

CONTENTS
 LINE STATION
 -L- 16+77.28

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-4179	1	1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33526.1.1	BRZ-1504 (2)	P.E.	
		CONST.	

STRUCTURE
SUBSURFACE INVESTIGATION

STATE PROJ. 33526.1.1 I.D. B-4179 F.A. PROJ. BRZ-1513 (2)
 COUNTY MACON
 PROJECT DESCRIPTION CULVERT ON SR-1513 OVER RABBIT
AT -L- STA. 16+77.28

CAUTION NOTICE

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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 UN-PLACED 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.

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PROJECT: 33526.1.1 ID: B-4179

- PERSONNEL
- T.B. DANIEL
 - J.T. WILLIAMS
 - L.E. LANKFORD
 - M.M. HAGER
 - G.K. ROSE

INVESTIGATED BY P.Q. LOCKAMY
 CHECKED BY W.D. FRYE
 SUBMITTED BY W.D. FRYE
 DATE 04.15.08

4-15-08

SIGNATURE

DRAWN BY: J.T. WILLIAMS

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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, WEATHERING, and EQUIPMENT USED ON SUBJECT PROJECT.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 15, 2008

STATE PROJECT: 33526.1.1 (B-4179)
FEDERAL PROJECT: BRZ-1513 (2)
COUNTY: Macon
DESCRIPTION: Replacement of Bridge No. 65 on SR-1513 over Rabbit Creek
SUBJECT: Geotechnical Report – Inventory

Project Description

This project has had many variations; a bridge and a proposed culvert centered at the existing bridge and a culvert upstream which has now been extended. No new borings were performed but borings from previous culvert and retaining wall investigations were incorporated into this Inventory. Also, boring stations have been translated from previous -L- and -L2- alignments. Rock lines shown on cross section from the previously proposed culvert upstream of the existing bridge have been adapted and used here.

Physiography and Geology

The existing bridge is located over a flat sheet of rock in shallow water. The rock line plunges sharply downstream and outcrops for nearly 300 feet upstream. A patch of gravel covering bedrock in the creek bed has migrated downstream some since the retaining wall investigation of September 2004.

The stream is pinched by low ridges on each side indicating shallow rock. The north side has older red clayey soils while the south side has younger sandy saprolite over shallow weathered rock and crystalline rock. The valley widens considerably both upstream and downstream of the exposed rock section of the creek.

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

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

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

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

The stream path has been altered slightly by the placement of highway and driveway embankments. Alluvium is shallow and may have patches of gravel with small boulders. A few of the boulders seen in the creek are blast rock.

Rock type is basement age gneiss with possible interlayers of darker colored rock and light colored vein intrusions.

Closing

The utility pole which formerly held benchmark BM 1 has fallen down and been removed.

The Bridge Survey and Hydraulic Design Report dated 10-25-07 for the proposed conspan culvert at 16+77.28 -L- was used in this investigation.

