

PROJECT: 17BP.5.R.76 REFERENCE: SF-920044

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY WARREN
 PROJECT DESCRIPTION BRIDGE NO. 44 ON SR 1600
(BALTIMORE ROAD) OVER RICHNECK CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-920044	1	8

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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.

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DATE NOVEMBER 2017



DocuSigned by:

 11-27-17
 C06817F5E770411
 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
 SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION
 SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS		
	A-1	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7		
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7			
SYMBOL	[Pattern]							[Pattern]							[Pattern]		
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 35 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN							
MATERIAL PASSING #40 LL PI	[Values]							[Values]							[Values]		
GROUP INDEX	[Values]							[Values]							[Values]		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND			SILTY SOILS		CLAYEY SOILS			HIGHLY ORGANIC SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR							FAIR TO POOR POOR UNSUITABLE		

CONSISTENCY OR DENSENESS

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)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	4.75	2.00	0.42	0.25	0.075	0.053
BOULDER (BLDR.)						
COBBLE (COB.)						
GRAVEL (GR.)						
COARSE SAND (CS, SD.)						
FINE SAND (F SD.)						
SILT (SL.)						
CLAY (CL.)						

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH
SLIGHTLY PLASTIC	0-5	VERY LOW
MODERATELY PLASTIC	6-15	SLIGHT
HIGHLY PLASTIC	16-25	MEDIUM
	26 OR MORE	HIGH

COLOR
 DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION
 WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
 UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
 GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS
 THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION
 MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY
 SLIGHTLY COMPRESSIBLE LL < 31
 MODERATELY COMPRESSIBLE LL = 31 - 50
 HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE

GROUND WATER

▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
 ▽ STATIC WATER LEVEL AFTER 24 HOURS
 ▽PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
 ○ SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- 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
- SPT TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
 BT - BORING TERMINATED
 CL - CLAY
 CPT - CONE PENETRATION TEST
 CSE - COARSE
 DMT - DILATOMETER TEST
 DPT - DYNAMIC PENETRATION TEST
 e - VOID RATIO
 F - FINE
 FOSS. - FOSSILIFEROUS
 FRAC. - FRACTURED, FRACTURES
 FRAGS. - FRAGMENTS
 HI. - HIGHLY

MED. - MEDIUM
 MICA - MICACEOUS
 MOD. - MODERATELY
 NP - NON PLASTIC
 ORG. - ORGANIC
 PMT - PRESSUREMETER TEST
 SAP. - SAPROLITIC
 SD. - SAND, SANDY
 SL. - SILT, SILTY
 SLI. - SLIGHTLY
 TCR - TRIAXIAL REFUSAL
 w - MOISTURE CONTENT
 V - VERY

VST - VANE SHEAR TEST
 WEA. - WEATHERED
 U - UNIT WEIGHT
 U_G - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
 SS - SPLIT SPOON
 ST - SHELBY TUBE
 RS - ROCK
 RT - RECOMPACTED TRIAXIAL
 CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
 CME-45C
 CME-55
 CME-550
 VANE SHEAR TEST
 PORTABLE HOIST
 BK-51

ADVANCING TOOLS:
 CLAY BITS
 6" CONTINUOUS FLIGHT AUGER
 8" HOLLOW AUGERS
 HARD FACED FINGER BITS
 TUNG-CARBIDE INSERTS
 CASING W/ ADVANCER
 TRICONE 2 7/8" STEEL TEETH
 TRICONE " TUNG-CARB.
 CORE BIT

HAMMER TYPE:
 AUTOMATIC MANUAL

CORE SIZE:
 -B -H -N

HAND TOOLS:
 POST HOLE DIGGER
 HAND AUGER
 SOUNDING ROD
 VANE SHEAR TEST

ROCK DESCRIPTION
 HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)
 NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.

CRYSTALLINE ROCK (CR)
 FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

NON-CRYSTALLINE ROCK (NCR)
 FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTARY ROCK (CP)
 COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.

VERY SLIGHT (IV 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 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. IF TESTED, WOULD YIELD SPT REFUSAL

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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF

VERY SEVERE (IV SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF

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.

