

PROJECT: 8.1301801 ID: B-3453

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.1301801 I.D. NO. B-3453
F.A. PROJECT BRSTP-301(10)
COUNTY HALIFAX/EDGEcombe
PROJECT DESCRIPTION REPLACEMENT OF
Bridge No. 23 OVER FISHING CREEK ON US 301

CONTENTS:

NCDOT Geotechnical Unit Soil and Rock Classification Sheet	Sheet 2
Site Vicinity Map	Sheet 3
Boring Location Plan	Sheet 4
Generalized Subsurface Profile 18.0' Right of -L-	Sheet 5
Generalized Subsurface Cross Sections	
End Bent No. 1	Sheet 6A
Interior Bent No. 1	Sheet 6B
Interior Bent No. 2	Sheet 7A
End Bent No. 2	Sheet 7B
Test Boring Logs	Sheets 8 - 17
Rock Core Reports	
Rock Core Photographs	
Summary of Laboratory Test Data	Sheet 18
Rock Core Test Data	Sheet 19
Field Scour Report (Performed August 5, 2003)	Sheets 20 & 21
Grain Size Curves	Sheets 22 & 23

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3453	1	23
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1301801	BRSTP-301(10)	P.E. CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

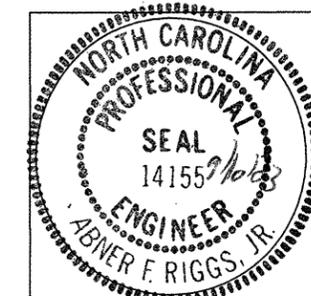
For Letting

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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.



SIGNATURE Abner F. Riggs, Jr.

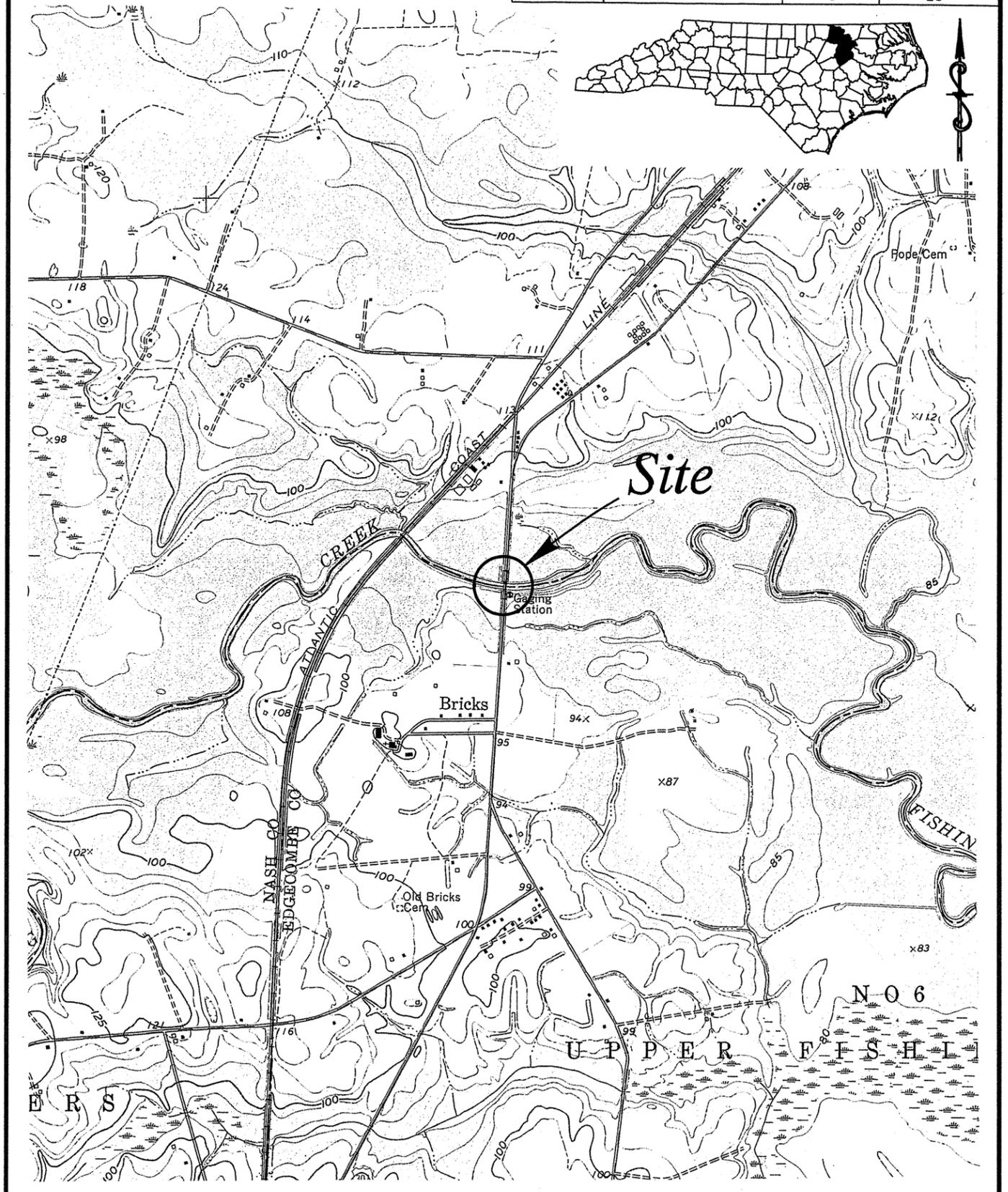
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3453	8.1301801	2	23

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																																																											
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p>VERY STIFF, GRN SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</p>		<p>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)</p> <p>GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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:</p>		<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (R.Q.D.) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - 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.</p> <p>TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																											
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (<math>75\%</math> PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (>85% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> </tr> <tr> <th>GROUP CLASS.</th> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>SYMBOL</th> <td></td> </tr> <tr> <th>% PASSING</th> <td>50 MX</td> <td>30 MX</td> <td>50 MX</td> <td>50 MX</td> <td>50 MX</td> <td>50 MX</td> <td>35 MX</td> </tr> <tr> <th>LIQUID LIMIT PLASTIC INDEX</th> <td>6 MX</td> <td>N.P.</td> <td>40 MX</td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAY GRAVEL AND SAND</td> <td>SILTY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GENERAL RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>P.I. OF A-7-5 \leq L.L. - 30 + P.I. OF A-7-6 $>$ L.L. - 30</p>		GENERAL CLASS.	GRANULAR MATERIALS (75% PASSING #200)							SILT-CLAY MATERIALS (>85% PASSING #200)							ORGANIC MATERIALS		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			GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7								SYMBOL															% PASSING	50 MX	30 MX	50 MX	50 MX	50 MX	50 MX	35 MX	LIQUID LIMIT PLASTIC INDEX	6 MX	N.P.	40 MX	GROUP INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS GRAVEL AND SAND	FINE SAND	SILTY OR CLAY GRAVEL AND SAND	SILTY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT						GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE						<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>MINERALOGICAL COMPOSITION</p> <p>COMPRESSIBILITY</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>			GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p>WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>SEVERE (SEV.) - ALL ROCKS 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.</p> <p>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.</p> <p>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.</p>																			
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<p>NOTES:</p>		<p>BENCH MARK: BL-3i NCDOT Traverse Station Rebar & Cap Stamped (B-3453)</p> <p>Located at Station 28+81.97 -BL-</p> <p>ELEVATION: 99.42'</p>		<p>NOTES:</p>																																																																																																																																																													

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3453	8.1301801	3	23



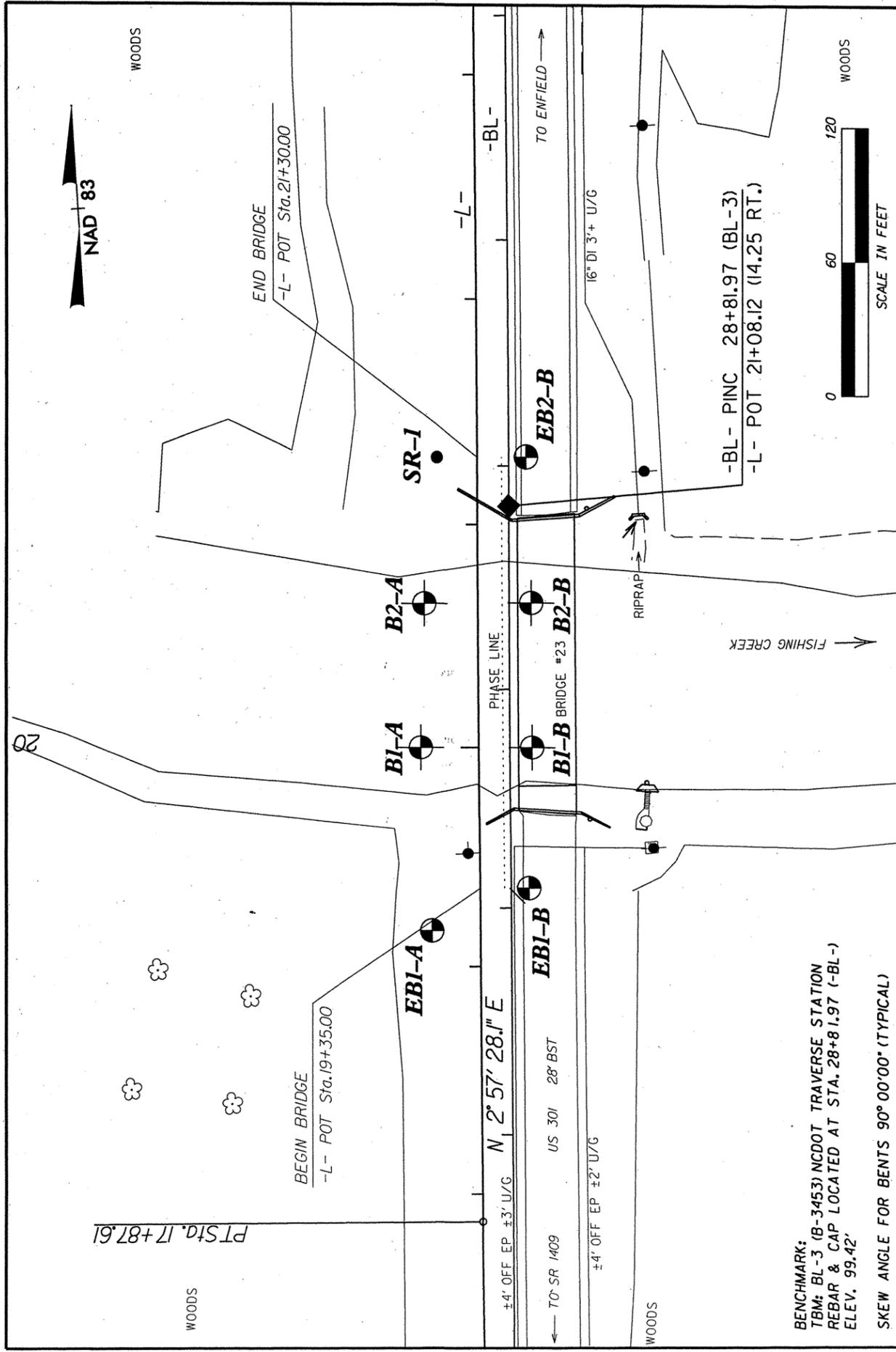
S:\GEO\TECH\2003\03 BRIDGES\B-3453 FISHING CREEK\CADD\B-3453 SITE 1 SITEVIC

SCALE:	1:24,000
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-130



SITE VICINITY MAP

REPLACEMENT OF BRIDGE No. 23
OVER FISHING CREEK ON US 301
STATE PROJECT NO. 8.1301801 TIP NO. B-3453
FEDERAL I.D. NO. BRSTP-301 (10)
HALIFAX/EDGECOMBE COUNTY, NORTH CAROLINA



BENCHMARK:
 TBM: BL-3 (B-3453) NCDOT TRAVERSE STATION
 REBAR & CAP LOCATED AT STA. 28+81.97 (-BL-)
 ELEV. 99.42'

SKREW ANGLE FOR BENTS 90° 00' 00" (TYPICAL)

SCALE:	1" = 60'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-130



BORING LOCATION PLAN

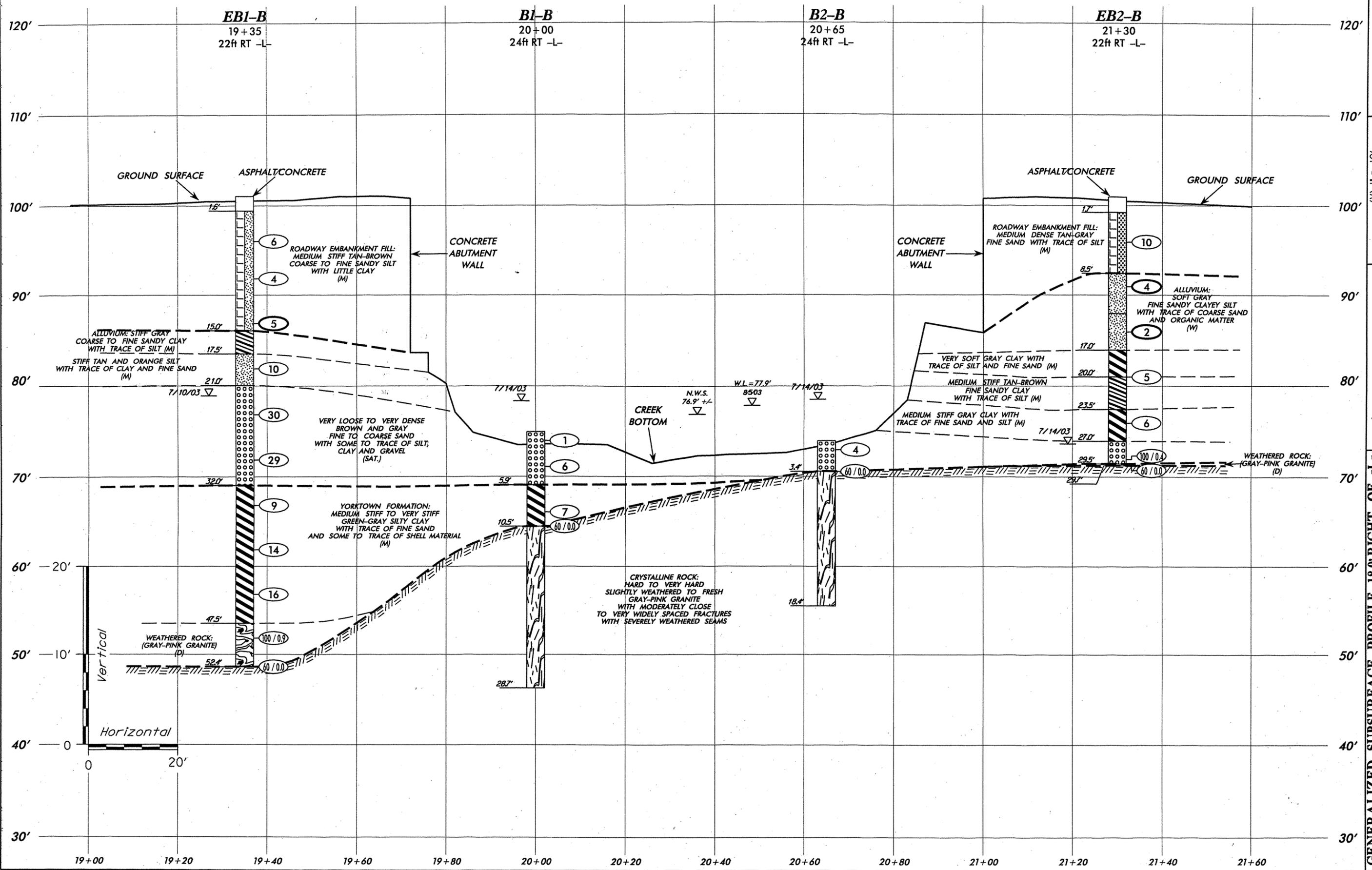
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 FEDERAL ID No. BRSTP-301(10)
 HALIFAX/EDGECOMBE COUNTY, NORTH CAROLINA

SHEET
 NO. **4**

TO SR 1409

GENERALIZED SUBSURFACE PROFILE 18.0' RIGHT OF -L-

TO ENFIELD



APPROVED BY: AFR

SCALE: (V) 1" = 10'
(H) 1" = 20'

DATE: AUGUST 2003

JOB NO.: 105 I-03-130

DRAWN BY: TRP

SHEET: 5 OF 23

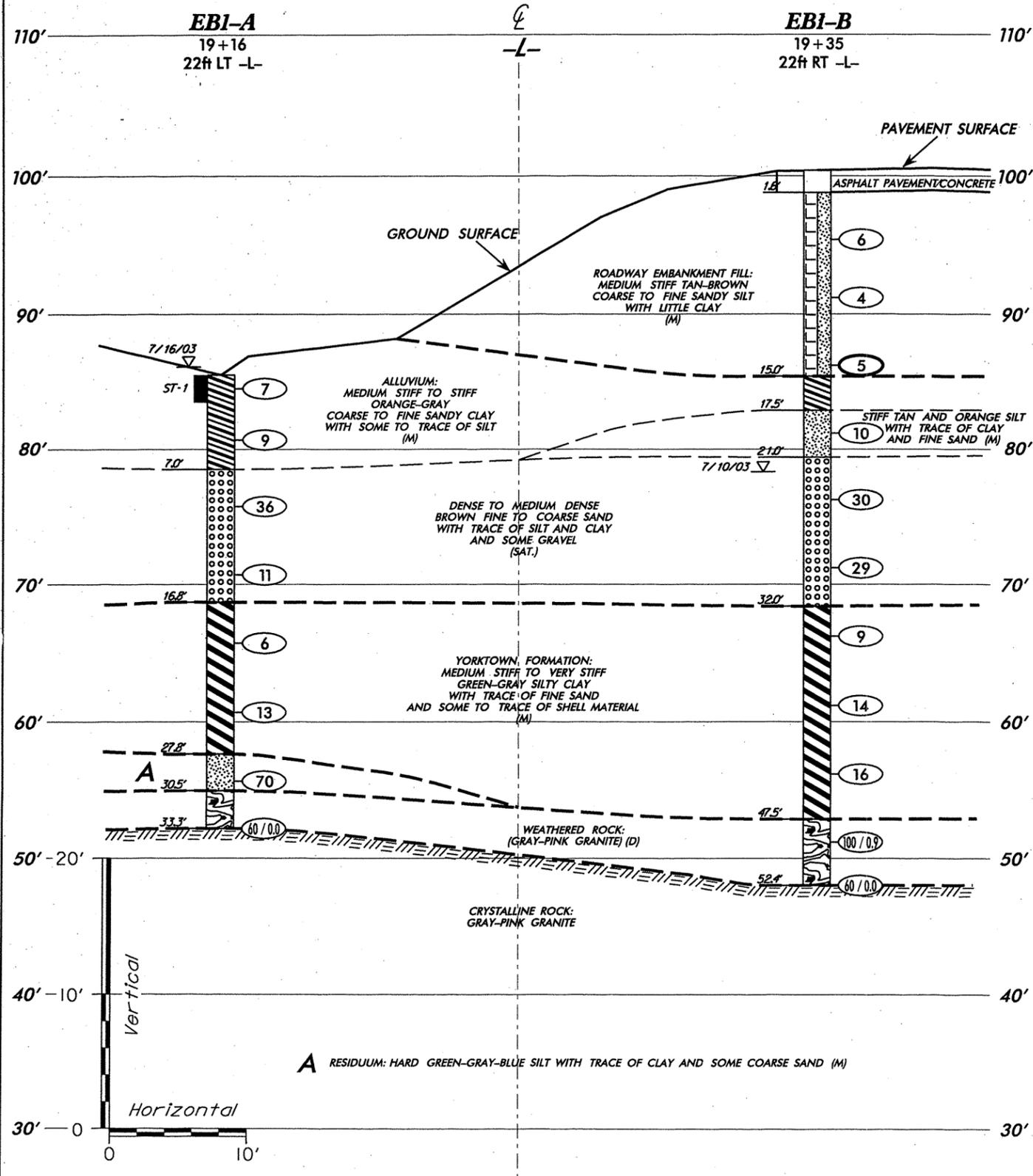
S&ME
ENVIRONMENTAL SERVICES
ENGINEERING - TESTING

GENERALIZED SUBSURFACE PROFILE 18.0' RIGHT OF -L-

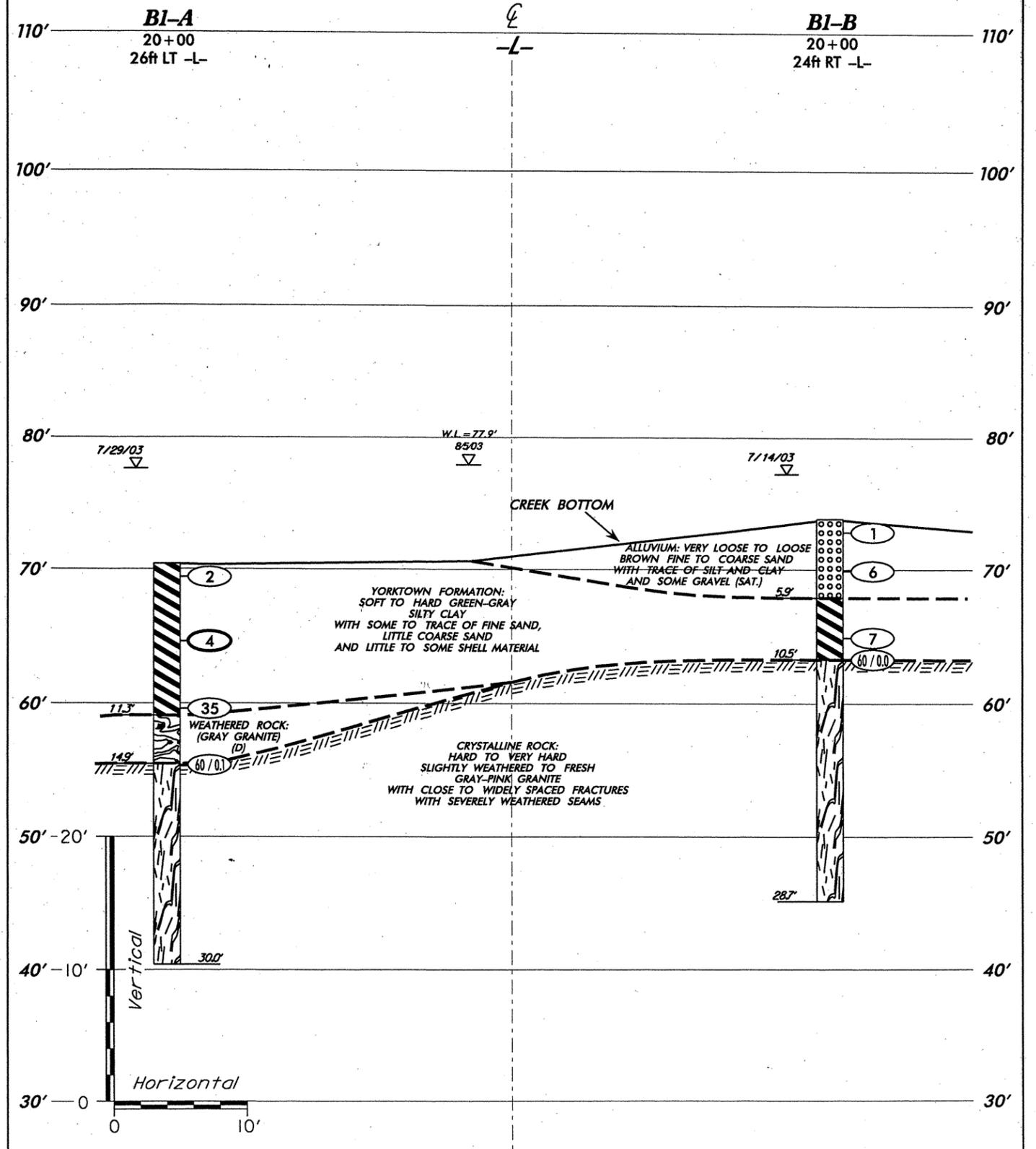
REPLACEMENT OF BRIDGE No. 23
OVER FISHING CREEK ON US 301
STATE PROJECT No. 8.1301801 FEDERAL I.D. BRSTP-30 (10)
TIP No. B-3453 HALIFAX/EDGEcombe COUNTY, NORTH CAROLINA

