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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY JOHNSTON

PROJECT DESCRIPTION BRIDGE NO. 50 ON -L-(NC 210) OVER MIDDLE CREEK AT STA. 20+95

7026 0 PROJEC

STATE PROJECT REFERENCE NO. STATE SHEETS 13 N.C **BR-0026** 1

CAUTION NOTICE

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

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTURE CONDITIONS MAY YARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OF CONTRACTOR IS CALIFORMUM AND MIDIL AS DUFILE AS OFMICH NOW CLIMATING CLIMATING AND IN MANY CASES THE FINAL DESIGN IDETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN INFORMATION ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONJITIONS 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 ACUAL ENDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES: I. 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 HAIVING 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

A .	N. JONES	

D. G. PINTER

R. E. SMITH

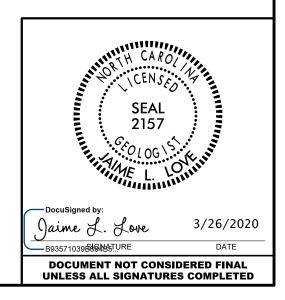
INVESTIGATED BY J. L. LOVE

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CHECKED BY <u>N. T. ROBERSON</u>

SUBMITTED BY <u>N. T. ROBERSON</u>

DATE _____ DECEMBER 2019



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

	CRADATION		
		ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	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.	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	50///650///6	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.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING 200) (> 35% PASSING 200) UNDHILL MHTERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) 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 CLASS A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5		NON CONCTANTING FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLH33. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7.6 H-3 H-6, H-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) STALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COCCOCCOCC	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 SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SANDSTONE, CEMENTED SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX *40 30 MX 50 MX 51 MN GRANULAR CLAY PEAT	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PASSING =40	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (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
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF ORGANI	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI,) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	▼STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN BATING	\bigtriangledown PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD,) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAE	LE	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	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	- O-MA- Spring or seep	WITH FRESH RUCK. 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.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED		(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 CONSISTENCY (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 29/023 DIP & DIP DIRECTION WITH 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.
		(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.
GRANIU AR LOOSE 4 TO 10	SOIL SYMBOL SUIL SYMBOL SUDPE INDICATOR	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT OF AUGER BORING ON TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NDN-COHESIVE) VERY DENSE > 50		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	INFERRED SOIL BOUNDARY - CORE BORING • SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0		COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2		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 ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTTT ALLUVIAL SOIL BOUNDARY A PIEZUMEIER - SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
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	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	I XX UNDERCOT I I UNSUITABLE WASTE IX™ ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. 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
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY (BLDR,) (COB.) (GR.) (SAND (SL.) (CL.)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE, SD.) (F SD.) (CEL)		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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
	- CL CLAY MOD MODERATELY γ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC γ_{d} - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	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 SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	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.
	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE < - WET - (W) SEMISULIDI: REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: BL-104, REBAR WITH CAP, AT -L- STA. 20+21, OFFSET=17'LT
	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: 126.01 FEET
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:
	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 G: CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	□ Image: Signature of the signate of the signature of the signature of the signature	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS X - N WL2	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	X TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST	GENILE BLOW BY HAMMER DISINIEGRATES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR		CRAINS ARE DISCIPLET TO SERADATE WITH STEEL PROPE.	
		INDURATED 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.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
HOUSE LENG GOOD HIS ELOND, DRIVE, STREAKED, ETC, BILE GOED TO DESURDE HI FEHRHINGE,		EXTREMELY INDUKATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

project reference no.



