

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	33824.1.1(B-4664)	1	14

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33824.1.1(B-4664) F.A. PROJ. BRZ-1206(5)
COUNTY WARREN
PROJECT DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER
SMITH CREEK AT -L- STATION 15+31.00

INVENTORY

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CAUTION NOTICE

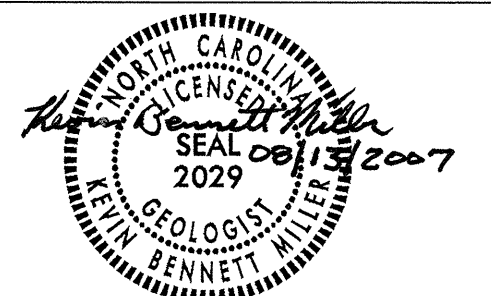
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALPHIGH BY CONTACTING 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.

PERSONNEL
Y. KUNTUKOVA
H.R. CONLEY
D.W. DIXON

INVESTIGATED BY K.B. MILLER
CHECKED BY N.T. ROBERSON
SUBMITTED BY N.T. ROBERSON
DATE AUGUST 2007



PROJECT: 33824.1.1 ID: B-4664

DRAWN BY: 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.

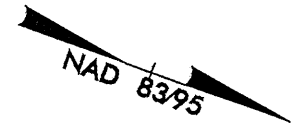
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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 (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:</p> <p><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>ANGULARITY OF GRAINS 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 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS 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 DISLOGGED 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 (N 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.</p>																																																																																																							
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="2">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> <td>≤ 4</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </tbody> </table>			GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p>WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SLI) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL 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 > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>	
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<p>TEXTURE OR GRAIN SIZE</p> <table border="1"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> </thead> <tbody> <tr> <td>GRAIN SIZE MM</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		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	305	75	2.0	0.25	0.05	0.005	IN.	12	3					<p>ABBREVIATIONS</p> <p>AR - AUGER REFUSAL BL - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST ○ - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS</p> <p>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</p> <p># - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED ? - DRY UNIT WEIGHT ? - UNIT WEIGHT</p>																																																																								
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<p>COLOR</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>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																																																											
<p>BENCH MARK: BM *501-L- STATION 16+40.95, 37.93' RIGHT</p> <p>ELEVATION: 251.45 FT.</p>		<p>NOTES:</p>																																																																																																											



PROPERTY LINE IS CENTER SMITH CREEK
BEARING AND DIST. FOR PARCEL 4
ALONG SMITH CREEK
PER DB 370 PG 165

End TIP Project B-4664
Sta. 19+35.00 -L-

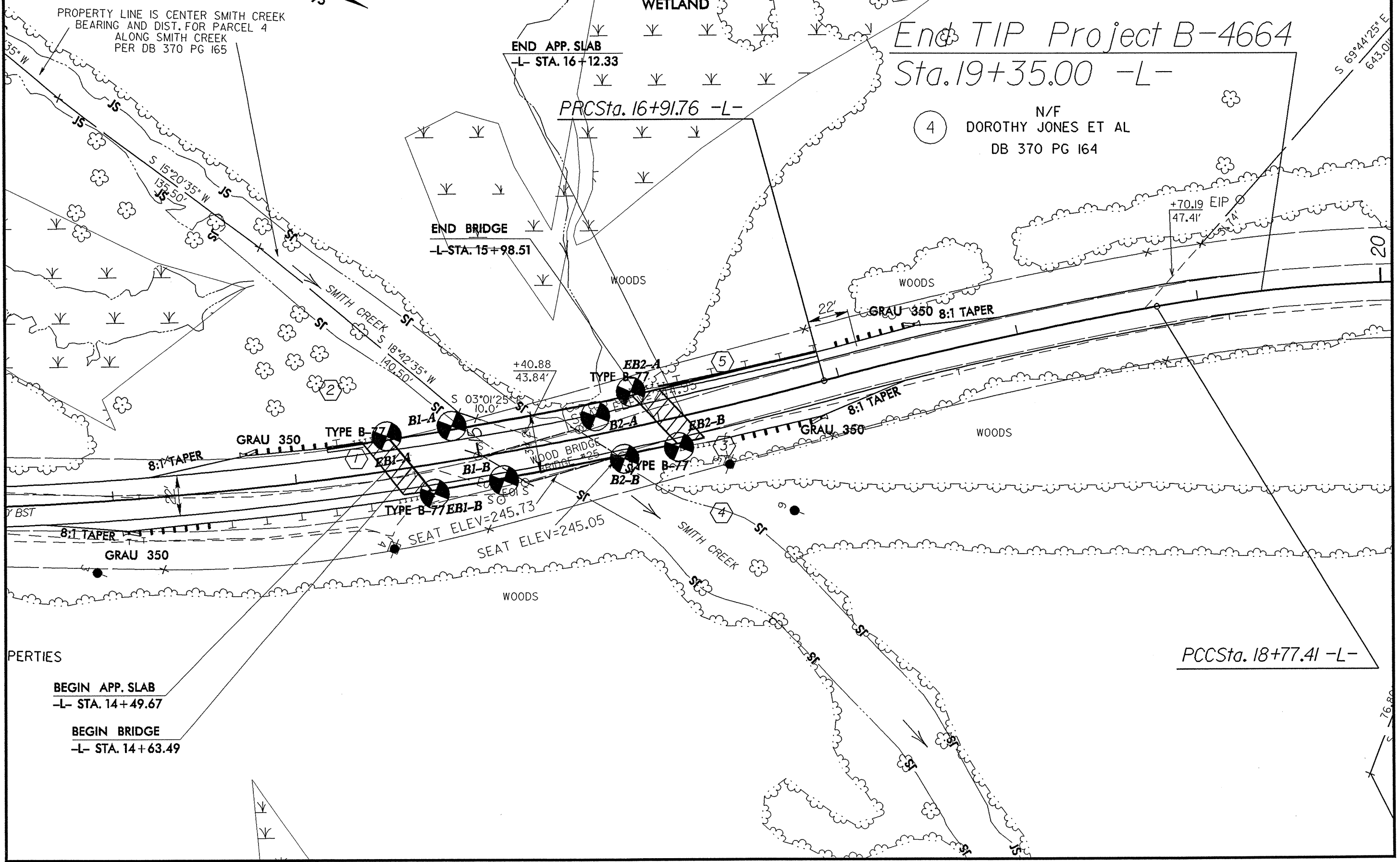
(4) N/F
DOROTHY JONES ET AL
DB 370 PG 164

END APP. SLAB
-L- STA. 16+12.33

PRC Sta. 16+91.76 -L-

END BRIDGE
-L- STA. 15+98.51

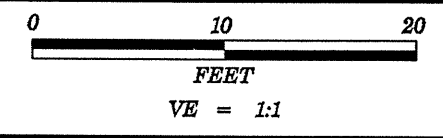
+70.19 EIP
47.41'



