

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	38606.1.1 B-4836	1	24

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

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PROJ. REFERENCE NO. B-4836 F.A. PROJ. BRZ-1331(12)
COUNTY WATAUGA
PROJECT DESCRIPTION BRIDGE NO. 59 ON S.R. 1331 (ROBY GREENE RD) OVER SOUTH FORK OF THE NEW RIVER

SITE DESCRIPTION _____

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 ~~PAI~~ PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN FIELD BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4068. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

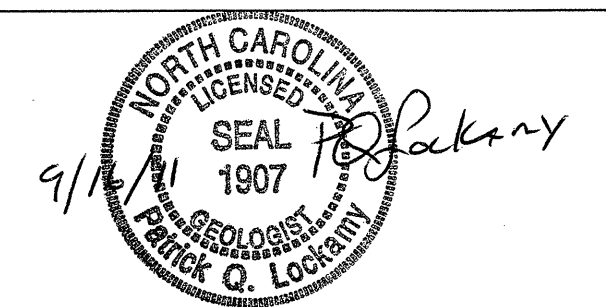
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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: 38606.1.1 **ID: B-4836**

PERSONNEL
D. C. ELLIOTT
C. J. COFFEY
L. A. RIDDLE

INVESTIGATED BY P. Q. LOCKAMY
CHECKED BY W. D. FRYE
SUBMITTED BY W. D. FRYE
DATE 9.16.11



DRAWN BY: J. T. WILLIAMS

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.

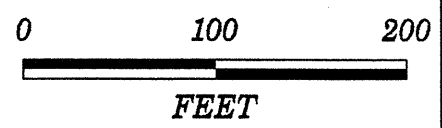
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

PROJECT REFERENCE NO. 38606.II B-4836	SHEET NO. 2 OF 24
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SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

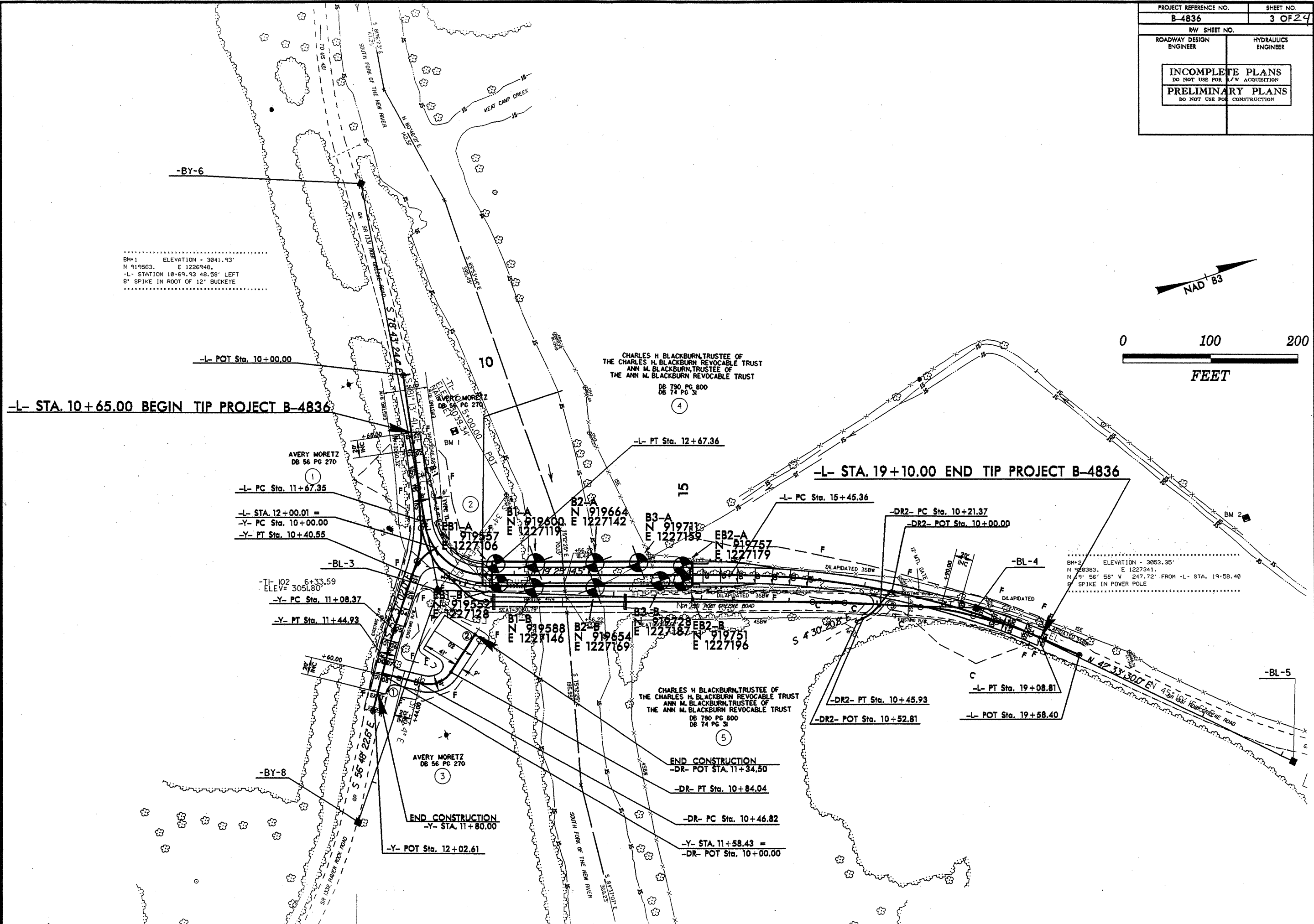
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM 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. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY 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. MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	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: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ADUIFIER - 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 REPLACED 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 (SCREC.) - 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 GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS GROUP CLASS. A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7 SYMBOL	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) CRYSTALS 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. 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. 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. 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> 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> 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> 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.	GROUND WATER 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
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR RESISTANCE RANGE OF STANDARD PENETRATION RESISTANCE (IN VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE <4 4 TO 10 10 TO 30 30 TO 50 >50 N/A GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD <2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30 <0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4	MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. 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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED 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. 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.	ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DPT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HL - HIGHLY MED - MEDIUM MICA - MICAEOUS MOD - MODERATELY NP - NON PLASTIC ORG - ORGANIC PMT - PRESSUREMETER TEST SAP - SAPROLITIC SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA - WEATHERED W - UNIT WEIGHT W _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL RATIO CBR - CALIFORNIA BEARING RATIO
TEXTURE OR GRAIN SIZE 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	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE 2 15/16" STEEL TEETH <input type="checkbox"/> TRICONE " TUNG-CARB. <input type="checkbox"/> CORE BIT HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> B- <input checked="" type="checkbox"/> N-XWL <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	FRACTURE SPACING TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET BEDDING TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	INDURATION 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.
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	PLASTICITY NONPLASTIC PLASTICITY INDEX (PI) DRY STRENGTH LOW PLASTICITY 0-5 VERY LOW MED. PLASTICITY 6-15 SLIGHT HIGH PLASTICITY 16-25 MEDIUM 26 OR MORE HIGH	COLOR 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.	BENCH MARK: BM #1 8" SPIKE IN ROOT OF 12" BUCKEYE -L- STA. 10+69.93 48.58' LT N 919563 E 1226948 ELEVATION: 3041.93' FT.
NOTES:			

PROJECT REFERENCE NO. B-4836	SHEET NO. 3 OF 24
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/CQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



REVISIONS
 02/17/10 - DESIGN REVISION: REVISED THE -L- GRADE TO AID IN THE HYDRAULIC DESIGN. TLW

14-SEP-2011 10:05
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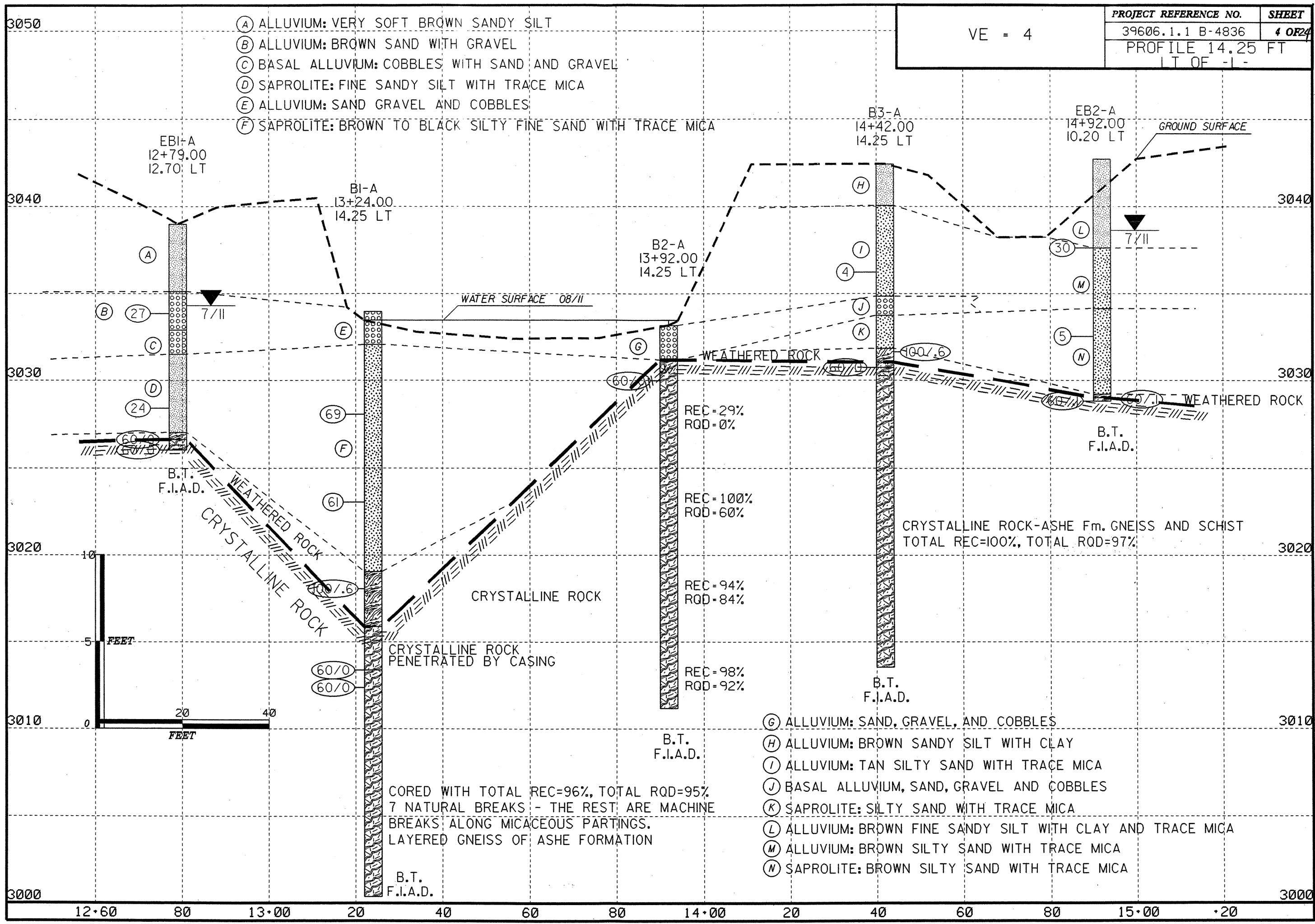


