

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

**STRUCTURE
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 38617.1.1 (B-4847) F.A. PROJ. BRZ-2486(1)

COUNTY WILKES

PROJECT DESCRIPTION BRIDGE No. 42 ON SR-2486
OVER MORAVIAN CREEK

SITE DESCRIPTION _____

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919/250-4086. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-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.

PERSONNEL

D C ELLIOT

D O CHEEK

G K ROSE

C J COFFEY

L E RIDDLE

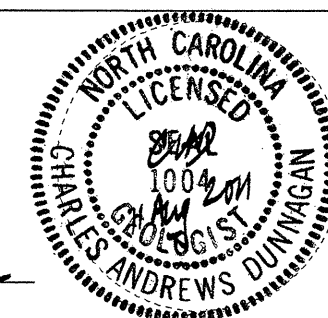
R D CHILDERS

INVESTIGATED BY C A DUNNAGAN

CHECKED BY W D FRYE, Jr

SUBMITTED BY W D FRYE, Jr

DATE AUGUST 2011



C. A. Dunnagan

PROJECT: 38617.1.1 ID: B-4847

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.

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SUBSURFACE INVESTIGATION

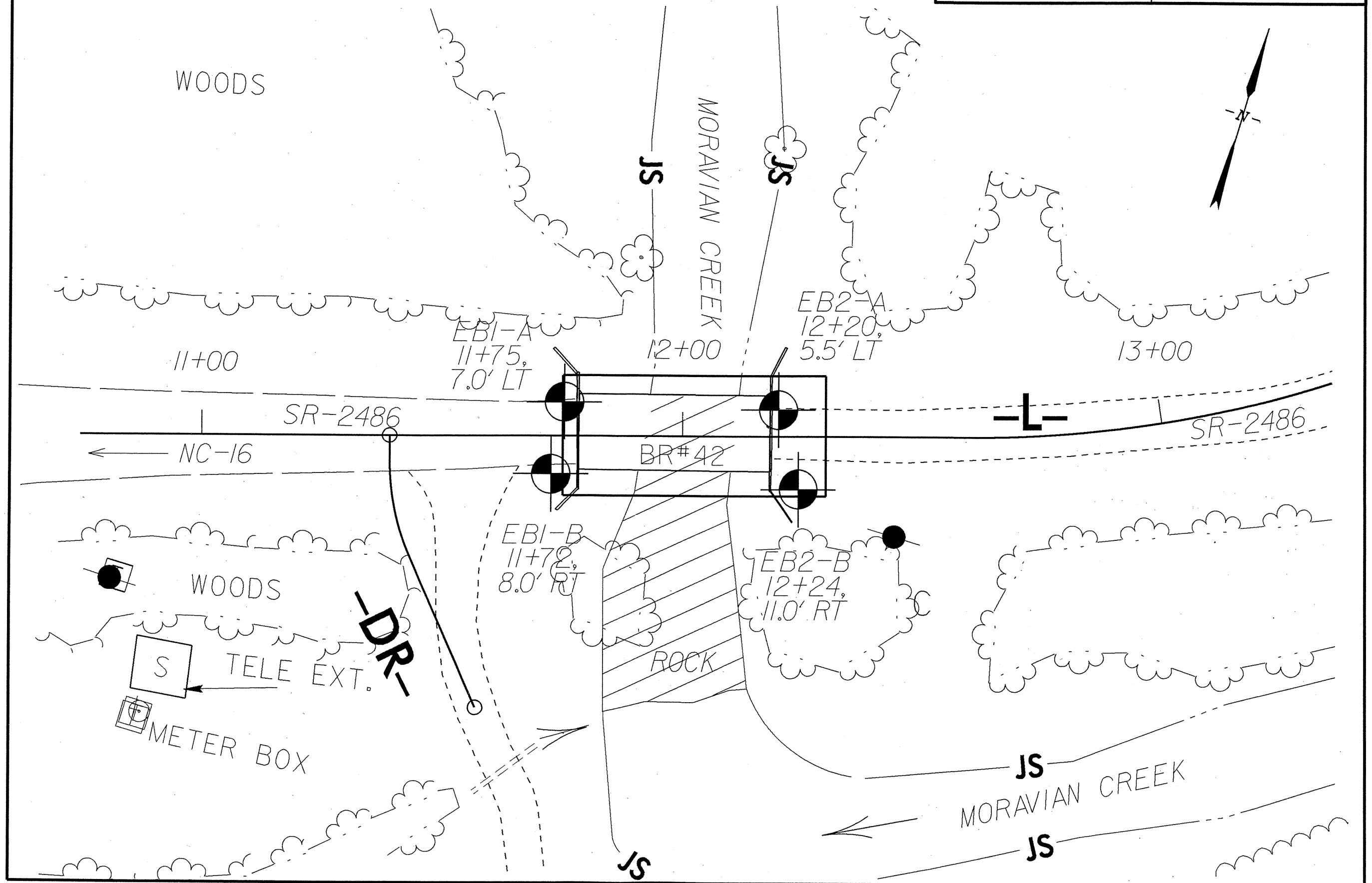
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 (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, GRN. SAT. CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>				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 IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. 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 YIELD 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.				ALLUVIUM (ALLUV.) - SOILS THAT 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 IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT 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 DISLOOED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - 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 (MOTL) - 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 (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - 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 THAT 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, THAT 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 BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. 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 (SRQD) - 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 (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="12" style="text-align: center;">BENCH MARK: BM#2: 8" SPIKE IN ROOT OF 12' SYCAMORE</td> </tr> <tr> <td colspan="12" style="text-align: center;">118' RT OF -BL- STA 7+25.00</td> </tr> <tr> <td colspan="12" style="text-align: right;">ELEVATION: 1208.68 FT.</td> </tr> </table>												BENCH MARK: BM#2: 8" SPIKE IN ROOT OF 12' SYCAMORE												118' RT OF -BL- STA 7+25.00												ELEVATION: 1208.68 FT.												NOTES:																																																																																																																																																																																																																																																																																																																																																																																																																							
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BRIDGE No. 42 ON SR-2486 OVER MORAVIAN CREEK

