

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

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PROJ. REFERENCE NO. 42294.1.1 (B-5135) F.A. PROJ. BRZ-1512(5)  
 COUNTY BURKE  
 PROJECT DESCRIPTION BRIDGE No. 1 ON SR-1512  
OVER HUNTING CREEK  
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 SITE DESCRIPTION \_\_\_\_\_  
 \_\_\_\_\_  
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**CAUTION NOTICE**

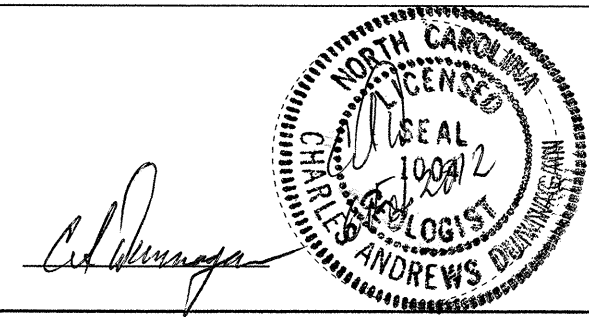
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (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 ELLIOT  
M M HAGER  
D O CHEEK  
C J COFFEY  
R D CHILDERS  
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INVESTIGATED BY C A DUNNAGAN  
 CHECKED BY W D FRYE, Jr  
 SUBMITTED BY W D FRYE, Jr  
 DATE FEBRUARY 2012



**PROJECT: 42294.1.1 ID: B-5135**

DRAWN BY: C A DUNNAGAN

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.

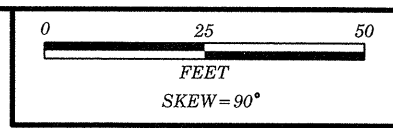
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

**SUBSURFACE INVESTIGATION**

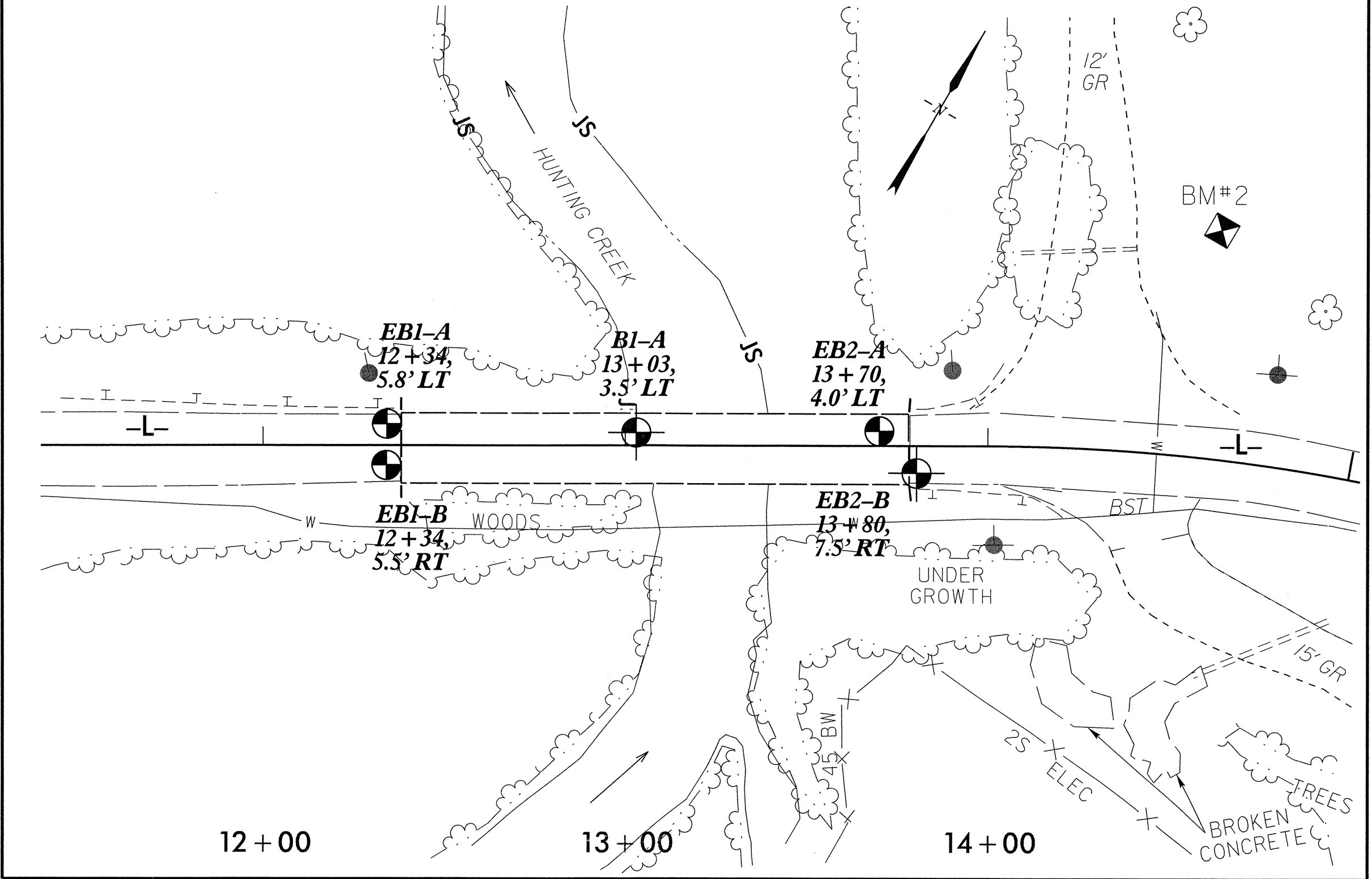
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

