

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33638.1.1 (B-4301)	1	11

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 33638.1.1 (B-4301) F.A. PROJ. BRSTP-1007(9)  
COUNTY WAKE  
PROJECT DESCRIPTION BRIDGE NO. 229 ON -L- (SR 1007) OVER  
POPLAR CREEK AT STA. 21+68.5

**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) 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.

**PROJECT: 33638.1.1 ID: B-4301**

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DATE JULY 2007



DRAWN BY: J. L. PEDRO

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

PROJECT REFERENCE NO. 33638.11(B-4301) SHEET NO. 2

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		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 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 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)			
GROUP CLASS. A-1, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-7-5, A-7-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7		COMPRESSIBILITY		FRESH VERY SLIGHT (V SLI.) SLIGHT (SLI.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SYMBOL		PERCENTAGE OF MATERIAL		MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
% PASSING		ORGANIC MATERIAL		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
LIQUID LIMIT PLASTIC INDEX		TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
GROUP INDEX		GROUND WATER		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
USUAL TYPES OF MAJOR MATERIALS		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		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
GEN. RATING AS A SUBGRADE		MISCELLANEOUS SYMBOLS		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSATISFACTORY		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS >= LL - 30		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
CONSISTENCY OR DENSENESS		ABBREVIATIONS		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
PRIMARY SOIL TYPE		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST V - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
COMPACTNESS OR CONSISTENCY		HI. - 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		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		# - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - UNIT WEIGHT		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )		EQUIPMENT USED ON SUBJECT PROJECT		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30		HAMMER TYPE: AUTOMATIC MANUAL		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4		CORE SIZE: B N H		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
TEXTURE OR GRAIN SIZE		HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
U.S. STD. SIEVE SIZE OPENING (MM)		INDURATION		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
4 10 40 60 200 270		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
4.75 2.00 0.42 0.25 0.075 0.053		FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GRV.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)		ROCK HARDNESS		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
GRAIN SIZE MM 305 IN. 12		VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SOIL MOISTURE - CORRELATION OF TERMS		FRACURE SPACING		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		TERM SPACING		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
FIELD MOISTURE DESCRIPTION		TERM THICKNESS		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
GUIDE FOR FIELD MOISTURE DESCRIPTION		BEDDING		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SATURATED - (SAT.) WET - (W) MOIST - (M) DRY - (D)		VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		BENCH MARK: BL-102 at -L- Sta. 22+00.76, 18.55' LT		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		ELEVATION: 184.10 FT.		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
SOLID; AT OR NEAR OPTIMUM MOISTURE		NOTES:		SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
PLASTICITY				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
PLASTICITY INDEX (PI)				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
DRY STRENGTH				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
VERY LOW SLIGHT MEDIUM HIGH				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
COLOR				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			
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.				SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			

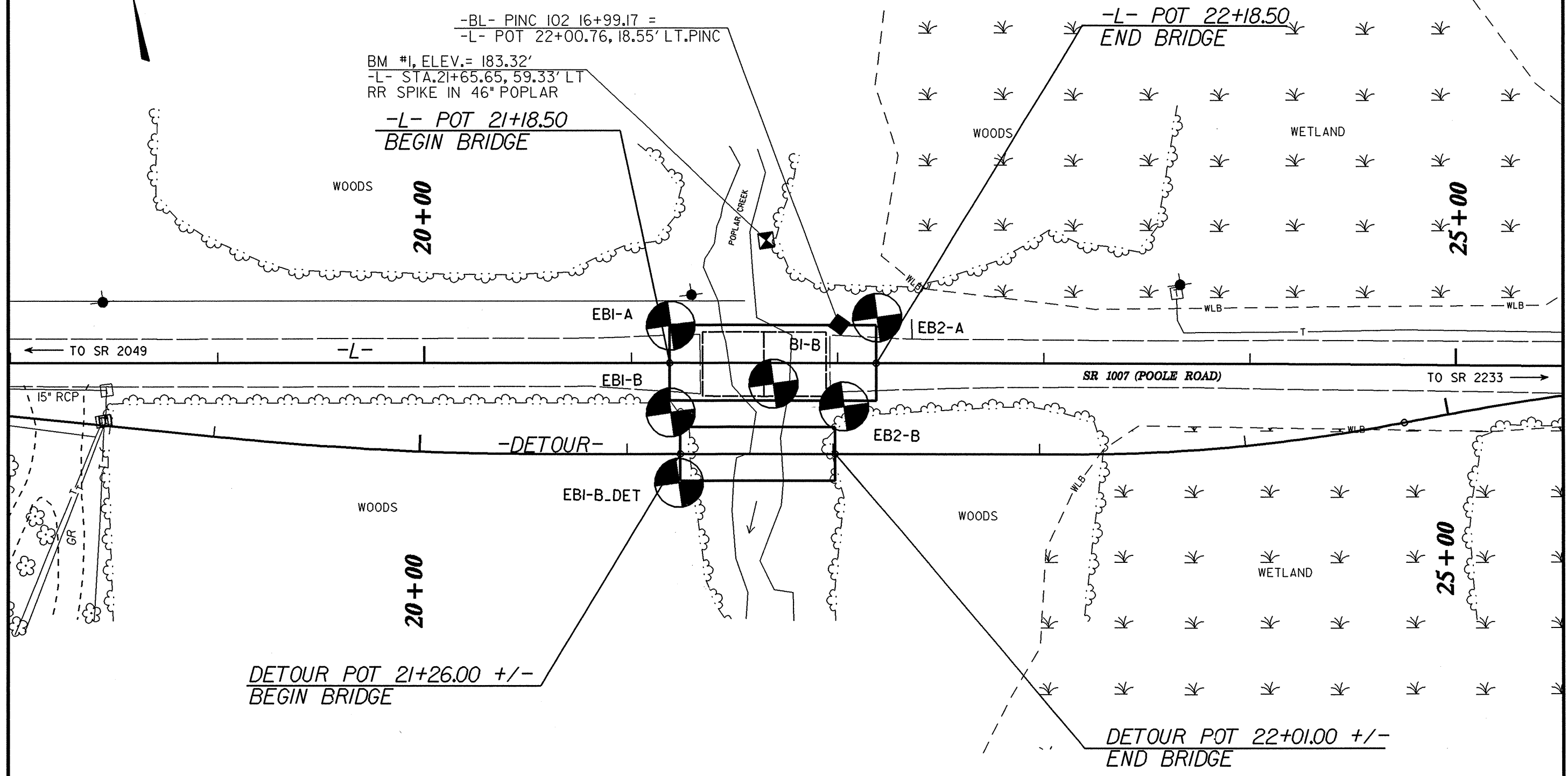
SKEW ANGLE = 90



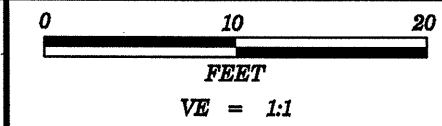
-BL- PINC 102 16+99.17 =  
 -L- POT 22+00.76, 18.55' LT.PINC  
 BM #1, ELEV.= 183.32'  
 -L- STA.21+65.65, 59.33' LT  
 RR SPIKE IN 46" POPLAR

