

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

**STRUCTURE
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 33717.1.1 (B-4468) F.A. PROJ. BRSTP-1327(2)

COUNTY CLEVELAND

PROJECT DESCRIPTION BRIDGE No. 144 ON SR 1327 (MOORESBORO ROAD) OVER SANDY RUN CREEK

SITE DESCRIPTION N/A

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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 250-4088. 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 (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.

Structure Design

PERSONNEL

M. GRAGG

K. MURRAY

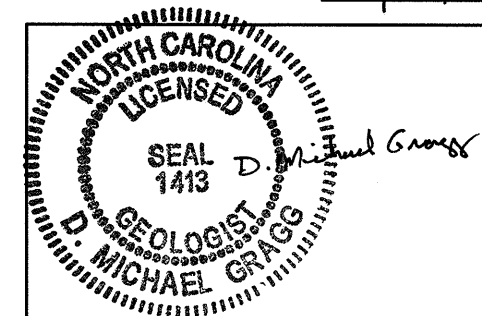
D. KOFRON

INVESTIGATED BY M. GRAGG

CHECKED BY S. PROVANCE

SUBMITTED BY D. CHITTENDEN

DATE April, 2009



PROJECT: 33717.1.1 ID: B-4468

DRAWN BY: W. SHUECRAFT

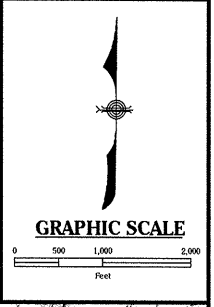
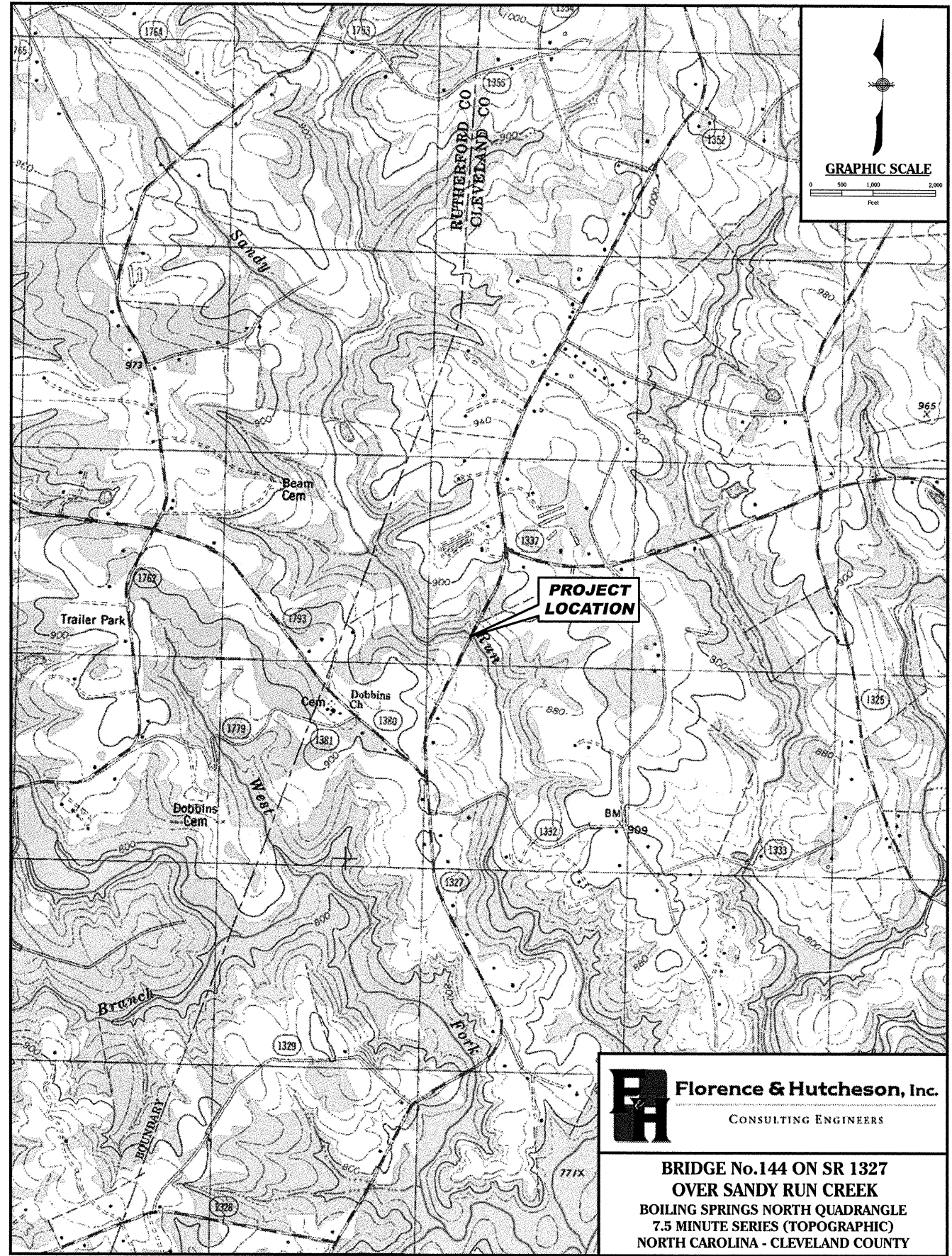
NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION					GRADATION					ROCK DESCRIPTION					TERMS AND DEFINITIONS																																					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGLARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY 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.					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 60 BLOWS PER FOOT 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:					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. FLOOD - 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 (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 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SCRC) - 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.																																					
					SOIL LEGEND AND AASHTO CLASSIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="3">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> <td>A-1</td><td>A-2</td><td>A-3</td> <td>A-4</td><td>A-5</td><td>A-6</td> <td>A-7</td><td>A-8</td><td>A-9</td> </tr> <tr> <th>SYMBOL</th> <td></td><td></td><td></td> <td></td><td></td><td></td> <td></td><td></td><td></td> </tr> </table>					GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)			SILT-CLAY MATERIALS (> 35% PASSING #200)			ORGANIC MATERIALS			GROUP CLASS.	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	SYMBOL										MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.					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 1/4 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. 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. 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. 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.							
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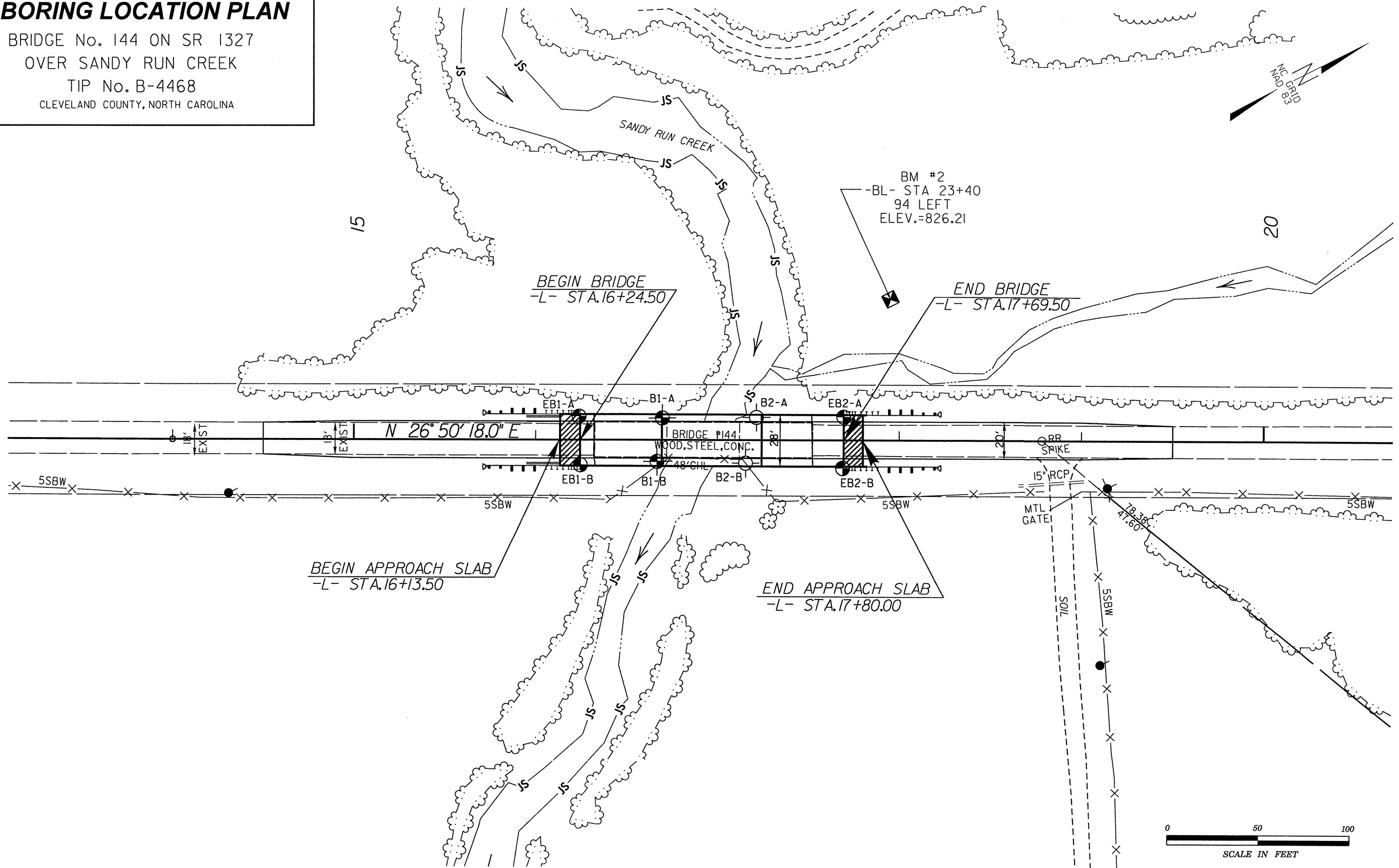