Respectfully Submitted,

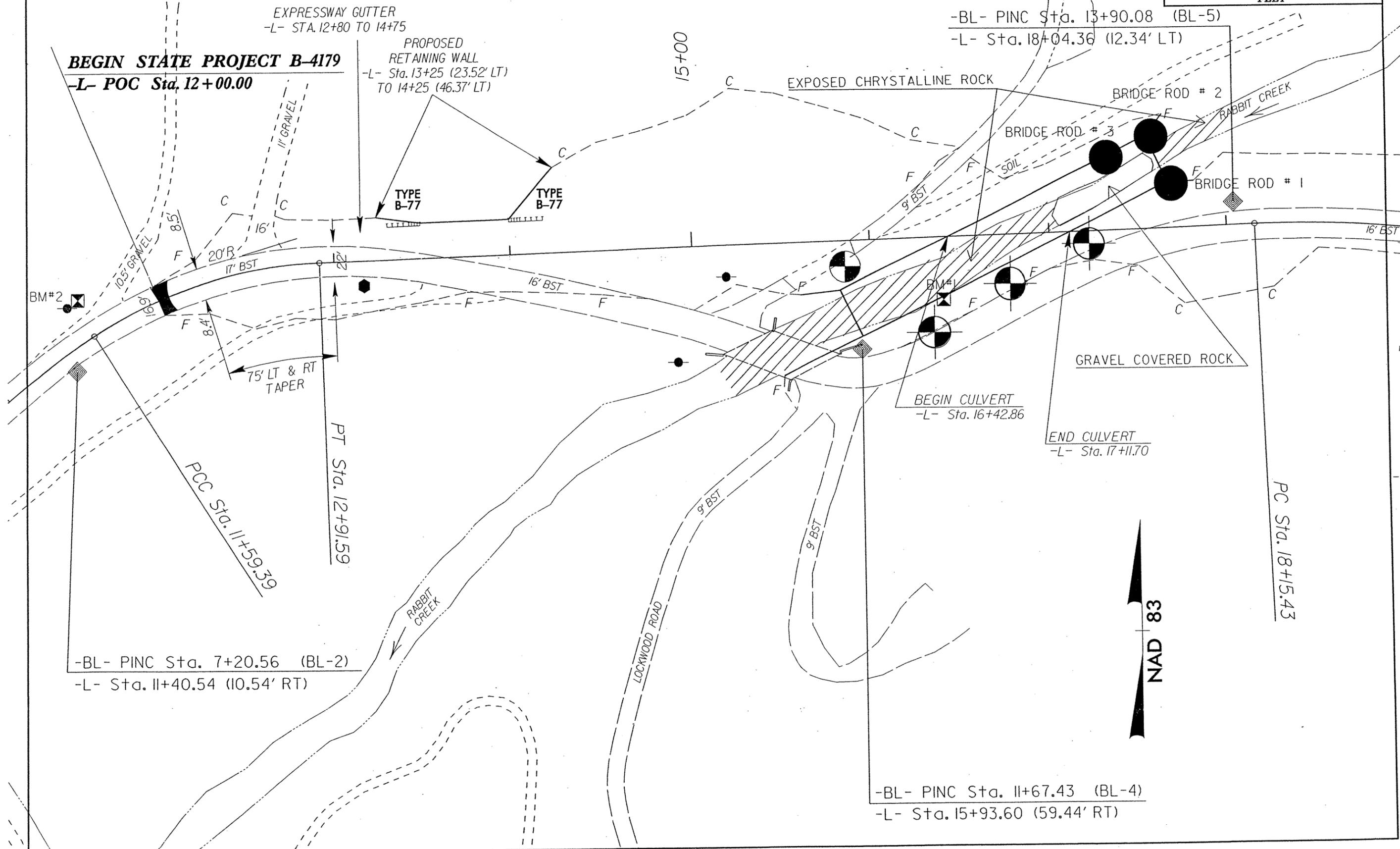
P. Q. Lockamy, LG

BORING LOCATIONS

