

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33346.1.1	1	9

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33346.1.1 (B-3911) F.A. PROJ. BRZ-1330(5)
COUNTY SURRY
PROJECT DESCRIPTION BRIDGE 38 OVER SADDLE MOUNTAIN CREEK
ON SR 1330 (HAYSTACK ROAD)

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 (919) 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

STICKNEY

C. SMITH

M. SMITH

WISE

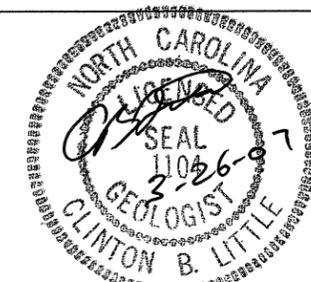
A. SMITH

INVESTIGATED BY STICKNEY

CHECKED BY _____

SUBMITTED BY LITTLE

DATE MARCH 2007



PROJECT: ID: B-3911

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DRAWN BY: McCLURE/LITTLE

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

PROJECT REFERENCE NO. 33346.1.1	SHEET NO. 2
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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. EXAMPLE:</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) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>ANGULARITY OF GRAINS 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 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:</p>		<p>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 DISLOADED 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 (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. 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 INTRODUCED 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 (SCREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROQ) - 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.</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-4, A-5</th> <th>A-6, A-7</th> <th colspan="4"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td colspan="4"></td> </tr> <tr> <th>% PASSING</th> <td>10 40 200</td> <td colspan="4"></td> </tr> <tr> <th>LIQUID LIMIT PLASTIC INDEX</th> <td>6 MX</td> <td>NP</td> <td>40 MX 10 MX</td> <td>41 MN 11 MN</td> <td colspan="4"></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>0 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>16 MX</td> <td>16 MX</td> <td colspan="4"></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>COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th></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 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>			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	<p>WEATHERED ROCK (WR) </p> <p>CRYSTALLINE ROCK (CR) </p> <p>NON-CRYSTALLINE ROCK (NCR) </p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) </p>		<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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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 06, 2007

STATE PROJECT: 33346.1.1 (B-3911)
COUNTY: Surry
DESCRIPTION: Bridge 38 over Saddle Mountain Creek
On SR 1330 (Haystack Road)

PROJECT DESCRIPTION

The project is located in northwestern Surry County, north of Elkin and west of I-77. The proposed structure as investigated is a single span bridge (1@85°) with a width of 38'-1¼" on 60° skew. The attached graphics are from the original roadway design drawings, which show a preliminary bridge design that has subsequently been revised.

The geotechnical field investigation was conducted in May 2006. It consisted of four Standard Penetration Test borings conducted with a CME 550 drill rig using 8" hollow stem augers.

PHYSIOGRAPHY AND GEOLOGY

The project is in the foothills region of North Carolina. Project elevations are in the range of 1325 to 1340. The geology is mapped as Alligator Back Formation gneiss, Zabg, Blue Ridge Belt. No rock core samples were obtained, but the saprolite and weathered rock samples are consistent with gneiss.

Saddle Mountain Creek at the site is about 20 feet wide with a normal flow depth of less than one foot. Per the Hydraulics Unit report, the normal water surface elevation is about 1324.5 with a Q25 elevation of 1332.4 and Q100 of 1334.0. Our field survey put the water surface at 1324.78 on 5-17-06.

The geotechnical test borings encountered alluvial soils, residual soils, and weathered rock. One boring terminated with auger refusal just below the alluvium. The alluvial deposit was eight to ten feet thick and contained loose silty sand, soft sandy silt, and variable layers of dense gravel. The top of residual soil elevation was fairly consistent near elevation 1320. The residual soils were highly variable, with Standard Penetration blow counts from six to 85. All borings encountered weathered rock. Boring EB2-B penetrated weathered rock and terminated in hard sandy silt saprolite. Boring EB2-A refused on crystalline rock. The borings at End Bent One were more consistent.

FOUNDATION MATERIALS

End Bent One: Loose alluvial sand with a basal gravel layer extended from the ground surface (Elev. ±1330) to a depth of 8 to 10' (Elevation 1322 left, 1319 right). Residual soils extended from there down to a depth of 17' to 25' (Elevation 1316-1320) where weathered rock was encountered.