Florence & Hutcheson, Inc.
 CONSULTING ENGINEERS

**BRIDGE No.144 ON SR 1327
 OVER SANDY RUN CREEK
 BOILING SPRINGS NORTH QUADRANGLE
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 NORTH CAROLINA - CLEVELAND COUNTY**

BORING LOCATION PLAN

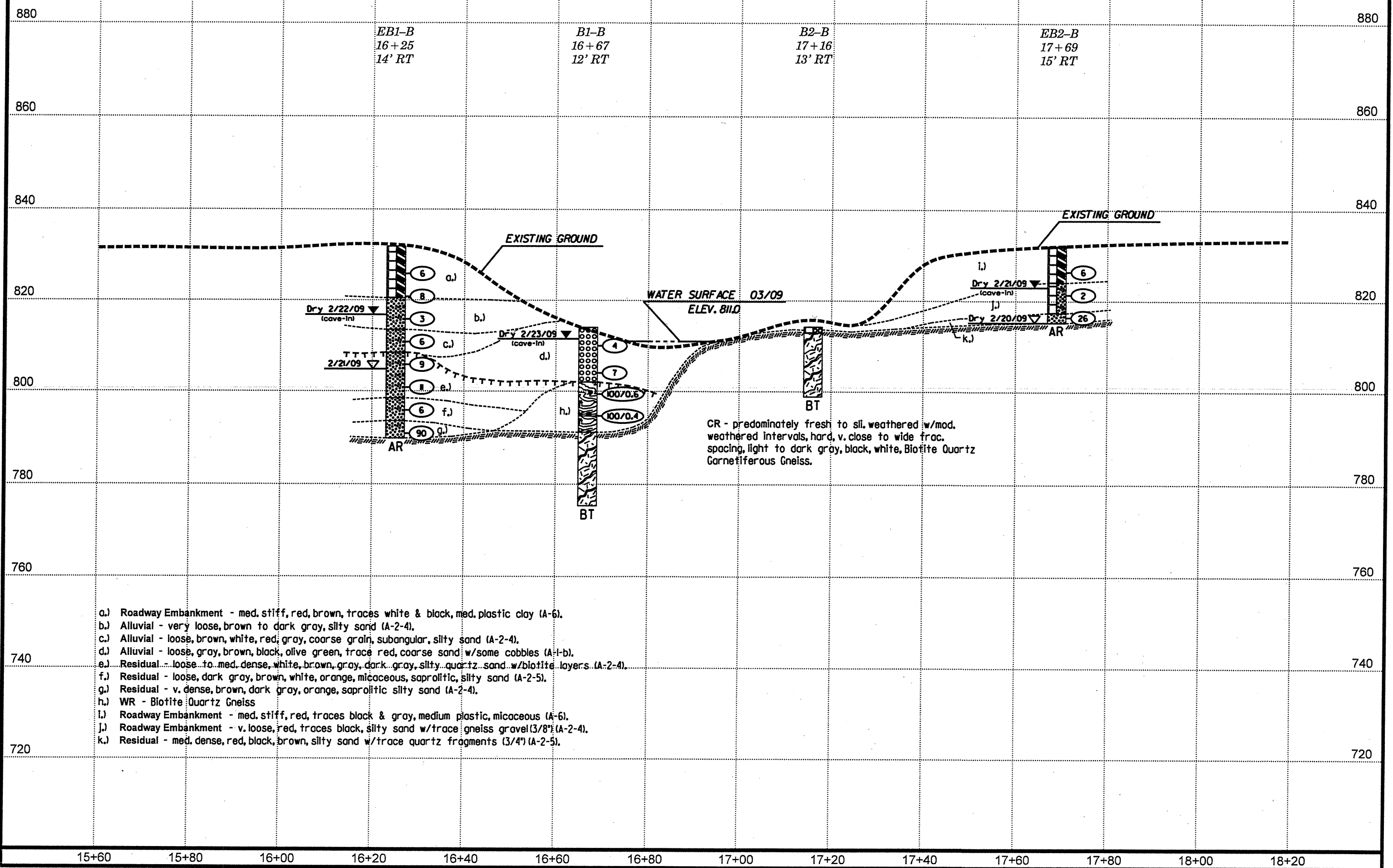
BRIDGE No. 144 ON SR 1327
OVER SANDY RUN CREEK
TIP No. B-4468
CLEVELAND COUNTY, NORTH CAROLINA



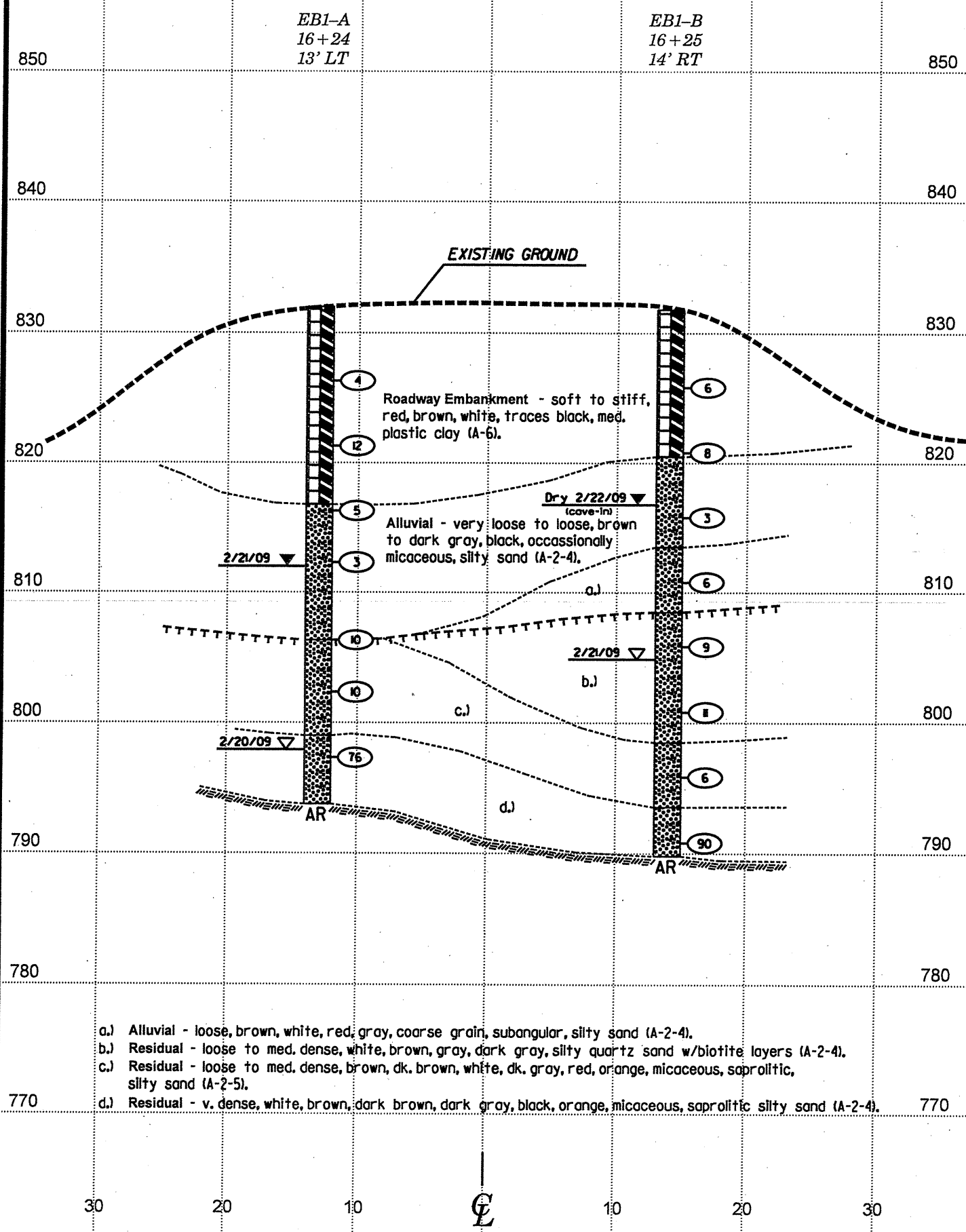
GENERALIZED SUBSURFACE PROFILE 15' Rt. of -L-