S:\GEO\TECH\2003\03BRIDGES\B-3453 FISHING CREEK\CADD\B-3453 PROFILE-XSEC.DGN

GENERALIZED SUBSURFACE CROSS SECTION THROUGH END BENT No.1



GENERALIZED SUBSURFACE CROSS SECTION THROUGH INTERIOR BENT No.1



S:GEOTECH/200 BRIDGES/B-3453 FISHING CREEK/CADD/B-3453 SITE 1 PROFILE-XSEC

S:GEOTECH/2003/03BRIDGES/B-3453 FISHING CREEK/CADD/B-3453 SITE 1 PROFILE-XSEC

SCALE:	(V) 1"=10' (H) 1"= 10'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-130



GENERALIZED SUBSURFACE CROSS SECTION
THROUGH END BENT No. 1
REPLACEMENT OF BRIDGE No. 23
OVER FISHING CREEK ON US 301
TIP No. B-3453 STATE PROJECT No. 8.1301801
FEDERAL ID No. BRSTP-301(10)
HALIFAX/EDGEcombe COUNTY, NORTH CAROLINA

SHEET NO.
6A

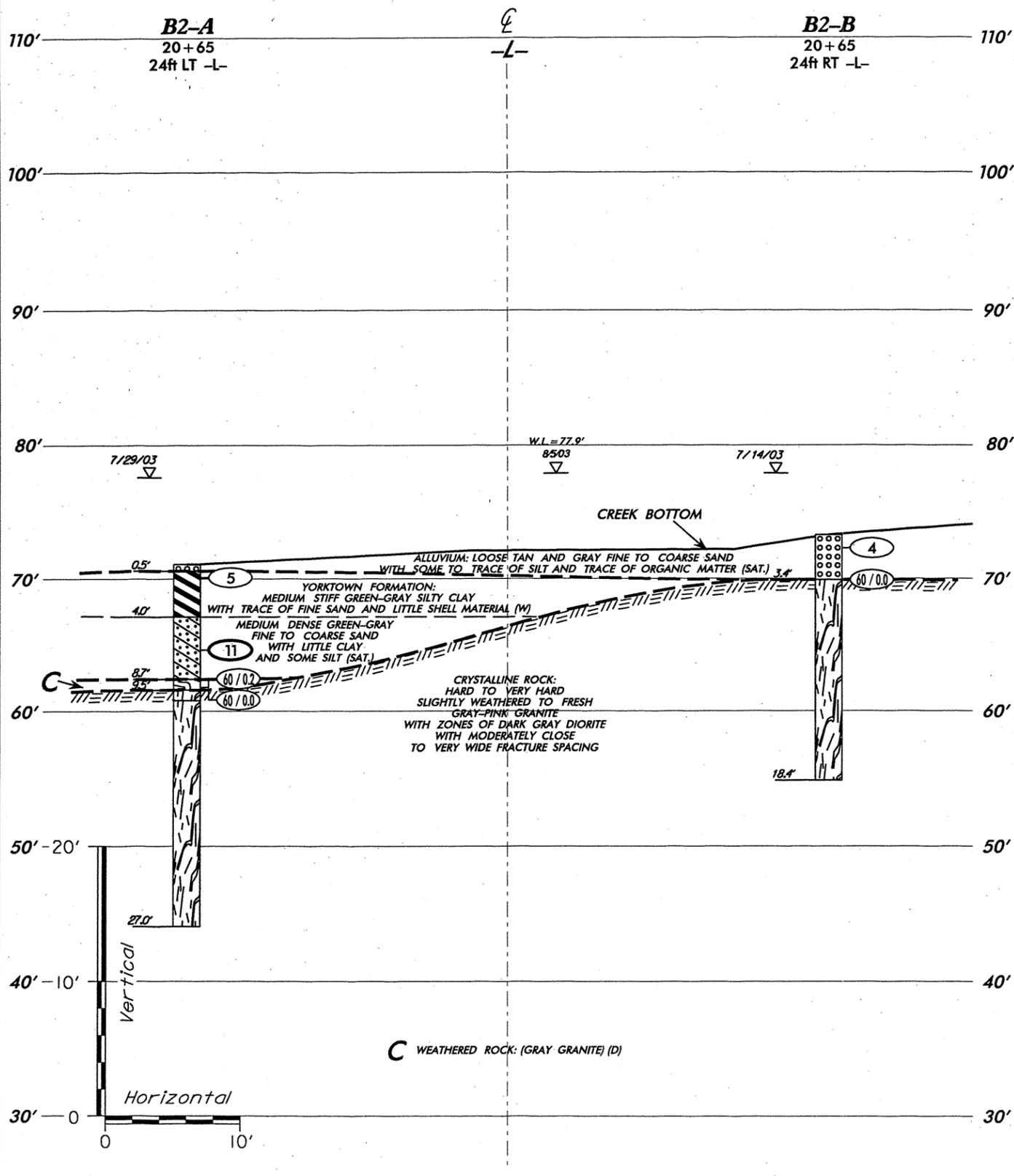
SCALE:	(V) 1"=10' (H) 1"= 10'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-130



GENERALIZED SUBSURFACE CROSS SECTION
THROUGH INTERIOR BENT No. 1
REPLACEMENT OF BRIDGE No. 23
OVER FISHING CREEK ON US 301
TIP No. B-3453 STATE PROJECT No. 8.1301801
FEDERAL ID No. BRSTP-301(10)
HALIFAX/EDGEcombe COUNTY, NORTH CAROLINA

SHEET NO.
6B

GENERALIZED SUBSURFACE CROSS SECTION THROUGH INTERIOR BENT No. 2



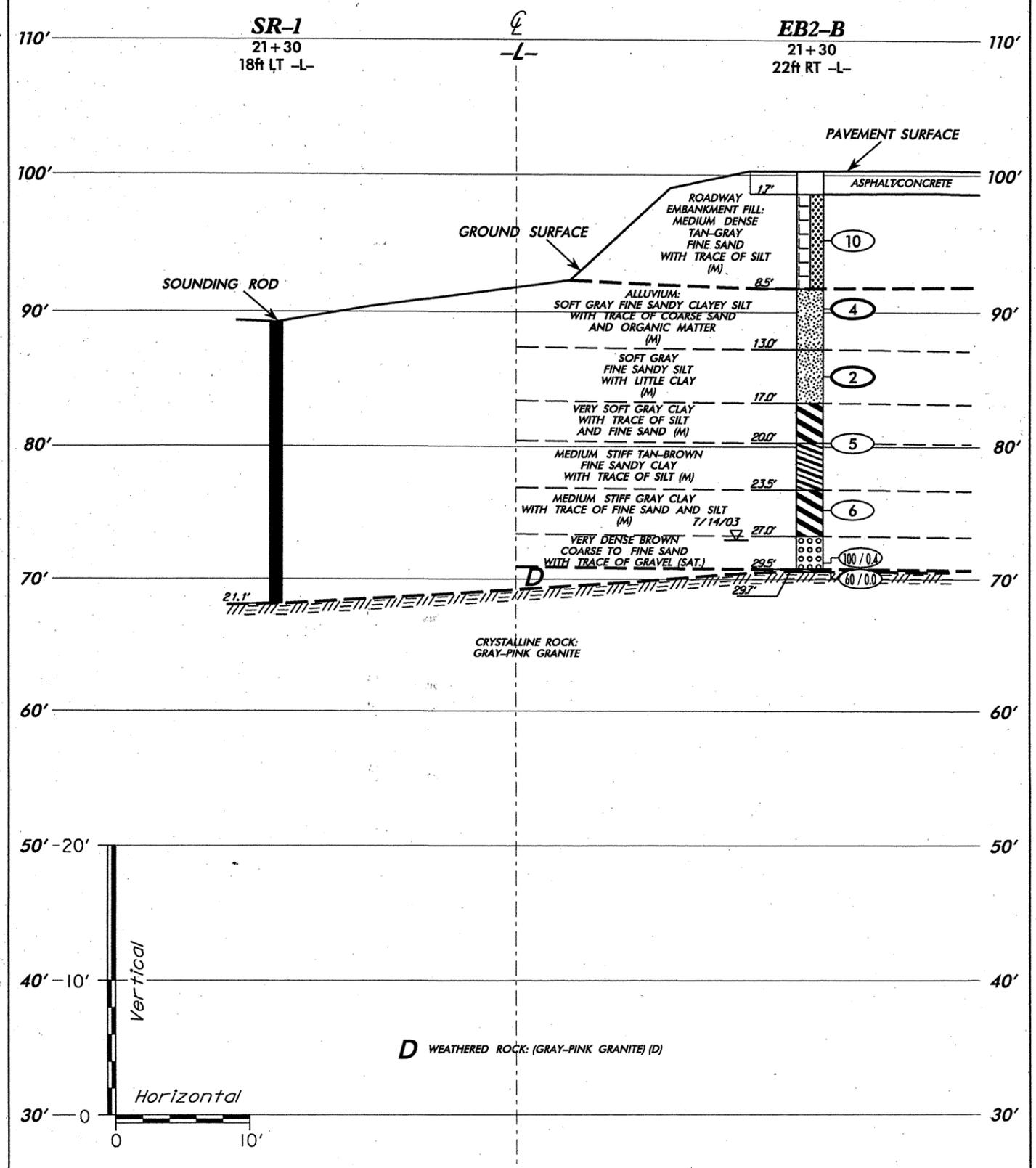
SCALE: (V) 1"=10' (H) 1"= 10'
 CHECKED BY: AFR
 DRAWN BY: TRP
 DATE: AUGUST 2003
 JOB NO. 1051-03-130



GENERALIZED SUBSURFACE CROSS SECTION
 THROUGH INTERIOR BENT No. 2
 REPLACEMENT OF BRIDGE No. 23
 OVER FISHING CREEK ON US 301
 TIP No. B-3453 STATE PROJECT No. 8.1301801
 FEDERAL ID No. BRSTP-301(10)
 HALIFAX/EDGEcombe COUNTY, NORTH CAROLINA

SHEET NO. 7A

GENERALIZED SUBSURFACE CROSS SECTION THROUGH END BENT No. 2



SCALE: (V) 1"=10' (H) 1"= 10'
 CHECKED BY: AFR
 DRAWN BY: TRP
 DATE: AUGUST 2003
 JOB NO. 1051-03-130



GENERALIZED SUBSURFACE CROSS SECTION
 THROUGH END BENT No. 2
 REPLACEMENT OF BRIDGE No. 23
 OVER FISHING CREEK ON US 301
 TIP No. B-3453 STATE PROJECT No. 8.1301801
 FEDERAL ID No. BRSTP-301(10)
 HALIFAX/EDGEcombe COUNTY, NORTH CAROLINA

SHEET NO. 7B

S:\GEO\TECH\2003\BRIDGES\B-3453 FISHING CREEK\CADD\B-3453 SITE - 1 PROFILE-XSEC

S:\GEO\TECH\2003\BRIDGES\B-3453 FISHING CREEK\CADD\B-3453 SITE - 1 PROFILE-XSEC



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)							
BORING NO. EB1-A		BORING LOCATION 19+16		OFFSET 22.0 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 85.5 ft		NORTHING 876,288.0		EASTING 2,385,868.8		0 HR. N/A							
TOTAL DEPTH 33.3 ft		DRILL MACHINE Mobile B-57		DRILL METHOD 3/4" HSA		HAMMER TYPE MANUAL							
DATE STARTED 7/16/03		COMPLETED 7/16/03		SURFACE WATER DEPTH 0.6 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
86.1	0.0												
85.5	0.6												
81.7	3.8	2	3	4									
76.7	8.8	3	4	5									
71.7	13.8	7	17	19									
66.7	18.8	7	5	6									
61.7	23.8	2	3	3									
56.7	28.8	5	5	8									
52.2	33.3	19	25	45									
	60/0.0												

SURFACE WATER LEVEL
 GROUND SURFACE

ALLUVIUM:
 MEDIUM STIFF TO STIFF ORANGE-GRAY
 COARSE TO FINE SANDY CLAY
 (A-6)
 WITH SOME SILT

DENSE TO MEDIUM DENSE BROWN FINE
 TO COARSE SAND
 (A-1-b)
 WITH TRACE OF SILT AND CLAY AND
 SOME GRAVEL

YORKTOWN FORMATION:
 MEDIUM STIFF TO STIFF GREEN-GRAY
 SILTY CLAY
 (A-7-6)
 WITH TRACE OF FINE SAND AND SOME
 SHELL MATERIAL

RESIDIUM:
 HARD GREEN-GRAY-BLUE SILT
 (A-4)
 WITH TRACE OF CLAY AND SOME
 COARSE SAND

WEATHERED ROCK:
 (GRAY-PINK GRANITE)
 1) ADVANCED 3-1/4" HSA TO 33.3 FEET.
 2) BORING WAS OFFSET TO STATION
 19+16 TO AVOID DISTURBING
 DESIGNATED WETLANDS

BORING TERMINATED
 WITH STANDARD PENETRATION TEST
 REFUSAL
 AT ELEV. 52.2 FEET
 ON CRYSTALLINE ROCK:
 GRAY-PINK GRANITE.

NCDOT BORE SINGLE 51-130.GPJ NCDOT.GDT 9/10/03



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)							
BORING NO. EB1-B		BORING LOCATION 19+35		OFFSET 22.0 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 100.4 ft		NORTHING 876,304.5		EASTING 2,385,913.5		0 HR. 22.1							
TOTAL DEPTH 52.4 ft		DRILL MACHINE Mobile B-57		DRILL METHOD 3/4" HSA		HAMMER TYPE MANUAL							
DATE STARTED 7/10/03		COMPLETED 7/10/03		SURFACE WATER DEPTH N/A									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
100.4	0.0												
96.4	4.0	3	3	3									
92.2	8.2	1	1	3									
87.2	13.2	3	2	3									
82.2	18.2	5	4	6									
77.2	23.2	13	14	16									
72.2	28.2	7	7	22									
67.2	33.2	5	4	5									
62.2	38.2	6	6	8									
57.2	43.2	6	7	9									
52.2	48.2	20	37	63/0.4									
48.0	52.4												

ASPHALT PAVEMENT SURFACE

ALLUVIUM:
 STIFF GRAY COARSE TO FINE SANDY
 CLAY
 (A-6)
 WITH TRACE OF SILT
 STIFF TAN AND ORANGE SILT
 (A-4)
 WITH TRACE OF CLAY AND FINE SAND
 MEDIUM DENSE BROWN FINE TO COARSE
 SAND
 (A-1-b)
 WITH TRACE OF SILT AND CLAY AND
 SOME GRAVEL

YORKTOWN FORMATION:
 STIFF TO VERY STIFF GREEN-GRAY SILTY
 CLAY
 (A-7-6)
 WITH TRACE OF FINE SAND AND SHELL
 MATERIAL

WEATHERED ROCK:
 (GRAY-PINK GRANITE)
 1) ADVANCED 3-1/4" HSA TO 52.4 FEET.

BORING TERMINATED
 WITH STANDARD PENETRATION TEST
 REFUSAL
 AT ELEV. 48.0 FEET
 ON CRYSTALLINE ROCK:
 GRAY-PINK GRANITE.

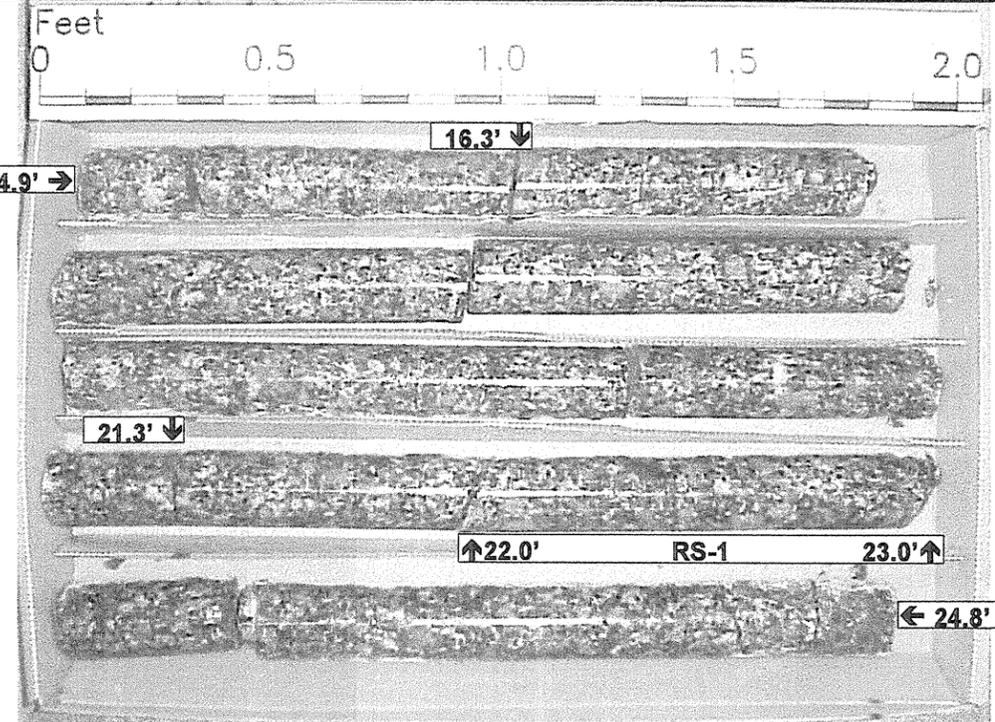
NCDOT BORE SINGLE 51-130.GPJ NCDOT.GDT 8/15/03

CORE PHOTOS

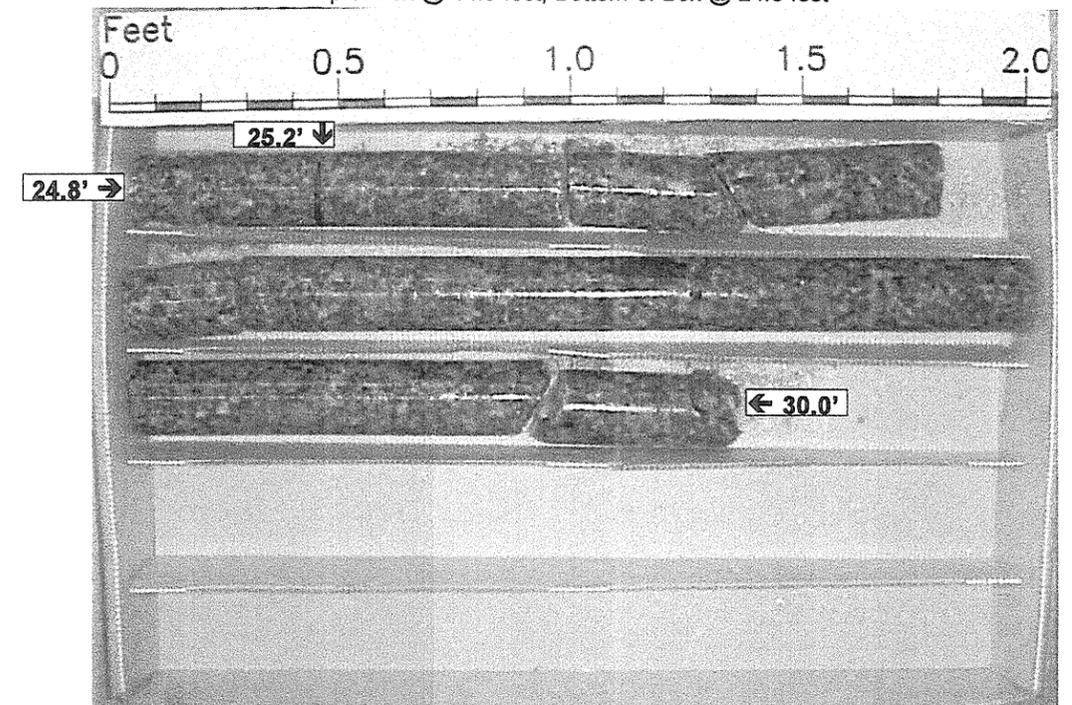
PROJECT NO. 8.1301801	ID. B-3453	COUNTY Edgecombe-Halifax	GEOLOGIST A. NASH
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301			GROUND WATER (ft)
BORING NO. B1-A	BORING LOCATION 20+00	OFFSET 26.0 ft LT	ALIGNMENT -L-
COLLAR ELEV. 70.4 ft	NORTHING 876,372.0	EASTING 2,385,868.9	0 HR. N/A
TOTAL DEPTH 30.0 ft	DRILL MACHINE CME-45c	DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NWD4 Split Core Barrel	24 HR. N/A
DATE STARTED 7/29/03	COMPLETED 7/29/03	SURFACE WATER DEPTH 7.2 ft	
CORE SIZE NWD4	TOTAL RUN 15.1 ft	DRILLER C. RICHARDSON	

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax/Edgecombe	Boring No.: B1-A
Site Description: Replacement of Bridge No. 23 Over Fishing Creek On US 301			Driller: C. Richardson
Collar Elev.: 70.4 ft.	Core Size: NWD4	Equipment: CME-45C	Geologist: A. Nash
Elev. at T.D.: 40.4 ft.	Total Depth: 30.0 ft.	Total Run: 15.1 ft.	Date: 7/29/2003

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
55.5	14.9	1.4	3:11	(1.0)	(1.0)		(14.6)	(14.6)		Begin Coring @ 14.9 ft
54.1	16.3	5.0	3:10/0.4	71%	71%		97%	97%		CRYSTALLINE ROCK: HARD TO VERY HARD VERY SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH CLOSE TO WIDELY SPACED FRACTURES 4 JOINTS @ <10°, 2 JOINTS @ 30-40°
			3:21	(4.9)	(4.9)					
			3:39	98%	98%					
			4:01							
49.1	21.3	3.9	3:45							
			3:30	(3.9)	(3.9)	RS-1				
			3:00	100%	100%					
			3:45							
45.2	25.2	4.8	3:30	(4.8)	(4.8)					
			3:00	100%	100%					
			3:00							
			3:00							
40.4	30.0		3:00							BORING TERMINATED AT ELEV. 40.4 FEET IN CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.



