

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

CONTENTS

LINE	STATION	SHEET NUMBERS		
		PLAN	PROFILE	XSECT
-L-	13:00 to 17+48.79	3	N/A	4,5,6,7

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4322	1	13
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33659.1.1	BRZ-1167(1)	PE	
33659.2.1	BRZ-1167(1)	RW & UTIL.	
33659.3.1	BRZ-1167(1)	CONST.	

ROADWAY  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. B-4322 F.A. PROJ. BRZ-1167(1)  
COUNTY WILKES  
PROJECT DESCRIPTION BRIDGE OVER STONY FORK CREEK ON S.R. 1167 BETWEEN S.R. 1155 AND 1501

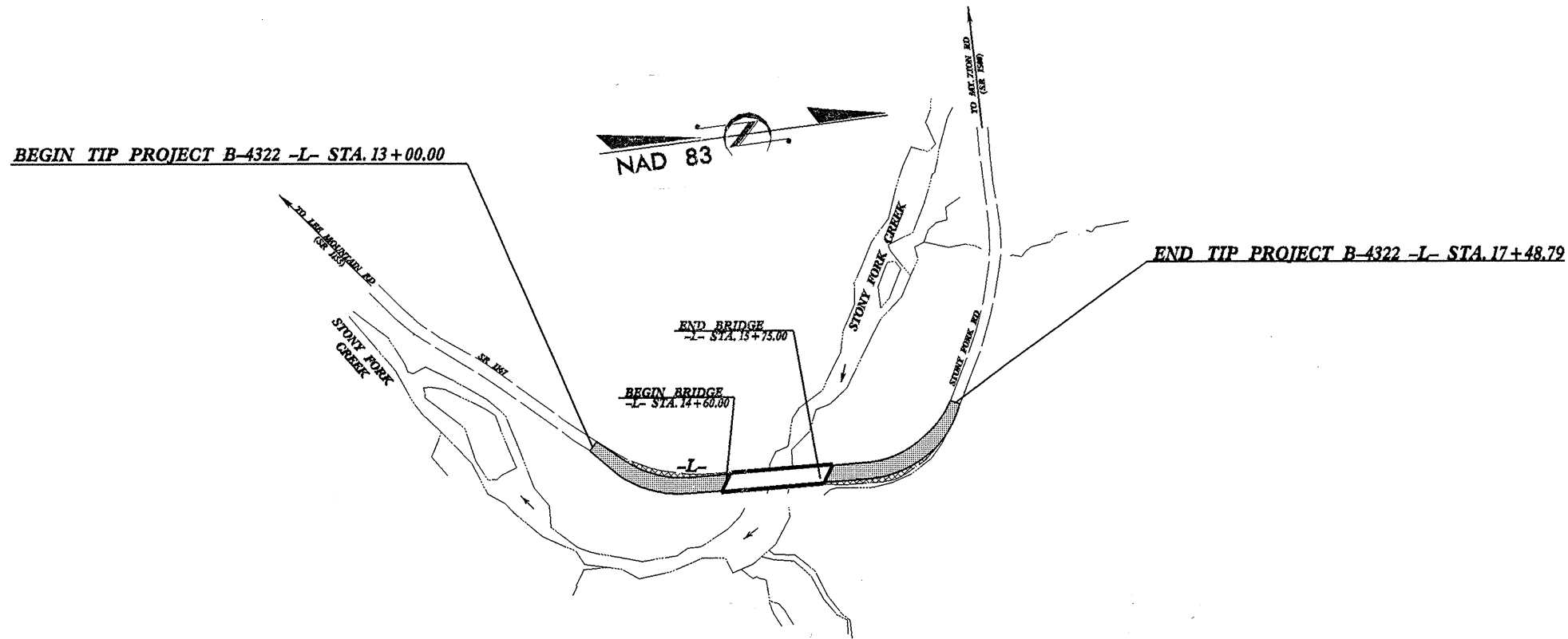
INVENTORY

**CAUTION NOTICE**  
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GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON 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.

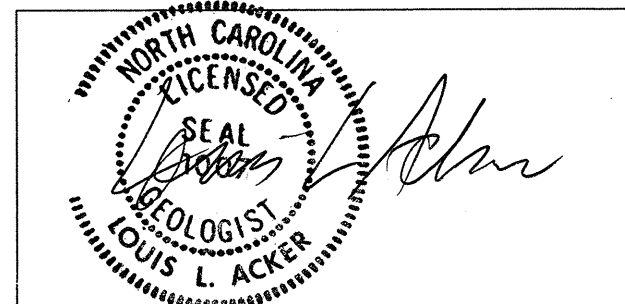
CONTRACT: C201973 ID: B-4322



PERSONNEL

T. B. DANIEL
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R. D. CHILDERS
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INVESTIGATED BY L. L. ACKER  
CHECKED BY W. D. FRYE  
SUBMITTED BY W.D. FRYE  
DATE 6.17.05



