N.C.	33301.1.1 B-3854	1	16
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
8.2942101		P.E.	
		CONST.	

ID. B-3854

PROJECT. 33301.1.1

CONTENTS:

BRIDGE FROM -L- STA 16+40
TO -L- STA 17+35

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

STATE PROJECT 33301.1.1 I.D. NO. B-3854

F.A. PROJECT

COUNTY HAYWOOD

DESCRIPTION BRIDGE NO.329 ON SR-1309
OVER JONATHAN CREEK

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 C A DUNNAGAN PERSONNEL T B DANIEL

CHECKED BY W D FRYE, JR P O LOCKAMY

SUBMITTED BY W D FRYE, JR J T WILLIAMS

DATE MARCH 2004 L E LANKFORD

DRAWN BY: C A DUNNAGAN

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 21004 GEOLOGIST CHARLES ANDREWS DUNNAGAN

SEAL

SIGNATURE C A Dunnagan

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3854	33301.1.1	2	16

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 ... 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-7-5, A-7-6)	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							
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#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			
LIQUID LIMIT				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	6 MX		N.P.	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	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/FT²)
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	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

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, RPT, VST — TEST BORING
- AUGER BORING
- CORE BORING
- MW — 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
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE_____" STEEL TEETH
- [ ] TRICONE_____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] OTHER_____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N XWL___
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] 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.

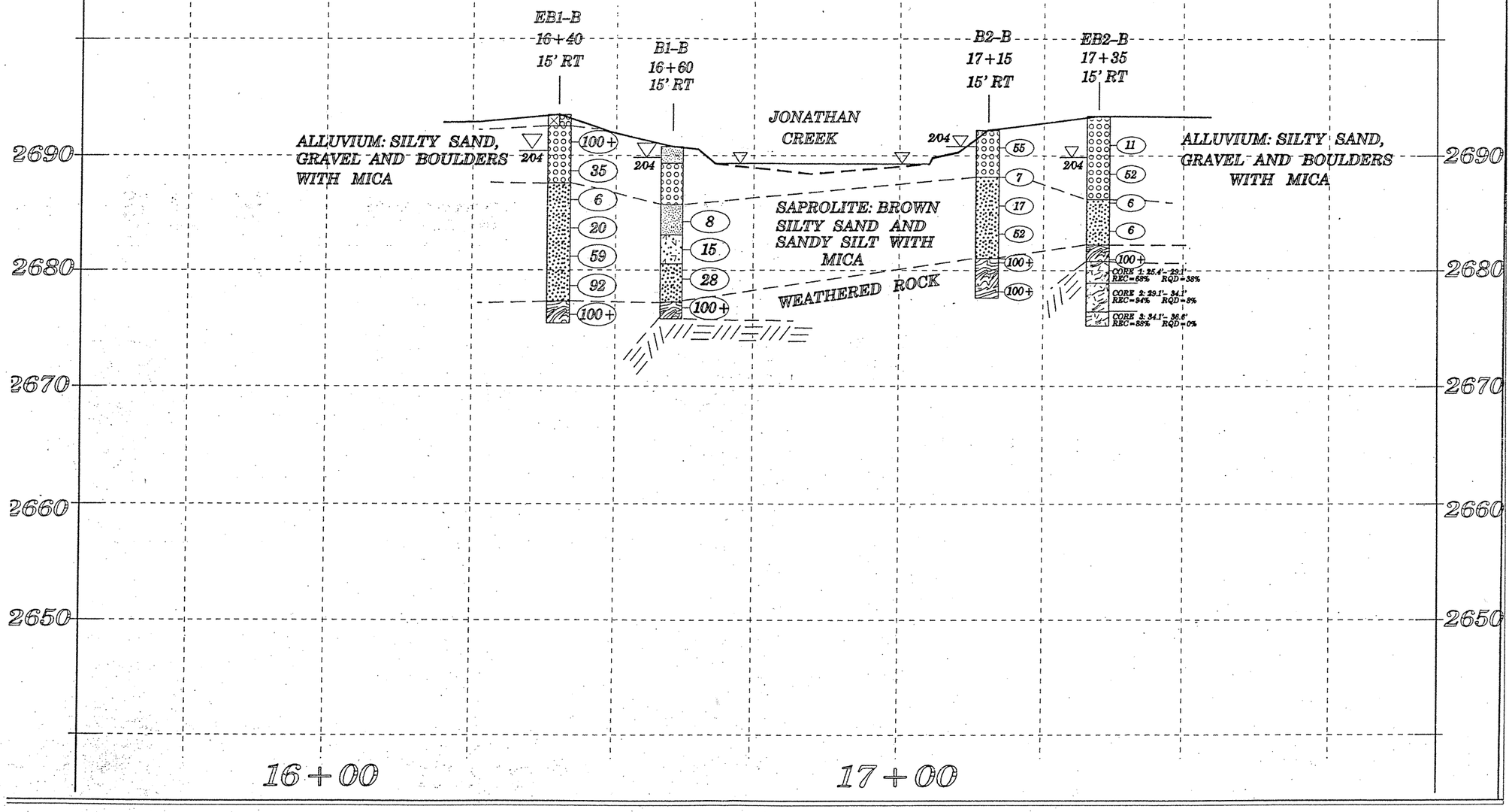
TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM#2 CHISELED SQUARE ON SW CORNER OF CONC. RET. WALL
-BL- STA 11+08.23, 8.195'LT
ELEVATION: 2697.15

