

CONTRACT: ID: B-4052

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33418.1.1 (B-4052)	1	30
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

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STATE PROJECT 33418.1.1 I.D. NO. B-4052

F.A. PROJECT BRZ-1106(4)

COUNTY Caldwell

PROJECT DESCRIPTION _____

Bridge No.7 on NC-268

over the Yadkin River

SITE DESCRIPTION _____

INVESTIGATED BY C A Dunnagan PERSONNEL M M Hager

CHECKED BY W D Frye, Jr D O Cheek

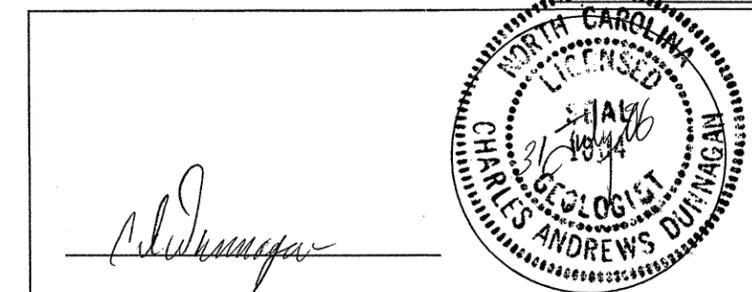
SUBMITTED BY W D Frye, Jr G K Rose

DATE May 2006

DRAWN BY: C A Dunnagan

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

PROJECT REFERENCE NO. 33418.11 (B-4052)
 SHEET NO. 21/30

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 (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6		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. 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 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 PHYLLITE, 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. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - 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.																																																																																																																																																																							
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1, A-1-b, A-3</td> <td>A-2, A-2-4, A-2-5, A-2-6, A-2-7</td> <td>A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10, 20, 40, 60, 80, 100</td> <td>10, 20, 40, 60, 80, 100</td> <td>10, 20, 40, 60, 80, 100</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td> <td>10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td> <td>10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td> </tr> <tr> <td>GROUP INDEX</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS., GRAVEL, AND SAND</td> <td>FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER, HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GENERAL RATING AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </tbody> </table>		GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS.	A-1, A-1-b, A-3	A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, A-5, A-6, A-7	SYMBOL				% PASSING	10, 20, 40, 60, 80, 100	10, 20, 40, 60, 80, 100	10, 20, 40, 60, 80, 100	LIQUID LIMIT	6, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	GROUP INDEX	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS., GRAVEL, AND SAND	FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER, HIGHLY ORGANIC SOILS	GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE	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. VERY SLIGHT (V SLI.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. 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.		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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. 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. 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.																																																																																																																																							
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 4, 2006

STATE PROJECT: 33418.1.1 (B-4052)
F. A. PROJECT: BRZ-1106(4)
COUNTY: Caldwell
DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

Introduction

This project is located in central Caldwell County, approximately 5.0 miles north of Lenoir. The existing structure will be replaced with a triple-span bridge. Each span of the new bridge will be 50.0 feet long; the skew is to be 90 degrees. A detour bridge, 60.0 feet upstream, will be utilized during construction.

The subsurface investigation was conducted using a CME-550 drill machine with -N-casing and advancer. Standard Penetration Tests were performed where applicable, using an automatic drop hammer. Rock core was retrieved from each of the borings with NXWL equipment. Two rock core samples were submitted for testing for Unit Weight, Compressive Strength (QU), Young's Modulus (E) and Split Tensile Strength. Centerline borings were drilled at both ends of the detour bridge.

Geology and Rock Characteristics

The rocks involved in this project are a biotite gneiss, labeled as CZbg on the Geologic Map of North Carolina (1985). The site is adjacent to (probably within) the Brevard Fault Zone. The Brevard Fault Zone is a large structure that spans the state in a northeast-southwest trend. Evidence of this structure is visible even at the -NXWL- core level. These small faults, and the accompanying mylonite, allow water to enter the rock body. This allows weathering, compromising the quality of the rock. The rock is exposed within the river channel throughout a major portion of the bridge site.

Foundation Material

End Bent One

Embankment is present from the ground surface across this location. It consists of up to 10.0 feet of loose, silty sand with gravel.

In the boring for EB1-A, alluvium is beneath the embankment. This material is comprised of about 2.0 feet of loose silty sand and gravel.

In the boring for EB1-A, weathered rock was encountered at 5.4 feet (elevation 1213.6). Coring was begun at 6.3 feet (elevation 1212.7) and terminated at 13.7 (elevation 1205.3). Recoveries were 88 and 94 percent; RQD's were 71 and 66 percent.

In the boring for EB1-B, the embankment was emplaced directly upon weathered rock. This contact occurs at 6.6 feet (elevation 1213.4). Coring was begun at 13.3 feet (elevation 1206.7) and terminated at 20.9 feet (elevation 1199.1). Recoveries were 90 and 94 percent; RQD's were 0 and 38 percent.

Static groundwater was not measurable in either of the End Bent One boreholes.

Interior Bent One

The boring for B1-A encountered a thin veneer of alluvium on the rock. At B1-B, the boring was started directly upon exposed rock.

Coring in B1-A was begun at 0.5 feet (elevation 1208.4) and terminated at 24.4 feet (elevation 1184.5). The Recoveries were from 80 to 100 percent (92 percent average). The RQD's were from 26 to 100 percent (58 percent average). Coring in B1-B was begun at 0.0 feet (elevation 1207.6) and terminated at 29.3 feet (elevation 1178.3). The Recoveries were from 42 to 98 percent (79 percent average). The RQD's were from 0 to 80 percent (34 percent average).

Interior Bent Two

A minor amount of silty sand and gravel alluvium was encountered at the top of both borings.

At B2-A, coring was begun at 2.3 feet (elevation 1210.9) and terminated at 19.3 feet (elevation 1193.9). The Recoveries were from 76 to 92 percent (86 percent average). The RQD's were from 42 to 92 percent (73 percent average).

In the boring for B2-B, coring was begun at 0.3 feet (elevation 1207.9) and terminated at 24.9 feet (elevation 1183.3). The Recoveries ranged from 54 to 94 percent (79 percent average). The RQD's were from 0 to 86 percent (42 percent average).

End Bent Two

The embankment encountered at EB2-A consists of approximately 7.0 feet of very soft to soft silty clay with sand. The boring for EB2-B was offset, and encountered no embankment.

Alluvium was drilled in both borings. It is comprised of about 5.0 feet of dense silty sand and gravel.

In EB2-A, weathered rock was found at 11.5 feet (elevation 1206.6). In this boring, coring was begun at 15.4 feet (elevation 1202.7) and terminated at 29.0 feet (elevation 1189.1). The Recoveries were from 89 to 100 percent (94 percent average).

In EB2-B, weathered rock starts at 5.4 feet (elevation 1208.7). Coring was begun at 6.7 feet (elevation 1207.4) and terminated at 19.6 feet (elevation 1194.5). The Recoveries were from 54 to 86 percent (68 percent average); RQD's were from 0 to 45 percent (19 percent average).

Static groundwater was measured in EB2-B at 5.5 feet (elevation 1208.6).

Detour Bridge

End Bent One

The embankment encountered from the surface extends to a depth of 5.1 feet. It consists of loose silty sand.

The alluvium under the embankment consists of about 2.0 feet of loose sand and gravel. Weathered rock starts at 7.2 feet (elevation 1212.0) and grades to hard rock by 10.6 feet (elevation 1208.6). Static groundwater was not encountered in this boring.

End Bent Two

Alluvium is present from the surface at this site. It is comprised of 4.9 feet of loose silty sand with gravel and cobbles.

