

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38544.1.1 (B-4772) F.A. PROJ. BRZ-1525(9)
 COUNTY JOHNSTON
 PROJECT DESCRIPTION BRIDGE NO. 326 ON -L- (SR 1525)
OVER MILL BRANCH CREEK AT STA. 14+78

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5	CROSS SECTION(S)
6-7	BORE LOG(S)
8	SOIL TEST RESULTS
9	SCOUR REPORT
10	SITE PHOTOGRAPH(S)

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-4772

PROJECT: 38544.1.1

PERSONNEL

J. L. PEDRO

H. R. CONLEY

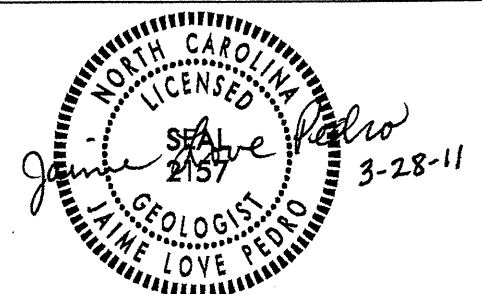
J. R. MATULA

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE MARCH 2011



DRAWN BY: J. L. PEDRO





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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

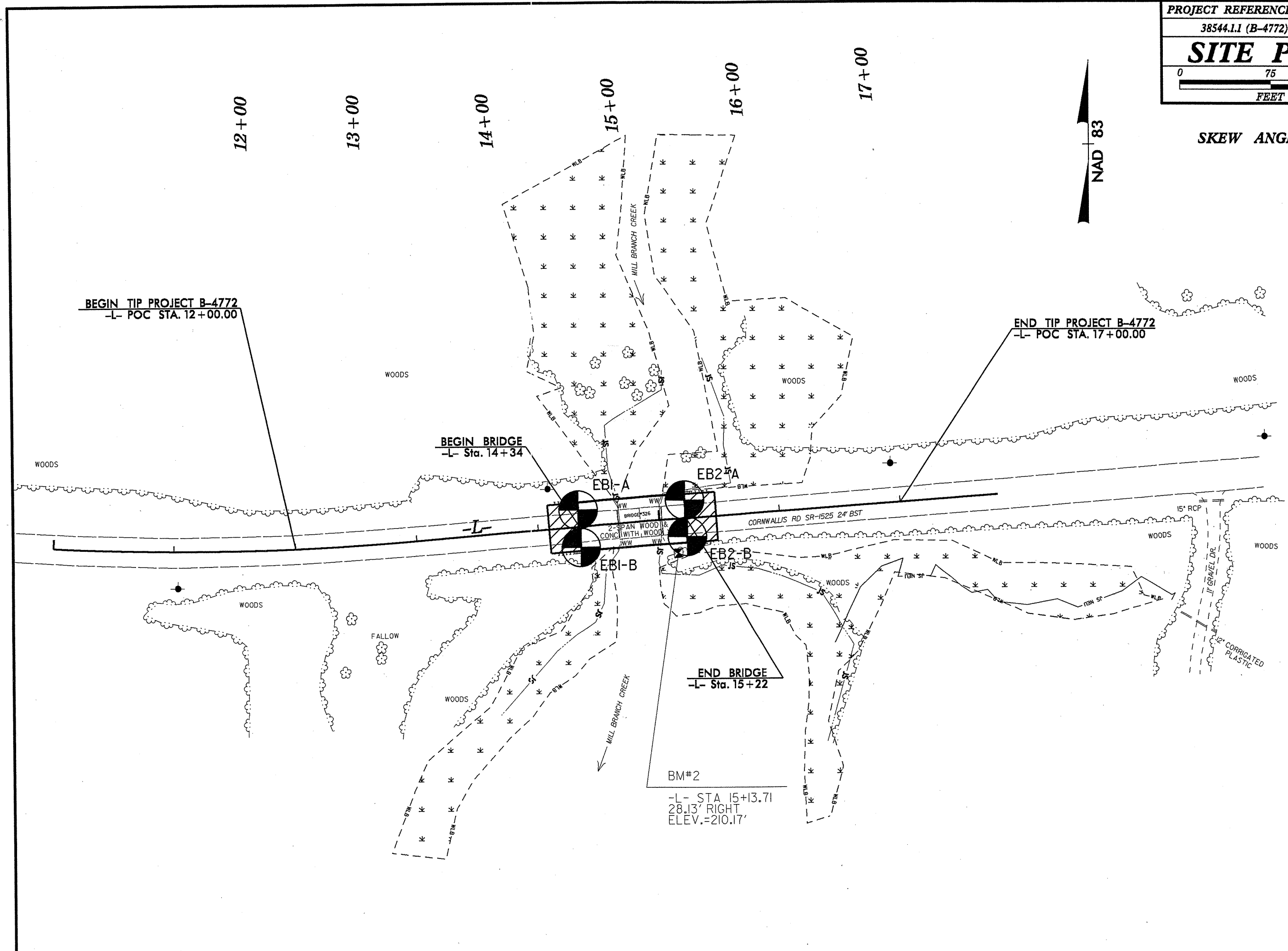
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 (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. EXAMPLES: <i>VERY STIFF, GRANULY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, MEDIUM 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. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				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 8.1 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:  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  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.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.				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. FLOOD - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (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 8.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.											
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.				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.															
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				COMPRESSION				VERY SLIGHT (V SL.) 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.															
SYMBOL				SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE				SLIGHT (SL.) 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.															
% PASSING				PERCENTAGE OF MATERIAL				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.															
LIQUID LIMIT PLASTIC INDEX				GROUND WATER				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. IF TESTED, WOULD YIELD SPT REFUSAL.															
GROUP INDEX				MISCELLANEOUS SYMBOLS				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. IF TESTED, YIELDS SPT N VALUES > 100 BPF.															
USUAL TYPES OF MAJOR MATERIALS				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				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. IF TESTED, YIELDS SPT N VALUES < 100 BPF.															
GEN. RATING AS A SUBGRADE				SOIL SYMBOL				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.															
PI OF A-7-5 SUBGROUP IS <= LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT				ROCK HARDNESS															
CONSISTENCY OR DENSENESS				INFERRERD SOIL BOUNDARY				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.															
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				INFERRERD ROCK LINE				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.															
GENERALY GRANULAR MATERIAL (NON-COHESIVE)				ALLUVIAL SOIL BOUNDARY				MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.															
GENERALY SILT-CLAY MATERIAL (COHESIVE)				DIP & DIP DIRECTION OF ROCK STRUCTURES				MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.															
TEXTURE OR GRAIN SIZE				DIP & DIP DIRECTION OF ROCK STRUCTURES				SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.															
U.S. STD. SIEVE SIZE OPENING (MM)				DIP & DIP DIRECTION OF ROCK STRUCTURES				VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.															
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)				DIP & DIP DIRECTION OF ROCK STRUCTURES				ABBREVIATIONS															
GRAIN SIZE				DIP & DIP DIRECTION OF ROCK STRUCTURES				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 - MICA MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITE SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY				VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT DU - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS SS - BULK S - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACT TRIAXIAL CBR - CALIFORNIA BEARING RATIO							
SOIL MOISTURE - CORRELATION OF TERMS				DIP & DIP DIRECTION OF ROCK STRUCTURES				EQUIPMENT USED ON SUBJECT PROJECT				FRACTURE SPACING											
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				DIP & DIP DIRECTION OF ROCK STRUCTURES				DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-55				ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE <input type="checkbox"/> STEEL TEETH <input type="checkbox"/> TRICONE <input type="checkbox"/> 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				TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET			
PLASTICITY				DIP & DIP DIRECTION OF ROCK STRUCTURES				INDURATION				BENCH MARK: BM#2, Railroad Spike in Base of 15' Birch tree at -L- Sta. 15+3.71, 28.13' Rt. ELEVATION: 210.17 FT.											
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY				DIP & DIP DIRECTION OF ROCK STRUCTURES				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.				NOTES:											
COLOR				DIP & DIP DIRECTION OF ROCK STRUCTURES																			
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.				DIP & DIP DIRECTION OF ROCK STRUCTURES																			

PROJECT REFERENCE NO.	SHEET
38544.1.1 (B-4772)	3
SITE PLAN	



SKEW ANGLE = 90°



BEGIN TIP PROJECT B-4772
-L- POC STA. 12+00.00

END TIP PROJECT B-4772
-L- POC STA. 17+00.00

BEGIN BRIDGE
-L- Sta. 14+34

END BRIDGE
-L- Sta. 15+22

BM#2
-L- STA 15+13.71
28.13' RIGHT
ELEV. = 210.17'