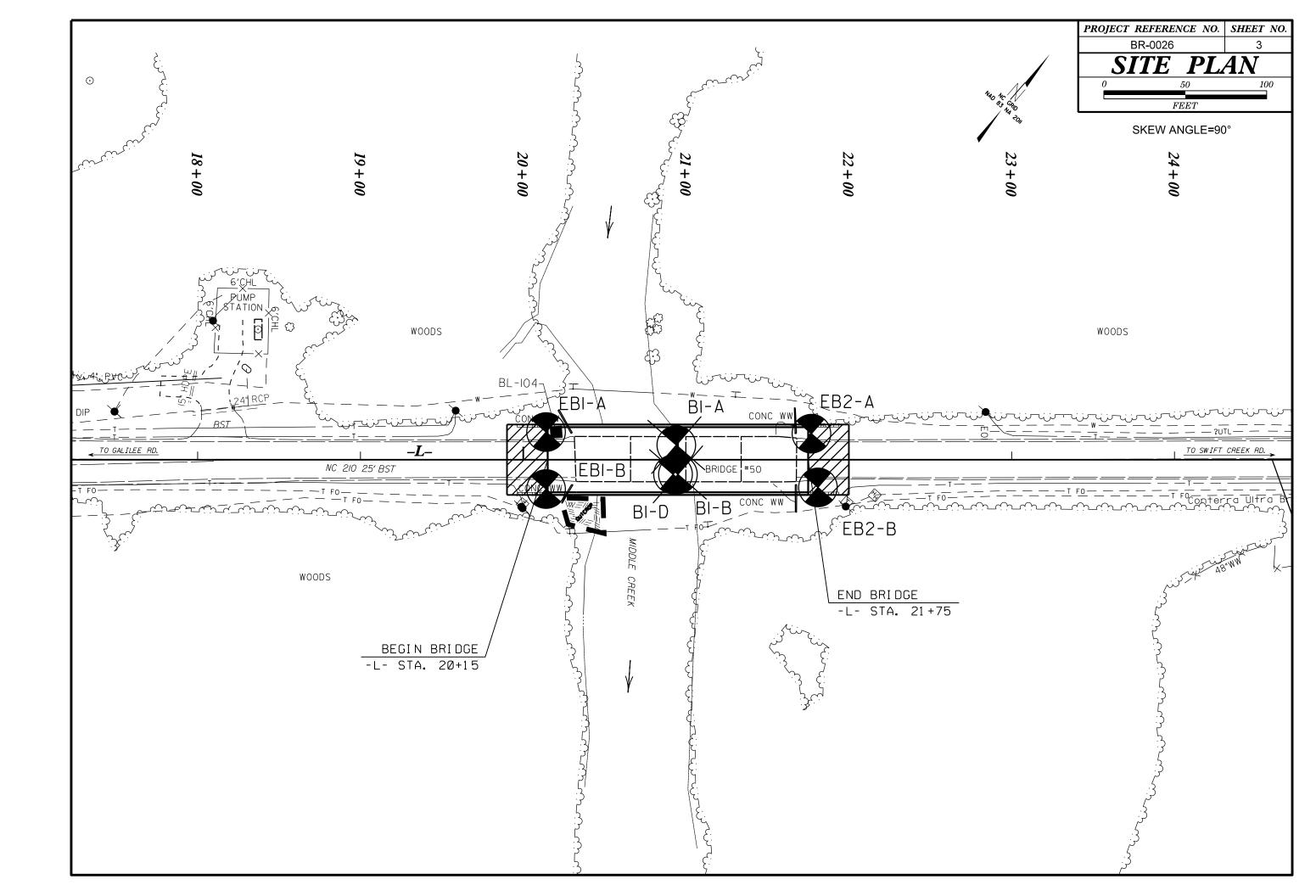
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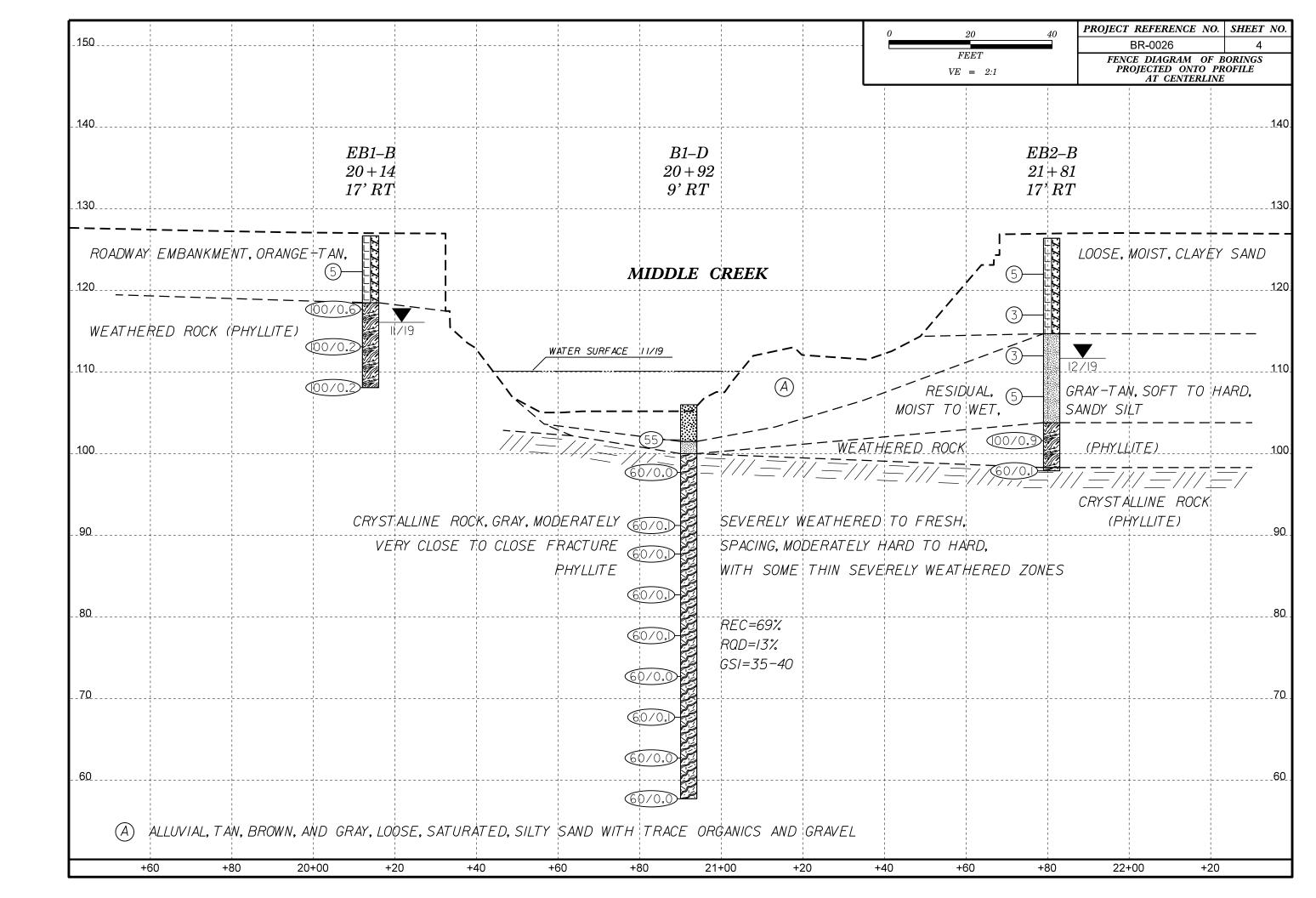
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

