

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33802.1.1 (B-4627)	1	18

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STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33802.1.1 (B-4627) F.A. PROJ. BRZ-1003(32)

COUNTY ROWAN

PROJECT DESCRIPTION BRIDGE OVER THIRD CREEK ON SR 1003
BETWEEN SR 1985 AND NC 801

SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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 UNIT @ (919) 250-4088. THE SUBSURFACE PLANS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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 DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE OR THE 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 THE 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.

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.

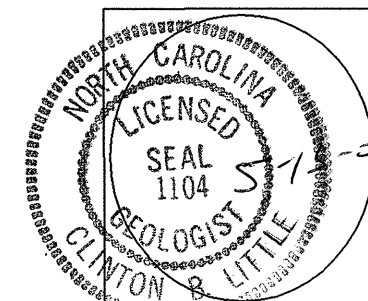
PERSONNEL
J. K. STICKNEY
C. L. SMITH
M. R. MOORE

INVESTIGATED BY J. E. BEVERLY

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE MAY, 2009



SEAL

 SIGNATURE

PROJECT: 33802.1.1 ID: B-4627

DRAWN BY: J. E. ROLFSMEYER

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 33802.11(B-4627)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

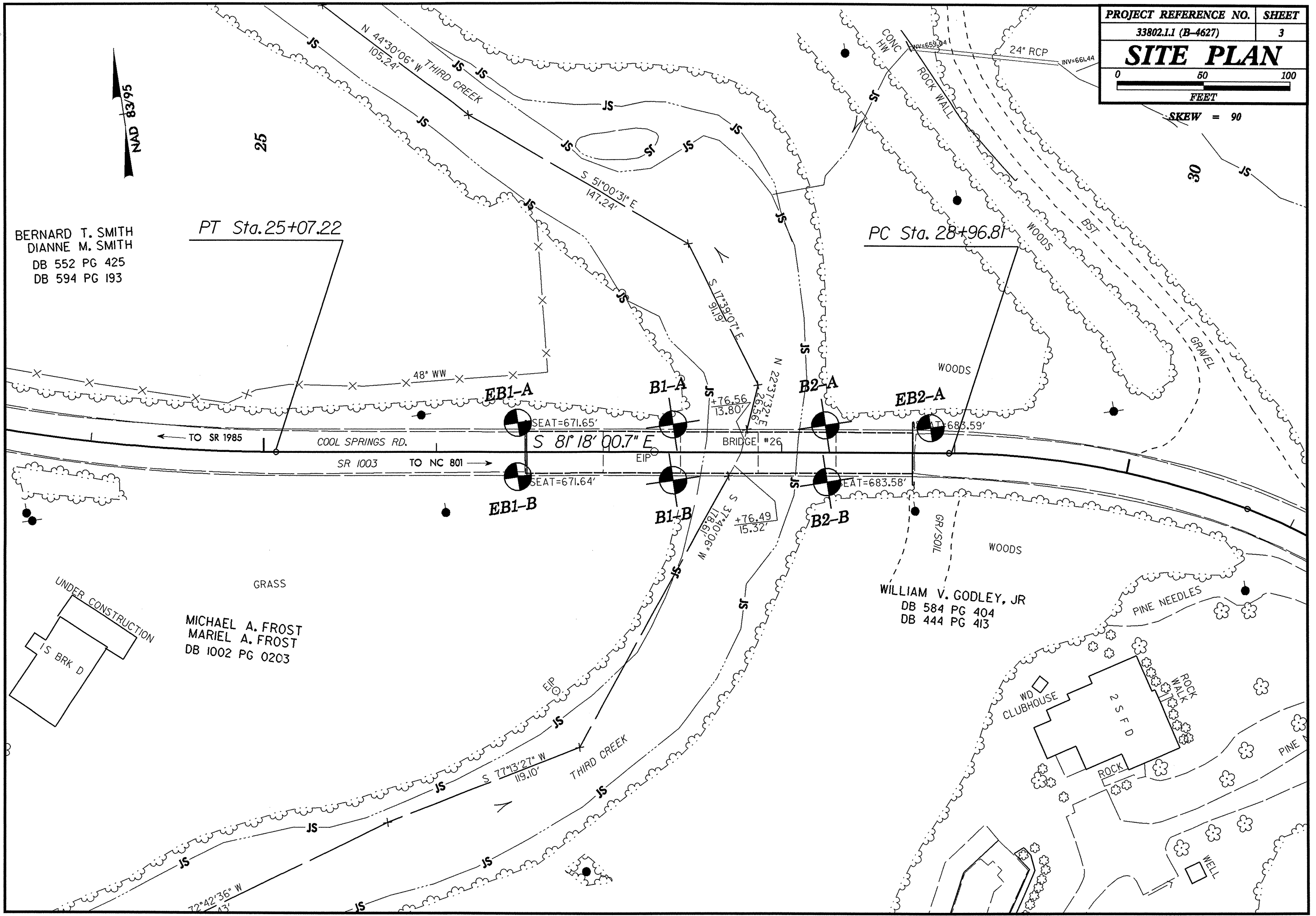
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRANULAR CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH 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: 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 (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 (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.					
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING							
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, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCKS 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.		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 FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCKS 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.			
COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		GROUND WATER 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		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 SOUNDING ROD SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL							
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		TEXTURE OR GRAIN SIZE 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		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 HL - 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 # - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT		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 GROUDED 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 GROUDED 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.					
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		EQUIPMENT USED ON SUBJECT PROJECT 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 2 1/8" TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, Q, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST		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 FEET 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							
PLASTICITY NONPLASTIC 0-5 LOW PLASTICITY 6-15 MED. PLASTICITY 16-25 HIGH PLASTICITY 26 OR MORE		INDURATION 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: BL-4 'BL' STA. 23+99.21 ELEVATION: 674.30 FT.							
COLOR DESCRIPTIONS MAY INCLUDE LIGHT OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		NOTES:									



BERNARD T. SMITH
 DIANNE M. SMITH
 DB 552 PG 425
 DB 594 PG 193

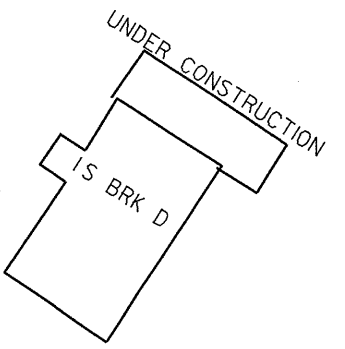
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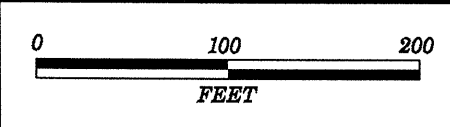
PC Sta. 28+96.81