End Bent Two: The stratigraphy at End Bent Two is erratic. The upper 10 feet is alluvial soil. Most of the alluvium is soft sandy silt, but there are layers of dense gravel and cobbles that yielded high SPT blow counts. The base of the alluvium is consistent at elevation ±1319. The left side boring refused on rock at elevation 1316.7. The right side boring penetrated nearly 20 feet of residual soil with blow counts ranging from 4 to 85. Weathered rock was encountered at elevation 1300 in a layer about 3.5 feet thick, underlain by hard sandy silt saprolite. The boring was terminated at a depth of 35.6'.

GROUNDWATER

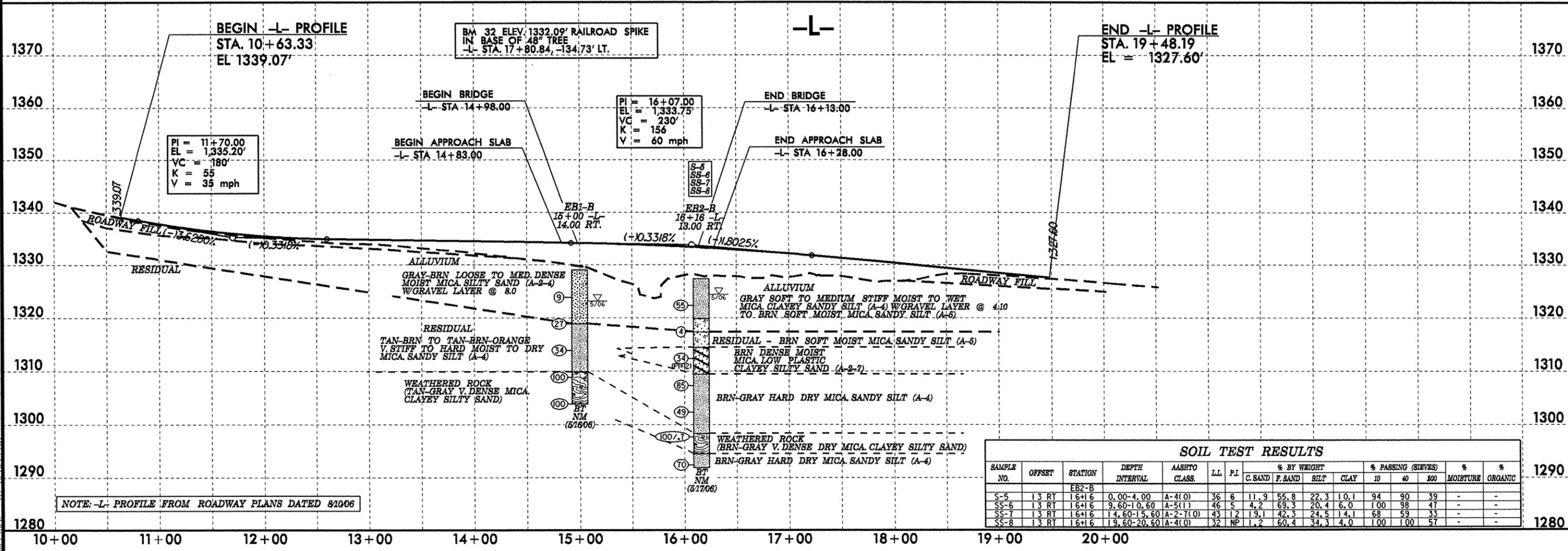
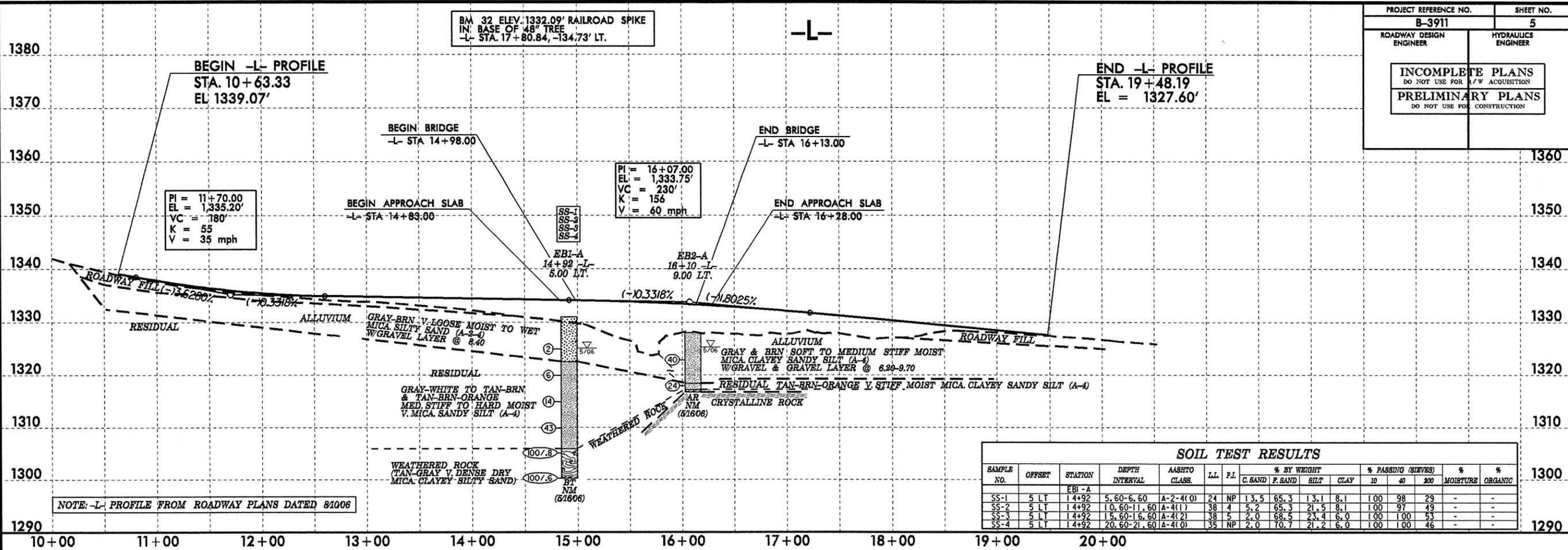
Groundwater was measured immediately after drilling. No 24 hour readings were obtained. Depth to water was about six feet at End Bent One and three feet at End Bent Two. The proposed bents are in the floodplain. These groundwater depths are probably typical, but can be expected to fluctuate and be rainfall dependent.