GROUNDLINE PROFILE SURVEYED BY FLORENCE & HUTCHESON, INC. AT 15' RT. OF -L- ON 3/4/09
 INFERRED STRATIGRAPHY IS DRAWN AT THE PROFILE OFFSET WITH THE BORINGS PROJECTED ONTO THE PROFILE

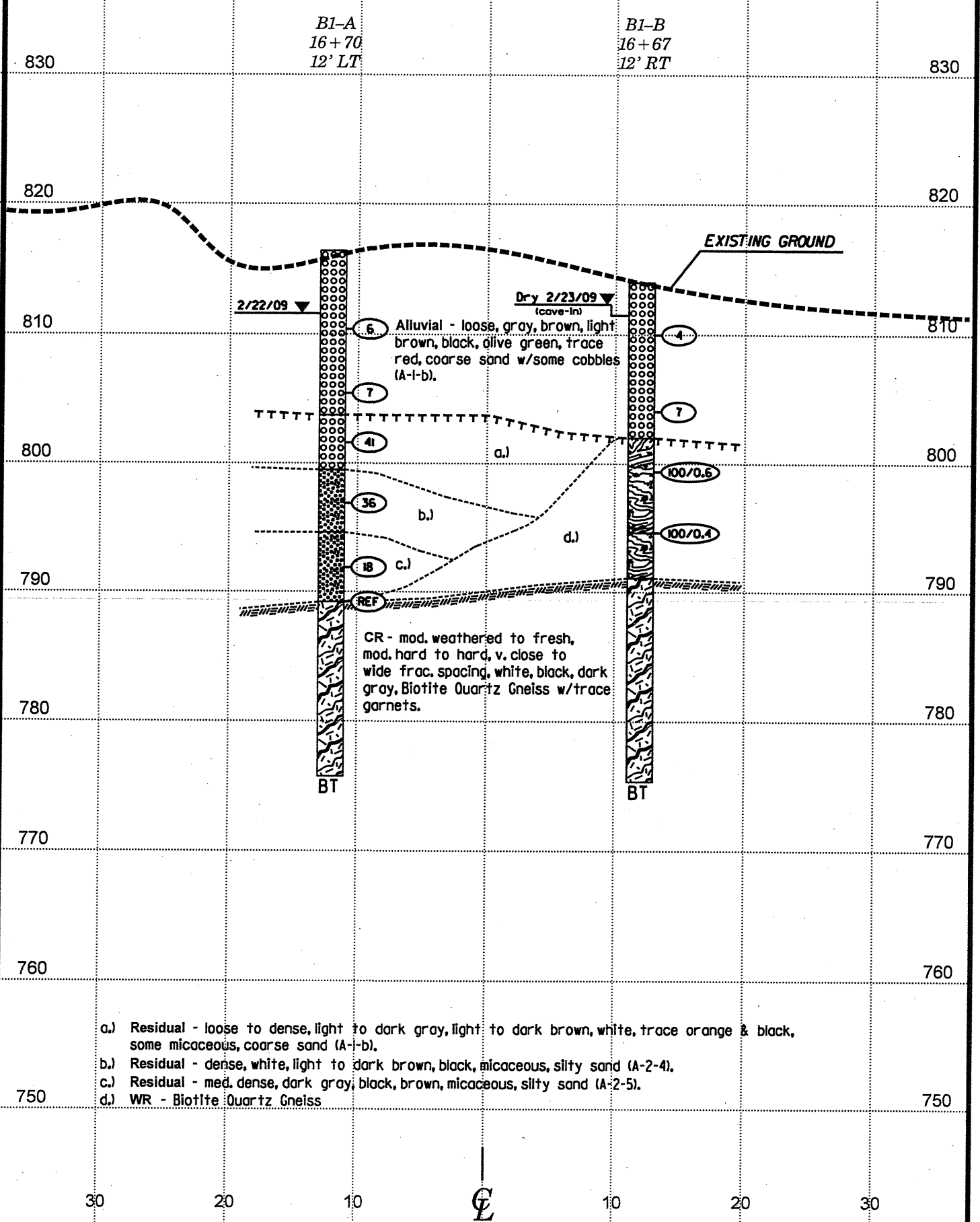
0 20 40 F E E T VE = NONE	PROJECT REFERENCE NO. B-4468	SHEET 5
PROFILE		



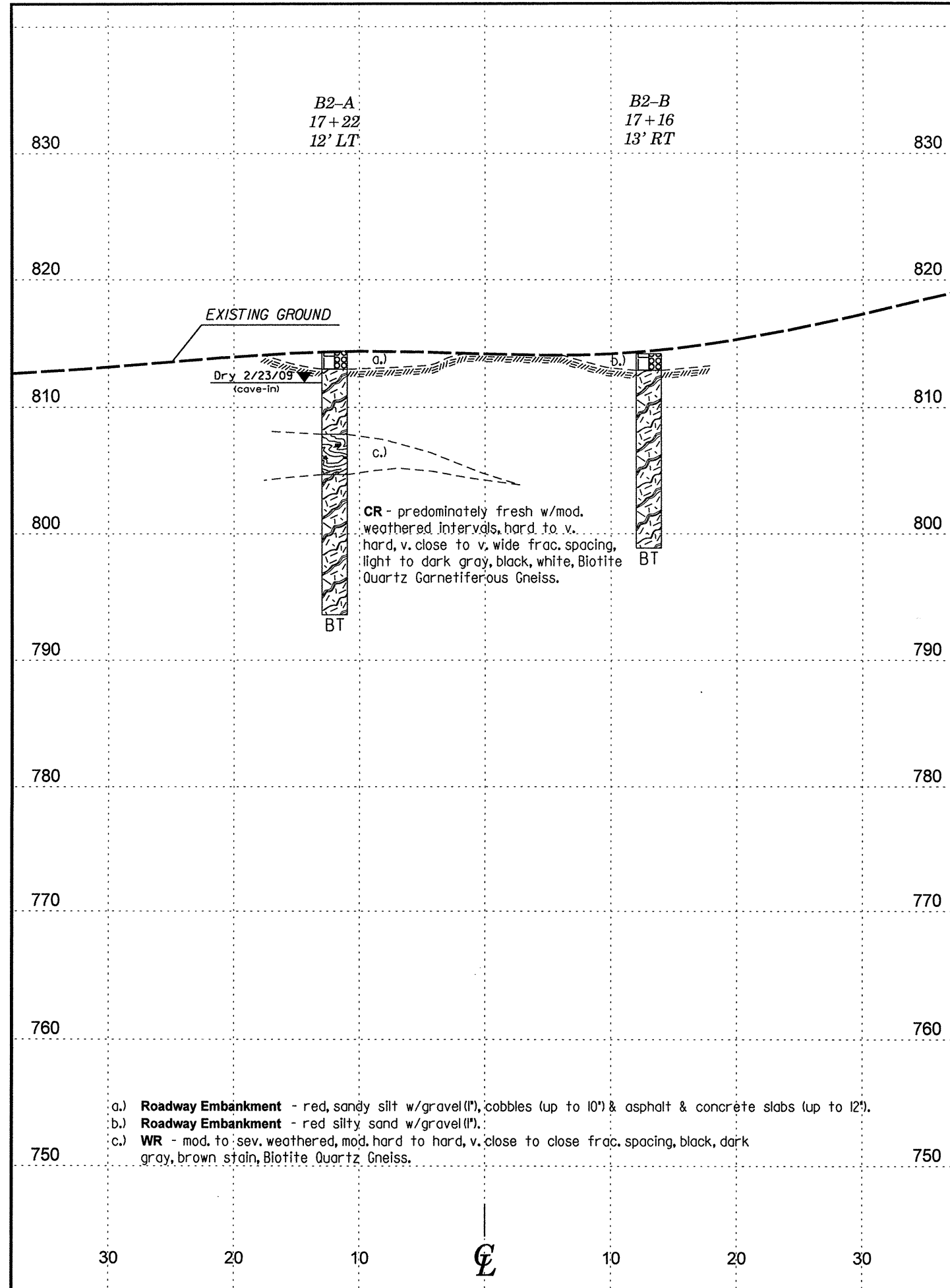
- a.) Roadway Embankment - med. stiff, red, brown, traces white & black, med. plastic clay (A-6).
- b.) Alluvial - very loose, brown to dark gray, silty sand (A-2-4).
- c.) Alluvial - loose, brown, white, red, gray, coarse grain, subangular, silty sand (A-2-4).
- d.) Alluvial - loose, gray, brown, black, olive green, trace red, coarse sand w/some cobbles (A-1-b).
- e.) Residual - loose to med. dense, white, brown, gray, dark gray, silty quartz sand w/biotite layers (A-2-4).
- f.) Residual - loose, dark gray, brown, white, orange, micaceous, saprolitic, silty sand (A-2-5).
- g.) Residual - v. dense, brown, dark gray, orange, saprolitic silty sand (A-2-4).
- h.) WR - Biotite Quartz Gneiss
- i.) Roadway Embankment - med. stiff, red, traces black & gray, medium plastic, micaceous (A-6).
- j.) Roadway Embankment - v. loose, red, traces black, silty sand w/trace gneiss gravel (3/8") (A-2-4).
- k.) Residual - med. dense, red, black, brown, silty sand w/trace quartz fragments (3/4") (A-2-5).



