ID: B-4011

PROJECT: C201766

CONTENTS: -L- 16+50 - 20+00

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4011	1	17

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33379.1.1	BRZ-1106(4)	PE
33379.3.1	BRZ-1106(4)	UTIL. & R/W
33379.2.2	BRZ-1106(4)	CONST.

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

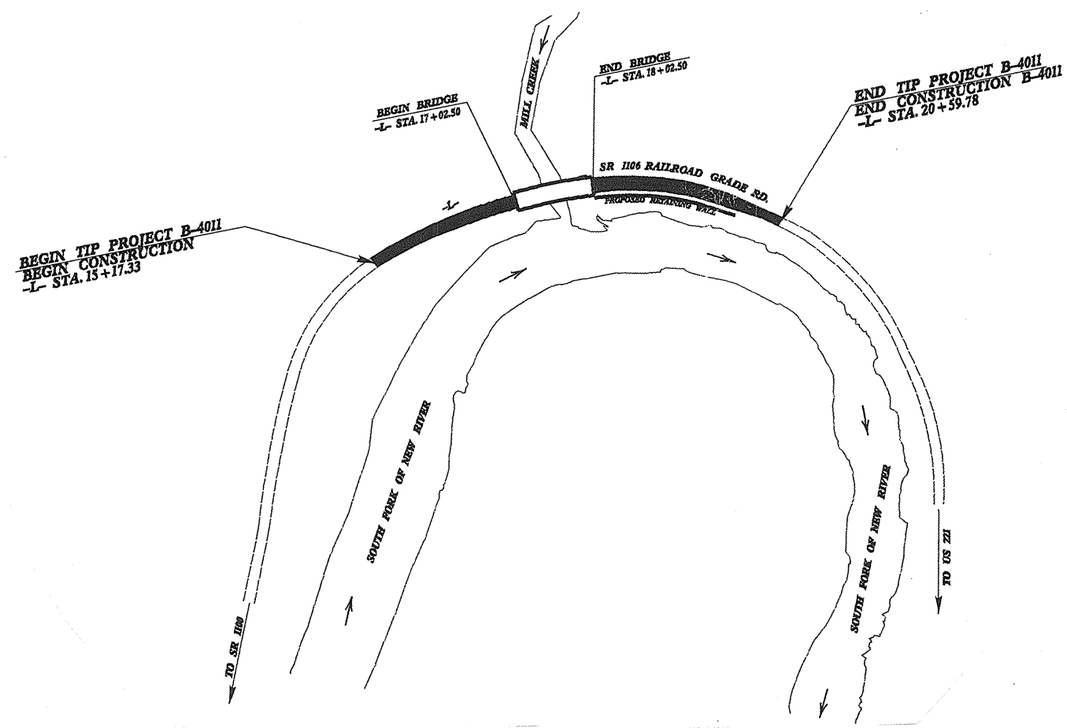
STATE PROJECT 33379.1.1 I.D. NO. B-4011

F.A. PROJECT BRZ-1106(4)

COUNTY ASHE

DESCRIPTION APPROACH TO BRIDGE NO. 85
ON SR-1106 OVER MILL CREEK

NAD 83
NC GRID



CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

INVESTIGATED BY L.L. ACKER PERSONNEL M.M. HAGER

CHECKED BY C.J. COFFEY

SUBMITTED BY G.K. ROSE

DATE 03-17-05

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

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

NORTH CAROLINA LICENSED SEAL 1007 GEOLOGIST LOUIS L. ACKER

SEAL

SIGNATURE

DRAWN BY: M.M. HAGER

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4011	33379.1.1	2	17

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

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	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT	6 MX		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	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				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12"	3"				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE
UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT- CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.
- STATIC WATER LEVEL AFTER 24 HOURS.
- PW — PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA
- SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT, CPT, DPT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S- BULK SAMPLE
SS- SPLIT SPOON SAMPLE
ST- SHELBY TUBE SAMPLE
RS- ROCK SAMPLE
RT- RECOMPACTED TRIAXIAL SAMPLE
CBR - CBR SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
v. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45
- [x] CME-550
- [ ] PORTABLE HOIST
- [ ] OTHER _____
- [ ] OTHER _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [x] CASING [x] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] OTHER _____