NOTES:

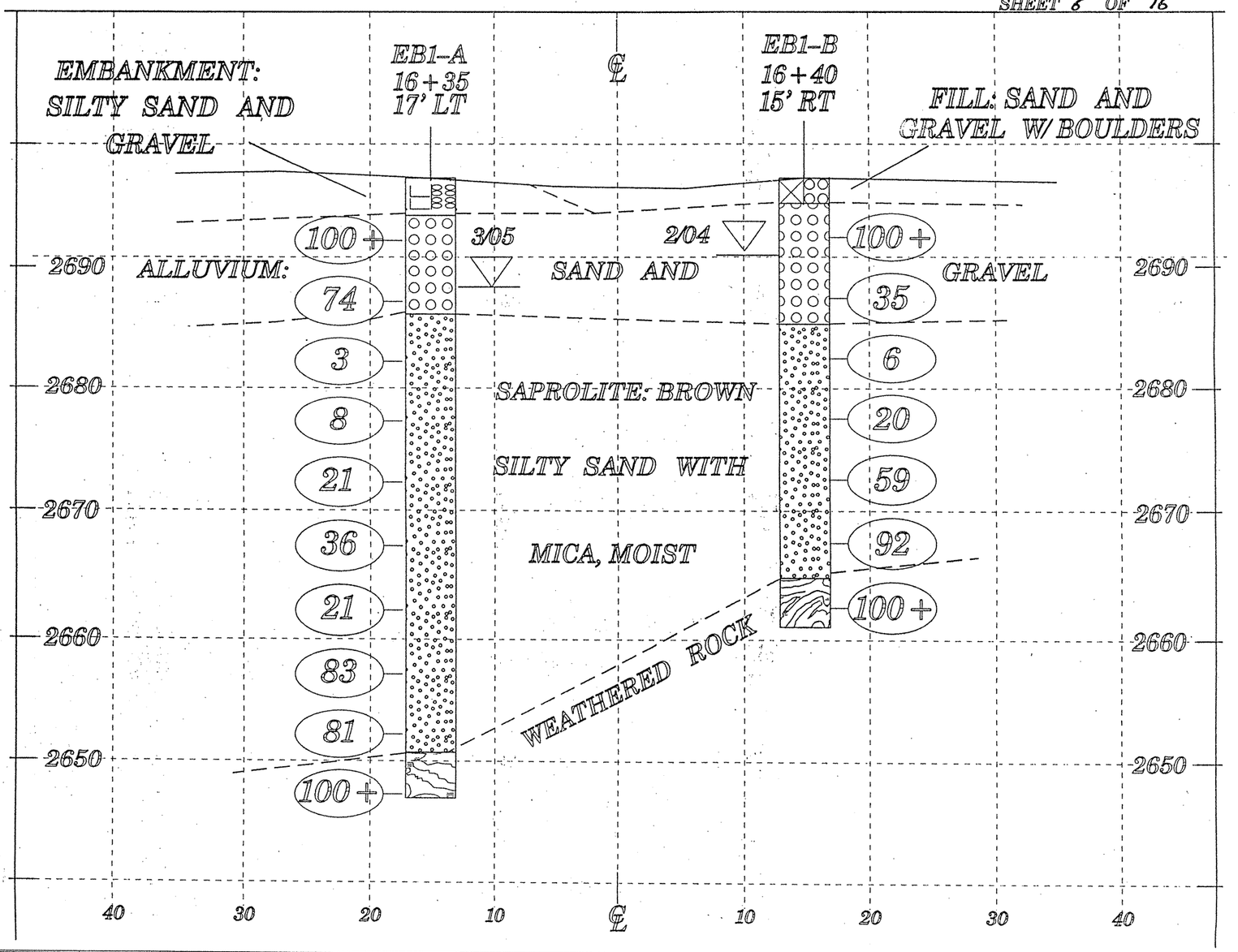
REVISED 09/15/00

PROFILE 15 FEET RIGHT OF -L-



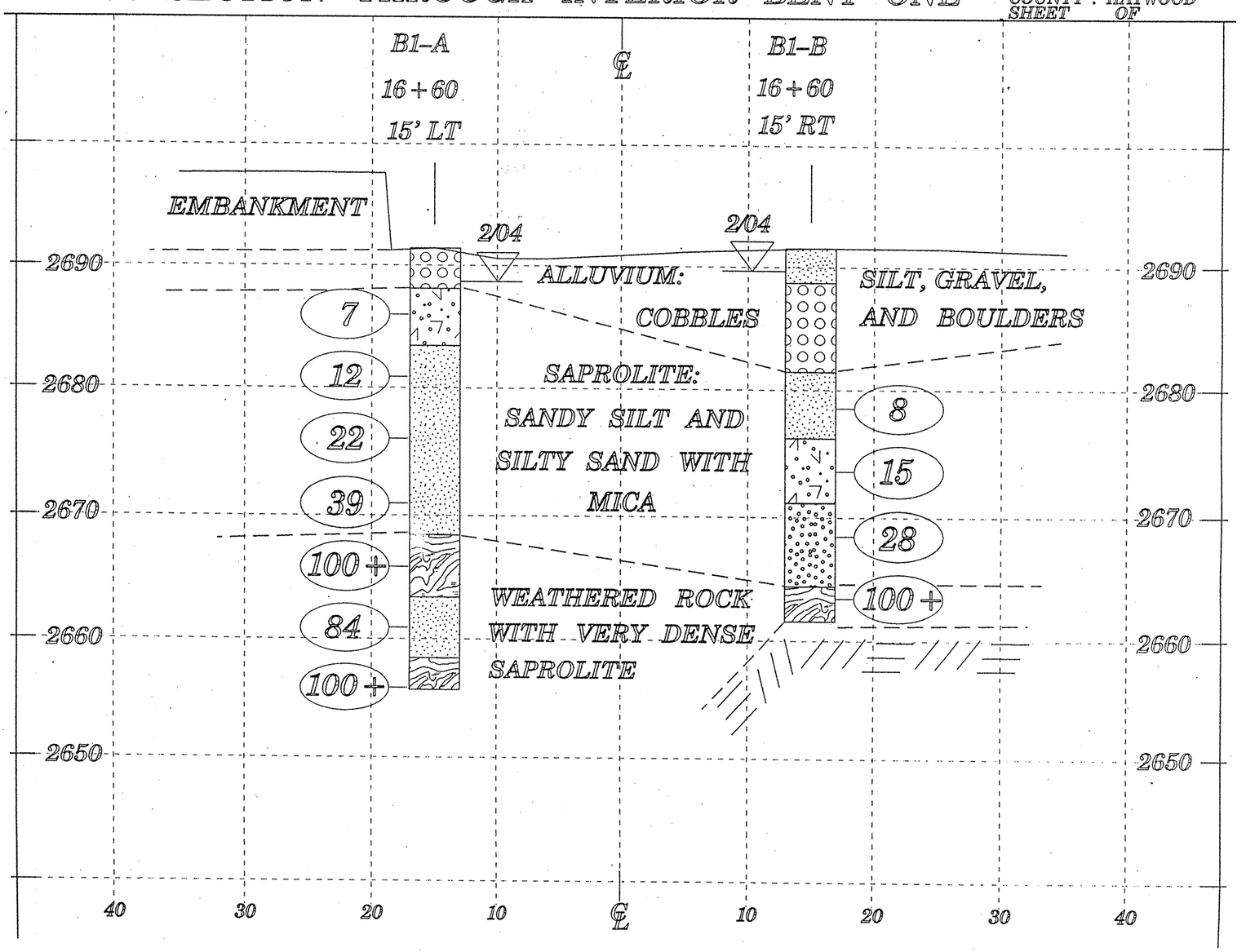
CROSS SECTION THROUGH END BENT ONE

PROJECT : 33301.1.1 B-3854
COUNTY : HAYWOOD
SHEET 6 OF 16



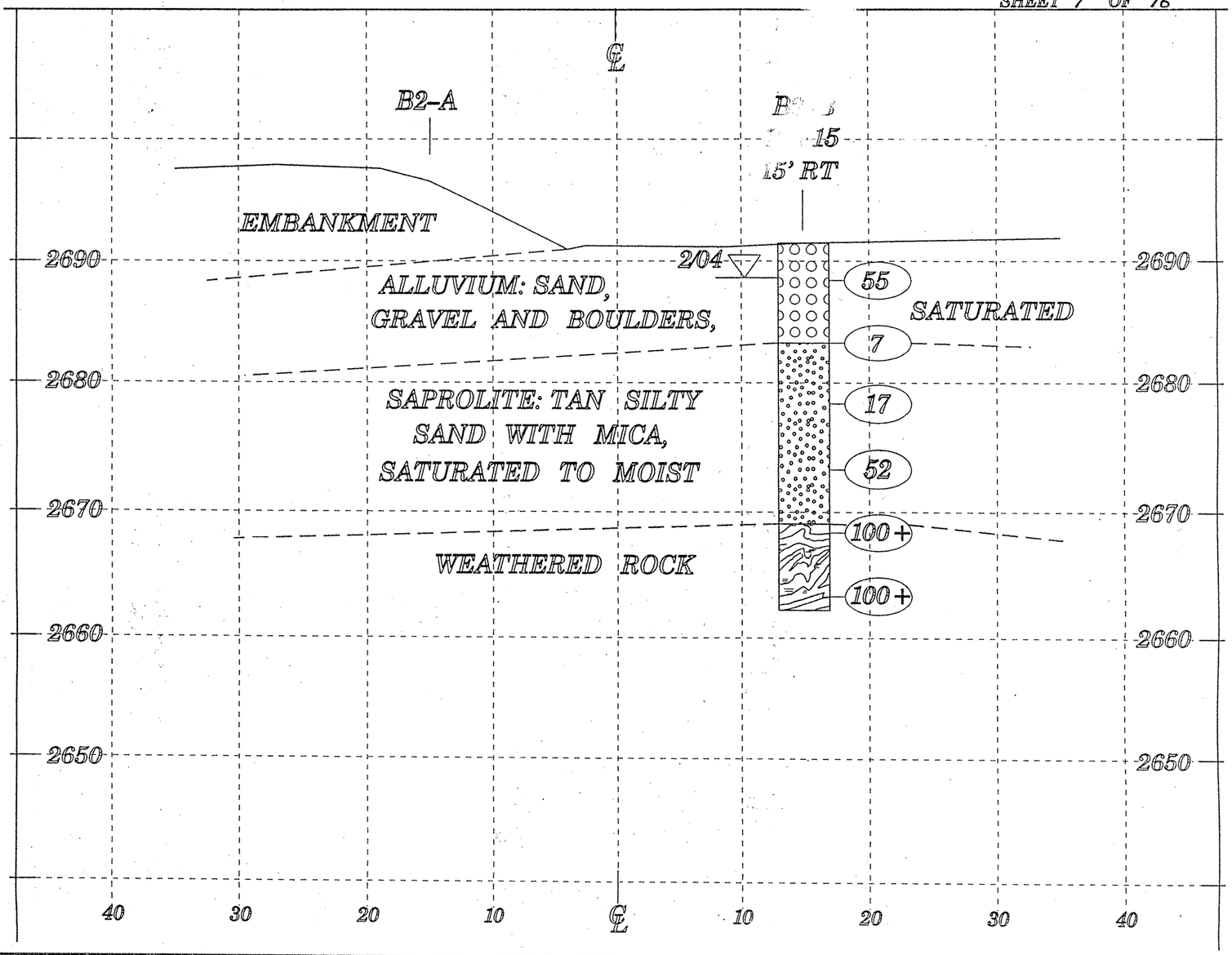
CROSS SECTION THROUGH INTERIOR BENT ONE

PROJECT: 33301.1.1. B-3854
COUNTY : HAYWOOD
SHEET OF



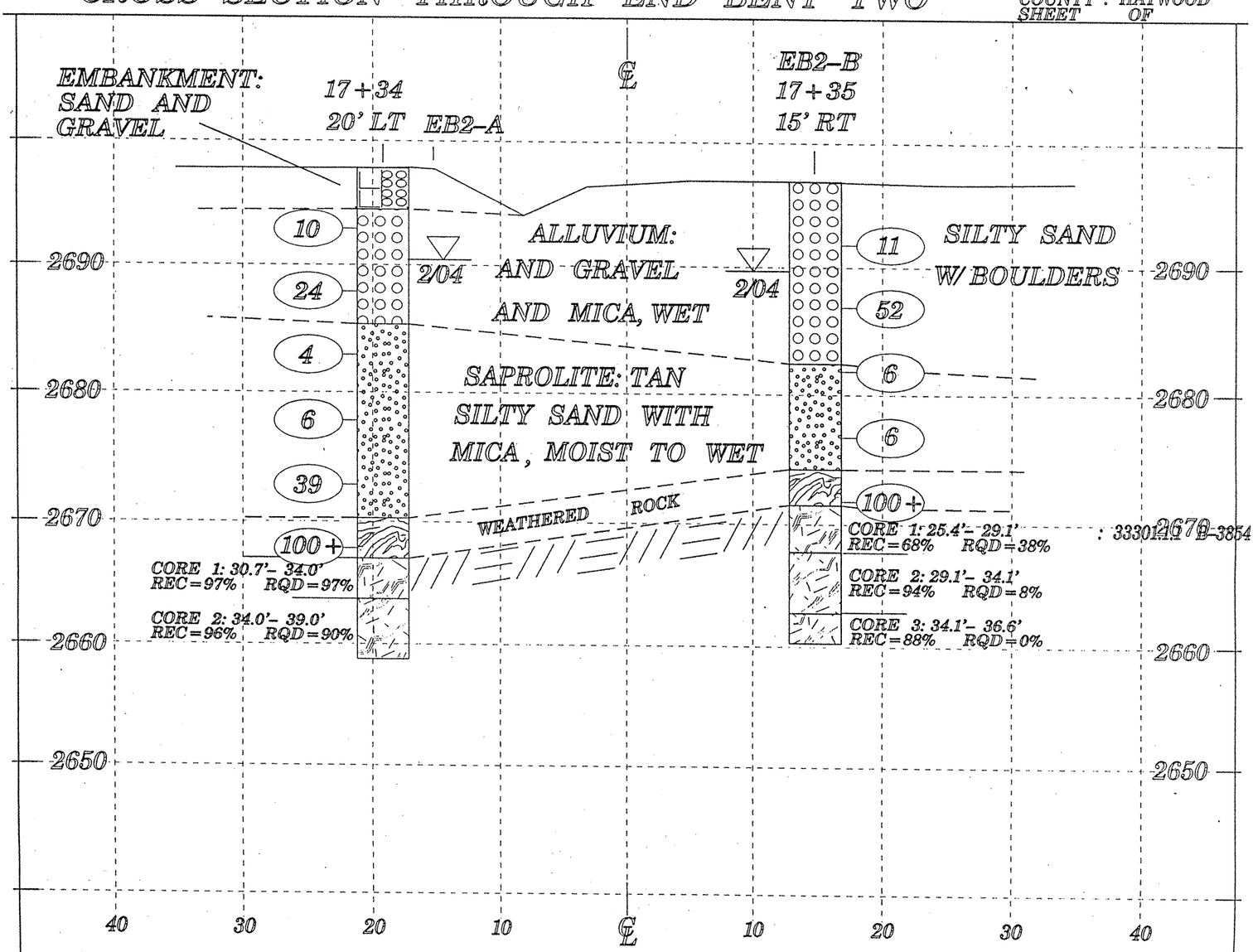
CROSS SECTION THROUGH INTERIOR BENT TWO

PROJECT: 33301.1.1 B-3854
COUNTY: HAYWOOD
SHEET 7 OF 16



CROSS SECTION THROUGH END BENT TWO

PROJECT
COUNTY: HAYWOOD
SHEET OF



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL
SITE DESCRIPTION BRIDGE NO.329 ON SR-1309 OVER JONATHON CREEK			GND WATER
BORING NO EB1-A	NORTHING 0.00	EASTING 0.00	0 HR 9.00ft
ALIGNMENT -L-	STATION 16+35.000	OFFSET 17.00ft LT	24 HR N/A
COLLAR ELEV 2697.28ft	TOTAL DEPTH 51.00ft	START DATE 3/01/04	COMPLETION DATE 03/01/04
DRILL MACHINE CME 550	DRILL METHOD ROTARY W/O MUD		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log EB1-A, 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
2697.28						Ground Surface				
	4.70	2	45	55	0.1	100				EMBANKMENT: BROWN SAND AND GRAVEL, SATURATED
2690.00										ALLUVIUM: BROWN SAND AND GRAVEL W/ BOULDERS, SAT
	9.70	28	40	34	1.0	74				
	14.70		1	2	1.0	3				SAPROLITE: BROWN SILTY SAND WITH MICA, MOIST
