

REFERENCE: B-5716

PROJECT: 45672

SEE SHEET 2A FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
-L-	21+00.00 - 32+73.70	4-5	6-7
-DRI-	21+95.00 - 41+50.50	4	7

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	16+09	8
-L-	21+52	9

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	LAB SUMMARY	10-II

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM

PROJECT DESCRIPTION BRIDGE NO.140 ON SR 1138
(LINDSEY BRIDGE ROAD) OVER DAN RIVER

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5716	1	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT, AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - 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.

PERSONNEL

TRIGON

LANE, R. W.

GOODNIGHT, D.J.

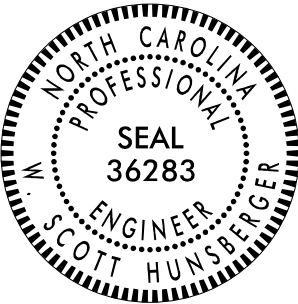
INVESTIGATED BY FALCON ENG.

DRAWN BY HUNSBERGER, W.S.

CHECKED BY CROCKETT, S. C.

SUBMITTED BY FALCON ENG.

DATE MARCH 2024



DocuSigned by:
W. Scott Hunsberger 3/29/2024
5A469AC80FCB49E SIGNATURE DATE

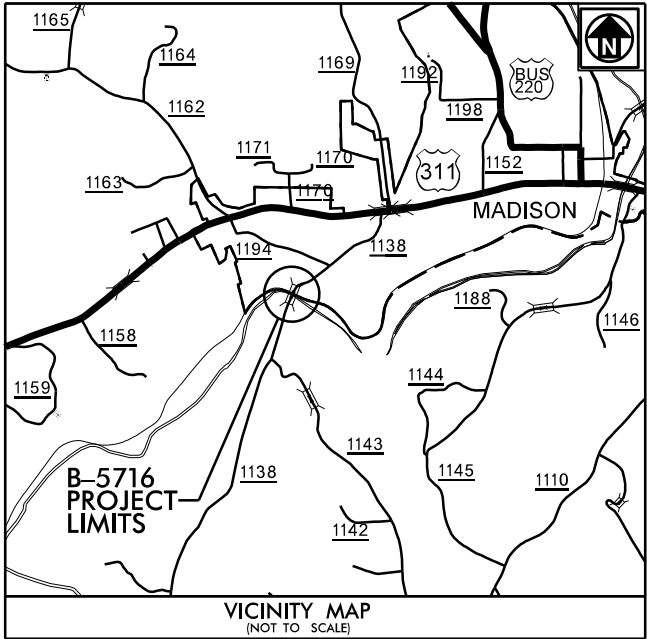
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION												GRADATION												ROCK DESCRIPTION												TERMS AND DEFINITIONS																																															
SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>												WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.												HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:												ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH 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.																																															
SOIL LEGEND AND AASHTO CLASSIFICATION												ANGULARITY OF GRAINS												WEATHERED ROCK (WR)												CRYSTALLINE ROCK (CR)																																															
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS				FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.																																																																	
GROUP CLASS.	A-1-a	A-1-b	A-3	A-2-4	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																																																																		
SYMBOL																																																																																			
% PASSING	*10	50 MX	30 MX	50 MX	51 MN	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																																																																		
MATERIAL PASSING #40	—	—	—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	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.																																																																		
LL	—	—	—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																																																																		
PI	6 MX	NP	—	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN	10 MX	WEATHERING																																																																		
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX								FRESH																																																																		
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				GRANULAR SOILS				SILT-CLAY SOILS				MUCK, PEAT				HIGHLY ORGANIC SOILS																																																										
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR		POOR		UNSATISFACTORY		VERY SLIGHT (V SL.)																																																																
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30												GROUND WATER												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.												SLIGHT (SL.)																																															
												WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING												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.												MODERATE (MOD.)																																															
												STATIC WATER LEVEL AFTER 24 HOURS												ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL												SEVERE (SEV.)																																															
												PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA												ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF												VERY SEVERE (V SEV.)																																															
												SPRING OR SEEP												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.												COMPLETE																																															
CONSISTENCY OR DENSENESS												MISCELLANEOUS SYMBOLS												ROCK HARDNESS												FRACTURE SPACING																																															
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)				RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION												DIP & DIP DIRECTION OF ROCK STRUCTURES												CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																																															
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)		VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		< 4 4 TO 10 10 TO 30 30 TO 50				N/A				SOIL SYMBOL												TEST BORING												SLOPE INDICATOR INSTALLATION												HARD																																			
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 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT												AUGER BORING												CONE PENETROMETER TEST												MODERATELY HARD																																			
												INFERRED SOIL BOUNDARY												CORE BORING												SOUNDING ROD												SOFT																																			
												INFERRED ROCK LINE												MONITORING WELL												TEST BORING WITH CORE												MEDIUM HARD																																			
												ALLUVIAL SOIL BOUNDARY												PIEZOMETER INSTALLATION												SPT N-VALUE												VERY SOFT																																			
TEXTURE OR GRAIN SIZE												RECOMMENDATION SYMBOLS												ROCK QUALITY DESIGNATION (ROD)												BEDDING																																															
U.S. STD. SIEVE SIZE OPENING (MM)		4		10		40		60		200		270		UNDERCUT												UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE												UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK												TERM												THICKNESS																					
		4.76		2.00		0.42		0.25		0.075		0.053		SHALLOW UNDERCUT												UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK																								VERY WIDE												MORE THAN 10 FEET																					
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE. SD.)		FINE SAND (F SD.)		SILT (SL.)		CLAY (CL.)																																						WIDE												3 TO 10 FEET																					
GRAIN SIZE		305		75		2.0		0.25		0.05		0.005																																						MODERATELY CLOSE												1 TO 3 FEET																					
SOIL MOISTURE - CORRELATION OF TERMS												ABBREVIATIONS												SAMPLE ABBREVIATIONS												VERY CLOSE												LESS THAN 0.16 FEET																																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION								AR - AUGER REFUSAL												MED. - MEDIUM												VST - VANE SHEAR TEST												CORE SIZE:												CORE SIZE:																							
												CL - CLAY												MICA - MICACEOUS												WEA. - WEATHERED												—B												—H																							
												CPT - CONE PENETRATION TEST												MOD. - MODERATELY												UNIT WEIGHT																																															
												CSE. - COARSE												NP - NON PLASTIC												DRY UNIT WEIGHT																																															
												DMT - DILATOMETER TEST												ORG. - ORGANIC																																																											
												DPT - DYNAMIC PENETRATION TEST												PMT - PRESSUREMETER TEST																																																											
												e - VOID RATIO												SAP. - SAPROLITIC																																																											
												F - FINE												SD. - SAND, SANDY												SL - SILT, SILTY																																															
												FOSS. - FOSSILIFEROUS												SLR. - SLIGHTLY																																																											
												FRAC. - FRACTURED, FRACTURES												TRI. - TRICONE REFUSAL																																																											
												FRAGS. - FRAGMENTS												w - MOISTURE CONTENT																																																											
												HL. - HIGHLY												V - VERY																																																											
PLASTICITY												EQUIPMENT USED ON SUBJECT PROJECT												INDURATION												BENCH MARK:																																															
												DRILL UNITS:												ADVANCING TOOLS:												HAMMER TYPE:												BORING ELEVATIONS TAKEN FROM B5716-Is.tin.tin																																			
												☐ CME-45C												☒ CLAY BITS												☒ AUTOMATIC ☐ MANUAL																																															
												☒ CME-55												☐ 6" CONTINUOUS FLIGHT AUGER												☐ CORE SIZE:																																															
												☐ CME-550												☒ 8" HOLLOW AUGERS												☐ —																																															
												☐ VANE SHEAR TEST												☐ HARD FACED FINGER BITS												☐ —H																																															
												☐ PORTABLE HOIST												☐ TUNG.-CARBIDE INSERTS												☒ N-02																																															
																								☒ CASING ☐ W/ ADVANCER																																																											
																								☐ TRICONE _____ * STEEL TEETH																																																											
																								☐ TRICONE _____ * TUNG.-CARB.																																																											
																								☒ CORE BIT																																																											
																								☐																																																											
																								☐																																																											
PLASTICITY INDEX (PI)												DRY STRENGTH												FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.												FRIABLE																																															
NON PLASTIC												0-5												VERY LOW												RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																																															
SLIGHTLY PLASTIC												6-15												SLIGHT												MODERATELY INDURATED																																															
MODERATELY PLASTIC												16-25												MEDIUM												GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																																															
HIGHLY PLASTIC												26 OR MORE												HIGH												INDURATED																																															
COLOR																																				GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																																															
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.																																				EXTREMELY INDURATED																																															
																																				SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																															