BRIDGE #326
2 SPAN WOOD &
CONC. WITH WOOD

CORNWALLIS RD SR-1525 24' BST

15' RCP
12" GRAVEL DN.
12" CORRUGATED PLASTIC

MILL BRANCH CREEK

FALLOW

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

WOODS

12+00

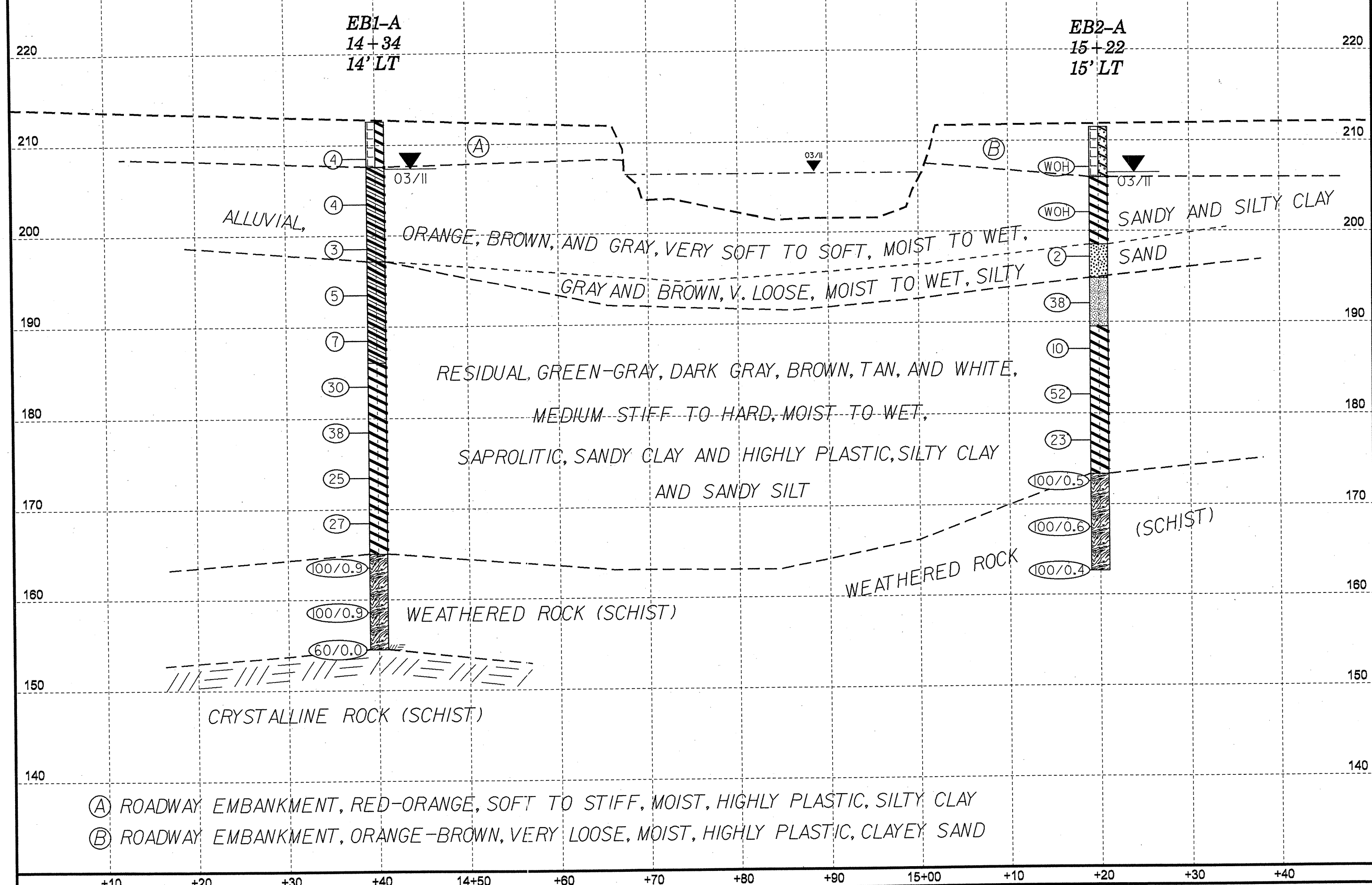
13+00

14+00

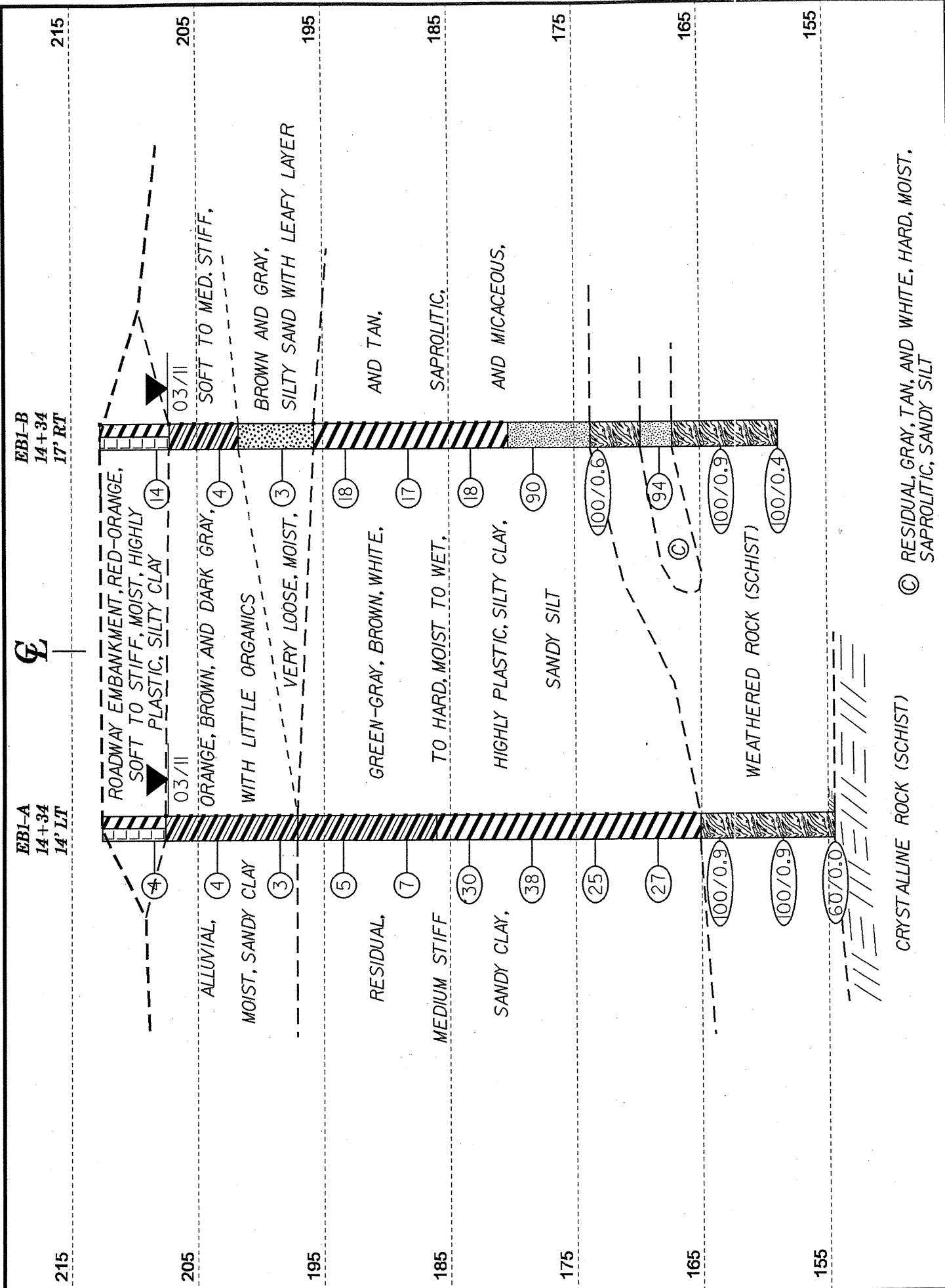
15+00

16+00

17+00



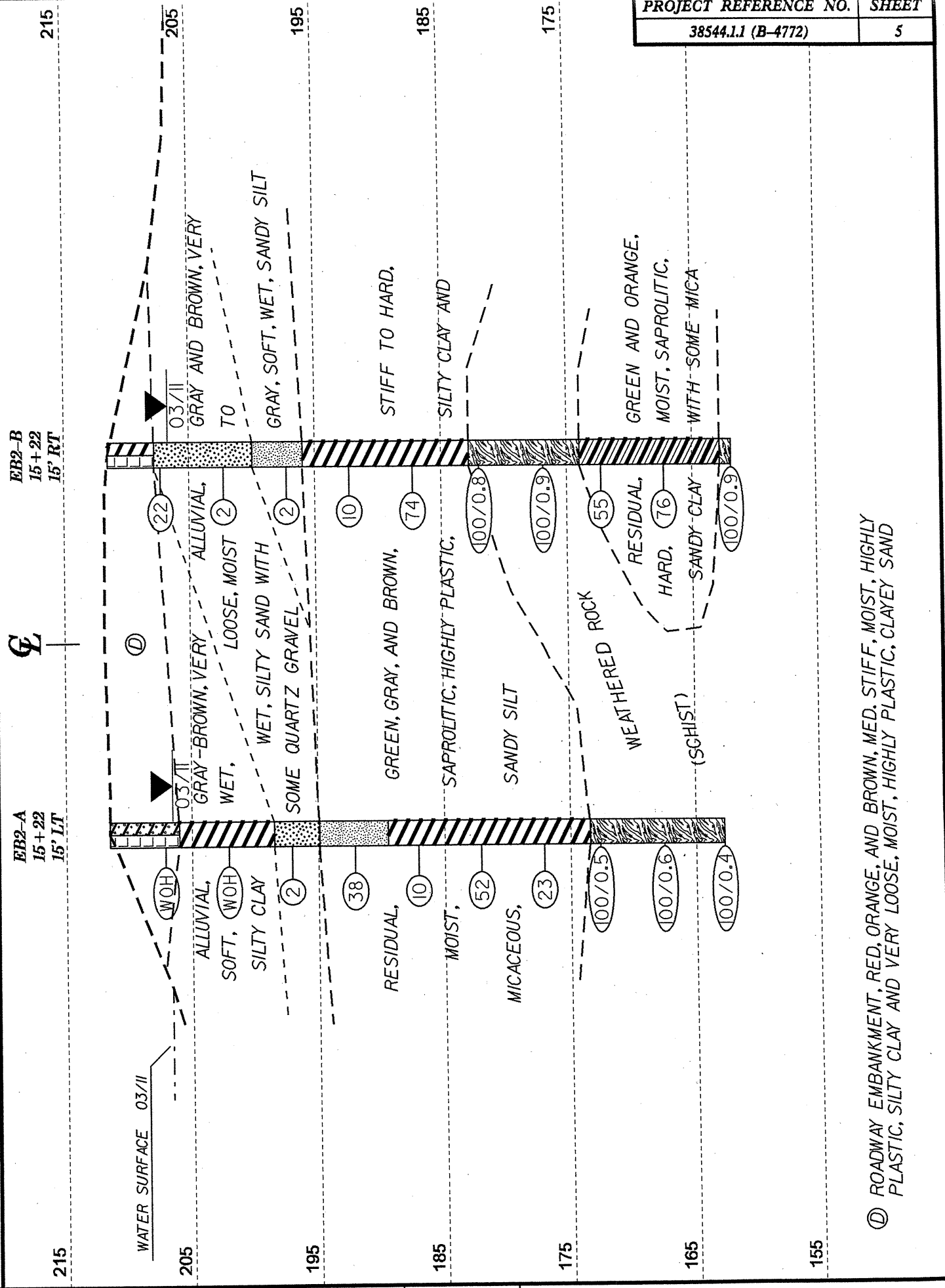
- (A) ROADWAY EMBANKMENT, RED-ORANGE, SOFT TO STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY
- (B) ROADWAY EMBANKMENT, ORANGE-BROWN, VERY LOOSE, MOIST, HIGHLY PLASTIC, CLAYEY SAND



HORIZ. SCALE 0 10 20 (FEET)

VE =

CROSS SECTION THROUGH END BENT 1



HORIZ. SCALE 0 10 20 (FEET)

