

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

ROY COOPER GOVERNOR JAMES H. TROGDON, III
SECRETARY

May 10, 2018

TO:

Prospective Bidders

FROM:

Jeff Turnet Division Proposals Engineer

SUBJECT:

Addendum #1

Contract DI00196 - "B-5771"

Grading, Paving, Drainage, Structure - Bridge No. 16 over Muddy Creek - SR

1611 (Main Street) - Forsyth County.

The subject contract proposal contains the following addendum:

1. Add the attached Structure Subsurface plans.

This addendum officially becomes part of the contract.

Ö REFERENCE

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

CONTENTS

SHEET NO.	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE
5-6	CROSS SECTIONS
7-12	BORE LOGS & CORE REPORTS
13-14	CORE PHOTOGRAPHS
15	ROCK CORE LABORATORY TEST RESULTS

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY	FORSYTH
PROJECT D	ESCRIPTION BRIDGE NO. 16 ON SR 1611
	AIN STREET) OVER MUDDY CREEK
SITE DESCR	STATION 17 + 57.50 -L-

STATE PROJECT REFERENCE NO. SHEETS B-5771

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 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 BORGHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU (IM-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 NIDICATED 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 INTERRETATIONS 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:

 1. 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.

 2. 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 STICKNEY, J. K. SMITH, C. L. INVESTIGATED BY ___STICKNEY, J. K. FIELDS, W. D. ALEXANDER, M. J. DRAWN BY MILLER, K. B. CHECKED BY MILLER, K. B. SUBMITTED BY NOVEMBER 2017



UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO. 2

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS COCANUS MATERIALS	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNEOUS AND METAMORPHIC ROCK THAT	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
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	ROCK (CP) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING GRANULAR SILT-MUCK,	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPIT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS SOILS SOILS PEAT	GRANULAR SILT - CLAY	- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
"200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL.
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 501LS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 10 MX 18 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MN MOGRATE OFFICIAL	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
HIGHAL TYPES CTOME EPAGS ORGANIC SUILS	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOND SOURS		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE AS SUBGRADE	E	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	→ SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
RANGE OF STANDARD RANGE OF UNCONFINED	POADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE (COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) #ITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SPI DAT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LUUSE 4 10 10 M	M	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MAILHIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY DENSE > 50 VERY SOFT < 2	INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MN - TECT DODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED ROCK LINE "OMNITORING WELL WITH CORE	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	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
HARD > 30 > 4 TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK,
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	UNSUITABLE WASTE	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	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
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	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.
PLASTIC LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) SEMISULID; REQUIRES DATING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BM #1: RAILROAD SPIKE SET IN 21" OAK.
(P) PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	STA. 16+79 -L-, 61.3 FEET LEFT (N: 890810; E: 1605677)
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 788.88 FEET
SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CLOSUTANIONS STRUCT	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NM - NOT MEASURED
ATTAIN UPTIMUM MUISTURE	CME-55	THINLY LAMINATED < 0.008 FEET	CAR - CASING ADVANCER REFUSAL
PLASTICITY		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	CT - CORING TERMINATED
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	X CME-550X (HF00070) HARD FACED FINGER BITS X-N X TUNGCARBIDE INSERTS	DURDING WITH CINCED EDEER NUMEROUS CRAINS.	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST X CASING X W/ ADVANCER HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
	X TRICONE 215/16 TUNGCARB. SOUNDING ROD	INDURATED 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.	X CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
TELE CONTROL ETGEN, CONTROL OF THE COLO TO DESCRIBE THE ENGINEER		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5771	2A

DATE: 8-19-1

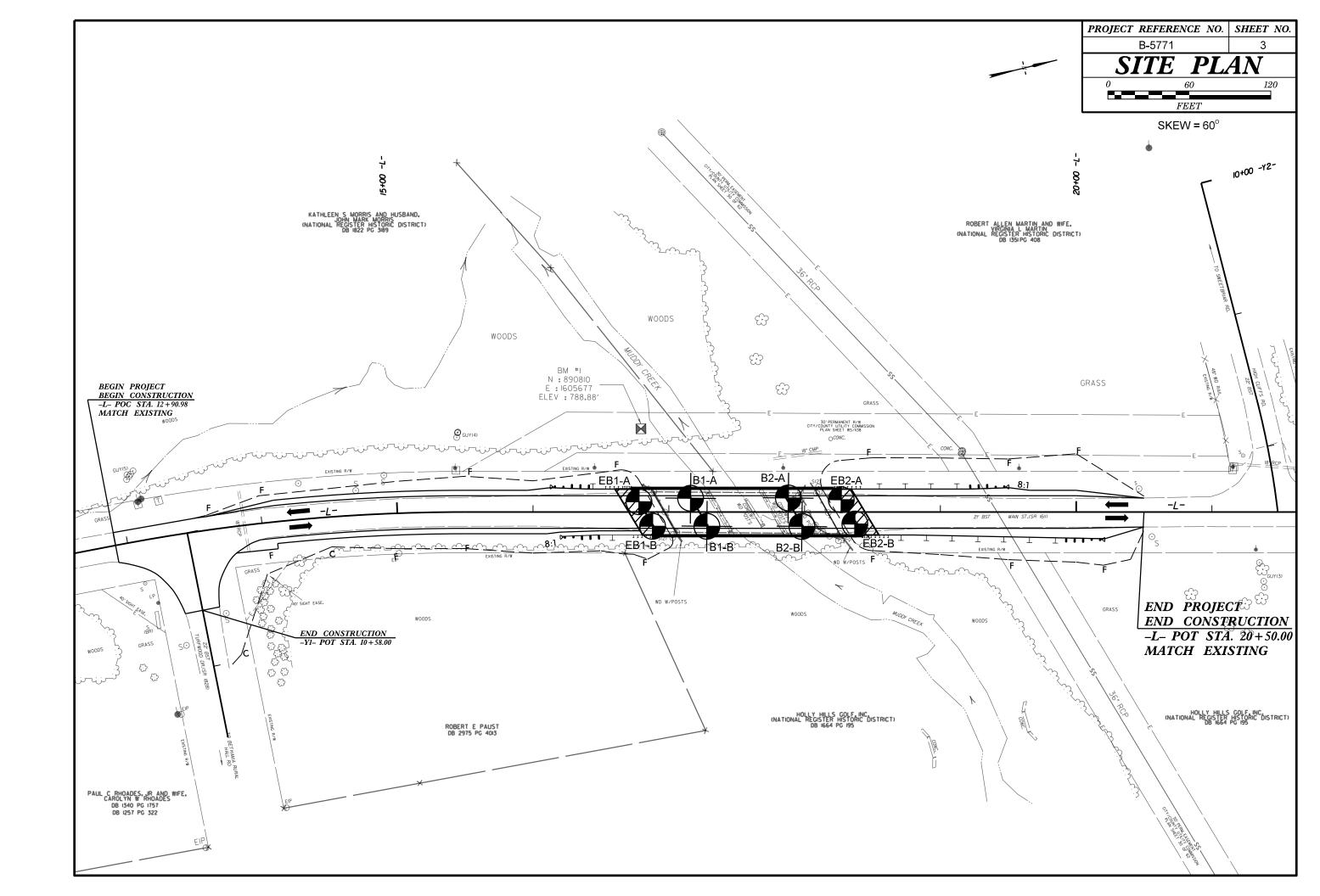
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