-L- POT 21+18.50  
 BEGIN BRIDGE

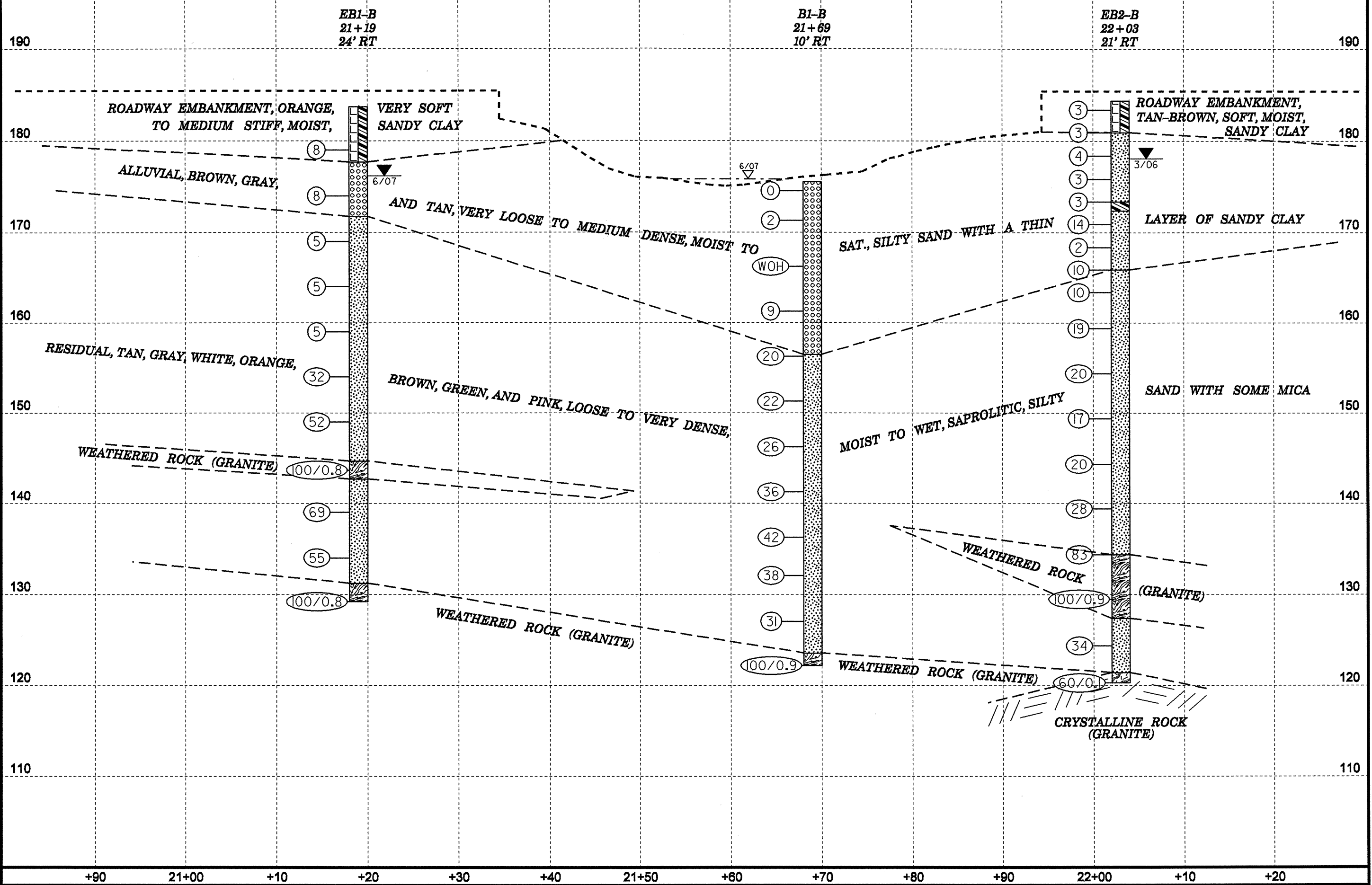
-L- POT 22+18.50  