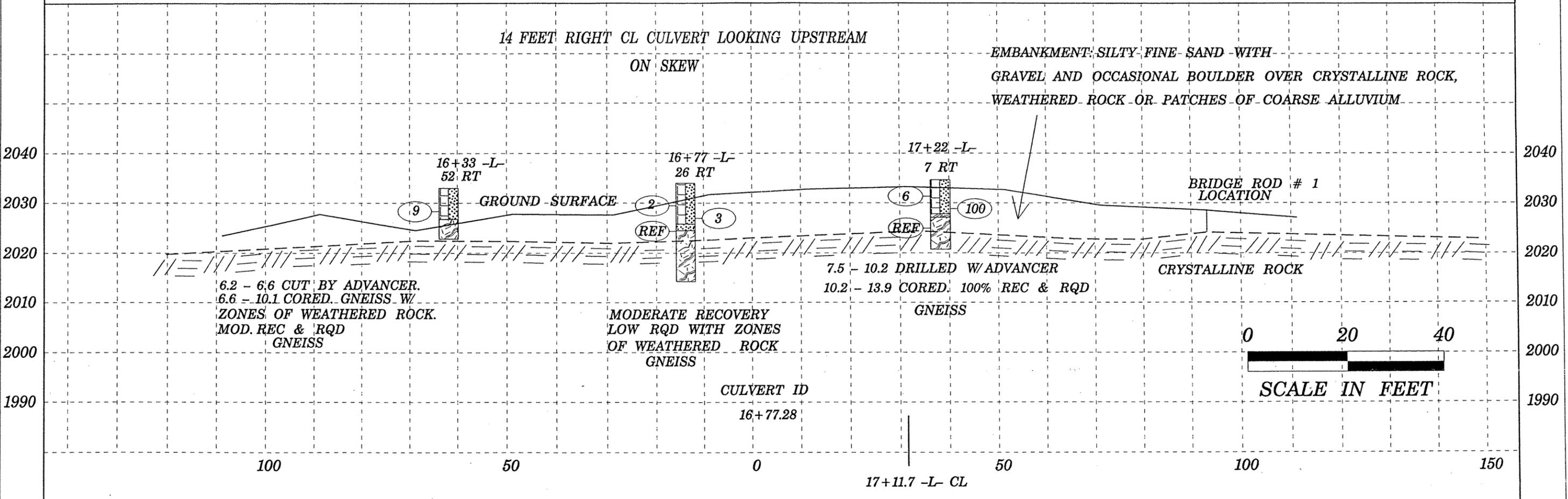
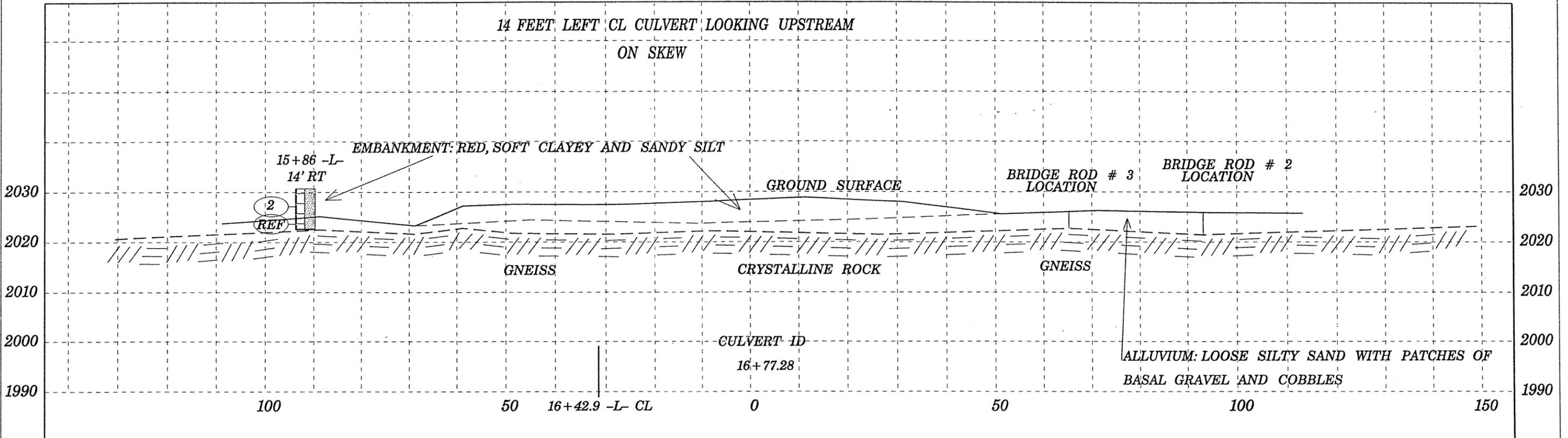
MACON CO. BR. NO. 65

