

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33540.1.1 (B-4193) F.A. PROJ. BRZ-1123(10)
 COUNTY McDOWELL
 PROJECT DESCRIPTION BRIDGE NO. 51 ON SR 1123 (BETHLEHEM RD.)
OVER CAMP CREEK

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.

PROJECT: 33540.1.1 ID: B-4193

PERSONNEL

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C.J. COFFEY

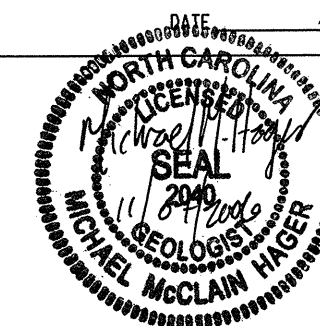
R.D. CHILDERS

INVESTIGATED BY M.M. HAGER, LG

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SUBMITTED BY WD FRYE, JR, LG

DATE 11/06/2006



DRAWN BY: M.M. HAGER

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 33540.11 (B-4193)	SHEET NO. 2
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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 1206, 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: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .		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 (CP) - 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.					
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING		ROCK HARDNESS					
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH - ROCK FRESH, CRYSTALLINE BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> 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 MINDR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.		COMPRESSIONIBILITY SLIGHTLY COMPRESSIBLE - LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE - LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE - 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 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		WEATHERING ROCK FRESH, CRYSTALLINE BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. 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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.	
CONSISTENCY OR DENSENESS		GROUND WATER		MISCELLANEOUS SYMBOLS		ROCK HARDNESS					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		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		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 TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL		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.					
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING					
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		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 - TRICONE REFUSAL v - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA. - WEATHERED γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT		<input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST		TERM SPACING MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FEET LESS THAN 0.16 FEET					
SOIL MOISTURE - CORRELATION OF TERMS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING		BEDDING					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:		TERM SPACING MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FEET LESS THAN 0.16 FEET		TERM THICKNESS > 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET					
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 - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		<input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING w/ ADVANCER <input type="checkbox"/> TRICONE * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG-CARB. <input type="checkbox"/> CORE BIT		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.		BENCH MARK: BM#1: RAILROAD SPIKE IN TREE 36' LT OF -BL- STATION 14+14 ELEVATION: 1486.56 FT.					
PLASTICITY		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION		NOTES:					
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		<input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST		INDURATION		NOTES:					
COLOR		EQUIPMENT USED ON SUBJECT PROJECT									
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.		<input type="checkbox"/> PORTABLE HOIST									



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 2006

STATE PROJECT: 33540.1.1 (B-4193)
FA PROJECT: BRZ-1123 (10)
COUNTY: McDOWELL

DESCRIPTION: Replace Bridge No. 51 over Camp Creek on SR 1123
at -L- Station 12+25.5

SUBJECT: Geotechnical Report- Inventory

Project Description

This project is located in southwest McDowell County, approximately 4 miles southeast of the town of Old Fort and 1.75 miles east of the intersection of SR 1123 (Bethlehem Rd.) and SR 1103 (Bat Cave Rd.). Camp Creek at this site is about 15' wide on average and runs across a channel bed of well-graded sands. Stream banks are five to eight feet in height. Camp Creek's floodplain is 300 to 400 feet wide at the site area. Rock was found outcropping in the stream 40' left of -L- station 11+85, about 50' downstream of the existing structure.

Bridge 51 is a dual lane, single span timber bridge built on concrete-encased timber piles. The proposed replacement structure will be built along the existing alignment and will traverse Camp Creek with one span of length of 65' and width of 30' built on a 60° skew.

The Geotechnical Engineering Unit conducted a foundation investigation for this project in October of 2006. Two Borings were made at each proposed bent utilizing a CME 550 X drill with 8" hollow stem augers. Standard Penetration Tests (SPT's) were performed in each boring on five-foot intervals. Ten soil samples were submitted to the Materials and Tests Unit soils lab for quality analysis.

Soil and Rock Materials

The materials found on this project consist of embankment, alluvium, saprolite, and weathered rock (gneiss). Crystalline rock (gneiss) was encountered in three of the borings but was not cored or sampled.

The embankment materials consist of approximately seven to ten feet of very soft to medium stiff sandy clayey silt with intermittent rip rap boulders. Minor amounts of coarse angular to subangular gravel were encountered throughout the embankment.

Generally, the alluvial soils encountered during the drilling of this project consisted of a fining upward sequence of sediments. The upper most layer ranged in overall composition from a very loose slightly clayey fine to coarse sand to soft silty clay and ranged in thickness from about 3' to 6'. This layer is underlain by a pinching, loose to dense, coarse sand and gravel layer that ranges in thickness from 2' to about 5'.

Saprolite, encountered in all of the borings, varied greatly in unit thickness from 4.5' to almost 20'. Qualitatively the saprolite encountered ranged from a very severely weathered, stiff sandy silt to a medium dense to very dense fine to coarse sand. Intermittent ledges of weathered rock (gneiss) or crystalline rock (gneiss) were encountered sporadically in the saprolite and were generally about one foot thick.

