

PROJECT: 33511.1.1 ID: B-4163

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33511.1.1 (B-4163)	1	13

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STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33511.1.1 (B-4163) F.A. PROJ. BRZ-1437(3)
 COUNTY JACKSON
 PROJECT DESCRIPTION _____

SITE DESCRIPTION BRIDGE NO. 123 OVER SCOTTS CREEK
ON SR 1437

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 (919) 250-4088. 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 (ON-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

M.M. HAGER

P.Q. LOCKAMY

D.O. CHEEK

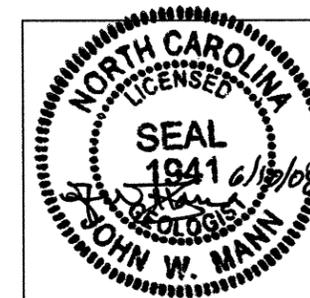
G.K. ROSE

INVESTIGATED BY J.W. MANN

CHECKED BY W.D. FRYE

SUBMITTED BY W.D. FRYE

DATE 6/10/08



DRAWN BY: J.W. MANN

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 DEPARTMENT OF TRANSPORTATION
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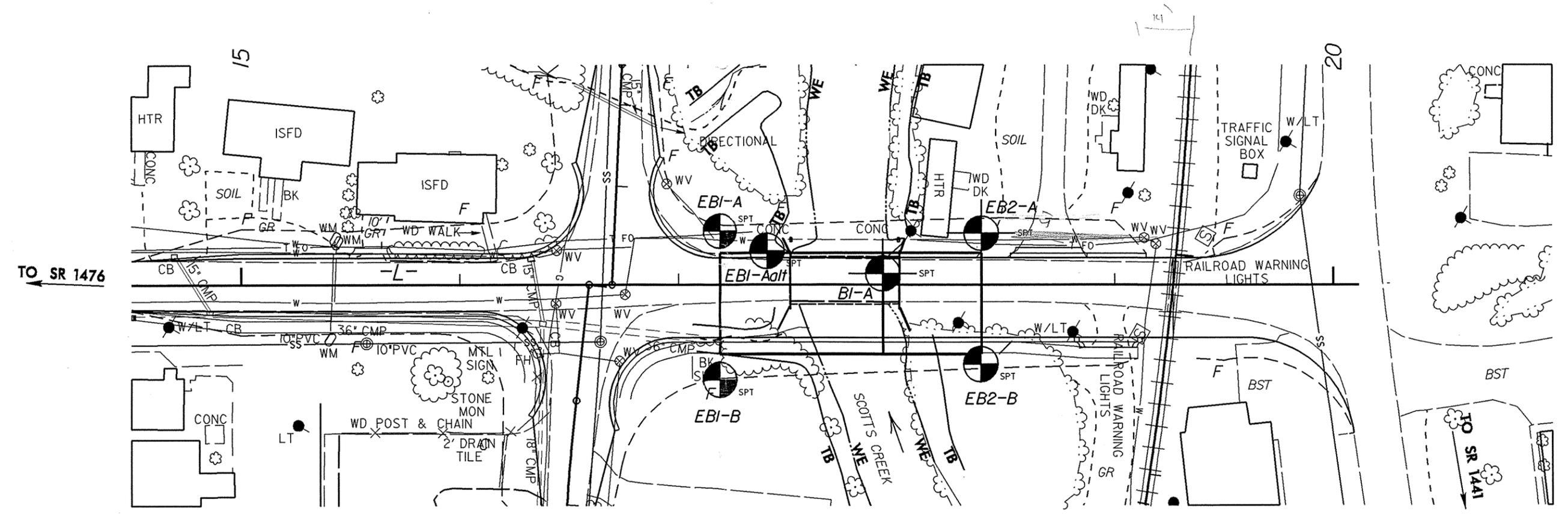
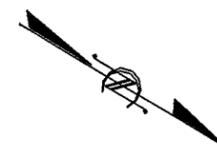
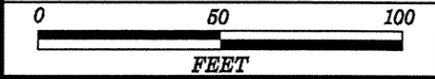
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SUBSURFACE INVESTIGATION

