <p>SD. - SAND, SANDY</p> <p>SL. - SILT, SILTY</p> <p>SLI. - SLIGHTLY</p> <p>TCR - TRICONE REFUSAL</p> <p>W - MOISTURE CONTENT</p> <p>V - VERY</p> <p>VST - VANE SHEAR TEST</p> <p>WEA. - WEATHERED</p> <p>γ - UNIT WEIGHT</p> <p>γ_d - DRY UNIT WEIGHT</p>																																																																																																																																																						
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RICHMOND TEMPERANCE &
LITERARY SOCIETY COMMISSION, INC.
DB 499 PG 195

HIGH WATER MARK
ELEV=223.05'
DETERMINED BY FIELD CREW
8-19-05

-L- +18.00
ON EXIST R/W
INV = 222.18' +00.00
45.00' RT

-L- +90.00
35.00' RT
-L- +70.00
ON EXIST R/W

-L- +82.00
41.00' RT

-L- +00.00
53.00' RT

-L- +50.00
42.00' RT

-L-
PI Sta 10+52.82
Δ = 0° 24' 26.4" (RT)
D = 0° 16' 22.2"
L = 149.30'
T = 74.65'
R = 21,000.00'
SE = NC

BM #2
N 412328
BL STATION 8+57.62 RIGHT
RR SPIKE IN BASE OF 36" POPLAR
ELEVATION = 222.55'
E 1883782

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4274-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 412539.267(±) EASTING: 1884738.810(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988710 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4274-1" TO -L- STATION IS

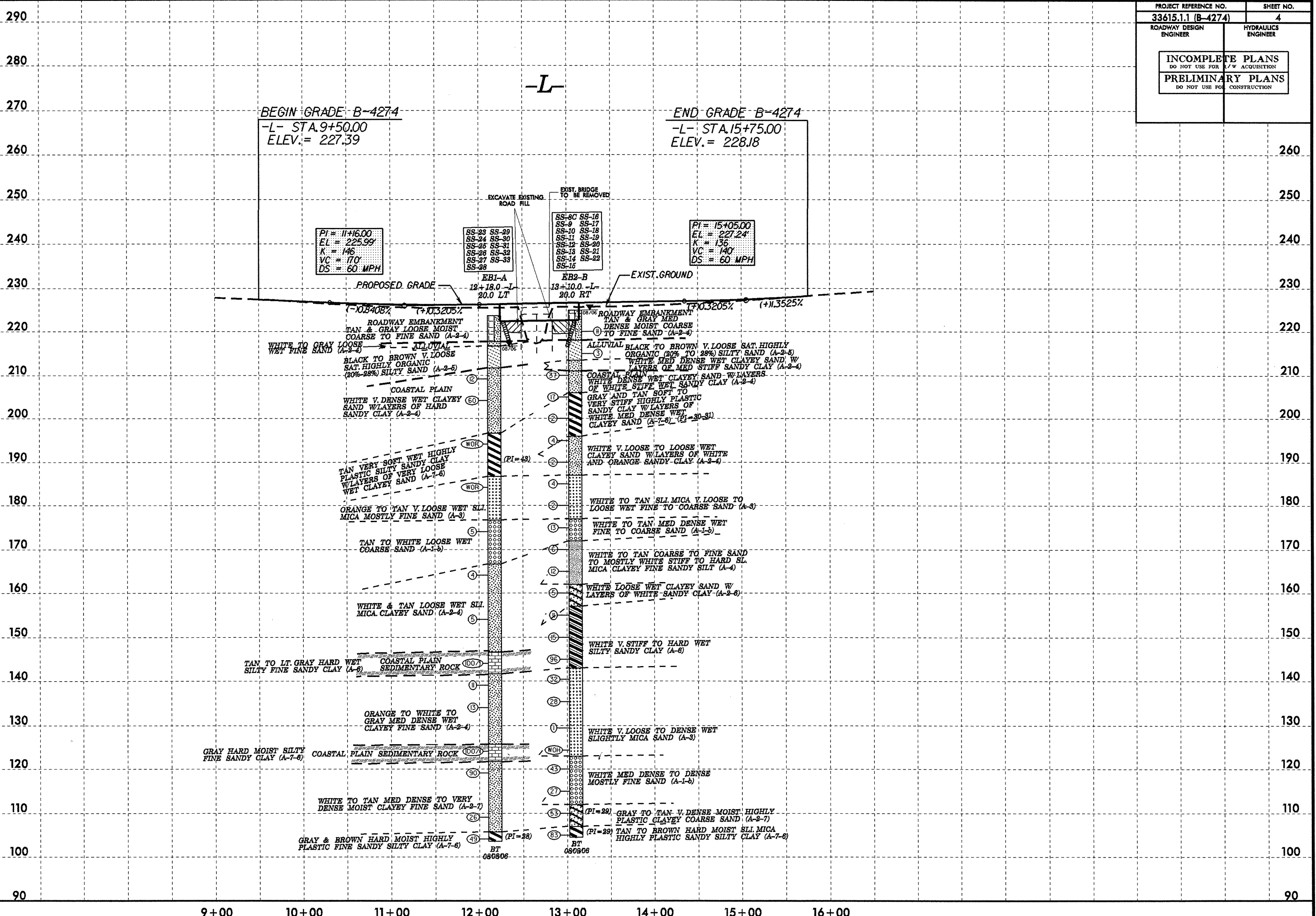
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

