STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP8.R019	1	30

REFERENCE: BP8.R019

PROJECT: N/A

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY RANDOLPH

PROJECT DESCRIPTION BRIDGE NO. 162 ON LANES MILL ROAD (SR 1005) OVER BRUSH CREEK

CONTENTS

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F29CA6BB83F449F...

10/4/2023

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX			— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0			0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND					SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD								FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-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 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	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				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	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.

GRADATION

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.

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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

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

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

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
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, CPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-50
- [ ] _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [X] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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:

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 YEILD 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.

WEATHERING

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. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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.

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 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 FINGERNAIL.

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 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY 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 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.

TERMS AND DEFINITIONS

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 (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM2 N: 688961 E: 1828888

ELEVATION: 446.21 FEET

NOTES:

FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

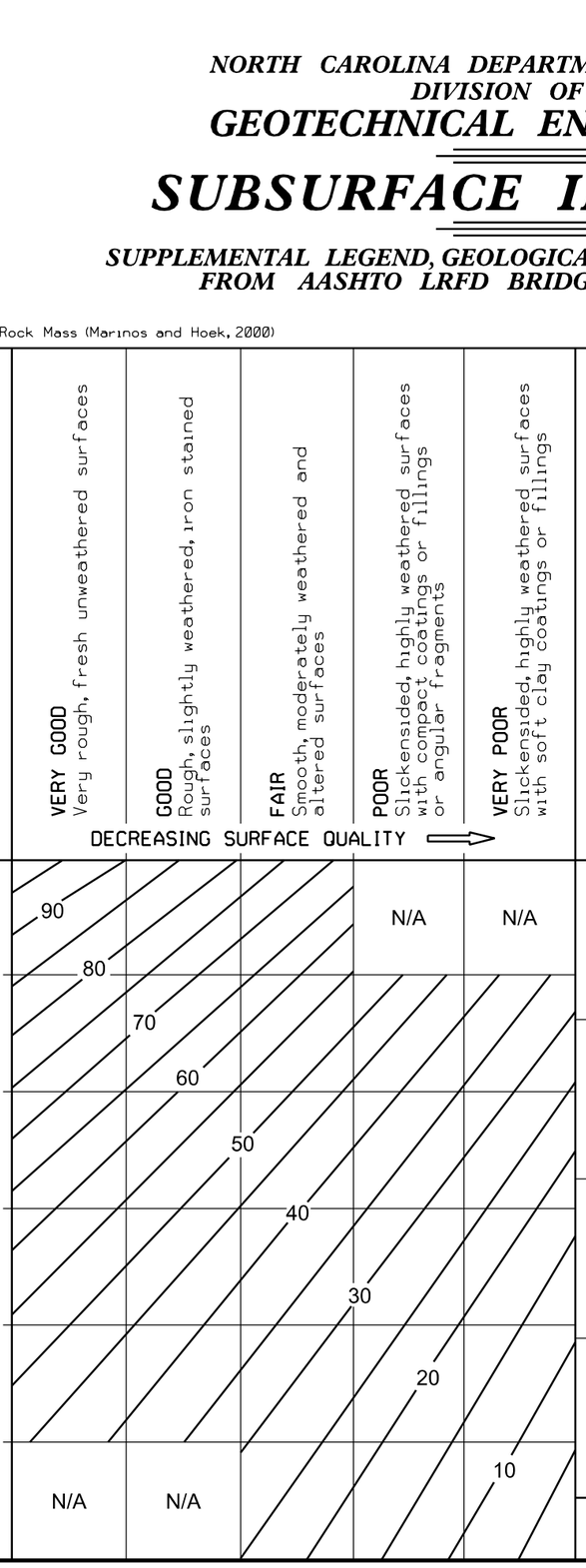
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

- INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
- BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
- VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
- BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
- DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
- LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

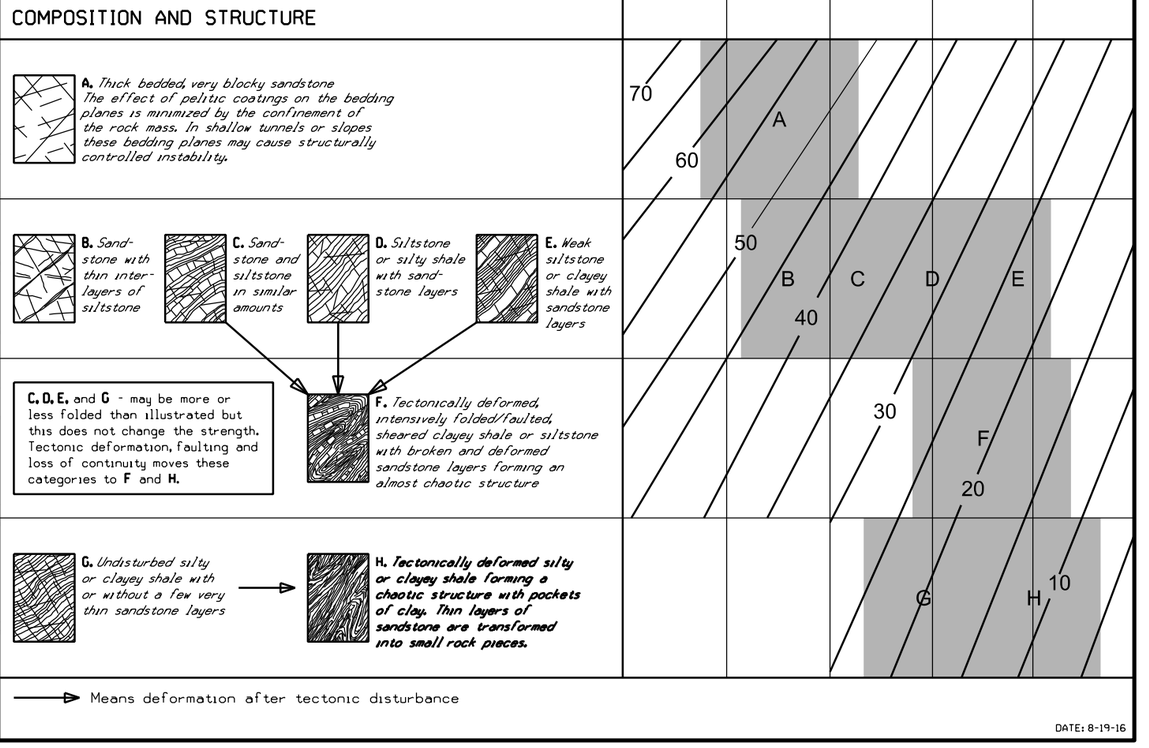


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE



DATE: 8-19-16

09/08/99

PROJECT: BP8.R019

CONTRACT:

\$\$\$\$\$\$\$\$\$\$USERNAME\$\$\$\$\$\$\$\$\$\$
\$\$\$\$\$\$\$\$\$\$SYSTIME\$\$\$\$\$\$\$\$\$\$
\$\$\$\$\$\$\$\$\$\$DGN\$\$\$\$\$\$\$\$\$\$

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

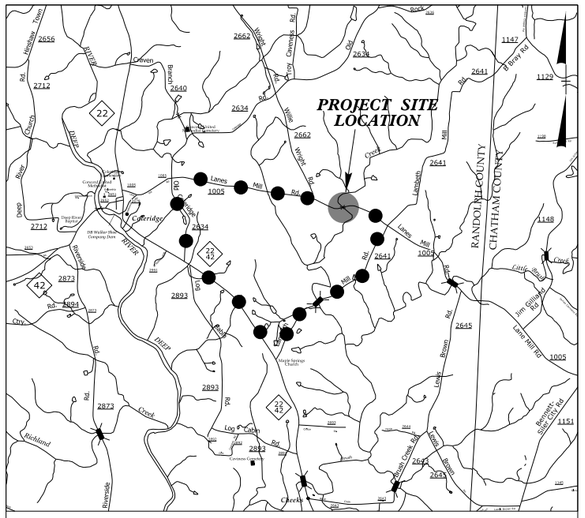
RANDOLPH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP8.R019	3	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP8.R019.1		P.E.
		R/W & Utilities
		Construction

LOCATION: BRIDGE 750162 OVER BRUSH CREEK ON SR 1005 (LANES MILL ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURES



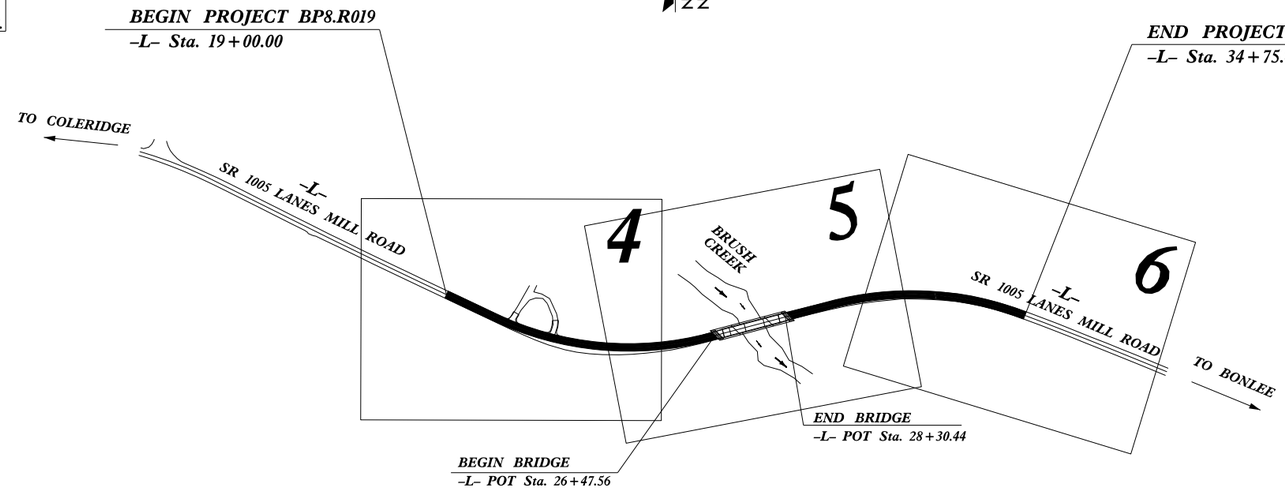
VICINITY MAP

OFF-SITE DETOUR ROUTE

N.T.S.

DRAFT PLANS
SEPT. 27, 2022

NAD 83/
NA 2011



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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 0 50 100

PROFILE (HORIZONTAL): 50 0 50 100

PROFILE (VERTICAL): 5 0 5 10

DESIGN DATA

ADT 2016 = 430
ADT 2040 = 860
K = %
D = %
T = 6 % *
V = 50 MPH
* TTST = DUAL
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP8.R019 = 0.263 mi

LENGTH STRUCTURE PROJECT BP8.R019 = 0.035 mi

TOTAL LENGTH OF PROJECT BP8.R019 = 0.298 mi

PLANS PREPARED BY:

CH ENGINEERING
3220 GLEN ROYAL RD. RALEIGH, NC 27617
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 10, 2022

LETTING DATE:
OCTOBER 22, 2024

PLANS PREPARED FOR:

DIVISION OF HIGHWAYS
DIVISION 8
121 DOT Drive
Carthage, NC 28327

BRIAN A. WILES, PE
PROJECT ENGINEER

TIM WELCH, PE
NCDOT CONTACT
DIV 8 BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER

MI ENGINEERING

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	4

SITE PLAN

0 50 100
FEET

PT Sta. 18+07.

20

25

–L– POT Sta. 19 + 00.00
BEGIN CONSTRUCTION

PC Sta. 20+38.69

TO COLERIDGE WOODS

15" RCP

°38' 45.3" E

ROADWAY

SR1005 (LANES MILL RD) 20' PAVED ROADWAY

12" RCP

12" RCP

RS-3W

RS-4N

RS-1E

2250

RS-2S

BL-103

8:1

8:1

GREU TL-3

GREU TL-3

EXISTING RW

EXISTING RW

WOODS

WOODS

WOODS

TO BONLEE

-L-

NAD 83

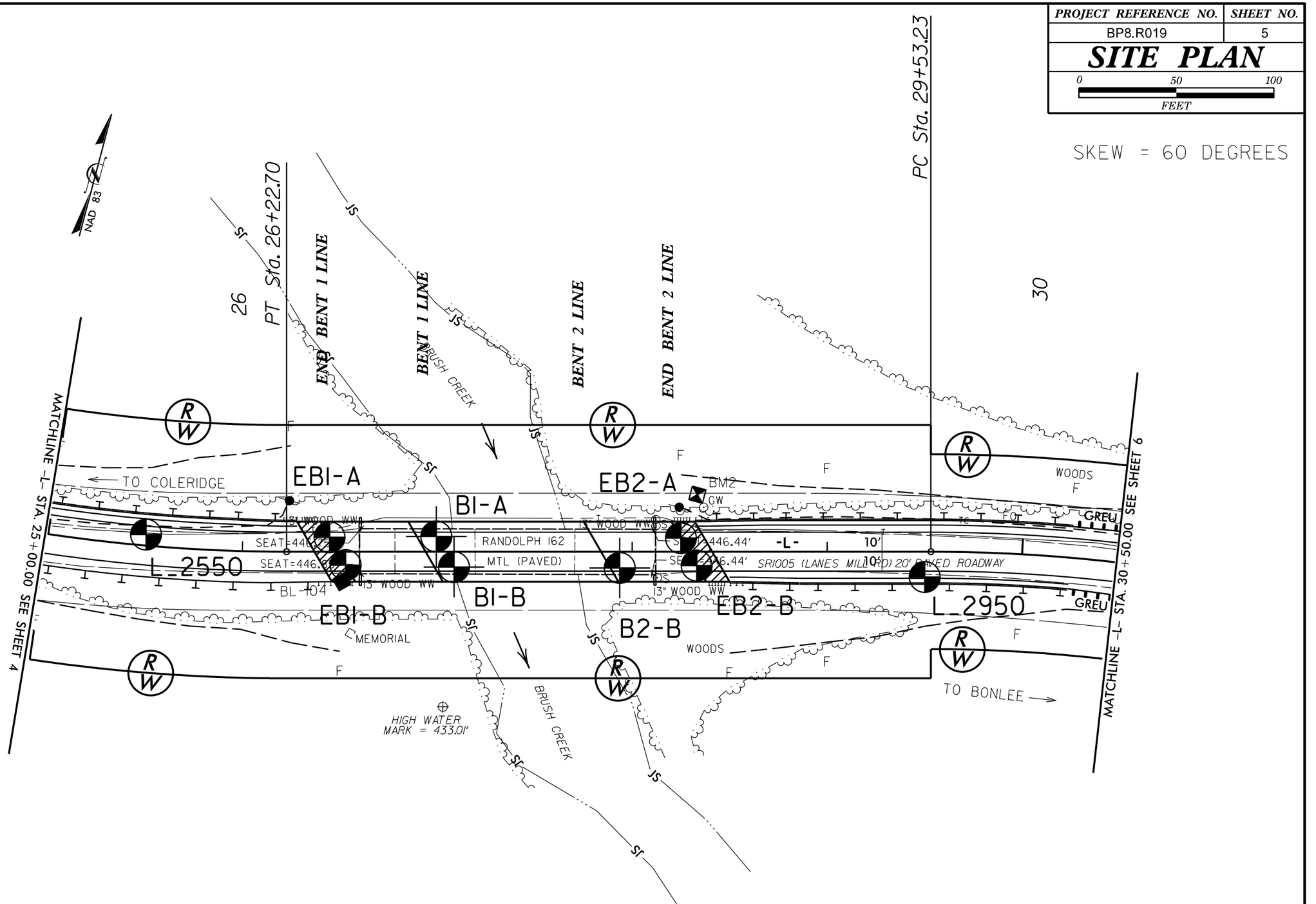
MATCHLINE –L– STA. 25+00.00 SEE SHEET 5

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	5

SITE PLAN

0 50 100
FEET

SKEW = 60 DEGREES



PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	6

SITE PLAN

0 50 100

FEET

NAD 83

32

35

PT Sta. 34+64.34

PC Sta. 34+79.93

S 69° 39' 34.1" E

TO COLERIDGE

MATCHLINE -L- STA. 30+50.00 SEE SHEET 5

BP8.R019-1

-L-

TL-3

8:1

C

F

FO

INV=451.04'

INV=449.13'

18" CMP

60.00'

EXISTING RW

RW

TC

BM3

SR1005 (JAMES MILL RD) 20' PAVED ROADWAY

TO BONLEE

-L- POT Sta. 34+75.00

END CONSTRUCTION

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	7

PROFILE PROJECTED ALONG CENTERLINE OF –L–

0 50 100
FEET
VE = 5:1

–L–

BEGIN GRADE
–L– STA 19+00.00
EL = 477.55'

