5910 Ö REFERENCE

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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY JACK	SON						_
PROJECT DESC	RIPTION	REPLACE	BRIDGE	#32	ON	NC	116
OVER SAVA	NNAH_	CREEK					_
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SITE DESCRIPTI	ON						_
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5910	1	21

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.

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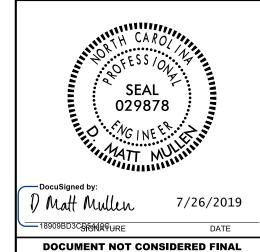
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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.

	C.D. JOHNSON
	D.O. CHEEK
	C.J. COFFEY
INVESTIGAT	ED BY
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	BY JCK
DATE 7/2	23/2019



UNLESS ALL SIGNATURES COMPLETED

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	<u>WELL GRADED</u> - 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 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 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.	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 >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CONTROL OF THE PROPERTY	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED. FINE TO COARSE GRAIN IGNEOUS 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.	UNEISS, CHEBRO, SCHIST, ETC.	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-7-5 A-7-6 A-7	COMPRESSIBILITY	BOOK (NICE) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY MUCK, ** *40 30 MX 50 MX 51 MN SOILS 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 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
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.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE 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 LITTLE UK 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 SOLIS	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.) 1 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	lacktriangle Static water level after 24 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 PATING	<u> </u>	(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 POOR UNSUITABLE	SPRING OR SEEP	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 UU = STANG ON SEET	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 (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	FIELD. <u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT ²)	₩ITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL SOIL SYMBOL SPT DMT TEST BORING INSTALLATION SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LOUSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A	Min	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