The weathered rock (gneiss) crushes easily to silty fine to coarse sand and is interlayered in places with very dense saprolite and crystalline rock (gneiss) ledges averaging approximately one foot in thickness. Weathered rock was found to be inconsistent across the site, varying in thickness from 0 to 12'. Weathered rock was not encountered at EB2-B, which terminated by auger refusal (AR) on crystalline rock (Gneiss) directly in contact with very dense fine to coarse sandy saprolite.

Crystalline rock (Gneiss) was encountered but not cored in three of the borings. Rock materials and their weathered constituents encountered at this site are probably derivative of the Ashe Formation biotite gneiss.

Bent Descriptions

End Bent One (EB1)

This bent lies in the floodplain approximately 25' west of Camp Creek. The bent falls on top of 8-9' of embankment material consisting of very soft to soft sandy clayey silt with intermittent loose rip rap boulders through out the embankment.

Alluvium consisting of up to 3' of very loose sand deposited above a 2.5-5' pinching, basal, medium dense, coarse sand and gravel unit, all found below the embankment material.

Directly below the alluvium, the saprolite on the left side (EB1-A) was 9.5' of medium dense to dense, fine to coarse sand overlying 10.3' of severely weathered rock (gneiss). Ledges of weathered rock (gneiss) or crystalline rock (gneiss) were encountered in the saprolite on the left side. The saprolite at EB1-B was 4.5' thick overlying 12.4' of weathered rock (gneiss).

Crystalline rock (gneiss) was encountered at EB1-A at elevation 1542.0' and was drilled a total of 0.2' before the boring was terminated at a depth of 32.5'. Boring EB1-B was terminated at a depth of 33.7' in weathered rock (gneiss). No crystalline rock was encountered in EB1-B.

End Bent Two (EB2)

This Bent lies chiefly on the east bank of Camp Creek approximately 10' from the edge of the stream channel. It is built upon approximately 7-9' of embankment material consisting of very soft to soft sandy clayey silt with rip-rap boulders armoring the face of the end bent slope.

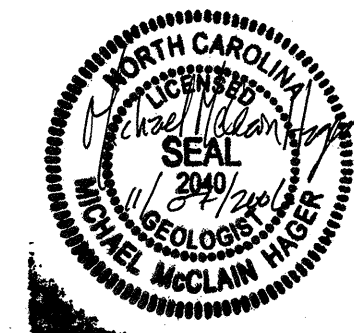
Alluvial sediments encountered on the east bank of Camp Creek also showed a fining upward sequence. The fine grained, cohesive upper layer in EB2 borings varied in classification from very soft fine sandy clayey silt in the left side boring (EB2-A) to soft silty clay in the right side boring (EB2-B). Below 2.5-6' of fine-grained alluvium, a pinching layer of up to 2' of loose coarse sand and gravel was found.

Saprolite in EB2 ranged from 11' to 19' of stiff sandy silt to medium dense to very dense fine to coarse sand. The right side boring (EB2-B) showed a greater degree of weathering through the first 8' of saprolite where a layer of stiff sandy silt was encountered above a layer of dense to very dense fine to coarse sand.

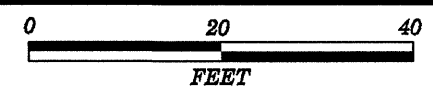
10.4' of weathered rock (gneiss) that crushes to a silty sand was encountered in the left side boring (EB2-A). Weathered rock (gneiss) was not discernable during drilling the right side boring (EB2-B) where saprolite was found to be in direct contact with underlying crystalline rock (gneiss) at a depth of 34'.

Gneissic crystalline rock was determined to lie nearly flat across EB2 as it was encountered at 1452' and 1451' in the left and right side borings respectively. In the left side boring (EB2-A), auger refusal (AR) was achieved at elevation 1452.0' and the boring was terminated at the top of gneissic crystalline rock. Boring EB2-B was terminated in crystalline rock (gneiss) after penetrating 0.4' to a final depth of 1450.6'