HAMMER TYPE:
- [x] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] OTHER _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V. SLI.)	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.
SLIGHT (SLI.)	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.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
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 PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

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

BEDDING

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

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

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.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A

NOTES:

REVISED 09/15/00

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 9, 2005

STATE PROJECT: 33379.1.1 (B-4011)
F. A. PROJECT: BRZ-1106(4)
COUNTY: Ashe
DESCRIPTION: Approaches to Bridge 49 on SR 1106 over Mill Creek

SUBJECT: Geotechnical Report – Inventory

Site Description

Bridge 49 is located in southern Ashe County on SR 1106 (Railroad Grade Road) between the rural communities of Fleetwood and Brownwood, approximately 1.8 miles north of the intersection with SR 1102 (Brownwood Road). SR 1106 follows the north bank of the South Fork New River and crosses Mill Creek about 50 feet upstream from its mouth at the river. Relief in the immediate vicinity of the road is about 200 feet on slopes of 30 – 35 degrees. Slopes on the Left Side are covered in mature forest and in recently clear-cut slash and stumps. The river bank on the Right Side is in grass, low brush and a few large trees. The road lies between rock outcrops in existing cuts on the Left Side and the river bank about 20 feet below the road on the Right Side.

The existing road is approximately 20 feet wide from ditch line to shoulder point. Plans call for widening the road to 36 feet, with two 9-foot travel lanes, and for construction of a retaining wall 200 feet long on the Right Side. Construction is to be carried out on line -L- from Station 15+17 to Station 20+35.

The Geotechnical Engineering Unit conducted a subsurface investigation on this project in January, 2005. Two borings were made in proposed cut slope areas and three borings were made for the proposed retaining wall. The borings for cut slopes were made with a track-mounted CME 45 power drilling machine equipped with 8-inch hollow-stem augers. Standard Penetration Tests (SPT's) were conducted at 5-foot intervals, and borings were carried to auger refusal in hard rock.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

The borings for the wall were made with a CME 550 power drilling machine using an N casing advancer and NXWL diamond bit coring tools. SPT's in those borings were conducted at intervals of 2.5 feet or 5 feet. Core borings at each end of the wall were carried at least 10 feet into hard rock. A rotary boring in the center of the wall was carried 10 feet below the rock line without coring.

The subsurface data has been supplemented with mapping of rock outcrops in plan view and on cross sections, and with strike and dip data from foliation and joints exposed in outcrops.

Areas of Special Geotechnical Interest

Hard Rock in Cuts

Hard rock will be encountered in all cuts. A small amount of hard rock will be found in the Left Side cut at Station 16+75. Hard rock will be the principal material excavated in the cut from Station 18+50 to the end of the project at Station 20+35. The depth to rock line throughout that interval will be between 5 and 10 feet.

Unstable Orientation in Hard Rock

The foliation in rock in the existing cuts dips towards the road at angles of 55 to 65 degrees. The existing rock cut between Stations 18+50 and the end of the project appears to be stable at approximately 0.25:1 in spite of the unfavorable foliation orientation. The possibility exists, however, that further excavation on those cuts at that angle may intersect release joints that would allow rock fall of large blocks. A few unfavorable wedge intersections and release joints are visible now in the cut.

Soil and Rock Materials

Cut slope excavations on this project will encounter saprolite, weathered rock and hard rock. The saprolite is composed of red or orange to brown, medium stiff, micaceous, sandy clayey silt (A-5) and medium dense, micaceous, silty sand (A-2-4). It forms a layer 5 to 8 feet thick overlying weathered rock or grading abruptly down to hard rock. The weathered rock layer varies in thickness from less than a foot to about 12 feet.

All the rock on this project consists of gray, micaceous, more or less schistose metagreywacke. It has a well-developed foliation that dips 55 to 65 degrees southeast.

