

PROJECT: 33389.1.1 ID: B-4022

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33389.1.1 I.D. NO. B-4022
F.A. PROJECT BRZ-1414(2)
COUNTY BEAUFORT/PITT
PROJECT DESCRIPTION N/A

SITE DESCRIPTION BRIDGE NO. 90 OVER
TRANTERS CREEK ON SR 1414 (BEAUFORT) &
SR 1556 (PITT)

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4022	1	17
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33389.1.1	BRZ-1414(2)	P.E.	
		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

For Letting

INVESTIGATED BY F&R, Inc. PERSONNEL C. BALDWIN

CHECKED BY E. HOWEY, P.E., L.G. B. MAXSON

SUBMITTED BY F&R, Inc. O. WILSON

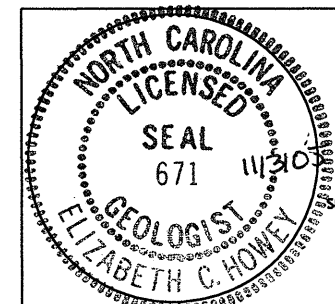
DATE 11/2005 D. RACEY

D. JENKS

DRAWN BY: D. RACEY

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.



Elizabeth C. Howey
SIGNATURE - ELIZABETH C. HOWEY, P.E., L.G.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

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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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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 style="text-align: center;"><i>VERY STIFF, GRM SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></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 style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>	<p>ALLUVIUM (ALLUV.)- SOILS WHICH 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 WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																			
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (75% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (75% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th colspan="2">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> <th></th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SYMBOL</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></td> <td></td> </tr> <tr> <td>% PASSING</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>100</td> <td>100</td> <td>100</td> <td>100</td> </tr> <tr> <td>LIQUID LIMIT INDEX</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>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>GROUP INDEX</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>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. GRAVEL AND SAND</td> <td>FINE SAND</td> <td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILTY SOILS</td> <td colspan="2">SILTY CLAYEY SOILS</td> <td colspan="3">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="3">HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td colspan="7">EXCELLENT TO GOOD</td> <td colspan="4">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> </tr> </table> <p style="text-align: center;">P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (75% PASSING #200)							SILT-CLAY MATERIALS (75% PASSING #200)							ORGANIC MATERIALS			A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7				GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7									SYMBOL															% PASSING	100	100	100	100	100	100	100	100	100	100	100	100	100	100	LIQUID LIMIT INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	GROUP INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		SILTY CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS			GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSATURABLE	<p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 30</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LIQUID LIMIT 31-50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> </table> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.</p> <p> STATIC WATER LEVEL AFTER 24 HOURS.</p> <p> PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA</p> <p> SPRING OR SEEPAGE</p>	SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30	MODERATELY COMPRESSIBLE	LIQUID LIMIT 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	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p style="text-align: center;">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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCKS 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. 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> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROOVED 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.</p> <p>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.</p>
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FROEHLING & ROBERTSON, INC.
 GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
 ENGINEERS • LABORATORIES
 "OVER ONE HUNDRED YEARS OF SERVICE"

310 Hubert St., Raleigh, NC 27603
 Telephone: (919) 828-3441
 Facsimile: (919) 828-5751

November 3, 2005

Mr. Njoroge Wainaina, P.E.
 State Geotechnical Engineer
 North Carolina Department of Transportation
 PO Box 25201
 Raleigh, North Carolina 27611-5201

Re: Bridge Foundation Investigation
 State Project: 33389.1.1
 TIP No.: B-4022
 F.A. Number: BRZ-1414(2)
 County: Beaufort/Pitt
 Description: Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort Co.) and SR 1556 (Pitt Co.)

Dear Mr. Wainaina:

The Raleigh, North Carolina office of Froehling & Robertson, Inc. (F&R) is pleased to submit the accompanying Bridge Foundation Investigation Report. The work was performed in general accordance with F&R's Proposal 0666-103G dated September 29, 2005. Please contact us at your earliest convenience to discuss any comments regarding this report or our services in general.

Sincerely,

Christopher R. Baldwin
 Christopher R. Baldwin
 Staff Geologist

Elizabeth C. Howey
 Elizabeth C. Howey, L.G., P.E. 11/3/05
 Project Geotechnical Engineer



SITE DESCRIPTION

The existing structure is 175 feet long and consists of 5 spans, each 35 feet in length. The original bridge contains a steel plank floor and timber piles, but additional foundations have apparently been added which consist of steel piles on steel beams that extend out from the existing bridge deck (see attached site photos). The replacement structure will be a 220 foot long box beam bridge containing 4 spans of 50, 60, 60, and 50 feet with a proposed skew angle of 90 degrees.

METHOD OF EXPLORATION

A subsurface investigation was conducted in October, 2005. Five borings were advanced at the site, one boring at each proposed bent location to depths ranging from 70.0 to 82.5 feet. The borings were advanced with a CME-550 drill rig with a 140-pound automatic hammer utilizing mud rotary drilling techniques. Standard penetration tests (SPT) were performed, in general accordance with ASTM D-1586, at all boring locations to aid in foundation analysis. Representative soil samples were obtained for visual classification in the field and returned to our office for potential laboratory analysis. Ten samples were selected and subjected to grain size, Atterberg Limits, and natural moisture content testing in accordance with AASHTO T-87, T-88, T-89, and T-90, as modified by NCDOT. Two samples of the alluvial strata obtained were subjected to grain size analysis; the grain size curves are attached. One Shelby tube was obtained within the area of Hydraulic Scour and provided to NCDOT for Erosion Function Apparatus (EFA) testing.

Elevations were surveyed using Benchmark #1, described as "Railroad spike set in 36" oak, 106 feet right of -BL- Station 12+18, and 121 feet right of -L- Station 16+78" with an elevation of 14.87 feet. However, it should be noted that the benchmark was actually located in a pine tree rather than an oak tree as stated above.



GEOLOGY

Based on review of the *Geologic Map of North Carolina* (1985), the project site is situated in the Coastal Plain Physiographic Province of North Carolina. More specifically, the project site is located in an area mapped as Tertiary Age deposits of the Yorktown Formation (Tpy) described in the area north of the Neuse River as bluish gray "fossiliferous clay with varying amounts of fine-grained sand." The Coastal Plain samples recovered in our borings exhibited the characteristics of the Yorktown Formation as described above.