00										
	19.70	2	3	5	1.0	8				
	24.7	7	7	14	1.0	21				
2670.00										
	29.70	7	17	19	1.0	36				
	34.70	4	7	14	1.0	21				
2660.00										
	39.70	19	32	51	1.0	83				
	44.70	19	42	39	1.0	81				
2650.00										
	49.70	14	51	49	0.3	100				WEATHERED ROCK
2646.28						BORING TERMINATED AT ELEV 2646.28 IN WEATHERED ROCK				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHAN CREEK			GND WATER
BORING NO EB1-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	STATION 16+40.000	OFFSET 15.00ft RT	24 HR 6.30ft
COLLAR ELEV 2697.11ft	TOTAL DEPTH 36.30ft	START DATE 2/23/04	COMPLETION DATE 02/23/04
DRILL MACHINE CME-550	DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log EB1-B, 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
2697.11						Ground Surface				
	4.90	44	53	50	1.0	100+				FILL: BROWN SILTY SAND, WET
2690.00										ALLUVIUM: BROWN SAND AND GRAVEL WITH BOULDERS, WET
	9.90	13	12	23	1.0	35				
	14.90	2	2	4	1.0	6				SAPROLITE: BROWN SILTY SAND WITH MICA, MOIST
2680.00										
	19.90	4	8	12	1.0	20				
	24.90	7	23	36	1.0	59				
2670.00										
	29.90	14	34	58	1.0	92				
	34.90	25	48	52	0.4	100				WEATHERED ROCK
2660.81						BORING TERMINATED AT ELEV 2660.81 IN WEATHERED ROCK				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHON CREEK			GND WATER
BORING NO B1-A	NORTHING 0.00	EASTING 0.00	0 HR 2.80ft