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, HIGHLY 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.  ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	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:  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 (CPI)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	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 (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 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 (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.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b> 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	<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.  <b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50  <b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SILT - CLAY 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	<b>WEATHERING</b> FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. 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, YIELDS SPT N VALUES > 100 BPF 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. IF TESTED, YIELDS 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.	<b>GROUND WATER</b> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP  <b>MISCELLANEOUS SYMBOLS</b> 
<b>CONSISTENCY OR DENSENESS</b> PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE, LOOSE, MEDIUM DENSE, DENSE, VERY DENSE GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT, SOFT, MEDIUM STIFF, STIFF, VERY STIFF, HARD	<b>TEXTURE OR GRAIN SIZE</b> U.S. STD. SIEVE SIZE (OPENING (MM)) 4, 10, 40, 60, 200, 270 4.76, 2.00, 0.42, 0.25, 0.075, 0.053 BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F. SD.), SILT (SL.), CLAY (CL.) GRAIN SIZE MM 305, 75, 2.0, 0.25, 0.05, 0.005 IN. 12, 3	<b>ROCK HARDNESS</b> 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED 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.	<b>ABBREVIATIONS</b> AR - AUGER REFUSAL HI. - HIGHLY BT - BORING TERMINATED MED. - MEDIUM CL. - CLAY MICA. - MICACEOUS CPT - CONE PENETRATION TEST MOD. - MODERATELY CSE. - COARSE N.P. - NON PLASTIC DMT - DILATOMETER TEST ORG. - ORGANIC DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST * - VOID RATIO SAP. - SAPROLITIC F - FINE SD. - SAND, SANDY FOSS. - FOSSILIFEROUS SL. - SILT, SILTY FRAC. - FRACTURED, FRACTURES S.L. - SLIGHTLY FRAGS. - FRAGMENTS TCR - TRICONE REFUSAL
<b>SOIL MOISTURE - CORRELATION OF TERMS</b> SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT - SATURATED - 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 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<b>EQUIPMENT USED ON SUBJECT PROJECT</b> DRILL UNITS: MOBILE B-51, 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, CASING W/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N-XWL, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST	<b>ROCK HARDNESS</b> 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED 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.	<b>ROCK HARDNESS</b> 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED 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.
<b>PLASTICITY</b> 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  <b>COLOR</b> 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.	<b>FRACTURE SPACING</b> TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET  <b>BEDDING</b> 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  <b>INDURATION</b> FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.	<b>FRACURE SPACING</b> TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET  <b>BEDDING</b> 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  <b>INDURATION</b> FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.	<b>BENCH MARK:</b> BM#2 - BL - STA 16+87.96, 71.28' LEFT  ELEVATION: 1047.35 FT.  NOTES:

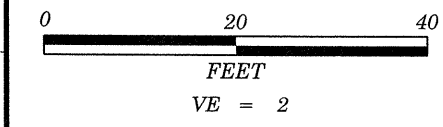
# BRIDGE No.1 ON SR-1512 OVER HUNTING CREEK



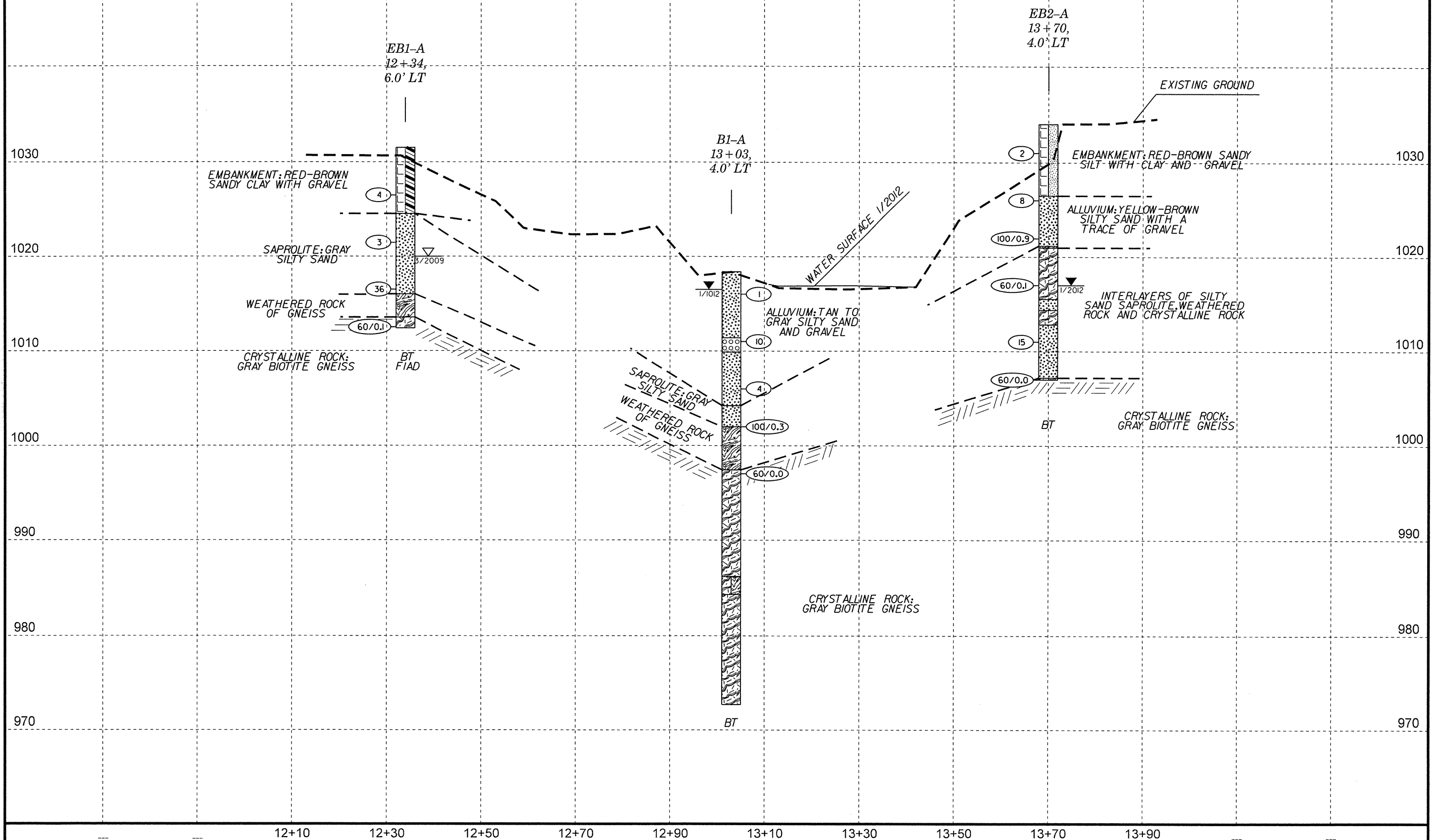
PROJECT REFERENCE NO.	SHEET
42294.1.1 (B-5135)	-
PLAN VIEW	