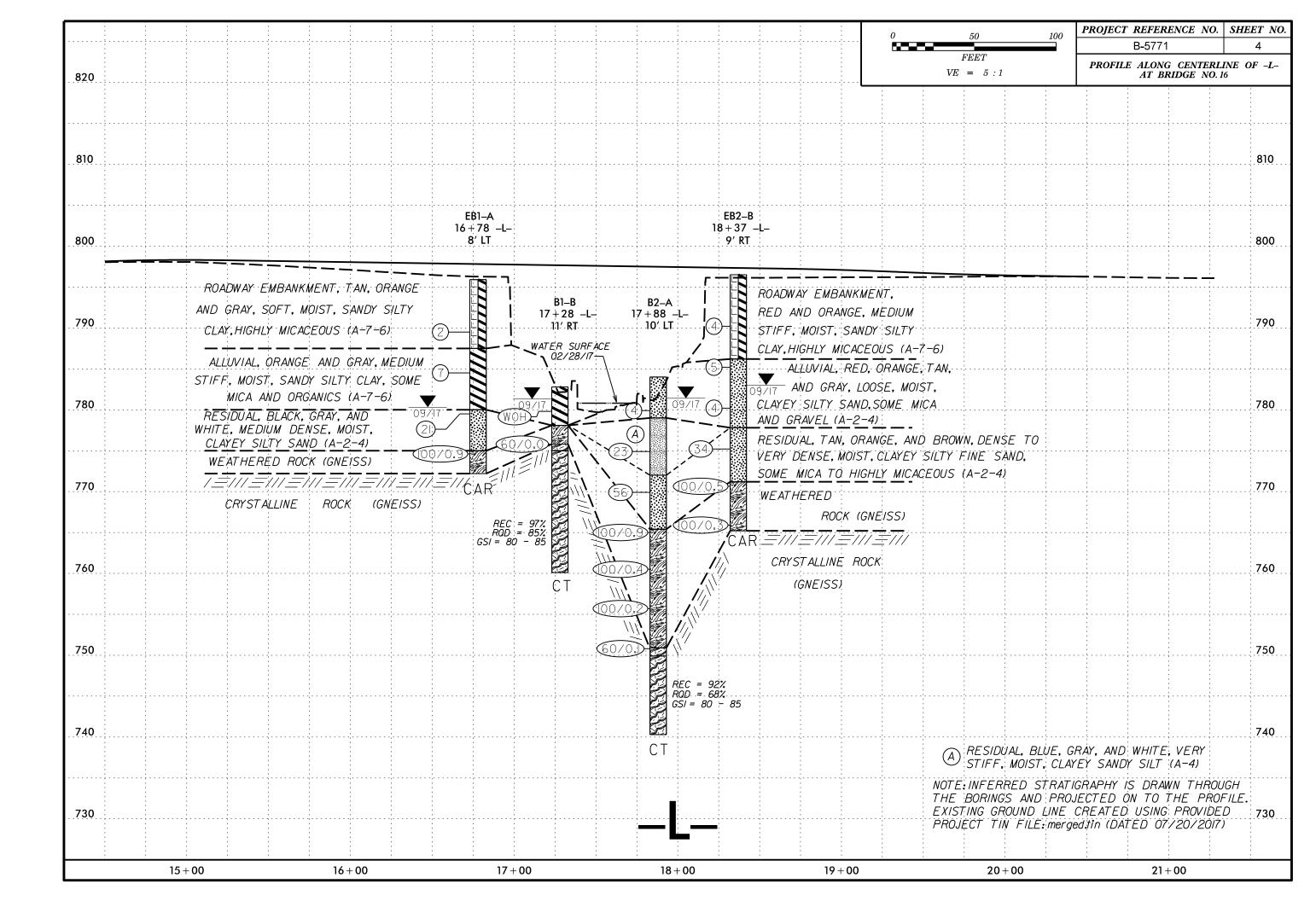
SUBSURFACE INVESTIGATION

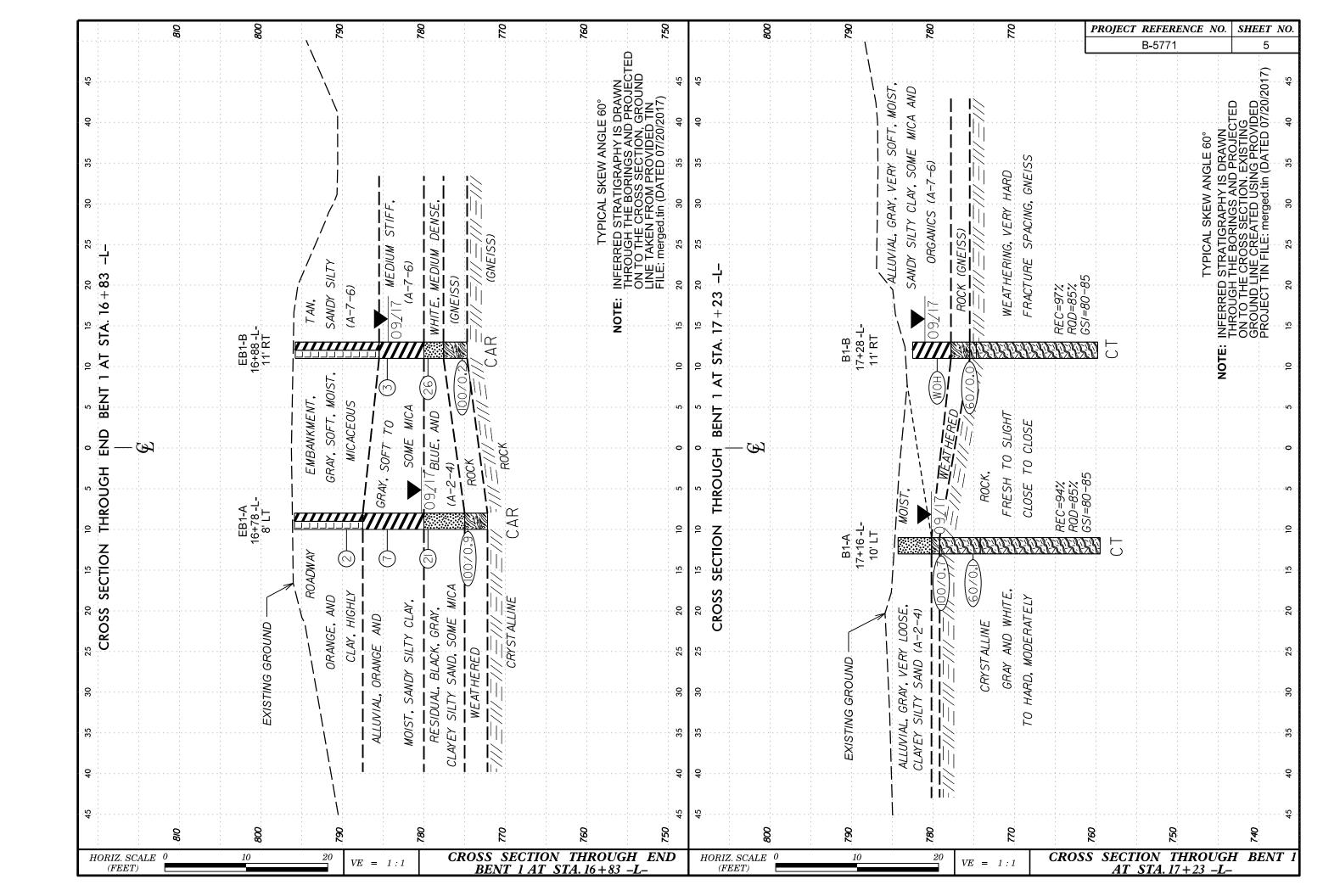
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES

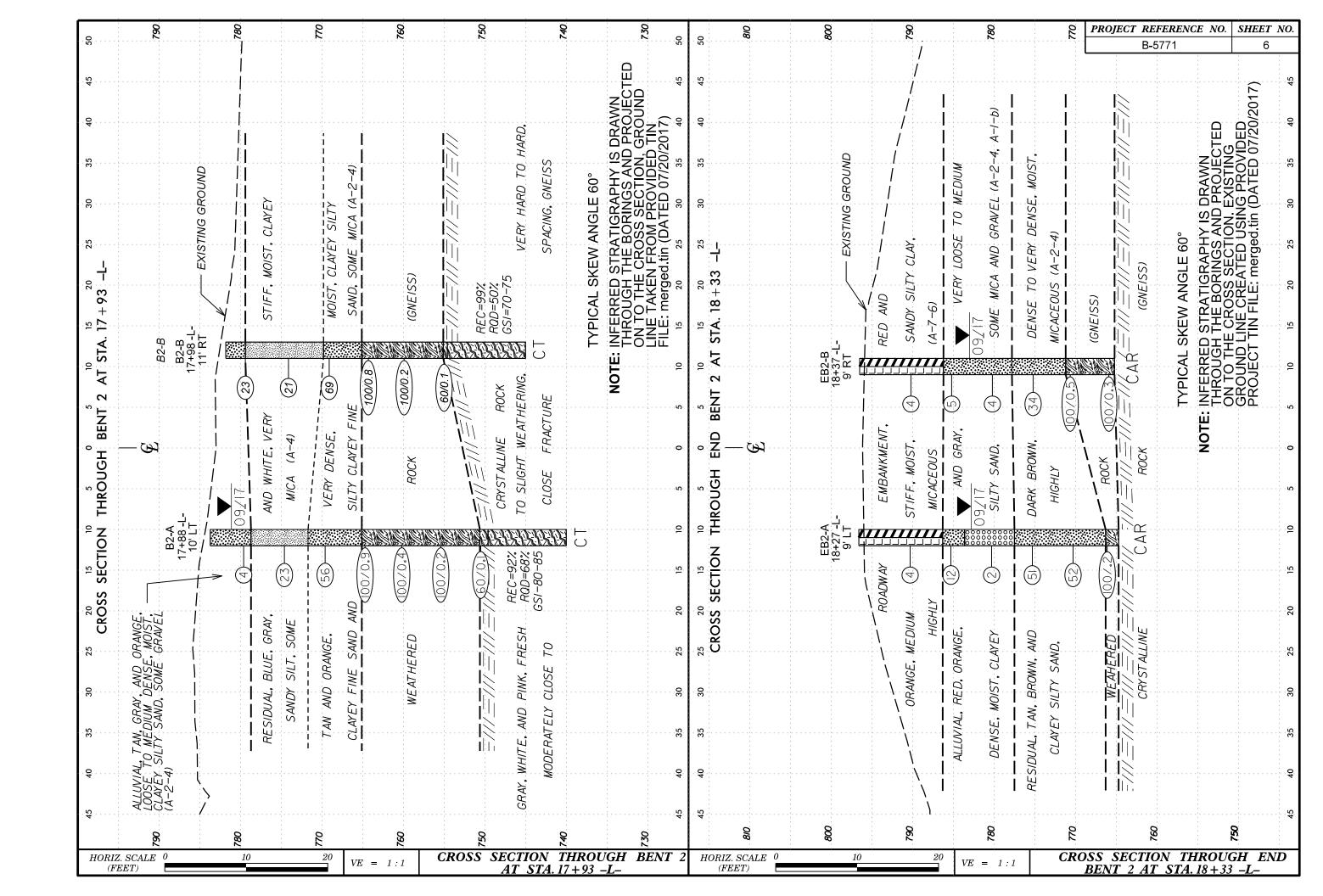
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000) AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000) GEOLOGICAL STRENGTH INDEX (GSI) FOR GSI FOR HETEROGENEOUS ROCK MASSES SUCH JOINTED ROCKS (Hoek and Marinos, 2000) faces AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and From the lithology, structure and surface **POOR -** Very smooth, slicken-or highly weathered surfaces soft clay coatings or fillings smooth, occasionally surfaces with compaci fillings with angular conditions of the discontinuities, estimate the average value of GSI. Do not try to weathered sur ngs or fillings ts surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the planes) be too precise. Quoting a range from 33 to 37 is more realistic than stating that weather position in the box that corresponds to the condition of the discontinuities and estimate the average value ther GSI = 35. Note that the table does not of GSI from the contours. Do not attempt to $\bar{\mathsf{be}}$ too eq. apply to structurally controlled failures. Where weak planar structural planes are ighly weat coatings precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the weather Rough, slightly present in an unfavorable orientation SURFACE CONDITIONS (DISCONTINUITIES (Predominantly beddin Hoek-Brown criterion does not apply to structurally with respect to the excavation face, highly coatin agment these will dominate the rock mass controlled failures. Where unfavourably oriented behaviour. The shear strength of surfaces continuous weak planar discontinuities are present, Smooth, ed and in rocks that are prone to deterioration slightly es these will dominate the behaviour of the rock mass. POOR Slickensided, h with compact or angular fra as a result of changes in moisture - Very sonsided for the formula or formula o 1 TO The strength of some rock masses is reduced by the content will be reduced if water is GOOD rough, G00D thered presence of groundwater and this can be allowed for present. When working with rocks in the by a slight