

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33510.1.1 B-4162 F.A. PROJ. BRZ-1432 (2)
 COUNTY JACKSON
 PROJECT DESCRIPTION BRIDGE NO. 320 OVER NORFOLK SOUTHERN RAILROAD ON SR 1432

SITE DESCRIPTION _____

CONTENTS

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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 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.

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.

PROJECT: 33510.1.1 ID: B-4162

PERSONNEL

M.M. HAGER

G.K. ROSE

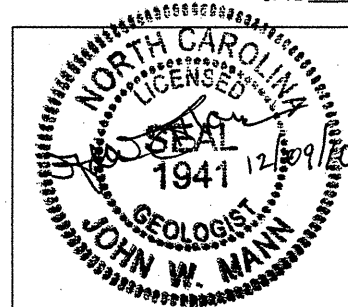
R.D. CHILDERS

INVESTIGATED BY J.W. MANN

CHECKED BY W.D. FRYE

SUBMITTED BY W.D. FRYE

DATE 120910



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 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.

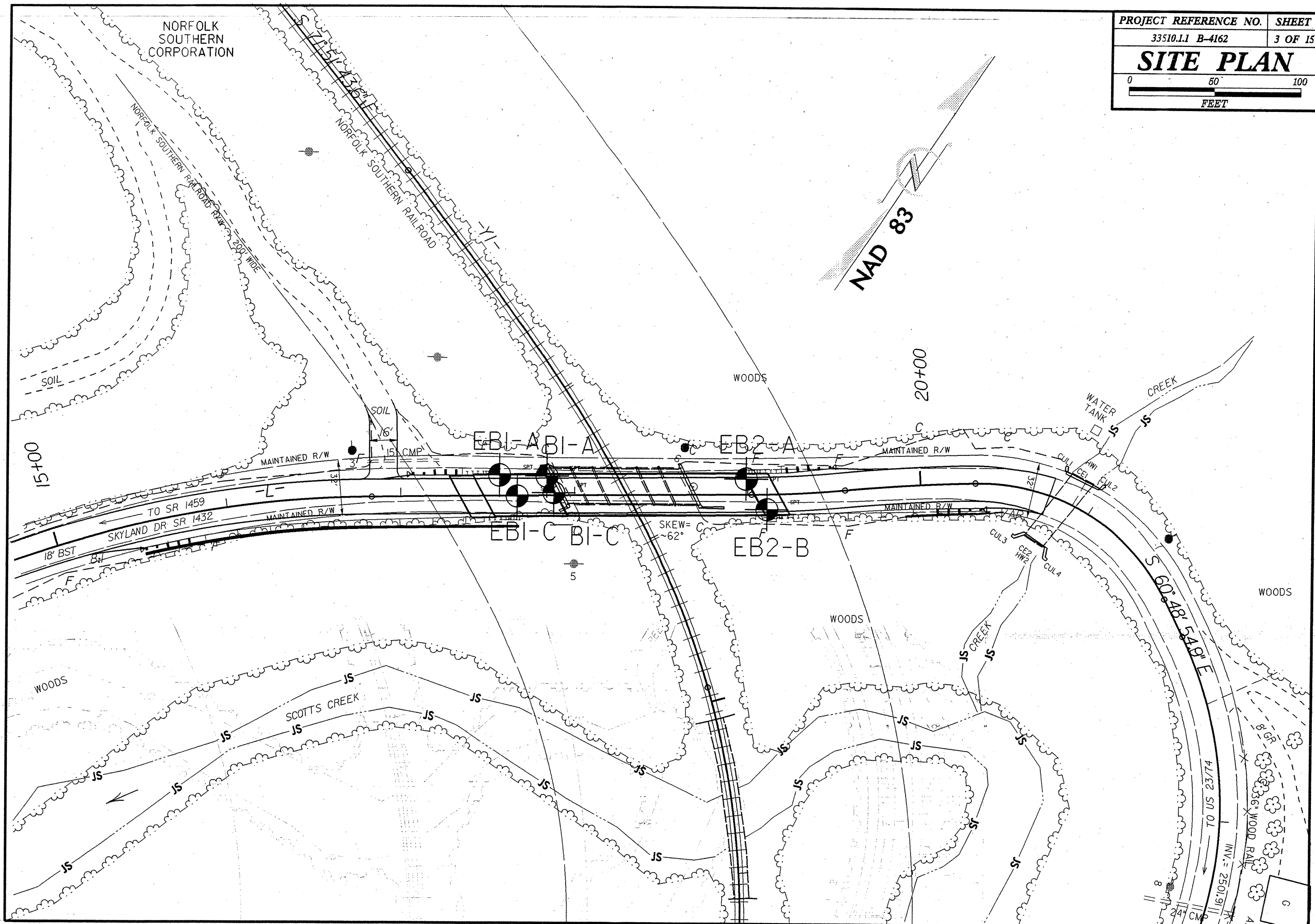
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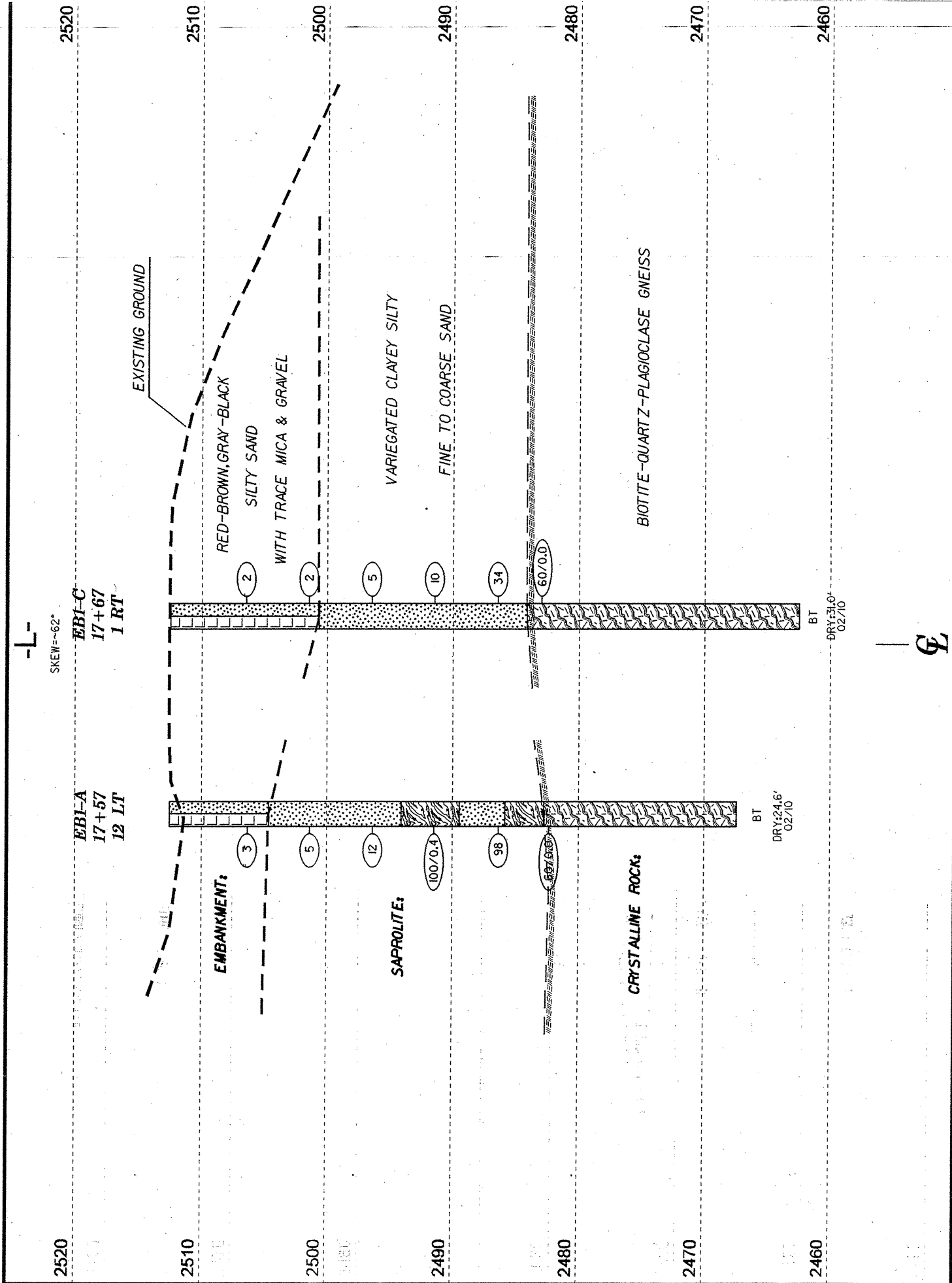
PROJECT REFERENCE NO. 33510.11 B-4162
SHEET NO. 2 OF 15