MICHAEL A. FROST
 MARIEL A. FROST
 DB 1002 PG 0203

WILLIAM V. GODLEY, JR
 DB 584 PG 404
 DB 444 PG 413





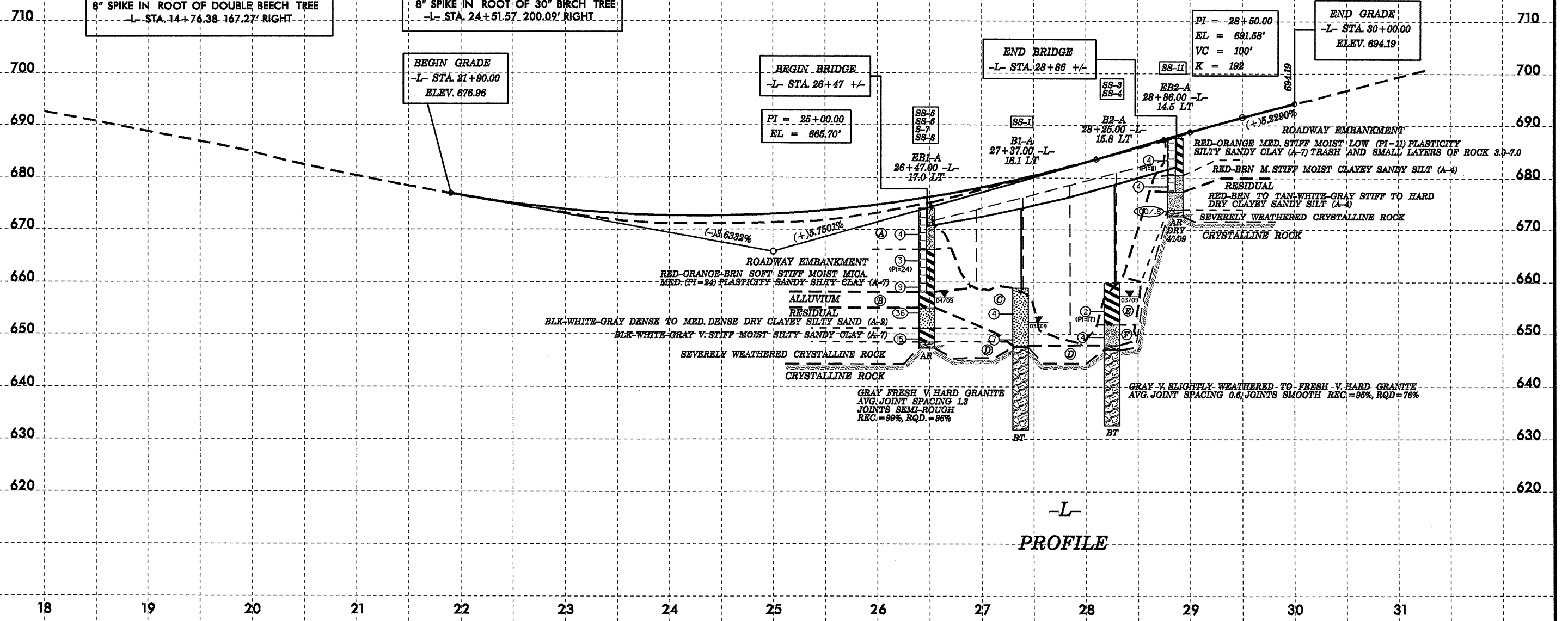
PROJECT REFERENCE NO.	SHEET
33802.1.1 (B-4627)	4
BRIDGE #26 OVER THIRD CREEK ON SR 1003 SKEW = 90	

BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 9300	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 669.3	FT
BASE DISCHARGE	= 13000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 671.2	FT
OVERTOPPING DISCHARGE	= 16000	CFS
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING ELEVATION	= 672.6	FT
DATE OF SURVEY = 01/29/08		
W.S. ELEVATION AT DATE OF SURVEY = 651.3 FT		

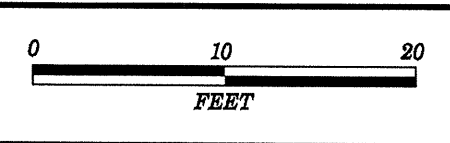
BORING DESCRIPTIONS	
A	TAN-BRN MED. STIFF MOIST MICA CLAYEY SANDY SILT (A-4)
B	RED-ORANGE-BRN STIFF TO V-STIFF SAT. MICA MED. (PI=19) PLASTICITY SILTY SANDY CLAY (A-7)
C	ALLUVIUM, BRN-GRAY LOOSE MOIST SILTY CLAYEY SAND (A-2) GRAVEL LAYER 8.7-9.7
D	SEVERELY WEATHERED CRYSTALLINE ROCK
E	ALLUVIUM, BRN-GRAY SOFT MOIST MED. (PI=17) PLASTICITY SANDY SILTY CLAY (A-7)
F	ALLUVIUM, BRN-GRAY SOFT MOIST CLAYEY SANDY SILT (A-4)

BM#1 ELEVATION = 697.11
N 745056 E 1525588
BL STATION 12+22.154 RIGHT
8" SPIKE IN ROOT OF DOUBLE BEECH TREE
L- STA. 14+74.38-167.27 RIGHT