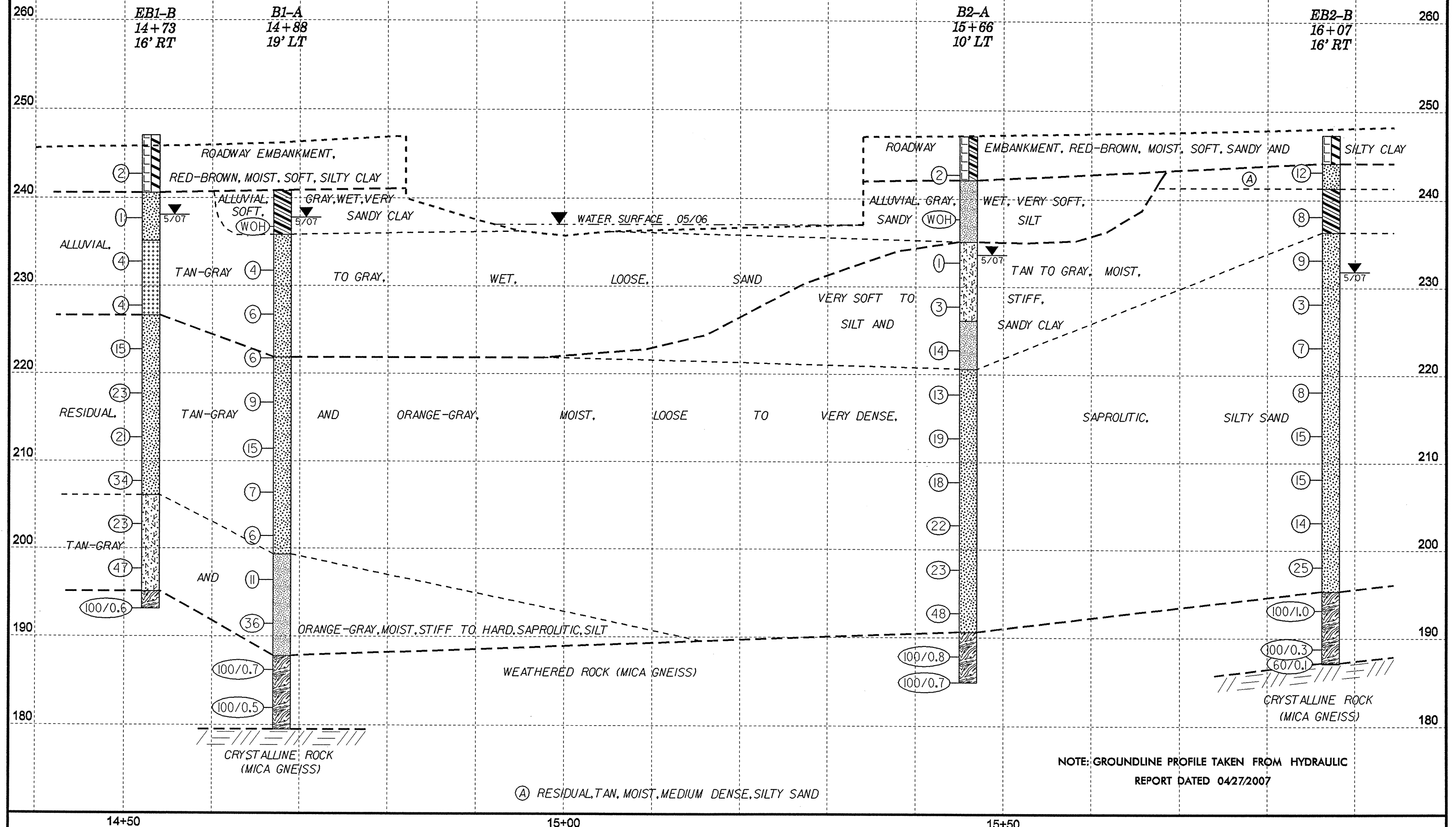
BEGIN APP. SLAB
-L- STA. 14+49.67

BEGIN BRIDGE
-L- STA. 14+63.49

PCC Sta. 18+77.41 -L-



PROJECT REFERENCE NO.	SHEET
33824.1.1(B-4664)	4
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L-	



