

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38532.1.1 (B-4760) F.A. PROJ. BRZ-4053(1)
 COUNTY GUILFORD
 PROJECT DESCRIPTION BRIDGE NO. 77 ON -L- SR 4053 (SURRETT DRIVE) OVER US 29/US 70I-85 BUSINESS

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 1910 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (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.

PERSONNEL

D.C. ELLIOT

C.J. COFFEY

L. RIDDLE

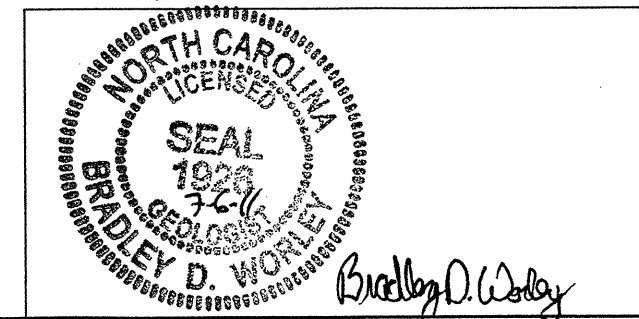
M. WHALEN

INVESTIGATED BY B.D. WORLEY

CHECKED BY C.A. YOUNGBLOOD

SUBMITTED BY K.B. MILLER

DATE JULY 2011



PROJECT: 38532.1.1 ID: B-4760

DRAWN BY: B.D. WORLEY and T.T. WALKER

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.

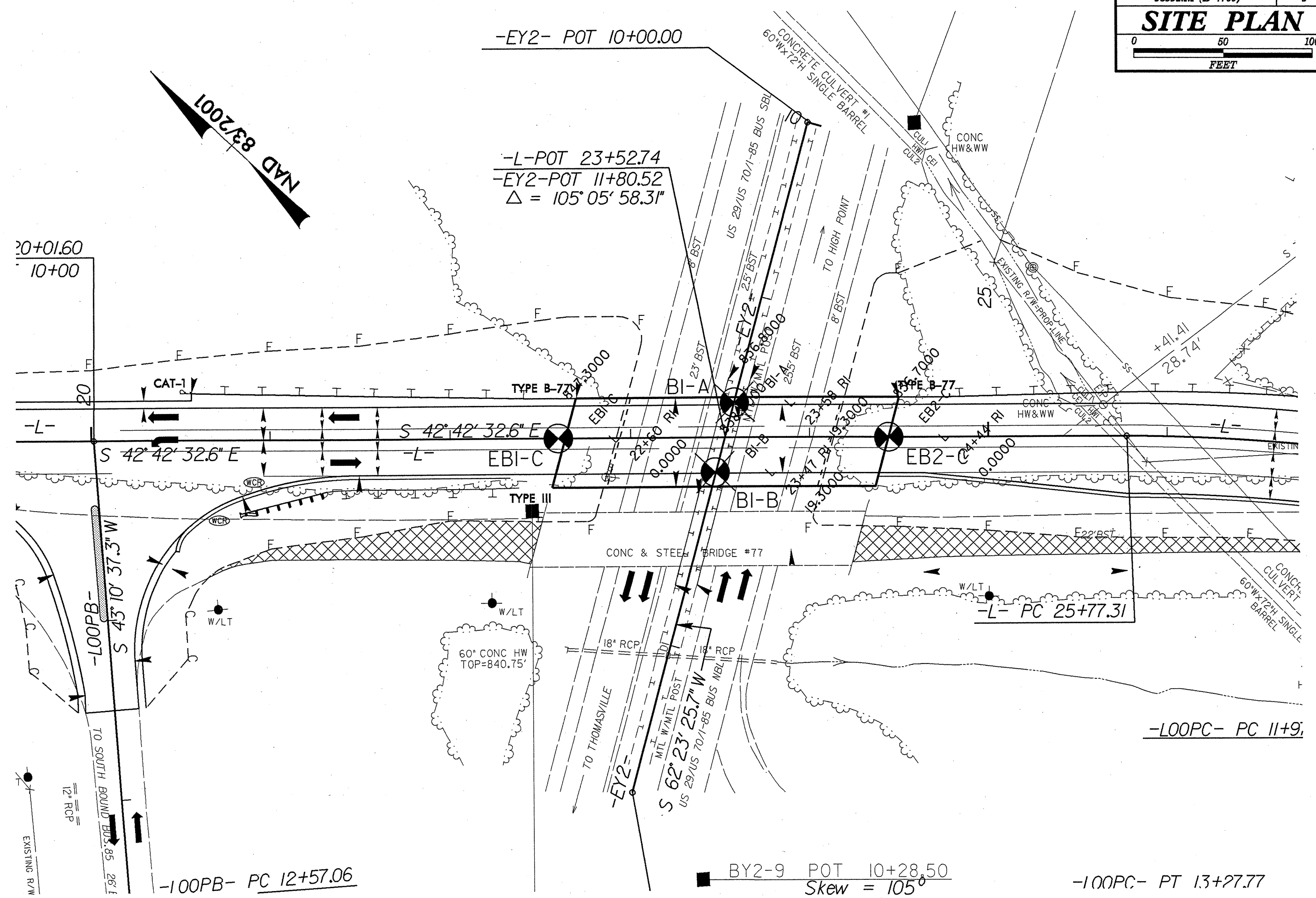
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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			
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM 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, ANGLE, STRUCTURE, PLASTICITY, ETC. EXAMPLES: VERY STIFF, GRAU/SILT CLAY, MOST 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) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>				<p>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 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 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 SURFACES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOOD - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (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 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>			
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p>				<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>				<p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</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>GENERAL CLASS.</p>				<p>MINERALOGICAL COMPOSITION</p>				<p>WEATHERING</p>				<p>ROCK HARDNESS</p>			
<p>GROUP CLASS.</p>				<p>COMPRESSIBILITY</p>				<p>WEATHERED ROCK (WR)</p>				<p>HARD</p>			
<p>SYMBOL</p>				<p>PERCENTAGE OF MATERIAL</p>				<p>CRYSTALLINE ROCK (CR)</p>				<p>MODERATELY HARD</p>			
<p>% PASSING</p>				<p>GROUND WATER</p>				<p>NON-CRYSTALLINE ROCK (NCR)</p>				<p>MODERATELY SOFT</p>			
<p>LIQUID LIMIT</p>				<p>MISCELLANEOUS SYMBOLS</p>				<p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p>				<p>SOFT</p>			
<p>GROUP INDEX</p>				<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p>				<p>FRESH</p>				<p>VERY HARD</p>			
<p>USUAL TYPES OF MAJOR MATERIALS</p>				<p>SOIL SYMBOL</p>				<p>VERY SLIGHT (V. SL.)</p>				<p>HARD</p>			
<p>GEN. RATING AS A SUBGRADE</p>				<p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p>				<p>SLIGHT (SL.)</p>				<p>MODERATELY HARD</p>			
<p>P1 OF A-7-5 SUBGROUP IS ≤ LL - 30 ; P1 OF A-7-6 SUBGROUP IS > LL - 30</p>				<p>INFERRED SOIL BOUNDARY</p>				<p>MODERATE (MOD.)</p>				<p>VERY HARD</p>			
<p>CONSISTENCY OR DENSENESS</p>				<p>INFERRED ROCK LINE</p>				<p>SEVERE (SEV.)</p>				<p>VERY HARD</p>			
<p>PRIMARY SOIL TYPE</p>				<p>ALLUVIAL SOIL BOUNDARY</p>				<p>VERY SEVERE (V. SEV.)</p>				<p>VERY HARD</p>			
<p>COMPACTNESS OR CONSISTENCY</p>				<p>DIP & DIP DIRECTION OF ROCK STRUCTURES</p>				<p>COMPLETE</p>				<p>VERY HARD</p>			
<p>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</p>				<p>ABBREVIATIONS</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</p>				<p>AR - AUGER REFUSAL</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>U.S. STD. SIEVE SIZE OPENING (MM)</p>				<p>BT - BORING TERMINATED</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>BOULDER (BLDR.)</p>				<p>CL - CLAY</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>COBBLE (COB.)</p>				<p>CPT - CONE PENETRATION TEST</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>GRAVEL (GR.)</p>				<p>CSE - COARSE</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>COARSE (CSE, SD.)</p>				<p>DMT - DILATOMETER TEST</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>FINE (FINE, F SD.)</p>				<p>DPT - DYNAMIC PENETRATION TEST</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>SILT (SIL.)</p>				<p>F - FINE</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>CLAY (CL.)</p>				<p>FOSS. - FOSSILIFEROUS</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>GRAIN MM</p>				<p>FRAC. - FRACTURED, FRACTURES</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>SIZE IN.</p>				<p>FRAGS. - FRAGMENTS</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>SOIL MOISTURE - CORRELATION OF TERMS</p>				<p>HI. - HIGHLY</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</p>				<p>EQUIPMENT USED ON SUBJECT PROJECT</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>FIELD MOISTURE DESCRIPTION</p>				<p>DRILL UNITS:</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>GUIDE FOR FIELD MOISTURE DESCRIPTION</p>				<p>ADVANCING TOOLS:</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>L.L. LIQUID LIMIT</p>				<p>HAMMER TYPE:</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>P.L. PLASTIC LIMIT</p>				<p>CORE SIZE:</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>O.M. OPTIMUM MOISTURE</p>				<p>HAND TOOLS:</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>S.L. SHRINKAGE LIMIT</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>PLASTICITY</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>PLASTICITY INDEX (PI)</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>DRY STRENGTH</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>LOW PLASTICITY</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>MED. PLASTICITY</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>HIGH PLASTICITY</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>COLOR</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			
<p>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.</p>				<p>INDURATION</p>				<p>ROCK QUALITY DESIGNATION (RQD)</p>				<p>VERY HARD</p>			



