

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33681.1.1 (B-4401) F.A. PROJ. BRZ-1124(5)
COUNTY ALAMANCE
PROJECT DESCRIPTION REPLACE BRIDGE NO.161 OVER NORTH PRONG STINKING QUARTER CREEK ON SR 1124

CONTENTS

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (UN-PLACED) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PROJECT: 33681.1.1 ID: B-4401

PERSONNEL

J. HOWARD

D. WHITE

O. SMITH


INVESTIGATED BY AMEC E&I, Inc.

CHECKED BY M. LEAR

SUBMITTED BY B. DEOBALD

DATE JUNE 2012

NORTH CAROLINA
LICENSED
4-25-12
SEAL
1730
GEOLOGIST
WILLIAM BRIAN DEOBALD



AMEC E&I, Inc.
4021 STIRRUP CREEK DRIVE, SUITE 100
DURHAM, NORTH CAROLINA 27703
(919) 381-9900

Signature: *William B. Deobald*
Engineering F-1253 NC Geology C-247

DRAWN BY: R. RAHIE

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

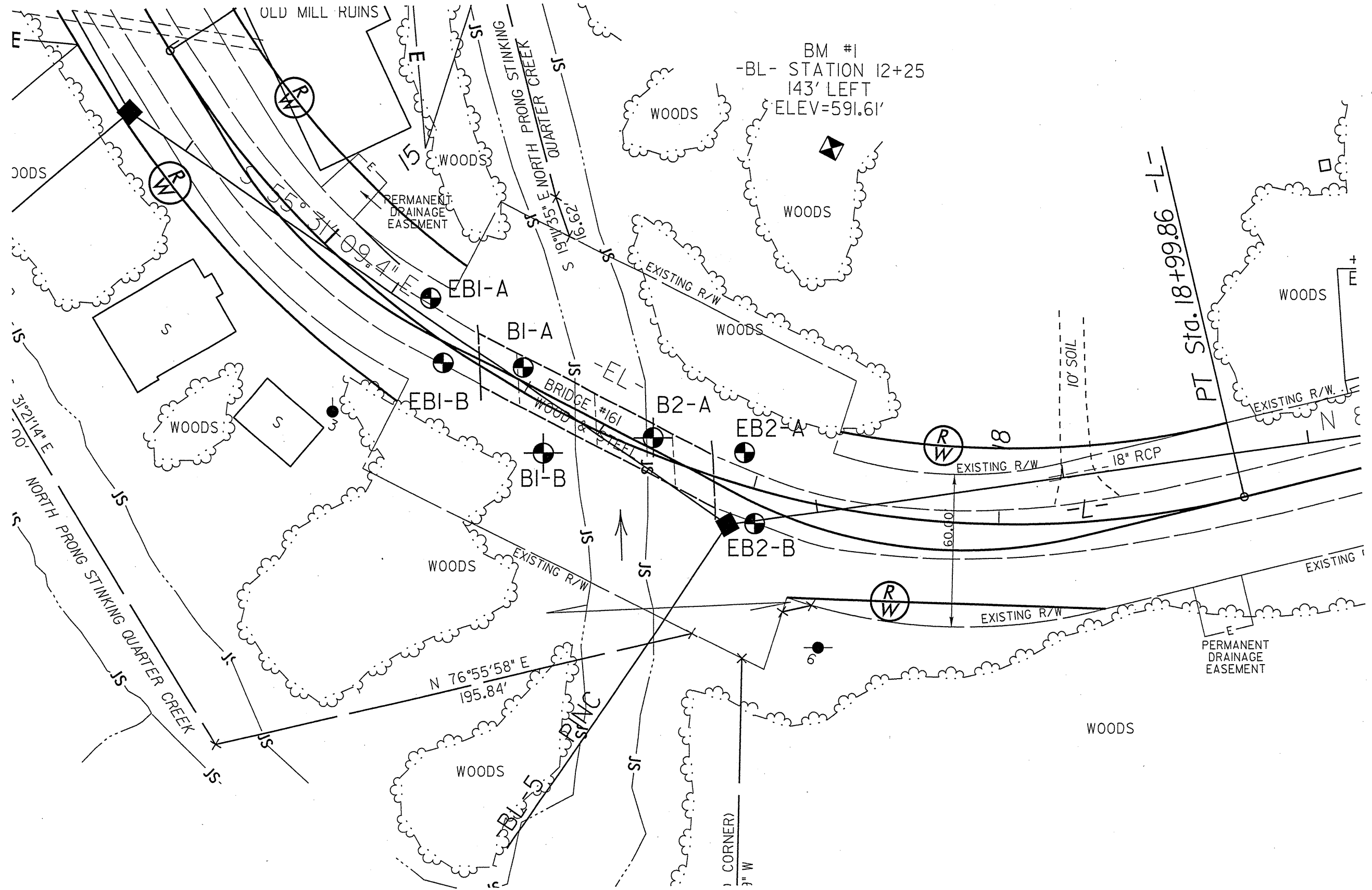
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRN. SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: 		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS.				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH			
GROUP CLASS.				COMPRESSIBILITY		VERY SLIGHT (V SLI)			
SYMBOL				PERCENTAGE OF MATERIAL		SLIGHT (SLI)			
% PASSING				GROUND WATER		MODERATE (MOD.)			
LIQUID LIMIT PLASTIC INDEX				MISCELLANEOUS SYMBOLS		SEVERE (SEV.)			
GROUP INDEX				ABBREVIATIONS		VERY SEVERE (V SEV.)			
USUAL TYPES OF MAJOR MATERIALS				EQUIPMENT USED ON SUBJECT PROJECT		COMPLETE			
GEN. RATING AS A SUBGRADE						ROCK HARDNESS			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS ≥ LL - 30						VERY HARD			
CONSISTENCY OR DENSENESS						HARD			
PRIMARY SOIL TYPE						MODERATELY HARD			
COMPACTNESS OR CONSISTENCY						MEDIUM HARD			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)						SOFT			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)						VERY SOFT			
TEXTURE OR GRAIN SIZE									
U.S. STD. SIEVE SIZE OPENING (MM)									
SOIL MOISTURE - CORRELATION OF TERMS									
SOIL MOISTURE SCALE (ATTERBERG LIMITS)									
FIELD MOISTURE DESCRIPTION									
GUIDE FOR FIELD MOISTURE DESCRIPTION									
PLASTICITY									
NONPLASTIC									
LOW PLASTICITY									
MED. PLASTICITY									
HIGH PLASTICITY									
COLOR									
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.									