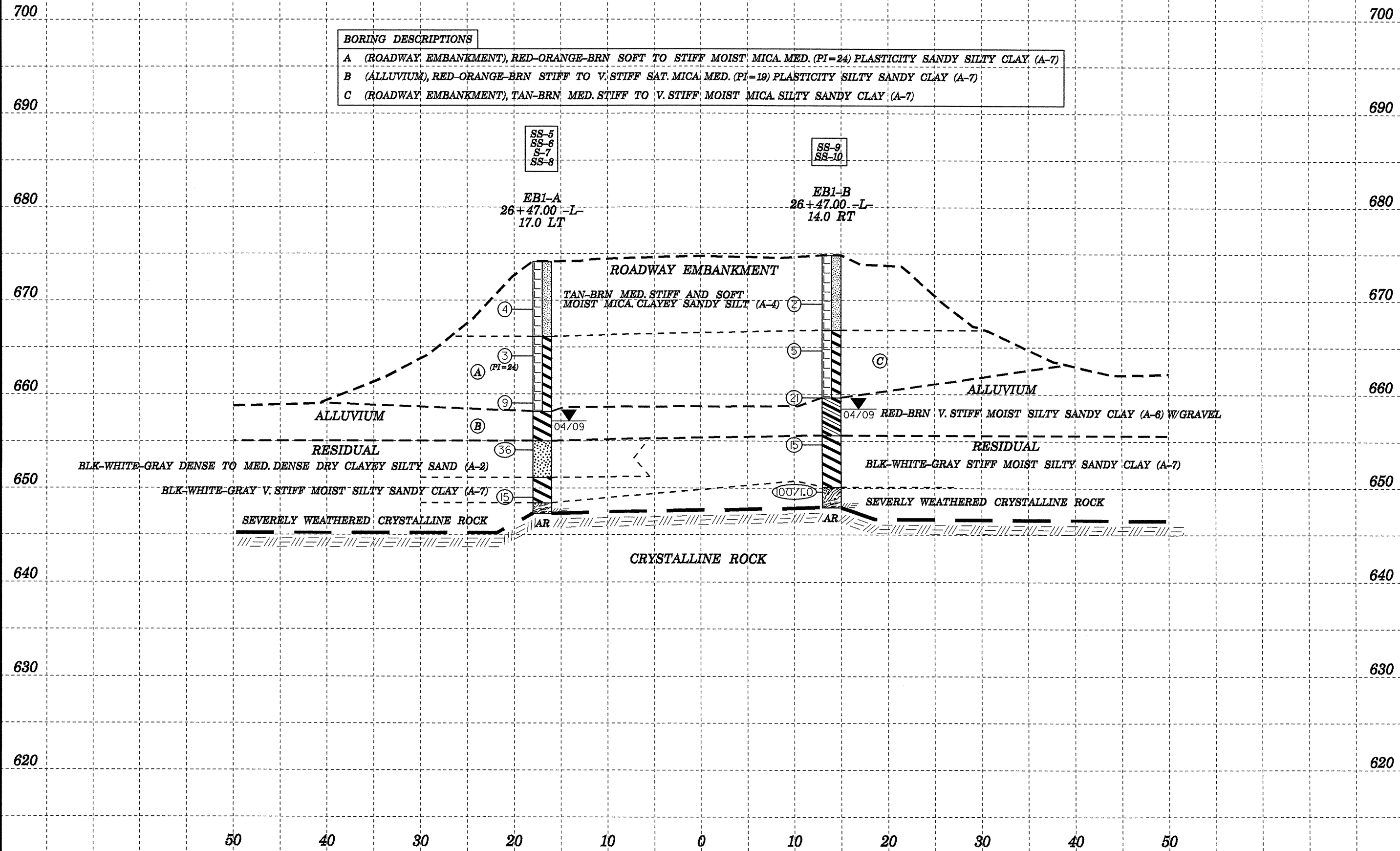
BM#2 ELEVATION = 664.63
N 744451 E 1526456
BL STATION 22+19.205 RIGHT
8" SPIKE IN ROOT OF 30" BIRCH TREE
L- STA. 24+51.57-200.09 RIGHT



-L-
PROFILE



PROJECT REFERENCE NO.	SHEET
33802.1.1 (B-4627)	5
SECTION THRU END BENT ONE	
STA. 26+46.13 -L-	
SKEW = 90	



BORING DESCRIPTIONS

A (ROADWAY EMBANKMENT), RED-ORANGE-BRN SOFT TO STIFF MOIST MICA MED. (PI=24) PLASTICITY SANDY SILTY CLAY (A-7)

B (ALLUVIUM), RED-ORANGE-BRN STIFF TO V. STIFF SAT. MICA, MED. (PI=19) PLASTICITY SILTY SANDY CLAY (A-7)

C (ROADWAY EMBANKMENT), TAN-BRN MED. STIFF TO V. STIFF MOIST MICA SILTY SANDY CLAY (A-7)

SS-5
SS-6
S-7
SS-8

SS-9
SS-10

EB1-A
26+47.00 -L-
17.0 LT

EB1-B
26+47.00 -L-
14.0 RT

ROADWAY EMBANKMENT

TAN-BRN MED. STIFF AND SOFT
MOIST MICA CLAYEY SANDY SILT (A-4)

ALLUVIUM

ALLUVIUM

RESIDUAL

RESIDUAL

BLK-WHITE-GRAY DENSE TO MED. DENSE DRY CLAYEY SILTY SAND (A-2)

BLK-WHITE-GRAY STIFF MOIST SILTY SANDY CLAY (A-7)

BLK-WHITE-GRAY V. STIFF MOIST SILTY SANDY CLAY (A-7)

SEVERLY WEATHERED CRYSTALLINE ROCK

SEVERLY WEATHERED CRYSTALLINE ROCK

CRYSTALLINE ROCK

RED-BRN V. STIFF MOIST SILTY SANDY CLAY (A-6) W/GRAVEL

04/09

04/09

100/1.0

(A) (PI=24)

(3)

(4)

(B)

(9)

(36)

(15)

(2)

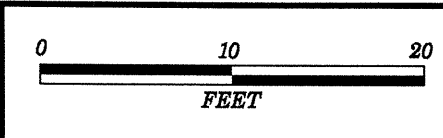
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(21)