STRATIGRAPHY

Existing roadway embankment was encountered at the ground surface in the borings advanced at the end bent locations. The embankment extends to a depth of approximately 13.5 feet (elevation 6.4 to 6.5 feet) and consists of very loose to loose, fine to coarse sand (A-2-4) and medium stiff to stiff, fine to coarse sandy clay (A-6). Beneath the embankment and at the ground surface at the interior bent boring locations, the borings encountered alluvial soil consisting of loose to medium dense, fine to coarse sand (A-2-4, A-3) and very soft to soft, fine sandy and silty clay (A-6, A-7-6) with organics. Muck and wood were encountered in boring B3-B from the ground surface to a depth of 7.5 feet. The alluvium extends to depths of 6.0 to 23.5 feet (elevation -9.4 to 1.5 feet) in borings advanced across the site. The alluvium is underlain by Coastal Plain deposits of the Yorktown Formation consisting of soft to very stiff, fine to coarse sandy clay (A-6), loose to very dense, fine to coarse sand (A-2-4, A-1-b), and cemented sandstone. The Coastal Plain deposits generally contain shell fragments. The top of cemented sand layer was encountered consistently between elevation -28.9 to -34.1 feet in four of the five borings advanced at the site. The thickness of the cemented sand layer ranged from 1.5 to 6 feet in our borings.



GROUND WATER

Ground water measurements were not taken immediately after drilling due to the mud rotary drilling techniques utilized. Ground water was measured in the end bent borings after a stabilization period of 24 hours; water levels were measured at elevations of 3.9 to 8.0 feet. The normal water surface elevation of Tranters Creek is shown at elevation 10.5 feet in the Bridge Survey and Hydraulic Design Report dated 11/1/04. The water surface of Tranters Creek was measured at elevation 9.8 feet during our field investigation

NOTES TO THE DESIGNER

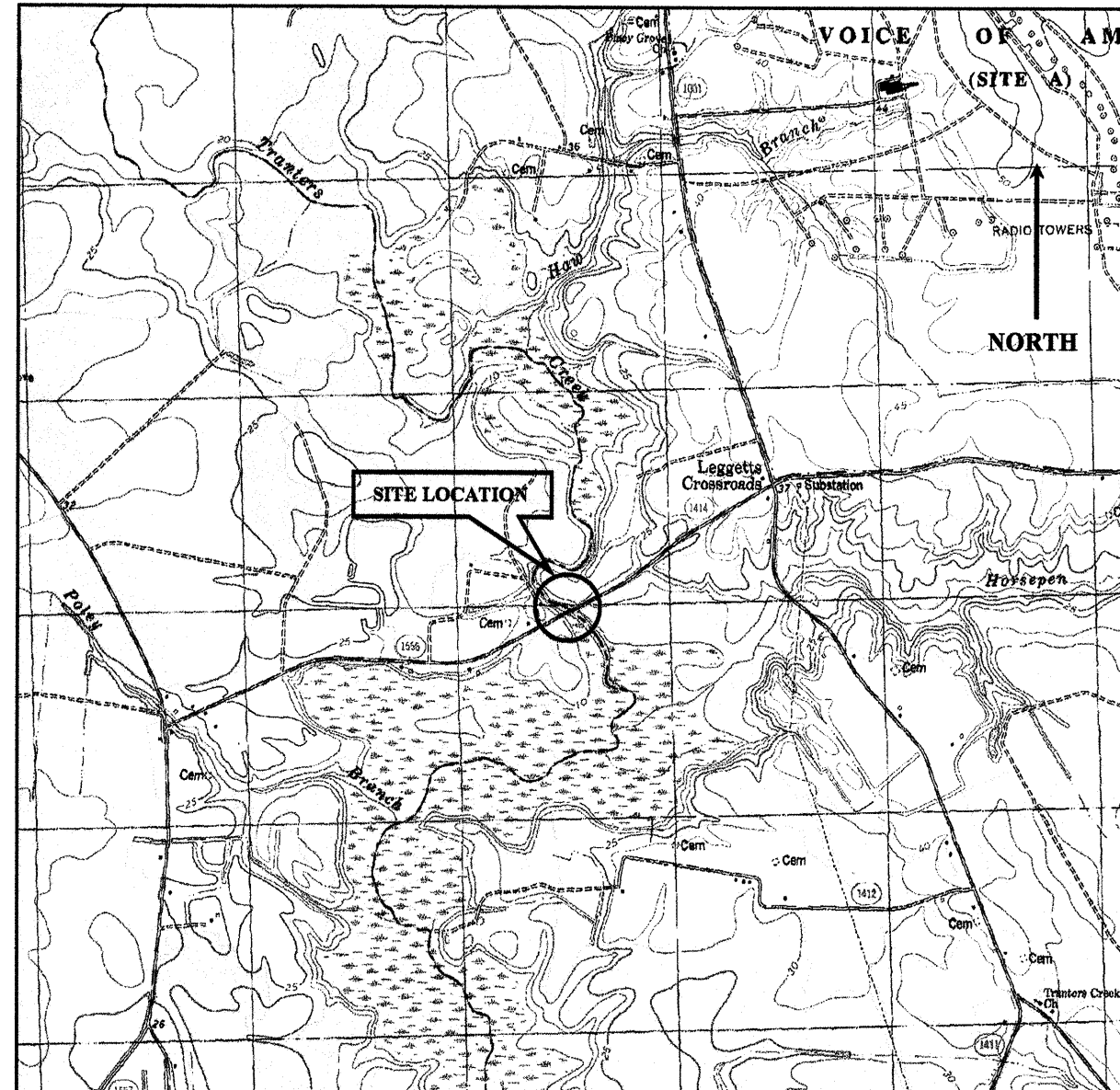
A layer of cemented sandstone (with SPT \geq 100 BPF) was encountered consistently across the site near elevation -30 feet in all borings except EB1-A, where a very dense sand was encountered near that elevation.

QUALIFICATIONS OF REPORT

This report has been prepared for the exclusive use of the North Carolina Department of Transportation and their assignees for specific application to the referenced property in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. The conclusions provided in this report do not reflect variations in subsurface conditions, which could exist intermediate of the boring locations, or in unexplored areas of the site. Should such variations become apparent during construction, we reserve the right to re-evaluate our conclusions based upon an on-site observation of the conditions. In the event that changes are made in the proposed construction plans, the findings presented in this report shall not be considered valid unless reviewed by our firm and conclusions of this report modified or verified in writing.