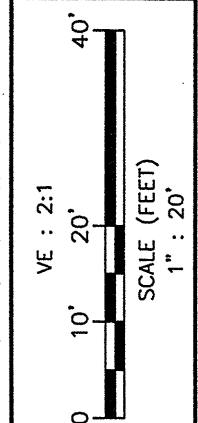
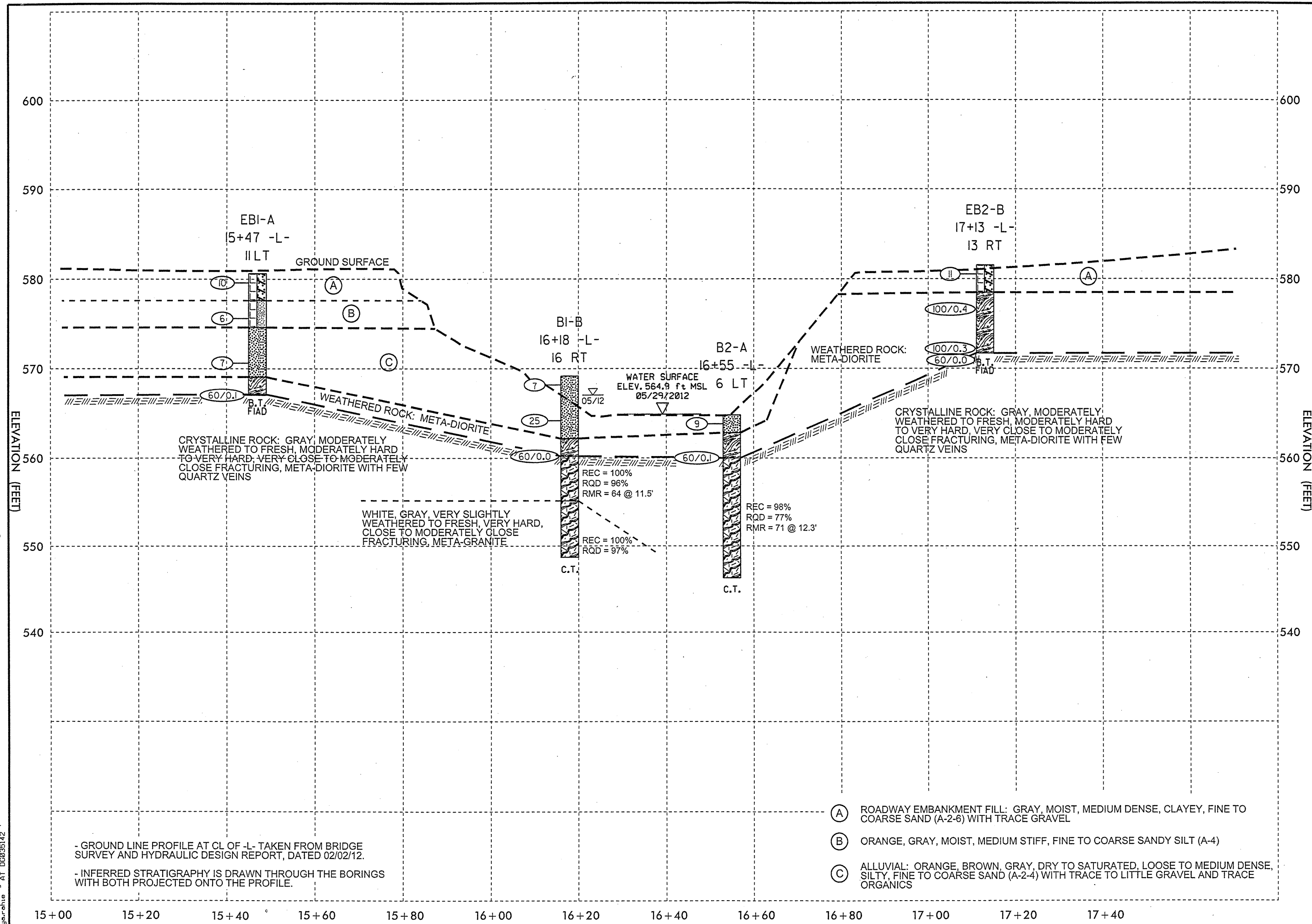
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SKEW = 60°



SHEET No: 3			
AMEC ENVIRONMENT AND INFRASTRUCTURE, INC. DURHAM, NORTH CAROLINA			
REVISIONS	DRAWN: R.R.	DATE: 06/15/2012	
	DFT CHECK: M.B.L.	JOB No.: 6468-12-1112	
	ENG CHECK: W.B.D.	DWG No: 1	
<p>SITE PLAN REPLACE BRIDGE NO. 161 OVER NORTH PRONG STINKING QUARTER CREEK ON SR 1124 NCDOT PROJECT NO. 33681.11 (B-4401) F.A. NO. BRZ-1124(S) ALAMANCE COUNTY, NORTH CAROLINA</p>			
<p>SCALE (FEET) 1" = 40'</p>			

AMEC ENVIRONMENT AND INFRASTRUCTURE, INC. DURHAM, NORTH CAROLINA			
REVISIONS DRAWN:	R.R.	DATE:	06/15/2012
DFT CHECK:	M.B.L.	JOB No.:	6468-12-1112
ENG CHECK:	W.B.D.	DWG No.:	2