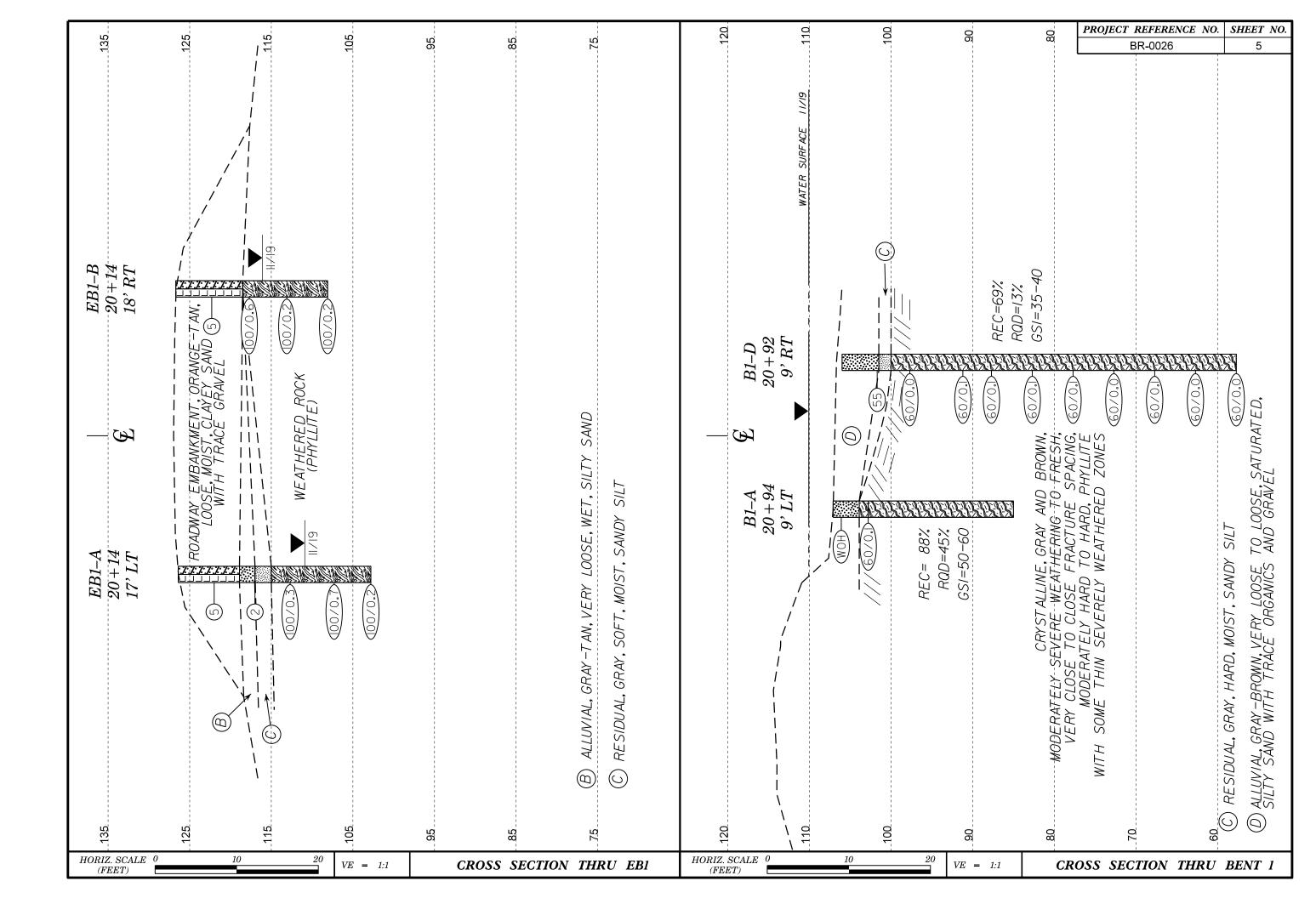
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

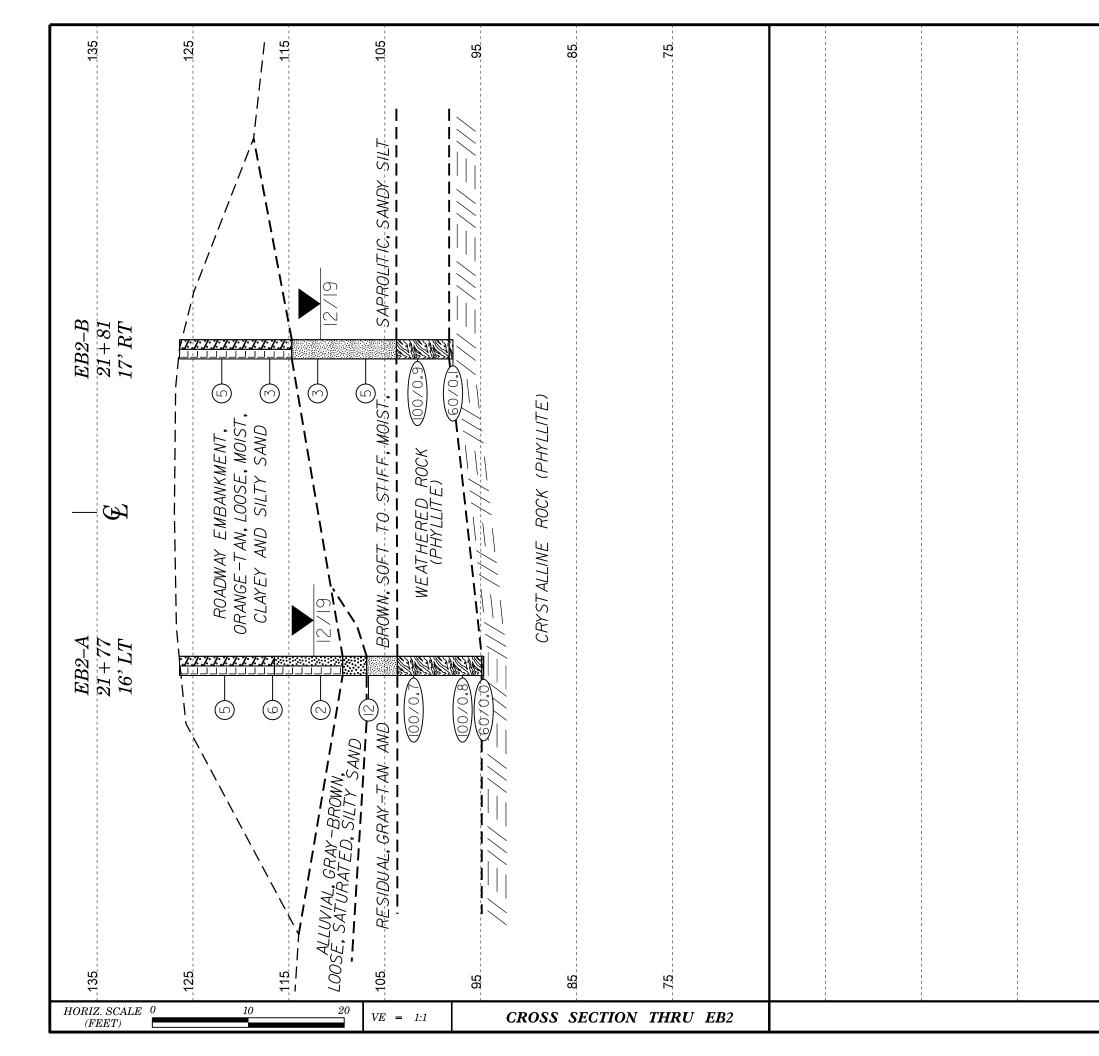
AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed F	Rock Mass (Marı	nos and Hoek,2	:000)			AASHTO LRFD Figure 10.4.6.4–2 — Determination of GSI for T
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed F GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 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.	GOOD rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	ch, moderately weathered and ed surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for T 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 fai poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by
STRUCTURE	V KERY Very DEC		LE ALR B D S D F J C D F J C L C L C L C L C L C L C L C L C L C		~	using effective stress analysis.
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.
disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 60				B. Sand- stone with stone and or silty shale
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		5	0			thun inter- layers of siltstone siltstone with sand- stone layers amounts
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40	30		C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.
discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces				20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10	Sandstone are trad into small rock pu → Means deformation after tectonic disturbance