FIGURE 1



SITE LOCATION PLAN

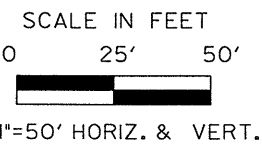
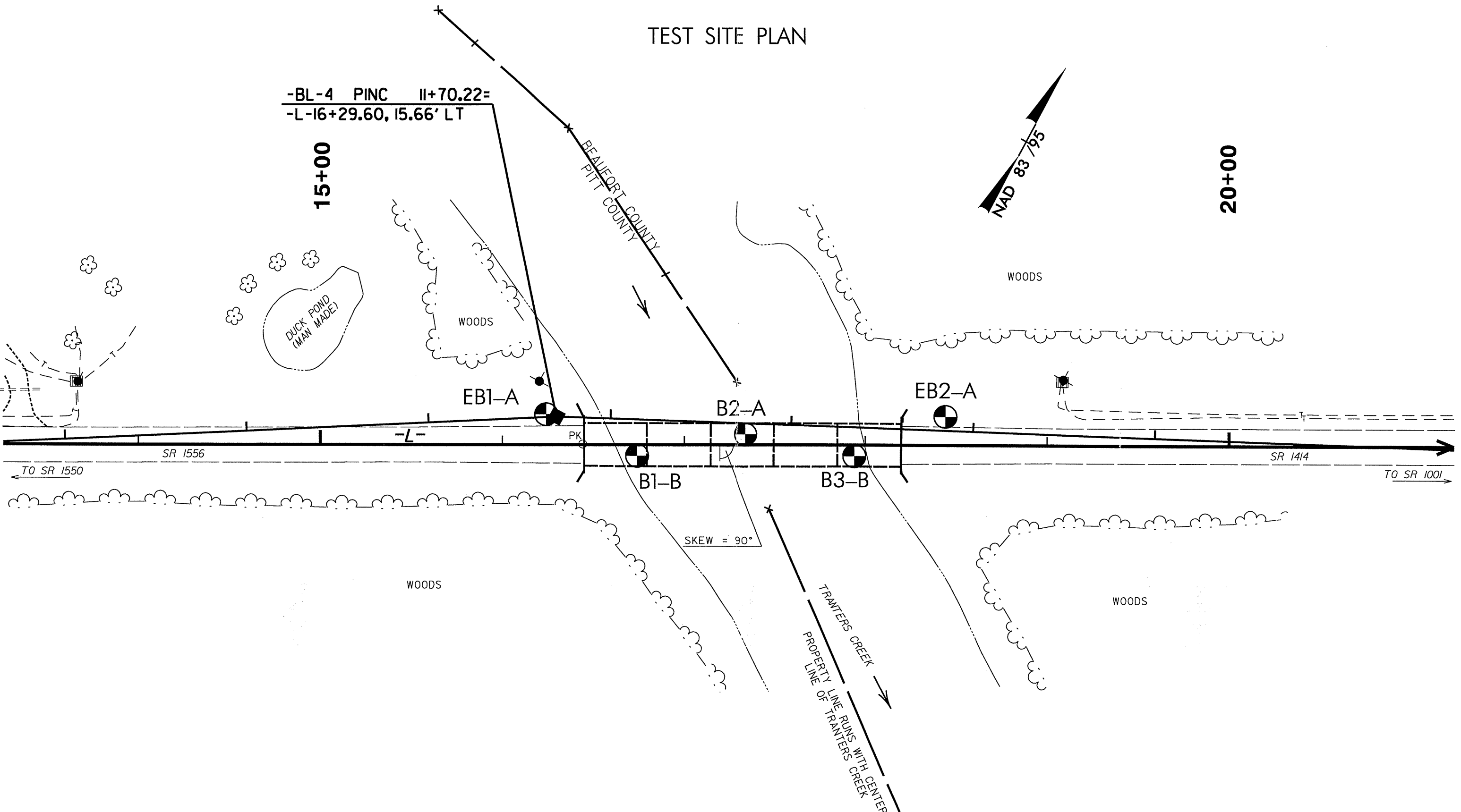
Adapted from a USGS Quadrangle 7.5 min. Topographic Map of Leggetts Crossroads, North Carolina, dated 1980. Scale 1"=2000' (approx.)