NAD 83/2001

-EY2- POT 10+00.00

-L-POT 23+52.74
 -EY2-POT 11+80.52
 $\Delta = 105^\circ 05' 58.31''$

20+01.60
 10+00

CAT-1
 S 42° 42' 32.6" E

TYPE B-77

BI-A

TYPE B-77

EBI-C

BI-B

EB2-C

CONC & STEEL BRIDGE #77

60° CONC HW
 TOP=840.75'

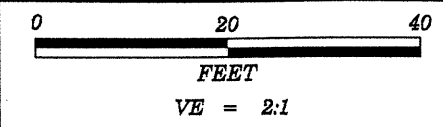
-L- PC 25+77.31

-LOOPC- PC 11+9.1

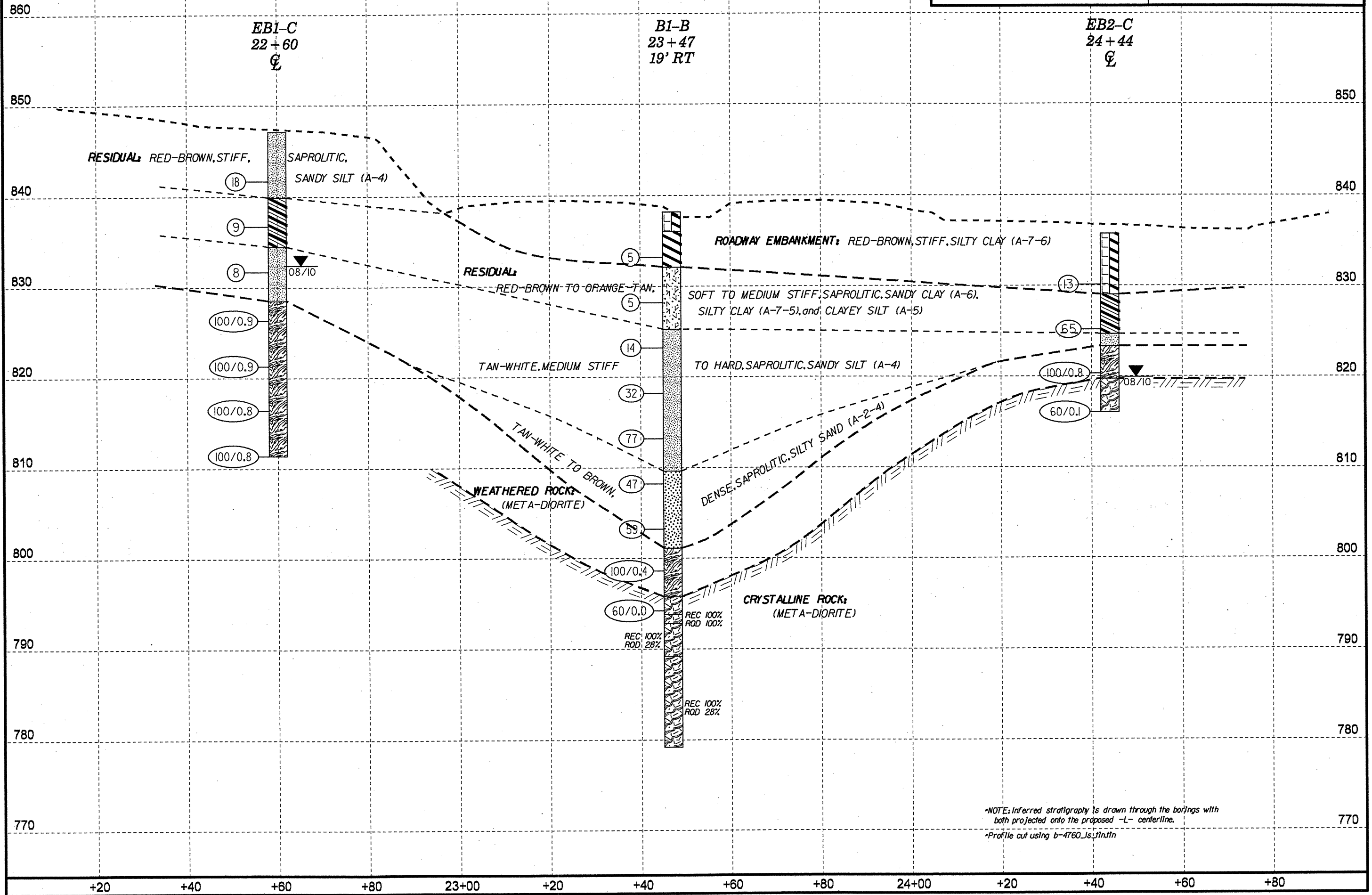
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BY2-9 POT 10+28.50
 Skew = 105°