Wall construction on the Right Side will encounter roadway embankment, alluvium and a thin layer of saprolite and weathered rock overlying hard rock. Embankment soils are less than 5 feet thick, composed of loose, silty sand with angular cobbles and boulders (A-1-b). Alluvial soils comprise 0 to 6 feet of loose silty sand (A-2-4).

Geotechnical Descriptive Analysis

Station 15+17 to 16+98

Widening the road in will require placement of 3 to 4 feet of fill on both sides of the road in the first 30 feet of this segment and on the Right Side for most of the remainder of this segment. Plans call for a Left Side cut from Station 15+50 to 16+80, approximately. The cut will have a maximum depth at the ditch line of about 12 feet. Most of the excavation will be in saprolite and weathered rock. A small amount of hard rock will have to be excavated around Station 16+75.

Station 16+98 to 18+02

The replacement bridge is to be constructed in this segment.

Station 18+02 to Station 20+35

Plans call for construction of a cut on the Left Side. The Left Side cut will be about 15 feet deep at the ditch line, and the exposed cut face will be about 40 feet high at its highest point.

Hard rock is abundantly visible in the existing roadcut, as well as along the river bank and in the channel downslope from the proposed wall. The hard rock line in the proposed cut area is only about 5 to 8 feet below the ground surface, beneath micaceous, sandy saprolite and weathered rock. Foliation in the rock dips toward the road at 55 to 65 degrees.

A retaining wall is to be constructed on the Right Side between Stations 18+02 and 20+00. Borings for the retaining wall penetrated a few feet of roadway embankment and then found pockets of alluvial sand and silt and a few feet of saprolite overlying weathered rock or hard rock. The alluvial sand was deepest, about 6 feet, at the beginning of the wall. The weathered rock line was 0 to 8 feet below natural ground, and the hard rock line was about 2 to 9 feet below natural ground. The weathered rock and hard rock lines were shallowest at the north end of the wall. The hard rock was very good quality, micaceous metagreywacke and schist.

Respectfully submitted,

Louis L. Acker, LG
Project Geologist

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT: B-4011 COUNTY: ASHE DATE: 23-Oct-07 COMPILED BY: BAM SHEET 4A OF 17 SHEETS