shift to the right in the columns for fair, fair to very poor categories, a shift to GOOD -surfaces FAIR - weather GOOD Rough, s surface poor and very poor conditions. Water pressure does the right may be made for wet conditions. VERY | sided with si VERY Water pressure is dealt with by effective VERY Very FAIR Smoo not change the value of GSI and it is dealt with by stress analysis. using effective stress analysis. STRUCTURE DECREASING SURFACE QUALITY COMPOSITION AND STRUCTURE INTACT OR MASSIVE - intact A. Thick bedded, very blocky sandstone 90 rock specimens or massive in N/A N/A The effect of pelitic coatings on the bedding planes is minimized by the confinement of situ rock with few widely spaced PIECES discontinuities the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally 80 60 BLOCKY - well interlocked un-70[′] disturbed rock mass consisting of cubical blocks formed by three O. Siltstone intersecting discontinuity sets 50 F. Weak C. Sand-60 or silty shale si/tstone stone with stone and С or clayey shale with thin inter siltstone with sandlayers of stone lauers ın sımılar VERY BLOCKY - interlocked, amounts sands tone siltstone 40 partially disturbed mass with 50 multi-faceted angular blocks formed by 4 or more joint sets INTERL C.D.E. and G - may be more or F. Tectonically deformed, BLOCKY/DISTURBED/SEAMY -30 less folded than illustrated but ntensively folded/faulted, folded with angular blocks this does not change the strength. sheared clayey shale or sıltstone formed by many intersecting Tectonic deformation, faulting and with broken and deformed CREASING loss of continuity moves these discontinuity sets. Persistence andstone layers forming an 30 categories to F and H. of bedding planes or schistosity almost chaotic structure 20 DISINTEGRATED - poorly interlocked, heavily broken rock mass 20 H. Tectonically deformed silty with mixture of angular and or clayey shale with or clayey shale forming a 10 rounded rock pieces or without a few very chaotic structure with pockets thin sandstone layers of clay. Thin layers of sandstone are transformed into small rock pieces. 10 LAMINATED/SHEARED - Lack of blockiness due to close spacing N/A N/A → Means deformation after tectonic disturbance