ALIGNMENT -L-	STATION 16+60.000	OFFSET 15.00ft LT	24 HR N/A
COLLAR ELEV 2691.44ft	TOTAL DEPTH 35.70ft	START DATE 2/16/04	COMPLETION DATE 02/16/04
DRILL MACHINE CME 550	DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log B1-A, 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
						Ground Surface				
2691.44										
2690.00										ALLUVIUM: BROWN SANDY SILT WITH GRAVEL AND BOULDERS, WET
	5.40	4	3	4	1.0	7	SS-1	W		SAPROLITE: BROWN SANDY SILT WITH MICA, WET
2680.00	10.40	3	4	8	1.0	12	SS-2	W		SAPROLITE: BROWN SANDY SILT WITH MICA, MOIST
	15.40	3	6	16	1.0	22	SS-3	M		
2670.00	20.40	10	20	19	1.0	39	SS-4	M		
	25.40	9	29	71	0.3	100				WEATHERED ROCK
2660.00	30.40	23	42	42	1.0	84	SS-5	M		SAPROLITE: BROWN SANDY SILT WITH MICA, MOIST
2655.74	35.40	50	ND	ND	0.3	50				WEATHERED ROCK
						BORING TERMINATED AT ELEV 2655.74 IN WEATHERED ROCK.				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST P Q LOCKAMY
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHAN CREEK			GND WATER
BORING NO B1-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	STATION 16+60.000	OFFSET 15.00ft RT	24 HR 1.80ft
COLLAR ELEV 2691.50ft	TOTAL DEPTH 30.00ft	START DATE 2/20/04	COMPLETION DATE 02/20/04
DRILL MACHINE CME 550	DRILL METHOD ROTARY W/O MUD		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log B1-B, 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