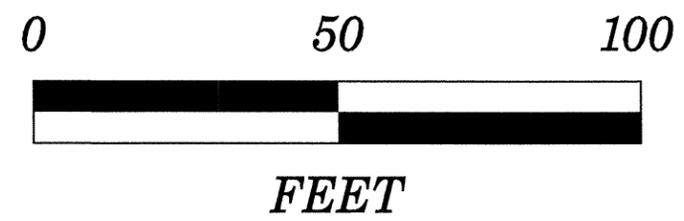
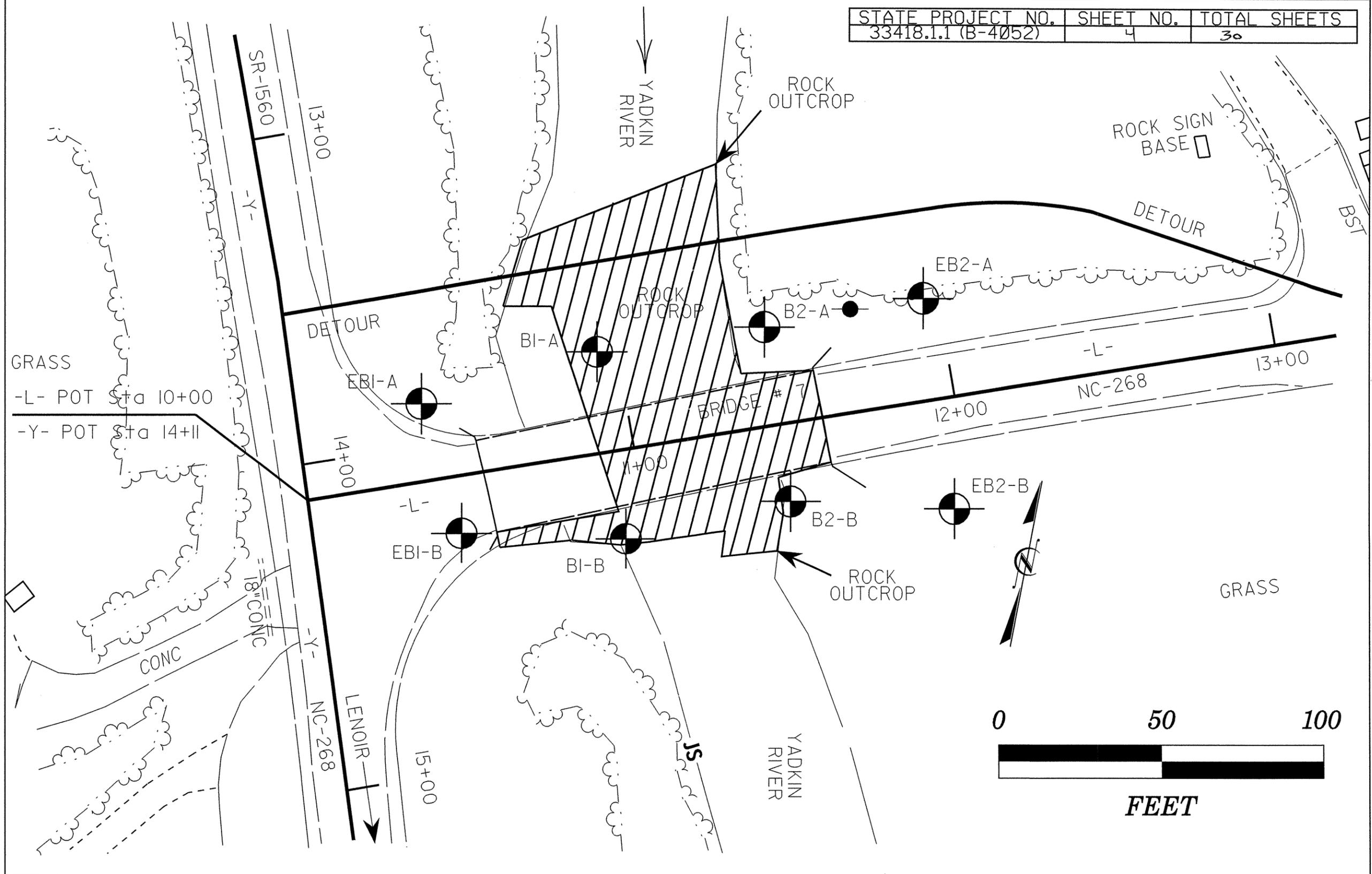
Weathered rock was encountered at 4.9 feet (elevation 1210.1) and grades almost immediately to rock by 5.2 feet (elevation 1209.8).

Respectfully Submitted,

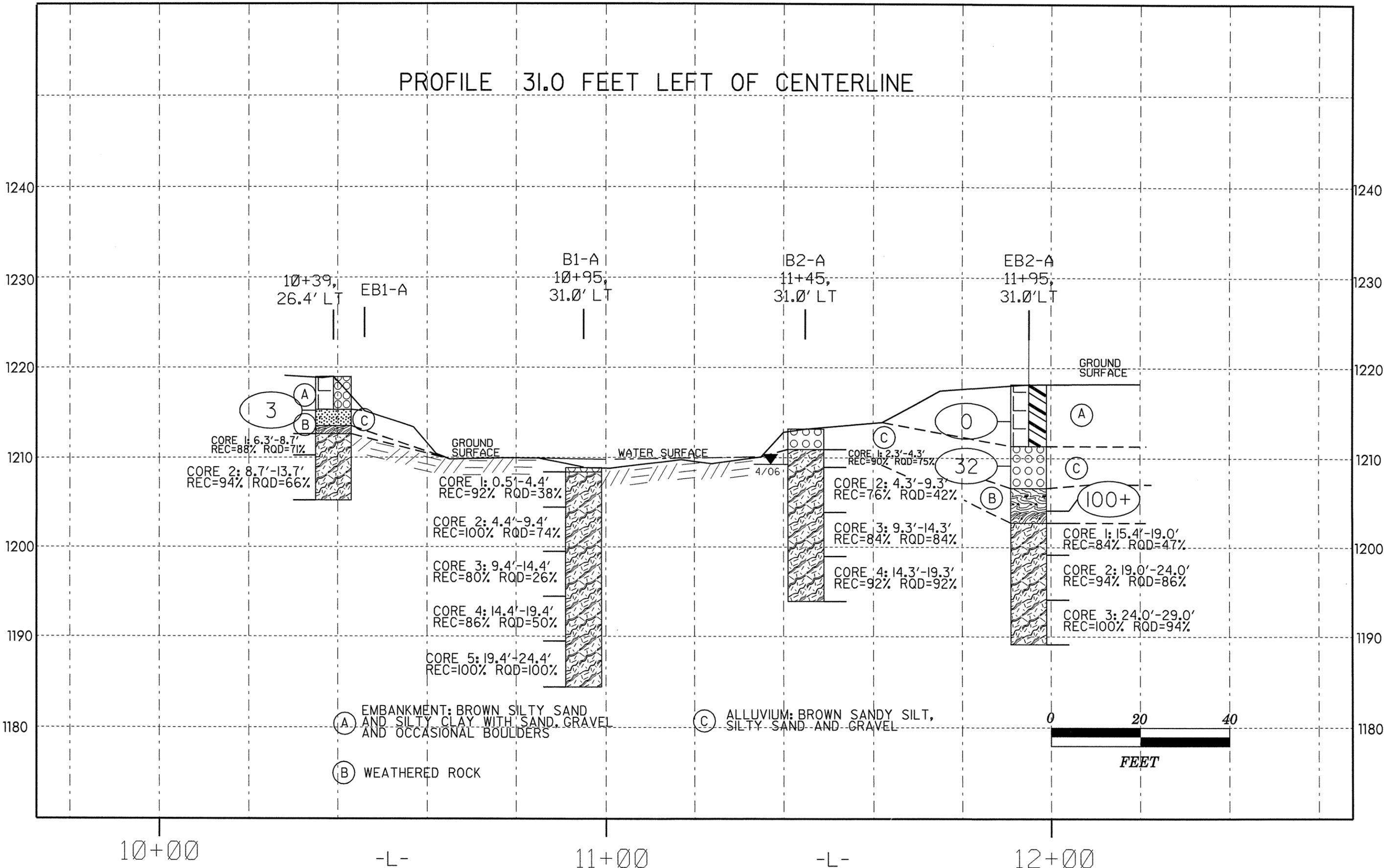


Charles A. Dupnagan, LG
Project Geological Engineer

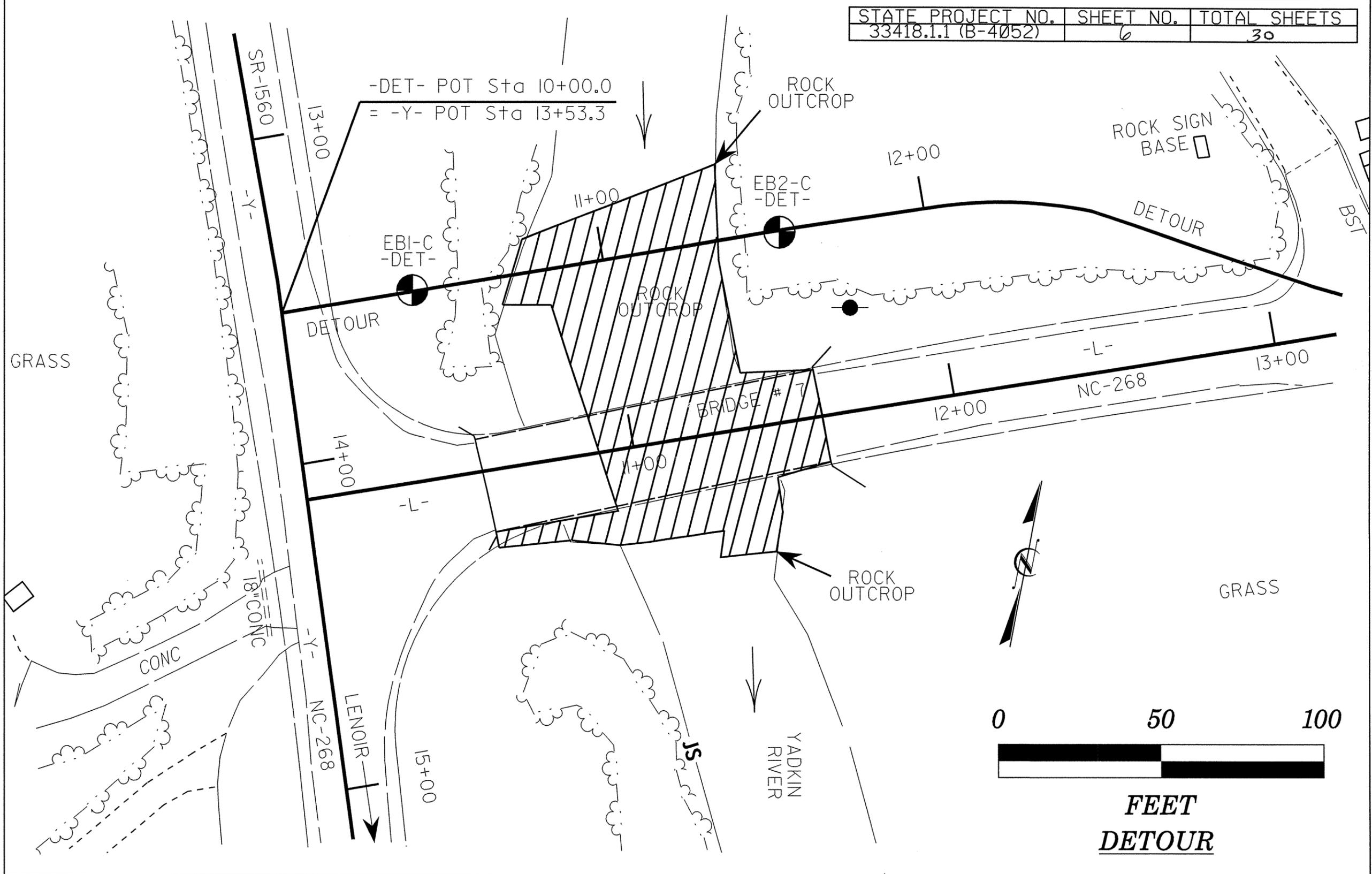
STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
33418.1.1 (B-4052)	4	30



