

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4488	1	20

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 33725.1.2 (B-4488) F.A. PROJ. BRSTP-1763(3)  
COUNTY CRAVEN  
PROJECT DESCRIPTION BRIDGE NO. 176 ON SR 1763 (CHURCH RD./  
MILLER BLVD.) OVER SLOCUM CREEK AT -L- STA. 14+62.00

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**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

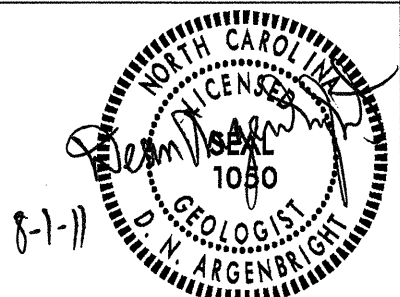
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT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

**ID: B-4488**

**PROJECT: 33725.1.2**

PERSONNEL  
**MACTEC**

INVESTIGATED BY D.N. ARGENBRIGHT  
CHECKED BY D.N. ARGENBRIGHT  
SUBMITTED BY D.N. ARGENBRIGHT  
DATE AUGUST 2011



DRAWN BY: C.P. TURNER

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

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

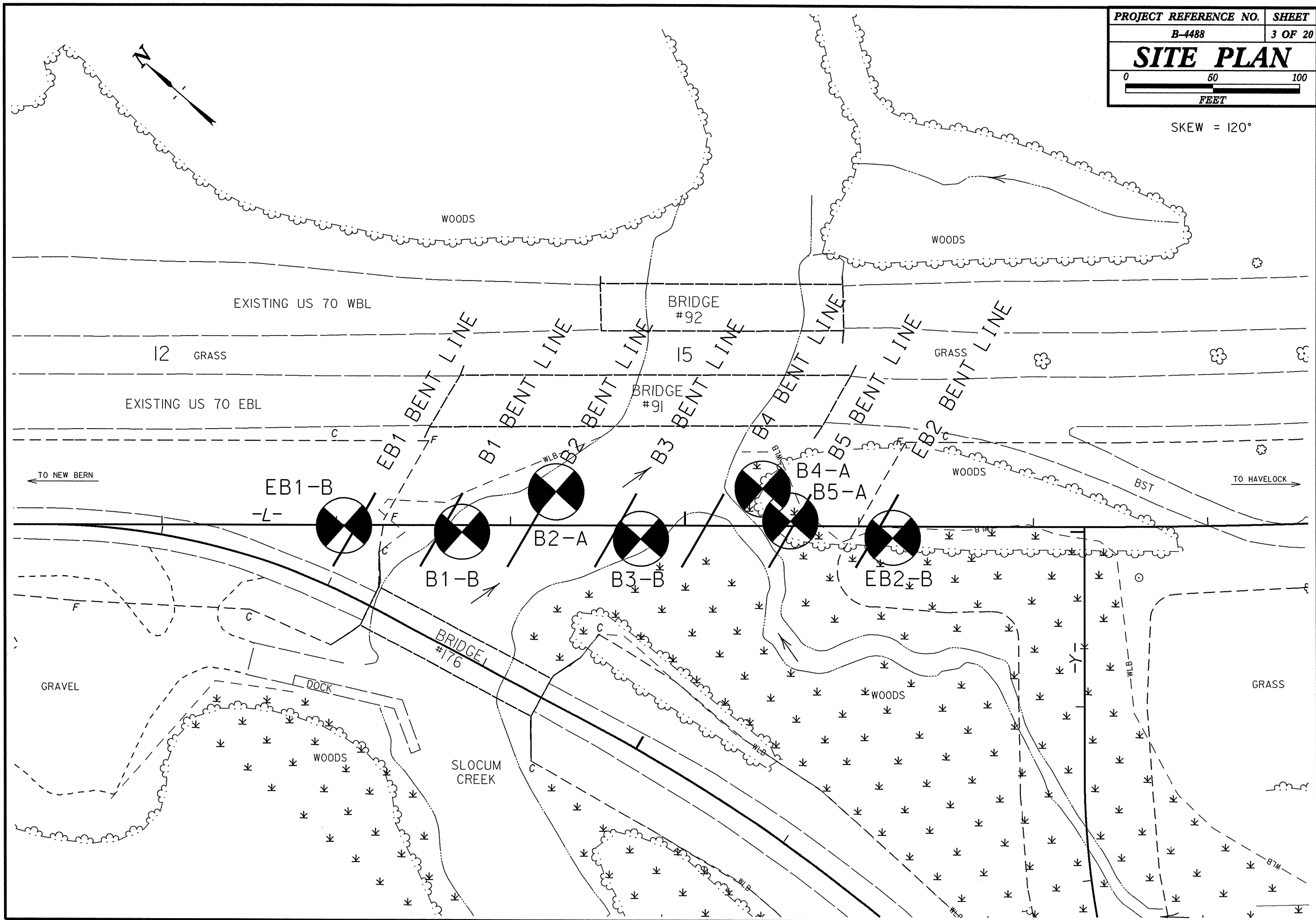
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

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 (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>				<b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .				<b>HARD ROCK</b> 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:  <b>WEATHERED ROCK (WR)</b> NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  <b>CRYSTALLINE ROCK (CR)</b> FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  <b>NON-CRYSTALLINE ROCK (NCR)</b> FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  <b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.				<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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. <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b> GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% 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-3 A-4, A-5 A-6, A-7 SYMBOL				<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				<b>WEATHERING</b> <b>FRESH</b> ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. <b>VERY SLIGHT (V SL.)</b> 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. <b>SLIGHT (SL.)</b> 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. <b>MODERATE (MOD.)</b> 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. <b>MODERATELY SEVERE (MOD. SEV.)</b> 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> <b>SEVERE (SEV.)</b> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i> <b>VERY SEVERE (V SEV.)</b> 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 &lt; 100 BPF</i> <b>COMPLETE</b> ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.							
<b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50				<b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE				<b>GROUND WATER</b> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP							
<b>CONSISTENCY OR DENSENESS</b> PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE <4 4 TO 10 10 TO 30 30 TO 50 >50 N/A GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4				<b>MISCELLANEOUS SYMBOLS</b> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD											
<b>TEXTURE OR GRAIN SIZE</b> U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053 BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM IN. 305 12 75 3 2.0 0.25 0.05 0.005				<b>ABBREVIATIONS</b> AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO f - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED X - UNIT WEIGHT Xg - DRY UNIT WEIGHT <b>SAMPLE ABBREVIATIONS</b> S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO											
<b>SOIL MOISTURE - CORRELATION OF TERMS</b> SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE				<b>EQUIPMENT USED ON SUBJECT PROJECT</b> DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input checked="" type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 <input type="checkbox"/> PORTABLE HOIST ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/16" STEEL TEETH <input type="checkbox"/> TRICONE " TUNG-CARB. <input type="checkbox"/> CORE BIT HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> B- <input type="checkbox"/> N- <input type="checkbox"/> H- HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST											
<b>PLASTICITY</b> NONPLASTIC 0-5 DRY STRENGTH VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH				<b>FRACATURE SPACING</b> TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET  <b>BEDDING</b> TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET											
<b>COLOR</b> 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.				<b>INDURATION</b> FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.											
<b>BENCH MARK: CONTROL POINT NO. 100: AT -L- STA. 14+02.28, 106.6' LEFT</b> ELEVATION: 11.78 FT.				<b>NOTES:</b>											