ANNIE SHAW
DB 7J PG 60

JOHN C. COOLEY
DB 5S PG 466

5/14/99
 AUG-2007 14:50
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PROJECT REFERENCE NO. 33615.1.1 (B-4274)	SHEET NO. 4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 33615.1.1	ID. B-4274	COUNTY SCOTLAND	GEOLOGIST Murray, C. C.
SITE DESCRIPTION Bridge 14 on NC 144 over Big Shoe Heel Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+18	OFFSET 20ft LT	ALIGNMENT -L-
COLLAR ELEV. 223.7 ft	TOTAL DEPTH 120.1 ft	NORTHING 412,391	EASTING 1,883,771
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 08/09/06	COMP. DATE 08/09/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 77.0 ft

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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				
225												GROUND SURFACE	0.0
												ROADWAY EMBANKMENT	
												Tan & gray loose moist coarse to fine sand (A-2-4)	
												ALLUVIAL	
												White to gray loose wet fine sand (A-2-4)	6.0
												Black to brown v. loose sat. highly organic (20% - 28%) silty sand (A-2-5)	7.0
												COASTAL PLAIN	
												White v. dense wet clayey sand w/ layers of hard sandy clay (A-2-4)	12.0
210.2	13.5	2	4	8									
205.2	18.5	20	25	35									
195.2	28.5	0	0	0									
185.2	38.5	0	0	0									
175.1	48.6	2	2	3									
165.1	58.6	1	2	2									
155.1	68.6	4	3	2									
145.1	78.6												

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				
145												Match Line	
140.1	83.6	6	7	4								COASTAL PLAIN SEDIMENTARY ROCK	
												Tan to lt. gray hard wet silty fine sandy clay (A-6) (continued)	82.0
												Orange to white to gray med. dense wet clayey fine sand (A-2-4)	
135.1	88.6	2	6	7									
125.1	98.6	42	58/5									COASTAL PLAIN SEDIMENTARY ROCK	
												Gray hard moist silty fine sandy clay (A-7-6)	98.0
120.1	103.6	35	42	48								White to tan med dense to v. dense moist clayey fine sand (A-2-7)	102.0
110.1	113.6	11	12	14									
105.1	118.6	13	20	29								Gray & brown hard moist highly plastic (28) fine sandy silty clay (A-7-6)	118.0
												Boring Terminated at Elevation 103.6 ft In hard moist highly plastic (28) sandy silty clay	120.1