TIP PROJECT: B-5716

CONTRACT:

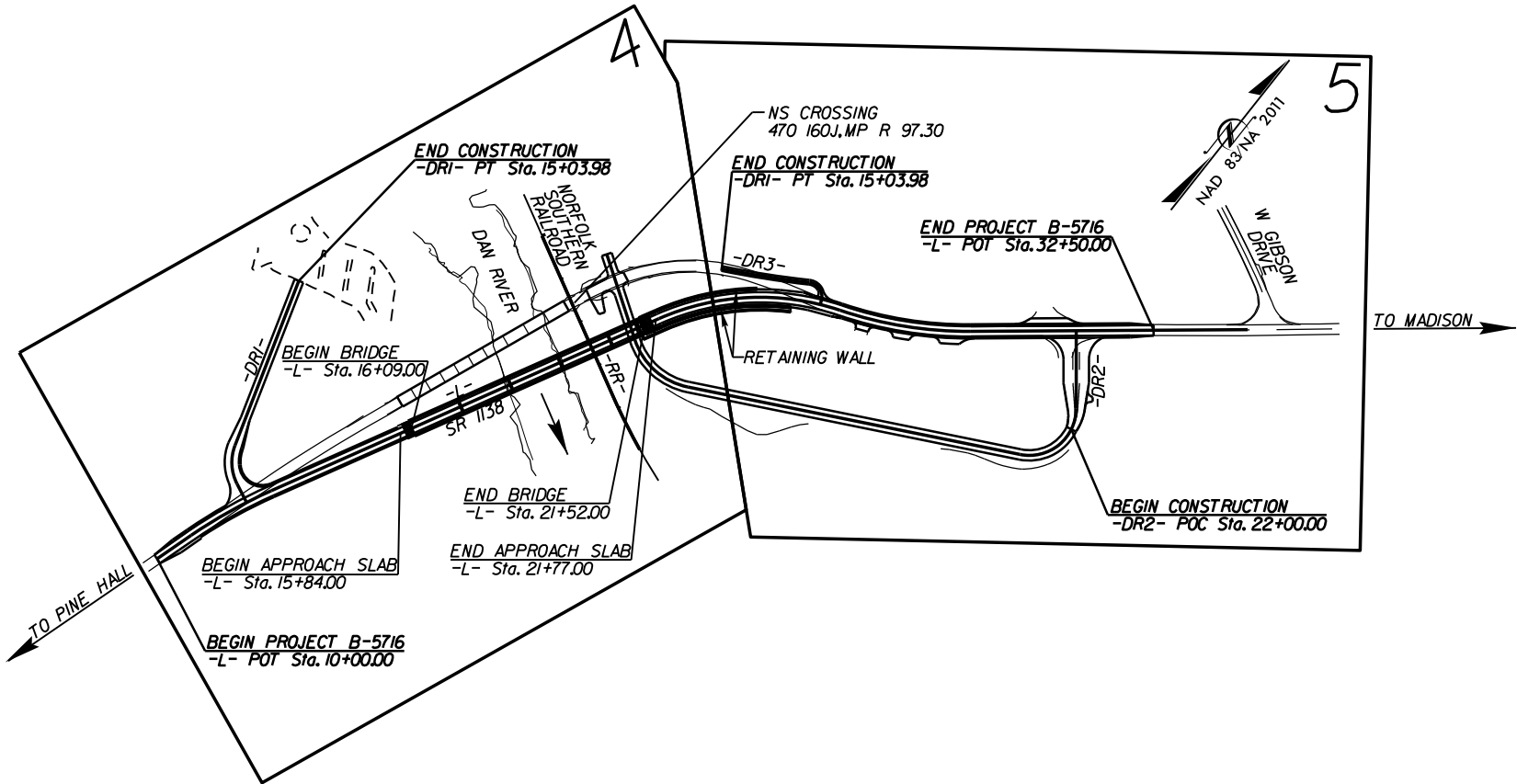


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALL AND STRUCTURE

R / W PLANS



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.



DESIGN DATA

ADT 2014 = 740
ADT 2025 = 1480

V = 40 MPH

MINOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT = 0.323 MILES

LENGTH STRUCTURE TIP PROJECT = 0.103 MILES

TOTAL LENGTH TIP PROJECT = 0.426 MILES

Prepared In the Office of Mott MacDonald for

DIVISION 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

LETTING DATE:

TIM JORDAN, PE
PROJECT ENGINEER

ELENI RIGGS, PE
HYDRAULICS ENGINEER

NCDOT CONTACT:

TIM POWERS, PE
DIVISION BRIDGE
PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

HYDRAULICS ENGINEER

SIGNATURE: P.E.

PLANS PREPARED BY:

M
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MACDONALD

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LICENSE NO. F-0669

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5716	2A	7
STATE PROJECT NO.	P.A. PROGRAM	DESCRIPTION	
45672.1.1		PE	
45672.2.1		RW/UTL	
45672.3.1		CONST.	

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



Roadway Subsurface Investigation Report - Inventory

Bridge No. 140 over Dan River on SR 1138 (Lindsey Bridge Road)
Rockingham County, North Carolina
TIP No.: B-5716
Falcon Project No.: G20014.00

Prepared for:

Mott Macdonald
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Submitted by:

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March 29, 2024

TIP NO.: B-5716
COUNTY: Rockingham
DESCRIPTION: Bridge No. 140 over Dan River on SR 1138 (Lindsey Bridge Road)
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of a new bridge over the Dan River and roadway improvements on SR 1138 (Lindsey Bridge Road) from south of W. Gibson Drive in the city of Madison in Rockingham County, NC. The project consists of a new bridge with retaining walls over the Dan River and railroad tracks and drive improvements on either side of the river. The structure inventories will be provided under separate cover.

The investigation was conducted between March 6th and May 17th, 2023, in general accordance with our Scope and Fee Estimate for Geotechnical Investigation and Engineering Services. The information provided in this report is based solely on our site reconnaissance, soil test borings and laboratory test data, engineering evaluation of these data, and generally accepted soil and foundation engineering practices and principles.

A total of twenty (20) Standard Penetration Test (SPT) borings were drilled for the proposed roadway alignments. All mechanical borings were drilled using a CME 55 ATV mounted drill rig equipped with 2 ¼-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler or with grab samples were selected for laboratory testing to verify visual field classifications.





Portions of the following alignment, totaling approximately 0.79 miles were investigated. Other minor tie-ins and driveways are included on the project but improvements are not anticipated to be significant enough to warrant investigation.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (Lindsey Bridge Road)	10+00 to 32+50
-DR1- (Burlington Rd. /E. Bessemer Ave.)	10+00 to 15+03.98
-DR2- (E. Market St. / Huffine Mill Rd.)	10+00 to 24+11.26

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. The following locations contain very soft to soft/very loose soils with an N-value less than 4 near the ground surface:

<u>Alignment</u>	<u>Station (ft)</u>	<u>Offset</u>
-L-	12+05	RT
-L-	17+25 to 18+00	LT
-DR1-	13+99	LT

- II. Alluvial soils were encountered at the following location:

<u>Alignment</u>	<u>Station (ft)</u>	<u>Offset</u>
-L-	15+00 to 18+50	LT and RT
-DR1-	11+00 to 15+00	LT and RT

- III. Artificial Fill soils were encountered at the following location:

<u>Alignment</u>	<u>Station (ft)</u>	<u>Offset</u>
-L-	13+97	RT

PHYSIOGRAPHY AND GEOLOGY

Existing site topography is rolling terrain typical of North Carolina's Piedmont Physiographic Province. The site runs to the south of the city of Madison. The project corridor is developed on the north end with commercial properties and rural property to the south. The Dan River crosses the alignment at 19+50, -L-.

