

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33521.1.1 (B-4174)	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33521.1.1 (B-4174) F.A. PROJ. BRZ-1515 (3)
COUNTY LENOIR
PROJECT DESCRIPTION BRIDGE NO. 128 OVER MOSELEY CREEK
ON SR 1515 AT -L- STATION 16+12.50

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CAUTION NOTICE

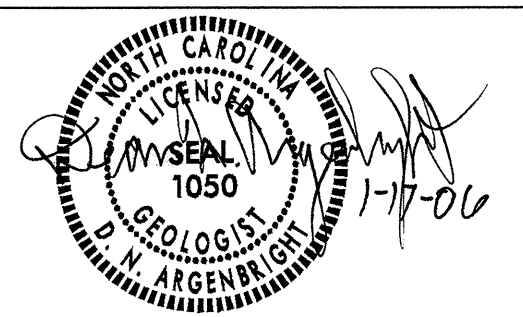
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.

PROJECT: ID: B-4174

	PERSONNEL
	<u>JLS</u>
	<u>MMH</u>
INVESTIGATED BY <u>K. B. QUICK</u>	<u>KBQ</u>
CHECKED BY <u>D. N. ARGENBRIGHT</u>	<u>RES</u>
SUBMITTED BY <u>D. N. ARGENBRIGHT</u>	<u>LWD</u>
DATE <u>JANUARY 2006</u>	<u>WNC</u>



DRAWN BY: A. N. KARPA, W. D. FIELDS

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

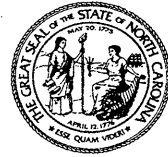
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 33521.I.I (B-4174)	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 (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p>VERY STIFF, GRN, SKTY CLM, MOIST WITH INTERBEDDED FINE SAND LAYERS, HARD 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>ANGULARITY OF GRAINS</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 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>WEATHERED ROCK (WR)</p> <p>CRYSTALLINE ROCK (CR)</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</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 (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</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 (SCRC) - 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="2">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="2">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td> <td>A-3</td> <td>A-2</td> <td>A-4</td> <td>A-5</td> <td>A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX 10 MX</td> <td>50 MX 35 MX 15 MX</td> <td>50 MX 35 MX 15 MX</td> <td>50 MX 35 MX 15 MX</td> <td>50 MX 35 MX 15 MX</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6 MX</td> <td>NP</td> <td>40 MX 10 MX 10 MX</td> <td>40 MX 10 MX 10 MX</td> <td>40 MX 10 MX 10 MX</td> <td>40 MX 10 MX 10 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX 12 MX</td> <td>16 MX</td> <td>No MX</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE</p> <p>MODERATELY COMPRESSIBLE</p> <p>HIGHLY COMPRESSIBLE</p> <p>LIQUID LIMIT LESS THAN 31</p> <p>LIQUID LIMIT EQUAL TO 31-50</p> <p>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> <p>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 SEEP</p>		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</p> <p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI)</p> <p>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 (SLI)</p> <p>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)</p> <p>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.)</p> <p>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.)</p> <p>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.)</p> <p>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 REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.</p> <p>COMPLETE</p> <p>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> <p>ROCK HARDNESS</p> <p>VERY HARD</p> <p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD</p> <p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD</p> <p>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</p> <p>CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT</p> <p>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</p> <p>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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<p>COLOR</p> <p>DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>		<p>BENCH MARK: B.M. #1 R/R SPIKE SET IN 18" GUM</p> <p>-L- STA. 18+58.87 OFFSET 70.94' RT</p> <p>ELEVATION: 82.07 FT.</p> <p>NOTES:</p>																																																																															



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

January 12, 2006

STATE PROJECT: 33521.1.1 B-4174
F.A. PROJECT: BRZ-1515 (3)
COUNTY: Lenoir
DESCRIPTION: Bridge No. 128 Over Moseley Creek on SR 1515
SUBJECT: Geotechnical Report - Bridge Foundation Investigation for SR 1515 over Moseley Creek at -L- Sta. 16+12.50

Site Description

The proposed bridge site is located in La Grange at the existing SR 1515 bridge over Moseley Creek. The replacement structure will be constructed along the existing alignment. Based on the proposed design, the new bridge will have two spans having a total length of 85 feet. The bents will have a skew of 90 degrees.