		PROJECT REF	ERENCE NO.		SHEET NO.
		BR–O	026		2A
Tectonically Deforme	ed Heteroc	geneous Rock	Masses (Marır	nos and Hoek	, 2000)
The dominantly bedding planes) و ه SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
70	60	A			
E. Weak siltstone or clayey shale with sandstone layers		50 B 40	СС	D E	
eformed, drfaulted, bale or sultstone deformed formung an tructure			30	F 20	
aformed silty forming a with pockets ers of ansformed neces.			¢		+ ¹⁰





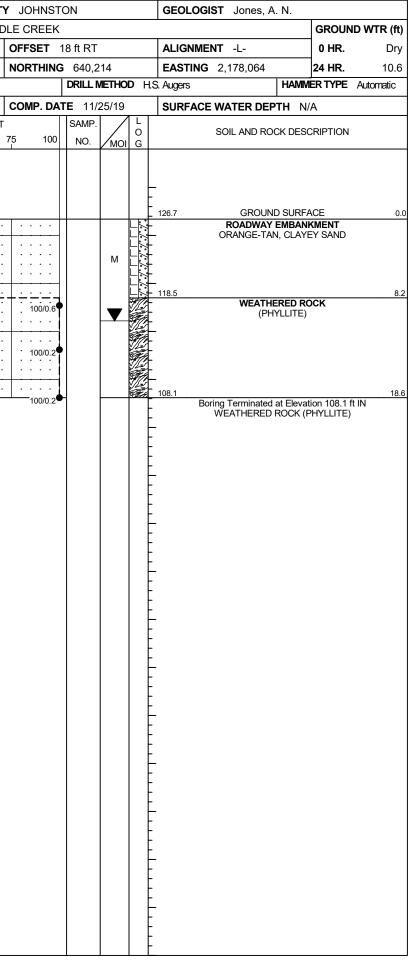




	PROJECT	REFERENCE 1	V <i>O</i> .	SHEET	<i>NO</i> .
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			1		
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	-L- (NC 210) OVER MIDD DN 20+14	LE CREEK	GEOLOGIST Jones, A. N.	ROUND WTR (ft)			TIP BR-0026 COUNTY 50 ON -L- (NC 210) OVER MIDD
BORING NO.EB1-ASTATIONCOLLAR ELEV.126.4 ftTOTAL	ON 20+14		GR	ROUND WTR (ft)		RIDGE NO. 5	50 ON -L- (NC 210) OVER MIDD
COLLAR ELEV. 126.4 ft TOTAL		OFFORT AT ALT					. ,
		OFFSET 17 ft LT	ALIGNMENT -L- 0	HR. 17.8	BORING NO. EB1-B	5	STATION 20+14
DRILL RIG/HAMMER EFF./DATE RF00074 CME-5	DEPTH 23.6 ft		EASTING 2,178,041 24		COLLAR ELEV. 126.7 f		TOTAL DEPTH 18.6 ft
	-55 80% 03/08/2019	DRILL METHOD H.S	Augers HAMMER T	TYPE Automatic	DRILL RIG/HAMMER EFF./D.	ATE RFO007	74 CME-55 80% 03/08/2019
DRILLER Pinter, D. G. START	DATE 11/25/19	COMP. DATE 11/25/19	SURFACE WATER DEPTH N/A		DRILLER Pinter, D. G.	ę	START DATE 11/25/19
ELEV DRIVE DEPTH BLOW COUNT	BLOWS PER FOOT	SAMP.	SOIL AND ROCK DESCRIP	PTION		OW COUNT	BLOWS PER FOOT
(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0	25 50		ELEV. (ft)	DEPTH (ft)	(ft) ELEV (ft) 0.5ft	ft 0.5ft 0.5ft	t 0 25 50 7
130					130		
			126.4 GROUND SURFACE ROADWAY EMBANKME			+	
	····		ORANGE-TAN, CLAYEY SANI				
	· · · · · · · · · · · · · · · · · ·		TRACE GRAVEL			2 3	$- \left \begin{array}{c} 1 \\ \bullet \\$
120					120		
			118.9 ALLUVIAL	7.5			
\downarrow WOH WOH 2 \downarrow 2	· · · · · · · · · · · · ·	W	117.0 GRAY-TAN, SILTY SAN	ID 9.4		50/0.1	
	· · · · · · · · · · · ·		115.0 RESIDUAL GRAY, SANDY SILT	11.4	115 +		
	· · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	WEATHERED ROCK (PHYLLITE)		113.3 + 13.4	0.2	
	· · · · · · · · · · · ·		(,				
		· · · · · ·					
	· · · · · · · · · · · ·	· 100/0.7			100/0	.2	
105	· · · · · · · · · · · ·	· 100/0.7					
103.0 23.4	· · · · · · · · · · · · · · · · · ·		102.8	23.6			
		100/0.2	Boring Terminated at Elevation 1 WEATHERED ROCK (PHYL				
			, , , , , , , , , , , , , , , , , , ,	,			
, <u>+</u>							
, <u>+</u>							