RD10S01C

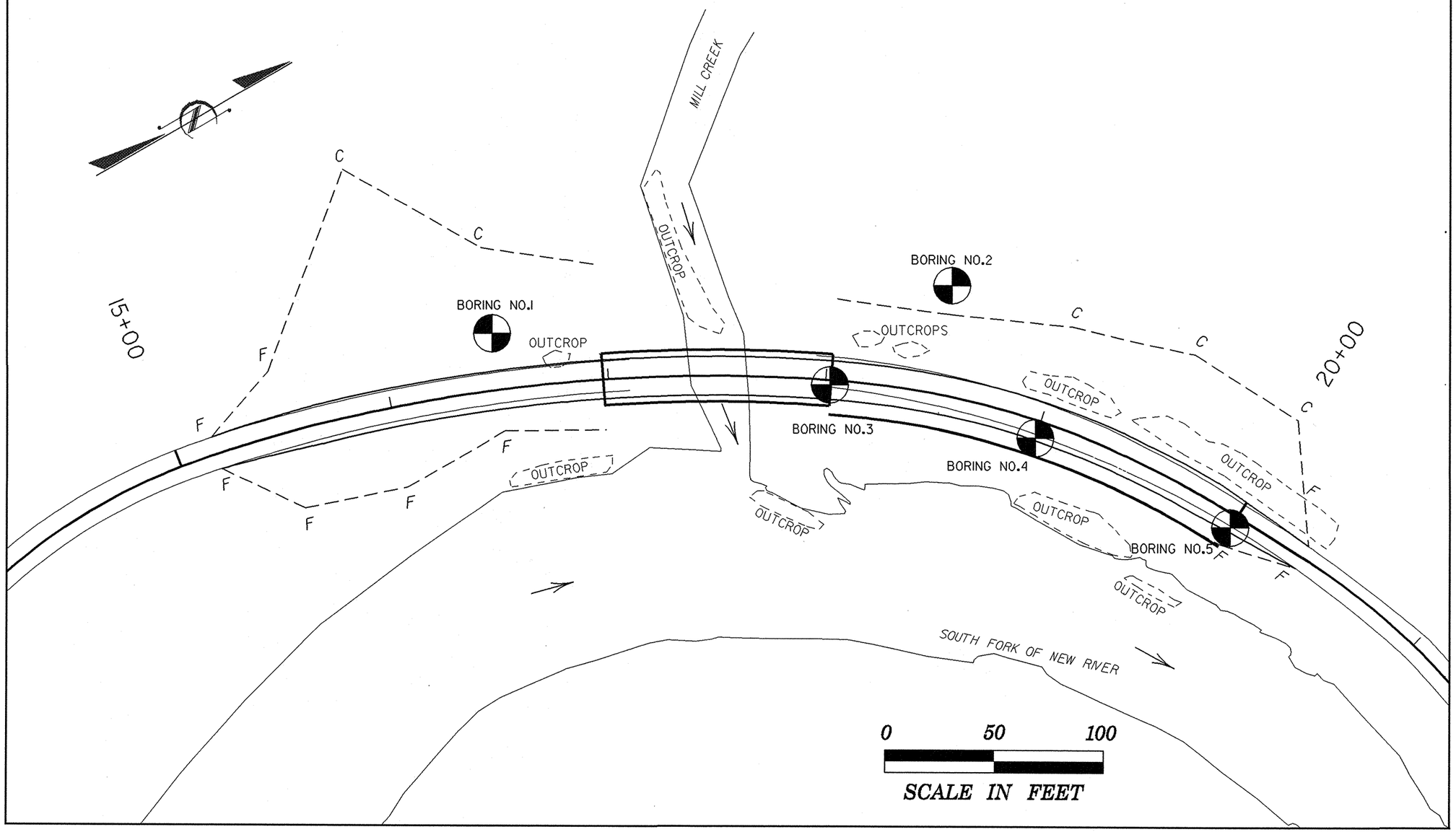
STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 15%		ROCK	SUITABLE	UNSUIT.	T0TAL
SUMMARY 1															
L 15+17.33 TO 17+02.50		391	76			315	121		121	139		76	176		252
SUBTOTAL 1		391	76			315	121		121	139		76	176		252
SUMMARY 2															
L 18+02.50 TO 20+34.78		1406	602			804	110		110	127		602	677		1279
SUBTOTAL		1406	602			804	110		110	127		602	677		1279
PROJECT SUBTOTAL		1797	678			1119	231		231	266		678	853		1531
LOSS DUE TO C & G		-150				-150							-150		-150
PROJECT TOTAL		1647	678			969	231		231	266		678	703		1381
ADJUST FOR ROCK WASTE												297			297
GRAND TOTAL		1647	678			969	231		231	266		975	703		1678
SAY		1700													1700

CONTINGENCY UNDERCUT = 500 CY

NOTE: 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.

STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
33379.1.1	5 OF 17	

PLAN VIEW



8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4011	6 OF 17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2940
2930
2920
2910
2900
2970
2960
2950
2940
2930
2920
2910
2900

Ⓐ SAPROLITE- BROWN MICACEOUS SILTY SAND

BORING NO.

Ⓐ

WEATHERED ROCK

100/1"
100/1"
100/1"

16+50.00

16+00.00

0.0600 0.0600

2911.552

2910.89

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

02-MAR-2005 14:31
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locker AT

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4011	7 OF 17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2920
2910
2900

BORING NO.3

BEGIN RET. WALL

EMBANKMENT: ORANGE TO BROWN, LOOSE, SILTY SAND WITH ROCK FRAGMENTS

ALLUVIUM: BROWN SILTY SAND

SAPROLITE: ORANGE TO GRAY, MICACEOUS SILTY SAND

15
6
0
33

REC = 93
ROD = 92

18+02.50

18+00.00

2920
2910
2900

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

02-MAR-2005 14:33
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bcoker
A1

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4011	8 OF 17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2970
2960
2950
2940
2930
2920
2910
2900

INTERSTATE 77

BORING NO.4

EMBANKMENT

ALLUVIUM: FINE SANDY SILT

WEATHERED ROCK

RETAINING WALL

90 (REF)