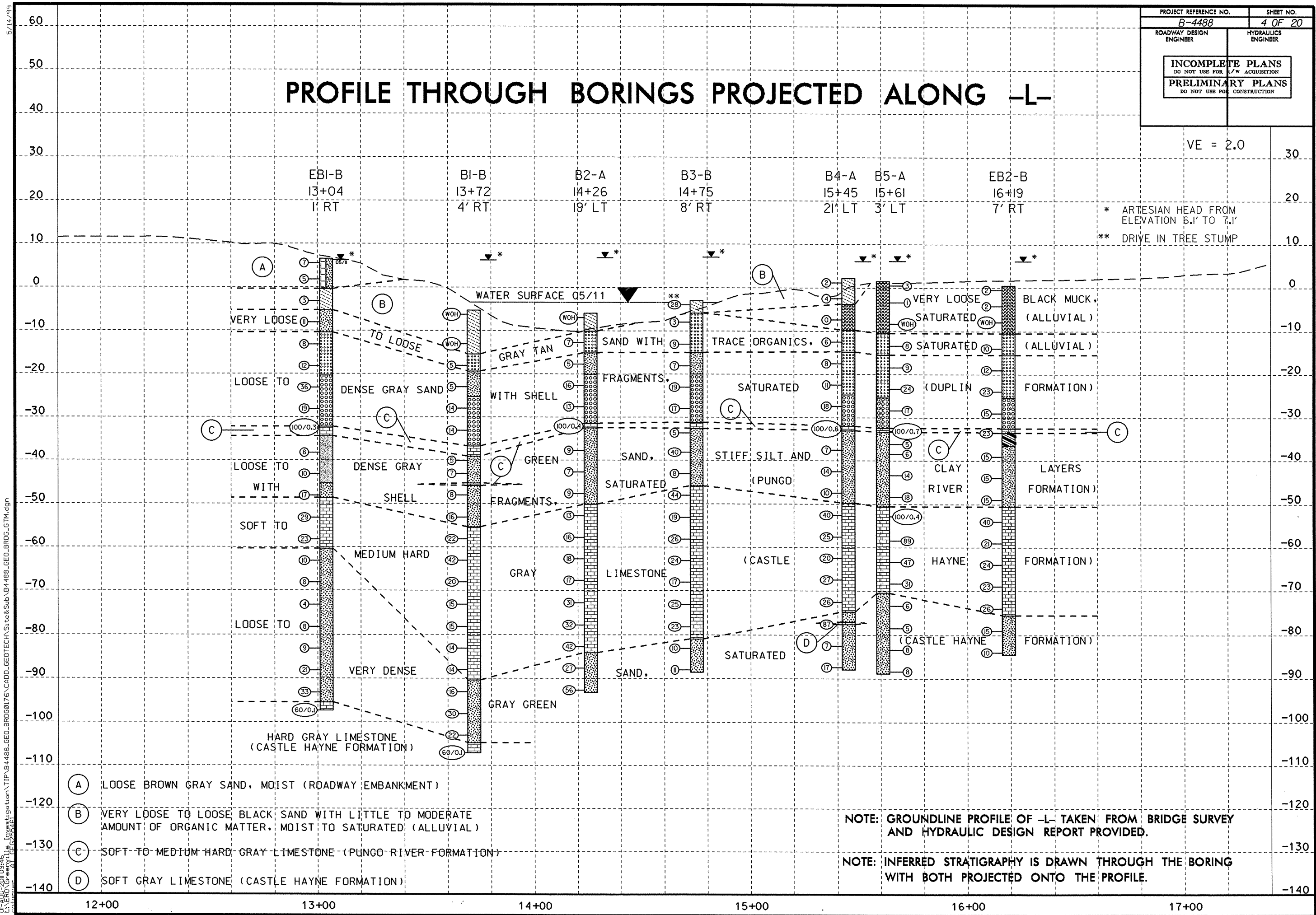
SKEW = 120°



# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.0

\* ARTESIAN HEAD FROM ELEVATION 6.1' TO 7.1'  
 \*\* DRIVE IN TREE STUMP



01-AUG-2010 09:46  
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

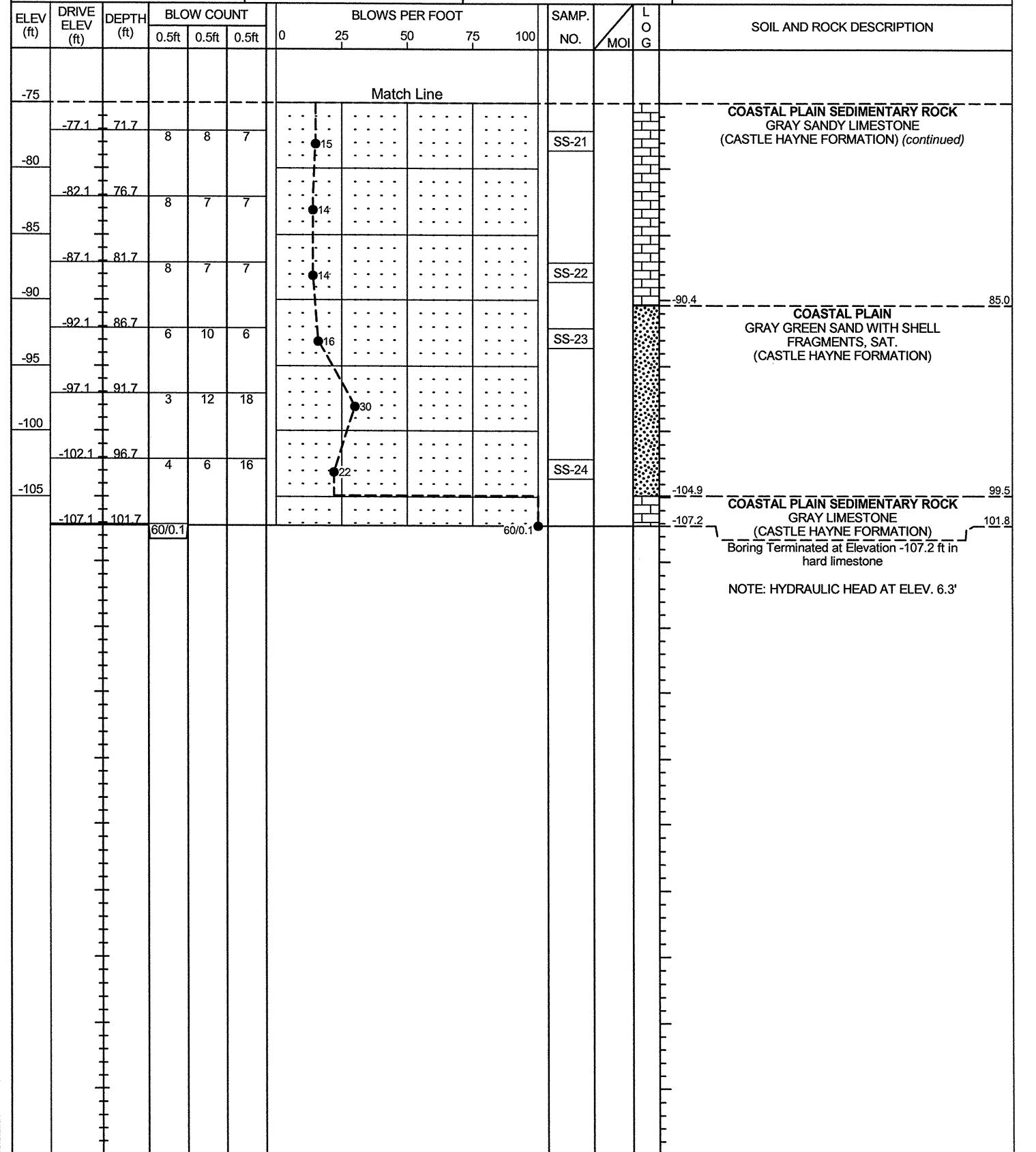
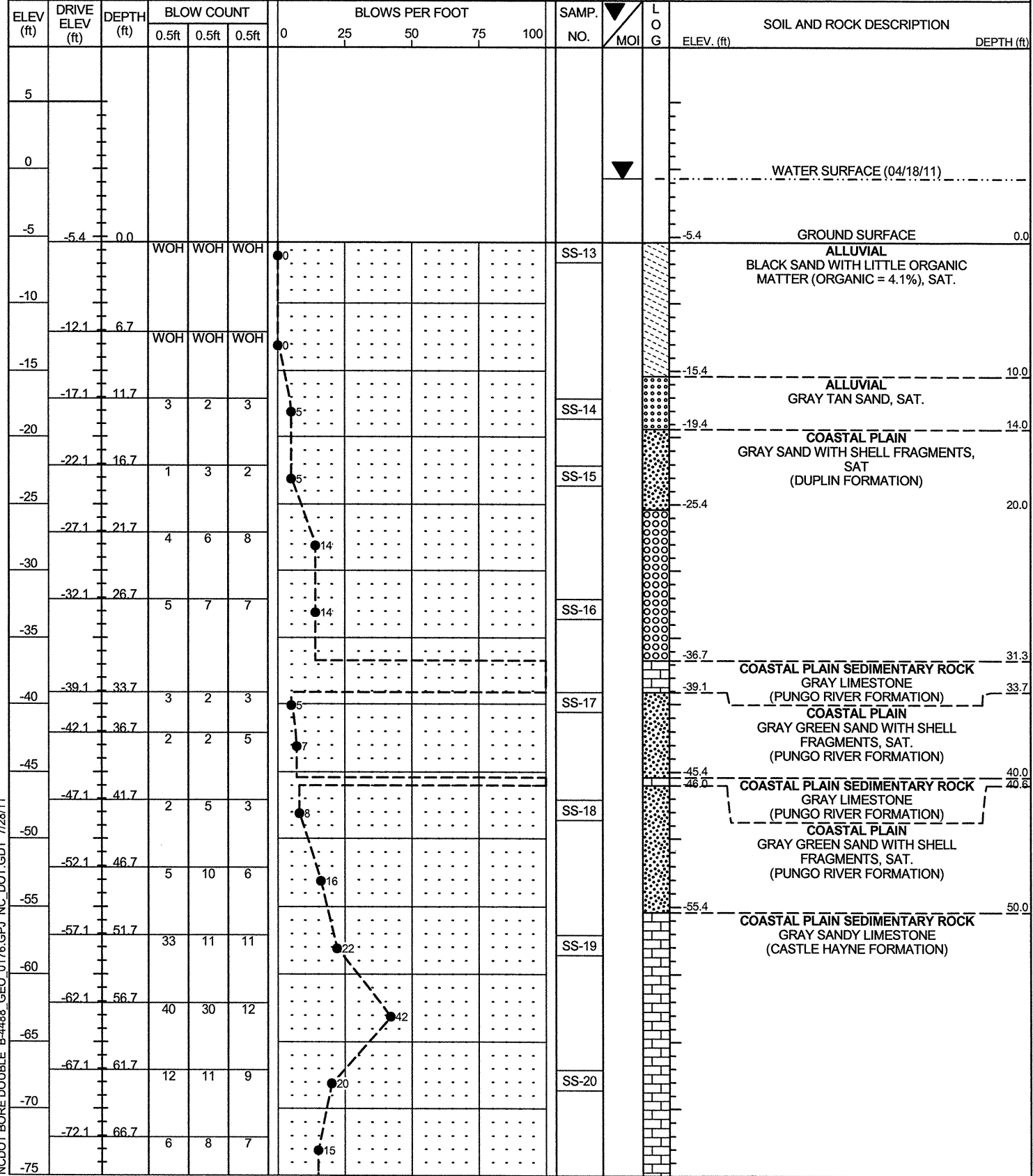
WBS 33725.1.2		TIP B-4488		COUNTY CRAVEN		GEOLOGIST Howard, J.									
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek							GROUND WTR (ft)								
BORING NO.	STATION	OFFSET	ALIGNMENT				0 HR. Artesian								
EB1-B	13+04	1 ft RT	-L-												
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING				24 HR. 0.3								
6.6 ft	103.9 ft	421,919	2,622,675												
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 05/04/11	COMP. DATE 05/05/11	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	100					
10															
	6.6	0.0												GROUND SURFACE	0.0
5			5	4	3							SS-74		ROADWAY EMBANKMENT	
	2.8	3.8										SS-75		BROWN GRAY SAND, MOIST TO SAT.	
0			1	3	2									ALLUVIAL	
	-2.2	8.8												BLACK SAND WITH LITTLE ORGANIC	
-5			4	2	1									MATTER, SAT.	
	-7.2	13.8												ALLUVIAL	
-10			4	5	6							SS-76		GRAY SAND, SAT	
	-12.2	18.8												COASTAL PLAIN	
-15			5	3	5							SS-77		GRAY SAND WITH SHELL FRAGMENTS,	
	-17.2	23.8												SAT	
-20			6	5	7									(DUPLIN FORMATION)	
	-22.2	28.8													
-25			13	17	19							SS-78		COASTAL PLAIN SEDIMENTARY ROCK	
	-27.2	33.8												GRAY LIMESTONE	
-30			8	8	11									(PUNGO RIVER FORMATION)	
	-32.2	38.8												COASTAL PLAIN	
-35			2	2	6							SS-79		GRAY GREEN SANDY SILT WITH SHELL	
	-37.2	43.8												FRAGMENTS, WET	
-40			3	5	5									(PUNGO RIVER FORMATION)	
	-42.2	48.8												COASTAL PLAIN	
-45			2	8	9							SS-80		GRAY GREEN SAND WITH SHELL	
	-47.2	53.8												FRAGMENTS, SAT.	
-50			54	16	13									(PUNGO RIVER FORMATION)	
	-52.2	58.8												COASTAL PLAIN SEDIMENTARY ROCK	
-55			11	11	12							SS-81		GRAY SANDY LIMESTONE	
	-57.2	63.8												(CASTLE HAYNE FORMATION)	
-60			17	5	5										
	-62.2	68.8										SS-82		COASTAL PLAIN	