TEST SITE PLAN

-BL-4 PINC II+70.22=
-L-16+29.60, 15.66' LT

15+00

20+00

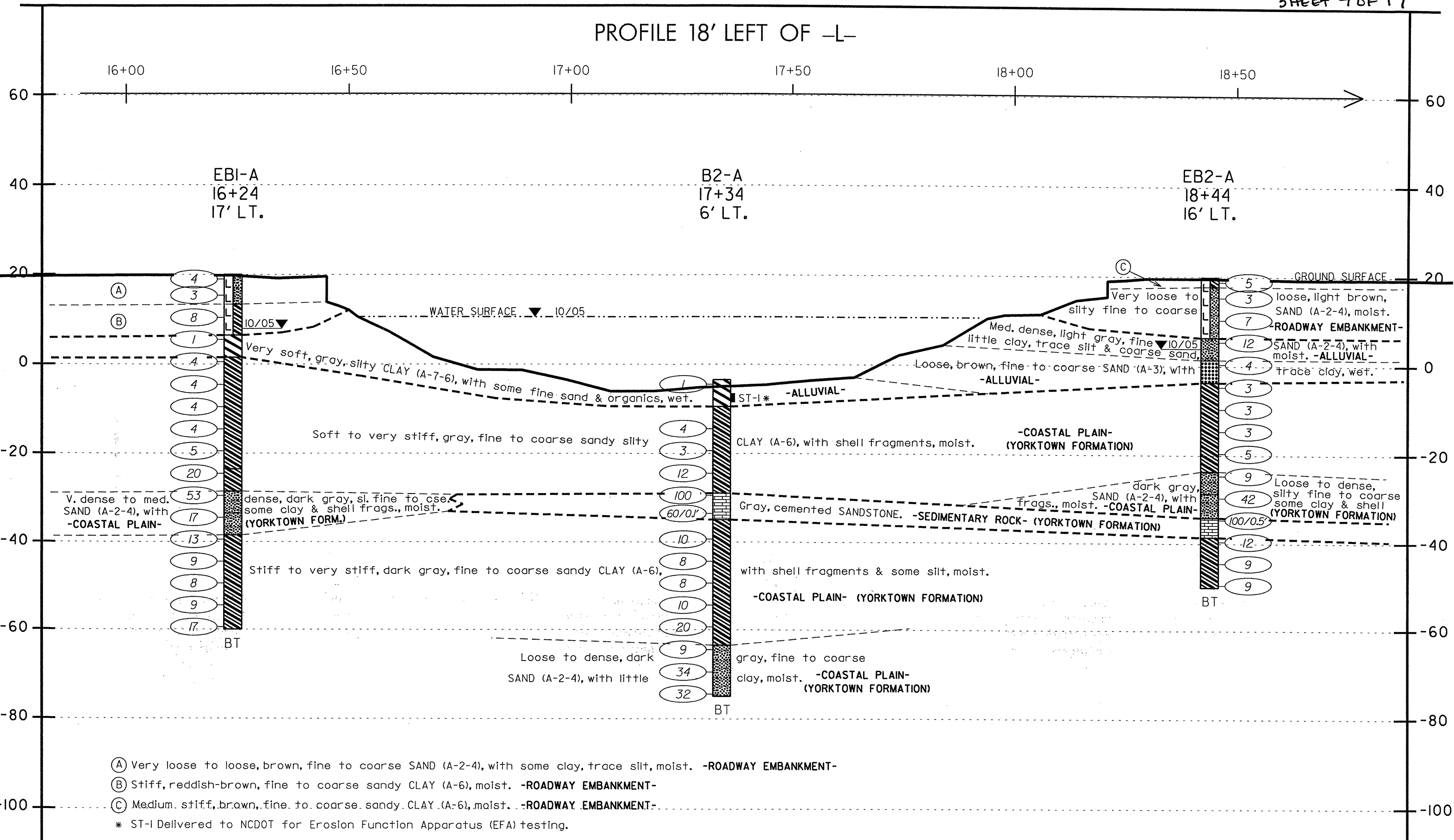


SINCE 1881

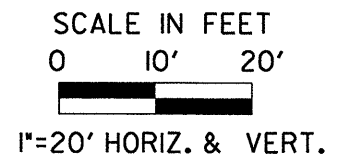
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CLIENT: N.C. Department of Transportation		
LOCATION: Bridge No. 90 over Tranter's Creek on SR 1414 & SR 1556		
STATE PROJ. No.: 33389.1.1	COUNTY: Beaufort/Pitt	
TIP No.: B-4022	FA No.: BRZ-1414(2)	
DATE: 10/2005	SCALE: 1"=50' HORIZ. & VERT.	DRAWING No.: 1

PROFILE 18' LEFT OF -L-



- (A) Very loose to loose, brown, fine to coarse SAND (A-2-4), with some clay, trace silt, moist. -ROADWAY EMBANKMENT-
- (B) Stiff, reddish-brown, fine to coarse sandy CLAY (A-6), moist. -ROADWAY EMBANKMENT-
- (C) Medium stiff, brown, fine to coarse sandy CLAY (A-6), moist. -ROADWAY EMBANKMENT-
- * ST-1 Delivered to NCDOT for Erosion Function Apparatus (EFA) testing.



 <p>FROEHLING & ROBERTSON, INC. GEOTECHNICAL • ENVIRONMENTAL • MATERIALS ENGINEERS • LABORATORIES "OVER ONE HUNDRED YEARS OF SERVICE" 310 Hubert Street Raleigh, North Carolina 27603 (919) 828-3441; Fax: (919) 828-5751</p>	CLIENT: N.C. Department of Transportation		
	LOCATION: Bridge No. 90 over Tranter's Creek on SR 1414 & SR 1556		
	STATE PROJ. No.: 33389.1.1	COUNTY: Beaufort/Pitt	
	TIP No.: B-4022	FA No.: BRZ-1414(2)	
	DATE: 10/2005	SCALE: 1"=10' HORIZ. & VERT.	DRAWING No.: 2



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 BORING LOG

SHEET 1 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin								
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)								
BORING NO. EB1-A		BORING LOCATION 16+24		OFFSET 17ft LT		ALIGNMENT -L-								
COLLAR ELEV. 20.0 ft		NORTHING 705,967		EASTING 2,543,214		0 HR. N/A								
TOTAL DEPTH 80.0 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DATE STARTED 10/3/05		COMPLETED 10/3/05		SURFACE WATER DEPTH N/A										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
20.0					Ground Surface							20.0	0.0	
16.5	3.5	2	2	1						SS-1	M	-ROADWAY EMBANKMENT- Brown, fine to coarse SAND (A-2-4(0)), with some clay, trace silt.	6.5	
11.5	8.5	2	2	1							M	Reddish-brown, fine to coarse sandy CLAY (A-6).	6.5	
6.5	13.5	3	3	5							M		6.5	
1.5	18.5	1	WOH	1							W	-ALLUVIAL- Gray, silty CLAY (A-7-6), with some fine sand.	18.5	
-3.5	23.5	2	1	3						SS-5	42.4%	-COASTAL PLAIN- (YORKTOWN FORMATION) Gray, fine sandy silty CLAY (A-6(11)), with some shell fragments & trace coarse sand.	18.5	
-8.5	28.5	2	2	2							M		23.5	
-13.5	33.5	2	2	2							M		28.5	
-18.5	38.5	2	2	2							M		33.5	
-23.5	43.5	1	3	2							M		38.5	
-28.5	48.5	15	10	10							M	Gray, fine to coarse sandy CLAY (A-6), with some silt & shell fragments.	43.5	
-33.5	53.5	11	19	34							M	Dark gray, silty fine to coarse SAND (A-2-4), with some shell fragments.	48.5	
-38.5	58.5	10	7	10							M	Dark gray, silty fine to coarse SAND (A-2-4), with some clay & shell fragments.	53.5	
-43.5	63.5	3	4	9							M	Dark gray, fine to coarse sandy CLAY (A-6), with some silt.	58.5	
-48.5	68.5	4	4	5							M		63.5	
-53.5	73.5	3	4	4							M		68.5	
		4	4	5							M		73.5	

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 BORING LOG

SHEET 2 OF 17

SHEET 2 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin							
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)							
BORING NO. EB1-A		BORING LOCATION 16+24		OFFSET 17ft LT		ALIGNMENT -L-							
COLLAR ELEV. 20.0 ft		NORTHING 705,967		EASTING 2,543,214		0 HR. N/A							
TOTAL DEPTH 80.0 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DATE STARTED 10/3/05		COMPLETED 10/3/05		SURFACE WATER DEPTH N/A									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
-54.8		Continued from previous page											
-58.5	78.5	5	9	8							M	Dark gray, fine to coarse sandy CLAY (A-6), with some silt. (continued)	80.0
		Boring Terminated at Elevation -60.0 ft in CLAY (COASTAL PLAIN-YORKTOWN FORMATION)											
NOTES: 1) Driller indicates harder drilling from a depth of 71.0' to 72.0' (elev. -51.0' to -52.0').													