19+00.00

BORING NO.2

Ⓐ SAPROLITE: RED TO BROWN MICACEOUS SILTY SAND

RETAINING WALL

18+50.00

02-MAR-2005 14:34
pt:\B4011_GEO_ROWY\CADD_GEOTECH\xsc\B-4011_rdy_xpl.dgn
locker: AT

8/23/96

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4011	9 OF 17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2980
2970
2960
2950
2940
2930
2920
2910
2900

RETAINING WALL

19+50.00

02-MAR-2005 14:36
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ccoker

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4011	10 OF 17

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2980
2970
2960
2950
2940
2930
2920
2910
2900

INTERMEDIATE/WEATHERED ROCK

BORING NO. 5

RETAINING WALL

EMBANKMENT

WEATHERED ROCK

REF

REC 93

ROD 84

INTERMEDIATE/WEATHERED ROCK

20+00.00

02-MAR-2005 14:37
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bc-sc_m1

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33379.1.1	**ID** B-4011	**COUNTY** ASHE	**GEOLOGIST** L.L. ACKER
SITE DESCRIPTION BRIDGE 85 ON SR 1106 OVER MILL CREEK - APPROACH			**GND WATER**
BORING NO BORING 1	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT -L-	**BORING LOCATION** 16+50.000	**OFFSET** 26.00ft LT	**24 HR** N/A
COLLAR ELEV 2921.80ft	**TOTAL DEPTH** 17.60ft	**START DATE** 1/12/05	**COMPLETION DATE** 01/12/05
DRILL MACHINE CME-45	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 17.40ft		**Log BORING 1, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2921.80						Ground Surface				
2920.00	4.90	8	50	50	1.0	100	S-1	M		SAPROLITE: BROWN, LOOSE TO MEDIUM DENSE, MICACEOUS SILTY SAND
	9.90	100			0.4	100				WEATHERED ROCK: METAGREYWACKE SCHIST
2910.00	14.90	100			0.3	100				
2904.20						TERMINATED BORING IN HARD ROCK AT ELEVATION 2904.2 FEET.				HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33379.1.1	**ID** B-4011	**COUNTY** ASHE	**GEOLOGIST** L.L. ACKER
SITE DESCRIPTION BRIDGE 85 ON SR 1106 OVER MILL CREEK - APPROACH			**GND WATER**
BORING NO BORING 2	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT -L-	**BORING LOCATION** 18+50.000	**OFFSET** 46.00ft LT	**24 HR** N/A
COLLAR ELEV 2930.20ft	**TOTAL DEPTH** 8.15ft	**START DATE** 1/12/05	**COMPLETION DATE** 01/12/05
DRILL MACHINE CME-45	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 7.70ft		**Log BORING 2, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2930.20						Ground Surface				
2922.05	4.40	2	4	7	1.0	11	S-2	M		SAPROLITE: RED TO BROWN, MEDIUM STIFF, MICACEOUS SANDY CLAYEY SILT
							SS-3	M		SAPROLITE: ORANGE TO BROWN, MICACEOUS SILTY SAND
						TERMINATED BORING IN HARD ROCK AT ELEVATION 2922.05 FEET				HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33379.1.1	**ID** B-4011	**COUNTY** ASHE	**GEOLOGIST** L.L. ACKER
SITE DESCRIPTION BRIDGE 85 ON SR 1106 OVER MILL CREEK - APPROACH			**GND WATER**
BORING NO BORING 3	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT -L-	**BORING LOCATION** 18+02.000	**OFFSET** 2.50ft RT	**24 HR** N/A
COLLAR ELEV 2910.20ft	**TOTAL DEPTH** 28.85ft	**START DATE** 1/12/05	**COMPLETION DATE** 01/12/05
DRILL MACHINE CME-550	**DRILL METHOD** SPT CORE BORING		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 14.00ft		**Log BORING 3, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2910.20						Ground Surface				
	4.50	2	11	4	1.0	15				EMBANKMENT: ORANGE TO BROWN, LOOSE, SILTY SAND WITH ROCK FRAGMENTS
	7.00	0	0	0	1.0	0				ALLUVIUM: BROWN TO ORANGE BROWN SANDY SILT
2900.00	9.50	1	3	3	1.0	6	SS-4			
	12.00	6	12	21	1.0	33	SS-5			SAPROLITE: ORANGE TO GRAY, MICACEOUS SILTY SAND
	14.50	60			0.1	60				HARD ROCK
							CORE 1			HARD ROCK: HARD, FRESH METAGREYWACKE SCHIST REC=93 RQD=92
							CORE 2			
							CORE 3			
2881.35						TERMINATED BORING IN HARD ROCK AT ELEVETION 2881.35 FEET.				