DRAWN BY: J. T. WILLIAMS

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

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

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

PROJECT REFERENCE NO. B-4322  
SHEET NO. 2  
**OF 13**

**SUBSURFACE INVESTIGATION**

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

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY-SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>	<b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO <b>POORLY GRADED</b> ) <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. <b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR</b> , <b>SUBANGULAR</b> , <b>SUBROUNDED</b> , OR <b>ROUNDED</b> .	<b>HARD ROCK</b> IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: <b>WEATHERED ROCK (WR)</b> <b>CRYSTALLINE ROCK (CR)</b> <b>NON-CRYSTALLINE ROCK (NCR)</b> <b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>	<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. <b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 60 BLOWS. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b> 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-4, A-5, A-6, A-7 SYMBOL % PASSING LIQUID LIMIT PLASTIC INDEX GROUP INDEX USUAL TYPES OF MAJOR MATERIALS GEN. RATING AS A SUBGRADE	<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. <b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE <b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC	<b>WEATHERING</b> FRESH VERY SLIGHT (V SL.) SLIGHT (SL.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE	
<b>CONSISTENCY OR DENSENESS</b> PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	<b>MISCELLANEOUS SYMBOLS</b> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION TEST BORING AUGER BORING CORE BORING SPT CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL	<b>ROCK HARDNESS</b> VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
<b>TEXTURE OR GRAIN SIZE</b> U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)	<b>ABBREVIATIONS</b> 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, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA. - WEATHERED γ <sub>u</sub> - UNIT WEIGHT γ <sub>d</sub> - DRY UNIT WEIGHT	<b>ABOVE</b> FRESH VERY SLIGHT (V SL.) SLIGHT (SL.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE	
<b>SOIL MOISTURE - CORRELATION OF TERMS</b> SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	<b>EQUIPMENT USED ON SUBJECT PROJECT</b> DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST OTHER OTHER ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT OTHER HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER	<b>ROCK HARDNESS</b> VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
<b>PLASTICITY</b> NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		<b>FRACTURE SPACING</b> TERM SPACING VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE <b>BEDDING</b> TERM THICKNESS VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED	<b>BENCH MARK:</b> BM #3 BL STA. 17+69.72 16.19' LT <b>ELEVATION:</b> 1976.97 FT. <b>NOTES:</b>
<b>COLOR</b> DESRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		<b>INDURATION</b> FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED	



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

July 5, 2005

STATE PROJECT: 33659.1.1 (B-4322)  
F.A. PROJECT: BRZ-1167 (1)  
COUNTY: Wilkes  
DESCRIPTION: Approaches to Bridge 71 over Stony Fork Creek on  
SR 1167 (Stony Fork Rd.)  
  
SUBJECT: Geotechnical Report – Inventory

### Site Description

This project is located in western Wilkes County approximately one mile from the Watauga County Line. Bridge number 71 is a single lane structure on gravel road SR 1167. It is approximately 2.5 miles from the intersection with US Highway 421 in Watauga County.

Stony Fork Creek is a turbulent mountain stream flowing on hard rock with bars of sand, gravel and boulders. The channel is about 12 to 15 feet wide in a floodplain 100 feet wide. Valley slopes above the floodplain are 25 to 35 degrees, except at the base of slope on the north side of the valley, where the slope is almost 45 degrees. The area is completely wooded and there are no houses or other structures in the vicinity.

The project begins at Station 13+00 and ends at Station 17+49. Plans call for small cuts of 10 feet or less and fills of 5 feet or less. A complete subsurface investigation was done under an earlier plan that called for large cuts on the approaches at both ends of the bridge. Six borings were made with a CME 45 power drilling machine equipped with rotary and diamond bit coring tools. The results are presented in this report, although most of the borings fall outside the limits of the project as now conceived.

### Areas of Special Geotechnical Interest

#### Water at Ground Surface

A wet area occupies both sides of the road between the proposed north bridge abutment at Station 15+50 and Station 16+50. Water is flowing in the existing ditch on the Right

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

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

Side. Heavy trucks may bog down in wet soil in a small parking area on the Left Side where water is standing in tire ruts. A boring at Station 16+50, CL found 3.3 feet of saturated alluvial silt directly overlying hard rock. The static groundwater table was 0.5 feet below ground surface.

### Soil and Rock Materials

The principal materials on this project are colluvium, saprolite and hard rock. Other materials include a thin alluvial soil on the flood plain, and weathered rock in some, but not all, residual profiles. Soil is very thin on slopes north of the bridge, where rock can be seen at the ground surface in several outcrops.

Borings on the Left Side, south of the bridge, encountered thick accumulations of old, deeply weathered colluvium. It typically consisted of an upper layer more than 10 feet thick composed of a red clay matrix (A-6 and A-7-6) enclosing pebbles and cobbles in various states of weathering, and a lower layer with a sandy, silty matrix and relatively unweathered clasts. The total thickness is more than 20 feet at one boring. N values in this old weathered colluvium range between 4 and 9, except where they are higher due to interference by large clasts.

Saprolite is about 10 feet thick underlying the old weathered colluvium, and it grades downward to weathered rock. It is composed of reddish brown, micaceous, silty sand (A-2-4) and white, feldspathic, silty coarse sand (A-1-b). Open joints in saprolite and weathered rock are filled with manganese oxide.