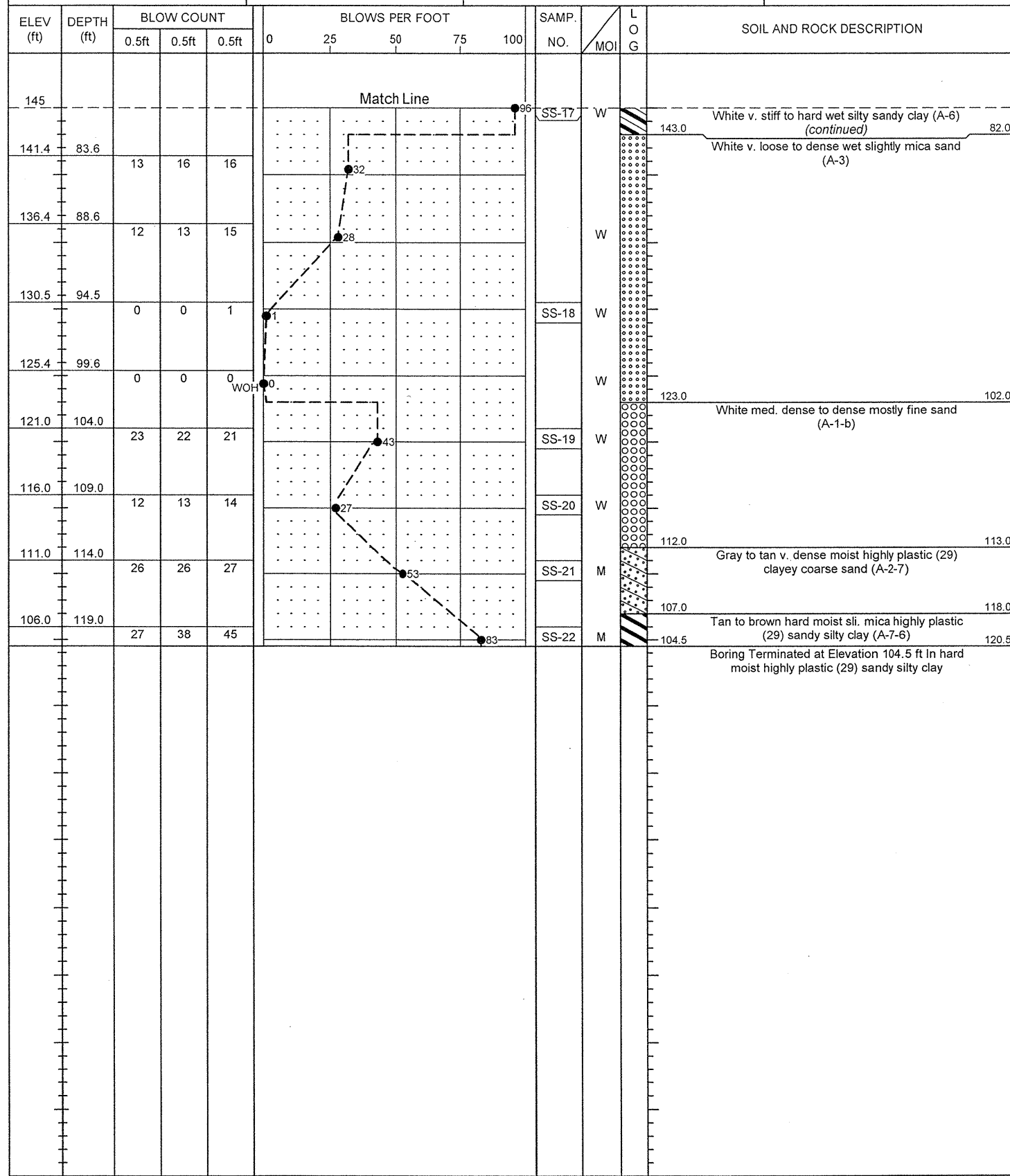
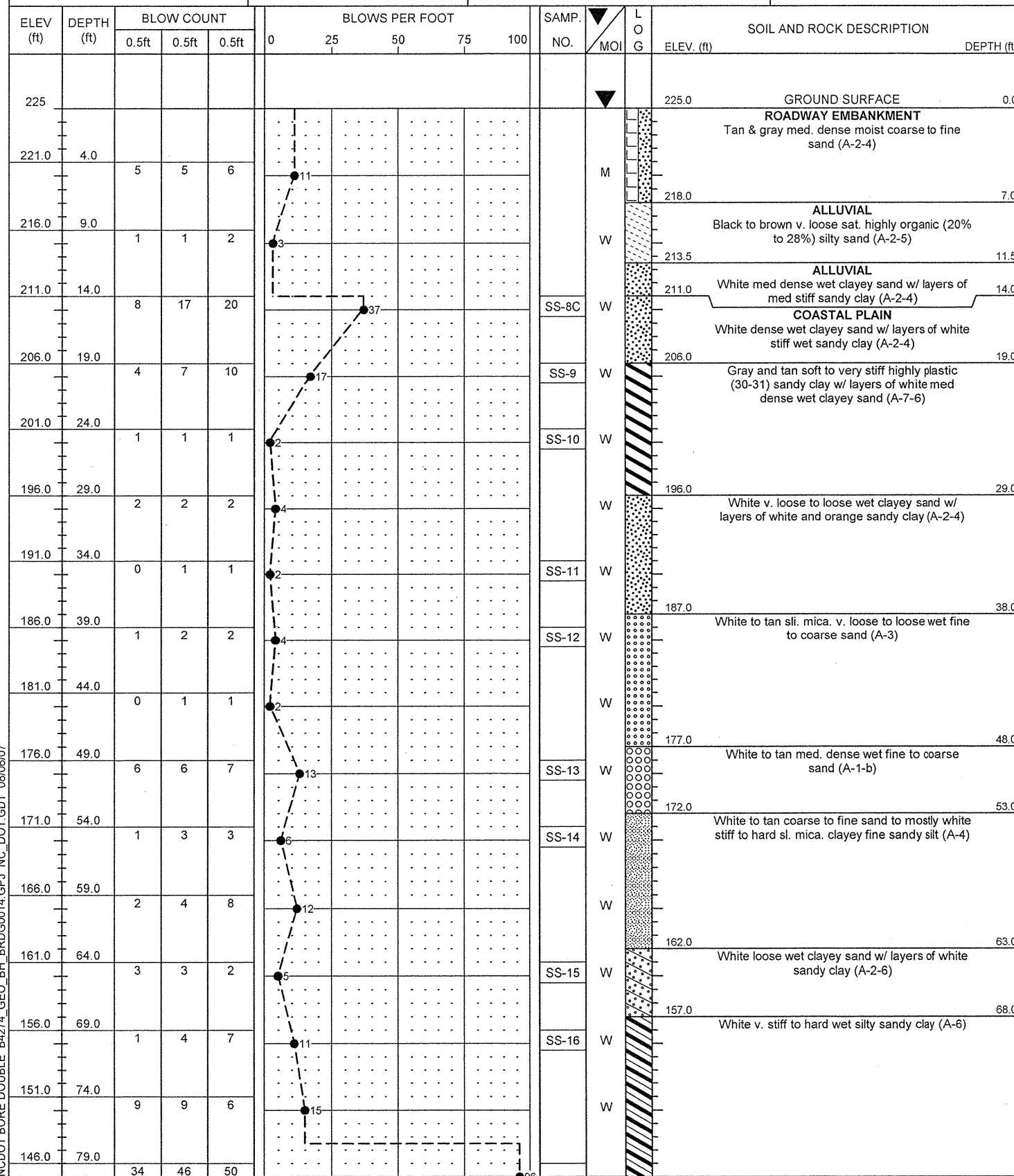
NCDOT BORE DOUBLE B4274_GEO_BH_BRD0014.GPJ NC_DOT_GDT 08/06/07