NOTE: GROUNDLINE PROFILE TAKEN FROM HYDRAULIC REPORT DATED 04/27/2007

E1-A
14+52
19' LT

E1-B
14+73
16' RT

250

240

230

220

210

200

190

250

240

230

220

210

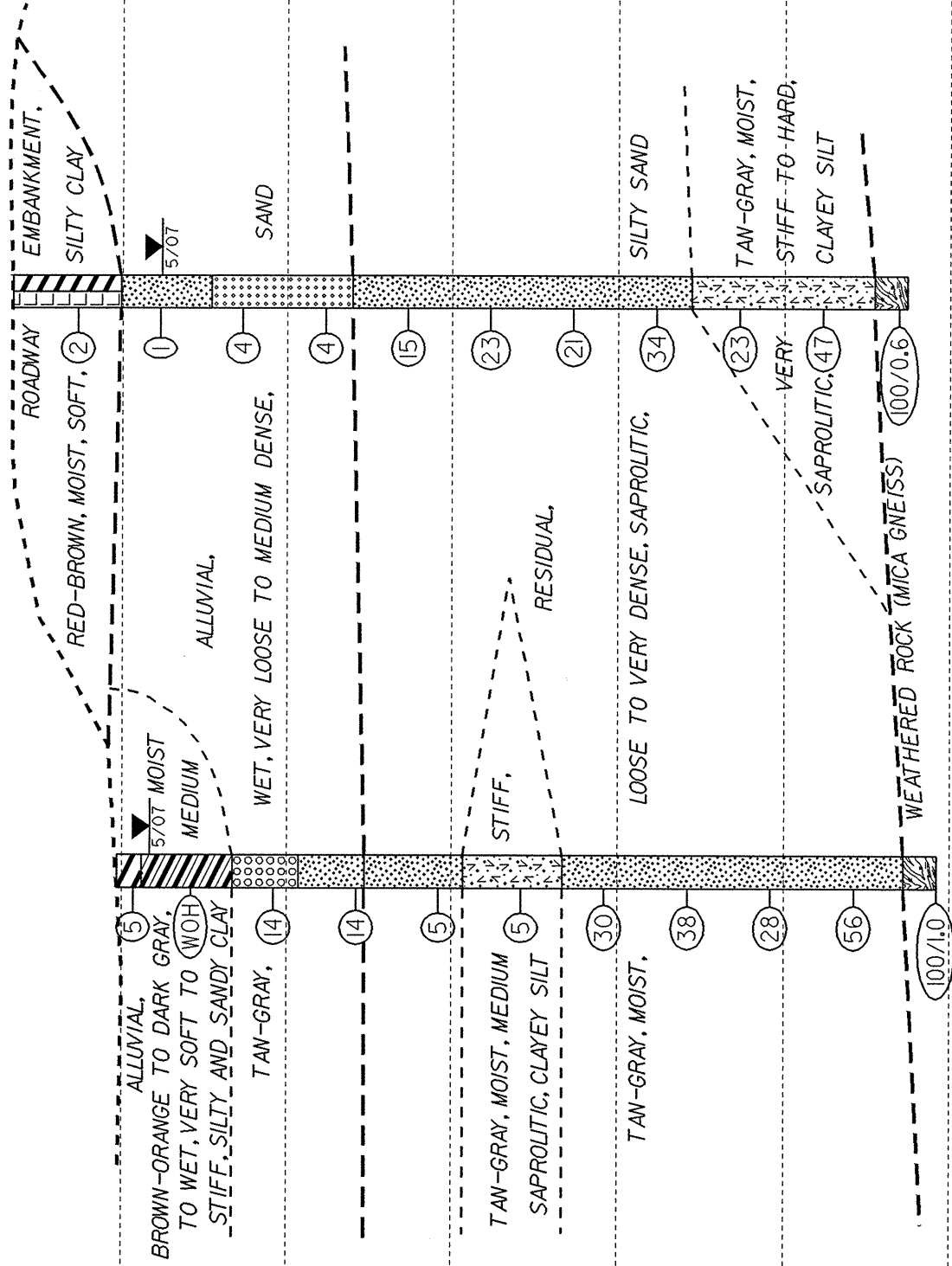
200

190



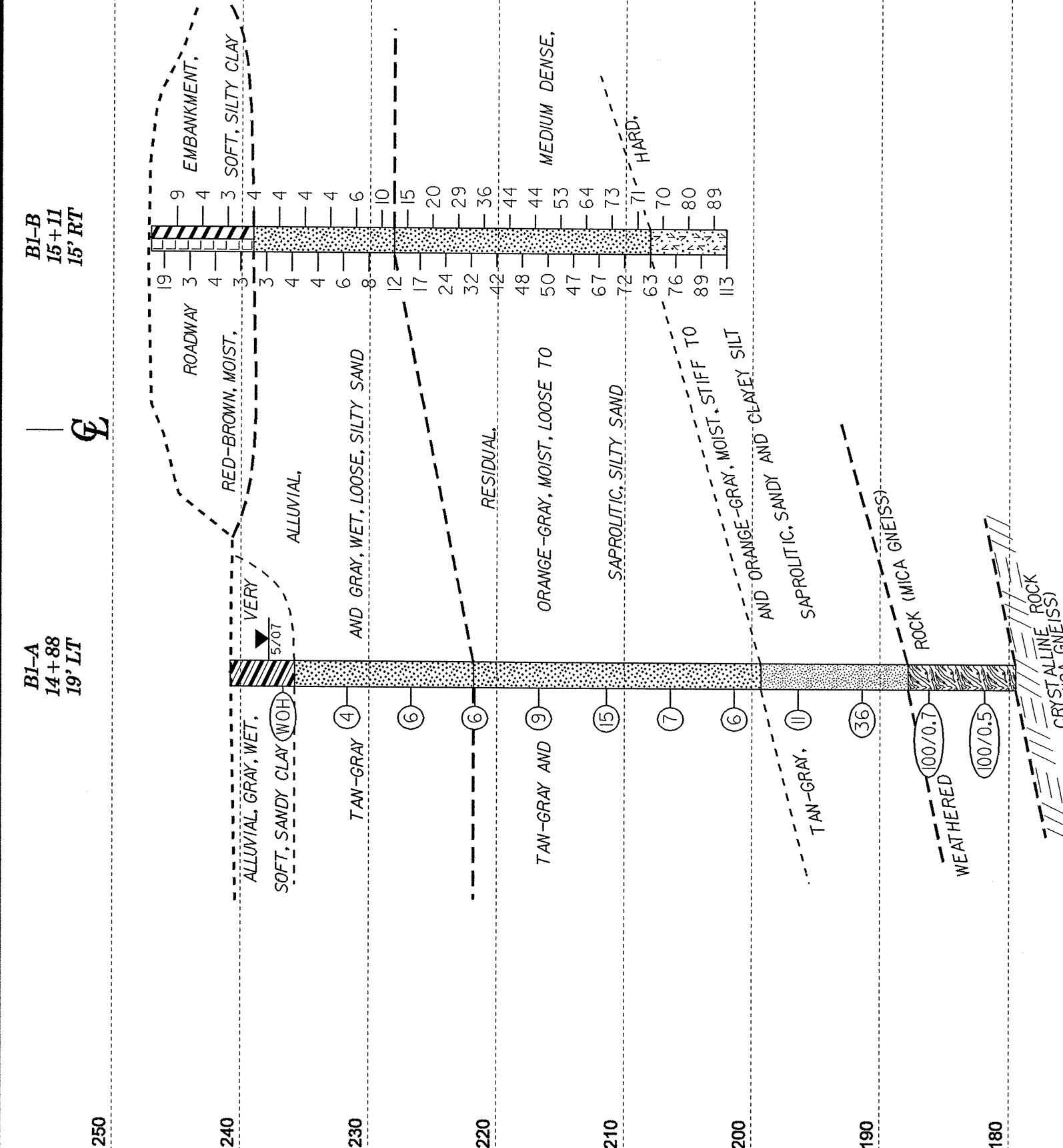
VE = 1:1

CROSS SECTION THROUGH END BENT 1



VE = 1:1

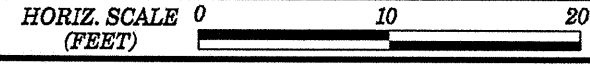
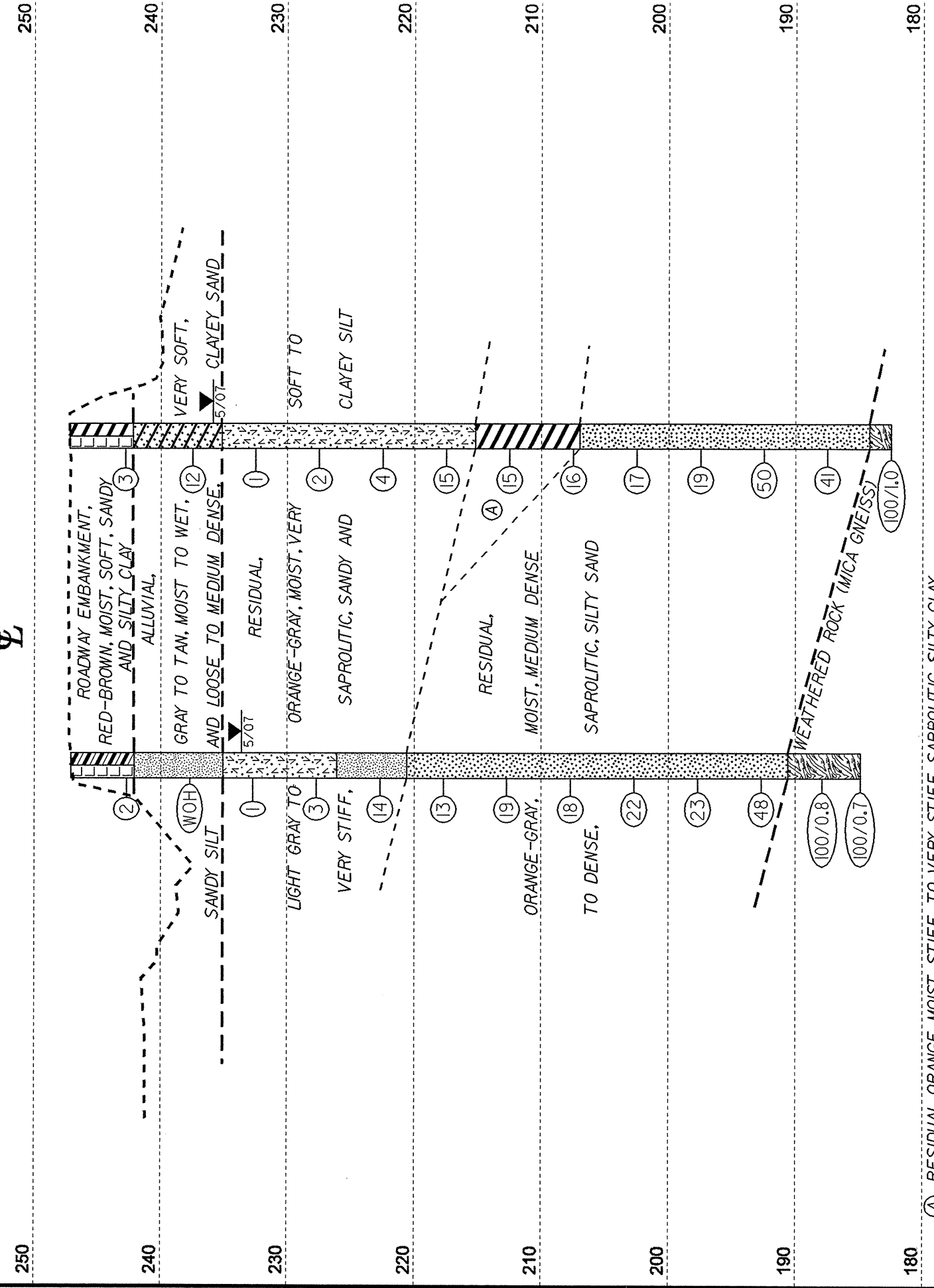
CROSS SECTION THROUGH BENT 1



PROJECT REFERENCE NO.	SHEET
33824.1.1(B-4664)	5

B2-B
15+77
16' RT

B2-A
15+66
10' LT

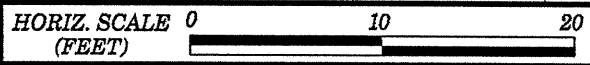
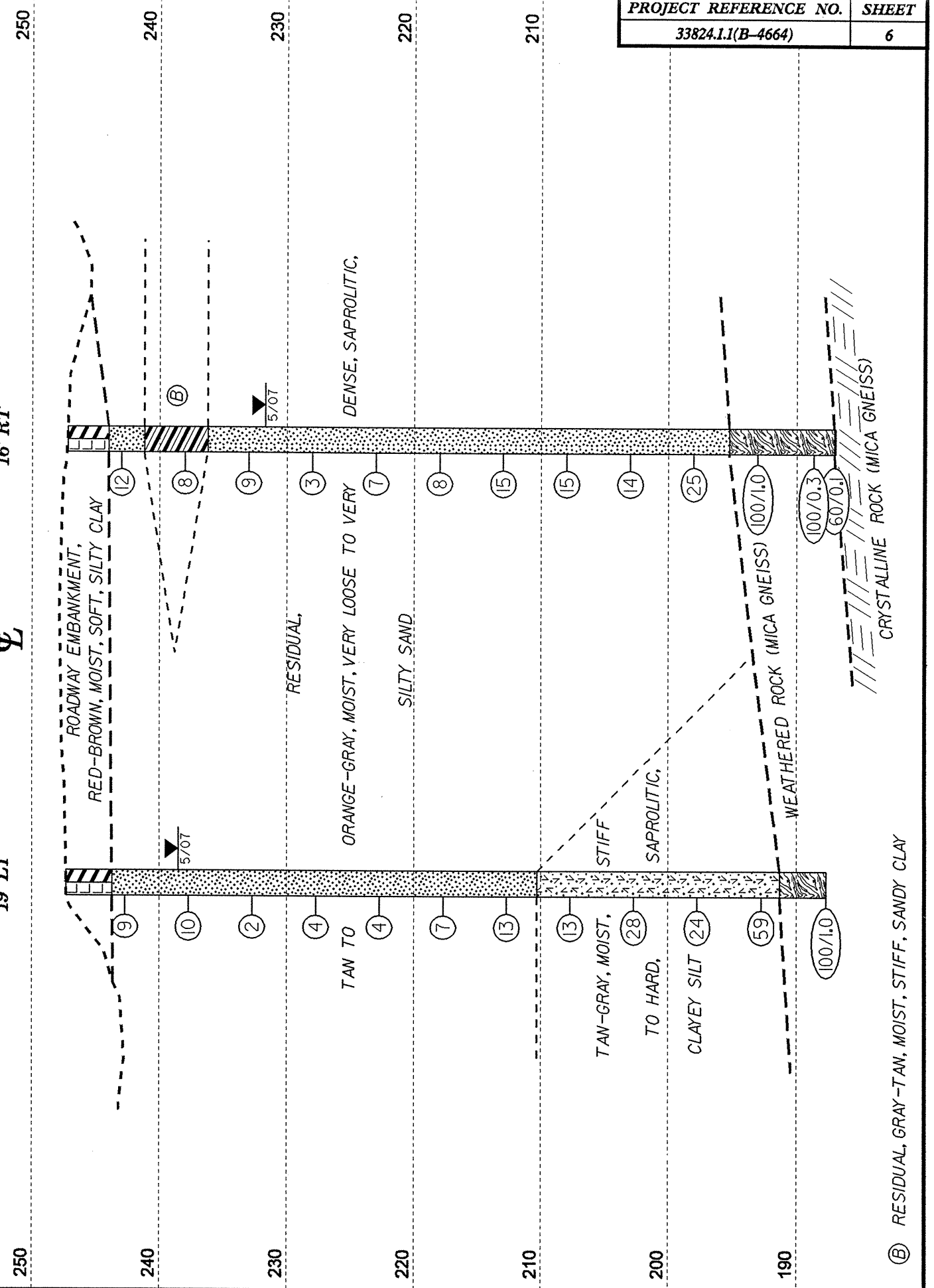