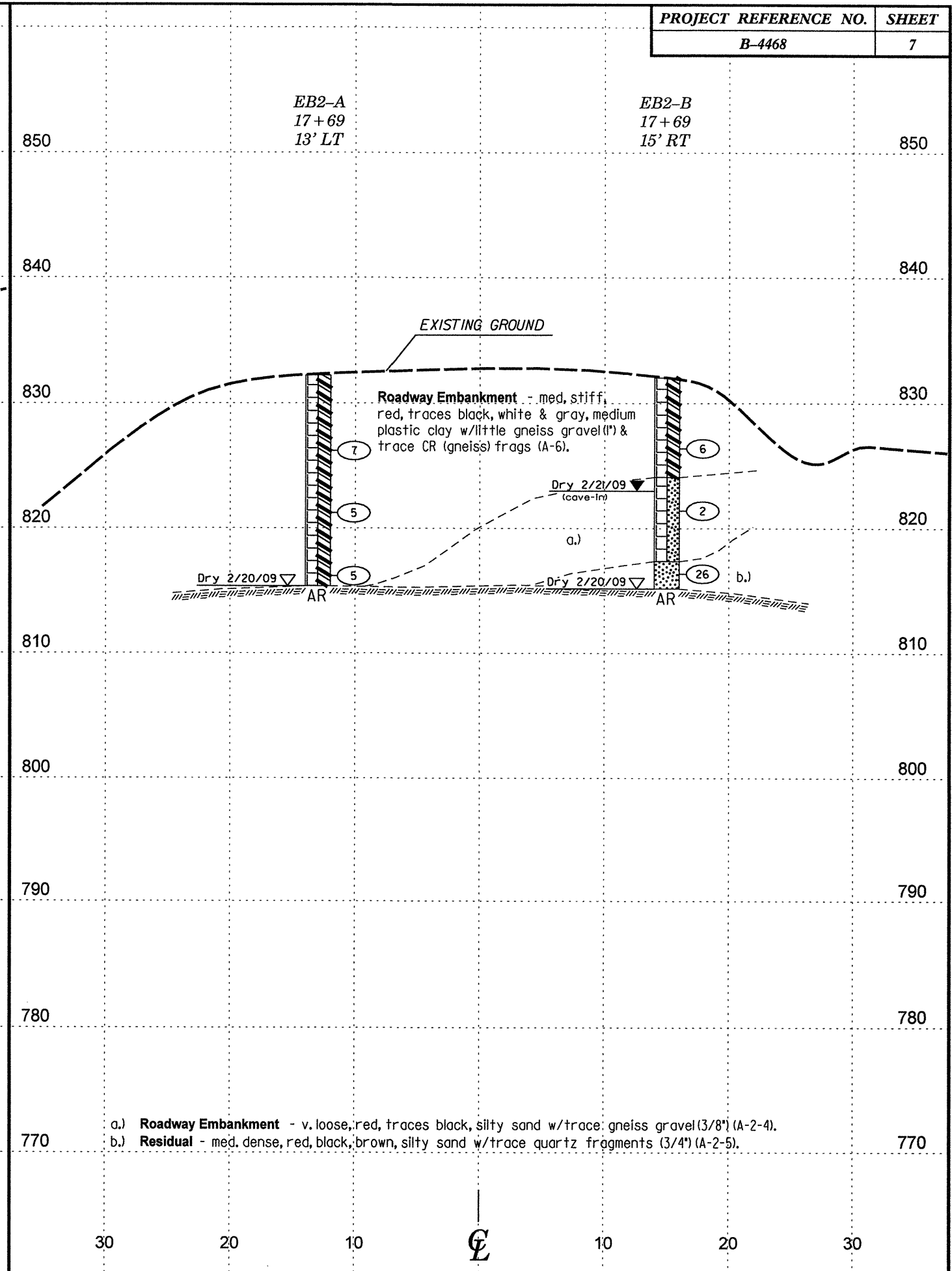
EBI CROSS SECTION



BI CROSS SECTION



HORIZ. SCALE 0 10 20 (FEET) VE = NONE



HORIZ. SCALE 0 10 20 (FEET) VE = NONE

a.) Roadway Embankment - red, sandy silt w/gravel (!), cobbles (up to 10") & asphalt & concrete slabs (up to 12").
 b.) Roadway Embankment - red silty sand w/gravel (!).
 c.) WR - mod. to sev. weathered, mod. hard to hard, v. close to close frac. spacing, black, dark gray, brown stain, Biotite Quartz Gneiss.

a.) Roadway Embankment - v. loose, red, traces black, silty sand w/trace gneiss gravel (3/8") (A-2-4).
 b.) Residual - med. dense, red, black, brown, silty sand w/trace quartz fragments (3/4") (A-2-5).



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.										
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 16+24		OFFSET 13ft LT		ALIGNMENT -L-										
COLLAR ELEV. 832.0 ft		TOTAL DEPTH 38.3 ft		NORTHING 590,775		EASTING 1,194,390										
DRILL MACHINE CME-45C		DRILL METHOD H.S. Augers w/SPT		HAMMER TYPE Automatic												
START DATE 02/20/09		COMP. DATE 02/20/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 38.3 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
835															832.0	0.0
830																
825	827.3	4.7	1	2	2									D	ROADWAY EMBANKMENT Soft to stiff, red, brown, white, micaceous clay (A-6). Cobble 7.0'-7.5'.	
820	822.3	9.7	3	5	7									M		
815	817.3	14.7	2	2	3									SS-3	ALLUVIAL Very loose to loose, brown, black, micaceous, silty sand (A-2-4).	15.2
810	812.3	19.7	1	1	2									W		
805	807.3	24.7	1	3	7									W	RESIDUAL Medium dense, white, brown, dark brown, red, white, silty, micaceous, saprolitic sand (A-2-5).	25.7
800	802.3	29.7	6	6	4									SS-5		
795	797.3	34.7	5	33	43									M	RESIDUAL Very dense, white, brown, dark brown, black, silty, micaceous, saprolitic sand (A-2-4).	33.0
790															Boring Terminated by Auger Refusal at Elevation 793.7 ft on crystalline rock (CR). Boring location offset adjustment for waterline clearance.	38.3



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET 8

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.										
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 16+25		OFFSET 14ft RT		ALIGNMENT -L-										
COLLAR ELEV. 831.8 ft		TOTAL DEPTH 42.0 ft		NORTHING 590,764		EASTING 1,194,414										
DRILL MACHINE CME-45C		DRILL METHOD H.S. Augers w/SPT		HAMMER TYPE Automatic												
START DATE 02/21/09		COMP. DATE 02/21/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 42.0 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
835															831.8	0.0
830																
825	826.8	5.0	3	4	2									D	ROADWAY EMBANKMENT Medium stiff, red, brown, traces black & white, clay (A-6).	
820	821.8	10.0	2	3	5									M		
815	816.8	15.0	2	1	2									M	ALLUVIAL Very loose, brown to dark gray, silty sand (A-2-4).	11.3
810	811.8	20.0	2	3	3									W	ALLUVIAL Loose, brown, white, red, gray, coarse grained, sub-angular, silty sand (A-2-4).	18.3
805	806.8	25.0	2	5	4									W	RESIDUAL Loose to med. dense, white, gray, dark gray, brown, silty quartz sand w/layers of biotite (A-2-4).	23.3
800	801.8	30.0	8	6	5									SS-4		
795	796.8	35.0	2	2	4									W	RESIDUAL Loose, dark gray, brown, orange, white, saprolitic, silty sand, (A-2-5).	33.3
790	791.8	40.0	5	60	30									W	RESIDUAL Very dense, dark gray, brown, orange, saprolitic, silty sand (A-2-4).	38.3
785															Boring Terminated by Auger Refusal at Elevation 789.8 ft on crystalline rock (CR). Boring location offset adjustment to clear overhead utilities.	42.0