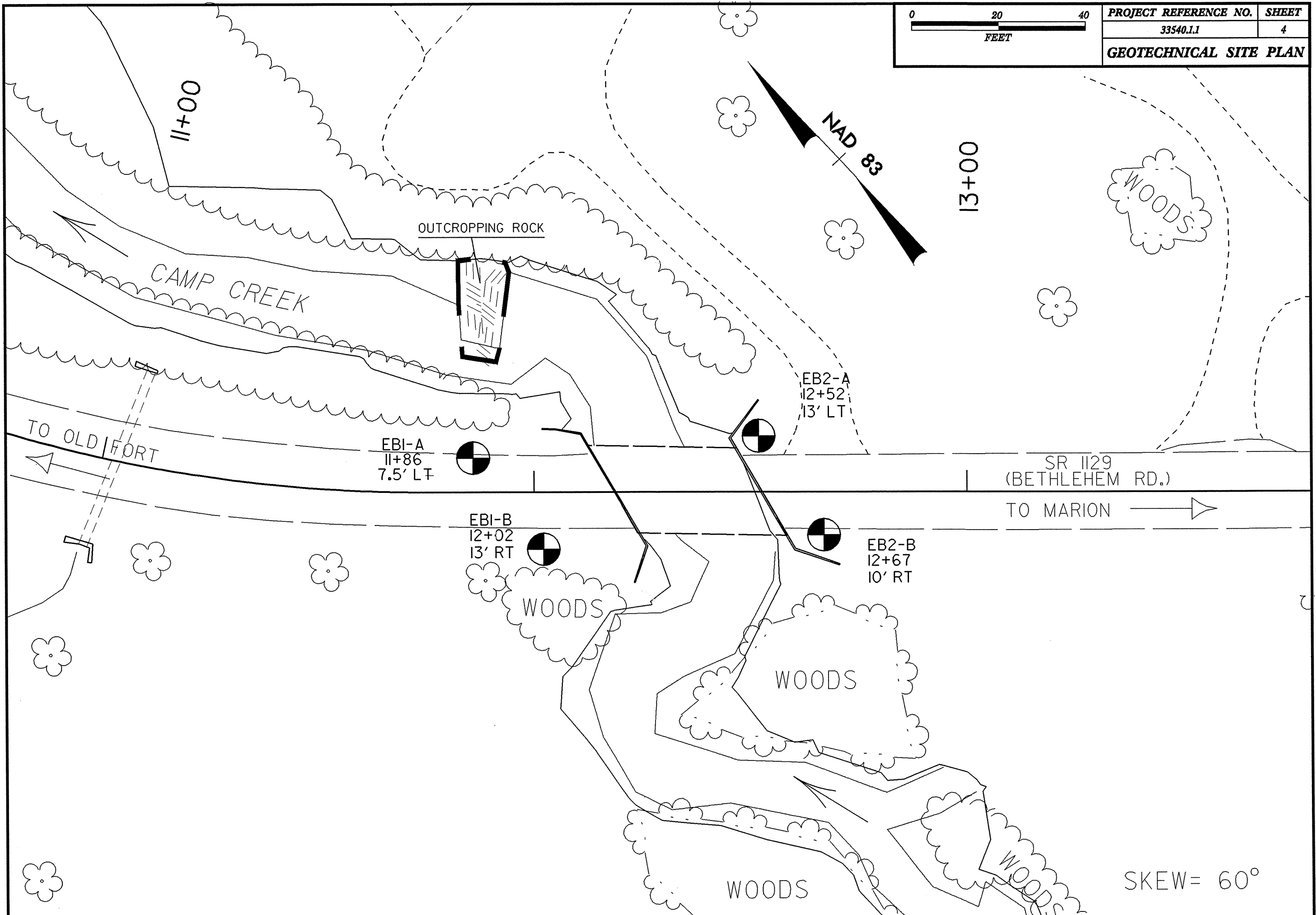
Respectfully Submitted,



Michael McClain Hager, LG



PROJECT REFERENCE NO.	SHEET
33540.1.1	4
GEOTECHNICAL SITE PLAN	



1520

1510

1500

1490

1480

1470

1460

1450

1440

1430

11+70

11+80

11+90

12+00

12+10

12+20

12+30

12+40

12+50

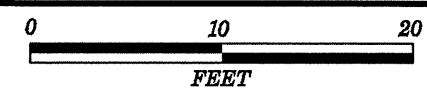
12+60

12+70

12+80

12+90

13+00



PROJECT REFERENCE NO.

SHEET

33540.1.1 (B-4193)

5

PROFILE 15' RT OF -L-

SS-1
SS-2
SS-3
SS-4

EB1-B
12+02
13' RT

SS-5
SS-6
SS-7
SS-8
SS-9

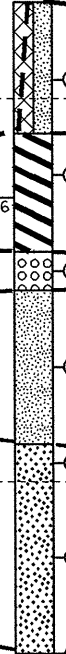
EB2-B
12+67
10' RT

EXISTING GROUND

WATER SURFACE 10/06



BT @ 33.7'
ELEV = 1451.3'



AR @ 34.4'
(ELEV = 1450.59')