According to the *Geologic Map of North Carolina* (1985), the site is located in the Triassic Basin geologic formation. The Triassic Basin was formed by the infilling of a Rift Basin along the Jonesboro Fault with upland sediments, and subsequent consolidation of these sediments into rock. Specifically, rocks at the site are noted as the Newark Group, Dan River Group; Stoneville Formation (**TRds**), consisting of conglomerate, sandstone, and mudstone, lenticular and laterally gradational bedding. This region of North Carolina is also known to be intruded by numerous dikes and sills of diabase.





SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankment, artificial fill, alluvial and residual soils, and weathered and non-crystalline rock.

Roadway Embankment soils were encountered at the ground surface adjacent to existing roadways. These soils consist of up to 8 feet of moist, medium stiff to very stiff, sandy silt and sandy clay (A-4, A-6) and loose, silty sand (A-2-4). One sample tested with a PI value of 23.

Artificial Fill soils were encountered at the ground surface due to previous grading activities in the area. These soils consist of up to 5 feet of moist, stiff, sandy clay (A-6) and loose, silty sand (A-2-4).

Alluvial soils were encountered below roadway embankment and artificial fill soils or at the ground surface. These soils consist of up to 20.5 feet of moist to saturated, soft to medium stiff, sandy and clayey silt and sandy clay (A-4, A-5, A-6) and very loose to medium dense, silty sand (A-2-4).

Residual soils were encountered at the ground surface, or beneath roadway embankment, artificial fill or alluvial soils throughout the project. These soils consist of moist to dry, non to moderately plastic (Tested PI range from 4 to 21), medium to very dense, gravelly silty and clayey sand (A-1-a, A-2-4, A-2-6) and soft to hard, sandy silt and sandy and silty clay (A-4, A-6, A-7).

Weathered Rock (WR) is a very hard material with properties intermediate of soil and rock. WR is classified as having an N-value of greater than 100 blows per one foot. WR generally consisted of weathered sandstone and mudstone. WR was encountered between 603.4 and 537.8 ft, msl across the site.

Non-Crystalline Rock (NCR), in the form of mudstone and sandstone, was encountered beneath weathered rock ranging in elevation from 572.4 and 531.1 ft, msl. NCR is classified as material that yields auger refusal or SPT refusal (blow count of 60/0.0 or 60/0.1 feet.)

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in many cases after a waiting period of at least 24 hours. Borings drilled within and in close

proximity to existing roadways, and within residential or commercial areas were backfilled immediately after completion due to safety considerations. Groundwater measurements were generally consistent with the elevation of the Dan River.

Groundwater elevations ranged from 546.6 ft to 555.7 ft, msl across the site. Detailed groundwater measurements are included in the attached subsurface profiles and cross sections, and noted areas of shallow groundwater are included in the Areas of Special Geotechnical Interest earlier in this report.

CLOSING

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

FALCON ENGINEERING, INC.

Report Prepared By:

Report Reviewed By:

A blue ink signature of W. Scott Hunsberger.

W. Scott Hunsberger, PE
Geotechnical Engineer

A blue ink signature of Jeremy R. Hamm.

Jeremy R. Hamm, PE
Geotechnical Engineering Manager



PROJECT REFERENCE
B-5716 - ROCKINGHAM 140

SHEET NO.
4

ROADWAY DESIGN ENGINEER
MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

**DOCUMENT NOT CONSIDERED FINAL
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Prepared in the Office of: **M** MOTT MACDONALD
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LEGEND
— HPB — HISTORIC PROPERTY BOUNDARY