(–)0.5689%

(–)5.5324%

RESIDUAL,
SOFT TO STIFF, BROWN, CLAYEY SILT, MOIST, A-5

500
480
460
440

17+00 18+00 19+00 20+00 21+00 22+00 23+00

NOTE: EXISTING GROUND SURFACE PROFILE OF –L– CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'bp8r019_ls_tin.tin' DATED 09/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	8

PROFILE PROJECTED ALONG CENTERLINE OF –L–

0 50 100
FEET
VE = 5:1

Ⓐ ROADWAY EMBANKMENT, STIFF TO VERY STIFF, BROWN, SILTY CLAY AND SANDY CLAY, MOIST, A-7-5 & A-6

Ⓑ ALLUVIAL, STIFF TO VERY STIFF, BROWN, SILTY CLAY, MOIST, A-7-5

Ⓒ RESIDUAL, MEDIUM STIFF TO HARD, BROWN, SANDY SILT AND CLAYEY SILT, MOIST, A-4 & A-5

Ⓓ ROADWAY EMBANKMENT, MEDIUM STIFF TO VERY STIFF, BROWN, SANDY SILT, CLAYEY SILT AND LOOSE, SILTY SAND, TRACE GRAVEL, MOIST, A-4, A-5 & A-2-4

Ⓔ RESIDUAL, STIFF, BROWN, CLAY, MOIST, A-7-6

Ⓕ WEATHERED ROCK, META-ARGILLITE

–L–

L_2550
25+50
5' LT
–L–
SS-42

EB1-B
26+53
7' RT
–L–
SS-15

B1-B
27+09
8' RT
–L–

B2-B
27+94
8' RT
–L–

EB2-B
28+33
7' RT
–L–

L_2950
29+50
35' RT
–L–
SS-37

BEGIN BRIDGE
–L– STA 26+47.56

END BRIDGE
–L– STA 28+30.44

BRIDGE NO. 162

(–)5.5324%
(–)1.5000%
(–)1.5000%
(+)1.3690%

PAVEMENT

RESIDUAL, STIFF TO VERY STIFF, BROWN, SANDY CLAY, MOIST, A-6

WEATHERED ROCK, META-ARGILLITE

NWS, 7-26-2022
EL = 428.2'

FIAD 01/23
FIAD BT 01/23
BT 01/23

RS-3
RS-4
RS-5

NON-CRYSTALLINE ROCK, GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE

REC. = 99%
RQD = 79%
GSI = 70-80

REC. = 99%
RQD = 82%
GSI = 70-80

480
460
440
420
400

24+00 25+00 26+00 27+00 28+00 29+00 30+00

NOTE: EXISTING GROUND SURFACE PROFILE OF –L– CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'bp8r019_ls_tin.tin' DATED 09/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP8.R019	9
PROFILE PROJECTED ALONG CENTERLINE OF –L–	

0 50 100
FEET
VE = 5:1

–L–

(A) RESIDUAL, STIFF, BROWN, CLAY, MOIST, A-7-6

(B) RESIDUAL, MEDIUM STIFF TO HARD, BROWN, SANDY SILT AND CLAYEY SILT, MOIST, A-4 & A-5

ROADWAY EMBANKMENT, STIFF TO VERY STIFF, BROWN, SANDY SILT AND CLAYEY SILT, TRACE GRAVEL, A-4 & A-5

END GRADE
–L– STA 34+75.00
EL = 457.05'

(+)11.3690%

(+)3.3750%

480
460
440
420

31+00 32+00 33+00 34+00 35+00 36+00 37+00

NOTE: EXISTING GROUND SURFACE PROFILE OF –L– CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'bp8r019_ls_tin.tin' DATED 09/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