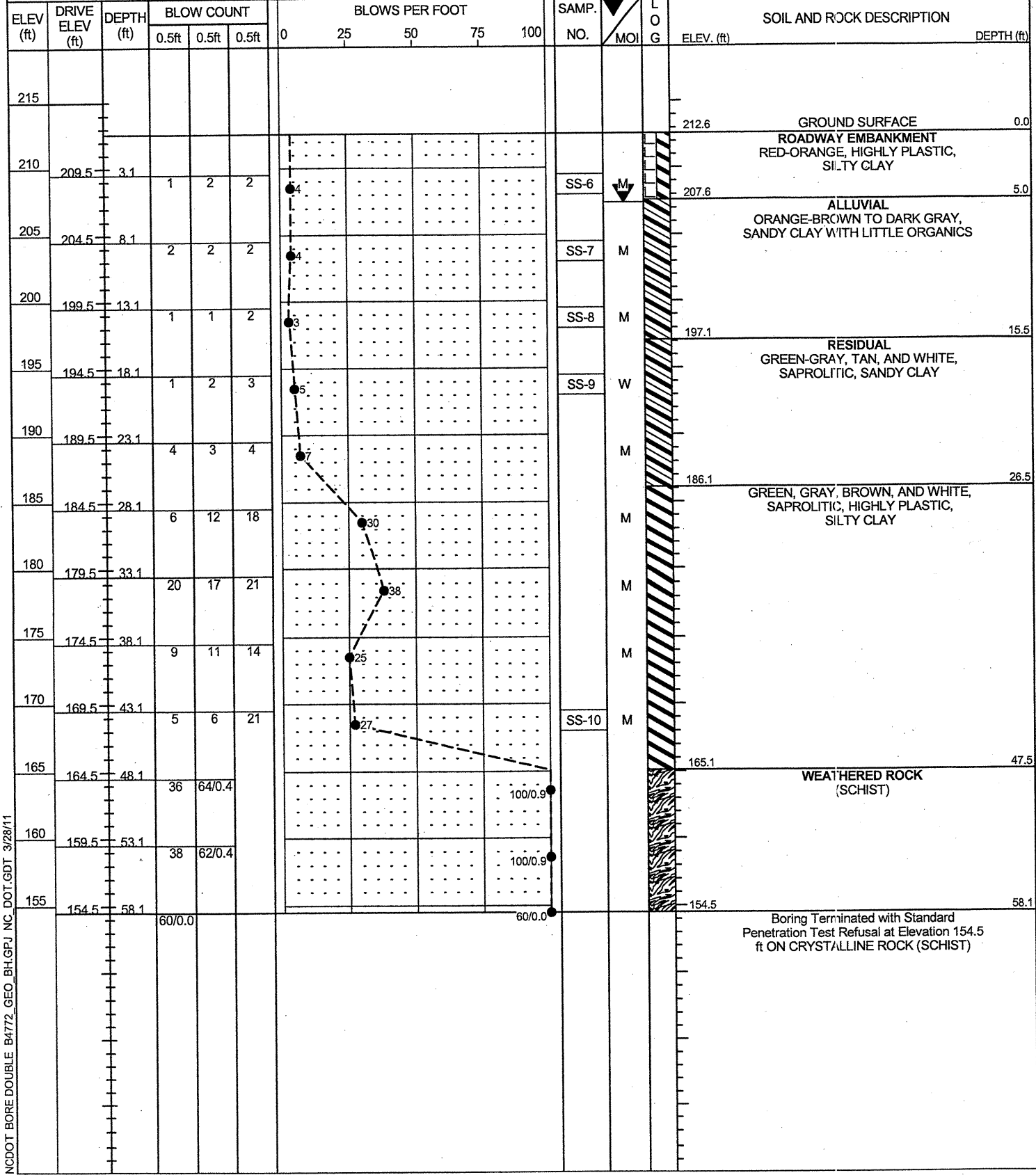
VE = 1:1

CROSS SECTION THROUGH END BENT 2

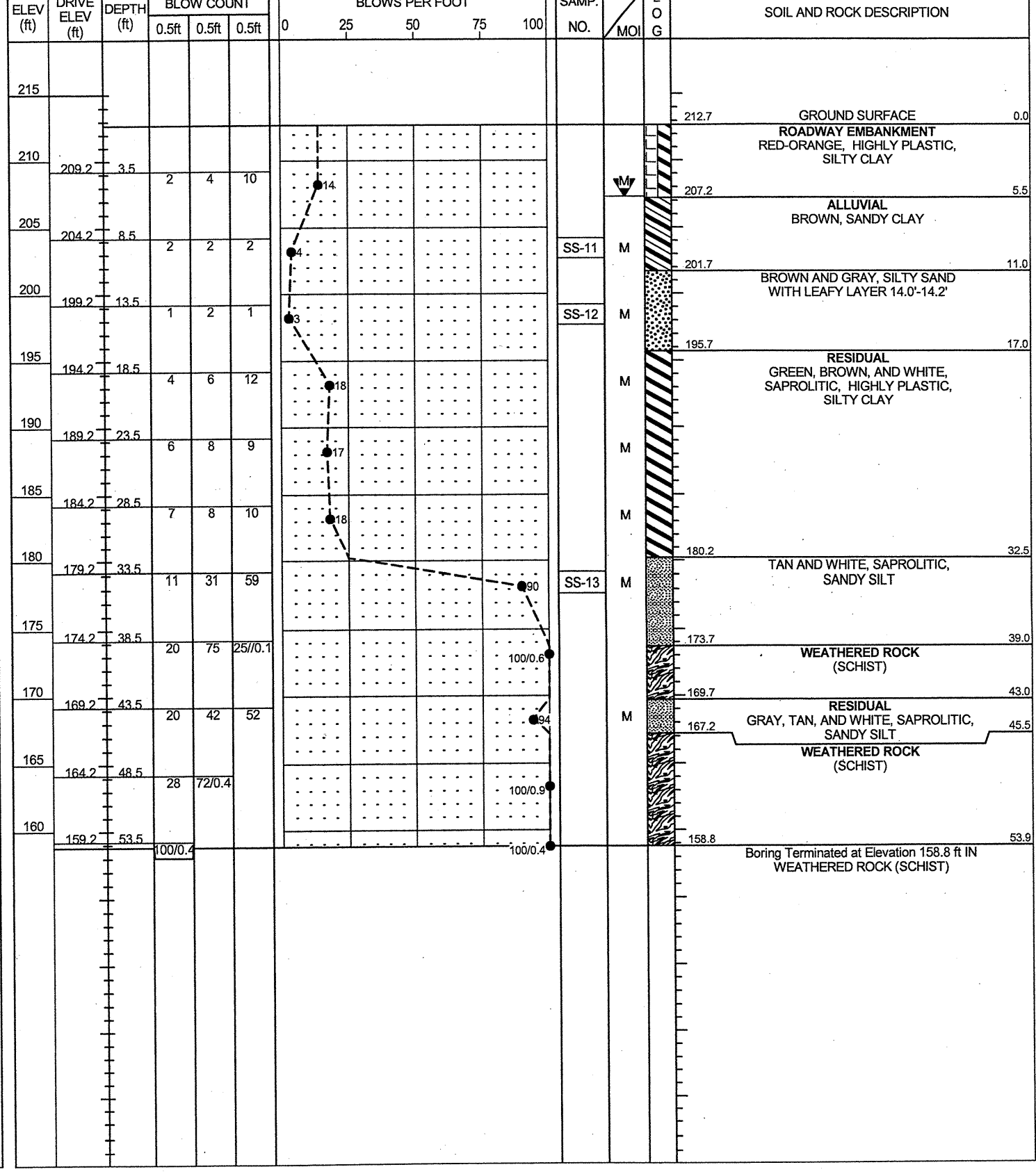
Ⓞ ROADWAY EMBANKMENT, RED, ORANGE, AND BROWN, MED. STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY AND VERY LOOSE, MOIST, HIGHLY PLASTIC, CLAYEY SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38544.1.1	TIP B-4772	COUNTY JOHNSTON	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 326 ON -L- (SR 1525) OVER MILL BRANCH CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 14+34	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 212.6 ft	TOTAL DEPTH 58.1 ft	NORTHING 664,044	EASTING 2,127,058
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/14/11	COMP. DATE 03/14/11	SURFACE WATER DEPTH N/A



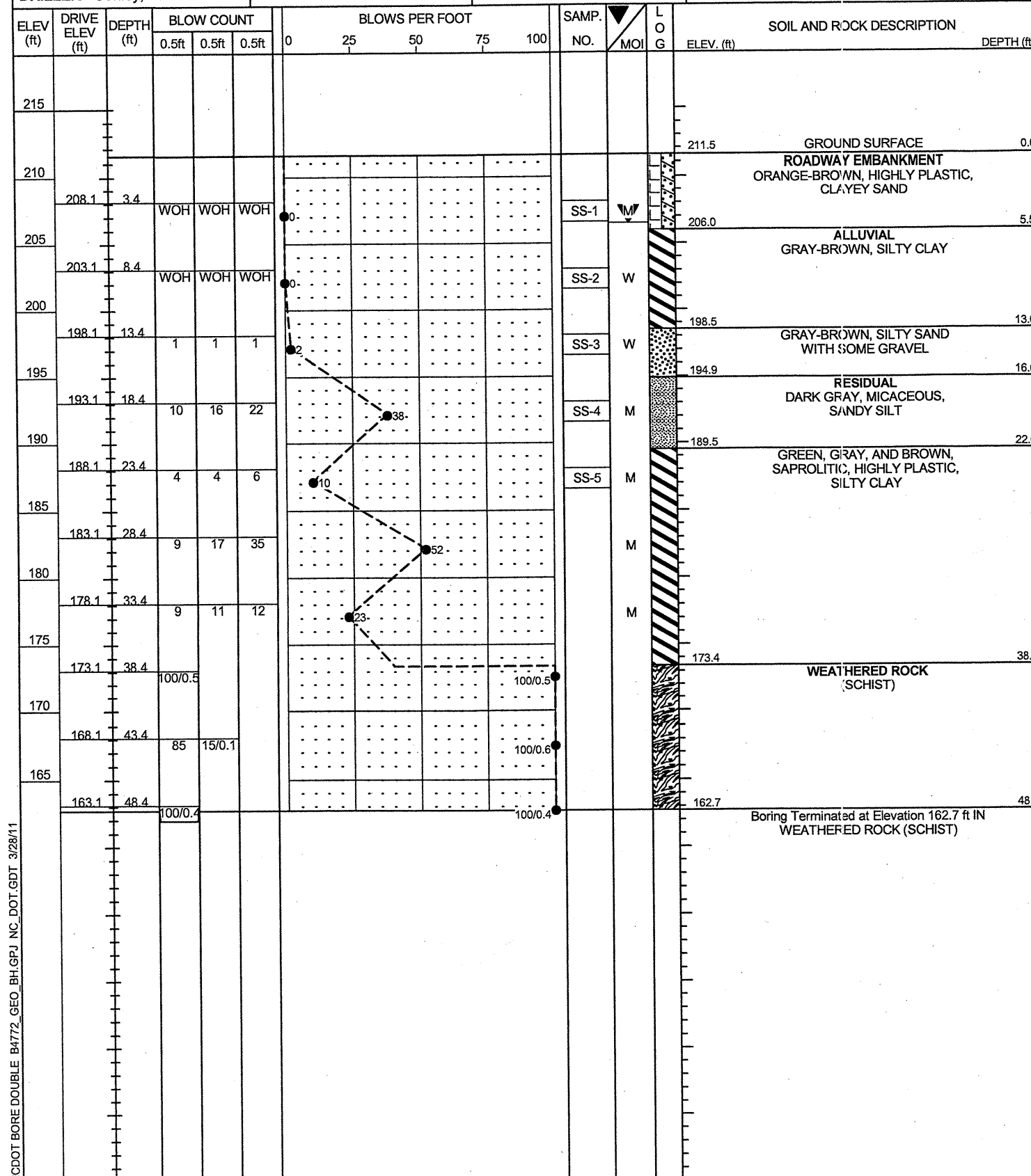
WBS 38544.1.1	TIP B-4772	COUNTY JOHNSTON	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 326 ON -L- (SR 1525) OVER MILL BRANCH CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 14+34	OFFSET 17 ft RT	ALIGNMENT -L-
COLLAR ELEV. 212.7 ft	TOTAL DEPTH 53.9 ft	NORTHING 664,013	EASTING 2,127,060
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/15/11	COMP. DATE 03/15/11	SURFACE WATER DEPTH N/A



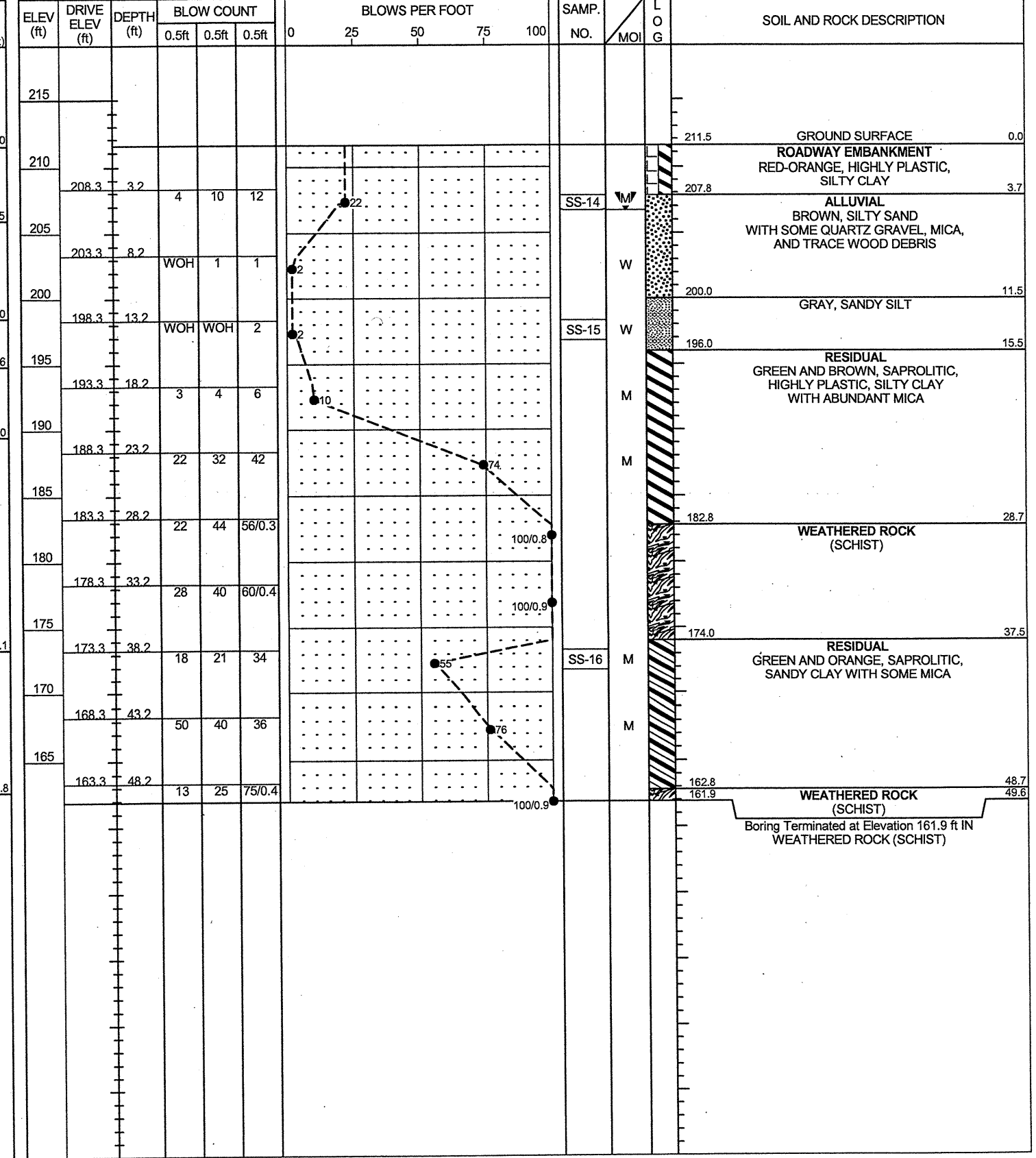
NCDOT BORE DOUBLE B4772 GEO. BH.GPJ NC DOT.GDT 3/28/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38544.1.1	TIP B-4772	COUNTY JOHNSTON	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 326 ON -L- (SR 1525) OVER MILL BRANCH CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 15+22	OFFSET 15 ft LT	ALIGNMENT -L-
COLLAR ELEV. 211.5 ft	TOTAL DEPTH 48.8 ft	NORTHING 664,051	EASTING 2,127,145
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/14/11	COMP. DATE 03/14/11	SURFACE WATER DEPTH N/A