STATIONING
15+00, 10+00, 20+00, 21+00

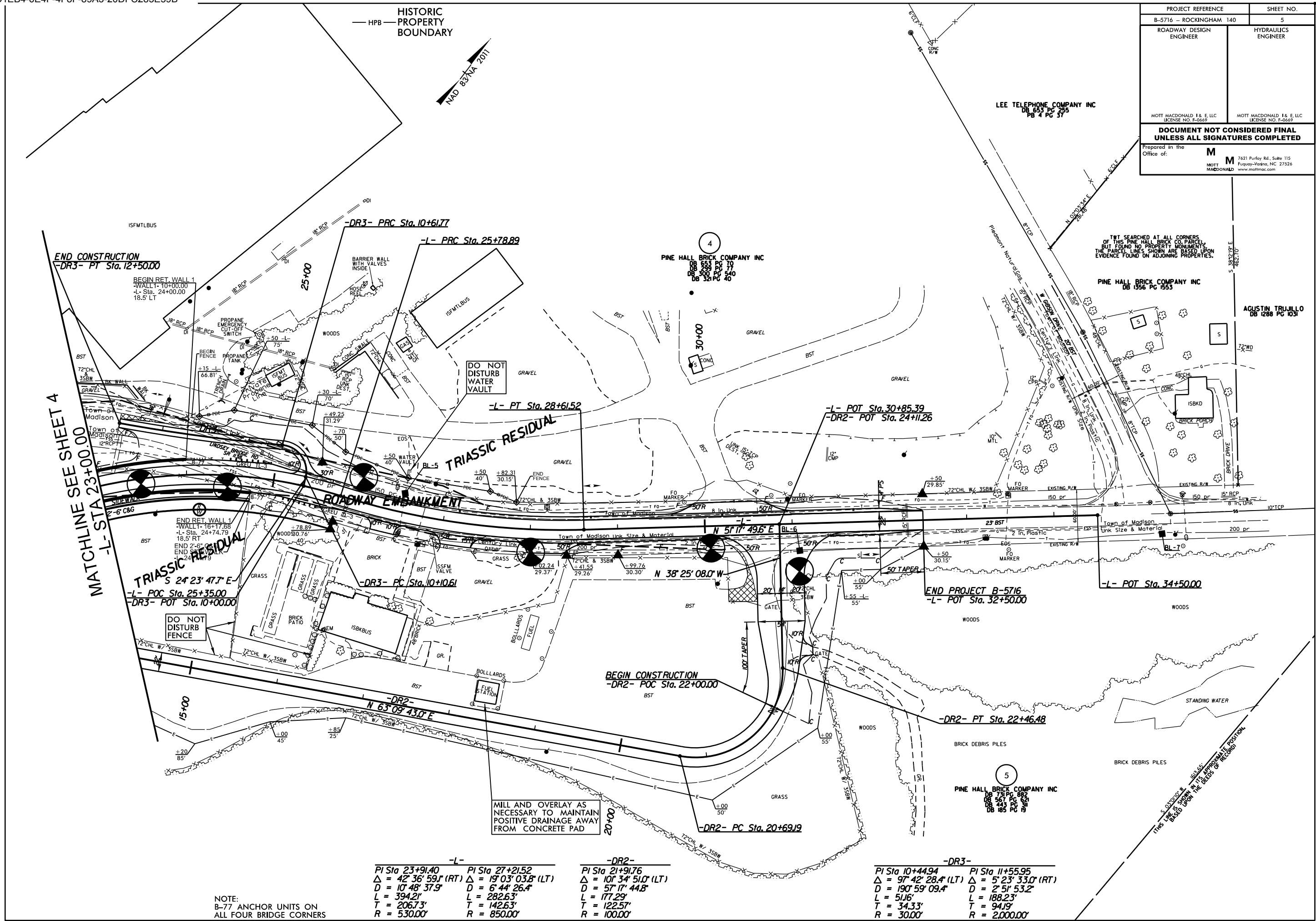
ALIGNMENTS
-DRI- PT Sta. 11+29.26
-DRI- PC Sta. 10+44.90
-L- PC Sta. 10+88.21
-DRI- PT Sta. 12+83.12
-L- PC Sta. 12+25.00
-DRI- PC Sta. 10+00.00
-RR- PT Sta. 10+00.00
-RR- PC Sta. 13+76.84
-RR- PT Sta. 15+00.00
-RR- PC Sta. 12+61.67
-RR- PT Sta. 14+38.46
-RR- PC Sta. 13+76.84
-DR2- PT Sta. 10+00.00
-DR2- PT Sta. 13+49.57
-DR2- PT Sta. 21+52.00
-DR2- PT Sta. 21+84.68