SKEW=155°

PROJECT REFERENCE NO.	33526.11 (B-4179)	SHEET	4/9
SITE PLAN			
0 50 100 FEET			



SECTIONS ALONG CULVERT ON -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL ENGINEERING UNIT BORING LOG SHEET OF

SHEET 8 OF 9

PROJECT NO.	33526.1.1	ID.	B-4179	COUNTY	MACON	GEOLOGIST	TB DANIEL			
SITE DESCRIPTION							BRIDGE 65 OVER RABBIT CREEK			
BORING NO.	BORING LOCATION		16+77	OFFSET	27 RT	ALIGNMENT	-L-			
COLLAR ELEVATION	2034.00	NORTHING	559247	EASTING	700482	GROUND WATER				
TOTAL DEPTH	19.7	DRILL MACHINE	CME 550	DRILL METHOD	SPT CORE	HAMMER TYPE	AUTO			
START DATE	6-15-04	COMPLETION DATE	6-15-04	SURFACE WATER DEPTH	DEPTH TO ROCK					
ELEV.	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION
		0.5' 0.5' 0.5'		0	25	50	75			
2034.0				GROUND SURFACE						
2030	4.5	0	1	1	1					EMBANKMENT: SILTY SAND WITH GRAVEL AND OCCASIONAL BOULDER
	7.0	1	1	2	1					
	9.5	60								ALLUVIUM: GRAVEL
2020										CRYSTALLINE ROCK (GNEISS) MODERATE RECOVERY WITH LOW RQD AND ZONES OF WEATHERED ROCK
2014.3										CORING TERMINATED AT A DEPTH OF 19.7 FEET IN SLIGHT, MODERATELY HARD GNEISS

CORE BORING REPORT							DATE	6/15/2004											
PROJECT:		33526.1.1		I.D. NO:		B-4179		BORING NO:		16+77 27		GEOLOGIST:		TB DANIEL					
DESCRIPTION:		BR. 65 OVER RABBIT CREEK										16+77 27 Rt. -L-							
COUNTY:		MACON				COLLAR ELEVATION:			2034.0		FT.		TOTAL DEPTH:			19.7		FT.	
ELEV. (FEET)	DEPTH (FEET)	DRILL RATE (MIN./FT.)	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS												
2023.6	10.4		4.3	2.9	0.0		LIGHT COLORED GNEISS WITH ZONES OF WEATHERED ROCK. MODERATE TO SLIGHT WEATHERING, MEDIUM TO MODERATELY HARD. FOLIATION NEAR 45 DEGREES. RUST ON SOME BREAKS.												
2019.3	14.7			67	0														
2019.3	14.7			3.3	1.8		GENISS WITH ZONES OF WEATHERED ROCK. HARDER AND FEWER BREAKS WITH DEPTH. MODERATE TO SLIGHT WEATHERING, MEDIUM TO MODERATELY HARD. FOLIATION NEAR 45 DEGREES.												
2014.3	19.7			66	36														
CORING TERMINATED AT ELEVATION 2014.3 FT.																			
DRILLER: JT WILLIAMS				CORE SIZE: NXWL				EQUIPMENT: CME-550											

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

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
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2	LEGEND
3	SITE PLAN
4-5	CROSS SECTIONS
6	BORE LOGS

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. B-4179 F.A. PROJ. BRZ-1513(2)
COUNTY MACON
PROJECT DESCRIPTION BRIDGE #65 ON SR 1513 OVER RABBIT CREEK

SITE DESCRIPTION RETAINING WALL -L- STA. 13+25.00 (23.52 LT) TO 14+25.00 (46.37 LT)