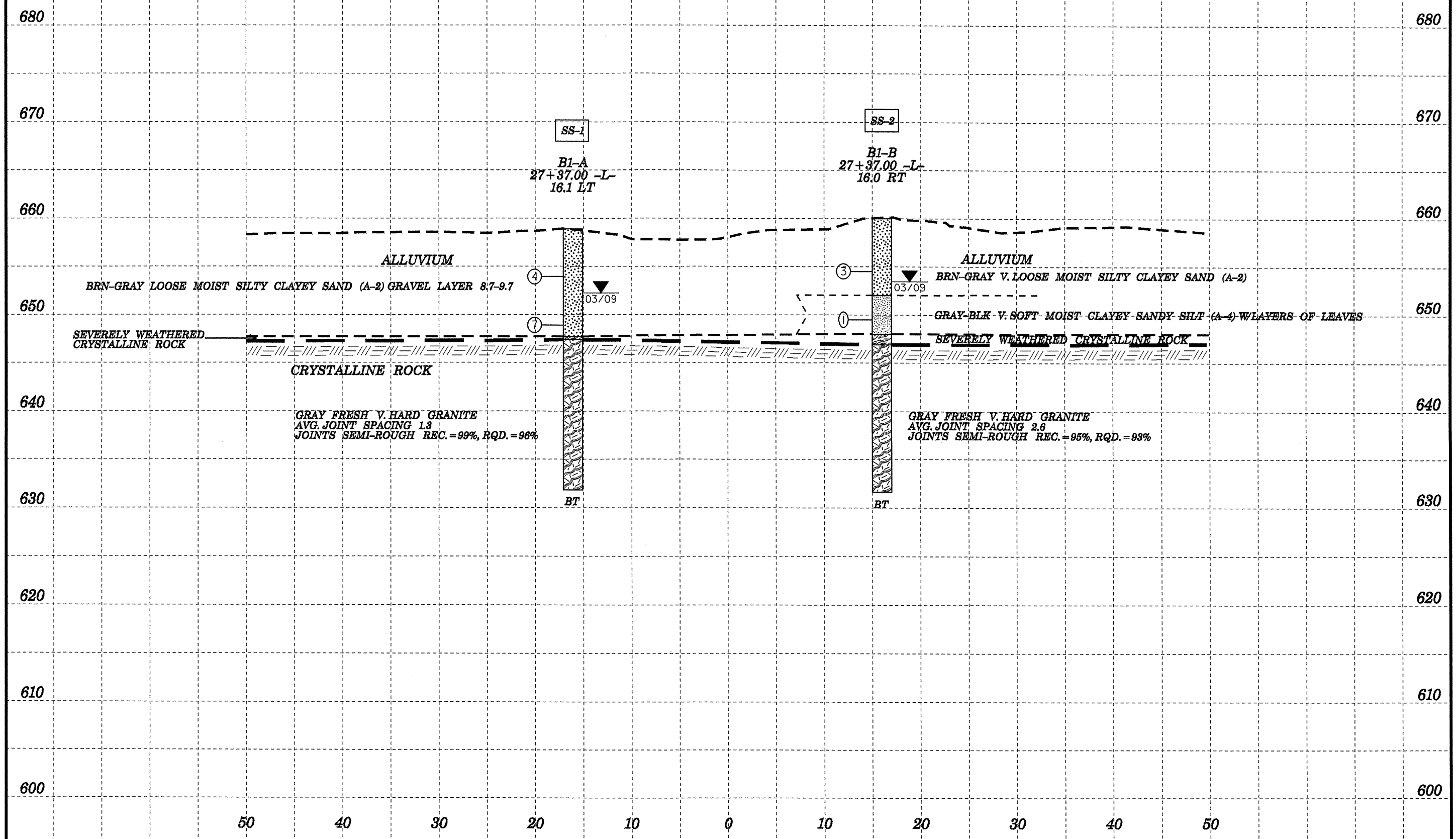
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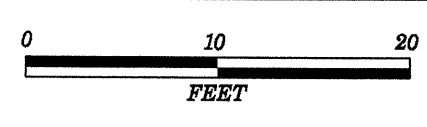
(C)