.....
 BM#1 ELEVATION = 3041.93'
 N 919563. E 1226948.
 -L- STATION 10+69.93 48.58' LEFT
 8" SPIKE IN ROOT OF 12" BUCKEYE

.....
 BM#2 ELEVATION = 3053.35'
 N 919383. E 1227341.
 N 91° 56' 56" W 247.72' FROM -L- STA. 19+58.40
 8" SPIKE IN POWER POLE

VE = 4

- (A) ALLUVIUM: VERY SOFT BROWN SANDY SILT
- (B) ALLUVIUM: BROWN SAND WITH GRAVEL
- (C) BASAL ALLUVIUM: COBBLES WITH SAND AND GRAVEL
- (D) SAPROLITE: FINE SANDY SILT WITH TRACE MICA
- (E) ALLUVIUM: SAND GRAVEL AND COBBLES
- (F) SAPROLITE: BROWN TO BLACK SILTY FINE SAND WITH TRACE MICA



- (G) ALLUVIUM: SAND, GRAVEL, AND COBBLES
- (H) ALLUVIUM: BROWN SANDY SILT WITH CLAY
- (I) ALLUVIUM: TAN SILTY SAND WITH TRACE MICA
- (J) BASAL ALLUVIUM, SAND, GRAVEL AND COBBLES
- (K) SAPROLITE: SILTY SAND WITH TRACE MICA
- (L) ALLUVIUM: BROWN FINE SANDY SILT WITH CLAY AND TRACE MICA
- (M) ALLUVIUM: BROWN SILTY SAND WITH TRACE MICA
- (N) SAPROLITE: BROWN SILTY SAND WITH TRACE MICA

CORED WITH TOTAL REC=96%, TOTAL RQD=95%
 7 NATURAL BREAKS - THE REST ARE MACHINE
 BREAKS ALONG MICACEOUS PARTINGS.
 LAYERED GNEISS OF ASHE FORMATION

B.T.
F.I.A.D.

B.T.
F.I.A.D.

B.T.
F.I.A.D.

B.T.
F.I.A.D.

FEET

FEET

12+60 80 13+00 20 40 60 80 14+00 20 40 60 80 15+00 +20

3000

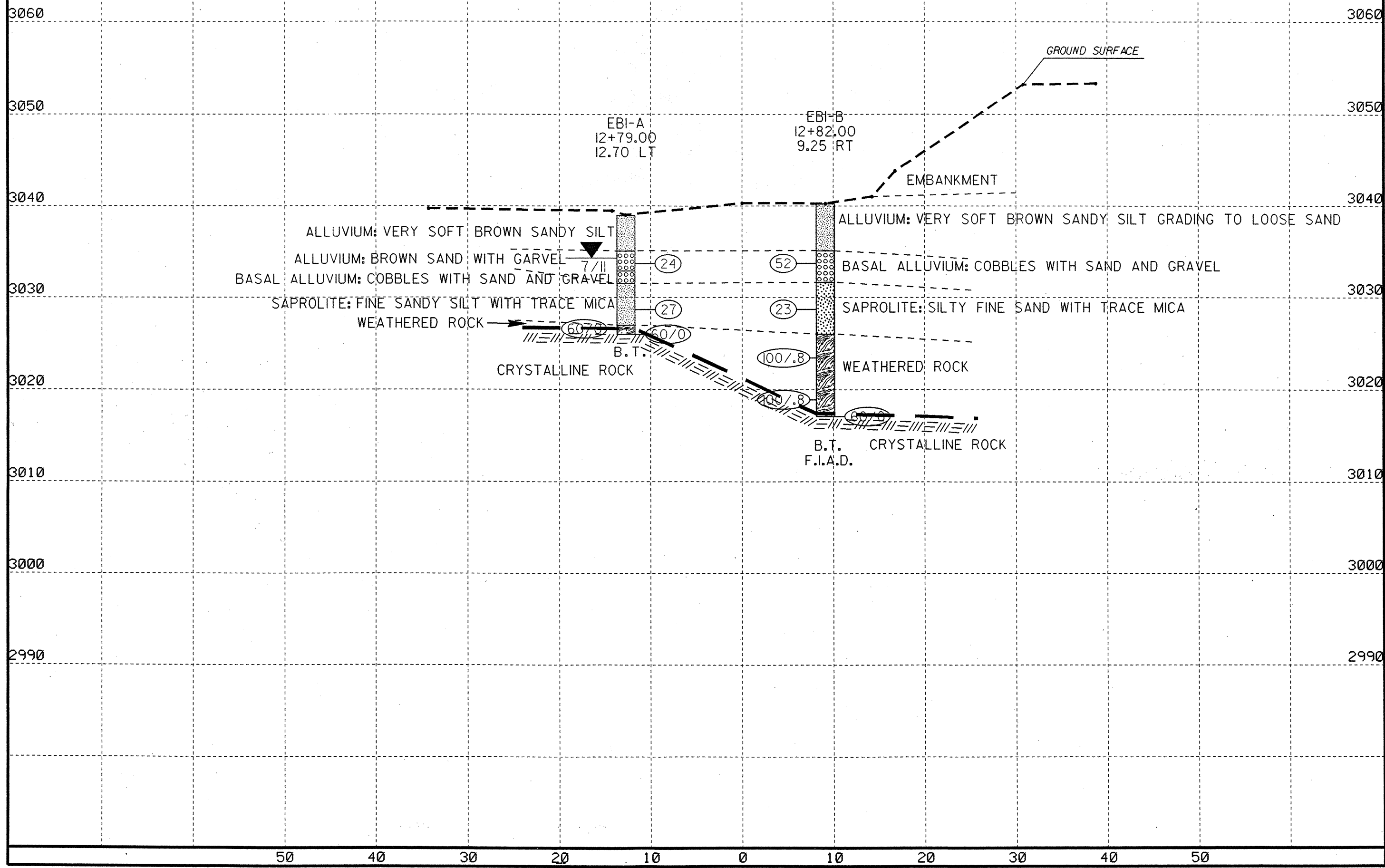
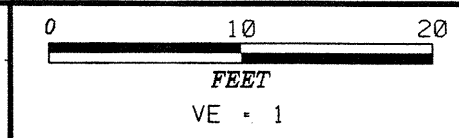
3000

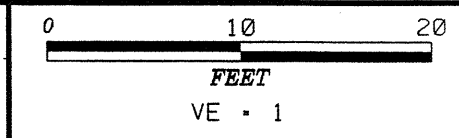
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3030

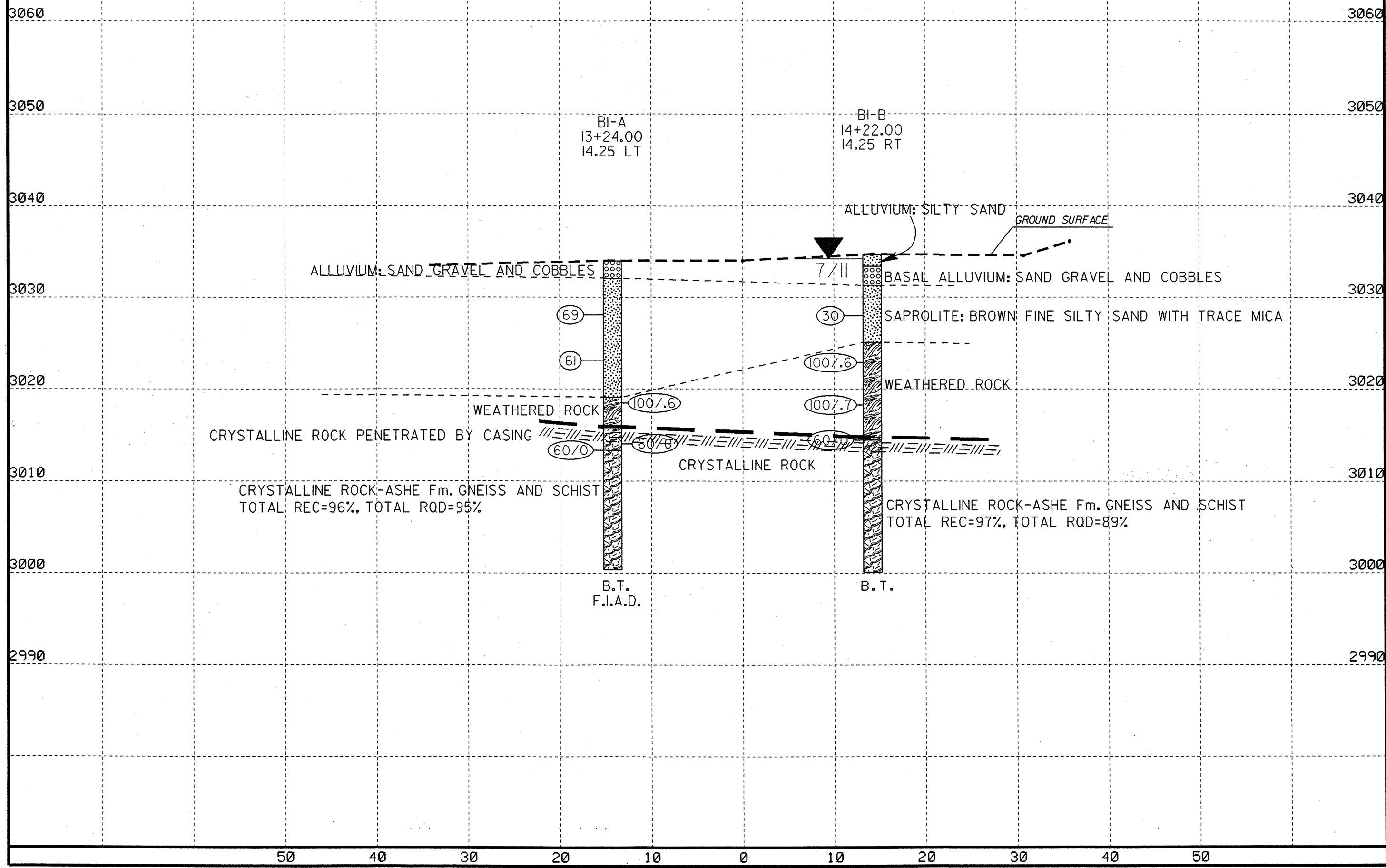
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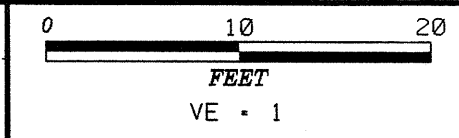
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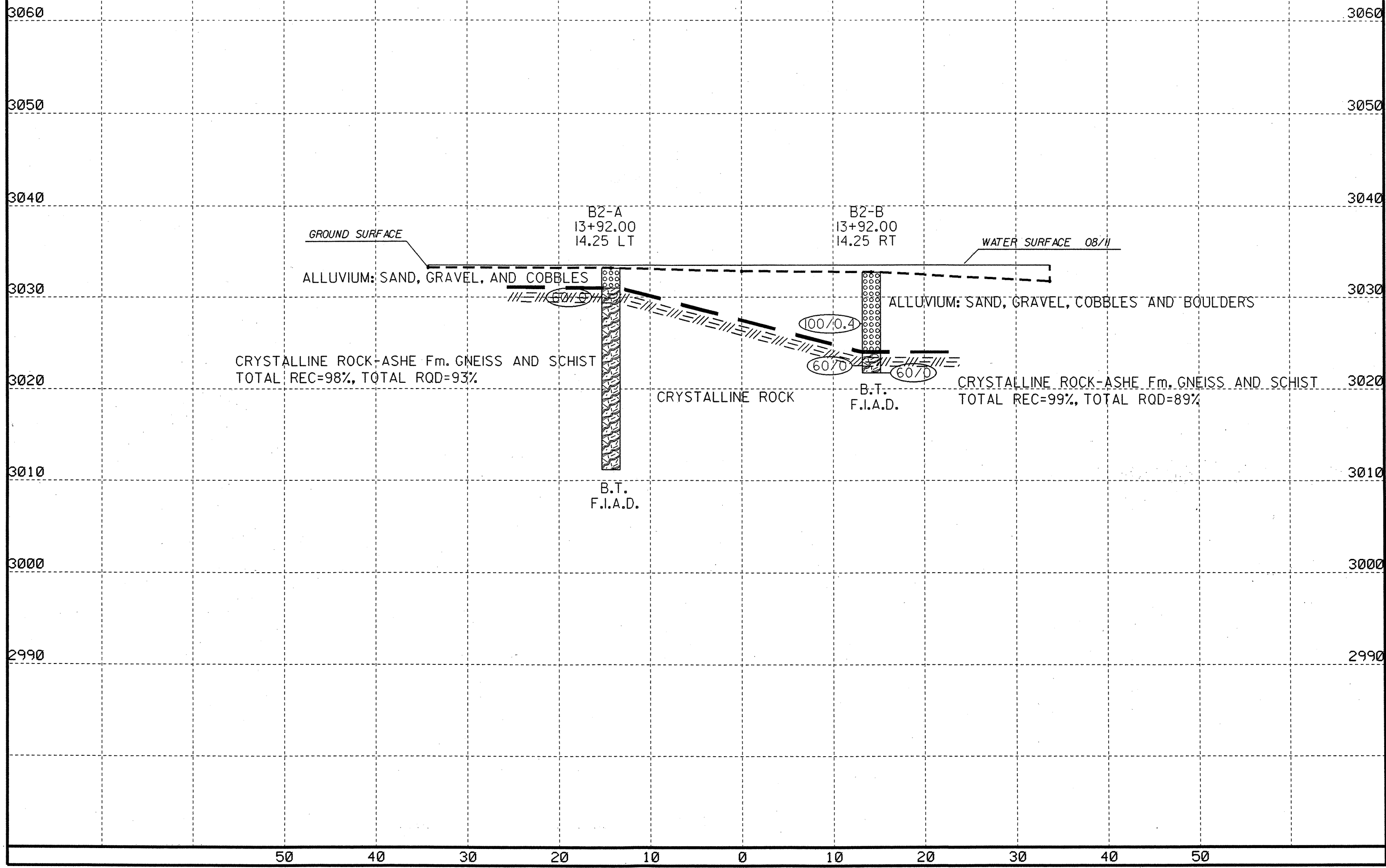