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 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:</p> <p style="text-align: center;"><i>VERY STIFF, GRN. SAT. CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY 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)</p> <p>POORLY 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 8.1 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>WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>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.</p> <p>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.</p> <p>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.</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (ROQD) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN 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 8.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SCREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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.</p> <p>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																				
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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p style="text-align: center;">COMPRESSIONIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p>		<p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>		<p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) - 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.</p> <p>SLIGHT (SL.) - 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.</p> <p>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.</p> <p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>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.</p>												
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PLASTICITY		DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		BENCH MARK: CHISELED SQUARE NW CORNER OF SIDEWALK																																																																																																																																																																						
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SITE PLAN



SKEW=90°

2110

2100

2090

2080

2070

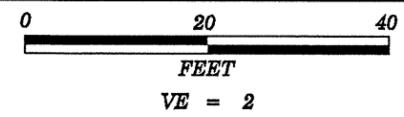
2060

2050

2040

2030

2020



EB1-A
17+19
24' LT

EB1-Aalt
17+41
15' LT

B1-A
17+94
5' LT

EB2-A
18+39
23' LT

2100

2090

2080

2070

2060

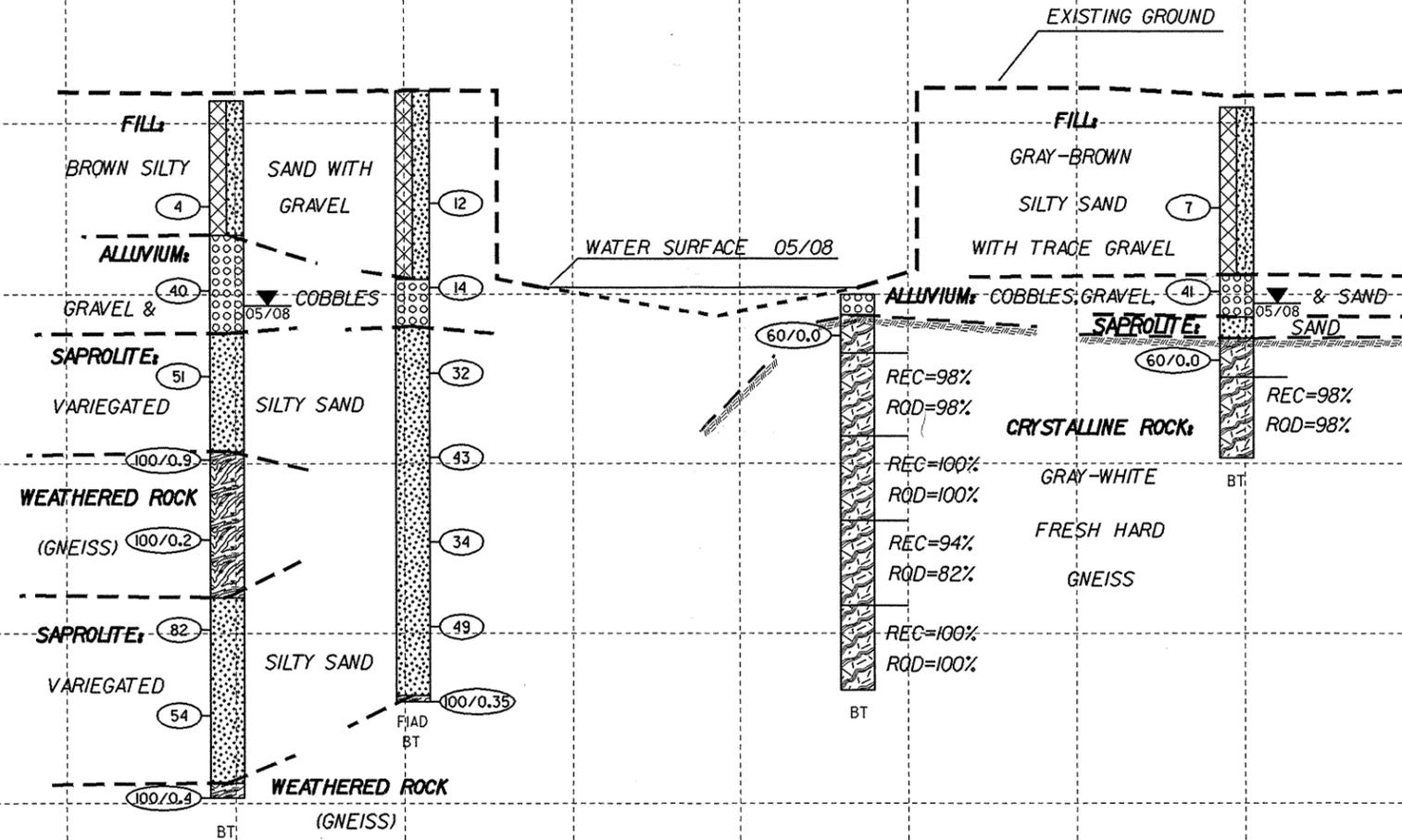
2050

2040

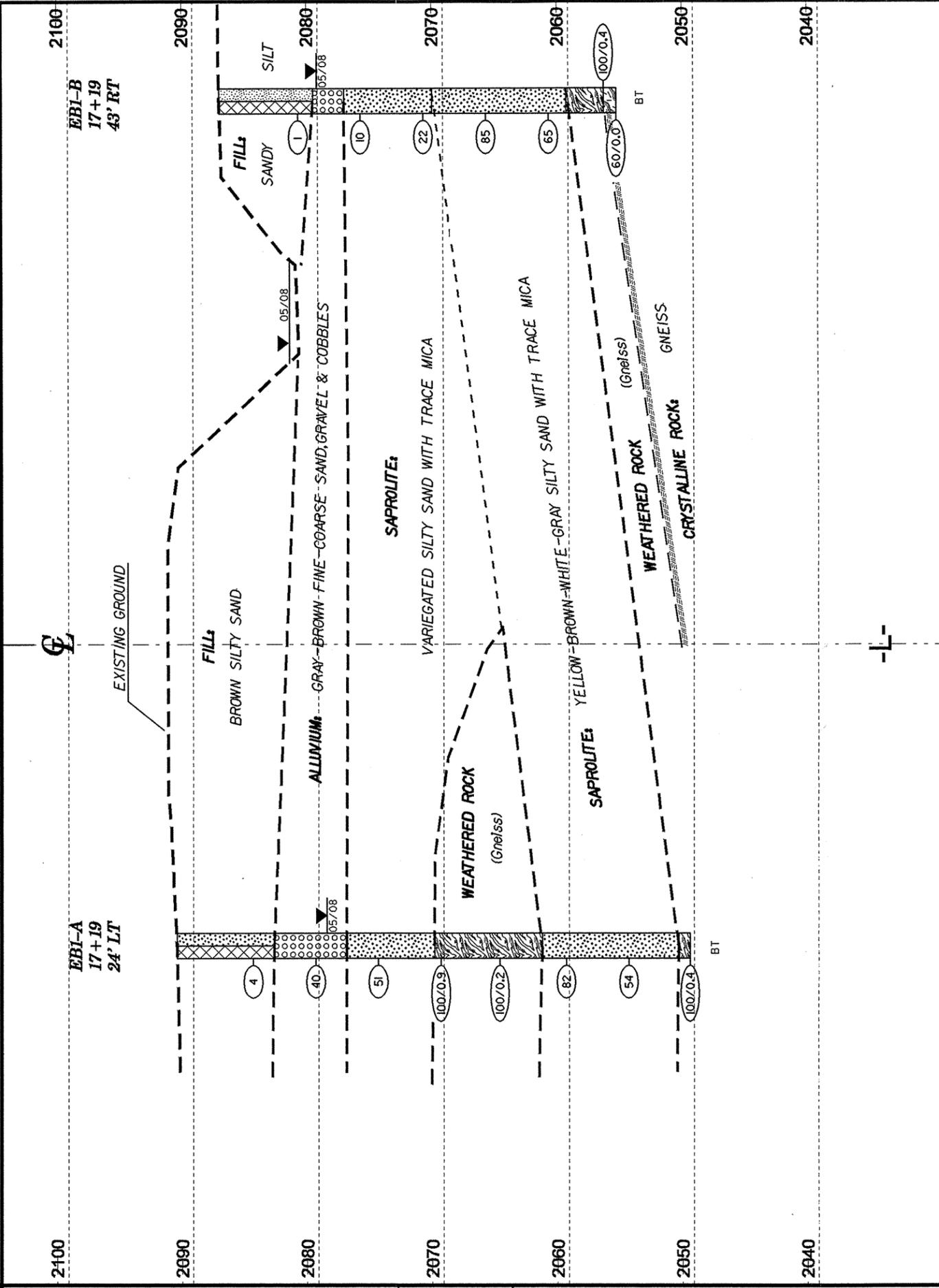
2030

2020

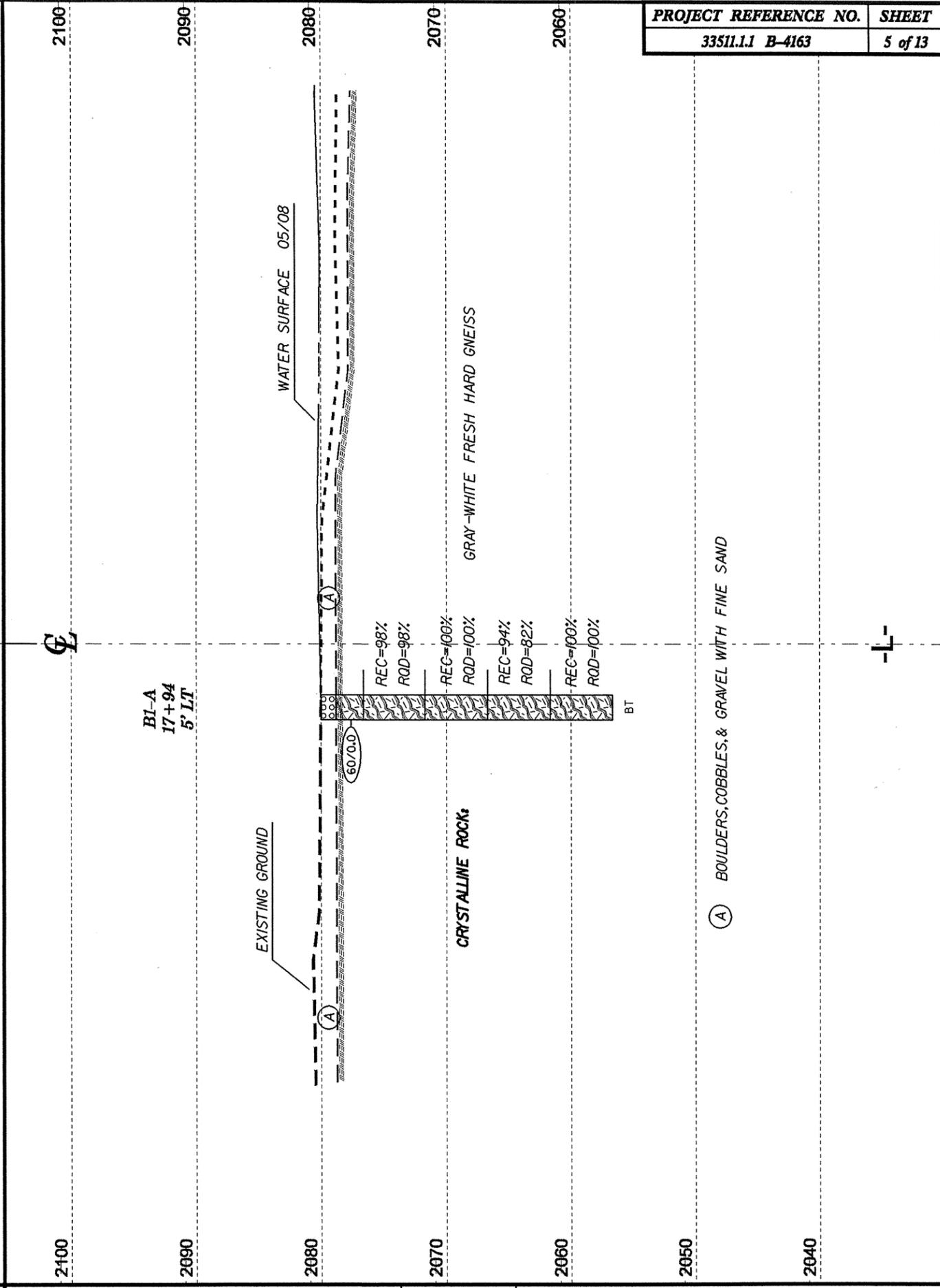
16+60 16+80 17+00 17+20 17+40 17+60 17+80 18+00 18+20 18+40 18+60 18+80 19+00 19+20