SHEET 7



														RE																		
		026.1						BR-0						JOHNS					0	GEOLOGIST Jones, A. N.	[6702					BR-0		C	
				BRI	DGE						OVE	R MID	_	CREE													IDGE NC) OVE	2
		NO. I						TION					-	FSET					_	ALIGNMENT -L-		N/A		ING NO						20+94		
		ELEV.								1 22.7				ORTHIN						EASTING 2,178,107		N/A								PTH 22		
										03/08/2										3	MER TYPE Automa	liC					TE RFO	-				
		Pinte					STA	rt da		11/26				OMP. D			_	1	[\$	SURFACE WATER DEPTH 3	.3ft			LER F						TE 11/2		
ELEV (ft)		EV ^{de}	EPTH (ft)		OW CO	_	+ 0)	25		S PE 50	R FOO	T 75	100	SAM		'/	Ō		SOIL AND ROCK DES					1	-		RI		N 17.8	ft T STI	57
()	(f	:)	()	0.511	0.51	0.0		,					10	100	NO	· /	/ MO	I G	EL	EV. (ft)	DEPT	Ή (ft)	ELEV (ft)	RUN ELEV	DEPTH (ft)	I RUN (ft)	DRILL RATE	REC. (ft)	RQD (ft)	SAMP. NO.	STI REC. (ft) %	Ť
																	•			WATER SURFACE (11/26/19)			(ft)	()	()	(Min/ft)	%	<u>%</u>		<u>%</u>	╀
110		<u> </u>														F	•		È			··	102.8	102.8	4.3	2.8	0:55/0.8	(2.7)	(1.1)		(15.7	$^{+}$
	10	<u>, 1</u>	0.0								· .								10	7.1 GROUND SURF		0.0	100	100.0	7.1	5.0	1:22/1.0				88%	
105		Ŧ		WOH	WOH		" ♠	0	•		•		•				Sat.		Ł	ALLUVIAL BROWN-GRAY, SIL					‡	5.0	1:16/1.0					
	10	2.9 ± .	4.2					<u>ا</u>	-+	·· ·	<u>+</u> +	<u></u>	-+-	<u> </u>					10 10	3.9 2.8 CRYSTALLINE I	ROCK	3.2 4.3			±		1:16/1.0 1:15/1.0					
		+		60/0.1				· · ·				· · ·	•	60/0.1	T					(PHYLLITE GRAY AND BROWN, M			95	95.0	12.1	5.0	1:05/1.0 1:11/1.0	(5.0)	(3.0)			
100	-	Ŧ									-							P	F	SEVERE WEATHERING TO	D FRESH, VERY				ŧ		1:41/1.0	100%	60%			
		Ŧ							•		•		•						F	CLOSE TO CLOSE FRACT MODERATELY HARD TO H	URE SPACING, IARD, PHYLLITE		90	90.0	17.1		1:32/1.0 1:20/1.0			RS-1	-	
95		Ŧ						· · · · · ·		· · · · · ·		· · ·		· · · · ·					F	REC= 88% RQD=45%	GSI=50-60				Ŧ	5.0	1:13/1.0	(3.0) 60%	(0.0) 0%		-1	
	1	Ŧ													11				F						£	1	2:06/1.0 2:34/1.0					
		‡						· · · · · ·	•	· · · · · ·		· · ·		· · · · · · · ·									85	85.0	22.1		3:07/1.0					╀
90		+						· · ·				· · ·		· · · ·	RS-	1			1						Ŧ							
		ŧ						· · · · · ·	•	· · · · · ·		· · ·		 					1						Ŧ							
85		ŧ						· · · · · ·		· · · · · ·		· · · · · ·		· · · · ·				P	85	0		22.1		-	Ŧ							
		+														╈			-	Boring Terminated at Elev CRYSTALLINE ROCK	ation 85.0 ft IN				Ŧ							
		Ŧ																	F		(111122112)			-	Ŧ							
		‡																	F						Ŧ							
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		‡																	È.			DOT.GDT			ŧ							
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		Ŧ																	F			GEO BRDG			ŧ							
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		‡				1													F			NCDOT CORE DOUBLE			Ŧ	1						
		‡																	ŧ			O T C		-	Ŧ							
		+																	E			NCD			<u>‡</u>							