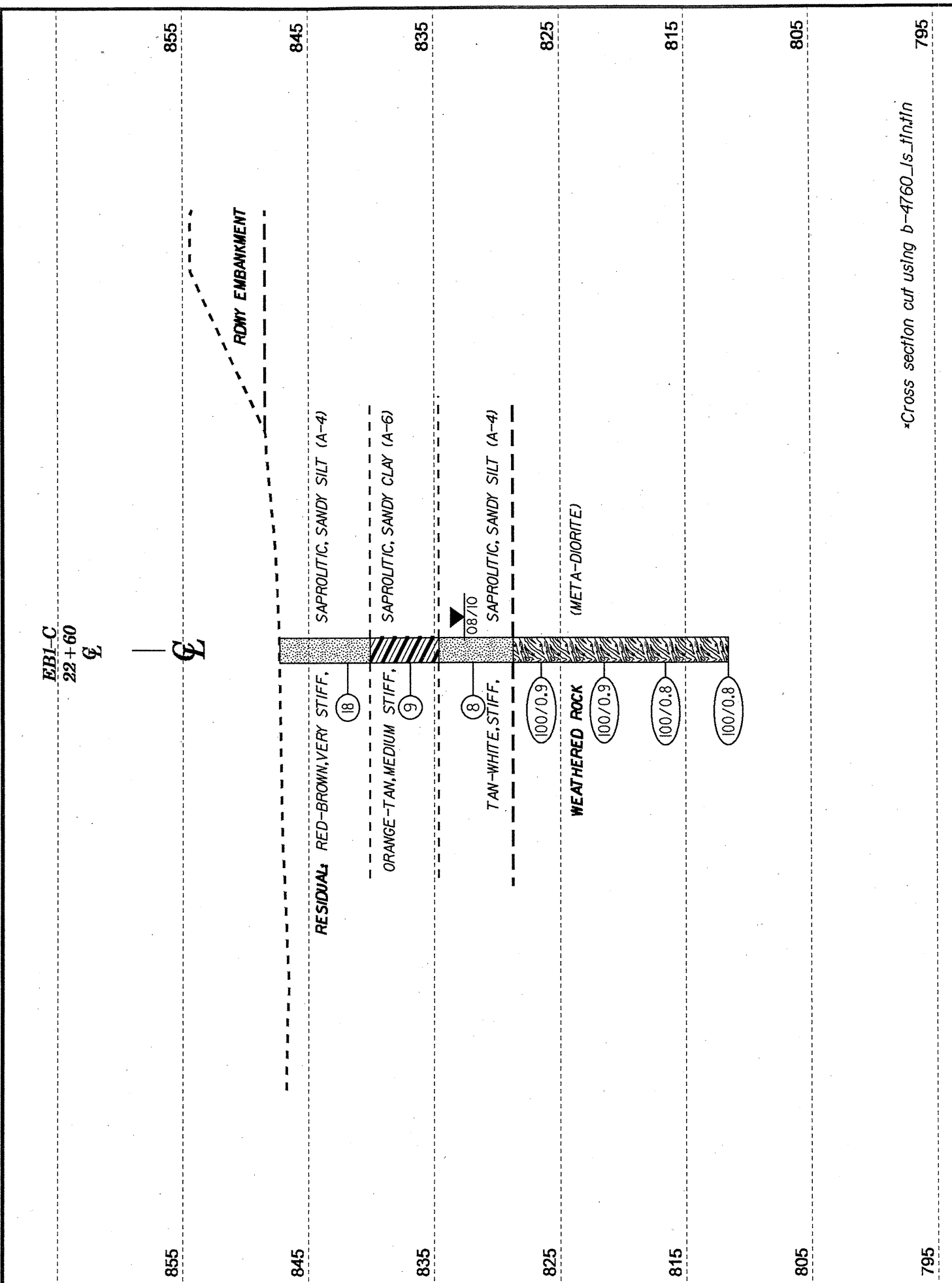
-100PC- PT 13+27.77



PROJECT REFERENCE NO.	SHEET
38532.1.1(B-4760)	4
Br. 77 on SR 4053 over US 29/US 701-85 BUS.	