6/23/16

0 2.5 5 UNITS = FEET	PROJ. REFERENCE NO.	SHEET NO.
	BP8.R019	10

BRIDGE NO. 162

$\mathcal{L}$

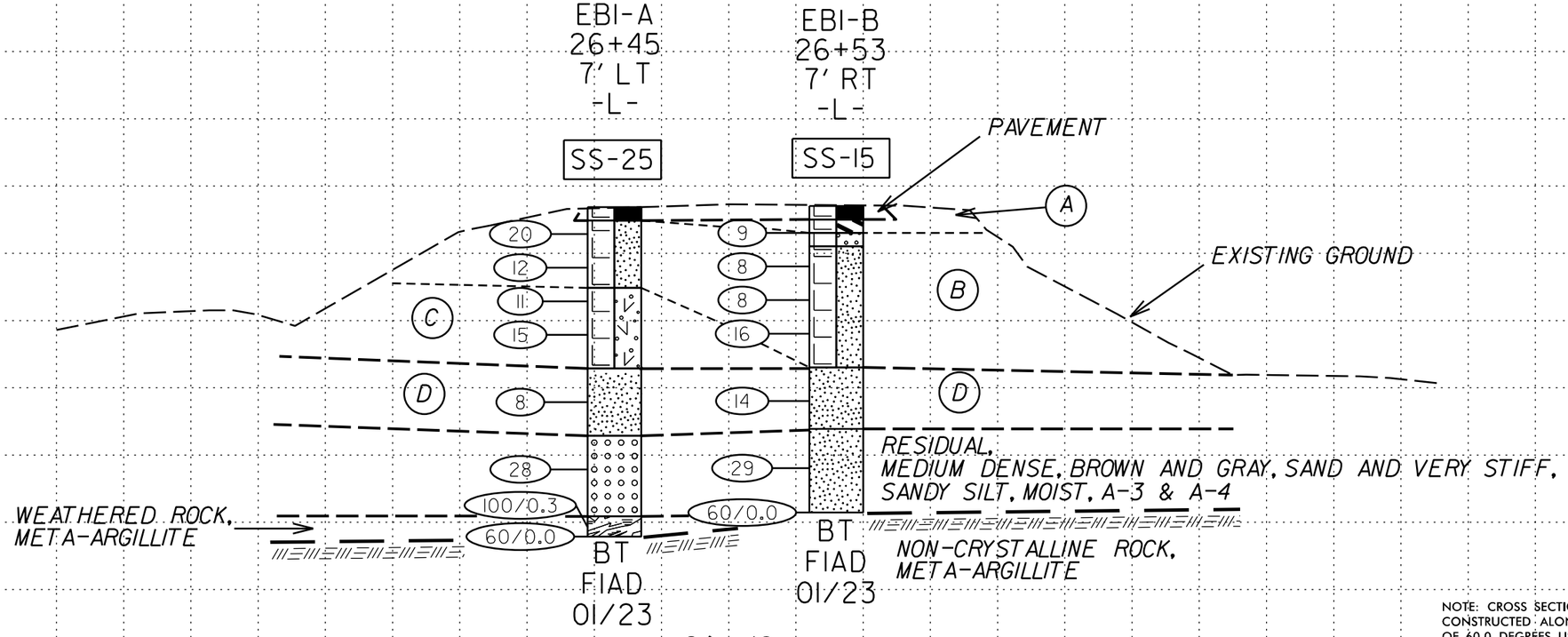
(A) ROADWAY EMBANKMENT, STIFF, BROWN, SILTY CLAY, WET, A-7-5

(B) ROADWAY EMBANKMENT, STIFF TO VERY STIFF, BROWN, SANDY SILT, AND LOOSE, SILTY SAND, TRACE GRAVEL, MOIST, A-4 & A-2-4

(C) ROADWAY EMBANKMENT, STIFF, BROWN, CLAYEY SILT, TRACE GRAVEL, MOIST, A-5

(D) ALLUVIAL, STIFF, BROWN, SANDY SILT, TRACE ORGANIC MATTER, MOIST, A-4

CROSS SECTION ALONG END BENT 1

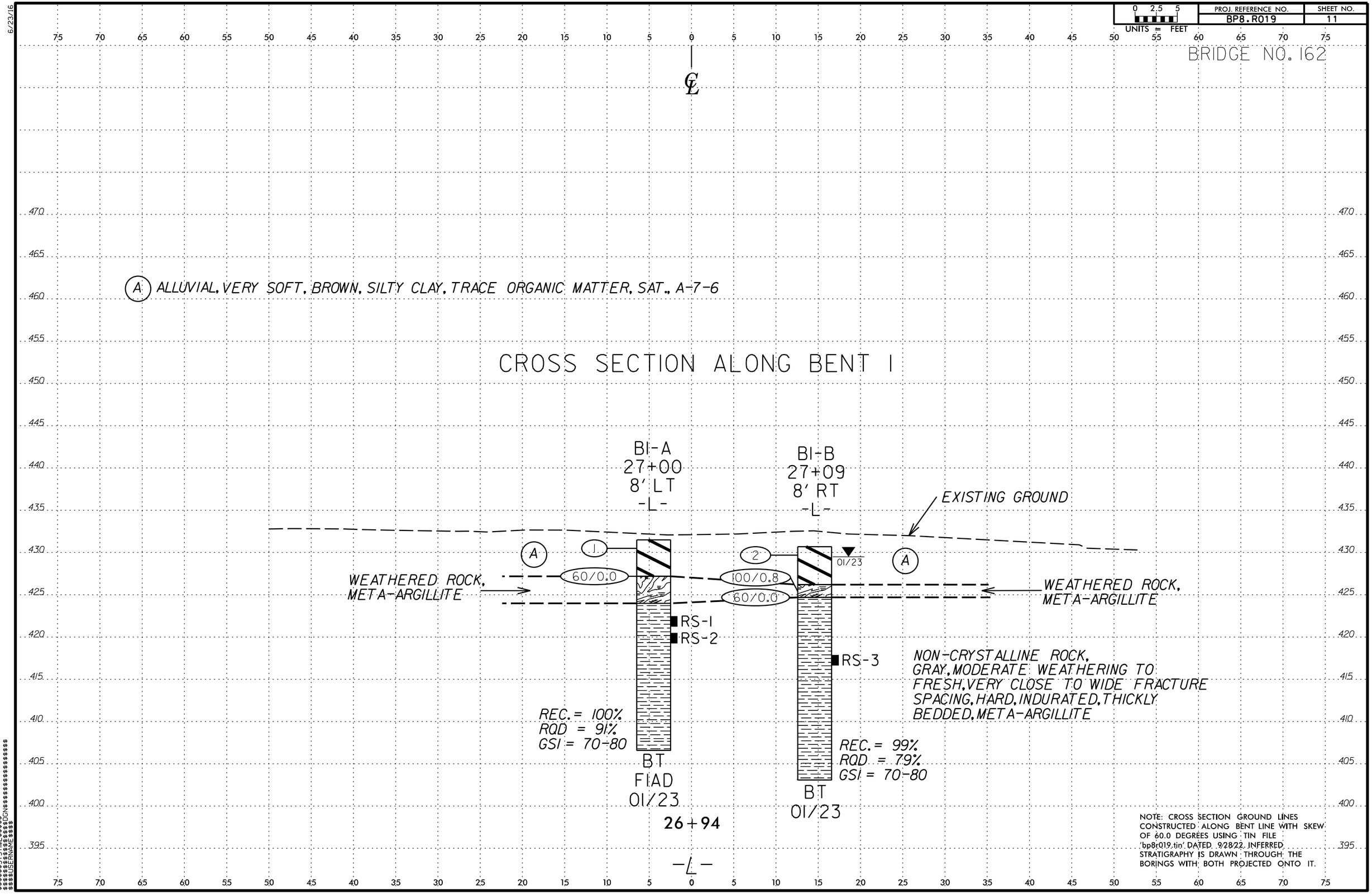


NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 60.0 DEGREES USING TIN FILE 'bp8r019.tin' DATED 9/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

BRIDGE NO. 162

CROSS SECTION ALONG BENT I



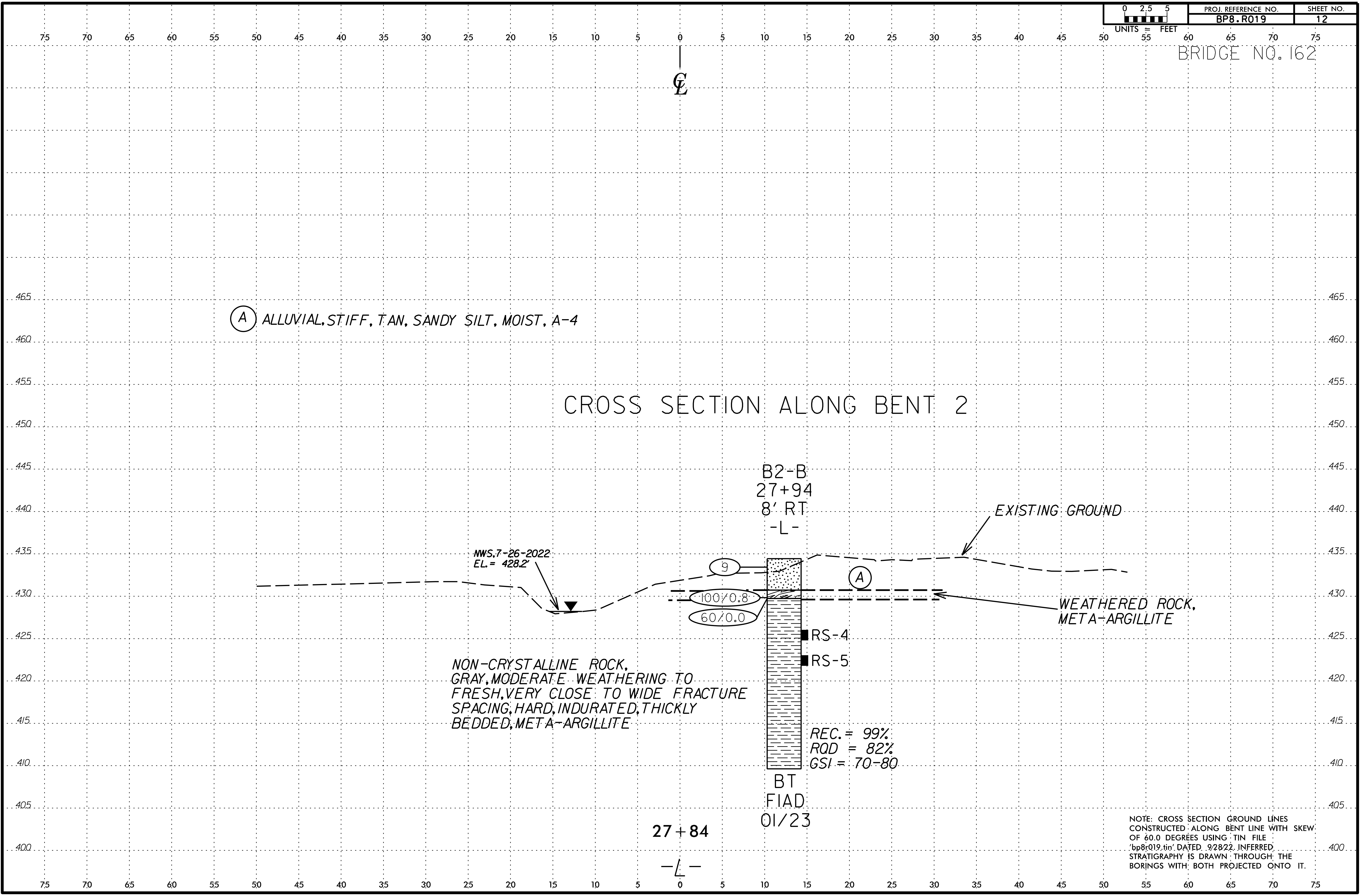
NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 60.0 DEGREES USING TIN FILE 'bp8r019.tin' DATED 9/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

PROJ. REFERENCE NO.	SHEET NO.
BP8.R019	12

0 2.5 5
UNITS = FEET

BRIDGE NO. 162

CROSS SECTION ALONG BENT 2



NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 60.0 DEGREES USING TIN FILE 'bp8r019.tin' DATED 9/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