PROFILE 31.0 FEET LEFT OF CENTERLINE

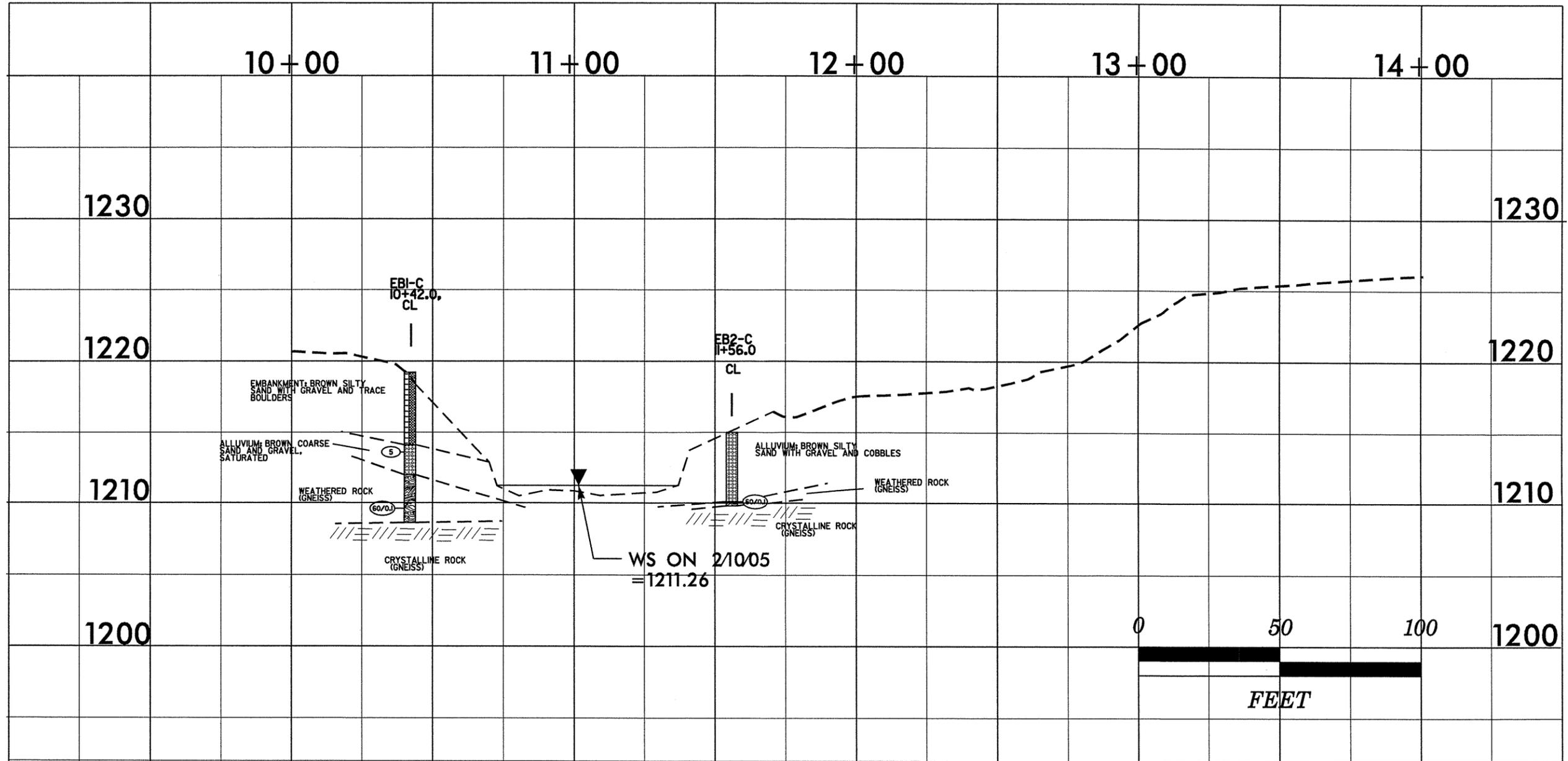


STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
33418.1.1 (B-4052)	6	30



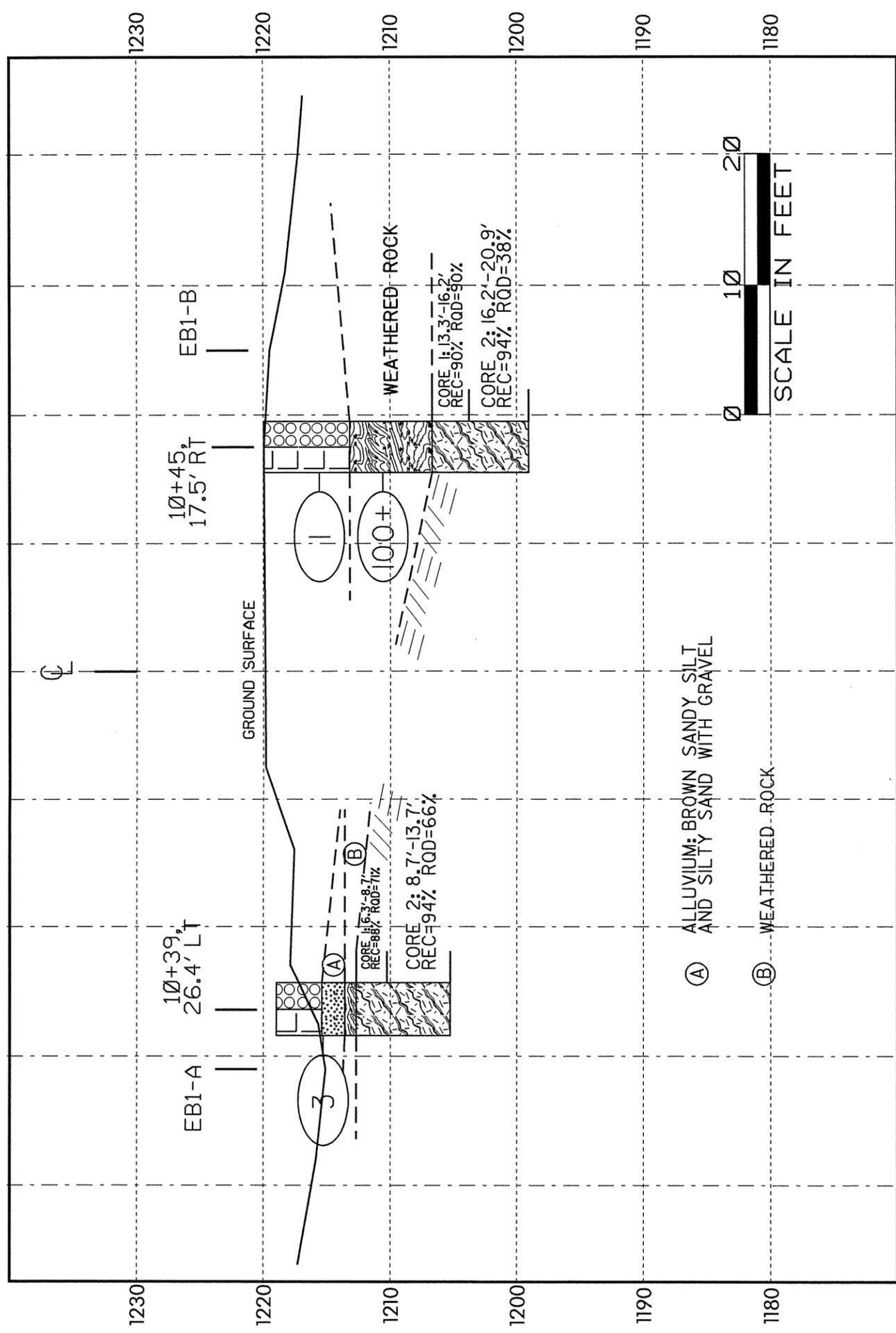
FEET
DETOUR

PROFILE ALONG CENTERLINE DETOUR



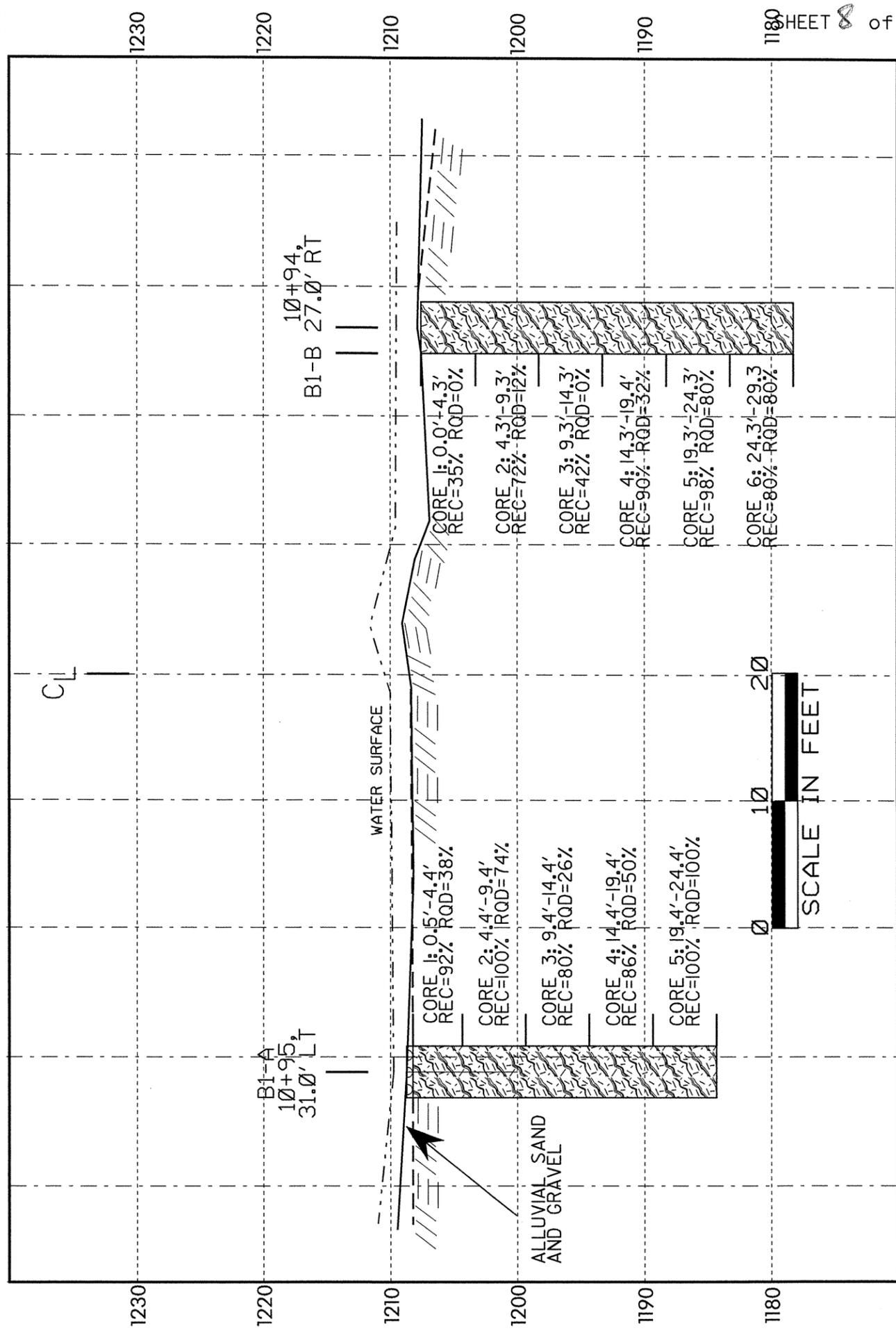