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 BORING LOG

SHEET 1 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin									
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)									
BORING NO. B1-B		BORING LOCATION 16+74		OFFSET 6ft RT		ALIGNMENT -L-									
COLLAR ELEV. 5.5 ft		NORTHING 705,970		EASTING 2,543,269		0 HR. N/A									
TOTAL DEPTH 70.0 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DATE STARTED 10/6/05		COMPLETED 10/6/05		SURFACE WATER DEPTH 4.3'											
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100		
9.8													Water Surface		
5.5	0.0												Ground Surface		
		1	2	2							SS-65	W	5.5	0.0	-ALLUVIAL- Gray, silty fine to coarse SAND (A-2-4), with some clay & organics.
	3.5	3	1	2							SS-66	47.5%	1.5	4.0	Gray, fine sandy CLAY (A-6(13)), with some silt, trace coarse sand.
	8.5	1	2	3								M	-3.0	8.5	-COASTAL PLAIN- (YORKTOWN FORMATION) Gray, fine sandy silty CLAY (A-6), with some shell fragments.
	13.5	1	2	1								M			
	18.5	2	2	3								M			
	23.5	WOH	1	2								M			
	28.5	3	4	3								M	-23.0	28.5	Dark gray, fine to coarse SAND (A-2-4), with some clay, silt & shell fragments.
	33.5	13	21	100/0.4'									-29.0	34.5	-COASTAL PLAIN SEDIMENTARY ROCK- (YORKTOWN FORMATION) Gray, cemented SANDSTONE.
	38.5	10	53	24							SS-73	M	-33.0	38.5	-COASTAL PLAIN- (YORKTOWN FORMATION) Dark gray, fine to coarse SAND (A-1-b(0)), with little clay & trace silt.
	43.5	3	4	16								M	-38.0	43.5	Dark gray, fine to coarse sandy CLAY (A-6), with some silt.
	48.5	4	5	5								M			
	53.5	3	4	5								M			
	58.5	4	5	6								M			
	63.5	9	10	9								M			
	68.5	4	6	9								M	-63.0	68.5	
													-64.5	70.0	Dark gray, fine to coarse SAND (A-2-4), with some silt & clay.

NCDOT BORE SINGLE G66-144.GPJ NC DOT.GDT 11/3/05



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 BORING LOG SHEET 9 OF 17

SHEET 2 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin							
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)							
BORING NO. B1-B		BORING LOCATION 16+74		OFFSET 6ft RT		ALIGNMENT -L-							
COLLAR ELEV. 5.5 ft		NORTHING 705,970		EASTING 2,543,269		0 HR. N/A							
TOTAL DEPTH 70.0 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DATE STARTED 10/6/05		COMPLETED 10/6/05		SURFACE WATER DEPTH 4.3'									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
-65.0													Continued from previous page
													Boring Terminated at Elevation -64.5 ft in SAND (COASTAL PLAIN-YORKTOWN FORMATION)
													NOTES: 1) Geologist indicates strata breaks in split spoon at depths of 4.0' (elev. 1.5') & 34.5' (elev. -29.0').

NCDOT BORE SINGLE G66-144.GPJ NC DOT.GDT 11/3/05



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 BORING LOG

SHEET 1 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin							
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)							
BORING NO. B3-B		BORING LOCATION 17+94		OFFSET 6ft RT		ALIGNMENT -L-							
COLLAR ELEV. 7.9 ft		NORTHING 706,026		EASTING 2,543,375		0 HR. N/A							
TOTAL DEPTH 82.5 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DATE STARTED 10/5/05		COMPLETED 10/5/05		SURFACE WATER DEPTH 1.9'									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
9.8													Water Surface
7.9	0.0												Ground Surface
		WOH	WOH	1									
1.9	6.0												
0.4	7.5	3	5	5									
		2	3	4									
-3.1	11.0												
		2	2	2									
-8.1	16.0												
		2	1	2									
-13.1	21.0												
		1	1	2									
-18.1	26.0												
		2	2	3									
-23.1	31.0												
		9	9	5									
-28.1	36.0												
		11	15	35									
-33.1	41.0												
		10	100/0.4'										
-38.1	46.0												
		3	4	5									
-43.1	51.0												
		3	3	5									
-48.1	56.0												
		3	4	5									
-53.1	61.0												
		3	4	5									
-58.1	66.0												
		4	8	8									
-63.1	71.0												
		4	6	7									

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 BORING LOG

SHEET 11 OF 17

SHEET 2 OF 2

PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin							
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)						GROUND WATER (ft)							
BORING NO. B3-B		BORING LOCATION 17+94		OFFSET 6ft RT		ALIGNMENT -L-							
COLLAR ELEV. 7.9 ft		NORTHING 706,026		EASTING 2,543,375		0 HR. N/A							
TOTAL DEPTH 82.5 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DATE STARTED 10/5/05		COMPLETED 10/5/05		SURFACE WATER DEPTH 1.9'									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
-65.0													
-68.1	76.0												
		11	17	17									
-73.1	81.0												
		9	17	15									

NCDOT BORE SINGLE G66-144.GPJ NC DOT.GDT 10/27/05

- NOTES:
- 1) Geologist indicates strata break in split spoon at a depth of 41.5' (elev. -33.6').
 - 2) Driller indicates softer drilling at a depth of 43.0' (elev. -35.1').