ROCK HARDNESS

VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.

HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.

MODERATELY HARD 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.

MEDIUM HARD 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.

SOFT 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.

VERY SOFT 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.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION
 FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE 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.

TERMS AND DEFINITIONS

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, SUCH 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 DISLOADED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

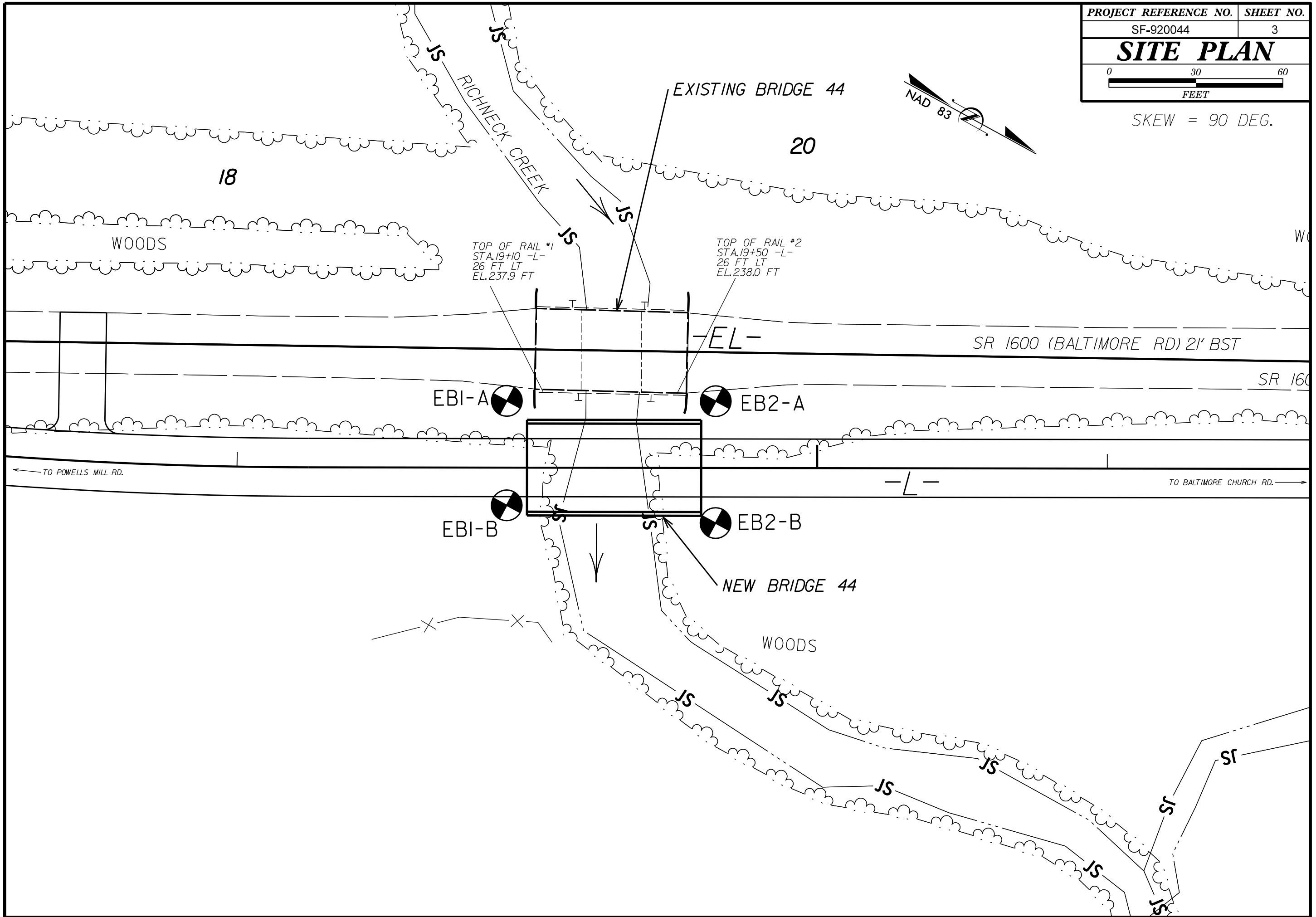
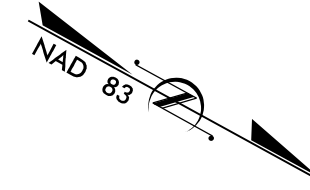
BENCH MARK: BM#2 - TIE NAIL IN 20" POPLAR, STA. 19+01-L-, 33 FT RT

ELEVATION: 233.78 FEET

NOTES:

PROJECT REFERENCE NO.	SHEET NO.
SF-920044	3
SITE PLAN	
FEET	

SKEW = 90 DEG.



