

NOTE: SEE SHEET 1A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4642	1	4
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33810.1.1	BRSTP-1433(2)	PE	
33810.2.1	BRSTP-1433(2)	R/W, UTIL.	
33810.3.1	BRSTP-1433(2)	CONSTR.	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	10+00.00 TO 20+79.04	4	4	

ROADWAY  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. B-4642 33810.1.1 F.A. PROJ. BRSTP-1433(2)  
COUNTY SCOTLAND  
PROJECT DESCRIPTION BR 28 ON SR 1433 OVER JORDAN CREEK

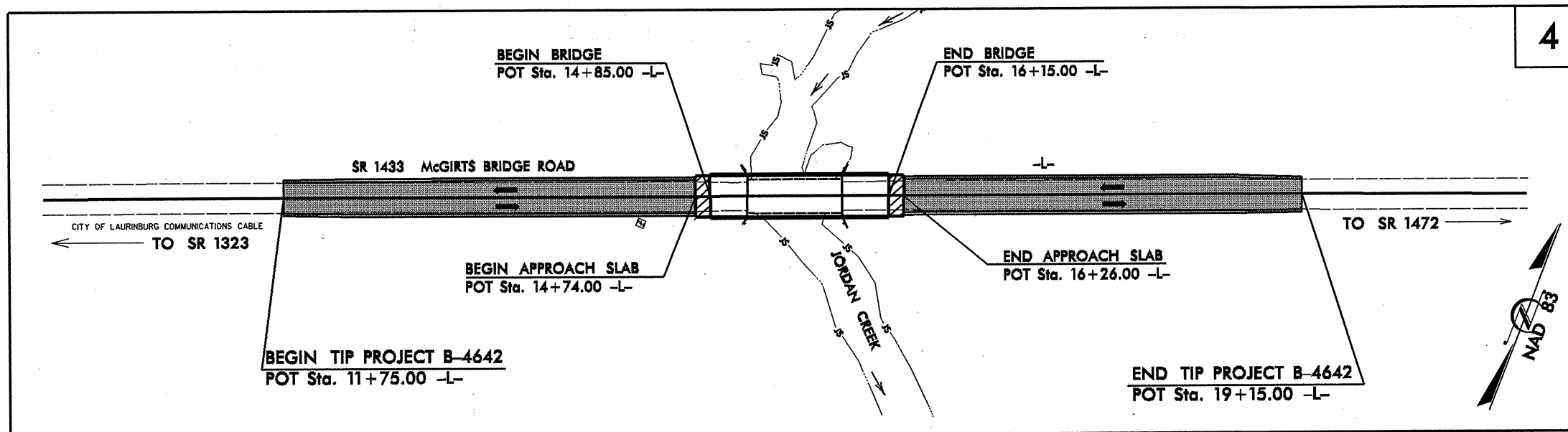
CAUTION NOTICE

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-PLACED) 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.