One Standard Penetration Test (SPT) boring was made at or near each proposed bent location to provide subsurface information relative to foundation design. The borings were made with an ATV mounted CME 45B drill machine along with a truck mounted Mobile B-47. All were advanced by rotary drill methods using bentonite drilling fluid.

The bridge site is located in the Coastal Plain Physiographic Province and is underlain by recent alluvial deposits and Cretaceous marine sediments of the Peedee Formation. Moseley Creek is a slow flowing stream typically 15± feet wide and 3 to 5 feet deep. Topography along the project is nearly flat to gently sloping. Elevations at the site range from 73± feet along the streambed to 82± feet along the existing SR 1515 embankment. The existing approach embankments are bordered by a 400± foot wide flood plain lying at elevations ranging from 75± to 78± feet.

The bridge is situated in an area characterized by artesian water levels. Artesian flow was noted in all borings drilled at the site where the hydrostatic head was measured at an elevation of 79 feet. The water surface of Moseley Creek was measured to an elevation of 76.3 feet at the time of this investigation. All borings were sealed after completion.

Soil Description

Surficial soils consist of 4 to 7.5 feet of very loose to loose alluvial moderately organic silty sand with wood (A-2-4) and muck. Approximately 5 to 13 feet of very loose to medium dense alluvial sand (A-2-4, A-3, A-1-b) underlie these soils. In borings EB1-A and EB2-B, 2 to 3 feet of soft alluvial sandy clay was encountered at an elevation of 64± feet. Soils belonging to the Cretaceous age Peedee Formation underlie the alluvial deposits at elevations ranging from 62± to 53± feet. The initial 3 to 12 feet of Peedee soils consists of very loose to loose sand (A-2-4, A-3, A-1-b) with weathered limestone. Below an elevation of 50± feet the Peedee Formational soils grade to a stiff to hard sandy silt (A-4) with some mica and shell fragments. In boring B1-A, a 5 foot thick discontinuous layer of stiff sandy clay (A-6) was encountered overlying the silt layer. At an elevation ranging from 30± to 25± feet the Cretaceous soils consist of very loose to very dense silty sand and sand (A-2-4, A-3) with shell fragments, mica, and phosphate. A hard sandy silt (A-4) layer was encountered in boring B1-A at an elevation of 9 feet.

Based on the proposed design, the existing grade will be raised approximately 1± foot at the bridge site. The existing fill at the end bent sites consists of stiff silty clay (A-7-6) at End Bent 1 and loose to medium dense silty sand (A-2-4) at End Bent 2. Some additional fill will be required for construction of the end bent and side slopes. Borrow meeting Coastal Plain criteria is available in nearby areas.