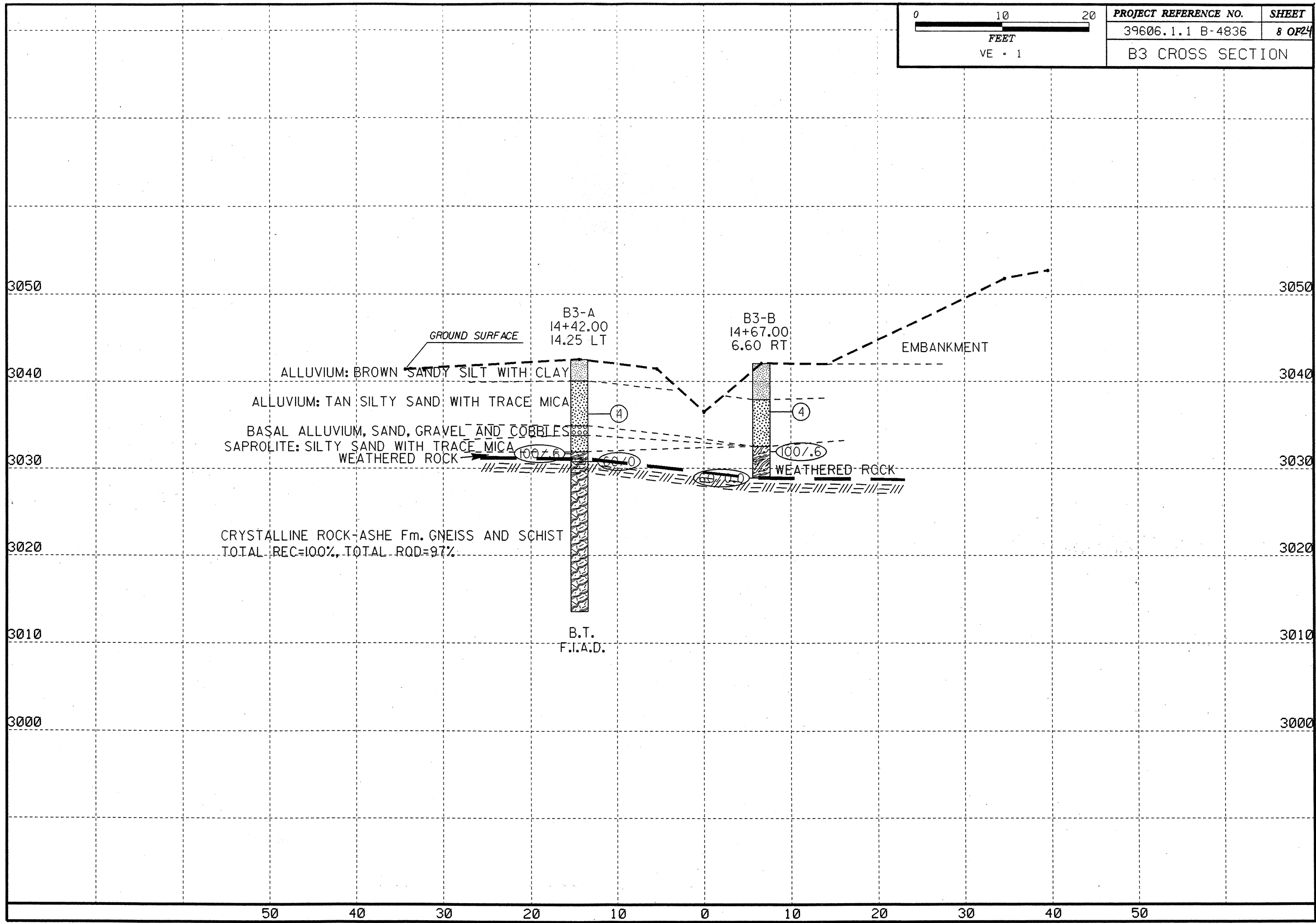
PROJECT REFERENCE NO.	SHEET
38606.1.1 B-4836	6 OF 24
B1 CROSS SECTION	





PROJECT REFERENCE NO.	SHEET
38606.1.1 B-4836	7 OF 24
B2 CROSS SECTION	





GROUND SURFACE

B3-A
14+42.00
14.25 LT

B3-B
14+67.00
6.60 RT

EMBANKMENT

ALLUVIUM: BROWN SANDY SILT WITH CLAY

ALLUVIUM: TAN SILTY SAND WITH TRACE MICA

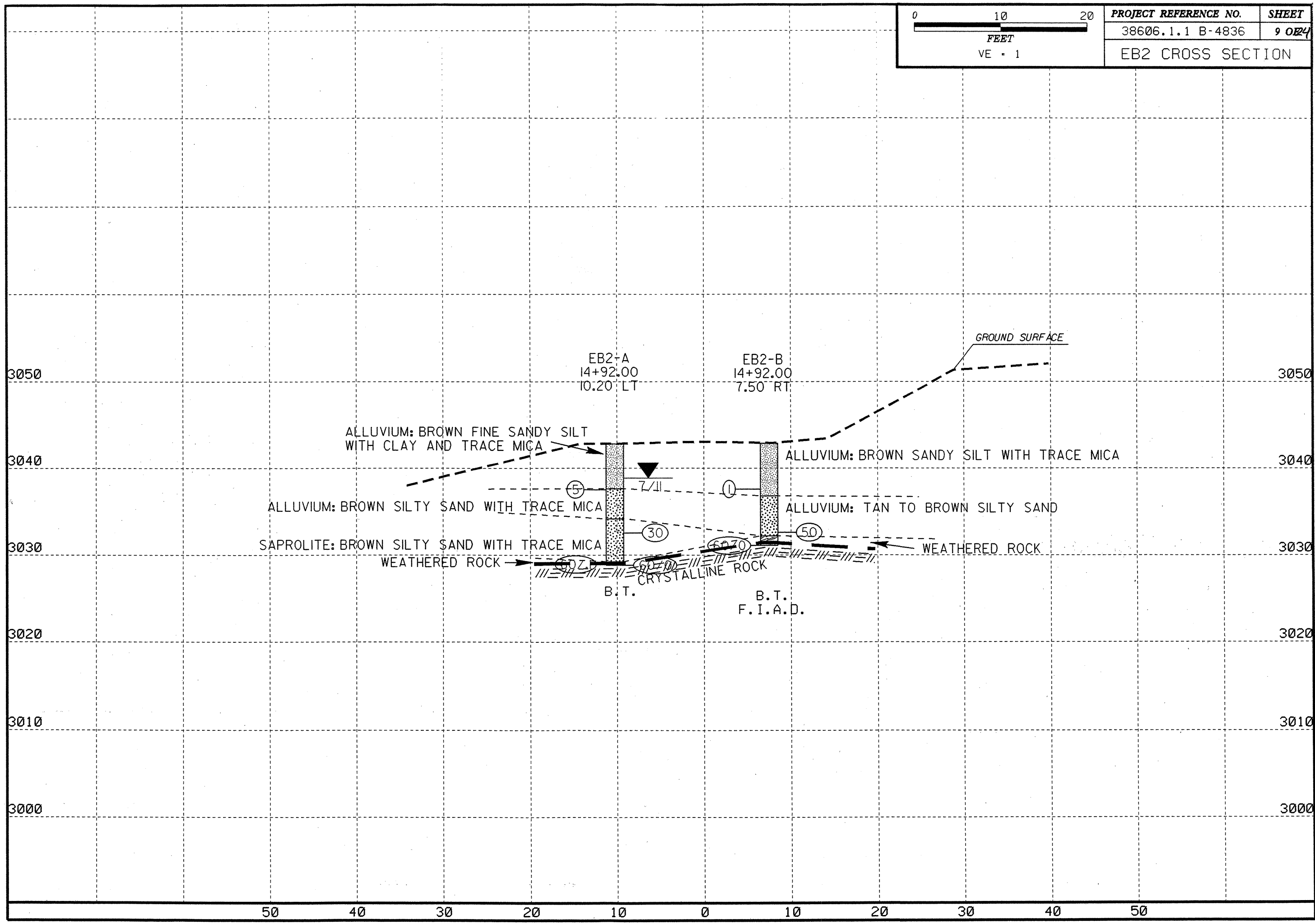
BASAL ALLUVIUM, SAND, GRAVEL AND COBBLES

SAPROLITE: SILTY SAND WITH TRACE MICA

WEATHERED ROCK

CRYSTALLINE ROCK-ASHE Fm. GNEISS AND SCHIST
TOTAL REC=100%, TOTAL RQD=97%

B.T.
F.T.A.D.





WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 12+79		OFFSET 13 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 3,039.0 ft		TOTAL DEPTH 13.0 ft		NORTHING 919,557		EASTING 1,227,106										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 07/26/11		COMP. DATE 07/26/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3040															3,039.0	0.0
															3,035.1	3.9
3035	3,034.7	4.3	5	8	16										3,032.9	6.1
															3,031.5	7.5
3030	3,029.7	9.3	5	7	20										3,027.0	12.0
	3,026.6	12.4	60/0												3,026.0	12.4
	3,026.0	13.0	60/0												3,026.0	13.0



WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 12+82		OFFSET 9 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 3,040.2 ft		TOTAL DEPTH 23.1 ft		NORTHING 919,552		EASTING 1,227,128										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 07/26/11		COMP. DATE 07/26/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3045															3,040.2	0.0
															3,035.1	5.1
3040															3,031.6	8.6
															3,026.0	14.2
3035	3,034.7	5.5	4	30	22										3,026.0	14.2
															3,026.0	14.2
3030	3,029.7	10.5	9	10	13										3,017.4	22.8
															3,017.1	23.1
3025	3,024.7	15.5	6	25	75/3										3,017.1	23.1
															3,017.1	23.1
3020	3,019.7	20.5	24	76/3											3,017.1	23.1
															3,017.1	23.1

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A					
B1-A	13+24	14 ft LT	-L-									
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	FIAD					
3,034.0 ft	33.6 ft	919,600	1,227,120									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009			DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic							
DRILLER Coffey, Jr., C.		START DATE 07/25/11	COMP. DATE 07/25/11	SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT			SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100		
3035												3,034.0 GROUND SURFACE 0.0
												3,032.1 ALLUVIUM: SAND GRAVEL AND COBBLES 1.9
3030	3,029.1	4.9	16	28	41							3,032.1 SAPROLITE: BROWN TO BLACK SILTY FINE SAND WITH TRACE MICA
3025	3,024.1	9.9	29	35	26							3,019.1 WEATHERED ROCK 14.9
3020	3,019.1	14.9	93	77.1								3,019.1 WEATHERED ROCK 14.9
3015	3,014.1	19.9	60/0									3,015.9 CRYSTALLINE ROCK PENETRATED BY CASING 18.1
	3,013.4	20.6	60/0									3,013.4 CRYSTALLINE ROCK ASHE Fm. GNEISS AND SCHIST TOTAL REC=96%, TOTAL RQD=95% 20.6
3010												
3005												
												3,000.4 Boring Terminated at Elevation 3,000.4 ft in crystalline rock 33.6

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A					
B1-B	13+22	14 ft RT	-L-									
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	0.5					
3,034.7 ft	34.6 ft	919,588	1,227,146									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009			DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic							
DRILLER Coffey, Jr., C.		START DATE 07/25/11	COMP. DATE 07/25/11	SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT			SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100		
3035												3,034.7 GROUND SURFACE 0.0
												3,033.4 ALLUVIUM: SILTY SAND 1.3
3030	3,029.0	5.7	6	20	10							3,031.3 BASAL ALLUVIUM: SAND GRAVEL AND COBBLES 3.4
												3,031.3 SAPROLITE: BROWN FINE SANDY SILT WITH TRACE MICA
3025	3,024.0	10.7	42	40	60/1							3,025.1 WEATHERED ROCK 9.6
												3,025.1 WEATHERED ROCK 9.6
3020	3,019.0	15.7	47	53/2								3,019.1 WEATHERED ROCK 14.9
												100/6
3015	3,014.5	20.2	60/0									3,014.8 CRYSTALLINE ROCK PENETRATED BY CASING 19.9
												3,014.5 CRYSTALLINE ROCK PENETRATED BY CASING 20.2
3010												CRYSTALLINE ROCK, ASHE Fm. GNEISS AND SCHIST TOTAL REC=97%, TOTAL RQD=89%
3005												
												3,000.1 Boring Terminated at Elevation 3,000.1 ft in crystalline rock 34.6

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. B2-A		STATION 13+92		OFFSET 14 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 3,033.2 ft		TOTAL DEPTH 21.0 ft		NORTHING 919,664		EASTING 1,227,142										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 07/27/11		COMP. DATE 07/27/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3035														3,033.2	0.0	GROUND SURFACE
														3,031.2	2.0	ALLUVIUM: SAND, GRAVEL, AND COBBLES
3030	3,031.0	2.2												3,031.0	2.2	CRYSTALLINE ROCK
														3,027.2	6.0	CRYSTALLINE ROCK ASHE Fm. GNEISS AND SCHIST REC=29% RQD=0 INTERLAYERED WITH 2.7 FEET OF SAPROLITE
3025														3,022.2	11.0	CRYSTALLINE ROCK Rec=100% RQD=60%
3020																CRYSTALLINE ROCK ASHE Fm. GNEISS AND SCHIST TOTAL REC=98% TOTAL RQD=93%
3015																
														3,012.2	21.0	Boring Terminated at Elevation 3,012.2 ft in crystalline rock

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. B2-B		STATION 13+92		OFFSET 14 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 3,032.7 ft		TOTAL DEPTH 28.8 ft		NORTHING 919,654		EASTING 1,227,169										
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 07/26/11		COMP. DATE 07/26/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3035														3,032.7	0.0	GROUND SURFACE
																ALLUVIUM: SAND, GRAVEL, COBBLES AND BOULDERS
3030														3,027.5	5.2	CRYSTALLINE ROCK
														3,024.0	8.7	CRYSTALLINE ROCK PENETRATED BY CASING ADVANCER
3025														3,021.7	11.0	CRYSTALLINE ROCK ASHE Fm. GNEISS AND SCHIST TOTAL REC=99% TOTAL RQD=89%
3020																
3015																
3010																
3005														3,004.9	27.8	Boring Terminated at Elevation 3,003.9 ft in crystalline rock

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. B3-A		STATION 14+42		OFFSET 14 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 3,042.5 ft		TOTAL DEPTH 28.9 ft		NORTHING 919,711		EASTING 1,227,159										
0 HR. N/A		24 HR. FIAD														
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic										
DRILLER Coffey, Jr., C.		START DATE 07/27/11		COMP. DATE 07/27/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3045														3,042.5	0.0	GROUND SURFACE
3040														3,040.1	2.4	ALLUVIUM: BROWN SANDY SILT WITH CLAY
	3,037.3	5.2														ALLUVIUM: TAN SILTY SAND WITH TRACE MICA
3035			2	2	2									3,034.9	7.6	BASAL ALLUVIUM, SAND, GRAVEL AND COBBLES
	3,032.3	10.2												3,033.8	8.7	SAPROLITE: SILTY SAND WITH TRACE MICA
3030			79	217.1										3,031.9	10.6	WEATHERED ROCK
	3,030.8	11.7												3,031.1	11.4	CRYSTALLINE ROCK PENETRATED BY ADVANCER
		60/0												3,030.8	11.7	CRYSTALLINE ROCK
3025																ASHE Fm. GNEISS AND SCHIST
3020																TOTAL REC=100% TOTAL RQD=97%
3015																
														3,013.6	28.9	Boring Terminated at Elevation 3,013.6 ft in crystalline rock

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)									
BORING NO. B3-B		STATION 14+67		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 3,042.4 ft		TOTAL DEPTH 13.1 ft		NORTHING 919,725		EASTING 1,227,194										
0 HR. N/A		24 HR. FIAD														
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic										
DRILLER Coffey, Jr., C.		START DATE 07/28/11		COMP. DATE 07/28/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3045														3,042.4	0.0	GROUND SURFACE
3040														3,038.3	4.1	ALLUVIUM: TAN TO GRAY FINE SANDY SILT WITH CLAY AND TRACE MICA
	3,037.9	4.5														ALLUVIUM: DARK BROWN CLAYEY SILT WITH TRACE ORGANICS
3035			1	1	3									3,034.5	7.9	SAPROLITE: BROWN SILTY SAND WITH TRACE MICA
	3,032.9	9.5												3,032.9	9.5	WEATHERED ROCK
3030			8	88	12									3,029.5	12.9	CRYSTALLINE ROCK
	3,029.3	13.1												3,029.3	13.1	Boring Terminated at Elevation 3,029.3 ft in crystalline rock

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.											
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River						GROUND WTR (ft)											
BORING NO. EB2-A		STATION 14+92		OFFSET 10 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 3,043.0 ft		TOTAL DEPTH 13.9 ft		NORTHING 919,757		EASTING 1,227,179											
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic													
DRILLER Coffey, Jr., C.		START DATE 07/27/11		COMP. DATE 07/27/11		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
3045															3,043.0	GROUND SURFACE	0.0
3040	3,038.8	4.2	0	2	3										3,037.9	ALLUVIUM: BROWN FINE SANDY SILT WITH CLAY AND TRACE MICA	5.1
3035	3,033.8	9.2	5	10	20										3,034.4	ALLUVIUM: BROWN SILTY SAND WITH TRACE ORGANICS	8.6
3030	3,029.1	13.7	60/0												3,029.5	SAPROLITE: BROWN SILTY SAND WITH TRACE MICA	13.5
	3,029.1	13.9	60/0												3,029.5	WEATHERED ROCK	13.5
															3,029.3	CRYSTALLINE ROCK	13.7
															3,029.1	CRYSTALLINE ROCK	13.9
Boring Terminated with Standard Penetration Test Refusal at Elevation 3,029.1 ft in crystalline rock																	

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.											
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River						GROUND WTR (ft)											
BORING NO. EB2-B		STATION 14+92		OFFSET 8 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 3,042.8 ft		TOTAL DEPTH 11.7 ft		NORTHING 919,751		EASTING 1,227,196											
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic													
DRILLER Coffey, Jr., C.		START DATE 07/28/11		COMP. DATE 07/28/11		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
3045															3,042.8	GROUND SURFACE	0.0
3040	3,038.6	4.2	0	0	1										3,036.8	ALLUVIUM: BROWN SANDY SILT WITH TRACE MICA	6.0
3035	3,033.6	9.2	25	15	35										3,032.2	ALLUVIUM: TAN TO BROWN SILTY SAND WITH TRACE ORGANICS	10.6
	3,031.1	11.7	60/0												3,032.2	WEATHERED ROCK	10.6
															3,031.4	CRYSTALLINE ROCK	11.4
															3,031.1	CRYSTALLINE ROCK	11.7
Boring Terminated with Standard Penetration Test Refusal at Elevation 3,031.1 ft in crystalline rock																	