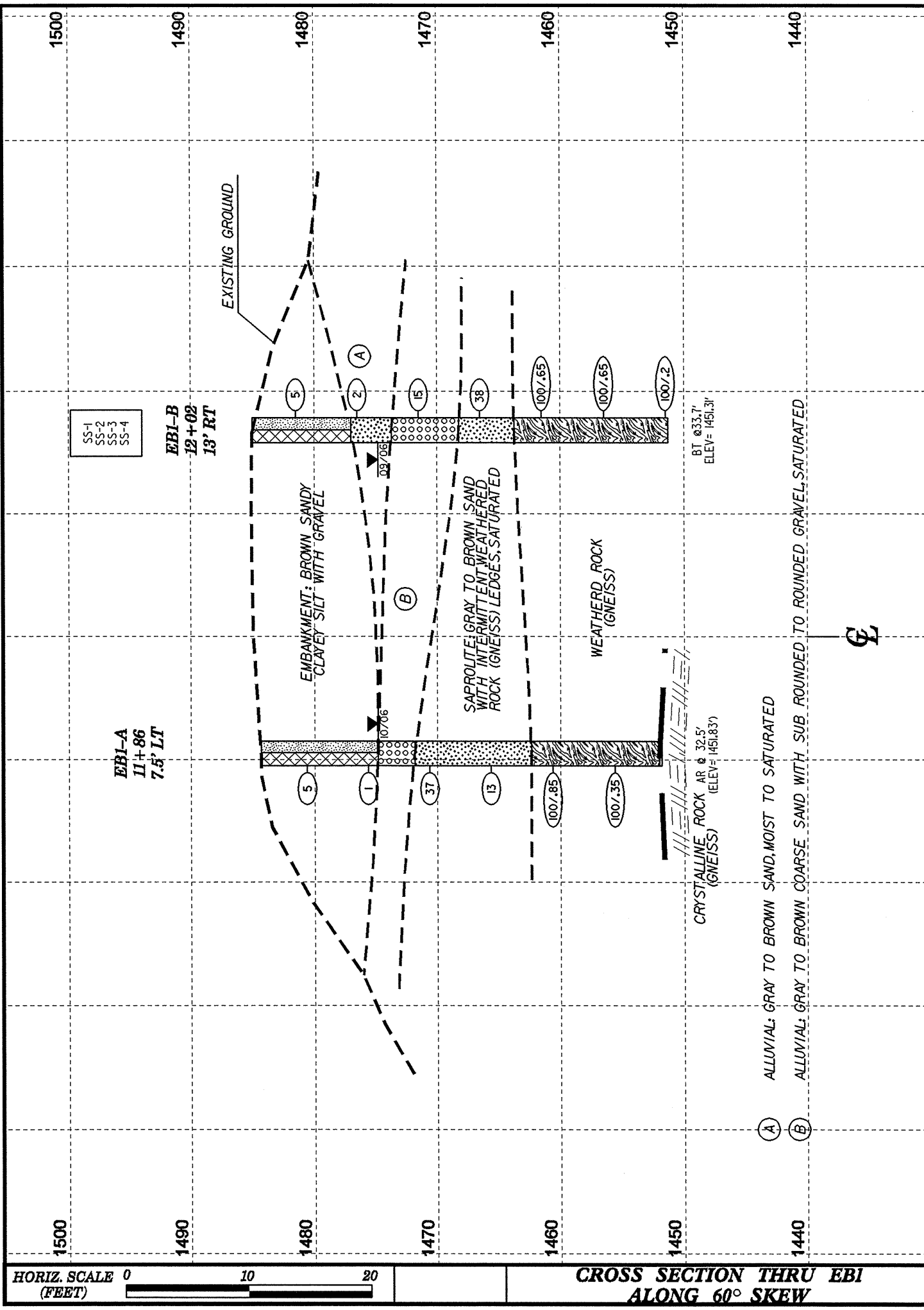
SAPROLITE: BROWN TO GRAY TO WHITE, SANDY SILT, WET

SAPROLITE: BROWN TO GRAY