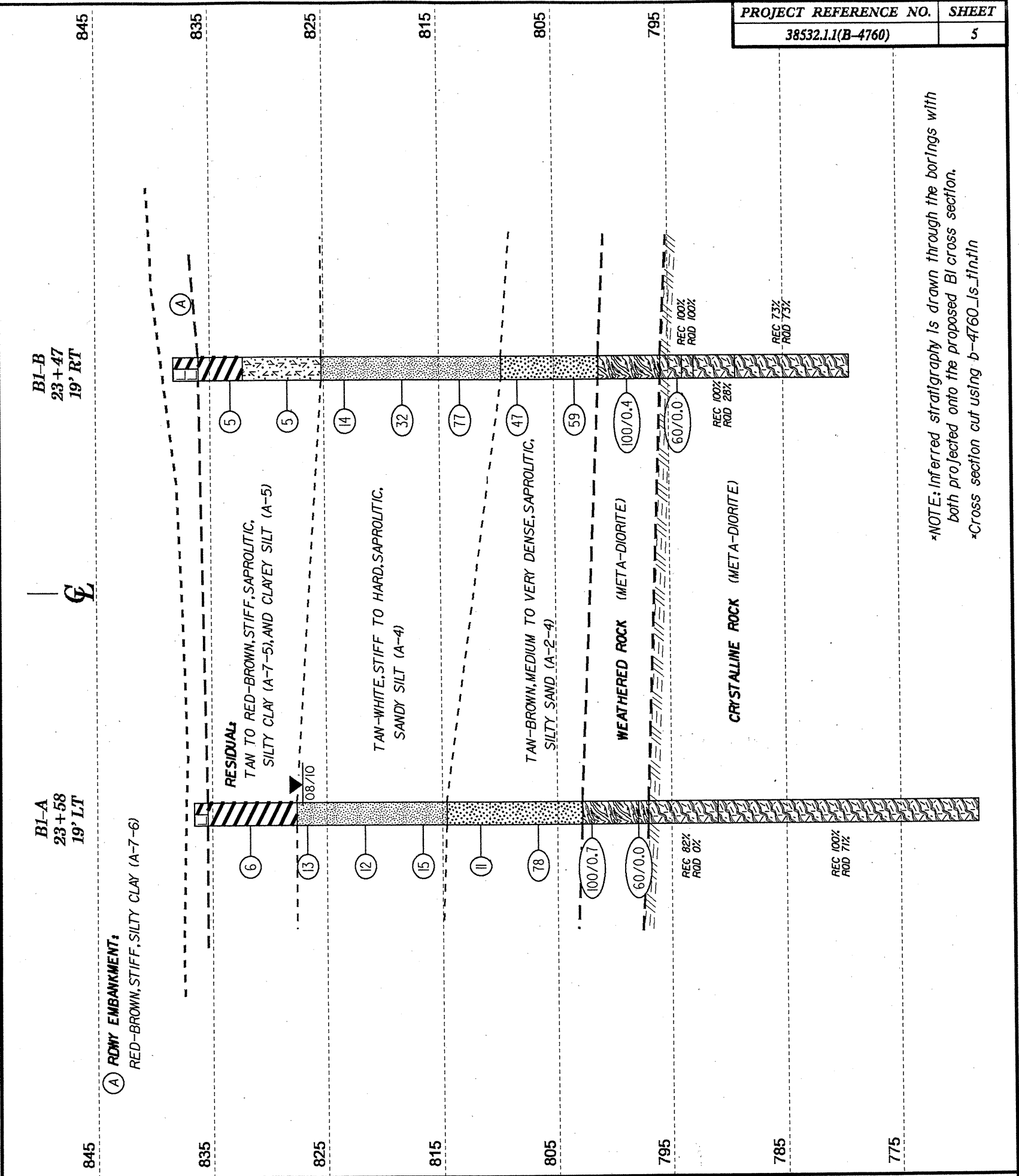


*NOTE: Inferred stratigraphy is drawn through the borings with both projected onto the proposed -L- centerline.
 *Profile cut using b-4760_Is_1/n_1/n



HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

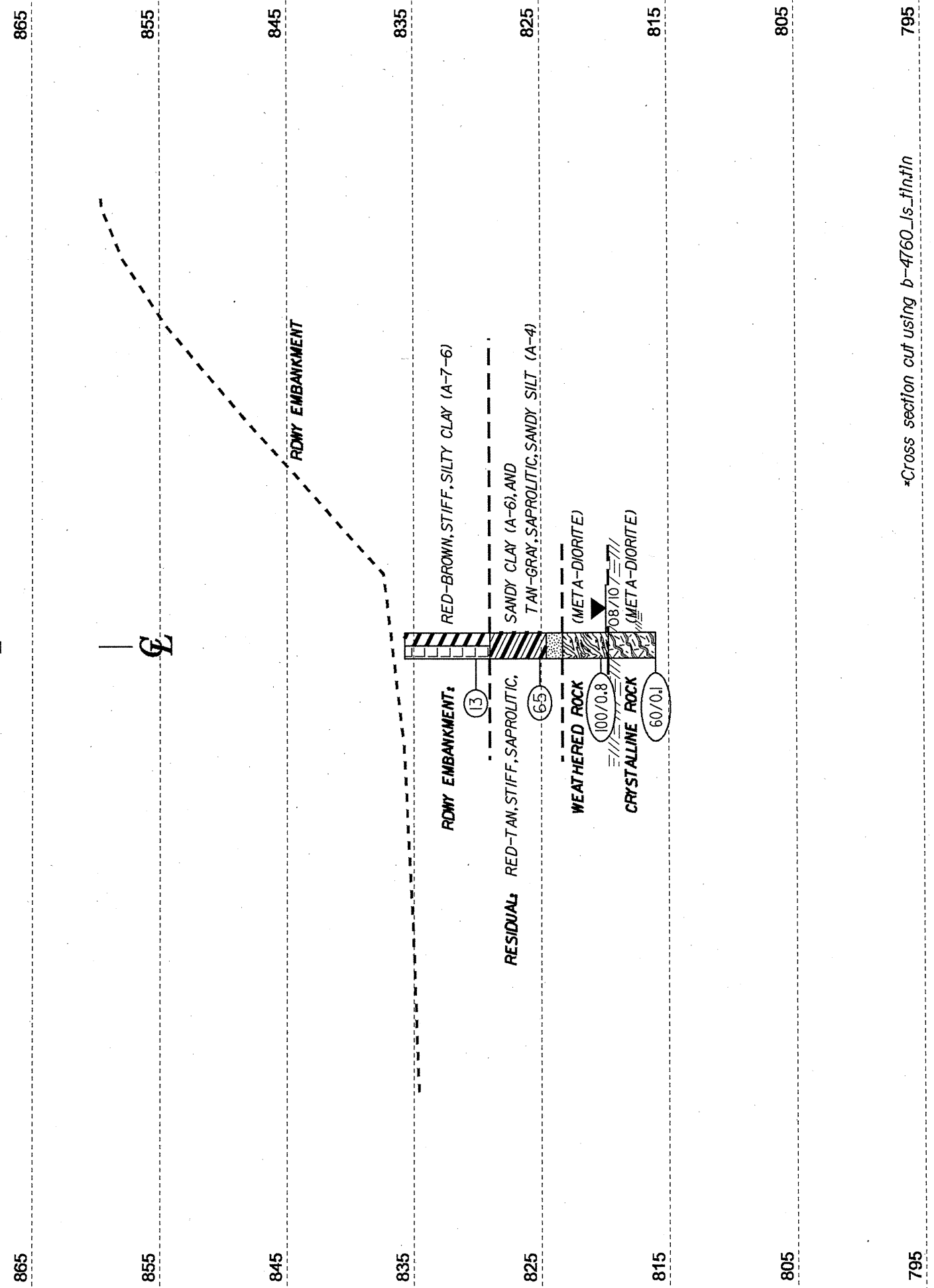
CROSS SECTION THROUGH END BENT 1



HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

CROSS SECTION THROUGH BENT 1

EB2-C
24+44
L



*Cross section cut using b-4760_ls_11n/11n

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

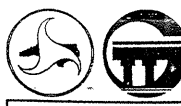
CROSS SECTION THROUGH END BENT 2



WBS 38532.1.1	TIP B-4760	COUNTY GUILFORD	GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS				GROUND WTR (ft)
BORING NO. EB1-C	STATION 22+60	OFFSET CL	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 847.1 ft	TOTAL DEPTH 35.7 ft	NORTHING 795,036	EASTING 1,703,509	24 HR. 14.7
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER Coffey, Jr., C.	START DATE 08/10/10	COMP. DATE 08/10/10	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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
850															847.1	GROUND SURFACE	0.0
845																RESIDUAL RED, BROWN, SANDY SILT, SAPROLITIC	
840	842.7	4.4	5	10	8								M		839.9	ORANGE, TAN, SANDY CLAY, SAPROLITIC WITH SOME COARSE SAND LAYERS	7.2
835	837.7	9.4	1	4	5								SS-8	M	834.5	TAN, WHITE, SANDY SILT	12.7
830	832.7	14.4	7	4	4								SS-9		828.5	WEATHERED ROCK (META-DIORITE)	18.6
825	827.7	19.4	7	41	59/0.4												
820	822.7	24.4	30	47	63/0.4												
815	817.7	29.4	22	39	61/0.3												
	812.7	34.4	20	59	41/0.3										811.4	Boring Terminated at Elevation 811.4 ft in WEATHERED ROCK (META-DIORITE)	35.7

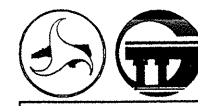
NCDOT BORE SINGLE B4670_GEO_BH.GPJ NC_DOT_GDT 7/6/11



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38532.1.1		TIP B-4760		COUNTY GUILFORD		GEOLOGIST Elliott, D. C.							
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS							GROUND WTR (ft)						
BORING NO. B1-A		STATION 23+58		OFFSET 19 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 836.6 ft		TOTAL DEPTH 68.4 ft		NORTHING 794,977		EASTING 1,703,589							
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic							
DRILLER Coffey, Jr., C.		START DATE 08/24/10		COMP. DATE 08/24/10		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				
840												GROUND SURFACE	0.0
												ROADWAY EMBANKMENT	1.2
835												RESIDUAL TAN, LIGHT BROWN, FINE SILTY CLAY	
	832.7	3.9		2	3	3					M		
	827.7	8.9		3	5	8					M		
830													
	827.7	13.9		3	5	7					M		
825													
	822.7	18.9		2	7	8					M		
820													
	817.7	23.9		1	5	6					M		
815													
	812.7	28.9		17	42	36					M		
810													
	807.7	33.9		57	43/0.2								
805													
	802.7	38.7											
800													
	797.9	60/0.0											
795													
790													
785													
780													
775													
770													

NCDOT BORE SINGLE B4670_GEO_BH.GPJ_NC_DOT.GDT 7/6/11



NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 38532.1.1		TIP B-4760		COUNTY GUILFORD		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS							GROUND WTR (ft)					
BORING NO. B1-A		STATION 23+58		OFFSET 19 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 836.6 ft		TOTAL DEPTH 68.4 ft		NORTHING 794,977		EASTING 1,703,589						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic						
DRILLER Coffey, Jr., C.		START DATE 08/24/10		COMP. DATE 08/24/10		SURFACE WATER DEPTH N/A						
CORE SIZE NWD4			TOTAL RUN 29.7 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	ROD (ft) %		REC. (ft) %	ROD (ft) %			
797.9			4.7	1:37/0.7 1:20/1.0 1:07/1.0	(2.1) 45%	(0.7) 14%		(0.8) 89%	(0.0) 0%		Begin Coring @ 38.7 ft	
795				1:15/1.0 1:25/1.0				(4.9) 82%	(0.0) 0%		WEATHERED ROCK BROWN, WEATHERED ROCK CRYSTALLINE ROCK	38.7 39.6
	793.2	43.4	5.0	1:21/1.0 1:11/1.0 1:07/1.0 1:15/1.0 1:12/1.0	(0.8) 16%	(0.0) 0%		(22.8) 100%	(16.3) 71%		BROWN TO GRAY, MODERATELY WEATHERED, CLOSE FRACTURED, MODERATELY HARD TO HARD, META-DIORITE, FOLIATED	
790				1:57/1.0 2:01/1.0 2:12/1.0 2:07/1.0 2:09/1.0	(3.3) 66%	(1.7) 34%					GRAY, VERY SLIGHTLY WEATHERED TO FRESH, CLOSE TO MODERATELY CLOSE FRACTURED HARD TO VERY HARD, FOLIATED, META-DIORITE	45.6
	788.2	48.4	5.0	2:21/1.0 2:25/1.0 2:17/1.0 2:19/1.0 2:24/1.0	(4.6) 92%	(3.8) 76%						
785				2:21/1.0 2:25/1.0 2:17/1.0 2:19/1.0 2:27/1.0 2:28/1.0 2:22/1.0	(5.0) 100%	(5.0) 100%						
	783.2	53.4	5.0	2:21/1.0 2:04/1.0 2:11/1.0 2:25/1.0 2:21/1.0	(5.0) 100%	(5.0) 100%						
780												
	778.2	58.4	5.0									
775												
	773.2	63.4	5.0									
770												
	768.2	68.4										