NCDOT BORE SINGLE B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO. B1-A		STATION 13+24		OFFSET 14 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 3,034.0 ft		TOTAL DEPTH 33.6 ft		NORTHING 919,600		EASTING 1,227,120						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 07/25/11		COMP. DATE 07/25/11		SURFACE WATER DEPTH N/A						
CORE SIZE NX		TOTAL RUN 13.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
3033.98											Ground Surface	
											ALLUVIUM: SAND GRAVEL AND COBBLES	1.9
3030											SAPROLITE: BROWN TO BLACK SILTY FINE SAND WITH TRACE MICA	
3025												
3020											WEATHERED ROCK	14.9
3015											CRYSTALLINE ROCK PENETRATED BY CASING	18.1
	3,013.4	20.6	3.0	1:41/1.0 1:49/1.0 1:58/1.0	(2.9) 97%	(2.8) 93%					CRYSTALLINE ROCK ASHE FORMATION GNEISS AND SCHIST HARD AND FRESH, MACHINE BREAKS ON MICACEOUS FOLIATION.	20.6
3010	3,010.4	23.6	5.0	2:06/1.0 2:01/1.0 1:50/1.0 1:57/1.0 2:01/1.0	(4.9) 98%	(4.9) 98%	RS-3				HARD AND FRESH WITH MACHINE BREAKS ON MICACEOUS FOLIATION.	23.6
3005	3,005.4	28.6	5.0	1:50/1.0 1:54/1.0 2:09/1.0 2:06/1.0 2:02/1.0	(4.7) 94%	(3.8) 76%	RS-4				GENERALLY HARD AND FRESH WITH MACHINE BREAKS ON FOLIATION	28.6
	3,000.4	33.6									Boring Terminated at Elevation 3,000.4 ft in crystalline rock	33.6

NCDOT CORE SINGLE CORE OF B4836 BORINGS.GPJ NC_DOT_GDT_9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO. B1-B		STATION 13+22		OFFSET 14 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 3,034.7 ft		TOTAL DEPTH 34.6 ft		NORTHING 919,588		EASTING 1,227,146						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 07/25/11		COMP. DATE 07/25/11		SURFACE WATER DEPTH N/A						
CORE SIZE NX		TOTAL RUN 14.2 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
3034.69											Ground Surface	
											ALLUVIUM: SILTY SAND	1.3
											BASAL ALLUVIUM: SAND GRAVEL AND COBBLES	3.4
3030											SAPROLITE: BROWN FINE SANDY SILT WITH TRACE MICA	
3025												
3020											WEATHERED ROCK	9.6
3015											CRYSTALLINE ROCK PENETRATED BY CASING. ASHE FORMATION GNEISS AND SCHIS	19.9
	3,014.5	20.2	4.2	0:20/0.4 1:41/1.0 1:49/1.0	(4.2) 100%	(4.1) 98%					HARD AND FRESH WITH ONE WEATHERED LAYER AT 23.3 FEET. MACHINE BREAKS ON MICACEOUS PARTINGS ALONG FOLIATION.	20.2
3010	3,010.3	24.4	5.0	1:59/1.0 2:06/1.0 1:57/0.0 2:04/1.0 2:01/1.0	(5.0) 100%	(4.0) 80%					HARD AND FRESH WITH A PARTIALLY OPENED VERTICAL FRACTURE IN THE MIDDLE OF THE RUN.	24.6
3005	3,005.1	29.6	5.0	1:53/1.0 2:04/1.0 2:00/1.0 2:09/1.0 2:08/1.0	(5.0) 100%	(4.5) 90%					HARD AND FRESH WITH MACHINE BREAKS ON MICACEOUS FOLIATION	29.6
	3,000.1	34.6									Boring Terminated at Elevation 3,000.1 ft in crystalline rock	34.6

NCDOT CORE SINGLE CORE OF B4836 BORINGS.GPJ NC_DOT_GDT_9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A					
B2-A	13+92	14 ft LT	-L-									
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	FIAD					
3,033.2 ft	21.0 ft	919,664	1,227,142									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic						
DRILLER Coffey, Jr., C.		START DATE 07/27/11	COMP. DATE 07/27/11	SURFACE WATER DEPTH N/A								
CORE SIZE NX			TOTAL RUN 21.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
3033.18	3,033.2	0.0	2.2								Ground Surface	
	3,031.0	2.2									ALLUVIUM: SAND, GRAVEL, AND COBBLES	2.0
3030	3,031.0		3.8	0:17/0.8 0:19/1.0 0:29/1.0 0:18/1.0	(1.1) 29%	(0.0) 0%					CRYSTALLINE ROCK PENETRATED BY CASING. CRYSTALLINE ROCK (ASHE FM.) GRADING TO WEATHERED ROCK OR DENSE SAPROLITE	2.2
	3,027.2	6.0									SLIGHT TO VERY SLIGHT WEATHERING, MEDIUM HARD TO HARD. TOP OF RUN HAS WEATHERING. BREAKS ON WEATHERED FOLIATION OR MACHINE BREAKS ON MICACEOUS FOLIATION.	6.0
3025			5.0	1:44/1.0 1:57/1.0 1:49/1.0 1:55/1.0 2:01/1.0	(5.0) 100%	(3.0) 60%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	11.0
	3,022.2	11.0									HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	11.0
3020			5.0	2:07/1.0 2:00/1.0 1:58/1.0 2:10/1.0 2:04/1.0	(4.2) 84%	(4.7) 94%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	16.0
	3,017.2	16.0									HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	16.0
3015			5.0	2:00/1.0 1:54/1.0 2:10/1.0 2:01/1.0 2:03/1.0	(4.9) 98%	(4.6) 92%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	21.0
	3,012.2	21.0									Boring Terminated at Elevation 3,012.2 ft in crystalline rock	21.0

NCDOT CORE SINGLE CORE OF B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1		TIP B-4836		COUNTY WATAUGA		GEOLOGIST Elliott, D. C.						
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River							GROUND WTR (ft)					
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A					
B2-B	13+92	14 ft RT	-L-									
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	FIAD					
3,032.7 ft	28.8 ft	919,654	1,227,169									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic						
DRILLER Coffey, Jr., C.		START DATE 07/26/11	COMP. DATE 07/26/11	SURFACE WATER DEPTH N/A								
CORE SIZE NX			TOTAL RUN 28.8 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
3032.72	3,032.7	0.0	11.0								Ground Surface	
	3,031.0										ALLUVIUM: SAND, GRAVE, COBBLES AND BOULDERS	
3030												
3025											CRYSTALLINE ROCK PENETRATED BY CASING ADVANCER	8.7
	3,021.7	11.0									CRYSTALLINE ROCK	11.0
3020			2.8	1:28/0.8 1:41/1.0 1:53/1.0	(2.7) 96%	(2.5) 89%					ASHE FORMATION GNEISS AND SCHIST. HARD AND FRESH.	13.8
	3,018.9	13.8									MACHINE BREAKS ON MICACEOUS FOLIATION. HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	13.8
3015			5.0	1:51/1.0 1:49/1.0 1:52/1.0 1:58/1.0 2:00/1.0	(5.0) 100%	(5.0) 100%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	18.8
	3,013.9	18.8									HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	18.8
3010			5.0	2:10/1.0 1:58/1.0 2:00/1.0 1:51/1.0 1:55/1.0	(5.0) 100%	(5.0) 100%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	23.8
	3,008.9	23.8									HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	23.8
3005			5.0	2:14/1.0 2:03/1.0 2:19/1.0 2:07/1.0 2:05/0.0	(5.0) 100%	(5.0) 100%					HARD AND FRESH. MACHINE BREAKS ON MICACEOUS FOLIATION.	28.8
	3,003.9	28.8									Boring Terminated at Elevation 3,003.9 ft in crystalline rock	28.8

NCDOT CORE SINGLE CORE OF B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11

WBS 38606.1.1	TIP B-4836	COUNTY WATAUGA	GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION Watauga County Bridge number 59 on SR-1331 (Roby Green Road) over South Fork of the New River				GROUND WTR (ft)
BORING NO. B3-A	STATION 14+42	OFFSET 14 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 3,042.5 ft	TOTAL DEPTH 28.9 ft	NORTHING 919,711	EASTING 1,227,159	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic	
DRILLER Coffey, Jr., C.		START DATE 07/27/11	COMP. DATE 07/27/11	SURFACE WATER DEPTH N/A
CORE SIZE NX		TOTAL RUN 28.9 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
3042.45	3,042.5	0.0	11.7								Ground Surface	
											ALLUVIUM: BROWN SANDY SILT WITH CLAY	2.4
3040											ALLUVIUM: TAN SILTY SAND WITH TRACE MICA	
3035												
											BASAL ALLUVIUM, SAND, GRAVEL AND COBBLES	7.6
											SAPROLITE: SILTY SAND WITH TRACE MICA	8.7
											WEATHERED ROCK	10.6
3030	3,030.8	11.7	2.2	0:22/0.2	(2.2)	(1.8)					CRYSTALLINE ROCK PENETRATED BY ADVANCER	11.4
	3,028.6	13.9	5.0	1:43/1.0	100%	82%	RS-1				ASHE FM. GNEISS AND SCHIST.	13.9
				1:47/1.0							HARD AND FRESH. WEATHERED LAYER AT 12.6.	
3025				2:04/1.0	(5.0)	(5.0)					ONE PARTIALLY HEALED VERTICAL FRACTURE IN MIDDLE OF RUN.	
				1:51/1.0	100%	100%					MACHINE BREAKS ON MICACEOUS FOLIATION.	
				1:57/1.0			RS-2					
	3,023.6	18.9	5.0	2:06/1.0	(5.0)	(5.0)					HARD AND FRESH.	18.9
				2:12/1.0							MACHINE BREAKS ON MICACEOUS FOLIATION.	
3020				2:07/1.0	100%	100%					HARD AND FRESH.	
				2:13/1.0							MACHINE BREAKS ON MICACEOUS FOLIATION.	
				2:12/1.0								
	3,018.6	23.9	5.0	2:14/1.0	(5.0)	(4.8)					HARD AND FRESH.	23.9
				2:19/1.0							MACHINE BREAKS ON MICACEOUS FOLIATION.	
3015				2:10/1.0	100%	96%						
				2:01/1.0								
				2:09/1.0								
	3,013.6	28.9		1:59/1.0								
				2:05/1.0								
											Boring Terminated at Elevation 3,013.6 ft in crystalline rock	28.9

NCDOT CORE SINGLE CORE OF B4836 BORINGS.GPJ NC_DOT.GDT 9/13/11



**FIELD
SCOUR REPORT**

WBS: 38606.1.1 TIP: B-4836 COUNTY: Watauga

DESCRIPTION(1): Watauga County Bridge Number 59 on SR-1331 over South Fork New River

EXISTING BRIDGE

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

Bridge No.: 59 Length: 152 Total Bents: 4 Bents in Channel: 1 Bents in Floodplain: 3
Foundation Type: concrete

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: none

Interior Bents: upstream side of south interior bent undermined

Channel Bed: broad depression on south side of south interior bent

Channel Bank: none

EXISTING SCOUR PROTECTION

Type(3): stone placed on approach embankments, wood wing walls

Extent(4): stone under bridge

Effectiveness(5): very good

Obstructions(6): some downed trees on floodplain

INSTRUCTIONS

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

DESIGN INFORMATION

Channel Bed Material(7): sand, gravel, cobbles and boulders

Channel Bank Material(8): brown sandy silt

Channel Bank Cover(9): bare soil with tree roots

Floodplain Width(10): 500 feet

Floodplain Cover(11): cultivated field, hay fields and woods

Stream is(12): Aggrading _____ Degrading XX Static _____

Channel Migration Tendency(13): to the north

Observations and Other Comments: channel is armored with gravels and cobbles

Reported by: P. Q. Lockamy Date: 9/14/2011
PQ Lockamy

DESIGN SCOUR ELEVATIONS(14)

Feet XX Meters _____

BENTS

	EB1	B1	B2	B3	EB2						
Lt	NA	3019.0	3031.0	3020.0	NA						
Rt	NA	3025.0	3024.0	3020.0	NA						

Comparison of DSE to Hydraulics Unit theoretical scour:
The presence of weathered rock at interior bents raised the scour making the end bent one unaffected.