VE = 1:1

CROSS SECTION THROUGH BENT 2

EB2-B
16+07
16' RT

EB2-A
15+88
19' LT



VE = 1:1

CROSS SECTION THROUGH END BENT 2

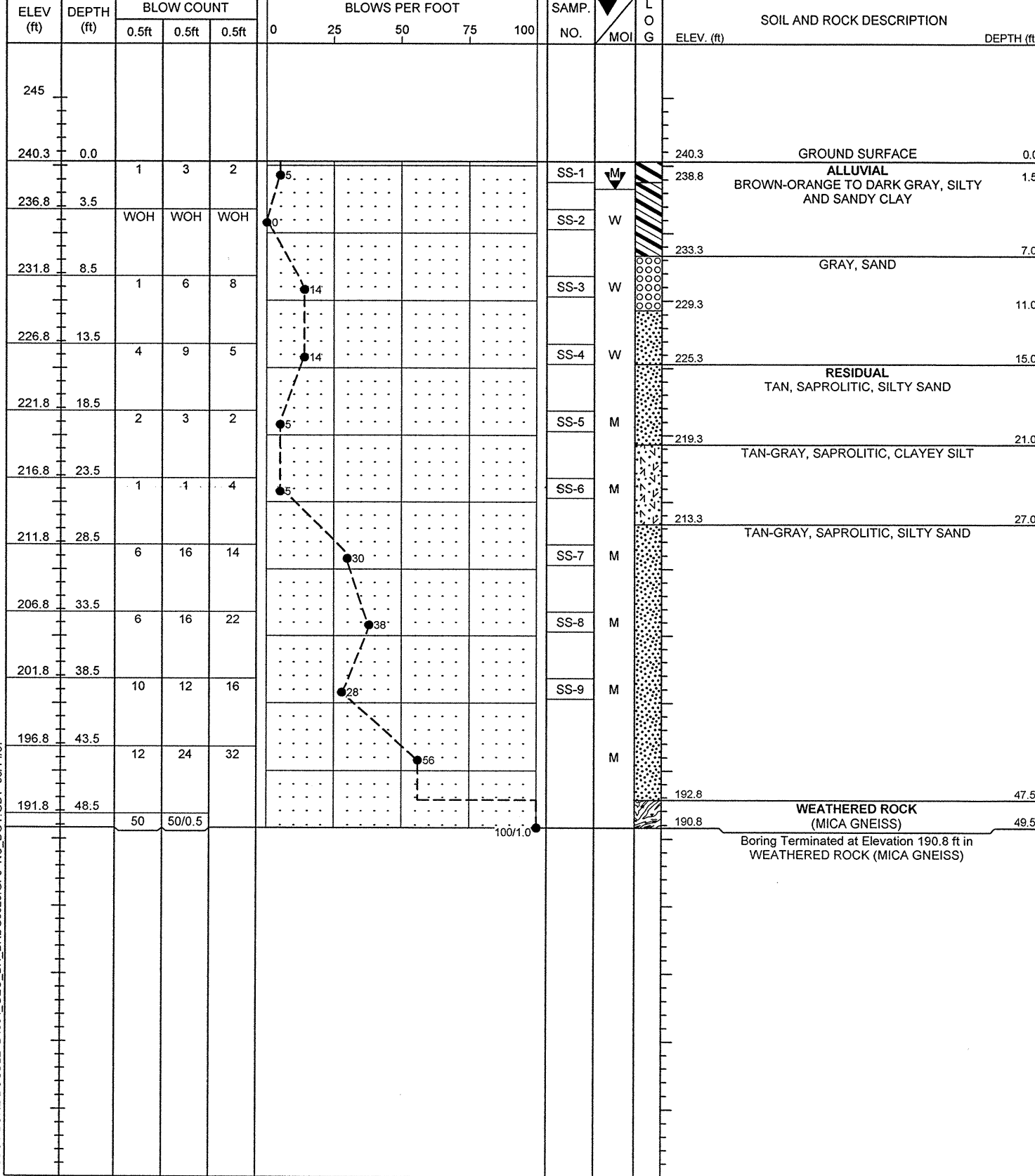
(B) RESIDUAL, GRAY-TAN, MOIST, STIFF, SANDY CLAY



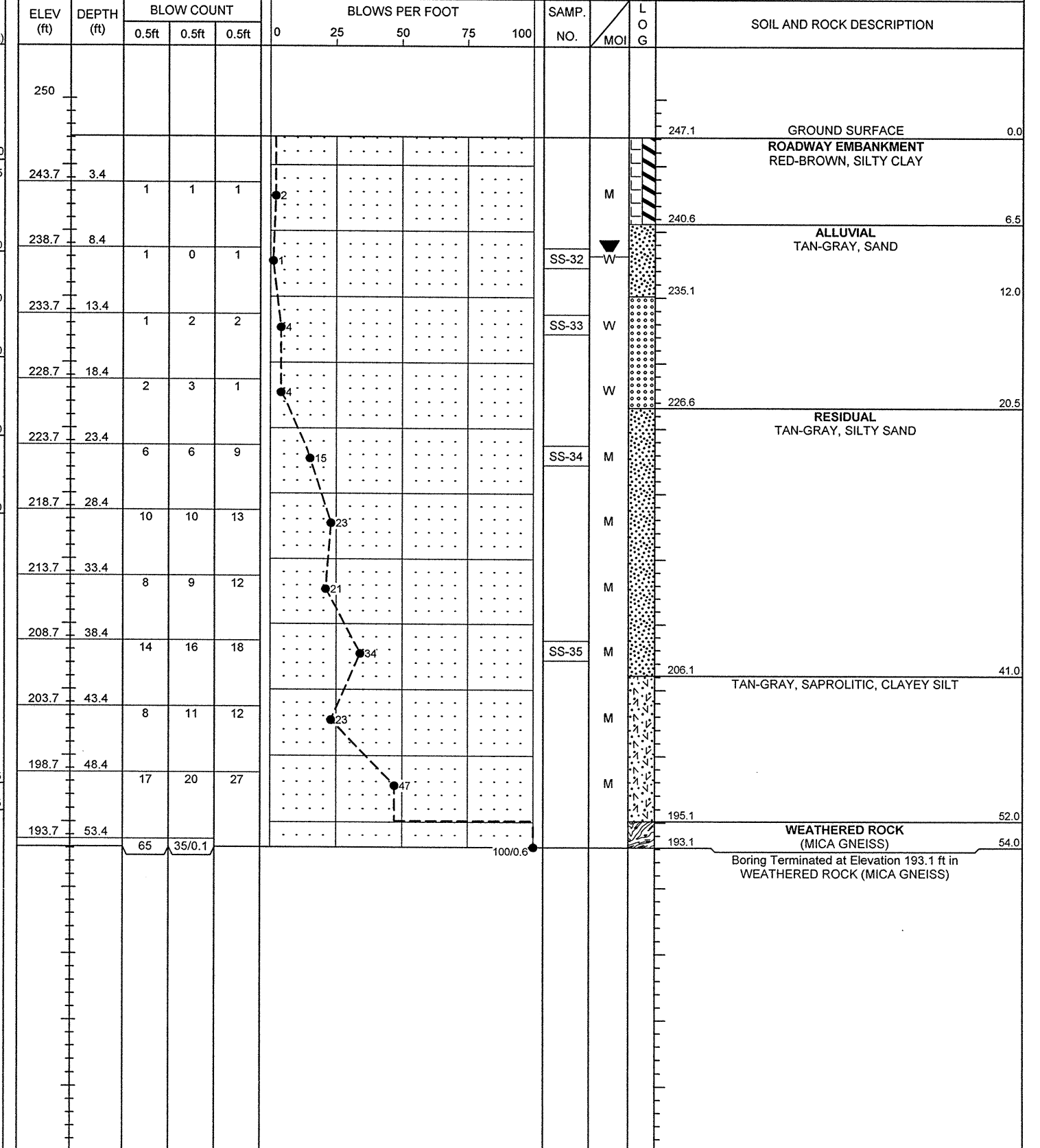
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 14+52	OFFSET 19ft LT	ALIGNMENT -L-
COLLAR ELEV. 240.3 ft	TOTAL DEPTH 49.5 ft	NORTHING 1,002,373	EASTING 2,219,851
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 05/01/07	COMP. DATE 05/01/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 14+73	OFFSET 16ft RT	ALIGNMENT -L-
COLLAR ELEV. 247.1 ft	TOTAL DEPTH 54.0 ft	NORTHING 1,002,408	EASTING 2,219,871
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 05/11/07	COMP. DATE 05/11/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4664_GEO_BH_BRD0025.GPJ NC_DOT_GDT_09/14/07