6/23/16

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

6/23/16

UNITS = FEET	PROJ. REFERENCE NO.	SHEET NO.
0 2.5 5	BP8.R019	13

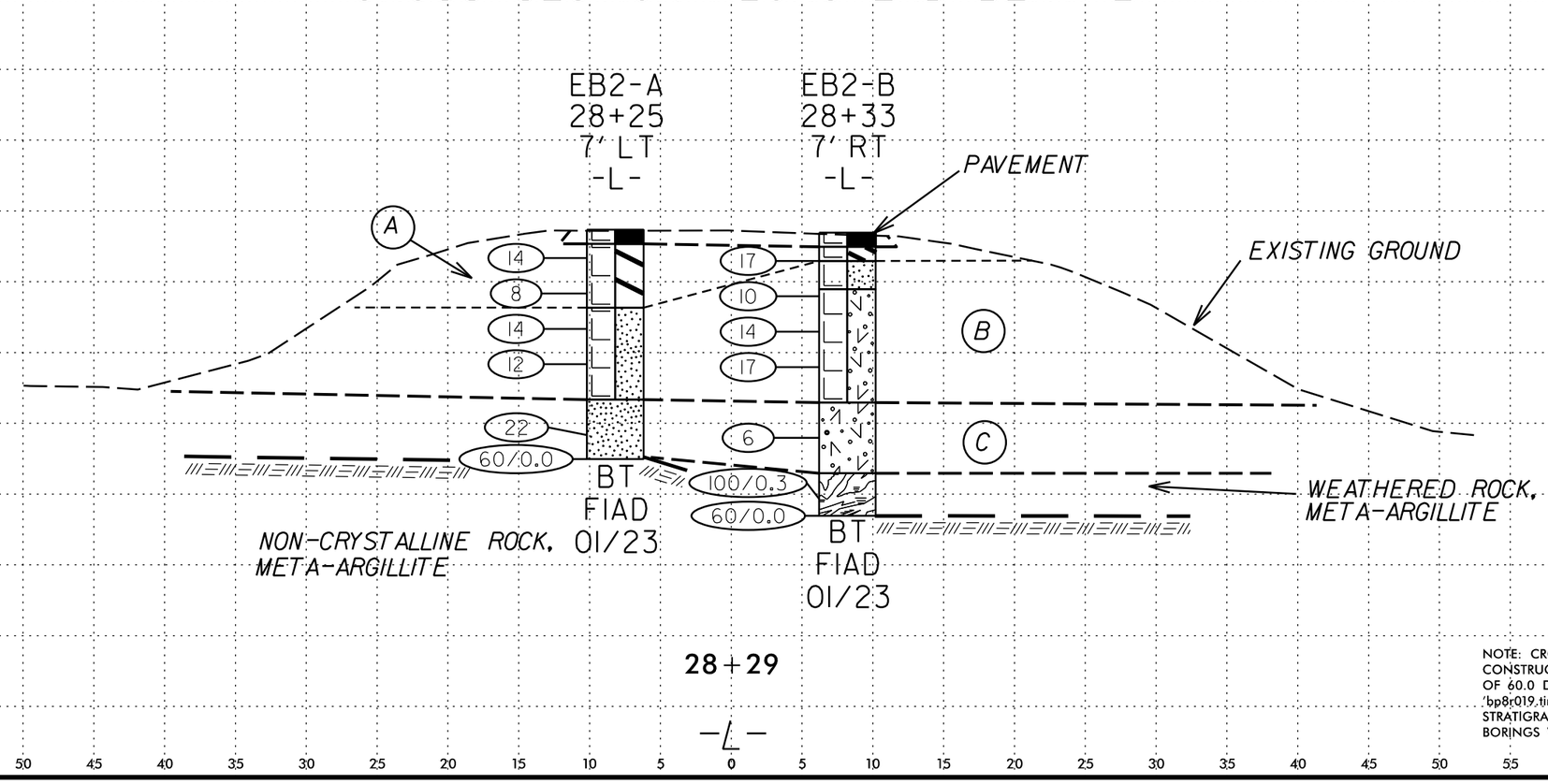
BRIDGE NO. 162

Ⓐ ROADWAY EMBANKMENT, STIFF, BROWN, SILTY CLAY, MOIST, A-7-5

Ⓑ ROADWAY EMBANKMENT, STIFF TO VERY STIFF, BROWN, SANDY SILT AND CLAYEY SILT, MOIST, A-4 & A-5

Ⓒ RESIDUAL, MEDIUM STIFF TO VERY STIFF, BROWN, SANDY SILT AND CLAYEY SILT, MOIST, A-4 & A-5

CROSS SECTION ALONG END BENT 2



NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 60.0 DEGREES USING TIN FILE 'bp8r019.tin' DATED 9/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

$$$$$$$$SYSTIME$$$$$
$$$$$$$$USERNAME$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 26+45	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 448.4 ft	**TOTAL DEPTH** 24.5 ft	**NORTHING** 688,891	**EASTING** 1,828,711	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/23/23	**COMP. DATE** 01/23/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450											
	447.4	1.0						M		448.4 GROUND SURFACE	0.0
			16	10	10	20				447.4 **ROADWAY EMBANKMENT** (PAVEMENT)	1.0
445	444.9	3.5						M		STIFF TO VERY STIFF, TAN, SANDY SILT, A-4	
			3	5	7	12					
	442.4	6.0						M		442.4 STIFF, BROWN, CLAYEY SILT, TRACE GRAVEL, A-5	6.0
			4	5	6	11					
440	439.9	8.5						M			
			8	7	8	15				436.4 **ALLUVIAL**	12.0
435	434.9	13.5						M		MEDIUM STIFF, GRAY, SANDY SILT, TRACE ORGANIC MATTER, A-4	
			2	3	5	8	SS-25	17%			
	431.4	17.0						M		**RESIDUAL**	
430	429.9	18.5								MEDIUM DENSE, BROWN AND GRAY, SAND, A-3	
			7	12	16	28					
	425.4	23.0						M		425.4 **WEATHERED ROCK** (META-ARGILLITE)	23.0
425	424.9	23.5								423.9 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 423.9 ft ON NON-CRYSTALLINE ROCK (META-ARGILLITE)	24.5
	423.9	24.5	100/0.3			100/0.3					
			60/0.0			60/0.0					

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 26+53	**OFFSET** 7 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 448.5 ft	**TOTAL DEPTH** 22.8 ft	**NORTHING** 688,879	**EASTING** 1,828,723	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/23/23	**COMP. DATE** 01/23/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
450											
	447.5	1.0						M		448.5 GROUND SURFACE	0.0
			5	4	5	9				447.5 **ROADWAY EMBANKMENT** (PAVEMENT)	1.0
445	445.0	3.5						M		446.5 STIFF, BROWN, SILTY CLAY, A-7-5	2.0
			3	3	5	8	SS-15	19%		445.5 LOOSE, BROWN, SILTY SAND, A-2-4	3.0
	442.5	6.0						M		STIFF TO VERY STIFF, BROWN, SANDY SILT, TRACE GRAVEL, A-4	
			3	3	5	8					
440	440.0	8.5						M			
			4	7	9	16				436.5 **ALLUVIAL**	12.0
435	435.0	13.5						M		STIFF, BROWN, SANDY SILT, TRACE ORGANIC MATTER, A-4	
			5	6	8	14					
								M		431.5 **RESIDUAL**	17.0
430	430.0	18.5								VERY STIFF, BROWN, SANDY SILT, A-4	
			6	13	16	29					
	425.7	22.8	60/0.0			60/0.0				425.7 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 425.7 ft ON NON-CRYSTALLINE ROCK (META-ARGILLITE)	22.8