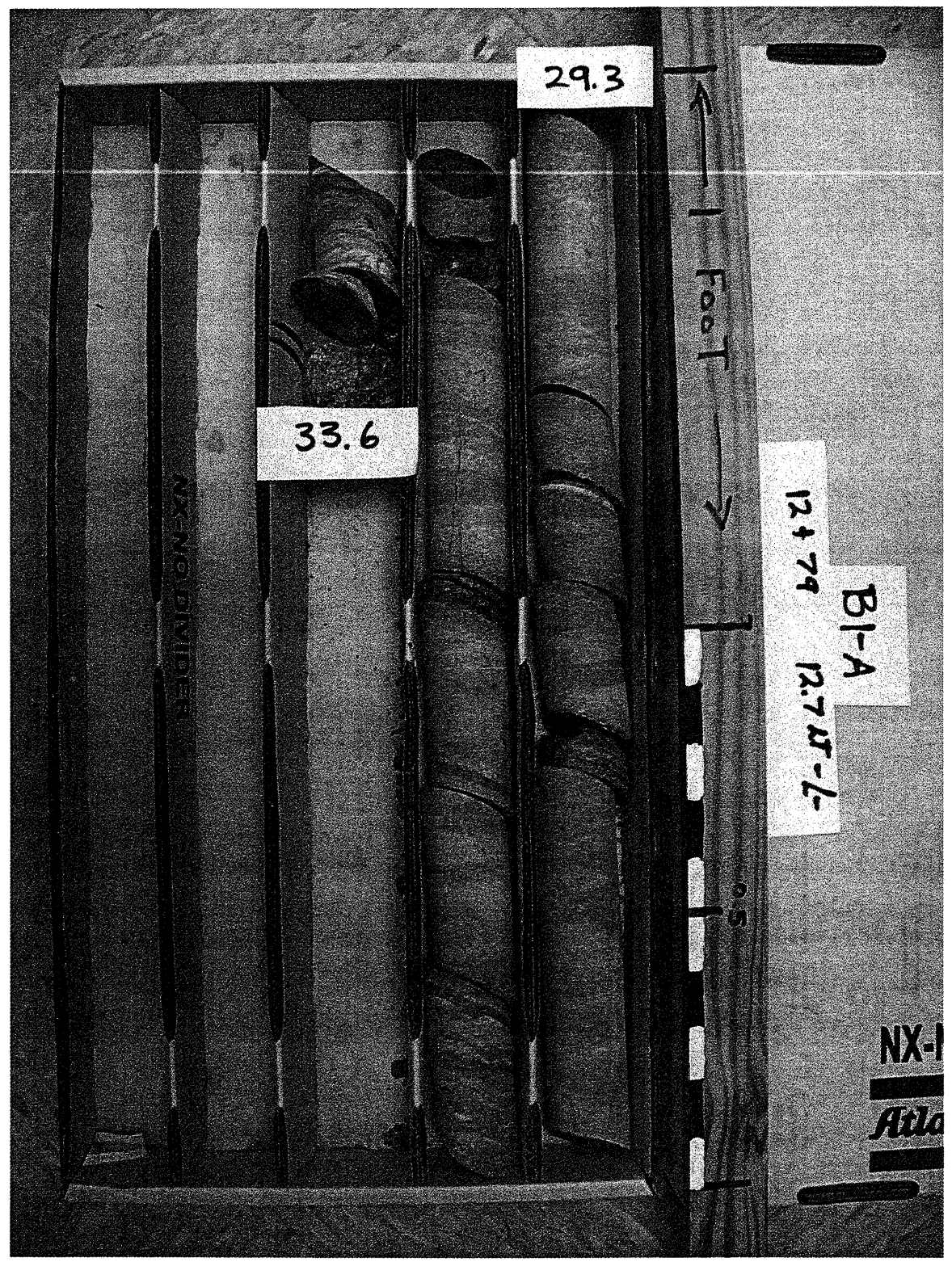
DSE determined by: W.D. Frye Date: 9/14/2011
WD Frye

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

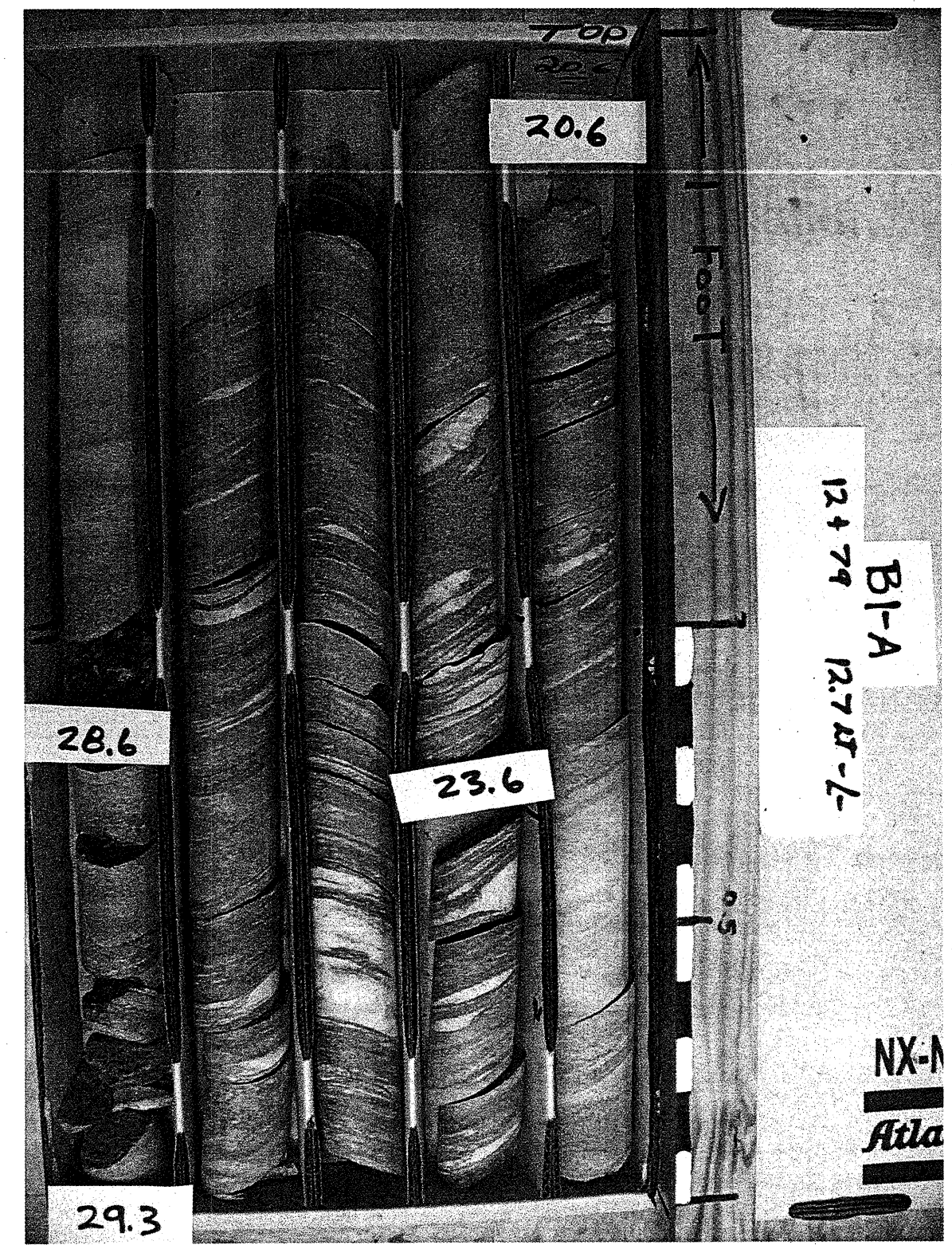
Bed or Bank											
Sample No.											
Retained #4											
Passed #10											
Passed #40											
Passed #200											
Coarse Sand											
Fine Sand											
Silt											
Clay											
LL											
PI											
AASHTO											
Station											
Offset											
Depth											

Boring / Strata	Sample Number	Depth	Type*	Load to Plane of Weakness*	D (Core Dia or distance between platen) (mm)	W (Width) (mm)	PSI (at Failure)	De (Equiv. Core Dia)(in)	P (=PSI*1.47 in ²) (Pounds)	De ² (=De ² for diametral or =4WD/π for axial) (In ²)	I _s (I _s =P/De ²) (KSF)	F (F=(D _c /50) ^{0.45}) (KSF)	I _{s(50)} (I _{s(50)} =F*I _s) (KSF)	Average I _{s(50)} (KSF)	R1 (RMR First Category Rating)
B1-A	1	2.4	d	//	44		577	1.7	848.19	3.0	40.7	0.94	38.43		
B1-A	2	28.8	d	//	44		1094	1.7	1608.18	3.0	77.2	0.94	72.86	32	
B1-A	3	26.1	d	//	44		281	1.7	413.07	3.0	19.8	0.94	18.71		
B1-A	4	26.5	d	//	44		339	1.7	498.33	3.0	23.9	0.94	22.58		
B1-A	5	26.7	d	//	44		205	1.7	301.35	3.0	14.5	0.94	13.65		
B1-A	6	27.7	d	//	44		223	1.7	327.81	3.0	15.7	0.94	14.85		
B1-A	7	24.1	d	//	44		519	1.7	762.93	3.0	36.6	0.94	34.56		
B1-A	8	24.6	d	//	44		200	1.7	294	3.0	14.1	0.94	13.32		
B1-A	9	30.0	d	//	44		661	1.7	971.67	3.0	46.6	0.94	44.02		
B1-A	10	32.8	d	//	44		2002	1.7	2942.94	3.0	141.2	0.94	133.33		
B1-A	11	29.9	a	⊥	45	44	1302		1913.94	3.9	70.5	0.95	67.27		
B1-A	12	25.8	a	⊥	457	44	1720		2528.4	39.7	9.2	2.71	24.83	85	
B1-A	13	23.8	a	⊥	40	44	1262		1855.14	3.5	76.9	0.90	69.56		
B1-A	14	24.1	a	⊥	41	44	1705		2506.35	3.6	101.4	0.91	92.71		
B1-A	15	28.8	a	⊥	30	44	1352		1987.44	2.6	109.9	0.79	87.30		
B1-A	16	27.7	a	⊥	58	44	995		1462.65	5.0	41.8	1.07	44.71		
B1-A	17	28.0	a	⊥	37	44	1038		1525.86	3.2	68.4	0.87	59.72		
B1-A	18	29.8	a	⊥	42	44	2239		3291.33	3.6	130.0	0.92	120.15		
B1-A	19	32.8	a	⊥	30	44	2202		3236.94	2.6	178.9	0.79	142.18		
B1-A	20	33.0	a	⊥	32	44	2907		4273.29	2.8	221.5	0.82	184.16		