INVENTORY



4

PERSONNEL  
C. MURRAY

J. ESTEP

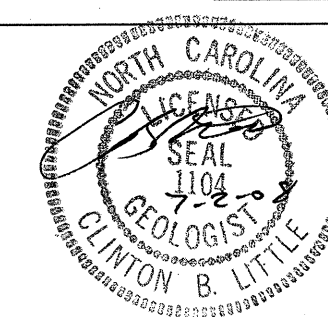
M.R. MOORE

INVESTIGATED BY MURRAY

CHECKED BY LITTLE

SUBMITTED BY LITTLE

DATE JUNE 2008



DRAWN BY: A. ROJAS

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

ID: B-4642

CONTRACT: C202328

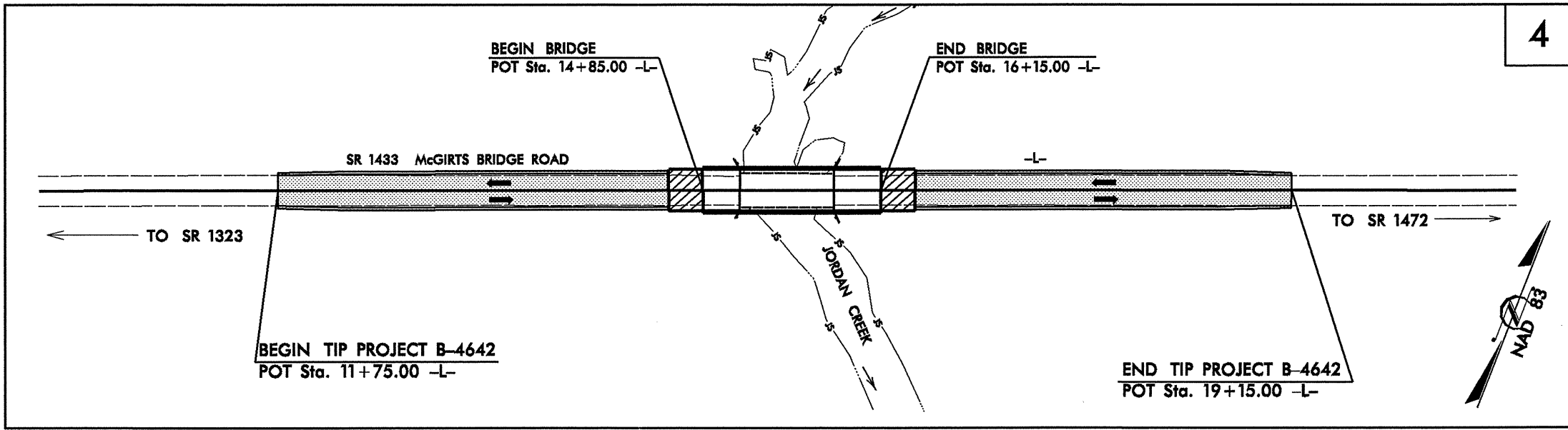
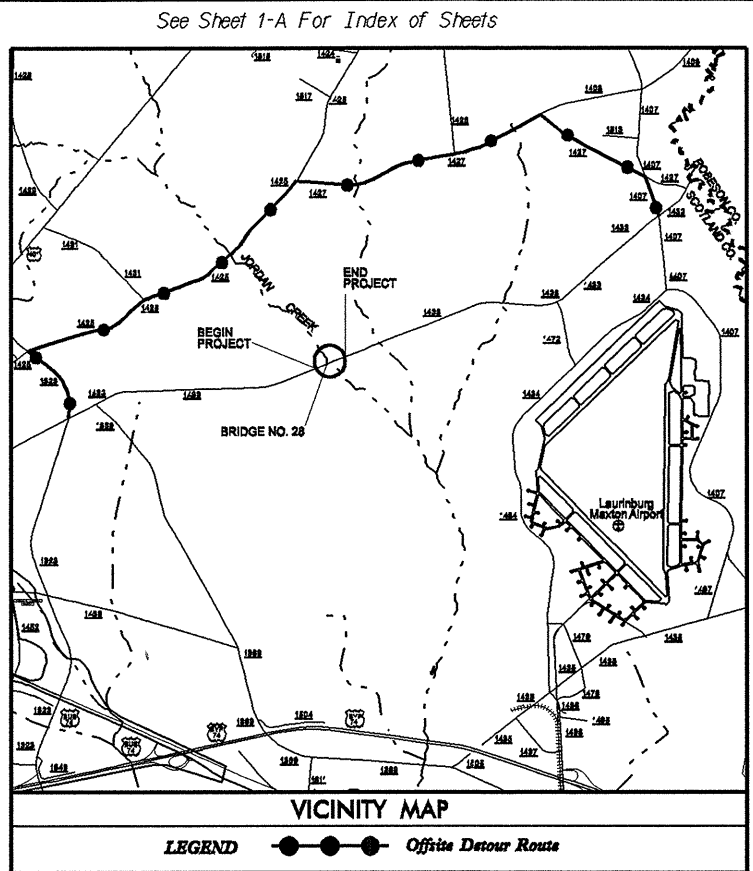
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4642	1A	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33810.1.1	BRSTP-1433(2)	PE	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**SCOTLAND COUNTY**

LOCATION: BRIDGE NO. 28 OVER JORDAN CREEK ON SR 1433

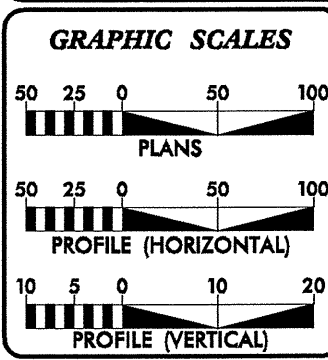
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



THIS PROJECT IS NOT WITHIN MUNICIPAL BOUNDARIES.