Unweathered colluvium is found near the base of the slope north of the bridge. It consists of brown, loose, silty sand with cobbles and boulders (A-2-4 to A-1-b). It is underlain by weathered rock and hard rock.

Floodplain soil is composed of saturated, brown, soft or loose, sandy, gravelly silt or sand (A-4, A-1-b) a few feet deep.

The hard rock underlying this site is of two types – gray, medium-grained, biotite gneiss and white, coarse pegmatite. The latter is composed of very large feldspar and quartz grains with scattered mica and with lenses or selvages of coarse black mica a few feet thick. The pegmatite forms intrusive sills up to ten feet or more in thickness between layers of gneiss.

### Geotechnical Descriptive Analysis

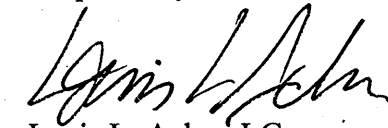
#### Station 13+00 to 14+50

This segment covers ground between the beginning of the project and the proposed south bridge abutment. A small cut on the Left Side will encounter reddish brown, micaceous silty sand saprolite (A-2-4).

Station 15+75 to 17+49

This segment begins at the north abutment and ends at the end of the project. It is underlain by saturated alluvial sandy to gravelly silt from the Right Side ditch line to the Left Side beyond construction limits. The alluvial soil is approximately 3 feet deep overlying hard rock. Static groundwater is 0.5 feet or less below the ground surface and there is flowing or standing water in depressions. A small cut on the Right Side at Station 17+00 may encounter weathered rock or hard rock at the base of the slope adjacent to the ditch line.