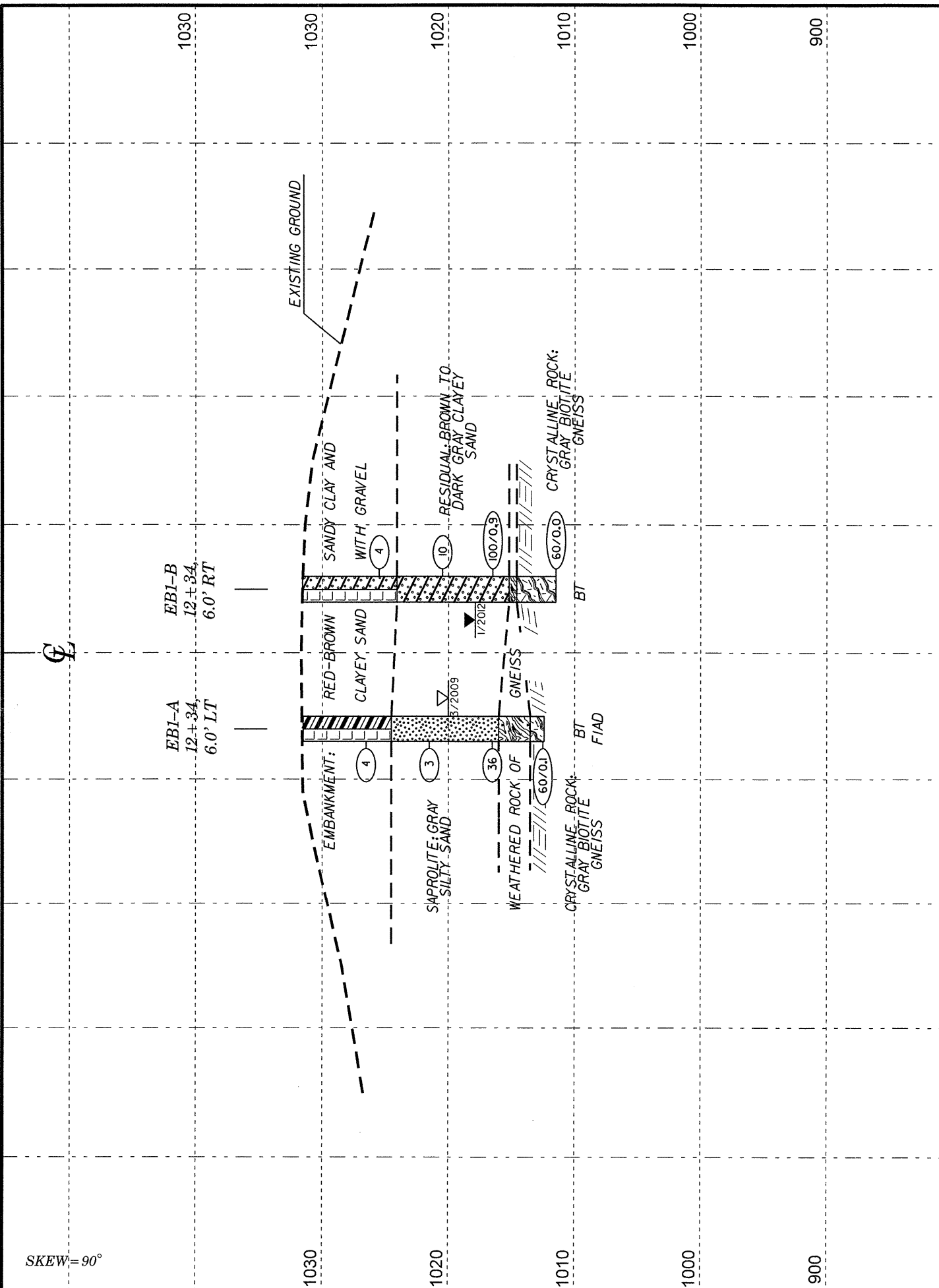


# BRIDGE No. 1 ON SR-1512 OVER HUNTING CREEK

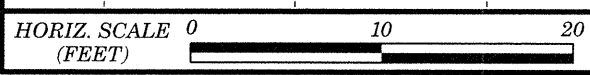


PROJECT REFERENCE NO.	SHEET
42294.1.1 (B-5135)	4/15
PROFILE 14.0' LT OF CENTERLINE	