CROSS SECTION THROUGH END BENT ONE

BRIDGE NO. 7,
33418.1.1 (B-4052)



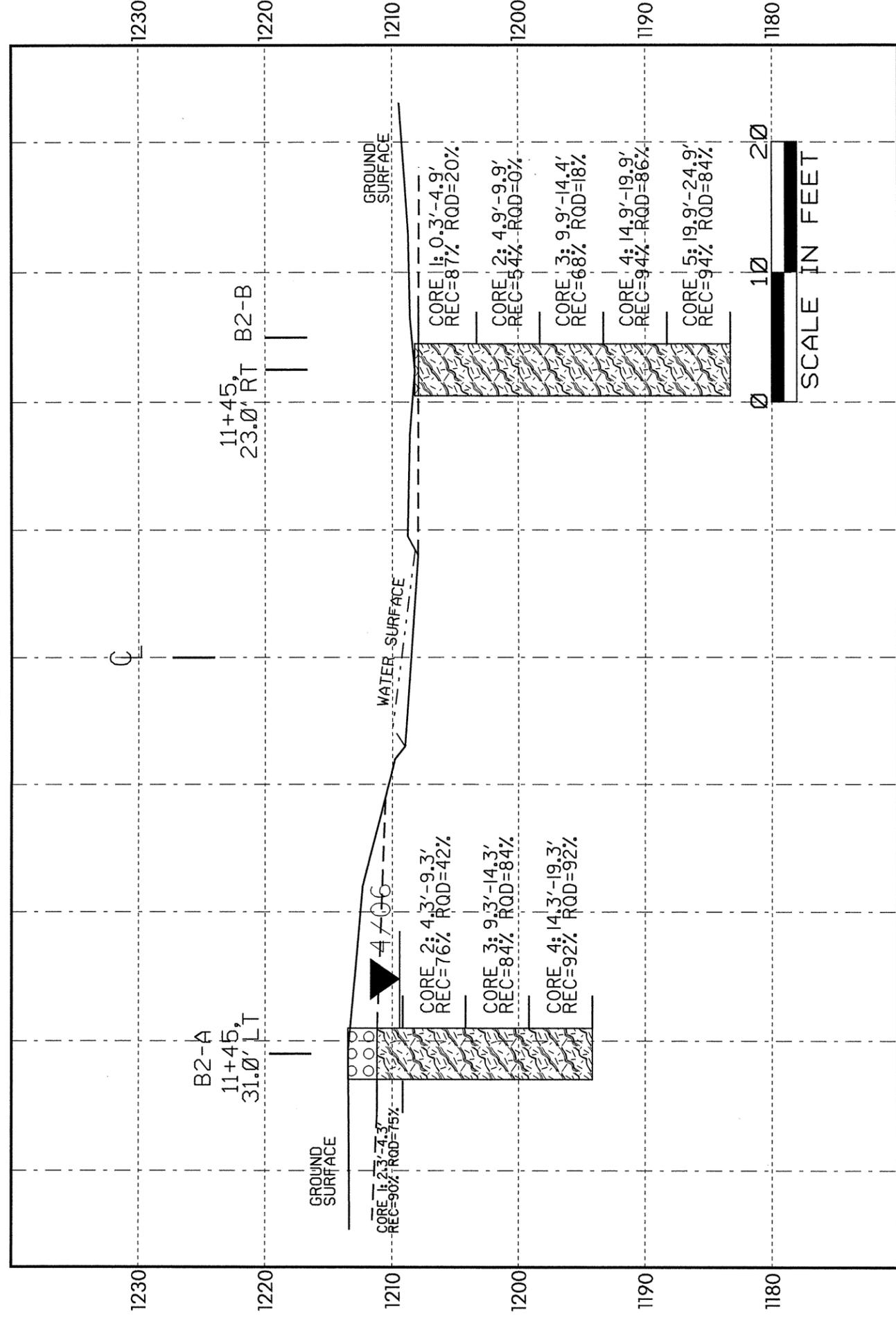
CROSS SECTION THROUGH INTERIOR BENT ONE

BRIDGE NO. 7,
33418.1.1 (B-4052)



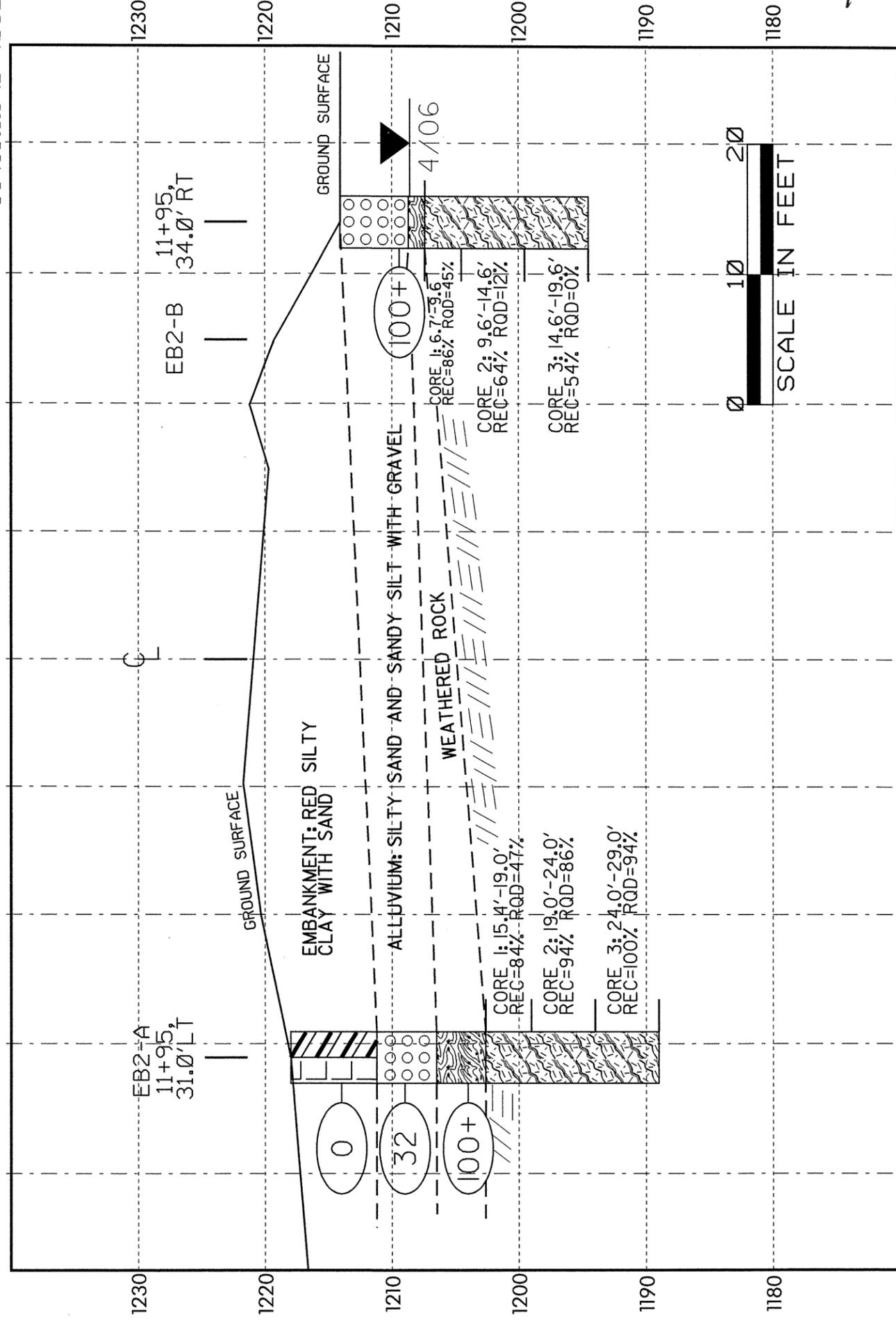
CROSS SECTION THROUGH INTERIOR BENT TWO

BRIDGE NO. 7,
33418.1.1 (B-4052)