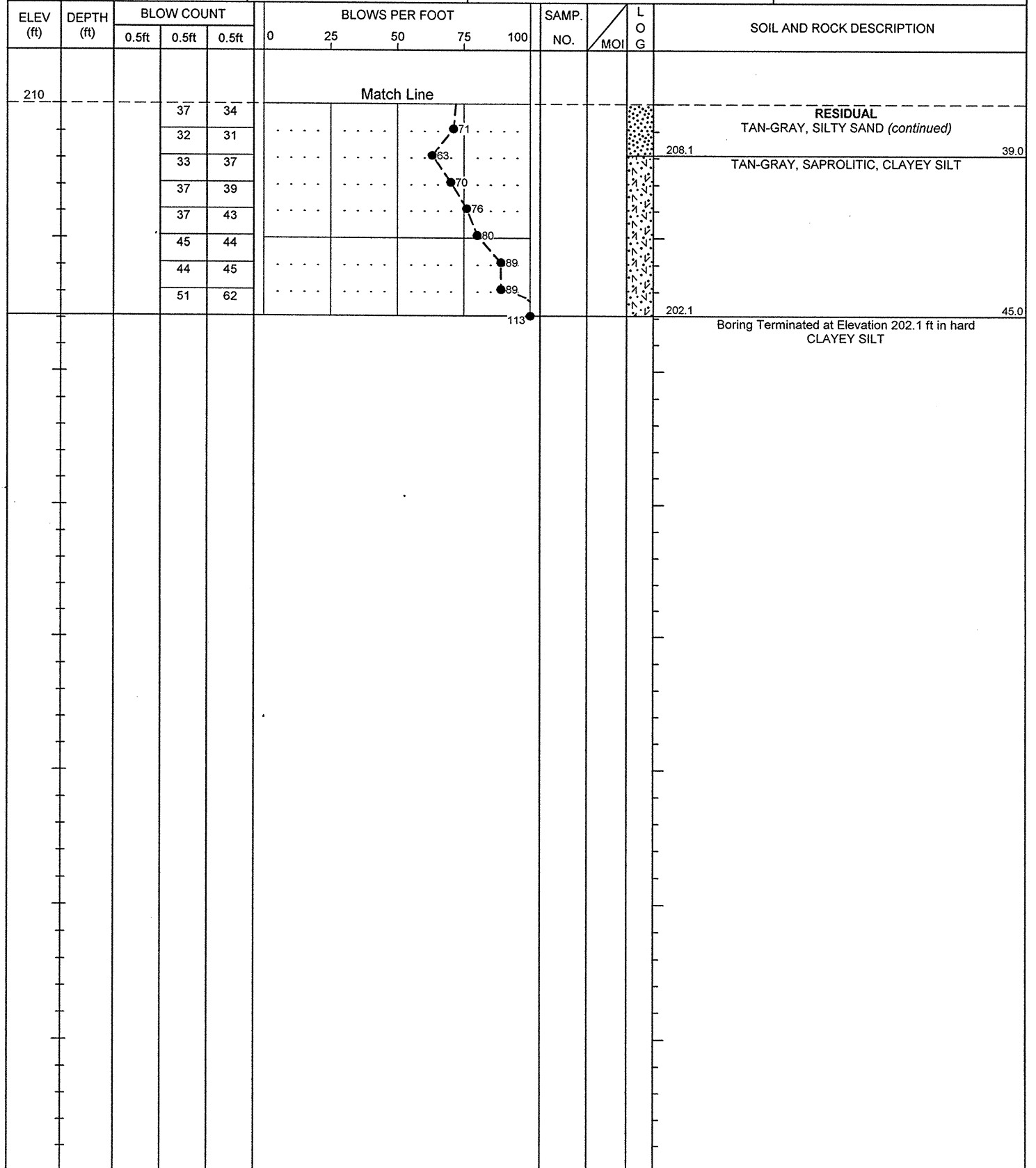
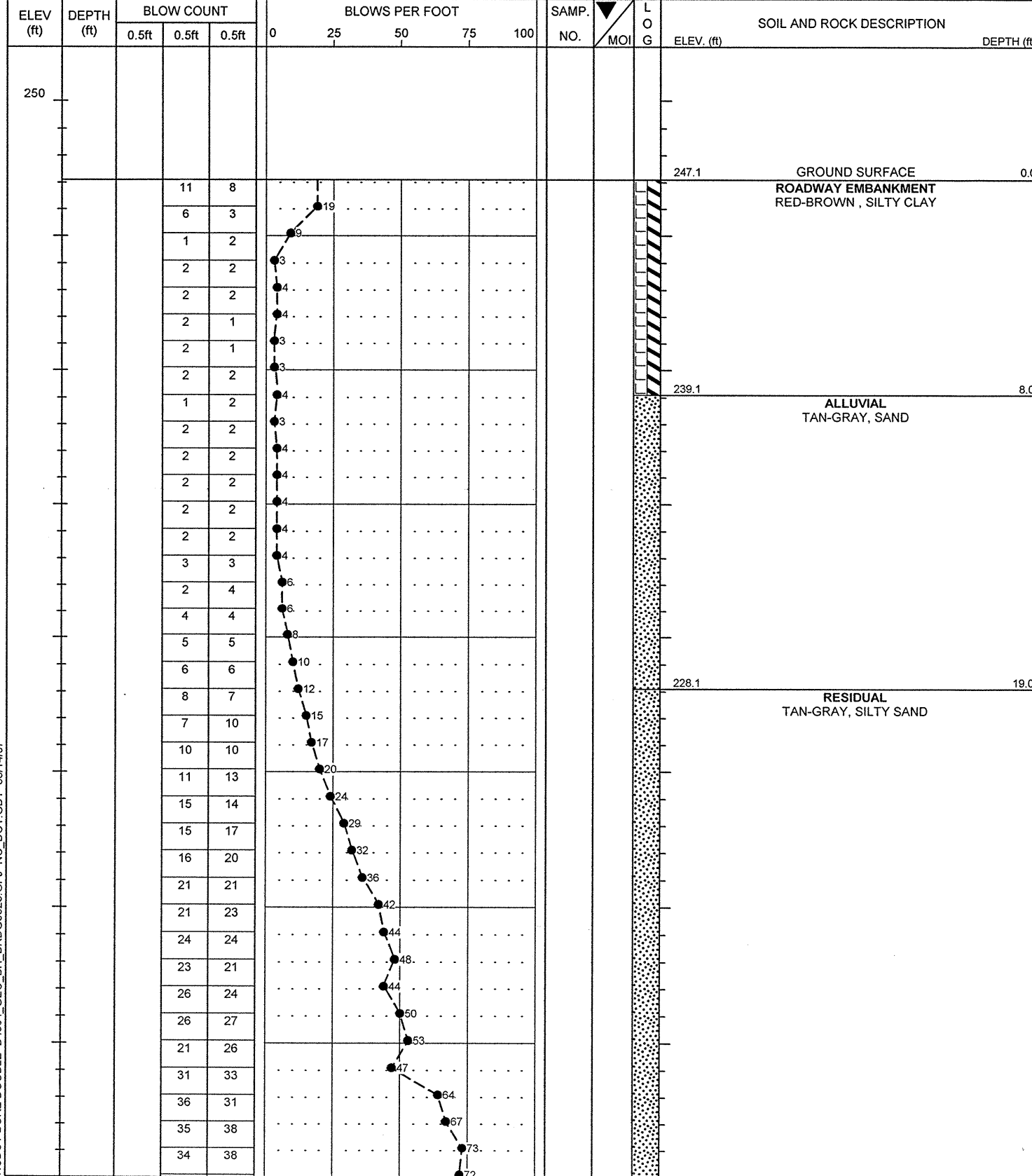
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SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK							GROUND WTR (ft)						
BORING NO. B1-A		STATION 14+88		OFFSET 19ft LT		ALIGNMENT -L-	0 HR. 2.8						
COLLAR ELEV. 240.8 ft		TOTAL DEPTH 61.3 ft		NORTHING 1,002,404		EASTING 2,219,833	24 HR. 3.0						
DRILL MACHINE CME-550		DRILL METHOD Mud Rotary				HAMMER TYPE Automatic							
START DATE 05/02/07		COMP. DATE 05/03/07		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 61.3 ft							
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
245													
													240.8 GROUND SURFACE 0.0
													235.8 ALLUVIAL GRAY, SANDY CLAY 5.0
	3.1	WOH	WOH	WOH						SS-10	W		
													232.7 GRAY, SILTY SAND 8.1
	8.1	1	2	2						SS-11	W		
													227.7 13.1
	13.1	4	3	3							W		
													222.7 18.1
	18.1	3	3	3						SS-12	M		221.8 RESIDUAL ORANGE-GRAY, SAPROLITIC, SILTY SAND 19.0
													217.7 23.1
	23.1	2	4	5						SS-13	M		
													212.4 28.4
	28.4	5	7	8							M		
													207.4 33.4
	33.4	2	3	4							M		
													202.4 38.4
	38.4	1	2	4							M		
													197.4 43.4
	43.4	3	4	7						SS-14	M		199.3 ORANGE-GRAY, SANDY SILT 41.5
													192.4 48.4
	48.4	9	16	20							M		
													187.4 53.4
	53.4	7	58	42/0.2									187.8 WEATHERED ROCK (MICA GNEISS) 53.0
													182.4 58.4
	58.4	100/0.5											179.5 Boring Terminated by Drag Bit Refusal at Elevation 179.5 ft on CRYSTALLINE ROCK (MICA GNEISS) 61.3