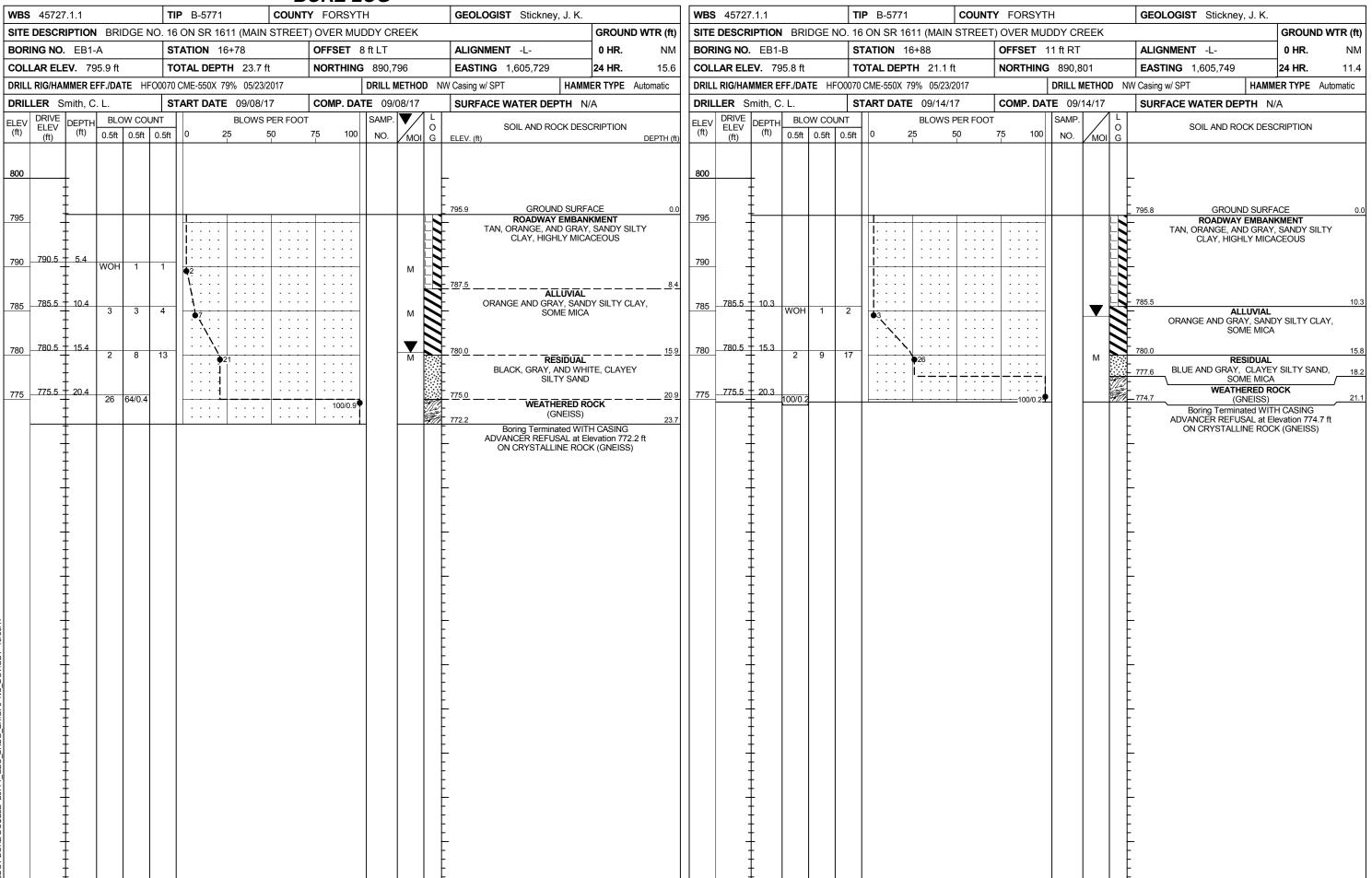
of weak schistosity or shear planes











DRILLER Smith, C. L. START DATE 09/08/17 COMP. DATE 09/08/17 SURFACE WATER DEPT ELEV (ft) DEPTH (ft) DEPTH (ft) BLOW COUNT (ft) BLOWS PER FOOT 0.5ft SAMP. NO. NO. NO. MOI G ELEV. (ft) SOIL AND ROC 785 780.5 4.1 99/0.2 NO. NO. NO. 784.6 GROUND 780.5 780.5 4.1 1 1 99/0.2 NO.	J. K. GROUND WTF 0 HR.
BORING NO. B1-A COLLAR ELEV. 784.6 ft TOTAL DEPTH 24.8 ft NORTHING 890,833 EASTING 1,605,735 DRILL RIG/HAMMER EFF./DATE HF00070 CME-550X 79% 05/23/2017 DRILLER Smith, C. L. START DATE 09/08/17 COMP. DATE 09/08/17 SURFACE WATER DEPTH (ft) 0.5ft 0.5f	
COLLAR ELEV. 784.6 ft TOTAL DEPTH 24.8 ft NORTHING 890,833 EASTING 1,605,735 DRILL RIG/HAMMER EFF./DATE HF00070 CME-550X 79% 05/23/2017 DRILL METHOD NW Casing W/SPT & Core DRILLER Smith, C. L. START DATE 09/08/17 COMP. DATE 09/08/17 SURFACE WATER DEPT ELEV (ft) DEPTH (ft) DEPTH (ft) BLOW COUNT (ft) BLOWS PER FOOT 25 SAMP. NO. NO. MOI G ELEV. (ft) SOIL AND ROC 785 780.5 4.1 1 1 99/0.2 1 1 1 99/0.2 1 1 1 99/0.2 1 1 1 1 1 1 1 1 1 99/0.2 1 1 1 1 1 1 99/0.2 1 1 1 1 1 1 1 99/0.2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <t< th=""><th> n HB</th></t<>	n HB
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DRILLER Smith, C. L. START DATE 09/08/17 COMP. DATE 09/08/17 SURFACE WATER DEPT LEV (ft) DRIVE (ft) DEPTH (ft) BLOW COUNT (ft) BLOWS PER FOOT 75 100 NO. MOI G ELEV. (ft) SOIL AND ROC 785 780.5 4.1 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 199/0.2 1 1 1 199/0.2 1 1 1 1 199/0.2 1	24 HR.
DRIVE ELEV (ft)	HAMMER TYPE Automa
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780 780.5 4.1 99/0.2	K DESCRIPTION DEP
GRAY, CLAYE 780.5	SURFACE
60 + 1 1 99/0.2 WEATHER	UVIAL EY SILTY SAND
T 1 1 99/0.2	
	RED ROCK EISS)
T GRAY AND W	LINE ROCK /HITE, GNEISS
75 775.5 + 9.1	
5 +	
0 +	
_ Boring Terminated a	t Elevation 759.8 ft IN
The character of the control of the control of the character of the charac	ROCK (GNEISS)
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GEOTECHNICAL BORING REPORT

SHEET 8 OF 15

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WBS	45727	7.1.1			TIP	B-577	'1	С	OUNT	ΥF	ORSYT	1		GEOLOGI	ST Stickne	y, J. K.		
SITE	DESCR	RIPTION	I BRI	DGE NO	. 16 O	N SR	1611 (MA	AIN ST	REET	r) 0\	/ER MU	DDY CREEK		_			GROUN	ID WTR (ft)
BOR	ING NO	. B1-A	١		STA	TION	17+16			OF	FSET 1	0 ft LT		ALIGNME	NT -L-		0 HR.	NM