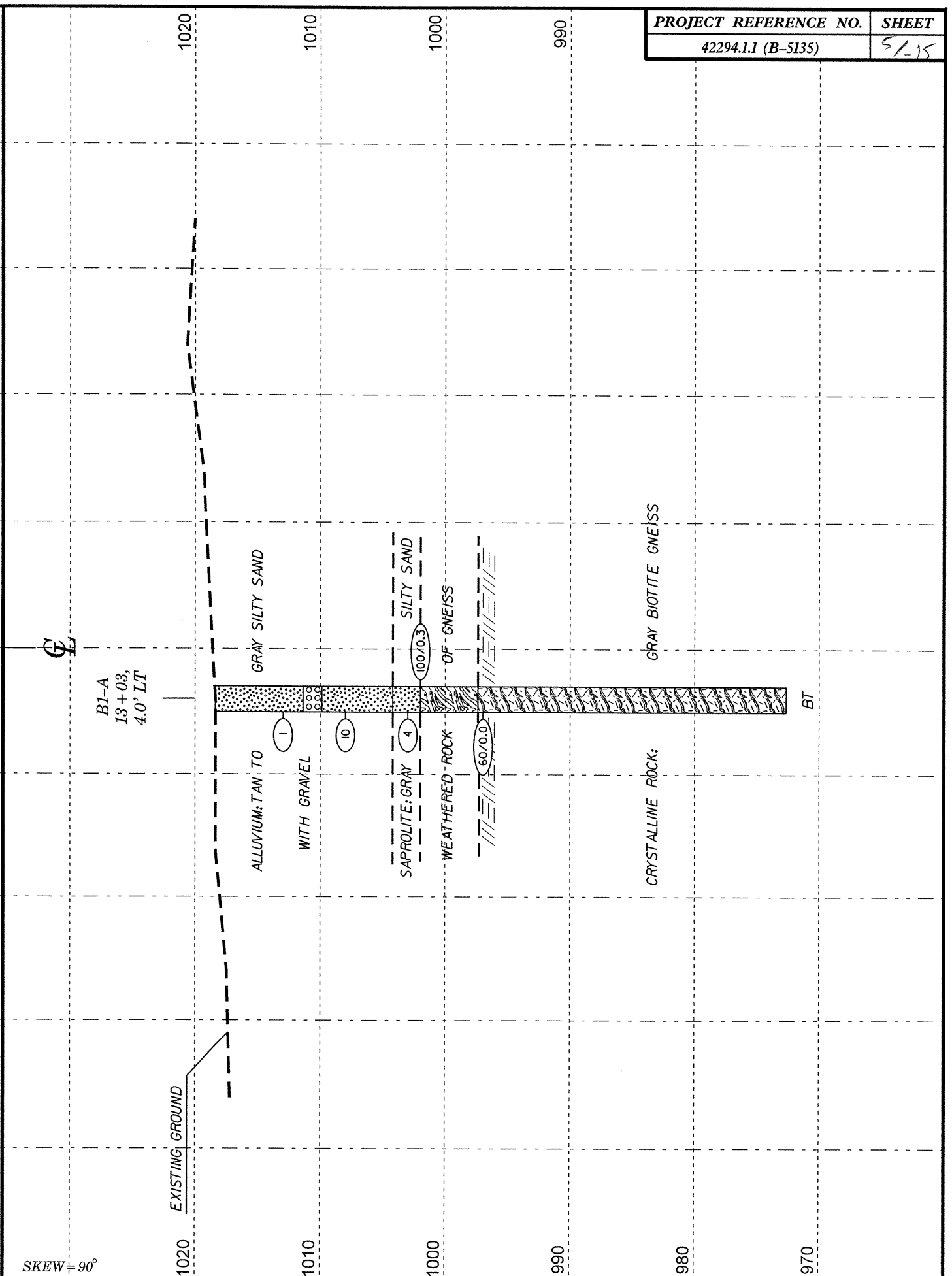




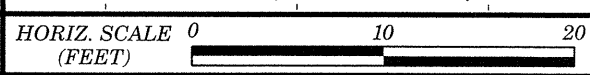
SKEW=90°



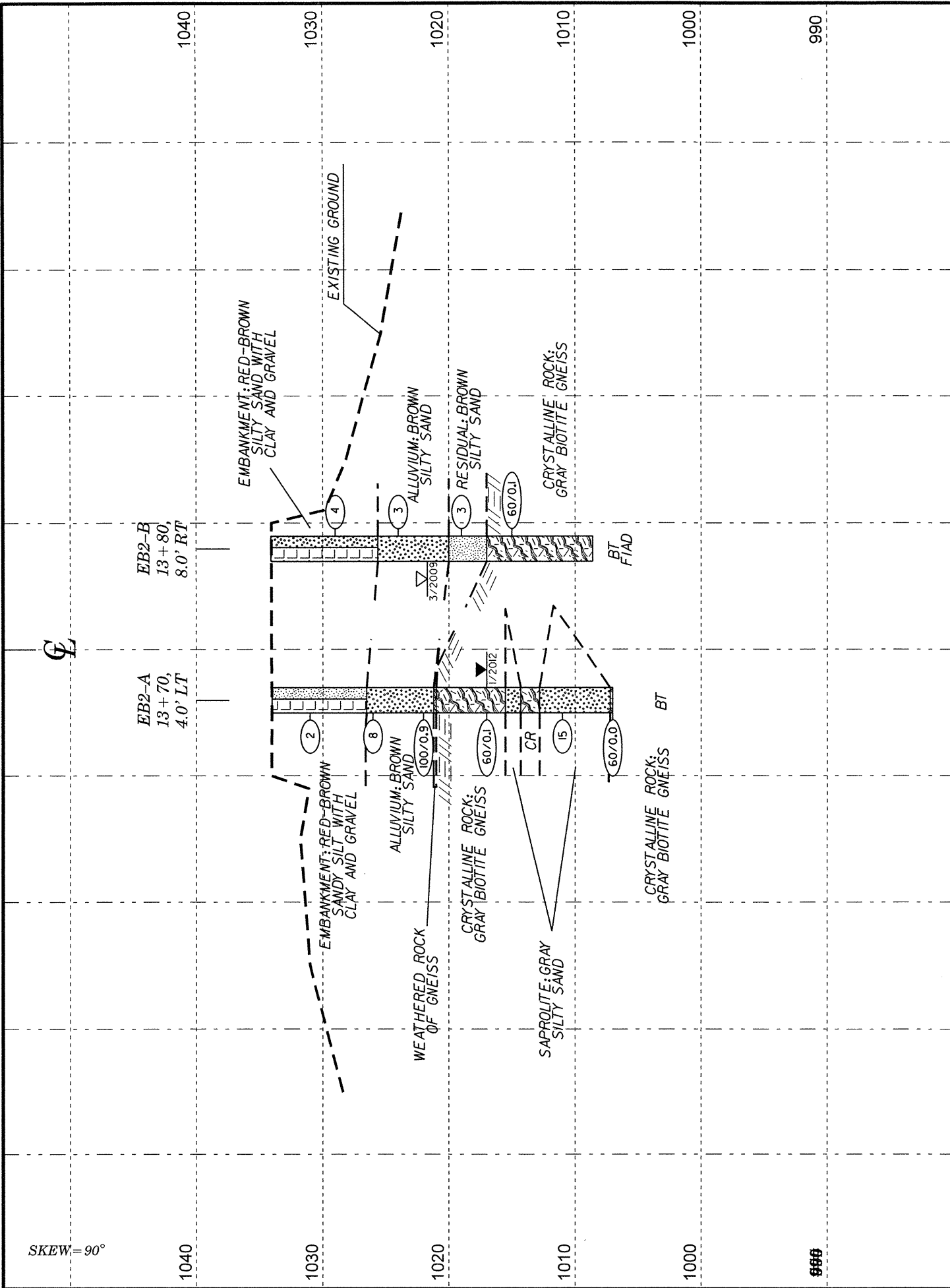
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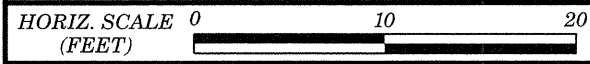
SKEW=90°