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 27+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 431.5 ft	**TOTAL DEPTH** 24.9 ft	**NORTHING** 688,906	**EASTING** 1,828,764	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/26/23	**COMP. DATE** 01/26/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
435											
	431.5	0.0	WOH	WOH	1	1		M		GROUND SURFACE	0.0
430										**ALLUVIAL** VERY SOFT, BROWN, SILTY CLAY, TRACE ORAGANIC MATTER, A-7-6	
	427.2	4.3	60/0.0			60/0.0				427.2	4.3
425										**WEATHERED ROCK** (META-ARGILLITE)	
										424.0	7.5
420							RS-1 RS-2			**NON-CRYSTALLINE ROCK** GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE REC = 100% RQD = 91% GSI = 70-80	
415											
410											
										406.6	24.9
										Boring Terminated at Elevation 406.6 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 27+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 431.5 ft	**TOTAL DEPTH** 24.9 ft	**NORTHING** 688,906	**EASTING** 1,828,764	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/26/23	**COMP. DATE** 01/26/23	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.6 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) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
427.18											Begin Coring @ 4.3 ft	
	427.2	4.3	4.6	*N=60/0.0* 1:34/0.6 2:40/1.0 2:55/1.0	(3.0) 65%	(1.1) 24%					427.2 **WEATHERED ROCK** (META-ARGILLITE)	4.3
425											424.0	7.5
	422.6	8.9	5.0	3:15/1.0 1:46/1.0 2:07/1.0 2:34/1.0 2:50/1.0 2:50/1.0 3:05/1.0	(5.0) 100%	(4.5) 90%	RS-1 RS-2	(17.4) 100%	(15.9) 91%		**NON-CRYSTALLINE ROCK** GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE GSI = 70-80	
420												
	417.6	13.9	5.0	2:58/1.0 2:41/1.0 2:48/1.0 2:50/1.0 3:15/1.0	(5.0) 100%	(4.3) 86%						
415												
	412.6	18.9	5.0	2:26/1.0 3:00/1.0 2:52/1.0 2:50/1.0 2:58/1.0	(5.0) 100%	(5.0) 100%						
410												
	407.6	23.9										
	406.6	24.9	1.0	2:11/1.0	(1.0) 100%	(1.0) 100%					406.6	24.9
											Boring Terminated at Elevation 406.6 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 27+09	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 430.7 ft	**TOTAL DEPTH** 27.6 ft	**NORTHING** 688,893	**EASTING** 1,828,777	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/24/23	**COMP. DATE** 01/24/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
435											
430	430.7	0.0	1	0	2	2				430.7 GROUND SURFACE	0.0
	426.7	4.0								**ALLUVIAL** SOFT, BROWN, SILTY CLAY, TRACE ORGANIC MATTER, A-7-5	
425	424.7	6.0	1	26	74/0.3	100/0.8 60/0.0				426.2	4.5
			60/0.0							424.7 **WEATHERED ROCK** (META-ARGILLITE)	6.0
420										**NON-CRYSTALLINE ROCK** GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE	
							RS-3			REC = 99% RQD = 79% GSI = 70-80	
415											
410											
405										403.1	27.6
										Boring Terminated at Elevation 403.1 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 27+09	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 430.7 ft	**TOTAL DEPTH** 27.6 ft	**NORTHING** 688,893	**EASTING** 1,828,777	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/24/23	**COMP. DATE** 01/24/23	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 21.6 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) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
424.69											Begin Coring @ 6.0 ft	
	424.7	6.0	1.6	0:54/0.6 1:48/1.0	(1.6) 100%	(1.1) 69%		(21.4) 99%	(17.0) 79%		424.7 **NON-CRYSTALLINE ROCK**	6.0
420	423.1	7.6	5.0	1:59/1.0 1:57/1.0 2:21/1.0 2:37/1.0 2:50/1.0	(5.0) 100%	(1.1) 22%					GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE GSI = 70-80	
	418.1	12.6	5.0	2:47/1.0 2:53/1.0 3:40/1.0 2:30/1.0 2:55/1.0	(5.0) 100%	(5.0) 100%	RS-3					
415	413.1	17.6	5.0	1:52/1.0 2:38/1.0 2:46/1.0 3:14/1.0 3:30/1.0	(4.8) 96%	(4.8) 96%						
410	408.1	22.6	5.0	2:55/1.0 2:35/1.0 2:40/1.0 2:56/1.0 3:01/1.0	(5.0) 100%	(5.0) 100%						
405	403.1	27.6									403.1 Boring Terminated at Elevation 403.1 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)	27.6

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 27+94	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 434.4 ft	**TOTAL DEPTH** 24.8 ft	**NORTHING** 688,914	**EASTING** 1,828,859	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/30/23	**COMP. DATE** 01/30/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
435										ELEV. (ft) DEPTH (ft)
	434.4	0.0	2	2	7	9		M		434.4 0.0 GROUND SURFACE
										RESIDUAL
	430.6	3.8								STIFF, TAN, SANDY SILT, A-4
430	429.7	4.7	2	98/0.3						430.1 4.3
			60/0.0			100/0.8 60/0.0				429.7 4.7 **WEATHERED ROCK**
										(META-ARGILLITE)
425							RS-4			**NON-CRYSTALLINE ROCK**
										GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE
							RS-5			
420										REC = 99% RQD = 82% GSI = 70-80
415										
410										409.6 24.8 Boring Terminated at Elevation 409.6 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)

NCDOT BORE DOUBLE RANDOLPH BR 162.GPJ NC_DOT.GDT 10/2/23

GEOTECHNICAL BORING REPORT
CORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 27+94	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 434.4 ft	**TOTAL DEPTH** 24.8 ft	**NORTHING** 688,914	**EASTING** 1,828,859	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/30/23	**COMP. DATE** 01/30/23	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.1 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) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
429.73											ELEV. (ft) DEPTH (ft)
											Begin Coring @ 4.7 ft
	429.7	4.7	1.6	2:00/0.6	(1.5)	(1.3)		(19.9)	(16.4)		429.7 4.7 **NON-CRYSTALLINE ROCK**
	428.1	6.3		3:57/1.0	94%	81%		99%	82%		GRAY, MODERATE WEATHERING TO FRESH, VERY CLOSE TO WIDE FRACTURE SPACING, HARD, INDURATED, THICKLY BEDDED, META-ARGILLITE
			5.0	2:02/1.0							
				2:52/1.0	(5.0)	(3.0)					
425				2:41/1.0	100%	60%	RS-4				
				2:28/1.0							GSI = 70-80
	423.1	11.3		3:26/1.0			RS-5				
			5.0	2:47/1.0	(5.0)	(4.5)					
				2:06/1.0	100%	90%					
420				3:03/1.0							
				3:29/1.0							
	418.1	16.3		4:24/1.0							
			5.0	2:55/1.0	(4.9)	(4.1)					
				3:31/1.0	98%	82%					
415				3:11/1.0							
				3:20/1.0							
	413.1	21.3		4:44/1.0							
			3.5	3:50/1.0	(3.5)	(3.5)					
				3:59/1.0	100%	100%					
410				5:04/1.0							
	409.6	24.8		2:09/0.5							409.6 24.8 Boring Terminated at Elevation 409.6 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)

NCDOT CORE DOUBLE RANDOLPH BR 162.GPJ NC_DOT.GDT 10/2/23

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 28+25	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 448.7 ft	**TOTAL DEPTH** 16.2 ft	**NORTHING** 688,937	**EASTING** 1,828,885	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/23/23	**COMP. DATE** 01/23/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450											
	447.7	1.0								448.7 GROUND SURFACE	0.0
			11	6	8	14		M		447.7 **ROADWAY EMBANKMENT** (PAVEMENT)	1.0
445	445.2	3.5								STIFF, BROWN, SILTY CLAY, A-7-5	
			3	3	5	8		M			
	442.7	6.0								443.2	5.5
			5	7	7	14		M		STIFF, BROWN, SILT WITH GRAVEL, A-4	
440	440.2	8.5									
			4	6	6	12		M			
										436.7	12.0
435	435.2	13.5								**RESIDUAL**	
			6	10	12	22		M		VERY STIFF, BROWN, SILT, A-4	
	432.5	16.2								432.5	16.2
			60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 432.5 ft ON NON-CRYSTALLINE ROCK (META-ARGILLITE)	

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 28+33	**OFFSET** 7 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 448.5 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 688,925	**EASTING** 1,828,897	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/23/23	**COMP. DATE** 01/23/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
450										
	447.5	1.0								448.5 GROUND SURFACE 0.0
			13	9	8	17		M		447.5 **ROADWAY EMBANKMENT** (PAVEMENT) 1.0
445	445.0	3.5								446.5 VERY STIFF, BROWN, SILTY CLAY, A-7-5 2.0
			2	5	5	10		M		444.5 VERY STIFF, BROWN, SANDY SILT, A-4 4.0
	442.5	6.0								STIFF TO VERY STIFF, BROWN, CLAYEY SILT, TRACE GRAVEL, A-5
			5	7	7	14		M		
440	440.0	8.5								
			5	7	10	17		M		
										436.5 12.0
435	435.0	13.5								**RESIDUAL**
			3	3	3	6		M		MEDIUM STIFF, BROWN, CLAYEY SILT, A-5
										431.5 17.0
430	430.0	18.5								**WEATHERED ROCK**
			100/0.3			100/0.3				(META-ARGILLITE)
	428.5	20.0	60/0.0			60/0.0				428.5 20.0
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 428.5 ft ON NON-CRYSTALLINE ROCK (META-ARGILLITE)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. L_2250	**STATION** 22+50	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 472.5 ft	**TOTAL DEPTH** 0.7 ft	**NORTHING** 688,890	**EASTING** 1,828,327	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER Williams, T.	**START DATE** 02/07/23	**COMP. DATE** 02/07/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
475										
										472.5 0.0 GROUND SURFACE
										471.8 0.7 **RESIDUAL** SOFT TO STIFF, TAN, CLAYEY SILT, A-5
										Boring Terminated at Elevation 471.8 ft ON WEATHERED ROCK (META-ARGILLITE)
										Hand Auger refusal at 0.7 feet.