Respectfully submitted,



Louis L. Acker, LG  
Project Geologist

**EARTHWORK BALANCE SHEET**

Volumes in Cubic Yards

PROJECT: B-4322

COUNTY: WILKES

DATE: 4-Aug-08

COMPILED BY: BAM

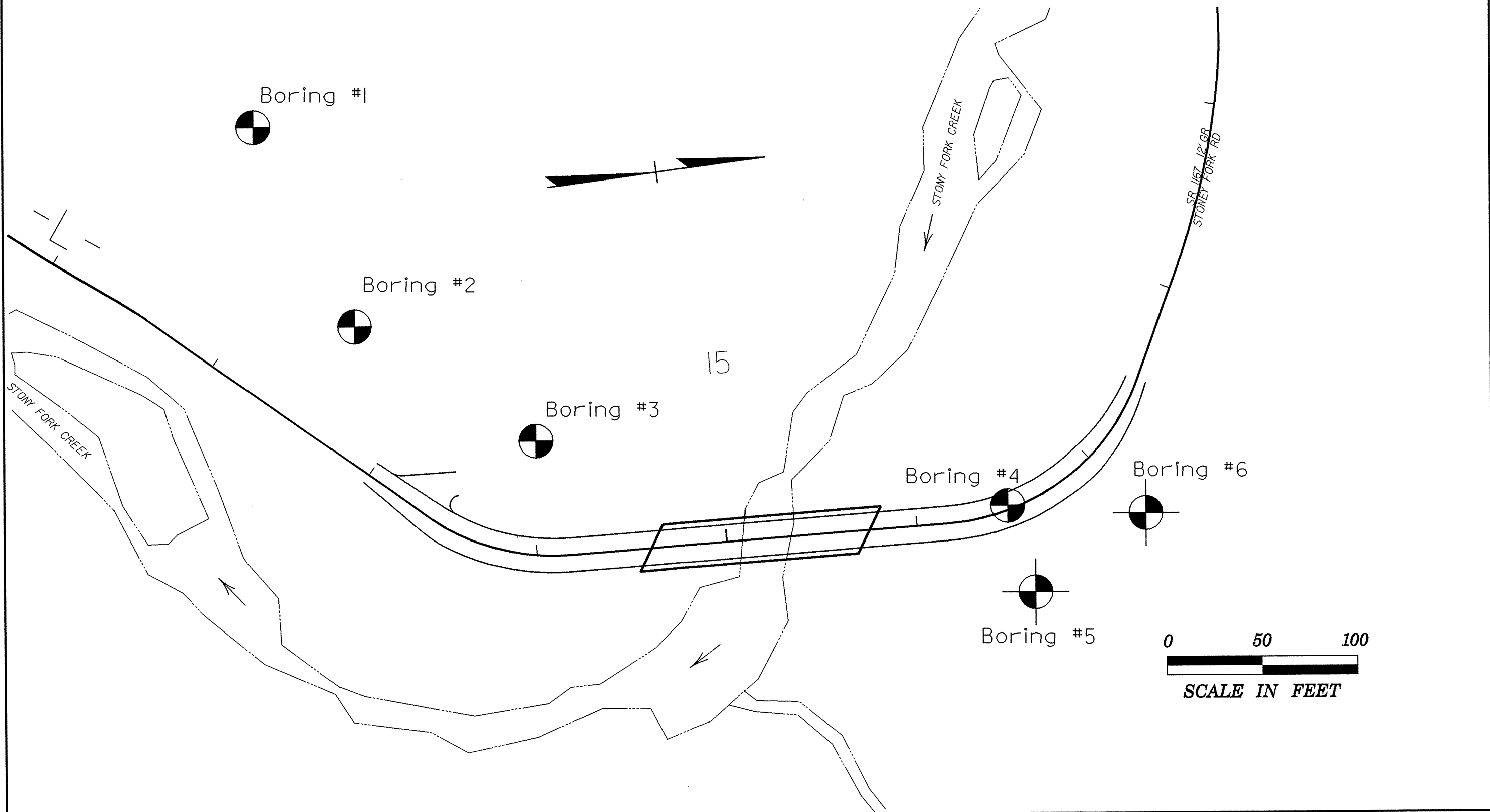
SHEET 3C OF 13 SHEETS

RD10501C

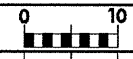
STATION	STATION	EXCAVATION (Cubic Yards)					EMBANKMENT (Cubic Yards)				BORROW	WASTE (Cubic Yards)						
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 15%		ROCK	SUITABLE	UNSUIT.	TOTAL			
SUMMARY 1																		
L 13+00.00 TO 14+60.00		280				280	347		347	399	119							
SUBTOTAL 1		280				280	347		347	399	119							
SUMMARY 2																		
L 15+75.00 TO 17+48.79		36				36	77		77	88	52							
SUBTOTAL		36				36	77		77	88	52							
PROJECT SUBTOTAL		316				316	424		424	487	171							
LOSS DUE TO C & G		-150				-150					150							
ROCK WASTE TO REPL. BORROW																		
ADJUST FOR ROCK WASTE																		
EARTH WASTE TO REPL. BORROW																		
EST. SHOULDER MATERIAL																		
ADDITIONAL UNDERCUT																		
PROJECT TOTAL		166				166	424		424	487	321							
EST. 5% TO REPLACE TOPSOIL											16							
GRAND TOTAL		166				166	424		424	487	337							
SAY		200									500							

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

# PLAN VIEW



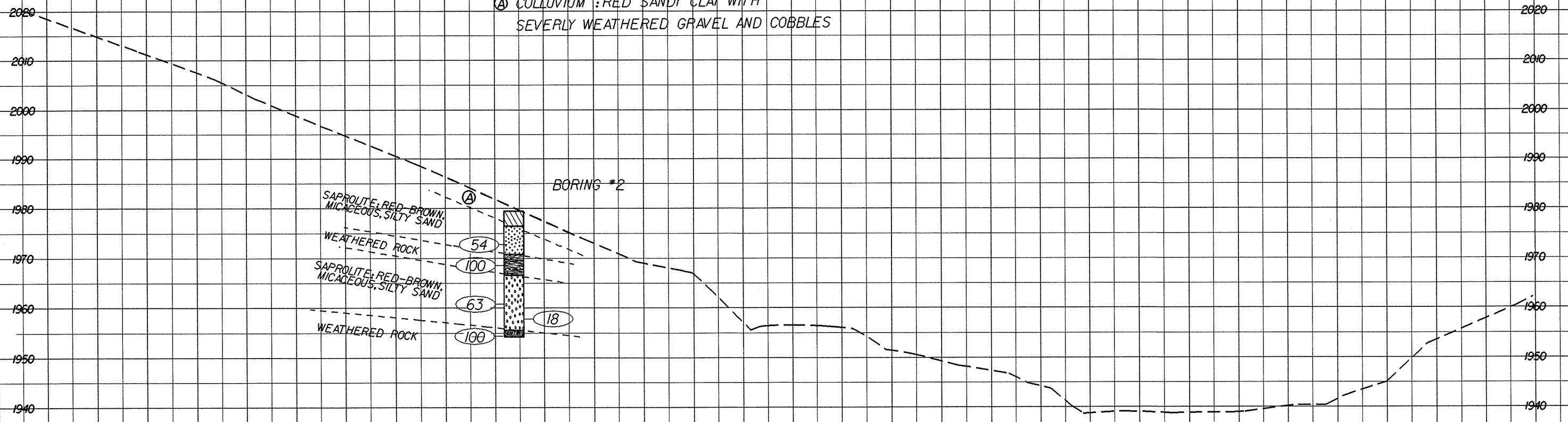
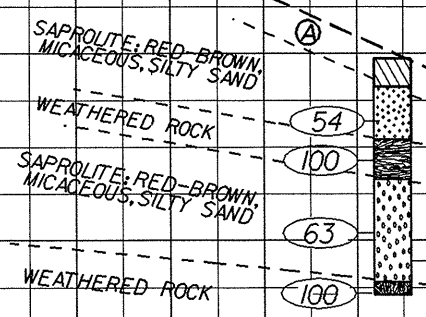
8/23/99