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.									
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)								
BORING NO. B1-A		STATION 16+70		OFFSET 12ft LT		ALIGNMENT -L-									
COLLAR ELEV. 816.4 ft		TOTAL DEPTH 40.7 ft		NORTHING 590,816		EASTING 1,194,411									
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance w/SPT & Core			HAMMER TYPE Automatic										
START DATE 02/21/09		COMP. DATE 02/21/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 27.2 ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75						100
820													816.4	GROUND SURFACE	0.0
815														ALLUVIAL Loose, gray, light brown, trace black, coarse sand (A-1-b).	
810	811.4	5.0	1	2	4										
805	806.4	10.0	WOH			2	5								
800	802.6	13.8	12	16	25									RESIDUAL Loose to dense, light brown to brown, light gray, dark gray, white, micaceous, coarse sand (A-1-b).	12.7
795	797.9	18.5	5	23	13									RESIDUAL Dense, white, light brown, dark brown, black, micaceous, silty sand (A-2-4).	16.9
790	792.9	23.5	6	8	10									RESIDUAL Medium dense, dark gray, black, brown, micaceous, silty sand (A-2-5).	21.8
785	789.3	27.1	60/0.1											CRYSTALLINE ROCK Biotite quartz gneiss (CR).	27.2
780															
775															
770															
765															
760															
755															
750															
745															
740															



NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 9

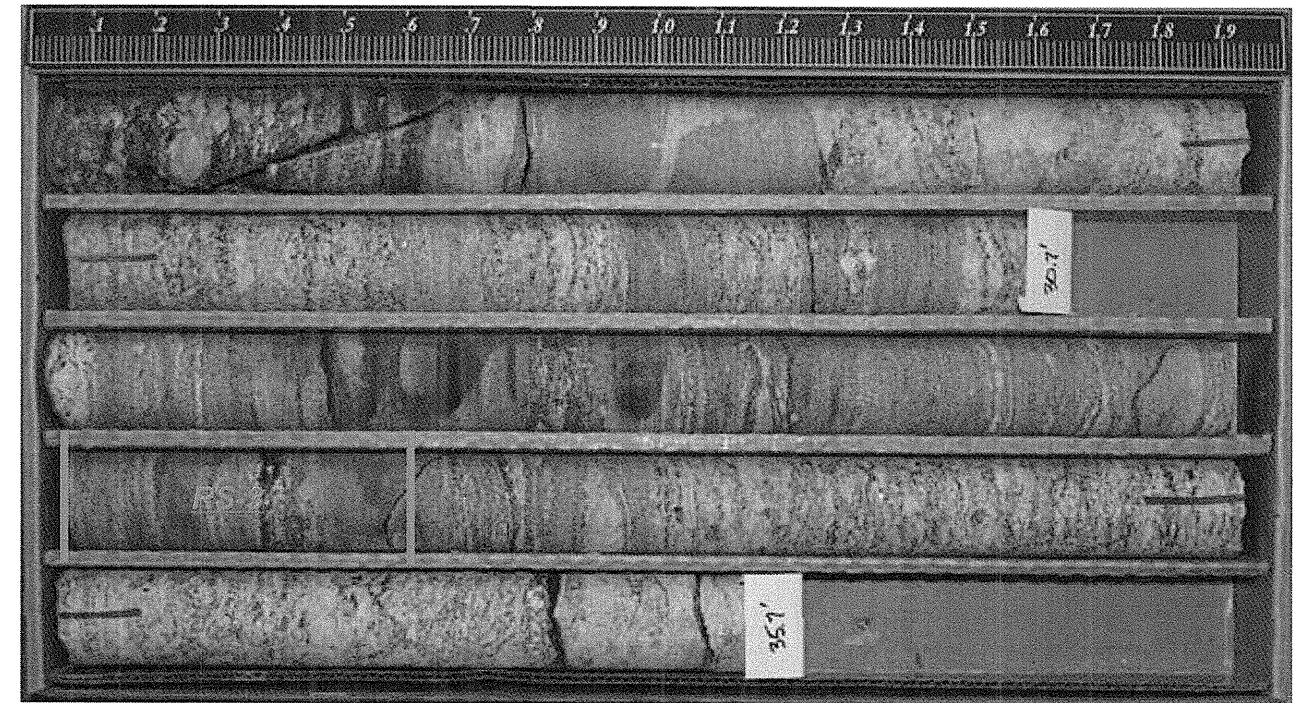
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SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)					
BORING NO. B1-A		STATION 16+70		OFFSET 12ft LT		ALIGNMENT -L-						
COLLAR ELEV. 816.4 ft		TOTAL DEPTH 40.7 ft		NORTHING 590,816		EASTING 1,194,411						
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance w/SPT & Core			HAMMER TYPE Automatic							
START DATE 02/21/09		COMP. DATE 02/21/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 27.2 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. (%)	RCD (%)		REC. (%)	RCD (%)			
789.2	789.2	27.2	3.5	1:11/0.5 2:27 2:26 1:58	(3.5) 100%	(2.7) 77%		(13.5) 100%	(11.4) 84%		Begin Coring @ 27.2 ft	27.2
785	785.7	30.7	5.0	1:48 1:53 2:02 3:22	(5.0) 100%	(4.3) 86%	RS-3				Moderately weathered to fresh, mod. hard to hard, black, dark gray, white, biotite quartz gneiss (CR), close to mod. close fracture spacing, trace garnet. 75° frac. 27.4'-27.9', 8' 10" frac., 3' 45" frac. some w/pyrite & 3' 30" frac. w/pyrite.	
780	780.7	35.7	5.0	3:04 2:56 3:25 3:56 4:22	(5.0) 100%	(4.4) 88%					Uniaxial compressive strength=509 KSF R1=4, R2=17, R3=10, R4=20, R5=4, RMR=55 Rock Type E	
775	775.7	40.7									Boring Terminated at Elevation 775.7 ft in biotite quartz gneiss (CR). Drilling fluid = water from Sandy Run Creek. Final casing depth 27.1'.	40.7
770												
765												
760												
755												
750												
745												
740												
735												
730												
725												
720												
715												
710												

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

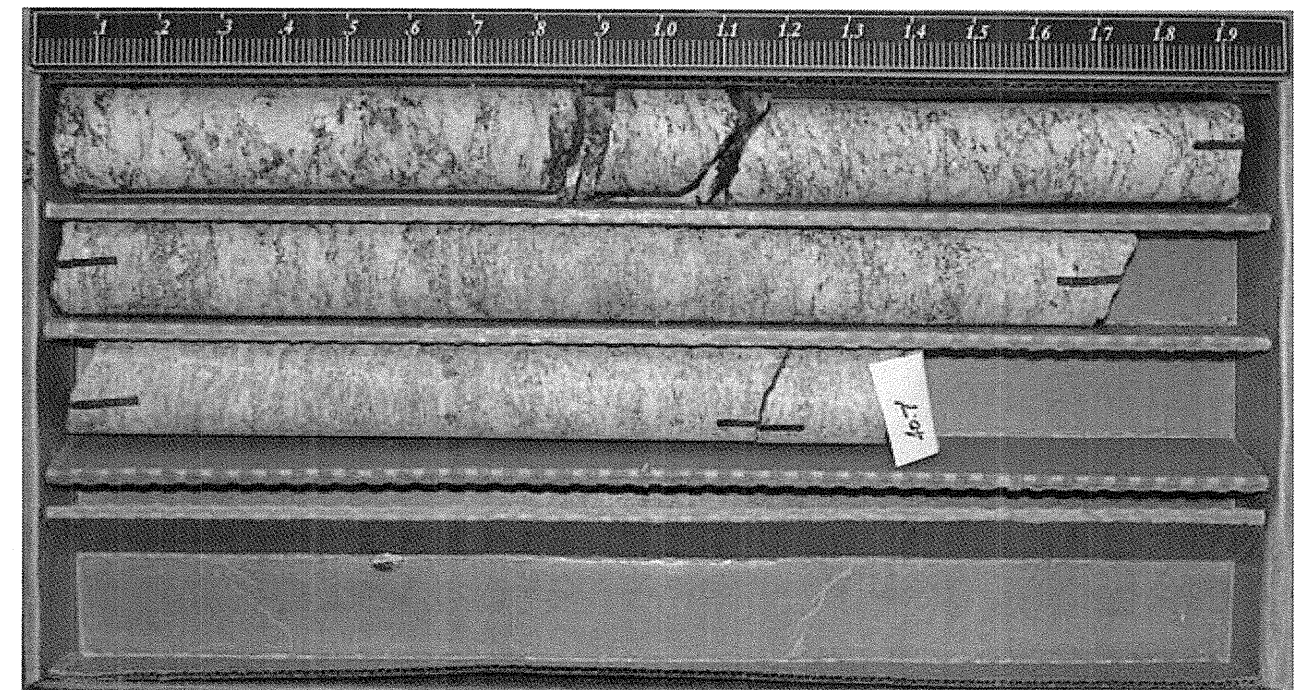
NCDOT CORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