-65			2	3	5									GRAY GREEN SAND WITH SHELL	
	-67.2	73.8												FRAGMENTS, SAT.	
-70														(CASTLE HAYNE FORMATION)	

WBS 33725.1.2		TIP B-4488		COUNTY CRAVEN		GEOLOGIST Howard, J.									
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek							GROUND WTR (ft)								
BORING NO.	STATION	OFFSET	ALIGNMENT				0 HR. Artesian								
EB1-B	13+04	1 ft RT	-L-												
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING				24 HR. 0.3								
6.6 ft	103.9 ft	421,919	2,622,675												
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 05/04/11	COMP. DATE 05/05/11	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	100					
	-72.2	78.8												Match Line	
-75			2	2	2							SS-83		COASTAL PLAIN	
	-77.2	83.8												GRAY GREEN SAND WITH SHELL	
-80			4	2	6									FRAGMENTS, SAT.	
	-82.2	88.8												(CASTLE HAYNE FORMATION)(continued)	
-85			2	4	5										
	-87.2	93.8													
-90			5	11	10							SS-84			
	-92.2	98.8													
-95			7	11	22										
	-97.2	103.8													
			60/0.1											COASTAL PLAIN SEDIMENTARY ROCK	
														GRAY SANDY LIMESTONE	
														(CASTLE HAYNE FORMATION)	
														Boring Terminated at Elevation -97.3 ft in	
														moderately hard limestone	
														NOTE: HYDRAULIC HEAD AT ELEV. 6.3'	

NCDOT BORE DOUBLE B-4488 GEO\_0176.GPJ NC\_DOT.GDT 7/28/11

WBS 33725.1.2	TIP B-4488	COUNTY CRAVEN	GEOLOGIST Howard, J.
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek			GROUND WTR (ft)
BORING NO. B1-B	STATION 13+72	OFFSET 4 ft RT	ALIGNMENT -L-
COLLAR ELEV. -5.4 ft	TOTAL DEPTH 101.8 ft	NORTHING 421,866	EASTING 2,622,717
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 04/18/11	COMP. DATE 04/19/11	SURFACE WATER DEPTH 4.7ft

WBS 33725.1.2	TIP B-4488	COUNTY CRAVEN	GEOLOGIST Howard, J.
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek			GROUND WTR (ft)
BORING NO. B1-B	STATION 13+72	OFFSET 4 ft RT	ALIGNMENT -L-
COLLAR ELEV. -5.4 ft	TOTAL DEPTH 101.8 ft	NORTHING 421,866	EASTING 2,622,717
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 04/18/11	COMP. DATE 04/19/11	SURFACE WATER DEPTH 4.7ft