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

Ⓐ COLLUVIUM : RED SANDY CLAY WITH SEVERLY WEATHERED GRAVEL AND COBBLES

BORING #2



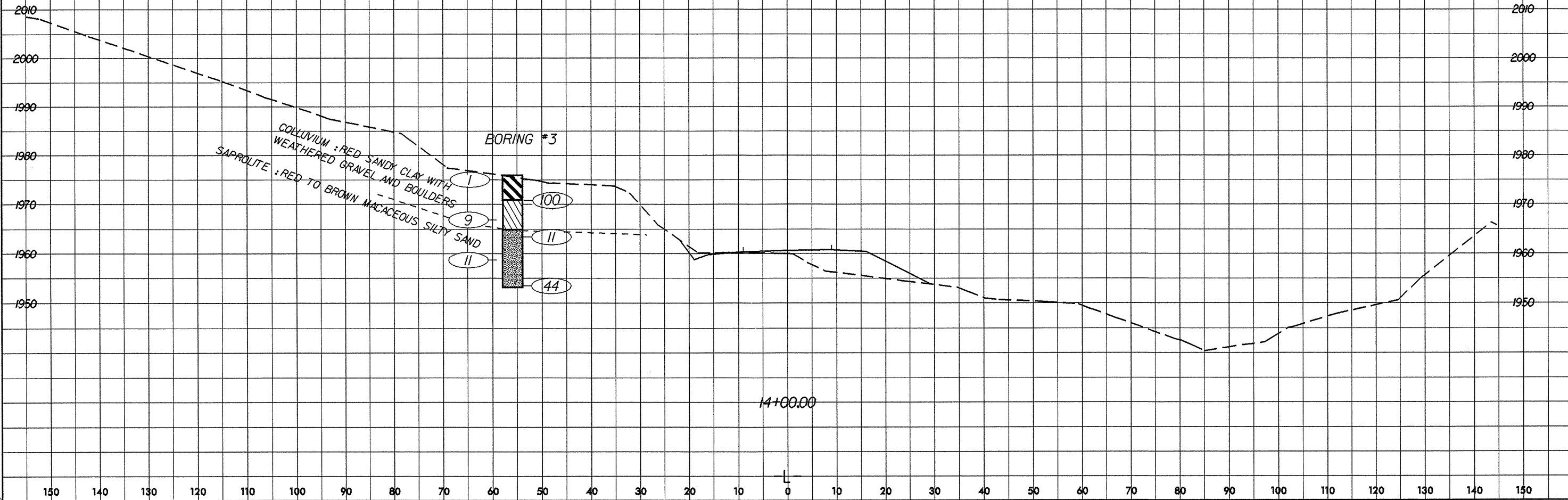
12+50.00

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

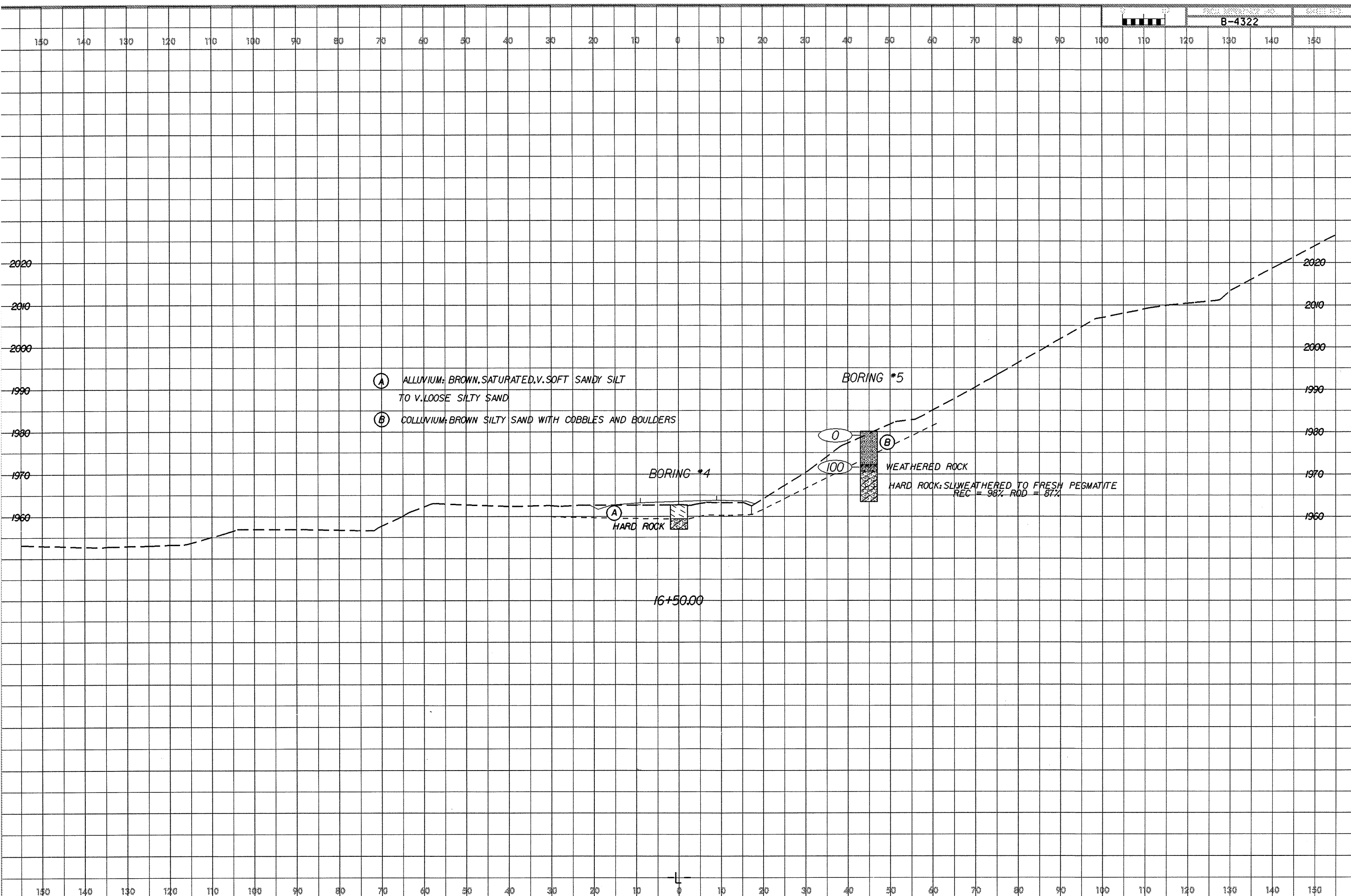
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