CROSS SECTION THROUGH END BENT TWO

BRIDGE NO. 7,
33418.1.1 (B-4052)



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

10/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER								
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER							
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT -L-		BORING LOCATION 10+39.000		OFFSET 26.40ft LT		24 HR N/A								
COLLAR ELEV 1218.96ft		TOTAL DEPTH 13.70ft		START DATE 4/20/06		COMPLETION DATE 04/20/06								
DRILL MACHINE CME 550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
1218.96														Ground Surface
	3.70	1	1	2	1.0									EMBANKMENT: BROWN SILTY SAND WITH GRAVEL AND OCC BOULDERS
														ALLUVIUM: BROWN SANDY SILT AND SILTY SAND WITH GRAVEL
														WEATHERED ROCK
														CORE 1: 6.3'- 8.7' REC=88% RQD=71%
														CORE 2: 8.7'- 13.7' REC=94% RQD=66%
1210.00														
1205.26														BORING TERMINATED AT ELEV-1205.26 IN ROCK

SHEET 1 OE1

DATE 21-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: EB1-A GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1219.0 FT. TOTAL DEPTH: 13.7 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1212.7	6.3			2.1	1.7		Tan and light gray biotite gneiss. Moderately weathered to fresh; hard.
			2.4	88	71		
1210.3	8.7						a) Occasional parts along foliation @ 45°.
1210.3	8.7			4.7	3.3		b) Occasional joints @ 10°.
			5.0	94	66		c) Occasional joints @ 45°.
1205.3	13.7						

CORING TERMINATED AT ELEVATION 1205.3 FT.

DRILLER: G K Rose CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

11/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER					
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 10+45.000		OFFSET 17.50ft RT		24 HR N/A						
COLLAR ELEV 1219.96ft		TOTAL DEPTH 20.90ft		START DATE 4/20/06		COMPLETION DATE 04/20/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1219.96												Ground Surface
	4.40	0	0	1	1.0							EMBANKMENT: BROWN SILTY SAND WITH GRAVEL
1210.00	9.40	65	35		0.1							WEATHERED ROCK
												CORE 1: 13.3'- 16.2' REC=90% RQD=0%
												CORE 2: 16.2'-20.9' REC=94% RQD=38%
1200.00												BORING TERMINATED AT ELEV- 1199.1 IN ROCK
1199.08												

SHEET 1 OF 1

DATE 21-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: EB1-B GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1220.0 FT. TOTAL DEPTH: 19.9 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1206.7	13.3		2.9	2.6	0.0		Brown biotite gneiss. Very severely to moderately severely weathered with completely weathered zones. Very softer to medium hard. a) Abundant parts along foliation @ 60°. b) Occasional joints @ 80°. c) Occasional joints @ 45°.
1203.8	16.2			90	0		
1203.8	16.2		4.7	4.4	1.8		Tan-gray biotite gneiss. Moderately to slightly weathered with very severely weathered zone from 19.1ft to 19.6ft. a) Occasional parts along foliation @ 60°. b) Occasional joints @ 60°.
1199.1	20.9			94	38		

CORING TERMINATED AT ELEVATION 1200.1 FT.

DRILLER: G.T. BELL CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

12/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER					
BORING NO B1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 10+95.000		OFFSET 31.00ft LT		24 HR N/A						
COLLAR ELEV 1208.85ft		TOTAL DEPTH 24.40ft		START DATE 4/12/06		COMPLETION DATE 04/12/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B1-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1208.85												Ground Surface
										RS-2		ALLUVIAL SAND AND GRAVEL CORE 1: 0.5'- 4.4' REC= 92% RQD=38%
												CORE 2: 4.4'- 9.4' REC=100% RQD=74%
												CORE 3: 9.4'- 14.4' REC=80% RQD=26%
												CORE 4: 14.4'- 19.4' REC=86% RQD=50%
												CORE 5: 19.4'- 24.4' REC=100% RQD=100%
												BORING TERMINATED AT ELEV. 1184.45 IN ROCK

SHEET 1 OF 1

DATE 18-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: B1-A GEOLOGIST: C A Dunnagan
 DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River
 COUNTY: Caldwell COLLAR ELEVATION: 1208.9 FT. TOTAL DEPTH: 24.4 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1208.4	0.5		3.9	3.6	1.5		Tan to light gray biotite gneiss. Some faulting with mylonite zones. Moderately weathered to fresh with occasional severely weathered seams. a) Abundant parts along foliation @ 45°. b) Occasional joints @ 70°. c) Occasional faults @ 70°. d) Occasional joints @ 10°.
				92	38		
1204.5	4.4						
1204.5	4.4		5.0	5.0	3.7	RS-2	
				100	74		
1199.5	9.4						
1199.5	9.4		5.0	4.0	1.3		
				80	26		
1194.5	14.4						
1194.5	14.4		5.0	4.3	2.5		
				86	50		
1189.5	19.4						
1189.5	19.4		5.0	5.0	5.0		
				100	100		
1184.5	24.4						
1184.5	24.4						
1184.5	24.4						

CORING TERMINATED AT ELEVATION 1184.5 FT.

DRILLER: G K Rose CORE SIZE: NXWL EQUIPMENT: CME-550

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG**

13/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER					
BORING NO B1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 10+94.000		OFFSET 27.00ft RT		24 HR N/A						
COLLAR ELEV 1207.59ft		TOTAL DEPTH 29.30ft		START DATE 4/18/06		COMPLETION DATE 04/18/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B1-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1207.59												Ground Surface
												CORE 1: 0.0'- 4.3' REC=35% RQD=0%
												CORE 2: 4.3'- 9.3' REC=72% RQD=12%
												CORE 3: 9.3'- 14.3' REC=42% RQD=0%
												CORE 4: 14.3'- 19.3' REC=90% RQD=32%
												CORE 5: 19.3'- 24.3' REC=98% RQD=80%
												CORE 6: 24.3'- 29.3' REC=80% RQD=80%
												BORING TERMINATED AT ELEV- 1178.29 IN ROCK

SHEET 1 OF 1

DATE 19-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: B1-B GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1207.6 FT. TOTAL DEPTH: 29.3 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1207.6	0.0			1.5	0.0		Brown biotite gneiss. Faulted with thin mylonite seams. Severely to moderately weathered. Soft to medium hard. a) Abundant parts along foliation @ 70°. b) Abundant joints @ 10°. c) Occasional joints @ 30°. d) Occasional joints/faults @ 60°.
			4.3	35	0		
1203.3	4.3						
1203.3	4.3			3.6	0.6		
			5.0	72	12		
1198.3	9.3						
1198.3	9.3			2.1	0.0		
			5.0	42	0		
1193.3	14.3						
1193.3	14.3			4.5	1.6		
			5.0	90	32		
1188.3	19.3						
1188.3	19.3			4.9	4.0		
			5.0	98	80		
1183.3	24.3						
1183.3	24.3			4.0	4.0		
			5.0	80	80		
1178.3	29.3						

CORING TERMINATED AT
ELEVATION 1178.3 FT.

DRILLER: D O Cheek CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

14/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER					
BORING NO B2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 11+45.000		OFFSET 31.00ft LT		24 HR 4.00ft						
COLLAR ELEV 1213.22ft		TOTAL DEPTH 19.30ft		START DATE 4/12/06		COMPLETION DATE 04/12/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1213.22												Ground Surface
1210.00												ALLUVIUM: BROWN SILTY COURSE SAND
												CORE 1: 2.3'- 4.3' REC=90% RQD=75%
												CORE 2: 4.3'- 9.3' REC=76% RQD=42%
1200.00												CORE 3: 9.3'- 14.3' REC=84% RQD=84%
												CORE 4: 14.3'- 19.3' REC=92% RQD=92%
1193.92												BORING TERMINATED AT ELEV 1193.92 IN ROCK

SHEET 1 OF 1

DATE 18-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: B2-A GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1213.2 FT. TOTAL DEPTH: 19.3 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1210.9	2.3			1.8	1.5		
			2.0	90	75		
1208.9	4.3			3.8	2.1		Light gray to gray biotite gneiss with traces of pyrite. Slightly weathered to fresh; hard with occasional rubble zones. Interlayered well foliated and massive layers. Occasional mylonite zones. a) Occasional parts along foliation @ 45°. b) Occasional joints @ 75°. c) Occasional joints @ 10°.
1208.9	4.3		5.0	76	42		
1203.9	9.3			4.2	4.2	RS-1	
1203.9	9.3		5.0	84	84		
1198.9	14.3			4.6	4.6		
1198.9	14.3		5.0	92	92		
1193.9	19.3						

CORING TERMINATED AT ELEVATION 1193.9 FT.