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe

Boring 3
18+02, 6'RT

CORE 1: 16.2 – 18.5	REC=91	RQD=91
CORE 2: 18.9 – 23.9	REC=92	RQD=88
CORE 3: 23.9 – 28.9	REC=96	RQD=96

LAYER 1: 16.2 – 28.9 Hard, fresh, gray metagreywacke schist; very wide-fractured, 4 pieces, longest piece 7 feet. 4 joints on foliation dipping 60 degrees, moderately rough, with a little Fe-oxide. REC=93% RQD=92%

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33379.1.1	**ID** B-4011	**COUNTY** ASHE	**GEOLOGIST** L.L. ACKER
SITE DESCRIPTION BRIDGE 85 ON SR 1106 OVER MILL CREEK - APPROACH			**GND WATER**
BORING NO BORING 4	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT -L-	**BORING LOCATION** 19+00.000	**OFFSET** 8.00ft RT	**24 HR** N/A
COLLAR ELEV 2909.00ft	**TOTAL DEPTH** 9.20ft	**START DATE** 1/13/05	**COMPLETION DATE** 01/13/05
DRILL MACHINE CME-550	**DRILL METHOD** N-CASING		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 5.80ft		**Log BORING 4, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2909.00						Ground Surface				
	4.20	0	29	61	0.8	90				EMBANKMENT: BROWN SANDY SILT WITH ROCK FRAGMENTS
										ALLUVIUM: TAN TO BROWN, MICACEOUS FINE SANDY SILT
2899.80	9.20	60			0.1	60				WEATHERED ROCK
						TERMINATED BORING IN HARD ROCK AT ELEVATION 2899.8 FEET.				HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33379.1.1	ID B-4011	COUNTY ASHE	GEOLOGIST L.L. ACKER
SITE DESCRIPTION BRIDGE 85 ON SR 1106 OVER MILL CREEK - APPROACH			GND WATER
BORING NO BORING 5	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 20+00.000	OFFSET 6.00ft RT	24 HR N/A
COLLAR ELEV 2910.00ft	TOTAL DEPTH 18.50ft	START DATE 1/13/05	COMPLETION DATE 01/13/05
DRILL MACHINE CME-550	DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK 3.10ft		Log BORING 5, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in | 6in | 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION
2910.00				Ground Surface				
	4.40	60	0.1	60	CORE 1			EMBANKMENT
								WEATHERED ROCK
								HARD ROCK
2900.00					CORE 2			HARD ROCK: HARD, SLIGHTLY WEATHERED METAGREYWACKE SCHIST REC=93 RQD=84
					CORE 3			
2891.50				TERMINATED BORING IN HARD ROCK AT ELEVATION 2891.5 FEET.				

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe

Boring 5
20+00, 6'RT

CORE 1: 5.5 – 8.5	REC=90	RQD=83
CORE 2: 8.5 – 13.5	REC=95	RQD=82
CORE 3: 13.5 – 18.5	REC=94	RQD=86

LAYER 1: 5.5 – 18.5 Hard, very slightly to slightly weathered, gray metagreywacke with white quartz veins up to one foot thick; close-fractured, 27 pieces, longest piece 1.3 feet. 15 joints on foliation at 50 degrees, moderately rough, coated with Fe-oxide. 3 joints at 20-30 degrees, rough, clean or with a little Fe-oxide. 1 joint at 60 degrees, moderately rough, clean. REC=93% RQD=84%