WBS 38544.1.1	TIP B-4772	COUNTY JOHNSTON	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 326 ON -L- (SR 1525) OVER MILL BRANCH CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 15+22	OFFSET 15 ft RT	ALIGNMENT -L-
COLLAR ELEV. 211.5 ft	TOTAL DEPTH 49.6 ft	NORTHING 664,021	EASTING 2,127,147
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/16/11	COMP. DATE 03/16/11	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE B4772_GEO_BH.GPJ NC_DOT.GDT 3/28/11

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-6	14 LT	14+34	3.1-4.6	A-7-5(31)	69	38	5.7	14.7	18.4	61.2	90	88	75	-	-
SS-7	14 LT	14+34	8.1-9.6	A-6(4)	36	13	19.8	36.5	15.1	28.6	96	87	49	-	-
SS-8	14 LT	14+34	13.1-14.6	A-6(5)	39	11	6.5	49.8	23.3	20.4	100	97	57	-	7.7
SS-9	14 LT	14+34	18.1-19.6	A-4(4)	37	8	11.6	36.5	35.5	16.3	92	87	59	-	-
SS-10	14 LT	14+34	43.1-44.6	A-7-6(23)	58	34	11.8	20.4	31.0	36.7	97	91	70	-	-

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-11	17 RT	14+34	8.5-10.0	A-6(9)	40	15	10.8	29.6	18.8	40.8	98	92	66	-	-
SS-12	17 RT	14+34	13.5-15.0	A-2-4(0)	30	NP	28.2	56.3	7.3	8.2	96	87	21	-	-
SS-13	17 LT	14+34	33.5-35.0	A-4(2)	38	5	7.8	44.9	33.1	14.3	100	99	57	-	-

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-1	15 LT	15+22	3.4-4.9	A-2-7(4)	58	35	56.3	10.0	1.0	32.7	87	48	31	-	-
SS-2	15 LT	15+22	8.4-9.9	A-7-6(2)	43	18	32.4	23.5	11.4	32.7	79	62	38	-	-
SS-3	15 LT	15+22	13.4-14.9	A-2-4(0)	24	NP	43.5	45.5	2.9	8.2	92	69	13	-	-
SS-4	15 LT	15+22	18.4-19.9	A-4(0)	27	NP	13.5	56.9	21.4	8.2	100	97	40	-	-
SS-5	15 LT	15+22	23.4-24.9	A-7-6(39)	71	47	7.6	15.9	25.5	51.0	99	95	79	-	-

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-14	15 RT	15+22	3.7-4.7	A-2-4(0)	16	NP	39.4	42.4	8.0	10.2	77	61	18	-	-
SS-15	15 RT	15+22	13.2-14.7	A-4(0)	30	NP	14.5	39.2	13.7	32.7	98	92	54	-	-
SS-16	15 RT	15+22	38.2-39.7	A-6(3)	34	12	3.5	58.2	30.2	8.2	100	99	51	-	-



**FIELD
SCOUR REPORT**

WBS: 38544.1.1 TIP: B-4772 COUNTY: Johnston

DESCRIPTION(1): Bridge No. 326 on -L- (SR 1525) over Mill Branch Creek

EXISTING BRIDGE

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

Bridge No.: 326 Length: 35 Total Bents: 3 Bents in Channel: 3 Bents in Floodplain: 0
Foundation Type: Timber Piles

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None visible - submerged

Interior Bents: None visible - submerged

Channel Bed: None

Channel Bank: None

EXISTING SCOUR PROTECTION

Type(3): Wooden wing walls

Extent(4): 40' W x 5' H

Effectiveness(5): Effective

Obstructions(6): None

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 and brown, soft, sandy clay

Channel Bank Material(8): Alluvial, gray and brown, very soft to soft, silty clay

Channel Bank Cover(9): Grass and brush

Floodplain Width(10): +/- 250

Floodplain Cover(11): grass, trees, and brush

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tend.(13): None

Observations and Other Comments: Mill Branch Creek empties into the head of a pond on the downstream side

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

Comparison of DSE to Hydraulics Unit theoretical scour:
According to the DSE, the scour elevation in the channel is 200.0'. The historical scour elevations range from 194.9' to 197.1'.

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 8,
"Soil Test Results",
for samples:
SS-7
SS-11

Reported by: Jaime Love Pedro Date: 3/14/2011
Jaime Love Pedro

SITE PHOTOGRAPH

Bridge No. 326 on -L- (SR 1525) over Mill Branch Creek



Looking South towards End Bent 2

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33772.1.1 (B-4561)	1	11

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

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-6	CROSS SECTIONS
7-10	BORE LOGS
11	SITE PHOTOGRAPH

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33772.1.1 (B-4561) F.A. PROJ. BRZ-1525(5)
COUNTY JOHNSTON
PROJECT DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK

INVENTORY

CAUTION NOTICE

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

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (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: 33772.1.1 ID: B-4561

PERSONNEL

N.D. MOHS

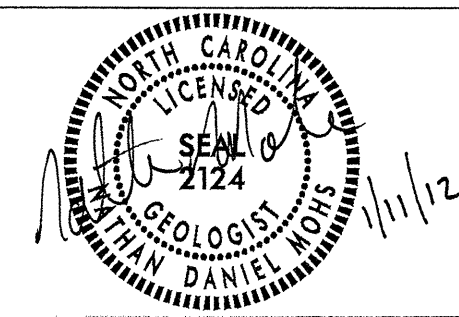
TERRACON

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.D. MOHS

DATE JANUARY 2012



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 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

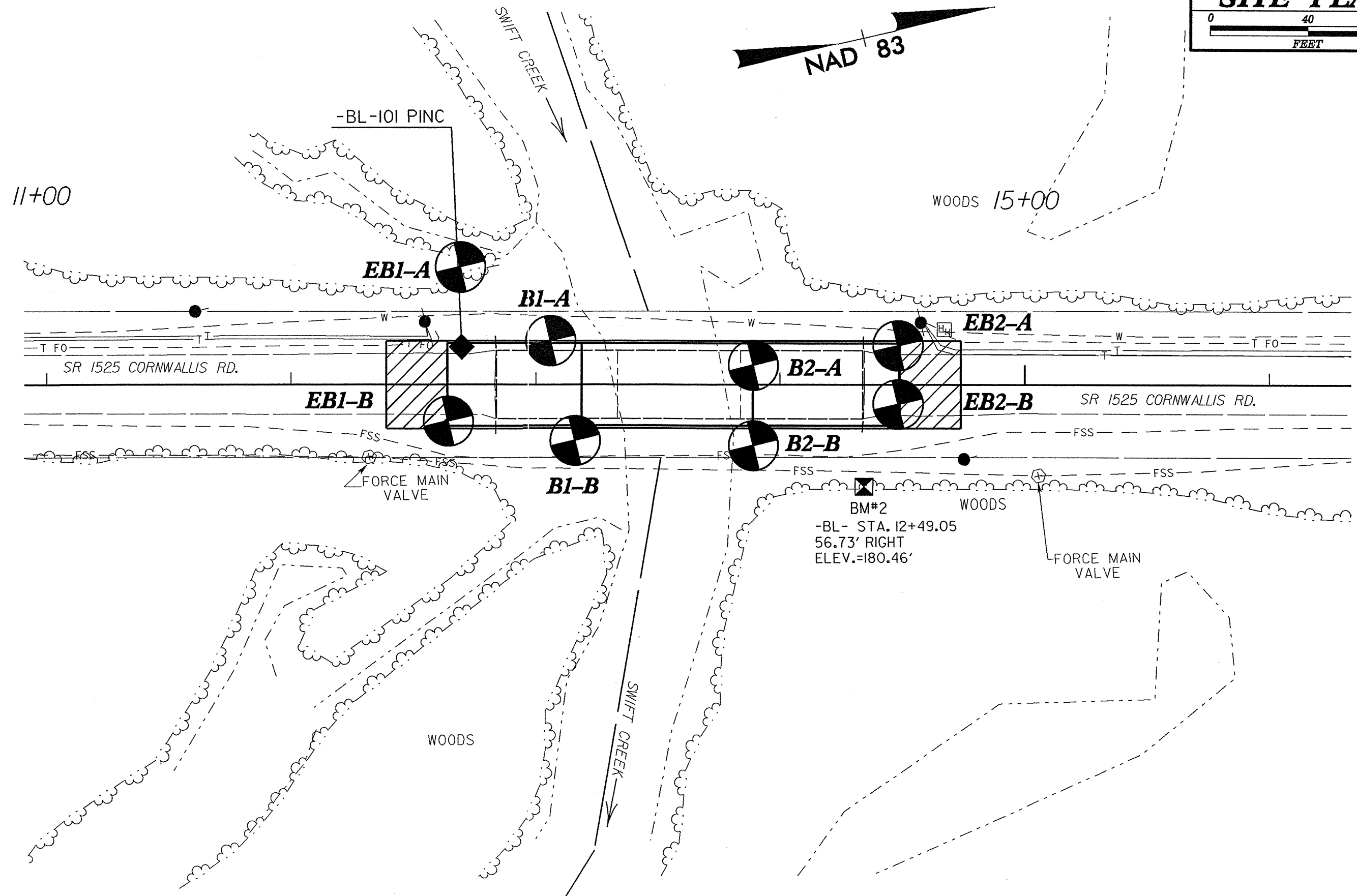
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

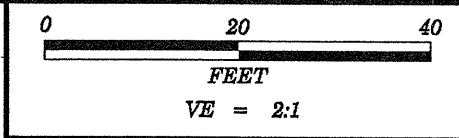
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 33772.I.I (B-4561) SHEET NO. 2