Box 1 of 2
Top of Box @ 14.9 feet; Bottom of Box @ 24.8 feet

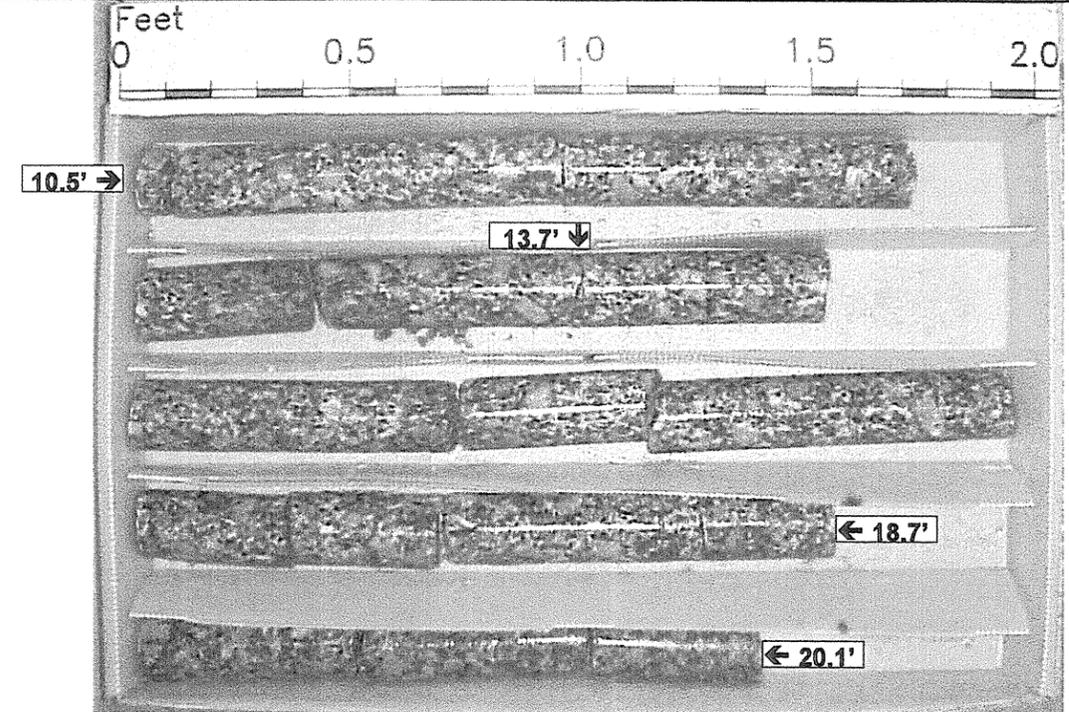


Box 2 of 2
Top of Box @ 24.8 feet; Bottom of Box @ 30.0 feet

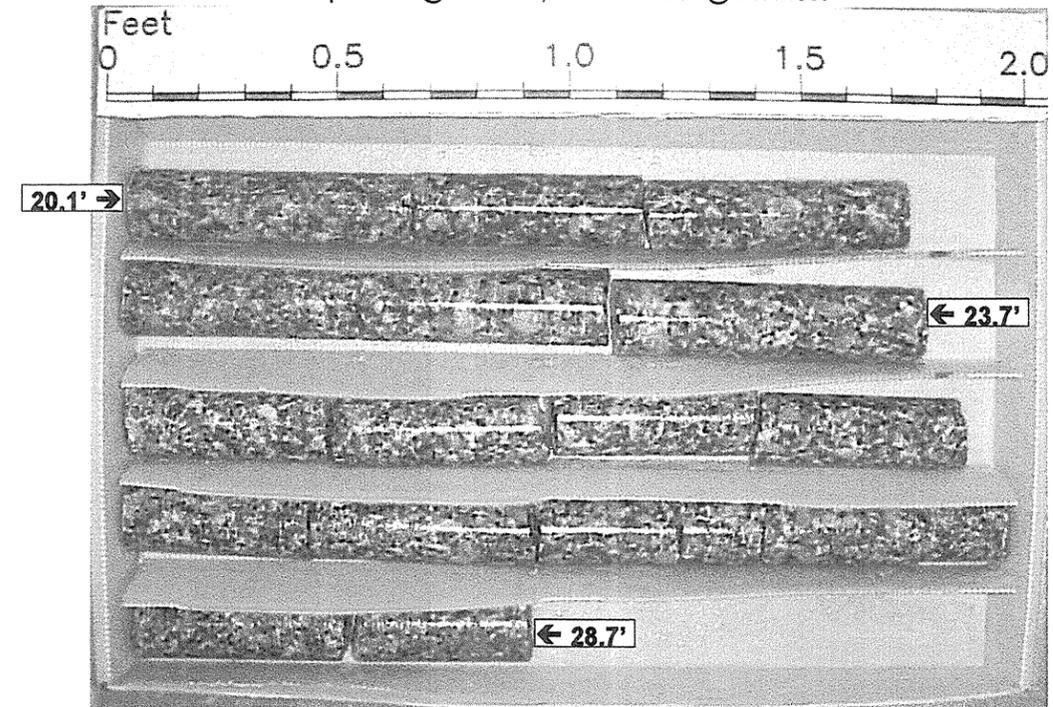
PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH					
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)					
BORING NO. B1-B		BORING LOCATION 20+00		OFFSET 24.0 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 73.8 ft		NORTHING 876,369.1		EASTING 2,385,918.8		0 HR. N/A					
TOTAL DEPTH 28.7 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NQ-2 Core Barrel		24 HR. N/A					
DATE STARTED 7/14/03		COMPLETED 7/14/03		SURFACE WATER DEPTH 3.4 ft							
CORE SIZE NQ-2		TOTAL RUN 18.2 ft		DRILLER C. RICHARDSON							
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS	
										63.3 Begin Coring @ 10.5 ft 10.5	
63.3	10.5	3.2	2:57 3:47	(2.7) 84%	(2.7) 84%		(16.5) 91%	(16.5) 91%		CRYSTALLINE ROCK: HARD TO VERY HARD SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH MODERATELY CLOSE TO WIDELY SPACED FRACTURES 3 JOINTS @ <10° SEVERELY WEATHERED SEAMS FROM (12.6 TO 13.1 FEET) (16.9 TO 17.8 FEET)	
60.1	13.7	5.0	3:38 0:58 3:31 3:24	(4.1) 82%	(4.1) 82%						
55.1	18.7	5.0	3:10 3:12 3:14 3:39	(4.9) 98%	(4.9) 98%						
50.1	23.7	5.0	3:45 3:16 3:24 3:33 3:28 3:41	(4.8) 96%	(4.8) 96%						
45.1	28.7										45.1 BORING TERMINATED AT ELEV. 45.1 FEET IN CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE. 28.7

CORE PHOTOS

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax/Edgecombe	Boring No.: B1-B
Site Description: Replacement of Bridge No. 23 Over Fishing Creek On US 301			Driller: C. Richardson
Collar Elev.: 73.8 ft.	Core Size: NQ-2	Equipment: Mobile B-57	Geologist: A. Nash
Elev. at T.D.: 45.1 ft.	Total Depth: 28.7 ft.	Total Run: 18.2 ft.	Date: 7/14/2003



Box 1 of 2
Top of Box @ 10.5 feet; Bottom of Box @ 20.1 feet



Box 2 of 2
Top of Box @ 20.1 feet; Bottom of Box @ 28.7 feet



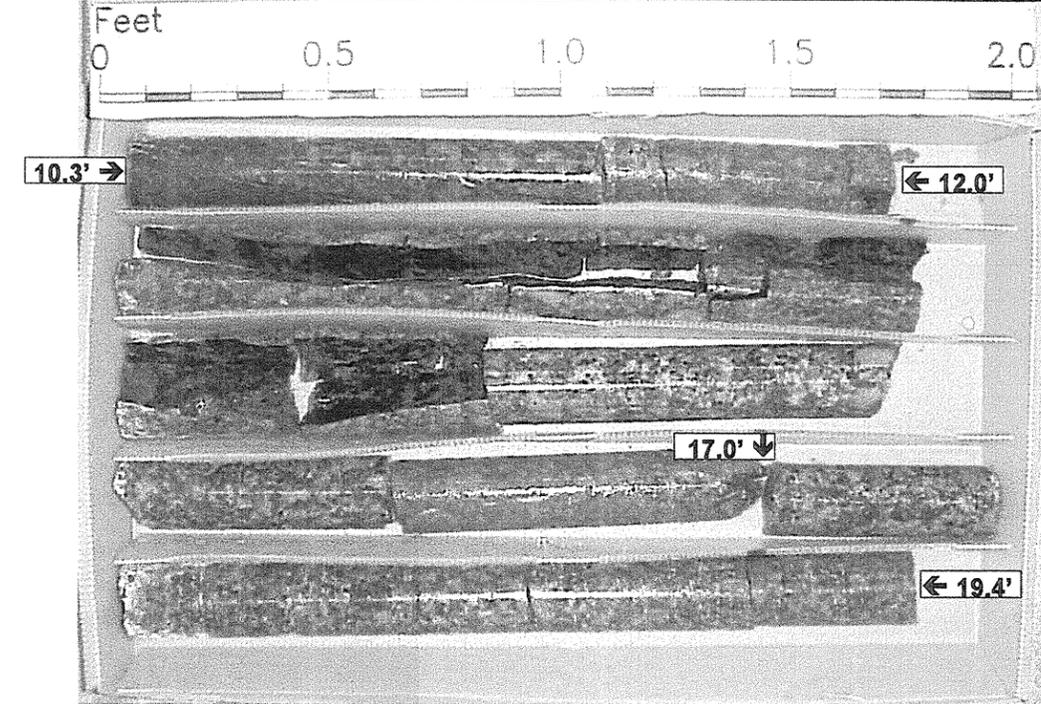
PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH								
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301							GROUND WATER (ft)							
BORING NO. B2-A		BORING LOCATION 20+65		OFFSET 24.0 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 71.1 ft		NORTHING 876,436.7		EASTING 2,385,874.2		0 HR. N/A								
TOTAL DEPTH 27.0 ft		DRILL MACHINE CME-45c		DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NWD4 Split Core Barrel		24 HR. N/A								
DATE STARTED 7/29/03		COMPLETED 7/29/03		SURFACE WATER DEPTH 6.5 ft										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
77.6													CREEK LEVEL	
71.1	0.0												CREEK BOTTOM	
65.6	5.5	6	3	2	05						Sat	W	ALLUVIUM: LOOSE TAN COARSE TO FINE SAND (A-1-b) WITH TRACE OF SILT	
62.0	9.1	3	4	7	01						SS-3	Sat	YORKTOWN FORMATION: MEDIUM STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND LITTLE SHELL MATERIAL	
61.8	9.3	60/0.27										D	MEDIUM DENSE GREEN-GRAY FINE TO COARSE SAND (A-2-6) WITH LITTLE CLAY AND SOME SILT	
		60/0.0											WEATHERED ROCK: (GRAY GRANITE) CRYSTALLINE ROCK: HARD DARK GRAY DIORITE CRYSTALLINE ROCK: HARD TO VERY HARD SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH DARK GRAY DIORITE ZONES WITH MODERATELY CLOSE TO VERY WIDE FRACTURE SPACING VERTICAL FRACTURE FROM 12.0-14.7 FEET	
													44.1	27.0
BORING TERMINATED AT ELEV. 44.1 FEET IN CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.												<ol style="list-style-type: none"> 1) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 10.3 FEET. 2) ADVANCED NWD4 SPLIT CORE BARREL FROM 10.3 FEET TO 27.0 FEET. 3) SET 9.2 FEET OF NW CASING (7.6 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED. 		

NCDOT BORE SINGLE 51-130.GPJ NCDOT.GDT 8/13/03

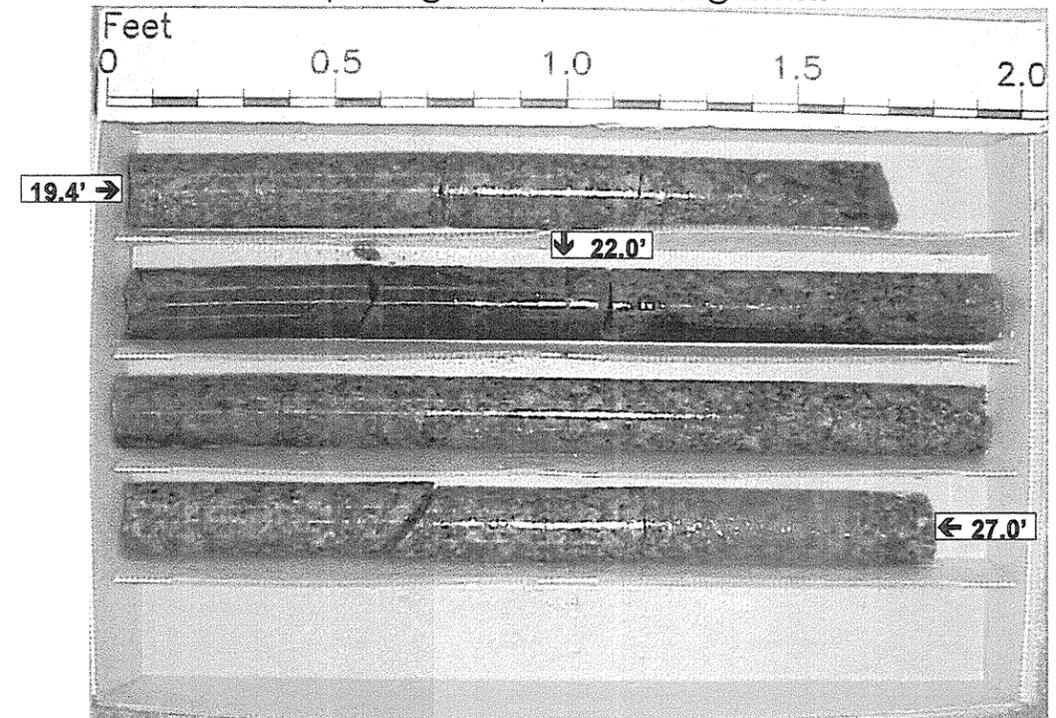
CORE PHOTOS

PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH				
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)				
BORING NO. B2-A		BORING LOCATION 20+65		OFFSET 24.0 ft LT	ALIGNMENT -L-	0 HR. N/A	24 HR. N/A			
COLLAR ELEV. 71.1 ft		NORTHING 876,436.7		EASTING 2,385,874.2						
TOTAL DEPTH 27.0 ft		DRILL MACHINE CME-45c	DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NWD4 Split Core Barrel		HAMMER TYPE MANUAL					
DATE STARTED 7/29/03		COMPLETED 7/29/03		SURFACE WATER DEPTH 6.5 ft						
CORE SIZE NWD4		TOTAL RUN 16.7 ft		DRILLER C. RICHARDSON						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										60.8 Begin Coring @ 10.3 ft 10.3
60.8	10.3	1.7	2:30	(1.7)	(1.7)		(16.5)	(13.8)		CRYSTALLINE ROCK: HARD TO VERY HARD SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH DARK GRAY DIORITE ZONES WITH MODERATELY CLOSE TO VERY WIDE FRACTURE SPACING VERTICAL FRACTURE FROM 12.0-14.7 FEET
59.1	12.0	5.0	2:30/0.7	100%	100%		99%	83%		
			5:00	(5.0)	(2.3)					
			4:30	100%	46%					
54.1	17.0	5.0	5:00							
			5:00	(5.0)	(5.0)					
			5:00	100%	100%					
			4:30							
49.1	22.0	5.0	4:30							
			5:00	(4.8)	(4.8)					
			4:00	96%	96%					
44.1	27.0	4.0	4:00						44.1 BORING TERMINATED AT ELEV. 44.1 FEET IN CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE. 27.0	

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax/Edgecombe	Boring No.: B2-A
Site Description: Replacement of Bridge No. 23 Over Fishing Creek On US 301		Driller: C. Richardson	
Collar Elev.: 71.1 ft.	Core Size: NWD4	Equipment: CME-45C	Geologist: A. Nash
Elev. at T.D.: 44.1 ft.	Total Depth: 27.0 ft.	Total Run: 16.7 ft.	Date: 7/29/2003



Box 1 of 2
Top of Box @ 10.3 feet; Bottom of Box @ 19.4 feet



Box 2 of 2
Top of Box @ 19.4 feet; Bottom of Box @ 27.0 feet



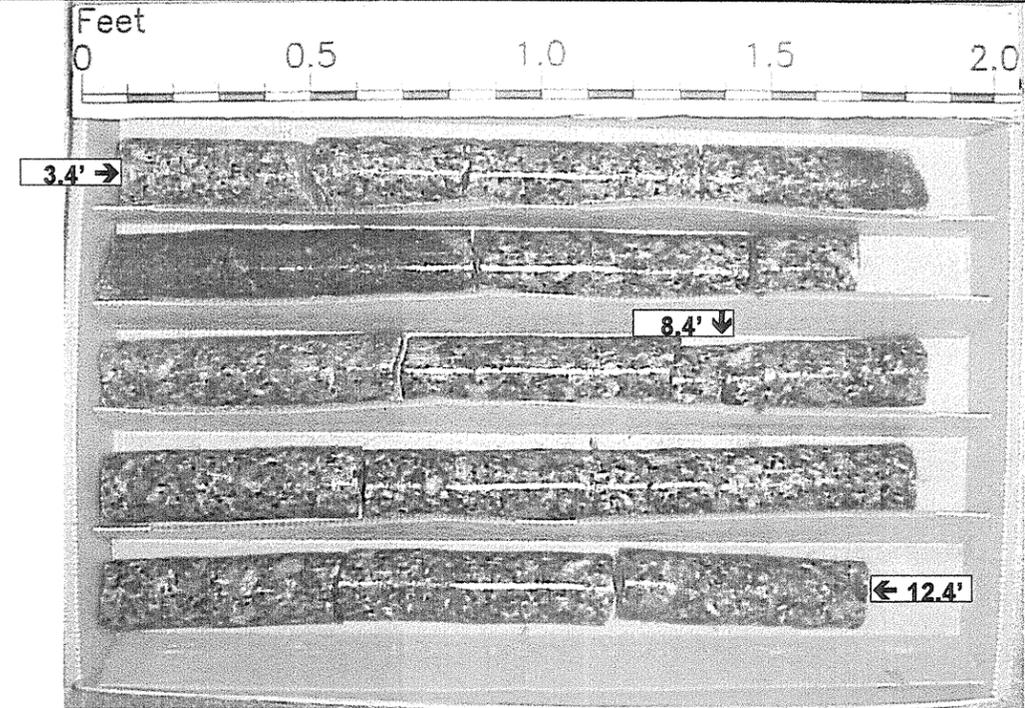
PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301							GROUND WATER (ft)						
BORING NO. B2-B		BORING LOCATION 20+65		OFFSET 24.0 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 73.3 ft		NORTHING 876,434.2		EASTING 2,385,922.2		0 HR. N/A							
TOTAL DEPTH 18.4 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NQ-2 Core Barrel		HAMMER TYPE MANUAL							
DATE STARTED 7/14/03		COMPLETED 7/14/03		SURFACE WATER DEPTH 4.6 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
77.9													CREEK LEVEL
73.3	0.0												CREEK BOTTOM
69.9	3.4	1	2	2									ALLUVIUM: LOOSE GRAY FINE TO COARSE SAND (A-1-b) WITH SOME SILT AND TRACE OF ORGANIC MATTER
		60/0.0											CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH VERY WIDELY SPACED FRACTURES
													RS-2
													54.9
													18.4
													1) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 3.4 FEET. 2) ADVANCED NQ-2 CORE BARREL FROM 3.4 TO 18.4 FEET. 3) SET 3.4 FEET OF NW CASING (27.5 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED.

NCDOT BORE SINGLE 51-130.GPJ NCDOT.GDT 8/14/03

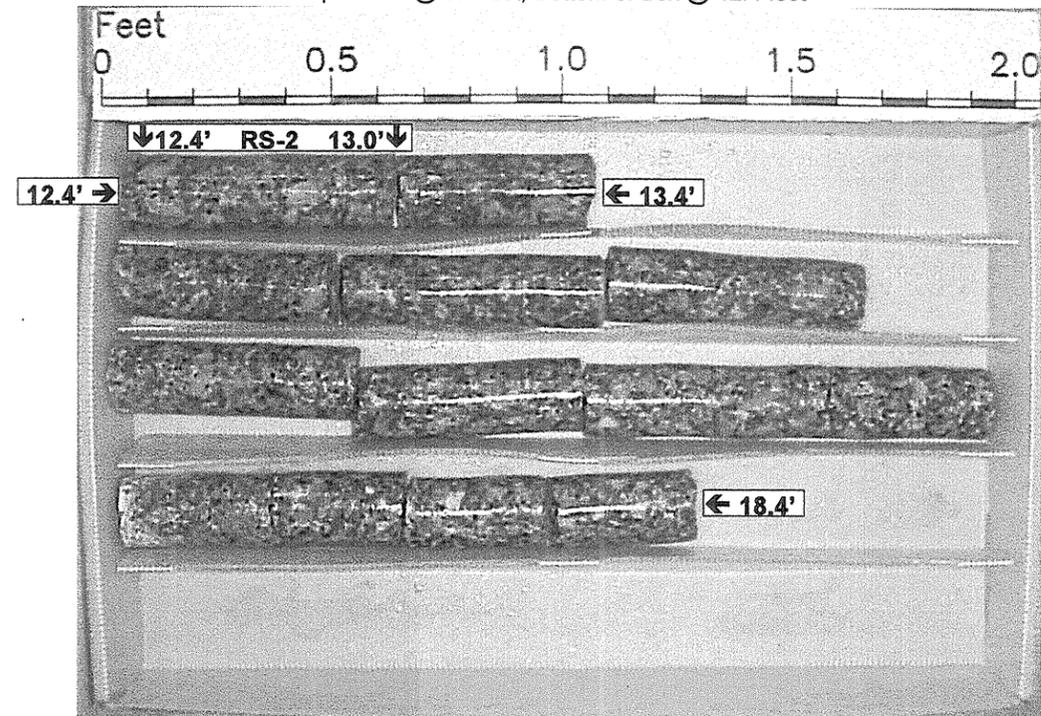
PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH				
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)				
BORING NO. B2-B		BORING LOCATION 20+65		OFFSET 24.0 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 73.3 ft		NORTHING 876,434.2		EASTING 2,385,922.2		0 HR. N/A				
TOTAL DEPTH 18.4 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/ 2-7/8" Tricone and NQ-2 Core Barrel		HAMMER TYPE MANUAL				
DATE STARTED 7/14/03		COMPLETED 7/14/03		SURFACE WATER DEPTH 4.6 ft						
CORE SIZE NQ-2		TOTAL RUN 15.0 ft		DRILLER C. RICHARDSON						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										69.9 Begin Coring @ 3.4 ft 3.4
69.9	3.4	5.0	5:26 5:18 4:58 5:04	(4.8) 96%	(4.8) 96%		(14.8) 99%	(14.8) 99%		CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH VERY WIDELY SPACED FRACTURES
64.9	8.4	5.0	4:52 3:12 3:15 3:12 4:01	(5.0) 100%	(5.0) 100%					
59.9	13.4	5.0	4:10 3:15 3:11 2:31 2:47 3:01	(5.0) 100%	(5.0) 100%	RS-2				
54.9	18.4								54.9 BORING TERMINATED AT ELEV. 54.9 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY-PINK GRANITE. 18.4	

CORE PHOTOS

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax/Edgecombe	Boring No.: B2-B
Site Description: Replacement of Bridge No. 23 Over Fishing Creek On US 301			Driller: C. Richardson
Collar Elev.: 73.3 ft.	Core Size: NQ-2	Equipment: Mobile B-57	Geologist: A. Nash
Elev. at T.D.: 54.9 ft.	Total Depth: 18.4 ft.	Total Run: 15.0 ft.	Date: 7/14/2003



Box 1 of 2
Top of Box @ 3.4 feet; Bottom of Box @ 12.4 feet



Box 2 of 2
Top of Box @ 12.4 feet; Bottom of Box @ 18.4 feet



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH/S. JOHNSON									
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)									
BORING NO. SR-1		BORING LOCATION 21+30		OFFSET 18.0 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 89.2 ft		NORTHING 876,501.3		EASTING 2,385,883.6		0 HR. N/A									
TOTAL DEPTH 21.1 ft		DRILL MACHINE N/A		DRILL METHOD N/A		24 HR. N/A									
DATE STARTED 8/11/03		COMPLETED 8/11/03		SURFACE WATER DEPTH N/A											
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100		
89.2													89.2	0.0	
															ALLUVIUM: SILT/SAND/CLAY.
													68.1	21.1	1) BORING EB2-B WAS USED TO INTERPOLATE STRATA
															SOUNDING ROD REFUSAL AT ELEV. 68.1 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.