M&T 503E

JJL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	B-4011

REPORT ON SAMPLES OF:	Soil for Classification

PROJECT:	33379.3.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	01-05	DATE RECEIVED:	1-14-05	DATE REPORTED:	1-18-05
SAMPLED FROM:	Roadway	SAMPLED BY:	L.L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	S-1	S-2	S-3	S-4	S-5		M-2	M-4
Lab Sample No. A	148011	012	014	015	017		148013	016
HiCAMS Sample #	--	--	--	--	--		15.7%	19.4%
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	97	95	94	100	81			
Passing #40 Sieve %	88	88	82	98	68			
Passing #200 Sieve %	34	45	17	45	17			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	24	17	34	9	33			
Fine Sand - Ret. #270	49	44	53	55	54			
Silt 0.05-0.005 mm %	15	11	5	14	9			
Clay < 0.005 mm %	12	28	8	22	4			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	32	45	39	32	34			
Plastic Index	NP	NP	NP	NP	NP			
AASHTO Classification	A-2-4 (0)	A-5 (2)	A-2-4 (0)	A-4 (2)	A-2-4 (0)			
Quantity								
Texture								
Station	16+50	18+50	18+50	18+02	18+02		18+50	18+02
Hole No.								
Depth (ft) From:	1.5	1.5	4.4	9.5	12.0		1.5	9.5
To:	4.9	4.4	5.9	11.0	13.5		4.4	11.0

Remarks:

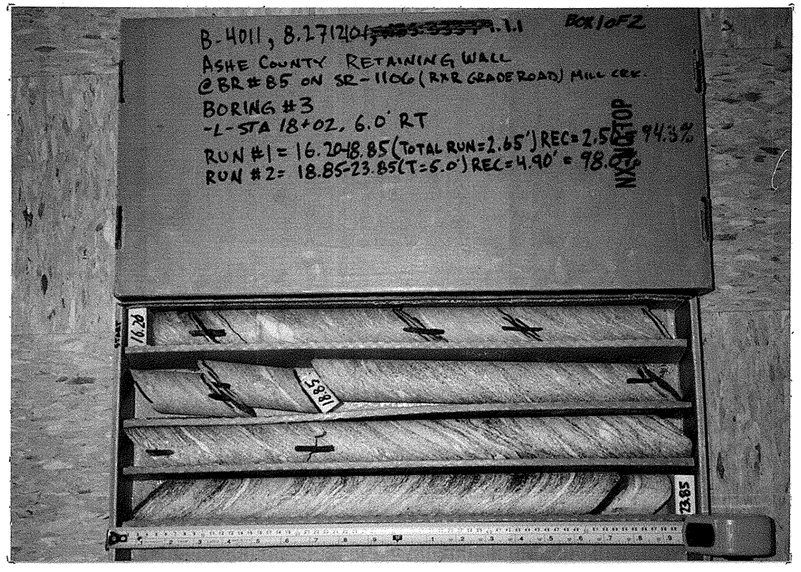
A-148011 – A-148017

CC:

L.L. Acker	
J. J. Lail	
File	

SOILS ENGINEER:	