DENSE 30 TO 50	THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. 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	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	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MW C TEST BODING	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 MONITORING 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	→ PIEZOMETER OF 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	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	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	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
COARSE FINE	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BUOLDER CUBBLE GRAVEL SAND SAND SILI CLAY		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, SDI) (F SDI)	ABBREVIATIONS	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 0.005 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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 2 - 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
SOLI MOISTURE SCALE FIELD MOISTURE	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\sf d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	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 (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
(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	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BM-3
" " PL L PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 2036.23' FEET
SL _ SHRINKAGE LIMIT	X CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	C. CONTINUOUS ELICHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	
ATTAIN OPTIMUM MOISTURE	CME-55 CORE 512E:	THINLY LAMINATED < 0.008 FEET INDURATION	-
PLASTICITY		INDUKATIUN FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1
PLASTICITY INDEX (PI) DRY STRENGTH	L CME-550 HARD FACED FINGER BITS X -N XWL	DIRDING WITH FINGED EDEES NUMEDOUS COAINS.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST UNGCARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	X CASING X W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE	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).	CORE BIT VANE SHEAR TEST	CHARD HAMMED DI CHE DECITION TO DOEAN CAMDIE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHAMP HAMMER BLOWS REGULARD TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-
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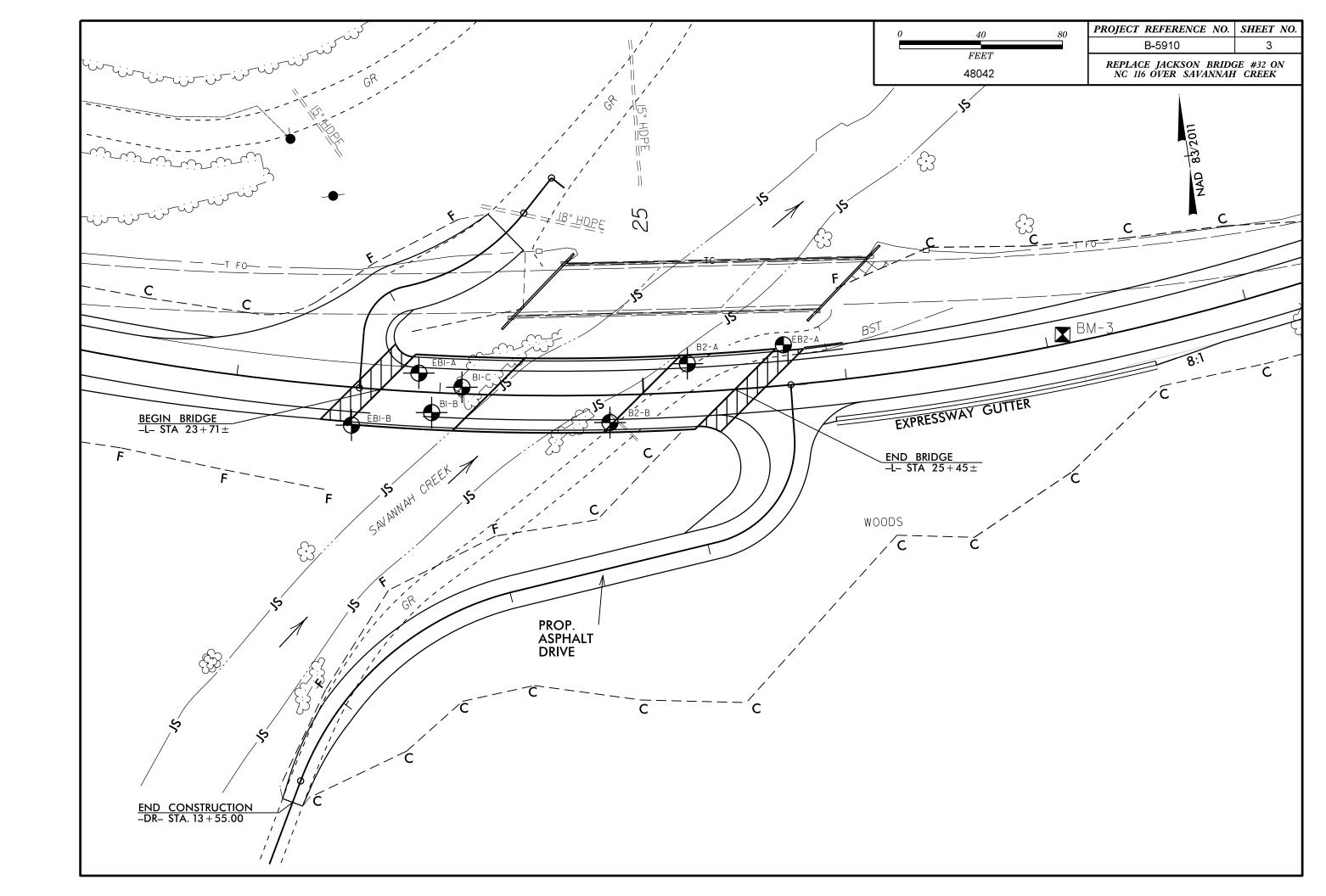
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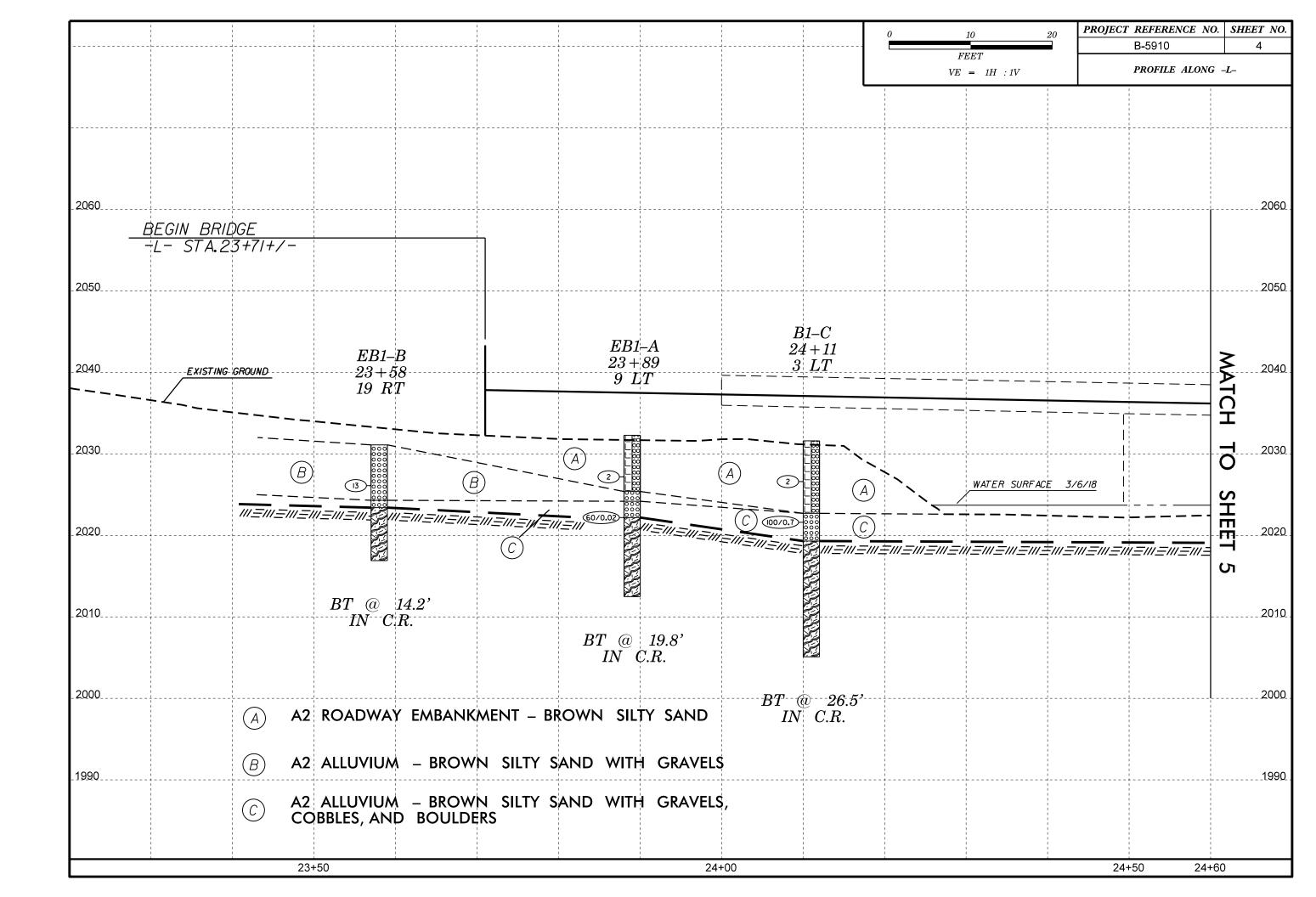
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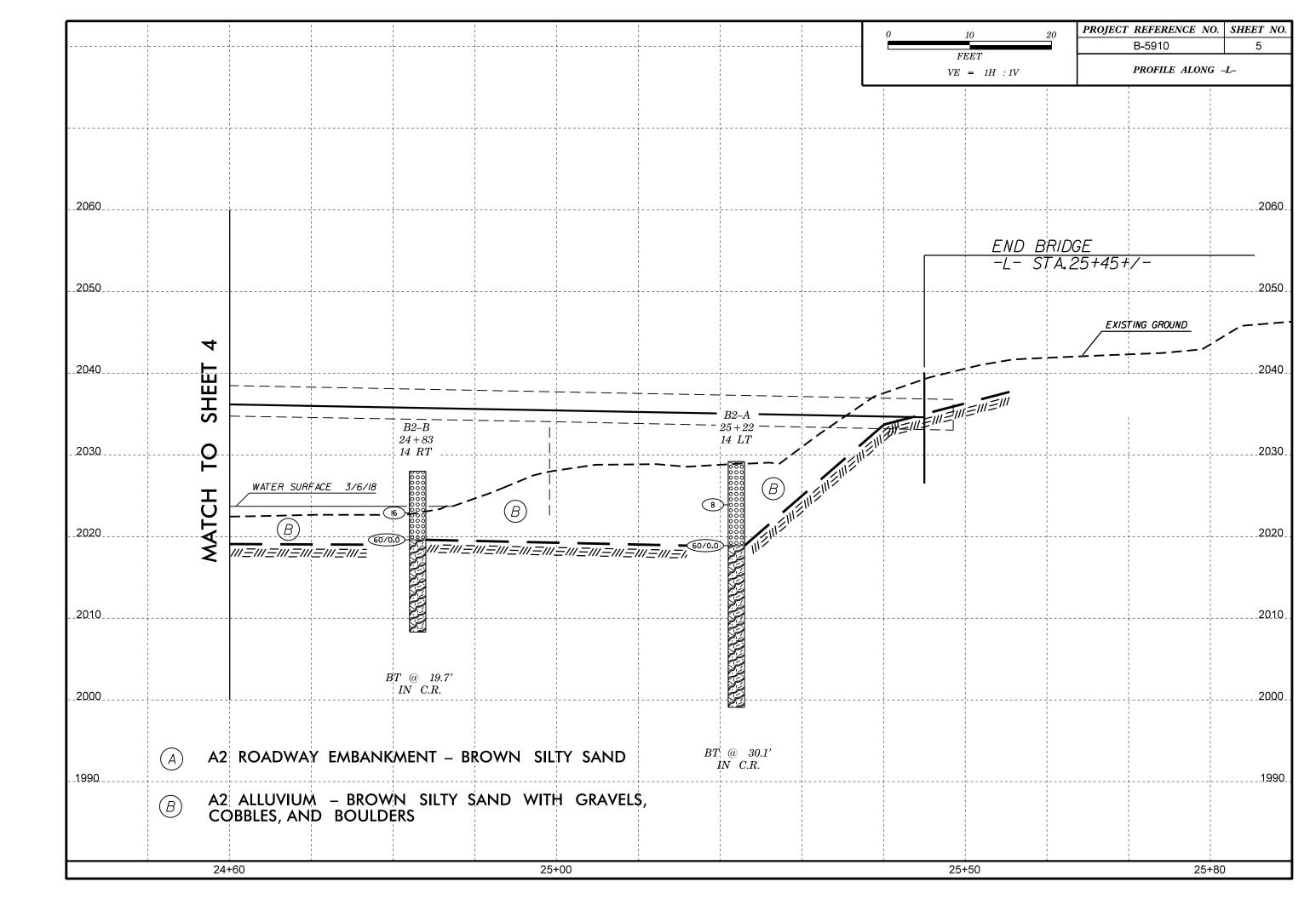
SUBSURFACE INVESTIGATION