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 33615.1.1	ID. B-4274	COUNTY SCOTLAND	GEOLOGIST Murray, C. C.
SITE DESCRIPTION Bridge 14 on NC 144 over Big Shoe Heel Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+10	OFFSET 20ft RT	ALIGNMENT -L-
COLLAR ELEV. 225.0 ft	TOTAL DEPTH 120.5 ft	NORTHING 412,374	EASTING 1,883,870
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 08/08/06	COMP. DATE 08/08/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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NCDOT BORE DOUBLE B4274_GEO_BH_BRDG0014.GPJ NC_DOT.GDT 08/08/07

TEST RESULTS

PROJECT: 33615.1.1 B-4274

COUNTY: SCOTLAND

SITE DESCRIPTION: BRIDGE NO. 14 ON NC 144 OVER BIG SHOE HEEL CREEK

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC	UNIT WT. (d)	VOID RATIO
								C. SAND	F. SAND	SILT	CLAY	10	40	200				

EB1-A

SS-23	20 LT	12+18	18.50-20.20	A-2-4(0)	60	20	5	56.0	22.4	4.5	17.1	99	59	25			
SS-24	20 LT	12+18	28.50-30.00	A-7-6(23)	WOR	61	43	18.3	27.6	13.8	40.3	99	88	61			
SS-25	20 LT	12+18	38.50-40.00	A-3(0)	WOR	16	NP	12.9	78.2	1.8	7.0	100	90	10			
SS-26	20 LT	12+18	48.60-50.10	A-1-b(0)	5	20	NP	83.2	12.2	1.6	3.0	99	23	5			
SS-27	20 LT	12+18	58.60-60.10	A-2-4(0)	4	19	NP	73.8	11.6	0.5	14.1	99	54	15			
SS-28	20 LT	12+18	68.60-70.10	A-2-4(0)	5	22	NP	56.5	27.6	1.8	14.1	100	78	17			
SS-29	20 LT	12+18	78.60-80.10	A-6(7)	100	30	15	7.3	36.7	13.8	42.3	100	96	63			
SS-30	20 LT	12+18	83.60-85.10	A-2-4(0)	11	21	NP	8.3	76.7	2.9	12.1	100	99	17			
SS-31	20 LT	12+18	88.60-90.10	A-2-4(0)	13	18	NP	27.2	51.9	7.9	13.1	98	79	25			
SS-32	20 LT	12+18	98.60-100.10	A-7-6(18)	100	42	23	4.6	22.2	18.8	54.4	100	97	81			
SS-33	20 LT	12+18	118.60-120.10	A-7-6(25)	49	47	28	7.0	10.5	18.0	64.5	100	95	86			