GEOTECHNICAL BORING REPORT

	C	OUNT	ΥJ	JOHNSTON	GEOLOGIST	Jones, A. N.		
0)				CREEK			GROUND W	R (ft)
4	0.12.1		-	FSET 9 ft LT	ALIGNMENT	-l -	0 HR.	N/A
	4.64						_	
	.1 ft			DRTHING 640,286	EASTING 2		24 HR. MER TYPE Auto	N/A
	2019				D NW Casing w/ Core			THALIC
1/2	6/19		CO	DMP. DATE 11/26/19	SURFACE W	ATER DEPTH 3	.3ft	
8 f	_			1				
P.	STR REC.	RQD	L O		DESCRIPTION AN	ID REMARKS		
	REC. (ft) %	(ft) %	Ğ	ELEV. (ft)			DE	EPTH (ft
					Begin Coring	@ 4.3 ft		
	(15.7) 88%	(8.0) 45%			OWN, MODERATELY S TO CLOSE FRACTUR			4.3
			S.		to hard, f	PHYLLITE		
					GSI=5	0-60		
			P					
1			لتطبخ					
				-				
				85.0 Boring Torminat	ted at Elevation 85.0 ft I			22.1
							OCK (FITTLETL)	
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								B	ORE L	UG											-				<u> </u>
	67026					P BR-002			Y JOHNST				GEOLOGIST Jones, A. N.	1			67026					BR-00			OUNT
SITE	DESCR	IPTION	I BRI	DGE	VO. 50) ON -L- (N	C 210) OVE	ER MIDD	LE CREEK				1) [SITE D	DESCR	IPTION	I BRI	DGE NC). 50 O	N -L- (NC 210)	OVER	
BOR	ING NO.	B1-B			S	TATION 2	0+95		OFFSET	9 ft RT			ALIGNMENT -L-	0 HR. N/		BORIN	ig no.	B1-B	1		STA	ΓΙΟΝ	20+95		
	LAR ELE					OTAL DEPT			NORTHING				EASTING 2,178,119	24 HR. N/				EV. 10					PTH 46		
DRILI	_ RIG/HAI	MMER E	FF./DA	TE RE		CME-55 80%				DRILLI	METHO	DD N	N Casing w/ Core HAMIV	IER TYPE Automatic		DRILL F	rig/hai	MMER E	FF./DA	TE RFO	0074 CN	1E-55 8	0% 03/08/	2019	
DRIL	LER P								COMP. DA	-		7	SURFACE WATER DEPTH 3.	.1ft				inter, D					TE 11/2		
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	BLC	W COU 0.5ft		0 2	BLOWS Pl		75 100	SAMP.	17		SOIL AND ROCK DES					NWL2	1			AL RUI Jn	N 37.6 f	_	RATA
()	(ft)	(,	0.51	0.511	0.511				10 100	NO.	ИМО	I G	ELEV. (ft)	DEPTH	-4 14	LEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE		RQD (ft)	SAMP. NO.		RQD (ft) %
110																	(π)		. ,	(Min/ft)	%	%		%	%
110	-	ł											WATER SURFACE (1	11/27/19)	- -	97.7	97.7	9.0	2.8	1:20/0.8 1:22/1.0	(2.3)	(0.7)			(5.0)
	- 106.7 -	0.0					, ,						106.7 GROUND SURF	ACE	.0	95	94.9 _	11.8	5.0	1:59/1.0 1:29/1.0				69%	13%
105		+	1	1	3	• 4 · · ·		· · · ·	· · · · ·		Sat.		- ALLUVIAL - GRAY-BROWN, SILTY SAN				-		0.0	1:00/1.0	60%	16%			
	102.8	3.9	6	24	76/0.4						Sat.		ORGANICS AND G		4	90	89.9	- 16.8		1:18/1.0					
100	-	ŧ		24	70/0.4		<u> </u>	· · · ·	• 100/0.9				WEATHERED RO (PHYLLITE)		7 [5.0	1:12/1.0	(3.4)	(1.0) 20%			
	97.8 -	8.9											98.2		.5		-			1:22/1.0 2:08/1.0					
		0.9	60/0.1						. 60/0.1	2		R	CRYSTALLINE R (PHYLLITE)			85	84.9	21.8	5.0	2:40/1.0 1:01/1.0	(4.0)	(0.6)			
95	-	E											GRAY, MODERATELY WEATHERING TO FRESH,				-	-		1:07/1.0 1:09/1.0		12%			
	-	ł											TO CLOSE FRACTURE			80	79.9 _	26.8	10	4:10/1.0					
90		ŧ.										R	WITH SOME THIN SE WEATHERED ZC	EVERELY			-	-	4.8	0:53/0.8 1:45/1.0 4:45/1.0	(1.6) 33%	0%			
	-	ł						· · · ·				R	REC=69% RQD=13%			75	- 75.1	- 31.6		2:37/1.0					
85	-	ł					· · · · ·	· · · · ·									-	-	5.0	0:56/1.0	(1.7)	(0.0) 0%			
00	_	+											-				-			1:21/1.0 1:29/1.0					
	-	ŧ					· · · · ·	· · · · · · · ·								70	70.1	36.6	5.0	1:26/1.0 1:18/1.0	(5.0)	(0.6)			
80		ŧ											_				-			1:22/1.0 1:37/1.0	100%	12%			
	-	ŧ						· · · · ·								65	65.1	41.6		1:48/1.0 2:34/1.0					
75	-	Ŧ						· · · · ·									-		5.0	1:18/1.0 1:15/1.0	100%	(1.3) 26%			
	-	F											-				-	40.0		1:33/1.0					
	-	E															60.1	46.6		1:28/1.0					
70	_	E											- 				-	-							
	-	ŧ															-	-							
65		÷											_				-	-							
	-	ŧ					· · · · ·	· · · · ·									-	-							
	-	ŧ					· · · · ·	· · · · ·					60.1	4	6		-	-							
07/01	-	-					1 1						Boring Terminated at Eleva CRYSTALLINE ROCK (ation 60.1 ft IN	1/6/20		-	E							
	-	ŧ													GDT 1		_	-							
	_	ŧ											_		DOT.G		-								
	-	E													NC N		-	-							
	-	L.											_		BH.GPJ		-	-							
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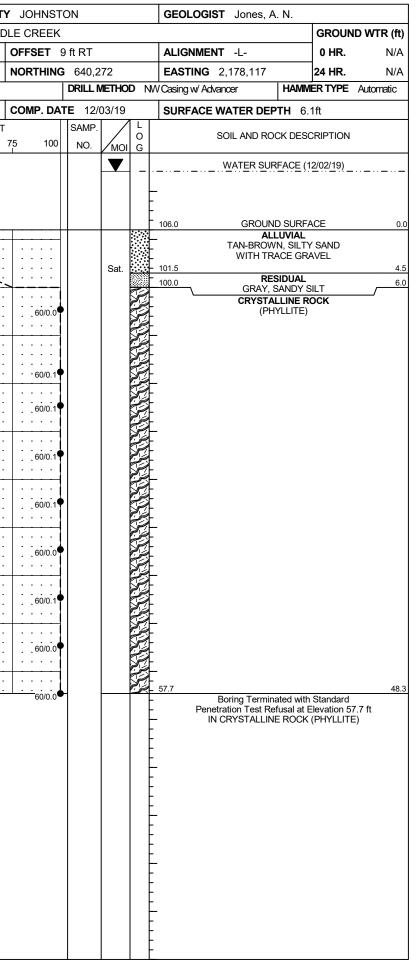
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GEOTECHNICAL BORING REPORT CORE LOG