-DR2- PT Sta. 11+91.66
-L- PC Sta. 21+66.00
-L- PC Sta. 21+84.68
-L- PC Sta. 23+91.40
-L- PC Sta. 23+00.00

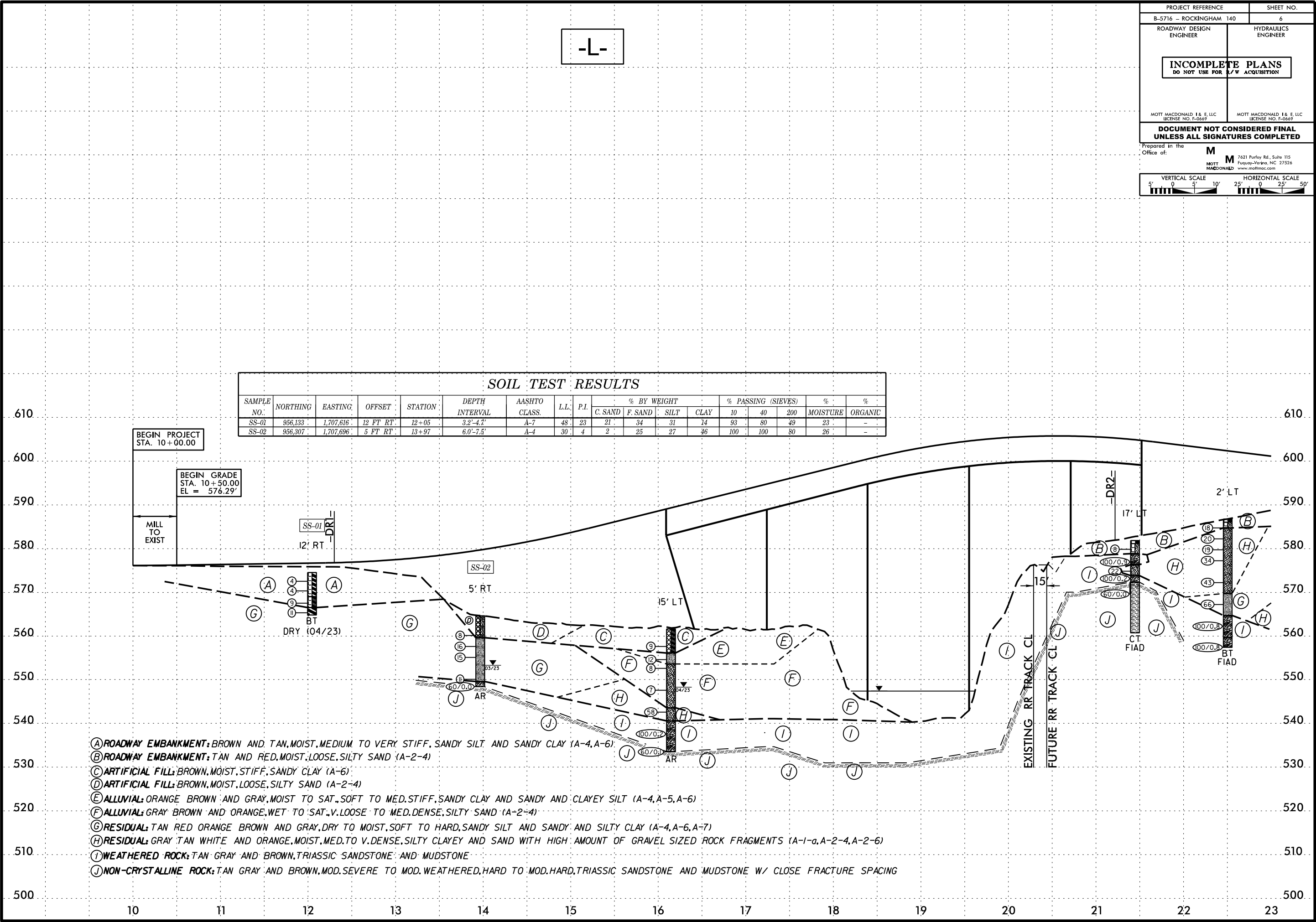
FEATURES
TRIASSIC RESIDUAL
ALLUVIAL
ARTIFICIAL FILL
BOADWAY EMBANKMENT
ROADWAY EMBANKMENT
PINE HALL BRICK COMPANY INC
TOWN OF MADISON
JEFFREY D. MURPHY
MONICA C. MEDINA-MURPHY
APPROXIMATE LOCATION OF SEPTIC DRAIN FIELDS AS PER SITE DIAGRAM PROVIDED BY: PIEDMONT ENVIRONMENTAL ASSOCIATES, P.A.