 END BRIDGE

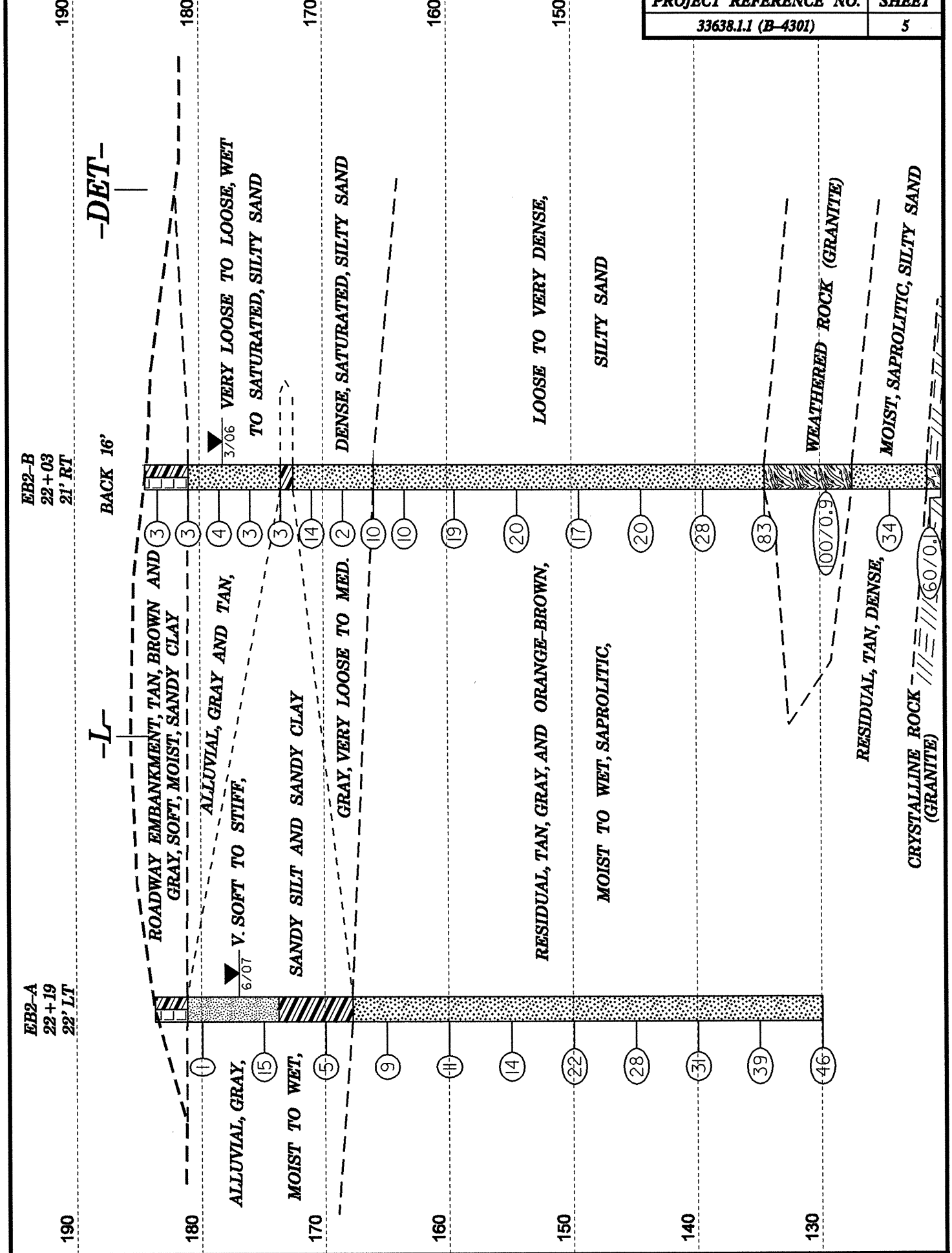
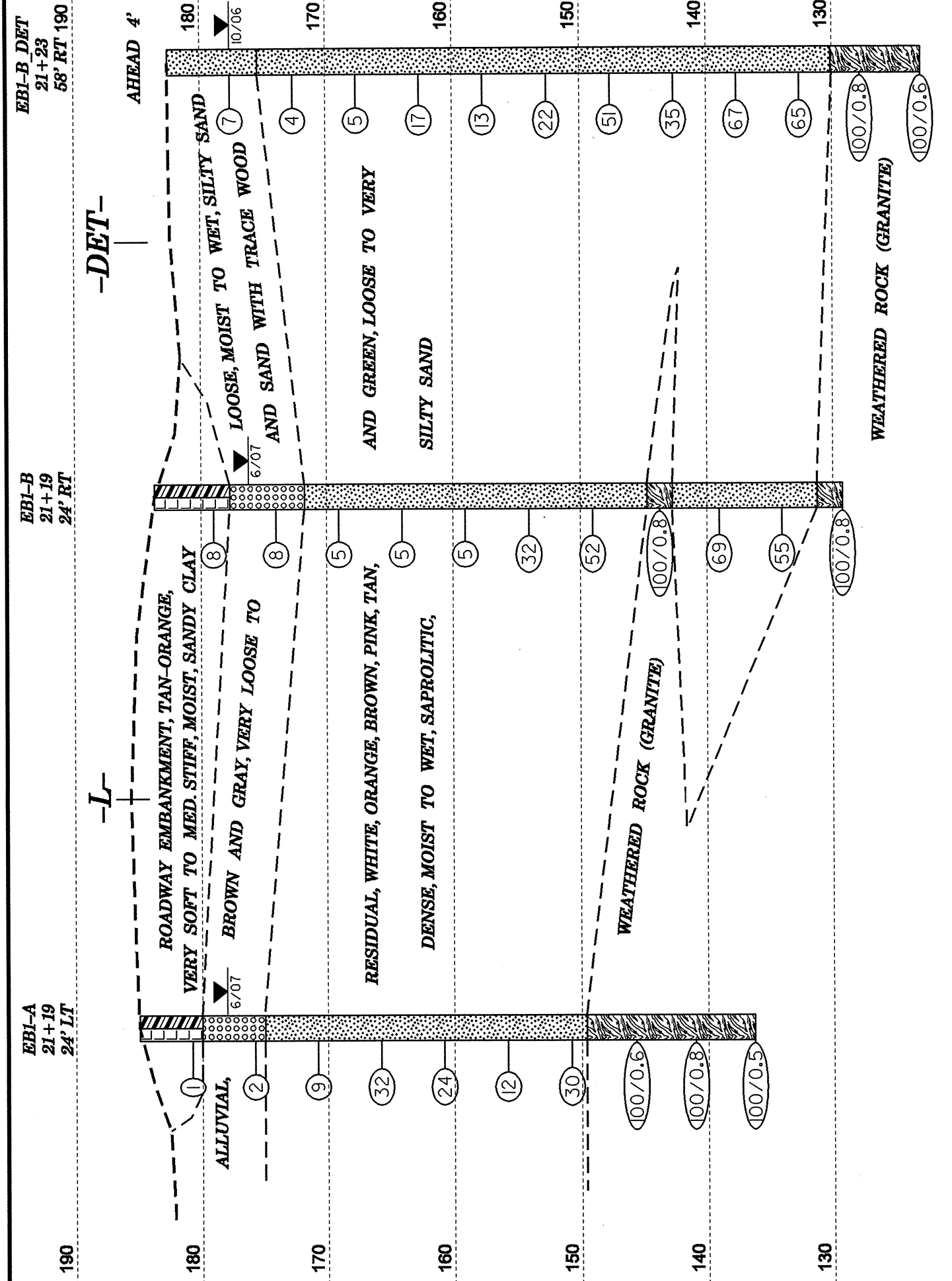