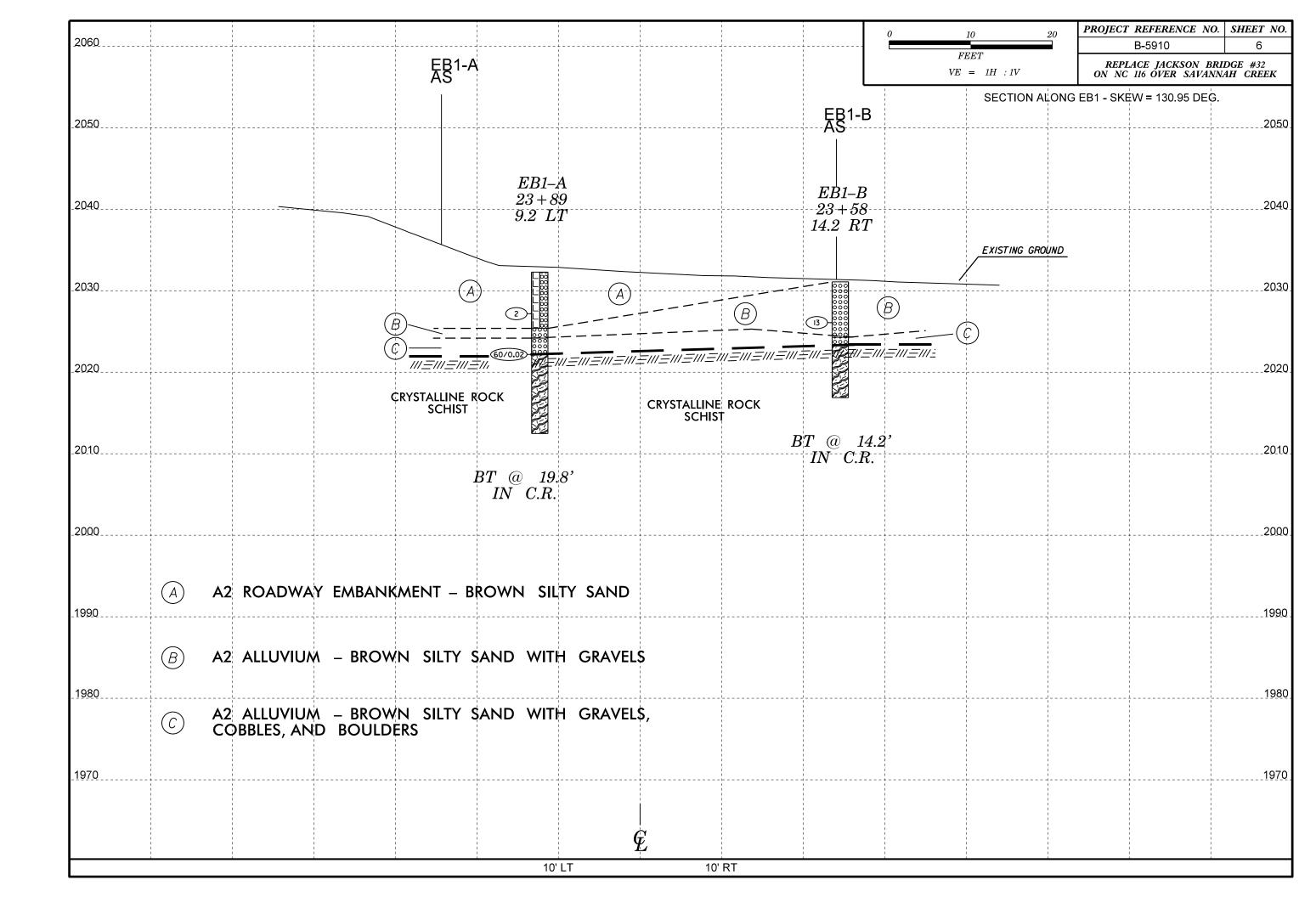
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES

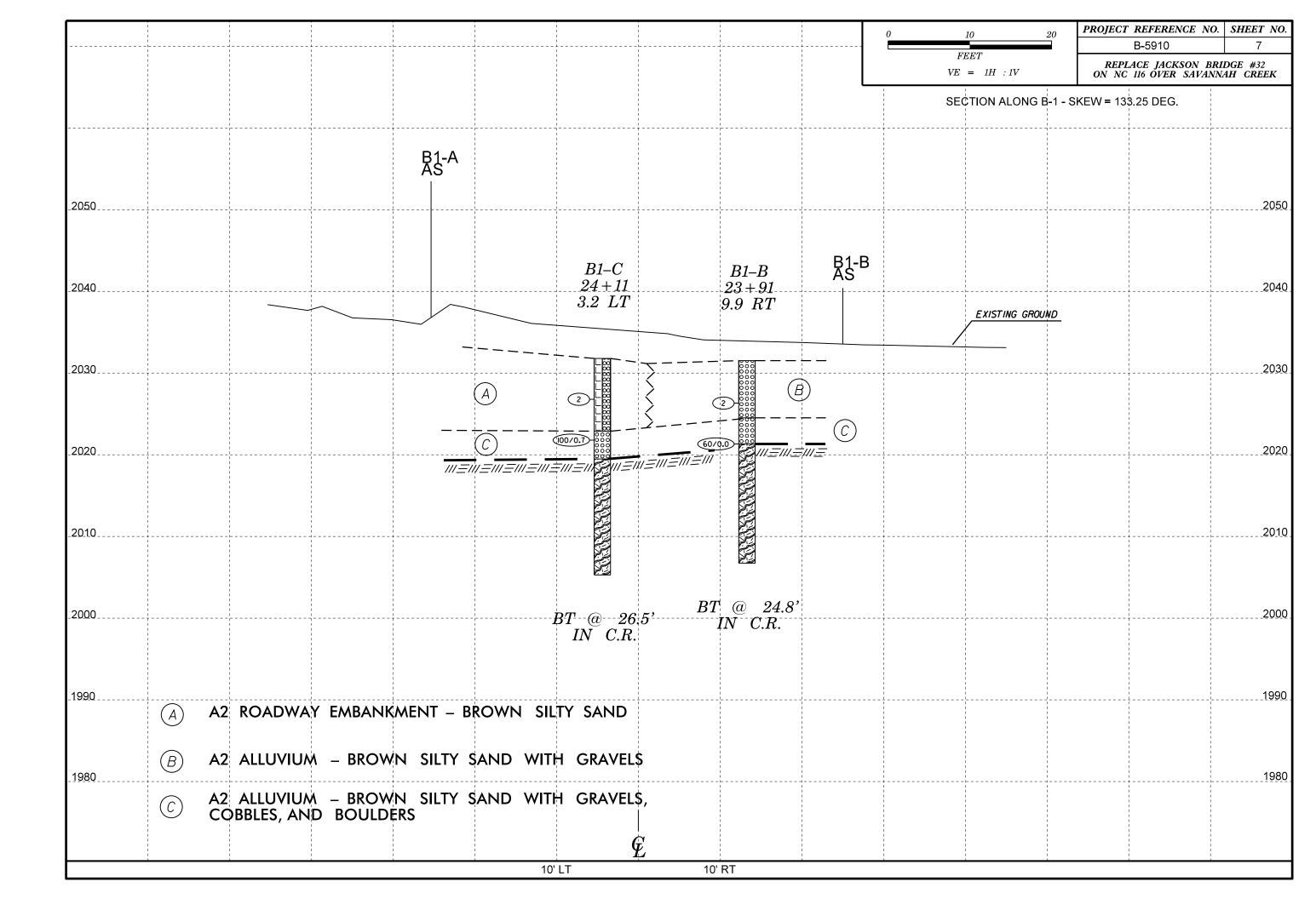
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000) AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000) GEOLOGICAL STRENGTH INDEX (GSI) FOR GSI FOR HETEROGENEOUS ROCK MASSES SUCH JOINTED ROCKS (Hoek and Marinos, 2000) AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and POOR - Very smooth, slicken-l or highly weathered surfaces soft clay coatings or fillings From the lithology, structure and surface eathered surf occasionally es with compac with angular conditions of the discontinuities, estimate the average value of GSI. Do not try to and 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 GSI = 35. Note that the table does not position in the box that corresponds to the condition weathered of the discontinuities and estimate the average value ther of GSI from the contours. Do not attempt to be too eď, apply to structurally controlled failures. Where weak planar structural planes are precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the weather slightly present in an unfavorable orientation SURFACE CONDITIONS (DISCONTINUITIES (Predominantly beddir smooth, c surface: fillings highly coating Hoek-Brown criterion does not apply to structurally with respect to the excavation face, these will dominate the rock mass controlled failures. Where unfavourably oriented behaviour. The shear strength of surfaces continuous weak planar discontinuities are present, 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 Rough, as a result of changes in moisture content will be reduced if water is POOR - Very s slickensided coatings or f fragments GOOD -thered The strength of some rock masses is reduced by the GOOD rough, 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 th, r GOOD - I surfaces FAIR - weather the right may be made for wet conditions. GOOD Rough, s surface poor and very poor conditions. Water pressure does VERY | sided with s VERY Very FAIR Smoot alter VERY Slicke With Water pressure is dealt with by effective 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 controlled instability. 60 BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets 50 C. Sand-D. Siltstone E. Weak 60 siltstone stone with stone and or silty shale or clayey С thin inter siltstone with sand-/B lauers of in similar stone lauers shale with 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 intensively folded/faulted, folded with angular blocks this does not change the strength. sheared clayey shale or siltstone formed by many intersecting Tectonic deformation, faulting and with broken and deformed CREASING loss of continuity moves these discontinuity sets. Persistence sandstone layers forming an 30 categories to F and H. of bedding planes or schistosity lmost chaotic structure 20 DISINTEGRATED - poorly interlocked, heavily broken rock mass 20 G. Undisturbed silty 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 of clay. Thin layers of thin sandstone layers 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