-L-



HORIZ. SCALE 0 10 20 (FEET) VE = 1 X-SECTION THRU END BENT ONE



HORIZ. SCALE 0 10 20 (FEET) VE = 1 X-SECTION THRU INTERIOR BENT ONE

(A) BOULDERS, COBBLES, & GRAVEL WITH FINE SAND

PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 17+19	OFFSET 24ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,091.3 ft	TOTAL DEPTH 41.0 ft	NORTHING 623,037	EASTING 746,908
DRILL MACHINE CME-45C	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 05/27/08	COMP. DATE 05/27/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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				
2095														
2090													2,091.3 GROUND SURFACE 0.0	
2085	2,086.2	5.1	1	2	2								2,083.5 ARTIFICIAL FILL Brown silty SAND 7.8	
2080	2,081.2	10.1	22	17	23								2,077.7 ALLUVIAL Gray-brown GRAVEL & silty SAND with roots 13.6	
2075	2,076.2	15.1	14	22	29								2,070.7 SAPROLITE Red-brown-black-white silty SAND with trace mica 20.6	
2070	2,071.2	20.1	18	62	38/0.4								2,062.1 WEATHERED ROCK (Gneiss) 29.2	
2065	2,066.2	25.1	55	45/0.2									2,051.2 SAPROLITE Yellow-brown-white-gray silty SAND 40.1	
2060	2,061.2	30.1	21	30	52								2,050.3 WEATHERED ROCK (Gneiss) 41.0	
2055	2,056.2	35.1	9	24	30									
2050	2,051.2	40.1	42	58/0.4										
2045														
2040														
2035														
2030														
2025														
2020														
2015														

PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION 17+19	OFFSET 43ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,087.9 ft	TOTAL DEPTH 31.7 ft	NORTHING 623,071	EASTING 746,966
DRILL MACHINE CME-45C	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 05/21/08	COMP. DATE 05/21/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 30.7 ft

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				
2090														
2085	2,082.6	5.3	WOH	WOH	1								2,080.4 GROUND SURFACE 0.0	
2080	2,077.6	10.3	2	4	6								2,077.9 ARTIFICIAL FILL Red-brown slightly clayey fine sandy SILT 7.5	
2075	2,072.6	15.3	5	8	14								2,070.9 ALLUVIAL COBBLES 10.0	
2070	2,067.6	20.3	19	26	59								2,057.2 SAPROLITE Gray-brown-white silty SAND with trace mica 17.0	
2065	2,062.6	25.3	26	34	31								2,052.2 SAPROLITE Yellow-brown-black silty SAND with trace mica 27.7	
2060	2,057.6	30.3	100/0.4										2,052.2 WEATHERED ROCK (Gneiss) 30.7	
2055	2,056.2	31.7	60/0.0										2,056.2 CRYSTALLINE ROCK GNEISS 31.7	
2050														
2045														
2040														
2035														
2030														
2025														
2020														
2015														
2010														

NCDOT BORE SINGLE B4163_GEO_BH.GPJ NC_DOT.GDT 06/11/08

NCDOT BORE SINGLE B4163_GEO_BH.GPJ NC_DOT.GDT 06/11/08



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. EB1-Aalt	STATION 17+41	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,091.9 ft	TOTAL DEPTH 35.9 ft	NORTHING 623,061	EASTING 746,905
DRILL MACHINE CME-45C	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/01/05	COMP. DATE 02/01/05	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
2095															
2090														2,091.9	0.0
2085	2,086.4	5.5	4	7	5										
2080	2,081.4	10.5	4	6	8									2,080.9	11.0
2075	2,076.4	15.5	8	12	20									2,078.1	13.8
2070	2,071.4	20.5	7	18	25										
2065	2,066.4	25.5	8	10	24										
2060	2,061.4	30.5	35	30	19										
2055	2,056.4	35.5	100/0.35											2,056.4	35.5
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2025															
2020															
2015															

NCDOT BORE SINGLE B4163.GEO.BH.GPJ NC_DOT.GDT 06/11/08

WEATHERED ROCK (Gneiss)
Boring Terminated at Elevation 2,056.0 ft in Weathered Rock (Gneiss)

PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+94	OFFSET 5ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,080.0 ft	TOTAL DEPTH 23.3 ft	NORTHING 623,111	EASTING 746,886
DRILL MACHINE CME-45C	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 05/29/08	COMP. DATE 05/29/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 1.2 ft

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					
2080													2,080.0	GROUND SURFACE	0.0
	2,077.6	2.4											2,078.8	ALLUVIAL BOULDERS, COBBLES, & GRAVEL with fine SAND	1.2
		60/0.0											2,076.6	CRYSTALLINE ROCK GNEISS	3.4
2075													2,071.7	CRYSTALLINE ROCK Gray-white GNEISS. REC=98% RQD=98%	8.3
2070													2,066.7	CRYSTALLINE ROCK Gray-white GNEISS. REC=100% RQD=100%	13.3
2065													2,061.7	CRYSTALLINE ROCK Gray-white GNEISS. REC=94% RQD=82%	18.3
2060													2,056.7	CRYSTALLINE ROCK Gray-white GNEISS. REC=100% RQD=100%	23.3
2055													Boring Terminated at Elevation 2,056.7 ft in Crystalline Rock: Gneiss		
2050															
2045															
2040															
2035															
2030															
2025															
2020															
2015															
2010															
2005															
2000															

PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+94	OFFSET 5ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,080.0 ft	TOTAL DEPTH 23.3 ft	NORTHING 623,111	EASTING 746,886
DRILL MACHINE CME-45C	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 05/29/08	COMP. DATE 05/29/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 1.2 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft) %	RQD (ft) %		REC (ft) %	RQD (ft) %			
2076.58											Begin Coring @ 3.4 ft	
2075	2,076.6	3.4	4.9		(4.8) 98%	(4.8) 98%		(19.5) 98%	(18.9) 95%		CRYSTALLINE ROCK Gray-white, fresh, hard GNEISS. Foliation variable. Fracture spacing typically very wide. Only 4 fractures, undulating, occurring in Run 3.	3.4
	2,071.7	8.3									CRYSTALLINE ROCK	8.3
2070			5.0		(5.0) 100%	(5.0) 100%						
	2,066.7	13.3									CRYSTALLINE ROCK	13.3
2065			5.0		(4.7) 94%	(4.1) 82%						
	2,061.7	18.3									CRYSTALLINE ROCK	18.3
2060			5.0		(5.0) 100%	(5.0) 100%						
	2,056.7	23.3									Boring Terminated at Elevation 2,056.7 ft in Crystalline Rock: Gneiss	23.3
2055												
2050												
2045												
2040												
2035												
2030												
2025												
2020												
2015												
2010												
2005												
2000												