NCDOT BORE DOUBLE B-4488\_GEO\_0176.GPJ NC\_DOT.GDT 7/28/11

NOTE: HYDRAULIC HEAD AT ELEV. 6.3'

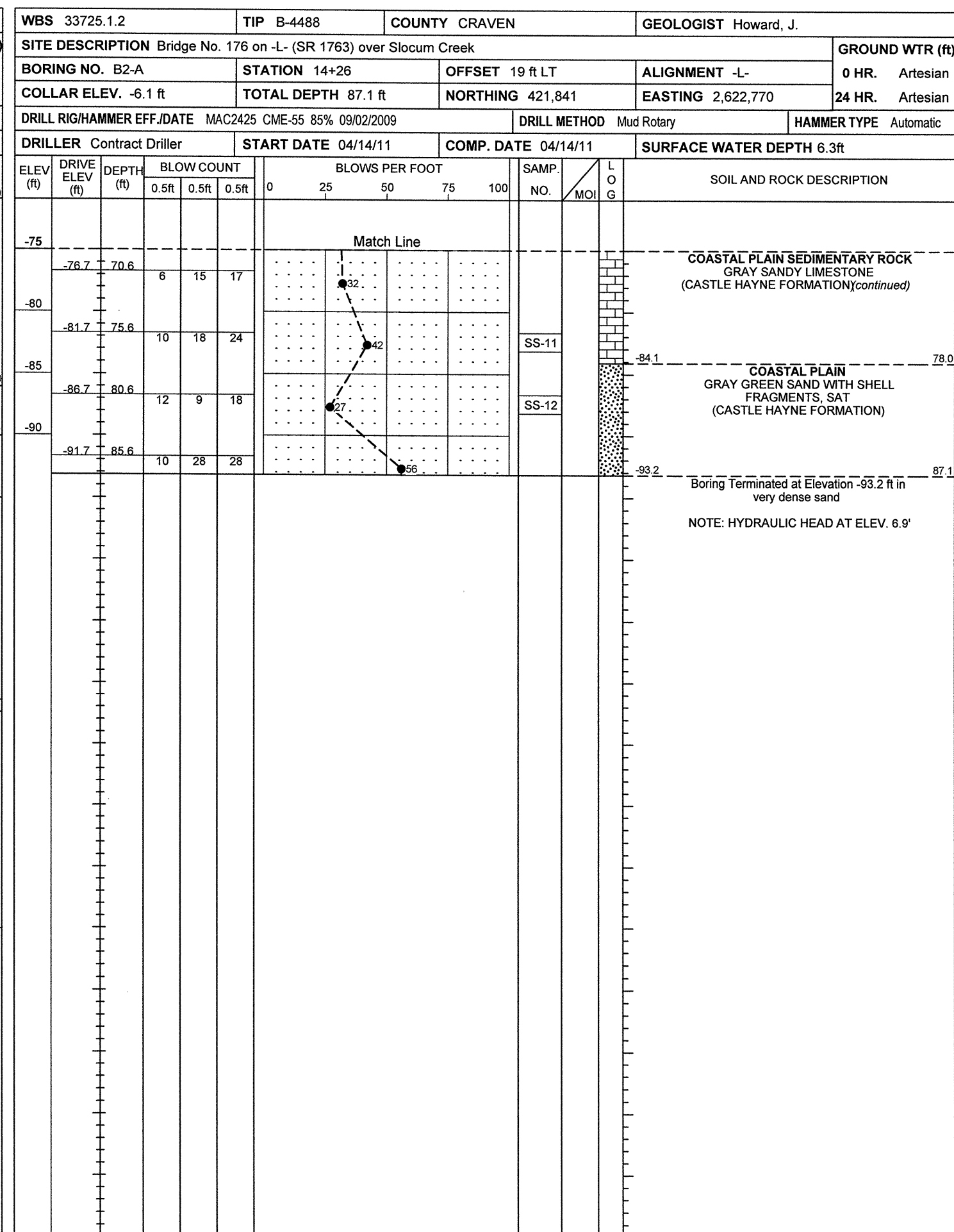
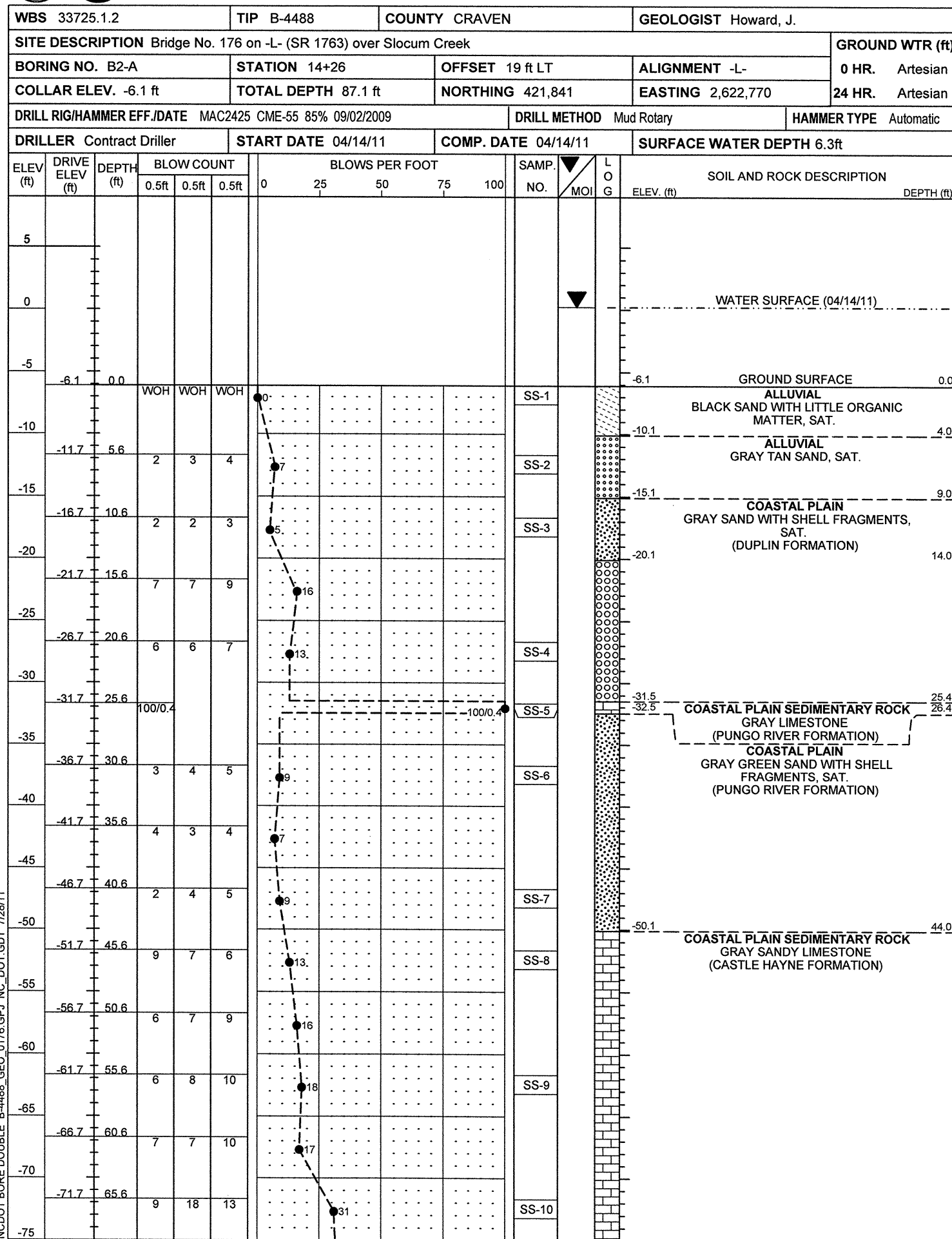