	LAR ELI						PTH 24			NC	RTHING	890,833		l	1,605,735		24 HR.	4.1
				TE HFOO					7			DRILL METH						Automatic
	LER S		. L.				TE 09/0			cc	MP. DAT	E 09/08/17	,	SURFACE	WATER DE	PTH N	<u>'A</u>	
	E SIZE			DRILL	RI	UN RU	N 14.7 f	t STR	ATA	L								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC.	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	Ö G	ELEV. (fl)	С	ESCRIPTION	I AND REMAR	KS		DEPTH (ft)
774.5	774.5	10.1	4.7	0:50/1.0	(4.0)	(3.5)		(13.8)	(12.5)		774.5	GRAY AND	WHITE, I	FRESH TO SL	ng @ 10.1 f IGHT WEATH	ERING. V	ERY HARD	O TO 10.1
770	769.8	14.8		0:53/1.0 0:58/1.0 0:55/1.7	85%	74%		94%	85%		- - -	HARD, MODE	ERATEL		CLOSE FRAC I=80-85	TURE SPA	ACING, GN	EISS
		<u> </u>	5.0	1:11/1.0 1:15/1.0 1:23/1.0 1:21/1.0	(4.9) 98%	(4.6) 92%					- - -							
765	764.8	19.8	5.0	1:24/1.0 1:33/1.0 1.43/1.0	(4.9) 98%	(4.4) 88%					_ - -							
760	759.8	24.8		1:35/1.0 1:40/1.0 1:44/1.0							- 759.8 -	Boring Termi	nated at	Elevation 759	.8 ft IN CRYS	TALLINE R	OCK (GNE	24.8 EISS)
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	457						P B-577						FORS					GEOLOGIST Stickney, J.			
					DGE		ON SR			N ST	REE	-				REEK		T			D WTR (ft)
	ING N						TATION					-			1 ft RT			ALIGNMENT -L-		HR.	NM
	LAR E						OTAL DE					NC	DRTHI	_	890,8			EASTING 1,605,758		HR.	1.5
					TE H		CME-550X					1		_						TYPE	Automatic
	LER DRIVI				ow cc		TART DA		09/14/ BLOWS		F00		OMP. L	AI	E 09/		1 L	SURFACE WATER DEPTH	N/A		
ELEV (ft)	DRIVI ELEV (ft)	7 DEF 1 (1	PTH ft)	0.5ft			0	25		50	.100	75	10	00	NO.	мо	0	SOIL AND ROCK ELEV. (ft)	DESCRIF	PTION	DEPTH (f
785	(it)	<u> </u>) INIO	1 0	_			
		<u>+</u>										.						_ 782.8 GROUND SI _ ALLUV	IAL		0.
780	780.8	+ 2	.0	WOH	WOH	WOH		:		:	• •					М		GRAY, SANDY SILTY (AND ORG	CLAY, SO ANICS	OME M	ICA
		‡						- -			 	<u>.</u>	 —:—-				3,000	778.1 WEATHERE	D DOCK	,	4.
775	775.8	‡ ₇	.0	00/0.0				:					60/0					775.8 (GNEIS	SS)		7. 7.
113		‡		60/0.0						+		-		Ţ				775.0 CRYSTALLIN - (GNEIS		•	7.
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770		‡						:		<u> </u>	• •							-			
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765		‡						:			: :	:						-			
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	-	‡						•			• •	•	• • •	.				760.1 Boring Terminated at E	levation :	760 1 f	22. HIN
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GEOTECHNICAL BORING REPORT