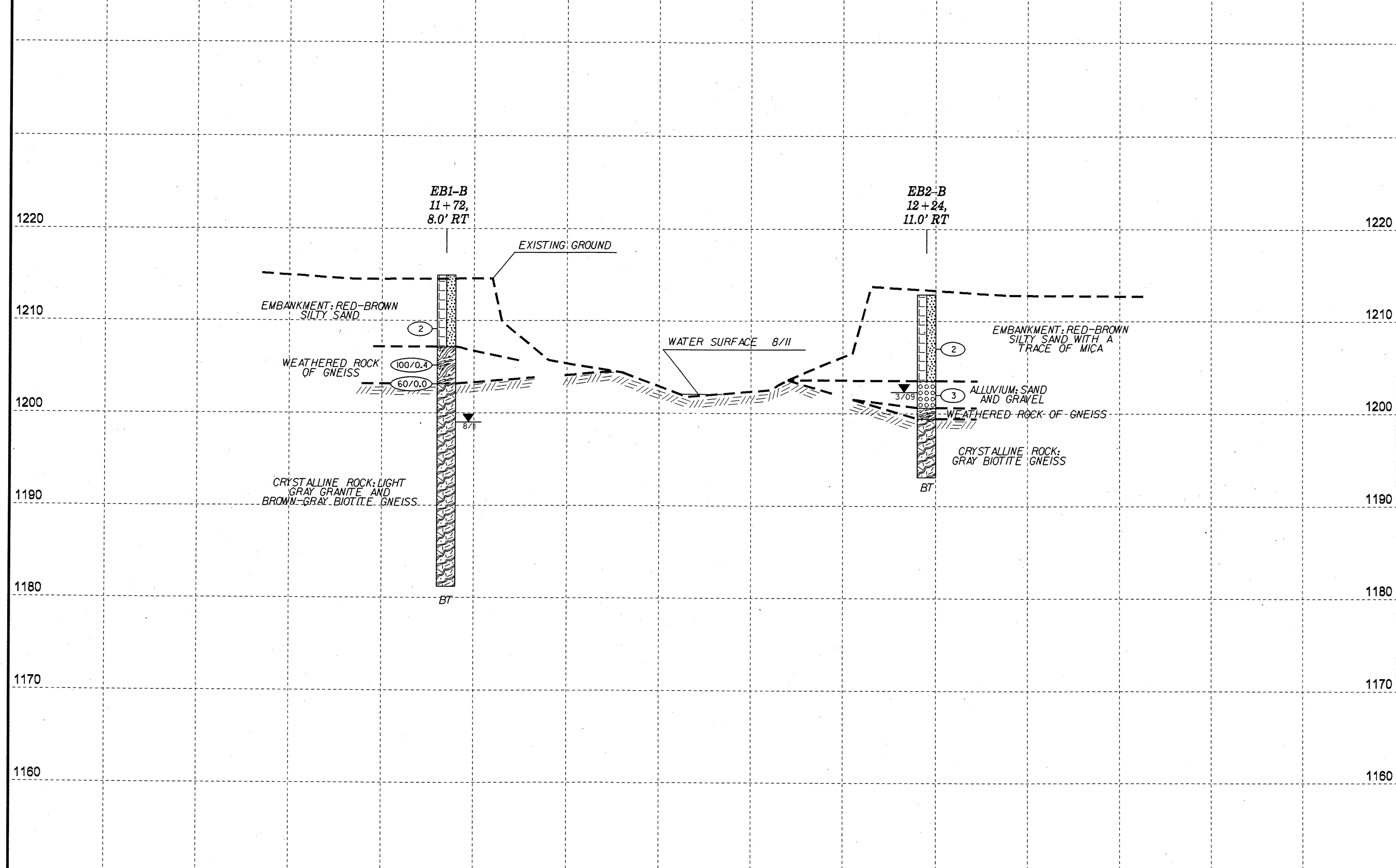
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 SKEW=90