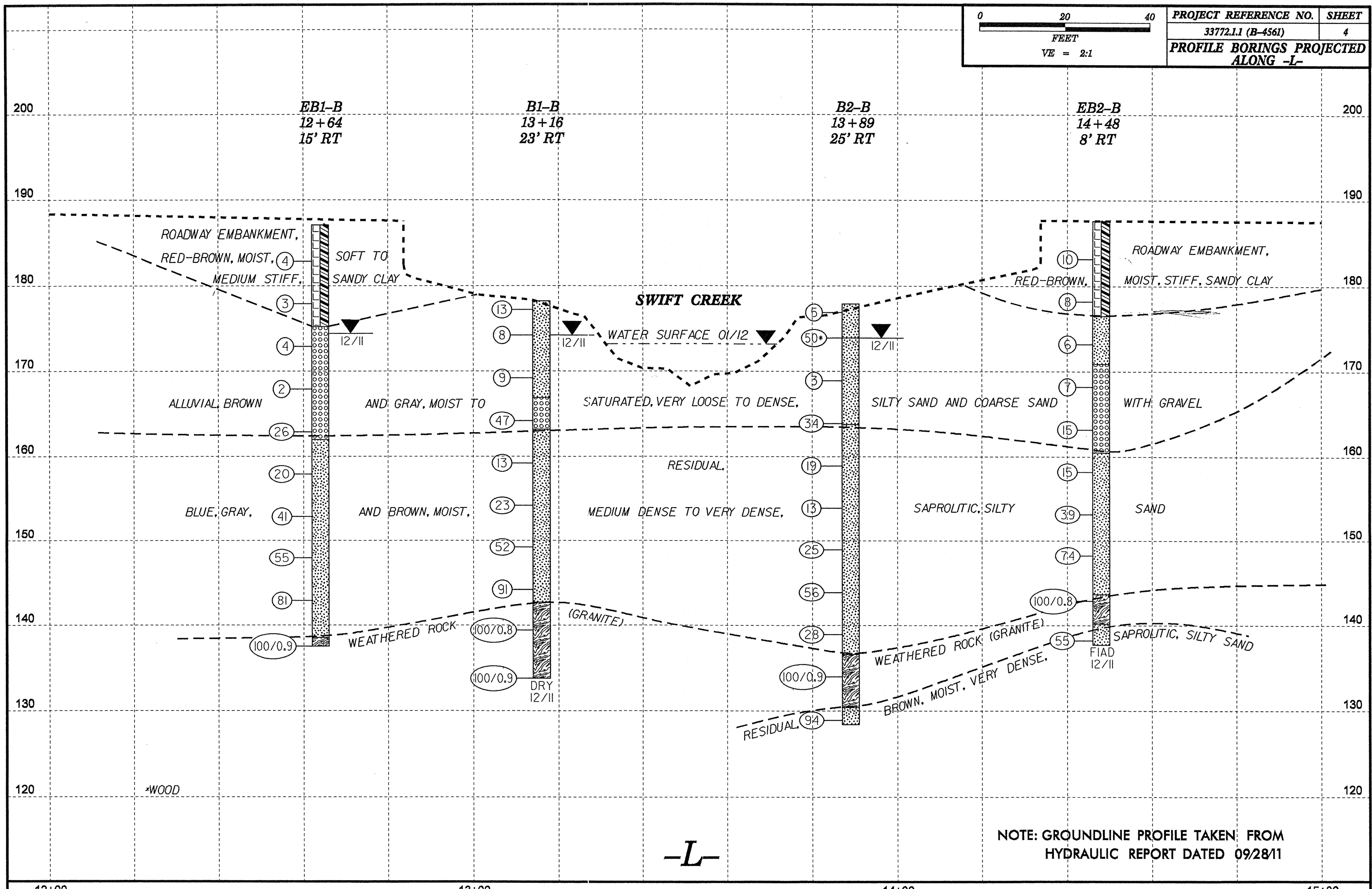
Main content area containing SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, PLASTICITY, and COLOR.