50 40 30 20 10 0 10 20 30 40 50

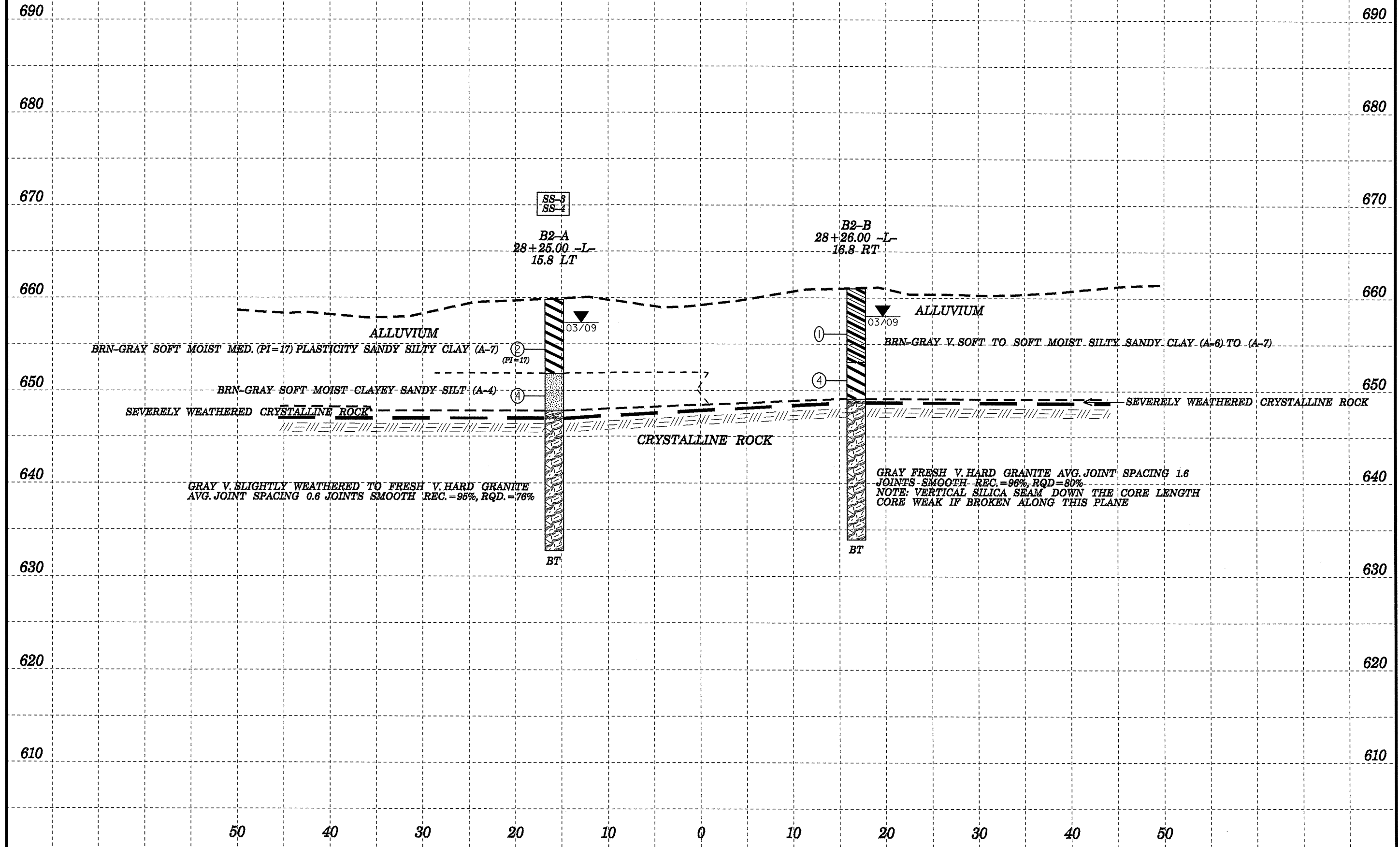


PROJECT REFERENCE NO.	SHEET
33802.1.1 (B-4627)	6
SECTION THRU BENT ONE	
STA. 27+37.00 -L-	
SKEW = 90	





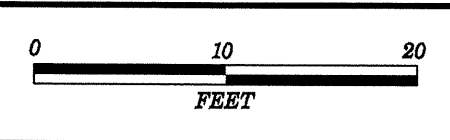
PROJECT REFERENCE NO.	SHEET
33802.1.1 (B-4627)	7
SECTION THRU BENT TWO	
STA. 28+25.00 -L-	
SKEW = 90	



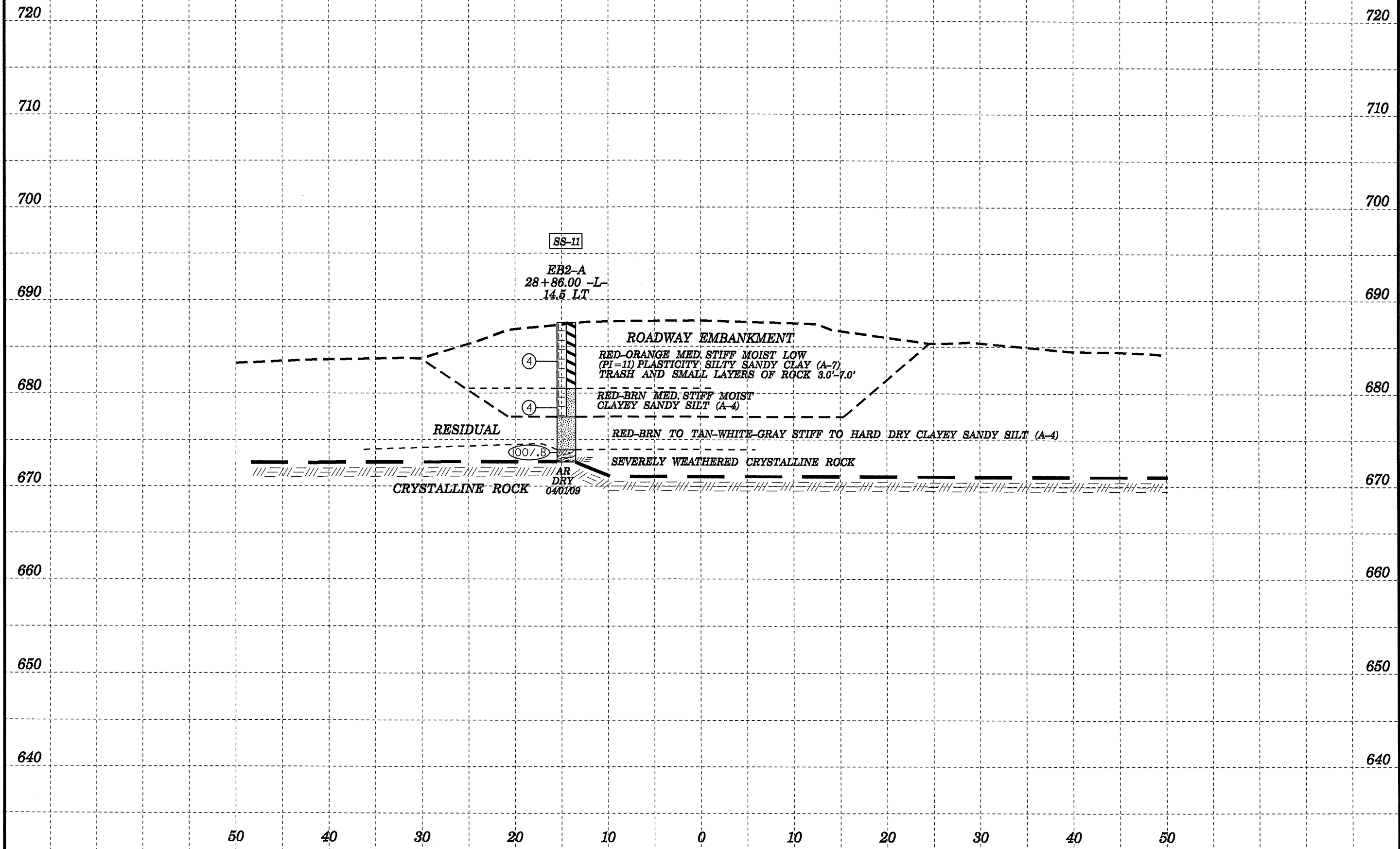
690
680
670
660
650
640
630
620
610

690
680
670
660
650
640
630
620
610

50 40 30 20 10 0 10 20 30 40 50



PROJECT REFERENCE NO.	SHEET
33802.1.1 (B-4627)	8
SECTION THRU END BENT TWO	
STA. 28+86.00 -L-	
SKEW = 90	



PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. EB1-A	STATION 26+47	OFFSET 17ft LT	ALIGNMENT -L-
COLLAR ELEV. 674.1 ft	TOTAL DEPTH 26.8 ft	NORTHING 744,633	EASTING 1,526,693
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/31/09	COMP. DATE 03/31/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 26.8 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
675															674.1	GROUND SURFACE	0.0
670	670.0	4.1													666.1	ROADWAY EMBANKMENT TAN-BRN MED. STIFF MOIST MICA. CLAYEY SANDY SILT (A-4)	8.0
665	665.0	9.1	1	2	2							SS-5	M		666.1	ROADWAY EMBANKMENT RED-ORANGE-BRN SOFT TO STIFF MOIST MICA. MED. (PI=24) PLASTICITY SANDY SILTY CLAY (A-7)	8.0
660	660.0	14.1	1	1	2							SS-6	M		658.1	ALLUVIAL RED-ORANGE-BRN STIFF TO V. STIFF SAT. MICA. MED. (PI=19) PLASTICITY SILTY SANDY CLAY (A-7)	16.0
655	655.0	19.1	2	3	6							Sat.			655.0	RESIDUAL BLK-WHITE-GRAY DENSE TO MED. DENSE DRY CLAYEY SILTY SAND (A-2)	23.0
650	650.0	24.1	9	16	20							S-7	D		651.1	RESIDUAL BLK-WHITE-GRAY V. STIFF MOIST SILTY SANDY CLAY (A-7)	25.7
645			9	8	7							SS-8	M		648.4	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	26.8
640															647.3	Boring Terminated BY AUGER REFUSAL at Elevation 647.3 ft ON CRYSTALLINE ROCK	