TO WHITE, FINE TO COARSE SAND, WET

WEATHERED ROCK

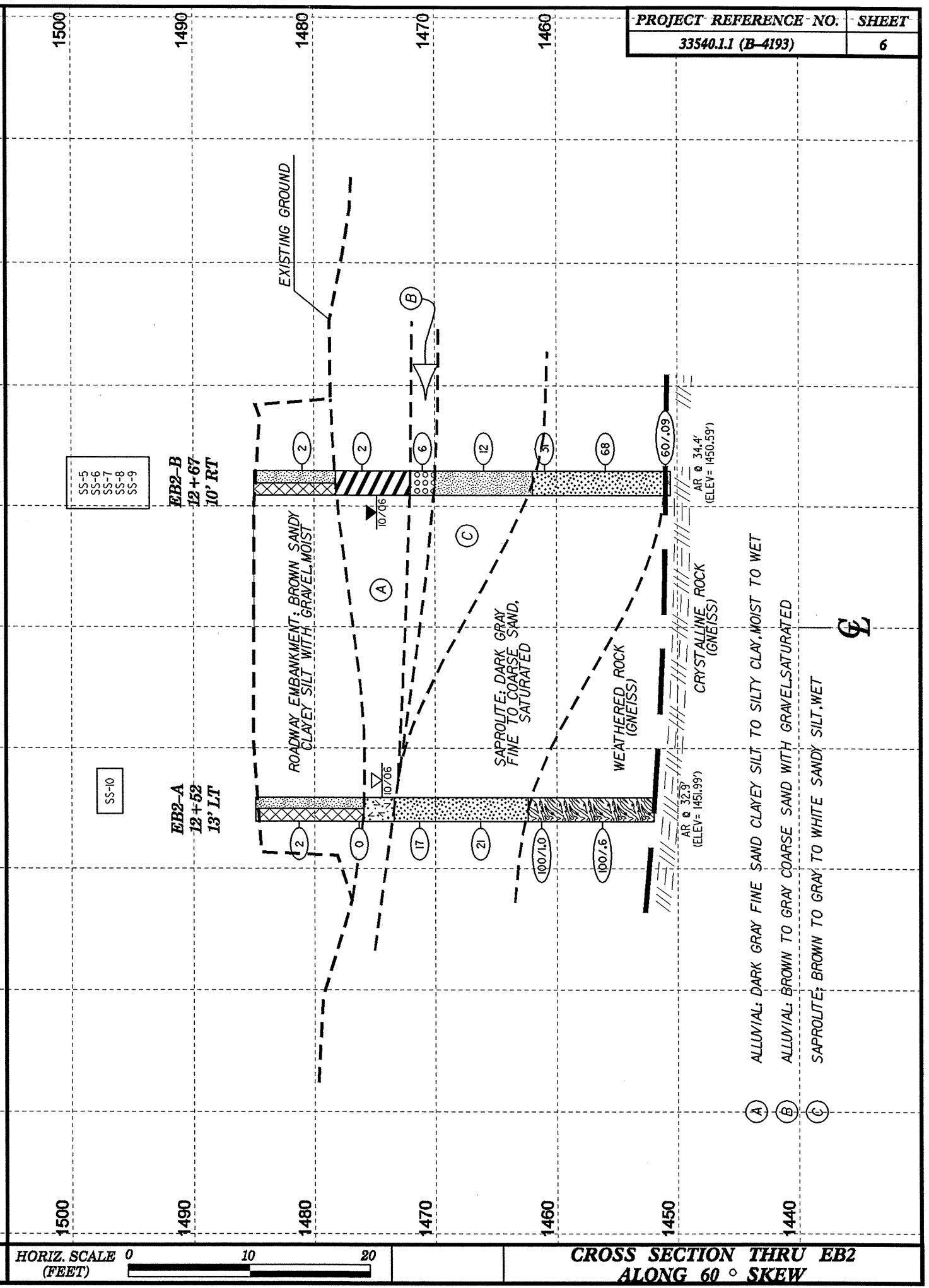
CRYSTALLINE ROCK (GNEISS)