# FENCE DIAGRAM WITH BORINGS PROJECTED ALONG -L-



PROJECT REFERENCE NO.	SHEET
33638.1.I (B-4301)	4





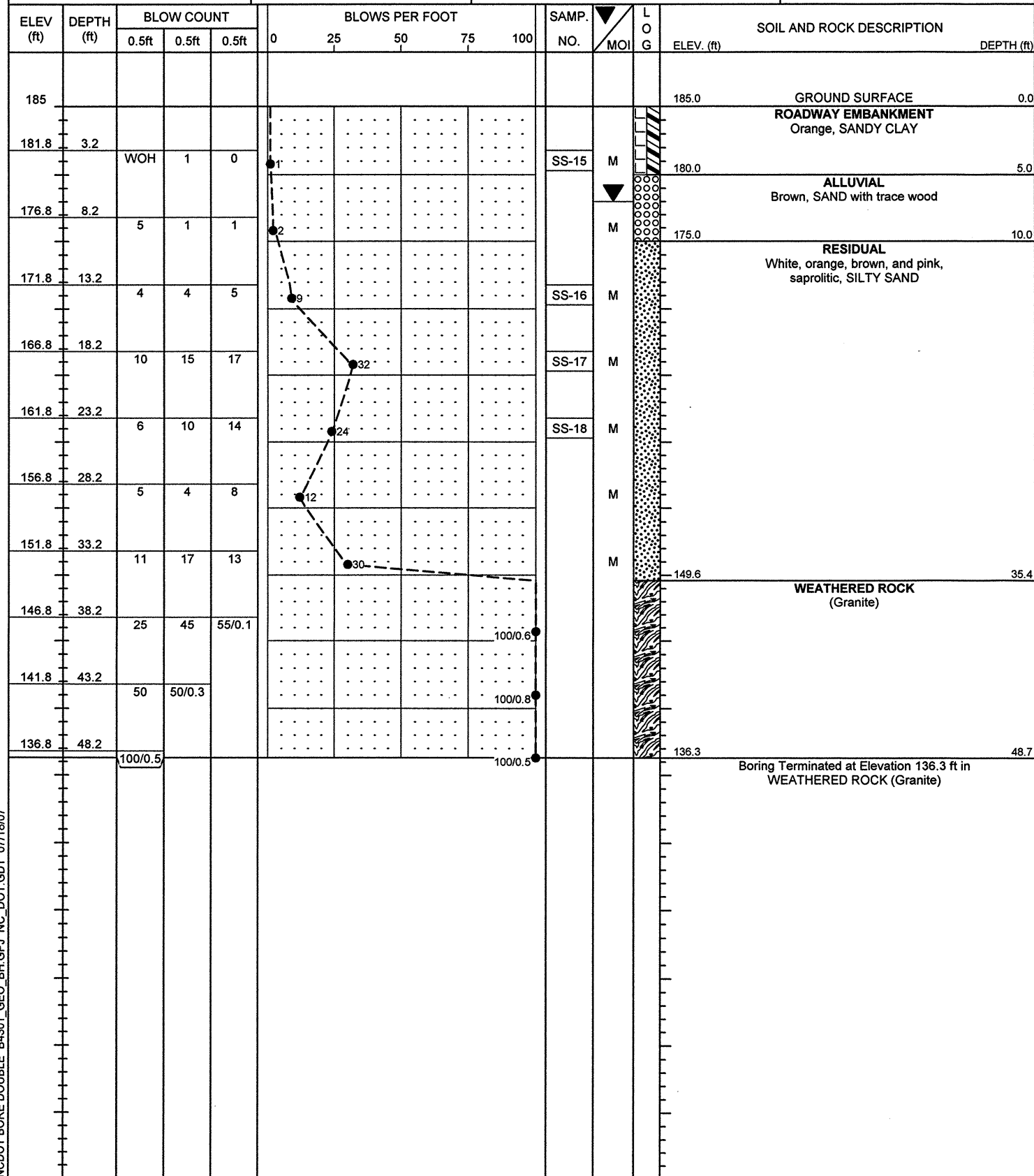
HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1 CROSS SECTION THROUGH END BENT 1

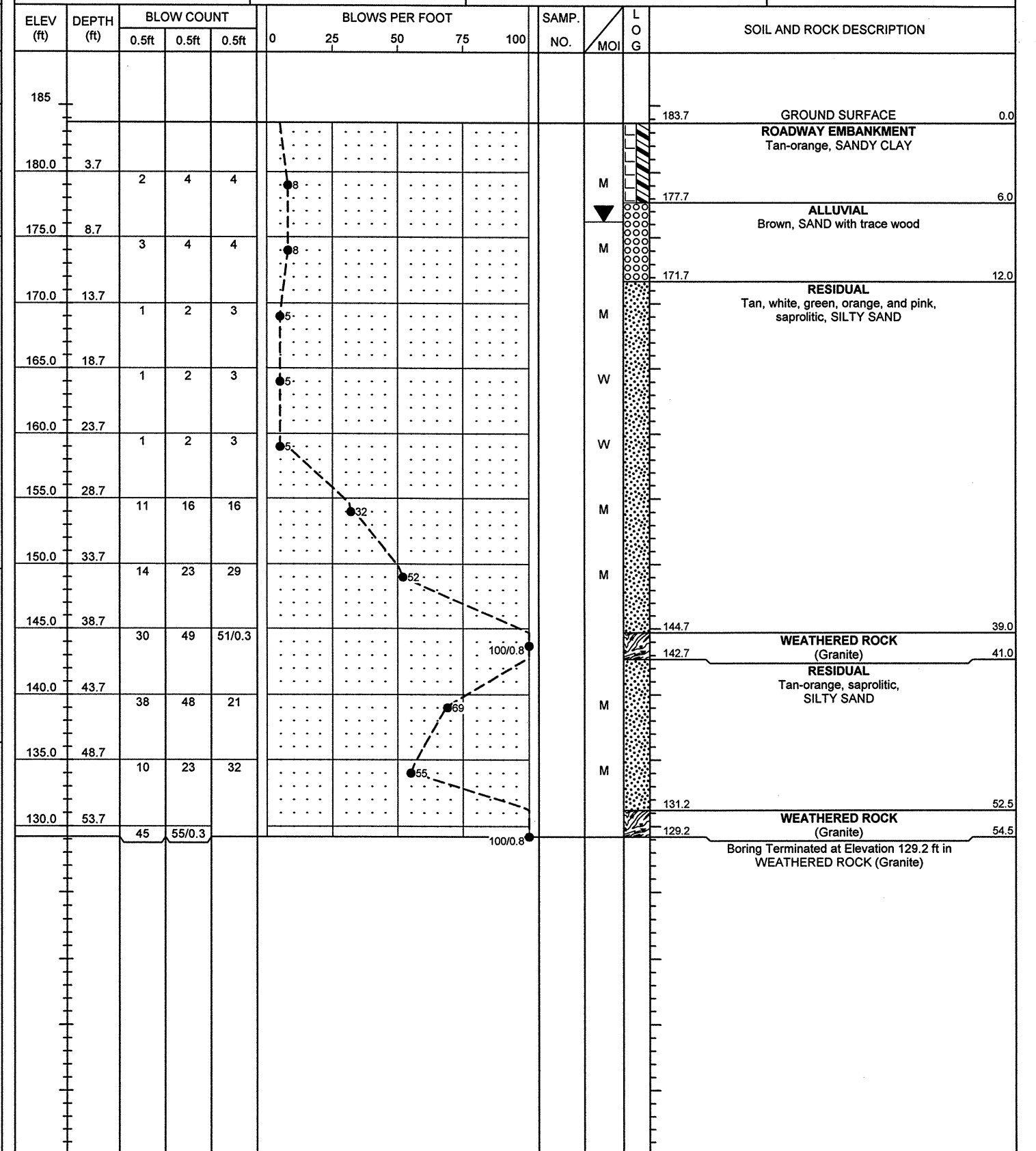
HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1 CROSS SECTION THROUGH END BENT 2

PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 21+19	OFFSET 18ft LT	ALIGNMENT -L-
COLLAR ELEV. 185.0 ft	TOTAL DEPTH 48.7 ft	NORTHING 727,876	EASTING 2,158,454
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/21/07	COMP. DATE 06/21/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Milkovits, J. I.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION 21+19	OFFSET 24ft RT	ALIGNMENT -L-
COLLAR ELEV. 183.7 ft	TOTAL DEPTH 54.5 ft	NORTHING 727,835	EASTING 2,158,448
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/26/07	COMP. DATE 06/26/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

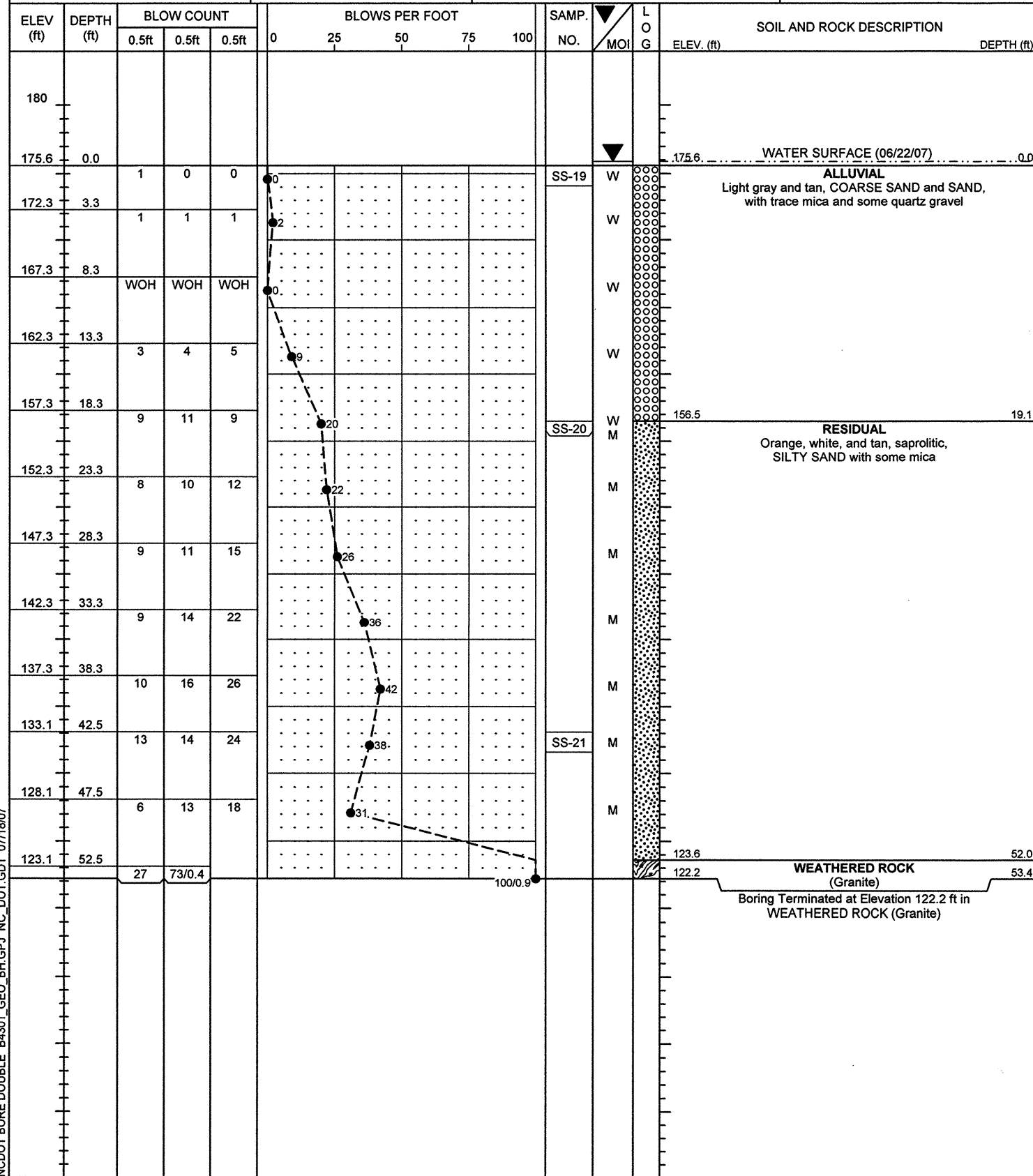


NCDOT BORE DOUBLE B4301\_GEO\_BH.GPJ NC\_DOT.GDT 07/19/07