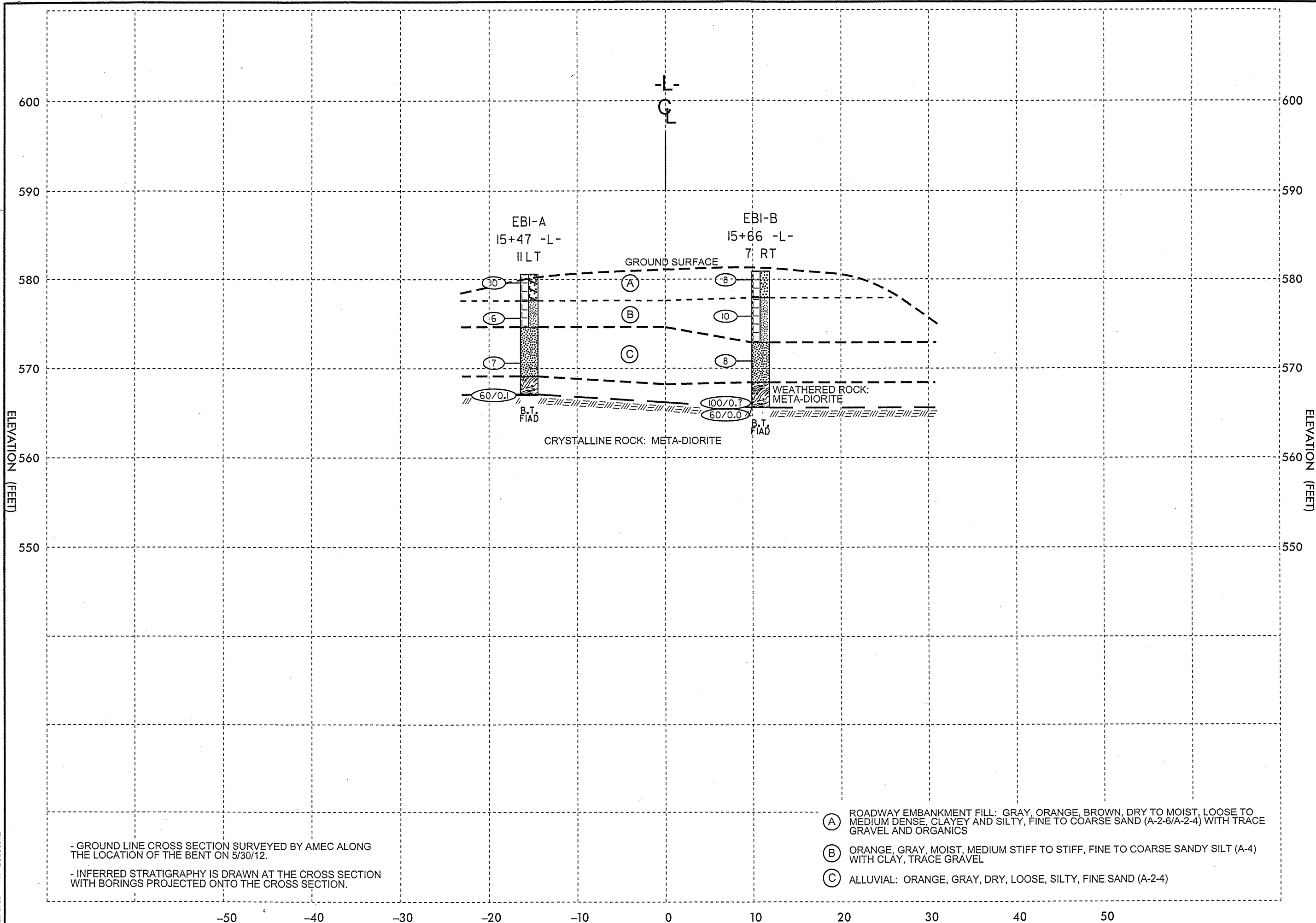


PROFILE ALONG -L-
REPLACE BRIDGE NO. 161 OVER NORTH PRONG STINKING QUARTER CREEK ON SR 1124
 NCDOT PROJECT NO. 33681.11 (B-4401)
 F.A. NO. BRZ-1124(5)
 ALAMANCE COUNTY, NORTH CAROLINA

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- GROUND LINE PROFILE AT CL OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT, DATED 02/02/12.
 - INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

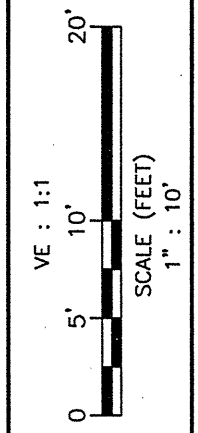
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- GROUND LINE CROSS SECTION SURVEYED BY AMEC ALONG THE LOCATION OF THE BENT ON 5/30/12.
 - INFERRED STRATIGRAPHY IS DRAWN AT THE CROSS SECTION WITH BORINGS PROJECTED ONTO THE CROSS SECTION.

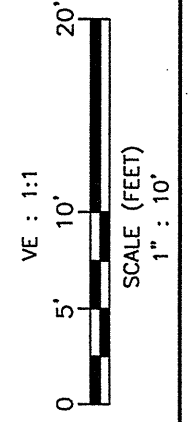
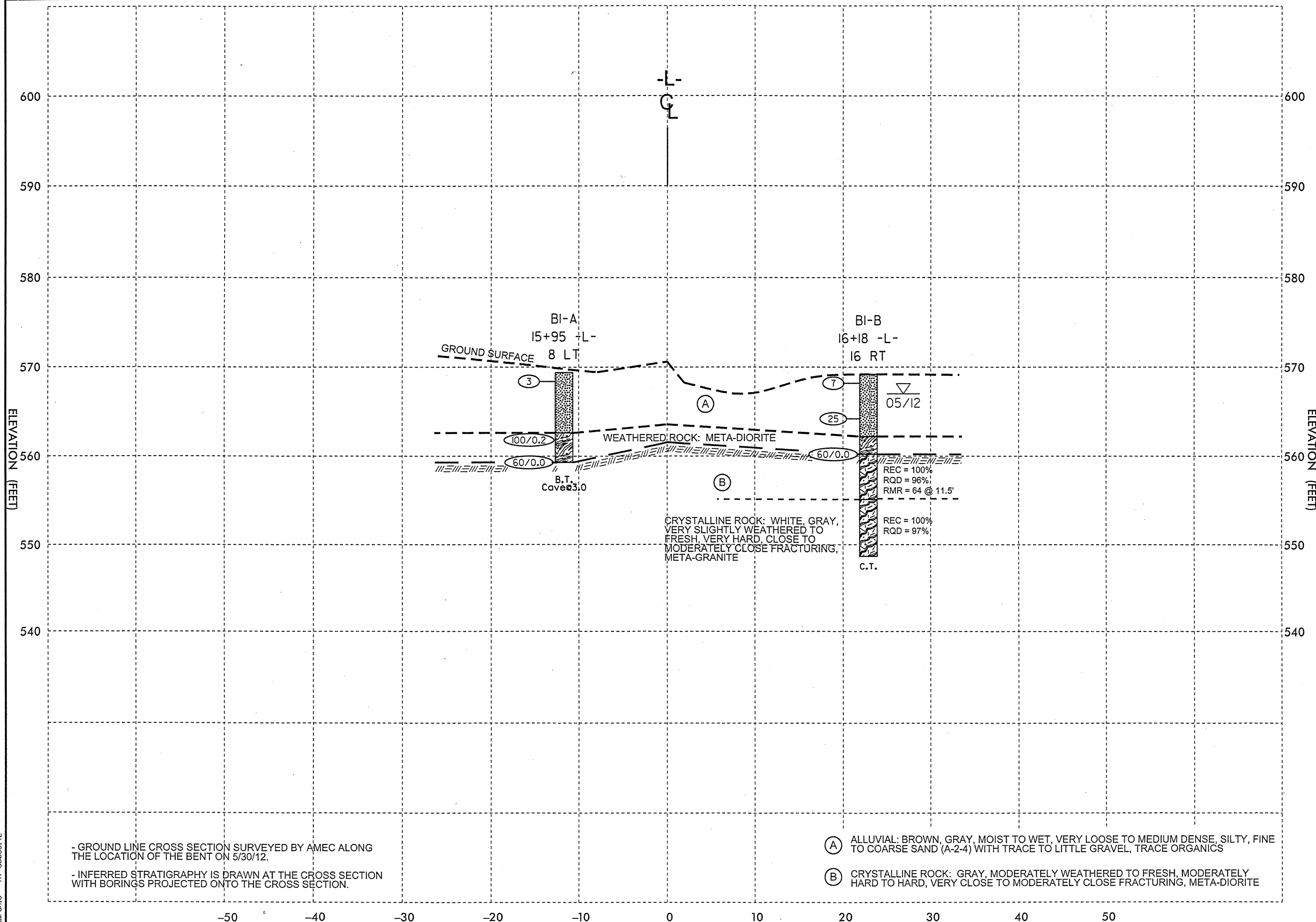
- (A) ROADWAY EMBANKMENT FILL: GRAY, ORANGE, BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, CLAYEY AND SILTY, FINE TO COARSE SAND (A-2-6/A-2-4) WITH TRACE GRAVEL AND ORGANICS
- (B) ORANGE, GRAY, MOIST, MEDIUM STIFF TO STIFF, FINE TO COARSE SANDY SILT (A-4) WITH CLAY, TRACE GRAVEL
- (C) ALLUVIAL: ORANGE, GRAY, DRY, LOOSE, SILTY, FINE SAND (A-2-4)

AMEC ENVIRONMENT AND INFRASTRUCTURE, INC. DURHAM, NORTH CAROLINA			
REVISIONS	DRAWN: R.R.	DATE: 06/15/2012	
	DFT CHECK: M.B.L.	JOB No.: 6468-12-1112	
	ENG CHECK: W.B.D.	DWG No: 3	



CROSS SECTION ALONG END BENT I
 REPLACE BRIDGE NO. 161 OVER NORTH PRONG STINKING QUARTER CREEK ON SR 1124
 NCDOT PROJECT NO. 3368L11 (B-4401)
 F.A. NO. BRZ-1124(5)
 ALAMANCE COUNTY, NORTH CAROLINA

AMEC ENVIRONMENT AND INFRASTRUCTURE, INC. DURHAM, NORTH CAROLINA			
REVISIONS	DRAWN:	R.R.	DATE: 06/15/2012
	DFT CHECK:	M.B.L.	JOB No.: 6468-12-1112
	ENG CHECK:	W.B.D.	DWG No: 4

