CONTENTS:

SITE PLAN _

BORLOGS _

SCOUR REPORT

NCDOT LEGEND SHEET _

SITE VICINITY MAP

SECTIONS _____

FOUNDATION INVESTIGATION REPORT ____ 3-5

SUMMARY OF ROCK CORE SAMPLES ____ 23

-L- PROFILE

GRAIN SIZE DISTRIBUTION GRAPHS ___

SITE PHOTOGRAPHS _____

AASHTO SOIL TEST RESULTS

SHEET No.:

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION	OF	HIGI	HWAY.
GEOTECH	INIC	CAL	UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33468.I.I I.D. NO. B-4113
F.A. PROJECT BRZ-IIO6(3)
COUNTY_FRANKLIN
PROJECT DESCRIPTION N/A
SITE DESCRIPTION BRIDGE NO. 15 ON SR 1106
OVER LITTLE RIVER

STATE	STATE PR	OJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	. I	3-4113	1	26
STATE	PROJ. NO.	F. A. PROJ. NO.	DESCRI	PTION
3346	8.1.1	BRZ-1106(3)	P.E	
			6011	

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 BORNING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL UNIT 6 1993 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING 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 NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STILL UN-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 MOSTURE CONDITIONS WOIGLATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOSTURE CONDITIONS WOIGLATED IN THE SUBSURFACE INVESTIGATIONS AND AVARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMMARY ONLY AND IN MANY CASES THE FRAIL DESIGN DETAILS ARE DEFERENT, 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, NOT THE INTERPRETATIONS MADE OR OPPOND 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 CLAMFOR 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. J. GILCHRIST

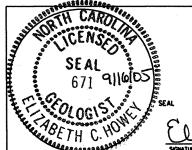
SUBMITTED BY F&R, Inc. J. SEHULSTER

DATE 8/2005 D. RACEY

D. JENKS

M. JONES

B. BOSTIAN



Clieateth Ct Courses

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 CLAMIS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON OFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DRAWN BY: D. RACEY

STATE PROJECT NO. SHEET NO. TOTAL SHEETS
33468.1.1 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION													
	SOIL AND ROCK LEGEND, TERM	S, SYMBOLS, AND ABBREVIATIONS											
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS										
OIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS	WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.										
HICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN	UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)	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.	AQUIFER - A WATER BEARING FORMATION OR STRATA.										
00 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.										
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS.										
IS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.										
VERY STIFF, GRAY SUTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6		ROCK (WR) PER FOOT.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL										
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERAL OGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC, ARE USED IN DESCRIPTIONS	1 [RACIO] INE	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.										
CLASS. (35% PASSING *200) (35% PASSING *200) (35% PASSING *200) (35% PASSING *200)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.										
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-COVETALLING FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM										
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6. A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30	I DOCK MICH SEDIMENTANT RUCK THAT WOULD TELLU SPI REPUSAL IF TESTED, RUCK TYPE I	OF SLOPE.										
SYMBOL COCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOC	MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL										
PASSING PASSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.										
* 10 50 MX GRANULAR SLI- MUCK,	GRANULAR STUT- CLAY	WEATHERING	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.										
** 40 30 MX50 MX51 MN	SOILS SOILS STILL THE LIGHT	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE										
	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%		HORIZONTAL.										
1010 LIMIT	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF										
HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V.SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.										
AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.										
SURL TIPES STATE FAND FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.	(SLI.) I INCH. UPEN JUINIS MAY CUNTAIN CLAY. IN GRANITUID RUCKS SUME UCCASIONAL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.										
ATERIALS SAND GRAVEL AND SAND SUILS SUILS	STATIC WATER LEVEL AFTER 24 HOURS.		FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM										
IN RATING AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	∇PW PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.										
SUBGRADE POOR POOR ONSUITABLE	0000	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY										
P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30	SPRING OR SEEPAGE	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.										
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.										
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT SPT CPT TEST BORING SAMPLE STICKED TO THE STEEL SAMPLE STICKED TO THE STICKED THE S	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.										
(N-VALUE) (TUNS/FIF)	<u> </u>	SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED											
GENERALLY VERY LOOSE 4 COANNIAD LOOSE 4 TO 10	AUGER BORING & HAND AUGER BORING S- BULK SAMPLE	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.										
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL OTHER THAN \$ SS- SPLIT SPOON		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.										
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	ROADWAY EMBANKMENTS - CORE BORING SAMPLE		MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN										
7,50	ST- SHELBY TUBE SAMPLE SAMPLE	(1. 364.) THE THOSE IS CONTECT RESOLD TO SOLE STRIPS, WITH ONCY THROUGHTON ON STRIPS	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN										
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MONITORING WELL SAMPLE ###################################		INTERVENING IMPERVIOUS STRATUM.										
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1	A PIEZOMETER	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.										
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	ALLUVIAL SOIL BOUNDARY INSTALLATION RT- RECOMPACTED SLOPE INDICATOR TRIAXIAL SAMPLE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF										
HARD >30 >4	25/825 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE	ALSO AN EXAMPLE. ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.										
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES SPT N-VALUE		SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE										
.S. STD. SIEVE SIZE 4 10 40 60 200 270	• - SOUNDING ROD REF SPT REFUSAL	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.	PARENT ROCK.										
PENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND										
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL FRAC FRACTURED	TO DETACH HAND SPECIMEN	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS										
(BLDR.) (COB.) (GR.) (CSE, SD.) (F. SD.) (SL.) (CL.)	B.I.A.D BACKFILLED IMMEDIATELY AFTER DRILLING FRAGS FRAGMENTS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR										
GRAIN MM 305 75 2.0 0.25 0.05 0.005	BRN BROWN MED MEDIUM BT - BORING TERMINATED RDWY EMBANK ROADWAY EMBANKENT	HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.										
SIZE IN. 12' 3'	C.I CAVE IN SDY SANDY	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF										
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY SL SILT, SILTY CPT - CONE PENETRATION TEST SLI SLIGHTLY	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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										
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR EIGHT MOISTURE DESCRIPTION	CSE COARSE TCR - TRICONE REFUSAL	POINT OF H DEDUCTION TICK.	WITH 60 BLOWS.										
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTONE DESCRIPTION	CT - CORING TERMINATED 7 - UNIT WEIGHT	SOFT 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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH										
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST ON - DRY UNIT WEIGHT	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.										
(SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO W - MOISTURE CONTENT F FINE V VERY	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	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										
ASTIC SEMISOLID; REQUIRES DRYING TO	FOSS FOSSILIFEROUS VST - VANE SHEAR TEST	FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.										
ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.										
PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS	BENCH MARK: NCDOT MONUMENT "GPS B4113-1" -L- STA. 30+77.71, 13.91' LT.										
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	M AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 2 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET											
SL SHRINKAGE LIMIT	MOBILE 8-	MIDE: 3 TO 10 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 370.30'										
- DRY - (D) REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY A BEDDE	NOTES:										
- DRY - (D) ATTAIN OPTIMUM MOISTURE	□ BK-51 ⊠ 8" HOLLOW AUGERS □-B	VERY CLUSE LESS THAN 0.16 FEET THINLY LAMINATED < 0.008 FEET	m l										
PLASTICITY	☐ CME-45 ☐ HARD FACED FINGER BITS ☐ N_03	INDURATION	X										
PLASTICITY INDEX (PI) DRY STRENGTH	TUNGCARRIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	AUGERING										
ONPLASTIC 0-5 VERY LOW	CME-550 ATV CASING W/ ADVANCER	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;											
OW PLASTICITY 6-15 SLIGHT IED. PLASTICITY 16-25 MEDIUM	CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.											
IGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.											
COLOR	OTHER TRICONE TUNG,-CARB.												
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.											
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER OTHER OTHER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:											
	OTHER	SAMPLE BREAKS ACROSS GRAINS.											
			REVISED 09/15/00										



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

August 22, 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:

33468.1.1

TIP No.:

B-4113

F.A. Number:

BRZ-1106(3)

County:

Franklin

Description:

Bridge No. 15 on SR 1106 over Little River

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 0666-043G dated July 19, 2005. Please contact us at your earliest convenience to discuss any comments regarding this report or our services in general.

Sincerely,

BRANCHES:

Christopher R. Baldwin

Staff Geologist

Elizabeth C. Howey, L.G., P.E Project Geotechnical Engineer

HEADQUARTERS: 3015 DUMBARTON ROAD • BOX 27524 • RICHMOND, VA 23261-7524 TELEPHONE (804) 264-2701 • FAX (804) 264-1202 • www.FandR.com

> ASHEVILLE, NC . BALTIMORE, MD . CHARLOTTE, NC . CHESAPEAKE, VA CROZET, VA • FAYETTEVILLE, NC • FREDERICKSBURG, VA • GREENVILLE, SC HICKORY, NC • RALEIGH, NC • ROANOKE, VA • STERLING, VA

Sheet 3 of 26



SITE DESCRIPTION

The proposed construction will involve a new two-span bridge to replace an existing two-span bridge on SR 1106 over Little River. The existing bridge is 60.5 feet long supported by timber piles with timber abutments at each end bent. The proposed replacement bridge will contain two spans with lengths of 50 and 85 feet; therefore, the new structure will be approximately 74.5 feet longer than the existing bridge. The proposed skew angle is 115 degrees.

METHOD OF EXPLORATION

A subsurface investigation was conducted in July, 2005. F&R proposed to advance 6 borings at the site, two borings at each proposed bent location. However, five borings were advanced at the right side of Bent 1 due to both boulders encountered in the existing fill and mechanical problems. Borings B1-B(1) (terminated due to a broken auger) and B1-B(4) (terminated due to a pump malfunction which did not allow the coring required to advance the boring) were combined into one boring log due to their very close proximity to each other. Borings B1-B(2) and B1-B(3) were terminated with shallow auger refusal on apparent boulders at depths of 6.5 and 5.0 feet, respectively. Boring B1-B(5) was advanced to perform rock coring at this side of Bent 1. In addition, these borings on the right side of Bent 1 were offset to avoid a tree that had fallen over the power lines between the time of the site visit and drill mobilization to the site; the borings were advanced as close as safely possible to the proposed location. Hand auger borings were also advanced to characterize the material near the ground surface on each side of the existing embankment at End Bent 1 and on the right side of Bent 1. The information obtained from these borings is included on the attached cross sections and boring logs.

The drilled borings were advanced with a CME-550 track-mounted drill rig with a 140-pound automatic hammer, utilizing 2-1/4 inch (at end Bent locations) and 3-1/4 inch (at Bent 1) inside diameter hollow stem augers. 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. Seven 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.

Sheet 4 of 26



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.

Boring collar elevations were surveyed using Benchmark NCDOT monument "GPS B4113-1" located at -L-Station 30+77.71, 13.91 feet left, with an elevation of 370.30 feet. Due to the distance of this benchmark from the bridge, a temporary benchmark (metal pipe) was set at the location of the EB2-B boring located at -L- Station 25+17, 15 feet right, with an elevation of 346.72 feet. This temporary benchmark was utilized to perform the remainder of the surveying for the profile and section views.

GEOLOGY

Based on review of the Geologic Map of North Carolina (1985), the project site is situated in an area of igneous intrusive rock of the Raleigh Belt. More specifically, the area is mapped and described as "foliated to massive granitic rock" (PPmg). The rock encountered in our borings is granite and exhibits the characteristics of the rock described in this area. A diabase dike is mapped nearby but diabase was not recovered in our borings.