CORE PHOTOGRAPHIC RECORD

Bridge No. 144 on State Route 1327 Over Sandy Run Creek



Boring B1-A – Station 16+70 @ 12' Lt. Box 1 of 2



Boring B1-A – Station 16+70 @ 12' Lt. Box 2 of 2



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.								
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)							
BORING NO. B1-B		STATION 16+67		OFFSET 12ft RT		ALIGNMENT -L-								
COLLAR ELEV. 814.0 ft		TOTAL DEPTH 38.7 ft		NORTHING 590,802		EASTING 1,194,431								
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance w/SPT & Core			HAMMER TYPE Automatic									
START DATE 02/22/09		COMP. DATE 02/22/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 22.9 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
815												814.0	GROUND SURFACE	0.0
													ALLUVIAL Loose, brown, gray, black, olive gray, traces red, coarse sand (A-1-b). Cobbles 6.5'-9.0'.	
810	810.0	4.0	3	2	2						W			
805	805.0	9.0									W			
800	800.0	14.0	2	2	5						W			
			95	5/0.1							W			
795	795.0	19.0												
			100/0.4											
790														
785														
780														
775														
770														
765														
760														
755														
750														
745														
740														
735														

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09



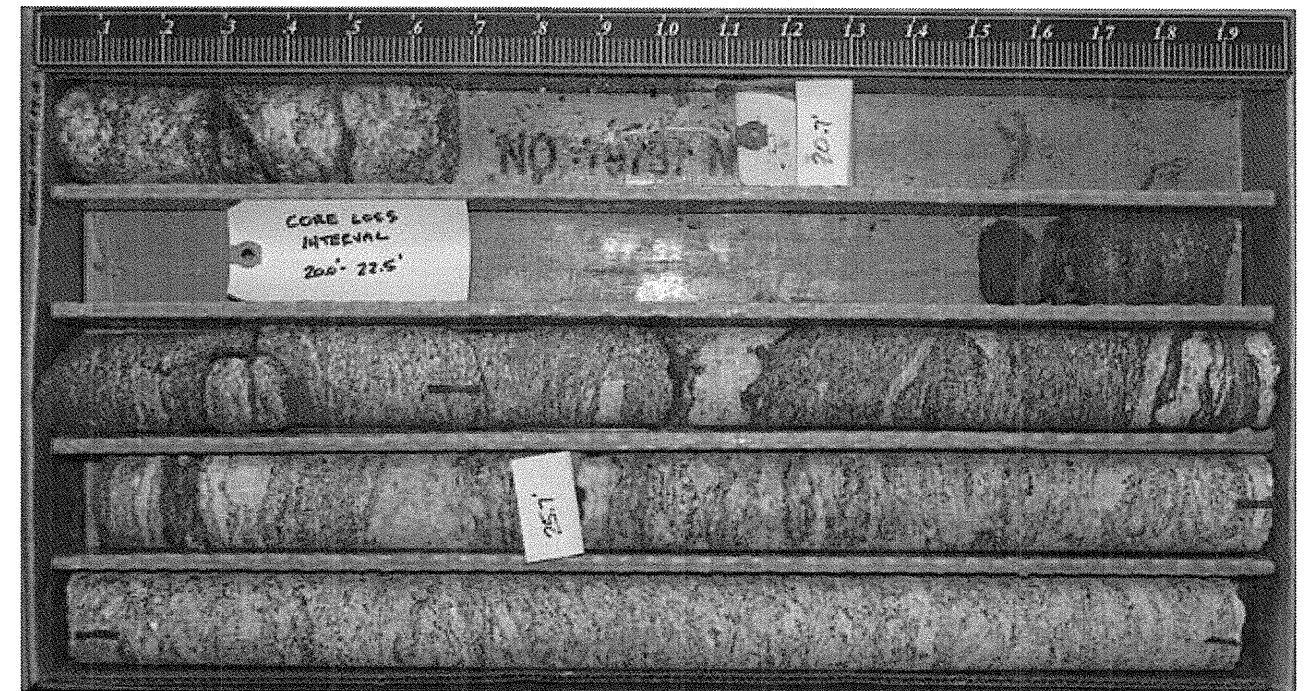
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.						
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)					
BORING NO. B1-B		STATION 16+67		OFFSET 12ft RT		ALIGNMENT -L-						
COLLAR ELEV. 814.0 ft		TOTAL DEPTH 38.7 ft		NORTHING 590,802		EASTING 1,194,431						
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance w/SPT & Core			HAMMER TYPE Automatic							
START DATE 02/22/09		COMP. DATE 02/22/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 22.9 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. (%)	ROD (%)		REC. (%)	ROD (%)			
794.6	794.6	19.4	1.3	0:32	(0.6)	(0.0)		(1.0)	N/A		Begin Coring @ 19.4 ft	
	793.3	26.7	5.0	0:11/0.3	46%	0%		29%			WEATHERED ROCK Biotite quartz gneiss (WR).	19.4
790				0:30	(3.2)	(2.6)						22.9
				0:33	64%	52%		(15.7)	(14.5)		CRYSTALLINE ROCK Fresh to slightly weathered, hard, v. close to wide fracture spacing, white, black, dark gray, biotite quartz gneiss w/trace garnet (CR). 3 30° frac. 1 w/iron oxide stain, 2 w/no fill; 18 0°-10° frac. 2 w/0.01' open, 3 w/0.01'-0.03' sev. weathered biotite fill. Uniaxial compressive strength=509 KSF R1=4, R2=20, R3=10, R4=20, R5=7, RMR=61 Rock type E	
785				1:45				99%	92%			
				1:50								
780				2:12	(5.0)	(4.6)						
				2:04	100%	92%						
775				1:48								
				2:25								
770				2:21								
				2:02	(5.0)	(4.4)						
765				1:46	100%	88%						
				2:08								
760				2:20								
				2:46								
755				3:05	(2.9)	(2.9)						
				2:15	97%	97%						
750				2:40								
745												
740												
735												

NCDOT CORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

CORE PHOTOGRAPHIC RECORD

Bridge No. 144 on State Route 1327 Over Sandy Run Creek



Boring B1-B – Station 16+67 @ 12' Rt. Box 1 of 2



Boring B1-B – Station 16+67 @ 12' Rt. Box 2 of 2

PROJECT NO. 33717.1.1	ID. B-4468	COUNTY Cleveland	GEOLOGIST Gragg, D. M.
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek			GROUND WTR (ft) 0 HR. N/A
BORING NO. B2-A	STATION 17+22	OFFSET 12ft LT	ALIGNMENT -L-
COLLAR ELEV. 814.4 ft	TOTAL DEPTH 20.8 ft	NORTHING 590,862	EASTING 1,194,434
DRILL MACHINE CME-45C	DRILL METHOD Casing Advance & Core	HAMMER TYPE N/A	
START DATE 02/22/09	COMP. DATE 02/22/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 1.4 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				
815												814.4 GROUND SURFACE 0.0	
810												813.0 ROADWAY EMBANKMENT 1.4 Red, sandy silt w/ gravel (1"); cobbles (up to 10") & asphalt & concrete slabs (up to 12").	
805												806.3 CRYSTALLINE ROCK 8.1 Biotite quartz gneiss (CR).	
800												805.0 WEATHERED ROCK 9.4 Biotite quartz gneiss (WR).	
795												805.0 CRYSTALLINE ROCK 9.4 Biotite quartz garnetiferous gneiss (CR).	
790												793.6 Boring Terminated at Elevation 793.6 ft in biotite quartz garnetiferous gneiss (CR).	20.8
785												Roadway embankment - no SPT taken, visual description; crystalline rock outcrop (gneiss) within 5.0' south & west of borehole - no joints or foliation features. Drilling fluid = Water from Sandy Run Creek. Final casing depth 1.4'.	
780													
775													
770													
765													
760													
755													
750													
745													
740													
735													

PROJECT NO. 33717.1.1	ID. B-4468	COUNTY Cleveland	GEOLOGIST Gragg, D. M.
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek			GROUND WTR (ft) 0 HR. N/A
BORING NO. B2-A	STATION 17+22	OFFSET 12ft LT	ALIGNMENT -L-
COLLAR ELEV. 814.4 ft	TOTAL DEPTH 20.8 ft	NORTHING 590,862	EASTING 1,194,434
DRILL MACHINE CME-45C	DRILL METHOD Casing Advance & Core	HAMMER TYPE N/A	
START DATE 02/22/09	COMP. DATE 02/22/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 1.4 ft