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PERSONNEL

T.B. DANIEL

C.J. COFFEY

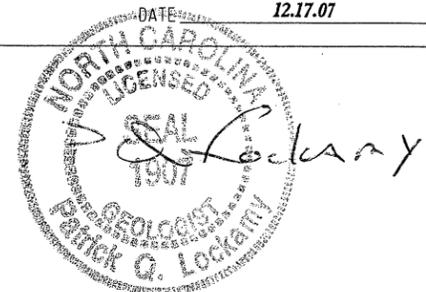
R.D. CHILDERS

INVESTIGATED BY P.Q. LOCKAMY

CHECKED BY W.D. FRYE

SUBMITTED BY W.D. FRYE

DATE 12.17.07



PROJECT: 33526.1.1 ID: B-4179

DRAWN BY: J.T. WILLIAMS

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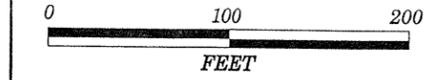
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. B-4179	SHEET NO. 2
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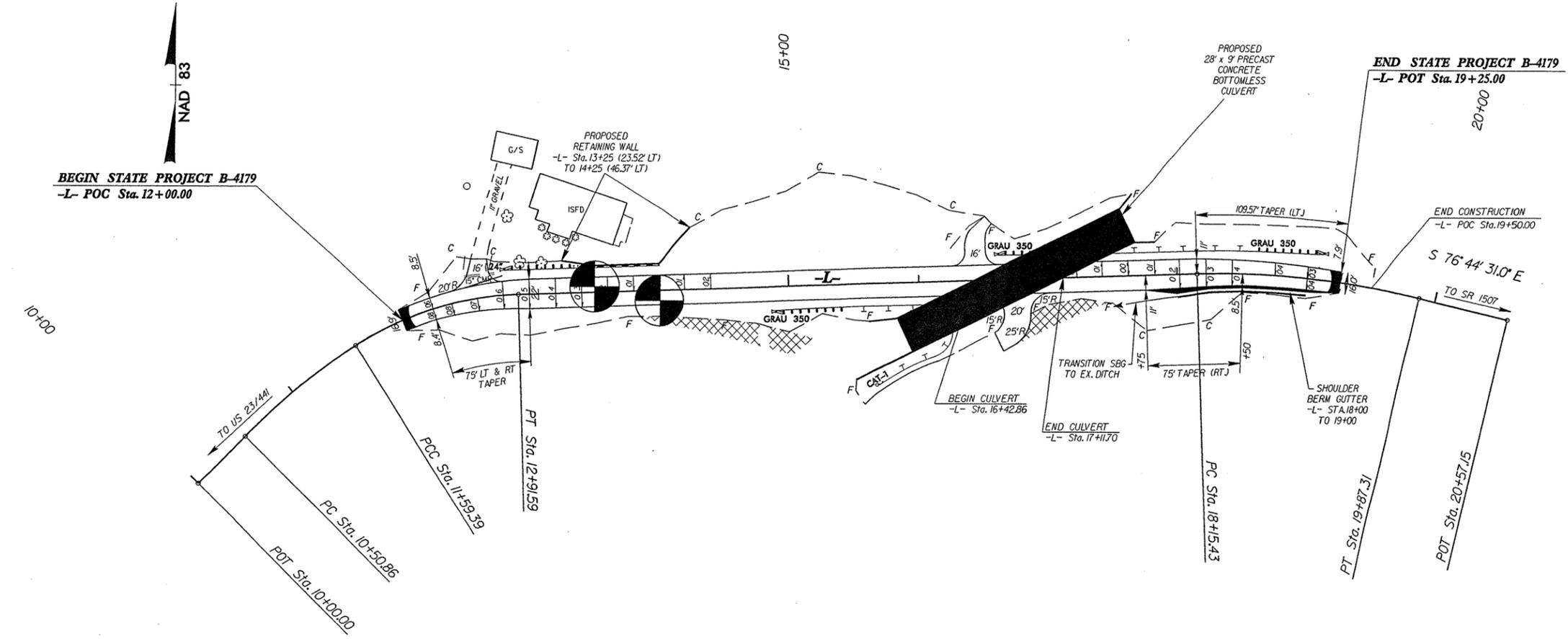
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																								
<p>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 T208; 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:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>		<p>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.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>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:</p>		<p>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 DISLOGGED 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 (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 (RES) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - 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 (SROD) - 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.</p>																																																																																																																								
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING																																																																																																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="3">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th colspan="2">A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th colspan="3"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td colspan="3"></td> </tr> <tr> <th>% PASSING</th> <td>10 15 20</td> <td colspan="3"></td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6 MX</td> <td>NP</td> <td>40 MX</td> <td>41 MN</td> <td>40 MX</td> <td>41 MN</td> <td>40 MX</td> <td>41 MN</td> <td>40 MX</td> <td>41 MN</td> <td>40 MX</td> <td colspan="3"></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>10 MX</td> <td colspan="4"></td> <td colspan="2">HIGHLY ORGANIC SOILS</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILTY SOILS</td> <td colspan="2">CLAYEY SOILS</td> <td colspan="4"></td> <td colspan="2">HIGHLY ORGANIC SOILS</td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td colspan="4"></td> <td colspan="2">UNSATURABLE</td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>		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	10 15 20				LIQUID LIMIT	6 MX	NP	40 MX	41 MN	40 MX				GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	10 MX					HIGHLY ORGANIC SOILS		USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS						HIGHLY ORGANIC SOILS		GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR					UNSATURABLE		<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p> <p>LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50</p>		<p style="text-align: center;">WEATHERING</p> <p>FRESH VERY SLIGHT (V SL) SLIGHT (SL) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE</p>		<p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT</p>																	
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PROJECT REFERENCE NO.	SHEET
B-4179	3
BRIDGE # 65 ON SR 1513 OVER RABBIT CREEK	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