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. L_2550	**STATION** 25+50	**OFFSET** 5 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 449.8 ft	**TOTAL DEPTH** 17.1 ft	**NORTHING** 688,868	**EASTING** 1,828,620	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Williams, T.	**START DATE** 01/27/23	**COMP. DATE** 01/27/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
450										
	448.8	1.0	11	8	8	16		M		449.8 0.0 GROUND SURFACE
										448.8 1.0 **ROADWAY EMBANKMENT** (PAVEMENT)
	446.3	3.5	4	6	13	19	SS-42	18%		VERY STIFF, BROWN, SANDY CLAY, TRACE GRAVEL, A-6
445										445.8 4.0 **RESIDUAL**
	443.8	6.0	11	16	23	39		M		VERY STIFF TO HARD, TAN, SANDY CLAY, A-6
	441.3	8.5	9	10	11	21		M		
440										
	436.3	13.5	100/0.4			100/0.4				437.8 12.0 **WEATHERED ROCK** (META-ARGILLITE)
435										
	432.7	17.1	60/0.0			60/0.0				432.7 17.1 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 432.7 ft ON NON-CRYSTALLINE ROCK (META-ARGILLITE)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** BP8.R019	**COUNTY** RANDOLPH	**GEOLOGIST** Melecosky, S.	
SITE DESCRIPTION BRIDGE NO. 162 ON SR 1005 (-L-) OVER BRUSH CREEK				**GROUND WTR (ft)**
BORING NO. L_2950	**STATION** 29+50	**OFFSET** 13 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 446.7 ft	**TOTAL DEPTH** 18.6 ft	**NORTHING** 688,950	**EASTING** 1,829,011	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME383 DIEDRICH D-50 88% 08/22/2022		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Williams, T.	**START DATE** 01/27/23	**COMP. DATE** 01/27/23	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
450										446.7 GROUND SURFACE	0.0
445	445.7	1.0	4	3	2	5		M		**ROADWAY EMBANKMENT** MEDIUM STIFF TO STIFF, BROWN, SANDY SILT WITH GRAVEL, A-4	
	443.2	3.5	4	5	5	10		M			
440	440.7	6.0	3	4	5	9	SS-37	23%		441.2 **RESIDUAL** STIFF, BROWN, CLAY, A-7-6	5.5
	438.2	8.5	3	3	6	9		M			
435	433.2	13.5	19	57	39	96		M		434.7 HARD, BROWN, SANDY SILT, A-4	12.0
430	428.2	18.5	60/0.1			60/0.1				429.7 **WEATHERED ROCK** (META-ARGILLITE)	17.0
										428.2 **NON-CRYSTALLINE ROCK** (META-ARGILLITE)	18.5
										428.1 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 428.1 ft IN NON-CRYSTALLINE ROCK (META-ARGILLITE)	18.6

NCDOT BORE DOUBLE RANDOLPH BR 162.GPJ NC_DOT.GDT 10/2/23

ROD SOUNDING LOG

PROJECT	Randolph Bridge No. 162 Randolph County, North Carolina S&ME Project No. 213636A	TEST NUMBER	**RS-1E**
Sta: 22+55, Offset: 25 LT, Line: -L- North: 688889 East: 1828332 Elev: 472.2		DATE	2/7/2023
DEPTH 1.0 feet	DRILL METHOD Rod Sounding	FIELD TECHS.	SM/LB

DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	TOTAL	BLOWS PER FOOT 0 25 50 75 100	NOTES
	1	24	25		Rods Bouncing at 1.0 ft
5					Sounding refusal at 1.0 feet below ground surface on apparent rock or cobble
10					
15					

ROD SOUNDING LOG

PROJECT	Randolph Bridge No. 162 Randolph County, North Carolina S&ME Project No. 213636A	TEST NUMBER	**RS-2S**
Sta: 22+50, Offset: 20 LT, Line: -L- North: 688885 East: 1828326 Elev: 472.0		DATE	2/7/2023
DEPTH 0.5 feet	DRILL METHOD Rod Sounding	FIELD TECHS.	SM/LB

DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	TOTAL	BLOWS PER FOOT 0 25 50 75 100	NOTES
	20	0	20		Rods Bouncing at 0.5 feet
5					Sounding refusal at 0.5 feet below ground surface on apparent rock
10					
15					

ROD SOUNDING LOG

PROJECT	Randolph Bridge No. 162 Randolph County, North Carolina S&ME Project No. 213636A	**TEST NUMBER**	**RS-3W**
Sta: 22+45, Offset: 25 LT, Line: -L- North: 688891 East: 1828322 Elev: 472.7		**DATE**	2/7/2023
DEPTH 2.0 feet	**DRILL METHOD** Rod Sounding	**FIELD TECHS.**	SM/LB

DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	TOTAL	BLOWS PER FOOT 0 25 50 75 100	NOTES
	1	24	25		Rods Bouncing at 2.0 feet
	20	100	120		
5					Sounding refusal at 2.0 feet below ground surface on apparent rock
10					
15					

ROD SOUNDING LOG

PROJECT	Randolph Bridge No. 162 Randolph County, North Carolina S&ME Project No. 213636A	**TEST NUMBER**	**RS-4N**
Sta: 22+50, Offset: 30 LT, Line: -L- North: 688895 East: 1828328 Elev: 473.3		**DATE**	2/7/2023
DEPTH 0.5 feet	**DRILL METHOD** Rod Sounding	**FIELD TECHS.**	SM/LB

DEPTH (ft)	BLOW COUNT 0.5 ft	0.5 ft	TOTAL	BLOWS PER FOOT 0 25 50 75 100	NOTES
	1	100	101		Rods Bouncing at 0.5 Feet
5					Sounding refusal at 0.5 feet below ground surface on apparent rock
10					
15					

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	213636A			Date Report:	8/14/2023
State Project No.:	N/A	County:	Randolph	Date Tested:	07/13-08/13/23
Federal ID No.:	N/A	TIP No.:	BP8.R019		
Project Name:	Bridge No. 162 on SR 1005 over Brush Creek				
Client Name:	CH Engineering	Client Address:	Raleigh, NC		

Sample No.	Boring No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Organic	Moist. %
								10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay					
SS-15	EB1-B	26+53	7' RT	-L-	3.5-5.0	A-4	(2)	93	70	60	47	36	17	22	25	29	19	10	-	19.4
SS-25	EB1-A	26+45	7' LT	-L-	13.5-15.0	A-4	(5)	100	99	97	83	3	20	45	32	27	19	8	-	17.0
SS-37	L_2950	29+50	13' RT	-L-	6.0-7.5	A-7-6	(18)	99	95	90	84	9	8	30	53	45	24	21	-	22.9
SS-42	L_2550	25+50	5' LT	-L-	3.5-5.0	A-6	(11)	95	91	89	84	6	9	51	34	35	22	13	-	17.9

References / Comments / Deviations: ND=Not Detemined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner		NCDOT 118-06-0305	Joey Daily	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

Form No. TR-43-D7012C-02
Revision No. : 0
Revision Date: 08/22/18

UNCONFINED COMPRESSION
(ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

roject Name: Bridge No. 162
ject Number: 213636A

Report Date: June 16, 2023
Reviewed By: JD

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)	Time to Failure (s)
			Length	Diameter								
B1-A	RS-1	8.95 - 9.35	4.52	1.86	A	2.72	177.1	81	30,296	11,138	0.1	137.5
B1-A	RS-2	11.00 - 11.40	4.30	1.86	A	2.72	174.8	103	57,898	21,286	0.1	206.7
B1-B	RS-3	12.75 - 13.15	4.32	1.86	A	2.72	175.8	106	61,139	22,478	0.0	212.1
B2-B	RS-4	8.35 - 8.75	4.36	1.86	A	2.72	174.7	80	22,936	8,432	0.1	105.4
B2-B	RS-5	11.35 - 11.75	4.33	1.86	A	2.72	175.2	99	53,065	19,509	0.0	197.1

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

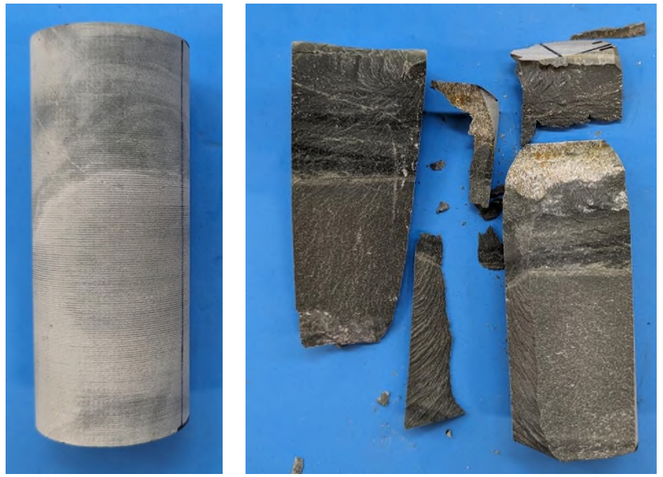
A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.