NCDOT BORE SINGLE 5...0.GPJ NCDOT.GDT 9/10/03



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Edgecombe-Halifax		GEOLOGIST A. NASH									
SITE DESCRIPTION Bridge 23 over Fishing Creek on U.S. 301						GROUND WATER (ft)									
BORING NO. EB2-B		BORING LOCATION 21+30		OFFSET 22.0 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 100.3 ft		NORTHING 876,499.2		EASTING 2,385,923.5		0 HR. 27.3									
TOTAL DEPTH 29.7 ft		DRILL MACHINE Mobile B-57		DRILL METHOD 3/4" HSA		24 HR. N/M									
DATE STARTED 7/14/03		COMPLETED 7/14/03		SURFACE WATER DEPTH N/A											
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100		
100.3													100.3	0.0	ASPHALT PAVEMENT SURFACE
													99.4	0.9	ASPHALT (0.9) 11 INCHES
													98.6	1.7	CONCRETE (0.8) 10 INCHES
															ROADWAY EMBANKMENT FILL: MEDIUM DENSE TAN-GRAY FINE SAND (A-2-4) WITH TRACE OF SILT
													91.8	8.5	ALLUVIUM: SOFT GRAY FINE SANDY CLAYEY SILT (A-4) WITH TRACE OF COARSE SAND AND ORGANIC MATTER
													87.3	13.0	SS-4 27.6% SOFT GRAY FINE SANDY SILT (A-4) WITH LITTLE CLAY
													83.3	17.0	SS-5 22.3% VERY SOFT GRAY CLAY (A-7-6)
													80.3	20.0	M WITH TRACE OF SILT AND FINE SAND MEDIUM STIFF TAN-BROWN FINE SANDY CLAY (A-6)
													76.8	23.5	M WITH TRACE OF SILT MEDIUM STIFF GRAY CLAY (A-7-6)
													73.3	27.0	M WITH TRACE OF FINE SAND AND SILT VERY DENSE BROWN COARSE TO FINE SAND (A-1-b)
													70.8	29.5	Sat. D WITH TRACE OF GRAVEL WEATHERED ROCK: (GRAY-PINK GRANITE)
													70.6	29.7	1) ADVANCED 3-1/4" HSA TO 29.7 FEET.
															BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 70.6 FEET ON CRYSTALLINE ROCK: GRAY-PINK GRANITE.

NCDOT BORE SINGLE 51-130.GPJ NCDOT.GDT 8/14/03

**Summary of Laboratory Results
Soil Classification and Gradation**

Borehole	Sample	Depth (ft)	AASHTO Classification	% Passing Sieve #			Soil Mortar Fraction					Organic Content (%)		
				10	40	60	200	Coarse Sand		Clay	Plasticity Index		Moisture Content (%)	
								% Retained on No. 60	Fine Sand					Silt
EB1-A	ST-1	0.50 - 2.00	A-6 (3)	100	99	90	51	10	47	21	22	31	12	19.2
EB1-B	SS-1	13.20 - 14.70	A-4 (0)	100	98	88	46	12	52	24	12	19	4	14.7
B1-A	SS-2	4.80 - 6.30	A-7-6 (19)	98	89	87	75	11	22	45	22	48	25	50.0
B1-B	S-1	0.00 - 0.50	A-1-b (0)	60	30	18	8	69	20	5	6	12	NP	
B2-A	SS-3	5.50 - 7.00	A-2-6 (1)	69	49	44	30	36	24	28	12	40	17	
EB2-B	SS-4	9.00 - 10.50	A-4 (2)	98	95	93	69	6	36	36	22	24	7	27.6
EB2-B	SS-5	14.00 - 15.50	A-4 (1)	100	100	99	64	1	51	32	16	22	5	22.3

Consolidation Test Results

Borehole	Sample	Depth (ft)	AASHTO Classification	C _c	C _v (ft ² /day)	t ₉₀ (min)	γ, initial (lbs/ft ³)	Initial Moisture, %	G _s	Initial Voids Ratio, e
EB1-A	ST-1	0.5 - 2.0	A-6 (3)	0.056	1.159	1.77	129.6	19.2	2.66	0.5266

PROJECT DESCRIPTION: Bridge 23 over Fishing Creek on U.S. 301
 STATE PROJECT No.: 8.1301801
 TIP No.: B-3453
 FEDERAL I.D. No. BRSTP-301(10)
 COUNTY: Edgecombe-Halifax, NORTH CAROLINA
 S&ME JOB No.: 1051-03-130
 CHECKED BY: AFR/JSJ

**UNCONFINED COMPRESSION
(ASTM D2938)**

PROJECT: Replacement of Bridge No. 23 over Fishing Creek on U.S. 301 (B-3453)

LOCATION: Halifax / Edgecombe Co., N.C.

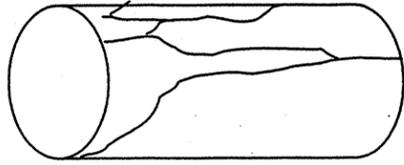
JOB No.: 1051-03-130

Date: 8/13/03

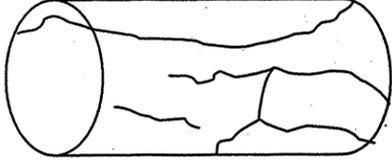
Tested by: JBB

Boring No.	Sample No.	Depth (ft)	Specimen Dimension, in.		Unit Wt. (lb/ft ³)	Moisture Content (%)	Loading Rate (psi/min)	Max. Load (lb)	Strength (psi)
			Length	Diameter					
B1-A	RS-1	22.0 - 23.0	4.49	2.05	171.4	0.05	1089	44700	13543
B2-B	RS-2	12.4 - 13.0	4.37	1.98	168.8	0.03	1861	44400	14420

B1-A

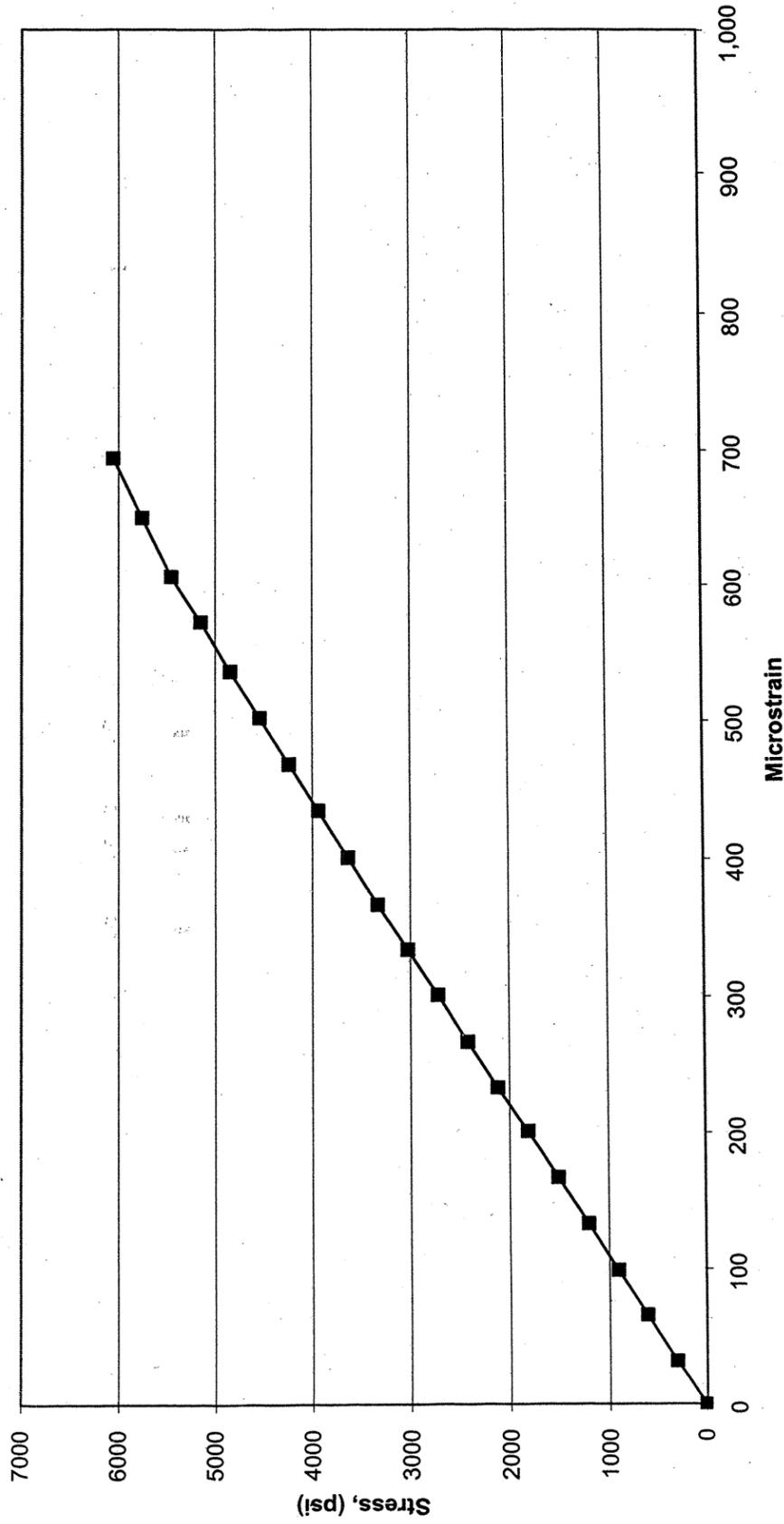


B2-B



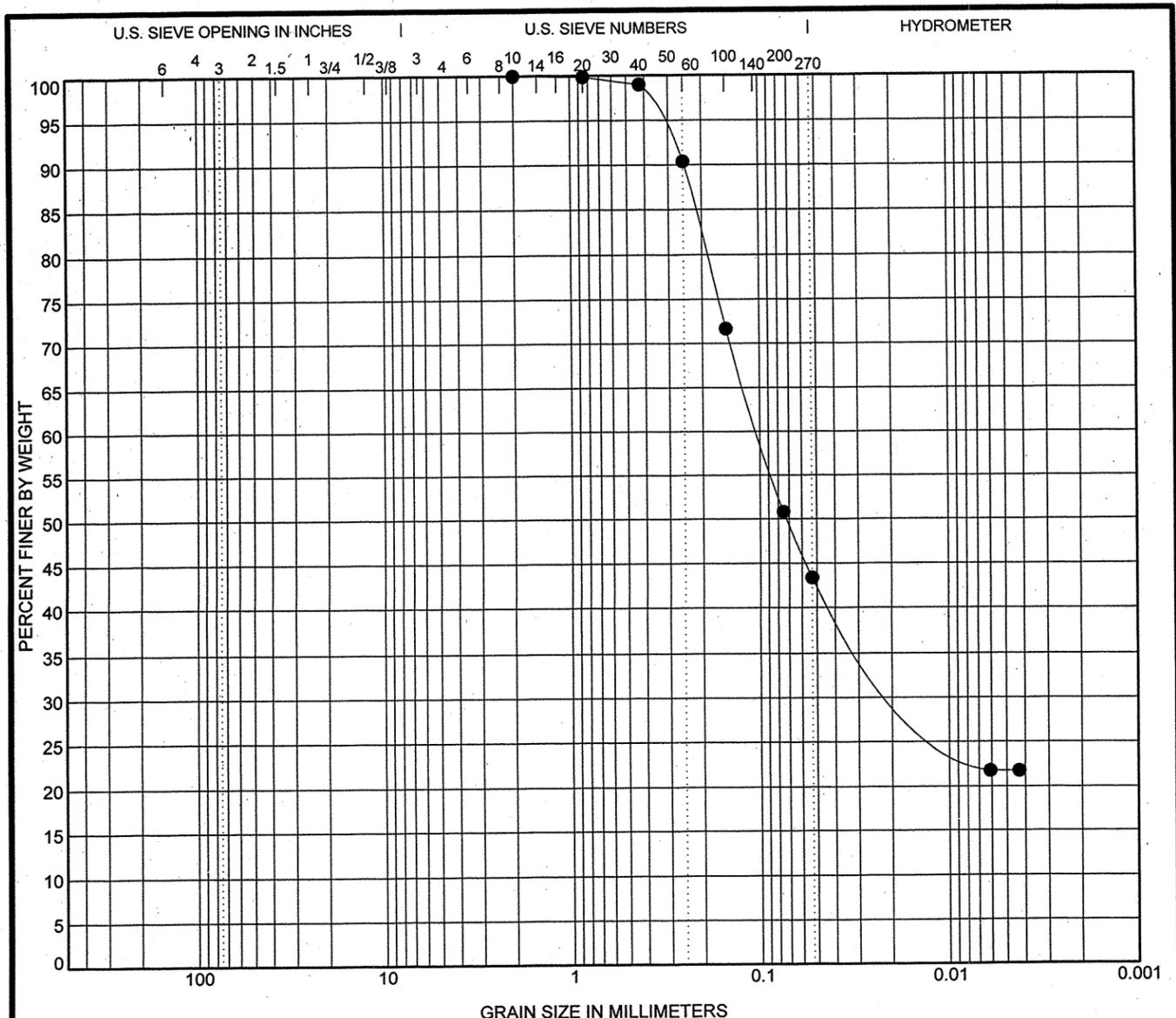
Job Name: Replacement of Bridge No. 23 over Fishing Creek on U.S. 301 (B-3453)
 Job Number: 1051-03-130
 Job Location: Halifax / Edgecombe County, N.C.
 Sample Number: RS-1
 Sample Location: B1-A
 Sample Depth: 22.0 - 23.0 ft.

Stress vs. Microstrain



PROJECT #: 8.1301801
 COUNTY: Edgecombe/Halifax (B-3453)
 DESCRIPTION: Replacement of Bridge No.23 Over Fishing Creek on U.S. Highway 301

SAMPLE #	CHANNEL BED MATERIAL			CHANNEL BANK MATERIAL			
	S-1	SS-2		ST-1	SS-4		
RETAINED #4	23	1		0	1		
PASSING #10	60	98		100	98		
PASSING #40	30	89		99	95		
PASSING #200	8	75		51	69		
COARSE SAND	69	11		10	6		
FINE SAND	20	22		47	36		
SILT	5	45		21	36		
CLAY	6	22		22	22		
LL	12	48		31	24		
PL	NP	23		19	17		
AASHTO CLASSIFICATION	A-1-b(0)	A-7-6(19)		A-6(3)	A-4(2)		
STATION	20+00	20+00		19+16	21+30		
OFFSET	24.0 ft RT	26.0 ft LT		22.0 ft LT	22.0 ft RT		
DEPTH	0.0-0.5	4.8-6.3		0.5-2.0	9.0-10.5		



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

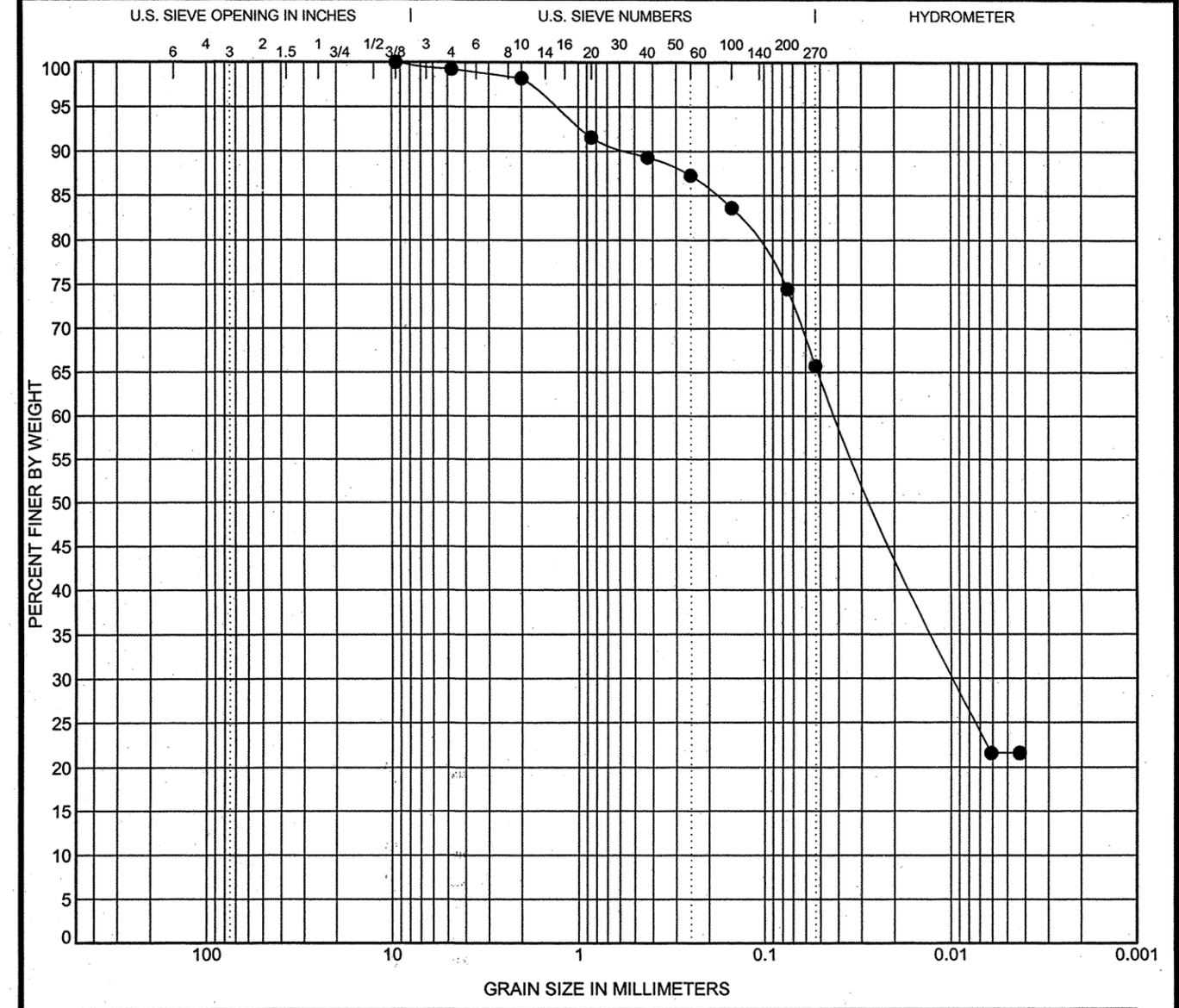
AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **EB1-A** Station: 19+16 -L- Offset: 22.0 ft LT Depth: 0.50 - 2.00 ft
 Sample: **ST-1** Orange-Gray Coarse to Fine Sandy Clay
 Soil Description: A-6 (3) with Some Silt

Moisture Content: 19.2	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 31
Specific Gravity: 2.66	Coarse Sand: 10	10	Plastic Limit: 19
Cc	Fine Sand: 47	47	Plasticity Index: 12
Cu	Silt: 21	21	% Passing #270: 43
D ₉₀ 0.247 D ₅₀ 0.072	Clay: 22	22	% Organic Content: NM

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GRAIN SIZE DISTRIBUTION
 Bridge 23 over Fishing Creek on U.S. 301
 TIP No. B-3453 STATE PROJECT NO. 8.1301801
 FEDERAL I.D. NO. BRSTP-301(10)
 Edgecombe-Halifax COUNTY, NORTH CAROLINA



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

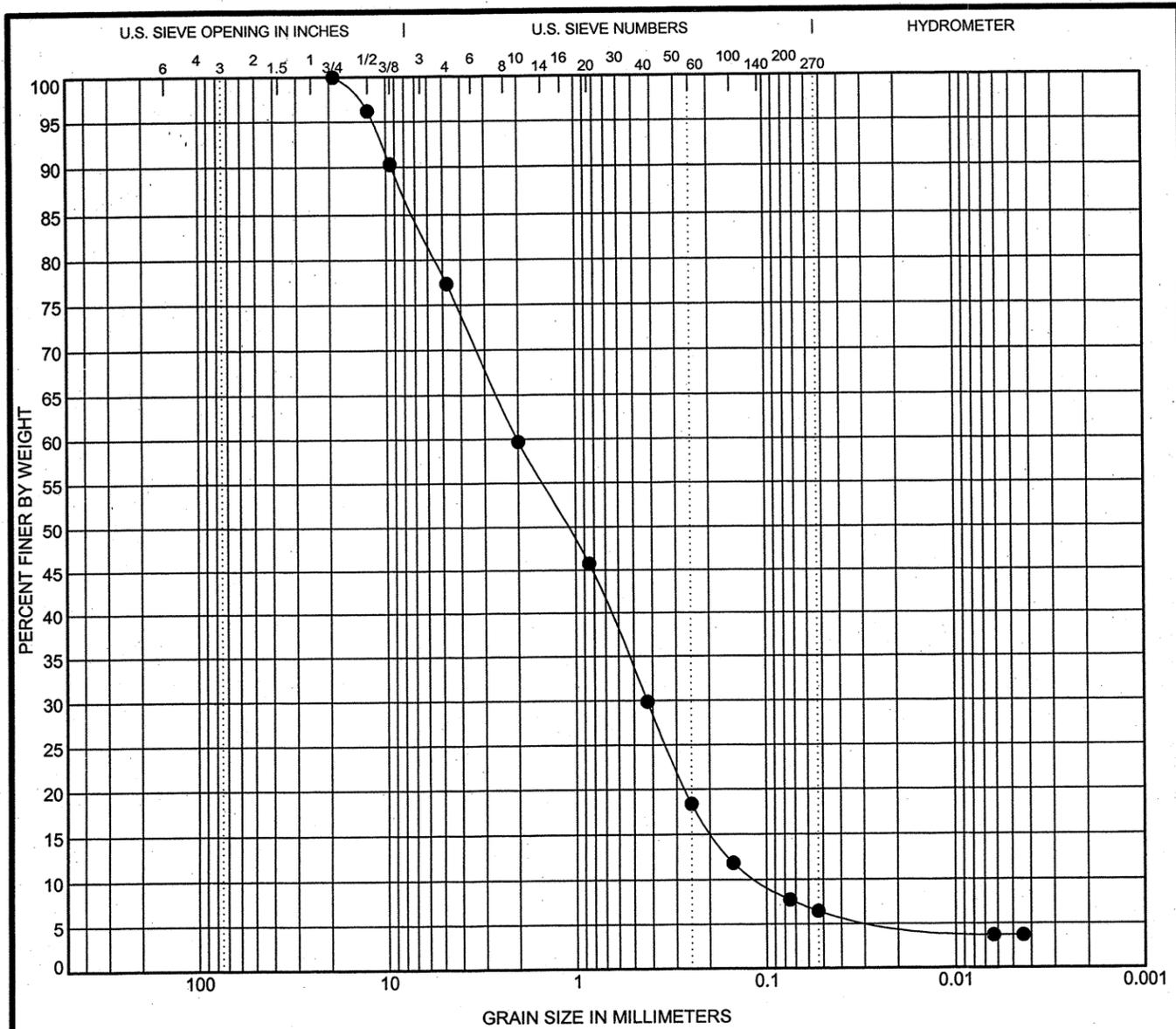
AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **B1-A** Station: 20+00 -L- Offset: 26.0 ft LT Depth: 4.80 - 6.30 ft
 Sample: **SS-2** Green-Gray Silty Clay
 Soil Description: A-7-6 (19) with Some Fine Sand, Little Coarse Sand and Shell Material

Moisture Content: 50.0	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 48
Specific Gravity: 2.65	Coarse Sand: 11	11	Plastic Limit: 23
Cc	Fine Sand: 22	21	Plasticity Index: 25
Cu	Silt: 45	44	% Passing #270: 66
D ₉₀ 0.524 D ₅₀ 0.025	Clay: 22	22	% Organic Content: NM

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 Edgecombe-Halifax COUNTY, NORTH CAROLINA