STRATIGRAPHY

Existing roadway embankment was encountered at the ground surface in the borings advanced near the end bents of the existing bridge. The embankment extends to depths of 3.0 to 12.0 feet (elevation 334.7 to 343.7 feet) and consists of loose to medium dense, fine to coarse sand with some clay (A-2-4, A-1-b) and soft to medium stiff, fine to coarse sandy clay (A-6). At the ground surface at B1-A and beneath the embankment at End Bent 2 the borings encountered alluvial soil consisting of very loose to loose, fine to coarse sand (A-2-4, A-1-b) and soft, fine to coarse sandy clay (A-6). The alluvium extends to depths of 8.0 to 17.5 feet (elevation 329.7 to 332.2 feet) in these borings. The embankment in borings EB1-A, EB1-B and B1-B and the alluvium in the remainder of the borings are underlain by weathered rock and/or crystalline rock (granite) to the boring termination depths of 6.0 to 30.4 feet (elevation 316.2 to 341.7 feet). The borings at the end bent locations were terminated by auger refusal while the borings at Bent 1 were advanced with NQ-3 coring equipment to their boring terminations. The rock properties of the recovered core are discussed below.



ROCK PROPERTIES

Crystalline rock was cored at Bent 1 of the proposed bridge. The recovered core consists of white, brown, black and pink, moderately to very slightly weathered, very hard, foliated to massive granite. The first core run at B1-A was a short run of only 1.3 feet; the upper 0.8 foot of material was not recovered and was designated as weathered rock. The recovery and Rock Quality Designation (RQD) values in this run were both 38%, reflecting the crystalline rock recovered in the lower 0.5 foot of the core run. Core recoveries were 100% in the remainder of the core runs advanced at Bent 1. The Rock Quality Designation (RQD) ranged from 74% to 100% in material designated as crystalline rock. Four samples of the recovered core were trimmed and subjected to unconfined compressive strength. Their tested strengths ranged from 5,207 to 25,886 psi. The results are included with the laboratory test results.

GROUND WATER

Ground water was generally measured in the borings immediately after drilling and after a stabilization period of 24 hours. Borings at End Bent 1 were dry immediately after drilling. Boring EB1-A was backfilled immediately after drilling (B.I.A.D.) due to its location in a driveway while boring EB1-B remained dry after a stabilization period of 24 hours. In borings advanced at Bent 1 and End Bent 2, ground water was encountered at elevations ranging from 337.7 to 341.2 feet. Boring EB2-A caved at a depth of 1.0 foot when the augers were removed. The water surface of Little River was measured at elevation 338.7 feet during our field investigation

NOTES TO THE DESIGNER

Apparent boulders were encountered within the fill in borings advanced at the right side of Bent 1; shallow auger refusal was obtained in borings B1-B(2) and B1-B(3) at depths of 6.5 and 5.0 feet, respectively. It should also be noted that a diabase dike is mapped in the vicinity of this site although diabase was not encountered in our borings.

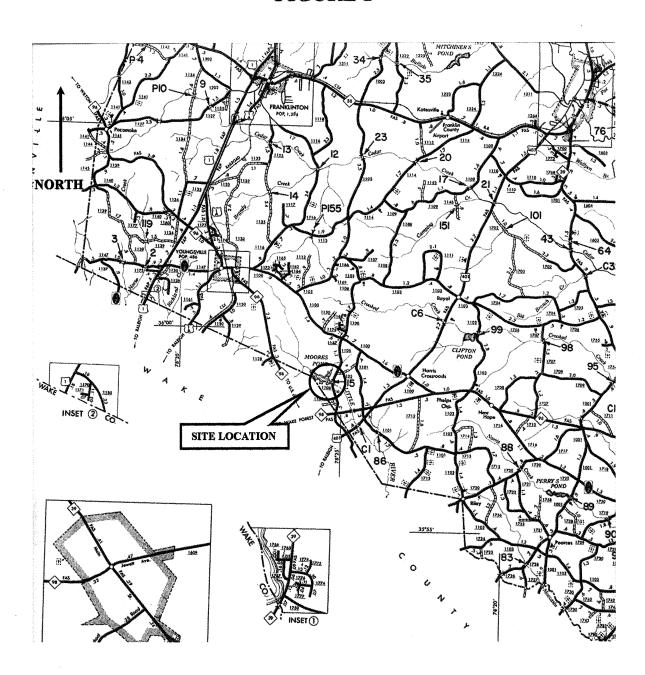


QUALIFICATIONS OF REPORT

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.



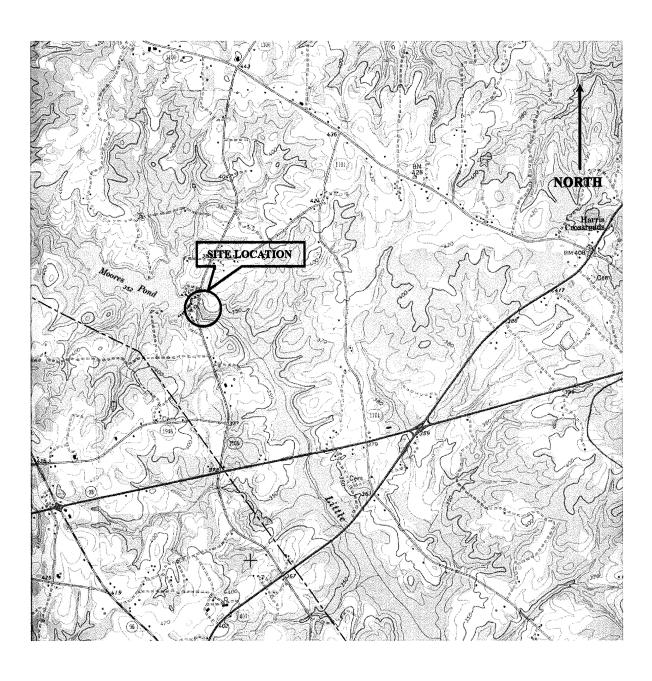
FIGURE 1



SITE VICINITY MAP

Adapted from an NCDOT Bridge Location Map of Franklin County, North Carolina, dated January 1, 1990. Scale 1"=2.5 mi. (approx.)