NCDOT CORE SINGLE B4670_GEO_BH.GPJ_NC_DOT.GDT 7/6/11

WBS 38532.1.1		TIP B-4760		COUNTY GUILFORD		GEOLOGIST Elliott, D. C.									
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS							GROUND WTR (ft)								
BORING NO. B1-B		STATION 23+47		OFFSET 19 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 838.2 ft		TOTAL DEPTH 59.0 ft		NORTHING 794,959		EASTING 1,703,554									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 08/24/10		COMP. DATE 08/24/10		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75					100	
840												838.2	GROUND SURFACE	0.0	
835	834.2	4.0	1	2	3	5					SS-23	M	836.0	ROADWAY EMBANKMENT SILTY CLAY	2.2
													832.1	RESIDUAL RED, BROWN, FINE SILTY CLAY, SAPROLITIC	6.1
830	829.2	9.0	WOH	2	3	5					SS-24	M	825.2	TAN, BROWN, CLAYEY SILT, SAPROLITIC	13.0
													824.2	TAN, WHITE, AND LIGHT BROWN, SANDY SILT, SAPROLITIC	14.0
820	819.2	19.0	9	12	20	32					SS-26	M	809.6	TAN, BROWN, AND WHITE, SILTY SAND, SAPROLITIC	28.6
													814.2		24.0
810	809.2	29.0	5	14	33	47					SS-28	D	801.1	WEATHERED ROCK (META-DIORITE)	37.1
													804.2		34.0
800	799.2	39.0	20	100/0.4								D	795.7	CRYSTALLINE ROCK (META-DIORITE)	42.5
													794.2		44.0
795	794.2	44.0	60/0.0										793.8	CRYSTALLINE ROCK (META-DIORITE)	44.4
													792.8	CRYSTALLINE ROCK (META-DIORITE)	45.4
790													789.2	CRYSTALLINE ROCK (META-DIORITE)	49.0
													779.2	Boring Terminated at Elevation 779.2 ft in CRYSTALLINE ROCK (META-DIORITE)	59.0

NCDOT BORE SINGLE B4670_GEO_BH.GPJ NC_DOT.GDT 7/6/11

WBS 38532.1.1		TIP B-4760		COUNTY GUILFORD		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS							GROUND WTR (ft)					
BORING NO. B1-B		STATION 23+47		OFFSET 19 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 838.2 ft		TOTAL DEPTH 59.0 ft		NORTHING 794,959		EASTING 1,703,554						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 08/24/10		COMP. DATE 08/24/10		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 (%)			
793.8	793.8	44.4	4.6	2:15/0.6 2:25/1.0 2:19/1.0	(2.4)	(1.4)		(1.0)	(1.0)		Begin Coring @ 44.4 ft	44.4
790	789.2	49.0	5.0	2:02/1.0 2:10/1.0 2:15/1.0 2:16/1.0 2:03/1.0	(4.8)	(4.8)	RS-1	(7.3)	(7.3)		792.8	45.4
785	784.2	54.0	5.0	2:01/1.0 2:14/1.0 2:16/1.0 2:15/1.0 2:19/1.0	(3.0)	(3.0)					789.2	49.0
780	779.2	59.0									779.2	59.0

NCDOT CORE SINGLE B4670_GEO_BH.GPJ NC_DOT.GDT 7/6/11



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 38532.1.1	TIP B-4760	COUNTY GUILFORD	GEOLOGIST Elliott, D. C.
SITE DESCRIPTION BRIDGE NO. 77 ON SR 4053 (SURRETT DR.) OVER US 29/US 70/ I-85 BUSINESS			GROUND WTR (ft)
BORING NO. EB2-C	STATION 24+44	OFFSET CL	ALIGNMENT -L-
COLLAR ELEV. 835.7 ft	TOTAL DEPTH 19.7 ft	NORTHING 794,901	EASTING 1,703,633
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Coffey, Jr., C.	START DATE 08/11/10	COMP. DATE 08/11/10	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						ELEV. (ft)
840																
835															835.7	GROUND SURFACE
																ROADWAY EMBANKMENT RED, BROWN, SILTY CLAY
830	831.1	4.6	3	8	5							SS-16	M		829.0	RESIDUAL TAN, RED, SANDY CLAY, SAPROLITIC
825	826.1	9.6	4	6	59							SS-17	M		824.6	GRAY, TAN, SANDY SILT, SAPROLITIC
															823.3	WEATHERED ROCK (META-DIORITE)
820	821.1	14.6													819.7	CRYSTALLINE ROCK (META-DIORITE)
	816.1	19.6													816.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 816.0 ft in CRYSTALLINE ROCK

NCDOT BORE SINGLE B4670_GEO_BH.GPJ NC_DOT_GDT 7/6/11

EB1-C

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-8	CL	22+60	9.4-10.9	A-6(5)	35	15	21.4	27.3	26.7	24.5	88	77	51	-	-
SS-9	CL	22+60	14.4-15.9	A-4(0)	24	NP	33.4	33.4	27.1	6.1	100	83	40	-	-

B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-23	19.3 RT	23+47	4.0-5.5	A-7-5(9)	44	11	9.0	29.2	41.4	20.4	100	97	72	-	-
SS-24	19.3 RT	23+47	9.0-10.5	A-5(3)	43	5	13.3	37.6	41.0	8.2	100	95	61	-	-
SS-26	19.3 RT	23+47	19.0-20.5	A-4(0)	27	2	29.4	39.8	26.7	4.1	100	86	41	-	-
SS-28	19.3 RT	23+47	29.0-30.5	A-2-4(0)	28	4	48.6	24.3	19.0	8.2	93	59	31	-	-