VE = 1



SKEW = 90°

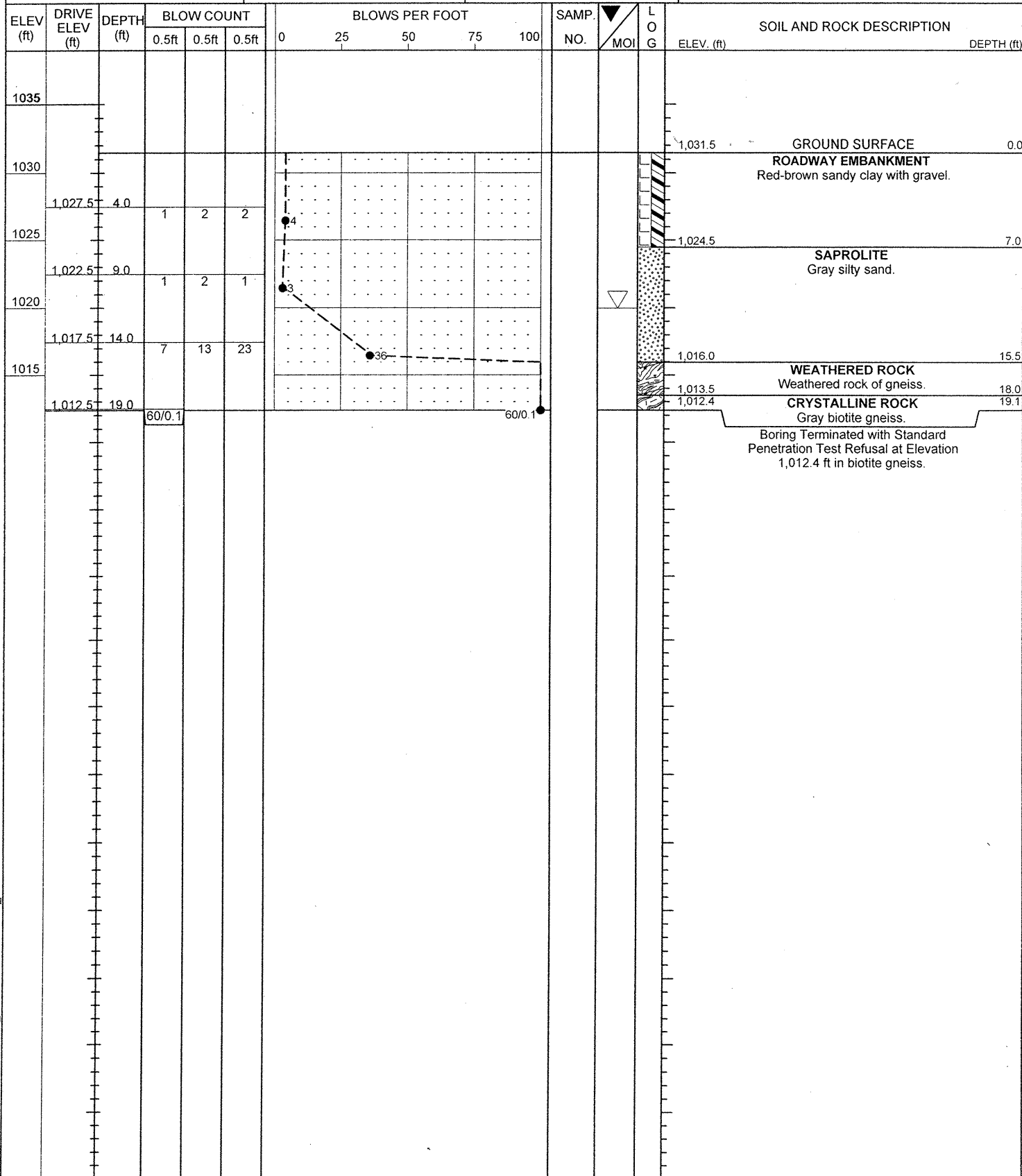


VE = 1

**CROSS SECTION:  
END BENT TWO**

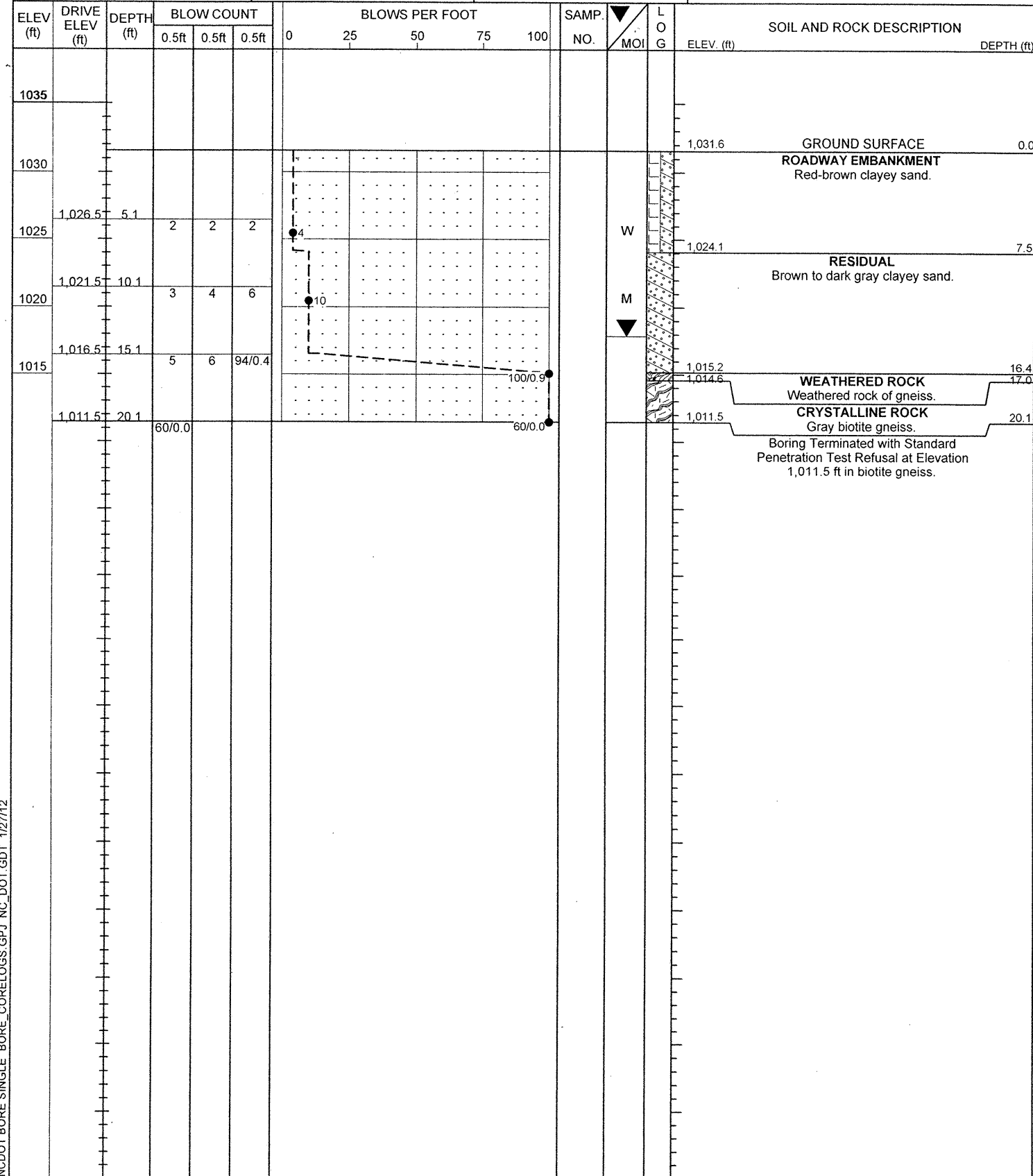
###

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+34	OFFSET 6 ft LT	ALIGNMENT -L-
COLLAR ELEV. 1,031.5 ft	TOTAL DEPTH 19.1 ft	NORTHING 742,116	EASTING 1,212,338
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Coffey, Jr., C.	START DATE 03/19/09	COMP. DATE 03/19/09	SURFACE WATER DEPTH N/A



7/15

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+34	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,031.6 ft	TOTAL DEPTH 20.1 ft	NORTHING 742,106	EASTING 1,212,343
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 01/25/12	COMP. DATE 01/25/12	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE\_BORE\_CORELOGS.GPJ NC\_DOT\_GDT\_1/27/12

NCDOT BORE SINGLE\_BORE\_CORELOGS.GPJ NC\_DOT\_GDT\_1/27/12

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 13+03	OFFSET 4 ft LT	ALIGNMENT -L-
COLLAR ELEV. 1,018.4 ft	TOTAL DEPTH 45.7 ft	NORTHING 742,148	EASTING 1,212,399
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 01/24/12	COMP. DATE 01/25/12	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						
1020														1,018.4	GROUND SURFACE	0.0
1015	1,017.0	1.4	WOH	1	WOH										ALLUVIAL Tan to gray silty sand.	
1010	1,012.0	6.4	1	4	6									1,011.4	ALLUVIAL Tan to gray silty sand with gravel.	7.0
1005	1,007.0	11.4	2	2	2									1,009.9	ALLUVIAL Tan to gray silty sand.	8.5
1000	1,002.0	16.4	15	100/0.3										1,004.2	SAPROLITE Gray silty sand.	14.2
995	997.0	21.4	60/0.0											1,002.0	WEATHERED ROCK Weathered rock of gneiss.	16.4
990														997.4	CRYSTALLINE ROCK Gray biotite gneiss.	21.0
985														986.2	CRYSTALLINE ROCK Brown-gray biotite gneiss.	32.2
980														984.3	CRYSTALLINE ROCK Gray biotite gneiss.	34.1
975														972.7	Boring Terminated at Elevation 972.7 ft in biotite gneiss.	45.7