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. EB1-B	STATION 26+47	OFFSET 14ft RT	ALIGNMENT -L-
COLLAR ELEV. 674.8 ft	TOTAL DEPTH 26.9 ft	NORTHING 744,602	EASTING 1,526,688
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/31/09	COMP. DATE 03/31/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 26.9 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
675															674.8	GROUND SURFACE	0.0
670	670.6	4.2													666.8	ROADWAY EMBANKMENT TAN-BRN SOFT MOIST MICA. CLAYEY SANDY SILT (A-4)	8.0
665	665.6	9.2	1	1	1								M		666.8	ROADWAY EMBANKMENT TAN-BRN MED. STIFF TO V. STIFF MOIST MICA. SILTY SANDY CLAY (A-7)	8.0
660	660.6	14.2	2	2	3							SS-9	M		659.6	ALLUVIAL RED-BRN V. STIFF MOIST SILTY SANDY CLAY (A-6) W/ GRAVEL	15.2
655	655.6	19.2	4	9	12							SS-10	M		655.6	RESIDUAL BLK-WHITE-GRAY STIFF MOIST SILTY SANDY CLAY (A-7)	19.2
650	650.6	24.2	5	6	9								M		650.1	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	24.7
645			29	51	49								D		647.9	Boring Terminated BY AUGER REFUSAL at Elevation 647.9 ft ON CRYSTALLINE ROCK	26.9

NCDOT BORE SINGLE B4627_GEO_BH_BRDG0026_ROWAN.GPJ NC_DOT_GDT_05/06/09

NCDOT BORE SINGLE B4627_GEO_BH_BRDG0026_ROWAN.GPJ NC_DOT_GDT_05/07/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B1-A	STATION 27+37	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 658.9 ft	TOTAL DEPTH 27.1 ft	NORTHING 744,618	EASTING 1,526,782
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/20/09	COMP. DATE 03/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100								
660															658.9	GROUND SURFACE	0.0	
655	654.9	4.0														ALLUVIAL BRN-GRAY LOOSE MOIST SILTY CLAYEY SAND (A-2) GRAVEL LAYER 8.7-9.7		
650	649.9	9.0	1	2	2													
645			4	4	3											WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	11.2	
640																CRYSTALLINE ROCK GRAY FRESH GRANITE	11.5	
635																		
630																	Boring Terminated at Elevation 631.8 ft IN CRYSTALLINE ROCK	27.1
625																		
620																		
615																		
610																		
605																		
600																		
595																		
590																		
585																		
580																		

NCDOT BORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ_NC_DOT.GDT 09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B1-A	STATION 27+37	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 658.9 ft	TOTAL DEPTH 27.1 ft	NORTHING 744,618	EASTING 1,526,782
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/20/09	COMP. DATE 03/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.5 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (%)		REC. (%)	ROD (%)			
647.4											Begin Coring @ 11.5 ft	
645	647.4	11.5	3.1	07:23/3.1	(3.1)	(2.6)		(15.5)	(14.9)		CRYSTALLINE ROCK GRAY FRESH VERY HARD GRANITE AVG. JOINT SPACING 1.3', JOINTS SEMI-ROUGH	11.5
	644.3	14.6			100%	84%						
640			5.0	09:28/5.0	(5.0)	(4.9)					AVG. Is(50) = 112.84 KSF DIAMETRIAL R1=12, R2=20, R3=20, R4=20, R5=4, RMR=76 ROCK TYPE E	
					100%	98%						
635			5.0	09:42/5.0	(4.9)	(4.9)						
					98%	98%						
630	634.3	24.6										
			2.5	05:09/2.5	(2.5)	(2.5)						
	631.8	27.1			100%	100%						
625												
620												
615												
610												
605												
600												
595												
590												
585												
580												

NCDOT CORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ_NC_DOT.GDT 09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B1-B	STATION 27+37	OFFSET 16ft RT	ALIGNMENT -L-
COLLAR ELEV. 660.0 ft	TOTAL DEPTH 28.4 ft	NORTHING 744,586	EASTING 1,526,777
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/20/09	COMP. DATE 03/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 13.1 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
665															
660														660.0	GROUND SURFACE
655	655.5	4.5	1	1	2										ALLUVIAL BRN-GRAY V. LOOSE MOIST SILTY CLAYEY SAND (A-2)
650	650.5	9.5	1	0	1										ALLUVIAL GRAY-BLK V. SOFT MOIST CLAYEY SANDY SILT (A-4) W/ LAYERS OF LEAVES
645														648.0	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK
640														646.9	CRYSTALLINE ROCK GRAY FRESH GRANITE
635															
630														631.6	Boring Terminated at Elevation 631.6 ft IN CRYSTALLINE ROCK
625															
620															
615															
610															
605															
600															
595															
590															
585															

NCDOT BORE SINGLE B4627_GEO_BH_BRDG0026_ROWAN.GPJ_NC_DOT_GDT_09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B1-B	STATION 27+37	OFFSET 16ft RT	ALIGNMENT -L-
COLLAR ELEV. 660.0 ft	TOTAL DEPTH 28.4 ft	NORTHING 744,586	EASTING 1,526,777
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/20/09	COMP. DATE 03/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 13.1 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (%)		REC. (%)	ROD (%)			
646.9												
645	646.9	13.1	2.3	03:16/2.3	(2.3)	(2.1)		(14.6)	(14.2)		Begin Coring @ 13.1 ft	
	644.6	15.4			100%	91%		95%	93%		CRYSTALLINE ROCK	13.1
			5.0	12:03/5.0	(5.0)	(4.9)					GRAY FRESH V. HARD GRANITE AVG. JOINT SPACING 2.6 JOINTS ARE SEMI-ROUGH	
640	639.6	20.4			100%	98%					AVG. Is(50) = 126.98 KSF DIAMETRIAL R1=12, R2=20, R3=20, R4=20, R5=4, RMR=76 ROCK TYPE E	
			5.0	12:45/5.0	(4.8)	(4.7)						
635	634.6	25.4										
			3.0	08:01/3.0	(2.5)	(2.5)						
	631.6	28.4			83%	83%						
630											Boring Terminated at Elevation 631.6 ft IN CRYSTALLINE ROCK	28.4
625												
620												
615												
610												
605												
600												
595												
590												
585												