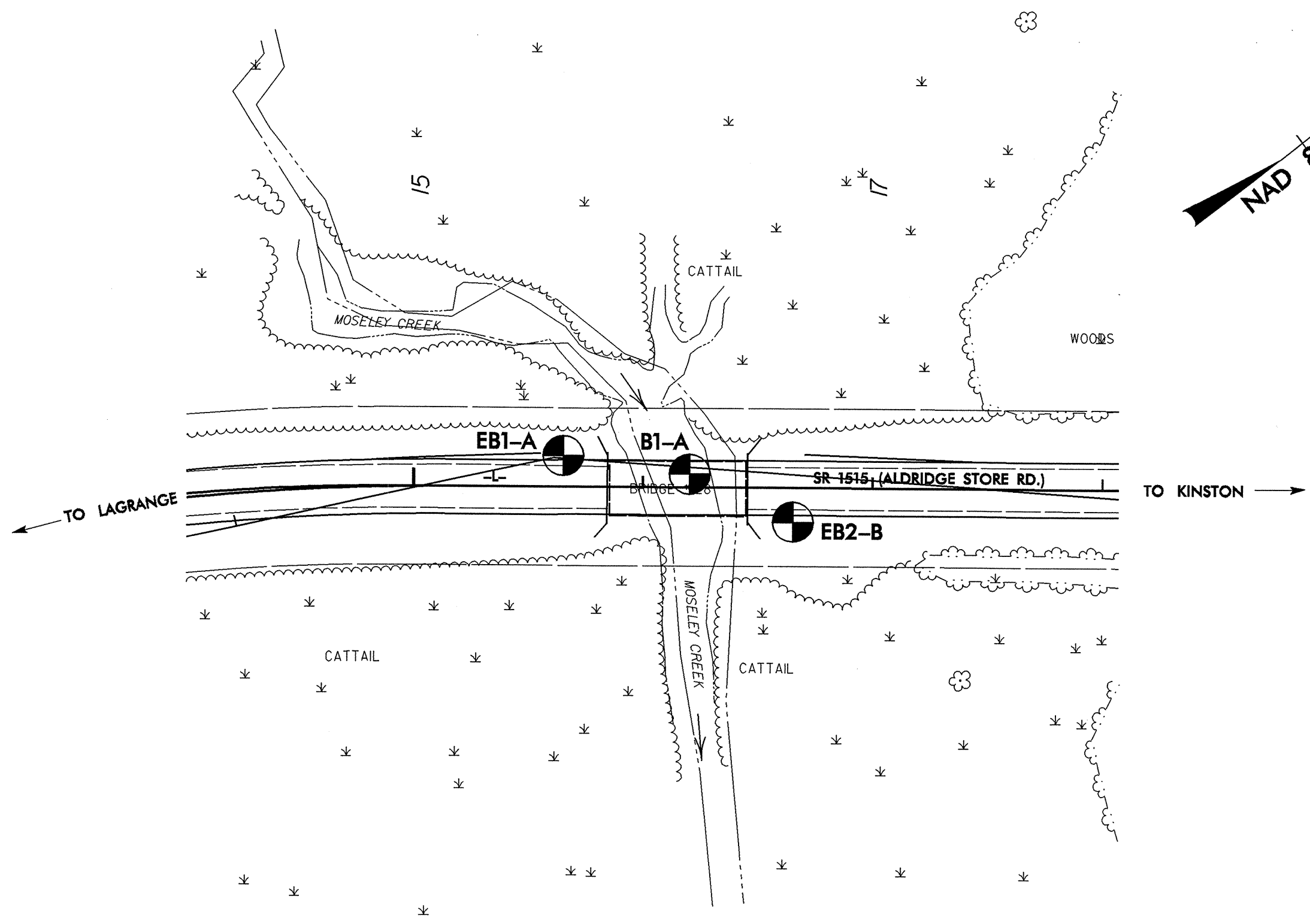
This Geotechnical Foundation Report is based on the Bridge Survey and Hydraulic Design Report for Moseley Creek dated August 5, 2005. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

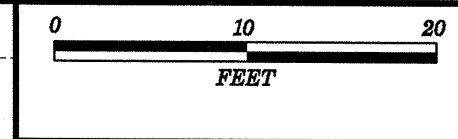
Prepared By:

Kyle B. Quick

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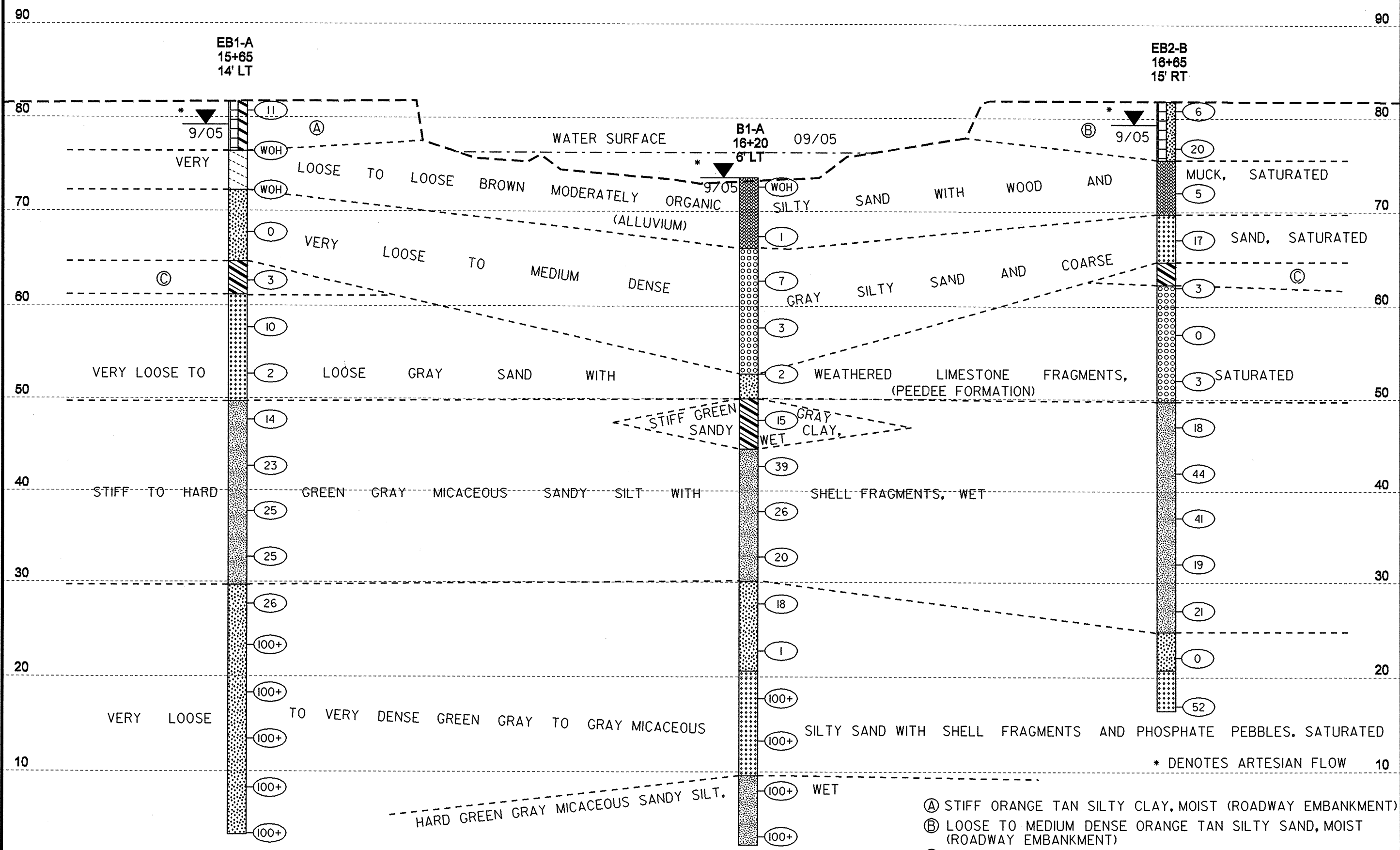
PROJECT REFERENCE NO.	SHEET
33521.1.1 (B-4174)	4
SITE PLAN	
FEET	





PROJECT REFERENCE NO.	SHEET
33521.1.1 B-4174	5

PROFILE THROUGH BORINGS PROJECTED ALONG -L-



- Ⓐ STIFF ORANGE TAN SILTY CLAY, MOIST (ROADWAY EMBANKMENT)
- Ⓑ LOOSE TO MEDIUM DENSE ORANGE TAN SILTY SAND, MOIST (ROADWAY EMBANKMENT)
- Ⓒ SOFT GRAY SANDY CLAY, WET

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 6 OF 10

PROJECT NO. 33521.I.I		ID. B-4174		COUNTY LENOIR		GEOLOGIST M. M. HAGER							
SITE DESCRIPTION BRIDGE NO. 128 OVER MOSELEY CREEK ON SR 1515							GROUND WATER						
BORING NO. EBI-A		BORING LOCATION 15+65		OFFSET 14' LT	ALIGNMENT -L-		0 HR. NM						
COLLAR ELEVATION 81.7'		NORTHING		EASTING		24 HR. ARTESIAN							
TOTAL DEPTH 78.4'		DRILL MACHINE CME 45B		DRILL METHOD ROTARY W/MUD		HAMMER TYPE AUTOMATIC							
START DATE 07/15/03		COMPLETION DATE 07/15/03		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A							
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75				100
81.7	0.0	1	3	8									
80.0	4.3	WOH	WOH	WOH	1	X0						SS-1	ORANGE TAN SILTY CLAY, MOIST (ROADWAY EMBANKMENT)
75.0	8.5	WOH	WOH	WOH	1	X0							BROWN ORGANIC SILTY SAND, SATURATED (ALLUVIUM)
70.0	13.0	1	0	0	1	X0						SS-2	BROWN-GRAY SILTY SAND WITH WOOD, SATURATED
65.0	18.0	1	2	1	1	X3							GRAY SANDY CLAY, WET
60.0	23.0	4	5	5	1	X10						SS-3	GRAY SAND, SATURATED (PEEDEE FORMATION)
55.0	28.0	WOH	1	1	1	X2							GRAY SAND, SATURATED (PEEDEE FORMATION)
50.0	33.0	3	7	7	1	X14						SS-4	GREEN GRAY SANDY SILT WITH SHELLS, WET
45.0	38.0	5	8	15	1	X23							GREEN GRAY SANDY SILT WITH SHELLS, WET (PEEDEE FORMATION)
40.0	43.0	6	8	17	1	X25						SS-5	GREEN GRAY SANDY SILT WITH SHELLS, WET
35.0	48.0	8	10	15	1	X25							GREEN GRAY SANDY SILT WITH SHELLS, SATURATED
30.0	53.0	7	12	14	1	X26						SS-6	GREEN GRAY SANDY SILT WITH SHELLS, SATURATED
25.0	58.0	100			0.4					100+X			GREEN GRAY SAND WITH SOME MICA, WET TO SATURATED
20.0	63.0	100			0.3					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET
15.0	68.0	100			0.2					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET
10.0	73.0	100			0.5					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET
5.0	78.0	100			0.4					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET

BORING TERMINATED AT ELEVATION 3.3' IN VERY DENSE SILTY SAND

PROJECT NO. 33521.I.I		ID. B-4174		COUNTY LENOIR		GEOLOGIST J.L. STONE							
SITE DESCRIPTION BRIDGE NO. 128 OVER MOSELEY CREEK ON SR 1515							GROUND WATER						
BORING NO. BI-A		BORING LOCATION 16+20		OFFSET 6' LT	ALIGNMENT -L-		0 HR. NM						
COLLAR ELEVATION 73.6'		NORTHING		EASTING		24 HR. ARTESIAN							
TOTAL DEPTH 71.4'		DRILL MACHINE MOBILE B-47		DRILL METHOD ROTARY W/MUD		HAMMER TYPE MANUAL							
START DATE 09/20/05		COMPLETION DATE 09/20/05		SURFACE WATER DEPTH 1.4'		DEPTH TO ROCK N/A							
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75				100
73.6	0.0	WOH	WOH	WOH	1	X0							
70.0	5.3	WOH	WOH	1	1	X1						SS-15	MUCK, SATURATED (ALLUVIUM)
65.0	9.9	1	3	4	1	X7						SS-16	GRAY COARSE SAND, SATURATED
60.0	14.9	1	1	2	1	X3						SS-17	GRAY COARSE SAND, SATURATED
55.0	19.9	1	1	1	1	X2						SS-18	GRAY SAND, SATURATED (PEEDEE FORMATION)
50.0	24.9	2	6	9	1	X15						SS-19	GREEN GRAY SANDY CLAY, WET
45.0	29.9	6	12	27	1	X39						SS-20	GREEN GRAY SANDY SILT WITH SHELLS, WET (PEEDEE FORMATION)
40.0	34.9	6	12	14	1	X26						SS-21	GREEN GRAY SANDY SILT WITH SHELLS, WET (PEEDEE FORMATION)
35.0	39.9	5	9	11	1	X20						SS-22	GREEN GRAY SANDY SILT WITH SHELLS, SATURATED
30.0	44.9	6	9	9	1	X18						SS-23	GREEN GRAY SANDY SILT WITH SHELLS, SATURATED
25.0	49.9	1	WOH	1	1	X1							GREEN GRAY SANDY SILT WITH SHELLS, SATURATED
20.0	54.9	11	34	66	0.9					100+X			GREEN GRAY SAND WITH SOME MICA, WET TO SATURATED
15.0	59.9	100			0.4					100+X			GREEN GRAY SAND WITH SOME MICA, WET TO SATURATED
10.0	64.9	61	39		0.7					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET
5.0	69.9	72	28		0.6					100+X			GREEN GRAY SANDY SILT WITH SOME MICA, WET
0.0													BORING TERMINATED AT ELEVATION 2.2' IN VERY DENSE SAND
-5.0													