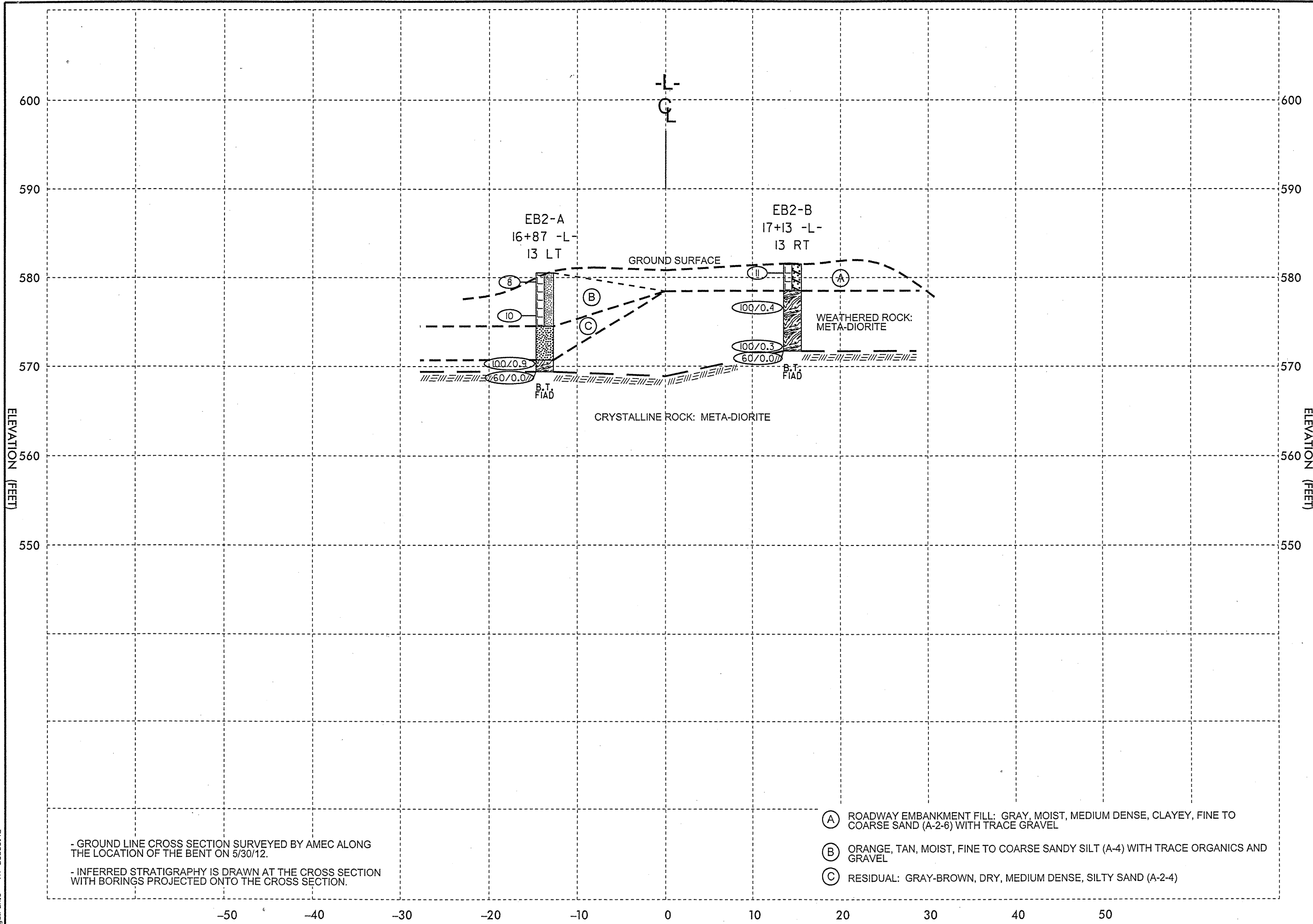


- GROUND LINE CROSS SECTION SURVEYED BY AMEC ALONG THE LOCATION OF THE BENT ON 5/30/12.
 - INFERRED STRATIGRAPHY IS DRAWN AT THE CROSS SECTION WITH BORINGS PROJECTED ONTO THE CROSS SECTION.

- (A) ALLUVIAL: BROWN, GRAY, MOIST TO WET, VERY LOOSE TO MEDIUM DENSE, SILTY, FINE TO COARSE SAND (A-2-4) WITH TRACE TO LITTLE GRAVEL, TRACE ORGANICS
- (B) CRYSTALLINE ROCK: GRAY, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURING, META-DIORITE

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SHEET No: 7

AMEC ENVIRONMENT AND INFRASTRUCTURE, INC.
 DURHAM, NORTH CAROLINA

REVISIONS	DRAWN:	R.R.	DATE:	06/15/2012
	DFT CHECK:	M.B.L.	JOB No.:	6468-12-1112
	ENG CHECK:	W.B.D.	DWG No.:	6

VE : 1:1
 SCALE (FEET)
 1" : 10'

CROSS SECTION ALONG END BENT 2
 REPLACE BRIDGE NO. 161 OVER NORTH PRONG STINKING
 QUARTER CREEK ON SR 1124
 NCDOT PROJECT NO. 3368L1J (B-4401)
 F.A. NO. BRZ-1124(5)
 ALAMANCE COUNTY, NORTH CAROLINA

- GROUND LINE CROSS SECTION SURVEYED BY AMEC ALONG THE LOCATION OF THE BENT ON 5/30/12.
 - INFERRED STRATIGRAPHY IS DRAWN AT THE CROSS SECTION WITH BORINGS PROJECTED ONTO THE CROSS SECTION.

- (A) ROADWAY EMBANKMENT FILL: GRAY, MOIST, MEDIUM DENSE, CLAYEY, FINE TO COARSE SAND (A-2-6) WITH TRACE GRAVEL
- (B) ORANGE, TAN, MOIST, FINE TO COARSE SANDY SILT (A-4) WITH TRACE ORGANICS AND GRAVEL
- (C) RESIDUAL: GRAY-BROWN, DRY, MEDIUM DENSE, SILTY SAND (A-2-4)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 33681.1.1		TIP B-4401		COUNTY ALAMANCE		GEOLOGIST Howard, J. P.									
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 15+47		OFFSET 11 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 580.6 ft		TOTAL DEPTH 13.6 ft		NORTHING 810,190		EASTING 1,842,012									
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER White, D. A.		START DATE 05/30/12		COMP. DATE 05/30/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
585															
580	580.6	0.0													580.6 GROUND SURFACE 0.0
			6	6	4										ROADWAY EMBANKMENT 3.0
	576.6	4.0													577.6 Gray, clayey, fine to coarse SAND (A-2-6), with trace gravel 3.0
575			2	3	3										574.6 Orange, gray, fine to coarse sandy SILT (A-4), with clay 6.0
	571.6	9.0													574.6 ALLUVIAL 6.0
			3	4	3										Orange, gray, silty, fine SAND (A-2-4)
570															569.1 WEATHERED ROCK 11.5
	567.1	13.5													567.1 WEATHERED ROCK 13.5
			60/0.1												567.0 CRYSTALLINE ROCK 13.6
															Meta-Diorite
															Boring Terminated with Standard Penetration Test Refusal at Elevation 567.0 ft in Crystalline Rock: Meta-Diorite