NCDOT CONTACT: CATHY HOUSER, P.E., PROJECT ENGINEER - ROADWAY DESIGN \*CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD \*

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



**DESIGN DATA**

ADT 2010	=	3,300
ADT 2030	=	5,100
DHV	=	10 %
D	=	60 %
T	=	3 %
V	=	60 MPH
FUNC. CLASS	=	RURAL MAJOR COLLECTOR
TTST 1 %		DUAL 2 %

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4642	=	0.115 mi.
LENGTH STRUCTURE TIP PROJECT B-4642	=	0.025 mi.
TOTAL LENGTH TIP PROJECT B-4642	=	0.140 mi.

Prepared In the Office of:  
**WANG ENGINEERING COMPANY, INC.**  
CARY, N.C.  
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 19, 2009  
LETTING DATE: JUNE 15, 2010

JAMES SJ WANG, P.E.  
PROJECT ENGINEER

SCOTT L. KENNEDY  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER  
SUNGAIX DESIGN GROUP, PA

ROADWAY DESIGN ENGINEER  
WANG ENGINEERING

SIGNATURE: \_\_\_\_\_ P.E.

SIGNATURE: \_\_\_\_\_ P.E.

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

CONTRACT: TIP PROJECT: B-4642  
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																								
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, BRN, SILTY CLM, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>	<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR</b>, <b>SUBANGULAR</b>, <b>SUBROUNDED</b>, OR <b>ROUNDED</b>.</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><b>WEATHERED ROCK (WR)</b>  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p> <p><b>CRYSTALLINE ROCK (CR)</b>  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b>  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SCREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																								
<p style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="2">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="2">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> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td>10 40 200</td> <td>10 40 200</td> <td>10 40 200</td> <td>10 40 200</td> <td>10 40 200</td> <td>10 40 200</td> </tr> <tr> <th>LIQUID LIMIT PLASTIC INDEX</th> <td>6 MX</td> <td>NP</td> <td>40 MX 10 MX 11 MN</td> <td>40 MX 10 MX 11 MN</td> <td>40 MX 10 MX 11 MN</td> <td>40 MX 10 MX 11 MN</td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX 12 MX</td> <td>16 MX No MX</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS 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>MUCK, PEAT</td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="2">EXCELLENT TO GOOD</td> <td colspan="2">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS ≥ LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)		SILT-CLAY MATERIALS (> 35% PASSING #200)		ORGANIC MATERIALS		GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	SYMBOL							% PASSING	10 40 200	10 40 200	10 40 200	10 40 200	10 40 200	10 40 200	LIQUID LIMIT PLASTIC INDEX	6 MX	NP	40 MX 10 MX 11 MN	40 MX 10 MX 11 MN	40 MX 10 MX 11 MN	40 MX 10 MX 11 MN	GROUP INDEX	0	0	0	4 MX	8 MX 12 MX	16 MX No MX	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	MUCK, PEAT	GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD		FAIR TO POOR		FAIR TO POOR	POOR	<p style="text-align: center;"><b>MINERALOGICAL COMPOSITION</b></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;"><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE      LIQUID LIMIT LESS THAN 31      MODERATELY COMPRESSIBLE      LIQUID LIMIT EQUAL TO 31-50      HIGHLY COMPRESSIBLE      LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <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></td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td></td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td></td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt;10%</td> <td>&gt;20%</td> <td></td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p style="text-align: center;"><b>GROUND WATER</b></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> <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%		TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%		LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%		SOME 20 - 35%	HIGHLY ORGANIC	>10%	>20%		HIGHLY 35% AND ABOVE																									<p style="text-align: center;"><b>WEATHERING</b></p> <p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL.)</b> - 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><b>SLIGHT (SL.)</b> - 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><b>MODERATE (MOD.)</b> - 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><b>MODERATELY SEVERE (MOD. SEV.)</b> - 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><b>SEVERE (SEV.)</b> - 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. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i></p> <p><b>VERY SEVERE (V SEV.)</b> - 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 &lt; 100 BPF</i></p> <p><b>COMPLETE</b> - 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 style="text-align: center;"><b>ROCK HARDNESS</b></p> <p><b>VERY HARD</b> - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p><b>HARD</b> - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p><b>MODERATELY HARD</b> - 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><b>MEDIUM HARD</b> - CAN BE GROVED 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><b>SOFT</b> - CAN BE GROVED 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><b>VERY SOFT</b> - 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>
GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)		SILT-CLAY MATERIALS (> 35% PASSING #200)		ORGANIC MATERIALS																																																																																																						
GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6																																																																																																					
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USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	MUCK, PEAT																																																																																																					
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD		FAIR TO POOR		FAIR TO POOR	POOR																																																																																																					
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	<input type="checkbox"/> TRICONE _____ * TUNG-CARB.																																																																																																										
	<input type="checkbox"/> CORE BIT																																																																																																										
TERM	SPACING																																																																																																										
VERY WIDE	MORE THAN 10 FEET																																																																																																										
WIDE	3 TO 10 FEET																																																																																																										
MODERATELY CLOSE	1 TO 3 FEET																																																																																																										
CLOSE	0.16 TO 1 FEET																																																																																																										
VERY CLOSE	LESS THAN 0.16 FEET																																																																																																										
TERM	THICKNESS																																																																																																										
VERY THICKLY BEDDED	> 4 FEET																																																																																																										
THICKLY BEDDED	1.5 - 4 FEET																																																																																																										
THINLY BEDDED	0.16 - 1.5 FEET																																																																																																										
VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																										
THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																										
THINLY LAMINATED	< 0.008 FEET																																																																																																										
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																																																																																																										
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																																																																																																										
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																																																																																																										
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																																																																																										
		<p><b>BENCH MARK:</b> _____</p> <p><b>ELEVATION:</b> _____ FT.</p> <p><b>NOTES:</b></p>																																																																																																									