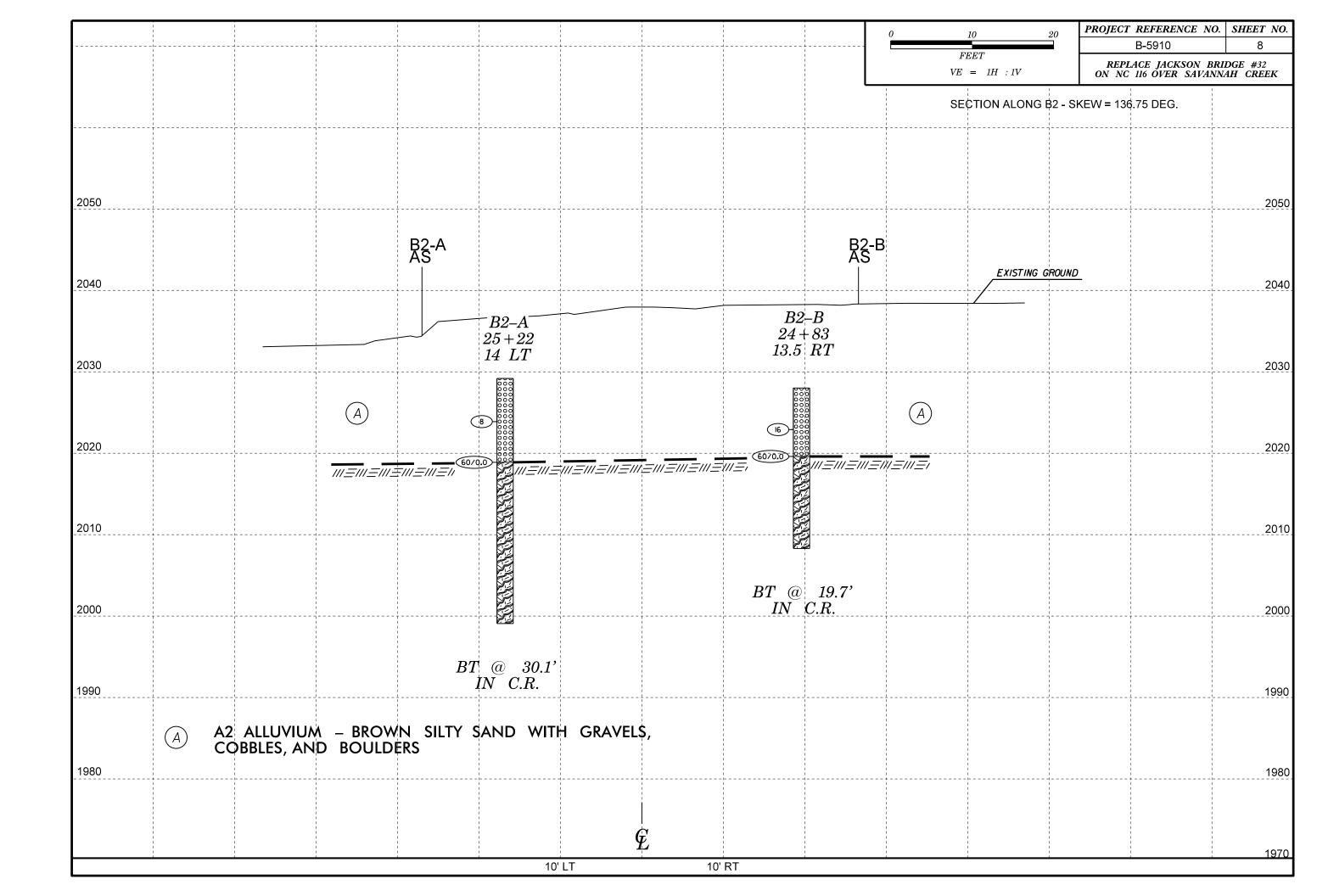


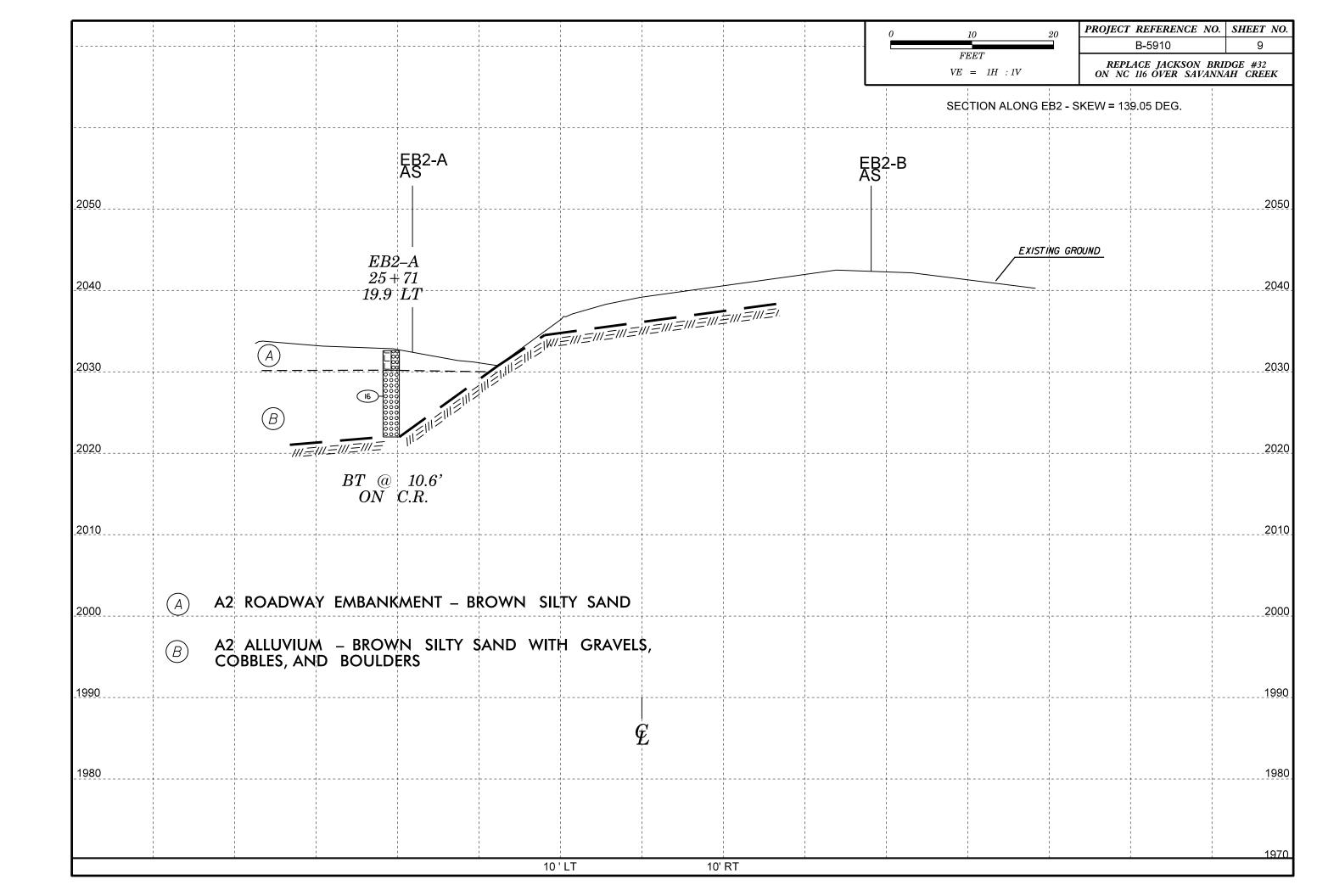












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	48042				TI	P B-5910	C	CTNUO	/ JACKSO	N			GEOLOGIST Johnson, C.	
	DESCR			١										GROUND WTR (ft)
	ING NO					TATION 2			OFFSET				ALIGNMENT L	0 HR . N/A
	LAR EL				- 1		TH 19.8 ft		NORTHING				EASTING 736,681	24 HR. 8.6
				TE A			77% 07/31/2017	7 				D N	W Casing W/SPT & Core H/	AMMER TYPE Automatic
DRIL	LER C					TART DAT	E 02/06/19		COMP. DA	_		1	SURFACE WATER DEPTH	N/A
ELEV (ft)	LLEV	DEPTH (ft)	` 	OW CO	_		BLOWS PER		75 100	SAMP.	'/	0	SOIL AND ROCK I	
(1.1)	(ft)	(1.5)	0.5ft	0.5ft	0.5ft		25 50		75 100	NO.	MOI	G	ELEV. (ft)	DEPTH (f
2035		ł											<u>-</u> -	
		<u> </u>											2,032.3 GROUND SI	
2030		Ŧ											ROADWAY EMI Brown silty	
		ł				:::::	: : : :						<u>-</u> -	
	2,027.2	<u> 5.1</u>	0	1	1								- - 2,025.4	6.
2025	-	†					+					000		IAL 8.
	2,022.2	10.1	00/00							,	_	000	Brown silty SAND	IAL
2020	_	ŧ	60/.02										Brown silty SAND with g	
		ŧ											- CRYSTALLIN gneis	
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2015	-	†				 	 						<u> </u>	
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GEOTECHNICAL BORING REPORT