EB2-B

SS-8C	20 RT	13+10	14.00-15.50	A-2-4(0)	37	27	10	53.4	22.7	5.8	18.1	99	58	27			
SS-9	20 RT	13+10	19.00-20.50	A-7-6(29)	17	60	31	12.1	5.6	11.8	70.5	100	91	83			
SS-10	20 RT	13+10	24.00-25.50	A-7-6(23)	2	49	30	7.0	21.3	21.2	50.4	100	98	77			
SS-11	20 RT	13+10	29.00-30.50	A-2-4(0)	2	30	10	23.1	53.9	3.9	19.1	95	81	25			
SS-12	20 RT	13+10	39.00-40.50	A-3(0)	4	23	NP	55.7	38.2	1.1	5.0	100	84	7			
SS-13	20 RT	13+00	49.00-50.50	A-1-b(0)	13	25	4	66.8	23.2	1.0	9.1	88	34	10			
SS-14	20 RT	13+10	54.00-55.50	A-4(2)	6	31	8	1.4	58.8	13.6	26.2	100	100	51			
SS-15	20 RT	13+10	64.00-65.50	A-2-6(0)	5	26	11	67.6	13.3	3.0	16.1	97	47	19			
SS-16	20 RT	13+10	69.00-70.50	A-6(3)	11	29	12	35.9	19.7	10.2	34.2	99	77	48			
SS-17	20 RT	13+10	79.00-80.50	A-6(14)	96	35	18	2.6	20.7	24.3	52.4	100	98	85			
SS-18	20 RT	13+10	94.50-96.00	A-3(0)	1	24	NP	48.7	47.2	1.0	3.0	100	83	5			
SS-19	20 RT	13+10	104.00-105.50	A-1-b(0)	43	19	NP	79.2	11.8	1.0	8.1	94	44	9			
SS-20	20 RT	13+10	109.00-110.50	A-1-b(0)	27	20	6	86.5	4.8	0.6	8.1	97	18	9			
SS-21	20 RT	13+10	114.00-115.50	A-2-7(4)	53	48	29	59.8	5.1	0.8	34.2	99	45	35			
SS-22	20 RT	13+10	119.00-120.50	A-7-6(25)	83	47	29	4.6	13.3	19.6	62.4	100	97	86			



**FIELD
 SCOUR REPORT**

WBS: 33615 TIP: B-4274 COUNTY: SCOTLAND

DESCRIPTION(1): BRIDGE 14 ON NC 144 OVER BIG SHOE HEEL CREEK

EXISTING BRIDGE

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

Bridge No.: 14 Length: 36 Total Bents: 3 Bents in Channel: 1 Bents in Floodplain: 2
 Foundation Type: TIMBER PILES

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE

Interior Bents: NONE

Channel Bed: NONE

Channel Bank: NONE

EXISTING SCOUR PROTECTION

Type(3): NONE

Extent(4): _____

Effectiveness(5): _____

Obstructions(6): NONE

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): ORGANIC LOOSE SAND

Channel Bank Material(8): ORGANIC LOOSE SAND

Channel Bank Cover(9): GRASS/WEEDS

Floodplain Width(10): 500'

Floodplain Cover(11): GRASS/WOODS/MARSH

Stream is(12): Aggrading Degrading _____ Static _____

Channel Migration Tendency(13): MINOR

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

CHANNEL	216.5																		

Comparison of DSE to Hydraulics Unit theoretical scour:
 THE DSE IS EQUAL TO THE HYDRAULICS THEORETICAL SCOUR

Reported by: C. LITTLE Date: 8/17/2007

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																				