SKEW = 90°

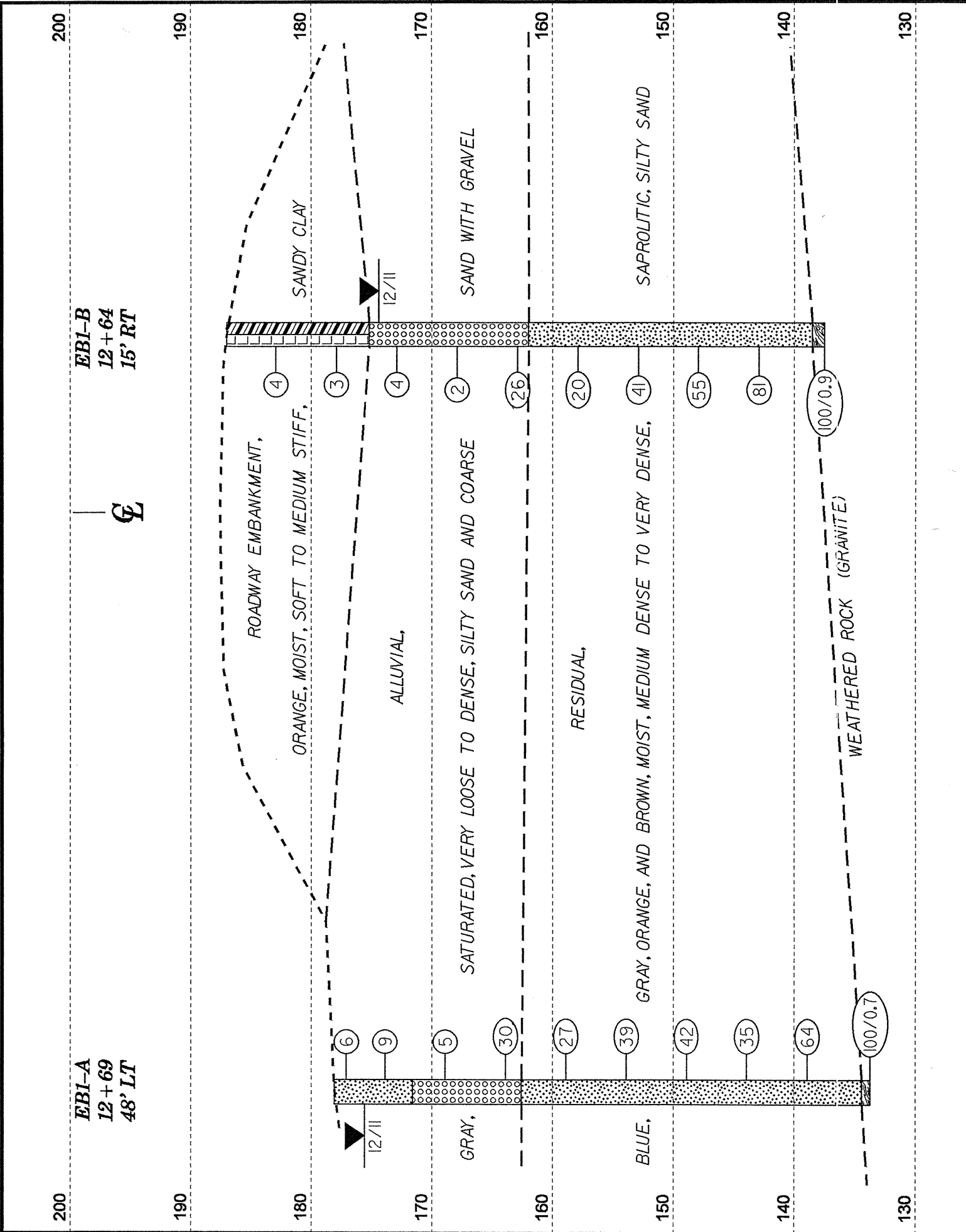


PROJECT REFERENCE NO.	SHEET
33772.1.1 (B-4561)	4
PROFILE BORINGS PROJECTED ALONG -L-	



-L-

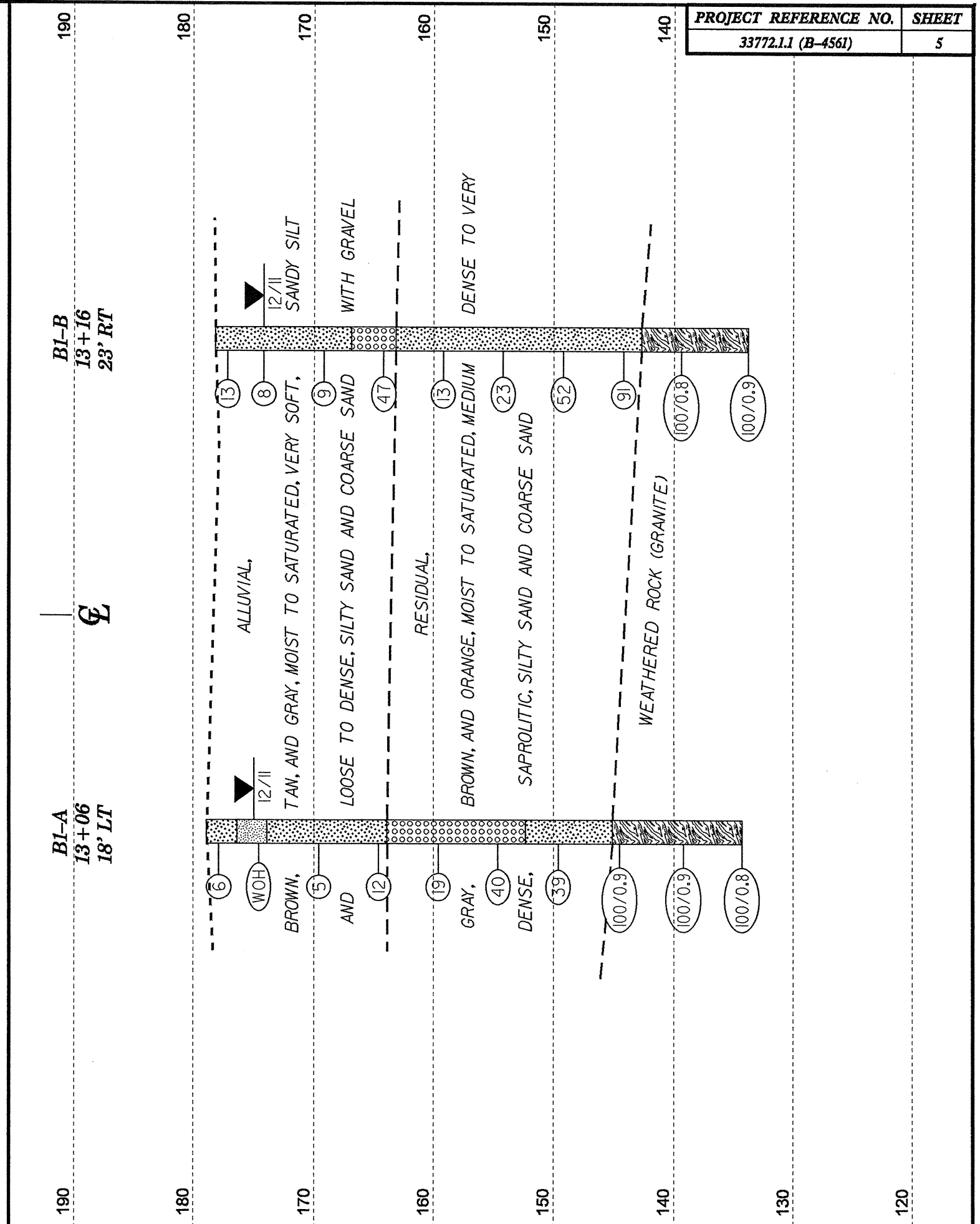
NOTE: GROUNDLINE PROFILE TAKEN FROM HYDRAULIC REPORT DATED 09/28/11



HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

CROSS SECTION THROUGH END BENT 1

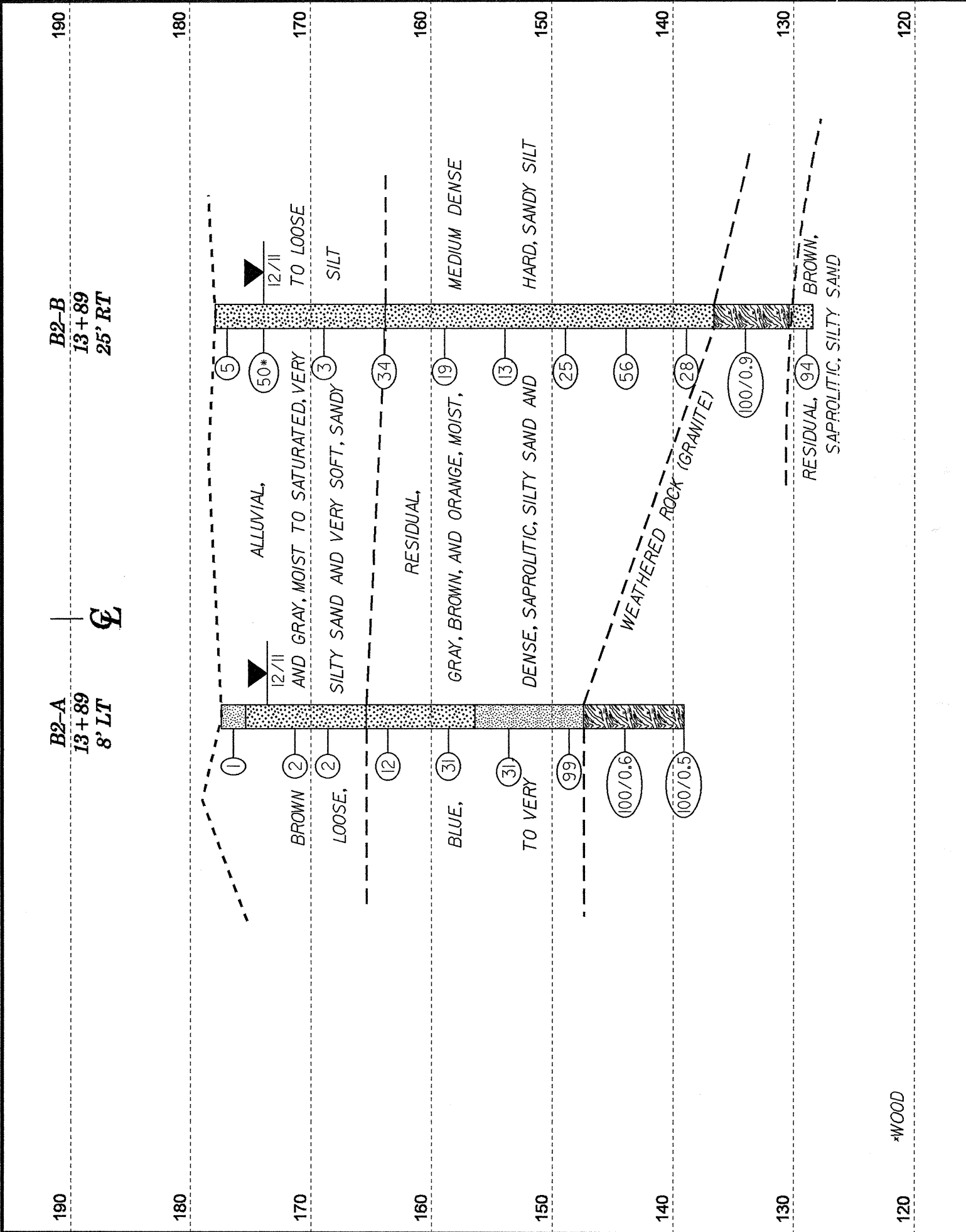


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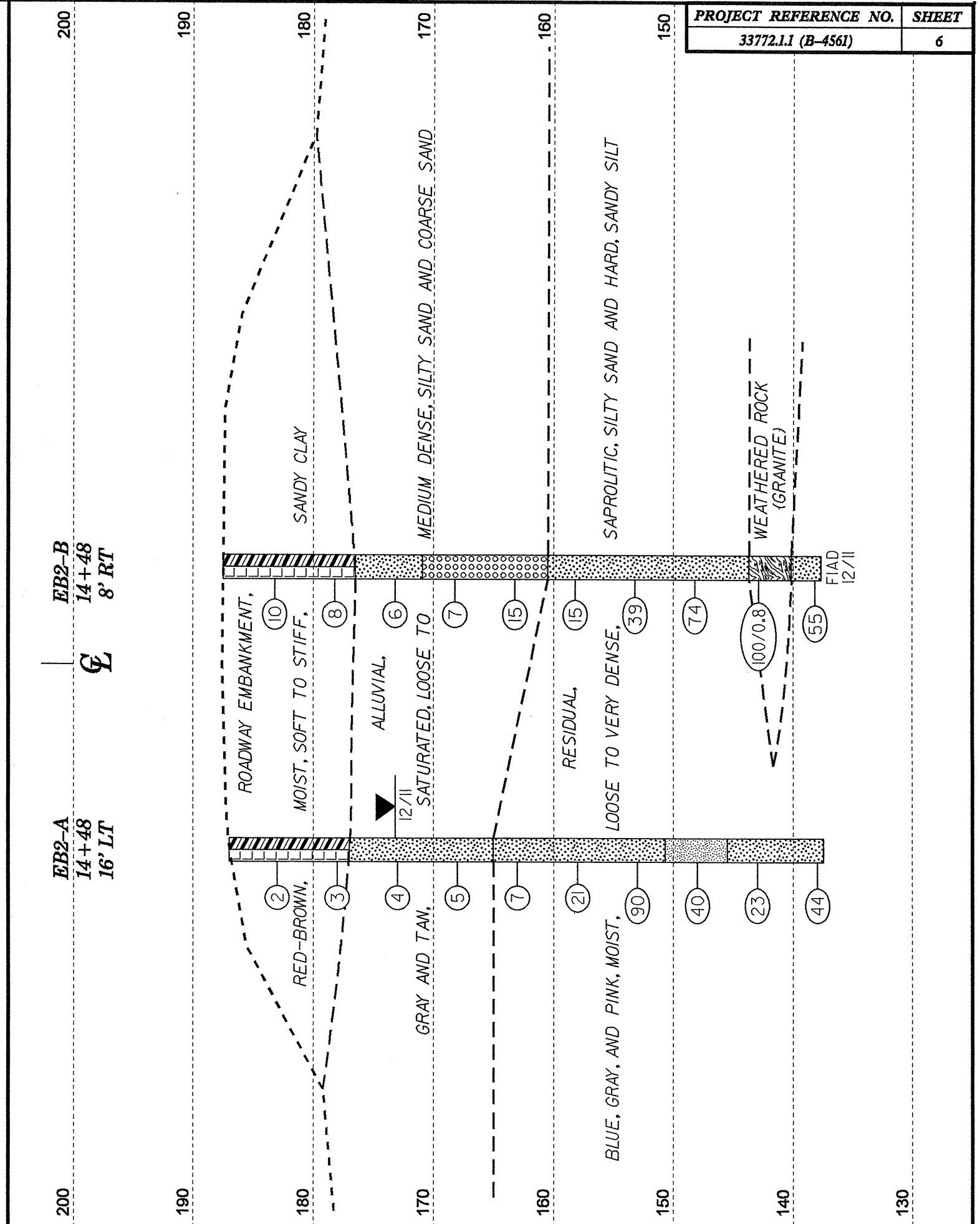
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33772.1.1 (B-4561)	5



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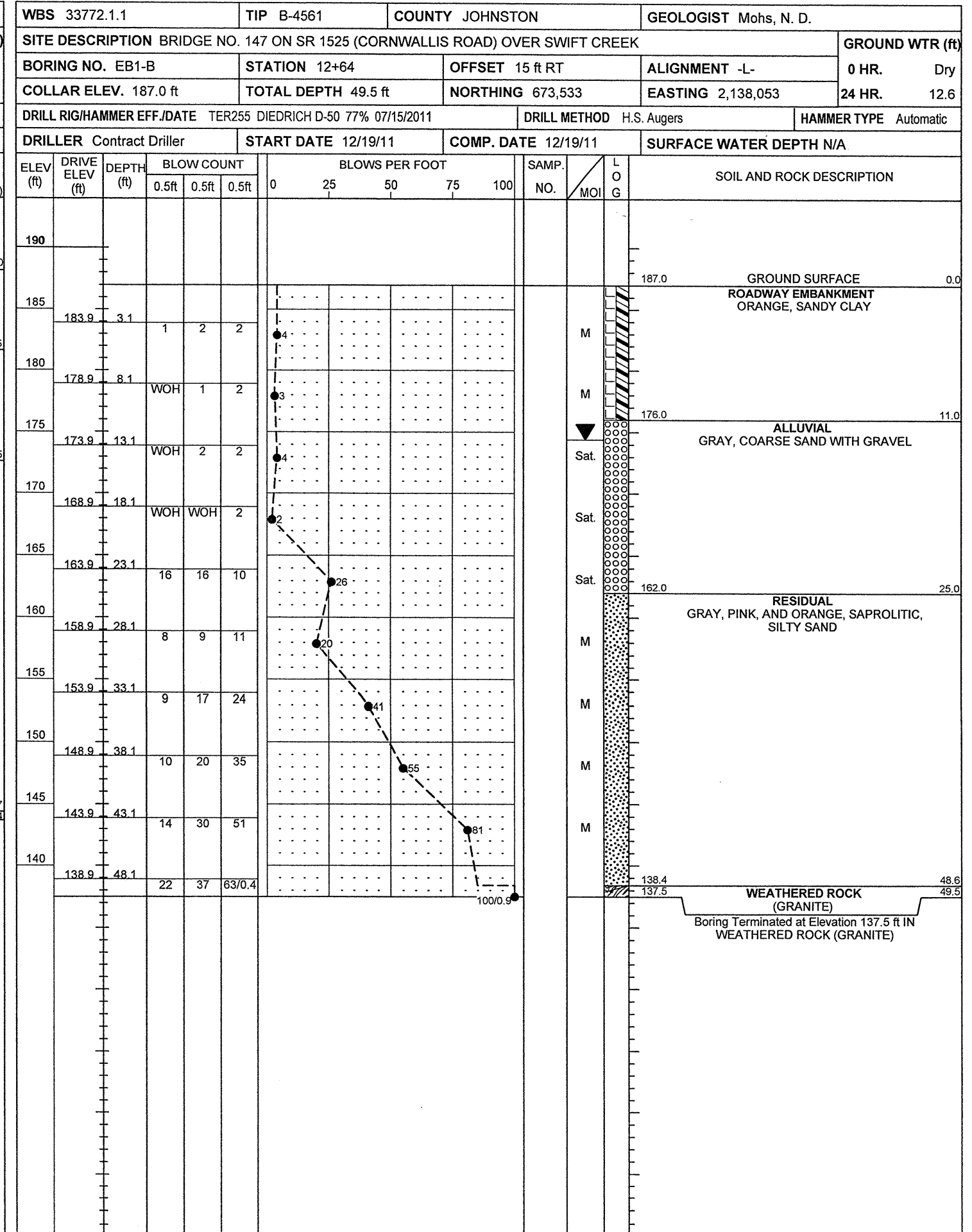
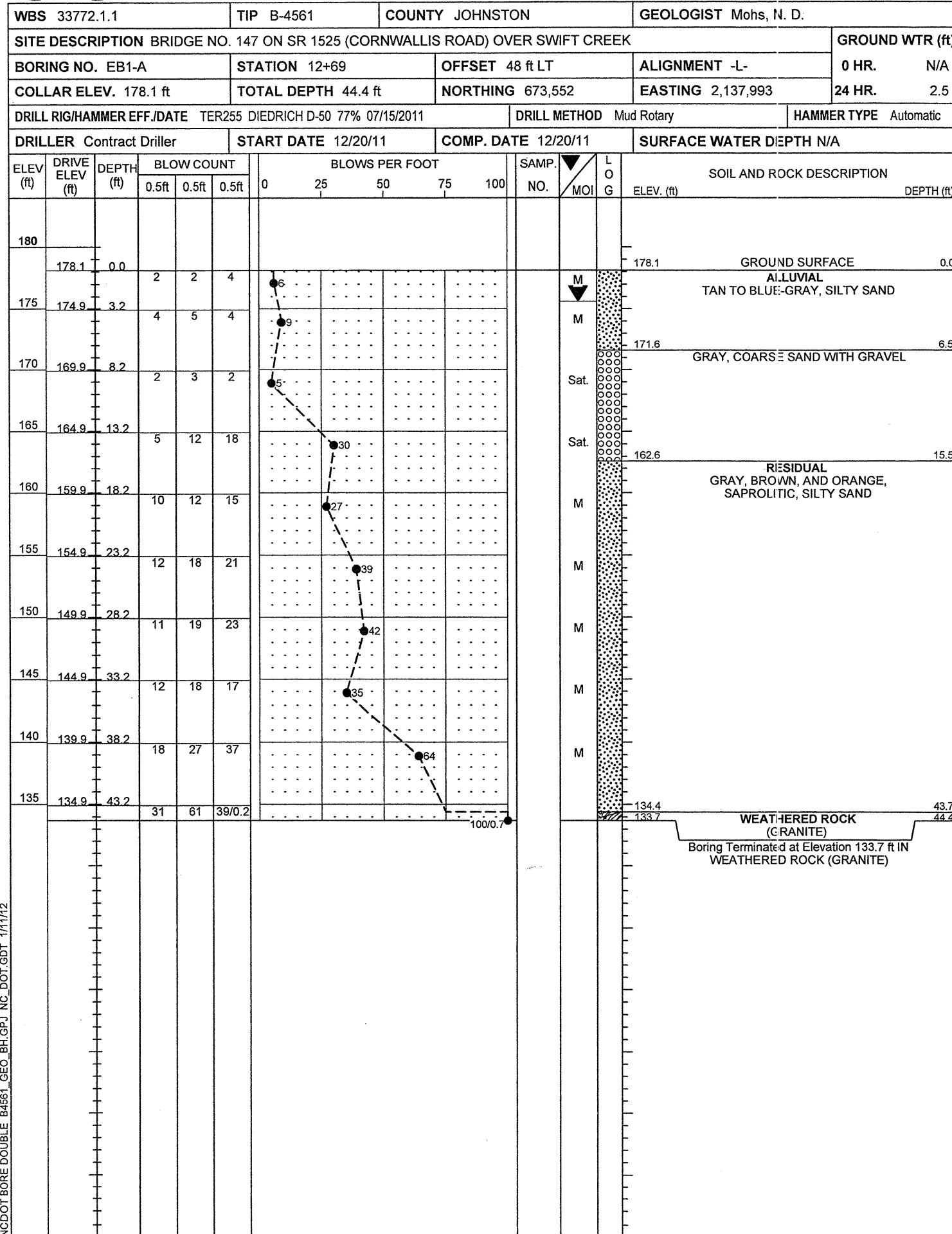