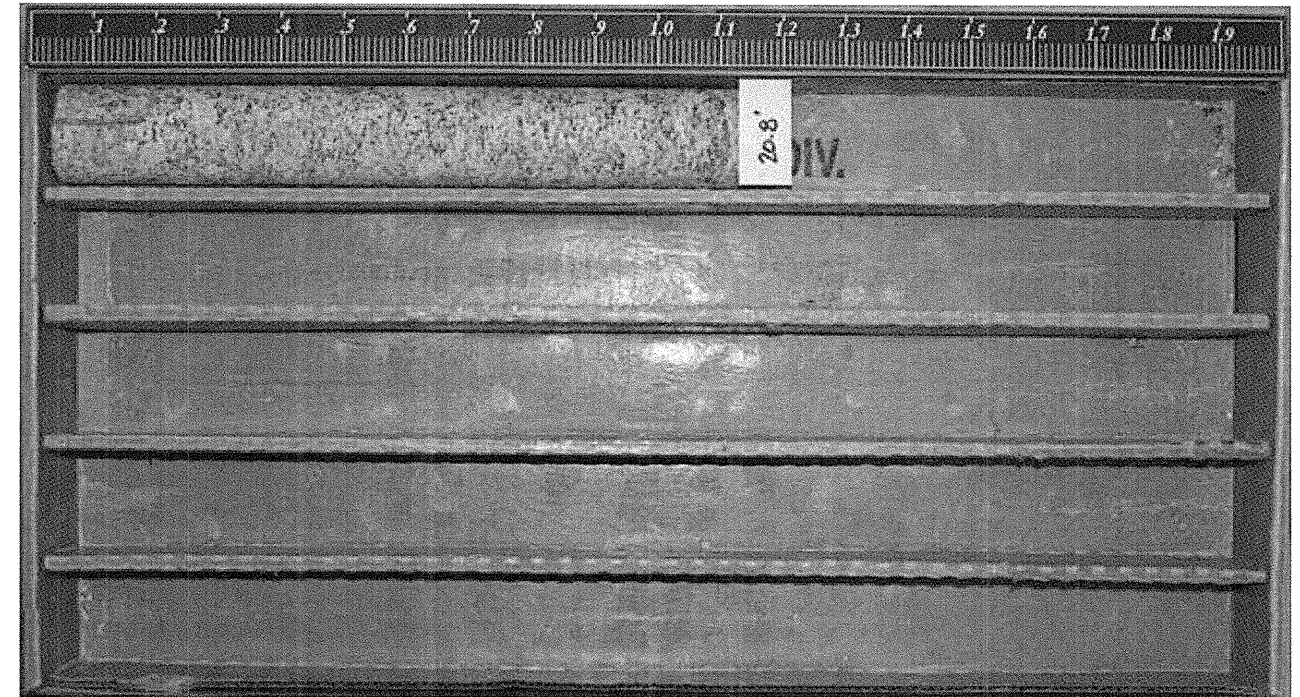
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (%)		REC. (%)	ROD (%)			
813	813.0	1.4	4.4	0:35/0.4	(4.4)	(4.3)		(6.5)	(6.0)		Begin Coring @ 1.4 ft	
810	808.6	5.8		1:51 2:01 1:47 1:59	100%	98%		97%	90%		CRYSTALLINE ROCK Fresh to slightly weathered, hard, wide frac. spacing, dark gray, black, white, biotite quartz gneiss w/trace garnet (CR). 7 0° frac., no fill, 2 w/0.01' open; 2 20° frac., no fill; 1 65° frac. w/iron stain.	1.4
805	803.6	10.8	5.0	1:35 1:18 0:54 0:37 2:01	(3.9)	(2.5)	RS-1	(0.4)	N/A		Uniaxial compressive strength=509 KSF R1=2, R2=20, R3=25, R4=6, R5=7, RMR=60 Rock type E	8.1
800	798.6	15.8	5.0	1:53 1:45 1:58 2:01 2:20	(5.0)	(5.0)	RS-2	(11.4)	97%		WEATHERED ROCK Biotite quartz gneiss (WR).	9.4
795	793.6	20.8	5.0	1:55 2:08 2:25 2:15 2:40	(5.0)	(5.0)					CRYSTALLINE ROCK Fresh, hard to v. hard, v. wide fracture spacing, light gray, dark gray, white, black, biotite quartz garnetiferous gneiss (CR). Uniaxial compressive strength=1349 KSF R1=7, R2=20, R3=30, R4=25, R5=4, RMR=86 Rock type E	20.8
790											Boring Terminated at Elevation 793.6 ft in biotite quartz garnetiferous gneiss (CR).	
785											Roadway embankment - no SPT taken, visual description; crystalline rock outcrop (gneiss) within 5.0' south & west of borehole - no joints or foliation features. Drilling fluid = Water from Sandy Run Creek. Final casing depth 1.4'.	
780												
775												
770												
765												
760												
755												
750												
745												
740												
735												

CORE PHOTOGRAPHIC RECORD

Bridge No. 144 on State Route 1327 Over Sandy Run Creek



Boring B2-A – Station 17+22 @ 12' Lt. Box 1 of 3



Boring B2-A – Station 17+22 @ 12' Lt. Box 3 of 3



Boring B2-A – Station 17+22 @ 12' Lt. Box 2 of 3



PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.							
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)						
BORING NO. B2-B		STATION 17+16		OFFSET 13ft RT		ALIGNMENT -L-							
COLLAR ELEV. 814.2 ft		TOTAL DEPTH 15.3 ft		NORTHING 590,846		EASTING 1,194,454							
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance & Core				HAMMER TYPE N/A							
START DATE 02/23/09		COMP. DATE 02/23/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 1.3 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				
815												814.2 GROUND SURFACE 0.0	
												812.9 ROADWAY EMBANKMENT 1.3	
810												CRYSTALLINE ROCK	
												Biotite quartz garnetiferous gneiss (CR).	
805													
800												798.9 15.3	
												Boring Terminated at Elevation 798.9 ft in biotite quartz garnetiferous gneiss (CR).	
795												Roadway embankment - no SPT taken, visual description; crystalline rock outcrop (gneiss) within 5.0' west of borehole - no joints or foliation features; borehole plugged immediately due to presence of livestock. Drilling fluid = Water from Sandy Run Creek. Final casing depth 1.3'.	
790													
785													
780													
775													
770													
765													
760													
755													
750													
745													
740													
735													

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09



PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.						
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)					
BORING NO. B2-B		STATION 17+16		OFFSET 13ft RT		ALIGNMENT -L-						
COLLAR ELEV. 814.2 ft		TOTAL DEPTH 15.3 ft		NORTHING 590,846		EASTING 1,194,454						
DRILL MACHINE CME-45C		DRILL METHOD Casing Advance & Core				HAMMER TYPE N/A						
START DATE 02/23/09		COMP. DATE 02/23/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 1.3 ft						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		SAMP. NO.	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (ft)	REC. (%)	ROD (ft)				
812.9	812.9	1.3	4.0	1:30 2:12 1:44 2:00	(4.0) 100%	(3.2) 80%					812.9	
810	808.9	5.3	5.0	1:45 1:50 2:16 2:22 2:19	(5.0) 100%	(4.6) 92%					Begin Coring @ 1.3 ft CRYSTALLINE ROCK Predominately fresh w/moderately weathered intervals 4.6'-5.3' & 6.3'-6.6', hard, v. close to wide fracture spacing, dark gray, black, light gray, white, biotite quartz garnetiferous gneiss. 15 0°-10° frac., no infill, 6 w/iron stain; 1 20° frac., no infill, iron stain. Uniaxial compressive strength=1349 KSF R1=7, R2=17, R3=20, R4=12, R5=4, RMR=60 Rock type E	1.3
805	803.9	10.3	5.0	2:27 2:06 2:05 2:13 2:02	(4.9) 98%	(4.9) 98%						
800	798.9	15.3									Boring Terminated at Elevation 798.9 ft in biotite quartz garnetiferous gneiss (CR).	15.3
795												
790												
785												
780												
775												
770												
765												
760												
755												
750												
745												
740												
735												