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WBS	48042	 !.1.1			TIP	b-591	0	C			ACKSO				GEOLOG	SIST N/A			
SITE	DESCR	IPTION	N/A															GROUN	D WTR (ft)
BORI	NG NO.	EB1-	A		STAT	TION	N/A	,		OF	FSET 1	N/A			ALIGNMI	ENT N/A		0 HR.	N/A
COLL	AR ELI	EV. N/	A		TOT	AL DE	PTH 19.	.8 ft		NC	RTHING	• N/	A		EASTING	3 N/A		24 HR.	N/A
DRILL	. RIG/HAI	VIMER E	FF./DA	TE N/A								DRIL	L METHO	D N/A			HAMIN	ER TYPE	Automatic
DRIL	LER N	/A			STAF	RT DA	TE N/A			CC	MP. DA	TE (02/06/19		SURFAC	E WATER [DEPTH N	/A	
CORI	E SIZE	NXWL			TOT/	AL RU	N 8.9 ft												
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RATA RQD (ft) %	LOG	ELEV. (f	ft)		D	ESCRIPTIO	N AND REMA	ARKS		DEPTH (ft)
		40.0												Со	ntinued fro	om previous	page		
		10.9	3.9		(3.9) 100%	(3.9) 100%													
		14.8	5.0		(5.0)	(5.0)													
			3.0		100%	(5.0) 100%													
		19.8																	
		10.0											GSI: 70						
												'	JSI. /(7 - 90					
		1 '	1 !	1	1		1	1	1										

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WBS	48042	2.1.1			TI	P B-591	0		COUN	TY	JACK	SO	N			GEOLOGI	ST Johns	on, C. D.		
SITE	DESCR	IPTION	I N/A																GROUN	ID WTR (ft)
BOR	ING NO.	. EB1-	-B		S	TATION	23+	·58		О	FFSE	Т	18.6 ft F	RT		ALIGNME	NT L		0 HR.	N/A
COL	LAR ELI	EV. 2,	031.1	ft	т	OTAL DE	PTH	14.21	t	N	ORTH	ING	604,7	73		EASTING	736,644		24 HR.	6.1
						CME-550X									D N	 W Casing W/SP		HAMIN		Automatic
DRIL	LER C	heek [2 0		s	TART DA	TE	02/06/1	 19	С	OMP.	DA	TE 02/				WATER D	F PTH N	/A	
ELEV	DRIVE	DEPTH		OW CO					PER FOO				SAMP.	7	1 L	001117102				
(ft)	ELEV (ft)	(ft)	0.5ft	_		0	25		50	75		100	NO.	MOI	O G		SOIL AND F	ROCK DES	CRIPTION	
2035		 - -														- -				
0000		<u> </u>				<u> </u>			,						000	2,031.1		JND SURF	ACE	0.0
2030	-	‡				 						-			000	Bro	own micaceou	LLUVIAL us coarse s	and with sr	mall
		<u> </u>				.	:			:		:			000	• •	pebbles a	and rock fra	agments	
2025	2,026.1	5.0	1	5	8	j. ——●13	-			•		٠		\blacksquare	000	-				6.0
		‡				' -		·	† 	-+					000	2,024.3		LLUVIAL		6.8
		l										\cdot				Brov		s, and bou	lders	ivels,
2020	_	Ŧ					+		1	+						_	CRYS	Gneiss	ROCK	
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	-	‡													-	_ BOII	CRYS	TALLINE R	1011 2,0 16.9 ROCK	IL IIN
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GEOTECHNICAL BORING REPORT

										C	ORE	EL	OG								11
WBS	48042	2.1.1			TIP	b-591	0	С	OUNT	ΥJ	ACKSO	N			GE	OLOGI	ST N	/A			
SITE	DESCR	IPTION	N/A																	GROUN	ID WTR (ft)
BORI	NG NO.	EB1-	В		STA	TION	N/A			OF	FSET I	N/A			ALI	GNME	NT N	/A		0 HR.	N/A
COLL	AR ELE	EV. N/	Α		TOT	AL DE	PTH 14	.2 ft		NO	RTHING	3 N/A	4		EAS	STING	N/A			24 HR.	N/A
DRILL	. RIG/HAI	MMER E	FF./DA	TE N/A								DRIL	L METHO	D N/A	١				HAMI	VIER TYPE	Automatic
DRIL	LER N	/A			STAF	RT DA	TE N/A	A COMP. DATE 02/06/19 SURFACE WATER DEPTH N//										I/A			
COR	E SIZE	NXWL				TOTAL RUN 5.0 ft															
LEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	L O G	O DESCRIPTION AND REMARKS										
		9.2	5.0		(4.0)	(4.4)				Continued from previous page											
		5.2	5.0		(4.9) 98%	(4.4) 88%															
		14.2																			
		14.2																			
													GSI: 6	0 - 90	0						
- 1				i			ı	1	ı												