WBS 33681.1.1		TIP B-4401		COUNTY ALAMANCE		GEOLOGIST Howard, J. P.									
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 15+66		OFFSET 7 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 580.9 ft		TOTAL DEPTH 15.3 ft		NORTHING 810,164		EASTING 1,842,017									
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER White, D. A.		START DATE 05/30/12		COMP. DATE 05/30/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
585															
580	580.9	0.0													580.9 GROUND SURFACE 0.0
			3	4	4										ROADWAY EMBANKMENT 3.0
	576.8	4.1													577.9 Orange, brown, silty, fine to coarse SAND (A-2-4), with trace organics 3.0
575			4	5	5										577.9 Orange, sandy SILT (A-4), with trace gravel 3.0
	571.8	9.1													572.9 ALLUVIAL 8.0
			3	3	5										Gray, orange, silty, fine SAND (A-2-4)
570															568.4 WEATHERED ROCK 12.5
	566.8	14.1													568.4 WEATHERED ROCK 12.5
	565.6	15.3													565.6 WEATHERED ROCK 15.3
			41	59/0.2											Orange, white, Meta-Diorite
			60/0.0												Boring Terminated with Standard Penetration Test Refusal at Elevation 565.6 ft on Crystalline Rock: Meta-Diorite

NCDOT BORE DOUBLE B4401_GEO_BRDG0161_GINT.GPJ_NC_DOT.GDT 6/22/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 33681.1.1		TIP B-4401		COUNTY ALAMANCE		GEOLOGIST Howard, J. P.							
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124							GROUND WTR (ft)						
BORING NO. B1-A		STATION 15+95		OFFSET 8 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 569.4 ft		TOTAL DEPTH 10.1 ft		NORTHING 810,162		EASTING 1,842,049							
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER White, D. A.		START DATE 05/29/12		COMP. DATE 05/29/12		SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
570	569.4	0.0	WOH	WOH	3							569.4	0.0
565													
560	562.0	7.4	100/0.2									562.6	6.8
	559.3	10.1	60/0.0									559.3	10.1
Boring Terminated with Standard Penetration Test Refusal at Elevation 559.3 ft on Crystalline Rock: Meta-Diorite													

NCDOT BORE SINGLE B4401_GEO_BRDG0161_GINT.GPJ NC_DOT_GDT_6/22/12



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.	
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124				GROUND WTR (ft)
BORING NO. B1-B	STATION 16+18	OFFSET 16 ft RT	ALIGNMENT -L-	0 HR. 2.2
COLLAR ELEV. 569.2 ft	TOTAL DEPTH 20.5 ft	NORTHING 810,128	EASTING 1,842,057	24 HR. Cave 2.2
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER White, D. A.		START DATE 05/23/12	COMP. DATE 05/23/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
570	569.2	0.0	3	4	3							M		GROUND SURFACE	0.0
565	565.2	4.0	14	13	12							W		ALLUVIAL SAND Brown, gray, silty, fine to coarse (A-2-4), with trace to little gravel, trace organics	
560	560.2	9.0	60/0.0											WEATHERED ROCK Meta-Diorite	9.0
555													RS-1	CRYSTALLINE ROCK Meta-Diorite	14.1
550														Meta-Granite	20.5

Boring Terminated at Elevation 548.7 ft in Crystalline Rock: Meta-Granite



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.	
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124				GROUND WTR (ft)
BORING NO. B1-B	STATION 16+18	OFFSET 16 ft RT	ALIGNMENT -L-	0 HR. 2.2
COLLAR ELEV. 569.2 ft	TOTAL DEPTH 20.5 ft	NORTHING 810,128	EASTING 1,842,057	24 HR. Cave 2.2
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER White, D. A.		START DATE 05/23/12	COMP. DATE 05/23/12	SURFACE WATER DEPTH N/A

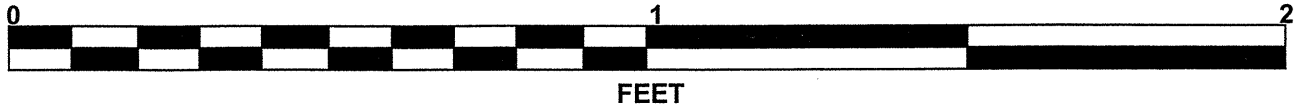
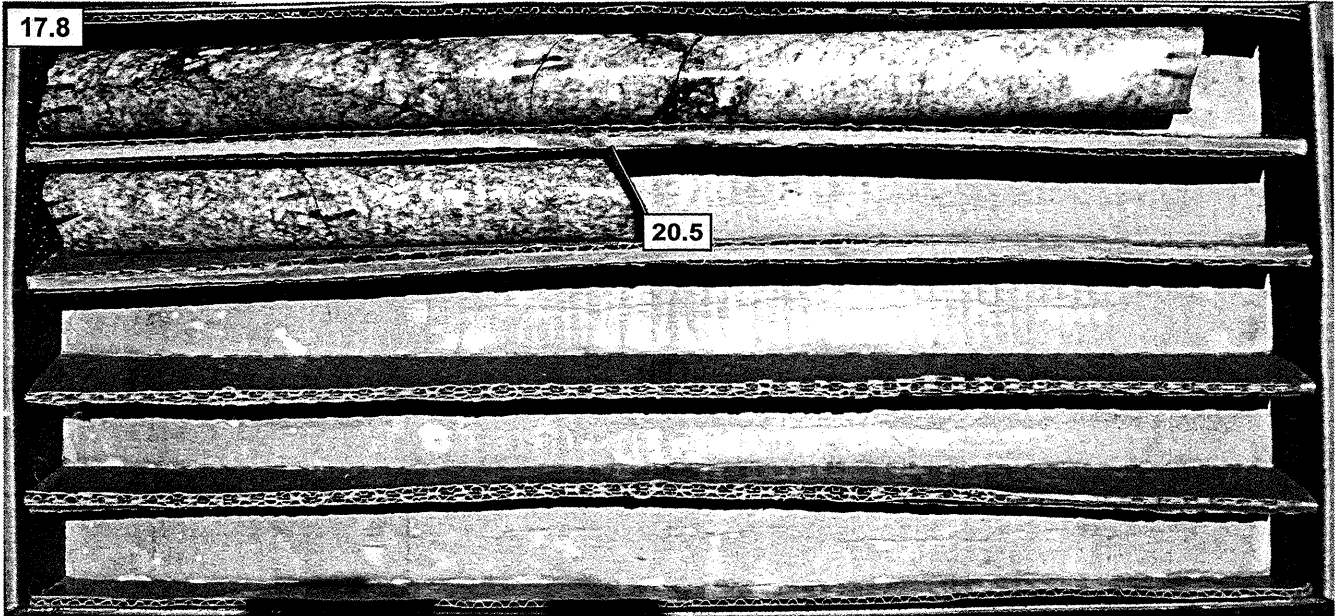
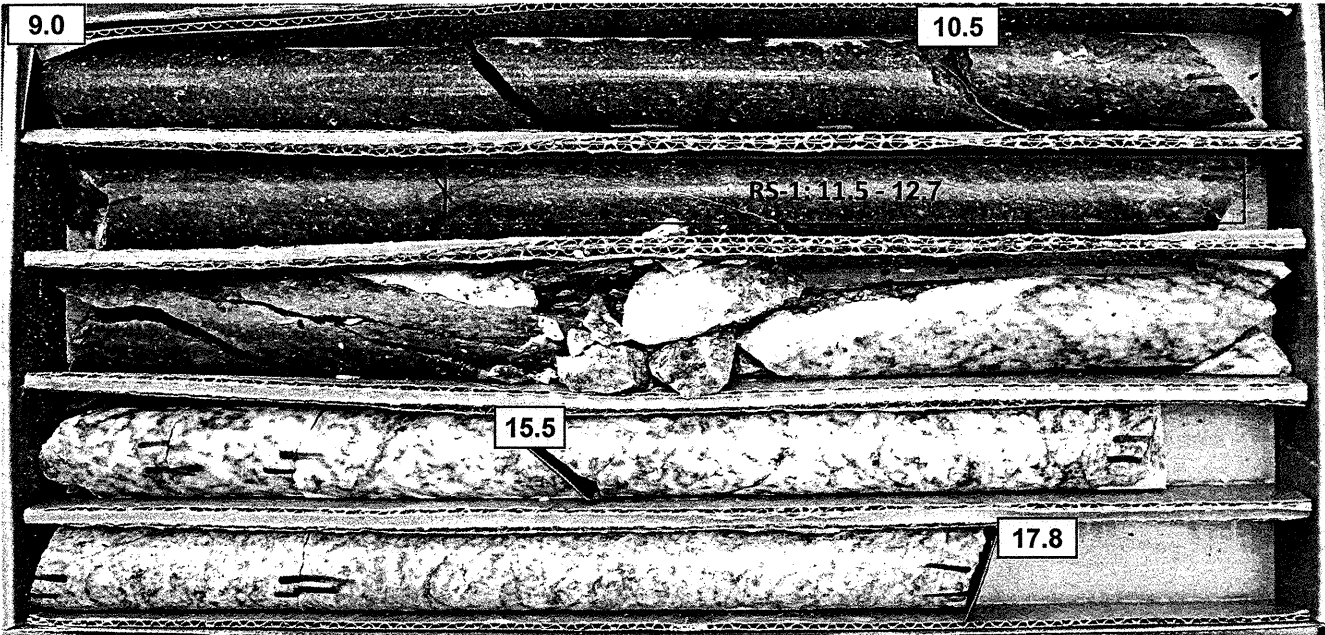
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
569.2	569.2	0.0									Begin Coring @ 9.0 ft	
565.7	565.7	4.0	1.5	N=60/0.0 4:00 2:15/0.5	(1.5) 100%	(1.5) 100%		(5.1) 100%	(4.9) 96%		CRYSTALLINE ROCK Gray, moderately weathered to fresh, moderately hard to hard, very close to moderately close fracturing, Meta-Diorite, weathering at transition zone 1 joint at 45°	9.0
555.1	555.1	14.1	5.0	3:30 2:45 3:00 5:15 7:15	(5.0) 100%	(4.6) 92%	RS-1				3 joints at 80° RS-1: R1=7, R2=20, R3=10, R4=20, R5=7, RMR=64, Rock Type=E	14.1
550.2	550.2	15.5	5.0	5:15 5:45 4:45 3:30 3:00	(5.0) 100%	(5.0) 100%		(6.4) 100%	(6.2) 97%		White, gray, very slightly weathered to fresh, very hard, close to moderately close fracturing, Meta-Granite 2 joints at 75° 1 joint at 30°	20.5