**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**CORE BORING REPORT**

WBS 33725.1.2		TIP B-4488		COUNTY CRAVEN		GEOLOGIST Howard, J.						
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek							GROUND WTR (ft)					
BORING NO. B1-B		STATION 13+72		OFFSET 4 ft RT		ALIGNMENT -L-						
COLLAR ELEV. -5.4 ft		TOTAL DEPTH 101.8 ft		NORTHING 421,866		EASTING 2,622,717						
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 04/18/11		COMP. DATE 04/19/11		SURFACE WATER DEPTH 4.7ft						
CORE SIZE NQ		TOTAL RUN 2.4 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN ROD (%)	SAMP. NO.	STRATA REC. (%)	STRATA ROD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
-36.7	-36.7	31.3	2.4	1:15/1.0	(1.4)	(0.9)					Begin Coring @ 31.3 ft	31.3
-40	-39.1	33.7		3:00/1.0	58%	38%	SS-17				COASTAL PLAIN SEDIMENTARY ROCK GRAY LIMESTONE (PUNGO RIVER FORMATION) COASTAL PLAIN	33.7
-45				N=5								
-45				N=7								
-50				N=8			SS-18				COASTAL PLAIN SEDIMENTARY ROCK COASTAL PLAIN	40.0
-50				N=16								
-55				N=22			SS-19				COASTAL PLAIN SEDIMENTARY ROCK	50.0
-60				N=42								
-65				N=20			SS-20					
-70				N=15								
-75				N=15			SS-21					
-80				N=14								
-85				N=14			SS-22					
-90				N=14								
-90				N=16			SS-23					
-95				N=30								
-100				N=22			SS-24					
-105				N=60/0.1								
											COASTAL PLAIN	90.4
											COASTAL PLAIN SEDIMENTARY ROCK	99.5
											Boring Terminated at Elevation -107.2 ft in hard limestone	101.8
											NOTE: HYDRAULIC HEAD AT ELEV. 6.3'	

WBS 33725.1.2		TIP B-4488		COUNTY CRAVEN		GEOLOGIST Howard, J.						
SITE DESCRIPTION Bridge No. 176 on -L- (SR 1763) over Slocum Creek							GROUND WTR (ft)					
BORING NO. B3-B		STATION 14+75		OFFSET 8 ft RT		ALIGNMENT -L-						
COLLAR ELEV. -3.0 ft		TOTAL DEPTH 85.6 ft		NORTHING 421,787		EASTING 2,622,783						
DRILL RIG/HAMMER EFF./DATE MAC2425 CME-55 85% 09/02/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 04/20/11		COMP. DATE 04/21/11		SURFACE WATER DEPTH 2.6ft						
CORE SIZE NQ		TOTAL RUN 1.4 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN ROD (%)	SAMP. NO.	STRATA REC. (%)	STRATA ROD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
-31.2	-31.2	28.2	1.4	2:00/1.0	(0.9)	(0.6)					Begin Coring @ 28.2 ft	28.2
-35	-32.6	29.6		0:30/0.4	64%	43%	SS-28				COASTAL PLAIN SEDIMENTARY ROCK GRAY LIMESTONE (PUNGO RIVER FORMATION) COASTAL PLAIN	29.6
-40				N=5								
-40				N=40			SS-29					
-45				N=8								
-50				N=44			SS-30				COASTAL PLAIN SEDIMENTARY ROCK	43.0
-55				N=19								
-60				N=26			SS-31					
-65				N=24								
-70				N=17			SS-32					
-75				N=25								
-80				N=23			SS-33					
-85				N=10			SS-34					
-85				N=11								
											COASTAL PLAIN	78.0
											Boring Terminated at Elevation -88.6 ft in medium dense sand	85.6
											NOTE: HYDRAULIC HEAD AT ELEV. 7.1'	