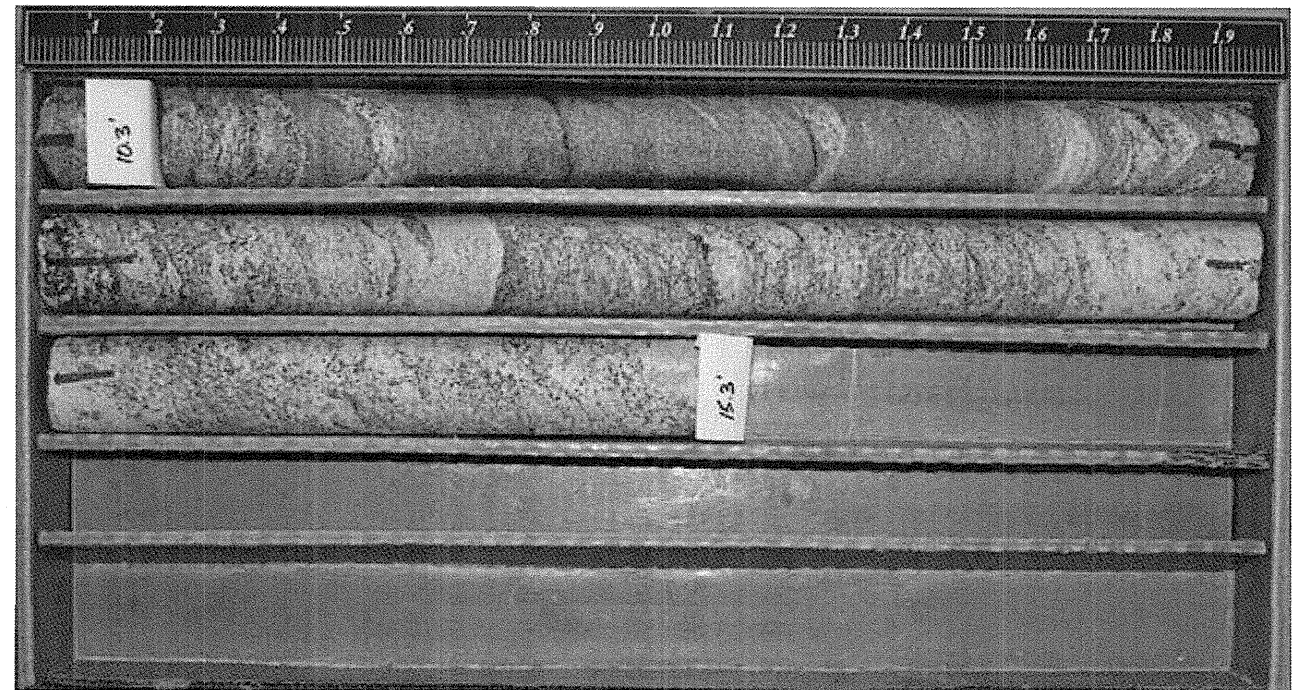
NCDOT CORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

CORE PHOTOGRAPHIC RECORD

Bridge No. 144 on State Route 1327 Over Sandy Run Creek



Boring B2 - B – Station 17+16 @ 13' Rt. Box 1 of 2



Boring B2 – B – Station 17+16 @ 13' Rt. Box 2 of 2



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.									
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 17+69		OFFSET 13ft LT		ALIGNMENT -L-									
COLLAR ELEV. 832.2 ft		TOTAL DEPTH 16.8 ft		NORTHING 590,905		EASTING 1,194,455									
DRILL MACHINE CME-45C		DRILL METHOD H.S. Augers w/SPT			HAMMER TYPE Automatic										
START DATE 02/20/09		COMP. DATE 02/20/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 16.8 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	
835													832.2	GROUND SURFACE	0.0
830														ROADWAY EMBANKMENT Medium stiff, red, trace black & white, clay w/coarse quartz sand, little gneiss gravel (1") & traces crystalline rock (gneiss) fragments (A-6).	
825	827.2	5.0	3	4	3							M			
820	822.2	10.0	3	2	3							M			
815	817.2	15.0	3	2	3							M			
810															
805															
800															
795															
790															
785															
780															
775															
770															
765															
760															
755															

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET 17

PROJECT NO. 33717.1.1		ID. B-4468		COUNTY Cleveland		GEOLOGIST Gragg, D. M.									
SITE DESCRIPTION Bridge No. 144 on SR 1327 over Sandy Run Creek							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 17+69		OFFSET 15ft RT		ALIGNMENT -L-									
COLLAR ELEV. 832.0 ft		TOTAL DEPTH 16.8 ft		NORTHING 590,892		EASTING 1,194,480									
DRILL MACHINE CME-45C		DRILL METHOD H.S. Augers w/SPT			HAMMER TYPE Automatic										
START DATE 02/20/09		COMP. DATE 02/20/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 16.8 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	
835													832.0	GROUND SURFACE	0.0
830														ROADWAY EMBANKMENT Medium stiff, red, traces black & gray, micaceous clay (A-6).	
825	827.4	4.6	2	3	3							M			
820	822.4	9.6	1	1	1							M		ROADWAY EMBANKMENT Very loose, red, trace black, silty sand, w/trace gneiss gravel (3/8") (A-2-4).	7.9
815	817.4	14.6	6	9	17							M		RESIDUAL Medium dense, red, black, brown, silty sand w/trace quartz fragments (3/4") (A-2-5). Boring Terminated by Auger Refusal at Elevation 815.2 ft on crystalline rock (CR). Boring location offset adjustment to provide adequate spacing from overhead utilities.	14.6
810															
805															
800															
795															
790															
785															
780															
775															
770															
765															
760															
755															

NCDOT BORE SINGLE B4468.GPJ NC_DOT.GDT 4/6/09

STATE PROJECT NO.: 33717.1.1
TIP NO.: B-4468
COUNTY: Cleveland
PROJECT DESC.: Bridge No. 144 on SR 1327 over Sandy Run Creek

SUMMARY OF SOIL CLASSIFICATIONS AND GRADATIONS																	
Boring No.	Sample No.	Depth Interval (ft.)	AASHTO Class.	N	Soil No.	Percent Passing No.10	Percent Passing No.40	Percent Passing No.200	Percent Retained No. 60	SOIL MORTAR				LL	PI	PL	Percent Moisture
										Coarse Sand	Fine Sand	Silt	Clay				
EB1-B	SS-1	5.0' - 6.5'	A-6 (4)	6	1	92.0	70.9	45.4	37.1	31.7	22.0	12.7	33.6	38	18	20	15.2
B1-A	SS-2	10.0' - 11.5'	A-1-b (0)	7	2	78.2	46.2	14.1	67.7	58.7	25.3	10.2	5.8	29	NP	NP	42.0
EB1-A	SS-3	14.7' - 16.2'	A-2-4 (0)	5	3	99.9	91.0	24.1	26.4	26.3	53.0	10.4	10.2	20	NP	NP	15.9
EB1-B	SS-4	25.0' - 26.5'	A-2-4 (0)	9	4	81.1	44.9	17.8	64.9	56.7	23.2	11.0	9.1	32	9	23	40.9
EB1-A	SS-5	29.7' - 31.2'	A-2-5 (0)	10	5	79.7	48.5	15.0	63.3	53.9	30.0	9.1	7.0	41	7	34	27.7
EB1-B	SS-6	40.0' - 41.5'	A-2-4 (0)	90	6	86.4	52.2	15.5	61.1	54.9	29.8	10.7	4.6	34	NP	NP	26.8



FIELD SCOUR REPORT

WBS: 33717.1.1 TIP: B-4468 COUNTY: Cleveland

DESCRIPTION(1): Bridge No. 144 on SR 1327 over Sandy Run Creek

EXISTING BRIDGE

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

Bridge No.: 144 Length: 145 Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
 Foundation Type: Wood piers in concrete footing

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: No evidence

Interior Bents: scour between concrete footing and crystalline rock, upstream side Bent 3

Channel Bed: No evidence at present

Channel Bank: Bare tree roots, boulders at surface

EXISTING SCOUR PROTECTION

Type(3): Partially collapsed rip rap on south abutment pass thru slope; dumped boulders on north abutment pass thru slope

Extent(4): Down 1/3 of slope on south abutment; nearly touching Bent 3 footer on north abutment

Effectiveness(5): Appears to be working but not complete protection

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): Samples taken for laboratory analysis; primarily coarse sand & gravel w/pods of silty sand & scattered cobbles

Channel Bank Material(8): Samples taken for laboratory analysis; fine to medium sand w/pods of sandy silt & clay, some boulders & cobbles at top of bank

Channel Bank Cover(9): Weeds, bare roots

Floodplain Width(10): 250 feet

Floodplain Cover(11): Grassland/pasture

Stream is(12): Aggrading _____ Degrading _____ Static

Channel Migration Tendency(13): North @ Bent 3

Observations and Other Comments: Cattle fence attached to Bridge Piers 2 & 3

Reported by: D. Michael Gragg Date: 2/21/2009
 Mike Gragg, L.G.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

	B1	B2								
	807.7	812.7								

Comparison of DSE to Hydraulics Unit theoretical scour:
 The DSE for bent 1 agrees with Hydraulics Unit theoretical scour. The DSE for bent 2 is higher than Hydraulics Unit theoretical scour due to crystalline rock.

DSE determined by: Cheryl A. Youngblood Date: 4/13/2009
 Cheryl A. Youngblood, L.G.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank	Bed	Bank					
Sample No.	Bag 2	Bag 1					
Retained #4	11.2	0.1					
Passed #10	79.4	99.5					
Passed #40	52.5	91.5					
Passed #200	15.7	19.7					
Coarse Sand	58.6	26.2					
Fine Sand	23.4	57.6					
Silt	12.9	9.2					
Clay	5	7					
LL	23	27					
PI	NP	NP					
AASHTO	A-2-4 (0)	A-2-4 (0)					
Station	N/A	N/A					
Offset	N/A	N/A					
Depth	N/A	N/A					