Boring Terminated at Elevation 548.7 ft in Crystalline Rock: Meta-Granite

CORE PHOTOGRAPHS

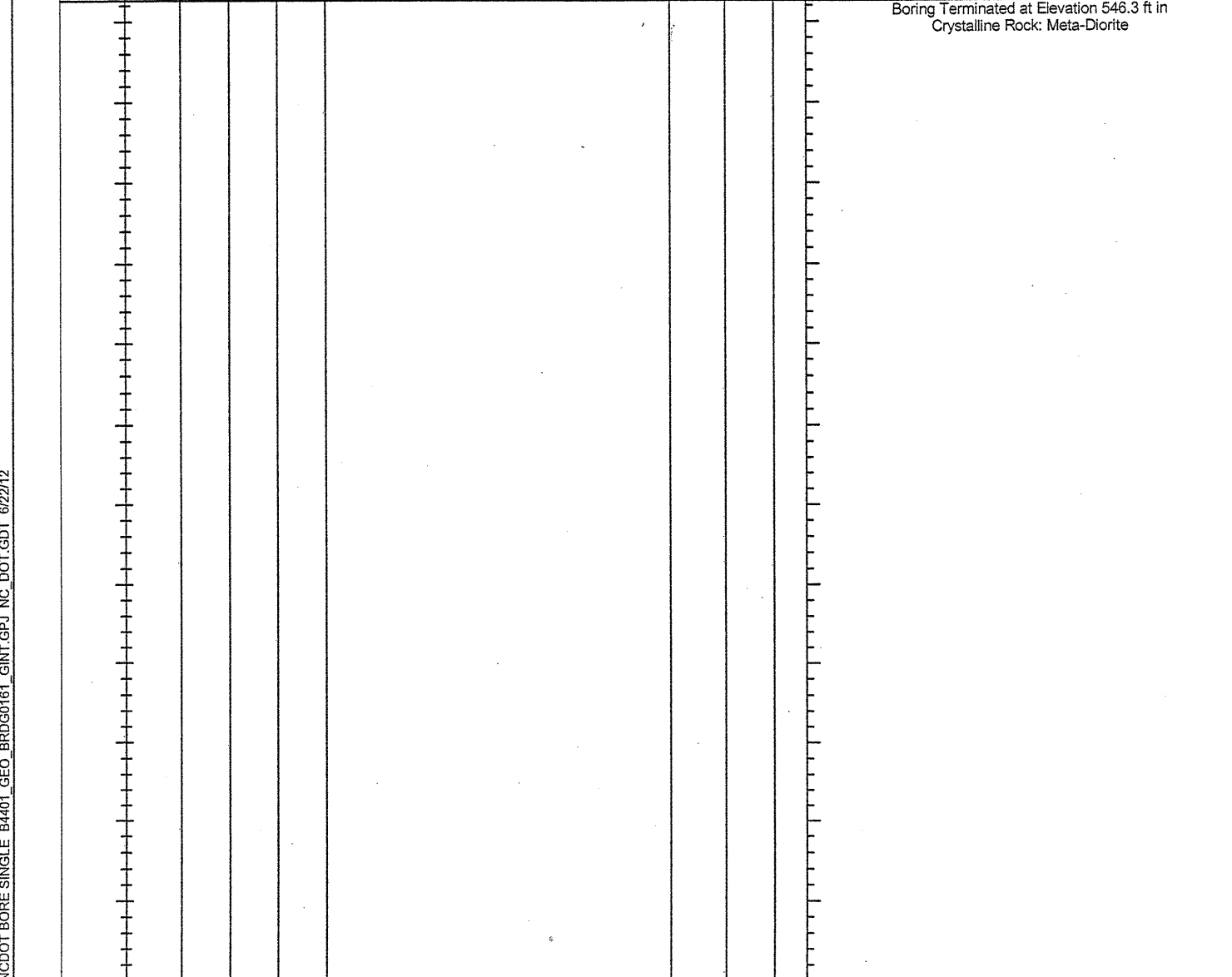
B1-B

BOXES 1 & 2: 9.0 - 20.5 FEET



WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124			GROUND WTR (ft)
0 HR. Water	BORING NO. B2-A	STATION 16+55	ALIGNMENT -L-
24 HR. Boring	COLLAR ELEV. 564.8 ft	TOTAL DEPTH 18.5 ft	OFFSET 6 ft LT
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER White, D. A.	START DATE 05/29/12	COMP. DATE 05/29/12	SURFACE WATER DEPTH 0.1ft