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST N.T.R./L.T.D.
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 15+11	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 247.1 ft	TOTAL DEPTH 45.0 ft	NORTHING 1,002,441	EASTING 2,219,851
DRILL MACHINE CME-550	DRILL METHOD CPT / DPT	HAMMER TYPE Automatic	
START DATE 04/22/04	COMP. DATE 04/22/04	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST N.T.R./L.T.D.
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DRILL MACHINE CME-550	DRILL METHOD CPT / DPT	HAMMER TYPE Automatic	
START DATE 04/22/04	COMP. DATE 04/22/04	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4664_GEO_BH_BRDG025.GPJ NC_DOT_GDT_08/14/07

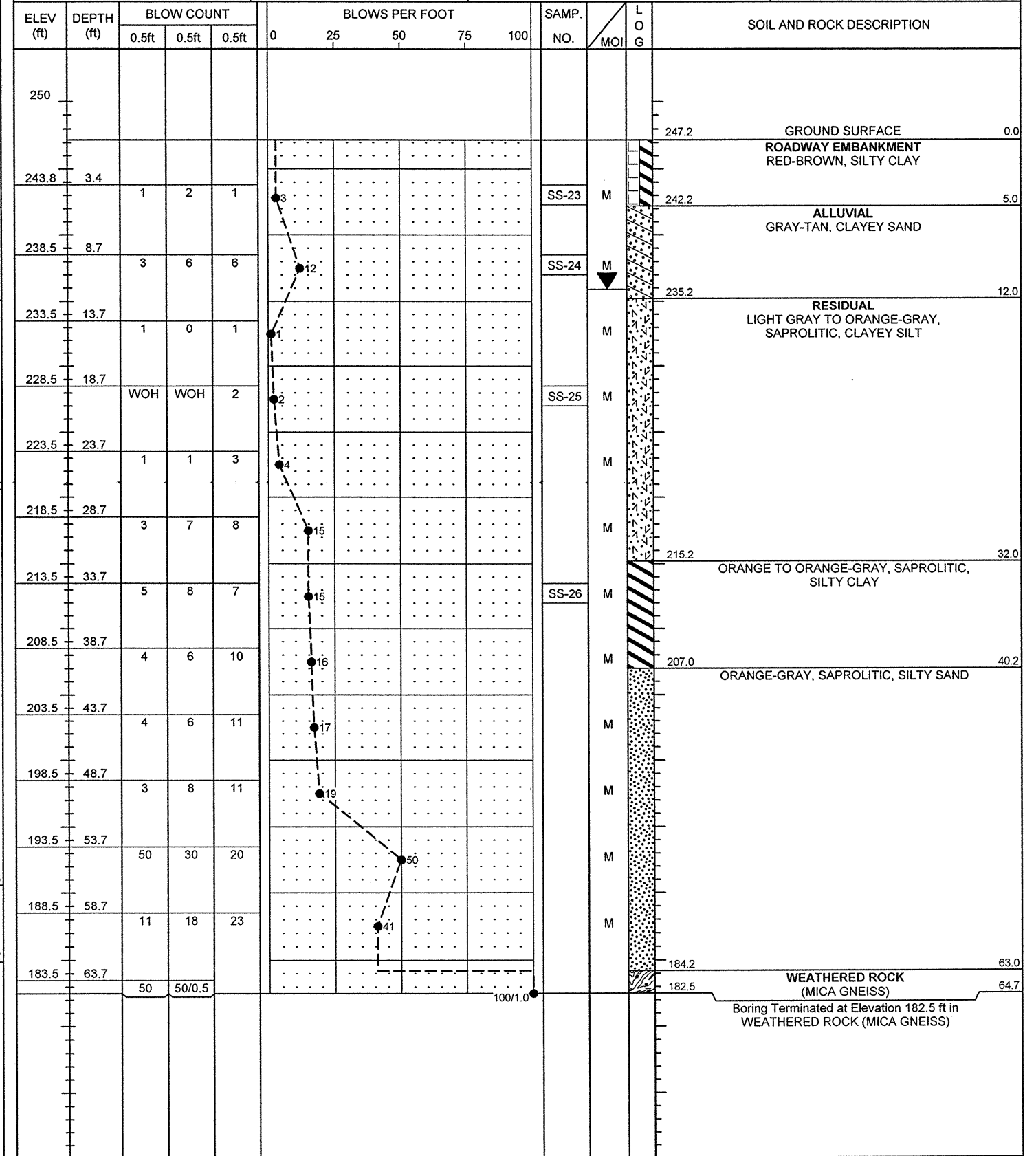
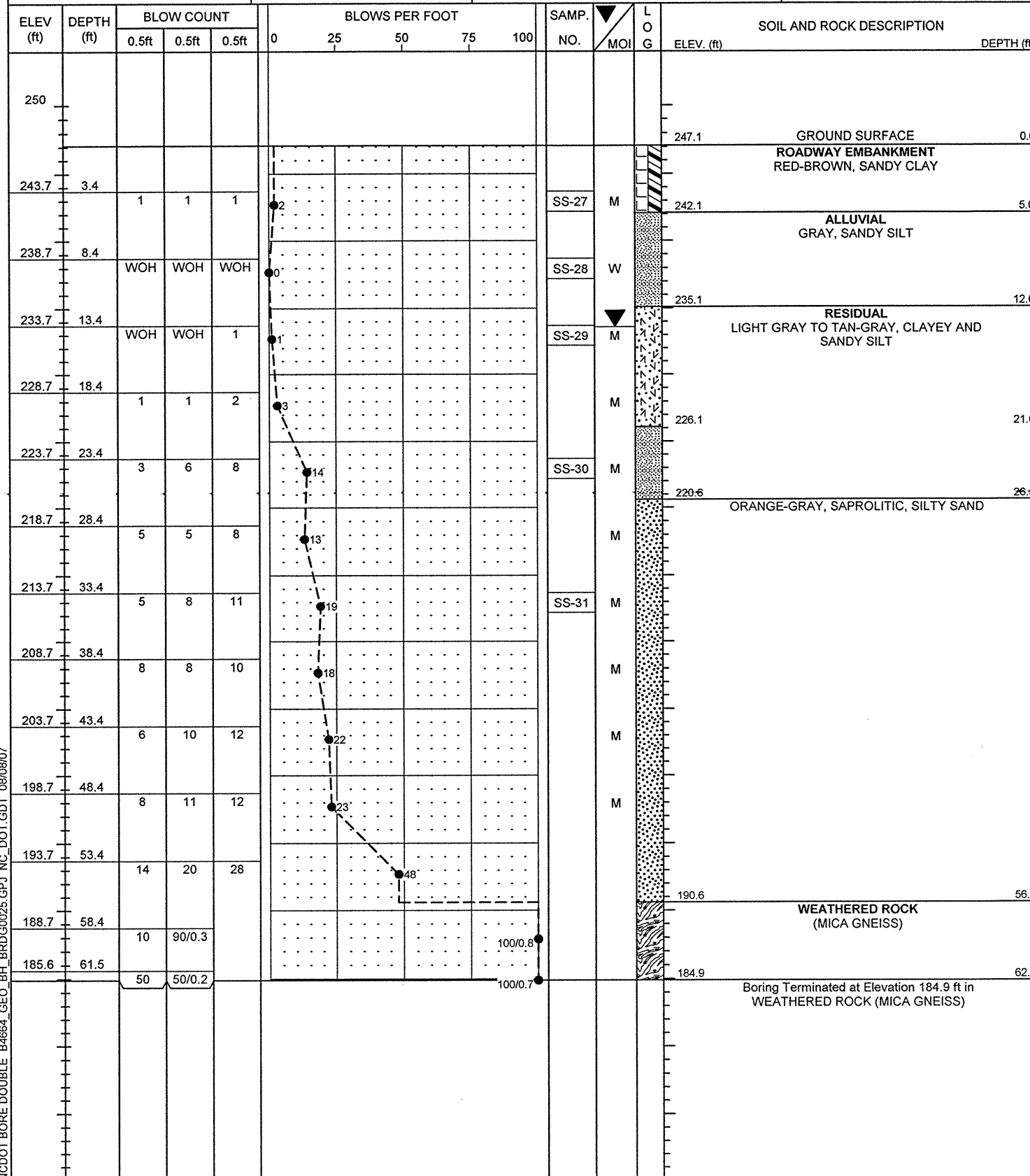