PROJECT REFERENCE NO.	SHEET
38617.1.1 (B-4847)	3/13
PLAN VIEW	

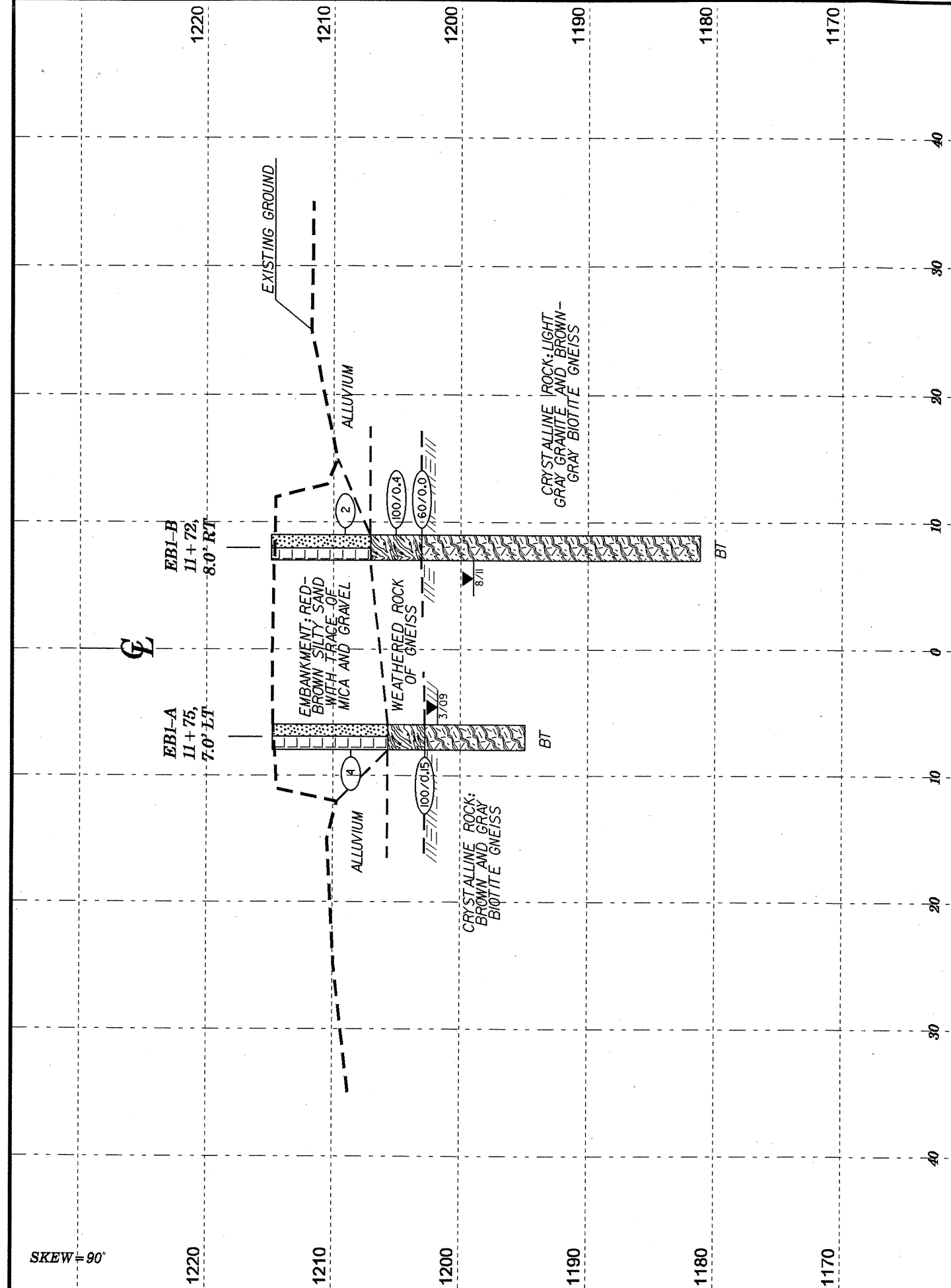


BRIDGE No. 42 ON SR-2486 OVER MORAVIAN CREEK