GEOTECHNICAL BORING REPORT BORE LOG

		BORE LOG			<u> </u>	CORE LOG		
WBS 48042.1.1	TIP B-5910 COUN	ITY JACKSON	GEOLOGIST Johnson, C. D.	WBS 48042.1.1	TIP b-5910 COUN	TY JACKSON	GEOLOGIST N/A	
SITE DESCRIPTION N/A			GROUND WTR (ft)	SITE DESCRIPTION N/A			GROUND W	TR (ft)
BORING NO. B1-B	STATION 23+91	OFFSET 9.9 ft RT	ALIGNMENT L 0 HR. N/A	BORING NO. B1-B	STATION N/A	OFFSET N/A	ALIGNMENT N/A 0 HR.	N/A
COLLAR ELEV. 2,031.5 ft	TOTAL DEPTH 24.8 ft	NORTHING 604,773	EASTING 736,684 24 HR. 5.0	COLLAR ELEV. N/A	TOTAL DEPTH 10.7 ft	NORTHING N/A	EASTING N/A 24 HR.	N/A
DRILL RIG/HAMMER EFF/DATE AF	O8963 CME-550X 77% 07/31/2017	DRILL METHOD	NW Casing W/SPT & Core HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD N	VA HAMMER TYPE Auto	matic
DRILLER Cheek, D. O.	START DATE 02/06/19	COMP. DATE 02/06/19	SURFACE WATER DEPTH N/A	DRILLER N/A	START DATE N/A	COMP. DATE 02/06/19	SURFACE WATER DEPTH N/A	
ELEV DRIVE DEPTH BLOW COL		OT SAMP.	SOIL AND ROCK DESCRIPTION	CORE SIZE NXWL	TOTAL RUN 14.1 ft			
(ft) CELEV (ft) 0.5ft 0.5ft	0.5ft 0 25 50	75 100 NO. MOI 0		ELEV RUN DEPTH RUN RATE (Min/ft)	RUN SAMP. REC. RQD (ft) (ft) NO. (ft) (ft) %	_ L O G ELEV. (ft)	DESCRIPTION AND REMARKS	EPTH (ft)
2035				10.7 4.1	(4.1) (3.4) 100% 83%		Begin Coring @ 10.7 ft	
2030	1	 	2,031.5 GROUND SURFACE 0.0 ALLUVIAL Red-brown, micaceous silty, coarse SAND	14.8	(5.0) (4.3) 100% 86%			
2,026.3 5.2				19.8				
2025 woh 1				5.0	(4.5) (3.6) 90% 72%			
2020 2,021.3 10.2 60/0			Red-brown, micaceous silty, coarse SAND 10.2 with gravels, cobbles, and boulders CRYSTALLINE ROCK Gneiss	24.8		GSI	l: 40 - 80	
2015								
2010			-					
-			Boring Terminated at Elevation 2,006.7 ft IN CRYSTALLINE ROCK					
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				BRDG_CORELOGS				
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48042	1.1.1			TI	P B-591	10		COU	NTY	JAC	KSO	N			GEOLOGIST Johnson, C. D		
DESCR	IPTION	N/A														GROU	ND WTR (ft)
NG NO.	B1-C			S.	TATION	24+1	11			OFFS	ET :	3.2 ft LT			ALIGNMENT L	0 HR.	N/A
AR ELE	V. 2.0	31.6	ft	T	OTAL DE	PTH	26.5 f	t		NORT	HING	604.7	83		EASTING 736.701	24 HR.	6.8
														D NV			
			/ -						1.					- 147			- / KATOTT KATO
					IARI DA					COMP	, DA		J7/19	1	SURFACE WATER DEPTH	N/A	
ELEV (ft)	DEPTH (ft)				0	25 				7 5	100	NO.	MOI		SOIL AND ROCK DE	SCRIPTION	1
	- - -													 - - -			0.0
_									• •		• •			<u> </u> -			
- - 2,026.6- - -	- - - 5.0 -	0	1	1	•2								•		-	AND	200
2 021 6-	10.0							: :							2,022.7 ALLUVIAI		8.9
	- - -	30	70/.2			·	: 		 -		•			- - - -	Brown silty SAND with grav 2,019.3 boulders	els, cobble	s, and 12.3
														l E			
_	-				 	+		 		-				-	-		
-	- - -						· · · ·										
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-	-								: :	1					- Daving Tarminated at Claye	tion 2.005	4 # INI
	NG NO. AR ELE RIG/HAI LER C DRIVE ELEV (ft)	NG NO. B1-C AR ELEV. 2,0 RIG/HAMMER EI LER Cheek, D DRIVE DEPTH ELEV DEPTH	NG NO. B1-C AR ELEV. 2,031.6 RIG/HAMMER EFF/DA LER Cheek, D. O. DRIVE ELEV (ft) DEPTH (ft) 0.5ft 2,026.6 5.0 0	AR ELEV. 2,031.6 ft RIG/HAMMER EFF/DATE AF LER Cheek, D. O. DRIVE CITY (ft) DEPTH O.5ft 0.5ft 2,026.6 - 5.0 0 1	NG NO. B1-C ST	NG NO. B1-C STATION	STATION 24+ AR ELEV. 2,031.6 ft TOTAL DEPTH RIG/HAMMER EFF./DATE AF08963 CME-550X 77% AF08963 CME-550X AF08963 CM	STATION 24+11 AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft	STATION 24+11 AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft	STATION 24+11	NG NO. B1-C STATION 24+11 OFFS	NG NO. B1-C AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING RIGHAMMER EFF./DATE AF08963 CME-550X 77% 07/31/2017 ER Cheek, D. O. DRIVE (ft) DEPTH (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 0.25 50 75 100 2,026.6 5.0 0 1 1 2,021.6 10.0 30 70/.2	NG NO. B1-C STATION 24+11 OFFSET 3.2 ft LT AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING 604,7 RIG/HAMMER EFF/DATE AF08963 CME-550X 77% 07/31/2017 DRILL IN LER Cheek, D. O. START DATE 02/07/19 COMP. DATE 02/07/19 LER Cheek, D. O. START DATE 02/07/19 SAMP. COMP. DATE 02/07/19	NG NO. B1-C STATION 24+11 OFFSET 3.2 ft LT AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING 604,783 RIGHAMMER EFFJDATE AF08963 CME-550X 77% 07/31/2017 DRILL METHO LER Cheek, D. O. START DATE 02/07/19 COMP. DATE 02/07/19 DRIVE CHEEV (ft) DEPTH BLOW COUNT (ft) 0.5ft NG NO. B1-C AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING 604,783 RIG/HAMMER EFF,DATE AF08963 CME-550X 77% 07/31/2017 DRILL METHOD NO ER Cheek, D. O. START DATE 02/07/19 COMP. DATE 02/07/19 DRIVE BLOW COUNT (ft) 0.5ft 0.5f	NG NO. B1-C STATION 24+11 OFFSET 3.2 ft LT ALIGNMENT L AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING 604,783 EASTING 736,701 RIGHAMMER EFF/DATE AF08963 CME-550X 77% 07/31/2017 DRILL METHOD NWCæsing WSPT & Core HAM LER Cheek, D. O. START DATE 02/07/19 COMP. DATE 02/07/19 SURFACE WATER DEPTH NO. DRIVE DEPTH BLOW COUNT 0.5ft 0.5	NG NO. B1-C STATION 24+11 OFFSET 3.2 ft LT ALIGNMENT L 24 HR. AR ELEV. 2,031.6 ft TOTAL DEPTH 26.5 ft NORTHING 604,783 EASTING 736,701 24 HR. RIGHAMMER EFF, DATE AF08963 CM-2560X 77% 07/31/2017 DRILL METHOD NW Casing WSPT & Core HAMMER TYPE ER Cheek, D. O. START DATE 02/07/19 COMP. DATE 02/07/19 SURFACE WATER DEPTH N/A DRIVE DEPTH BLOW COUNT (ft) 0.5ft	
GEOTECHNICAL BORING REPORT CORE LOG