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

July 2, 2008

STATE PROJECT: 33810.1.1 (B-4642)  
FEDERAL PROJECT: BRSTP-1433(2)  
COUNTY: Scotland  
DESCRIPTION: Bridge 28 on SR 1433 over Jordan Creek

SUBJECT: Geotechnical Report - Inventory

**PROJECT DESCRIPTION**

The project is located in southeastern Scotland County, east of Laurinburg. The Geotechnical investigation consisted of two Standard Penetration Test (SPT) borings. The borings were performed with a CME-550 drill rig using 8" hollow stem augers. The borings were conducted in May 2008.

There is a discrepancy regarding the stream name. The project description refers to Jordan Creek; the plans as well as the Bridge Maintenance records indicate Juniper Creek.

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

The project limits are entirely within the floodplain. The test borings found roadway embankment fill resting on organic soils. The organic content ranged from 7% to 15%. These soils are very soft and saturated, and about five feet thick. The proposed roadway improvements will maintain the existing grade with minor widening.

**PHYSIOGRAPHY AND GEOLOGY**

The site is in the Coastal Plain, Middendorf Formation. The organic soils are recent sediments that rest on Coastal Plain sands. The natural ground elevation across the project is near 178 – 180'. The existing embankment height is about five feet. The embankment soils are sand. Groundwater is at or near the natural ground surface.