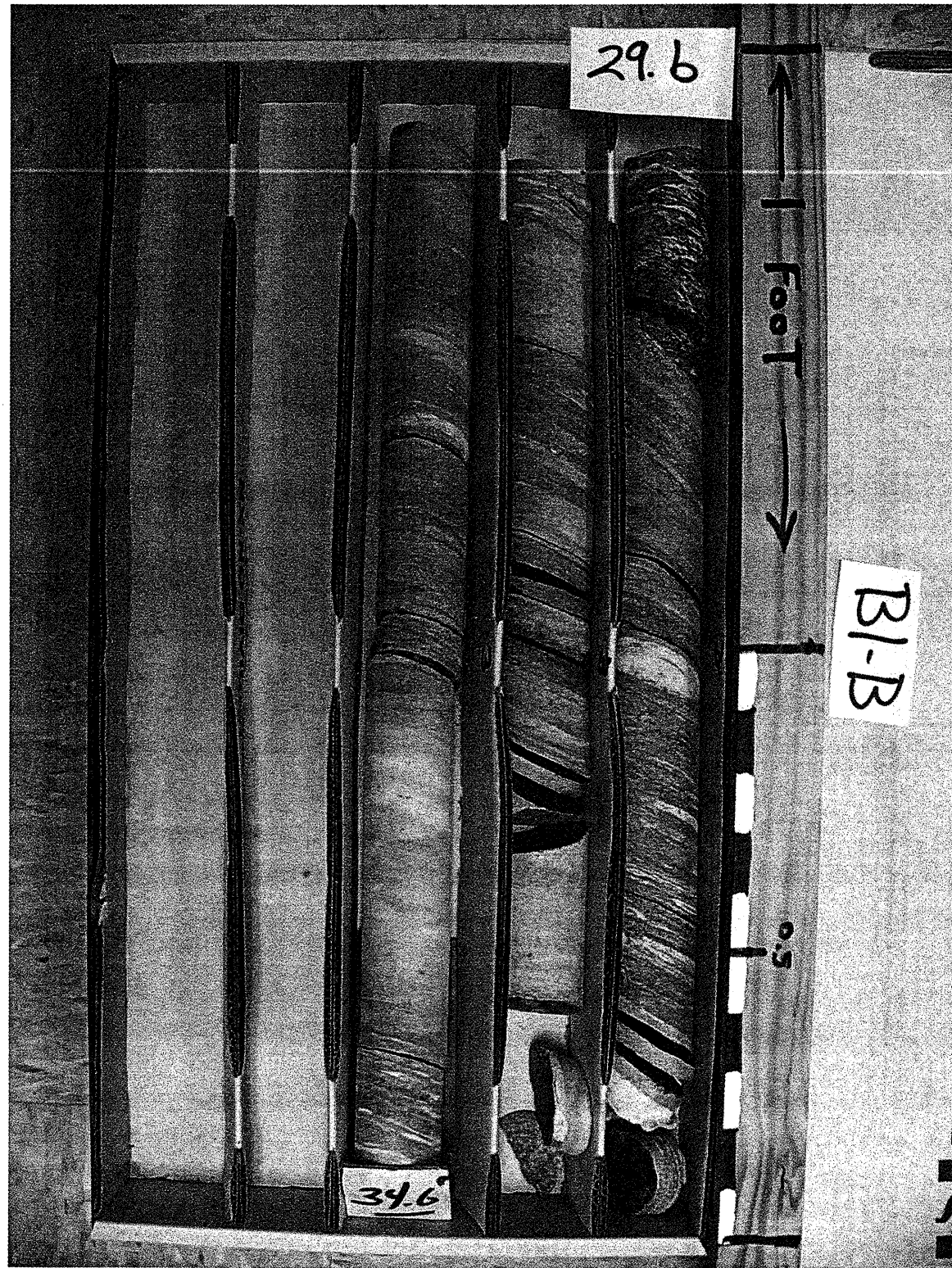
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



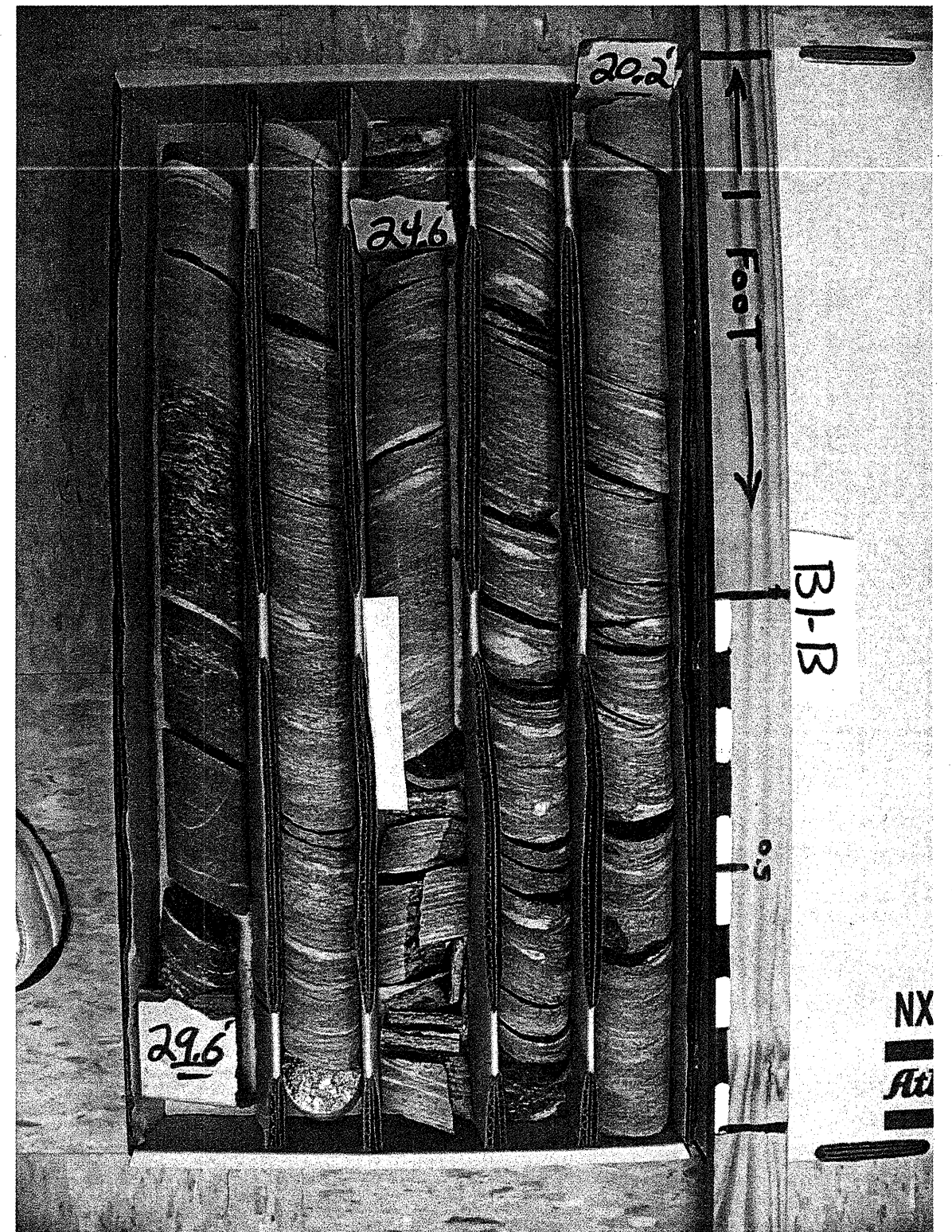
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



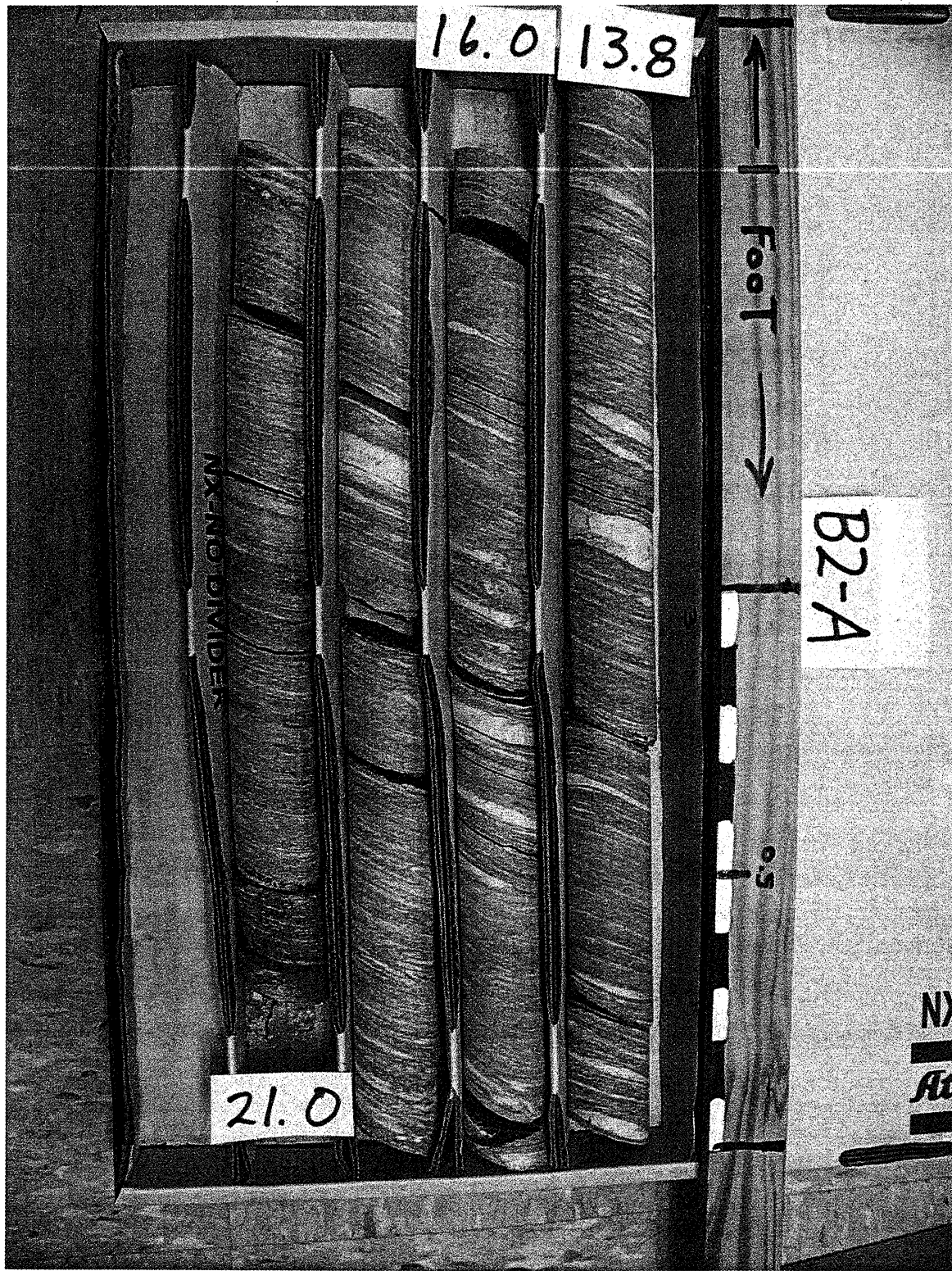
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