18

20

WOODS

TOP OF RAIL #1
STA. 19+10 -L-
26 FT LT
EL. 237.9 FT

TOP OF RAIL #2
STA. 19+50 -L-
26 FT LT
EL. 238.0 FT

-EL-

SR 1600 (BALTIMORE RD) 21' BST

SR 160

EBI-A

EB2-A

← TO POWELLS MILL RD.

-L-

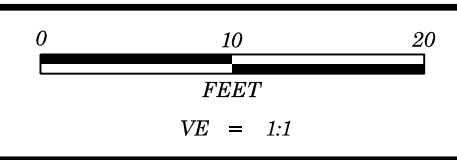
TO BALTIMORE CHURCH RD. →

EBI-B

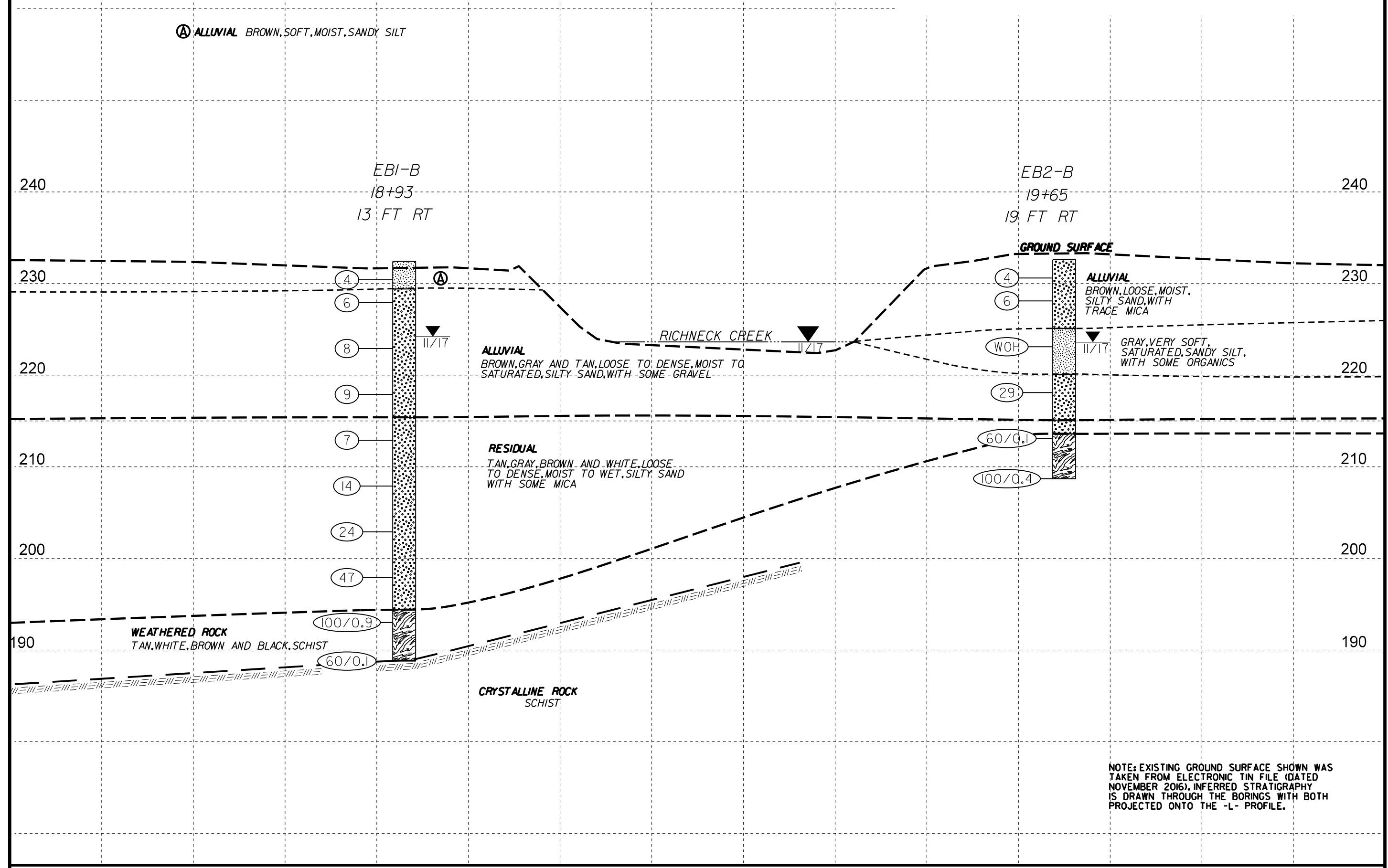
EB2-B

NEW BRIDGE 44

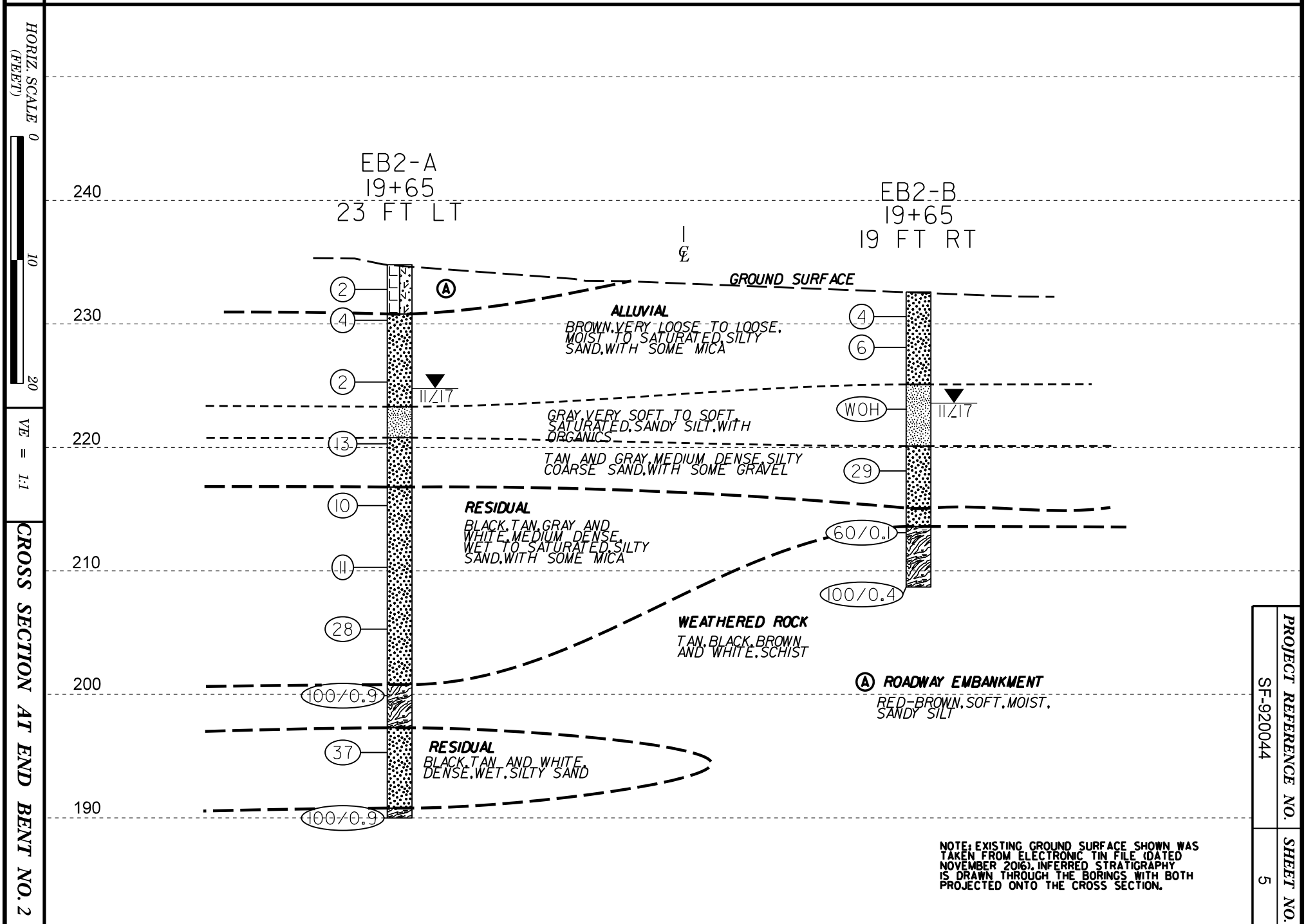
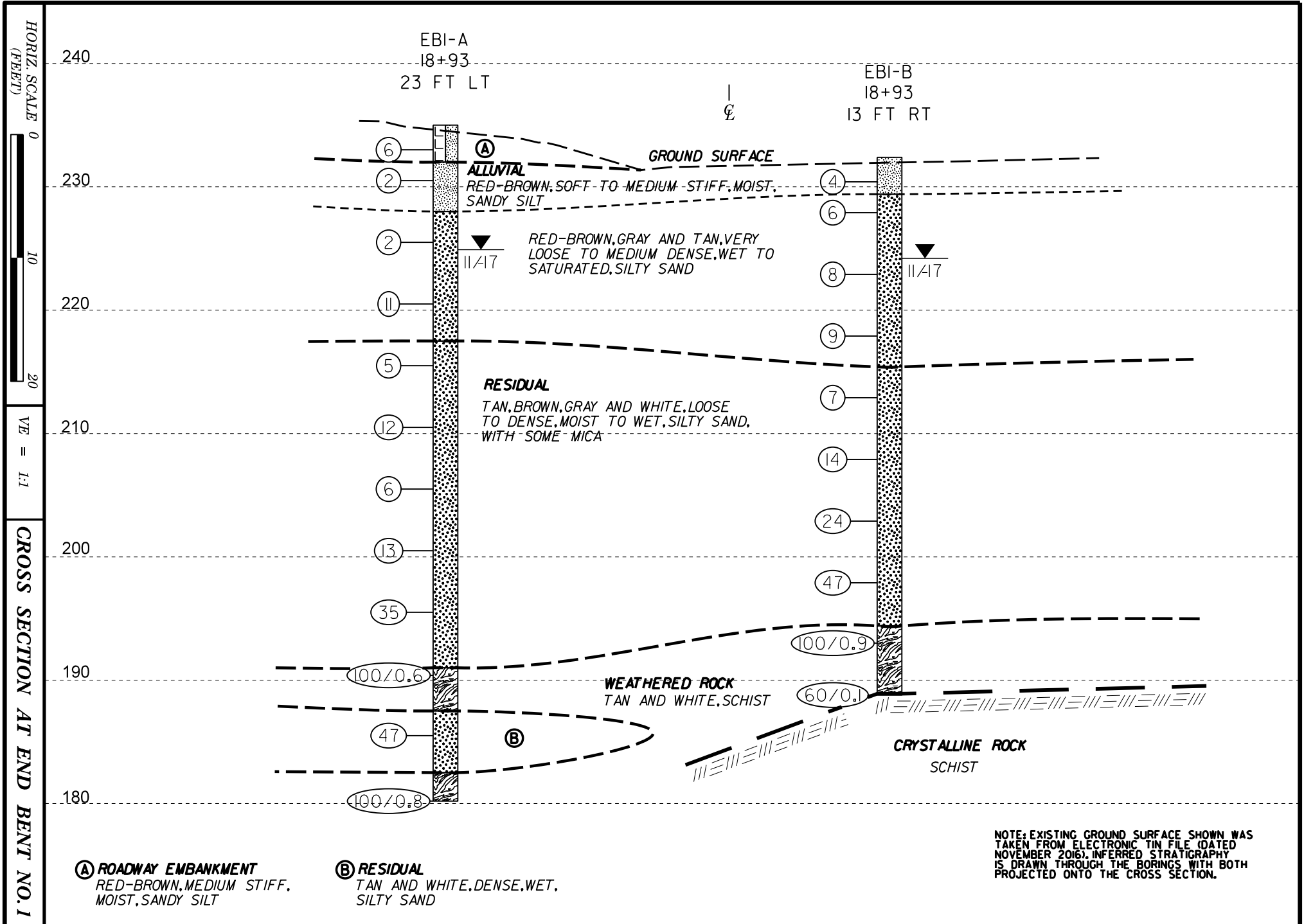
WOODS