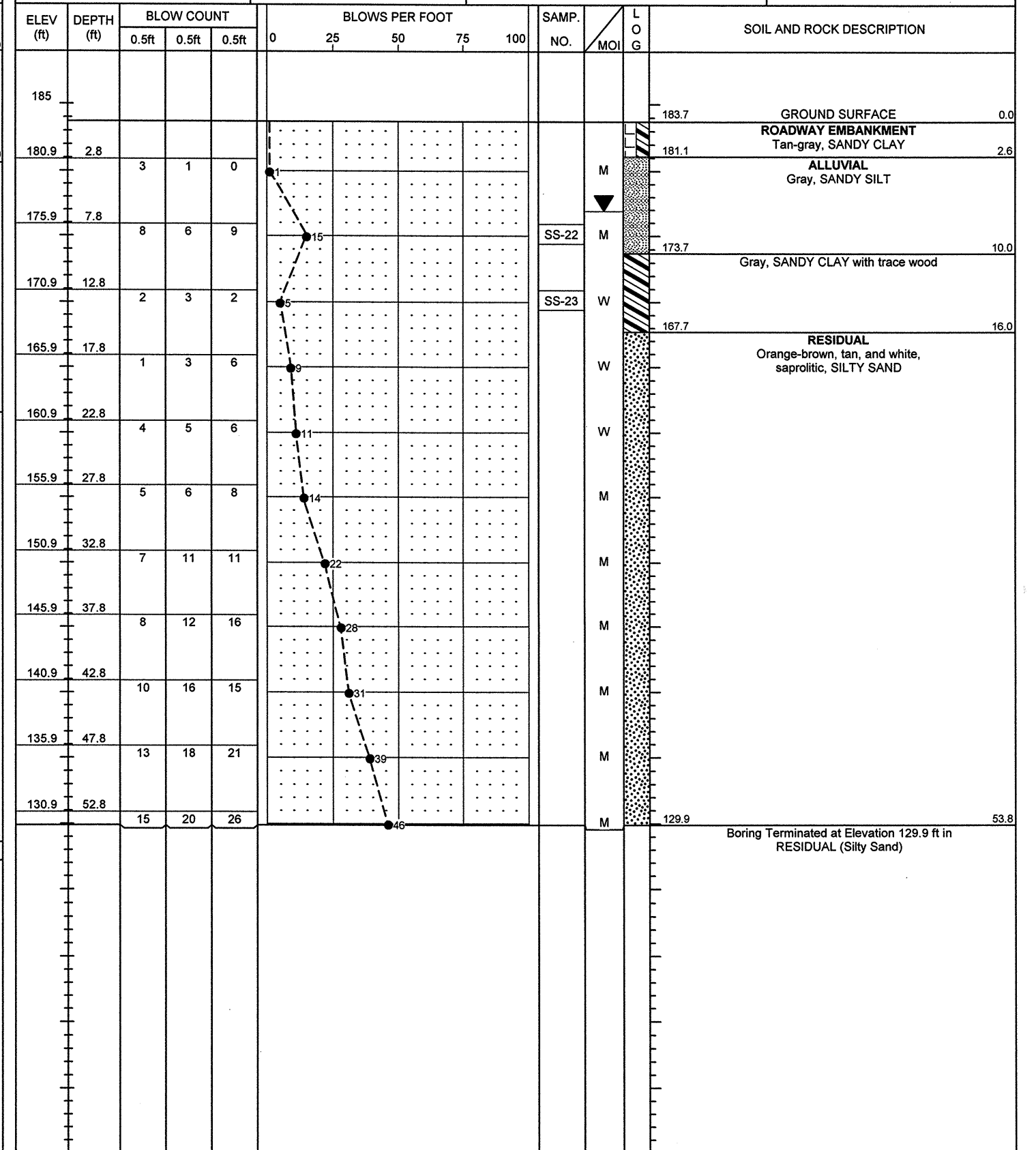


**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. B1-B	STATION 21+69	OFFSET 10ft RT	ALIGNMENT -L-
COLLAR ELEV. 175.6 ft	TOTAL DEPTH 53.4 ft	NORTHING 727,842	EASTING 2,158,500
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 06/22/07	COMP. DATE 06/22/07	SURFACE WATER DEPTH 0.3ft	DEPTH TO ROCK N/A



PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Milkovits, J. I.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION 22+19	OFFSET 22ft LT	ALIGNMENT -L-
COLLAR ELEV. 183.7 ft	TOTAL DEPTH 53.8 ft	NORTHING 727,867	EASTING 2,158,553
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/25/07	COMP. DATE 06/25/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