NCDOT CORE DOUBLE B-4488\_GEO\_0176.GPJ NC\_DOT\_GDT\_5/25/11



NCDOT BORE DOUBLE B-4488\_GEO\_0176.GPJ NC\_DOT\_GDT\_7/28/11







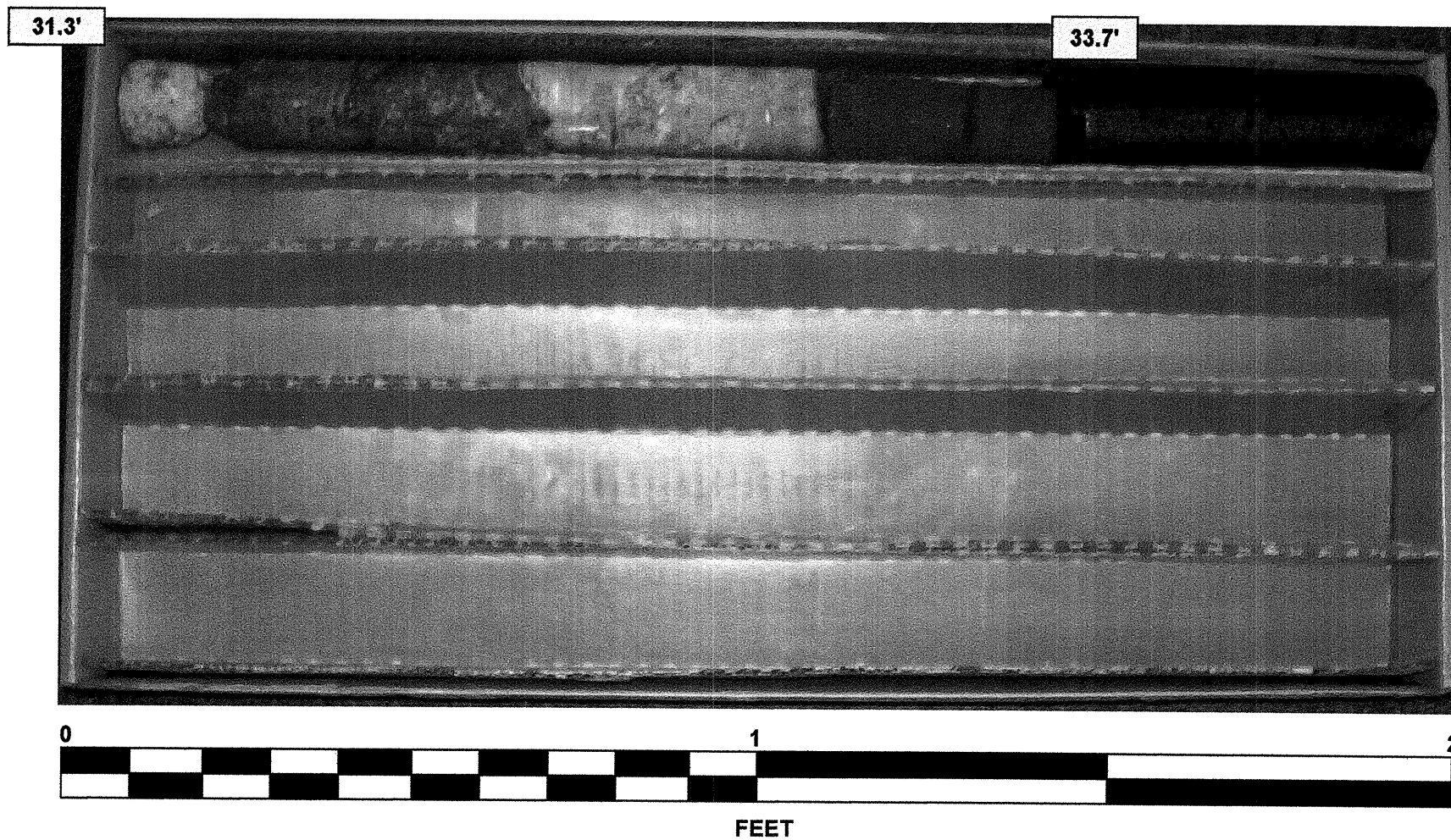








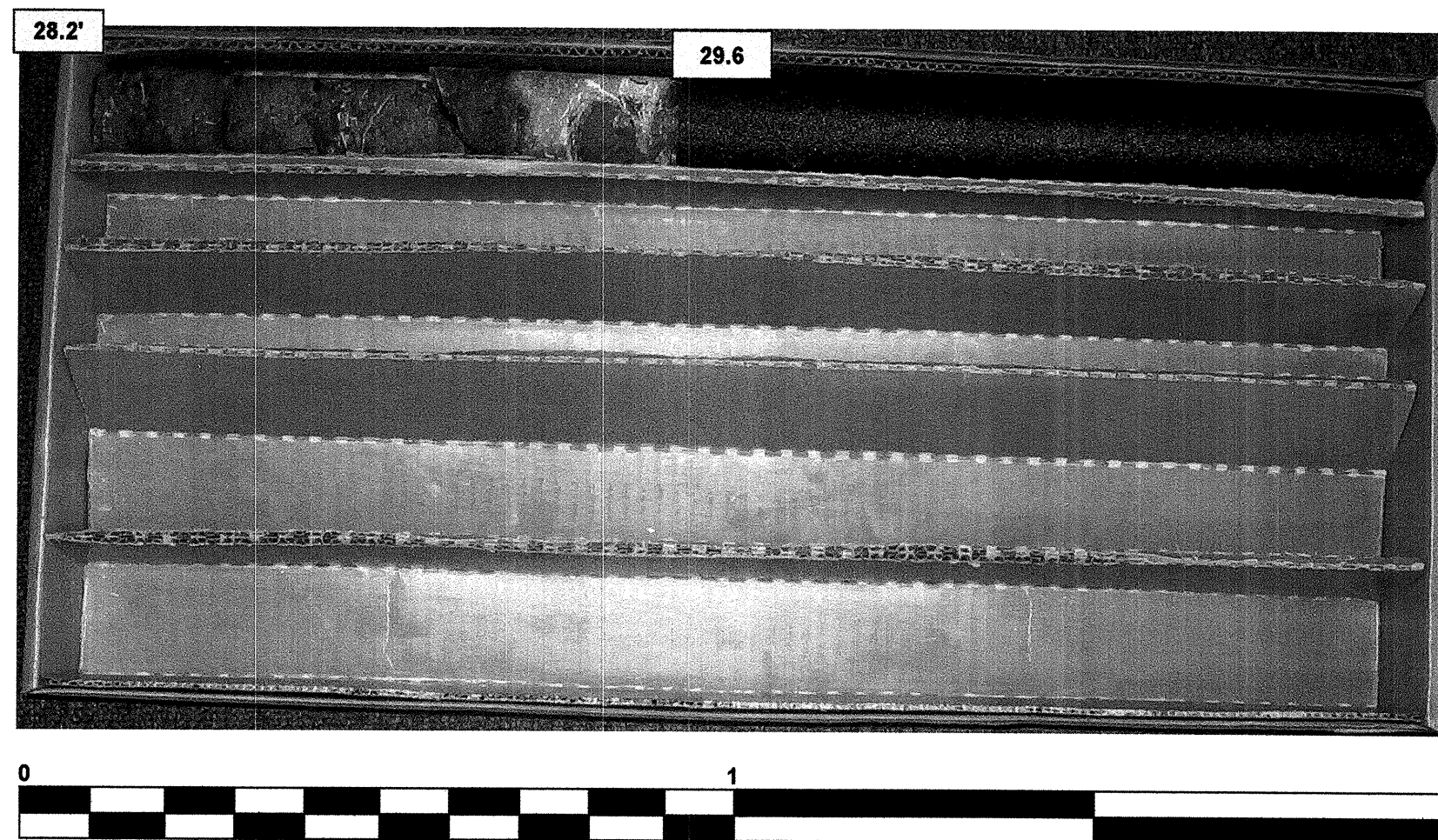
**CORE PHOTOGRAPH**  
**B1-B**  
Box 1 of 1 (31.3' to 33.7')



# CORE PHOTOGRAPH

## B3-B

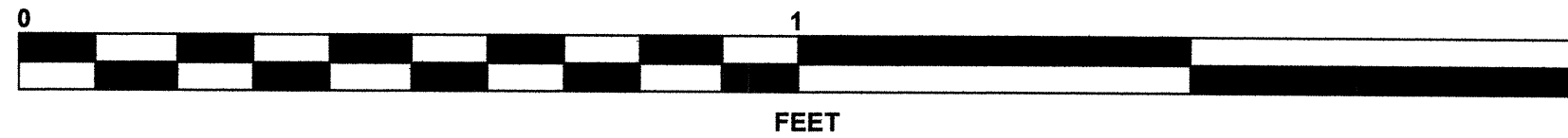
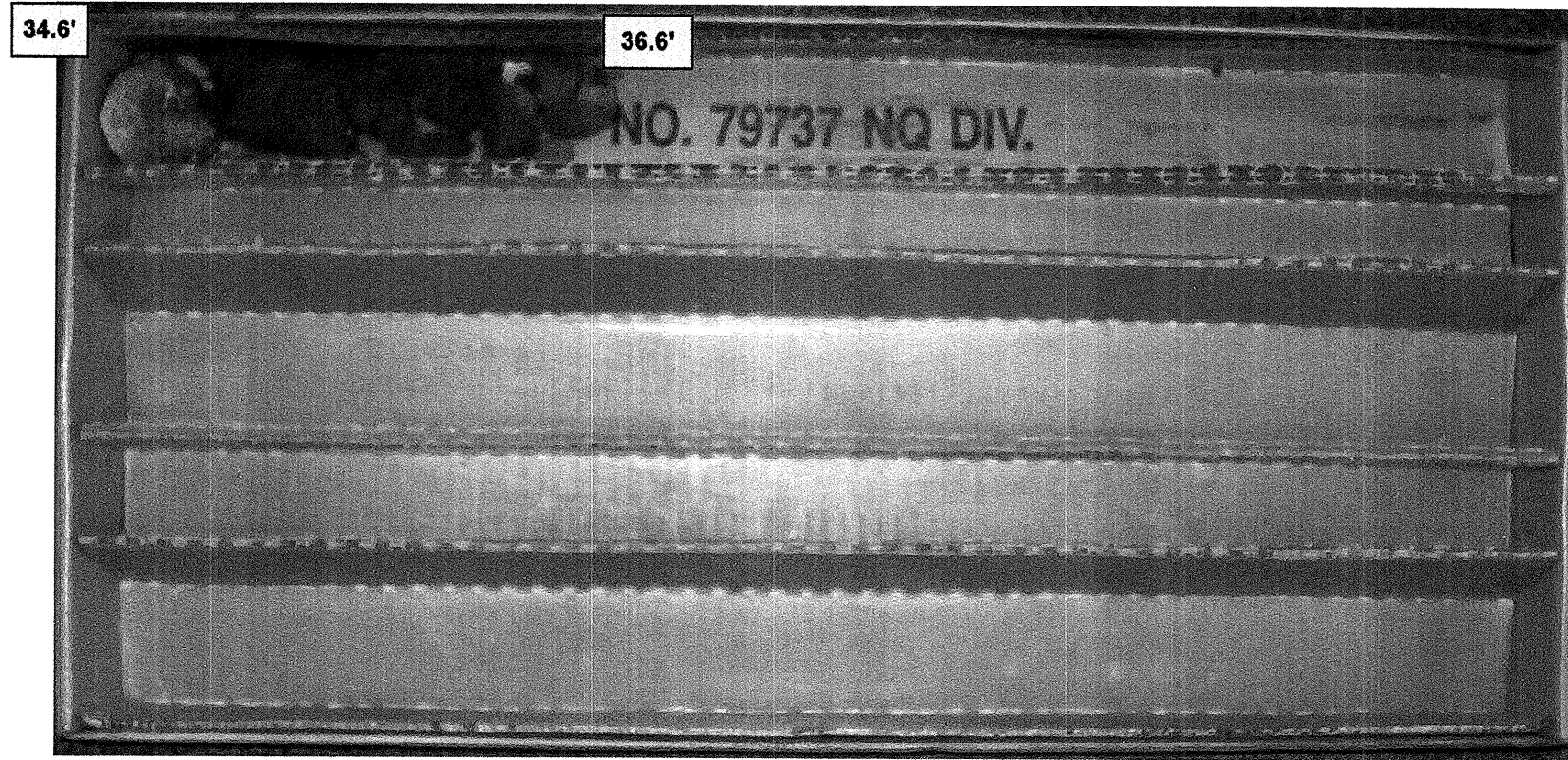
Box 1 of 1 (28.2' to 29.6')