SUBSURFACE INVESTIGATION

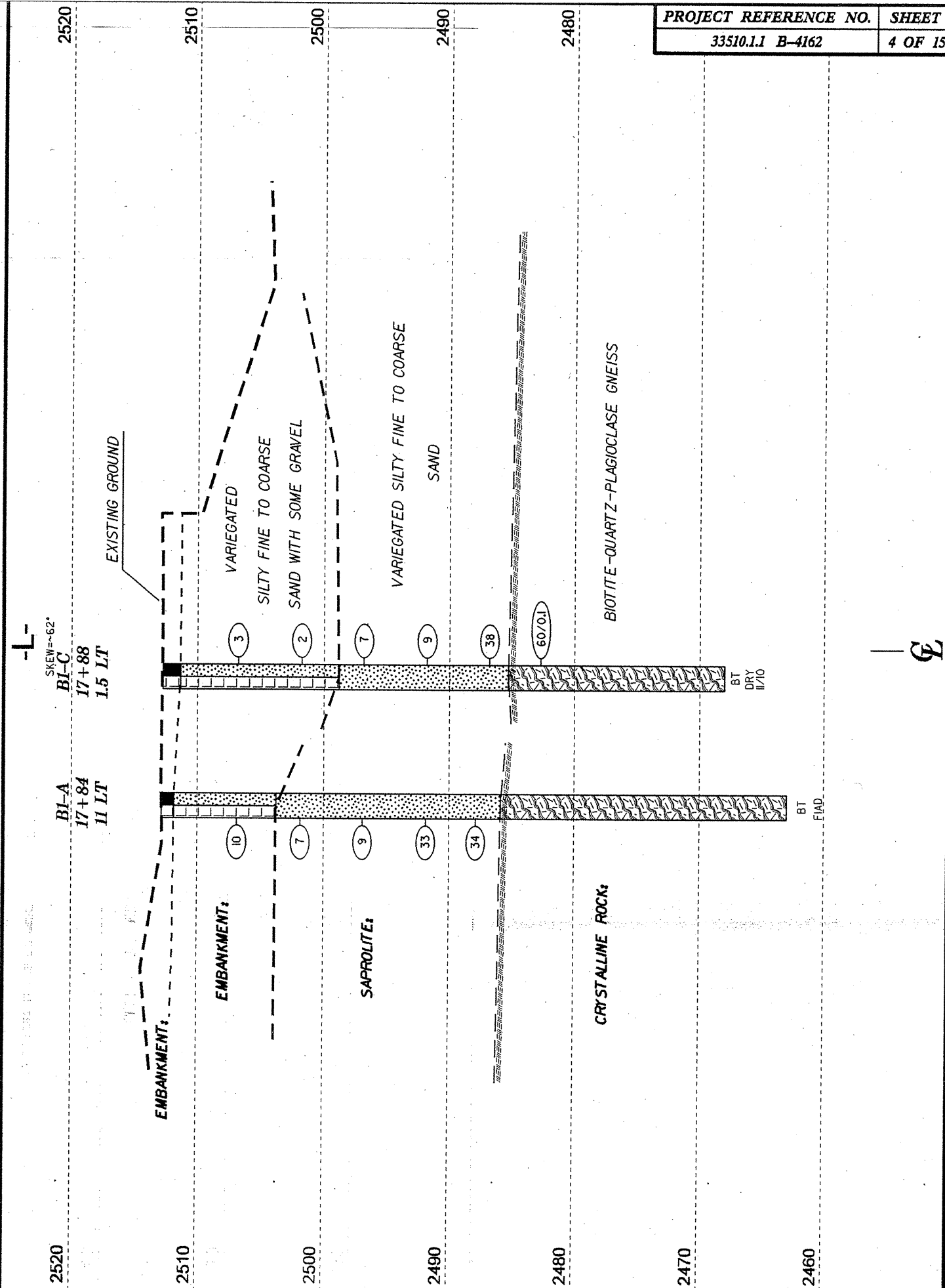
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6				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 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:				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 DISLODGED 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 (ROQ) - 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 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 0.1 FOOT PER 60 BLOWS. 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				MINERALOGICAL COMPOSITION				WEATHERING				WEATHERING			
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-3, A-4, A-5, A-6, A-7 SYMBOL % PASSING 10 40 200 LIQUID LIMIT PLASTIC INDEX GROUP INDEX LEGAL TYPES OF MAJOR MATERIALS GEN. RATING AS A SUBGRADE				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50 PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE MODERATELY ORGANIC 5 - 10% 12 - 20% SOME HIGHLY ORGANIC >10% >20% HIGHLY				WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP) FRESH VERY SLIGHT (V SL) SLIGHT (SL) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE				NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. 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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			
CONSISTENCY OR DENSENESS				MISCELLANEOUS SYMBOLS				ROCK HARDNESS				ROCK HARDNESS			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) GENERALLY SILT-CLAY MATERIAL (COHESIVE)				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD				VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT				CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. CAN BE GROOVED OR GOUGED, 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.			
TEXTURE OR GRAIN SIZE				ABBREVIATIONS				FRACTURE SPACING				BEDDING			
U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GRL.) COARSE SAND (CS.SD.) FINE SAND (F.SD.) SILT (SL.) CLAY (CL.)				AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE SAND DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA - MICA MOD. - MODERATELY NP - NON-PLASTIC ORG. - ORGANIC PNT - PRESSUREMETER TEST SAP. - SAPROLITE SD. - SAND, SANDY SIL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT				TERM SPACING VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE				TERM THICKNESS VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED			
SOIL MOISTURE - CORRELATION OF TERMS				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION				INDURATION			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION PLASTIC RANGE (PI) EQUIPMENT (WET) (WF) (SD) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OPTIMUM MOISTURE SHRINKAGE LIMIT MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				DRILL UNITS: MOBILE B, BK-51, CME-45C, CME-550, PORTABLE HOIST ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT DIFFICULT TO DRINK WITH HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, XL, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIBLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				BENCH MARK: BL-3 STA. 10+80.72 & BM-2 -L- Sta. 16+78.13 100.0' LT. BM-2: 8" Spike in base of 18" Poplar ELEVATION: * FT. NOTES: * BL-3 ELEV. 2511.58 BM-2 ELEV. 2522.16			

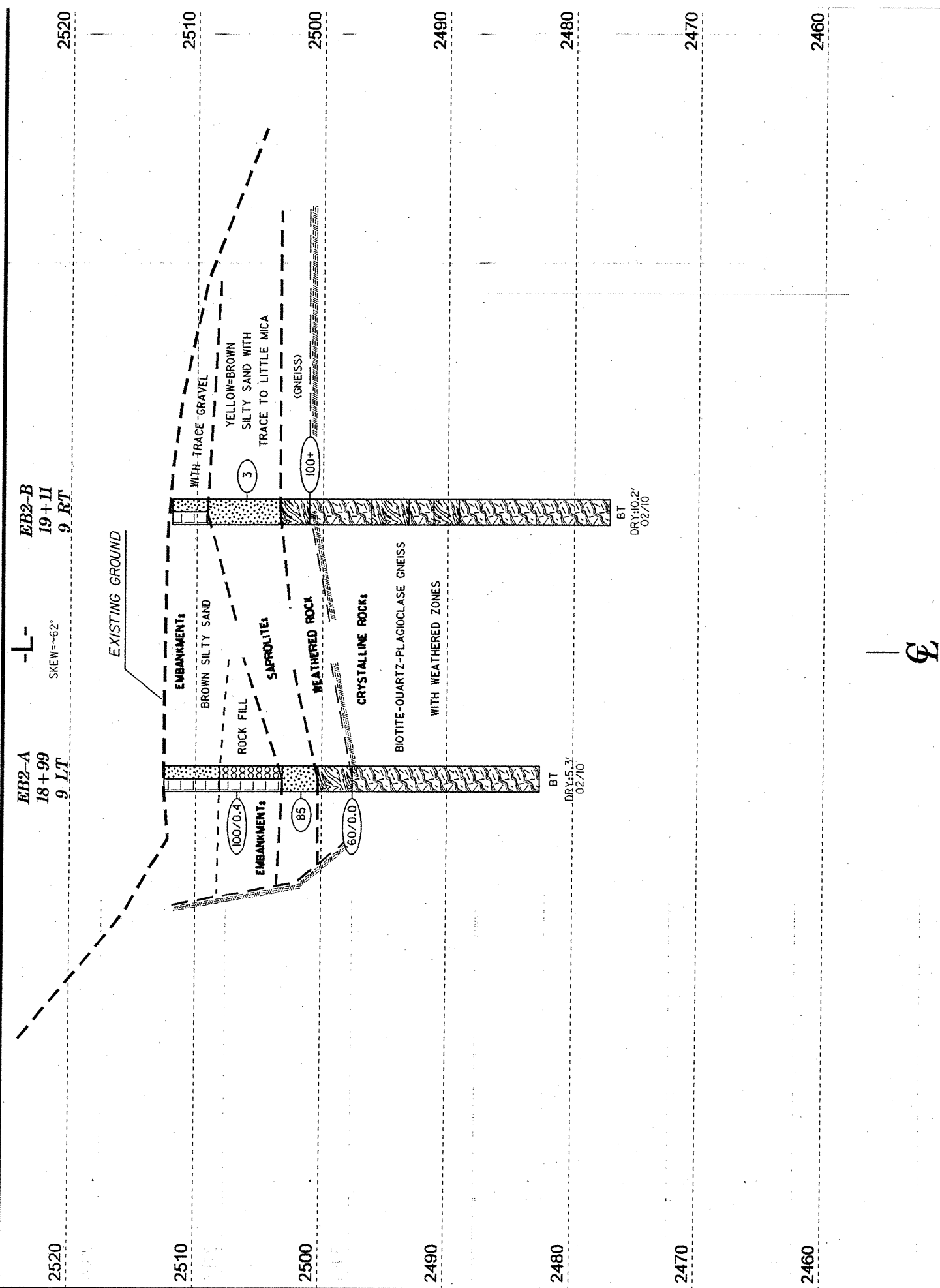




HORIZ. SCALE 0 10 20 (FEET)
 VE = 1
 SECTION THRU END BENT ONE



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



HORIZ. SCALE 0 10 20 (FEET)

VE = 1

SECTION THRU END BENT TWO

PROJECT NO. 33510.1.1		ID. B-4162		COUNTY Jackson		GEOLOGIST Hager, M. M.							
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR							GROUND WTR (ft)						
BORING NO. EB1-A		STATION 17+57		OFFSET 12 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 2,512.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 627,997		EASTING 765,854							
DRILL MACHINE CME-550X		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic								
DRILLER Rose, G. K.		START DATE 02/11/10		COMP. DATE 02/11/10		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				
2515												GROUND SURFACE	0.0
2510												ROADWAY EMBANKMENT Red-brown, gray-black silty Sand with trace mica & gravel	
2505	2,507.4	5.2	0	1	2								
2500	2,502.4	10.2	1	2	3							SAPROLITE Red-brown, black clayey silty fine-coarse Sand with trace mica & MnO	7.9
2495	2,497.4	15.2	3	4	8								
2490	2,492.4	20.2	23	77/0.4								WEATHERED ROCK (gneiss)	18.5
2485	2,487.4	25.2	13	21	77							SAPROLITE Seam of silty sand	23.1
2480	2,482.4	30.2	60/0.0									WEATHERED ROCK (gneiss)	26.7
2475												CRYSTALLINE ROCK Biotite-quartz-plagioclase Gneiss Run 1: 31.2-35.1' REC=79% RQD=74% Run 2: 35.1-40.1' REC=100% RQD=88% Run 3: 40.1-45.1' REC=100% RQD=84%	29.8
2470													
2465													
2460													
2455													
2450													
2445													
2440													
2435													

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SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR							GROUND WTR (ft)					
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COLLAR ELEV. 2,512.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 627,997		EASTING 765,854						
DRILL MACHINE CME-550X		DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic							
DRILLER Rose, G. K.		START DATE 02/11/10		COMP. DATE 02/11/10		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 (%)			
2481.35											Begin Coring @ 31.2 ft	
2480	2,481.4	31.2	3.9	1:17 1:22 2:05 1:47/0.9	(3.1) 79%	(2.9) 74%					CRYSTALLINE ROCK	
2475	2,477.5	35.1	5.0	1:05 1:39 1:39 1:30 1:15	(5.0) 100%	(4.4) 88%	RS-3				White-gray to dark gray biotite-quartz-plagioclase Gneiss. Rock is hard & slightly weathered to fresh with a severely weathered unrecovered zone from 31.2-33.2'. Fracture spacing is typically close to moderately close with two small (<0.3') very close fracture areas below 40'. (continued)	
2470	2,472.5	40.1	5.0	1:06 1:28 1:19 1:30 1:24	(5.0) 100%	(4.2) 84%	RS-4					
2465	2,467.5	45.1									Boring Terminated at Elevation 2,467.5 ft Crystalline Rock: Gneiss	45.1
2460												
2455												
2450												
2445												
2440												
2435												
2430												
2425												
2420												
2415												
2410												
2405												