NCDOT BORE SINGLE B4163_GEO_BH.GPJ NC_DOT.GDT 06/11/08

NCDOT CORE SINGLE B4163_GEO_BH.GPJ NC_DOT.GDT 06/11/08



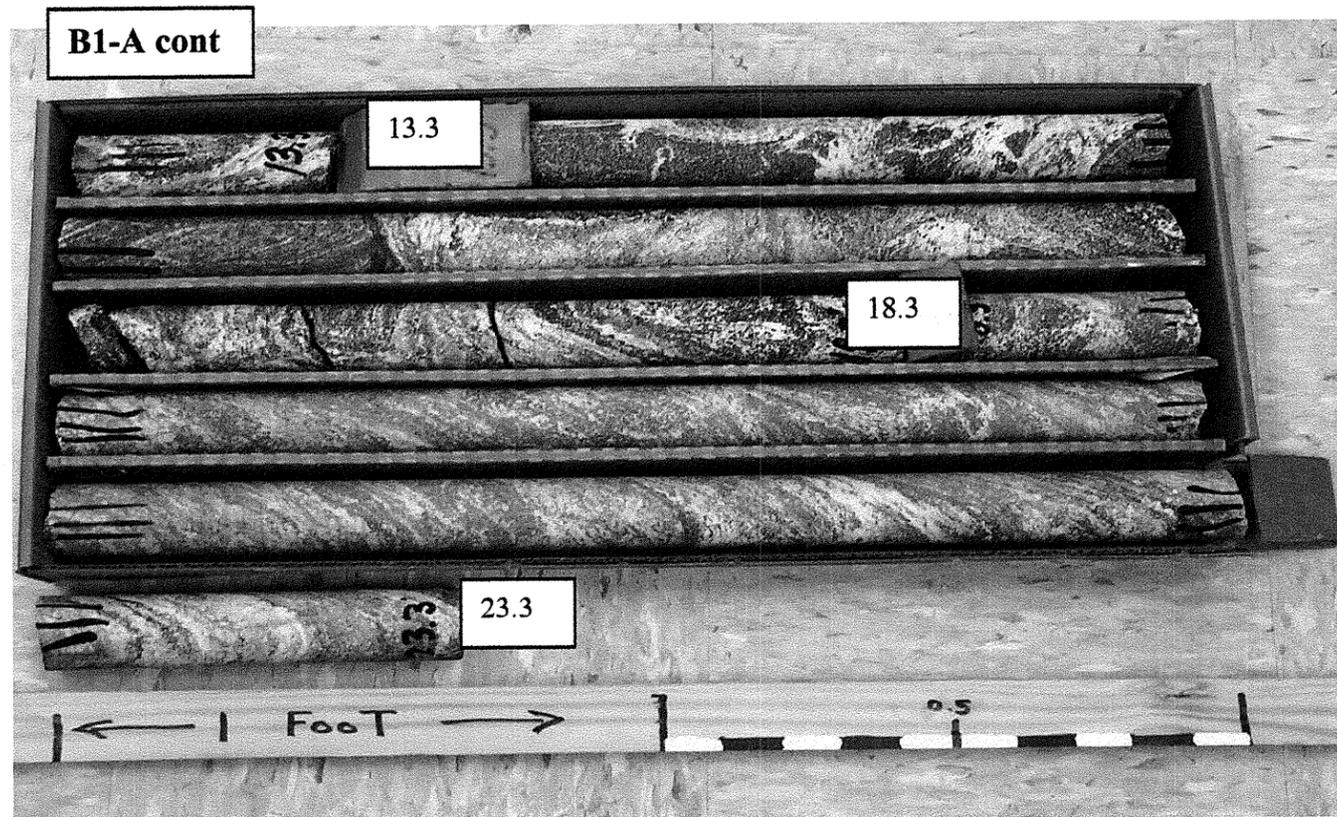
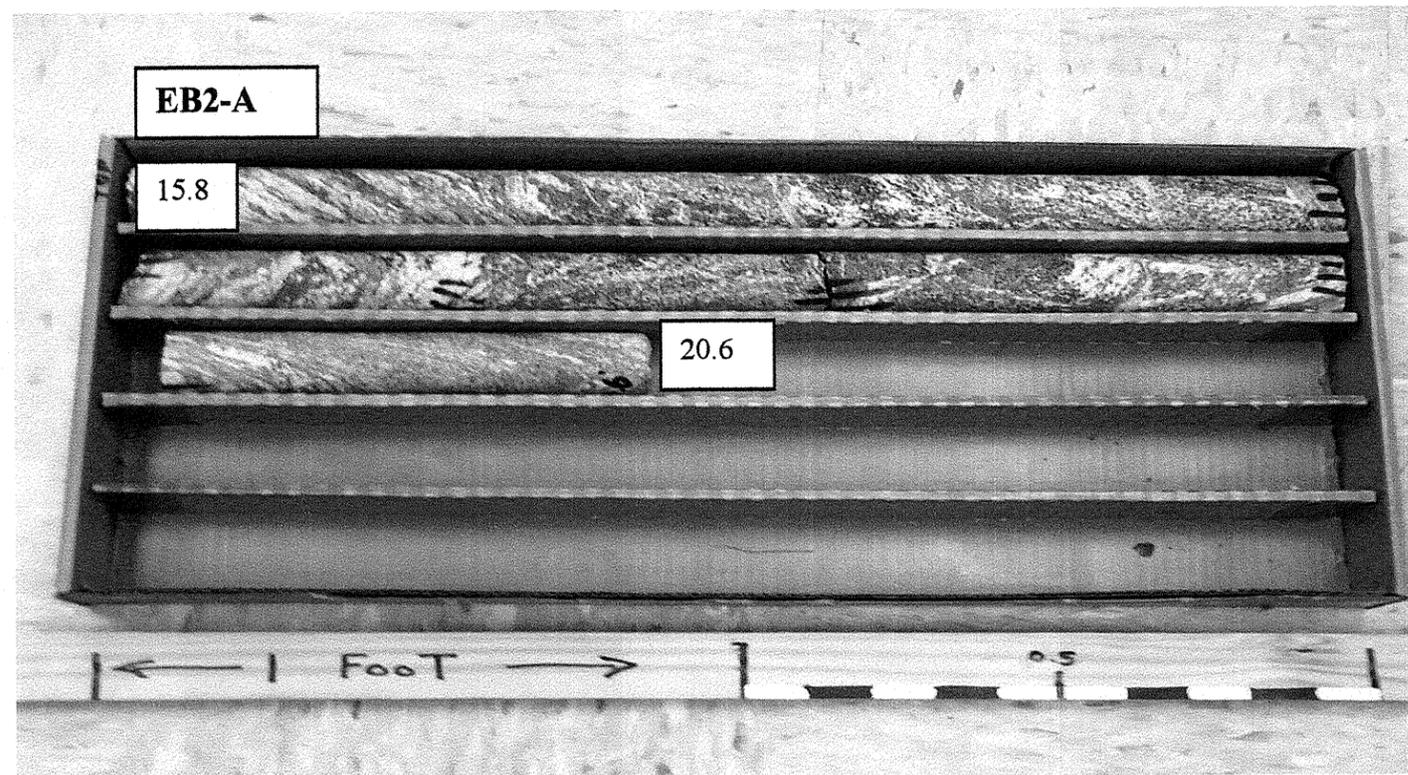
PROJECT NO. 33511.1.1	ID. B-4163	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 123 on SR 1437 (Hospital Road) over Scotts Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 18+39	OFFSET 36ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,092.7 ft	TOTAL DEPTH 20.6 ft	NORTHING 623,171	EASTING 746,899
DRILL MACHINE CME-45C	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/01/05	COMP. DATE 02/01/05	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 19.0 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2095																	
															2,092.7	GROUND SURFACE	0.0
2090																	
	2,087.2	5.5															
2085			2	2	2												
	2,082.2	10.5													2,083.2		9.5
2080			10	14	18												
	2,077.2	15.5													2,079.9		12.8
2075			10	90/0.4													
	2,072.2	20.5													2,076.4		16.3
2070															2,073.7		19.0
															2,072.1		20.6
2065																	
2060																	
2055																	
2050																	
2045																	
2040																	
2035																	
2030																	
2025																	
2020																	
2015																	