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PROJECT NO. 33389.1.1		ID. B-4022		COUNTY Beaufort/Pitt		GEOLOGIST C. Baldwin								
SITE DESCRIPTION Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) & SR 1556 (Pitt)							GROUND WATER (ft)							
BORING NO. EB2-A		BORING LOCATION 18+44		OFFSET 16ft LT		ALIGNMENT -L-								
COLLAR ELEV. 19.9 ft		NORTHING 706,069		EASTING 2,543,409		0 HR. N/A								
TOTAL DEPTH 70.0 ft		DRILL MACHINE CME 550		DRILL METHOD Mud Rotary		24 HR. 16.0								
DATE STARTED 10/3/05		COMPLETED 10/3/05		SURFACE WATER DEPTH N/A		HAMMER TYPE Automatic								
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
19.9					Ground Surface									
19.9	0.0	3	3	2							M	19.9	0.0	-ROADWAY EMBANKMENT- Brown, fine to coarse sandy CLAY (A-6).
16.4	3.5	1	2	1							M	17.9	2.0	Light brown, silty fine to coarse SAND (A-2-4).
11.4	8.5	2	3	4							M	6.4	13.5	
6.4	13.5	5	8	4							SS-21	6.4	13.5	
1.4	18.5	3	2	2							SS-22	1.4	18.5	-ALLUVIAL- Light gray, fine SAND (A-2-4(0)), with little clay, trace silt & coarse sand.
-3.6	23.5	2	1	2							W	-3.6	23.5	Brown, fine to coarse SAND (A-3(0)), with trace clay.
-8.6	28.5	1	1	2							M	-8.6	28.5	-COASTAL PLAIN- (YORKTOWN FORMATION) Gray, fine sandy silty CLAY (A-6), with some shell fragments & trace coarse sand.
-13.6	33.5	2	1	2							M	-13.6	33.5	
-18.6	38.5	WOH	2	3							M	-18.6	38.5	
-23.6	43.5	4	5	4							W	-23.6	43.5	Dark gray, silty fine to coarse SAND (A-2-4), with some clay & shell fragments.
-28.6	48.5	12	17	25							M	-28.6	48.5	Dark gray, silty fine to coarse SAND (A-2-4), with some clay & shell fragments.
-33.6	53.5	9	100/0.5'						100/0.5'			-34.1	54.0	-COASTAL PLAIN SEDIMENTARY ROCK- (YORKTOWN FORMATION) Gray, cemented SANDSTONE.
-38.6	58.5	3	5	7							M	-38.6	58.5	
-43.6	63.5	3	4	5							M	-43.6	63.5	-COASTAL PLAIN- (YORKTOWN FORMATION) Dark gray, fine to coarse sandy CLAY (A-6), with some silt.
-48.6	68.5	3	4	5							M	-48.6	68.5	
												-50.1	70.0	Boring Terminated at Elevation -50.1 ft in CLAY (COASTAL PLAIN-YORKTOWN FORMATION) NOTES:

NCDOT BORE SINGLE G66-144.GPJ NC DOT.GDT 11/2/05

1) Geologist indicates strata break in split spoon at a depth of 54.0' (elev. -34.1').



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

M&T Form 503

T.I.P. ID NO.: B-4022

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: 33389.1.1
DATE SAMPLED: 10/05
SAMPLED FROM: -L-
SUBMITTED BY: E.C. Howey

COUNTY: Beaufort/Pitt
RECEIVED: 10/05
REPORTED: 10/26/05
BY: Dave Jenks

TEST RESULTS

PROJ. SAMPLE NO.	EB1-A	EB1-A	B1-B	B1-B	B2-A	B2-A	B3-B
LAB SAMPLE NO.	SS-1	SS-5	SS-66	SS-73	SS-44	SS-45	SS-52
Retained #4 Sieve %	0.1	0.0	0.0	31.3	0.0	0.0	0.2
Passing #10 Sieve %	99.5	99.9	100.0	66.9	99.9	99.9	98.2
Passing #40 Sieve %	82.3	98.5	99.4	50.4	84.7	79.5	95.9
Passing #200 Sieve %	28.7	76.5	79.7	13.7	24.1	12.6	77.8

MINUS #10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60 %	30.5	1.5	1.1	49.5	48.3	57.1	3.6
Fine Sand Ret - #270 %	45.5	42.3	39.1	32.4	31.3	30.6	27.7
Silt 0.053 - 0.010 mm %	3.0	21.8	23.8	3.0	2.2	0.0	34.4
Clay < 0.010 mm %	21.0	34.4	36.0	15.1	18.2	12.3	34.3
L.L.	17	38	40	20	26	19	30
P.L.	17	23	23	NP	19	NP	18
P.I.	0	15	17	NP	7	NP	12
AASHTO Classification	A-2-4 (0)	A-6 (11)	A-6 (13)	A-1-b (0)	A-2-4 (0)	A-2-4 (0)	A-6 (8)
Station	16+24	16+24	16+74	16+74	17+34	17+34	17+94
Offset	17 ft LT	17 ft LT	6 ft RT	6 ft RT	6 ft LT	6 ft LT	6 ft RT
Depth (ft)	0.0	18.5	4.0	38.5	60.0	65.0	21.0
to	1.5	20.0	5.0	40.0	61.5	66.5	22.5
Moisture Content (%)	N/A	42.4	47.5	N/A	24.8	N/A	34.7
Organic Content (%)							

NT = Not Tested
NP = Not Plastic
NA = Not Applicable

E.C. Howey, L.G., P.E.
Soils Engineer



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

M&T Form 503

SHEET 13 OF 17

T.I.P. ID NO.: B-4022

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: 33389.1.1
DATE SAMPLED: 10/05
SAMPLED FROM: -L-
SUBMITTED BY: E.C. Howey

COUNTY: Beaufort/Pitt
RECEIVED: 10/05
REPORTED: 10/26/05
BY: Dave Jenks

TEST RESULTS

PROJ. SAMPLE NO.	B3-B	EB2-A	EB2-A				
LAB SAMPLE NO.	SS-54	SS-21	SS-22				
Retained #4 Sieve %	13.3	0.0	0.0				
Passing #10 Sieve %	82.8	99.9	98.6				
Passing #40 Sieve %	70.8	99.7	72.1				
Passing #200 Sieve %	29.4	27.6	8.5				

MINUS #10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60 %	32.3	4.2	50.7				
Fine Sand Ret - #270 %	37.2	77.7	39.6				
Silt 0.053 - 0.010 mm %	12.6	6.2	0.0				
Clay < 0.010 mm %	17.9	11.9	9.7				
L.L.	19	18	19				
P.L.	18	NP	NP				
P.I.	1	NP	NP				
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-3 (0)				
Station	17+94	18+44	18+44				
Offset	6 ft RT	16 ft LT	16 ft LT				
Depth (ft)	31.0	13.5	18.5				
to	32.5	15.0	20.0				
Moisture Content (%)	20.7	N/A	N/A				
Organic Content (%)							

NT = Not Tested
NP = Not Plastic
NA = Not Applicable

E.C. Howey, L.G., P.E.
Soils Engineer

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33389.1.1 ID: B-4022 COUNTY: Beaufort

DESCRIPTION(1): Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort Co.) and SR 1556 (Pitt Co.)