- (A) EMBANKMENT: BROWN SANDY CLAYEY SILT WITH GRAVEL, MOIST
- (B) ALLUVIAL: DARK GRAY TO BROWN SLIGHTLY COARSE SAND TO SILTY CLAY, MOIST TO SATURATED
- (C) ALLUVIAL: BROWN TO GRAY COARSE SAND AND GRAVEL, SATURATED



HORIZ. SCALE 0 10 20 (FEET)

CROSS SECTION THRU EBI ALONG 60° SKEW



HORIZ. SCALE 0 10 20 (FEET)

CROSS SECTION THRU EB2 ALONG 60° SKEW

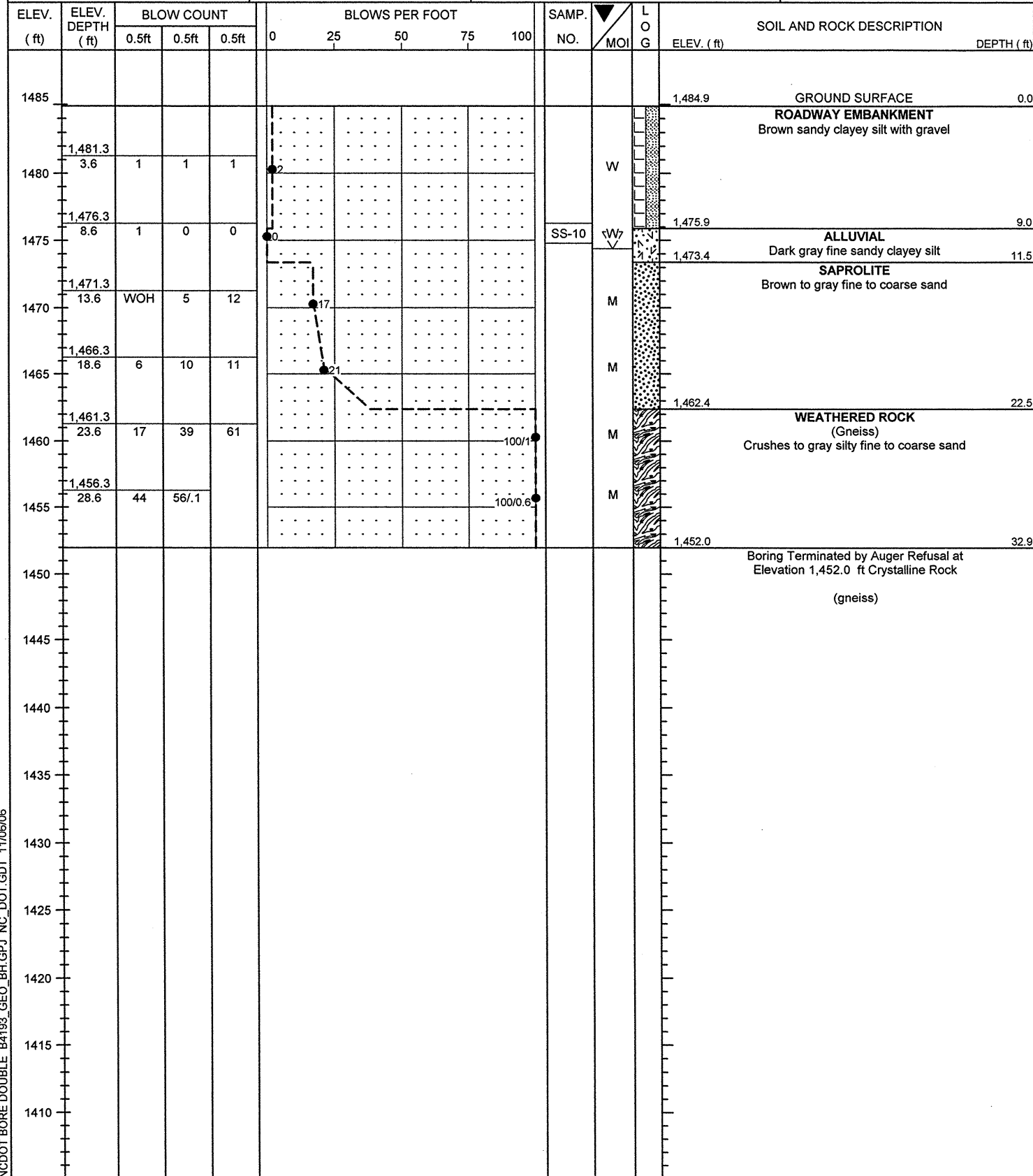


PROJECT NO. 33540.1.1		ID. B-4193		COUNTY McDowell		GEOLOGIST Daniel, T. B.									
SITE DESCRIPTION Bridge No. 51 over Camp Creek over SR 1123 (Bethlehem Rd.)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 11+86		OFFSET 8 ft LT		ALIGNMENT L									
COLLAR ELEV. 1,484.3 ft		TOTAL DEPTH 32.5 ft		NORTHING 677,518		EASTING 1,061,341									
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
START DATE 10/02/06		COMP. DATE 10/02/06		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 32.3 ft									
ELEV. (ft)	ELEV. 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						
1485													1,484.3	0.0	GROUND SURFACE
	1,480.6	3	3	2									1,474.8	9.5	ROADWAY EMBANKMENT Brown sandy clayey silt with gravel
1480	3.7												1,471.8	12.5	ALLUVIAL Gray coarse sand and gravel
	1,475.6	2	1	0									1,468.6	15.7	SAPROLITE Gray to brown fine to coarse sand with intermittent weathered rock (gneiss) ledges.
1475	8.7												1,467.6	16.7	
	1,470.6	8	14	23									1,466.6	17.7	
1470	13.7												1,465.6	18.7	
	1,465.6	14	6	7									1,464.6	19.7	
1465	18.7												1,462.3	22.0	WEATHERED ROCK Crushes to silty sand with very dense saprolite and crystalline rock (gneiss) ledges.
	1,460.6	13	20	80									1,452.0	32.3	CRYSTALLINE ROCK not cored
1460	23.7												1,451.8	32.5	Boring Terminated by Auger Refusal at Elevation 1,451.8 ft Crystalline Rock
1455	28.7	44	56/35												(gneiss)