NCDOT BORE SINGLE B4162 GEO_BH_050.GPJ NC_DOT.GDT 3/25/10

NCDOT CORE SINGLE B4162 GEO_BH_050.GPJ NC_DOT.GDT 3/25/10

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. EB1-C	STATION 17+67	OFFSET 1 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,512.5 ft	TOTAL DEPTH 49.9 ft	NORTHING 627,993	EASTING 765,869
DRILL MACHINE CME-550X		DRILL METHOD NW Casing W/SPT & Core	
DRILLER Rose, G. K.		START DATE 02/08/10	
COMP. DATE 02/08/10		SURFACE WATER DEPTH N/A	

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
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COLLAR ELEV. 2,512.5 ft	TOTAL DEPTH 49.9 ft	NORTHING 627,993	EASTING 765,869
DRILL MACHINE CME-550X		DRILL METHOD NW Casing W/SPT & Core	
DRILLER Rose, G. K.		START DATE 02/08/10	
COMP. DATE 02/08/10		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					
2515														2,512.5	0.0
GROUND SURFACE															
ROADWAY EMBANKMENT															
Red-brown to brown silty Sand with trace gravel															
2510															
2505	2,507.5	5.0	0	0	2										
2500	2,502.5	10.0	0	1	1										
2495	2,497.5	15.0	1	2	3										
2490	2,492.5	20.0	3	6	4										
2485	2,487.5	25.0	6	14	20										
2480	2,483.0	29.5	60/0.0												
SAPROLITE															
Yellow-brown-gray silty fine to coarse Sand															
2475															
2470															
2465															
2460															
2455															
2450															
2445															
2440															
2435															
2430															
2425															
2420															
2415															
2410															
2405															
CRYSTALLINE ROCK															
Biotite-quartz-plagioclase Gneiss															
Run 1: 31.0-34.9' REC=100% RQD=100%															
Run 2: 34.9-39.9' REC=100% RQD=100%															
Run 3: 39.9-44.9' REC=98% RQD=98%															
Run 4: 44.9-49.9' REC=100% RQD=100%															
Boring Terminated at Elevation 2,462.6 ft Crystalline Rock: Gneiss															

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 (%)			
2481.47											Begin Coring @ 31.0 ft	
2480	2,481.5	31.0	3.9	1:29	(3.9)	(3.9)					CRYSTALLINE ROCK White-gray, fresh, hard biotite-quartz-plagioclase Gneiss. Fracture spacing is wide (continued)	
	2,477.6	34.9		1:45	100%	100%				RS-7		
2475			5.0	2:00	(5.0)	(5.0)						
	2,472.6	39.9		1:27/0.9	100%	100%				RS-8		
2470			5.0	2:07	(4.9)	(4.9)						
	2,467.6	44.9		2:01	98%	98%						
2465			5.0	2:05	(5.0)	(5.0)						
	2,462.6	49.9		2:13	100%	100%						
2460				2:11							Boring Terminated at Elevation 2,462.6 ft Crystalline Rock: Gneiss	
2455				2:03								
2450				2:12								
2445				2:20								
2440				1:14								
2435				1:29								
2430				1:15								
2425				1:18								
2420				1:20								
2415												
2410												
2405												

NCDOT BORE SINGLE B4162 GEO BH_050.GPJ NC_DOT.GDT 3/25/10

NCDOT CORE SINGLE B4162 GEO BH_050.GPJ NC_DOT.GDT 3/25/10

WBS 33510.1.1	TIP B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+84	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,512.9 ft	TOTAL DEPTH 49.9 ft	NORTHING 628,012	EASTING 765,877
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Rose, G. K.	START DATE 11/18/10	COMP. DATE 11/18/10	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				
2515													GROUND SURFACE	0.0
													ROADWAY EMBANKMENT	1.0
2510													Aggregate Base Course	
	2,507.9	5.0											ROADWAY EMBANKMENT	
													Tan-brown-orange silty fine to coarse Sand with some Gravel	
2505			6	5	5									
	2,502.9	10.0											SAPROLITE	9.1
													Orange-brown-gray silty fine to coarse Sand	
2500			3	3	4									
	2,497.9	15.0												
2495			2	4	5									
	2,492.9	20.0												
2490			5	12	21									
	2,487.9	25.0												
2485			16	19	15									
2480														
2475														
2470														
2465														
2460														
2455														
2450														
2445														
2440														
2435														

WBS 33510.1.1	TIP B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+84	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,512.9 ft	TOTAL DEPTH 49.9 ft	NORTHING 628,012	EASTING 765,877
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Rose, G. K.	START DATE 11/18/10	COMP. DATE 11/18/10	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 (%)			
2485.37											Begin Coring @ 27.5 ft	
	2,485.4	27.5	2.4	7:53	(2.4)	(2.2)					CRYSTALLINE ROCK White-dark gray biotite-quartz-plagioclase Gneiss. Rock is slightly weathered to fresh, hard, and well-foliated. Fracture spacing is close to moderately close. Joint angles range from horizontal to 70°. (continued)	
	2,483.0	29.9	5.0	10:09	100%	92%						
2480				2:42/0.4	(4.8)	(3.6)						
	2,478.0	34.9		1:11								
				1:17								
2475				1:00								
	2,473.0	39.9	5.0	1:33	(4.8)	(4.4)						
				1:37	96%	88%						
	2,470.0			1:58								
				1:53								
2470				2:05								
	2,468.0	44.9	5.0	1:50	(5.0)	(3.9)						
				2:00	100%	78%						
	2,465.0			1:59								
				2:10								
2465				2:17								
	2,463.0	49.9	5.0	1:59	(4.8)	(4.5)						
				1:45	96%	90%						
				2:01								
				2:08								
2460											Boring Terminated at Elevation 2,463.0 ft Crystalline Rock: Gneiss	49.9
2455												
2450												
2445												
2440												
2435												

NCDOT BORE SINGLE B4162 GEO BH 050 REV.GPJ NC DOT.GDT 12/7/10

NCDOT CORE SINGLE B4162 GEO BH 050 REV.GPJ NC DOT.GDT 12/7/10

WBS 33510.1.1		TIP B-4162		COUNTY Jackson		GEOLOGIST Hager, M. M.										
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR							GROUND WTR (ft)									
BORING NO. B1-C		STATION 17+88		OFFSET 2 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,512.8 ft		TOTAL DEPTH 44.8 ft		NORTHING 628,006		EASTING 765,886										
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Rose, G. K.		START DATE 11/17/10		COMP. DATE 11/17/10		SURFACE WATER DEPTH N/A										
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						
2515															2,512.8	0.0
															2,511.4	1.4
2510																
	2,507.8	5.0														
2505			1	1	2											
	2,502.8	10.0														
2500			2	1	1											
	2,497.8	15.0														
2495			2	3	4											
	2,492.8	20.0														
2490			3	4	5											
	2,487.8	25.0														
2485			14	13	25											
	2,482.8	30.0														
2480		60/0.1														
2475																
2470																
2465																
2460																
2455																
2450																
2445																
2440																
2435																

WBS 33510.1.1		TIP B-4162		COUNTY Jackson		GEOLOGIST Hager, M. M.						
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR							GROUND WTR (ft)					
BORING NO. B1-C		STATION 17+88		OFFSET 2 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 2,512.8 ft		TOTAL DEPTH 44.8 ft		NORTHING 628,006		EASTING 765,886						
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Rose, G. K.		START DATE 11/17/10		COMP. DATE 11/17/10		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2481.79												
2480	2,481.8	31.0	3.8	2:56 5:42 3:45	(3.7) 97%	(2.7) 71%						
	2,478.0	34.8	5.0	4:23/0.8	(5.0) 100%	(5.0) 100%						
2475				4:35 3:44 4:48 5:11 6:14								
	2,473.0	39.8	5.0	7:14 7:11 7:13 7:01	(5.0) 100%	(5.0) 100%						
2470												
	2,468.0	44.8										44.8
2465												
2460												
2455												
2450												
2445												
2440												
2435												
2430												
2425												
2420												
2415												
2410												
2405												

NCDOT BORE SINGLE B4162_GEO_BH_050_REV.GPJ NC DOT.GDT 12/7/10

NCDOT CORE SINGLE B4162_GEO_BH_050_REV.GPJ NC DOT.GDT 12/9/10

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. EB2-A	STATION 18+99	OFFSET 9 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,512.6 ft	TOTAL DEPTH 29.9 ft	NORTHING 628,076	EASTING 765,973
DRILL MACHINE CME-550X	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Rose, G. K.	START DATE 02/11/10	COMP. DATE 02/11/10	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						
2515														2,512.6	GROUND SURFACE	0.0
2510														2,508.1	ROADWAY EMBANKMENT Brown silty Sand	4.5
2505	2,507.6	5.0	22	78/0.4										2,503.1	ROADWAY EMBANKMENT Rock Fill	9.5
2500	2,502.6	10.0	21	27	58									2,500.3	SAPROLITE Yellow-brown silty Sand with little mica	12.3
2495	2,497.6	15.0	60/0.0											2,497.6	WEATHERED ROCK (gneiss)	15.0
2490															CRYSTALLINE ROCK Biotite-quartz-plagioclase Gneiss Run 1: 16.0-19.9' REC=100% RQD=100% Run 2: 19.9-24.9' REC=100% RQD=100% Run 3: 24.9-29.9' REC=98% RQD=88%	
2485																
2480														2,482.7	Boring Terminated at Elevation 2,482.7 ft Crystalline Rock: Gneiss	29.9

NCDOT BORE SINGLE B4162 GEO BH 050.GPJ NC_DOT.GDT 3/25/10

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. EB2-A	STATION 18+99	OFFSET 9 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,512.6 ft	TOTAL DEPTH 29.9 ft	NORTHING 628,076	EASTING 765,973
DRILL MACHINE CME-550X	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Rose, G. K.	START DATE 02/11/10	COMP. DATE 02/11/10	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 (%)			
2496.58											Begin Coring @ 16.0 ft	
2495	2,496.6	16.0	3.9	1:45	(3.9)	(3.9)					CRYSTALLINE ROCK	
	2,492.7	19.9		1:46	100%	100%					White-gray to dark gray biotite-quartz-plagioclase Gneiss. Rock is slightly weathered to fresh, well foliated, & hard. Fracture spacing is close to moderately close. Some joints are horizontal, others are along foliation @ 50-65°. (continued)	
2490			5.0	1:54			RS-1					
				1:05/0.9								
2485			5.0	1:29	(5.0)	(5.0)						
				1:31	100%	100%						
				1:27			RS-2					
				1:21								
				1:34								
2480			5.0	1:23	(4.9)	(4.4)						
				1:24	98%	88%						
				1:21								
				1:22								
				1:18								
2475												
2470												
2465												
2460												
2455												
2450												
2445												
2440												
2435												