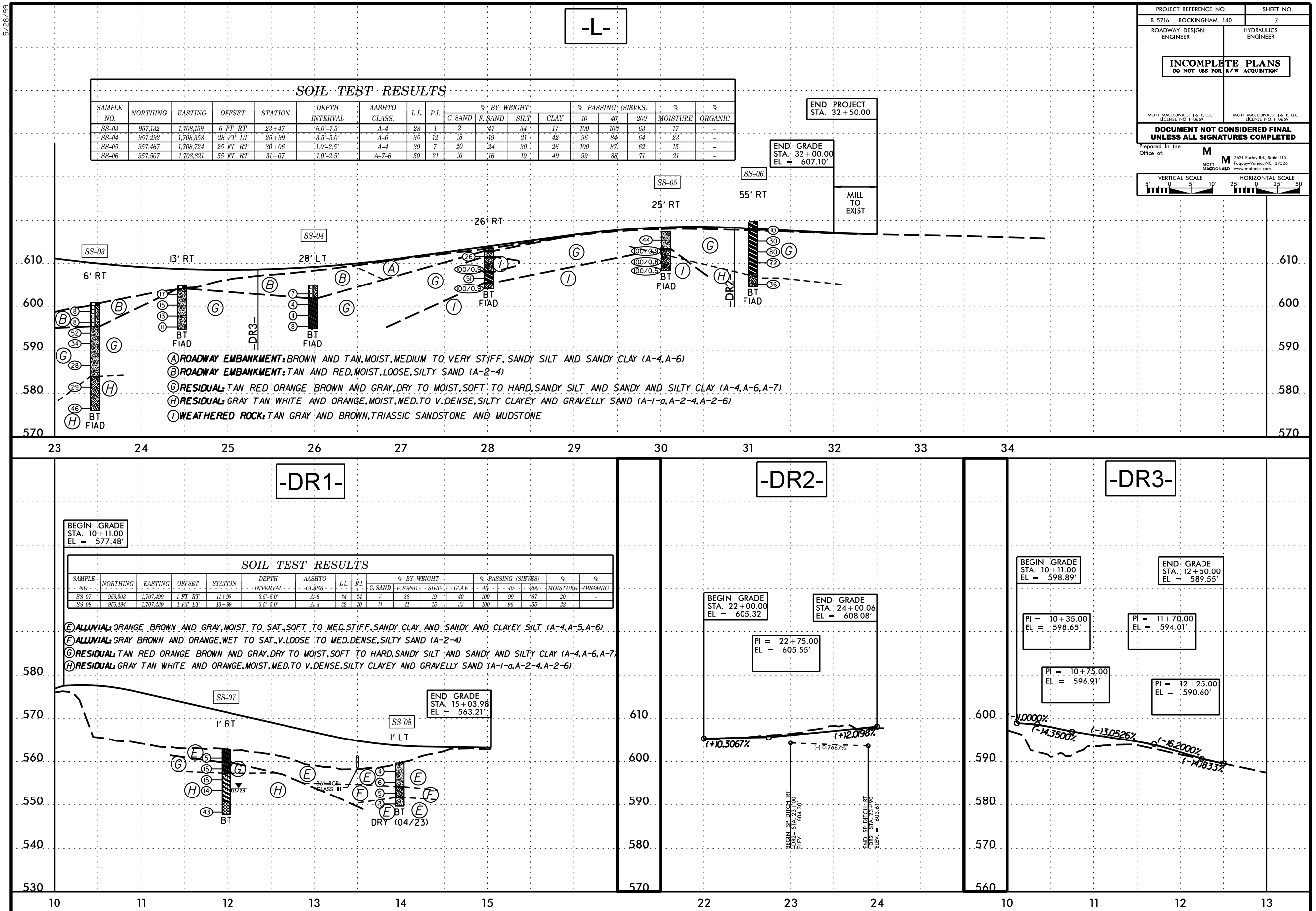
TABLES

-L-		-DRI-		-DR2-		-DR3-		-RR-	
PI Sta 11+85.94	PI Sta 23+91.40	PI Sta 10+89.77	PI Sta 12+78.82	PI Sta 10+93.11	PI Sta 14+38.46	PI Sta 10+93.11	PI Sta 14+38.46	PI Sta 10+93.11	PI Sta 14+38.46
Δ = 10° 32' 08.0" (RT)	Δ = 42° 36' 59.1" (RT)	Δ = 48° 20' 03.8" (RT)	Δ = 60° 18' 57.0" (LT)	Δ = 16° 06' 32.9" (RT)	Δ = 5° 15' 58.0" (LT)	Δ = 16° 06' 32.9" (RT)	Δ = 5° 15' 58.0" (LT)	Δ = 16° 06' 32.9" (RT)	Δ = 5° 15' 58.0" (LT)
D = 5° 24' 18.9"	D = 10° 48' 37.9"	D = 57° 17' 44.8"	D = 38° 11' 49.9"	D = 14° 32' 33.6"	D = 4° 16' 32.9"	D = 14° 32' 33.6"	D = 4° 16' 32.9"	D = 14° 32' 33.6"	D = 4° 16' 32.9"
L = 194.91'	L = 394.21'	L = 84.36'	L = 157.91'	L = 110.77'	L = 123.16'	L = 110.77'	L = 123.16'	L = 110.77'	L = 123.16'
T = 97.73'	T = 206.73'	T = 44.87'	T = 87.15'	T = 55.75'	T = 61.62'	T = 55.75'	T = 61.62'	T = 55.75'	T = 61.62'
R = 1,060.00'	R = 530.00'	R = 100.00'	R = 150.00'	R = 393.98'	R = 1,340.00'	R = 393.98'	R = 1,340.00'	R = 393.98'	R = 1,340.00'