Respectfully submitted,

Clint Little  
Regional Geological Engineer

### EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT TIP # B-4642

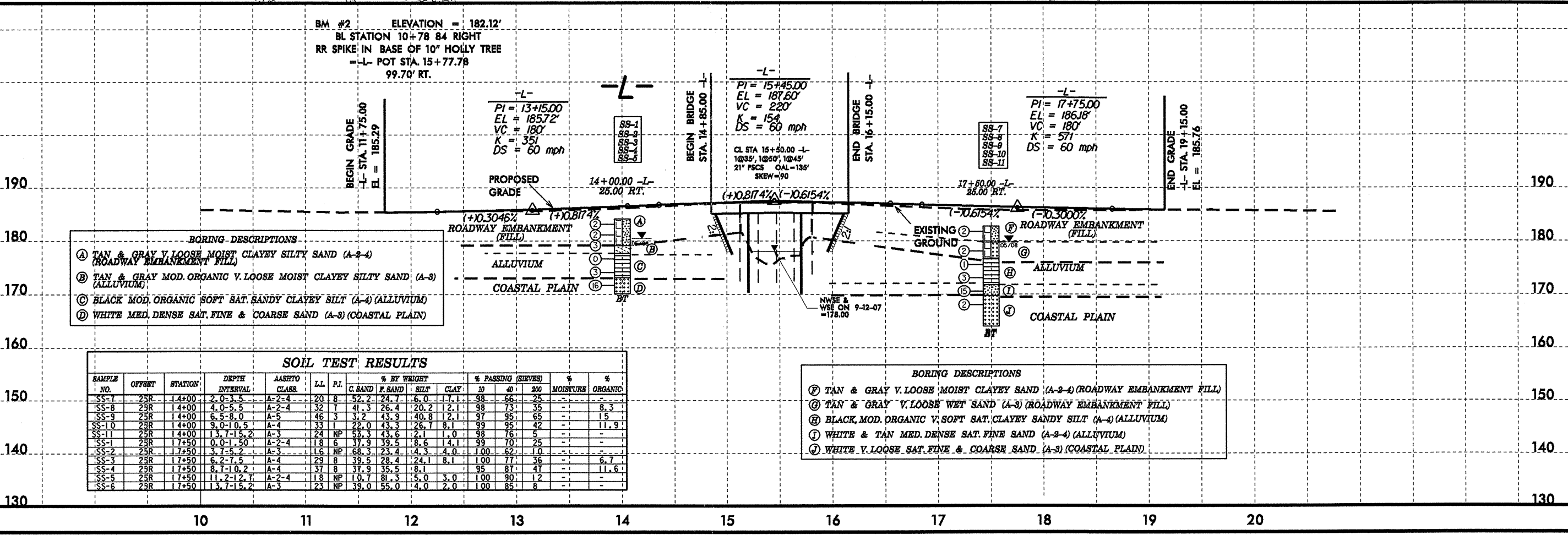
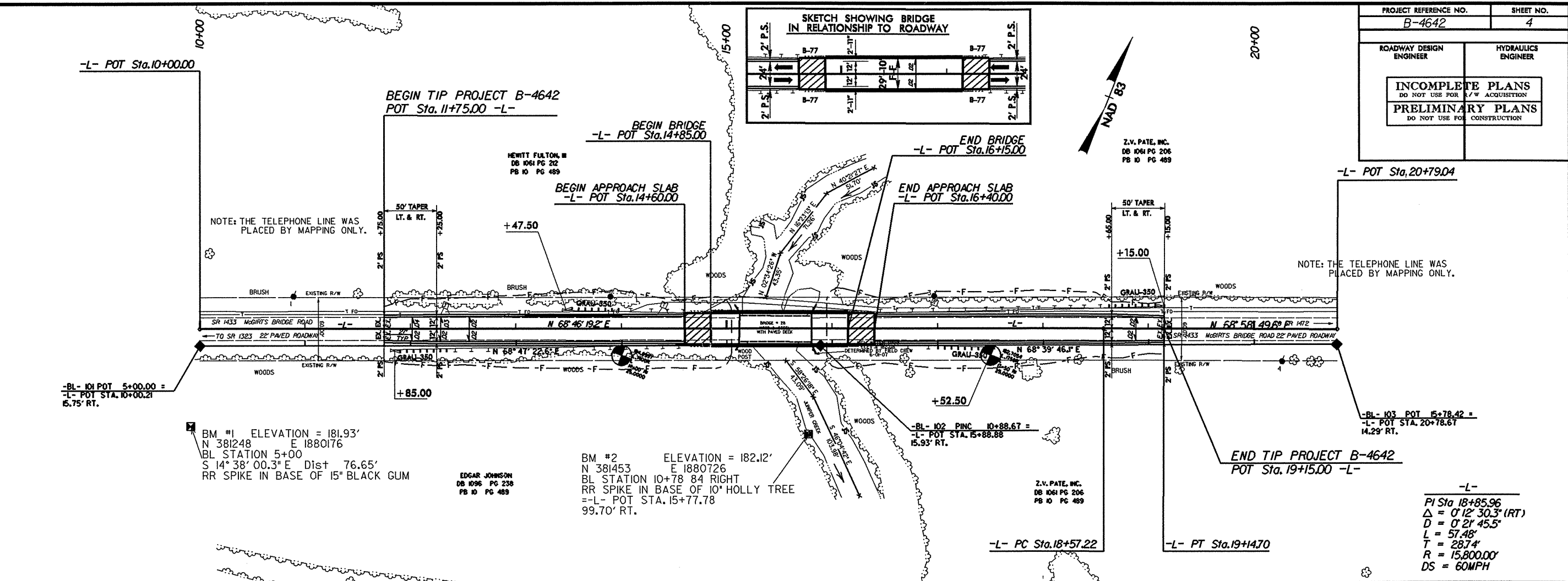
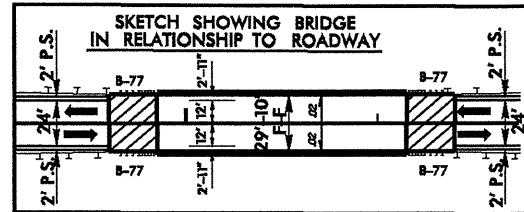
COUNTY : SCOTLAND