Respectfully submitted,

Clint Little
Regional Geological Engineer

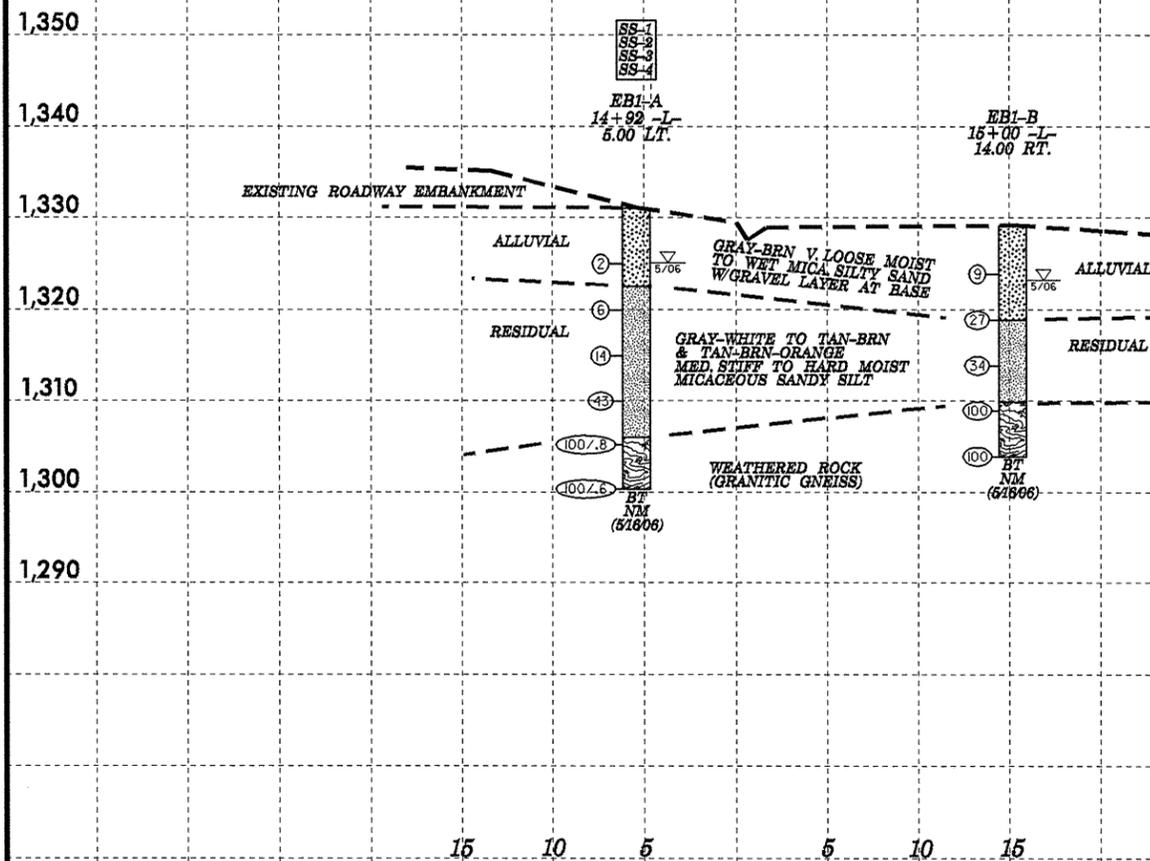
5/28/99

PROJECT REFERENCE NO.		SHEET NO.	
B-3911		5	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