NOTE:
B-77 ANCHOR UNITS ON ALL FOUR BRIDGE CORNERS





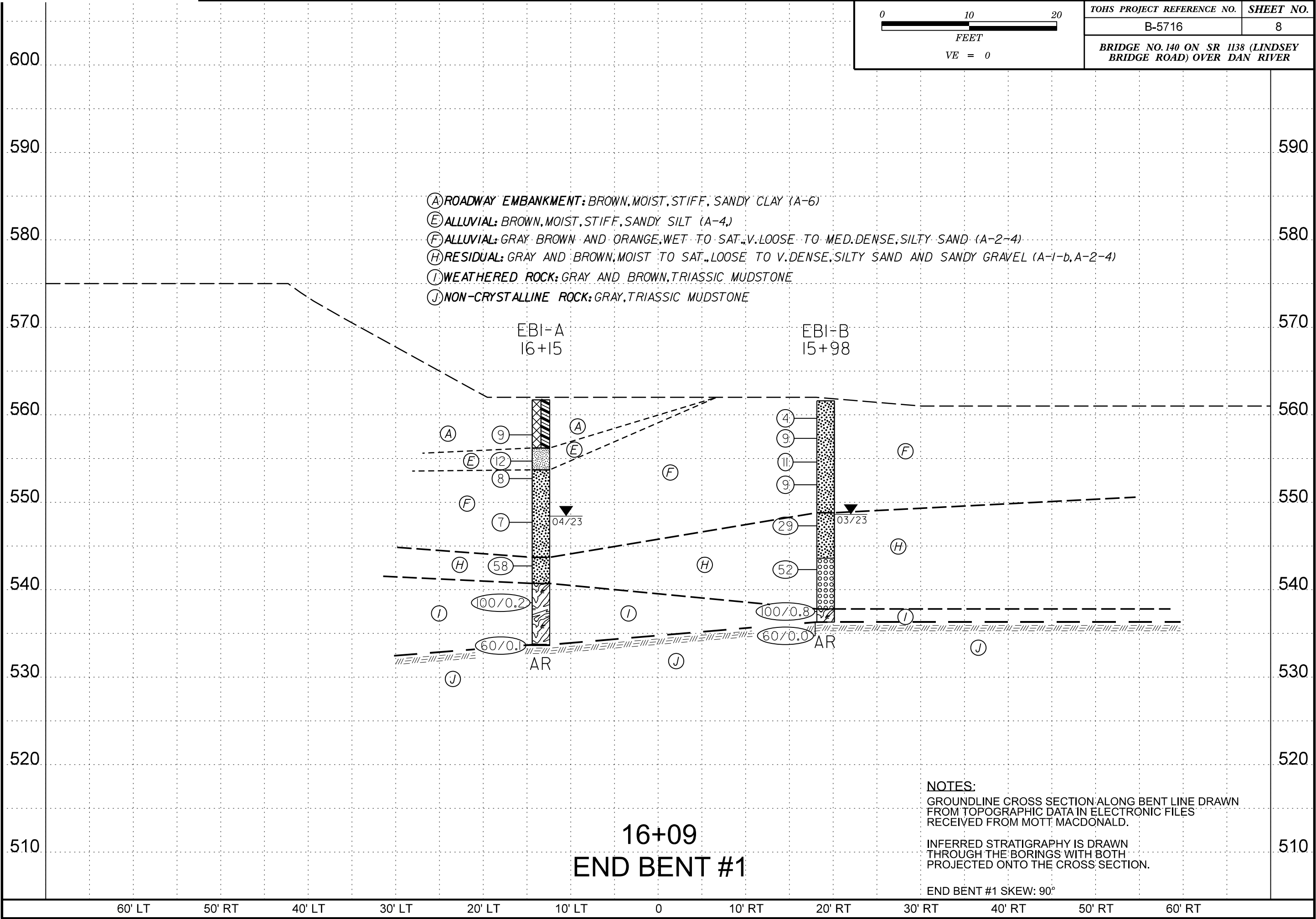


01020

FEET

VE = 0

TOHS PROJECT REFERENCE NO.	SHEET NO.
B-5716	8
BRIDGE NO. 140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER	



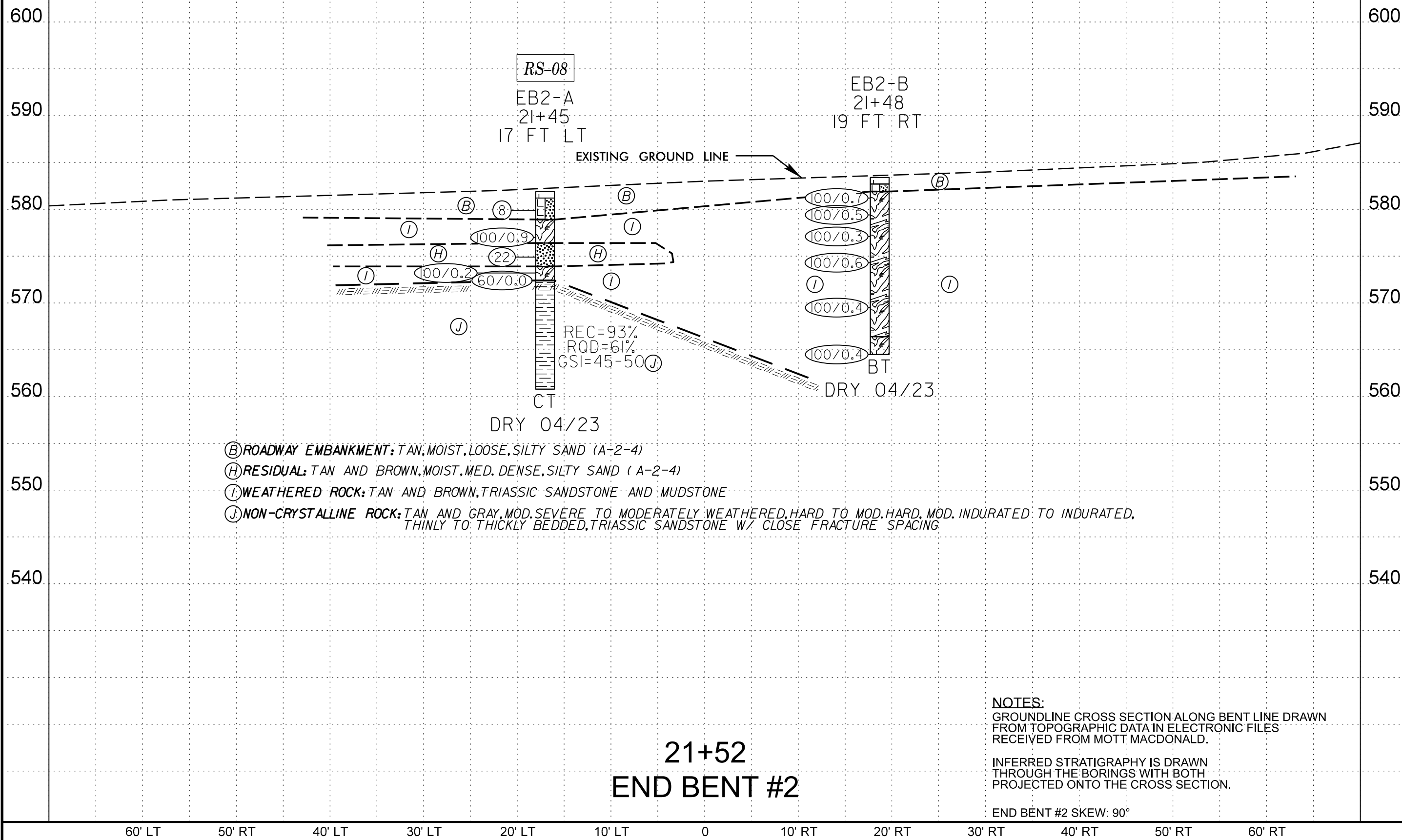
16+09
END BENT #1

01020

FEET

VE = 0

TOHS PROJECT REFERENCE NO.	SHEET NO.
B-5716	9
BRIDGE NO. 140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER	



21+52
END BENT #2

NOTES:
GROUNDLINE CROSS SECTION ALONG BENT LINE DRAWN FROM TOPOGRAPHIC DATA IN ELECTRONIC FILES RECEIVED FROM MOTT MACDONALD.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
END BENT #2 SKEW: 90°

PROJECT: 45672 REFERENCE: B-5716

PROJECT REFERENCE NO.	SHEET NO.
B-5716	10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
LABORATORY RESULTS

FALCON ENGINEERING

1210 TRINITY ROAD, SUITE 110, CARY, NORTH CAROLINA 27513

SUMMARY OF ROCK CORE TEST RESULTS

BRIDGE NO.140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER

ROCKINGHAM COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G20014.00

Sample No.	Boring	Alignment	Station	Offset	Northing	Easting	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Geologic Strength Index (GSI)	Failure
RS-8	EB2-A	-L-	21+45	17 ft LT	956,979	1,708,025	12.0-12.4	SANDSTONE	TRds	61%	0.38	0.16	161.2	10,850	45	

Note: Time to failure on all compression tests was between 2 and 15 minutes per ASTM-D7012.