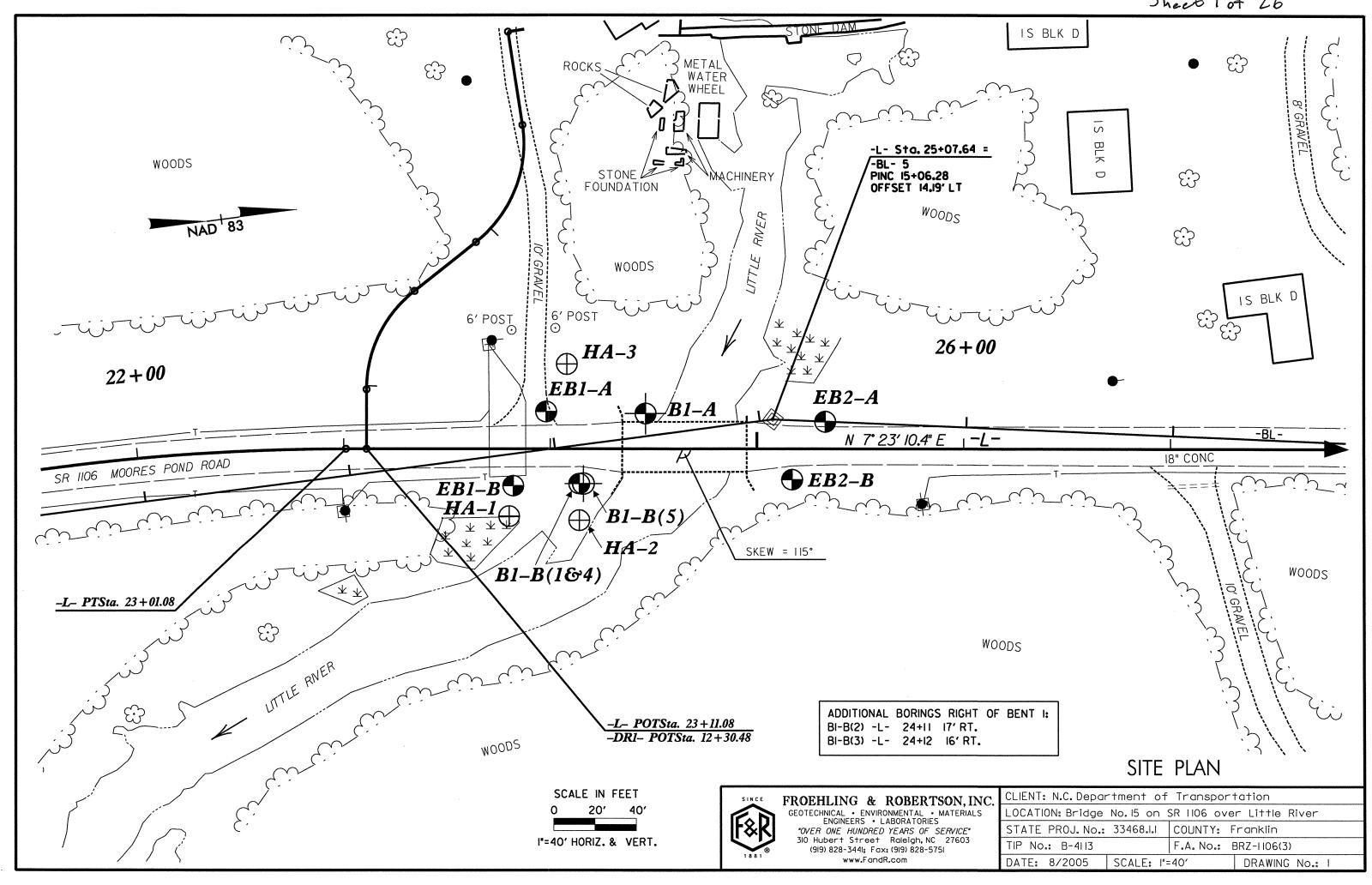
FIGURE 2

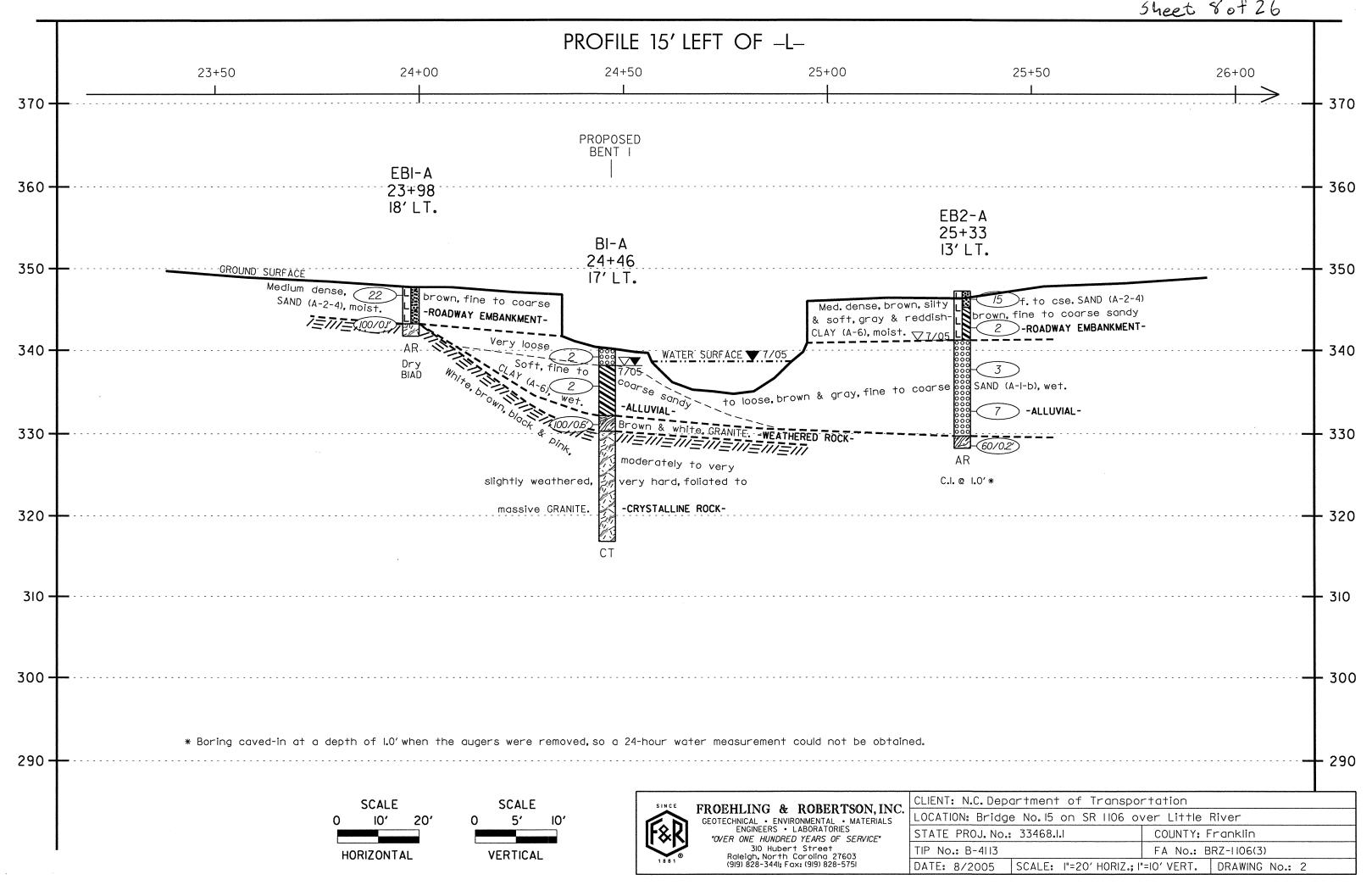


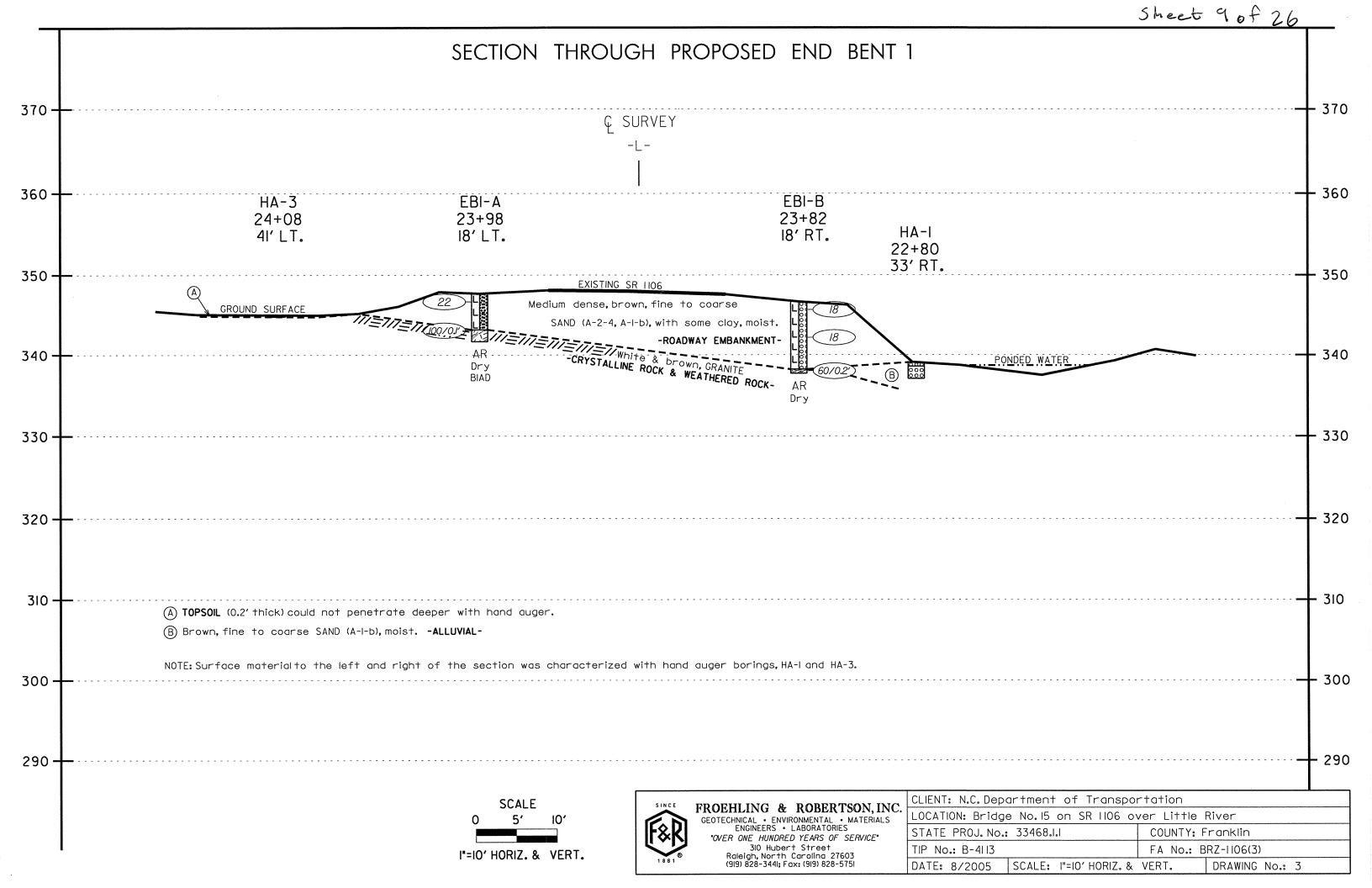
SITE LOCATION PLAN

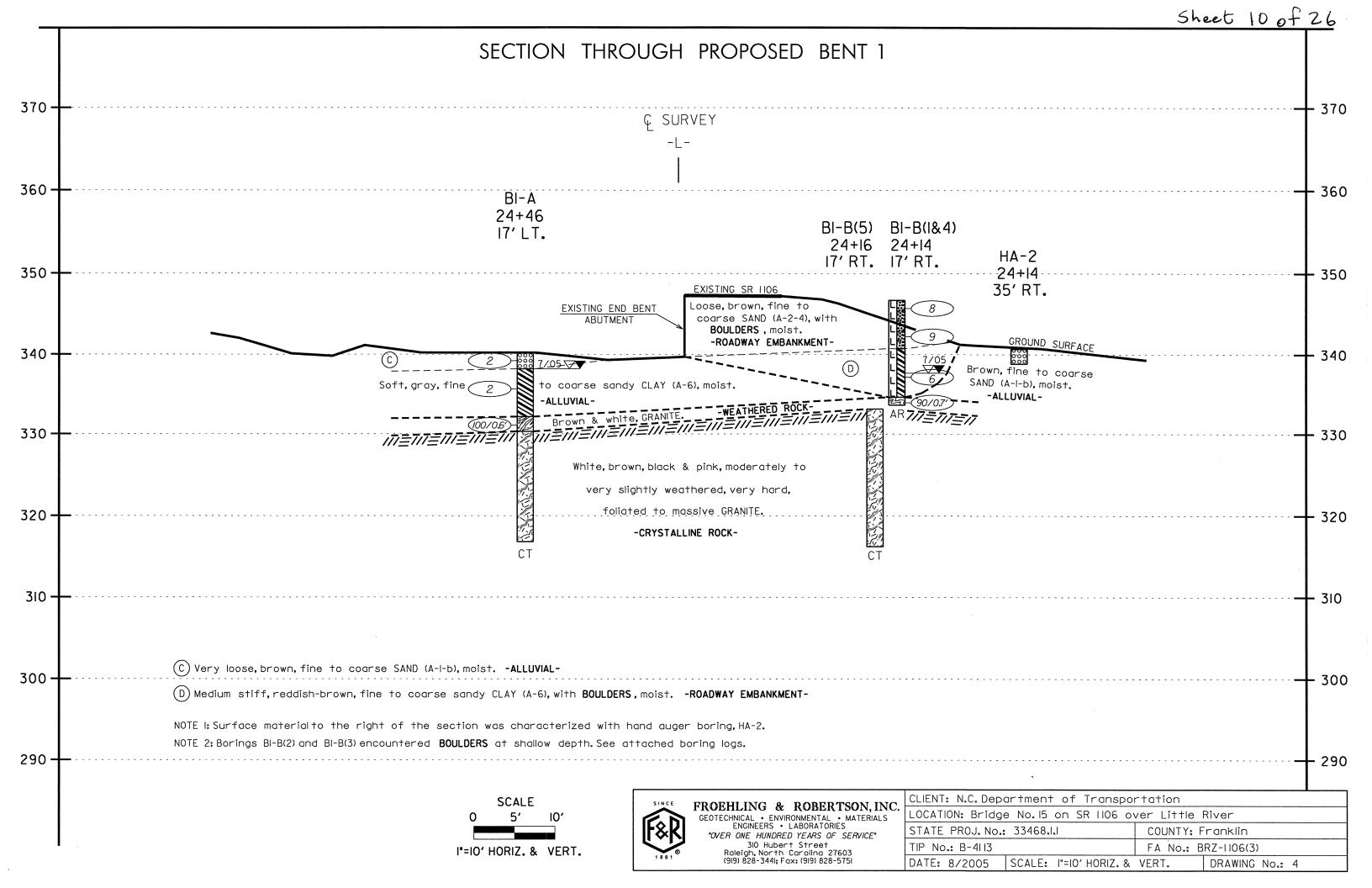
Adapted from a USGS Quadrangle 7.5 min. Topographic Map of Rolesville, North Carolina, dated 1967, photorevised 1973.