34%

HOLE NO.	SAMPLE NO.	PASS 10	PASS 40	PASS 200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
EB1-A	SS-1	100	99	92	2.6	7.5	55.3	34.6	48	23	A-7-6(15)	4.3-5.3		
	SS-2	88	63	17	51.7	31.6	10.3	6.4	31	NP	A-2-4(0)	13.0-14.5		
	SS-3	97	52	2	89.5	8.7	1.4	0.4	20	NP	A-3(0)	23.0-24.5		
	SS-4	84	83	58	4.8	58.4	22.3	14.5	40	7	A-4(5)	33.0-34.5		
	SS-5	100	100	63	0.4	66.0	19.1	14.5	30	1	A-4(5)	43.0-44.5		
	SS-6	100	99	22	3.2	80.3	10.1	6.4	23	NP	A-2-4(0)	53.0-54.5		
EB2-B	SS-7	82	62	12	51.9	35.2	4.4	8.5	15	NP	A-2-4(0)	4.0-5.5		
	SS-8	87	67	24	37.0	40.7	15.9	6.4	30	NP	A-2-4(0)	8.8-10.3		
	SS-9	87	51	6	69.0	25.2	1.4	4.4	17	NP	A-3(0)	13.8-15.3		
	SS-10	89	46	8	79.7	12.1	1.8	6.4	21	NP	A-1-b(0)	23.8-25.3		
	SS-11	64	34	7	75.5	14.4	1.6	8.5	27	NP	A-1-b(0)	29.5-30.3		
	SS-12	95	94	69	3.0	58.4	20.1	18.5	39	9	A-4(7)	38.8-40.3		
	SS-13	100	99	71	1.6	59.2	24.7	14.5	34	4	A-4(7)	43.8-45.3		
	SS-14	98	74	20	41.4	43.7	4.4	10.5	21	NP	A-2-4(0)	58.8-60.3		
B1-A	SS-15	100	81	55	29.1	18.6	27.9	24.3	Not	Enough	Material	5.3-6.8		27.8%
	SS-16	81	48	6	66.3	28.0	5.3	0.4	25	NP	A-1-b(0)	9.9-11.4		
	SS-17	93	44	4	87.6	8.7	1.3	2.4	18	NP	A-1-b(0)	14.9-16.4		
	SS-18	88	67	12	48.4	37.8	5.8	8.0	27	NP	A-2-4(0)	20.9-21.4		
	SS-19	97	95	72	3.2	53.1	29.2	14.5	40	12	A-6(8)	24.9-26.4	33.9%	
	SS-20	100	99	75	2.4	51.3	26.2	20.1	35	7	A-4(8)	29.9-31.4		
	SS-21	100	99	25	4.4	76.8	10.8	8.0	27	2	A-2-4(0)	44.9-46.4		
	SS-22	100	73	6	74.0	21.7	4.3	0.0	19	NP	A-3(0)	54.9-56.4		
	SS-23	98	87	53	22.7	24.5	52.8	0.0	22	NP	A-4(4)	64.9-65.6		

PROJECT: 33521.1.1 ID: B-4174 COUNTY: Lenoir

DESCRIPTION(1): Bridge No. 128 over Moseley Creek on SR 1515

INFORMATION ON EXISTING BRIDGE

Information obtained from: field inspection
 microfilm (Reel: Pos:)
 other: Bridge Hydro Report

BR. NO.: 128 BR. LENGTH: 61.2 ft. NO. BENTS: 3 NO. BENTS IN: CHANNEL: 1 FLOODPLAIN: 2

FOUNDATION TYPE: timber piles

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: none noted

INTERIOR BENTS: none noted

CHANNEL BED: none noted

CHANNEL BANKS: some slumping along channel banks

EXISTING SCOUR PROTECTION:

TYPE(3): wooden end walls

EXTENT(4): 10-15 ft. outside edge of bridge

EFFECTIVENESS(5): seems effective

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): none noted

DESIGN INFORMATION

CHANNEL BED MATERIAL(7): Muck (SS-15)

CHANNEL BANK MATERIAL(8): Muck

CHANNEL BANK COVER(9): grasses

FLOOD PLAIN WIDTH(10): 400 ft.

FLOOD PLAIN COVER(11): grasses and trees

DESIGN INFORMATION CONT.

STREAM IS: X DEGRADING AGGRADING EQUILIBRIUM (12)

OTHER OBSERVATIONS AND COMMENTS: stream is channelized down stream of the bridge
site

CHANNEL MIGRATION TENDENCY (13): North migration toward End Bent 2 is unlikely due to channelization

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14):

Geotechnical analysis agrees with the scour elevations as outlined in the Bridge Survey and
Hydraulic Design. The scour elevation at Bent 1 is 64 feet.

REPORTED BY: *Kyle Truel* DATE: 09/19/05

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE, INCLUDING 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 BASED ON OBSERVATION AND/OR SAMPLES.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL BASED ON OBSERVATION AND/OR SAMPLES.
- (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 THE RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) 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.

**33521.1.1
B-4174
Lenoir Co.**

Bridge No. 128 on SR 1515 Over Moseley Creek



Looking South West Toward End Bent 1