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

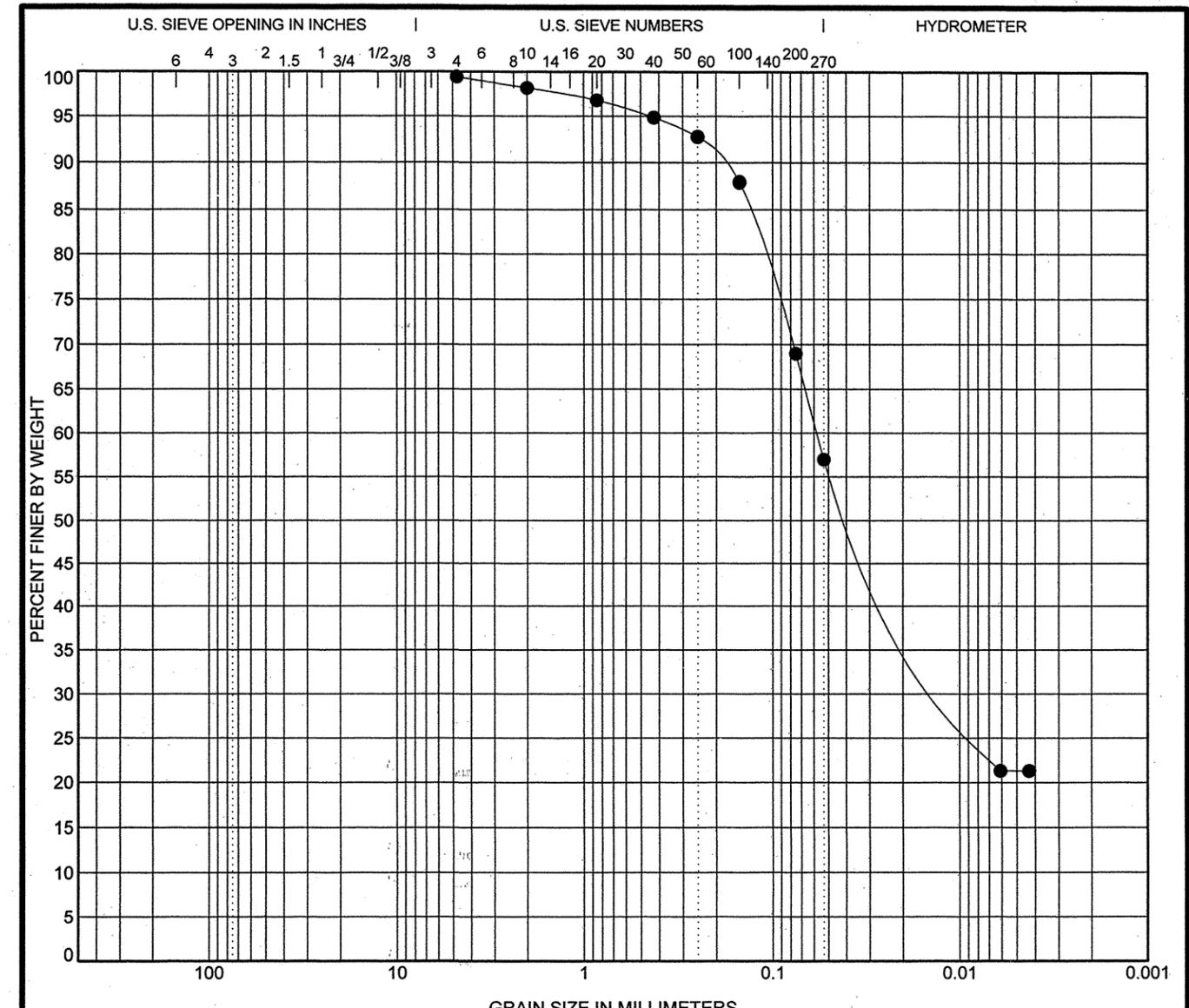
AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **B1-B** Station: 20+00 -L- Offset: 24.0 ft RT Depth: 0.00 - 0.50 ft
 Sample: **S-1** Brown Fine to Coarse Sand
 Soil Description: A-1-b (0) with Trace of Silt and Clay and Some Gravel

Moisture Content: NM	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 12
Specific Gravity: 2.65	Coarse Sand: 69	42	Plastic Limit: 12
Cc 0.82	Fine Sand: 20	12	Plasticity Index: 0
Cu 18.49	Silt: 5	2	% Passing #270: 6
D ₉₀ 9.349 D ₅₀ 1.102	Clay: 6	4	% Organic Content: NM

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 TIP No. B-3453 STATE PROJECT NO. 8.1301801
 FEDERAL I.D. NO. BRSTP-301(10)
 Edgecombe-Halifax COUNTY, NORTH CAROLINA



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **EB2-B** Station: 21+30 -L- Offset: 22.0 ft RT Depth: 9.00 - 10.50 ft
 Sample: **SS-4** Gray Fine Sandy Clayey Silt A-4 (2)
 Soil Description: with Trace of Coarse Sand and Organic Matter

Moisture Content: 27.6	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 24
Specific Gravity: 2.65	Coarse Sand: 6	5	Plastic Limit: 17
Cc	Fine Sand: 36	36	Plasticity Index: 7
Cu	Silt: 36	36	% Passing #270: 57
D ₉₀ 0.186 D ₅₀ 0.035	Clay: 22	21	% Organic Content: NM

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GRAIN SIZE DISTRIBUTION
 Bridge 23 over Fishing Creek on U.S. 301
 TIP No. B-3453 STATE PROJECT NO. 8.1301801
 FEDERAL I.D. NO. BRSTP-301(10)
 Edgecombe-Halifax COUNTY, NORTH CAROLINA

PROJECT: 8.1301801 ID: B-3453

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.1301801 I.D. NO. B-3453
 F.A. PROJECT BRSTP-301(10)
 COUNTY HALIFAX
 PROJECT DESCRIPTION REPLACEMENT OF BRIDGE
No. 17 OVER FISHING CREEK OVERFLOW ON US 301

CONTENTS:

NCDOT Geotechnical Unit Soil and Rock Classification Sheet	Sheet 2
Site Vicinity Map	Sheet 3
Boring Location Plan	Sheet 4
Generalized Subsurface Profile 17.0' Right of -L-	Sheet 5
Generalized Subsurface Cross Sections	
End Bent No. 1	Sheet 6A
Interior Bent No. 1	Sheet 6B
Interior Bent No. 2	Sheet 7A
Interior Bent No. 3	Sheet 7B
End Bent No. 2	Sheet 8A
Test Boring Logs	Sheets 9 - 16
Rock Core Reports	
Rock Core Photographs	
Summary of Laboratory Test Data	Sheet 17
Field Scour Report (Performed August 18, 2003)	Sheets 18 & 19
Grain Size Curves	Sheets 20 & 21

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3453	1	21
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1301801	BRSTP-301(10)	P.E. CONST.	

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For Letting

INVESTIGATED BY S&ME, INC. PERSONNEL S. JOHNSON
 CHECKED BY A.F. RIGGS, JR. A. NASH
 SUBMITTED BY S&ME, INC. M. MOSELEY
 DATE AUGUST 22, 2003 J. WHITE
C. RICHARDSON
K. MARTIN
A. GALHER
E. MOSELEY
P. PHELPS
T. PEREZ

DRAWN BY: T. PEREZ

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Abner F. Riggs, Jr.
SIGNATURE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

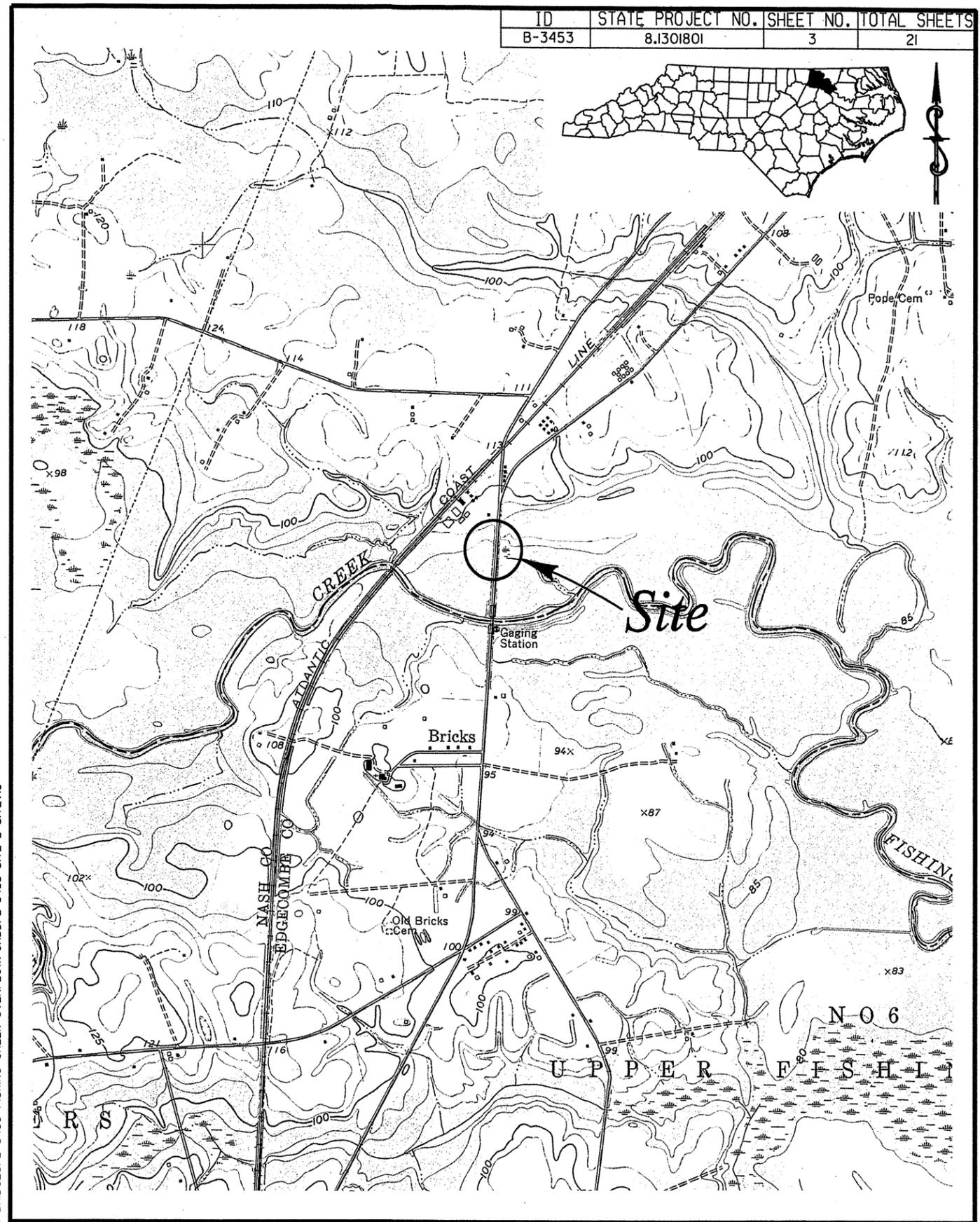
ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3453	8.1301801	2	21

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																								
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM T286, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS PERTINENT SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES:</p> <p align="center"><i>VERY STIFF, GRW SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>		<p>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)</p> <p>GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.)- SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (R.Q.D.) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - 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.</p> <p>TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																								
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (>5% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (>85% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td><td>A-3</td><td>A-2</td><td>A-4</td><td>A-5</td><td>A-6</td><td>A-7</td> <td>A-1, A-2</td><td>A-4, A-5</td><td>A-6, A-7</td><td>A-7-5</td><td>A-7-6</td><td>A-7-8</td> </tr> <tr> <td>SYMBOL</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>% PASSING</td> <td>100</td><td>100</td><td>100</td><td>100</td><td>100</td><td>100</td><td>100</td> <td>100</td><td>100</td><td>100</td><td>100</td><td>100</td><td>100</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td> <td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table>		GENERAL CLASS.	GRANULAR MATERIALS (>5% PASSING #200)				SILT-CLAY MATERIALS (>85% 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-4, A-5	A-6, A-7	A-7-5	A-7-6	A-7-8	SYMBOL														% PASSING	100	100	100	100	100	100	100	100	100	100	100	100	100	LIQUID LIMIT	50	50	50	50	50	50	50	50	50	50	50	50	50	PLASTIC INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	<p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p align="center">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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></p> <p>SEVERE (SEV.) - ALL ROCKS 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></p> <p>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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>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.</p>		<p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY
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ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3453	8.1301801	3	21



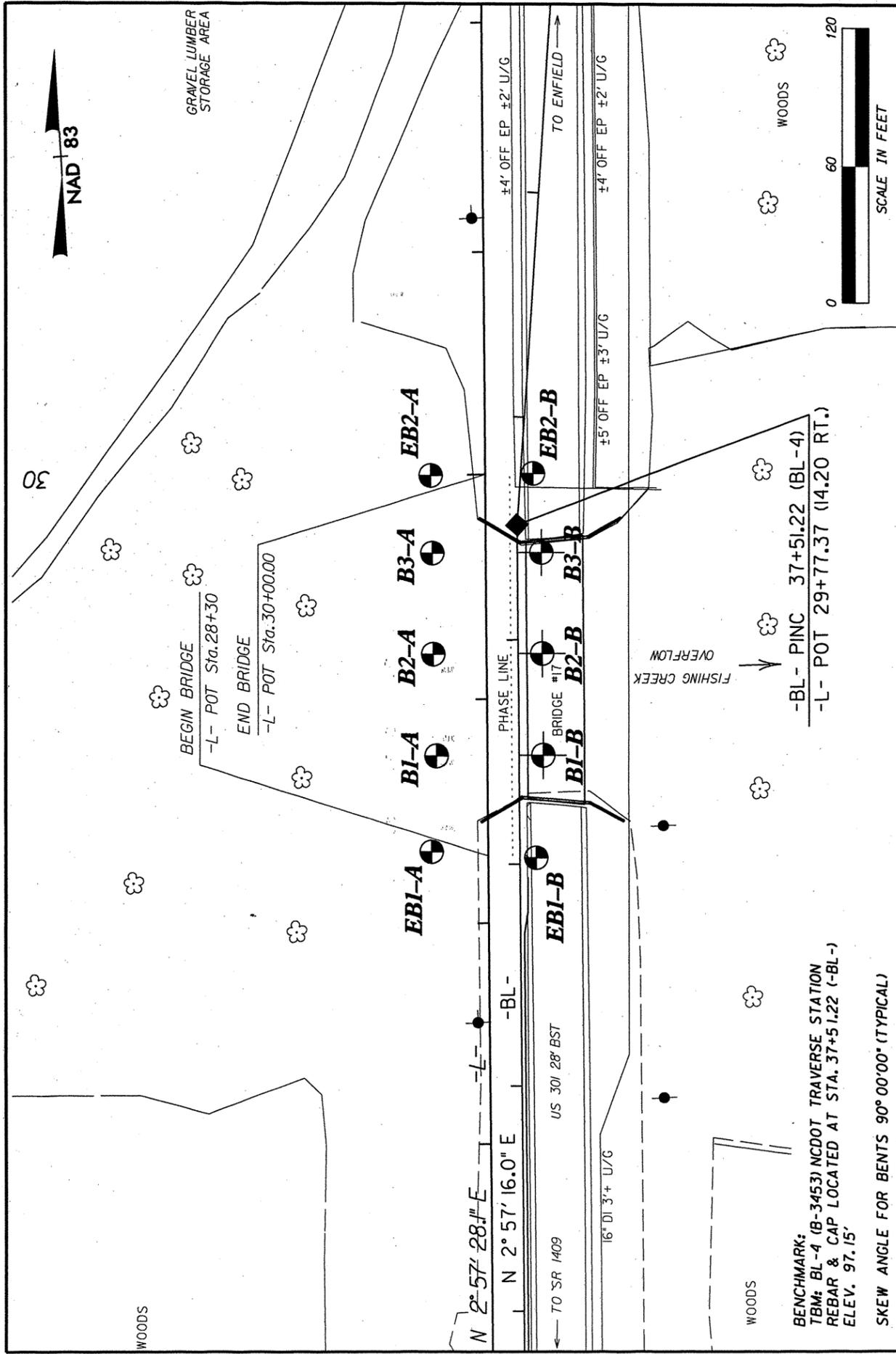
S:\GEO TECH\2003\03 BRIDGES\B-3453 FISHING CREEK OVERFLOW\CADD\B-3453 SITE 2 SITEVIC

SCALE:	1:24,000
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-131



SITE VICINITY MAP

REPLACEMENT OF BRIDGE No. 17
OVER FISHING CREEK OVERFLOW ON US 301
STATE PROJECT NO. 8.1301801 TIP NO. B-3453
FEDERAL I.D. NO. BRSTP-301 (10)
HALIFAX COUNTY, NORTH CAROLINA



BENCHMARK:
 TBM: BL-4 (B-3453) NCDOT TRAVERSE STATION
 REBAR & CAP LOCATED AT STA. 37+51.22 (-BL-)
 ELEV. 97.15'

SKEW ANGLE FOR BENTS 90° 00' 00" (TYPICAL)

-BL- PINC 37+51.22 (BL-4)
 -L- POT 29+77.37 (14.20 RT.)

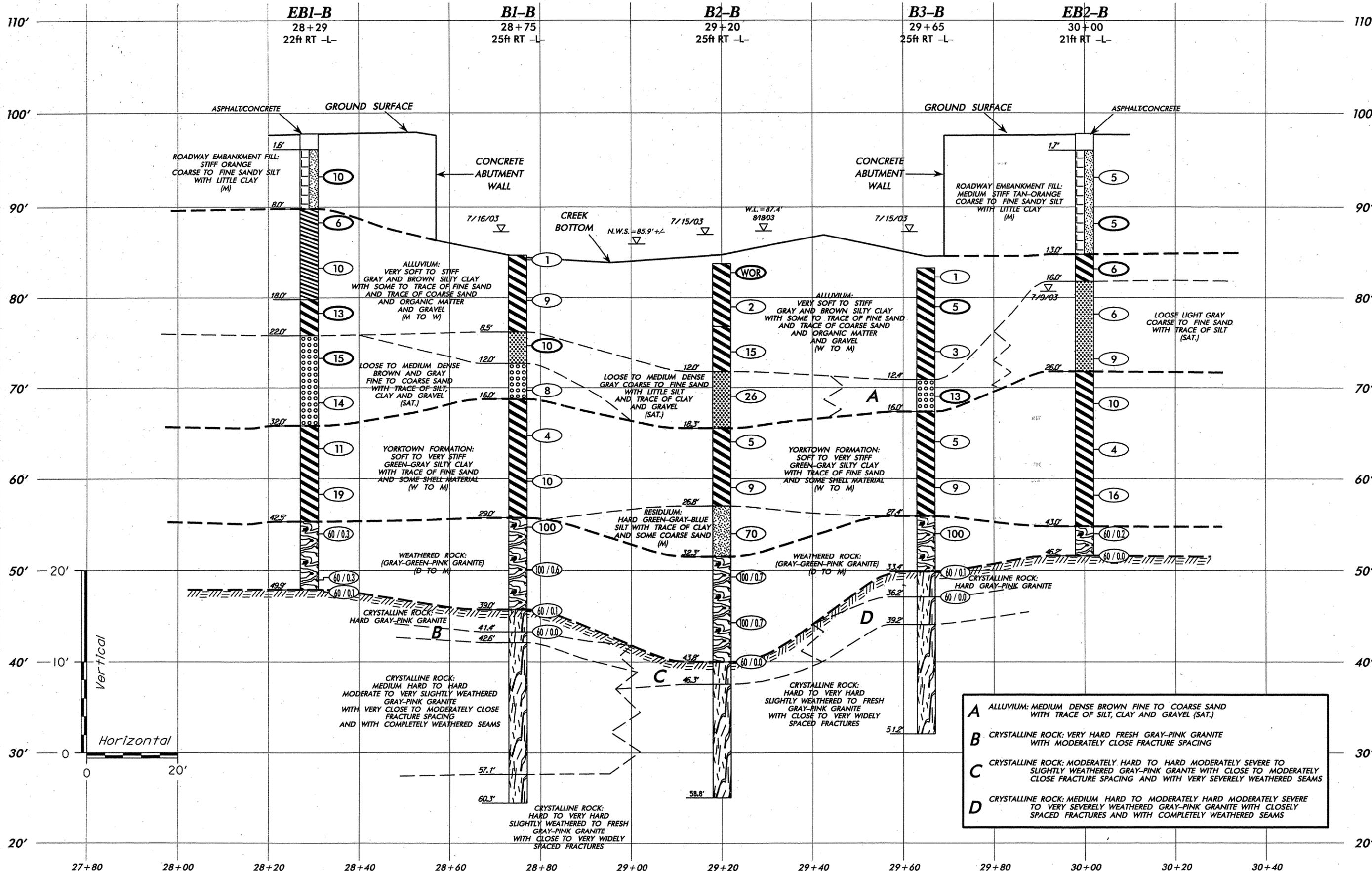


<p>SCALE: 1" = 60'</p> <p>CHECKED BY: AFR</p> <p>DRAWN BY: TRP</p> <p>DATE: AUGUST 2003</p> <p>JOB NO. 105 I-03-13 I</p>		<p>S&ME ENVIRONMENTAL SERVICES ENGINEERING TESTING</p>	<p>BORING LOCATION PLAN</p> <p>REPLACEMENT OF BRIDGE No. 17 OVER FISHING CREEK OVERFLOW ON US 301 TIP No. B-3453 STATE PROJECT No. 8.1301801 FEDERAL ID No. BRSTP-301(10) HALIFAX COUNTY, NORTH CAROLINA</p>	<p>SHEET NO. 4</p>

TO SR 1409

GENERALIZED SUBSURFACE PROFILE 17.0' RIGHT OF -L-

TO ENFIELD



S:\GEO\TECH\20_3BRIDGES\B-3453 FISHING CREEK OVERFLOW\CADD\SITE 2 PROFILE_XSEC.DGN

GENERALIZED SUBSURFACE PROFILE 17.0' RIGHT OF -L-

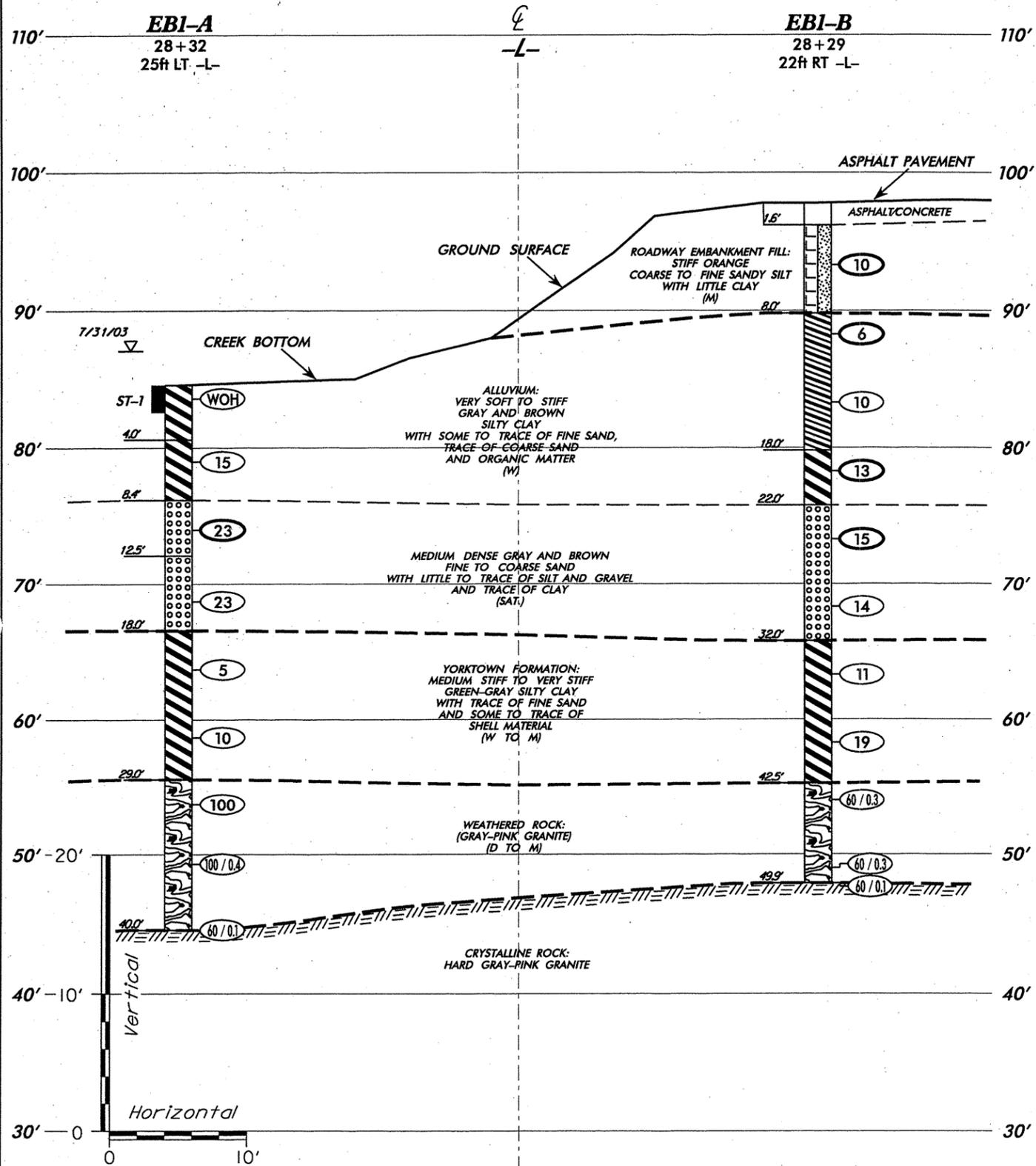
REPLACEMENT OF BRIDGE No. 17
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TIP No. B-3453 STATE PROJECT No. B.130.1801 FEDERAL I.D. BRSTP-30 (10)
HALIFAX COUNTY, NORTH CAROLINA