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe



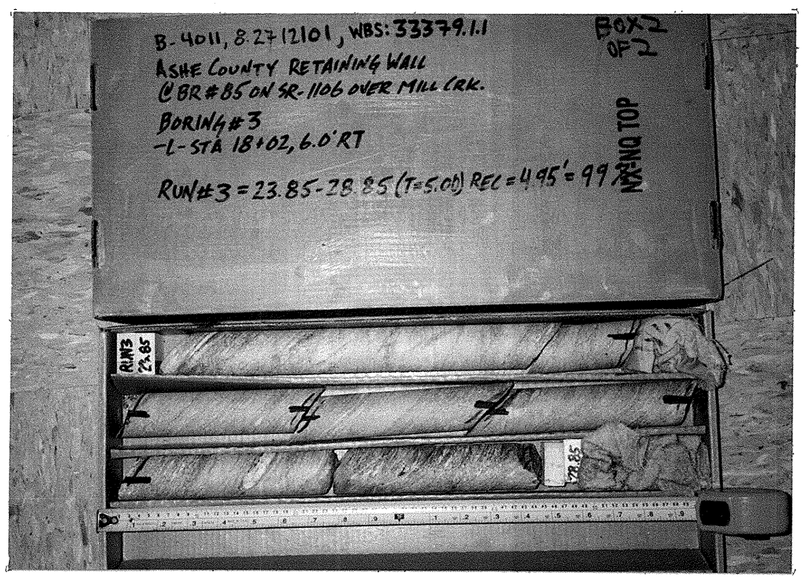
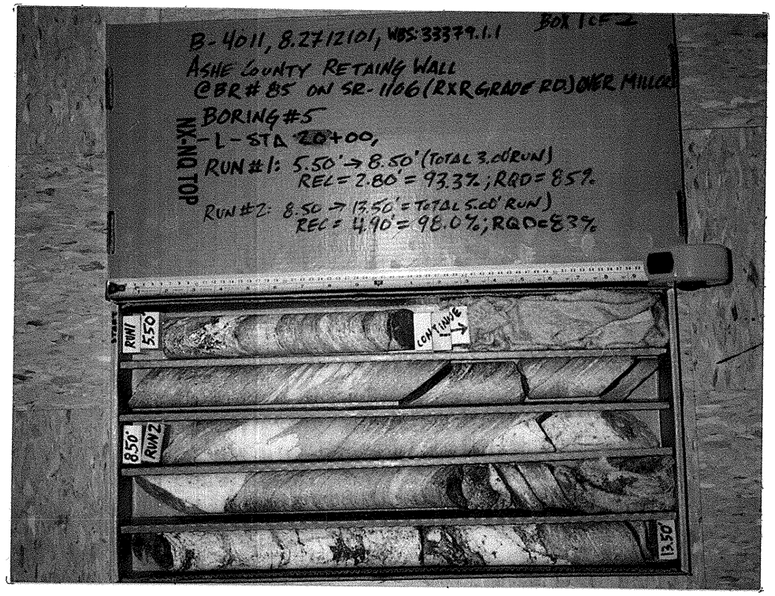


Fig. 1. Core Photography, Boring No. 3

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe



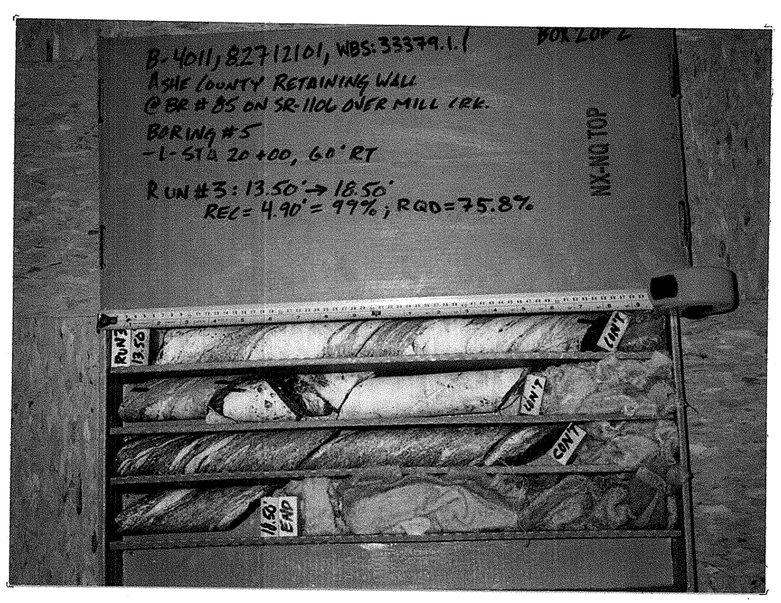


Fig. 2. Core Photography, Boring No. 5

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe

Fig. 3. View forward from Station 15+00

Fig. 4. View forward from Station 17+00

PROJECT NO: 33379.1.1 (B-4011)
COUNTY: Ashe

Fig. 5. View back from Station 20+50

Fig. 6. View toward proposed wall site from Station 17+20