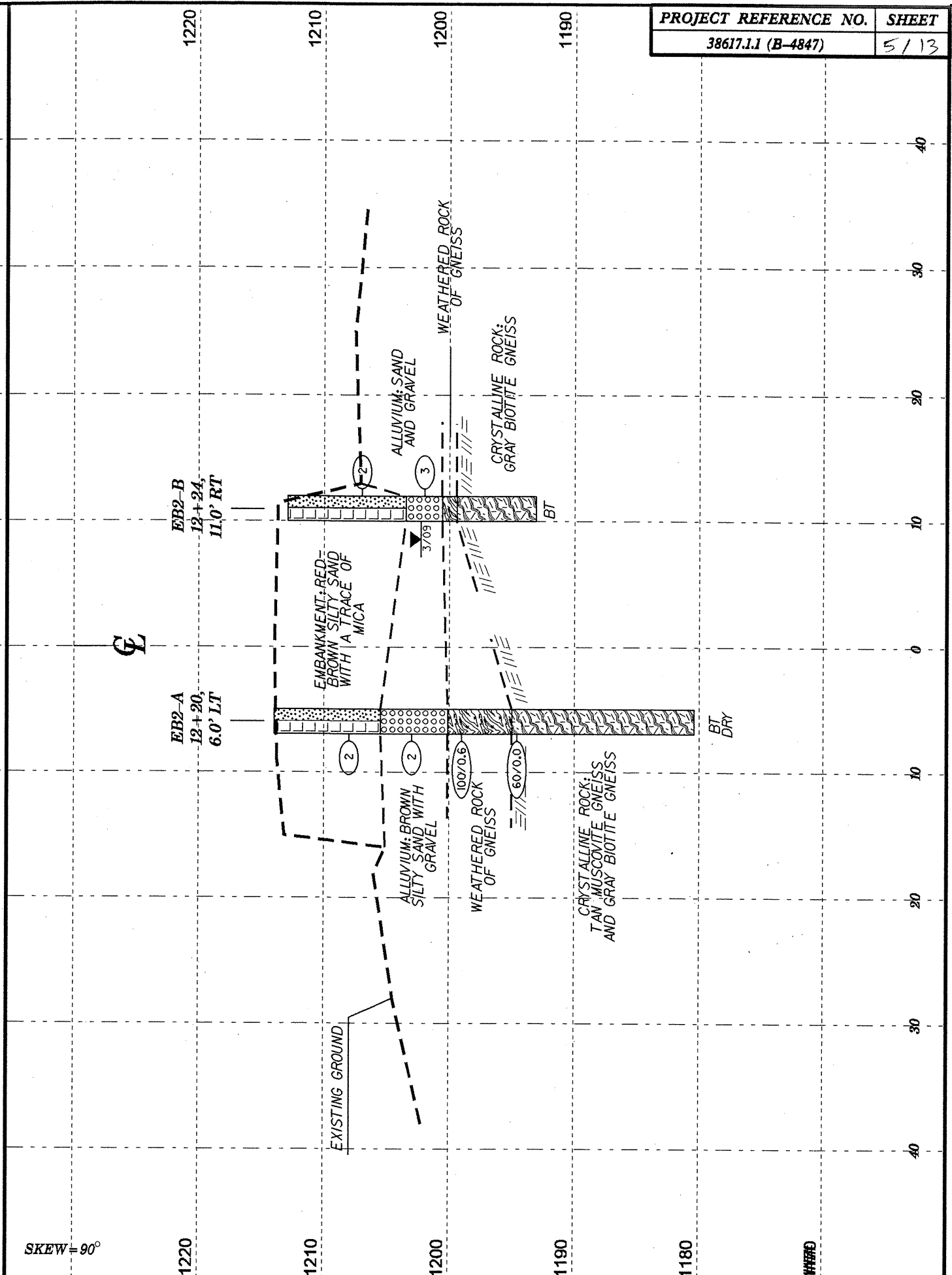
		PROJECT REFERENCE NO.	SHEET
VE = 1		38617.1.1 (B-4847)	4/13
SKEW = 90°		PROFILE 15.0 FEET RIGHT OF CENTERLINE	