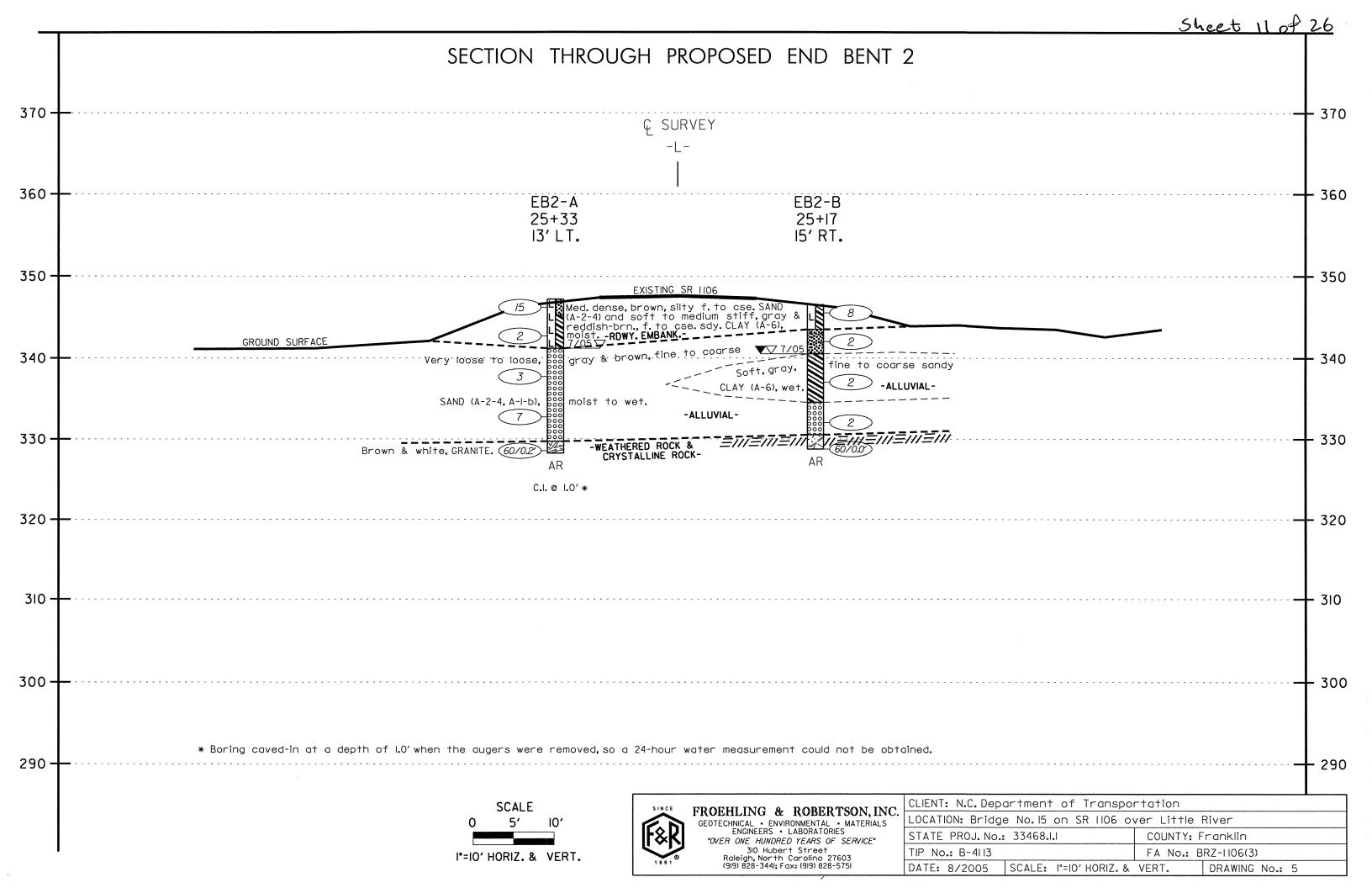
Scale 1"=2000' (approx.)















FROEHLING & ROBERTSON, INC. GEOTECHNICAL • ENVIRONMENTAL • MATERIALS ENGINEERS • LABORATORIES

N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

The same of the sa		18		"OVER ONE HUNDRED YE	ARS OF SERVIC	E"			SHEE	T 1 OF 1		
PROJECT NO.	33468.1.1		ID.	B-4113	COUNTY	/ Frank	din			OGIST C. Baldwin		
ITE DESCRIP	TION Bridg	ge No. 15 o	n SR 110	6 over Little River						GROUND WATER (ft)		
BORING NO.	EB1-A	вог	RING LO	CATION 23+98	OFFS	ET 18	ft LT		ALIGNMENT -L-	0 HR. Dry		
OLLAR ELEV	/. 347.7 ft	NORTH	ING 81	1,542	EAST	ING 2	171,3	14		24 HR. B.I.A.D.*		
OTAL DEPTH	6.0 ft	DRILL	MACHINI	E CME 550 Track	RILL METH	IOD 2.2	25" ID	HSA	HAMI	MER TYPE Automatic		
ATE STARTE	D 7/26/05	······	СО	MPLETED 7/26/05	SURF	ACE W	ATER	DEP	PTH N/A			
LEV. DEPTH	BLOW C	OUNT		BLOWS PER FOOT		SAMP.	V/	L	COULAND DOO	K DESCRIPTION		
(ft) (ft)	0.5ft 0.5	ift 0.5ft	0 2	0 40 60	80 100	NO.	MOI		SOIL AND ROOM	V DESCRIPTION		
347.7				Ground Surface					347.7			
47.7 0.0	8 12	2 10				SS-8	М	Н:	ROADWAY	EMBANKMENT-		
44.2 + 3.5									Brown, fine to coa with some	rse SAND (A-2-4(0)), clay, trace silt.		
+	2 3	100/0.1		· · · · · · · · · · · · · · · · · · ·	100/0.1				343.2 -CRYSTAL	LINE ROCK-		
‡						1	 	1/1	White & brown,	foliated to massive		
‡				w.					Boring Terminated by Elevation 341.7 ft in C	Auger Refusal at		
‡									GRANITE)	RYSTALLINE ROCK		
‡ .									<u>-</u>			
<u> </u>									- NOTES:			
<u> </u>									- 1) Geologist indicates spoon at a depth of			
<u>+</u>									2) Auger refusal at a d	epth of 6.0'		
<u> </u>									†	andintala often dellina		
Ŧ									* Boring backfilled imn (B.I.A.D.) due to loca	ation in driveway.		
ł												
Ŧ.				,								
Ŧ									, -			
Ŧ									_			
Ŧ					•				<u>-</u>			
Ŧ												
Ŧ							,	1.				
Ŧ									<u></u>			
Ŧ									-			
Ī									-			
Ī									_			
ł									<u>.</u>			
+									-			
Ŧ									<u>-</u>			
Ŧ												
Ŧ												
Ŧ												
‡									<u>-</u>			
‡									-			
‡									- -			
+									- -			
‡									- -			
Ī									_	•		
Ŧ									_			
Ŧ									_	•		
‡									<u> </u>			
سلد		1 1					1		-			





FROEHLING & ROBERTSON, INC.

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

Ster OF T	ARREST			1	881									SHEET 1 OF 1	,	
PROJECT NO. 33468.1.1 ID. B-4113									C	OUNTY	Frank	din	GEOLOGIST C. Baldwin			
SITE DI	ESCRIP	TION	Bridge	No. 15	on SI	R 1106 c	ver Litt	le River						GROUND W	ATER (ft)	
BORING	3 NO.	EB1-B		ВО	RING	G LOCAT	rion 2	23+82		OFFS	ET 18	ft RT		ALIGNMENT -L- 0 HR.	Dry	
COLLA	R ELEV	. 346.	7 ft	NORT	HING	811,5	22			EAST	ING 2	,171,3	47	24 HR.	Dry	
TOTAL	DEPTH	9.0 ft		DRILL	. MA	CHINE (CME 5	50 Track	DRILL	. METH	OD 2.	25" ID	HSA	A HAMMER TYPE Auto	matic	
DATE S	TARTE	D 7/26	3/05			COMP	LETED	7/26/05		SURF	ACE W	ATER	DEP	PTH N/A		
ELEV.	DEPTH	BLC	ow cor	TNL				PER FOO	Т		SAMP.	V /	L	SOIL AND ROCK DESCRIPTION		
(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ŷ	20	40 	60 	80 	100	NO.	MOI		SOIL AND NOOK DESCRIPTION		
346.7							Groun	nd Surface)					346.7	0.0	
346.7.4	0.0	3	8	10		· • 18·						М				
343.2	3.5				: :									Brown, fine to coarse SAND (A-1-b(0)),	
1 1	-	2	6	12] : :	18					SS-6	M		with some clay & gravel.		
1	-				: :											
338.2	8.5	60/0.2'-				<u> L</u>				60/0.2	ļ	ļ	_80 -80 -80	338.2 -WEATHERED ROCK-	8.8 /9.0	
1 1	-													White & brown, foliated to massive GRANITE.	/	
	-													Boring Terminated by Auger Refusal at Elevation 337.7 ft in WEATHERED ROCK		
	-													(GRANITE)	`	
	-													-		
	-													- NOTES:	•	
	-											ļ		1) Driller indicates harder drilling at a depth of 8.5' (elev. 338.2').		
	- -													2) Auger refusal at a depth of 9.0' (elev. 337.7').		
	-								,					(elev. 357.7).		
-	-													<u> </u>		
	_													F		
	-													F		
-	-													F		
	-													F		
	-					•								<u>-</u>		
	-													- -		
1 1	-													 		
	-													<u> </u>		
	-													<u> </u>		
	-													‡		
	-													-		
	- -													t		
	-					•						-		Ł		
CT/K	-													-		
	-													-		
-	_													F		
ָרָ בַּ														F		
	-													-		
7	- -													<u> </u>		
1005	-													<u>.</u>		
9	_			1										<u> </u>		
DNII	-													F .		
i i	_													F		
ACDOT BOKE SINGLE GOG-009, OF INC. DOT. GD. 7/12/03	_													F		
3	-													F		





N.C.D.O.T. GEOTECHNICAL UNIT **BORING LOG**

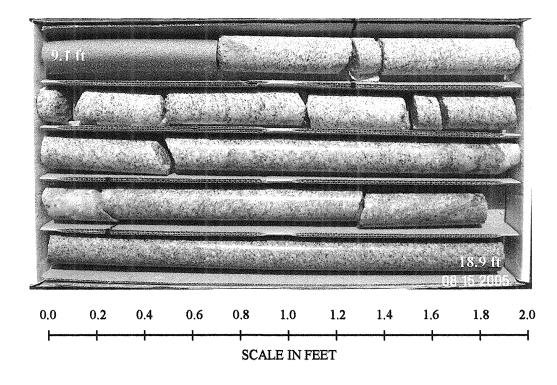
ROJE	CT NO.	33468	3.1.1			ID. E	3-4113		C	YTNUC	Frank	lin		GEOLOGIST C. E	aldwin	
ITE DI	ESCRIP	TION	Bridge	No. 15	on S	R 1106	over Little	River							GROUND W	ATER (ft)
ORIN	G NO.	B1-A		ВО	RIN	G LOCA	TION 24	+46		OFFS	ET 17	ft LT		ALIGNMENT -L-	0 HR.	2.0
OLLA	R ELEV	7. 340.	2 ft	NORT	HINC	3 811,	590	, , , , , , , , , , , , , , , , , , , ,		EAST	ING 2,	171,3	21		24 HR.	2.0
OTAL	DEPTH	23.4	ft	DRILL	. MA	CHINE	CME 550) Track	DRILL	METH	OD 3.2	25" ID	HSA	VNQ-3 Core HAMMI	R TYPE Auto	matic
ATE S	TARTE	D 7/28	3/05	L		COM	PLETED	7/29/05		SURF	ACE W	ATER	DEP	TH N/A		
LEV.	DEPTH	BL	ow cou	JNT	Π		BLOWS F	PER FOOT	•	L	SAMP.	V /	11	000 440 5004		
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	80	100	NO.	мог	O G	SOIL AND ROCK I	DESCRIPTION	
40.2							O									
	₹_0.0	1	1	1	2	,	Ground	Surface			 		800	340.2 		
36.7	- - - 3.5												200			
70.7	- 0.0	1	WOH	2	•2						SS-20	25.3%		Gray, fine to coarse so with trace	andy CLAY (A-6(ce silt.	(2)),
7	-													-	,	
31.7	8.5		10/0.41		.L									332.2 -WEATHER	ED ROCK-	
1	-	60	40/0.1'		ļ				1	00/0.6				Brown, severely weath massive G	ered, soft, foliate	ed to
1	_ ,				: :						RS-1			-CRYSTALL		
1	-													White, brown, black & p.	nk, moderately to	o very
4	-													slightly weathered, v massive G	ery nard, foliated RANITE.	το
	-													-		
_	_				: :									<u>-</u>		
}	_				: :									-		
-					├		· · · · ·		· · ·	· · _	RS-2	1	12	_ 316.8 - Boring Terminated at Ele	evation 316.8 ft in	
_														CRYSTALLINE ROCK (GRANITE)	•
1	-															
	_													- NOTES:		
-	- -								•					1) Driller indicates harde depth of 8.0' (elev. 332	2.2').	
	_													2) Coring began at a der (elev. 331.1').	oth of 9.1'	
-	-													(0.00.001.1).		
-	-					,										
]	_															
-	_															
-	_													-		
	- -													•		
-	-					-								-		
	-													-		
1	_						,							-		
	_													- -		
-	-													-		
-	_													_		
														-		
_														<u>-</u>		
-																
-														-		
-	_													<u>-</u>		
-	-													<u>-</u>		
	-															
_	_													<u> </u>		
-					-	•								-		
1	Ė		1	1										- -		