						Ground Surface				
2691.50										
2690.00										ALLUVIUM: BROWN SANDY SILT
	8.10	ND	ND	ND	0.0	0	SS-12			ALLUVIUM: SAND, COBBLES AND BOULDERS
2680.00	13.10	2	3	5	1.0	8				SAPROLITE: BROWN SANDY SILT WITH MICA
	18.10	3	5	10	1.0	15	SS-13			
2670.00	23.10	5	7	21	1.0	28				SAPROLITE: BROWN SILTY FINE SAND WITH MICA
	28.10	50	ND	ND	0.3	50				WEATHERED ROCK
2661.50						CASING REFUSAL AT ELEV 2661.50 ON ROCK				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL	
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHAN CREEK				GND WATER
BORING NO B2-B	NORTHING 0.00	EASTING 0.00		0 HR N/A
ALIGNMENT -L-	STATION 17+15.000	OFFSET 15.00ft RT		24 HR 2.80ft
COLLAR ELEV 2691.45ft	TOTAL DEPTH 29.20ft	START DATE 2/18/04	COMPLETION DATE 02/19/04	
DRILL MACHINE CME 550	DRILL METHOD ROTARY W/O MUD		HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log B2-B, 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
						Ground Surface				
2691.45										
2690.00	3.00	12	31	24	1.0	55				ALLUVIUM: BROWN SILTY SAND AND GRAVEL W/BOULDERS, SAT.
	8.10	2	3	4	1.0	7				SAPROLITE: BROWN SILTY SAND WITH MICA, WET TO MOIST
	13.00	6	13	14	1.0	27				
	18.00	22	29	23	1.0	52				
2670.00	23.00	50	ND	ND	0.2	50				WEATHERED ROCK
	28.00	29	26	74	0.1	100				
2662.25						BORING TERMINATED AT ELEV 2662.25 IN WEATHERERD ROCK				

GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHON CREEK			GND WATER
BORING NO EB2-A	NORTHING 0.00	EASTING 0.00	0 HR 7.20ft
ALIGNMENT -L-	STATION 17+35.000	OFFSET 20.00ft LT	24 HR N/A
COLLAR ELEV 2697.79ft	TOTAL DEPTH 39.00ft	START DATE 2/25/04	COMPLETION DATE 02/25/04
DRILL MACHINE CME 550	DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log EB2-A, 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
2697.79						Ground Surface				
	4.90	6	5	5	1.0	10				EMBANKMENT: COARSE SAND AND GRAVEL, MOIST
2690.00										ALLUVIUM: BROWN SILTY SAND WITH MICA AND GRAVEL, SAT.
	9.90	13	11	13	1.0	24				
	90	1	1	3	1.0	4				SAPROLITE: BROWN SILTY SAND WITH MICA, WET TO MOIST
	19.90	1	3	3	1.0	6				
	24.90	7	14	25	1.0	39				
2670.00										
	29.90	50	ND	ND	0.2	50				WEATHERED ROCK
										CORE 1: 30.7' -34.0' REC=97% RQD=97%
										CORE 2: 34.0' 39.0' REC=96% RQD=90%
2660.00 2658.79						BORING TERMINATED AT ELEV 2658.79 IN ROCK				

SHEET 1 OF 1

DATE 8/25/1997

CORE BORING REPORT

PROJECT: 33301.1.1 I. D. NO: B-3854 BORING NO: EB2-A GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No.329 on SR-1389 over Jonathan Creek

COUNTY: Haywood COLLAR ELEVATION: 2697.8 FT. TOTAL DEPTH: 39.2 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
2667.1	30.7		3.3	3.2 97	3.2 97		Gray, hard, fresh biotite gneiss. a) Occ parts along foliation @ 65°. b) Occ joints @ 10°.
2663.8	34.0						
2663.8	34.0		5.0	4.8 96	4.5 90		
2658.8	39.0						

CORING TERMINATED AT ELEVATION 2658.6 FT.

DRILLER: J T Williams CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33301.1.1	ID B-3854	COUNTY HAYWOOD	GEOLOGIST T B DANIEL
SITE DESCRIPTION BRIDGE NO.329 ON SR-1389 OVER JONATHON CREEK			GND WATER
BORING NO EB2-B	NORTHING 0.00	EASTING 0.00	0 HR 5.00ft
ALIGNMENT -L-	STATION 17+35.000	OFFSET 15.00ft RT	24 HR 7.20ft
COLLAR ELEV 2696.89ft	TOTAL DEPTH 36.60ft	START DATE 2/18/04	COMPLETION DATE 02/18/04
DRILL MACHINE CME 550	DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK N/A		Log EB2-B, 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
2696.89						Ground Surface				
2690.00	5.10	34	7	4	1.0	11	SS-6	SAT		ALLUVIUM: COARSE SAND AND GRAVEL WITH BOULDERS
	10.10	15	24	28	1.0	52				
	15.10	2	2	4	1.0	6	SS-7	W		SAPROLITE: BROWN SILTY SAND WITH MICA, WET
	20.10	2	2	4	1.0	6				
2670.00	25.10	60	ND	ND	0.1	60				WEATHERED ROCK
										CORE 1: 25.4'- 29.1' REC=68% RQD=38%
										CORE 2: 29.1'-34.1' REC=94% RQD=8%
2660.29										CORE 3: 34.1'- 36.6' REC=88% RQD=0%
						BORING TERMINATED AT ELEV 2660.29 IN ROCK				