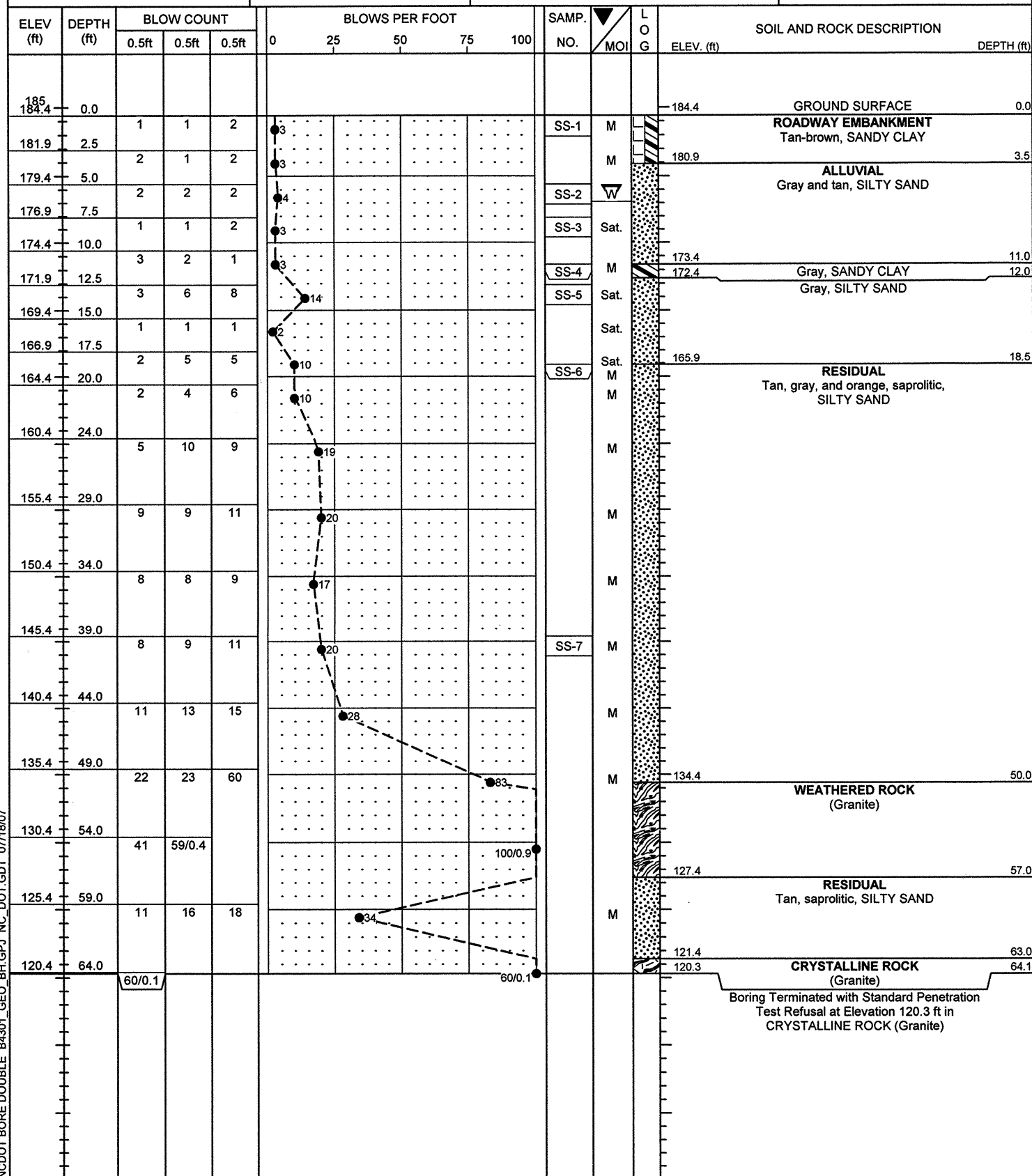
NCDOT BORE DOUBLE B4301\_GEO\_BH.GPJ\_NC\_DOT.GDT\_07/18/07



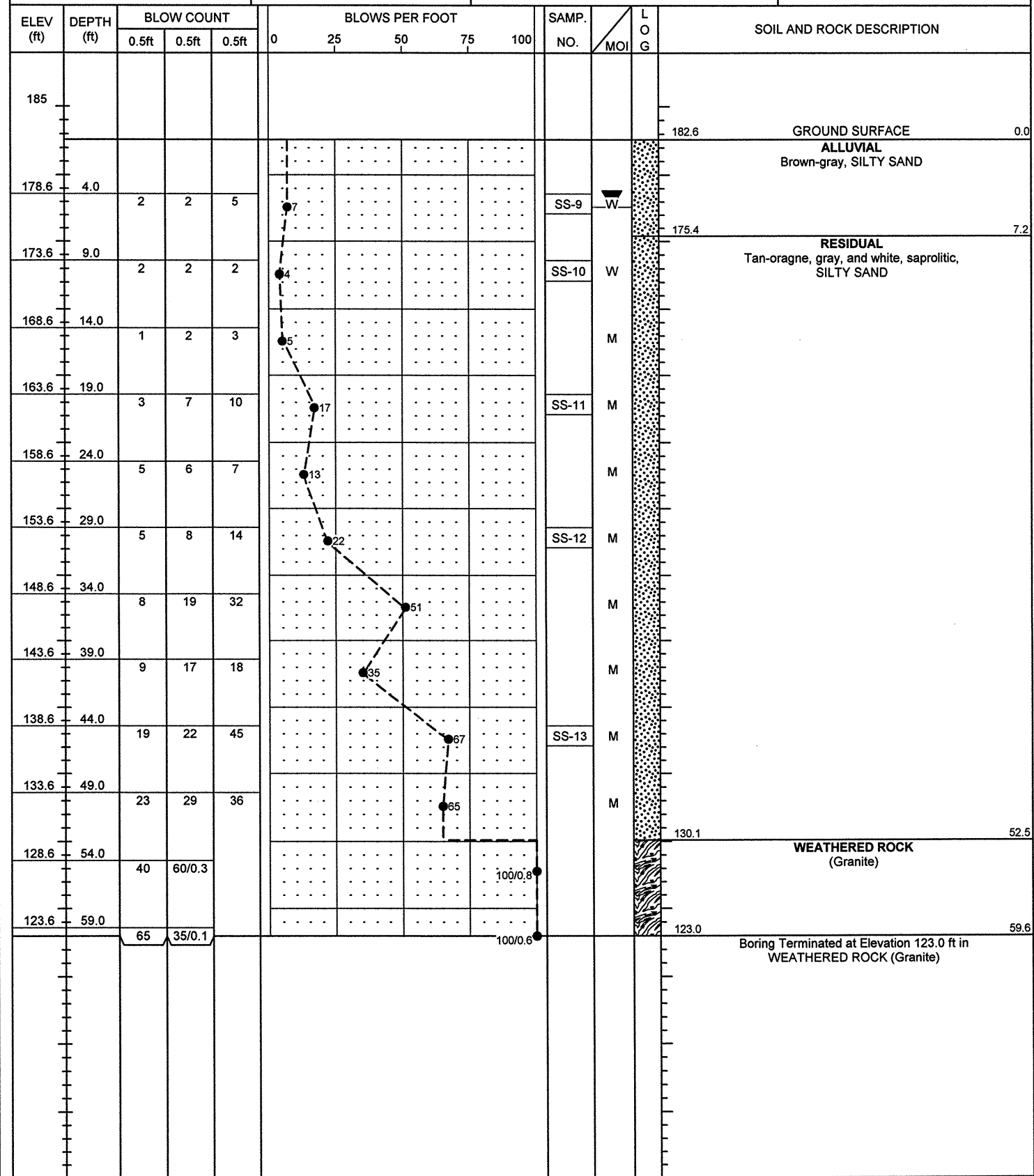
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 22+03	OFFSET 21ft RT	ALIGNMENT -L-
COLLAR ELEV. 184.4 ft	TOTAL DEPTH 64.1 ft	NORTHING 727,826	EASTING 2,158,532
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/14/06	COMP. DATE 03/14/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 63.0 ft