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y	
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK				GROUND WTR (ft)
BORING NO. B2-A	STATION 15+66	OFFSET 10ft LT	ALIGNMENT -L-	0 HR. 10.0
COLLAR ELEV. 247.1 ft	TOTAL DEPTH 62.2 ft	NORTHING 1,002,474	EASTING 2,219,800	24 HR. 13.5
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic		
START DATE 05/10/07	COMP. DATE 05/10/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A	

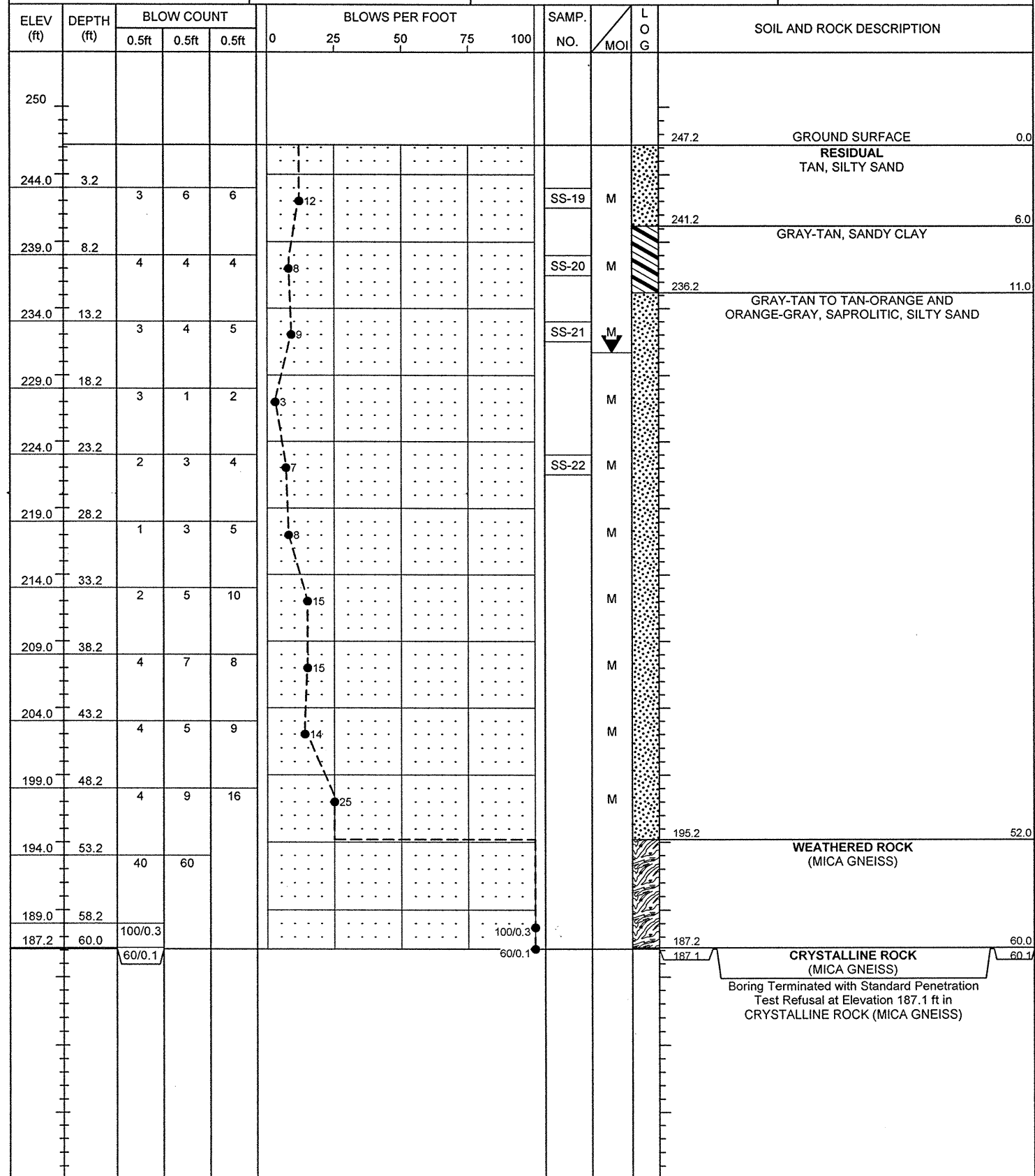
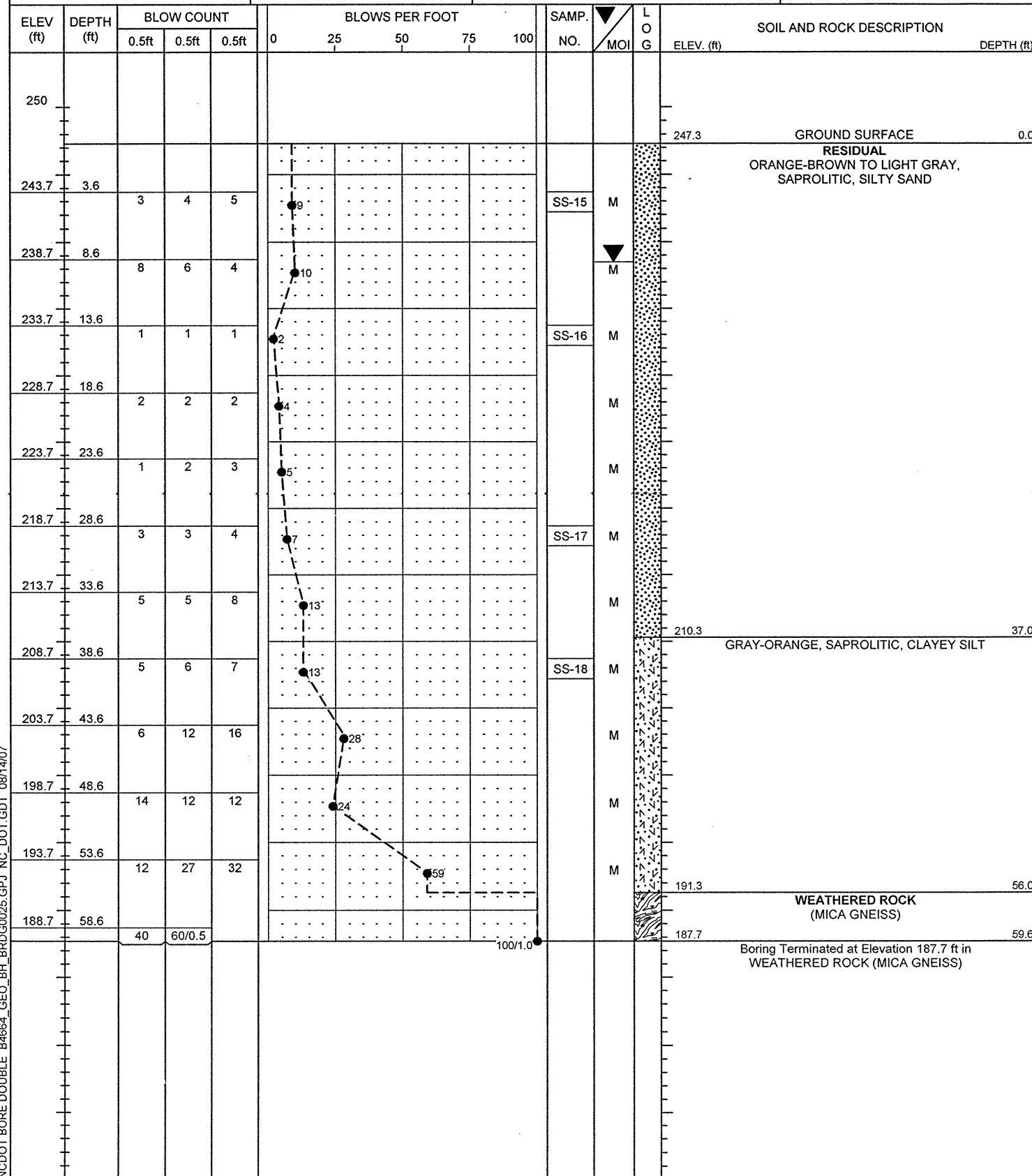
PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y	
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK				GROUND WTR (ft)
BORING NO. B2-B	STATION 15+77	OFFSET 16ft RT	ALIGNMENT -L-	0 HR. 9.0
COLLAR ELEV. 247.2 ft	TOTAL DEPTH 64.7 ft	NORTHING 1,002,498	EASTING 2,219,816	24 HR. 11.3
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic		
START DATE 05/09/07	COMP. DATE 05/09/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A	