d:\wpo\ashville\cadd\311\station\b-4322-geo.rdw\cadd\geotech\asc\b-4322-geo.rsc\l.dgn  
Williams HT 08/22/99

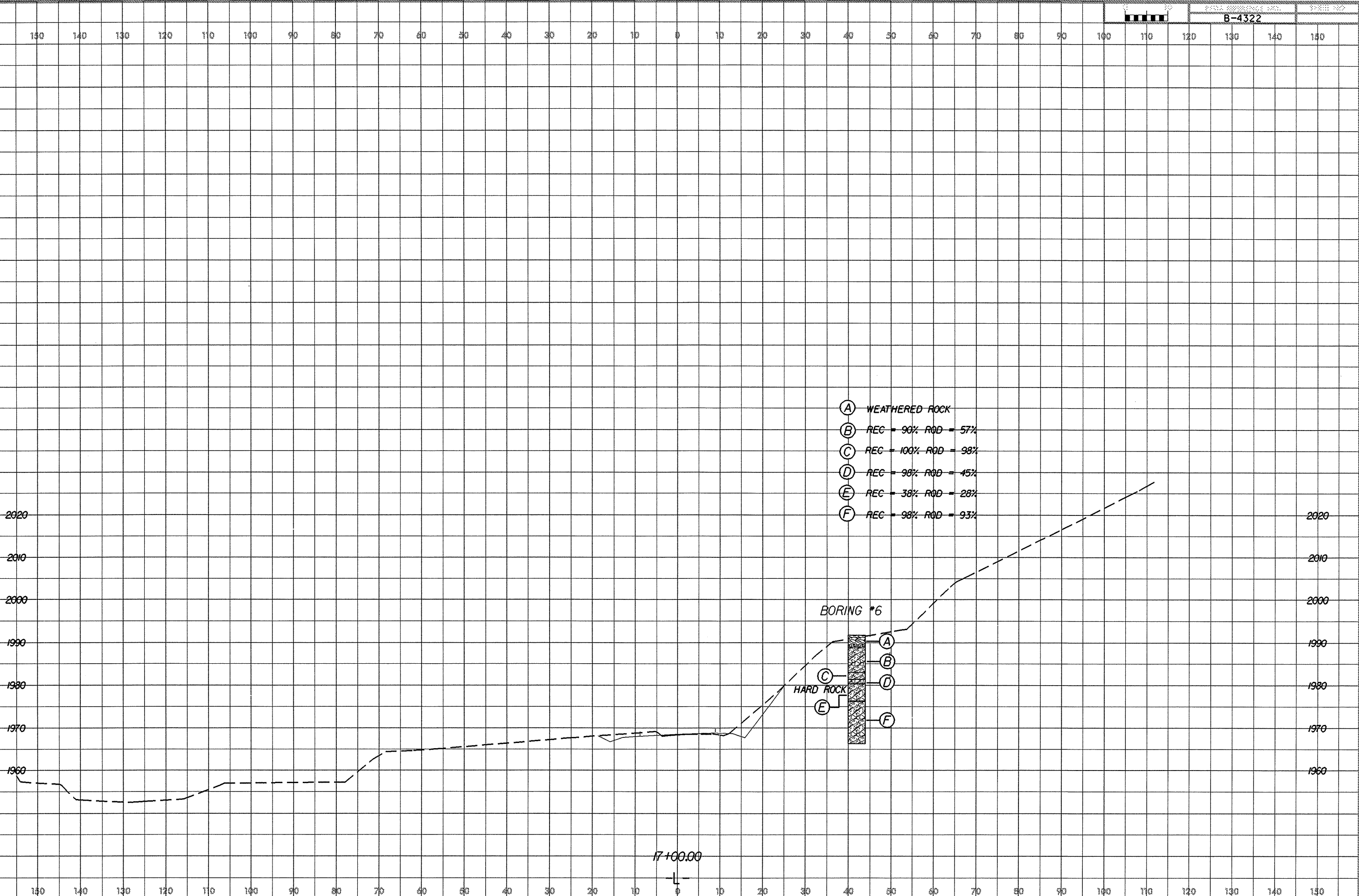
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150







B-4322



- (A) WEATHERED ROCK
- (B) REC = 90% ROD = 57%
- (C) REC = 100% ROD = 98%
- (D) REC = 98% ROD = 45%
- (E) REC = 38% ROD = 28%
- (F) REC = 98% ROD = 93%