NCDOT CORE SINGLE B4162 GEO BH 050.GPJ NC_DOT.GDT 3/25/10

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. EB2-B	STATION 19+11	OFFSET 9 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,512.0 ft	TOTAL DEPTH 34.8 ft	NORTHING 628,068	EASTING 765,993
DRILL MACHINE CME-550X	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Rose, G. K.	START DATE 02/04/10	COMP. DATE 02/04/10	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					
2515															
													2,512.0	GROUND SURFACE	0.0
2510													2,509.2	ROADWAY EMBANKMENT Brown silty Sand with trace gravel from 2.6-2.8'	2.8
	2,507.1	4.9											2,503.4	SAPROLITE Yellow-brown silty Sand with trace mica	8.6
2505			0	1	2								2,501.1	WEATHERED ROCK (gneiss)	10.9
	2,502.1	9.9											2,496.2	CRYSTALLINE ROCK Biotite-quartz-plagioclase Gneiss	15.8
2500			54	31	60/0.1								2,493.2	WEATHERED ROCK Unrecovered severely weathered rock zone (gneiss)	18.8
2495													2,491.2	CRYSTALLINE ROCK Biotite-quartz-plagioclase Gneiss	20.8
2490													2,489.2	WEATHERED ROCK Unrecovered severely weathered rock zone (gneiss)	22.8
2485													2,477.2	CRYSTALLINE ROCK Biotite-quartz-plagioclase Gneiss Recovered rock is moderately severely weathered to fresh and typically hard with some soft zones. Fracture spacing is generally close to moderately close. Most fractures are along foliation @ ~40° with some horizontal & high angle discontinuities.	34.8
2480															
2475															Boring Terminated at Elevation 2,477.2 ft Crystalline Rock: Gneiss
2470															
2465															
2460															
2455															
2450															
2445															
2440															
2435															

PROJECT NO. 33510.1.1	ID. B-4162	COUNTY Jackson	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 320 on SR 1432 over Norfolk Southern RR			GROUND WTR (ft)
BORING NO. EB2-B	STATION 19+11	OFFSET 9 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,512.0 ft	TOTAL DEPTH 34.8 ft	NORTHING 628,068	EASTING 765,993
DRILL MACHINE CME-550X	DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Rose, G. K.	START DATE 02/04/10	COMP. DATE 02/04/10	SURFACE WATER DEPTH N/A

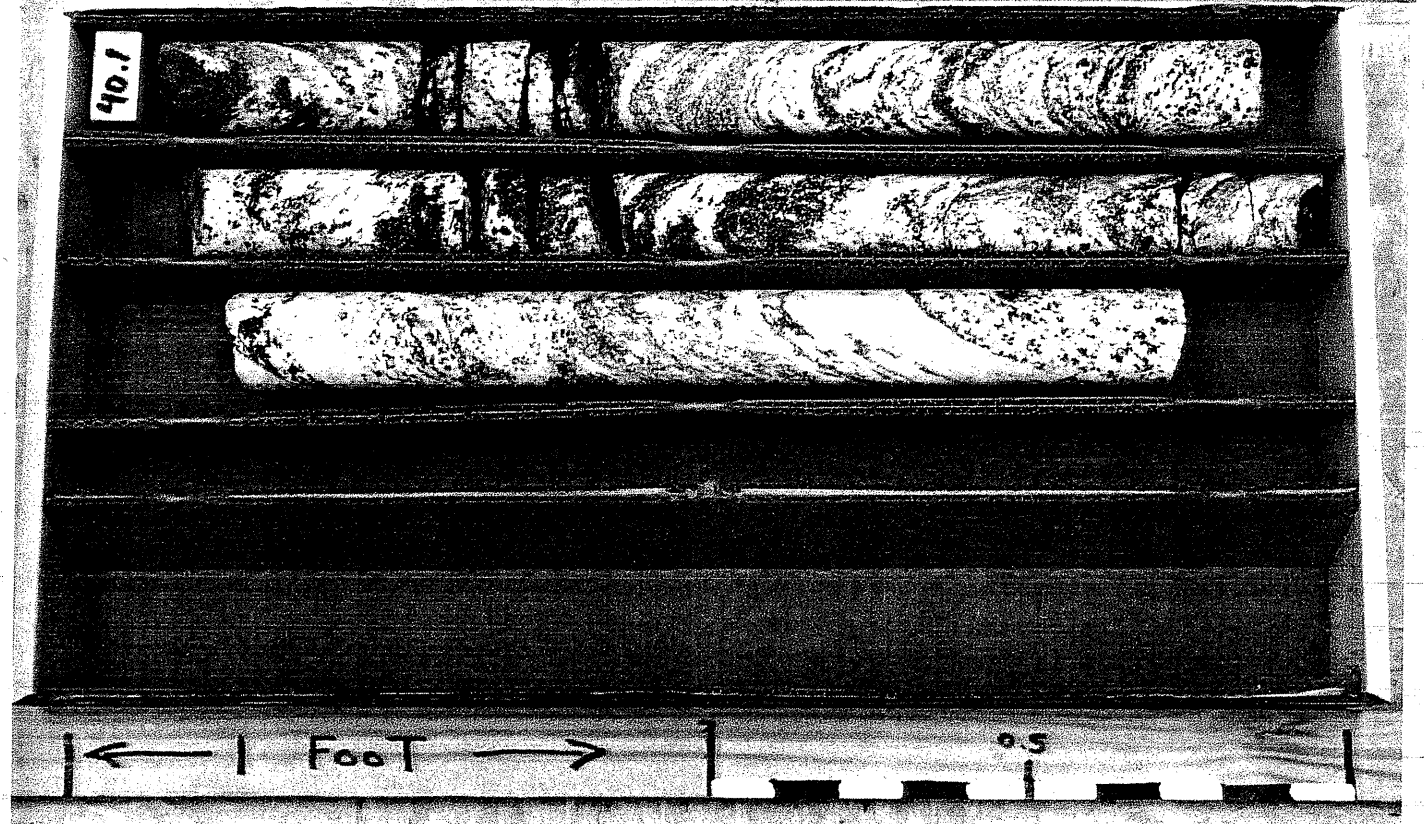
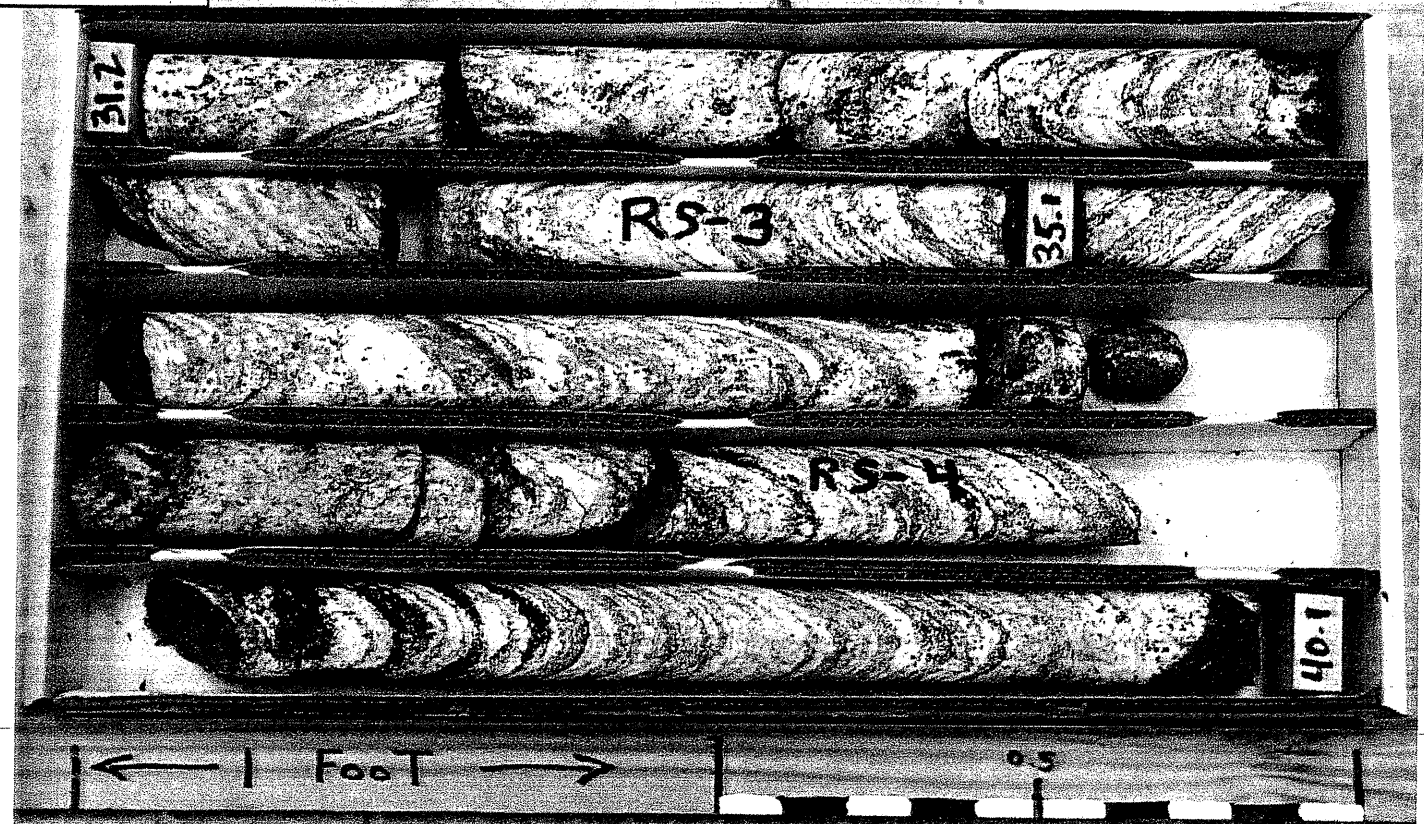
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2500.85												
2500	2,500.9	11.1	3.7	1:59	(3.4)	(2.4)						
				2:05	92%	65%						
	2,497.2	14.8		1:31			RS-5					
			5.0	1:00/0.7								
2495				2:07	(1.5)	(0.0)					2,496.2	15.8
				0:20	30%	0%						
				0:51							2,493.2	18.8
	2,492.2	19.8		0:55								
				1:05								
2490			5.0	1:28	(1.1)	(0.6)					2,491.2	20.8
				0:54	22%	12%						
				1:14							2,489.2	22.8
				1:35								
	2,487.2	24.8		0:25								
2485			5.0	1:12	(4.6)	(3.8)	RS-6					
				1:41	92%	76%						
				1:27								
	2,482.2	29.8		1:33								
			5.0	1:13								
2480				1:27	(4.9)	(4.6)						
				1:30	98%	92%						
				1:10								
	2,477.2	34.8		1:27								
				1:23								
2475												
2470												
2465												
2460												
2455												
2450												
2445												
2440												
2435												