APPROVED BY: AFR
DRAWN BY: TRP
DATE: AUGUST 2003
JOB NO. 1051-03-131
SHEET 5 OF 21

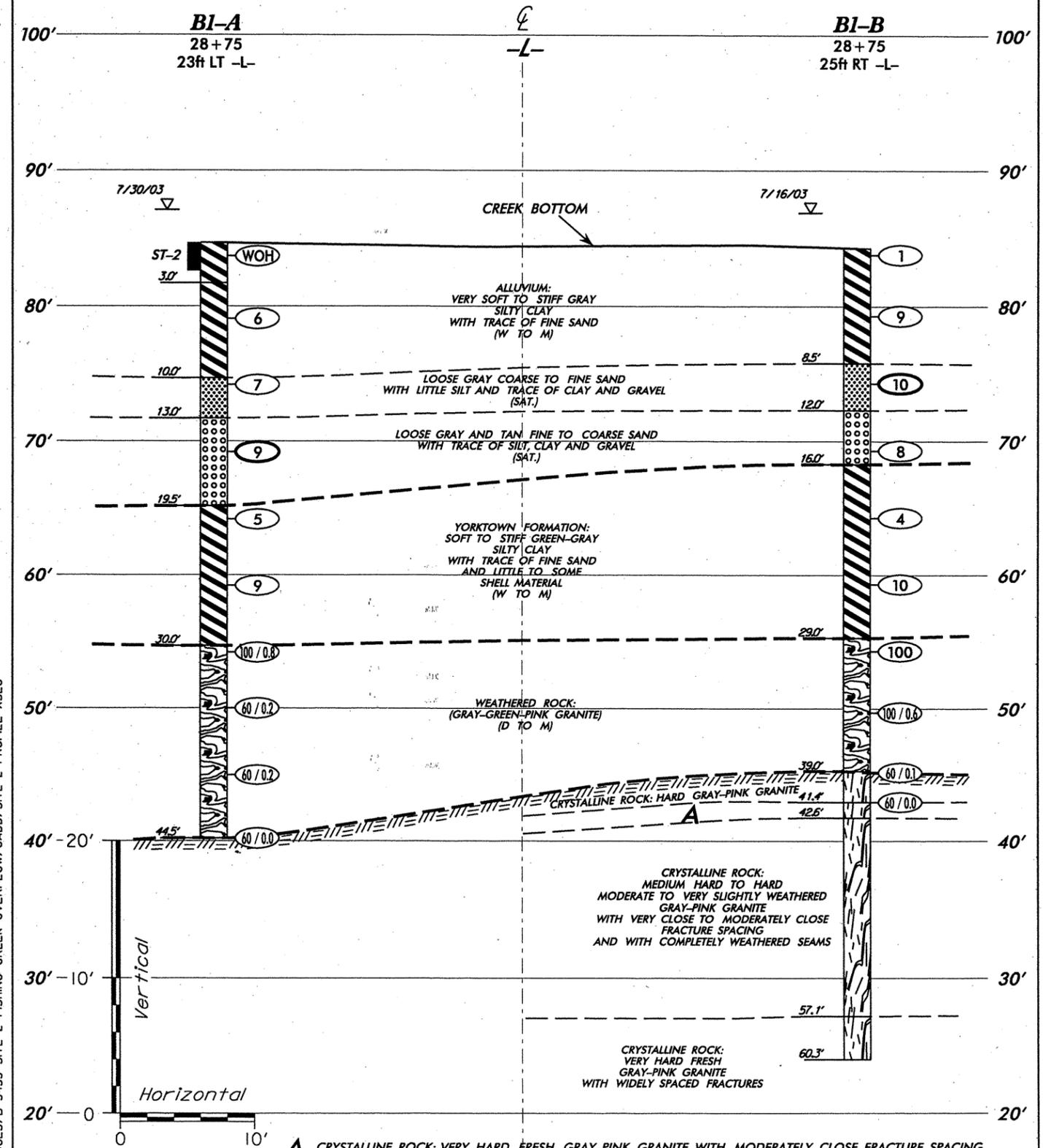
SCALE: (V) 1" = 10'
(H) 1" = 20'

S&ME
ENVIRONMENTAL SERVICES
ENGINEERING - TESTING

GENERALIZED SUBSURFACE CROSS SECTION THROUGH END BENT No.1



GENERALIZED SUBSURFACE CROSS SECTION THROUGH INTERIOR BENT No.1



RIDGES/B-3453 SITE 2 FISHING CREEK OVERFLOW/CADD/SITE 2 PROFILE-XSEC

S:\GEO\2003\03BRIDGES/B-3453 SITE 2 FISHING CREEK OVERFLOW/CADD/SITE 2 PROFILE-XSEC

SCALE:	(V) 1"=10' (H) 1"= 10'
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GENERALIZED SUBSURFACE CROSS SECTION
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 HALIFAX COUNTY, NORTH CAROLINA

SHEET NO.
6A

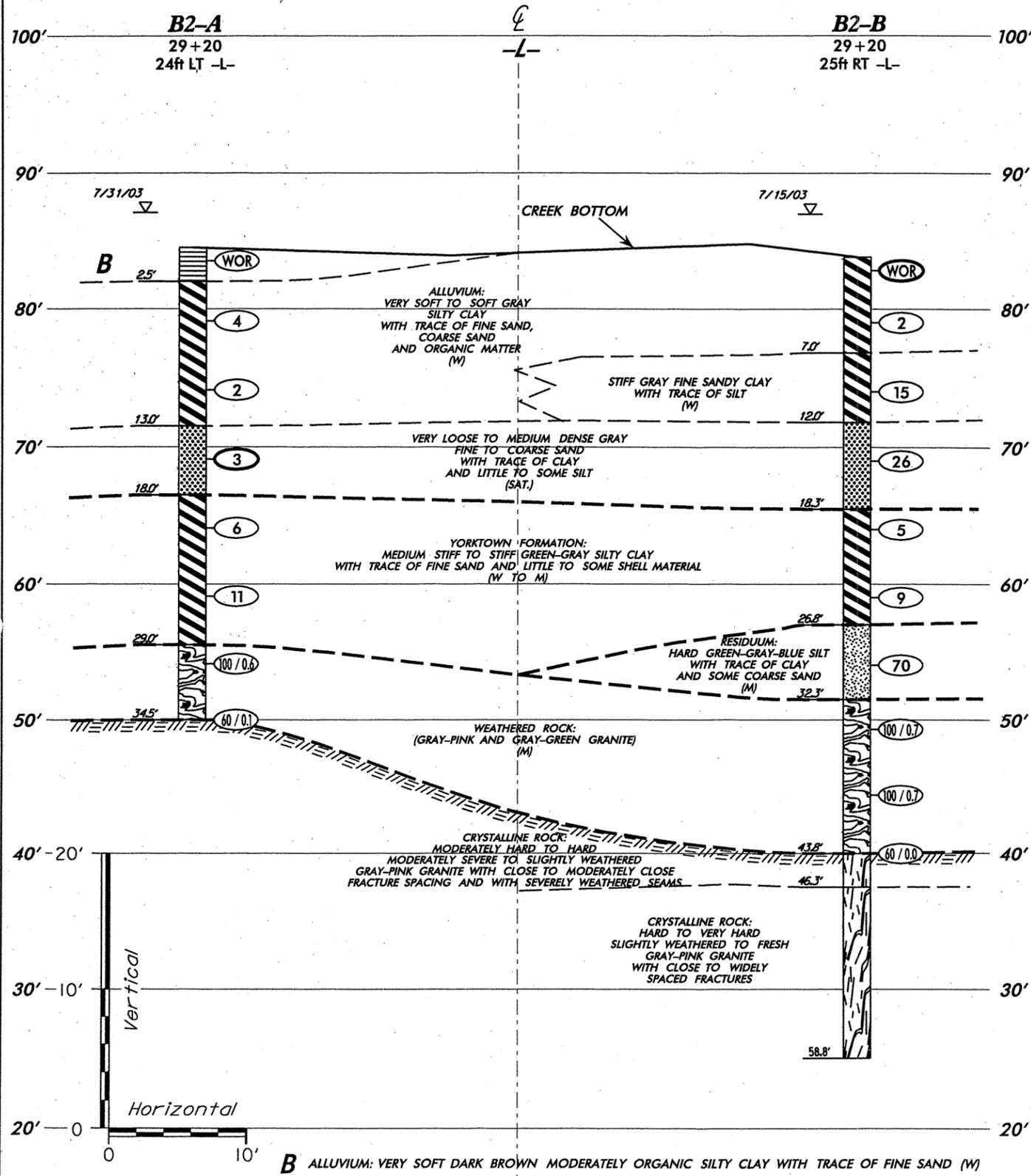
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GENERALIZED SUBSURFACE CROSS SECTION
 THROUGH INTERIOR BENT No. 1
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 HALIFAX COUNTY, NORTH CAROLINA

SHEET NO.
6B

GENERALIZED SUBSURFACE CROSS SECTION THROUGH INTERIOR BENT No. 2



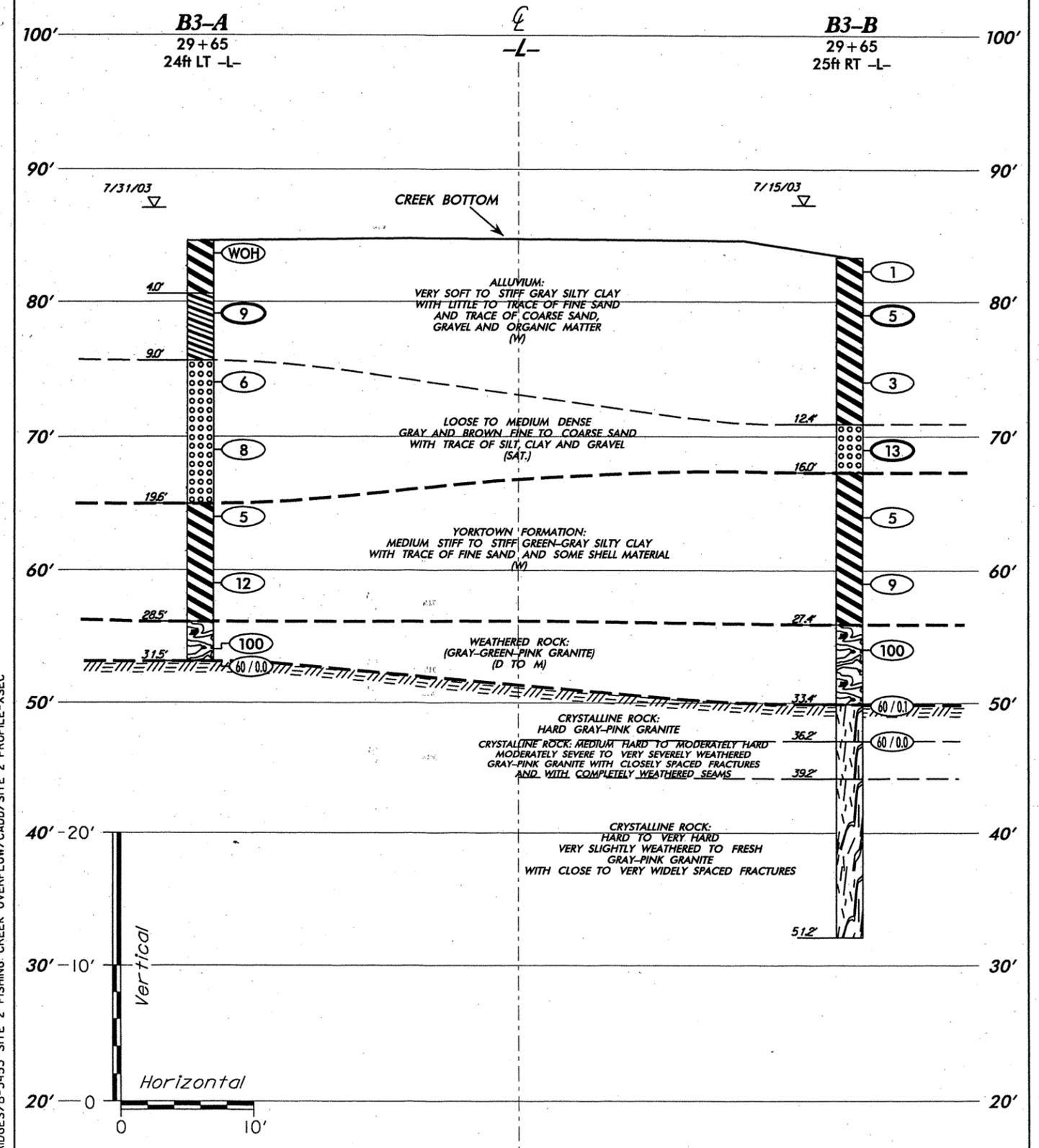
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GENERALIZED SUBSURFACE CROSS SECTION
 THROUGH INTERIOR BENT No. 2
 REPLACEMENT OF BRIDGE No. 17
 OVER FISHING CREEK OVERFLOW ON US 301
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 FEDERAL ID No. BRSTP-301(10)
 HALIFAX COUNTY, NORTH CAROLINA

SHEET NO.
7A

GENERALIZED SUBSURFACE CROSS SECTION THROUGH INTERIOR BENT No. 3



SCALE:	(V) 1"=10' (H) 1"= 10'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-131



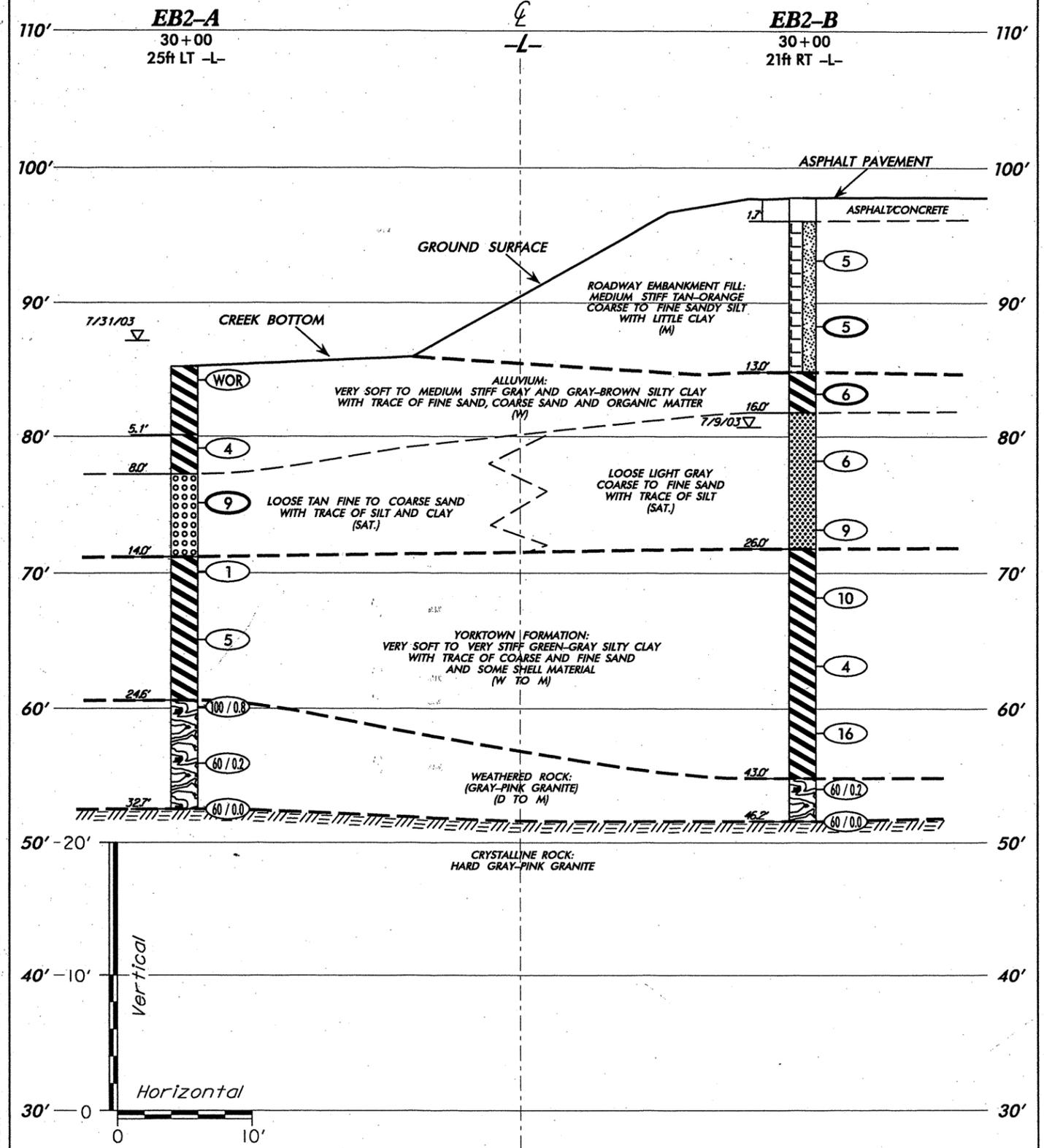
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SHEET NO.
7B

S:\GEO\TECH\2003\03BRIDGES\B-3453 SITE 2 FISHING CREEK OVERFLOW\CADD\SITE 2 PROFILE-XSEC

S:\GEO\TECH\2003\03BRIDGES\B-3453 SITE 2 FISHING CREEK OVERFLOW\CADD\SITE 2 PROFILE-XSEC

GENERALIZED SUBSURFACE CROSS SECTION THROUGH END BENT No. 2



SIGTECH/2003/03BRIDGES/B-3453 SITE 2 FISHING CREEK OVERFLOW/CADD/SITE 2 PROFILE-XSEC

SCALE:	(V) 1"= 10' (H) 1"= 10'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2003
JOB NO.	1051-03-131



GENERALIZED SUBSURFACE CROSS SECTION
THROUGH END BENT No. 2
REPLACEMENT OF BRIDGE No. 17
OVER FISHING CREEK OVERFLOW ON US 301
TIP No. B-3453 STATE PROJECT No. 8.1301801
FEDERAL ID No. BRSTP-301(10)
HALIFAX COUNTY, NORTH CAROLINA

SHEET NO.
8A



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. EB1-A		BORING LOCATION 28+32		OFFSET 25.0 ft LT	ALIGNMENT -L-	0 HR. N/A	24 HR. N/A						
COLLAR ELEV. 84.6 ft		NORTHING 877,202.7		EASTING 2,385,912.4									
TOTAL DEPTH 40.0 ft		DRILL MACHINE CME-45c	DRILL METHOD Rotary Wash w/ 2-17/18" Drag Bit & 2-7/8" Tricone		HAMMER TYPE MANUAL								
DATE STARTED 7/31/03		COMPLETED 7/31/03		SURFACE WATER DEPTH 2.5 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
87.1													CREEK LEVEL
84.6	0.0												CREEK BOTTOM
80.0	4.6	WOR	WOH	WOH									ALLUVIUM: VERY SOFT GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND COARSE SAND
75.0	9.6	5	5	10									STIFF GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND
69.7	14.9	5	11	12									MEDIUM DENSE GRAY FINE TO COARSE SAND (A-1-a) WITH TRACE OF CLAY AND LITTLE SILT AND GRAVEL
64.7	19.9	11	13	10									MEDIUM DENSE GRAY FINE TO COARSE SAND (A-1-b) WITH TRACE OF SILT AND CLAY
59.7	24.9	4	2	3									YORKTOWN FORMATION: MEDIUM STIFF TO STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND SHELL MATERIAL
54.7	29.9	3	4	6									WEATHERED ROCK: (GRAY-PINK GRANITE)
49.7	34.9	20	34	66									
44.7	39.9	60/0.1											
BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 44.6 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.												1) ADVANCED 2-17/18" DRAG BIT WITH ROTARY WASH TO 9.6 FEET. 2) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 39.9 FEET. 3) SET 19.4 FEET OF NW CASING (3.6 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED.	



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. EB1-B		BORING LOCATION 28+29		OFFSET 22.0 ft RT	ALIGNMENT -L-	0 HR. N/M	24 HR. N/M						
COLLAR ELEV. 97.8 ft		NORTHING 877,197.3		EASTING 2,385,959.2									
TOTAL DEPTH 49.9 ft		DRILL MACHINE Mobile B-57	DRILL METHOD 3/4" HSA		HAMMER TYPE MANUAL								
DATE STARTED 7/10/03		COMPLETED 7/10/03		SURFACE WATER DEPTH N/A									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
97.8													ASPHALT PAVEMENT SURFACE
94.3	3.5	3	6	4									ASPHALT (0.9) 11 INCHES CONCRETE (0.7) 8 INCHES ROADWAY EMBANKMENT FILL: STIFF ORANGE COARSE TO FINE SANDY SILT (A-4) WITH LITTLE CLAY
89.3	8.5	WOR	3	3									ALLUVIUM: MEDIUM STIFF TO STIFF GRAY SILTY CLAY (A-6) WITH TRACE OF ORGANIC MATTER AND COARSE SAND AND SOME FINE SAND
84.3	13.5	2	5	5									
79.3	18.5	4	4	9									STIFF BROWN FINE SANDY SILTY CLAY (A-7-6) WITH TRACE OF COARSE SAND AND ORGANIC MATTER
74.3	23.5	5	6	9									MEDIUM DENSE BROWN FINE TO COARSE SAND (A-1-b) WITH TRACE OF SILT, CLAY AND GRAVEL
69.3	28.5	6	6	8									
64.3	33.5	4	5	6									YORKTOWN FORMATION: STIFF TO VERY STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND SOME SHELL MATERIAL
59.3	38.5	5	6	13									
54.3	43.5	60/0.3											WEATHERED ROCK: (GRAY-PINK GRANITE)
49.3	48.5	60/0.3											
48.0	49.8	60/0.3											
BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 47.9 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.												1) ADVANCED 3-1/4" HSA TO 49.8 FEET.	

NCDOT BORE SINGLE 1.GPJ NCDOT.GDT 8/21/03

NCDOT BORE SINGLE 51-131.GPJ NCDOT.GDT 8/21/03



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. B1-A		BORING LOCATION 28+75		OFFSET 23.0 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 84.7 ft		NORTHING 877,245.6		EASTING 2,385,917.1		0 HR. N/A							
TOTAL DEPTH 44.5 ft		DRILL MACHINE CME-45c		DRILL METHOD Rotary Wash w/2-17/18" Drag Bit & 2-7/8" Tricone		HAMMER TYPE MANUAL							
DATE STARTED 7/30/03		COMPLETED 7/30/03		SURFACE WATER DEPTH 2.4 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
87.1													CREEK LEVEL
84.7	0.0												CREEK BOTTOM
80.1	4.6	WOR	WOR	WOH	0						ST-2	W	ALLUVIUM: VERY SOFT GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND
75.2	9.5	2	3	3							W	W	MEDIUM STIFF GRAY SILTY CLAY (A-7-6) WITH TRACE OF BROWN FINE SAND
70.2	14.5	5	4	3							Sat.	Sat.	LOOSE GRAY COARSE TO FINE SAND (A-2-4) WITH LITTLE SILT AND TRACE OF CLAY AND GRAVEL
65.2	19.5	3	5	4							SS-6	Sat.	LOOSE GRAY AND TAN FINE TO COARSE SAND (A-1-b) WITH TRACE OF SILT, CLAY AND GRAVEL
60.2	24.5	2	2	3							W	W	YORKTOWN FORMATION: MEDIUM STIFF TO STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND LITTLE SHELL MATERIAL
55.2	29.5	3	3	6							W	W	WEATHERED ROCK: (GRAY-PINK GRANITE)
50.2	34.5	26	67	33/0.3							M	M	
45.2	39.5	60/0.2									M	M	
40.2	44.5	60/0.0									M	M	
BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 40.2 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.												<ol style="list-style-type: none"> 1) ADVANCED 2-17/18" DRAG BIT WITH ROTARY WASH TO 4.6 FEET. 2) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 44.5 FEET. 3) SET 18.6 FEET OF NW CASING (3.5 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED. 	