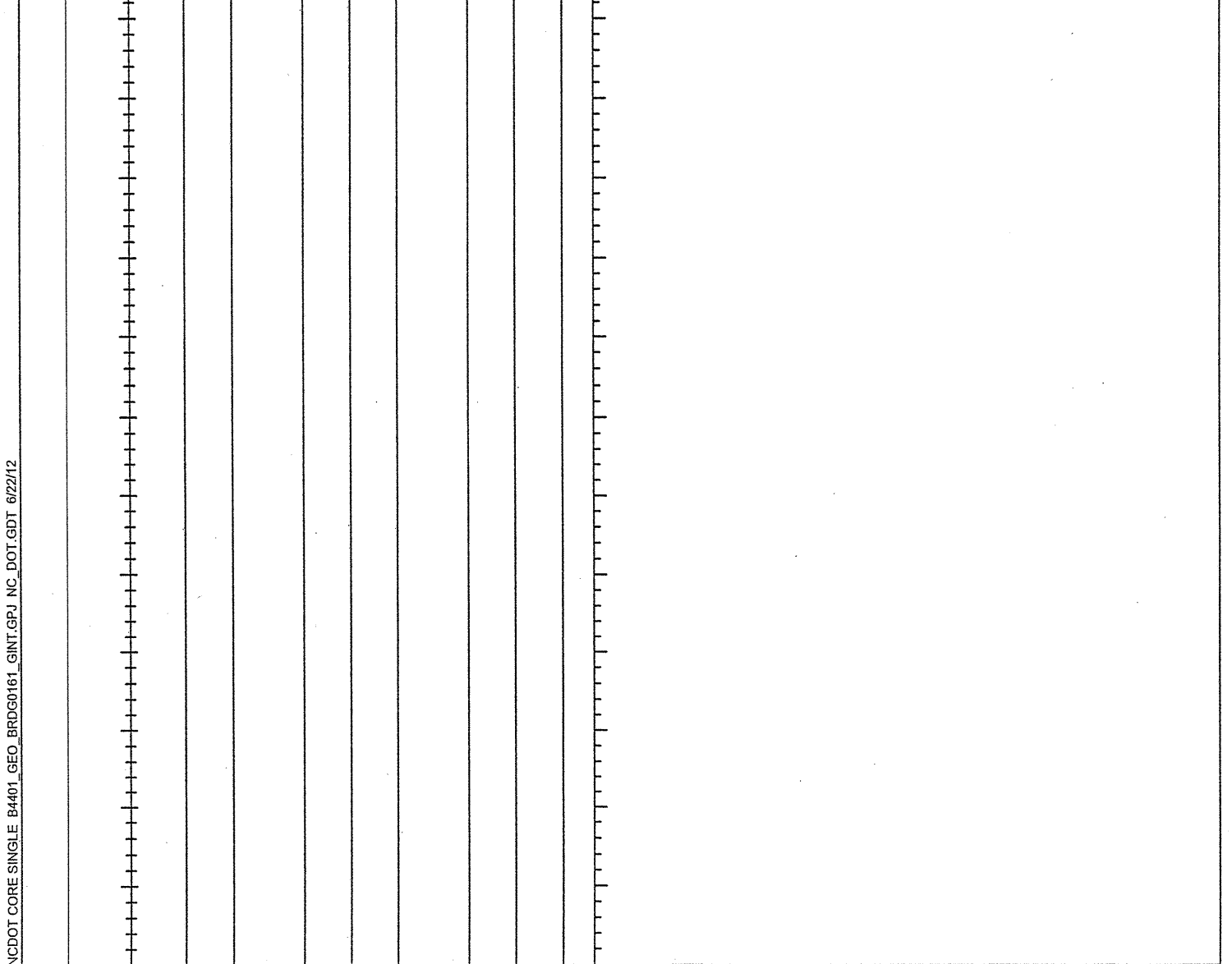
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
565	564.8	0.0	2	4	5								▼		564.8	WATER SURFACE (05/29/12) 0.0
														Sat.	562.8	ALLUVIAL Brown-gray, silty, fine to coarse SAND (A-2-4), with gravel 2.0
560	560.1	4.7	60/0.1												560.0	WEATHERED ROCK Meta-Diorite 4.8
																CRYSTALLINE ROCK Meta-Diorite
555																
														RS-2		
550																



NCDOT BORE SINGLE B4401_GEO_BRDG0161_GINT.GPJ NC_DOT_GDT 6/22/12

WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124			GROUND WTR (ft)
0 HR. Water	BORING NO. B2-A	STATION 16+55	ALIGNMENT -L-
24 HR. Boring	COLLAR ELEV. 564.8 ft	TOTAL DEPTH 18.5 ft	OFFSET 6 ft LT
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER White, D. A.	START DATE 05/29/12	COMP. DATE 05/29/12	SURFACE WATER DEPTH 0.1ft

CORE SIZE NQ				TOTAL RUN 13.7 ft				STRATA		LOG	DESCRIPTION AND REMARKS
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %		
560	560.0	4.8	3.7	3:45 3:45 4:15 4:30/0.7	(3.7) 100%	(2.9) 78%		(13.4) 98%	(10.6) 77%	560.0	4.8
	556.3	8.5									
555			5.0	2:45 3:15 3:15 4:15 4:30	(5.0) 100%	(5.0) 100%					
	551.3	13.5									
550			5.0	3:30 3:30 2:45 3:30 3:30	(4.7) 94%	(2.7) 54%					
	546.3	18.5								546.3	18.5