NCDOT BORE SINGLE B4162_GEO_BH_050.GPJ NC_DOT.GDT 3/25/10

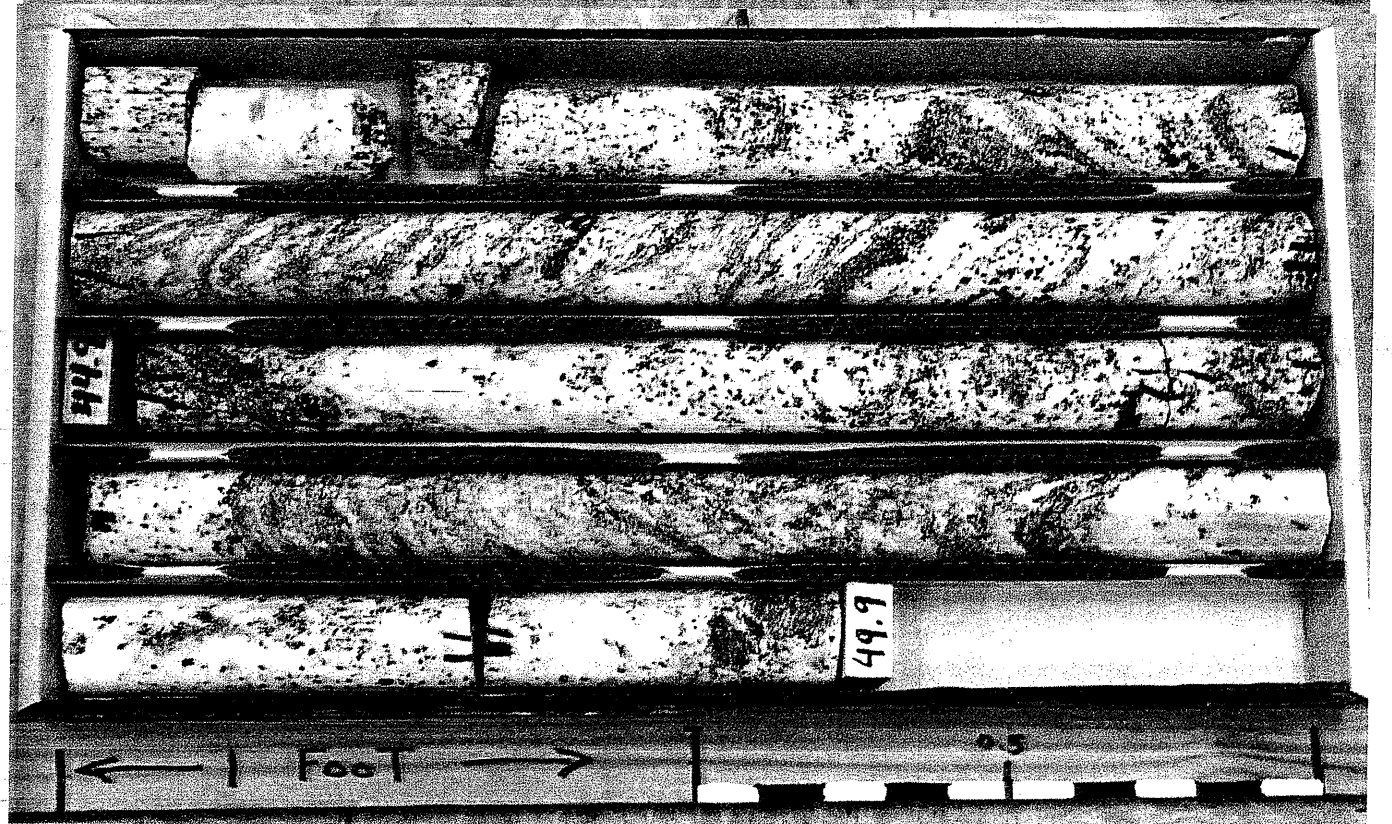
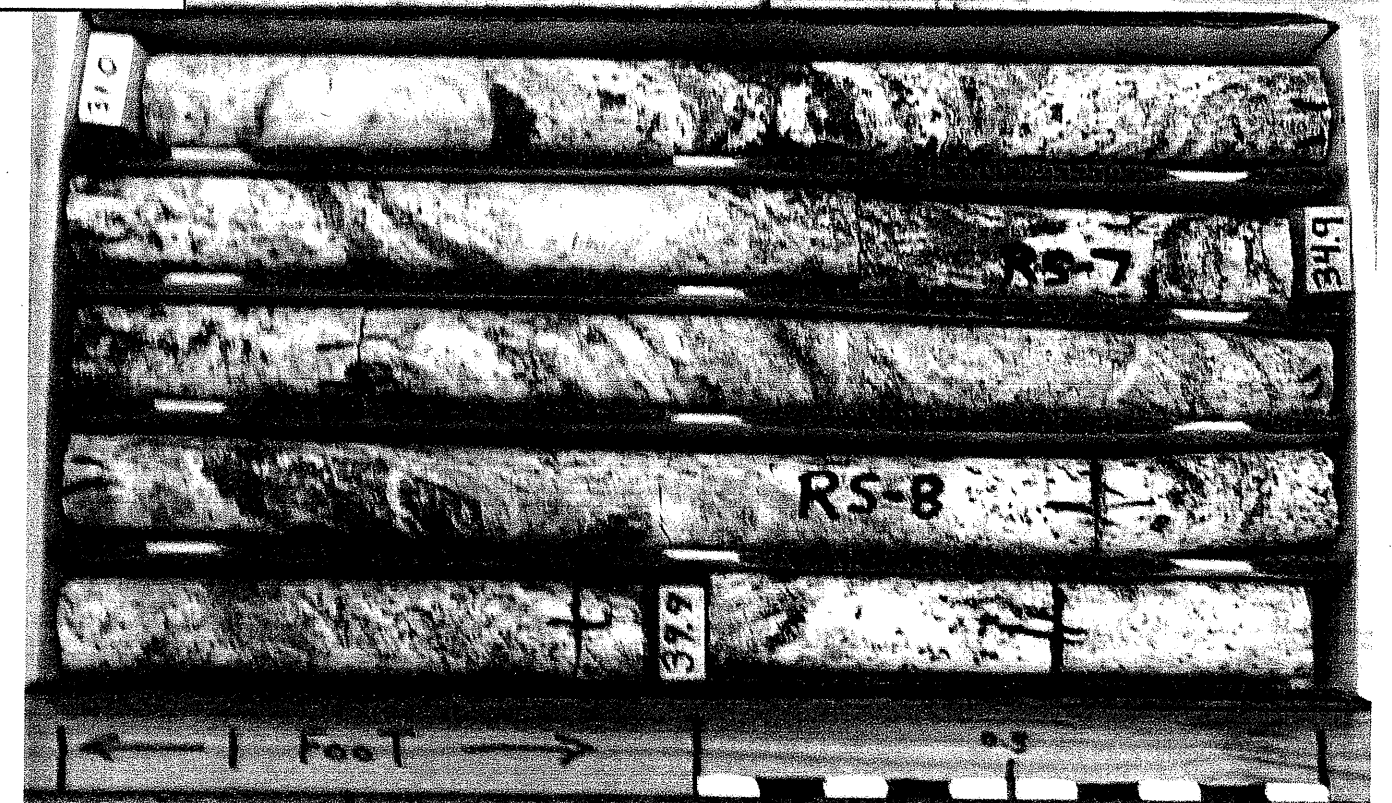
NCDOT BORE SINGLE B4162_GEO_BH_050.GPJ NC_DOT.GDT 3/25/10