11+55 11+65 11+75 11+85 11+95 12+05 12+15 12+25 12+35 12+45



CROSS SECTION THROUGH END BENT ONE



CROSS SECTION THROUGH END BENT TWO



WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 11+72		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 1,214.9 ft		TOTAL DEPTH 33.7 ft		NORTHING 851,950		EASTING 1,356,672										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 08/03/11		COMP. DATE 08/03/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1215														1,214.9	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT Red-brown silty sand.	
1210	1,210.1	4.8														
			1	1	1											
1205	1,205.1	9.8												1,207.1	WEATHERED ROCK Weathered rock of gneiss.	7.8
			100/0.4													
	1,203.1	11.8												1,203.1	CRYSTALLINE ROCK Light gray granite.	11.8
			60/0.0													
1200														1,199.3	CRYSTALLINE ROCK Brown-gray biotite gneiss.	15.6
1195																
1190														1,191.2	CRYSTALLINE ROCK Gray and brown biotite gneiss with garnets and interlayers of granite.	23.7
1185														1,181.2	Boring Terminated at Elevation 1,181.2 ft in biotite gneiss.	33.7

NCDOT BORE SINGLE BORE_CORELOGS.GPJ NC_DOT.GDT 08/09/11



7/13

WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)
BORING NO. EB1-B		STATION 11+72		OFFSET 8 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 1,214.9 ft		TOTAL DEPTH 33.7 ft		NORTHING 851,950		EASTING 1,356,672	
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic			
DRILLER Coffey, Jr., C.		START DATE 08/03/11		COMP. DATE 08/03/11		SURFACE WATER DEPTH N/A	
CORE SIZE NXWL		TOTAL RUN 21.9 ft		RUN		STRATA	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.
1203.1							
	1,203.1	11.8	1.9	N=60/0.0 1.7/0.9 2.0/0.0	(1.3) 68%	(1.2) 63%	
1200			5.0	2.0/0.0 1.9/0.0 0.5/0.0 0.8/0.0 0.7/0.0	(4.5) 90%	(1.3) 26%	
	1,199.3	18.7					
1195			5.0	1.2/0.0 1.0/0.0 1.7/0.0 1.8/0.0 0.6/0.0	(3.6) 72%	(0.4) 8%	
	1,191.2	23.7					
1190			5.0	1.8/0.0 1.9/0.0 1.7/0.0 1.8/0.0 2.0/0.0	(4.6) 92%	(3.1) 62%	
	1,186.2	28.7					
1185			5.0	1.6/0.0 1.5/0.0 1.5/0.0 1.8/0.0 1.6/0.0	(4.8) 96%	(1.9) 38%	
	1,181.2	33.7					
Boring Terminated at Elevation 1,181.2 ft in biotite gneiss.							