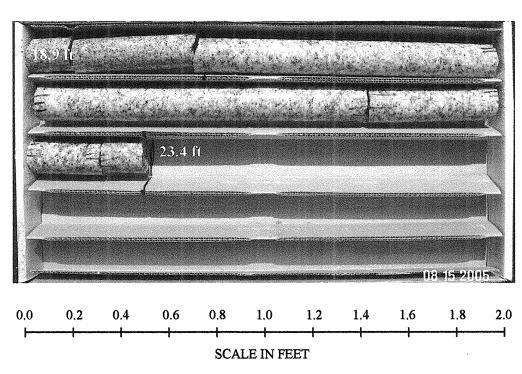
Sheet lof 26

								Sheet 1 o
							CORE BORING REPORT	DATE: <u>7/28-29/2005</u>
PROJEC'	Г:	33468.1.1			I.D. NO.	B-4113	BORING NO.: <u>B1-A</u>	GEOLOGIST: Chris Baldwin
DESCRI	PTION:	Bridge No. 1	5 on SR 1	106 over L	ittle River			SENIOR DRILLER: Jim Gilchrist
COUNTY	<i>ไ</i> :	Franklin			-	COLLAR	ELEVATION: 340.2 ft TOTAL DEPTH: 23.4 ft	DRILLING ASSISTANT: Jason Schulster
		T 70.31	T n	nr.c	T DOD	1		
Elev. (ft)	Depth (ft)	Drill Rate min./ft	Run Length (ft)	REC (ft) %	RQD (ft) %	Sample #	FIELD CLASSIFICATION AND REMARKS	221 1 0 (01 (
331.1	9.1	0:37/0.3 ft	1.3	0.5/1.3	0.5/1.3		WR - 9.1 - 9.9 ft Brown, severely weathered, soft Foliated to Massive Granite Very close fracture spacing.	331.1 ft (9.1 f
329.8	10.4	4:56		38%	38%		STRATA BREAK STRATA REC.=0% STRATA RQD=N/A	330.3 ft (9.9 f
329.8	10.4	5:28	5.0	5.0/5.0	3,9/5,0		CP 00 2246 White bound blok and side and school and side	1 1750 200
		5:36		100%	78%		CR - 9.9 - 23.4 ft. White, brown, black and pink, moderately to very slightly weath Close to wide fracture spacing.	ered, very hard, Foliated to Massive Granite
		5:30					4 joints at 0° 2 joints at 10°	
		5:45					1 joint at 20° STRATA REC.=100%	
224.9	15.4	5:50					2 joints at 30° STRATA RQD=92%	
324.8 324.8	15.4 15.4	1:57/0.3 ft	4.3	4.3/4.3	4.3/4.3		1	
		5:59		100%	100%		1 joint at 10°	
		6:04			- i		,	
		6:15						
		6:09						
320.5 320.5	19.7 19.7	5:00/0.7 ft	3.7	3.7/3.7	3.7/3.7			
		6:39		100%	100%			
		6:45						
		7:20						
316.8	23.4	<u> </u>	L	l	L	<u></u>		316.8 ft (23.4 f
	·····						NOTES:	oring Terminated at Elevation 316.8 ft
HOLE A	Track Ri	g with automatic		stem augers.			NOTES.	
2. Cored u		w/SICB and a S		-		m ·		



CORE PHOTOGRAPHS: B1-A 24+46, 17' Lt.





61	ONTH CARD
Ext. ((TELL
1	



OF 18	41192			1	881											SHEE	T 1 OF 1	
PROJEC	CT NO.	33468	3.1.1			ID.	3-4113		С	OUNTY	Frank	din		[GEOLOGI	-		
SITE DE	SCRIP	TION	Bridge I	No. 15	on SR	1106	over Lit	tle River			**** <u>*********************************</u>			······································	-	:	GROUND WAT	ER (ft)
BORING	NO.	31-B (1	(&4)	ВО	RING	LOCA	TION 2	24+14		OFFS	ET 17	ft RT		ALIGNME	NT -L-		0 HR.	9.0
COLLA	R ELEV	346.	7 ft	NORT	HING	811,	554			EAST	ING 2	,171,3	50				24 HR.	9.0
TOTAL	DEPTH	13.0	ft	DRILL	. MAC	HINE	CME 5	50 Track	DRIL	L METH	OD 3.2	25" ID	HSA	\	·	HAMN	TER TYPE Autom	atic
DATE S	TARTE	D 7/2	5/05	***************************************		COM	PLETEC	7/26/05		SURF	ACE W	ATER	DEP	TH N/A		·		
ELEV.	DEPTH	BLO	ow cor	JNT			BLOW	S PER FOO	т	***************************************	SAMP.	V/	L		COU AN	D DOO!	/ DECODIDE ON	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60 L	80	100	NO.	MOI			SOIL AN	D ROCK	DESCRIPTION	-
346.7							Crow	nd Surface										
346.7	0.0	2	4	4	1	8 · ·		iu Suriace			SS-1	М	<u> </u>	346.7 -				0.0
343.2	3.5											1			Brown, fine	e to coar	MBANKMENT- se SAND (A-2-4(0)),	
Ŧ		4	5	4] : : •	9		· · · · · ·				M		- 040.7	with	some c	lay, trace silt.	
+					: :			· · · · · ·					N	340.7				6.0
338.2	8.5	8	2	4	1:1	 						V		-	Reddish-l	brown, fi AY (A-6)	ne to coarse sandy , with gravel.	
334.7	12.0				: T							1		- 2247	*			40.0
554.7	12.0	75	15/0.2'				***************************************			90/0.7		<u> </u>	5	334.7 333.7			RED ROCK-	12.0
. [GRA	oliated to massive NITE.	_/
\pm												ĺ	E	- Ele	vation 333.	ated by A 7 ft in Wi	Auger Refusal at EATHERED ROCK	
ł													[- (GF	RANITE)			
1												ŀ	E	_ NO	TES:			-
1													1		Oriller indica	ates hard	ler drilling at a	
1					-				,					d 2) <i>A</i>	epth of 12.0 Auger refus)' (elev. 3 al at a de	334.7'). epth of 13.0'	
+ 1	-												[(€	elev. 333.7')).	at a depth of 11.0'	
1													l E	- d	ue to broke	n auger.	at a depth of 13.0'	
1													[- d	ue to pump	malfunc	tion.	,
ł													1 6	-	Dee D 1-D(0)) ioi coni	ng miormation.	
1													E					
+	-												1 -					
+														-				
#	-													_				
‡	·													-				
1														-				
+	-													-				
1														- -				,
1														-				
‡												ŀ		- -				
<u> </u>														_				
+	-																	
1	•													<u>.</u>				
1													<u> </u>	-				
<u> </u>													<u> </u>	<u>.</u>				
1		-											<u> </u>	- -			-	
+	-													_				
1	<u>. </u>												[-				
1	-												[_				
Ī							`						1 [-				





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

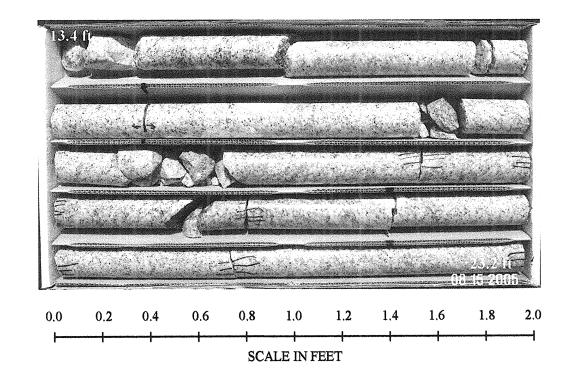
OF THANK				1	1881			·								T 1 OF 1
ROJECT	NO.	33468	3.1.1			ID.	3-411:	3	C	OUNT	f Frank	lin		GEOLOG	IST C.	Baldwin
ITE DESC	CRIPT	ION I	Bridge I	No. 15	on SR	1106	over L	_ittle Rive	r							GROUND WATER (ft)
ORING N	10. E	31-B(5))	В	DRING	LOCA	TION	24+16		OFFS	SET 17	t RT		ALIGNMENT -L-		0 HR. N/A
OLLAR E	LEV.	346.0	6 ft	NORT	THING	811,	556			EAS	ring 2,	171,35	51			24 HR. N/A
OTAL DE	PTH	30.41	ft	DRIL	L MAC	HINE	CME	550 Trac	k DRIL	L MET	HOD 3.2	25" ID	HSA	/NQ-3 Core	HAMN	MER TYPE Automatic
ATE STA	RTE	7/25	5/05			COM	PLETE	ED 7/25/	05	SUR	FACE W	ATER	DEP.	TH N/A		
LEV. DE	PTH	BLO	ow cor	JNT			BLO	WS PER F	тос		SAMP.	V	L	IA IIO2	ND BUCK	CDESCRIPTION
(ft) ((ft)	0.5ft	0.5ft	0.5ft	Ŷ	20	4	10 60	80	10	NO.	MOI		OOIL A		C DECORNI TION
346.6							Gro	ound Surfa	ace.					346.6		
+	$\neg \uparrow$				 								1)	•	norod to a	attempt pering
Ŧ					1::								$ \langle F $	- Au	gereu to a	attempt coring.
Ŧ					1::			· · · · ·						•		
Ŧ					: :								$ \langle F \rangle$	-		
‡					1 : :								$ \lambda $			
‡													{\F	•		
‡	- 1				1								Иҍ	- 333.2		
‡					· ·						RS-3	1			RYSTAI	LINE ROCK-
‡					: :									White, brow	wn, black	& pink, slightly to very very hard, foliated to GRANITE.
‡					1::									. ongmy m	massive	GRANITE.
‡					1::						DC 4			•		
‡					1::						RS-4	1		•		
‡														•	,	
‡														<u>.</u>		
‡														• •		
+			-		+	<u> </u>	<u> </u>			· · · · ·	 		4 .	316.2 Boring Termi	nated at E	Elevation 316.2 ft in
Ŧ														CRYSTALLIN	NE ROCK	(GRANITE)
Ŧ														NOTES:		
+														 . 1) Auger refu		epth of 13.4'
‡														- (elev. 333.2 - 2) Coring beg - (elev. 333.2	?'). jan at a d	epth of 13.4'
<u></u>														- (elev. 333.2 	2').	
<u> </u>														• •		
Ţ														<u>.</u>		•
+																
ł														- -		
Ŧ																
ŧ														<u>.</u>		
+													l Ł	<u>.</u>		
\pm														-		
Ŧ	I													<u>.</u>		
Ŧ													F			
Ŧ	-												F	- -		
Ŧ													F	- -		
‡													F	- 		
Ŧ					1									. • '		
‡											-		F	- -		
Ŧ	Ì				1								F			
İ	İ		1									1	Ιt	_		