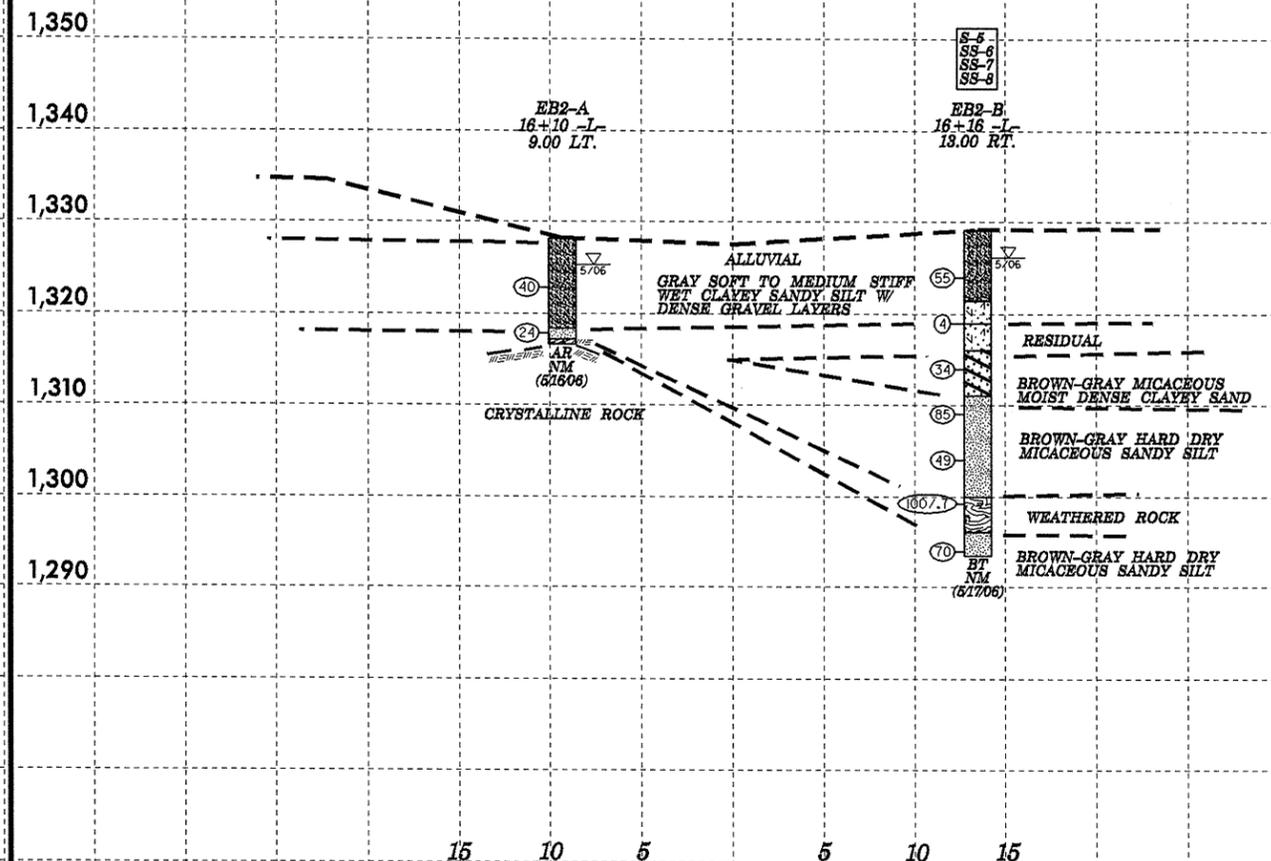


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SECTION THROUGH EB1-A & EB1-B



SECTION THROUGH EB2-A & EB2-B



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33346.1.1		ID B-3911		COUNTY SURRY		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION BRIDGE 38 OVER SADDLE MOUNTAIN CREEK ON SR 1330							GND WATER						
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR 6.00ft							
ALIGNMENT L		BORING LOCATION 14+92.000		OFFSET 5.00ft LT		24 HR N/A							
COLLAR ELEV 1331.01ft		TOTAL DEPTH 30.70ft		START DATE 5/16/06		COMPLETION DATE 05/16/06							
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
1331.01													Ground Surface
	5.10	0	1	1	1.0	2							(ALLUVIUM) GRAY-BRN V. LOOSE MOIST TO WET MICA. SILTY SAND (A-2-4) W/ GRAVEL LAYER @ 8.4
320.00	10.10	3	3	3	1.0	6							(RESIDUAL) GRAY-WHITE TO TAN-BRN & TAN-BRN-ORANGE MED. STIFF TO HARD MOIST V. MICA. SANDY SILT (A-4)
	15.10	4	6	8	1.0	14							
310.00	20.10	19	25	18	1.0	13							
	25.10	25	75		0.8								
300.31	30.10	79	21		0.6								WEATHERED ROCK (TAN-GRAY V. DENSE DRY MICA. CLAYEY SILTY SAND)
TERMINATED BORING AT ELEV. 1300.31 IN WEATHERED ROCK													