NCDOT BORE SINGLE BORE CORELOGS.GPJ NC\_DOT.GDT 1/31/12

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 13+03	OFFSET 4 ft LT	ALIGNMENT -L-
COLLAR ELEV. 1,018.4 ft	TOTAL DEPTH 45.7 ft	NORTHING 742,148	EASTING 1,212,399
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 01/24/12	COMP. DATE 01/25/12	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. (%)	ROD (%)		REC. (%)	ROD (%)			
994.57												
994.6	23.8	1.9		NA/0.0	(1.3)	(0.0)					Begin Coring @ 23.8 ft	
992.7	25.7		1.9	1.8/0.9	68%	0%					CRYSTALLINE ROCK	
990			5.0	1.6/0.0	(4.7)	(3.7)					Brown-gray to gray biotite gneiss. Moderately weathered to fresh; moderately hard to hard.	
				1.7/0.0	94%	74%					a) Parts along foliation @ 30°.	
				1.2/0.0							b) Joints @ 10°. (continued)	
				1.1/0.0								
				1.0/0.0			RS-1					
985			5.0	1.5/0.0	(3.7)	(2.8)					CRYSTALLINE ROCK	
				0.9/0.0	74%	56%					Brown-gray biotite gneiss. Moderately severe to moderately weathered; soft to medium hard.	
				0.9/0.0							a) Joints @ 10°.	
				1.7/0.0							b) Joint @ 45°.	
				1.1/0.0			RS-2				c) Parts along foliation @ 15°.	
980			5.0	2.3/0.0	(5.0)	(4.6)					CRYSTALLINE ROCK	
				3.4/0.0	100%	92%					Gray biotite gneiss. Slightly weathered to fresh; moderately hard to hard.	
				1.4/0.0							a) Parts along foliation @ 15°.	
				1.1/0.0								
975			5.0	NA/0.0	(4.9)	(4.2)						
				1.2/0.0	98%	84%						
				1.0/0.0								
				1.3/0.0								
				1.7/0.0								
				1.6/0.0								
972.7			45.7								Boring Terminated at Elevation 972.7 ft in biotite gneiss.	45.7

NCDOT BORE SINGLE BORE CORELOGS.GPJ NC\_DOT.GDT 1/31/12





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

SHEET

9/15

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Hager, M. M.
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION 13+70	OFFSET 4 ft LT	ALIGNMENT -L-
COLLAR ELEV. 1,034.0 ft	TOTAL DEPTH 27.0 ft	NORTHING 742,181	EASTING 1,212,457
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 01/24/12	COMP. DATE 01/24/12	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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1035															1,034.0	0.0
	1,032.0	2.0	1	1	1											
1030																
	1,027.0	7.0	1	4	4										1,026.5	7.5
1025																
	1,022.0	12.0	1	100/0.4											1,021.2	12.8
1020															1,021.0	13.0
	1,017.0	17.0														
1015															1,015.5	18.5
	1,014.3														1,014.3	19.7
	1,012.0	22.0	WOH	4	11										1,012.8	21.2
1010																
	1,007.0	27.0													1,007.2	26.8
															1,007.0	27.0

NCDOT\_BORE\_SINGLE\_BORE\_CORELOGS.GPJ\_NC\_DOT\_GDT\_1127/12

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek				GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+80	OFFSET 8 ft RT	ALIGNMENT -L-	0 HR. 12.4
COLLAR ELEV. 1,034.1 ft	TOTAL DEPTH 25.5 ft	NORTHING 742,176	EASTING 1,212,471	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Coffey, Jr., C.	START DATE 03/18/09	COMP. DATE 03/18/09	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1035														1,034.1	0.0
1030	1,030.0	4.1	2	2	2							M	ROADWAY EMBANKMENT Red-brown silty sand with clay and gravel.		
1025	1,025.0	9.1	1	2	1							M	ALLUVIAL Brown silty sand.	8.5	
1020	1,020.0	14.1	WOH	2	1							M	RESIDUAL Brown sandy silt.	14.1	
1015	1,015.0	19.1	60/0.1										CRYSTALLINE ROCK Gray biotite gneiss.	17.1	
1010														1,008.6	25.5

Boring Terminated at Elevation 1,008.6 ft in biotite gneiss.

WBS 42294.1.1	TIP B-5135	COUNTY BURKE	GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION Bridge No. 1 on SR-1512 over Hunting Creek				GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+80	OFFSET 8 ft RT	ALIGNMENT -L-	0 HR. 12.4
COLLAR ELEV. 1,034.1 ft	TOTAL DEPTH 25.5 ft	NORTHING 742,176	EASTING 1,212,471	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Coffey, Jr., C.	START DATE 03/18/09	COMP. DATE 03/18/09	SURFACE WATER DEPTH N/A	