				KE L			1				
				IOHNST			GEOLOGIST	Jones, A	A. N.		
) 0	VER	RMIDE	i	CREEK							ID WTR (ft)
			OF	FSET 9	9 ft RT		ALIGNMENT			0 HR.	N/A
6.6	ft		NO	RTHING	640,273		EASTING 2,	178,119		24 HR.	N/A
3/20)19				DRILL METHOD	NM	/ Casing w/ Core		HAMM	ER TYPE	Automatic
27	/19		co	MP. DA	TE 12/02/19		SURFACE WA	ATER DEF	PTH 3.	1ft	
ft											
┢	STR REC.	RQD	L			С	ESCRIPTION AN		S		
\downarrow	(ft) %	(ft) %	Ğ	ELEV. (f	ft)						DEPTH (ft)
		(5.0)	Company in the second se		GRAY, MODERAT		Begin Coring	@ 9.0 ft			
	26.0) 69%	(5.0) 13%		97.7			FURE SPACING, N	NODERATE			
				F	WITH S	SON	PHYLL IE THIN SEVEREL		ERED ZO	NES	
							GSI=35	-40			
				L 							
				4							
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┢). D	60.1	Boring Terminated	at I	Elevation 60.1 ft IN	I CRYSTAL	LINE RO	CK (PHYLI	46.6 LITE)
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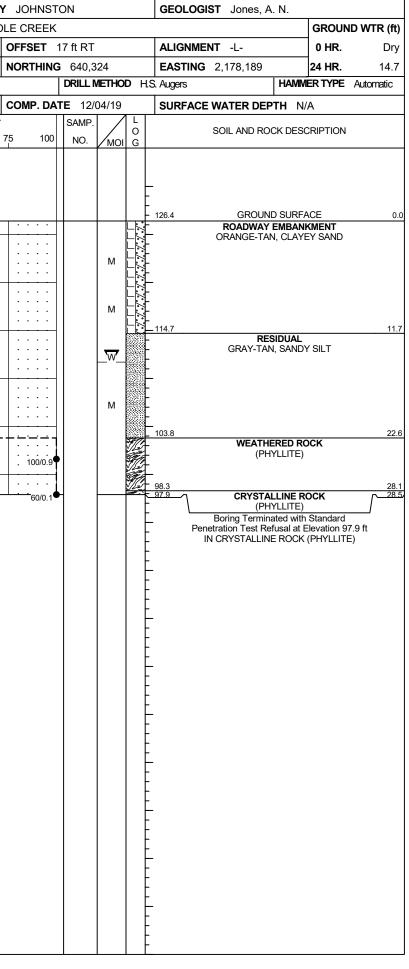
	67026						В								NT
SITE	DESCR		I BRI	DGE	10.5	0	ON	-L-	(N0	22	0) (ΟV	ER	MI	DD
BOR	ing no.	B1-D)		S	Τ.	ΑΤΙΟ	DN	20)+9	2				
							TAL								
DRILL	RIG/HA	MMER E	FF./DA	TE R	-0007	40	CME-	55	80%	6 03	/08/2	019	9		
DRIL	LER P	inter, D	. G.		s	τ.	ART	D/	١ΤE	: 1	2/02	2/1	9		
ELEV	DRIVE ELEV	DEPTH	BLC	w co	JNT						OW	SF	PER	FO	ОТ
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	+	0		2	25		5	50		
110		l-													
	-	ŧ													
105	-	†				+									
		ŧ								\					
	102.7 -	<u>- 3.3</u>	4	17	38			 	•			÷	\downarrow	55	· ·
100	-	ŧ					Ľ.	•••		:	•••	•	ļ-	~	\leq
	- 97.7 -	8.3						 	:	:	· · · ·	:	:	:	· ·
95	-	ŧ	60/0.0					· ·			· · · ·	:	:	:	· ·
90	-	ŧ					<u> </u> .			-			.		
	- 91.2	14.8					:	· ·	:		· · · ·	:	:	:	
90		- 14.0 -	60/0.1				·	•••	·	•	•••	:	·	÷	• •
	- 87.7 -	- 18.3					:	: :	:	:	· ·	:	:	:	· ·
05	-	ŧ	60/0.1					· ·	:		· ·	:	:	:	· ·
85	-	÷					-			-			.	:	
	82.7 -	23.3	60/0.1				·	· ·	:		· ·	:	·	:	· ·
80	-	ŧ						• •	·	·	•••	·	·	·	• •
	- 77.7 -	- 28.3					:	· ·	:	·	•••	:	:	÷	· ·
	-		60/0.1				:		:		· ·	:	:	:	· ·
75	-	F					<u> </u>			-			+ -		
	72.7 -	- 33.3	60/0.0				·	· ·	•	·	· ·	•	·	:	
70	-	Ł						• •	•	•	•••	·		·	•••
	67.7 -	38.3					<u>.</u>	· ·	:	·	· ·	:	<u>.</u>	·	· ·
	-		60/0.1				·	· ·	•		· ·	•	·	:	· ·
65	-	F					<u> </u>			-			+ -		
	62.7 -	43.3	60/0.0					 	•	:	· ·	:	:		· ·
60	-	ŧ					ŀ		•	•	• •	·	·	·	• •
	57.7 -	- 48.3					<u>.</u>	· ·	:	·	· ·	:	<u>.</u>	·	
	-	10.0	60/0.0												
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SHEET 10