PROJECT NO 33346.1.1		ID B-3911		COUNTY SURRY		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION BRIDGE 38 OVER SADDLE MOUNTAIN CREEK ON SR 1330							GND WATER						
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR 5.90ft							
ALIGNMENT L		BORING LOCATION 15+00.000		OFFSET 14.00ft RT		24 HR N/A							
COLLAR ELEV 1329.07ft		TOTAL DEPTH 25.20ft		START DATE 5/16/06		COMPLETION DATE 05/16/06							
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
1329.07													Ground Surface
	4.20	3	4	5	1.0	9							(ALLUVIUM) GRAY-BRN LOOSE TO MED. DENSE MOIST MICA. SILTY SAND (A-2-4) W/ GRAVEL LAYER @ 8.0
1320.00	9.20	8	8	19	1.0	27							(RESIDUAL) TAN-BRN TO TAN-BRN-ORANGE V. STIFF TO HARD MOIST TO DRY MICA. SANDY SILT (A-4)
	14.20	14	16	18	1.0	34							
1310.00	19.20	32	45	55	1.0	100							WEATHERED ROCK (TAN-GRAY V. DENSE MICA. CLAYEY SILTY SAND)
1303.87	24.20	35	65		1.0	100							
TERMINATED BORING AT ELEV. 1303.87 IN WEATHERED ROCK													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33346.1.1		ID B-3911		COUNTY SURRY		GEOLOGIST J.K. STICKNEY						
SITE DESCRIPTION BRIDGE 38 OVER SADDLE MOUNTAIN CREEK ON SR 1330							GND WATER					
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR 2.80ft						
ALIGNMENT L		BORING LOCATION 16+10.000		OFFSET 9.00ft LT		24 HR N/A						
COLLAR ELEV 1328.07ft		TOTAL DEPTH 11.40ft		START DATE 5/16/06		COMPLETION DATE 05/16/06						
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 11.40ft			Log EB2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1328.07												Ground Surface
	4.20	4	15	25	1.0							(ALLUVIUM) GRAY & BRN SOFT TO HARD MOIST MICA. CLAYEY SANDY SILT (A-4) W/ GRAVEL & GRAVEL LAYER @ 6.20-9.70
1320.00	9.20	17	9	15	1.0							
1316.67												AUGER REFUSAL AT ELEV. 1316.67 ON CRYSTALLINE ROCK
												(RESIDUAL) TAN-BRN-ORANGE V. STIFF MOIST MICA. CLAYEY SANDY SILT (A-4)
												WEATHERED ROCK (BRN-GRAY V. DENSE MOIST MICA. CLAYEY SILTY SAND)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33346.1.1		ID B-3911		COUNTY SURRY		GEOLOGIST J.K. STICKNEY						
SITE DESCRIPTION BRIDGE 38 OVER SADDLE MOUNTAIN CREEK ON SR 1330							GND WATER					
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR 3.00ft						
ALIGNMENT L		BORING LOCATION 16+16.000		OFFSET 13.00ft RT		24 HR N/A						
COLLAR ELEV 1327.44ft		TOTAL DEPTH 35.60ft		START DATE 5/16/06		COMPLETION DATE 05/17/06						
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			Log EB2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1327.44												Ground Surface
	4.10	22	38	17	1.0							S-5 M/W (ALLUVIUM) GRAY STIFF TO HARD MOIST TO WET MICA. CLAYEY SANDY SILT (A-4) W/ GRAVEL LAYER @ 4.1
1320.00	9.10	4	2	2	1.0							SS-6 M BRN SOFT MOIST MICA. SANDY SILT (A-5)
	14.10	16	17	17	1.0							(RESIDUAL) BRN SOFT MOIST MICA. SANDY SILT (A-5)
1310.00	19.10	15	40	45	1.0							SS-7 M BRN DENSE MOIST MICA. LOW PLASTIC (PI=12) CLAYEY SILTY SAND (A-2-7)
	24.10	16	26	23	1.0							SS-8 D BRN-GRAY HARD DRY MICA. SANDY SILT (A-4)
1300.00	29.10	30	60	40	0.7							WEATHERED ROCK (BRN-GRAY V. DENSE DRY MICA. CLAYEY SILTY SAND)
1291.84	34.10	5	26	44	1.0							BRN-GRAY HARD DRY MICA. SANDY SILT (A-4)
												TERMINATED BORING AT ELEV. 1291.84 IN HARD MICA. SANDY SILT (A-4)



FIELD SCOUR REPORT

WBS: 33346.1.1 TIP: B-3911 COUNTY: SURRY

DESCRIPTION(1): _____

EXISTING BRIDGE

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

Bridge No.: 38 Length: 46' Total Bents: 2 Bents in Channel: 1 Bents in Floodplain: 1
 Foundation Type: CONCRETE ABUTMENTS

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: MINOR SCOUR OBSERVED AT END BENT TWO

Interior Bents: N/A

Channel Bed: MINOR - ARMORED W/COBBLES

Channel Bank: MINOR EROSION VICINITY END BENT TWO

EXISTING SCOUR PROTECTION

Type(3): NONE

Extent(4): _____

Effectiveness(5): _____

Obstructions(6): NONE OBSERVED

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, GRAVEL, COBBLES, BOULDERS

Channel Bank Material(8): SILTY FINE SAND A-2-4 SAMPLE SS-1

Channel Bank Cover(9): GRASS, SMALL TREES

Floodplain Width(10): 1500' ESTIMATED

Floodplain Cover(11): CROPS (WHEAT)

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): MINOR

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

CHANNEL	EB1	NONE																		
	EB2	NONE																		
		1321																		

Comparison of DSE to Hydraulics Unit theoretical scour:
 THE HYDRAULICS OVERTOPPING CHANNEL SCOUR IS 1321. THIS IS WITHIN THE ALLUVIAL STRATA.
 NO END BENT IMPACT ANTICIPATED.

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																					

Template Revised 02/07/06

Reported by: _____

STICKNEY, LITTLE

Date: 3/6/2007