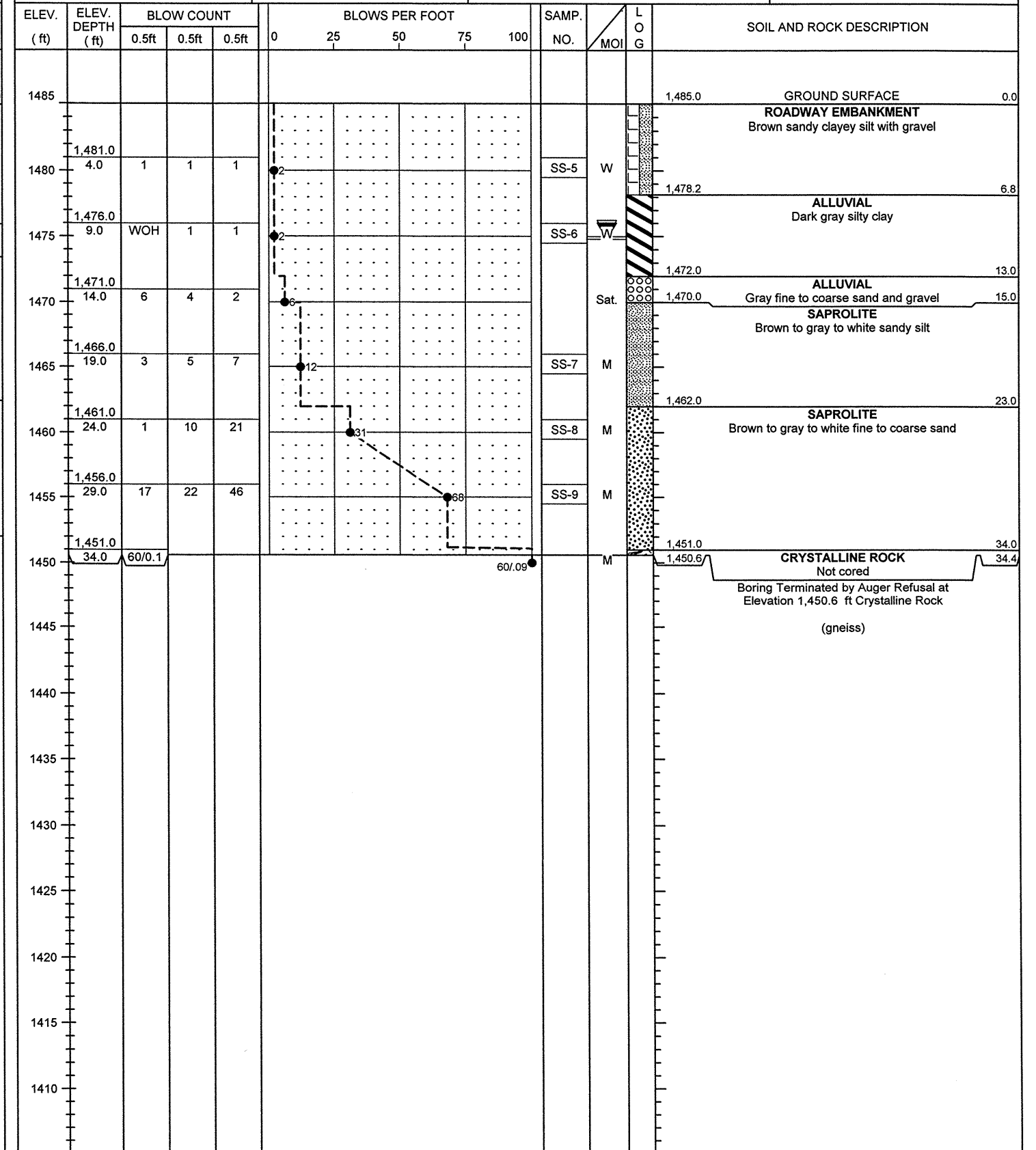
PROJECT NO. 33540.1.1		ID. B-4193		COUNTY McDowell		GEOLOGIST Daniel, T. B.									
SITE DESCRIPTION Bridge No. 51 over Camp Creek over SR 1123 (Bethlehem Rd.)							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 12+02		OFFSET 13 ft RT		ALIGNMENT L									
COLLAR ELEV. 1,485.0 ft		TOTAL DEPTH 33.7 ft		NORTHING 677,491		EASTING 1,061,339									
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
START DATE 09/28/06		COMP. DATE 09/28/06		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A									
ELEV. (ft)	ELEV. 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						
1490													1,485.0	0.0	GROUND SURFACE
	1,481.5	2	2	3									1,477.0	8.0	ROADWAY EMBANKMENT Brown sandy clayey silt with gravel
1485	3.5												1,473.7	11.3	ALLUVIAL Gray fine to coarse sand
	1,476.5	1	1	1									1,468.2	16.8	ALLUVIAL Brown coarse sand and gravel
1480	8.5												1,463.7	21.3	SAPROLITE Brown fine to coarse sand
	1,471.5	5	9	6									1,456.5	28.5	WEATHERED ROCK Crushes to silty sand with very dense saprolite and crystalline rock (gneiss) ledges.
1475	13.5												1,451.5	33.5	Boring Terminated at Elevation 1,451.3 ft Weathered Rock
	1,466.5	20	21	17											(gneiss)
1470	18.5														
	1,461.5	18	52	48/1											
1465	23.5														
	1,456.5	40	60/15												
1460	28.5														
	1,451.5	33.5	100/2												
1455	33.5														

NCDOT BORE DOUBLE B4193 GEO. BH. GPJ NC_DOT.GDT 11/06/06

PROJECT NO. 33540.1.1	ID. B-4193	COUNTY McDowell	GEOLOGIST Daniel, T. B.
SITE DESCRIPTION Bridge No. 51 over Camp Creek over SR 1123 (Bethlehem Rd.)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 12+52	OFFSET 13 ft LT	ALIGNMENT L
COLLAR ELEV. 1,484.9 ft	TOTAL DEPTH 32.9 ft	NORTHING 677,476	EASTING 1,061,393
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 10/03/06	COMP. DATE 10/03/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.9 ft



PROJECT NO. 33540.1.1	ID. B-4193	COUNTY McDowell	GEOLOGIST Daniel, T. B.
SITE DESCRIPTION Bridge No. 51 over Camp Creek over SR 1123 (Bethlehem Rd.)			GROUND WTR (ft)
BORING NO. EB2-B	STATION 12+67	OFFSET 10 ft RT	ALIGNMENT L
COLLAR ELEV. 1,485.0 ft	TOTAL DEPTH 34.4 ft	NORTHING 677,449	EASTING 1,061,388
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 10/03/06	COMP. DATE 10/03/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 34.0 ft



NCDOT BORE DOUBLE B4193_GEO_BH.GPJ NC_DOT.GDT 11/06/06

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: B-4193

T.I.P. ID #: B-4193

REPORT ON SAMPLES OF: Soils for Quality

REPORT ON SAMPLES OF: Soils for Quality

PROJECT:	33540.1.1	COUNTY:	McDowell	Owner:	--
DATE SAMPLED:	9.28.06	DATE RECEIVED:	10.6.06	DATE REPORTED:	10.16.06
SAMPLED FROM:	Bridge	SAMPLED BY:	T. B. Daniel		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