CORE PHOTOS

EB1-A



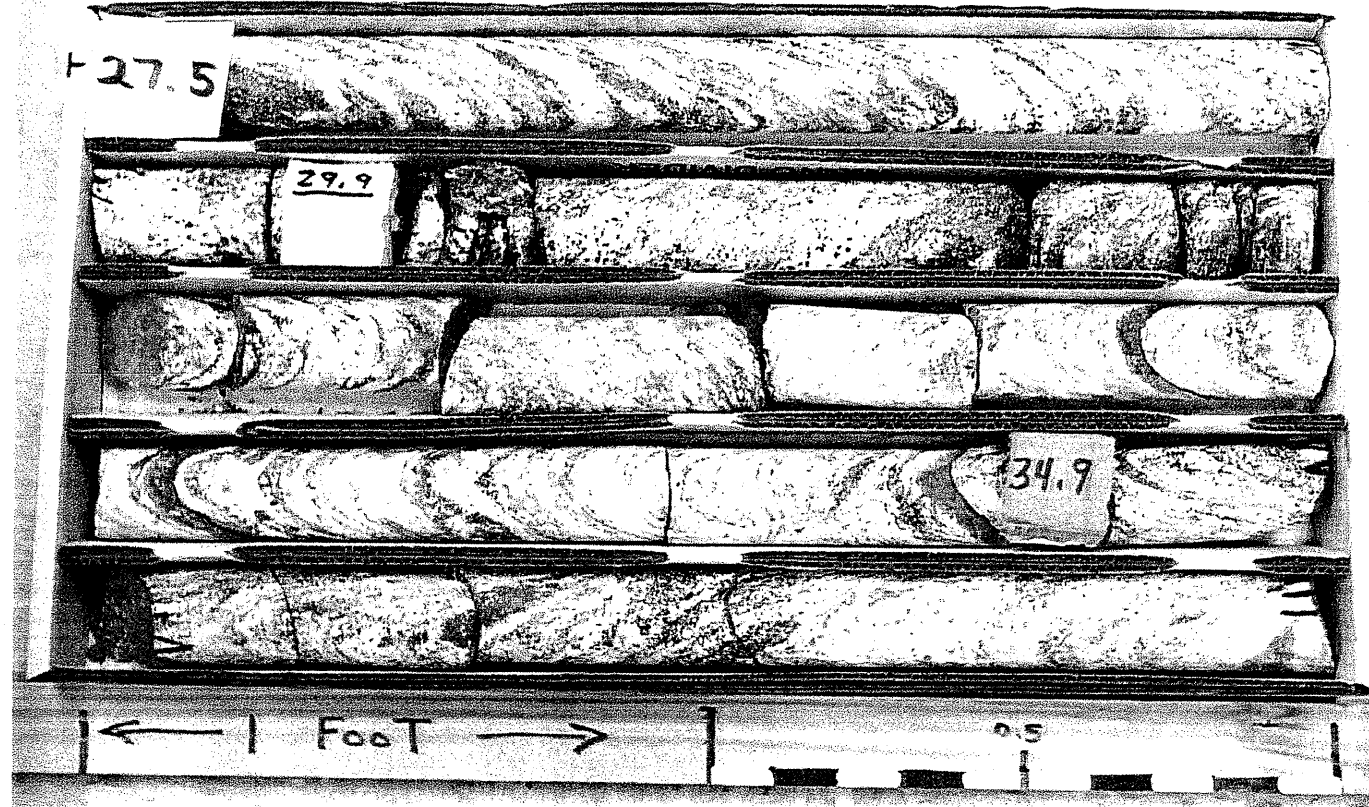
EB1-C



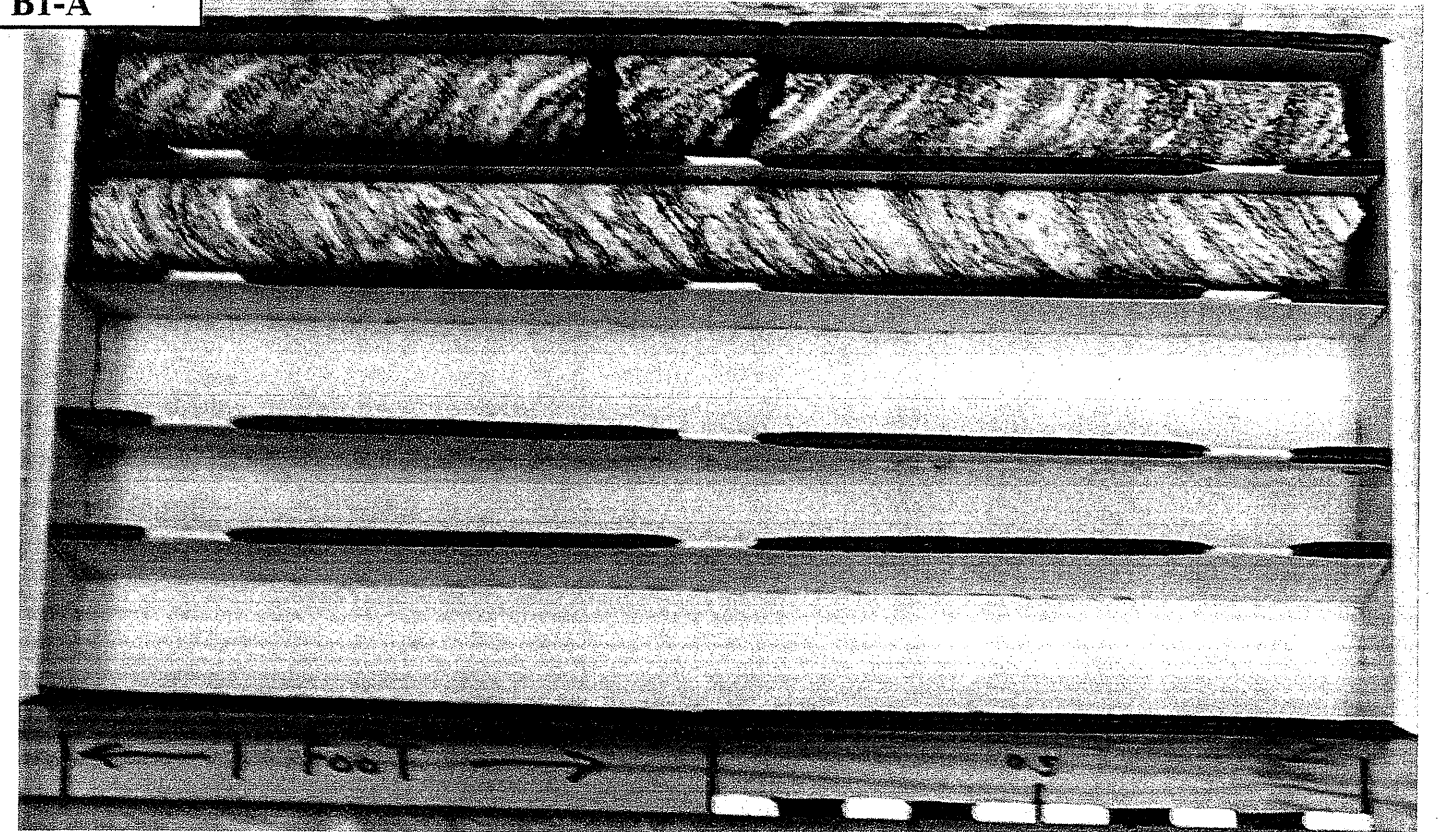
33510.1.1 B-4162
JACKSON COUNTY
BRIDGE # 320 ON SR 1432 OVER NORFOLK SOUTHERN RAILROAD

CORE PHOTOS

B1-A



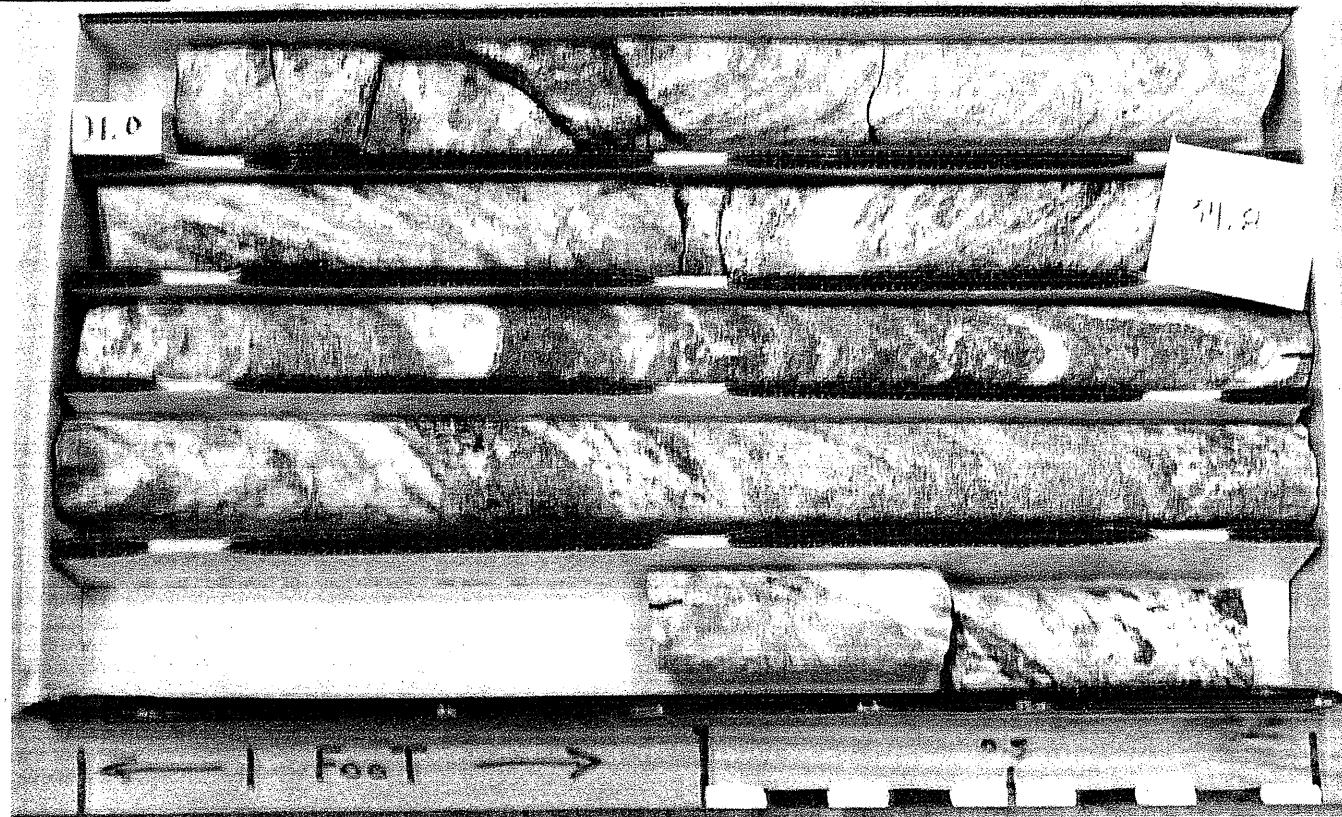
B1-A



33510.1.1 B-4162
JACKSON COUNTY
BRIDGE # 320 ON SR 1432 OVER NORFOLK SOUTHERN RAILROAD

CORE PHOTOS

B1-C



B1-C



CORE PHOTOS

EB2-A



EB2-B



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33510.1.1 B-4162	1	7

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33510.1.1 B-4162 F.A. PROJ. BRZ-1432 (2)

COUNTY JACKSON

PROJECT DESCRIPTION BRIDGE NO. 320 OVER NORFOLK SOUTHERN RAILWAY ON SR 1432 (SKYLAND DRIVE)

SITE DESCRIPTION RETAINING WALL NO.1 STA. 15+92.20 17' RT TO STA. 17+85.81 17' RT

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	BORELOGS

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 (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. ELLIOTT