NCDOT CORE SINGLE BORE_CORELOGS.GPJ NC_DOT.GDT 08/09/11

WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST Elliott, D. C.								
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)							
BORING NO. EB2-A		STATION 12+20		OFFSET 6 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 1,214.0 ft		TOTAL DEPTH 33.6 ft		NORTHING 851,977		EASTING 1,356,714								
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 08/03/11		COMP. DATE 08/03/11		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75					100
1215												1,214.0	GROUND SURFACE	0.0
1210	1,209.0	5.0	WOH	1	1						M	1,214.0	ROADWAY EMBANKMENT - Red-brown silty sand with a trace of mica.	
1205	1,204.0	10.0									M	1,205.5	ALLUVIAL Brown silty sand with gravel.	8.5
1200	1,199.0	15.0										1,200.1	WEATHERED ROCK Weathered rock of gneiss.	13.9
1195	1,194.6	19.4										1,195.0	CRYSTALLINE ROCK Tan muscovite gneiss and gray biotite gneiss.	19.0
1190														
1185														
												1,180.4	Boring Terminated at Elevation 1,180.4 ft in biotite gneiss.	33.6

NCDOT BORE SINGLE BORE_CORELOGS.GPJ_NC_DOT.GDT_08/09/11

8/13

WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)					
BORING NO. EB2-A		STATION 12+20		OFFSET 6 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 1,214.0 ft		TOTAL DEPTH 33.6 ft		NORTHING 851,977		EASTING 1,356,714						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic						
DRILLER Coffey, Jr., C.		START DATE 08/03/11		COMP. DATE 08/03/11		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
1194.56											Begin Coring @ 19.4 ft	
1190	1,194.6	19.4	4.2	N=60/0.0	(4.0)	(1.0)					CRYSTALLINE ROCK Tan muscovite gneiss to 20.9ft with gray biotite gneiss below. Slightly weathered to fresh, hard to very hard iwth soft, severely weathered zones from 21.8ft to 22.3ft and 24.3ft to 24.5ft. a) Parts along foliation @ 35°. b) Joints @ 80°. c) Joint @ 45°. (continued)	
	1,190.4	23.6	5.0	1.1/0.0 1.3/0.0 1.4/0.0 1.4/0.0 1.3/0.0	(5.0)	(3.9)						
	1,185.4	28.6	5.0	2.4/0.0 2.5/0.0 2.4/0.0 2.5/0.0 2.4/0.0	(5.0)	(5.0)						
	1,180.4	33.6									Boring Terminated at Elevation 1,180.4 ft in biotite gneiss.	33.6

NCDOT CORE SINGLE BORE_CORELOGS.GPJ_NC_DOT.GDT_08/09/11

WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST N/A									
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 12+24		OFFSET 11 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 1,212.9 ft		TOTAL DEPTH 19.8 ft		NORTHING 851,965		EASTING 1,356,726									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic											
DRILLER Rose, G. K.		START DATE 03/23/09		COMP. DATE 03/23/09		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75			100	ELEV. (ft)	DEPTH (ft)	
1215													1,212.9	0.0	GROUND SURFACE
1210															ROADWAY EMBANKMENT Red-brown silty sand with a trace of mica.
	1,208.0	4.9													
1205			2	1	1										
	1,203.0	9.9													
1200			2	2	1										
													1,200.6	12.3	ALLUVIAL Sand and gravel.
													1,199.4	13.5	WEATHERED ROCK Weathered rock of gneiss.
															CRYSTALLINE ROCK Gray biotite gneiss.
1195													1,193.1	19.8	Boring Terminated at Elevation 1,193.1 ft in biotite gneiss. Logged by D O Cheek.