SHEET 9 OF 15

		С	ORE LOG							
WBS 45727.1.1	TIP B-5771	COUNT	Y FORSYTH	GEOLOGIST Stickney, J. K.						
SITE DESCRIPTION BR	IDGE NO. 16 ON SR 161	I1 (MAIN STREET	OVER MUDDY CREEK		GROUND WTR (ft)					
BORING NO. B1-B	STATION 17	+28	OFFSET 11 ft RT	ALIGNMENT -L-	0 HR. NM					
COLLAR ELEV. 782.8 ft	TOTAL DEPTI	H 22.7 ft	NORTHING 890,840	EASTING 1,605,758	24 HR. 1.5					
DRILL RIG/HAMMER EFF./DA	ATE HFO0070 CME-550X 79	9% 05/23/2017	DRILL METHOD NV	V Casing W/SPT & Core H/	AMMER TYPE Automatic					
DRILLER Smith, C. L.	START DATE	09/14/17	COMP. DATE 09/14/17	SURFACE WATER DEPTH	N/A					
CORE SIZE NX	TOTAL RUN									
ELEV RUN ELEV (ft) DEPTH RUN (ft)		REC. RQD SAMP. REC. RQD O								
775 775.0 7.8 4.9	1 2 1 (2 2)	(44.5) (49.0)	ODAY AND WUTE	Begin Coring @ 7.8 ft	10 \/ED\/ ADD TO					
770 770.1 12.7	1:31/1.0 (4.7) (3.8) 1:54/1.0 96% 78% 1:36/1.0 1:32/1.9	(14.5) (12.6) 97% 85%	775.0 GRAY AND WHITE, HARD, MODERA	FRESH TO SLIGHT WEATHERIN TELY CLOSE TO CLOSE, FRACT GNEISS GSI=80-85						
765 765.1 17.7	1:30/1.0 (4.8) (3.9) 1:18/1.0 96% 78% 1:35/1.0 1:25/1.0	RS-1								
5.0	2:00/1.0 (5.0) (4.9) 1:45/1.0 100% 98% 1:32/1.0 1:34/1.0				00.7					
760.1 7 22.7	1:36/1.0		760.1 Boring Terminated at	Elevation 760.1 ft IN CRYSTALLIN	NE ROCK (GNEISS)					

WES	4E707	7 1 1			 - -	ID D 5774		ORE L				GEOLOGIST CHARACT	LV		
	45727		1 00	וחפב י		IP B-5771		FORSYT		GEOLOGIST Stickney,		יייי			
	ING NO.			IDGE		6 ON SR 1611 (MAIN TATION 17+88	i	OFFSET		KEEK		ALIGNMENT -L-		HR.	O WTR (ft NM
	AR ELE				-	OTAL DEPTH 43.7 f		NORTHING		.03		EASTING 1,605,752		4 HR.	2.6
						O CME-550X 79% 05/23/		NORTHING	DRILL N		D N	W Casing W/SPT & Core	HAMMER		
	LER S			116 111		TART DATE 09/08/1		COMP. DA			או טי	SURFACE WATER DEP		IIFE	Automatic
ELEV	DRIVE	DEPTH		DW CO		1	PER FOOT	COMP. DA	SAMP.		1 [SURFACE WATER DEP	III IN/A		
(ft)	ELEV (ft)	(ft)	0.5ft			 		75 100	NO.	МОІ	O I G	SOIL AND ROO	CK DESCRI	IPTION	DEPTH
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	780.9 -	3.1								lacksquare		TAN, GRAY, AND SILT	ORANGE, Y SAND	CLAYE	′
'80			2	2	2	4	$+\cdots$			М					
	-	<u> </u>										RES BLUE, GRAY, AN	SIDUAL ND WHITE.	CLAYEY	
75	775.9	8.1	6	9	14					М		SANI	DY SILT		
	-	F	`			23	T			IVI		- -			
	770.9 -	13.1									****			AVEV FI	<u> 1</u>
70	770.9 -	- 13.1	11	20	36		56	<u> </u>		М		SAND, S	SOME MICA	\ \	\ L
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35	765.9 -	18.1	30	70/0.4			į::::					- - 765.4			1
00	-	‡	30	70/0.4				100/0.9)			WEATHE	RED ROCK NEISS)	к [—] ——	
	-	‡										- -	VLICO)		
60	760.9 -	23.1	100/0.4	4				100/0.4	,			- -			
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	755.9 -	28.1										-			
5	_	-	100/0.2	2			+	100/0.2)		1	_			
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50	750.9	33.1	60/0.1					60/0.1	,			750.9 749.9 CRYSTAI	LLINE ROC	.K	
	-	†	00/0.1									=	NEISS)	· K	
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5	-	‡					<u> </u>					- -			
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	-							*				Boring Terminated : CRYSTALLINE	at Elevation	1740.3 ft	
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GEOTECHNICAL BORING REPORT CORE LOG