NCDOT BORE DOUBLE B4664_GEO_BH_BRD6025.GPJ_NC_DOT.GDT_08/08/07

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 15+88	OFFSET 19ft LT	ALIGNMENT -L-
COLLAR ELEV. 247.3 ft	TOTAL DEPTH 59.6 ft	NORTHING 1,002,488	EASTING 2,219,781
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 05/07/07	COMP. DATE 05/07/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 33824.1.1	ID. B-4664	COUNTY WARREN	GEOLOGIST Kuntukova, Y
SITE DESCRIPTION BRIDGE NO. 25 ON -L- (SR 1206) OVER SMITH CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 16+07	OFFSET 16ft RT	ALIGNMENT -L-
COLLAR ELEV. 247.2 ft	TOTAL DEPTH 60.1 ft	NORTHING 1,002,523	EASTING 2,219,800
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 05/08/07	COMP. DATE 05/08/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 60.0 ft



NCDOT BORE DOUBLE B4664_GEO_BH_BRDGC025.GPJ NC_DOT.GDT 08/14/07

EB1-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+52	0.0-1.5	A-7-5(25)	58	28	3.8	17.3	30.7	48.2	100	99	81	-	-
SS-2	19' LT	14+52	3.5-5.0	A-6(10)	39	16	2.6	31.6	23.6	42.2	100	100	70	-	-
SS-3	19' LT	14+52	8.5-10.0	A-1-b(0)	25	NP	71.0	20.3	0.7	8.0	68	34	7	-	-
SS-4	19' LT	14+52	13.5-15.0	A-2-4(0)	25	NP	58.9	28.3	4.7	8.0	87	53	13	-	-
SS-5	19' LT	14+52	18.5-20.0	A-2-4(0)	37	NP	31.8	50.5	11.8	6.0	97	82	23	-	-
SS-6	19' LT	14+52	23.5-25.0	A-5(0)	48	NP	14.9	53.9	23.2	8.0	100	99	38	-	-
SS-7	19' LT	14+52	28.5-30.0	A-2-4(0)	39	NP	38.4	43.8	9.7	8.0	100	78	25	-	-
SS-8	19' LT	14+52	33.5-35.0	A-2-4(0)	37	NP	30.6	46.6	16.8	6.0	84	70	25	-	-
SS-9	19' LT	14+52	38.5-40.0	A-2-4(0)	34	NP	36.2	42.4	13.4	8.0	90	73	24	-	-

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-32	16' RT	14+73	8.4-9.9	A-2-4(0)	26	NP	23.5	55.1	7.3	14.1	97	92	24	-	-
SS-33	16' RT	14+73	13.4-14.9	A-3(0)	28	NP	64.5	27.3	4.1	4.0	98	63	10	-	-
SS-34	16' RT	14+73	23.4-24.9	A-2-5(0)	41	NP	44.2	39.6	8.1	8.0	100	76	22	-	-
SS-35	16' RT	14+73	38.4-39.9	A-2-4(0)	37	NP	41.8	42.2	9.9	6.0	100	78	21	-	-

BI-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-10	19' LT	14+88	3.1-4.6	A-6(6)	40	13	12.1	35.2	22.6	30.2	100	97	57	-	-
SS-11	19' LT	14+88	8.1-9.6	A-2-4(0)	26	NP	60.7	26.9	4.3	8.0	99	58	15	-	-
SS-12	19' LT	14+88	18.1-19.0	A-2-4(0)	36	NP	50.3	31.4	12.4	6.0	90	59	20	-	-
SS-13	19' LT	14+88	23.1-24.6	A-2-5(0)	42	NP	23.9	54.3	13.8	8.0	95	84	28	-	-
SS-14	19' LT	14+88	43.4-49.9	A-4(0)	39	NP	9.2	52.9	27.8	10.1	100	99	47	-	-

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-27	10' LT	15+66	3.4-4.9	A-6(3)	36	14	22.7	27.9	15.2	34.2	82	71	44	-	-
SS-28	10' LT	15+66	8.4-9.9	A-4(1)	28	8	11.5	45.2	19.2	24.1	100	98	49	-	-
SS-29	10' LT	15+66	13.4-14.9	A-5(1)	45	7	33.0	29.7	25.2	12.1	100	77	42	-	-
SS-30	10' LT	15+66	23.4-24.9	A-4(0)	39	NP	36.8	31.6	19.6	12.1	99	76	38	-	-
SS-31	10' LT	15+66	33.4-34.9	A-2-4(0)	40	NP	30.2	50.1	11.8	8.0	100	87	26	-	-

B2-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	16' RT	15+77	3.4-4.9	A-7-5(15)	59	29	13.1	20.3	18.4	48.2	82	76	58	-	-
SS-24	16' RT	15+77	8.7-10.2	A-2-6(0)	29	12	36.8	31.0	8.1	24.1	78	60	28	-	-
SS-25	16' RT	15+77	18.7-20.2	A-5(0)	48	NP	12.7	49.2	26.0	12.1	100	99	43	-	-
SS-26	16' RT	15+77	33.7-35.2	A-7-5(17)	64	25	12.7	25.3	31.9	30.2	98	92	65	-	-

EB2-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-15	19' LT	15+88	3.6-5.1	A-2-4(0)	28	5	12.1	63.5	4.3	20.1	100	97	28	-	-
SS-16	19' LT	15+88	13.6-15.1	A-2-4(0)	39	NP	40.8	36.2	15.0	8.0	98	72	28	-	-
SS-17	19' LT	15+88	28.6-30.1	A-2-5(0)	43	NP	32.2	42.2	17.6	8.0	100	83	31	-	-
SS-18	19' LT	15+88	38.6-40.1	A-5(0)	41	NP	19.7	50.3	24.0	6.0	100	97	37	-	-

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-19	16' RT	16+07	3.2-4.7	A-2-4(0)	27	4	12.9	59.9	19.2	8.0	100	99	32	-	-
SS-20	16' RT	16+07	8.2-9.7	A-6(1)	30	13	20.3	46.2	9.3	24.1	98	91	38	-	-
SS-21	16' RT	16+07	13.2-14.7	A-2-4(0)	31	7	48.6	29.1	8.1	14.1	73	49	19	-	-
SS-22	16' RT	16+07	23.2-24.7	A-2-5(0)	53	NP	27.5	47.2	19.2	6.0	100	90	31	-	-



FIELD SCOUR REPORT

WBS: 33824.1.1 TIP: B-4664 COUNTY: Warren

DESCRIPTION(1): Bridge No. 25 on -L- (SR 1206) over Smith Creek

EXISTING BRIDGE

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

Bridge No.: 25 Length: 52.6' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
 Foundation Type: Timber piles

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: 1' to 3' deep scour pockets at End Bent 2

Interior Bents: Scour pockets 1' to 2' deep at Bent 1 and Bent 2

Channel Bed: None noted

Channel Bank: 1' to 2' deep scour pocket between End Bent 1 and Bent 1

EXISTING SCOUR PROTECTION

Type(3): Timber end walls and wing walls

Extent(4): 4' to 12' outside existing bridge

Effectiveness(5): Undermining noted at both end walls

Obstructions(6): Tree and limb debris around B1 and B2; tree debris in channel upstream

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): Gray, wet, loose, silty sand and coarse sand (SS-3, SS-11)

Channel Bank Material(8): Brown-orange to gray, wet, very soft to medium stiff, sandy and silty clay (SS-1, SS-2)

Channel Bank Cover(9): Trees and shrubs

Floodplain Width(10): About 400'

Floodplain Cover(11): Trees and shrubs

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): Slight tendency towards the north

Observations and Other Comments: Confluence of Smith Creek and an unnamed creek is in close proximity to B2-A.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

EB1	B1	B2	EB2						
N/A	227.5	229.1	N/A						

Comparison of DSE to Hydraulics Unit theoretical scour:
 The Geotechnical Engineering Unit agrees with the 100 year event theoretical scour for both interior bents as predicted in the Hydraulics Unit's Bridge Survey & Hydraulic Design Report dated 02/05/2007. Scour is not anticipated to impact the end bents as predicted in the BSR based on site history, local geology and an increased hydraulic opening.

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 12,
 "Soil Test Results",
 for samples:
 SS-1
 SS-2
 SS-3
 SS-11

Reported by: **Kevin B. Miller, LG** Date: 8/8/2007

SITE PHOTOGRAPH

Bridge No. 25 on -L- (SR 1206) over Smith Creek



FLOW →
Smith Creek