BORING #6

HARD ROCK

17+00.00

2020  
2010  
2000  
1990  
1980  
1970  
1960

2020  
2010  
2000  
1990  
1980  
1970  
1960

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

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 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER								
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER							
BORING NO BORING 1		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT -L-		BORING LOCATION 11+50.000		OFFSET 110.00ft LT		24 HR 23.50ft								
COLLAR ELEV 2021.80ft		TOTAL DEPTH 31.40ft		START DATE 3/23/05		COMPLETION DATE 03/23/05								
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log BORING 1, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
21.80	0.00	0	1	0	1.0	Ground Surface								
20.00	5.60	2	2	3	1.0	1					M		COLLUVIUM: RED SANDY CLAY WITH WEATHERED ROCK FRAGMENTS - OLD WEATHERED COLLUVIUM	
10.00	10.60	2	2	2	1.0	4					M		COLLUVIUM: RED SANDY CLAY WITH WEATHERED ROCK FRAGMENTS - OLD WEATHERED COLLUVIUM	
	15.60	3	2	3	1.0	5					SS-7	W	COLLUVIUM: RED AND BROWN SILTY SAND WITH WEATHERED ROCK FRAGMENTS - OLD WEATHERED COLLUVIUM	
00.00	20.60	2	2	3	1.0	5					SS-8	W	COLLUVIUM: RED AND BROWN SILTY SAND WITH WEATHERED ROCK FRAGMENTS - OLD WEATHERED COLLUVIUM	
	25.60	6	25	75	0.9		100						SAPROLITE: RED-BROWN, MICACEOUS SILTY SAND	
	30.60	47	53		0.3		100						WEATHERED ROCK: MICA GNEISS AND PEGMATITE INTERLAYERED	
							TERMINATED BORING IN WEATHERED ROCK AT ELEVATION 1990.4 FEET							

### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER								
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER							
BORING NO BORING 2		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT -L-		BORING LOCATION 12+50.000		OFFSET 55.00ft LT		24 HR 23.00ft								
COLLAR ELEV 1979.60ft		TOTAL DEPTH 25.90ft		START DATE 3/22/05		COMPLETION DATE 03/22/05								
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log BORING 2, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
1979.60	0.00	0	0	0	1.0	Ground Surface								
	5.40	17	28	26	1.0	54					M		COLLUVIUM: RED AND BROWN SANDY CLAY - OLD WEATHERED COLLUVIUM	
1970.00	10.40	48	52		0.2	100							SAPROLITE: BROWN TO RED-BROWN, MICACEOUS SILTY SAND	
	15.40	16	25	38	1.0	63					M		WEATHERED ROCK: WHITE PEGMATITE	
1960.00	20.40	8	8	10	1.0	18							SAPROLITE: RED-BROWN, MICACEOUS SILTY SAND	
1953.70	25.40	85	15		0.6	100							WEATHERED ROCK: PEGMATITE	
							TERMINATED BORING IN WEATHERED ROCK AT ELEVATION 1953.7 FEET							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER								
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER							
BORING NO BORING 3		NORTHING 0.00		EASTING 0.00		0 HR N/A	24 HR N/A							
ALIGNMENT -L-		BORING LOCATION 14+00.000		OFFSET 55.00ft LT										
COLLAR ELEV 1976.80ft		TOTAL DEPTH 22.70ft		START DATE 3/21/05		COMPLETION DATE 03/22/05								
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log BORING 3, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
1976.80	0.00	0	0	1	1.0									Ground Surface
	3.50	3	6	94	0.9					SS-1	M			COLLUVIUM: RED SANDY CLAY WITH WEATHERED ROCK FRAGMENTS - OLD WEATHERED COLLUVIUM
	7.70	4	4	5	1.0					SS-2	M			COLLUVIUM: RED-BROWN, SANDY CLAY WITH A FEW WEATHERED BOULDERS - OLD WEATHERED COLLUVIUM
	11.20	4	5	6	1.0					SS-3	W			SAPROLITE: REDDISH BROWN, MICACEOUS SILTY SAND WITH MANGANESE COATED JOINTS
	16.20	3	4	7	1.0					SS-4	W			
	21.20	20	22	22	1.0					SS-5	M			
	1954.10	TERMINATED BORING IN SAPROLITE AT ELEVATION 1954.1 FEET.												

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER								
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER							
BORING NO BORING 4		NORTHING 0.00		EASTING 0.00		0 HR 0.50ft	24 HR 0.50ft							
ALIGNMENT -L-		BORING LOCATION 16+50.000		OFFSET 0.00ft										
COLLAR ELEV 1963.00ft		TOTAL DEPTH 5.80ft		START DATE 3/29/05		COMPLETION DATE 03/29/05								
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 3.30ft			Log BORING 4, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
1963.00														Ground Surface
1960.00														ALLUVIUM: VERY SOFT, DARK BROWN SANDY SILT WITH ORGANIC LITTER
1957.20														HARD ROCK
		TERMINATED BORING IN HARD ROCK AT ELEVATION 1957.2 FEET.												