SHEET 10 OF 15

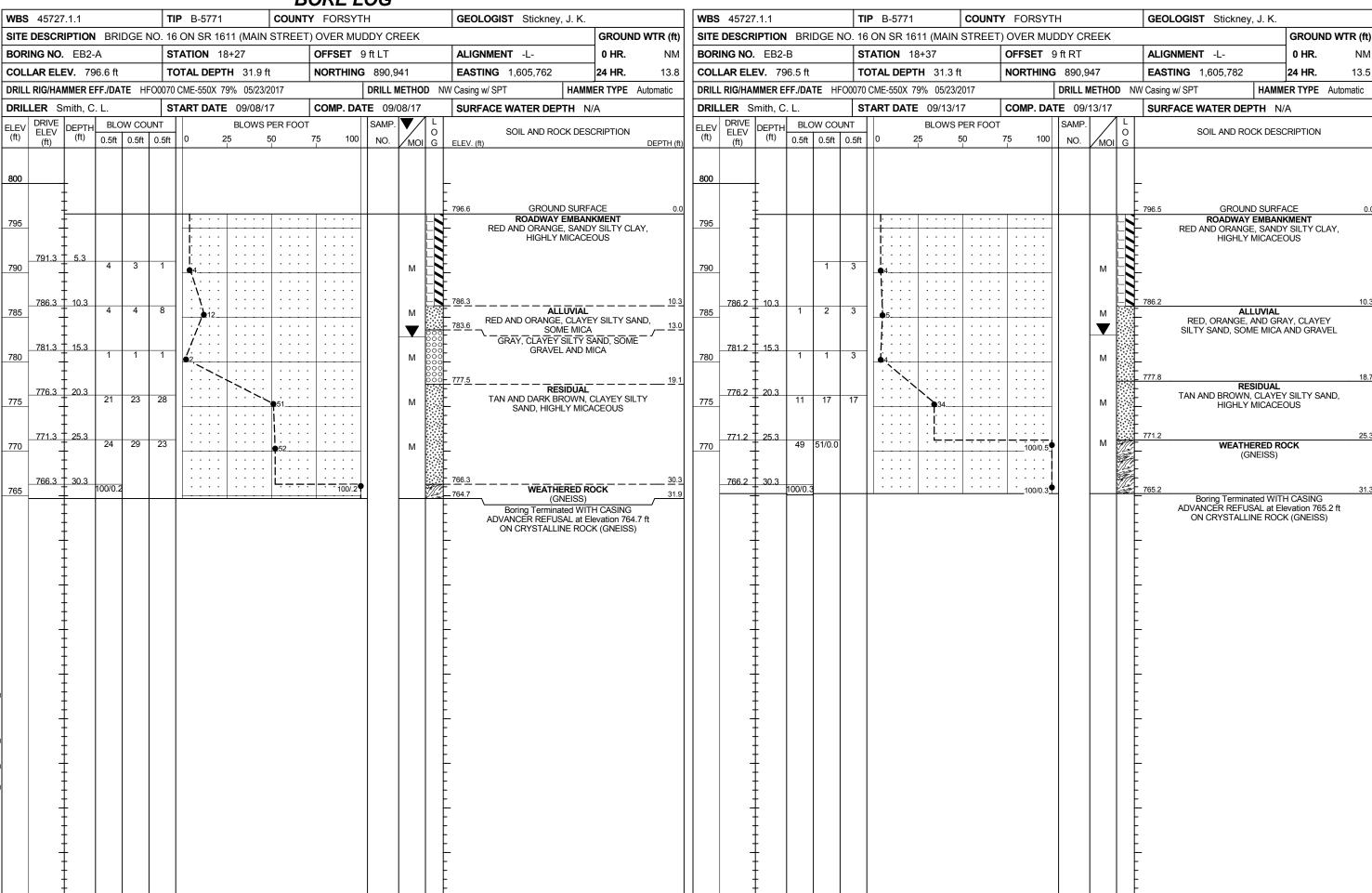
	<u>_</u>	CORE LOG
WBS 45727.1.1	TIP B-5771 COUNT	TY FORSYTH GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE NO	· · · · · · · · · · · · · · · · · · ·	<u> </u>
BORING NO. B2-A	STATION 17+88	OFFSET 10 ft LT ALIGNMENT -L- 0 HR. NM
COLLAR ELEV. 784.0 ft	TOTAL DEPTH 43.7 ft	NORTHING 890,903 EASTING 1,605,752 24 HR. 2.6
DRILL RIG/HAMMER EFF./DATE HFOO	0070 CME-550X 79% 05/23/2017	DRILL METHOD NW Casing W/SPT & Core HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 09/08/17	COMP. DATE 09/08/17 SURFACE WATER DEPTH N/A
CORE SIZE NX	TOTAL RUN 9.6 ft	
ELEV (ft) DEPTH RUN (ft) PRILL RATE (Min/ft)	RUN	L
749.9 34.1 4.6 1:27/1.0	(3.8) (1.6) (8.8) (6.5)	Begin Coring @ 34.1 ft Begin Coring @ 34.1 ft 749.9 GRAY AND WHITE, FRESH TO VERY SLIGHT WEATHERING, VERY 34.
745 745.3 38.7 1.30/1.0 1.24/1.0 1.29/1.6	83% 35% SS-2 92% 68%	HARD TO HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, GNEISS
5.0 1:37/1.0 1:40/1.0 1:42/1.0 1:39/1.0	100% 98%	GSI=80-85
740.3 + 43.7 1:40/1.0		Boring Terminated at Elevation 740.3 ft IN CRYSTALLINE ROCK (GNEISS)