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: _____ Pos: _____)
 other _____

COUNTY BRIDGE NO. 90 BRIDGE LENGTH 175' NO. BENTS IN: CHANNEL 9 FLOOD PLAIN 11

FOUNDATION TYPE: Original timber piles and steel H piles (5 foundations, consisting of steel H piles, have been added)

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: Minor scouring

INTERIOR BENTS: Appeared to be some minor scour pockets around the added H pile foundations.

CHANNEL BED: None observed

CHANNEL BANKS: Some small trees down along banks.

EXISTING SCOUR PROTECTION:

TYPE(3): Timber wingwall

EXTENT(4): To the limits of embankment

EFFECTIVENESS(5): Good

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): None observed

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Fine to coarse sand (A-2-4), fine sandy and silty clay (A-6, A-7-6), and muck

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Fine to coarse sand (A-2-4, A-3) and silty clay (A-7-6)

CHANNEL BANK COVER(9): Grasses, shrubs and trees

FLOOD PLAIN WIDTH(10): 4000±

FLOOD PLAIN COVER(11): Trees, grasses and shrubs

DESIGN INFORMATION CONT.

STREAM IS DEGRADING AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: Five steel H pile foundations have been added in between the original timber pile foundations.

CHANNEL MIGRATION TENDENCY (13): East

REPORTED BY: Elizabeth C. Howay DATE: 11/3/2005
Froehling & Robertson, Inc.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14): _____

	Bent 1	Bent 2	Bent 3
100-year	-3.3'	-11.1'	-1.2'

REPORTED BY: Chad M. Waddy DATE: 11/15/05
NCDOT GEOTECHNICAL UNIT

INSTRUCTIONS

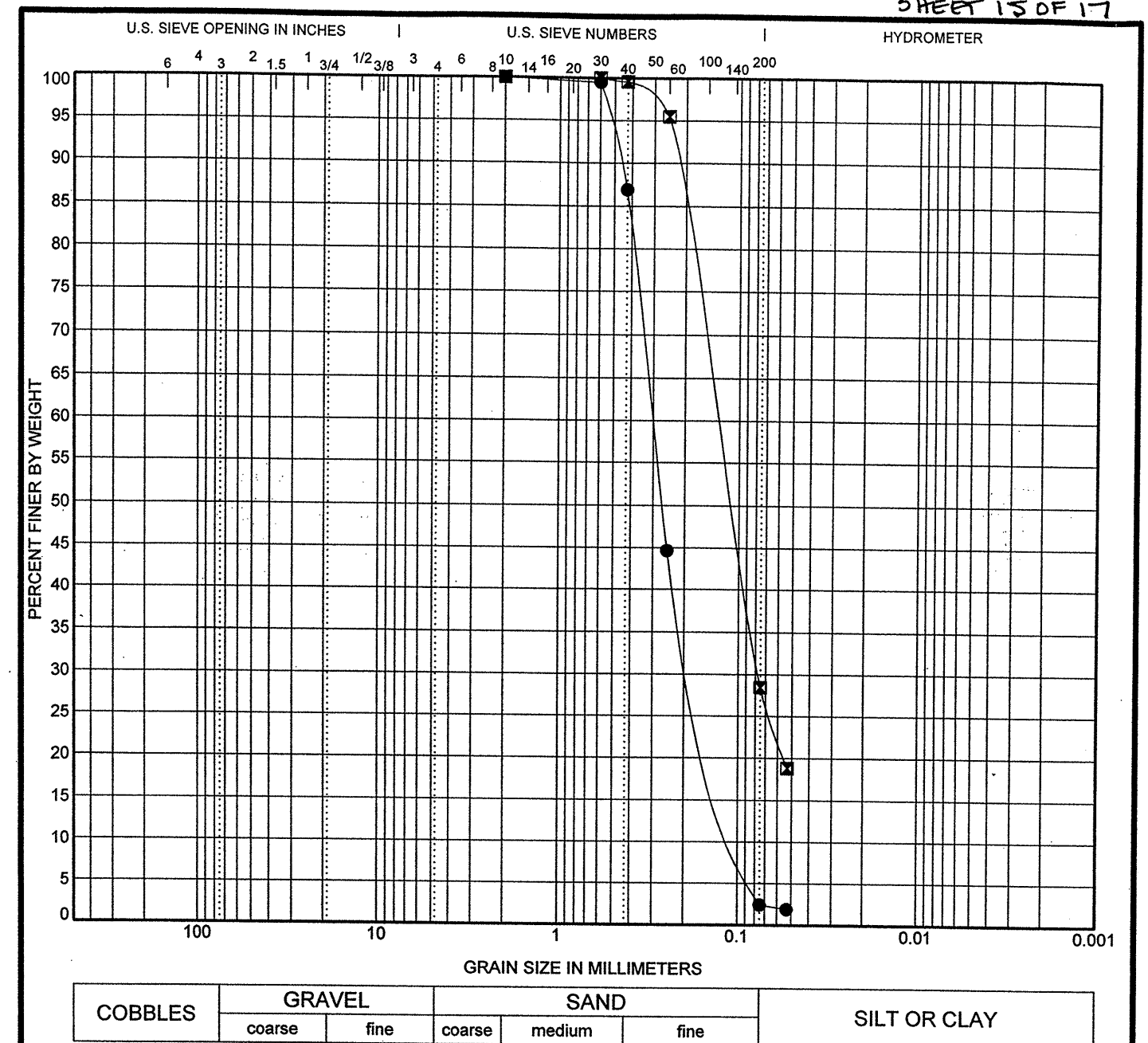
- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

PROJECT #: 33389.1.1 B-4022

COUNTY: Beaufort/Pitt

DESCRIPTION: Bridge No. 90 over Tranters Creek on SR 1414 (Beaufort) and SR 1556 (Pitt)


SAMPLE #	CHANNEL BED MATERIAL		CHANNEL BANK MATERIAL	
	SS-66		SS-21	SS-22
RETAINED #4	0.0		0.0	0.0
PASSING #10	100.0		99.9	98.6
PASSING #40	99.4		99.7	72.1
PASSING #200	79.7		27.6	8.5
COARSE SAND	1.1		4.2	50.7
FINE SAND	39.1		77.7	39.6
SILT	23.8		6.2	0.0
CLAY	36.0		11.9	9.7
LL	40		18	19
PL	23		NP	NP
AASHTO CLASSIFICATION	A-6(13)		A-2-4(0)	A-3(0)
STATION	16+74		18+44	18+44
OFFSET	6 ft RT		16 ft LT	16 ft LT
DEPTH	4.0 - 5.0		13.5 - 15.0	18.5 - 20.0