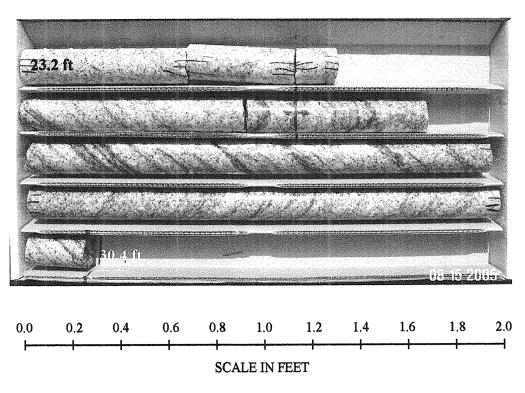
Sheet 16 of 26

							CO	ORE BORI	ING REPO	RT			DATE: _	Sheet 1 of 7/25-21/2005
PROÆC	Т:	33468.1.1			I.D. NO.	B-4113	MANAGER AND THE STREET STREET, STREET	BORIN	NG NO.: <u>B1-B (5)</u>			GEOL	OGIST: Chris Bal	dwin
DESCRI	PTION:	Bridge No. 1	5 on SR 1	106 over L	ittle River		~~~~					SENIO	R DRILLER: Jim	Gilchrist
COUNT	Y:	Franklin				COLLAR	ELEVATION:	346.6 ft	TOTAL I	DEPTH:	30.4 ft	DRILL	ING ASSISTANT	: Jason Sehulster
Elev.	Depth	Drill Rate min./ft	Run Length (ft)	REC (ft)	RQD (ft) %	Sample	FIE	ELD CLASSIFICA	ATION AND REM	ARKS				333.2 ft (13.4 f
333.2	13.4	1:01/0.3 ft 5:15	2.3	2.3/2.3	1.8/2.3 78%			0.4 ft White, brown fracture spacing.	n, black and pink,	slightly to very :	slightly weather	ed, very hard, Fo	liated to Massive	
330.9 330.9	15.7 15.7	5:27	5.0	5,0/5.0	3.7/5.0		3 joints at 0° 1 joint at 30°		CHID A TO A	DEC -1000/				
		5:30		100%	/4%		2 joints at 50° 1 joint at 70°			REC.=100% RQD=89%				
325.9	20.7	5:25												
325.9	20.7	5:47 5:52	5.0	5.0/5.0	5.0/5.0	4		*	٠					
		6:01 5:57												
320.9	25.7	5:52												
320.9	25.7	4:38/0.7 ft 5:50 6:04	4.7	100%	100%									
316.2	30.4	6:16			,					٠.				016000000
310.2	30.4	<u> </u>	1	L	L	1						Coring Terminated	at Elevation 316.2 ft	316.2 ft (30.4 ft
HOLE A	0 Track Ri DVANC from 0.0 - 1	g with automatic EMENT: 13.4 feet using 3 w/SICB and a S	.25" hollov	_		m		NOTES:	·					



CORE PHOTOGRAPHS: B1-B (5) 24+16, 17' Rt.









N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

Mer or 1	ALLIAN TO THE PARTY OF THE PART			1	881										T 1 OF 1	
	CT NO.					L	3-4113		CC	YTNUC	Frank	lin		GEOLOGIST C.		
ITE D	ESCRIP	TION	Bridge				over Little									WATER (ft)
	G NO.						TION 2	4+11			ET 17			ALIGNMENT -L-	0 HR.	N/A
OLLA	R ELEV	. 346.	5 ft			811,5				L	NG 2,				24 HR.	N/A
OTAL	DEPTH	6.5 ft		DRILL	. MAC	HINE	CME 55	0 Track	DRILL	METH					IER TYPE A	utomatic
ATE :	STARTE	D 7/2	5/05			COM		7/25/05		SURF		ATER	DEP	PTH N/A		
LEV.	DEPTH	BL	ow col					PER FOOT		400	SAMP.	V /	0	SOIL AND ROCK	DESCRIPTION	1
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40 	60 I	 	100	NO.	MOI	G		<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
346.5						·	Ground	d Surface						346.5		
_	<u> </u>				: :								И	Augered to a	ttempt coring.	
	Ŧ				: :									-		•
					::			<u> </u>	<i>.</i>				И	340.0 Boring Terminated by A	Vugar Dafuaal a	
	‡													Elevation 340.0 ft on B	OULDER.	
	‡													- - L NOTES:		
-	‡ ·													- 1) Auger refusal at a de	enth of 6.5'	
	‡													(elev. 340.0').	spur or o.o	
-	‡															
	Ŧ															
	Ŧ													_		
-	Ŧ															
	Ŧ													_		
	Ŧ													_		
	Ŧ													_		
	Ŧ													_		
•	Ŧ										-			_		
	Ŧ													<u> </u>		
•	ŧ					•							'	-		
	Ī													- -		
	Ŧ							•						<u> </u>		
	‡													<u> </u>		
	‡													-		
	‡													-		
	‡															
	‡							•						<u></u>		
	‡													-		
	‡													-		
•	‡													-		
	‡													-		
	‡													-		
	‡															
	‡															
	‡															
	‡															
	‡													F		
	†										1					





FROEHLING & ROBERTSON, INC.

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

N.C.D.O.F. GEOTECHNICAL UNIF BORING LOG

SHEET 1 OF 1

91				18	881									3	HEE	1 1 OF '	1
PROJE	CT NO.	33468	.1.1			ID.	3-4113		C	OUNTY	Frank	lin		GEOLOGIS	T C. E	Baldwin	
SITE D	ESCRIP	TION I	3ridge 1	No. 15 (on SR	1106	over Lit	tle River								GROUND	WATER (ft)
	G NO.						TION		······································	OFFS	ET 16f	ft RT		ALIGNMENT -L-		0 HR.	N/A
	R ELEV			NORT							NG 2,		49			24 HR.	N/A
	DEPTH		- 10					50 Track	DBILL	METH				T ₁	LIABARA	ER TYPE A	
				DRILL	WAC					T			·····		HAWW	ERITPE A	utomatic
	TARTE				r	COM		7/25/05		SURF	·	7	******	TH N/A			
	DEPTH		OW COL			20		S PER FOO		100	SAMP.		O	SOIL AND	ROCK	DESCRIPTIO	N
(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ŷ	20	40 1	60 	80	100	NO.	MOI	G				
346.7							Grou	nd Surfac	e					346.7			0.0
	-												1)	-			<u> </u>
-	-												$ \langle F \rangle$	- Auger -	rea to at	tempt coring.	
] :	-				· ·					· · · ·				- - 341.7		-	5.0
_	_													 Boring Terminat Elevation 341.7 	ted by A ft on BC	uger Refusal a ULDER .	at
-	-													<u>-</u>			
	-													NOTES:			
-	_													1) Auger refusal	at a de	oth of 5.0'	
	_													(elev. 341.7').			
	_												1	-			
	-													-			6
	-												F	-			
-	_													-			
] :	<u> </u>													- -			
									,					- -			
-																	
														<u>-</u>			
	F													- -			
-	ţ .																
	<u> </u>																
	<u> </u>											-		_			
	<u> </u>													_			
	ŀ																•
-	-																
	Ŧ																
	‡																
-	‡													<u> </u>			
	‡													-			
	<u> </u>													_			
	ţ													_			
	+													<u>-</u> .			
-	Ŧ																
	Ŧ																
	‡											-		-			
	‡													-			
	‡											1		<u>-</u>			
	‡													_			
	<u> </u>													-			
	Ŧ																
-	Ŧ											1		_			
	‡													-		,	
· L	<u></u>	1	<u></u>								.L	1		<u> </u>			





N.C.D.O.T. GEOTECHNICAL UNIT **BORING LOG**

PRO IE	CT NO.	33468	111			ID F	3-4113			OUNTY	Frank	lin		GEOLOGIST C.	Baldwin
				No. 15	on SE			le River							T
	S NO.		-iiuge				TION 2			OFFS	ET 131	HIT	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ALIGNMENT -L-	1
	R ELEV		2 #			811,6					ING 2,		36	APPARENT - F.	GROUND WATER (10 HR. 6.0 LAND CONTROL OF THE PROCESS AND (A-2-4). MED ROCK- Oliated to massive control of the sand. RED ROCK- Oliated to massive control of the sand. MET TYPE Automatic MET TYPE Automatic MET TYPE Automatic MED ROCK- Oliated Sand (A-2-4). MITE. Auger Refusal at EATHERED ROCK Deter drilling at a 329.7'). Pepth of 19.0' Meeth of 1.0' when the
				 				ro Tl	T _{DD} ₁₁					LIAMA	l
	DEPTH			DRILL	. MAC			50 Track		L METH				L	NEK ITPE Automatic
	TARTE					COM		7/26/0		SURF		ATER	1	PTH N/A	
	DEPTH		OW COL			20		PER FO 60	OT 80	100	SAMP.	V	0	SOIL AND ROCK	DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40 ————————————————————————————————————			100	NO.	MOI	G		
347.2							Grour	nd Surfac	ce					347.2	
347.2	_0.0_/	5	8	7		15						М	H :	-ROADWAY E	MBANKMENT- coarse SAND (A-2-4)
343.7	- - 3.5] : .	/								Gray & reddish-brow	n, fine to coarse sandy
1	-	1	1	1	• 2							M		- CLA	r (A-0).
1	-				: :							- <u>v</u> -	000		
338.7	8.5	1	1	2	 : :	 						w	000	Gray & brown, coa	rse SAND (A-1-b(0)),
‡	-	'	l '	"	1.93	3 . <i></i> .			 <i>.</i> .			"	000	with little clay,	trace fine sand.
333.7	- - 13.5				1:1								000	 	
555.7	- 10.0	4	4	3		7					SS-13	w	000	-	
‡	- -			1									000	329.7	
328.7	- - 18.5				: :			• • • • •		60/0.2		<u></u>	500	- 328 2 -WEATHE	RED ROCK-
f	-	60/0.2'-								00/0.2				- GRA	NITE.
1	-													Elevation 328.2 ft in W	Auger Refusal at EATHERED ROCK
1	-													(GRANITE)	
‡	-													- NOTES:	
1	-														dor drilling at a
}	-													1) Driller indicates have depth of 17.5' (elev.	329.7').
1	_											1		2) Auger refusal at a d (elev. 328.2').	eptn of 19.0'
7	-														depth of 1.0' when the
1	-											1 .		augers were remove	d, so a 24-hour water
-	_										1			measurement could	
†	-													F	
‡	- -													F	
-	-													F	
1	<u>-</u>										1			F	
_	_													<u> </u>	
	-													<u></u>	
-	_													<u> </u>	
4	_													<u></u>	
1														-	
1	F			1										F	
4	-														
	-													F	ı
-	_													<u> </u>	
	_													<u>}</u>	
	Ŀ													<u>.</u>	
4	L													_	•
1	F														
-	<u> </u>													-	
-	-		1	1	1						1	1	i	-	





FROEHLING & ROBERTSON, INC.