NCDOT CORE SINGLE B4627_GEO_BH_BRDG0026_ROWAN.GPJ_NC_DOT_GDT_09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B2-A	STATION 28+25	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 659.8 ft	TOTAL DEPTH 27.1 ft	NORTHING 744,604	EASTING 1,526,869
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/24/09	COMP. DATE 03/24/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.8 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
660													659.8	GROUND SURFACE	0.0
655	655.4	4.4											651.8	ALLUVIAL BRN-GRAY SOFT MOIST MED. (PI=17) PLASTICITY SANDY SILTY CLAY (A-7)	
650	650.4	9.4	0	0	2						SS-3	M	647.8	ALLUVIAL BRN-GRAY SOFT MOIST CLAYEY SANDY SILT (A-4)	12.0
645			1	2	2						SS-4	M	647.0	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	12.8
640														CRYSTALLINE ROCK GRAY V. SLIGHTLY WEATHERED TO FRESH GRANITE	
635															
630													632.7	Boring Terminated at Elevation 632.7 ft IN CRYSTALLINE ROCK	27.1

NCDOT BORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ NC_DOT.GDT 09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. B2-A	STATION 28+25	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 659.8 ft	TOTAL DEPTH 27.1 ft	NORTHING 744,604	EASTING 1,526,869
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 03/24/09	COMP. DATE 03/24/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.8 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft)	ROD (ft)		REC. (%)	ROD (%)			
647											Begin Coring @ 12.8 ft	
645	647.0	12.8	2.3	05:17/2.3	(2.3)	(1.1)		(13.6)	(10.8)		CRYSTALLINE ROCK	12.8
	644.7	15.1	5.0	10:00/5.0	100%	48%		95%	76%		GRAY V. SLIGHTLY WEATHERED TO FRESH V. HARD GRANITE AVG. JOINT SPACING 0.6 JOINTS SMOOTH	
					(4.4)	(3.9)					AVG. Is(50) = 151.29 KSF DIAMETRIAL R1=12, R2=17, R3=10, R4=6, R5=4, RMR=49	
640	639.7	20.1	5.0	29:00/5.0	88%	78%					ROCK TYPE E	
					(5.0)	(4.1)						
635	634.7	25.1	2.0	09:00/2.0	100%	82%						
	632.7	27.1			95%	85%						
630											Boring Terminated at Elevation 632.7 ft IN CRYSTALLINE ROCK	27.1
625												
620												
615												
610												
605												
600												
595												
590												
585												
580												

NCDOT CORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ NC_DOT.GDT 09/14/09

PROJECT NO. 33802.1.1		ID. B-4627		COUNTY ROWAN		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003							GROUND WTR (ft)									
BORING NO. B2-B		STATION 28+26		OFFSET 17ft RT		ALIGNMENT -L-										
COLLAR ELEV. 661.0 ft		TOTAL DEPTH 27.1 ft		NORTHING 744,572		EASTING 1,526,865										
DRILL MACHINE CME-550X		DRILL METHOD NW Casing w/ SPT Core			HAMMER TYPE Automatic											
START DATE 03/24/09		COMP. DATE 03/24/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 12.3 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
665																
														661.0	GROUND SURFACE	0.0
660															ALLUVIAL BRN-GRAY V. SOFT MOIST SILTY SANDY CLAY (A-6)	
	657.1	3.9		1	0	1							M			
655																
	652.1	8.9		2	2	2							M			
650														649.1	ALLUVIAL BRN-GRAY SOFT MOIST SILTY SANDY CLAY (A-7)	11.9
														648.7	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	12.3
645															CRYSTALLINE ROCK GRAY FRESH GRANITE	
640																
635														633.9	Boring Terminated at Elevation 633.9 ft IN CRYSTALLINE ROCK	27.1
630																
625																
620																
615																
610																
605																
600																
595																
590																
585																

NCDOT BORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ NC_DOT_GDT 09/14/09

PROJECT NO. 33802.1.1		ID. B-4627		COUNTY ROWAN		GEOLOGIST Stickney, J. K.						
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003							GROUND WTR (ft)					
BORING NO. B2-B		STATION 28+26		OFFSET 17ft RT		ALIGNMENT -L-						
COLLAR ELEV. 661.0 ft		TOTAL DEPTH 27.1 ft		NORTHING 744,572		EASTING 1,526,865						
DRILL MACHINE CME-550X		DRILL METHOD NW Casing w/ SPT Core			HAMMER TYPE Automatic							
START DATE 03/24/09		COMP. DATE 03/24/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 12.3 ft						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
648.7												
	648.7	12.3	2.3	07:49/2.3	(2.3)	(2.2)		(14.2)	(11.8)		Begin Coring @ 12.3 ft	
	646.4	14.6			100%	96%					CRYSTALLINE ROCK	12.3
645			5.0	23:48/5.0	(5.0)	(4.6)					GRAY FRESH V. HARD GRANITE AVG. JOINT SPACING 1.6', JOINTS SMOOTH	
					100%	92%					NOTE: VERTICAL SILICA SEAM DOWN THE CORE LENGTH. CORE WEAK IF BROKEN ALONG THIS PLANE.	
	641.4	19.6									AVG. Is(50) = 93.39 KSF DIAMETRIAL	
640			5.0	10:42/5.0	(5.0)	(5.0)					R1=12, R2=17, R3=12, R4=6, R5=4, RMR=51	
					100%	100%					ROCK TYPE E	
635			2.5	05:03/2.5	(1.9)	(0.0)						
	636.4	24.6										
	633.9	27.1			76%	0%					Boring Terminated at Elevation 633.9 ft IN CRYSTALLINE ROCK	27.1
630												
625												
620												
615												
610												
605												
600												
595												
590												
585												

NCDOT CORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ NC_DOT_GDT 09/14/09