											ORE L				T			
	45727					IP B-5			1		FORSYT				GEOLOGIST Stickney, J.			
				IDGE					STRE		OVER MU		KEEK		ALIONING L			D WTR (
	NG NO.					TATION			rı	\rightarrow	OFFSET		00		ALIGNMENT -L-		HR.	Cav
	AR ELE							36.8			NORTHING			D N	EASTING 1,605,775 W Casing W/SPT & Core		HR.	Automoti
	LER S			NIE H				% 05/23/ 09/13/		\neg	COMP. DA			וו ט	-		TPE	Automation
LEV (ft)		DEPTH		OW CO	UNT	0	25 	BLOWS		OOT	75 100	SAMP NO	MOI	L O G	SOIL AND ROCK I		TION	DEPTH
85	- - - -						ļ									IREACE		
30	780.7 - - - -	1.4	1	7	16		P 2	3					М		ALLUV _ _{779.7} TAN AND GRAY, CLA SOME GR	AL YEY SILT AVEL	Y SAN	D,
5	775.4 <u>-</u>	6.7	5	8	13		· · · · · ·						M		- RESIDU - BLACK, GRAY, AND - SANDY SILT, S	WHITE, O	CLAYE CA	Y
0	- - 770.4	11.7	45	40	50										- - - - 770.1			
	- - - 705 4 =	10.7	15	19	50					9		M		TAN AND ORANGE, CI SAND, SON - 765.4	AYEY SI E MICA	LTY F	NE
5	765.4 <u>-</u> - - -	16./	50	50/0.3						<u>'-</u>	. 100/0.8				WEATHERE GNEIS			
)	760.4	21.7	100/0.2	2							100/0.2				- - -			
5_	755.4 <u>-</u> - 755.4	26.7	60/0.1							: :	60/0.1				- - 755.4 754.9 CRYSTALLIN - (GNEIS			
0	- - -	<u> </u>													- \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	•		
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															CRYSTALLINE RC CRYSTALLINE RC			
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GEOTECHNICAL BORING REPORT

SHEET 11 OF 15

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WBS	45727	7.1.1			TIP	B-577	'1	С	OUNT	ΥF	ORSYTH	1		GEOLOGIST	Г Stickney	, J. K.		
SITE	DESCR	IPTION	I BRI	DGE NO	. 16 O	N SR	1611 (MA	AIN ST	REET	r) 0\	/ER MU	DY CREEK					GROUN	ID WTR (ft)
BOR	ING NO	. B2-B	3				17+98			OF	FSET 1	1 ft RT		ALIGNMENT	Г -L-		0 HR.	Caved
	LAR ELI						PTH 36.			NC		890,908		EASTING 1			24 HR.	NM
				TE HFOO					7			DRILL METHOD	NW					Automatic
	.LER S		. L.				TE 09/1			CC	MP. DAT	E 09/13/17		SURFACE W	VATER DEF	PTH N/	/A	
	E SIZE			DDILL	TOTA	AL RUI	N 9.6 ft		ATA	ļ.,								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC.	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	O G	ELEV. (ft	l .	D	ESCRIPTION A	ND REMARK	S		DEPTH (ft)
754.9	754.9	27.2	4.6	1:04/1.0	(4.6)	(2.3)		(9.5)	(4.8)		_ 754.9	GREY WHITE	- ANI	Begin Coring D PINK, VERY SI	@ 27.2 ft	IGHT W	FATHERIN	IG, 27.2
750	750.3	31.8		1:05/1.0 1:05/1.0 1:07/1.6	100%	50%		99%	50%		- -			RD, MODERATE SPACING,	ELY CLOSE 1			
	- -		5.0	1:08/1.0 1:32/1.0 1:34/1.0 1:34/1.0	(4.9) 98%	(2.5) 50%					- - -			GSI=7	70-75			
	745.3	36.8		1:14/1.0						M	745.3	Boring Terminat	od at	Elevation 745.2 f	# IN CDVCT/	VI I INE D	OCK (CNE	36.8



CORE PHOTOGRAPHS

B-5771

13

REPLACE BRIDGE NO. 16 ON SR 1611 (MAIN STREET) OVER MUDDY CREEK

B1-A BOX 1 OF 2 10.1 TO 19.8 FEET



FEET

B1-A BOX 2 OF 2



1 FEET

B1-B BOX 1 OF 2 7.8 TO 17.7 FEET





B1-B BOX 2 OF 2 17.7 TO 22.7 FEET





CORE PHOTOGRAPHS

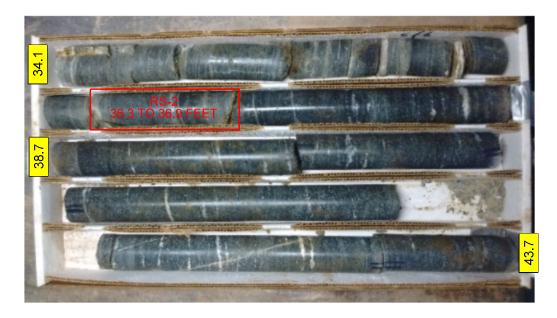
B-5771

PROJECT REFERENCE NO.

14

REPLACE BRIDGE NO. 16 ON SR 1611 (MAIN STREET) OVER MUDDY CREEK

B2-A BOX 1 OF 1 34.1 TO 43.7 FEET





B2-B BOX 1 OF 1 27.2 TO 36.8 FEET





SHEET 15 OF 15 M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT PHYSICAL TESTING LABORATORY

T. I. P. No. B-5771

REPORT ON SAMPLES OF ROCK COMPRESSION

Project	45727.1.1	County	Forsyth		Owner	K.B. Miller		
Date: Sampled	10/10/2017	Received	10/12/2017		Reported	10/27/2017		
Sampled from	Br# 16 Route 1611			Ву	K.B. Mille	B. Miller		
Submitted by	K.B. Miller					Standard Specifications		
Tested By	Michael Dubeau				Date Tested	10/27/2017		

TEST RESULTS

Proj. Sample No.		RS-1	RS-2		
Boring Sample No.		B1-B	B2-A		
Diameter	in	1.860	1.864		
Specimen Height	in	3.70	3.69		
Area	in ²	2.717	2.729		
H/D Ratio		1.99	1.98		
Weight	lbf	0.96	1.05		
Unit Weight	lbf/ft ³	165.0	180.2		
Ultimate	lbf	₩ 8500	39200		
Ultimate	ksi	3.130	14.360		
Ultimate Corrected	ksi	3.13	14.35		
Sec Mod @ 40%	Mpsi	23.6	5.14		
RS-1 # BRO	KE ALONG				
	CKIN				
Station Rock	CORE	17+28	17.88		
Offset		11 RT	10.4 LT		
Alignment					
Depth (ft)		14.40	36.30		
	to	14.80	36.90		

cc:

S.D. Freeman
Physical Testing Engineer

Page 1