G.J. COFFEY

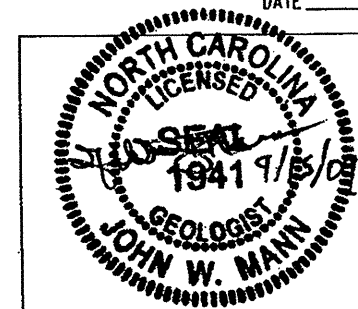
L.E. RIDDLE

INVESTIGATED BY J.W. MANN

CHECKED BY W.D. FRYE

SUBMITTED BY W.D. FRYE

DATE 9.15.09



PROJECT: 33510.1.1 ID: B-4162

DRAWN BY: J.T. WILLIAMS

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

DIVISION OF HIGHWAYS

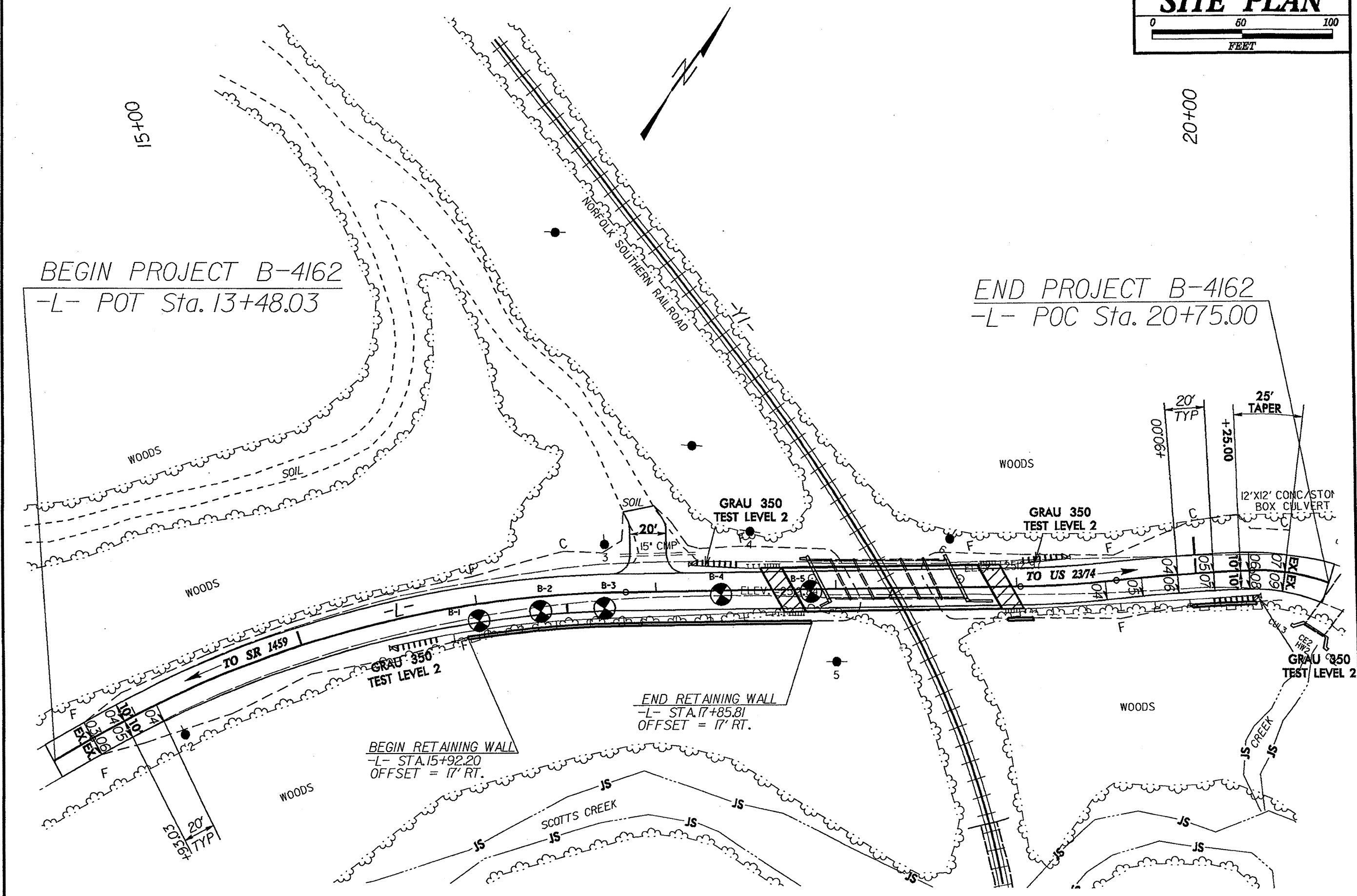
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Main body of the document containing various technical tables and legends. Includes sections for: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, ABBREVIATIONS, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, FRACTURE SPACING, BEDDING, and INDURATION. Each section contains detailed text, tables, and symbols used in geotechnical engineering.

PROJECT REFERENCE NO.	SHEET
33510.1.1 B-4162	3 OF 7
SITE PLAN	

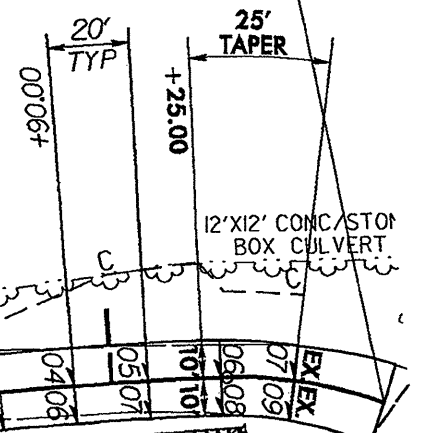
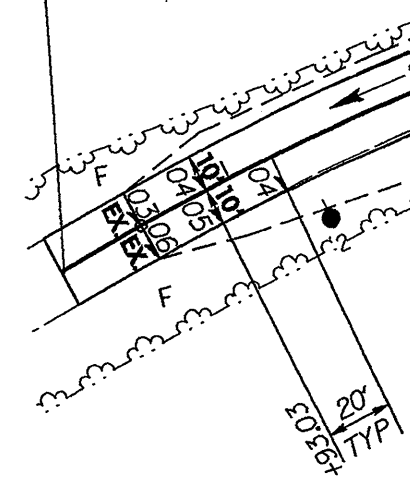
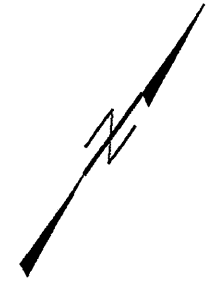


BEGIN PROJECT B-4162
 -L- POT Sta. 13+48.03

END PROJECT B-4162
 -L- POC Sta. 20+75.00

15+00

20+00



BEGIN RETAINING WALL
 -L- STA. 15+92.20
 OFFSET = 17' RT.

END RETAINING WALL
 -L- STA. 17+85.81
 OFFSET = 17' RT.