PROJECT NO. 33802.1.1	ID. B-4627	COUNTY ROWAN	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE #26 OVER THIRD CREEK ON SR 1003			GROUND WTR (ft)
BORING NO. EB2-A	STATION 28+86	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 687.5 ft	TOTAL DEPTH 14.9 ft	NORTHING 744,594	EASTING 1,526,929
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/31/09	COMP. DATE 03/31/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 14.9 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
690															
687.5														GROUND SURFACE	0.0
685	684.4	3.1									S-11	M		ROADWAY EMBANKMENT	
			1	1	3							M		RED-ORANGE MED. STIFF MOIST LOW (PI=11) PLASTICITY SILTY SANDY CLAY (A-7) TRASH (WOOD & PLASTIC) AND SMALL LAYERS OF ROCK 3.0-7.0	
680	679.4	8.1										M		ROADWAY EMBANKMENT	7.0
			1	1	3									RED-BRN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)	10.1
675	674.4	13.1										D		RESIDUAL	
			40	60/3										RED-BRN TO TAN-WHITE-GRAY STIFF TO HARD DRY CLAYEY SANDY SILT (A-4)	13.6
														WEATHERED ROCK	14.9
														SEVERELY WEATHERED CRYSTALLINE ROCK	
670														Boring Terminated BY AUGER REFUSAL at Elevation 672.6 ft ON CRYSTALLINE ROCK	
665															
660															
655															
650															
645															
640															
635															
630															
625															
620															
615															
610															

NCDOT BORE SINGLE B4627_GEO_BH_BRD0026_ROWAN.GPJ NC_DOT.GDT 05/07/09

TEST RESULTS

PROJECT: 33802.1.1 (B-4627)

COUNTY: ROWAN

SITE DESCRIPTION: BRIDGE NO. 26 ON SR 1003 OVER THIRD CREEK

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			%	%	UNIT WT. (d)	VOID RATIO
								C. SAND	F. SAND	SILT	CLAY	10	40	200				
EB1-A																		
SS-5	17.0 LT	26+47 -L-	4.60-5.60	A-4(0)	4	31	5	24.7	44.6	20.6	10.1	100	86	40	N/A	N/A	N/A	N/A
SS-6	17.0 LT	26+47 -L-	9.60-10.60	A-7-5(20)	3	57	24	6.5	24.1	35.0	34.4	100	97	76	N/A	N/A	N/A	N/A
S-7	17.0 LT	26+47 -L-	16.00-18.00	A-7-6(10)	N/A	43	19	16.4	28.8	28.5	26.3	100	91	61	N/A	N/A	N/A	N/A
SS-8	17.0 LT	26+47 -L-	19.60-20.60	A-2-4(0)	36	28	NP	27.6	40.7	21.6	10.1	87	73	35	N/A	N/A	N/A	N/A
EB1-B																		
SS-9	14.0 RT	26+47 -L-	9.70-10.70	A-7-6(7)	5	45	16	16.8	34.9	28.1	20.3	100	92	57	N/A	N/A	N/A	N/A
SS-10	14.0 RT	26+47 -L-	14.70-15.70	A-6(2)	21	28	11	16.8	35.1	21.8	26.3	81	73	45	N/A	N/A	N/A	N/A
B1-A																		
SS-1	16.1 LT	27+37 -L-	4.50-5.50	A-2-4(0)	4	23	4	37.1	37.5	11.2	14.2	100	89	29	N/A	N/A	N/A	N/A
B1-B																		
SS-2	16.0 RT	27+37 -L-	10.00-11.00	A-4(0)	1	36	7	23.1	38.9	19.8	18.2	100	94	42	N/A	N/A	N/A	N/A
B2-A																		
SS-3	15.8 LT	28+25 -L-	4.90-5.90	A-7-6(16)	2	44	17	1.4	19.9	34.1	44.6	100	100	86	N/A	N/A	N/A	N/A
SS-4	15.8 LT	28+25 -L-	9.90-10.90	A-4(0)	4	21	NP	17.4	51.9	18.5	12.2	100	92	41	N/A	N/A	N/A	N/A
EB2-A																		
S-11	14.5 LT	28+86 -L-	0.00-3.00	A-7-5(5)	N/A	41	11	18.0	26.1	29.5	26.3	96	86	59	N/A	N/A	N/A	N/A

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT	Q(MPa) (MPsi)	E(MPa) (MPsi)
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**FIELD
 SCOUR REPORT**

WBS: 33802.1.1 TIP: B-4627 COUNTY: Rowan

DESCRIPTION(1): Bridge #26 over Third Creek on SR 1003

EXISTING BRIDGE

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

Bridge No.: 26 Length: 225' 6" Total Bents: 6 Bents in Channel: 1 Bents in Floodplain: 5
 Foundation Type: Concrete Piers

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: _____

Interior Bents: Minimal erosion at bents 1 and 3

Channel Bed: None

Channel Bank: Steep banks that are unstable with trees leaning in toward creek.

EXISTING SCOUR PROTECTION

Type(3): Very large Rip-Rap

Extent(4): Both sides of approach fill slopes

Effectiveness(5): Fair - Some erosion noted between large Rip-Rap boulders especially on EB1 side

Obstructions(6): None at bridge but debris pile noted about 100 yards down stream.

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, or aggrading.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Sandy silt and silty sand

Channel Bank Material(8): Ref. SS-1 and SS-2 - Sand (A-2-4), and silt (A-4)

Channel Bank Cover(9): Small trees, grass, rock

Floodplain Width(10): Approximately 350'

Floodplain Cover(11): Trees, grass, shrubs

Stream is(12): Aggrading Degrading _____ Undetermined _____

Channel Migration Tendency(13): Moderate to high

Observations and Other Comments: Bridge in poor condition - concrete cracking and deteriorating, rebar broken, concrete can be broken by hand, bridge has undergone many repairs.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

		BENTS											
		B1	B2	B3	B4								
100 YR		649	651										
OT		648	650										

Comparison of DSE to Hydraulics Unit theoretical scour:
 Agree with NCDOT Hydraulics theoretical scour elevations. No adjustments made.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank										
Sample No.										
Retained #4										
Passed #10										
Passed #40										
Passed #200										
Coarse Sand										
Fine Sand										
Silt										
Clay										
LL										
PI										
AASHTO										
Station										
Offset										
Depth										

See Sheet # 15 for "Soil Test Results"

Reported by: JES JKS / JEB

Date: 5/7/2009

CORE PHOTOS



CORE PHOTOS