DATE 8/25/1997

CORE BORING REPORT

PROJECT: 33301.1.1 I. D. NO: B-3854 BORING NO: EB2-B GEOLOGIST: C A Dunnagan

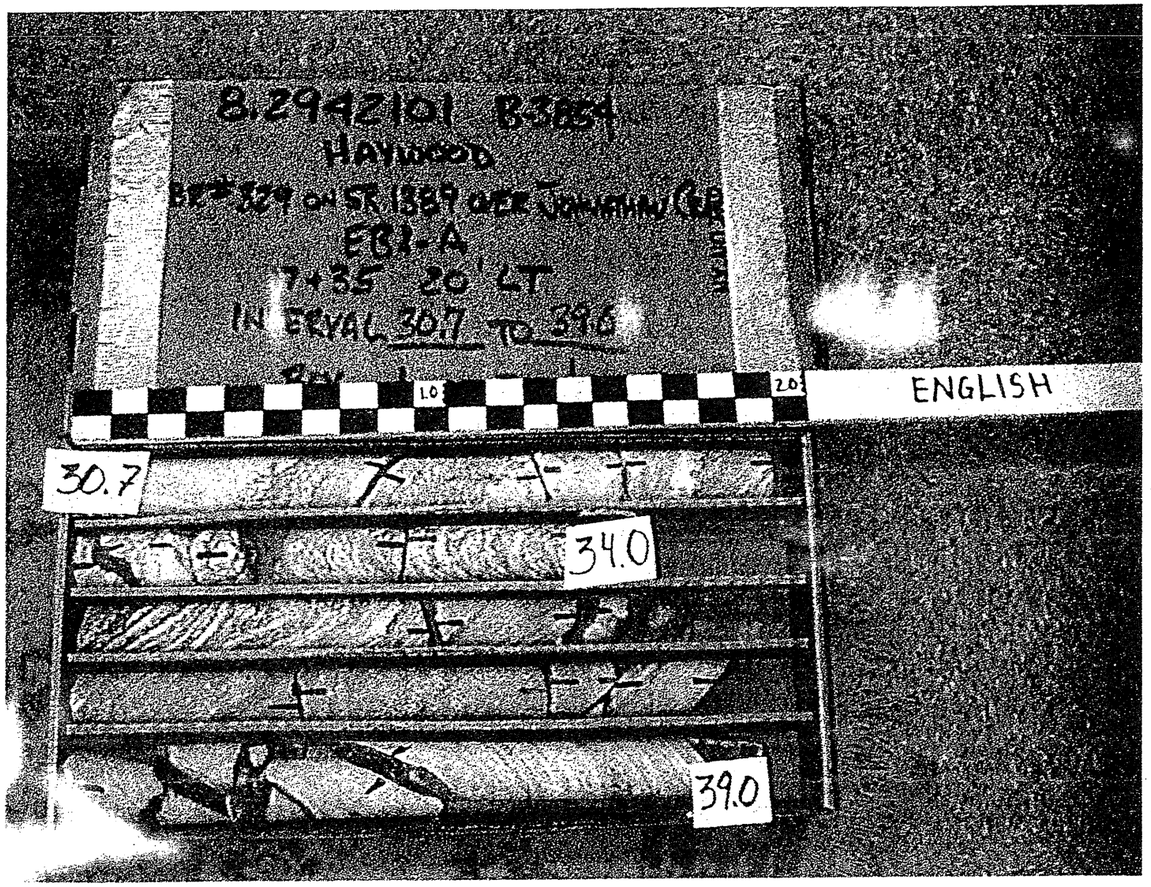
DESCRIPTION: Bridge No.329 on SR-1389 over Jonathan Creek

COUNTY: Haywood COLLAR ELEVATION: 2696.9 FT. TOTAL DEPTH: 36.6 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET	REC. %	RQD. FEET	RQD. %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
2666.2	30.7		3.7	2.5	68	1.4	38		
2662.5	34.4		5.0	4.7	94	0.4	8		White and black biotite gneiss. Severely to moderately weathered withocc weathered rock zones. Medium hard with very slightly weathered zone from 26.2ft to 27.9ft. a) Abundant parts along foliation @ 50°. b) Several joints @ 10°.
2657.5	39.4		2.5	2.2	88	0.0	0		

CORING TERMINATED AT ELEVATION 2660.3 FT.

DRILLER: J T Williams CORE SIZE: NXWL EQUIPMENT: CME-550



33301.1.1 B-3854
Haywood County
Bridge N0.329 on SR-1309 over Jonathan Creek.
EB2-A
Box 1 of 1

33301.1.1 B-3854
Haywood County
Bridge N0.329 on SR-1309 over Jonathan Creek.
EB2-B
Box 1 of 1

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33301.1.1 ID: B-3854 COUNTY: Haywood

DESCRIPTION(1): Bridge No. 329 on SR-1389 over Jonathan Creek

INFORMATION ON EXISTING BRIDGES Information obtained from: _X_ field inspection
___ microfilm(Reel: ____ Pos: ___)
_X_ othe Hydro. Report

COUNTY BRIDGE NO. 329 BRIDGE LENGTH [illegible] NO. BENTS IN: CHANNEL 1 FLOOD PLAIN 2

FOUNDATION TYPE: Footings(?)

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None noted.

INTERIOR BENTS: None noted.

CHANNEL BED: None noted.

[illegible]NEL BANKS: None noted.

[illegible] SCOUR PROTE[illegible]ON:

TYPE(3): Pile-and-panel End walls and wing-walls.

EXTENT(4): Wing extend 10ft beyond End Bent walls, both sides.

EFFECTIVENESS(5): [illegible]d.

OBSTRUCTIONS(6) (DAMS, [illegible]BRIS,ETC.): Sewer line supported by angle iron scaffold immediately downstream of existing bridge.

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Sand, gravel and cobbles with boulders.