FEET



**CORE PHOTOGRAPH**  
**B5-A**  
Box 1 of 1 (34.6' to 36.6')



33725.1.2  
B-4488

BRIDGE NO. 176 ON SR 1763 (CHURCH RD./MILLER BLVD.) OVER SLOCUM CREEK AT -L- STA. 14+62.00

**EB1-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-74	1 RT	13+04	0.0-1.5	A-2-4(0)	19	NP	29.5	48.2	11.3	11.0	72	60	18	-	-
SS-75	1 RT	13+04	3.8-5.3	A-2-4(0)	18	NP	9.9	72.0	8.0	10.0	100	97	20	-	-
SS-76	1 RT	13+04	13.8-15.3	A-2-4(0)	19	NP	45.2	43.0	5.8	6.0	100	79	13	-	-
SS-77	1 RT	13+04	18.8-20.3	A-3(0)	16	NP	65.3	26.6	4.1	4.0	96	73	9	-	-
SS-78	1 RT	13+04	23.8-25.3	A-1-b(0)	13	NP	82.5	12.7	1.8	3.0	94	37	6	-	-
SS-79	1 RT	13+04	43.8-45.3	A-4(0)	24	NP	5.6	59.9	24.4	10.0	97	93	37	-	-
SS-80	1 RT	13+04	53.8-55.3	A-2-4(0)	18	NP	46.1	29.5	16.4	8.0	83	59	22	-	-
SS-81	1 RT	13+04	63.8-65.3	A-1-b(0)	16	NP	51.6	29.1	14.3	5.0	73	46	16	-	-
SS-82	1 RT	13+04	68.8-70.3	A-2-4(0)	24	NP	11.2	74.7	8.0	6.0	100	94	17	-	-
SS-83	1 RT	13+04	78.8-80.3	A-2-4(0)	26	NP	2.8	85.0	6.2	6.0	100	99	15	-	-
SS-84	1 RT	13+04	93.8-95.3	A-2-4(0)	23	NP	2.7	82.7	8.6	6.0	100	99	18	-	-

**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-13	4 RT	13+72	0.0-1.5	A-2-4(0)	23	NP	18.0	65.1	16.9	0.0	100	97	18	-	4.1
SS-14	4 RT	13+72	11.7-13.2	A-3(0)	18	NP	59.6	39.7	0.7	0.0	100	81	1	-	-
SS-15	4 RT	13+72	16.7-18.2	A-2-4(0)	20	NP	46.2	34.7	8.0	11.1	94	71	21	-	-
SS-16	4 RT	13+72	26.7-28.2	A-1-b(0)	20	NP	82.4	13.8	1.8	2.0	77	29	4	-	-
SS-17	4 RT	13+72	33.7-35.2	A-2-4(0)	25	1	33.7	42.6	10.6	13.1	99	88	24	-	-
SS-18	4 RT	13+72	41.7-43.2	A-2-4(0)	24	NP	2.7	77.2	11.9	8.1	96	94	23	-	-
SS-19	4 RT	13+72	51.7-53.2	A-2-4(0)	21	NP	36.9	44.0	14.1	5.1	84	64	23	-	-
SS-20	4 RT	13+72	61.7-63.2	A-1-b(0)	20	NP	61.1	23.7	11.2	4.0	76	40	15	-	-
SS-21	4 RT	13+72	71.7-73.2	A-1-b(0)	20	NP	85.7	8.9	2.3	3.0	89	27	5	-	-
SS-22	4 RT	13+72	81.7-83.2	A-1-b(0)	18	NP	59.9	20.6	11.4	8.1	52	27	12	-	-
SS-23	4 RT	13+72	86.7-88.2	A-2-4(0)	23	NP	2.5	82.5	7.9	7.1	100	99	18	-	-
SS-24	4 RT	13+72	96.7-98.2	A-2-4(0)	20	NP	41.6	43.0	9.4	6.1	81	60	14	-	-

**B2-A 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-1	19 LT	14+26	0.0-1.5	A-2-5(0)	55	NP	16.1	65.3	14.6	4.0	100	92	22	-	-
SS-2	19 LT	14+26	5.6-7.1	A-3(0)	26	NP	22.5	71.5	5.0	1.0	100	95	6	-	-
SS-3	19 LT	14+26	10.6-12.1	A-2-4(0)	18	NP	38.5	46.0	7.4	8.0	99	94	19	-	-
SS-4	19 LT	14+26	20.6-22.1	A-1-b(0)	19	NP	69.6	22.9	4.4	3.0	84	41	7	-	-
SS-5	19 LT	14+26	25.6-27.1	-	-	-	66.8	22.9	7.2	3.0	74	43	9	-	-
SS-6	19 LT	14+26	30.6-32.1	-	-	-	10.5	58.1	23.4	8.0	88	83	31	-	-
SS-7	19 LT	14+26	40.6-42.1	A-2-4(0)	28	NP	2.0	81.0	11.0	6.0	100	99	20	-	-
SS-8	19 LT	14+26	45.6-47.1	A-1-b(0)	15	NP	81.3	7.4	8.2	3.0	91	34	11	-	-
SS-9	19 LT	14+26	55.6-57.1	A-1-b(0)	17	NP	85.4	7.9	4.6	2.0	89	32	7	-	-
SS-10	19 LT	14+26	65.6-67.1	A-1-b(0)	17	NP	73.3	16.1	8.6	2.0	76	39	9	-	-
SS-11	19 LT	14+26	75.6-77.1	A-1-b(0)	15	NP	80.5	11.3	6.2	2.0	99	50	9	-	-
SS-12	19 LT	14+26	80.6-82.1	A-2-4(0)	21	NP	25.6	60.4	11.0	3.0	100	88	16	-	-

**B3-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-25	8 RT	14+75	4.1-5.6	A-3(0)	29	NP	10.5	83.3	6.2	0.0	100	98	8	-	-
SS-26	8 RT	14+75	14.1-15.6	A-2-4(0)	19	NP	40.7	40.3	7.8	11.1	100	87	23	-	-
SS-27	8 RT	14+75	24.1-25.6	A-1-b(0)	24	NP	80.1	13.3	1.5	5.0	80	28	6	-	-
SS-28	8 RT	14+75	29.6-31.1	A-2-4(0)	25	NP	24.5	50.4	12.1	13.0	98	90	26	-	-
SS-29	8 RT	14+75	34.1-35.6	A-2-4(0)	26	4	3.8	65.2	14.9	16.0	89	87	32	-	-
SS-30	8 RT	14+75	44.1-45.6	A-2-4(0)	20	NP	41.1	31.7	13.1	14.0	81	58	25	-	-
SS-31	8 RT	14+75	54.1-55.6	A-1-b(0)	15	NP	93.0	4.0	1.0	2.0	92	31	3	-	-
SS-32	8 RT	14+75	64.1-65.6	A-1-b(0)	19	NP	87.5	6.1	4.4	2.0	87	22	6	-	-
SS-33	8 RT	14+75	74.1-75.6	A-1-b(0)	16	NP	86.4	6.3	4.3	3.0	89	31	7	-	-
SS-34	8 RT	14+75	79.1-80.6	A-2-4(0)	24	NP	12.3	75.7	5.9	6.0	99	96	14	-	-