Boring No.	Depth	Classification	LL	PL	PI	Cc	Cu
● B3-B	at 7.5 - 9.0	POORLY GRADED SAND (A-3)	NP	NP	NP	0.96	3.25
☒ B1-B	at 0.0 - 1.5	SILTY SAND (A-2-4)	NP	NP	NP		

Boring No.	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B3-B	at 7.5 - 9.0	2	0.303	0.165	0.093	0.0	97.6	2.4	
☒ B1-B	at 0.0 - 1.5	2	0.132	0.077		0.0	71.6	28.4	

SINCE



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GRAIN SIZE DISTRIBUTION
 Report No.: G66-144
 Client: NCDOT
 Project: B-4022
 Location: Beaufort - Pitt
 Date: October 11, 2005

US GRAIN SIZE G66-144T.GPJ F&R.GDT 10/26/05



SITE PHOTOGRAPHS



Photograph No. 1: Profile view left of -L-, looking east.



Photograph No. 3: Cross-section view of Bent 1, looking south.



Photograph No. 2: Cross-section view of End Bent 1, looking south.



Photograph No. 4: Cross-section view of Bent 2, looking south.



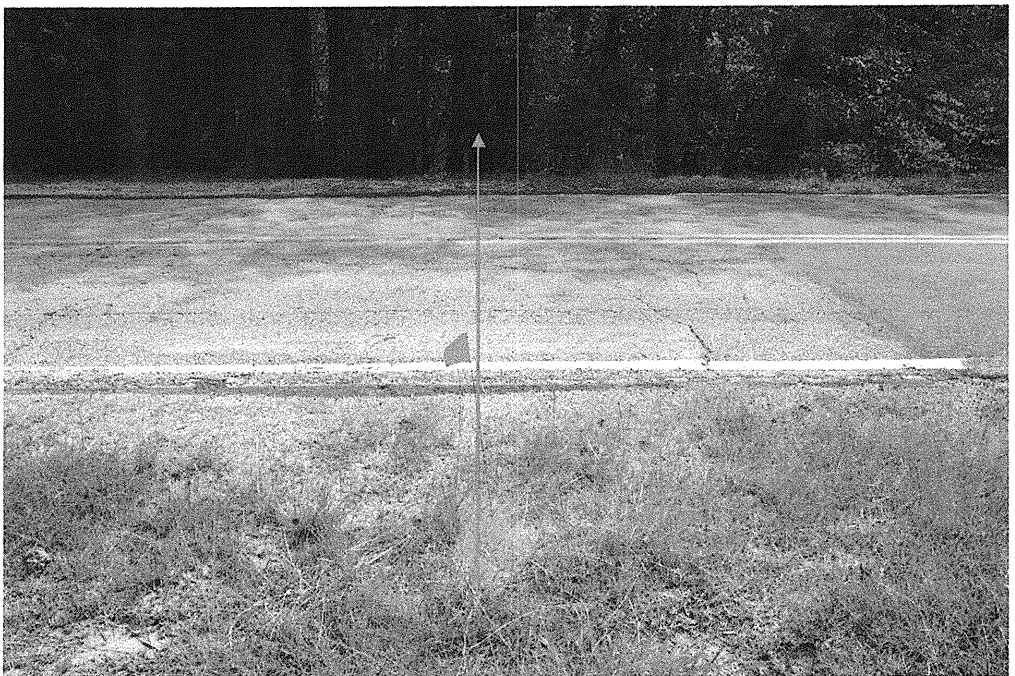
SITE PHOTOGRAPHS



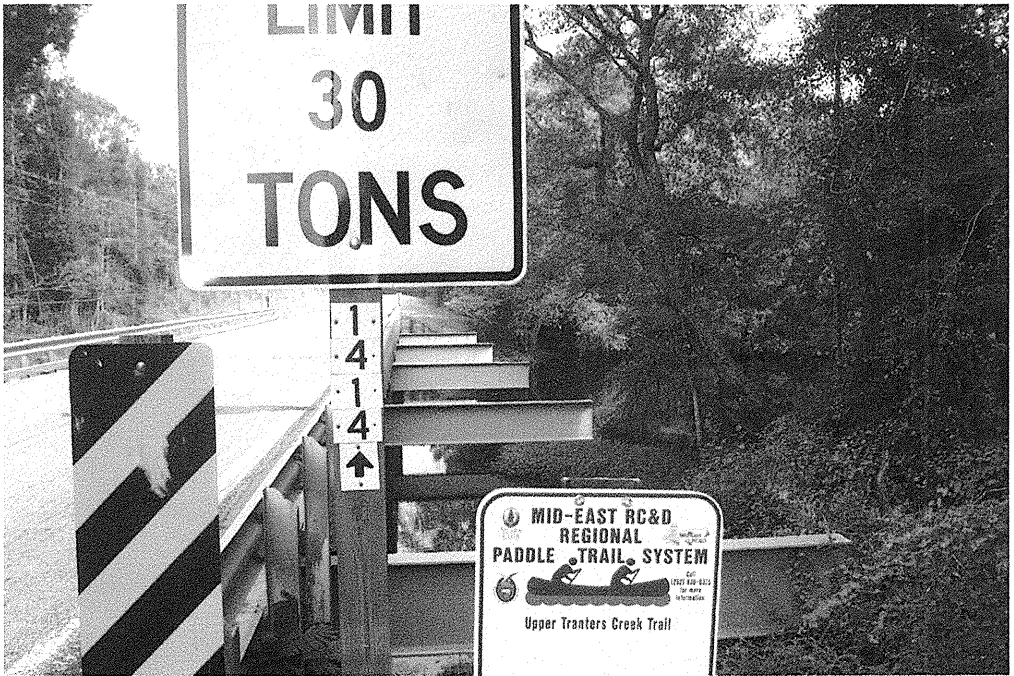
Photograph No. 5: View of Bent 3, looking west.



Photograph No. 7: North side of bridge, looking east.



Photograph No. 6: Cross-section view of End Bent 2, looking south.



Photograph No. 8: South side of bridge, looking east.