NCDOT BORE SINGLE 5 GPJ NCDOT.GDT 8/21/03



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. B1-B		BORING LOCATION 28+75		OFFSET 25.0 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 84.3 ft		NORTHING 877,243.1		EASTING 2,385,965.1		0 HR. N/A							
TOTAL DEPTH 60.3 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/2-7/8" Tricone & NWD4 Split Barrel		HAMMER TYPE MANUAL							
DATE STARTED 7/16/03		COMPLETED 7/16/03		SURFACE WATER DEPTH 2.6 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
86.9													CREEK LEVEL
84.3	0.0												CREEK BOTTOM
80.3	4.0	32	WOH	1									ALLUVIUM: VERY SOFT TO STIFF GRAY SILTY CLAY (A-7-6) WITH TRACE OF BROWN FINE SAND (WOOD DEBRIS AT SURFACE)
75.3	9.0	3	3	6							M	M	LOOSE GRAY COARSE TO FINE SAND (A-2-4) WITH LITTLE SILT AND TRACE OF CLAY AND GRAVEL
70.3	14.0	3	3	7							Sat.	Sat.	LOOSE GRAY FINE TO COARSE SAND (A-1-b) WITH TRACE OF SILT AND GRAVEL
65.3	19.0	4	4	4							Sat.	Sat.	YORKTOWN FORMATION: SOFT TO STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND SOME SHELL MATERIAL
60.3	24.0	2	1	3							M	M	
55.3	29.0	3	4	6							M	M	
50.3	34.0	24	76								D	D	WEATHERED ROCK: (GRAY-PINK GRANITE)
45.3	39.0	75	25/0.1								D	D	
42.9	41.4	60/0.1									D	D	CRYSTALLINE ROCK: GRAY-PINK GRANITE
		60/0.0									D	D	CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH MODERATELY CLOSE FRACTURE SPACING
													CRYSTALLINE ROCK: MEDIUM HARD TO HARD MODERATE TO VERY SLIGHTLY WEATHERED GRAY-PINK GRANITE WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING COMPLETELY WEATHERED SEAMS FROM (44.6' TO 45.3'), (45.9' TO 46.6'), (48.2' TO 49.0') 6 JOINTS @ <10°, 4 JOINTS @ 40° TO 50°, 1 JOINT @ 80°
													CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH WIDELY SPACED FRACTURES
													1) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 41.4 FEET. 2) ADVANCED NWD4 SPLIT CORE BARREL FROM 41.4 TO 60.3 FEET. 3) SET 41.4 FEET OF NW CASING (13.9 FEET TEMPORARY NW CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID

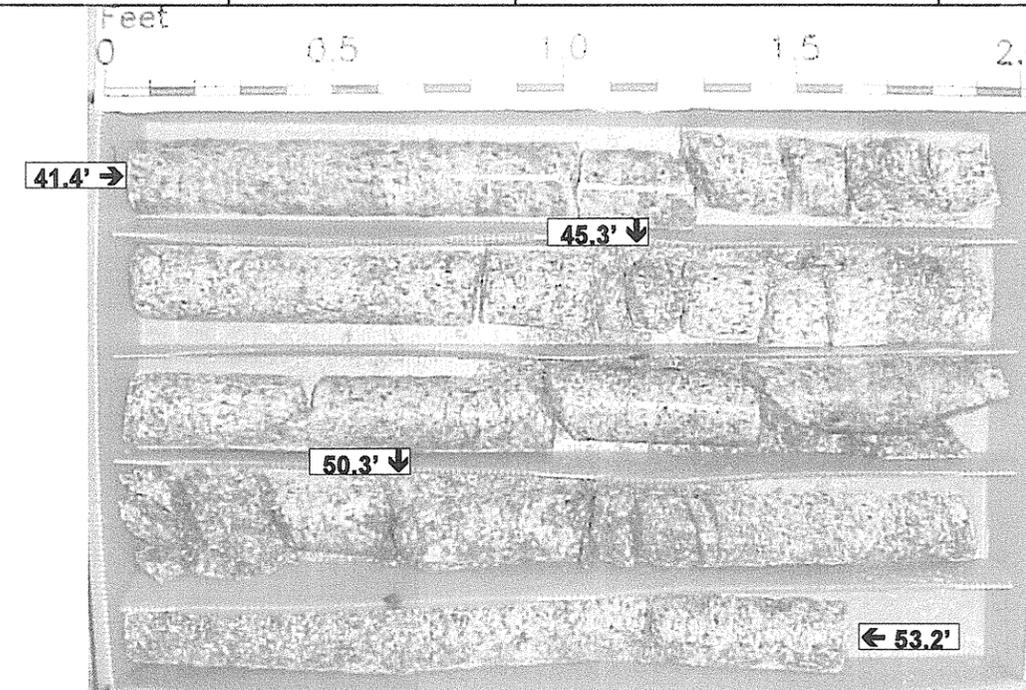
NCDOT BORE SINGLE 51-131.GPJ NCDOT.GDT 8/21/03

BORING TERMINATED AT ELEV. 24.0 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY-PINK GRANITE.

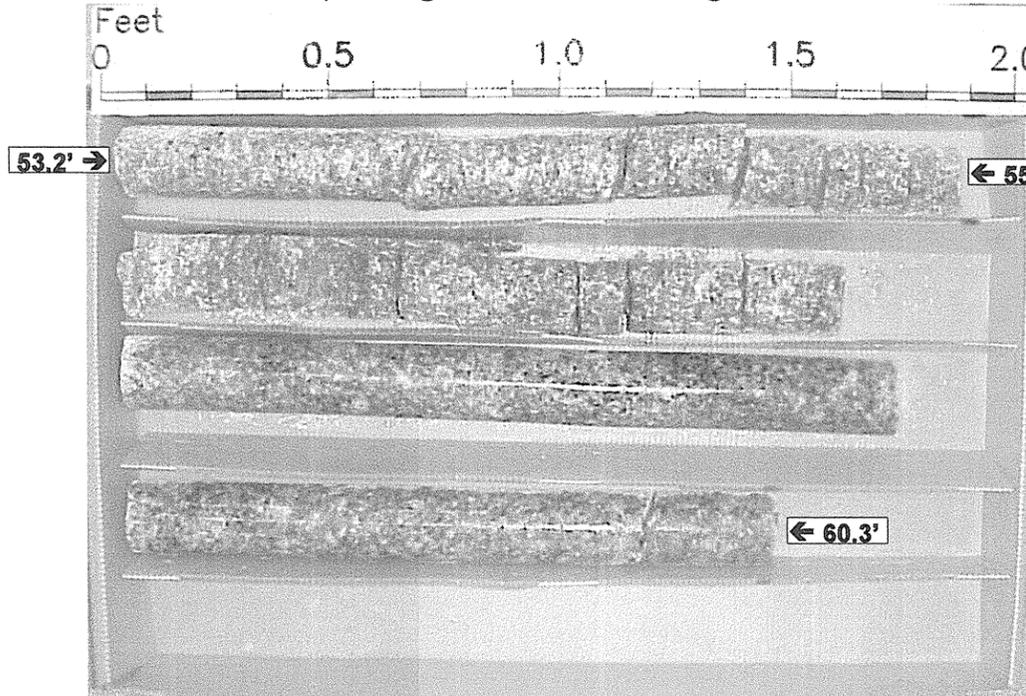
CORE PHOTOS

PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH				
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301						GROUND WATER (ft)				
BORING NO. B1-B		BORING LOCATION 28+75		OFFSET 25.0 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 84.3 ft		NORTHING 877,243.1		EASTING 2,385,965.1		0 HR. N/A				
TOTAL DEPTH 60.3 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/2-7/8" Tricone & NWD4 Split		HAMMER TYPE MANUAL				
DATE STARTED 7/16/03		COMPLETED 7/16/03		SURFACE WATER DEPTH 2.6 ft						
CORE SIZE NWD4		TOTAL RUN 18.9 ft		DRILLER C. RICHARDSON						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										42.9 Begin Coring @ 41.4 ft 41.4
42.9	41.4	3.9	2:58 2:10 2:33	(2.9) 74%	(2.5) 64%		(16.2) 86%	(13.7) 72%		41.7 CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH MODERATELY CLOSE FRACTURE SPACING 42.6
39.0	45.3	5.0	1:40 1:20 1:10 1:09 1:25	(3.5) 70%	(2.6) 52%					CRYSTALLINE ROCK: MEDIUM HARD TO HARD MODERATE TO VERY SLIGHTLY WEATHERED GRAY-PINK GRANITE WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING
34.0	50.3	5.0	1:12 1:45 1:45 1:38 1:40	(4.9) 98%	(4.4) 88%					COMPLETELY WEATHERED SEAMS FROM (44.6' TO 45.3'), (45.9' TO 46.6'), (48.2' TO 49.0') 6 JOINTS @ <10°, 4 JOINTS @ 40° TO 50°, 1 JOINT @ 80°
29.0	55.3	5.0	1:53 1:48 1:38 1:40	(4.9) 98%	(4.2) 84%					27.2
24.0	60.3	5.0	1:48 1:35 1:48 1:52							24.0 CRYSTALLINE ROCK: VERY HARD FRESH GRAY-PINK GRANITE WITH WIDELY SPACED FRACTURES BORING TERMINATED AT ELEV. 24.0 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY-PINK GRANITE. 60.3

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax	Boring No.: B1-B
Site Description: Replacement of Bridge No. 17 Over Fishing Creek Overflow On US 301			Driller: C. Richardson
Collar Elev.: 84.3 ft.	Core Size: NWD4	Equipment: Mobil B-57	Geologist: A. Nash
Elev. at T.D.: 24.0 ft.	Total Depth: 60.3 ft.	Total Run: 18.9 ft.	Date: 7/16/2003



Box 1 of 2
Top of Box @ 41.1 feet; Bottom of Box @ 53.2 feet



Box 2 of 2
Top of Box @ 53.2 feet; Bottom of Box @ 60.3 feet



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. B2-A		BORING LOCATION 29+20		OFFSET 24.0 ft LT		ALIGNMENT -L-	0 HR. N/A						
COLLAR ELEV. 84.5 ft		NORTHING 877,290.5		EASTING 2,385,918.4			24 HR. N/A						
TOTAL DEPTH 34.5 ft		DRILL MACHINE CME-45c		DRILL METHOD Rotary Wash w/2-17/18" Drag Bit & 2-7/8" Tricone		HAMMER TYPE MANUAL							
DATE STARTED 7/31/03		COMPLETED 7/31/03		SURFACE WATER DEPTH 2.6 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
87.1													CREEK LEVEL
84.5	0.0												CREEK BOTTOM
80.1	4.4	WOR	WOR	WOR									ALLUVIUM: VERY SOFT DARK BROWN MODERATELY ORGANIC SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND SOFT GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND ORGANIC MATTER
75.1	9.4												
70.1	14.4	WOR	WOR	2									
65.1	19.4	3	2	1									VERY LOOSE GRAY FINE TO COARSE SAND (A-2-4) WITH TRACE OF CLAY AND SOME SILT
60.1	24.4	5	4	2									YORKTOWN FORMATION: MEDIUM STIFF TO STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND LITTLE SHELL MATERIAL
55.1	29.4	4	4	7									
50.1	34.4	80	20/0.1										WEATHERED ROCK: (GRAY-PINK GRANITE)
		60/0.1											1) ADVANCED 2-17/18" DRAG BIT WITH ROTARY WASH TO 9.4 FEET. 2) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 34.4 FEET. 3) SET 19.4 FEET OF NW CASING (3.7 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED.

NCDOT BORE SINGLE 51-131.GPJ, NCDOT.GDT 8/21/03



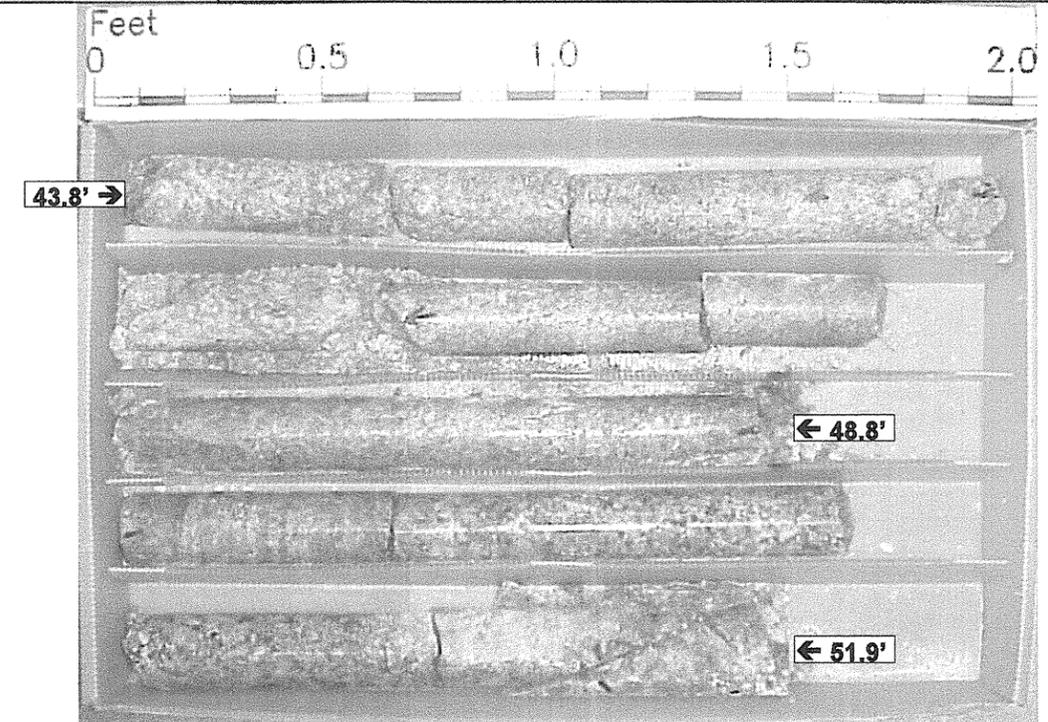
PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH							
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)						
BORING NO. B2-B		BORING LOCATION 29+20		OFFSET 25.0 ft RT		ALIGNMENT -L-	0 HR. N/A						
COLLAR ELEV. 83.8 ft		NORTHING 877,288.0		EASTING 2,385,967.3			24 HR. N/A						
TOTAL DEPTH 58.8 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/2-7/8" Tricone & NQ-2 Core Barrel		HAMMER TYPE MANUAL							
DATE STARTED 7/15/03		COMPLETED 7/15/03		SURFACE WATER DEPTH 3.2 ft									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
87.0													CREEK LEVEL
83.8	0.0												CREEK BOTTOM
80.0	3.8	WOR	WOR	WOR									ALLUVIUM: VERY SOFT TO SOFT GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND, COARSE SAND AND ORGANIC MATTER
75.0	8.8	1	1	1									
70.0	13.8	2	5	10									
65.0	18.8	26	13	13									MEDIUM DENSE GRAY FINE SAND (A-2-4) WITH LITTLE SILT, CLAY LAYERS AND TRACE OF COARSE SAND
60.0	23.8	5	2	3									YORKTOWN FORMATION: MEDIUM STIFF TO STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND SOME SHELL MATERIAL
55.0	28.8	3	4	5									
50.0	33.8	25	32	38									RESIDUUM HARD GREEN-GRAY-BLUE SILT (A-4) WITH TRACE OF CLAY AND SOME COARSE SAND
45.0	38.8	67	33/0.2										WEATHERED ROCK: (GRAY-GREEN GRANITE)
40.0	43.8	59	41/0.2										
		60/0.0											CRYSTALLINE ROCK: MODERATELY HARD TO HARD WEATHERED GRAY-PINK GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING AND VERY SEVERELY WEATHERED SEAMS 2 JOINTS @ 50° TO 60° CRYSTALLINE ROCK: HARD TO VERY HARD SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH CLOSE TO WIDELY SPACED FRACTURES 1 JOINT @ <10°, 1 JOINT @ 40°, 1 JOINT @ 60°, 2 JOINTS @ 75° TO 80°
													1) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 43.8 FEET. 2) ADVANCED NQ-2 CORE BARREL FROM 43.8 TO 58.8 FEET. 3) SET 33.8 FEET OF NW CASING (14.4 FEET TEMPORARY NW CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED.

NCDOT BORE SINGLE 51-131.GPJ, NCDOT.GDT 8/21/03

CORE PHOTOS

PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH			
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301						GROUND WATER (ft)			
BORING NO. B2-B		BORING LOCATION 29+20		OFFSET 25.0 ft RT		ALIGNMENT -L-			
COLLAR ELEV. 83.8 ft		NORTHING 877,288.0		EASTING 2,385,967.3		0 HR. N/A			
TOTAL DEPTH 58.8 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/2-7/8" Tricone & NQ-2 Core Barrel		24 HR. N/A			
DATE STARTED 7/15/03		COMPLETED 7/15/03		SURFACE WATER DEPTH 3.2 ft					
CORE SIZE NQ-2		TOTAL RUN 15.0 ft		DRILLER C. RICHARDSON					
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) % RQD (ft) %		STRATA REC. (ft) % RQD (ft) %		LOG	DESCRIPTION AND REMARKS
									40.0 Begin Coring @ 43.8 ft 43.8
40.0	43.8	5.0	1:37 1:26 1:24 1:38 2:31	(5.0) 100%	(4.4) 88%	(14.7) 98%	(13.3) 89%		37.5 CRYSTALLINE ROCK: MODERATELY HARD TO HARD MODERATELY SEVERE TO SLIGHTLY WEATHERED GRAY-PINK GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING AND VERY SEVERELY WEATHERED SEAMS 2 JOINTS @ 50° TO 60° 46.3
35.0	48.8	5.0	3:40 3:38 3:41 3:13	(4.9) 98%	(4.1) 82%				CRYSTALLINE ROCK: HARD TO VERY HARD SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH CLOSE TO WIDELY SPACED FRACTURES
30.0	53.8	5.0	3:21 3:20 3:40 3:33 3:36 3:37	(4.8) 96%	(4.8) 96%				1 JOINT @ <10°, 1 JOINT @ 40°, 1 JOINT @ 60°, 2 JOINTS @ 75° TO 80°
25.0	58.8								25.0 BORING TERMINATED AT ELEV. 25.0 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY-PINK GRANITE. 58.8

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax	Boring No.: B2-B
Site Description: Replacement of Bridge No. 17 Over Fishing Creek Overflow On US 301			Driller: C. Richardson
Collar Elev.: 83.8 ft.	Core Size: NQ-2	Equipment: Mobile B-57	Geologist: A. Nash
Elev. at T.D.: 25.0 ft.	Total Depth: 58.8 ft.	Total Run: 15.0 ft.	Date: 7/15/2003



Box 1 of 2
Top of Box @ 43.8 feet; Bottom of Box @ 51.9 feet



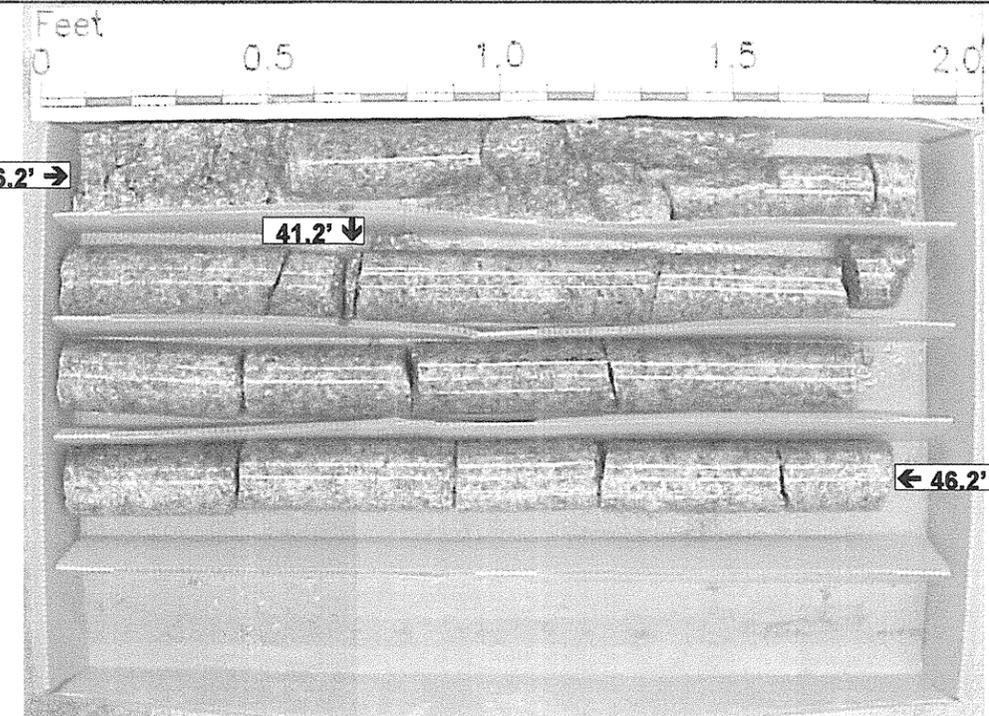
Box 2 of 2
Top of Box @ 51.9 feet; Bottom of Box @ 58.8 feet

CORE PHOTOS

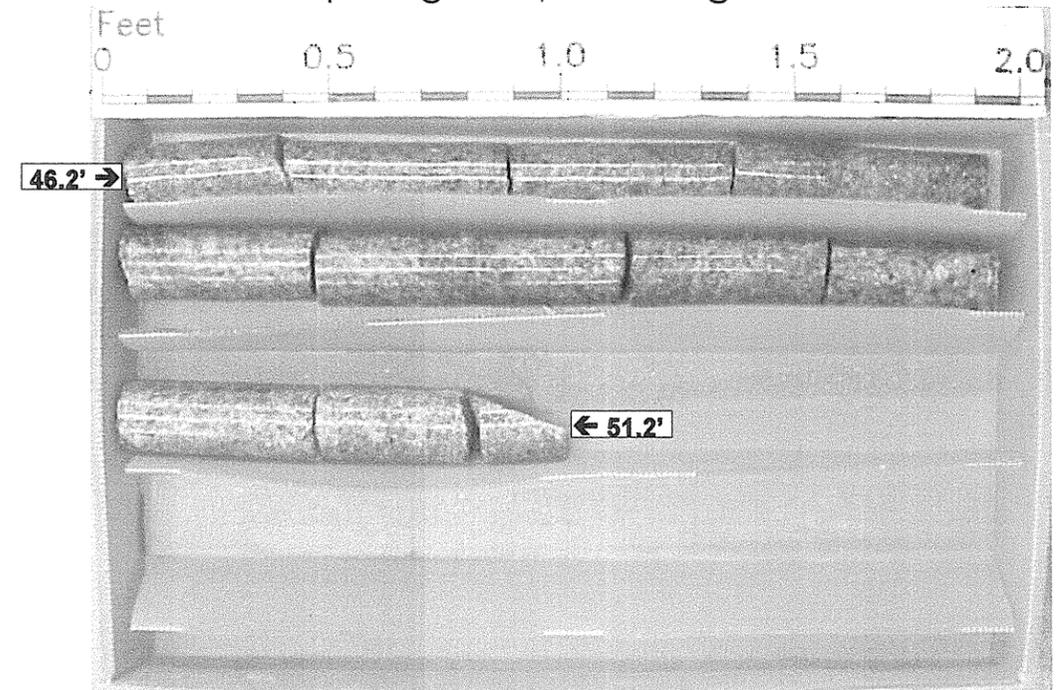
PROJECT NO. 8.1301801	ID. B-3453	COUNTY Halifax	GEOLOGIST A. NASH
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301			GROUND WATER (ft)
BORING NO. B3-B	BORING LOCATION 29+65	OFFSET 25.0 ft RT	ALIGNMENT -L-
COLLAR ELEV. 83.3 ft	NORTHING 877,333.0	EASTING 2,385,969.6	0 HR. N/A
TOTAL DEPTH 51.2 ft	DRILL MACHINE Mobile B-57	DRILL METHOD Rotary Wash w/2-7/8" Tricone & NWD4 Split Barrel	24 HR. N/A
DATE STARTED 7/15/03	COMPLETED 7/15/03	SURFACE WATER DEPTH 4 ft	
CORE SIZE NWD4	TOTAL RUN 15.0 ft	DRILLER C. RICHARDSON	