NCDOT BORE SINGLE B4163_GEO_BH.GPJ NC_DOT.GDT 06/11/08

Boring Terminated with Standard Penetration Test Refusal at Elevation 2,072.1 ft in Crystalline Rock: Gneiss

CORE PHOTOS





**FIELD
 SCOUR REPORT**

WBS: 33511.1.1 TIP: B-4163 COUNTY: JACKSON

DESCRIPTION(1): Bridge No. 123 on SR1 1437 over Scotts Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) BSR dated 1/22/08

Bridge No.: 123 Length: 51 Total Bents: 2 Bents in Channel: 2 Bents in Floodplain: n/a
 Foundation Type: Vertical timber pile abutments

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Evidence of sloughing behind upstream wing walls

Interior Bents: n/a

Channel Bed: None noted

Channel Bank: Both banks upstream

EXISTING SCOUR PROTECTION

Type(3): Rip rap

Extent(4): Placed behind EB1-B wing wall

Effectiveness(5): Fair

Obstructions(6): None

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 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): Boulders, cobbles, sand

Channel Bank Material(8): Fill: silty sand

Channel Bank Cover(9): Trees, bramble

Floodplain Width(10): ~400'

Floodplain Cover(11): Grass, asphalt: roads & parking lots

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): Toward EB1-B

Observations and Other Comments: Property owner stated that the channel bed had been reworked.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

		BENTS											
		B1	B2	B3	B4								
B1-A	2078												

Comparison of DSE to Hydraulics Unit theoretical scour:
 DSE is ~ 5' higher than theoretical scour.

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													

Reported by: J.W. Mann Date: 5/30/2008