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Silty sand with cobbles.

FOUNDATION BEARING MATERIAL(9): Weathered rock.

CHANNEL BANK COVER(10): Shrubs and occasional trees.

FLOOD PLAIN WIDTH(11): Greater than 100ft, either side.

FLOOD PLAIN COVER(12): Predominately grass.

DESIGN INFORMATION CONT.

STREAM IS _X_ DEGRADING ____ AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: Roadway embankments for SR-1389 and the farm road at EB1-B form levees for Jonathan Creek.

CHANNEL MIGRATION TENDENCY (14): South

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15):

End Bent One: 2677.0

Interior Bent One: 2676.0

Interior Bent Two: 2676.0

End Bent Two: 2677.0

REPORTED BY: C A Dunnagan DATE: 3/3/2004

INSTRUCTIONS

(1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
(2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
(3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
(4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
(5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
(6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
(7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
(8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
(9) DESCRIBE THE FOUNDATION BEARING MATERIAL,
(10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.
(11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
(12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
(13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
(14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
(15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

JJL

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

T.I.P. ID #:	B-3854

REPORT ON SAMPLES OF:	Soil for Classification

PROJECT:	33301.1.1	COUNTY:	Haywood	Owner:	--
DATE SAMPLED:	2-6-04	DATE RECEIVED:	2-17-04	DATE REPORTED:	2-23-04
SAMPLED FROM:	Rdw B1-B Bridge Foundation	SAMPLED BY:	C A Dunnagan		
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			
Lab Sample No. A-	144472	144473	144474	144475	144476			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	94	98	99	98	98			
Passing #40 Sieve %	83	89	86	85	88			
Passing #200 Sieve %	46	45	40	39	45			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	21	21	25	28	23			
Fine Sand - Ret. #270	45	52	39	38	42			
Silt 0.05-0.005 mm %	8	3	8	8	9			
Clay < 0.005 mm %	26	24	28	26	26			
ssing # 40 Sieve %	--	--	--	--	--			
ing # 200 Sieve %	--	--	--	--	--			
Liquid Limit	45	39	36	36	30			
Plastic Index	NP	NP	NP	NP	NP			
AASHTO Classification	A-5 (2)	A-4 (2)	A-4 (1)	A-4 (1)	A-4 (2)			
Quantity								
Texture								
Station	16+60 Lt	16+60 Lt	16+60 Lt	16+60 Lt	16+60 Lt			
Hole No.								
Depth (ft) From:	5.9	10.9	5.9	20.9	30.9			
To:	6.9	11.9	16.9	21.9	31.9			

Remarks:

CC:

W D Frye	
J J Lail	
File	

SOILS ENGINEER:	

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-3854

REPORT ON SAMPLES OF:	Soil for Classification

PROJECT:	--	COUNTY:	Cherokee	Owner:	--
DATE SAMPLED:	2-18-04	DATE RECEIVED:	2-19-04	DATE REPORTED:	3-5-04
SAMPLED FROM:	Rdwy -L-	SAMPLED BY:	C A Dunnagan		
SUBMITTED BY:	W D Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-6	SS-7						
Lab Sample No.	A-144480	A-144481						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	--	--						
Passing #10 Sieve %	39	99						
Passing #40 Sieve %	26	80						
Passing #200 Sieve %	10	34						

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	49	33						
Fine Sand - Ret. #270	25	44						
Silt 0.05-0.005 mm %	7	11						
Clay < 0.005 mm %	19	12						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						
Liquid Limit	27	39						
Plastic Index	NP	NP						
AASHTO Classification	A-1-a (0)	A-2-4 (0)						
Quantity								
Texture								
Station	17+35 Rt	17+35 Rt						
Hole No.	EB2-A	EB2-A						
Depth (ft) From:	5.6	15.6						
To:	6.6	16.6						

Remarks:

CC:

W D Frye	
J J Lail	
File	

SOILS ENGINEER:	

G:/Everyone. . . /M&T Forms/Regional Lab Statesville/Soils Test Report M&T 503E 8-19-2000

NORTH CAROLINA DEPAR TION
DIVISION OF HIGHWAYS-MATERIALS AN UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	B-3854

REPORT ON SAMPLES OF:	Soil for Classification

PROJECT:	--	COUNTY:	Cherokee	Owner:	--
DATE SAMPLED:	2-20-04	DATE RECEIVED:	3-1-04	DATE REPORTED:	3-5-04
SAMPLED FROM:	Rdwy -L-	SAMPLED BY:	C A Dunnagan		
SUBMITTED BY:	W D Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-12	SS-13						
Lab Sample No.	A-144582	A-144583						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	--	--						
Passing #10 Sieve %	97	96						
Passing #40 Sieve %	80	77						
Passing #200 Sieve %	40	39						

MINUS #10 FRACTION

Soil Mortar - 100%								
arse Sand -Ret. #60	30							
Sand - Ret. #270	39							
m %	17	8						
%	14	12						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						

Liquid Limit		41						
Plastic Index		NP						
AASHTO Classification	A	A-5 (1)						
Quantity								
Texture								
Station	16+60 Rt	16+60 Rt						
Hole No.	B1-B	B1-B						
Depth (ft) From:	13.6	18.6						
To:	14.6	19.6						

Remarks:

CC:

W D Frye	
J J Lail	
File	

SOILS ENGINEER:	