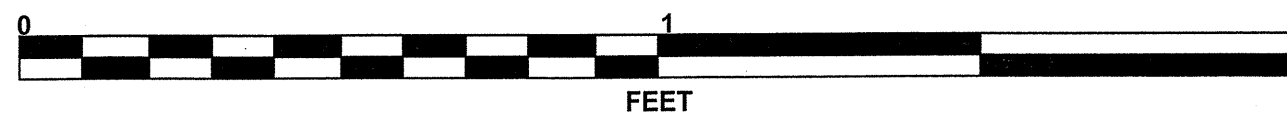
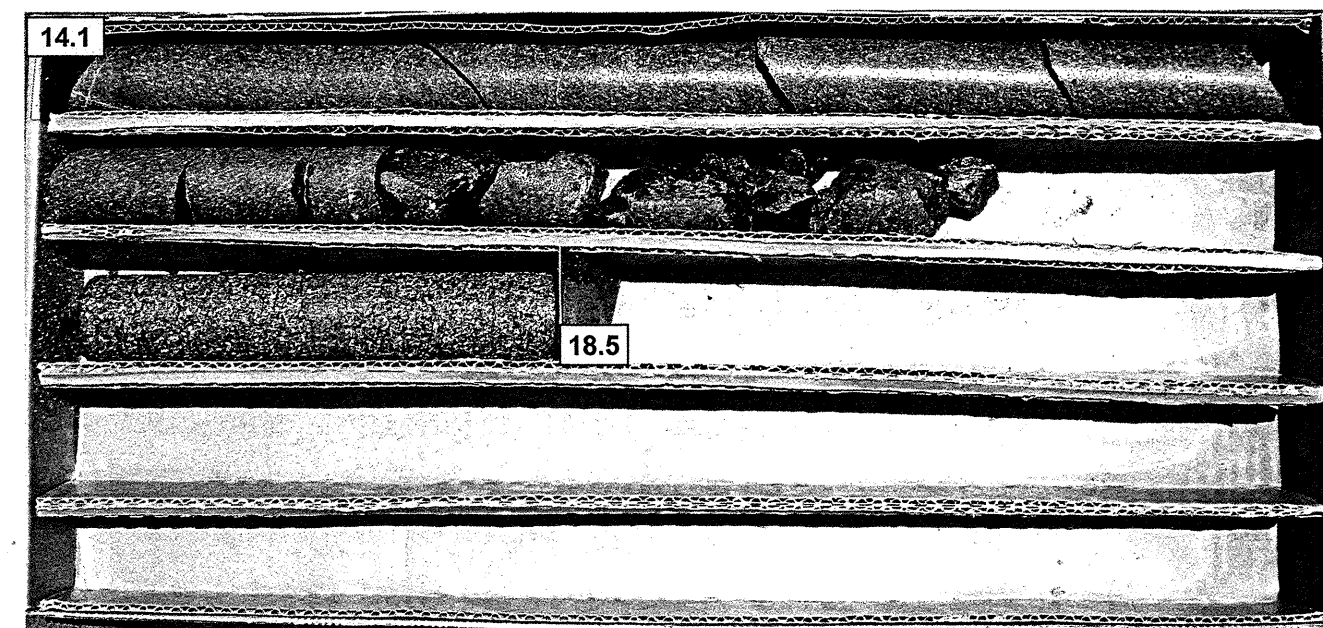
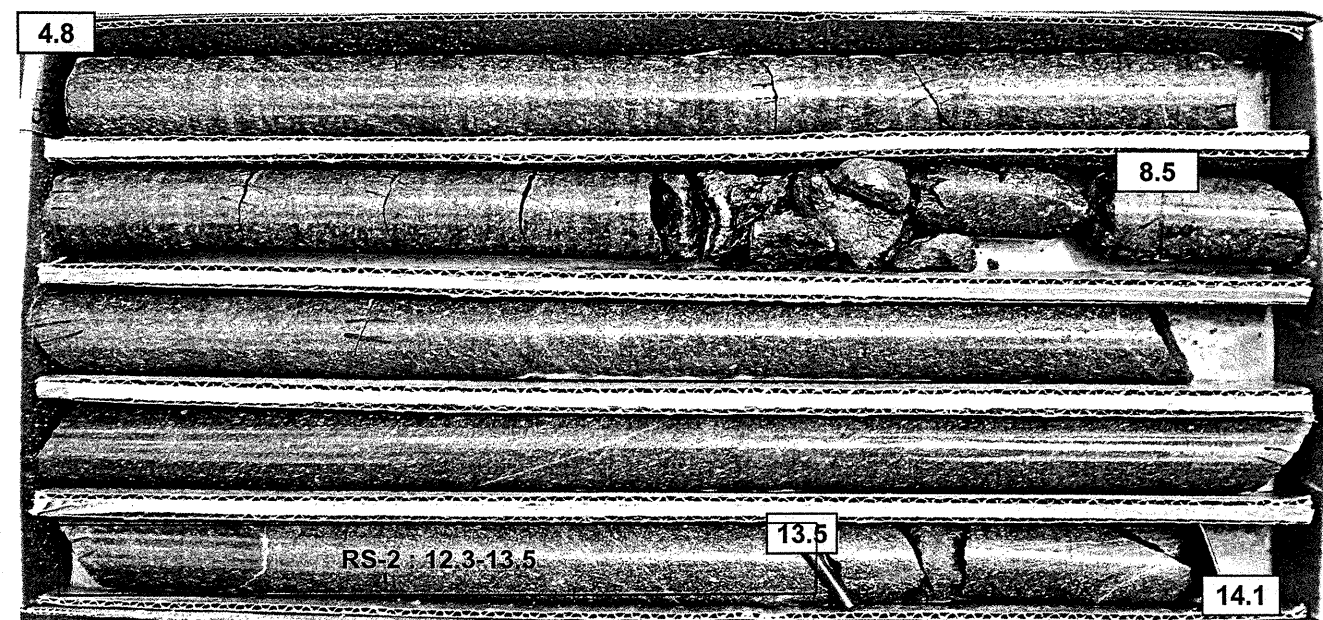


NCDOT BORE SINGLE B4401_GEO_BRDG0161_GINT.GPJ NC_DOT_GDT 6/22/12

CORE PHOTOGRAPHS

B2-A

BOXES 1 & 2: 4.8 - 14.1 FEET



FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+87	OFFSET 13 ft LT	ALIGNMENT -L-
COLLAR ELEV. 580.5 ft	TOTAL DEPTH 11.1 ft	NORTHING 810,128	EASTING 1,842,138
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER White, D. A.	START DATE 05/30/12	COMP. DATE 05/30/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
585															
580	580.5	0.0												580.5	0.0
			3	4	4								M	ROADWAY EMBANKMENT Orange, tan, fine to coarse sandy SILT (A-4), with trace organics, trace gravel at 3.8 ft	
575	576.7	3.8	3	4	6								M		6.0
														RESIDUAL Gray-brown, silty SAND (A-2-4)	
570	571.7	8.8	16	12	88/0.4								D	WEATHERED ROCK Gray-brown, Meta-Diorite	9.8
														Boring Terminated with Standard Penetration Test Refusal at Elevation 569.4 ft on Crystalline Rock: Meta-Diorite	11.1
	569.4	11.1													

WBS 33681.1.1	TIP B-4401	COUNTY ALAMANCE	GEOLOGIST Howard, J. P.
SITE DESCRIPTION Replace Bridge No. 161 over North Prong Stinking Quarter Creek on SR 1124			GROUND WTR (ft)
BORING NO. EB2-B	STATION 17+13	OFFSET 13 ft RT	ALIGNMENT -L-
COLLAR ELEV. 581.5 ft	TOTAL DEPTH 9.8 ft	NORTHING 810,100	EASTING 1,842,142
DRILL RIG/HAMMER EFF./DATE MAC1145 CME-55LC 88% 03/01/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER White, D. A.	START DATE 05/30/12	COMP. DATE 05/30/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
585															
580	581.5	0.0												581.5	0.0
			6	5	6								M	GROUND SURFACE	
														ROADWAY EMBANKMENT Gray, clayey, fine to coarse SAND (A-2-6), with trace gravel	3.0
575	577.5	4.0												WEATHERED ROCK Light gray, gray, Meta-Diorite	
	572.5	9.0													
	571.7	9.8													
														Boring Terminated with Standard Penetration Test Refusal at Elevation 571.7 ft on Crystalline Rock: Meta-Diorite	9.8

NCDOT BORE DOUBLE B4401_GEO_BRDG0161_GINT.GPJ NC_DOT.GDT 6/22/12

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	BORING NO.	DEPTH INTERVAL	UNIT WT. lbs/cf	UNCONFINED COMPRESSIVE STRENGTH KSI	ROCK MASS RATING
RS-1	16 RT	16+18	B1-B	11.5-12.7	127.6	9.48	64
RS-2	6 LT	16+55	B2-A	12.3-13.5	171.9	11.25	71



Existing Bridge No. 161, looking down stream



Center Line -L- looking down station