NCDOT BORE SINGLE BORE_CORELOGS.GPJ NC_DOT_GDT_08/05/11

9/13

WBS 38617.1.1		TIP B-4847		COUNTY WILKES		GEOLOGIST N/A	
SITE DESCRIPTION Bridge No. 42 on SR-2486 over Moravian Creek							GROUND WTR (ft)
BORING NO. EB2-B		STATION 12+24		OFFSET 11 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 1,212.9 ft		TOTAL DEPTH 19.8 ft		NORTHING 851,965		EASTING 1,356,726	
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic			
DRILLER Rose, G. K.		START DATE 03/23/09		COMP. DATE 03/23/09		SURFACE WATER DEPTH N/A	
CORE SIZE NXWL		TOTAL RUN 6.3 ft		RUN		STRATA	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	ROD (ft) %	SAMP. NO.
1199.39							
	1,199.4	13.5	1.3		(1.2) 92%	(1.0) 77%	
	1,195		5.0		(4.8) 96%	(3.3) 66%	
	1,193.1	19.8					
DESCRIPTION AND REMARKS		ELEV. (ft)		DEPTH (ft)		LOG	
Begin Coring @ 13.5 ft		1,199.4		13.5		CRYSTALLINE ROCK	
Gray biotite gneiss with garnets. Fresh, hard with interlayers of brown, moderately severely weathered and moderately hard rock.		1,199.4		13.5		a) Parts along foliation @ 45°. b) Joint @ 10°.	
Boring Terminated at Elevation 1,193.1 ft in biotite gneiss.		1,193.1		19.8		Logged by D O Cheek.	

NCDOT BORE SINGLE BORE_CORELOGS.GPJ NC_DOT_GDT_08/05/11



38617.1.1 (B-4847)
Wilkes Co.
Bridge No. 42 on SR-2486
Over Moravian Creek
EB1-A
Box 1 of 1



38617.1.1 (B-4847)
Wilkes Co.
Bridge No. 42 on SR-2486
Over Moravian Creek
EB2-B
Box 1 of 1



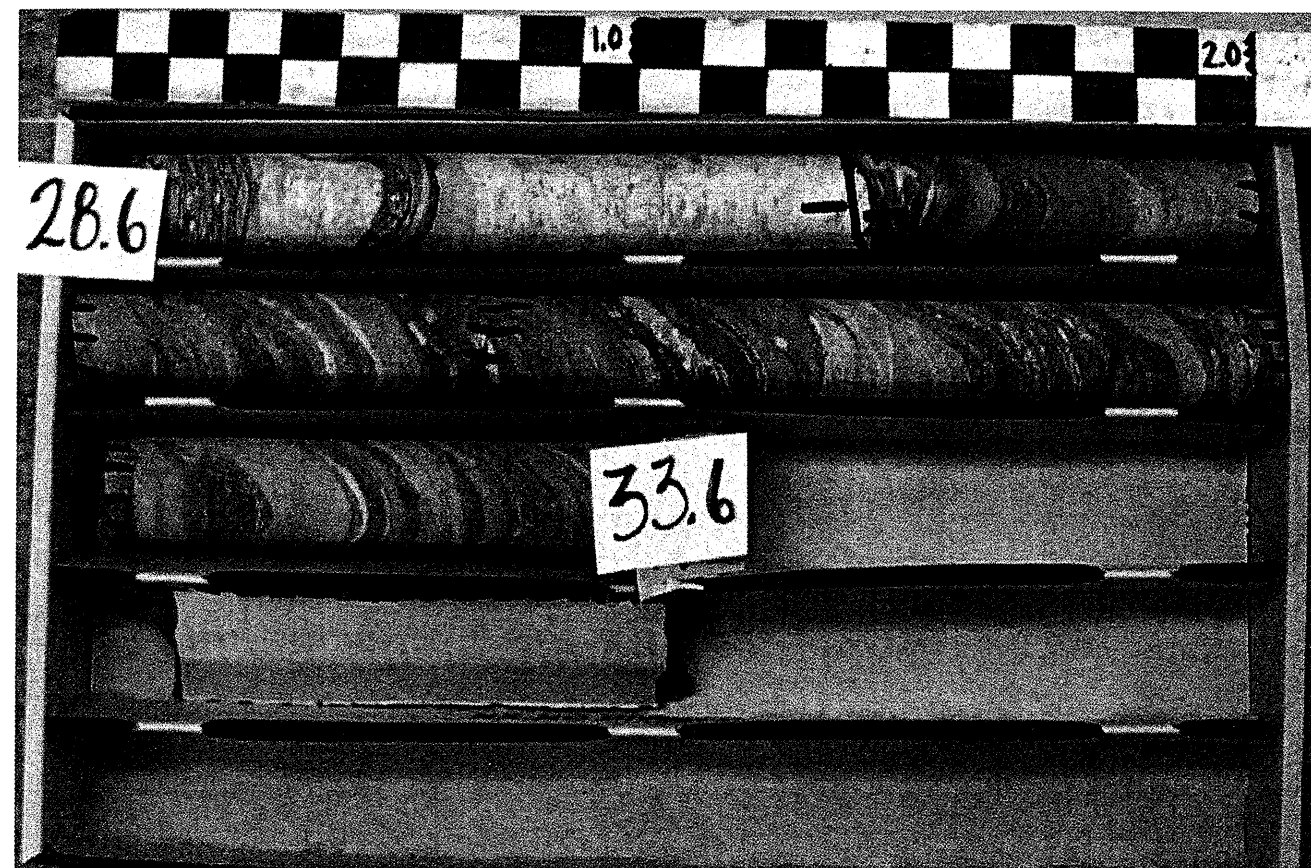
38617.1.1 (B-4847)
 Wilkes Co.
 Bridge No. 42 on SR-2486
 Over Moravian Creek
 EB1-B
 Box 1 of 2