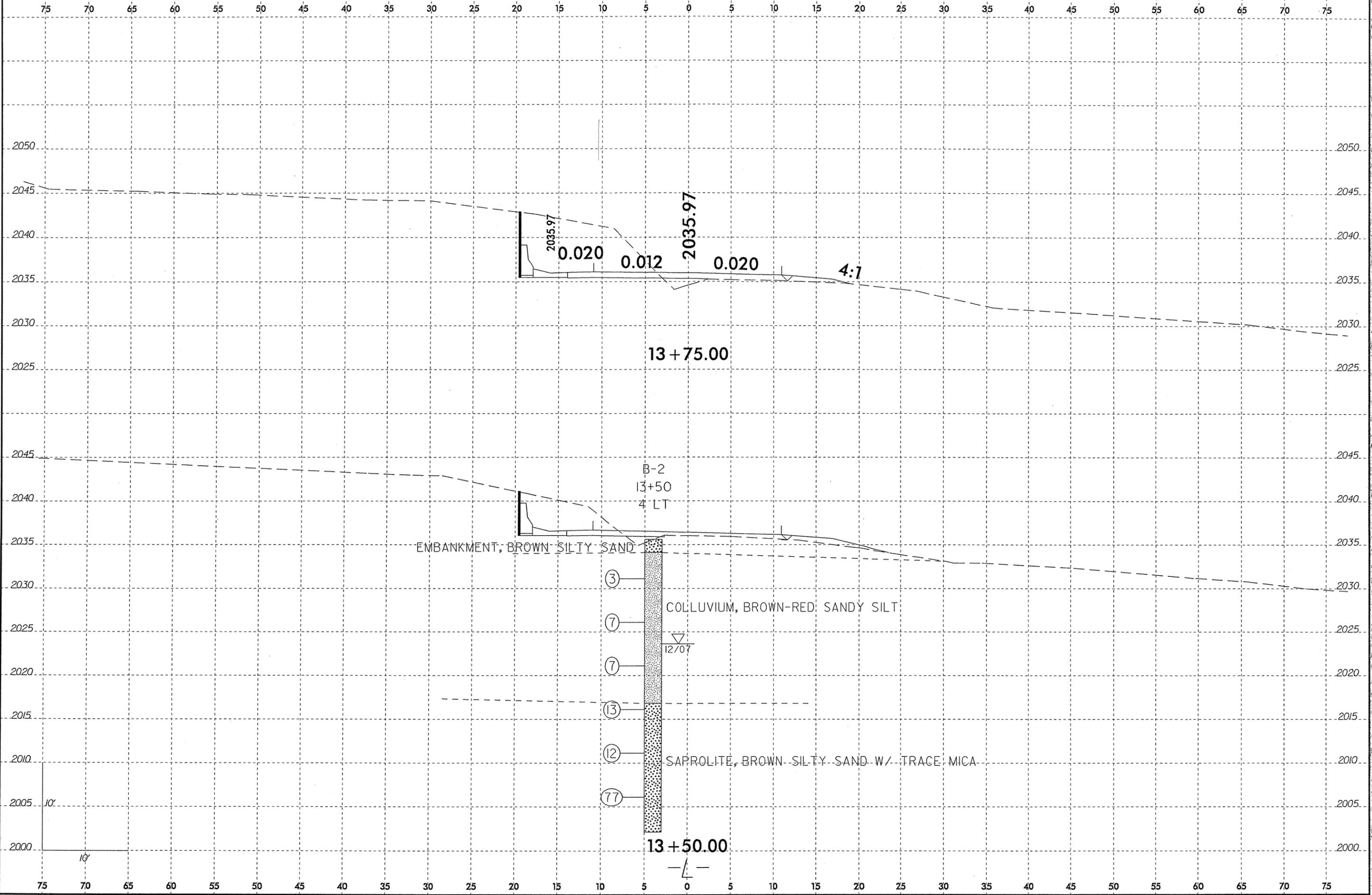


BEGIN STATE PROJECT B-4179
-L- POC Sta. 12+00.00

END STATE PROJECT B-4179
-L- POT Sta. 19+25.00

END CONSTRUCTION
-L- POC Sta. 19+50.00