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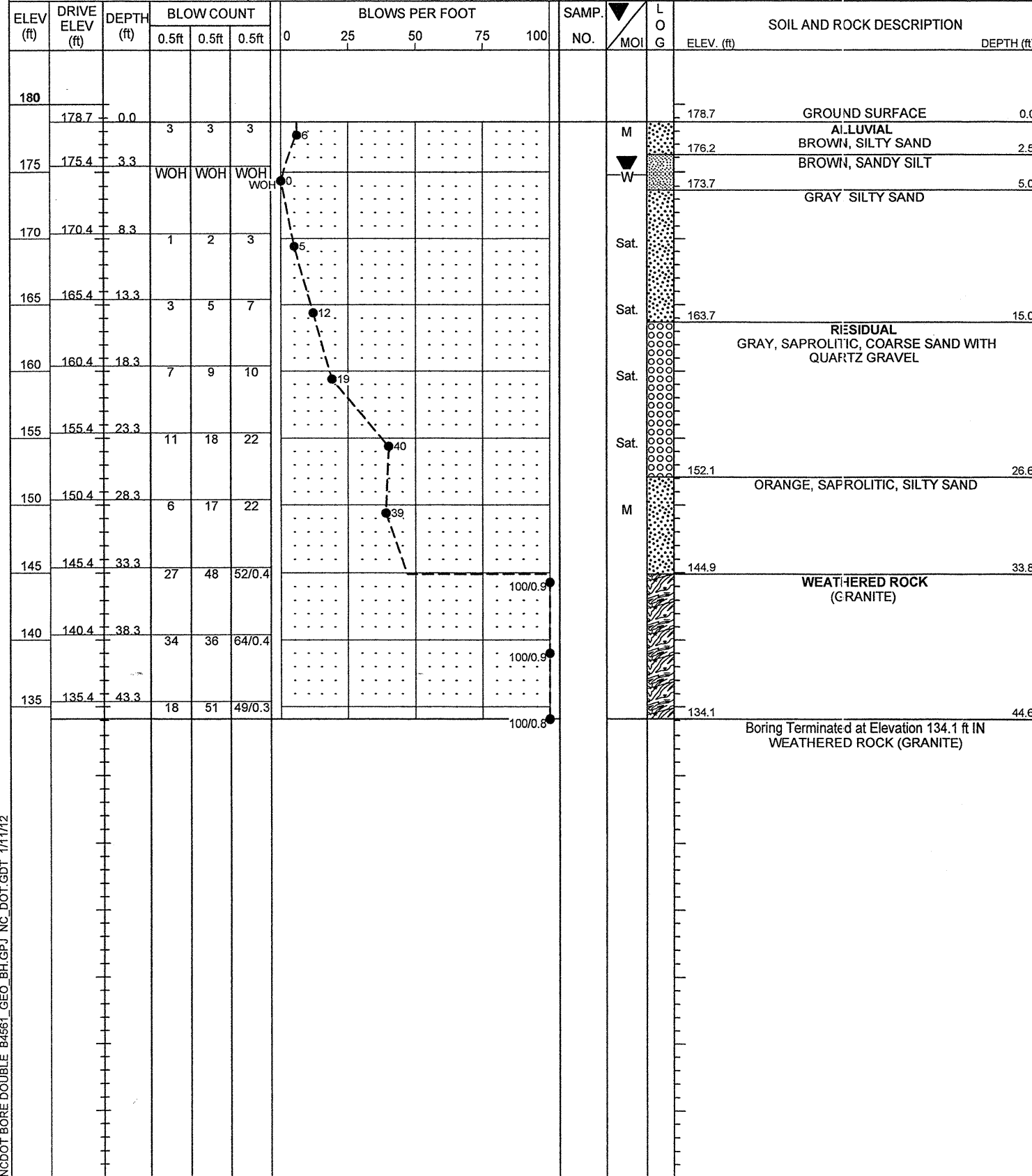
CROSS SECTION THROUGH END BENT 2

PROJECT REFERENCE NO.	SHEET
33772.1.1 (B-4561)	6

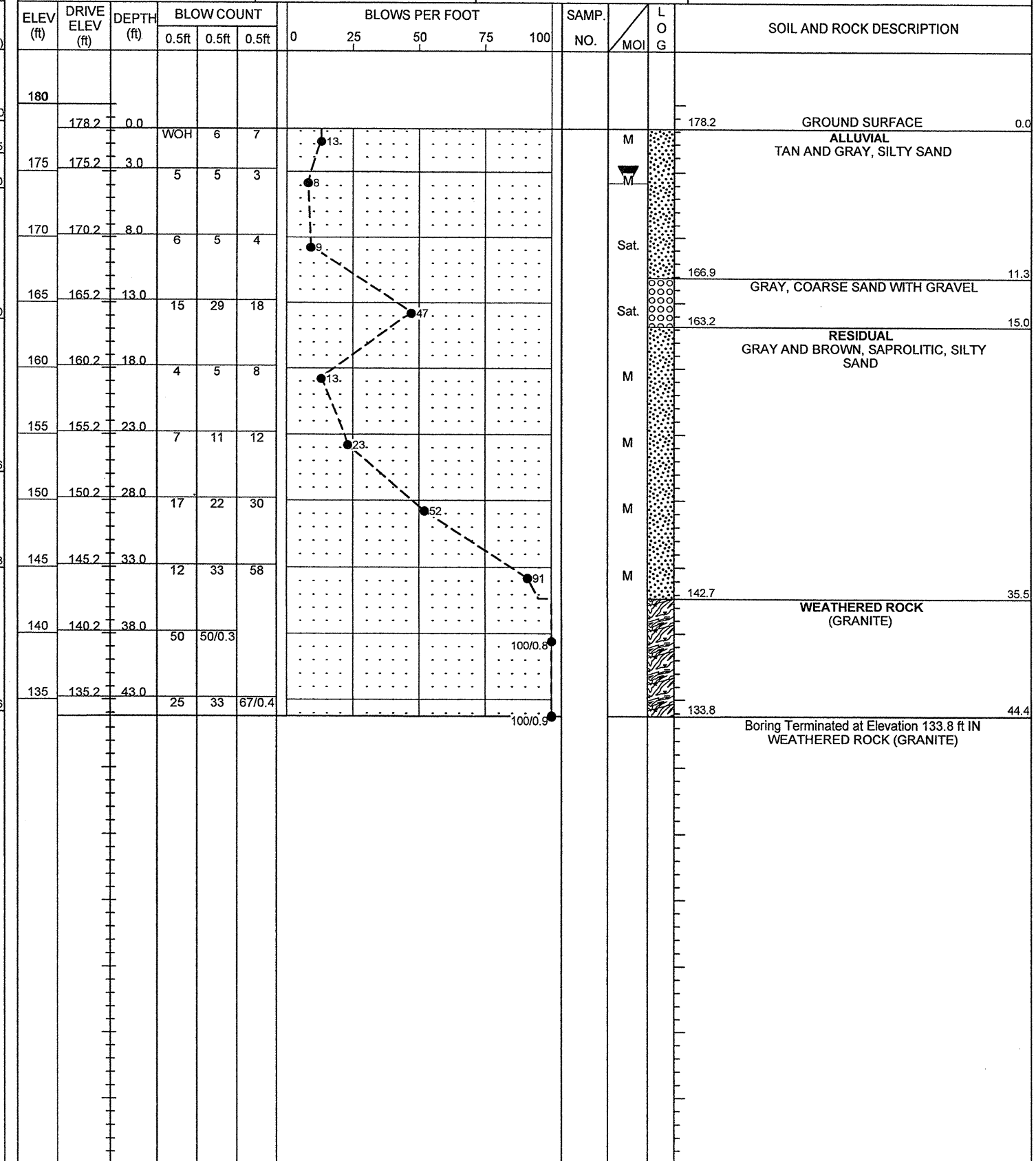


NCDOT BORE DOUBLE B4561_GEO_BH.GPJ NC_DOT.GDT 1/11/12

WBS 33772.1.1	TIP B-4561	COUNTY JOHNSTON	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 13+06	OFFSET 18 ft LT	ALIGNMENT -L-
COLLAR ELEV. 178.7 ft	TOTAL DEPTH 44.6 ft	NORTHING 673,581	EASTING 2,138,031
DRILL RIG/HAMMER EFF./DATE TER255 DIETRICH D-50 77% 07/15/2011		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 12/20/11	COMP. DATE 12/20/11	SURFACE WATER DEPTH N/A