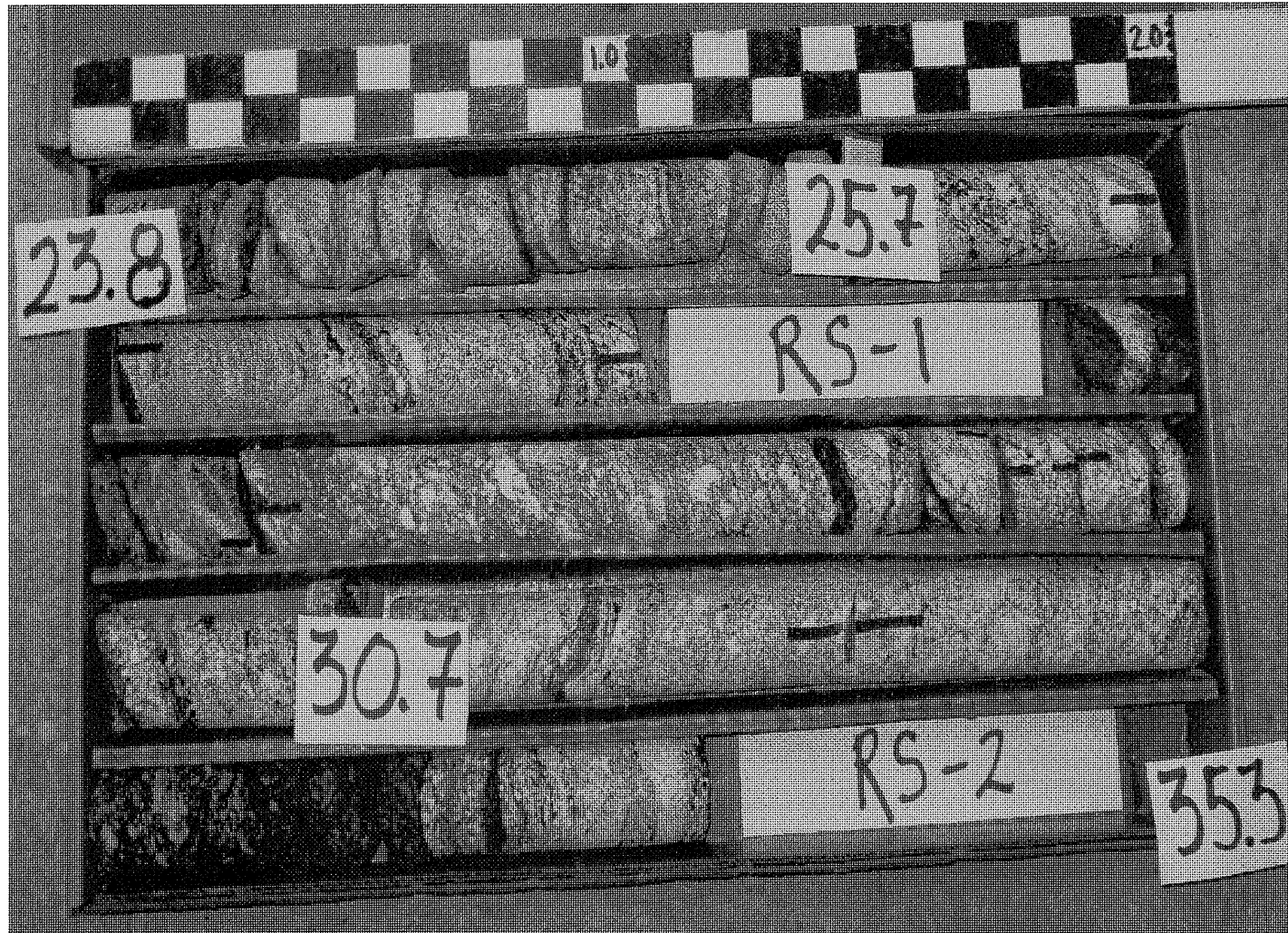
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	ELEV. (ft)	DEPTH (ft)
					REC. (%)	ROD (%)		REC. (%)	ROD (%)				
1014.87	1,014.9	19.2	1.3	2.0/1.3	(1.0)	(0.9)							
	1,013.6	20.5	5.0	1.4/0.0	77%	69%							
				1.3/0.0	(5.0)	(4.9)							
				1.7/0.0	100%	98%							
				1.3/0.0									
				1.5/0.0									
1010	1,008.6	25.5										1,008.6	25.5

Begin Coring @ 19.2 ft

CRYSTALLINE ROCK

Gray biotite gneiss. Hard; very slightly weathered to fresh.  
a) Parts along foliation @ 20°. (continued)

Boring Terminated at Elevation 1,008.6 ft in biotite gneiss.



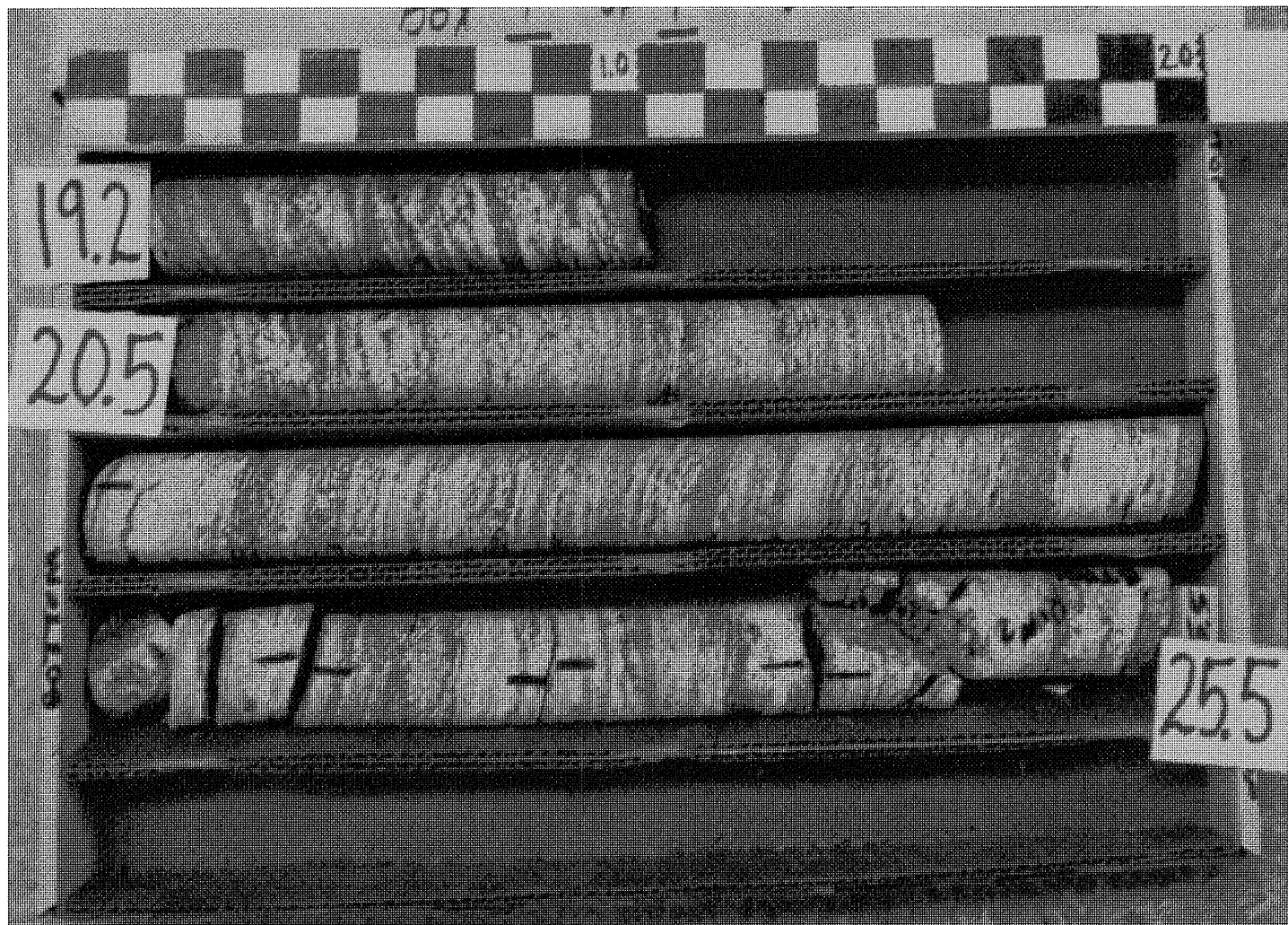
42294.1.1 (B-5135)  
 Burke Co.  
 Bridge No. 1 on SR-1512  
 Over Hunting Creek  
 B1-A  
 Box 1 of 3