38617.1.1 (B-4847)
 Wilkes Co.
 Bridge No. 42 on SR-2486
 Over Moravian Creek
 EB1-B
 Box 2 of 2



38617.1.1 (B-4847)
 Wilkes Co.
 Bridge No. 42 on SR-2486
 Over Moravian Creek
 EB2-A
 Box 1 of 2



38617.1.1 (B-4847)
 Wilkes Co.
 Bridge No. 42 on SR-2486
 Over Moravian Creek
 EB2-A
 Box 2 of 2



FIELD SCOUR REPORT

WBS: 38617.1.1 TIP: B-4847 COUNTY: Wilkes

DESCRIPTION(1): Bridge No. 42 on SR-2486 over Moravian Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm (reel pos:)
Other (explain)

Bridge No.: 42 Length: 40ft Total Bents: 2 Bents in Channel: 0 Bents in Floodplain: 2
Foundation Type: Footings.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None noted.

Interior Bents:

Channel Bed: None noted.

Channel Bank: None noted.

EXISTING SCOUR PROTECTION

Type(3): Wooden end-bent walls and wingwalls. Boulder rip-rap from EB2-B to centerline.

Extent(4): Wingwalls extend eight feet beyond end-bent walls.

Effectiveness(5): Good.

Obstructions(6): Rock outcrops in stream upstream of bridge; abundant boulders in stream downstream.

INSTRUCTIONS

- Describe the specific site's location, including route number and body of water crossed.
- Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- Note existing scour protection (e.g. rip rap).
- Describe extent of existing scour protection.
- Describe whether or not the scour protection appears to be working.
- Note obstructions such as dams, fallen trees, debris at bents, etc.
- Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- Determine the approximate floodplain width from field observation or a topographic map.
- Describe the material covering the floodplain (e.g. grass, trees, crops).
- Use professional judgement to specify if the stream is degrading, aggrading, or static.
- Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Rock upstream. Alluvial sand, gravel and boulders downstream.

Channel Bank Material(8): Silty sand with gravel.

Channel Bank Cover(9): Shrubberies with trees.

Floodplain Width(10): EB1: +/- 50ft. EB2 > 100ft.

Floodplain Cover(11): EB1-B: grass. Otherwise, trees and shrubberies.

Stream is(12): Aggrading Degradation Static

Channel Migration Tendency(13): East

Observations and Other Comments:

Reported by: C A Dunnagan Date: 8/5/2011

DESIGN SCOUR ELEVATIONS(14)

Feet Meters

BENTS

Comparison of DSE to Hydraulics Unit theoretical scour:

The Geotechnical Engineering Unit agrees with the Hydraulics Unit's theoretical scour in the report dated 18 July 2011. The end-bents will not be affected.

DSE determined by: C A Dunnagan Date: 8/10/2011

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank																						
Sample No.																						
Retained #4																						
Passed #10																						
Passed #40																						
Passed #200																						
Coarse Sand																						
Fine Sand																						
Silt																						
Clay																						
LL																						
PI																						
AASHTO																						
Station																						
Offset																						
Depth																						