Project No: 8.1301801	I.D. No.: B-3453	County: Halifax	Boring No.: B3-B
Site Description: Replacement of Bridge No. 17 Over Fishing Creek Overflow On US 301			Driller: C. Richardson
Collar Elev.: 83.3 ft.	Core Size: NWD4	Equipment: Mobile B-57	Geologist: A. Nash
Elev. at T.D.: 32.1 ft.	Total Depth: 51.2 ft.	Total Run: 15.0 ft.	Date: 7/15/2003

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										47.1 Begin Coring @ 36.2 ft 36.2
47.1	36.2	5.0	2:15 1:58 3:53 3:54	(2.5) 50%	(1.3) 26%		(12.2) 81%	(11.0) 73%		44.1 CRYSTALLINE ROCK: MEDIUM HARD TO MODERATELY HARD MODERATELY SEVERE TO VERY SEVERELY WEATHERED GRAY-PINK GRANITE WITH CLOSELY SPACED FRACTURES AND WITH COMPLETELY WEATHERED SEAMS 39.2
42.1	41.2	5.0	2:37 2:40 2:32 2:48	(4.9) 98%	(4.9) 98%					CRYSTALLINE ROCK: HARD TO VERY HARD VERY SLIGHTLY WEATHERED TO FRESH GRAY-PINK GRANITE WITH CLOSE TO VERY WIDELY SPACED FRACTURES VERTICAL FRACTURE FROM 39.6' TO 40.3'
37.1	46.2	5.0	2:53 2:57 3:21 3:41 3:31	(4.8) 96%	(4.8) 96%					32.1 BORING TERMINATED AT ELEV. 32.1 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY-PINK GRANITE. 51.2



Box 1 of 2
Top of Box @ 36.2 feet; Bottom of Box @ 46.2 feet



Box 2 of 2
Top of Box @ 46.2 feet; Bottom of Box @ 51.2 feet



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH								
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)							
BORING NO. EB2-A		BORING LOCATION 30+00		OFFSET 25.0 ft LT	ALIGNMENT -L-	0 HR. N/A	24 HR. N/A							
COLLAR ELEV. 85.2 ft		NORTHING 877,370.9		EASTING 2,385,922.0										
TOTAL DEPTH 32.7 ft		DRILL MACHINE CME-45c	DRILL METHOD Rotary Wash w/2-17/18" Drag Bit & 2-7/8" Tricone		HAMMER TYPE MANUAL									
DATE STARTED 7/31/03		COMPLETED 7/31/03		SURFACE WATER DEPTH 1.9 ft										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
87.1														CREEK LEVEL
85.2	0.0													CREEK BOTTOM
80.1	5.1	WOR	WOR	WOR										ALLUVIUM: VERY SOFT GRAY-BROWN SILTY CLAY (A-7-6) WITH TRACE OF ORGANIC MATTER
76.1	9.1	WOH	2	2										SOFT TAN AND GRAY SILTY CLAY (A-7-6) WITH TRACE OF ORGANIC MATTER
71.1	14.1	4	4	5										LOOSE TAN FINE TO COARSE SAND (A-1-b) WITH TRACE OF SILT AND CLAY
66.1	19.1	WOH	WOH	1										YORKTOWN FORMATION: VERY SOFT TO MEDIUM STIFF GRAY-GREEN SILTY CLAY (A-7-6) WITH TRACE OF COARSE TO FINE SAND
61.1	24.1	2	3	2										WEATHERED ROCK: (GRAY-PINK GRANITE)
56.1	29.1	5	20	80/0.3										
52.5	32.7	60/0.2												
		60/0.0												
<p>BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 52.5 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.</p> <p>1) ADVANCED 2-17/18" DRAG BIT WITH ROTARY WASH TO 24.1 FEET. 2) ADVANCED 2-7/8" TRICONE ROLLER WITH ROTARY WASH TO 32.7 FEET. 3) SET 20.2 FEET OF NW CASING (3.0 FEET TEMPORARY CASING). 4) CREEK WATER USED AS DRILLING FLUID. 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF. 6) NO LOSS OF DRILLING FLUID OBSERVED.</p>														

NCDOT BORE SINGLE 51-131.GPJ NCDOT.GDT 8/21/03



PROJECT NO. 8.1301801		ID. B-3453		COUNTY Halifax		GEOLOGIST A. NASH								
SITE DESCRIPTION Bridge 17 over Fishing Creek Overflow on U.S. 301							GROUND WATER (ft)							
BORING NO. EB2-B		BORING LOCATION 30+00		OFFSET 21.0 ft RT	ALIGNMENT -L-	0 HR. 17.1	24 HR. N/M							
COLLAR ELEV. 97.8 ft		NORTHING 877,368.5		EASTING 2,385,967.9										
TOTAL DEPTH 46.2 ft		DRILL MACHINE Mobile B-57	DRILL METHOD 3/4" HSA		HAMMER TYPE MANUAL									
DATE STARTED 7/9/03		COMPLETED 7/9/03		SURFACE WATER DEPTH N/A										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
97.8														ASPHALT PAVEMENT SURFACE
94.2	3.6	3	2	3										ASPHALT (0.9) 11 INCHES CONCRETE (0.8) 10 INCHES ROADWAY EMBANKMENT FILL: MEDIUM STIFF TAN-ORANGE COARSE TO FINE SANDY SILT (A-4) WITH LITTLE CLAY
89.2	8.6	2	2	3										SS-15 21.4%
84.2	13.6	1	3	3										SS-16 53.8%
79.2	18.6	2	3	3										ALLUVIUM: MEDIUM STIFF GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND, COARSE SAND AND ORGANIC MATTER LOOSE LIGHT GRAY COARSE TO FINE SAND (A-2-4) WITH TRACE OF SILT
74.2	23.6	2	2	7										YORKTOWN FORMATION: MEDIUM STIFF TO VERY STIFF GREEN-GRAY SILTY CLAY (A-7-6) WITH TRACE OF FINE SAND AND SOME SHELL MATERIAL
69.2	28.6	2	2	8										
64.2	33.6	2	2	2										
59.2	38.6	3	4	42										
54.2	43.6	60/0.2												
51.6	46.2	60/0.0												
<p>BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 51.6 FEET ON CRYSTALLINE ROCK: HARD GRAY-PINK GRANITE.</p> <p>1) ADVANCED 3-1/4" HSA TO 46.2 FEET.</p>														

NCDOT BORE SINGLE 51-131.GPJ NCDOT.GDT 8/22/03

**Summary of Laboratory Results
Soil Classification and Gradation**

Borehole	Sample	Depth (ft)	AASHTO Classification	% Passing Sieve #			Soil Mortar Fraction					Liquid Limit	Plasticity Index	Moisture Content (%)	Organic Content (%)
				10	40	60	200	Coarse Sand % Retained on No. 60	Fine Sand	Silt	Clay				
				99	95	94	89								
EB1-A	ST-1	0.00 - 1.50	A-7-6 (21)	99	95	94	89	6	8	34	52	46	21	53.0	
EB1-A	SS-1	9.60 - 11.10	A-1-a (0)	47	21	16	9	66	17	16	1	13	NP		
EB1-B	SS-2	3.50 - 5.00	A-4 (2)	100	97	88	51	12	46	25	17	27	10	19.3	
EB1-B	SS-3	8.50 - 10.00	A-6 (12)	100	99	98	80	2	26	37	35	34	16	23.0	
EB1-B	SS-4	18.50 - 20.00	A-7-6 (12)	100	98	96	74	4	33	43	20	44	16	28.7	
EB1-B	SS-5	23.50 - 25.00	A-1-b (0)	67	26	15	7	78	13	7	2	9	NP		
B1-A	SS-6	14.50 - 16.00	A-1-b (0)	70	28	18	9	75	14	9	2	14	NP		
B1-B	SS-7	9.00 - 10.50	A-2-4 (0)	94	80	66	33	30	42	19	9	15	1		
B2-A	SS-8	0.00 - 1.50													16.0
B2-A	SS-9	14.40 - 15.90	A-2-4 (0)	96	58	46	31	52	21	22	5	28	7		
B2-B	SS-10	0.00 - 1.50	A-7-6 (27)	99	98	98	96	2	3	36	59	52	24	58.5	
B3-A	SS-11	4.50 - 6.00	A-6 (16)	99	94	93	83	6	15	35	44	40	20	25.3	
B3-B	SS-12	3.30 - 4.80	A-7-5 (33)	100	100	99	99	0	2	36	62	60	27	44.7	
B3-B	SS-13	13.30 - 14.80	A-1-b (0)	79	30	18	8	77	15	7	1	12	NP		
EB2-A	SS-14	9.10 - 10.60	A-1-b (0)	87	32	20	10	77	13	8	2	14	NP		
EB2-B	SS-15	8.60 - 10.10	A-4 (0)	100	95	84	45	16	47	21	16	24	7	21.4	
EB2-B	SS-16	13.60 - 15.10	A-7-6 (35)	100	98	97	92	3	7	36	54	62	33	53.8	

Consolidation Test Results

Borehole	Sample	Depth (ft)	AASHTO Classification	C _c	C _v (ft ² /day)	t ₉₀ (min)	γ, initial (lbs/ft ³)	Initial Moisture, %	G _s	Initial Voids Ratio, e
EB1-A	ST-1	0.0 - 1.5	A-7-6 (21)	0.301	0.011	171.59	103.1	53.0	2.69	1.4885

PROJECT DESCRIPTION: Bridge 17 over Fishing Creek Overflow on U.S. 301
 STATE PROJECT No.: 8.1301801
 TIP No.: B-3453
 FEDERAL I.D. No. BRSTP-301(10)
 COUNTY: Halifax, NORTH CAROLINA
 S&ME JOB No.: 1051-03-131
 CHECKED BY: AFR/JSJ

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 8.1301801 ID: B-3453 COUNTY: Halifax

DESCRIPTION(1): Replacement of Bridge No. 17 over Fishing Creek Overflow on U.S. Highway 301

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: _____ Pos: _____)
 other Bridge Survey and Hydraulic Design Report

COUNTY BRIDGE NO. 17 BRIDGE LENGTH 120' NO. BENTS IN: CHANNEL 2 FLOOD PLAIN 2

FOUNDATION TYPE: Reinforced concrete piers on pile supported footings and full height concrete abutments on piles

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None observed due to the overflow channel extending to existing concrete abutments.

INTERIOR BENTS: None observed at the Interior Bents due to bents being located in the overflow channel.

CHANNEL BED: None observed

CHANNEL BANKS: None observed

EXISTING SCOUR PROTECTION:

TYPE(3): Concrete wing walls and concrete abutments at both End Bents.

EXTENT(4) Concrete wingwalls extend beyond concrete abutments at both end bents.

EFFECTIVENESS(5): Relatively effective with some minor erosion at both abutments.

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Debris observed around both interior bents and beneath the bridge.

DESIGN INFORMATION:

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Gray silty clay (A-7-6)(27) with trace of fine sand, coarse sand and organic matter and gray silty clay (A-7-5)(33) with trace of fine sand and gravel

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Gray silty clay (A-6)(12) with trace of organic matter and coarse sand and some fine sand and gray silty clay (A-7-6)(35) with trace of fine sand, coarse sand and organic matter

FOUNDATION BEARING MATERIAL(9): Weathered Rock:(Gray-Green-Pink Granite) and Crystalline Rock: Gray-Pink Granite

CHANNEL BANK COVER(10): Large to small trees, dense underbrush and swamp

FLOOD PLAIN WIDTH(11): 800+/- feet on north side of the overflow bridge and 2,500+/- feet on south side of the overflow bridge.

FLOOD PLAIN COVER(12): Large to small trees, underbrush, overflow area and swamp

DESIGN INFORMATION CONT.

STREAM IS DEGRADING AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: The overflow area extends north of Fishing Creek adjacent to the west side of U.S. Highway 301 to the existing Fishing Creek Overflow bridge. Swamp areas exist on each side of the existing bridge.

CHANNEL MIGRATION TENDENCY (14): Migration tendency to the south

REPORTED BY: *J. Shaw* DATE: 8/18/03
 S&ME, Inc.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15): _____

	B1-A	B1-B	B2-A	B2-B	B3-A	B3-B
<i>100-year GASE Elev.</i>	77.1'	76.7'	76.9'	76.2'	77.1'	75.8'

REPORTED BY: *Charles M. Wibley* DATE: 09/11/03

INSTRUCTIONS

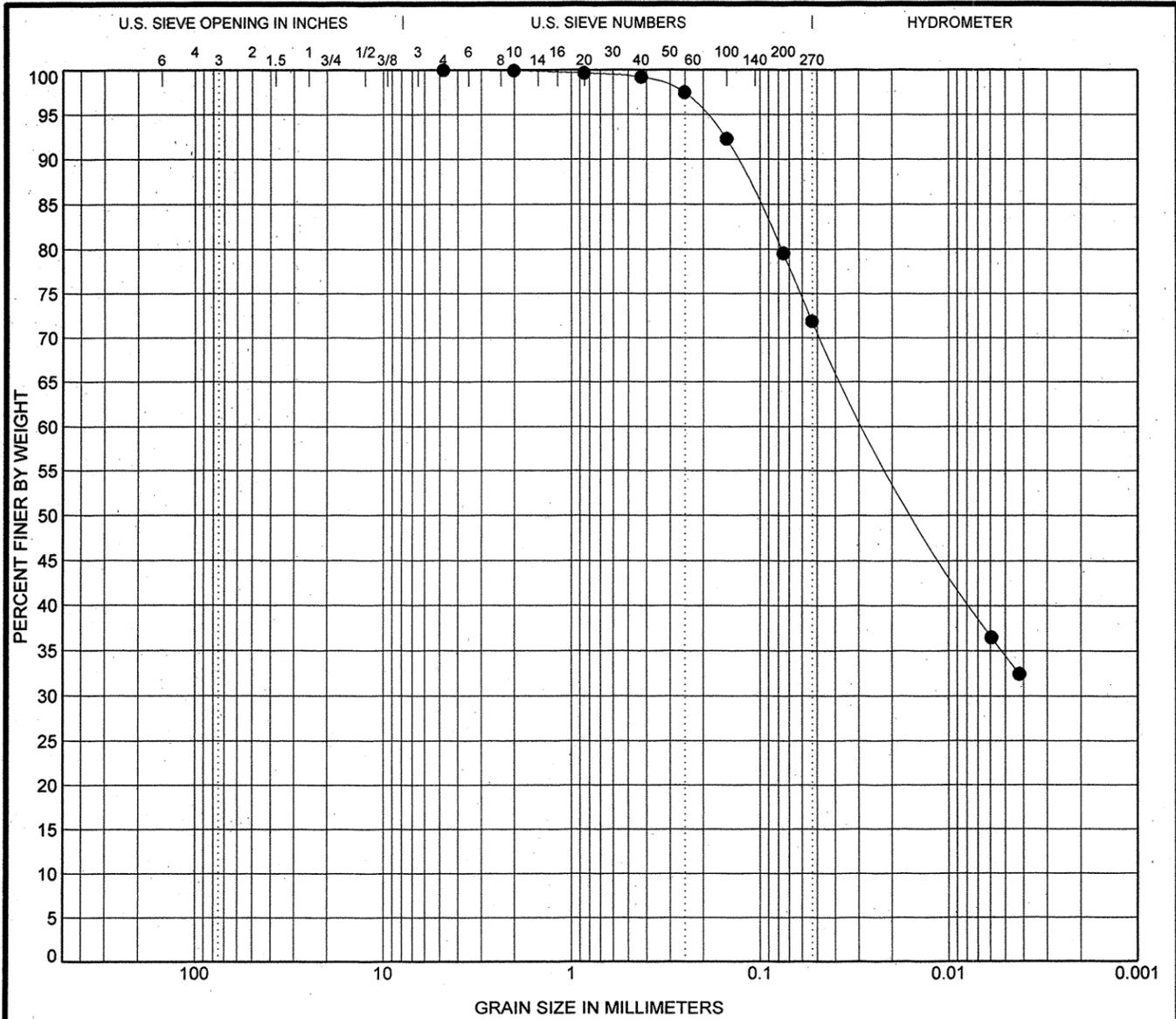
- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL.
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

PROJECT #: 8.1301801

COUNTY: Halifax (B-3453)

DESCRIPTION: Replacement of Bridge No.17 Over Fishing Creek Overflow on U.S. Highway 301

SAMPLE #	CHANNEL BED MATERIAL			CHANNEL BANK MATERIAL			
	SS-10	SS-12		SS-3	SS-16		
RETAINED #4	0	0		0	0		
PASSING #10	99	100		100	100		
PASSING #40	98	100		99	98		
PASSING #200	96	99		80	92		
COARSE SAND	2	0		2	3		
FINE SAND	3	2		26	7		
SILT	36	36		37	36		
CLAY	59	62		35	54		
LL	52	60		34	62		
PL	28	33		18	29		
AASHTO CLASSIFICATION	A-7-6(27)	A-7-5(33)		A-6(12)	A-7-6(35)		
STATION	29+20	29+65		28+29	30+00		
OFFSET	25.0 ft RT	25.0 ft RT		22.0 ft RT	21.0 ft RT		
DEPTH	0.0-1.5	3.3-4.8		8.5-10.0	13.6-15.1		



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **EB1-B** Station: 28+29 -L- Offset: 22.0 ft RT Depth: 8.50 - 10.00 ft
 Sample: **SS-3** Gray Silty Clay
 Soil Description: A-6 (12) with Trace of Organic Matter, Coarse Sand and Some Fine Sand

Moisture Content: 23.0	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 34
Specific Gravity: 2.65	Coarse Sand: 2	2	Plastic Limit: 18
Cc	Fine Sand: 26	26	Plasticity Index: 16
Cu	Silt: 37	37	% Passing #270: 72
D ₉₀ 0.132 D ₅₀ 0.014	Clay: 35	35	% Organic Content: NM

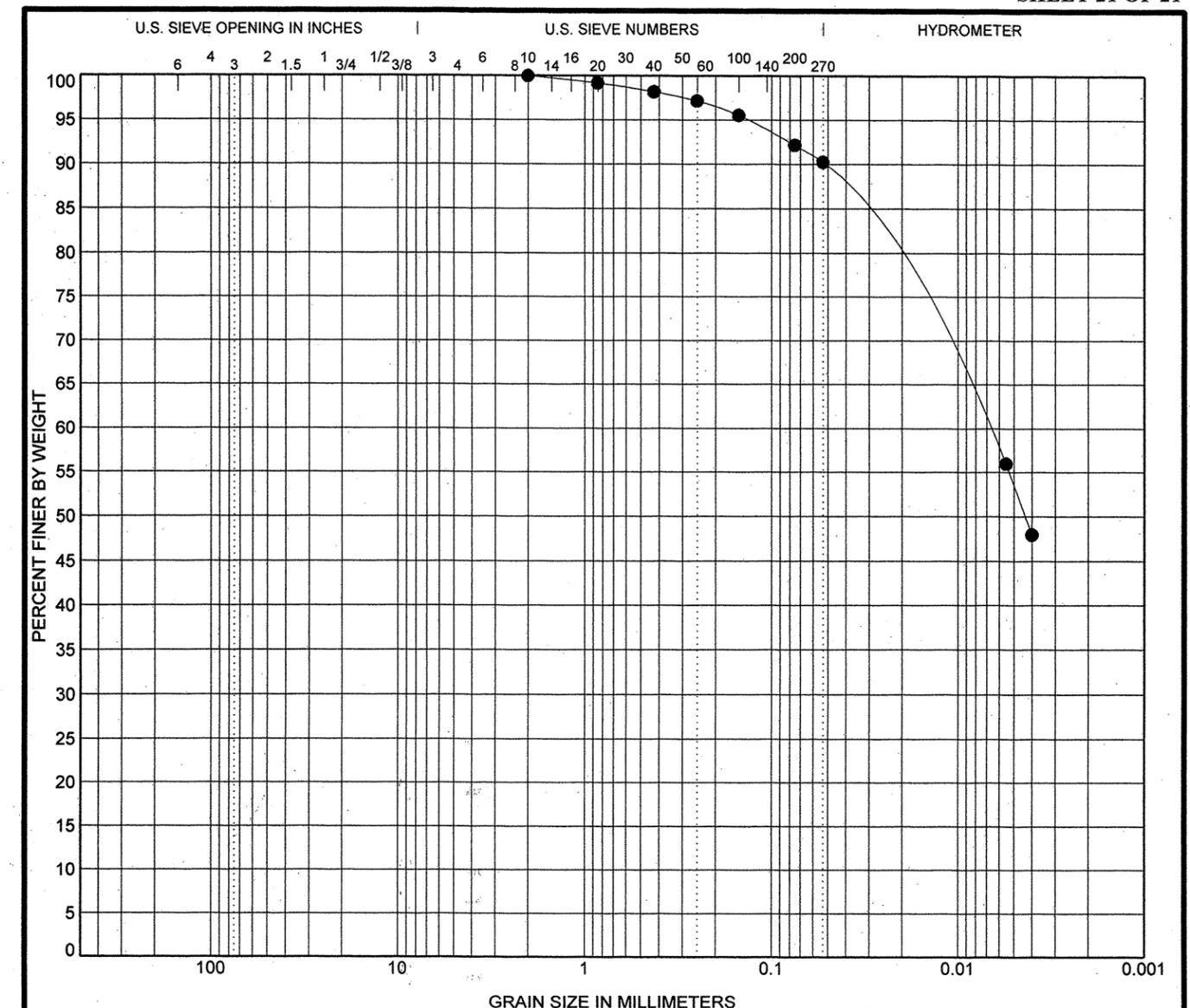


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ENGINEERING • TESTING
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GRAIN SIZE DISTRIBUTION
 Bridge 17 over Fishing Creek Overflow on U.S. 301

TIP No. B-3453 STATE PROJECT NO. 8.1301801
 FEDERAL I.D. NO. BRSTP-301(10)
 Halifax COUNTY, NORTH CAROLINA

3109 Spring Forest Rd,
 Raleigh, NC 27616
 (919) 872-2660
 (919) 876-3958 fax
 www.smeinc.com



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

AS DEFINED BY NCDOT		Fine Sand	< 0.25 mm and > 0.053 mm
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.053 mm and > 0.005 mm
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm

Test Boring: **EB2-B** Station: 30+00 -L- Offset: 21.0 ft RT Depth: 13.60 - 15.10 ft
 Sample: **SS-16** Gray Silty Clay
 Soil Description: A-7-6 (35) with Trace of Fine Sand, Coarse Sand and Organic Matter

Moisture Content: 53.8	SOIL MORTAR	TOTAL SAMPLE	Liquid Limit: 62
Specific Gravity: 2.65	Coarse Sand: 3	3	Plastic Limit: 29
Cc	Fine Sand: 7	7	Plasticity Index: 33
Cu	Silt: 36	36	% Passing #270: 90
D ₉₀ 0.052 D ₅₀ 0.004	Clay: 54	54	% Organic Content: NM



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