PROJECT:	33540.1.1 (cont.)	COUNTY:	McDowell	Owner:	--
DATE SAMPLED:	10.3.06	DATE RECEIVED:	10.6.06	DATE REPORTED:	10.16.06
SAMPLED FROM:	Bridge	SAMPLED BY:	T. B. Daniel		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Lab Sample No. A	153844	153845	153846	153847	153848	153849	153850	153851
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	0.0	0.0	19.8	0.0	0.0	0.0	0.0	0.0
Passing #10 Sieve %	83	99	58	92	98	97	91	85
Passing #40 Sieve %	76	98	34	71	96	96	84	74
Passing #200 Sieve %	42	30	6	26	49	80	38	26

TEST RESULTS

Project Sample No.	SS-9	SS-10						
Lab Sample No. A	153852	153853						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	0.0	0.0						
Passing #10 Sieve %	97	100						
Passing #40 Sieve %	82	99						
Passing #200 Sieve %	26	77						

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	33	35	79	55	19	7	33	46
Fine Sand - Ret. #270	25	42	11	26	42	19	37	33
Silt 0.05-0.005 mm %	9	5	0.0	7	12	37	16	13
Clay < 0.005 mm %	33	18	10	12	27	37	14	8 _A
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	53	9						
Fine Sand - Ret. #270	28	24						
Silt 0.05-0.005 mm %	7	36						
Clay < 0.005 mm %	12	31						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						

Liquid Limit	35	40	24	40	40	45	37	36
Plastic Index	9	NP	NP	NP	NP	14	NP	NP
AASHTO Classification	A-4 (1)	A-2-4 (0)	A-1-b (0)	A-2-4 (0)	A-4 (3)	A-7-5 (11)	A-4 (1)	A-2-4 (0)
Quantity								
Texture								
Station	12+02	12+02	12+02	12+02	12+67	12+67	12+67	12+67
Hole No.								
Depth (ft) From:	4.0	9.0	14.0	19.0	4.5	9.5	19.5	25.5
To:	5.0	10.0	15.0	20.0	5.5	10.5	20.5	34.5

Liquid Limit	28	44						
Plastic Index	NP	10						
AASHTO Classification	A-2-4 (0)	A-5 (9)						
Quantity								
Texture								
Station	12+67	12+52						
Hole No.								
Depth (ft) From:	29.5	9.1						
To:	30.5	10.1						

Remarks:

A-153844 - 153851

CC:

T. B. Daniel

File

SOILS ENGINEER:

Remarks:

A-153852 & 153853

CC:

T. B. Daniel

File

SOILS ENGINEER:



**FIELD
SCOUR REPORT**

WBS: 33540.1.1 TIP: B-4193 COUNTY: McDowell

DESCRIPTION(1): Bridge No. 51 On SR-1123 over Camp Creek

EXISTING BRIDGE

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

Bridge No.: 51 Length: 35' Total Bents: 2 Bents in Channel: 0 Bents in Floodplain: 2
 Foundation Type: Timber Piles Encased in Concrete

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Scouring of right side End Bent Slope 1 is undercutting the embankment slope

Interior Bents: N/A

Channel Bed: None noted

Channel Bank:

EXISTING SCOUR PROTECTION

Type(3): Wing walls and rip rap armouring of abutments and end bent slopes

Extent(4): Abutment Slopes covered with rip rap

Effectiveness(5): YES

Obstructions(6): N/A

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armor on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Coarse Sand and Gravel

Channel Bank Material(8): Fine to Coarse Sand

Channel Bank Cover(9): grass, small shrubs, and trees

Floodplain Width(10): 400'

Floodplain Cover(11): grass, shrubs, wooded

Stream is(12): Aggrading Degrading Static

Channel Migration Tendency(13): northwest, toward EB1

Observations and Other Comments:

DESIGN SCOUR ELEVATIONS(14)

Feet Meters

BENTS

Comparison of DSE to Hydraulics Unit theoretical scour:
No abutment scour per Hydraulics Unit BSR dated 6/5/06.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank	BANK	BED							
Sample No.	SS-2	SS-3							
Retained #4	0	19.8							
Passed #10	99	58							
Passed #40	98	34							
Passed #200	30	6							
Coarse Sand	35	79							
Fine Sand	42	11							
Silt	5	0							
Clay	18	10							
LL	40	24							
PI	NP	NP							
AASHTO	A-2-4(0)	A-1-b(0)							
Station	12+02	12+02							
Offset	13 RT	13'RT							
Depth	9.0-10.0	14.0-15.0							

Reported by: M.M. HAGER Date: 10/10/2006

Site Photography: McDowell Co. Bridge No. 51



Photo 1: Looking North (Downstream) at bridge. Note scouring of stream bank in lower left-hand portion of photo.



Photo 2: Looking South (Upstream) at bridge.



Photo 3: Looking East (Downstream) at -L-.



Photo 4: Looking at rock outcrop in stream bed located from 30-55' left of -L- STA 11+85