Date: 06/16/2023

Photographer: Ryan Skinner

1	**Location / Orientation**	B1-A, RS-1 (9.0′ – 9.4′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen B1-Before/After (ASTM D7012 Method C)

Date: 06/16/2023

Photographer: Ryan Skinner

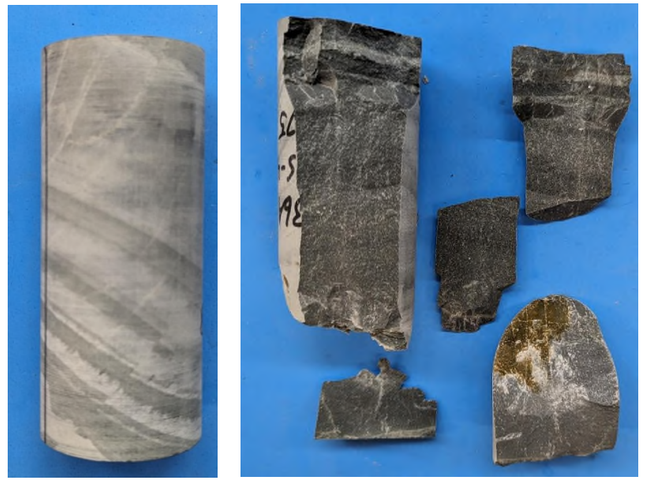
2	**Location / Orientation**	B1-A, RS-2 (11.00′ – 11.40′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen B1-Before/After (ASTM D7012 Method C)

S&ME Project No. 213636A

Date: 06/16/2023

Photographer: Ryan Skinner

3	**Location / Orientation**	B1-B, RS-3 (12.8′ – 13.2′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen B1-Before/After (ASTM D7012 Method C)



Date: 06/16/2023

Photographer: Ryan Skinner

4	**Location / Orientation**	B2-B, RS-4 (8.4′ – 8.8′)
	Remarks	Unconfined Compressive Strength of Rock Core Specimen B1-Before/After (ASTM D7012 Method C)

S&ME, Inc. | 1413 Topside Road | Louisville, TN 37777 | p 865.970.0003 | f 865.970.2312 | www.smeinc.com

Date: 06/16/2023

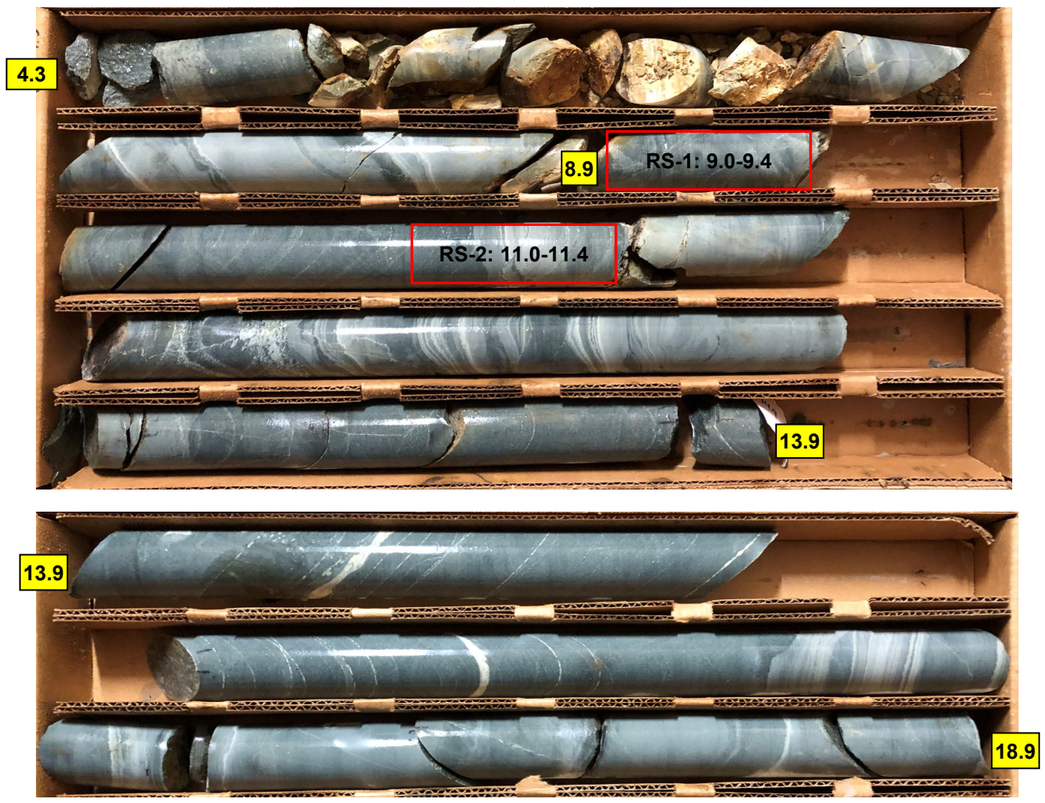
Photographer: Ryan Skinner

5	**Location / Orientation**	B2-B, RS-5 (11.4' – 11.8')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen B1-Before/After (ASTM D7012 Method C)

CORE PHOTOGRAPHS

B1-A

BOXES 1 & 2: 4.3 - 18.9 FEET



0 1 2
FEET

B1-A

BOX 3: 18.9 - 24.9 FEET

0 1 2
FEET

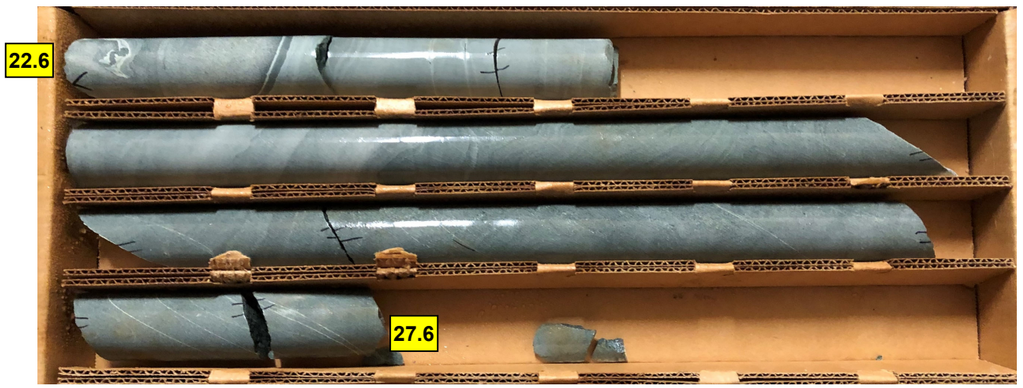
CORE PHOTOGRAPHS

B1-B

BOXES 1 & 2: 6.0 - 22.6 FEET

B1-B

BOX 3: 22.6 - 27.6 FEET



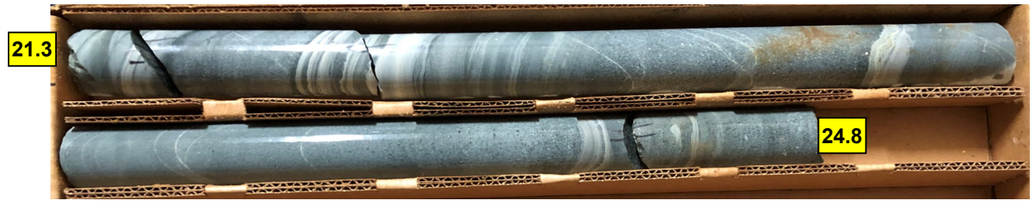
CORE PHOTOGRAPHS

B2-B

BOXES 1 & 2: 4.7 - 21.3 FEET

B2-B

BOX 3: 21.3 - 24.8 FEET



SITE PHOTOGRAPHS

Bridge No. 162 on –L– (SR 1005) over Brush Creek

Looking West