DRILLER: G K Rose CORE SIZE: NXWL EQUIPMENT: CME-550

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG**

15/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER					
BORING NO B2-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 11+45.000		OFFSET 23.00ft RT		24 HR N/A						
COLLAR ELEV 1208.18ft		TOTAL DEPTH 24.90ft		START DATE 4/17/06		COMPLETION DATE 04/17/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1208.18												Ground Surface
												ALLUVIAL SAND AND GRAVEL
												CORE 1: 0.3'- 4.9' REC=87% RQD=20%
												CORE 2: 4.9'- 9.9' REC=54% RQD=0%
												CORE 3: 9.9'- 14.9' REC=68% RQD=18%
												CORE 4: 14.9'- 19.9' REC=94% RQD=86%
												CORE 5: 19.9'- 24.9' REC=94% RQD=84%
												BORING TERMINATED AT ELEV- 1183.28 IN ROCK

SHEET 1 OE1

CORE BORING REPORT

DATE 18-Apr-06

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: B2-B GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1208.2 FT. TOTAL DEPTH: 24.9 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1207.9	0.3		4.6	4.0	0.9		Brown biotite gneiss. Severely to moderately severely weathered with occasional completely weathered seams. Soft to medium hard. a) Abundant parts along foliation @ 75°. b) Abundant joints @ 30°.
1203.3	4.9			87	20		
1203.3	4.9		5.0	2.7	0.0		
1198.3	9.9			54	0		
1198.3	9.9		5.0	3.4	0.9		
1193.3	14.9						13.9 Gray biotite gneiss. Fresh with occasional thin, moderately severely weathered seams. a) Occasional parts along foliation @ 70°. b) Occasional joints @ 10°.
1193.3	14.9		5.0	4.7	4.3		
				94	86		
1188.3	19.9						
1188.3	19.9		5.0	4.7	4.2		
				94	84		
1183.3	24.9						

CORING TERMINATED AT
ELEVATION 1183.3 FT.

DRILLER: D O Cheek CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

16/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER						GND WATER						
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 11+95.000		OFFSET 31.00ft LT		24 HR N/A						
COLLAR ELEV 1218.13ft		TOTAL DEPTH 29.00ft		START DATE 4/11/06		COMPLETION DATE 04/12/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1218.13												Ground Surface
	4.00	0	0	0	1.0							EMBANKMENT: RED SILTY CLAY WITH SAND, MOIST
1210.00	9.00	8	17	15	1.0							ALLUVIUM: SANDY SILT WITH GRAVEL, SATURATED
	14.00	100			0.3							WEATHERED ROCK
1200.00												CORE 1: 15.4'- 19.0' REC=84% RQD=47%
												CORE 2: 19.0'- 24.0' REC=94% RQD=86%
												CORE 3: 24.0'- 29.0' REC=100% RQD=94%
1189.13												BORING TERMINATED AT ELEV 1189.13 IN ROCK

SHEET 1 OE1

DATE 18-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: EB2-A GEOLOGIST: C A Dunnagan

DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River

COUNTY: Caldwell COLLAR ELEVATION: 1218.1 FT. TOTAL DEPTH: 29.0 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1202.7	15.4		3.6	3.2 89	1.7 47		Gray biotite gneiss with a trace of pyrite. Slightly weathered to fresh. Hard. a) Occasional parts along foliation @ 30°-60°. b) Occasional joints @ 75°.
1199.1	19.0						
1199.1	19.0		5.0	4.7 94	4.3 86		
1194.1	24.0						
1194.1	24.0		5.0	5.0 100	4.7 94		
1189.1	29.0						

CORING TERMINATED AT ELEVATION 1189.1 FT.

DRILLER: G K Rose CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

17/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER						
SITE DESCRIPTION BRIDGE NO. 7 ON NC-269 OVER YADKIN RIVER							GND WATER					
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 11+95.000		OFFSET 34.00ft RT		24 HR 5.50ft						
COLLAR ELEV 1214.10ft		TOTAL DEPTH 19.60ft		START DATE 4/13/06		COMPLETION DATE 04/13/06						
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
1214.10												Ground Surface
1210.00	4.70	9	62	38	0.1							ALLUVIUM: RED SILTY SAND WITH GRAV EL
												WEATHERED ROCK GRADING TO ROCK
												CORE 1: 6.7'- 9.6' REC=86% RQD=45%
												CORE 2: 9.6'- 14.6' REC=64% RQD=12%
												CORE 3: 14.6'- 19.6' REC=54% RQD=0%
1194.50												BORING TERMINATED AT ELEV. 1194.50 IN ROCK

SHEET 1 OE1

DATE 18-Apr-06

CORE BORING REPORT

PROJECT: 33418.1.1 I. D. NO: B-4052 BORING NO: EB2-B GEOLOGIST: C A Dunnagan
 DESCRIPTION: Bridge No. 7 on NC-268 over Yadkin River
 COUNTY: Caldwell COLLAR ELEVATION: 1214.1 FT. TOTAL DEPTH: 19.6 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
1207.4	6.7		2.9	2.5	1.3		
1204.5	9.6			86	45		Brown-gray to gray biotite gneiss. Severely to moderately severely weathered. Medium to moderately hard. Abundant Mn stains. a) Abundant parts along foliation @ 80°. b) Occasional joints @ 10°.
1204.5	9.6		5.0	3.2	0.6		
1199.5	14.6			64	12		
1199.5	14.6		5.0	2.7	0.0		
1194.5	19.6			54	0		

CORING TERMINATED AT ELEVATION 1194.5 FT.

DRILLER: D O Cheek CORE SIZE: NXWL EQUIPMENT: CME-550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER								
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER							
BORING NO EB1-C-DET-		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT -DET-		BORING LOCATION 10+42.000		OFFSET 0.00ft		24 HR N/A								
COLLAR ELEV 1219.20ft		TOTAL DEPTH 10.60ft		START DATE 4/18/06		COMPLETION DATE 04/18/06								
DRILL MACHINE CME 550			DRILL METHOD WASH BORING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-C-DET-, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
1219.20														Ground Surface
	4.60	3	2	3	1.0	5								EMBANKMENT: BROWN SILTY SAND WITH GRAVEL AND OCC BOULDERS
	9.60	60			0.1					60				ALLUVIUM: BROWN COARSE SAND AND GRAVEL, SATURATED WEATHERED ROCK GRADING TO ROCK
1210.00														CASING REFUSAL AT ELEV 1208.60 ON HARD ROCK
1208.60														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

18/30

PROJECT NO 33418.1.1		ID B-4052		COUNTY CALDWELL		GEOLOGIST M M HAGER								
SITE DESCRIPTION BRIDGE NO. 7 ON NC-268 OVER YADKIN RIVER							GND WATER							
BORING NO EB2-C-DET-		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT -DET-		BORING LOCATION 11+56.000		OFFSET 0.00ft		24 HR N/A								
COLLAR ELEV 1215.00ft		TOTAL DEPTH 5.20ft		START DATE 4/12/06		COMPLETION DATE 04/12/06								
DRILL MACHINE CME 550			DRILL METHOD WASH BORING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-C-DET-, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
														Ground Surface
	4.30	60			0.1					60				ALLUVIUM: BROWN SILTY SAND WITH GRAVEL AND COBBLES
1209.80														WEATHERED ROCK
														CASING REFUSAL AT ELEV 1209.80 ON HARD ROCK



**FIELD
SCOUR REPORT**

WBS: 33418.1.1 TIP: B-4052 COUNTY: Caldwell

DESCRIPTION(1): Bridge No. 7 on NC-268 over Yadkin river

EXISTING BRIDGE

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

Bridge No.: 7 Length: 110ft Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
Foundation Type: Spread footings on rock.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None noted.

Interior Bents: Minor amount around B1-A, caused by water being diverted by rock outcrop.

Channel Bed: None noted.

Channel Bank: Minor amount between Eb1-B and B1-B.

EXISTING SCOUR PROTECTION

Type(3): Concrete endbent and wing-walls.

Extent(4): Wing-walls extend 10ft from either end of endbent wall.

Effectiveness(5): Good.

Obstructions(6): Rock outcrops and boulders in streambed.

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): Rock with occasional veneer of alluvial sand, gravel and boulders.

Channel Bank Material(8): Silty sand.

Channel Bank Cover(9): EB1-A: grass and small shrubs. EB1-B: trees. EB2-A: trees. EB2-B: grass.

Floodplain Width(10): EB1: 30 feet. EB2 > 100ft.

Floodplain Cover(11): EB1: trees. EB2-A: trees. EB2-B: grass.

Stream is(12): Aggrading _____ Degrading _____ Static

Channel Migration Tendency(13): West.

Observations and Other Comments: Rock outcrops in channel bed, under and immediately downstream of bridge, are acting as dams. They have an important impact on the flow regime.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

	B1	B2								
A	1208	1210								
B	1207	1207								

Comparison of DSE to Hydraulics Unit theoretical scour:
The Hydraulics Unit's theoretical scour apparently doesn't allow for the obvious fact that the river bed is rock. Consequently, the DSE is 6.0 to 13.0 feet above the theoretical scour.