EB2-C

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-16	CL	24+44	4.6-6.1	A-7-6(21)	52	27	9.8	16.5	24.7	49.0	99	94	77	-	-
SS-17	CL	24+44	9.6-11.1	A-6(5)	40	12	21.4	32.0	28.2	18.4	99	85	56	-	-

**North Carolina Dept. of Transportation
Division of Highways
Materials and Tests
Physical Testing Laboratory**

Rock Compression

Lab Number	367301
Project #	38532.1.1
County	Gulford
Tip ID	B-4760
Structure Description	Bridge No. 77 on SR 4053 (surrett dr) ove US29/ U
Test Date	06/22/2011
Lab Number:	367301
Sample No.:	RS-1
Diameter, in:	1.8600
Area, in ² :	2.7172
Depth:	0.0000
Specimen, in:	3.85
H/D Ratio:	2.07
Weight, lbf:	1.0800
Unit Weight, lbf/ft ³ :	178.4
Ultimate, lbf:	27200
Ultimate, ksi:	10
Ultimate, ksi:	10.04
40% Ult. Load, lbf:	10870
Sec Mod @ 40%, Mpsi:	8.41

ROCK CORE PHOTOGRAPHS

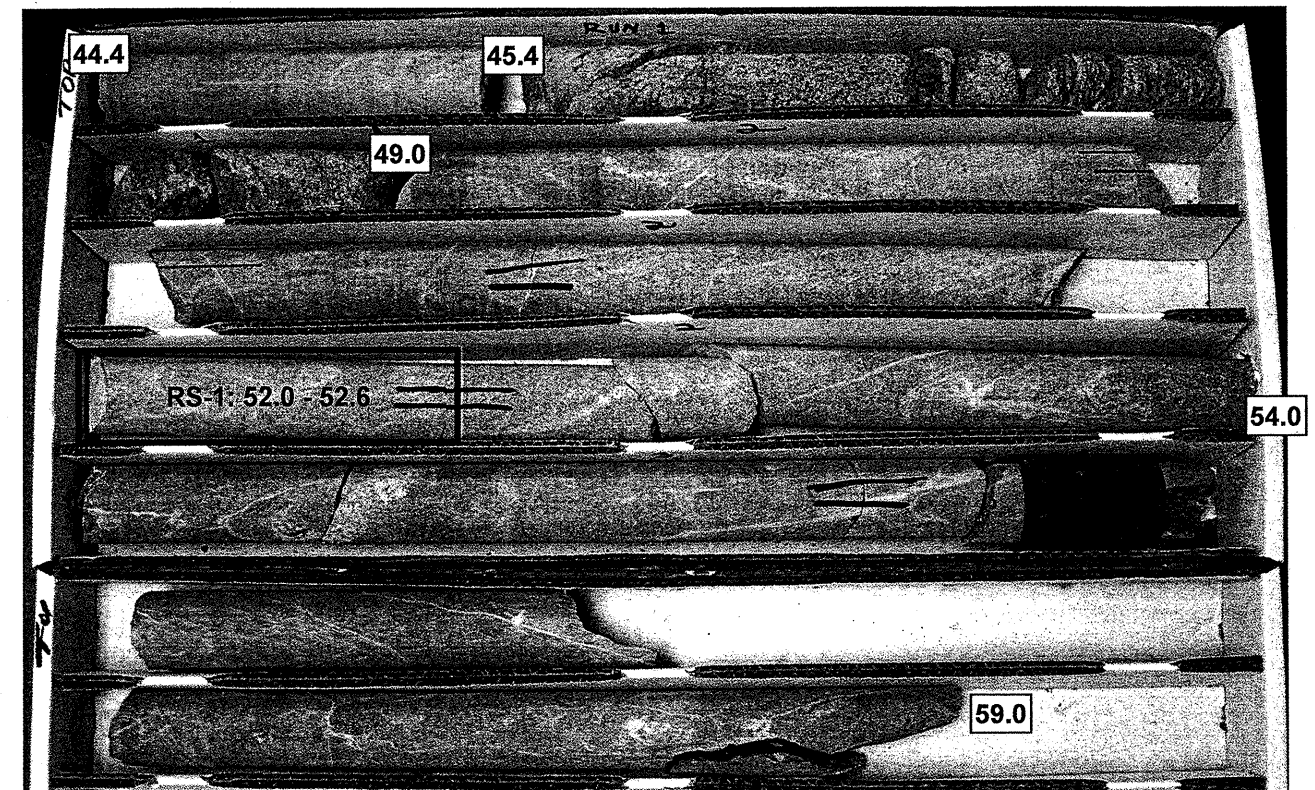
B1-A

BOXES 1, 2, & 3: 38.7 - 68.4 FEET



B1-B

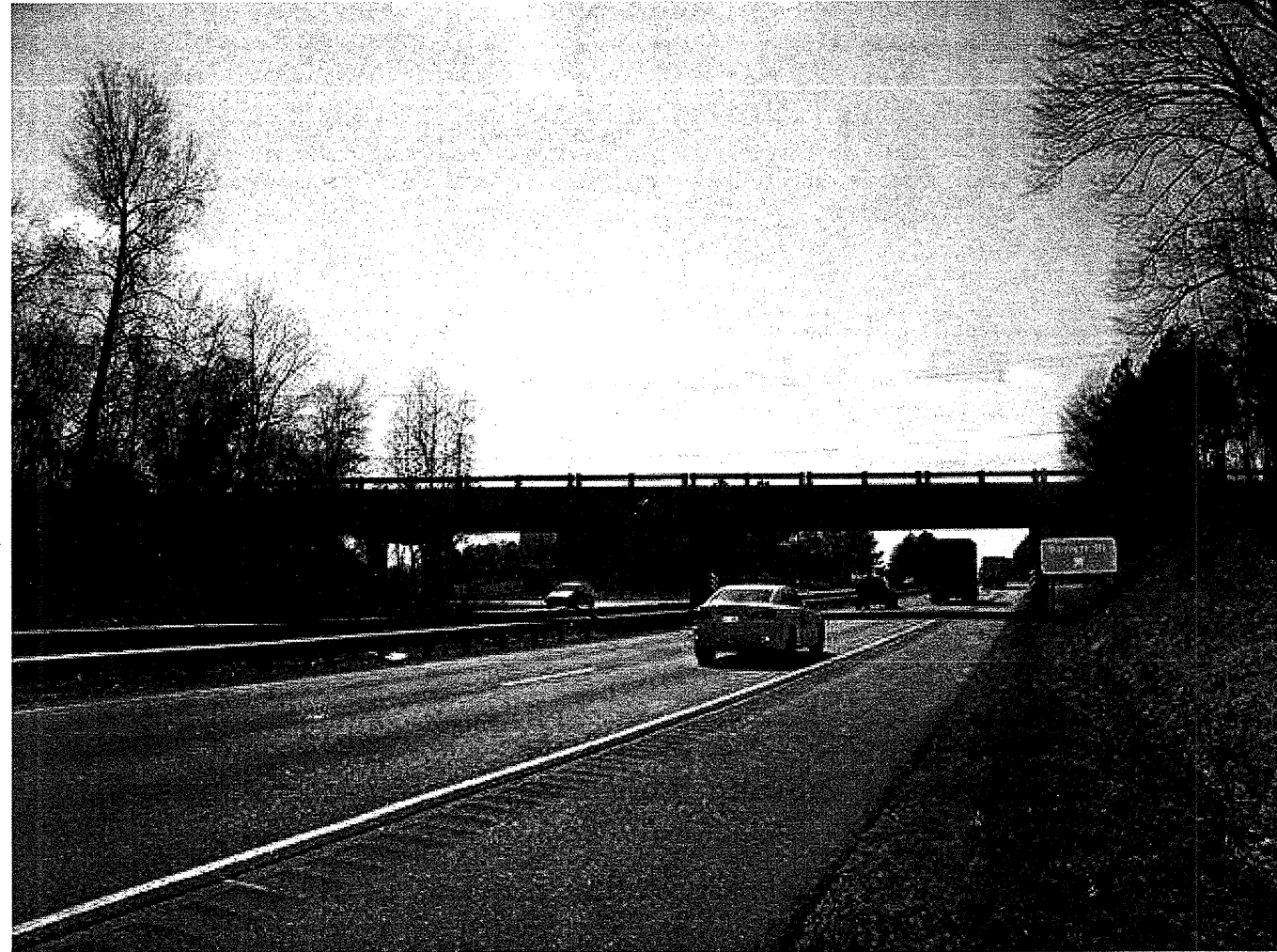
BOXES 1 & 2: 44.4 - 59.0 FEET



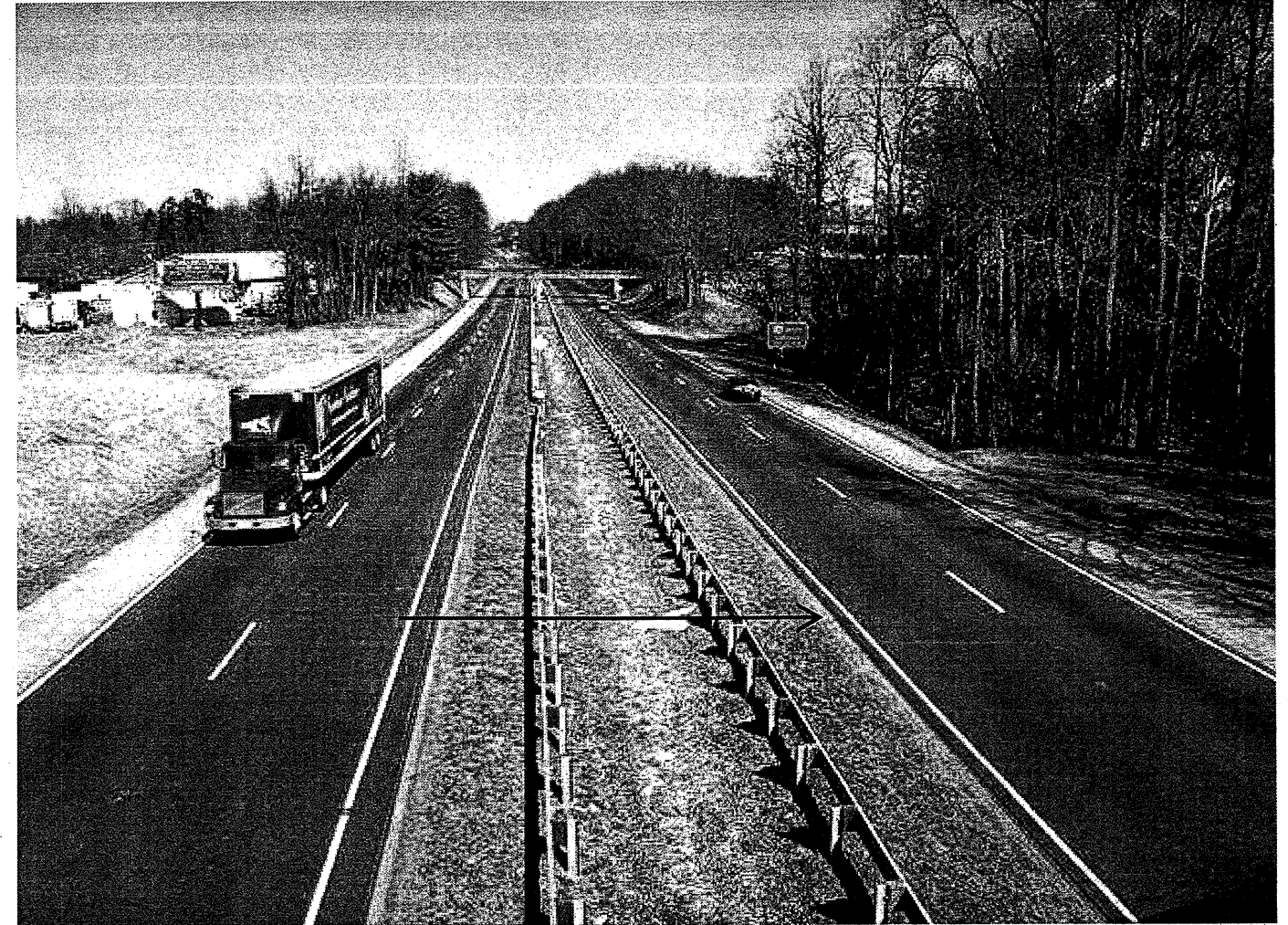
FEET

FEET

Site Photographs



View southwest along I-85. Red arrow denotes approximate centerline of -L-.



View northeast from existing bridge deck. Red arrow denotes approximate centerline of -L-.