PROJECT NO. 33638.1.1	ID. B-4301	COUNTY Wake	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION Bridge No. 229 on -L- (SR 1007) over Poplar Creek			GROUND WTR (ft)
BORING NO. EB1-B_Det	STATION 21+23	OFFSET 58ft RT	ALIGNMENT -L-
COLLAR ELEV. 182.6 ft	TOTAL DEPTH 59.6 ft	NORTHING 727,800	EASTING 2,158,447
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 10/11/06	COMP. DATE 10/11/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4301\_GEO\_BH.GPJ NC\_DOT.GDT 07/18/07



**EB1-A**

<b>SOIL TEST RESULTS</b>															
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-15	18 LT	21+19	3.2-4.7	A-6(5)	38	15	22.4	28.6	16.9	32.0	95	80	53	-	-
SS-16	18 LT	21+19	13.2-14.7	A-2-4(0)	36	4	50.8	24.3	14.9	10.0	93	55	28	-	-
SS-17	18 LT	21+19	18.2-19.7	A-2-4(0)	33	3	52.6	23.9	13.5	10.0	97	58	27	-	-
SS-18	18 LT	21+19	23.2-24.7	A-2-4(0)	31	4	48.2	22.5	15.3	14.1	90	57	31	-	-

**B1-B**

<b>SOIL TEST RESULTS</b>															
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-19	10 RT	21+69	0.0-1.5	A-1-b(0)	40	NP	85.9	11.4	0.6	2.0	81	25	3	-	-
SS-20	10 RT	21+69	19.1-19.8	A-1-b(0)	27	NP	57.4	23.7	10.8	8.0	95	50	23	-	-
SS-21	10 RT	21+69	42.5-44.0	A-2-4(0)	32	NP	50.8	32.1	11.0	6.0	96	62	21	-	-

**EB2-A**

<b>SOIL TEST RESULTS</b>															
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-22	22 LT	22+19	7.8-9.3	A-4(0)	19	NP	13.7	56.4	13.9	16.1	100	98	38	-	-
SS-23	22 LT	22+19	12.8-14.3	A-6(8)	33	14	4.0	34.5	27.3	34.1	100	98	70	-	-

**EB2-B**

<b>SOIL TEST RESULTS</b>															
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	21 RT	22+03	0.0-1.5	A-6(2)	30	13	41.7	20.1	14.0	24.2	96	66	40	-	-
SS-2	21 RT	22+03	5.0-6.5	A-2-4(0)	21	4	51.5	25.7	10.8	12.1	97	65	25	-	-
SS-3	21 RT	22+03	7.5-9.0	A-2-4(0)	22	NP	32.8	44.7	16.4	6.0	97	78	29	-	-
SS-4	21 RT	22+03	11.0-11.5	A-6(9)	32	16	9.7	24.8	27.3	38.3	99	94	72	-	-
SS-5	21 RT	22+03	12.5-14.0	A-2-4(0)	21	NP	64.5	23.0	6.5	6.0	95	53	14	-	-
SS-6	21 RT	22+03	18.5-19.0	A-2-4(0)	34	NP	58.8	23.8	15.4	2.0	99	56	21	-	-
SS-7	21 RT	22+03	39.0-40.5	A-2-4(0)	32	NP	53.6	27.4	17.0	2.0	99	61	23	-	-

**EB1-B -Detour-**

<b>SOIL TEST RESULTS</b>															
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-9	58 RT	21+23	4.0-5.5	A-2-4(0)	20	3	56.7	18.1	9.1	16.1	100	66	27	-	-
SS-10	58 RT	21+23	9.0-10.5	A-2-4(0)	29	NP	47.2	31.6	13.2	8.0	100	71	26	-	-
SS-11	58 RT	21+23	19.0-20.5	A-2-4(0)	26	NP	51.5	29.3	13.2	6.0	100	65	25	-	-
SS-12	58 RT	21+23	29.0-30.5	A-2-4(0)	29	NP	52.1	30.2	11.8	6.0	100	65	22	-	-
SS-13	58 RT	21+23	44.0-45.5	A-2-4(0)	30	NP	56.7	25.1	10.2	8.0	100	55	23	-	-



**FIELD  
 SCOUR REPORT**

WBS: 33638.1.1 TIP: B-4301 COUNTY: Wake

DESCRIPTION(1): Bridge No. 229 on -L- (SR 1007) over Poplar Creek at Sta. 21+68.5

**EXISTING BRIDGE**

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

Bridge No.: 229 Length: 60 Total Bents: 3 Bents in Channel: 1 Bents in Floodplain: 2  
 Foundation Type: Timber Piles

**EVIDENCE OF SCOUR(2)**

Abutments or End Bent Slopes: Large scour hole is present between the existing and previous wing walls

Interior Bents: None visible

Channel Bed: None visible

Channel Bank: None

**EXISTING SCOUR PROTECTION**

Type(3): Wing walls

Extent(4): 35'L x 8'H

Effectiveness(5): Effective

Obstructions(6): Beaver dam 125' upstream, several large trees in and across stream both up and downstream

**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): Alluvial, gray, very loose, coarse sand and gravel with some wood debris (SS-19)

Channel Bank Material(8): Residual, white and orange-brown, loose to dense, saprolitic, silty sand (SS-16)

Channel Bank Cover(9): Grass, trees and brush

Floodplain Width(10): 200-300 feet

Floodplain Cover(11): Grass, trees and brush

Stream is(12): Aggrading \_\_\_\_\_ Degrading  Static \_\_\_\_\_

Channel Migration Tend.(13): West towards End Bent 1

Observations and Other Comments: \_\_\_\_\_

**DESIGN SCOUR ELEVATIONS(14)**

Feet  Meters \_\_\_\_\_

BENT 1 = 162.2

Comparison of DSE to Hydraulics Unit theoretical scour:  
 The Geotechnical Engineering Unit agrees with the Hydraulic Unit's theoretical scour elevation.

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

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

See Sheet 9,  
 "Soil Test Results",  
 for samples:  
 SS-19 (Bed)  
 SS-16 (Bank)

Reported by: Jaime Love Pedro Date: 4/3/2007  
 Jaime Love Pedro

# SITE PHOTOGRAPH

Bridge No. 229 on -L- (SR 1007) over Poplar Creek