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									

Template Revised 02/07/06

Reported by:

C. A. Dunneagan
C A Dunneagan

Date: 4/3/2006

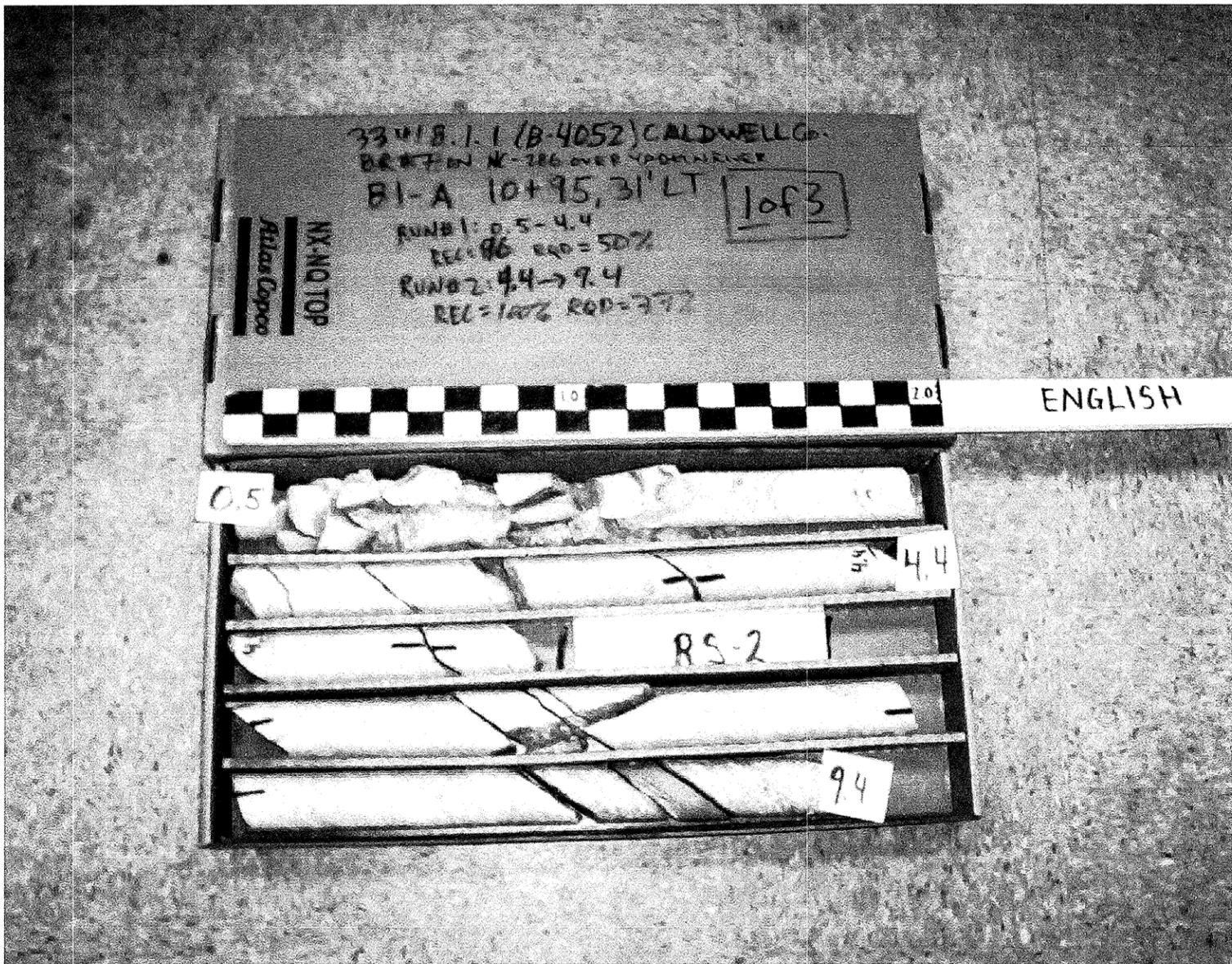
20/30



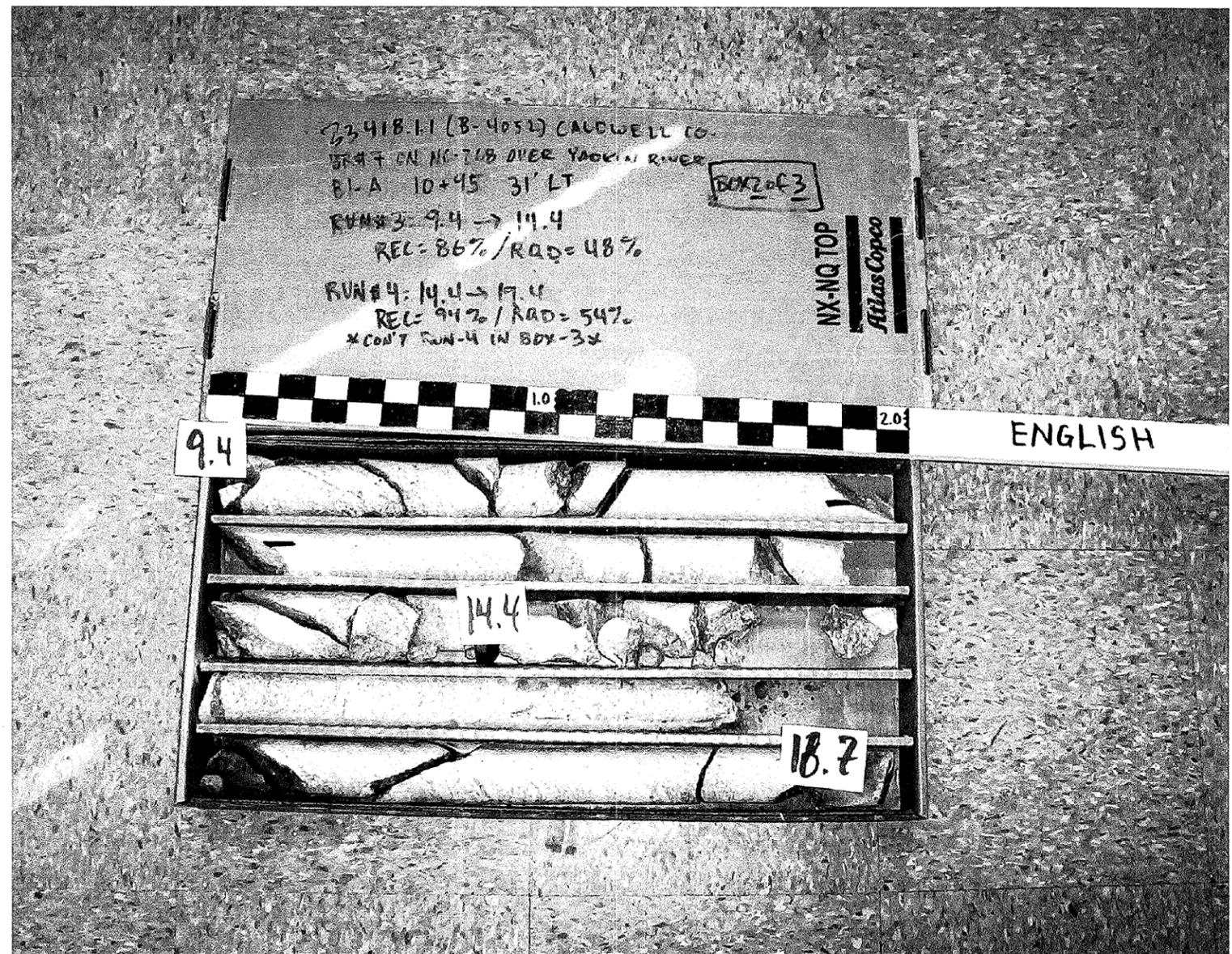
33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 EB1-A
 1 of 1



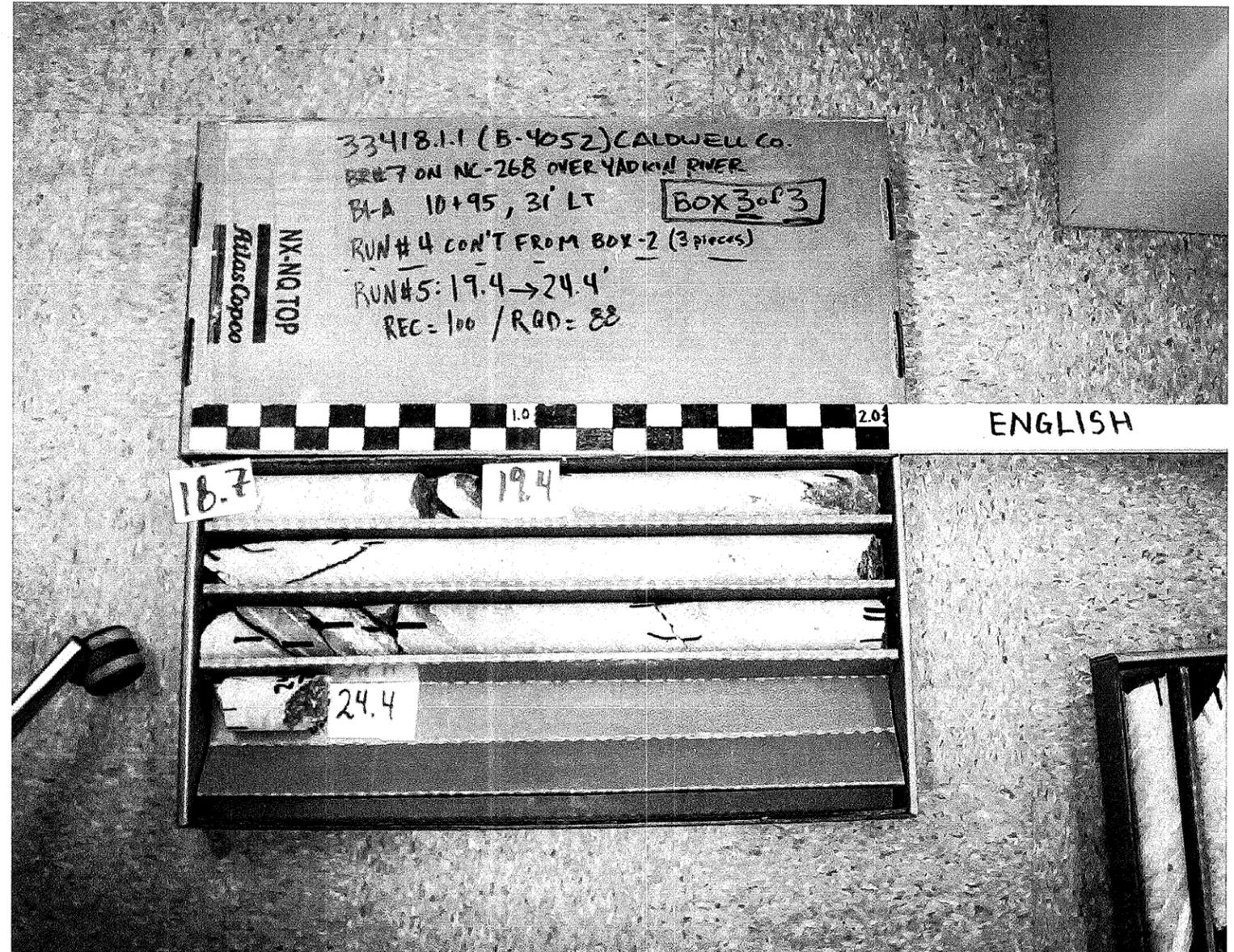
33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 EB1-B
 1 of 1