GEOTECHNICAL · ENVIRONMENTAL · MATERIALS
ENGINEERS · LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

348.7 0.0 1 3 5 8	Ster of I				18	381							SHEET 1 C	OF 1
BORING NO. EB2-B BORING LOCATION 25+17 OFFSET 15R RT ALIGNMENT -L-	PROJE	CT NO.	33468	.1.1			ID. B-4113	С	OUNTY	Frank	lin		GEOLOGIST C. Baldwin	
COLLAR ELEV. 346.7 ft NORTHING 811.656	SITE D	ESCRIP	TION I	3ridge 1	No. 15 c	on SF	R 1106 over Little River					*****	GRO	UND WATER (ft)
TOTAL DEPTH 17.8 ft DRILL MACHINE CME 550 Track DRILL METHOD 2.25* ID HSA HAMMER TYPE Automatic DATE STARTED 7/28/05 COMPLETED 7/28/05 SURFACE WATER DEPTH N/A ELEV. DEPTH BLOW COUNT (ft) 0.5ft 0.5f	BORIN	G NO.	EB2-B		во	RING	LOCATION 25+17		OFFS	ET 151	t RT		ALIGNMENT -L- 0 H	IR. 6.0
DATE STARTED 7/26/05 COMPLETED 7/26/05 SURFACE WATER DEPTH N/A	COLLA	R ELEV	. 346.	7 ft	NORT	HING	811,656		EAST	NG 2,	171,3	62	24 H	IR. 6.0
ELEV. DEPTH BLOW COUNT (ft) 0.5ft	TOTAL	DEPTH	17.8 f	t	DRILL	MAC	CHINE CME 550 Track	DRILI	METH	OD 2.2	25" ID	HSA	HAMMER TYP	E Automatic
(fi) (fi) 0.5ft 0.	DATE S	STARTE	D 7/26	5/05			COMPLETED 7/26/05		SURF	ACE W	ATER	DEP	TH N/A	
(ft) (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0 20 40 60 80 100 NO. Moli G 346.7 3	ELEV.	DEPTH	BLC	ow cou	INT		BLOWS PER FOO	Т		SAMP.	V/		SOIL AND DOCK DECOR	DTION
338.2 3.5	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20 40 60	80	100	NO.	МОІ		SOIL AND ROCK DESCR	
338.2 3.5														
338.2 3.5 1 1 1 1 2 2 38.5 1 3 5 38.2 3.5 1 1 1 1 2 38.2 3.5 1 3 3 3 3 3 3 3 3 3	246.7						Oracimal Occafora							
343.2 3.5 1 1 1 1 2 2 2 3 3 3 3 3 3 3		0.0	1	3	5						М			0.0 MENT-
## ALLUVIAL. 338.2 8.5	343.2	- 3.5				: /	T							rse sandy
338.2 8.5 WOH WOH 2 SS-17 32.6% Gray, fine to coarse sandy CLAY (A-6(4)), with some silt. 338.9 17.8 60/0.0 COUNTY CRYSTALLINE ROCK- 10 CRYSTALLINE ROCK (GRANITE) 8000.0 COUNTY CRYSTALLINE ROCK (GRANITE) 8000.0 COUNTY CRYSTALLINE ROCK (GRANITE) 8000.0 COUNTY CRYSTALLINE ROCK (GRANITE) 8000.0 CRYSTALLINE ROCK (GRANITE) 8000.		-	1	1	1	į į				SS-16	18.8%		Gray fine to coaree SAND	(A-2-4(0)).
WOH WOH 2	_	-				: :						K	with some clay.	6.0
333.2 13.5 WOH 1 1 1	338.2	8.5	WOH	WOH	2	: <u> </u> :				SS-17	32 6%		Gray, fine to coarse sandy CL	AY (A-6(4)),
333.2 13.5 WOH 1 1 1 2 2 8000.0 Brown, fine to coarse SAND (A-1-b), with some slit & clay. 328.9 17.6 60/0.0 Brown & white, foliated to massive GRANITE Boring Terminated with Standard Penetration Test Refusal at Elevation 328.9 ft in CRYSTALLINE ROCK (GRANITE) NOTES: 1) Driller indicates harder drillling at a depth of 16.0 (elev. 330.7). 2) Auger refusal at a depth of 17.8' (elev. 328.9').		<u>-</u>			-	2					1		- -	
WOH 1 1 1 1	333.2	- 13.5				: :						888	 Brown, fine to coarse SAN 	
328.9 17.8 60/0.0 CRYSTALLINE ROCK- Brown 8 white, foliated to massive GRANTE Boring Terminated with Standard Penetration Test Refusal at Elevation 328.9 ft in CRYSTALLINE ROCK (GRANITE) NOTES: 1) Driller indicates harder drilling at a depth of 16.0 (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').		-	WOH	1	1	2					W	000	_	•
60/0.0' Boving Terminated with Standard Penetration Test Refusal at Elevation 329.9 ft in CRYSTALLINE ROCK (GRANITE) NOTES: 1) Driller indicates harder drilling at a depth of 18.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').	328.0	17.8											- CRYSTALLINE RO	
Test Refusal at Elevation 328.9 ft in CRYSTALLINE ROCK (GRANITE) NOTES: 1) Driller indicates harder drilling at a depth of 16.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').	520.9	-	60/0.0'						60/0.0				GRANITE.	massive
NOTES: 1) Driller indicates harder drilling at a depth of 16.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').	_	-											Test Refusal at Elevation 328.9	ft in
1) Driller indicates harder drilling at a depth of 16.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').	-	-									·		CRYSTALLINE ROCK (GRANIT	ſE)
1) Driller indicates harder drilling at a depth of 16.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').		-						,					NOTES:	
depth of 16.0' (elev. 330.7'). 2) Auger refusal at a depth of 17.8' (elev. 328.9').	-	_												ı at a
	1												depth of 16.0' (elev. 330.7').	
BORE SINGLE GOOD ACCOUNTS AND A		-												.0
OLD BORE SINGLE GOO-GOO ALL AND ALL AN		-											- -	
OURONE SINGLE GO-GOS/GET NO. DOI: GOT 101 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-											· -	
		_											-	
		-											-	
		ļ											- -	
1] -	F											- -	
1		-											- -	
1	-	Ė.											-	
OI BORE SINGLE GO-GOS) GET A LEGAL COLOR OF THE COLOR OF		-											- -	
100 BOKE SINGLE GOO-GOOT AND LADY OF THE COO-GOOT AND LADY OF THE COO-G		ļ.											- -	
	12/03	<u> </u>											- -	
	5	<u> </u>											-	
	5 -	L											-	
NOTE ONCE SINGE	<u> </u>	<u> </u>											- -	
	ž .	<u> </u>											- -	
	5	<u> </u>											-	
	0-99 <u>1</u>	_											<u>t</u>	
	E E	L											<u></u>	
	SING.	t											· "	
	3	<u> </u>											_	
		<u> </u>											_	
		<u> </u>								<u> </u>				





N.C.D.O.T. GEOTECHNICAL UNIT **BORING LOG**

THE OF T	alling.			1	881	-								SHEET 1 OF 1
	CT NO.	33468	3.1.1			ID. E	3-4113		C	YTNUC	Frank	lin		GEOLOGIST C. Baldwin
SITE D	ESCRIP	TION	Bridge l				over Littl							GROUND WATER (ft
BORIN	G NO.	HA-1	·	BC	RING	LOCA	TION 2	3+80			ET 33		~····	ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	<u>'. </u>		ļ		814,7				J	ING 2			24 HR. N/A
	. DEPTH			DRILL	. MA	CHINE					OD Ha			
	STARTE				·	COME		8/18/05		SURF	·			PTH N/A
i	DEPTH		OW COL		,	20		PER FOO	TC 80	100	SAMP.	/	0	SOIL AND ROCK DESCRIPTION
(ft)	(ft)	0.5ft	0.5ft	0.5ft	10	20	40 	60 			NO.	MOI	G	
								d Surfac					000	TORSOU
					<u> </u>									
														-ALLUVIAL- Brown, fine to coarse SAND (A-1-b).
														Boring Terminated at Depth 2.0 ft
														NOTES:
														Doring performed to characterize material
														on outer side of cross section after surveying
														was performed. Collar elevation not obtained.
				1.					,					
													1	7
														,
Ì														
1											l			
			ŀ											
ŝ											1			
3														
3														
					1						1	1	1	·





FROEHLING & ROBERTSON, INC.

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS ENGINEERS • LABORATORIES

"OVER ONE HUNDRED YEARS OF SERVICE"

01-1	AAAA			16	381										SHEE	T 1 OF 1	
PROJE	CT NO.	33468	3.1.1			ID. E	3-4113		C	OUNTY	Frank	lin		GEOLOGI	ST C.	Baldwin	
SITE D	ESCRIP	TION I	3ridge 1	No. 15 d	n SR	1106	over Lif	ttle River								GROUND WA	TER (ft)
BORIN	G NO.	HA-2		ВО	RING	LOCA	TION	24+14		OFFS	ET 351	ft RT		ALIGNMENT -L-		0 HR.	N/A
COLLA	R ELEV	<u> </u>		NORT	HING	814.7	789		······································	EAST	NG 2,	171.7	 88			24 HR.	N/A
	DEPTH			DRILL					DRILL	<u> </u>	OD Ha				HAMM	IER TYPE N/A	
	STARTE					·		o 8/18/0						PTH N/A	L		
	DEPTH	,	OW COL	INT				S PER FO		Journ	SAMP.		1				
(ft)	(ft)	0.5ft	0.5ft	0.5ft	ọ	20	40		80	100	1	моі	0	SOIL AN	D ROCK	DESCRIPTION	
							L	L	L			VIVIOI					
							Grou	nd Surfac	се								0.
													000 000 000	Brown fi		SOIL- rse SAND (A-1-b).	0.2
														\	-ALLU	JVIAL-	/_
														Boring Termin		rse SAND (A-1-b). epth 2.0 ft	
														NOTES:			
														1) Boring perfo	ormed to	characterize materi	al
														on outer side of was performed	of cross so d. Collar	ection after surveying elevation not obtain	ng ned.
														·			
									*								
												Ì					
														•			
																•	
																•	
														-			
											'						
i	1				1						l	l	1				

100	AOBYH CAROL	



OF T				1	881									SHEET 1 OF 1
PROJE	CT NO.	33468	3.1.1			ID. E	3-4113		C	OUNTY	Frank	din		GEOLOGIST C. Baldwin
SITE D	ESCRIP	TION I	Bridge I	No. 15	on SF	R 1106	over Littl	le River						GROUND WATER (ft)
BORIN	G NO.	HA-3		во	RING	LOCA	TION 2	4+08		OFFS	ET 41	ft LT		ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	•		NORT	HING	814,7	'93			EAST	NG 2,	,171,7	12	24 HR. N/A
TOTAL	DEPTH	0.2 ft		DRILL	MAC	HINE	N/A		DRILL	. METH	OD Ha	and Au	ıger	Pr HAMMER TYPE N/A
DATE S	STARTE	D 8/18	3/05			COMP	PLETED	8/18/05	;	SURF	ACE W	ATER	DEP	EPTH N/A
ELEV.	DEPTH	BLC	ow cor	JNT				PER FOO			SAMP.	$\mathbf{V}/$	L	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20 1	40 L	60	80 L	100	NO.	MOI	Ğ	GOLFAID ROOK BEGOKII HON
												-		
							Groun	d Surface	Э					
							Groun	d Surface						Brown, fine to coarse SAND (A-1-b). Boring Terminated at Depth 0.2 ft - could not penetrate deeper with hand auger. NOTES: 1) Boring performed to characterize material on outer side of cross section after surveying was performed. Collar elevation not obtained.