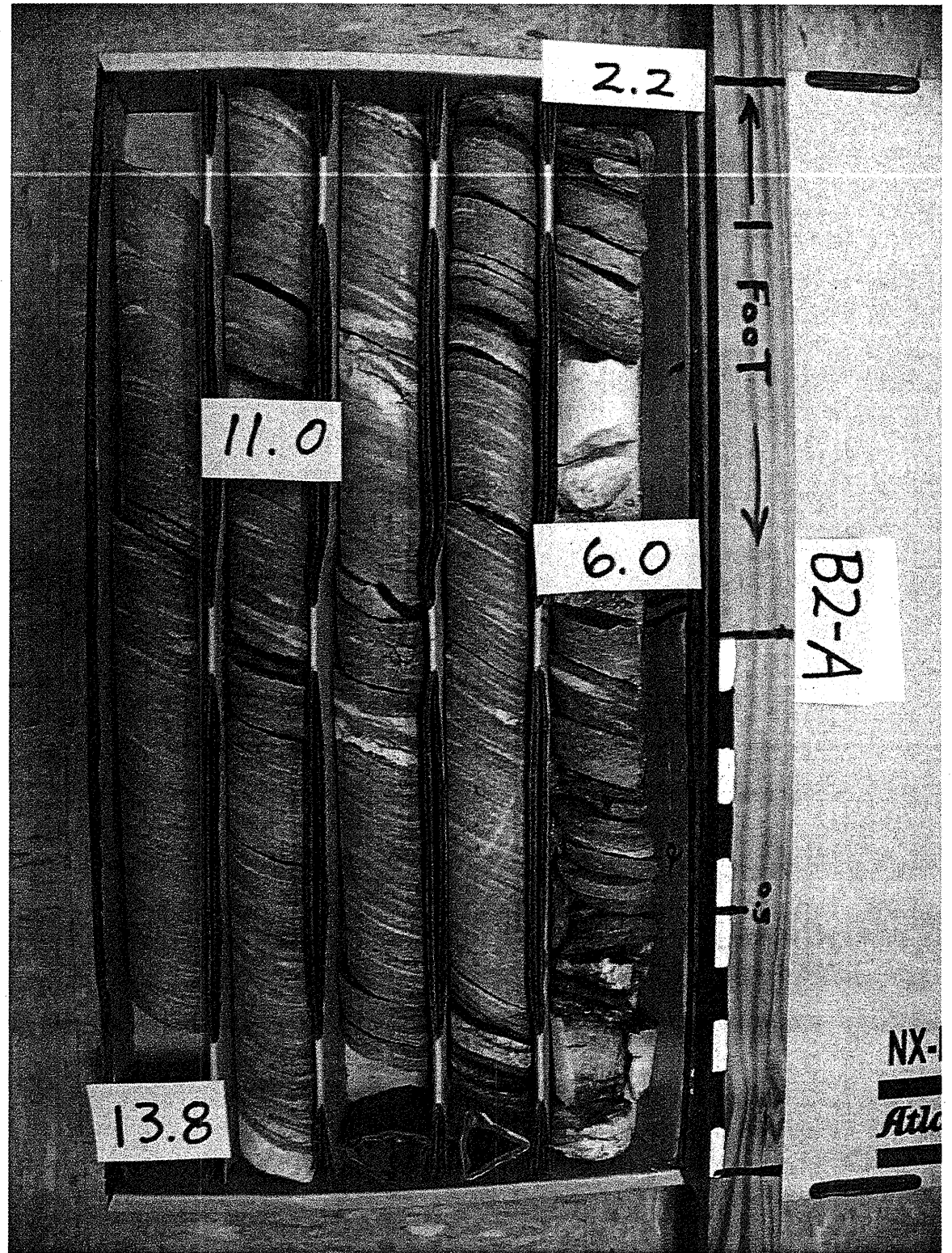
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



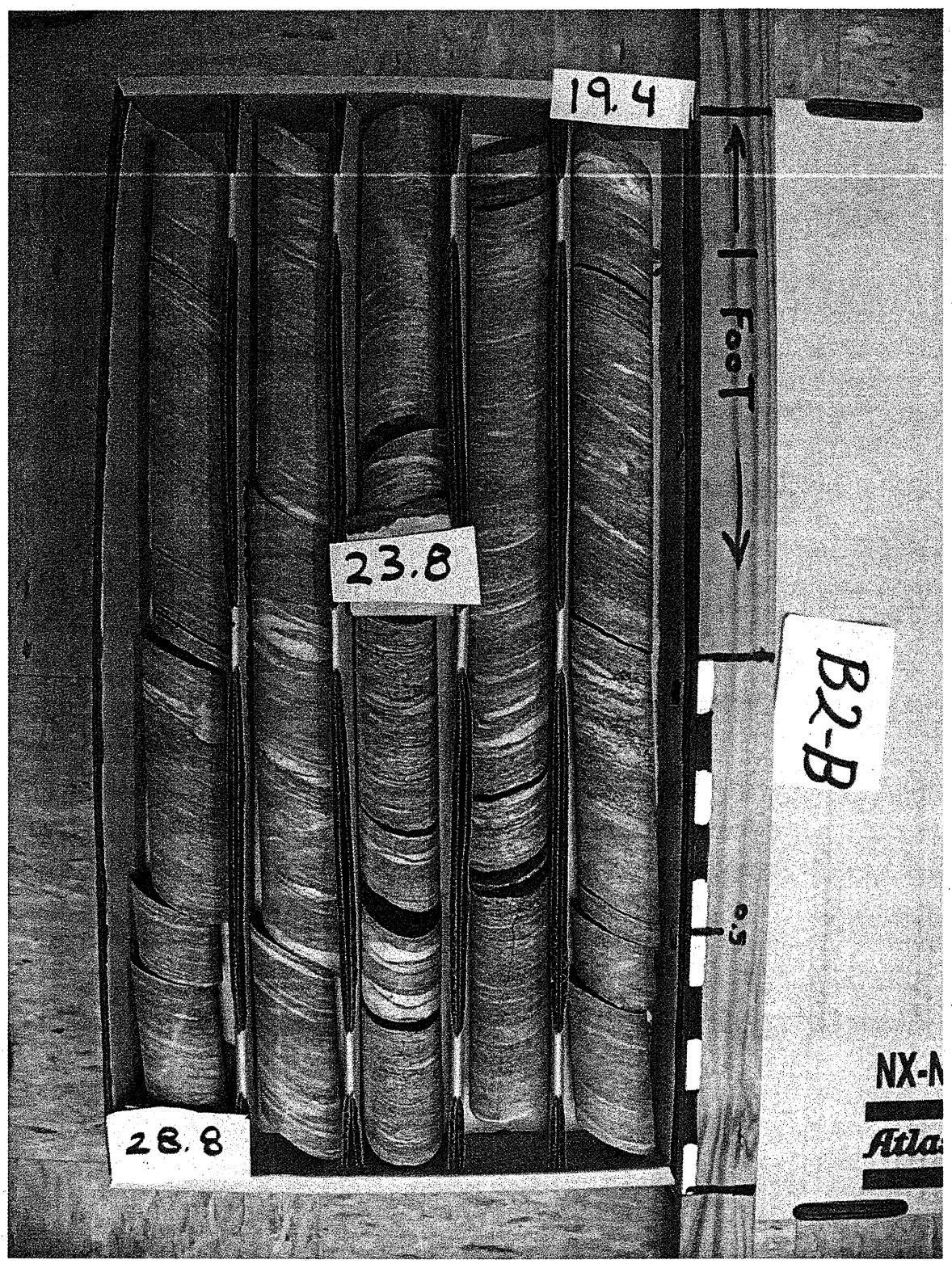
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



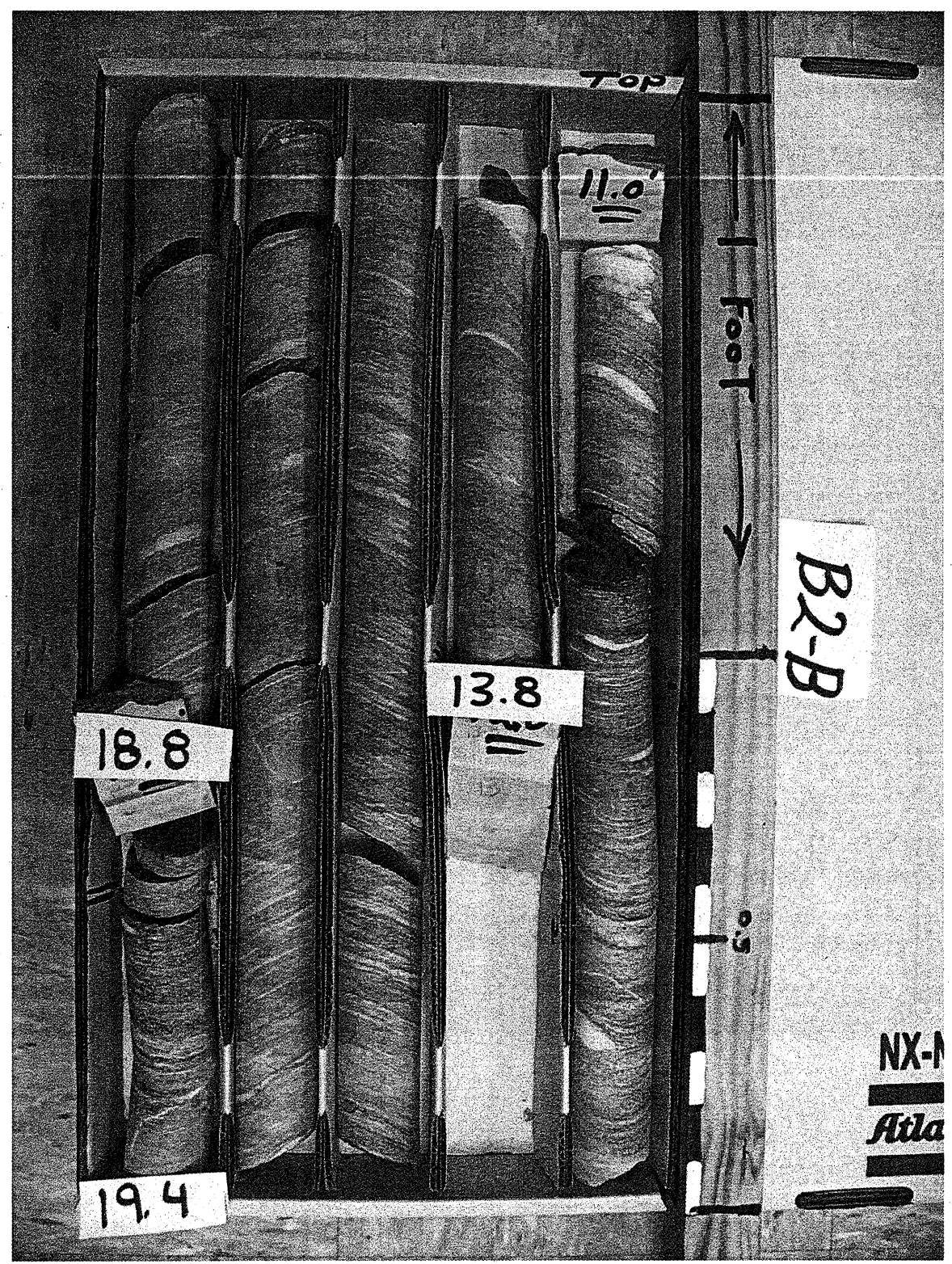
B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



B-4836 38606.1.1
Watauga Co. Br. 59
On SR-1331 over South Fork New River



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Watauga Co. Br. 59
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