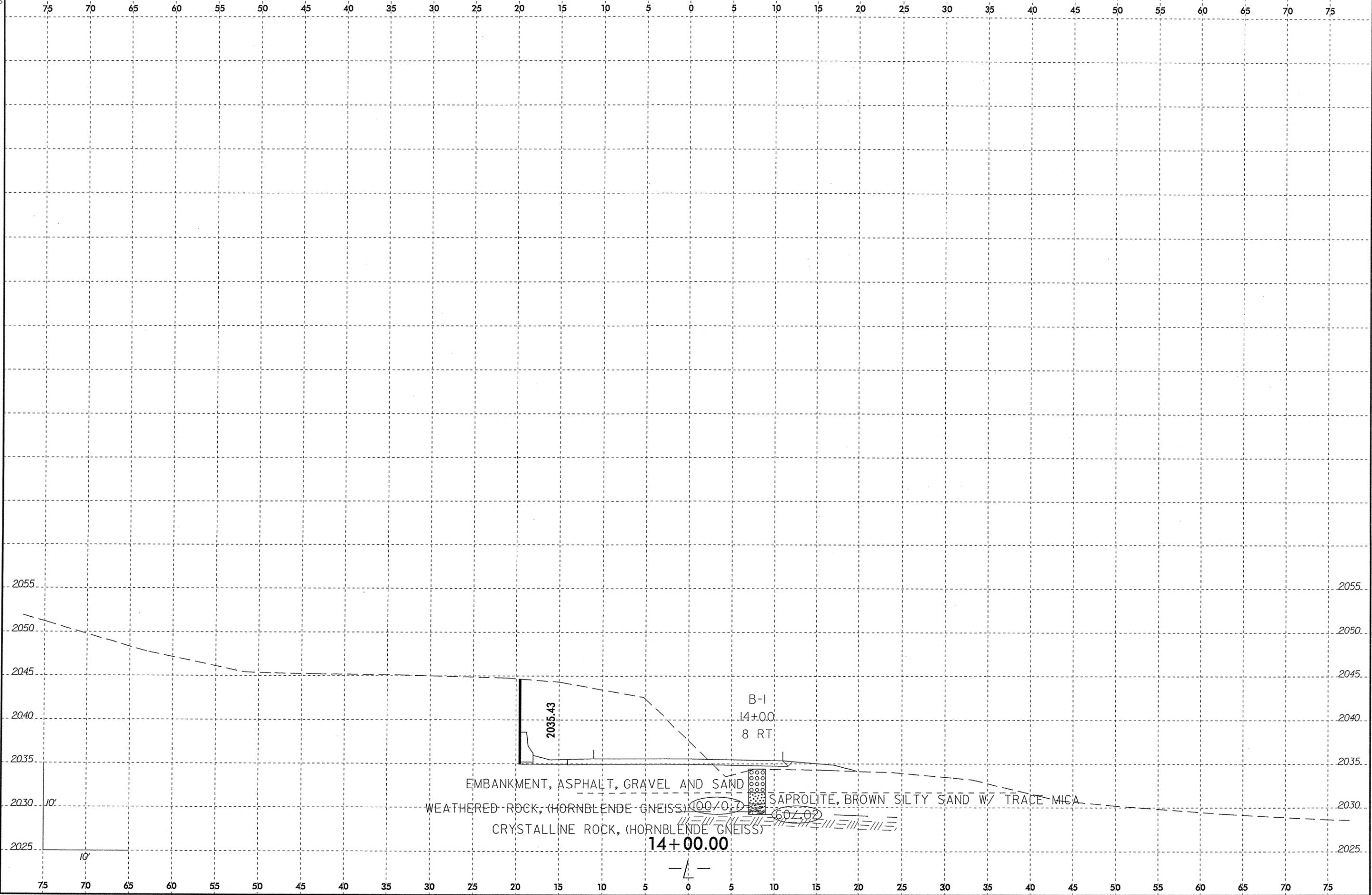




 SYSTEM TIME *****

 USER NAME *****

8/23



 SYSTEM TIME #####
 USER NAME #####
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