42294.1.1 (B-5135)  
 Burke Co.  
 Bridge No. 1 on SR-1512  
 Over Hunting Creek  
 B1-A  
 Box 2 of 3



42294.1.1 (B-5135)  
Burke Co.  
Bridge No. 1 on SR-1512  
Over Hunting Creek  
B1-A  
Box 3 of 3



42294.1.1 (B-5135)  
Burke Co.  
Bridge No. 1 on SR-1512  
Over Hunting Creek  
EB2-B  
Box 1 of 1

**Rock Mass Rating (AASHTO)**

Project: 42294.1.1 (B-5135) Bridge No. 1 on SR-1512 over Hunting Creek

Boring Location: B1-A, RS-1

Stratigraphic Depth Range: 28.6'-29.4'

**A. CLASSIFICATION PARAMETERS AND THEIR VALUES**

Parameter	Range of Values			
	Point-load Strength Index	590 - 1215 psi	312 - 590 psi	139-312 psi
1	Strength of Intact Rock Material	>1215psi	590 - 1215 psi	139-312 psi
	Uniaxial Comp. Strength	>30 ksi	15 - 30 ksi	3.6 - 7.5 ksi
	Rating	15	12	4
2	Drill Core Quality - RQD	90 - 100%	75 - 90%	50 - 75%
	Rating	20	17	13
3	Spacing of Discontinuities	>10 ft	3 - 10 ft	1 - 3 ft
	Rating	30	25	20
4	Condition of Discontinuities	Very Rough Surfaces	Slightly Rough Surface Separation <0.5 in	Slickensided Surfaces or Gouge <0.2 in thick or Separation 0.05 - 0.2in Continuous Joints
	Rating	25	20	12
5	Inflow per 30 ft tunnel length (Joint Water Pressure)/ (Major Principle $\sigma$ )	None	< 400 gal/hr	400 - 2000 gal/hr
	Rating	10	7	4
	General Conditions	Completely Dry	Moist only	Under Moderate Water Pressure
	Rating	10	7	4
	Groundwater			
	Rating			
	Strength Value			
	Rating			
	Quality Value			
	Rating			
	Disc. Spacing			
	Rating			
	Disc. Condition			
	Rating			
	Adjust to Rating			

**B. RATING ADJUSTMENT FOR DISCONTINUITY ORIENTATIONS**

Strike and Dip Orientations	Favorable	Fair	Unfavorable	Very Unfavorable
Foundations	0	-2	-15	-25
Slopes	0	-5	-50	-60

**ROCK MASS CLASSIFICATION**

Class III: Fair Rock

**ROCK MASS RATING**

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**Rock Mass Rating (AASHTO)**

Project: 42294.1.1 (B-5135) Bridge No. 1 on SR-1512 over Hunting Creek

Boring Location: B1-A, RS-2

Stratigraphic Depth Range: 34.6'-35.3'

**A. CLASSIFICATION PARAMETERS AND THEIR VALUES**

Parameter	Range of Values			
	Point-load Strength Index	590 - 1215 psi	312 - 590 psi	139-312 psi
1	Strength of Intact Rock Material	>1215psi	590 - 1215 psi	139-312 psi
	Uniaxial Comp. Strength	>30 ksi	15 - 30 ksi	3.6 - 7.5 ksi
	Rating	15	12	4
2	Drill Core Quality - RQD	90 - 100%	75 - 90%	50 - 75%
	Rating	20	17	13
3	Spacing of Discontinuities	>10 ft	3 - 10 ft	1 - 3 ft
	Rating	30	25	20
4	Condition of Discontinuities	Very Rough Surfaces	Slightly Rough Surface Separation <0.5 in	Slickensided Surfaces or Gouge <0.2 in thick or Separation 0.05 - 0.2in Continuous Joints
	Rating	25	20	12
5	Inflow per 30 ft tunnel length (Joint Water Pressure)/ (Major Principle $\sigma$ )	None	< 400 gal/hr	400 - 2000 gal/hr
	Rating	10	7	4
	General Conditions	Completely Dry	Moist only	Under Moderate Water Pressure
	Rating	10	7	4
	Groundwater			
	Rating			
	Strength Value			
	Rating			
	Quality Value			
	Rating			
	Disc. Spacing			
	Rating			
	Disc. Condition			
	Rating			
	Adjust to Rating			

**B. RATING ADJUSTMENT FOR DISCONTINUITY ORIENTATIONS**

Strike and Dip Orientations	Very Favorable	Fair	Unfavorable	Very Unfavorable
Foundations	0	-2	-15	-25
Slopes	0	-5	-50	-60

**ROCK MASS CLASSIFICATION**

Class III: Fair Rock

**ROCK MASS RATING**

57

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAY  
MATERIALS & TESTS UNIT  
PHYSICAL TESTING LABORATORY**

T. I. P. No. B-5135

**REPORT ON SAMPLES OF ROCK COMPRESSION**

**Project** 42291.1.1      **County** Burke      **Owner** \_\_\_\_\_  
**Date: Sampled** 1/26/2012      **Received** 1/30/2012      **Reported** 2/6/12  
**Sampled from** \_\_\_\_\_      **By** \_\_\_\_\_  
**Submitted by** C. A. Dunnagan      2006 Standard Specifications  
**Tested By** David Dowdy      **Date Tested** 2/3/2012

**TEST RESULTS**

Proj. Sample No.		RS-1	RS-2			
Lab. Sample No.						
Diameter	in	1.870	1.871			
Specimen Height	in	3.956	3.912			
Area	in <sup>2</sup>	2.746	2.749			
H/D Ratio		2.12	2.09			
Weight	lbf	1.09	1.05			
Unit Weight	lbf/ft <sup>3</sup>	173.4	168.7			
Ultimate	lbf	27600	38800			
Ultimate	ksi	10.049	14.112			
Ultimate Corrected	ksi	10.1	14.19			
Sec Mod @ 40%	Mpsi	4.94	3.09			
Station		13+03	13+03			
Offset		3.5"LT	3.5"LT			
Alignment						
Depth (ft)		28.60	34.60			
	to	29.40	35.30			

cc:

*V. O. Cordle*  
 \_\_\_\_\_  
 Physical Testing Engineer

**Dunnagan, Charles A**

**From:** Dowdy, Lemuel D  
**Sent:** Monday, February 06, 2012 11:31 AM  
**To:** Wainaina, Njoroge W; Bodenheimer, Gregory C; Dunnagan, Charles A; Babalola, Michael R  
**Cc:** Miller, Daniel I  
**Subject:** B-5135 Rock  
**Attachments:** B-5135-20120126.XLS; B-5135-20120126.pdf

In addition to this, here are results for split tensile strengths.

Sample	Length	Diameter	Area	Load	PSI
RS-1	4.07	1.87	11.96	25560	2140
RS-2	3.58	1.87	10.52	15640	1490

David Dowdy  
 NCDOT Materials and Tests  
 Physical Testing Lab  
 919-439-3624

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15/15