PROJECT REFERENCE NO.	SHEET NO.
SF-920044	4
PROFILE ALONG -L- CENTERLINE	



NOTE: EXISTING GROUND SURFACE SHOWN WAS TAKEN FROM ELECTRONIC TIN FILE (DATED NOVEMBER 2016). INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE -L- PROFILE.



HORIZ. SCALE 0 (FEET) 10 20

VE = 1:1

CROSS SECTION AT END BENT NO. 1

HORIZ. SCALE 0 (FEET) 10 20

VE = 1:1

CROSS SECTION AT END BENT NO. 2

PROJECT REFERENCE NO. SF-920044

SHEET NO. 5

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.5.R.76		TIP SF-920044		COUNTY WARREN		GEOLOGIST D. Brown										
SITE DESCRIPTION Bridge No. 44 on SR 1600 (Baltimore Rd.) over Richneck Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 18+93		OFFSET 23 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 235.0 ft		TOTAL DEPTH 54.8 ft		NORTHING 945,798		EASTING 2,251,718										
DRILL RIG/HAMMER EFF./DATE BRI9103 BK-51 82% 02/23/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER G. Eister		START DATE 11/14/17		COMP. DATE 11/14/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
235	234.0	1.0	2	3	3									235.0	GROUND SURFACE	0.0
	231.5	3.5	1	1	1									232.0	ROADWAY EMBANKMENT Red-Brown, Sandy Silt	3.0
230	228.0	7.0												228.0	ALLUVIAL Red-Brown, Sandy Silt	7.0
	226.5	8.5	WOH	1	1										Gray, Silty Sand	
225	221.5	13.5	2	2	9									217.5	RESIDUAL Tan, Brown and White, Silty Sand, with Some Mica	17.5
220	216.5	18.5	2	2	3											
215	211.5	23.5	5	6	6											
210	206.5	28.5	2	2	4											
205	201.5	33.5	3	6	7											
200	196.5	38.5	4	8	27											
195	191.5	43.5	8	57	43/0.1											
190	186.5	48.5	22	25	22									191.0	WEATHERED ROCK Tan and White, Schist	44.0
	181.5	53.5	12	20	80/0.3									187.5	RESIDUAL Tan and White, Silty Sand, with Some Mica	47.5
														182.5	WEATHERED ROCK Schist	52.5
														180.2	WEATHERED ROCK Schist	54.8
															Boring Terminated at Elevation 180.2 ft in Weathered Rock	

WBS 17BP.5.R.76		TIP SF-920044		COUNTY WARREN		GEOLOGIST C.T. Tang										
SITE DESCRIPTION Bridge No. 44 on SR 1600 (Baltimore Rd.) over Richneck Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 18+93		OFFSET 13 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 232.4 ft		TOTAL DEPTH 43.6 ft		NORTHING 945,814		EASTING 2,251,751										
DRILL RIG/HAMMER EFF./DATE BRI9103 BK-51 82% 02/23/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER G. Eister		START DATE 11/13/17		COMP. DATE 11/13/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
235	231.4	1.0	1	2	2									232.4	GROUND SURFACE	0.0
	228.9	3.5	3	3	3									229.4	ALLUVIAL Brown, Sandy Silt	3.0
230	223.9	8.5	3	4	4										Brown, Gray and Tan, Silty Sand	
225	218.9	13.5	3	4	5											
220	213.9	18.5	2	3	4									215.4	RESIDUAL Tan, Gray and Brown, Silty Sand, with Some Mica	17.0
215	208.9	23.5	3	5	9											
210	203.9	28.5	10	13	11											
205	198.9	33.5	4	16	31											
200	193.9	38.5	48	52/0.4												
195	188.9	43.5	60/0.1											194.4	WEATHERED ROCK Tan and White, Schist	38.0
														188.9	CRYSTALLINE ROCK Schist	43.5
														188.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 188.8 ft in Crystalline Rock	