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER						
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER					
BORING NO BORING 5		NORTHING 0.00		EASTING 0.00		0 HR 7.40ft						
ALIGNMENT -L-		BORING LOCATION 16+50.000		OFFSET 45.00ft RT		24 HR N/A						
COLLAR ELEV 1979.60ft		TOTAL DEPTH 16.70ft		START DATE 3/29/05		COMPLETION DATE 03/29/05						
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 9.50ft			Log BORING 5, Page 1 of 1						
LEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
9.60	0.00	0	0	0	1.0							Ground Surface
	7.10	15	10	90	0.8							COLLUVIUM: BROWN SILTY SAND WITH COBBLES AND BOULDERS
0.00												WEATHERED ROCK
												HARD ROCK: SLI. WEATHERED TO FRESH PEGMATITE REC=98% RQD=87%
2.90												TERMINATED BORING IN HARD ROCK AT ELEVATION 1962.9 FEET.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33659.1.1		ID B-4322		COUNTY WILKES		GEOLOGIST L.L. ACKER						
SITE DESCRIPTION APPROACH TO BR. 70 OVER STONY FORK CREEK ON SR 1167							GND WATER					
BORING NO BORING 6		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 17+00.000		OFFSET 42.00ft RT		24 HR N/A						
COLLAR ELEV 1991.20ft		TOTAL DEPTH 25.40ft		START DATE 3/24/05		COMPLETION DATE 03/24/05						
DRILL MACHINE CME-45			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 2.80ft			Log BORING 6, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1991.20												Ground Surface
												WEATHERED ROCK
												HARD ROCK: SLI. WEATHERED BIOTITE GNEISS REC=90% RQD=57%
1980.00												HARD ROCK: PEGMATITE REC=100% RQD=98%
												HARD ROCK: BIOTITE GNEISS REC=98% RQD=45%
												HARD ROCK: WEATHERED PEGMATITE REC=38% RQD=28%
1970.00												HARD ROCK: FRESH PEGMATITE REC=98% RQD=93%
1965.80												TERMINATED BORING IN HARD ROCK AT ELEVATION 1965.8 FEET.

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

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

T.I.P. ID #: B-4322

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REPORT ON SAMPLES OF: Soils for Classification

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	33659.1.1	COUNTY:	Wilkes	Owner:	--
DATE SAMPLED:	3-23-05	DATE RECEIVED:	3-31-05	DATE REPORTED:	4-8-05
SAMPLED FROM:	Roadway	SAMPLED BY:	L.L. Acker		
SUBMITTED BY:	W.D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

PROJECT:	33659.1.1	COUNTY:	Wilkes	Owner:	--
DATE SAMPLED:	3-29-05	DATE RECEIVED:	3-31-05	DATE REPORTED:	4-8-05
SAMPLED FROM:	Roadway	SAMPLED BY:	L.L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Lab Sample No. A	148561	148562	148563	148564	148565	148566	148567	148568
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	88	90	96	94	99	84	90	92
Passing #40 Sieve %	76	74	75	70	72	67	54	73
Passing #200 Sieve %	45	36	26	31	21	30	15	27

TEST RESULTS

Project Sample No.	SS-9							
Lab Sample No. A	148569							
HiCAMS Sample #	--							
Retained #4 Sieve %	--							
Passing #10 Sieve %	83							
Passing #40 Sieve %	56							
Passing #200 Sieve %	18							

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	26	34	39	41	49	37	59	40
Fine Sand - Ret. #270	26	31	41	32	35	32	28	36
Silt 0.05-0.005 mm %	18	17	20	23	16	31	1	16
Clay < 0.005 mm %	30	18	0	4	0	0	12	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	50							
Fine Sand - Ret. #270	34							
Silt 0.05-0.005 mm %	14							
Clay < 0.005 mm %	2							
Passing # 40 Sieve %	--							
Passing # 200 Sieve %	--							

Liquid Limit	47	36	38	40	27	29	39	36
Plastic Index	19	11	NP	NP	NP	NP	9	NP
AASHTO Classification	A-7-6 (5)	A-6 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	14+00	14+00	14+00	14+00	14+00	12+50	11+50	11+50
Hole No.								
Depth (ft) From:	3.5	6.2	11.2	16.2	21.2	6.1	15.6	20.6
To:	4.8	7.7	12.7	17.7	22.7	7.1	17.1	22.1

Liquid Limit	33							
Plastic Index	NP							
AASHTO Classification	A-2-4 (0)							
Quantity								
Texture								
Station	16+50							
Hole No.								
Depth (ft) From:	7.9							
To:	8.5							

Remarks:

A-148561-148568

CC:

L.L. Acker

File

SOILS ENGINEER:

Remarks:

A-148569

CC:

L.L. Acker

File

SOILS ENGINEER:

Project No. 33659.1.1  
B-4322 Wilkes Co.



Figure 1. Bridge 70, looking upstream.

Project No. 33659.1.1  
B-4322 Wilkes Co.



Figure 3. Looking back from Station 16+50. Note water in ruts on right.



Figure 2. Looking forward from Station 13+00.



Figure 4. Looking back from Station 17+00. Note water in ditch.