SING	
F &	R

Sheet 2 of 26

North Carolina Department of Transportation

M&T Form 503



Division of Highways

Materials and Test Unit **Soils Laboratory**

T.I.P. ID NO.:

REPORT ON SAMPLES OF:

SOIL FOR QUALITY

PROJECT:

DATE SAMPLED:

SAMPLED FROM: SUBMITTED BY:

33468.1.1

E.C. Howey

B-4113

7/05 -L-

COUNTY: Franklin

RECEIVED: 8/1/05

REPORTED: 8/9/05

BY:

Dave Jenks

TEST RESULTS

PROJ. SAMPLE NO.	EB1-A	EB1-B	B1-A	B1-B	EB2-A	EB2-B	EB2-B
LAB SAMPLE NO.	SS-8	SS-6	SS-20	SS-1	SS-13	SS-16	SS-17
Retained #4 Sieve %	0.2	6.9	0.5	1.0	0.0	0.5	0.0
Passing #10 Sieve %	95.3	84.4	97.6	94.0	96.3	89.0	99.9
Passing #40 Sieve %	59.9	42.8	69.4	55.5	22.5	46.0	92.7
Passing #200 Sieve %	28.5	21.5	39.1	23.7	4.2	25.9	57.4

MINUS #10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60 %	48.3	59.1	40.9	51.1	89.1	56.1	16.2
Fine Sand Ret - #270 %	25.9	18.4	23.2	27.4	0.5	18.1	31.5
Silt 0.053 - 0.010 mm %	4.0	0.7	1.6	3.9	0.0	0.0	28.3
Clay < 0.010 mm %	21.8	21.8	34.3	17.6	10.4	25.8	24.0
L.L.	16	19	35	15	19	31	32
P.L.	NP	NP	20	NP	NP	25	21
P.I.	NP	NP	15	NP	NP	6	11
AASHTO Classification	A-2-4 (0)	A-1-b (0)	A-6 (2)	A-2-4 (0)	A-1-b (0)	A-2-4 (0)	A-6 (4)
Station	23+98	23+82	24+46	24+14	25+33	25+17	25+17
Offset	18 ft LT	18 ft RT	17 ft LT	17 ft RT	13 ft LT	15 ft RT	15 ft RT
Depth (ft)	0.0	3.5	3.5	0.0	13.5	3.5	8.5
to	1.5	5.0	5.0	1.5	15.0	5.0	10.0
Moisture Content (%)			25.3			18.8	32.6
Organic Content (%)							:

NT = Not Tested NP = Not Plastic

NA = Not Applicable

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

Soils Engineer

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: B-4113 33468.1.1

F.A. NO.: BRZ-1106(3) COUNTY: Franklin

Bridge No. 15 on SR 1106 over Little River

				Geologic	Run			Unit Weight	Unconfined Compressive	Young's Modulus	Splitting Tensile Strength	
Sample #	Boring #	Depth (ft)	Rock Type	Map Unit	RQD	Length (in)	Diameter (in)	(PCF)	Strength (PSI)		(PSI)	Remarks
RS-1	B1-A	11.9 - 12.2	Granite	PPmg	78%	4.05	1.77	160.6	5,207			
RS-2	B1-A	16.5 - 16.8	Granite	PPmg	100%	4.13	1.77	163.2	17,414			
RS-3	B1-B(5)	13.9 - 14.2	Granite	PPmg	78%	4.07	1.77	162.1	8,399			
RS-4	B1-B(5)	20.8 - 21.1	Granite	PPmg	100%	4.10	1.77	163.6	25,886			
										٠		
	-											
							^					

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: <u>33468.1.1</u>	ID: B-4113 COUNTY: Franklin
DESCRIPTION(1):	Bridge No. 15 on SR 1006 over Little River
INFORMATION ON E	XISTING BRIDGES Information obtained from: X field inspection microfilm(Reel: Pos:) other
COUNTY BRIDGE NO.	15 BRIDGE LENGTH 60.5 NO. BENTS IN: CHANNEL 1 FLOOD PLAIN 3
FOUNDATION TYPE:	Timber piles
EVIDENCE OF SCO	DUR(2):
ABUTMENTS OR END	BENT SLOPES: Minor scouring
INTERIOR BENTS:	None observed
CHANNEL BED:	None observed
CHANNEL BANKS:	Some scouring along banks, fallen trees along banks
EXISTING SCOUR	PROTECTION:
TYPE(3): Timber wing	gwall
EXTENT(4): To the limit	s of embankment
EFFECTIVENESS(5): _	Good
OBSTRUCTIONS(6) (D	AMS,DEBRIS,ETC.): Stone dam upstream from bridge, several fallen trees in river
DESIGN INFORMA	<u>TION</u>
CHANNEL BED MATER	RIAL(7) (SAMPLE RESULTS ATTACHED): A-1-b, A-2-4, A-6
CHANNEL BANK MATE	ERIAL(8) (SAMPLE RESULTS ATTACHED): A-1-b, A-2-4, A-6
CHANNEL BANK COVE	ER(9): Grasses, shrubs and trees
FLOOD PLAIN WIDTH(10): 300±
FLOOD PLAIN COVER	(11):Trees, grasses and shrubs

Sheet 24 of 26

DESIG	ON INFORMATI	ON CONT.					PAGE 2			
STREA	AM IS X	DEGRADING		AGGRADI	NG (12)					
OTHE	R OBSERVATI	ONS AND CO	MMENTS:							
				<u></u>				_		
CHAN	INEL MIGRATION	ON TENDENC	Y (13)·	Northeast						
J. 17 (1 C	THE THICK THE	on rendeno	1 (10)	Hortificast						
RE	EPORTED BY:	:_Cliza	Weyn Froehling & R	CHOW Robertson, Inc.	ay	DATE:	8/22/2005			
3EU I	ECHNICALLY A	ADJUSTED SC	JOUR ELE	:VATION (14):					
		***	B1-A	B1-B						
		100 year	332.1'	333.8'				_		
		500 year	331.8'	333.5'						

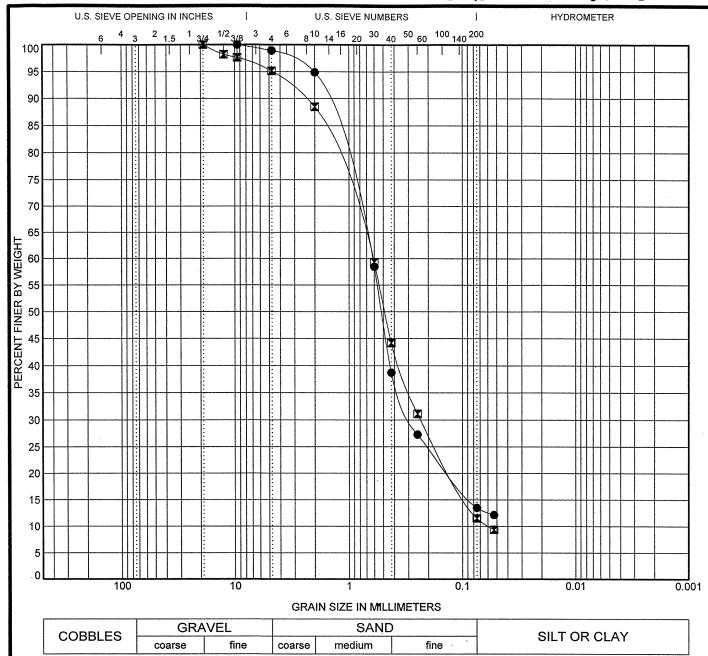
11) G 22) N S S 33) N 44) D 55) [66) N 77) [A 88) [NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION. DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING. NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC. DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.									
10) (11) [11] [12] (12) (13) [14] (14) (17] A	DESCRIBE THE POT BRIDGE (APPROXIM GIVE THE GEOTECH APPROXIMATELY 10 BENT BY BENT BAS HEORETICAL SCOU	MATE FLOOD PLAIN OD PLAIN COVERIN PRIATE SPACE AS ENTIAL OF THE BO IATELY 100 YEARS INICALLY ADJUSTE 20 YEARS). THIS COSIS WHERE VARIATIR AND THE GEOTE	N WIDTH (EST NG (GRASS, T TO WHETHER DDY OF WATE). ED SCOUR EL AN BE GIVEN TIONS EXIST. ECHNICALLY A	IMATE). TREES, CROPS R THE STREAM R TO MIGRAT EVATION EXP AS AN ELEVA DISCUSS REL ADJUSTED SO		LIFE OF THE BRIDG SITE, OR C HYDRAULI DTECHNICA	GE ON ICS ALLY			

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 #: 33468.1.1 (B-4113) COUNTY: Franklin DESCRIPTION: Bridge No. 15 on SR 1106 over Little River

	CHANNEL B	FD	CHANNEL BANK MATERIAL						
	MATERIAL								
SAMPLE#			SS-20	SS-13	SS-16				
RETAINED #4			0.5	0.0	0.5				
PASSING #10			97.6	96.3	89.0				
PASSING #40	·		69.4	22.5	46.0				
PASSING #200			39.1	4.2	25.9				
•									
COARSE SAND			40.9	89.1	56.1				
FINE SAND			23.2	0.5	18.1				
SILT			1.6	0.0	0.0				
CLAY			34.3	10.4	25.8				
			35	19	31				
LL PL			20	NP	25				
AASHTO									
CLASSIFICATION			A-6(2)	A-1-b(0)	A-2-4(0)				
STATION			24+46	25+33	25+17				
OFFSET			17' LT	13' LT	15' RT				
DEPTH			3.5 - 5.0	13.5 - 15.0	3.5 - 5.0				

Sheet 25 of 26



8	ample No		Depth		Cla	ssification			LL	. PL	PI	Cc	Cu
•	SS-12	at	8.5 - 10.0										
X	SS-19	at	0.0 - 1.5									1.50	10.49
5	Sample No		Depth	D100	D60	D30	D10	%Grav	/el	%Sand	%Si	lt G	%Clay
•	SS-12		8.5 - 10.0	9.5	0.631	0.284		1.1		85.4		13.5	,
Ž X	SS-19	at	0.0 -1.5	19	0.617	0.233	0.059	4.9		83.6		11.5	
JPJ F&R.GDT 8/11/05								ļ	_	······································			
<u> </u>			· · · · · · · · · · · · · · · · · · ·					_					

SINCE

FROEHLING & ROBERTSON, INC.

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS ENGINEERS • LABORATORIES "OVER ONE HUNDRED YEARS OF SERVICE"

GRAIN SIZE DISTRIBUTION

Report No.: G66-069 Client: NCDOT B-4113 Project:

Franklin Co., NC Location: 08/01/05 Date:





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



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



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



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