NCDOT BORE DOUBLE 920044_GEO_BRDG0044_BH.GPJ NC_DOT.GDT 11/27/17

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.5.R.76		TIP SF-920044		COUNTY WARREN		GEOLOGIST D. Brown											
SITE DESCRIPTION Bridge No. 44 on SR 1600 (Baltimore Rd.) over Richneck Creek							GROUND WTR (ft)										
BORING NO. EB2-A		STATION 19+65		OFFSET 23 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 234.8 ft		TOTAL DEPTH 44.8 ft		NORTHING 945,864		EASTING 2,251,688											
DRILL RIG/HAMMER EFF./DATE BRI9103 BK-51 82% 02/23/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER G. Eister		START DATE 11/14/17		COMP. DATE 11/14/17		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
235															234.8	0.0	GROUND SURFACE ROADWAY EMBANKMENT Red-Brown, Clayey Silt
	233.8	1.0	2	1	1												
	231.3	3.5	2	2	2										230.8	4.0	ALLUVIAL Brown, Silty Fine Sand, with Some Mica
230																	
	226.3	8.5	1	1	1												
225																	
	221.3	13.5	WOH	1	12										223.3	11.5	Gray, Sandy Silt, with Organics
220															220.8	14.0	Gray, Silty Coarse Sand
	216.3	18.5	3	5	5										216.8	18.0	RESIDUAL Black and Tan, Silty Sand, with Some Mica
215																	
	211.3	23.5	4	4	7												
210																	
	206.3	28.5	10	12	16												
205																	
	201.3	33.5	26	46	54/0.4										200.8	34.0	WEATHERED ROCK Tan, Black and White, Schist
200															197.3	37.5	RESIDUAL Brown, Tan and White, Silty Sand
	196.3	38.5	8	16	21												
195																	
	191.3	43.5	17	60	40/0.3										190.8	44.0	WEATHERED ROCK Schist
190															190.0	44.8	Boring Terminated at Elevation 190.0 ft in Weathered Rock

WBS 17BP.5.R.76		TIP SF-920044		COUNTY WARREN		GEOLOGIST D. Brown											
SITE DESCRIPTION Bridge No. 44 on SR 1600 (Baltimore Rd.) over Richneck Creek							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 19+65		OFFSET 19 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 232.6 ft		TOTAL DEPTH 23.9 ft		NORTHING 945,880		EASTING 2,251,722											
DRILL RIG/HAMMER EFF./DATE BRI9103 BK-51 82% 02/23/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER G. Eister		START DATE 11/14/17		COMP. DATE 11/14/17		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
235															232.6	0.0	GROUND SURFACE
	231.6	1.0	1	2	2												
230																	
	229.1	3.5	3	3	3												
225																	
	224.1	8.5	WOH	WOH	WOH										225.1	7.5	Gray, Sandy Silt, with Some Organics
220															220.1	12.5	Tan and Gray, Silty Coarse Sand, with Some Gravel
	219.1	13.5	6	11	18												
215															215.1	17.5	RESIDUAL Gray and White, Silty Sand
	214.1	18.5	30	60/0.1											213.6	19.0	WEATHERED ROCK Brown and Black, Mica Schist
210																	
	209.1	23.5	100/0.4												208.7	23.9	Boring Terminated at Elevation 208.7 ft in Weathered Rock

NCDOT BORE DOUBLE 920044_GEO_BRDG0044_BH.GPJ NC_DOT.GDT 11/27/17

SITE PHOTOGRAPH

BRIDGE 44



PHOTOGRAPH NO. 1.: VIEW LOOKING SOUTH