DATE : 10/28/2009

3A / 4  
SHEET 1 OF 1 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 20%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
L	11+75.00	14+85.00 BEGIN BRIDGE	102				102	443			443	532	430			
<b>SUBTOTAL</b>			102				102	443			443	532	430			
L	16+15.00 End Bridge	19+15.00	126				126	611			611	733	607			
Unclassified Structure Excavation			210				210							210		210
<b>SUBTOTAL</b>			336				336	611			611	733	607	210		210
<b>PROJECT SUBTOTAL</b>			438				438	1054			1054	1265	1037	210		210
WASTE IN LIEU OF BORROW													-210	-210		-210
<b>PROJECT TOTAL</b>			438				438	1054			1054	1265	827			
EST 5% TO REPLACE TOP SOIL ON BORROW PIT													41			
<b>GRAND TOTAL</b>			438				438	1054			1054	1265	868			
SAY			440										870			
Est. Undercut			500													
Est. Class IV Subgrade Stabilization			350													
Select Granular Material			500													
Fabric for Soil Stabilization			500													

\* EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.



- BORING DESCRIPTIONS**
- (A) TAN & GRAY V. LOOSE MOIST CLAYEY SILTY SAND (A-2-4) (ROADWAY EMBANKMENT FILL)
  - (B) TAN & GRAY MOD. ORGANIC V. LOOSE MOIST CLAYEY SILTY SAND (A-3) (ALLUVIUM)
  - (C) BLACK MOD. ORGANIC SOFT SAT. SANDY CLAYEY SILT (A-4) (ALLUVIUM)
  - (D) WHITE MED. DENSE SAT. FINE & COARSE SAND (A-3) (COASTAL PLAIN)

**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE		ORGANIC
							G. SAND	F. SAND	SILT	CLAY	10	200	W	U	
SS-7	25R	14+00	2.0-3.5	A-2-4	20	8	52.2	24.7	6.0	17.1	98	66	25	-	
SS-8	25R	14+00	4.0-5.5	A-2-4	32	7	41.3	26.4	20.2	12.1	98	73	35	8.3	
SS-9	25R	14+00	6.5-8.0	A-5	46	3	3.2	43.9	40.8	12.1	97	95	65	15	
SS-10	25R	14+00	9.0-10.5	A-4	33	1	22.0	43.3	26.7	8.1	99	95	42	11.9	
SS-11	25R	14+00	13.7-15.2	A-3	24	NP	53.3	43.6	2.1	1.0	98	76	5	-	
SS-1	25R	17+50	0.0-1.50	A-2-4	18	6	37.9	39.5	8.6	14.1	99	70	25	-	
SS-2	25R	17+50	3.7-5.2	A-3	16	NP	68.3	23.4	4.3	4.0	100	62	10	-	
SS-3	25R	17+50	6.2-7.5	A-4	29	8	39.5	28.4	24.1	8.1	100	77	36	6.7	
SS-4	25R	17+50	8.7-10.2	A-4	37	8	37.9	35.5	8.1	95	87	47	11.6		
SS-5	25R	17+50	11.2-12.7	A-2-4	18	NP	10.7	81.3	5.0	3.0	100	90	12	-	
SS-6	25R	17+50	13.7-15.2	A-3	23	NP	39.0	55.0	4.0	2.0	100	85	8	-	

- BORING DESCRIPTIONS**
- (E) TAN & GRAY V. LOOSE MOIST CLAYEY SAND (A-2-4) (ROADWAY EMBANKMENT FILL)
  - (F) TAN & GRAY V. LOOSE WET SAND (A-3) (ROADWAY EMBANKMENT FILL)
  - (G) BLACK, MOD. ORGANIC V. SOFT SAT. CLAYEY SANDY SILT (A-4) (ALLUVIUM)
  - (H) WHITE & TAN MED. DENSE SAT. FINE SAND (A-2-4) (ALLUVIUM)
  - (I) WHITE V. LOOSE SAT. FINE & COARSE SAND (A-3) (COASTAL PLAIN)

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