										SORE LOG					1												
WBS 67026.1.1						IP BR-				NTY JOHNSTON				GEOL	GEOLOGIST Jones, A. N.			WBS 67026.1.1						TIP BR-0026 COUNTY			
SITE DESCRIPTION BRIDGE NO					NO. 50	0 ON -L	- (NC	; 210) O	VER MID						GROUND WTR ((ft)	·						, ,			
BORING NO. EB2-A					S	TATION	N 21	+77		OFFSET 16 ft LT				ALIG	ALIGNMENT -L- 0 HR. 14			5 BORING NO. EB2-B						STATION 21+81			
COLLAR ELEV. 126.4 ft					Т	OTAL D	DEPTH	H 31.7	ft	NORTHING 640,346				EAST	EASTING 2,178,165 24 HR. 14.0			COLLAR ELEV. 126.4 ft					т	TOTAL DEPTH 28.5 ft			
DRILL RIG/HAMMER EFF./DATE RFC					F00074					DRILL METHOD Ha			OD H	I.S. Augers	S. Augers HAMMER TYPE		с	DRILL RIG/HAMMER EFF./DATE RFG					FO0074	CME-55	30% 03/08	/2019	
DRIL	DRILLER Pinter, D. G.					START DATE 12/03/19				COMP. DATE 12/04/19)	SURF	ACE WATER DEPTH N	N/A		DRILLER Pinter, D. G.							ATE 12/0)4/19	c
ELEV	DRIVE		1	ow co					PER FOO				/ L				_	ELEV	DRIVE			ow co				NS PER	
(ft)	ELEV (ft)	(ft)	' 		0.5ft	0	25	5	50	75 10			O DI G	ELEV. (ft	SOIL AND ROCK DES	CRIPTION DEPTH	⊣ (ft)	(ft)	ELEV (ft)	(ft)	·	0.5ft		0	25	50	75
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125		}	-			<u> ·</u>	• •	• • • •		• • • • •				- 126.4	GROUND SURFA		0.0	125	-	-	-			1	• • • •	••••••	•••
		‡												l- -	ORANGE-TAN, CLAYE	EY SAND		120	400.0	-						.	
	122.7	<u>+ 3.7</u> +	2	2	3		· · ·			· · · · ·		М							123.0	3.4	3	3	2	●5· ·	· · · ·		· · ·
120		1				▼ ³ .												120	-	L						.	
	117.7	+ 8.7				i ·								-					118.0	8.4				;		.	
		+ 0.7	2	2	4							M		- 116.5			9.9		-	-	3	2	1	•3 · ·		.	
115		‡					• •				· _			È.	BROWN-ORANGE, SIL WITH TRACE GR/	.TY SAND AVEL		115	-	-						· · ·	
	112.7	+ 13.7				<u> </u> :::				· · · · ·				-					113.0	13.4						.	· · ·
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110		+				$\begin{vmatrix} \uparrow \\ \downarrow \\$								109.4			17.0	110	_	-				<u> </u>			
	107.7	18.7				1.1						Sat.		106.9	ALLUVIAL GRAY-BROWN, SILT	Y SAND	19.5		108.0	18.4	1	3	2	 			
105		‡	2	7	5	:•	12			· · · · ·		М		- 100.9	RESIDUAL	1	19.5	105	-	-	'	Ŭ		•5· ·			· · ·
105		‡					Υ <u></u>		<u> </u>		_			103.7	BROWN, SAPROL SANDY SILT		22.7	105	_	-						<u> </u>	
	102.7	23.7	32	68/0.2	,			<u> </u>			11				WEATHERED RO (PHYLLITE)	DCK			103.0	23.4	13	28	72/0.4				
100		Ŧ		00,0.2						1 100/0	7		10		(PHILLITE)			100	-	F							
		Ŧ												F					 98.0	28.4							
	97.7	+ 28.7	27	73/0.3	5														98.0	- 28.4	60/0.1					•• • •	• • • · · ·
95	94 7	$\frac{1}{317}$												94.9			31.5 31.7		-	L							
		+	60/0.0							60/0	0			94.7/	CRYSTALLINE R (PHYLLITE)	оск Г	31.7/		-	-							
		Ŧ												F	Boring Terminated with				-	F							
		‡												F	Penetration Test Refusal at E ON CRYSTALLINE ROCK				-	1							
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SHEET 11



CORE PHOTOGRAPHS

B1-A BOXES 1 & 2: 4.3 - 22.1 FEET







SHEET 12 (BR-0026)



SITE PHOTOGRAPH

Bridge No. 50 on –L– (NC 210) over Middle Creek



SHEET 13 BR-0026 Johnston Co.