5/14/99

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**33725.1.2  
B-4488**

**BRIDGE NO. 176 ON SR 1763 (CHURCH RD./MILLER BLVD.) OVER SLOCUM CREEK AT -L- STA. 14+62.00**

**B4-A 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-48	21 LT	15+45	0.0-1.5	A-2-4(0)	23	NP	15.3	61.2	13.5	10.0	100	97	26	-	7.7
SS-49	21 LT	15+45	8.7-10.2	-	-	-	-	-	-	-	-	-	-	-	17.5
SS-50	21 LT	15+45	13.7-15.2	A-3(0)	22	NP	44.9	51.2	2.9	1.0	99	80	4	-	3.1
SS-51	21 LT	15+45	18.7-20.2	A-3(0)	14	NP	51.4	41.3	4.3	3.0	100	91	9	-	-
SS-52	21 LT	15+45	23.7-25.2	A-3(0)	13	NP	81.9	14.8	2.3	1.0	99	59	4	-	-
SS-53	21 LT	15+45	28.7-30.2	A-1-b(0)	19	NP	73.5	17.4	5.1	4.0	77	32	8	-	-
SS-54	21 LT	15+45	33.7-34.2	A-1-b(0)	17	NP	45.0	33.9	15.1	6.0	59	45	15	-	-
SS-55	21 LT	15+45	38.7-40.2	A-2-4(0)	33	NP	7.4	63.9	18.7	10.0	94	90	30	-	-
SS-56	21 LT	15+45	48.7-50.2	A-2-4(0)	28	NP	1.6	73.1	15.3	10.0	100	99	29	-	-
SS-57	21 LT	15+45	53.7-55.2	A-1-b(0)	17	NP	80.0	10.6	6.3	3.0	81	45	9	-	-
SS-58	21 LT	15+45	63.7-65.2	A-1-b(0)	16	NP	82.5	7.7	5.7	4.0	88	32	10	-	-
SS-59	21 LT	15+45	73.7-75.2	A-1-b(0)	18	NP	82.5	6.6	7.8	3.0	98	49	12	-	-
SS-60	21 LT	15+45	78.7-80.2	A-2-4(0)	22	NP	23.1	57.9	13.0	6.0	93	88	20	-	-
SS-61	21 LT	15+45	88.7-90.2	A-2-4(0)	25	NP	2.3	84.5	9.1	4.0	99	98	15	-	-

**B5-A 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-35	3 LT	15+61	0.0-1.5	A-2-5(0)	42	NP	32.7	50.4	10.8	6.0	95	81	18	-	14.3
SS-36	3 LT	15+61	3.9-5.4	-	-	-	-	-	-	-	-	-	-	-	-
SS-37	3 LT	15+61	13.9-15.4	A-3(0)	18	NP	47.0	51.3	1.7	0.0	100	91	2	-	-
SS-38	3 LT	15+61	18.9-20.4	A-3(0)	16	NP	66.2	26.4	2.4	5.0	100	75	9	-	-
SS-39	3 LT	15+61	28.9-30.4	A-1-b(0)	20	NP	74.9	16.9	3.2	5.0	79	31	8	-	-
SS-40	3 LT	15+61	33.9-34.6	A-2-4(0)	16	NP	41.2	33.1	17.7	8.0	67	53	20	-	-
SS-41	3 LT	15+61	36.6-38.1	A-2-4(0)	29	6	20.6	56.4	10.9	12.0	98	96	24	-	-
SS-42	3 LT	15+61	43.9-45.4	A-2-4(0)	26	NP	1.8	80.3	9.8	8.0	100	99	20	-	-
SS-43	3 LT	15+61	48.9-50.4	A-2-4(0)	17	NP	48.4	25.9	17.7	8.0	81	54	24	-	-
SS-44	3 LT	15+61	53.9-54.3	A-1-b(0)	16	NP	70.3	11.4	10.2	8.0	73	33	15	-	-
SS-45	3 LT	15+61	63.9-65.4	A-1-b(0)	14	NP	78.3	9.2	8.4	4.0	68	27	9	-	-
SS-46	3 LT	15+61	73.9-75.4	A-2-4(0)	23	NP	10.8	76.3	7.8	5.0	100	98	17	-	-
SS-47	3 LT	15+61	83.9-85.4	A-2-4(0)	25	NP	6.1	84.1	5.7	4.0	100	99	11	-	-

**EB2-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-62	7 RT	16+19	0.0-1.5	-	-	-	-	-	-	-	-	-	-	-	28.4
SS-63	7 RT	16+19	7.5-9.0	-	-	-	-	-	-	-	-	-	-	-	16.2
SS-64	7 RT	16+19	13.5-15.0	A-3(0)	18	NP	31.1	65.2	3.7	0.0	100	87	4	-	1.2
SS-65	7 RT	16+19	18.5-20.0	A-3(0)	20	NP	59.6	35.0	3.3	2.0	100	84	6	-	-
SS-66	7 RT	16+19	28.5-30.0	A-1-b(0)	26	NP	74.8	20.0	2.2	3.0	81	28	5	-	-
SS-67	7 RT	16+19	33.2-34.0	A-1-b(0)	22	NP	47.2	27.5	21.3	4.0	57	39	16	-	-
SS-68	7 RT	16+19	34.0-34.7	A-6(4)	33	13	25.7	31.3	24.9	18.1	95	88	42	-	-
SS-69	7 RT	16+19	43.5-45.0	A-2-4(0)	27	NP	2.4	80.7	10.8	6.0	100	100	20	-	-
SS-70	7 RT	16+19	53.5-55.0	A-1-b(0)	17	NP	80.5	8.1	7.4	4.0	82	32	11	-	-
SS-71	7 RT	16+19	63.5-65.0	A-1-b(0)	17	NP	87.5	5.9	3.6	3.0	84	27	6	-	-
SS-72	7 RT	16+19	73.5-75.0	A-1-b(0)	18	NP	84.4	7.0	5.6	3.0	92	47	9	-	-
SS-73	7 RT	16+19	78.5-80.0	A-2-4(0)	23	NP	20.0	64.8	11.1	4.0	100	96	19	-	-

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## FIELD SCOUR REPORT

WBS: 33725.1.2 TIP: B-4488 COUNTY: CRAVEN

DESCRIPTION(1): BRIDGE NO. 176 ON SR 1763 OVER SLOCUM CREEK

### EXISTING BRIDGE

Information from: Field Inspection  Microfilm (reel \_\_\_\_\_ pos: \_\_\_\_\_)  
 Other (explain) BRIDGE DOCUMENT MANAGEMENT SYSTEM

Bridge No.: 176 Length: 116 Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2  
 Foundation Type: REINFORCED CONCRETE FOOTING ON TIMBER PILES  
12' STEEL H PILES IN CRUTCH BENT AT BENT 2

#### EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE NOTED

Interior Bents: 1.5 TO 9 FT. SCOUR POCKETS NOTED AROUND BENT 1  
1.5 TO 3 FT. SCOUR POCKETS NOTED AROUND BENT 2

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

#### EXISTING SCOUR PROTECTION

Type(3): 1) CONCRETE END WALLS 2) RIP RAP ON NORTHWEST CHANNEL BANK

Extent(4): 1) 20' OUTSIDE EDGE OF BRIDGE, BOTH END BENTS 2) 100 FEET

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE NOTED

#### INSTRUCTIONS

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

### DESIGN INFORMATION

Channel Bed Material(7): SAND WITH LITTLE ORGANIC MATTER

Channel Bank Material(8): MUCK AND SAND WITH LITTLE TO MODERATE ORGANIC MATTER

Channel Bank Cover(9): TREES AND SHRUBS

Floodplain Width(10): 400± FEET

Floodplain Cover(11): TREES AND SHRUBS

Stream is(12): Aggrading  Degrading  Static

Channel Migration Tendency(13): NORTH TOWARD END BENT 1

Observations and Other Comments: BENT 2 SUPPORTED BY CRUTCH BENT

#### DESIGN SCOUR ELEVATIONS(14)

Feet  Meters

##### BENTS

B1	B2	B3	B4	B5						
-3.2	-12.8	-9.8	-2.7	-1.0						

Comparison of DSE to Hydraulics Unit theoretical scour:  
 GEOTECHNICAL DSE AGREES WITH THE 100 YR. SCOUR ELEVATION  
 OUTLINED IN THE BSR REPORT DATED 7/26/11

#### SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

See Sheet 18 and 19  
 "Soil Test Results",  
 for samples:  
 CHANNEL BED: SS-1,SS-13  
 CHANNEL BANK: SS-48,SS-49

Reported by: Dean H. Argenbright  
 Dean Argenbright

Date: 4/11/2011