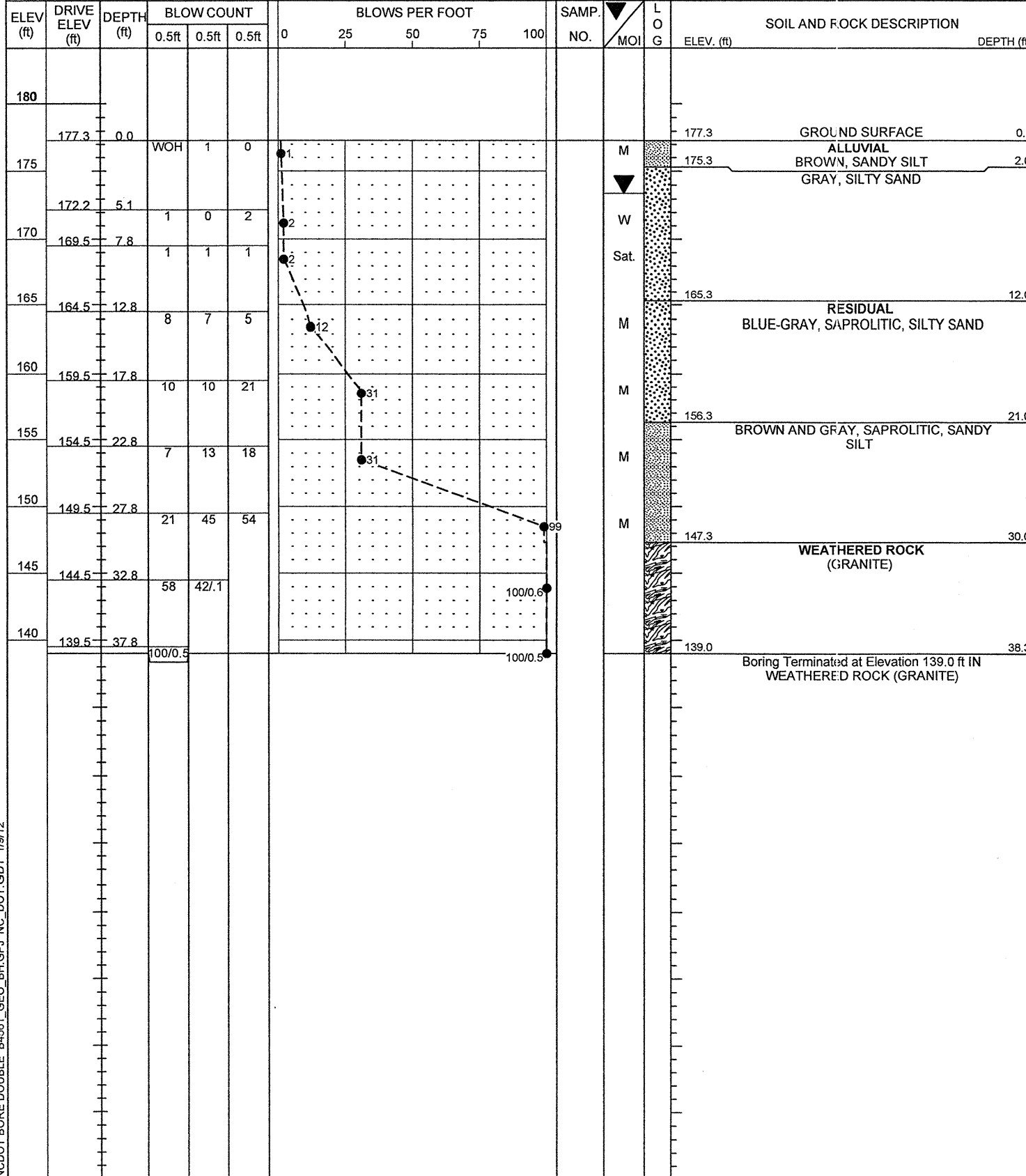


WBS 33772.1.1	TIP B-4561	COUNTY JOHNSTON	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 13+16	OFFSET 23 ft RT	ALIGNMENT -L-
COLLAR ELEV. 178.2 ft	TOTAL DEPTH 44.4 ft	NORTHING 673,581	EASTING 2,138,073
DRILL RIG/HAMMER EFF./DATE TER255 DIETRICH D-50 77% 07/15/2011		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 12/19/11	COMP. DATE 12/19/11	SURFACE WATER DEPTH N/A

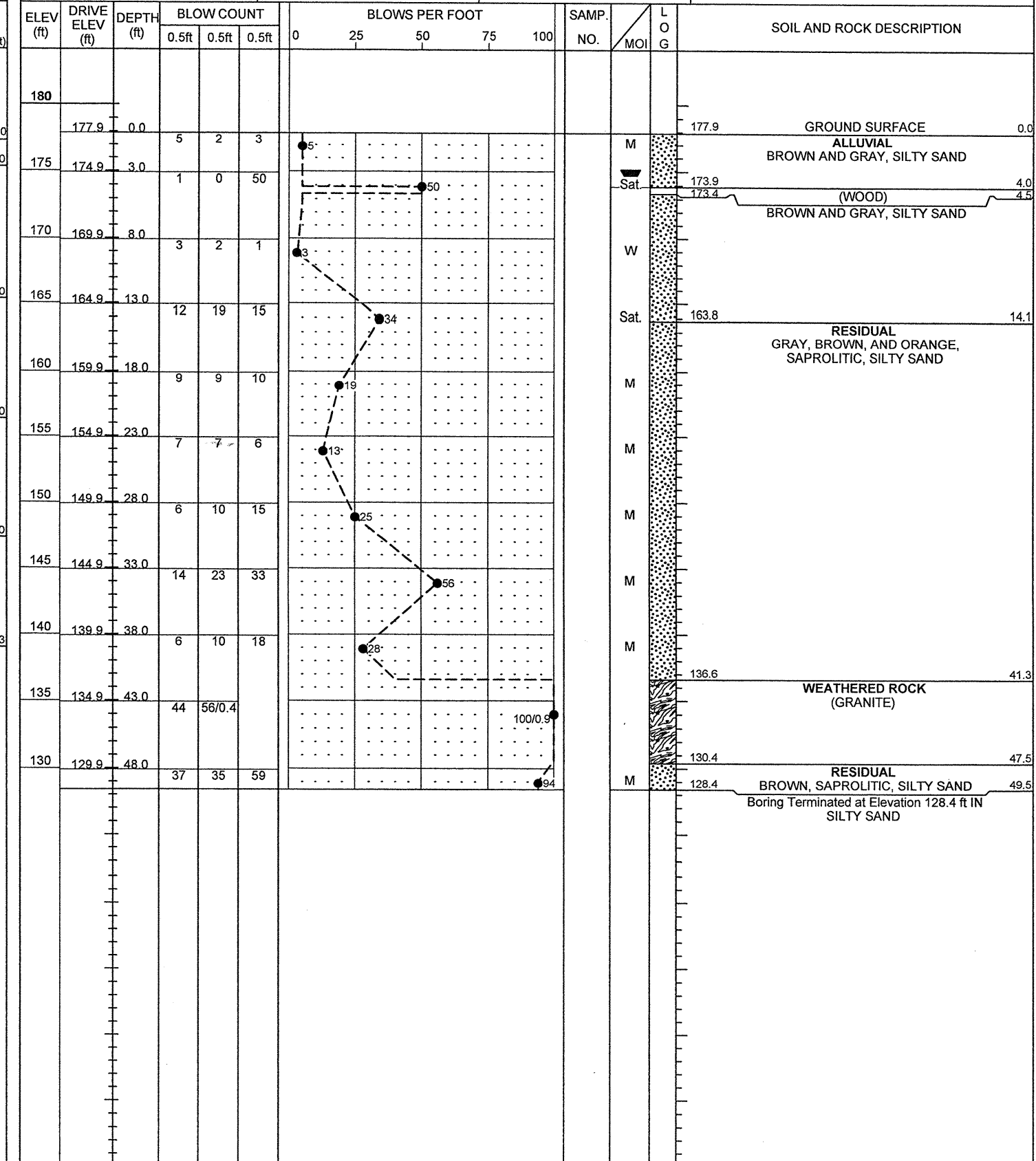


NCDOT BORE DOUBLE B4561 GEO_BH.GPJ NC_DOT.GDT 1/11/12

WBS 33772.1.1	TIP B-4561	COUNTY JOHNSTON	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 13+89	OFFSET 8 ft LT	ALIGNMENT -L-
COLLAR ELEV. 177.3 ft	TOTAL DEPTH 38.3 ft	NORTHING 673,659	EASTING 2,138,060
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 12/16/11	COMP. DATE 12/16/11	SURFACE WATER DEPTH N/A



WBS 33772.1.1	TIP B-4561	COUNTY JOHNSTON	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 13+89	OFFSET 25 ft RT	ALIGNMENT -L-
COLLAR ELEV. 177.9 ft	TOTAL DEPTH 49.5 ft	NORTHING 673,652	EASTING 2,138,092
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 12/20/11	COMP. DATE 12/20/11	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE B4561_GEO_BH.GPJ NC_DOT.GDT 1/9/12

WBS 33772.1.1		TIP B-4561		COUNTY JOHNSTON		GEOLOGIST Mohs, N. D.										
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK							GROUND WTR (ft)									
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	Dry									
EB2-A	14+48	16 ft LT	-L-			24 HR.	13.8									
COLLAR ELEV. 187.0 ft		TOTAL DEPTH 49.5 ft	NORTHING 673,719	EASTING 2,138,066												
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 12/16/11	COMP. DATE 12/16/11	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
190														187.0	GROUND SURFACE	0.0
185	184.0	3.0	5	1	1							M			ROADWAY EMBANKMENT RED-BROWN, SANDY CLAY	
180	179.0	8.0	WOH	WOH	3							M				
175	174.0	13.0	1	2	2							Sat.		177.0	ALLUVIAL GRAY AND TAN, SILTY SAND	10.0
170	169.0	18.0	1	2	3							Sat.				
165	164.0	23.0	3	3	4							M		165.0	RESIDUAL BLUE-GRAY, SAPROLITIC, SILTY SAND	22.0
160	159.0	28.0	5	8	13							M				
155	154.0	33.0	18	33	57							M				
150	149.0	38.0	9	16	24							M		150.7	GRAY, SAPROLITIC, SANDY SILT	36.3
145	144.0	43.0	7	8	15							M		145.5	PINK, GRAY, AND/ORANGE, SAPROLITIC, SILTY SAND	41.5
140	139.0	48.0	10	20	24							M		137.5	Boring Terminated at Elevation 137.5 ft IN SILTY SAND	49.5

WBS 33772.1.1		TIP B-4561		COUNTY JOHNSTON		GEOLOGIST Mohs, N. D.										
SITE DESCRIPTION BRIDGE NO. 147 ON SR 1525 (CORNWALLIS ROAD) OVER SWIFT CREEK							GROUND WTR (ft)									
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	14.0									
EB2-B	14+48	8 ft RT	-L-			24 HR.	FIAD									
COLLAR ELEV. 187.5 ft		TOTAL DEPTH 49.8 ft	NORTHING 673,713	EASTING 2,138,089												
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 12/19/11	COMP. DATE 12/19/11	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
190														187.5	GROUND SURFACE	0.0
185	184.2	3.3	3	4	6							M			ROADWAY EMBANKMENT RED-BROWN, SANDY CLAY	
180	179.2	8.3	4	4	4							M				
175	174.2	13.3	WOH	2	4							Sat.		176.5	ALLUVIAL TAN, SILTY SAND	11.0
170	169.2	18.3	2	3	4							Sat.		170.9	GRAY, COARSE SAND	16.6
165	164.2	23.3	7	8	7							Sat.				
160	159.2	28.3	3	5	10							M		160.5	RESIDUAL BLUE-GRAY, WHITE, AND PINK, SAPROLITIC, SILTY SAND	27.0
155	154.2	33.3	11	17	22							M				
150	149.2	38.3	10	20	54							M				
145	144.2	43.3	30	60	40/0.3							M		143.7	WEATHERED ROCK (GRANITE)	43.8
140	139.2	48.3	20	29	26							M		140.2	RESIDUAL ORANGE, SAPROLITIC, SILTY SAND	47.3
														137.7	Boring Terminated at Elevation 137.7 ft IN SILTY SAND	49.8

NCDOT BORE DOUBLE B4561_GEO_BH.GPJ NC_DOT.GDT 1/9/12

SITE PHOTOGRAPH

Bridge No. 147 on SR 1525 (Cornwallis Road) over Swift Creek