WOODS

SOIL

SOIL

GRAU 350
 TEST LEVEL 2

GRAU 350
 TEST LEVEL 2

12'X12' CONC/STON
 BOX CULVERT

GRAU 350
 TEST LEVEL 2

WOODS

WOODS

WOODS

SCOTT'S CREEK

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

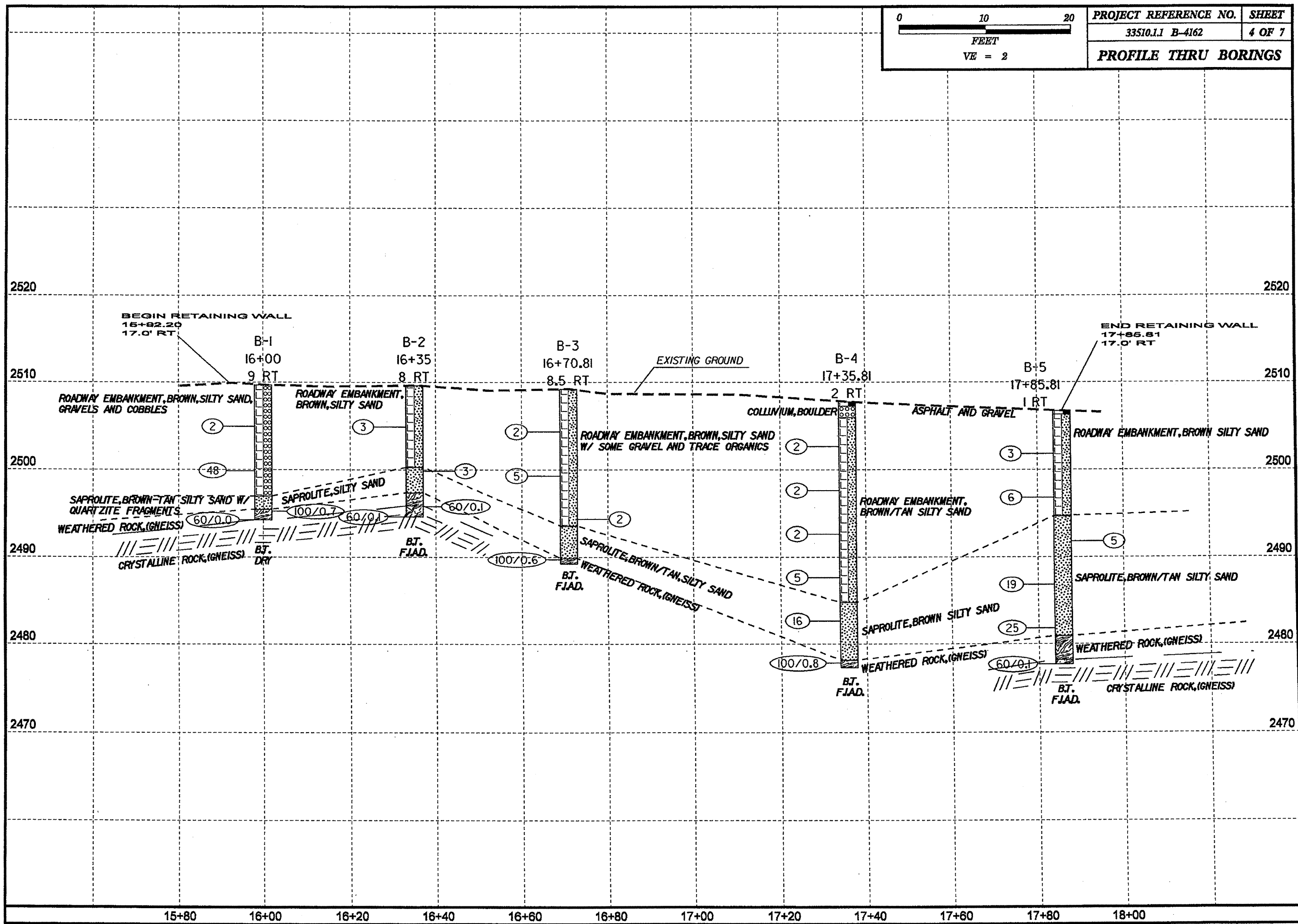
WOODS

WOODS

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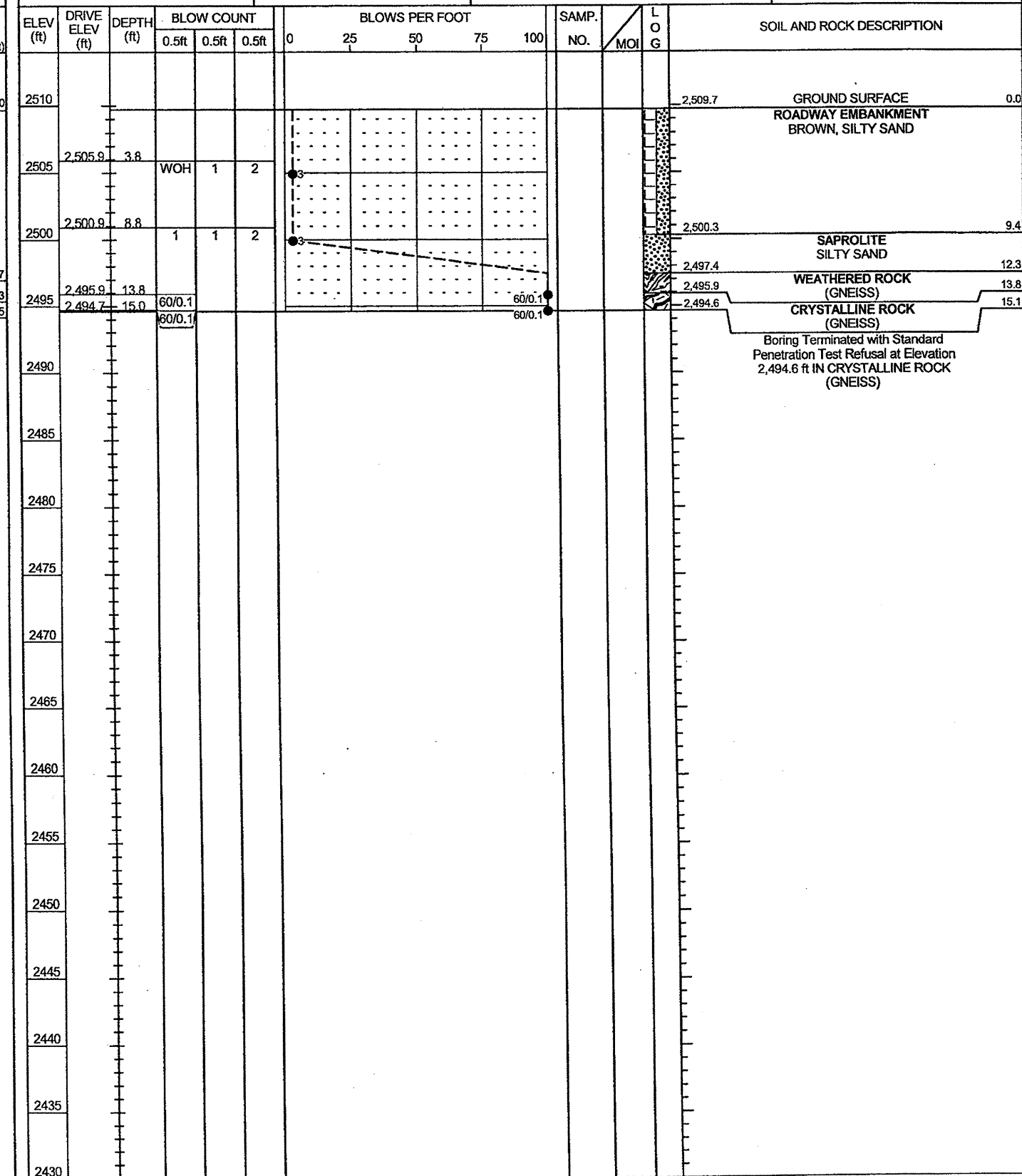
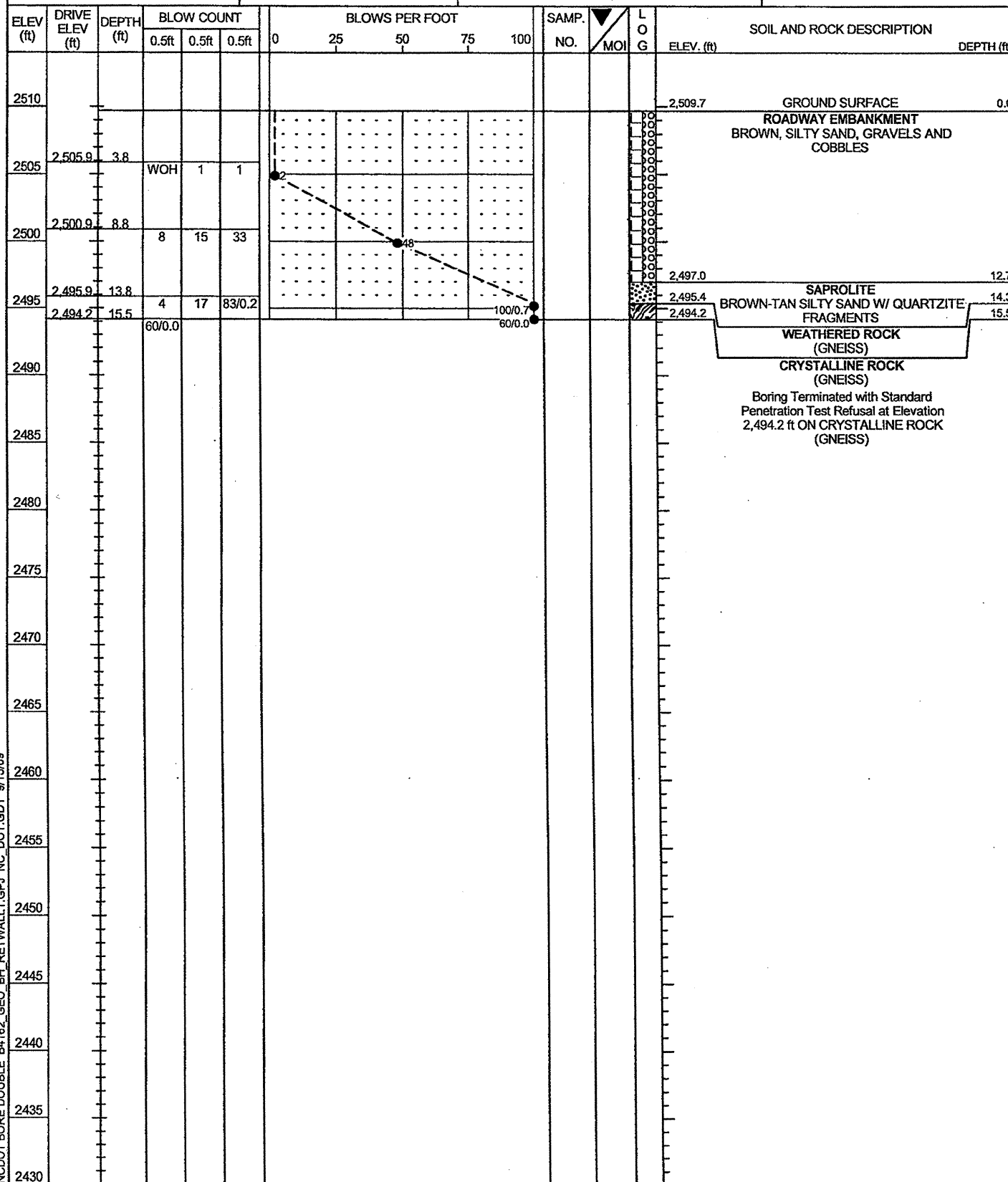
WOODS



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33510.1.1	ID. B4162	COUNTY JACKSON	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION RETAINING WALL -L- STA. 15+92.20 17' RT TO 17+85.81 17' RT			GROUND WTR (ft)
BORING NO. B-1	STATION 16+00	OFFSET 9ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,509.7 ft	TOTAL DEPTH 15.5 ft	NORTHING 627,887	EASTING 765,741
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/21/09	COMP. DATE 08/21/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 15.5 ft

PROJECT NO. 33510.1.1	ID. B4162	COUNTY JACKSON	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION RETAINING WALL -L- STA. 15+92.20 17' RT TO 17+85.81 17' RT			GROUND WTR (ft)
BORING NO. B-2	STATION 16+35	OFFSET 8ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,509.7 ft	TOTAL DEPTH 15.1 ft	NORTHING 627,910	EASTING 765,767
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/27/09	COMP. DATE 08/27/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 13.8 ft



NCDOT BORE DOUBLE B4162 GEO BH RETWALL1.GPJ NC DOT.GDT 9/15/09

PROJECT NO. 33510.1.1	ID. B4162	COUNTY JACKSON	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION RETAINING WALL -L- STA. 15+92.20 17' RT TO 17+85.81 17' RT			GROUND WTR (ft)
BORING NO. B-3	STATION 16+71	OFFSET 9ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,510.2 ft	TOTAL DEPTH 20.0 ft	NORTHING 627,932	EASTING 765,795
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/20/09	COMP. DATE 08/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 33510.1.1	ID. B4162	COUNTY JACKSON	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION RETAINING WALL -L- STA. 15+92.20 17' RT TO 17+85.81 17' RT			GROUND WTR (ft)
BORING NO. B-4	STATION 17+36	OFFSET 2ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,511.6 ft	TOTAL DEPTH 30.4 ft	NORTHING 627,974	EASTING 765,845
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/20/09	COMP. DATE 08/20/09	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 MOI	LOG ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2515															
2510													2,510.2	GROUND SURFACE	0.0
2505	2,508.3	3.9		1	1	1									
2500	2,501.3	8.9		6	2	3									
2495	2,496.3	13.9		WOH	1	1									
2490	2,491.3	18.9		3	28	72/0.1								2,490.2	100/0.6
2485													2,490.8	WEATHERED ROCK (GNEISS)	19.4
2480													2,490.2	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,490.2 ft IN WEATHERED ROCK (GNEISS)	20.0
2475															
2470															
2465															
2460															
2455															
2450															
2445															
2440															
2435															

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2515															
2510													2,511.6	GROUND SURFACE	0.0
2505	2,507.5	4.1		1	1	1								2,509.8	ASPHALT AND GRAVEL
2500	2,502.5	9.1		WOH	1	1									1.8
2495	2,497.5	14.1		1	1	1									
2490	2,492.5	19.1		1	2	3									
2485	2,487.5	24.1		3	7	9									
2480	2,482.5	29.1		15	22	78/0.3								2,481.2	100/0.6
2475													2,488.6	SAPROLITE BROWN SILTY SAND	23.0
2470															
2465													2,482.0	SAPROLITE BROWN SILTY SAND	29.6
2460													2,481.2	WEATHERED ROCK (GNEISS)	30.4
2455														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,481.2 ft IN WEATHERED ROCK (GNEISS)	
2450															
2445															
2440															
2435															

NCDOT BORE DOUBLE B4162_GEO_BH_RET WALL 1.GPJ NC_DOT.GDT 9/15/09



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 33510.1.1	ID. B4162	COUNTY JACKSON	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION RETAINING WALL -L- STA. 15+92.20 17' RT TO 17+85.81 17' RT			GROUND WTR (ft)
BORING NO. B-5	STATION 17+86	OFFSET 1ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,512.7 ft	TOTAL DEPTH 29.0 ft	NORTHING 628,003	EASTING 765,885
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/21/09	COMP. DATE 08/21/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.5 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					
2515															
2510	2,508.8	3.9	1	1	2								GROUND SURFACE	0.0	
													ASPHALT W/ SHALLOW LAYER OF GRAVEL		
													ROADWAY EMBANKMENT		
													BROWN SILTY SAND		
2505	2,503.8	8.9	1	2	4										
2500	2,498.8	13.9	1	2	3										
2495	2,493.8	18.9	2	8	11										
2490	2,488.8	23.9	4	8	17										
2485	2,483.8	28.9	60/0.1										WEATHERED ROCK (GNEISS)	25.8	
2480													CRYSTALLINE ROCK (GNEISS)	28.5	
2475															
2470															
2465															
2460															
2455															
2450															
2445															
2440															
2435															

NCDOT BORE DOUBLE B4162 GEO. BH. RETWALL.1.GPJ NC. DOT.GDT. 9/15/09

Boring Terminated with Standard Penetration Test Refusal at Elevation 2,483.7 ft IN CRYSTALLINE ROCK (GNEISS)