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-A
 1 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-A
 2 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-A
 3 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-B
 1 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-B
 2 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B1-B
 3 of 3



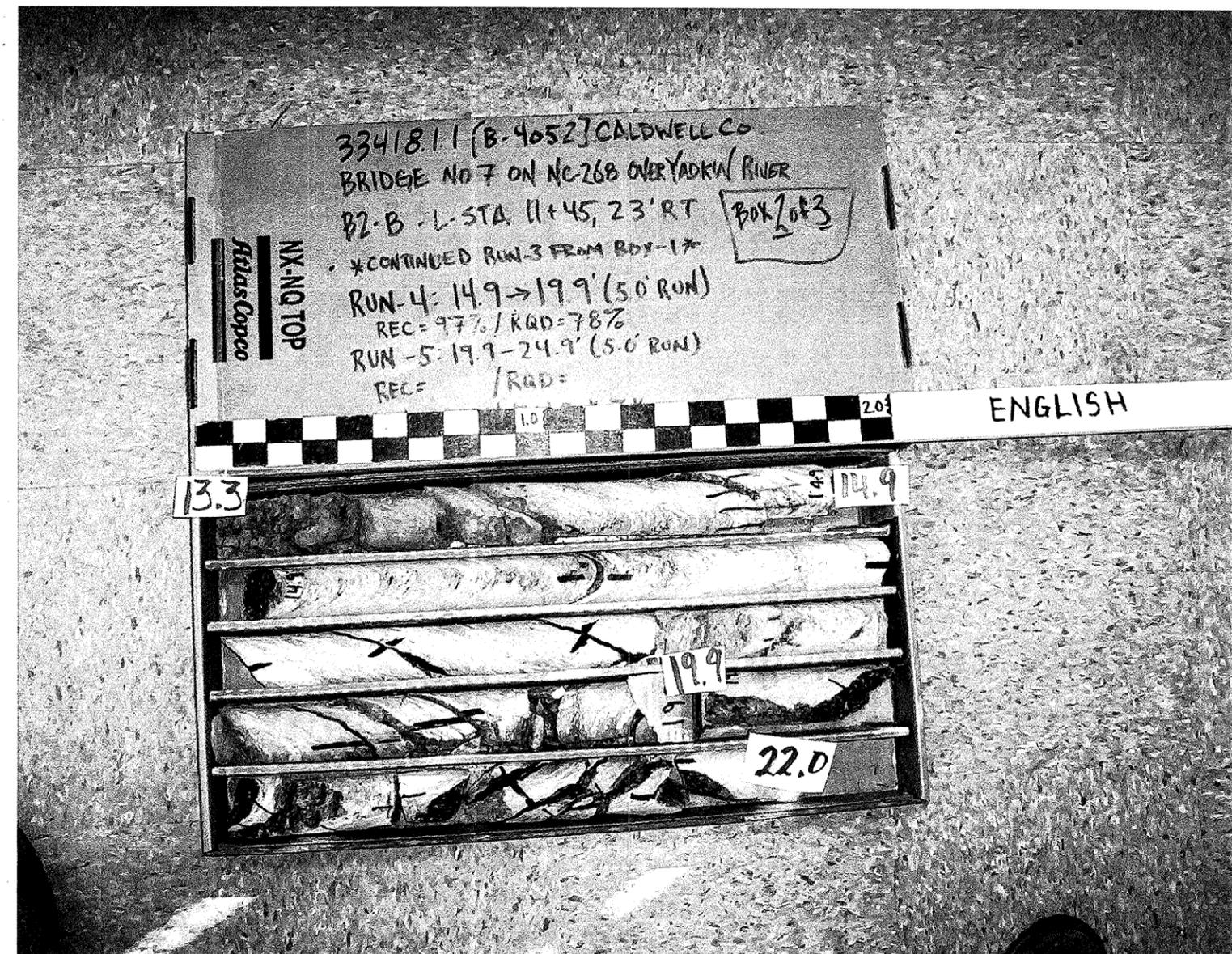
33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B2-A
 1 of 2



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B2-A
 2 of 2



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B2-B
 1 of 3



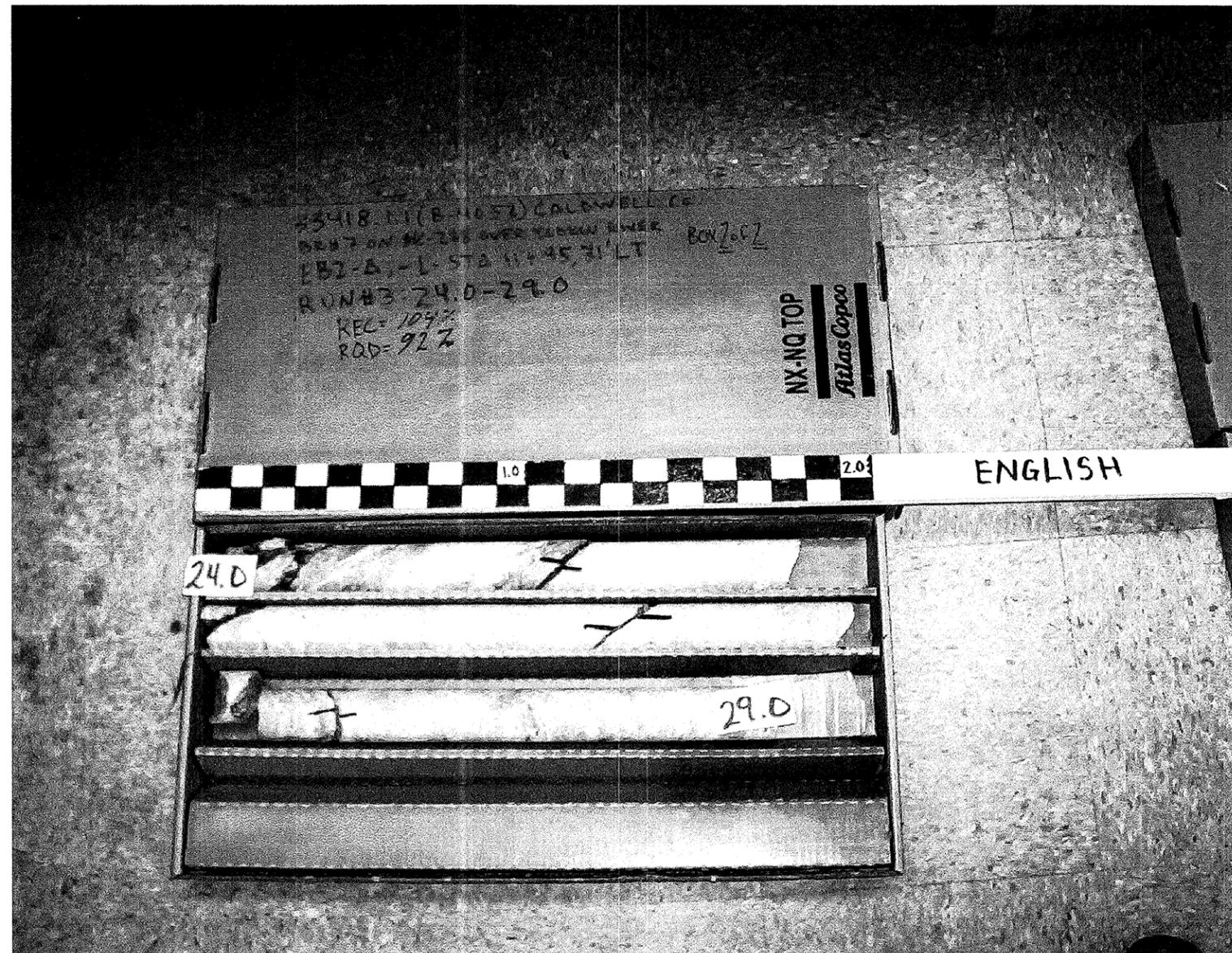
33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B2-B
 2 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 B2-B
 3 of 3



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 EB2-A
 1 of 2



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 EB2-A
 2 of 2



33418.1.1 B-4052
 Caldwell County
 Bridge No. 7 on NC-268 over
 Yadkin River
 EB2-B
 1 of 1