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WBS	48042	2.1.1			TIP	b-591	0	C	TNUC	Y J	ACKSO	N			GEOLOGIS	T N/A			
SITE	DESCR	IPTION	N/A					•						•				GROUN	D WTR (ft)
BOR	ING NO.	B1-C			STA	ΓΙΟΝ	N/A			OF	FSET N	N/A			ALIGNMEN [*]	T N/A		0 HR.	N/A
COL	LAR ELE	EV . N/.	A		TOT	AL DE	PTH 26.	5 ft		NO	RTHING	N//	A		EASTING	N/A		24 HR.	N/A
DRILL	RIG/HAI	VIMER E	FF./DA	TE N/A								DRIL	L METH	OD N/A			HAMMI	ER TYPE	Automatic
DRIL	LER N	/A			STAF	RT DA	TE N/A			СО	MP. DA	TE (02/07/19)	SURFACE V	VATER DEP	TH N/.	A	
COR	E SIZE	NXWL			TOTA	AL RU	N 13.2 f	t						•					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	LOG				DI	ESCRIPTION A	ND REMARKS	S		
															Begin Coring	g @ 12.3 ft			
		12.3	3.2		(3.2) 100%	(2.8) 88%													
		15.5	5.0		(5.0)	(3.4)													
					100%														
		20.5																	
			5.0		(5.0) 100%	(3.5) 70%													
		25.5																	
														GS	I: 40 - 80				
	l	1				ı	l	1		1									

								В	ORE L	OG						
WBS	48042.	1.1			TI	P B-5910		COUNT	Y JACKSC	N			GEOLOGIST Johnson	, C. D.		
SITE	DESCRI	PTION	N/A												ROUND W	TR (ft)
BORI	NG NO.	B2-A	١		S	TATION 25	5+22		OFFSET	14 ft LT			ALIGNMENT L		0 HR.	FIAD
COLL	AR ELE	V. 2,	029.2	ft	т	OTAL DEPT	H 30.1 ft		NORTHING	604,77	78		EASTING 736,812	2.	4 HR.	N/A
DRILL	RIG/HAM	MER E	FF./DA	TE A	FO8963	CME-550X 7	7% 07/31/20)17	ı	DRILL M	ETHO) NV	V Casing W/SPT & Core	HAMMER	RTYPE Auto	matic
DRIL	LER Ch	eek, [D. O.		S	TART DATE	02/07/19	9	COMP. DA	TE 02/0	7/19		SURFACE WATER DEP	TH N/A		
ELEV (ft)		DEPTH (ft)	BLC	0.5ft			BLOWS F			SAMP. NO.	MOI	L O G	SOIL AND ROCELEV. (ft)			EPTH (ft)
030													-2,029.2 GROUNI	D SURFAC	F	0.0
2025	2,023.9	5.3	7	5	3	• • • • • • • • • • • • • • • • • • • •						-	ALI Gray brown silty S	UVIAL		0.0
	2,018.9	10.3								,		_	2,018.9			10.3
015	+		60/0											LLINE ROC ineiss	:K	
010	† † †												-			
000	- -												- Boring Terminated a	at Flevation	1 999 1 ft IN	
														LLINE ROC		NCDOT CORE DOLINE E REGIO GEO REDE CORELOGS RICELINC DOT COLT 2/47/40

GEOTECHNICAL BORING REPORT CORE LOG

									C	Ol	RE L	OG						14
WBS	48042	.1.1			TIP	b-591	0	C			ACKSO				GEOLOGIST N/A			
SITE	DESCR	IPTION	N/A														GROUN	D WTR (ft)
BOR	ING NO.	B2-A			STA	TION	N/A			OF	FSET 1	V/A			ALIGNMENT N/A		0 HR.	N/A
COL	LAR ELE	V. N/	A		тот	AL DE	PTH 30.	1 ft		NO	RTHING	N/A			EASTING N/A		24 HR.	N/A
DRILI	RIG/HAI	VIMER E	FF./DA	TE NA								DRILL	METHOD	N/Α		HAMM	ER TYPE	Automatic
DRIL	LER N	/A			STAI	RT DA	TE N/A			CO	MP. DA	TE 02	/07/19		SURFACE WATER DEP	TH N/	'A	
COR	E SIZE	NXWL					N 14.8 f	t										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	L O G	ELEV. (f	ft)		D	ESCRIPTION AND REMARKS	3		DEPTH (ft)
														Со	ntinued from previous pa	ge		
		10.3	4.8		(4.6) 96%	(4.6) 96%												
		15.1	5.0		(5.0)	(4.8)												
					100%	96%												
		20.1			45													
			5.0		(5.0) 100%	(5.0) 100%												
		05 1																
		25.1																
													(GSI:	40 - 90			
I																		
ı																		
ı																		

										1	D	JKE	: L	OG							
WBS	48042	2.1.1			TI	P B-	5910		(COUN	VTY	JACŁ	(SOI	N			GEOLOGIST Johnson, C	. D.			
SITE	DESCR	RIPTION	N/A														_	G	ROUN	D WTR	(ft)
BOR	ING NO	. B2-B	3		S ⁻	TATIO	N 24	1+83			_			13.5 ft F			ALIGNMENT L	0	HR.	FIA	٩D
	LAR EL				I			H 19			l	NORTH	IING	604,7			EASTING 736,770		HR.		I/A
DRIL	_ RIG/HA	MMER E	FF./DA	TE A	FO8963	CME-5	50X 7	7% 07/	31/201	17				DRILL N	/IETHO	D N	W Casing W/SPT & Core F	AMMER	TYPE	Automati	С
DRIL	LER C	heek, [TART	DATE	02/0			_	COMP.	DAT	TE 02/0	07/19	4	SURFACE WATER DEPTH	I N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	·——	0.5ft		0	2	BLO\	NS PE	ER FO		'5 L	100	SAMP. NO.	MOI	L O I G	SOIL AND ROCK	DESCRI	PTION		
2030		‡																URFACE	Ē		0.0
2025							<u> </u>										ALLUV Brown silghtly micaced SAND with rock fragr	/IAL ous silty, \	very coa	arse ers	
2020	2,022.9. 2,019.6	‡	2	7	9		1 16	· ·		· · ·	· · · · · · · · · · · · · · · · · · ·	 	:				_ _ _ 2,019.6				8.4
2015			60/0					ļ			· · · · · · · · · · · · · · · · · · ·						- CRYSTALLI - Gnei 	NE ROCI ss	К		
2010	- - -	 									· ·						- - - -				

GEOTECHNICAL BORING REPORT CORE LOG

											RE L	LOG					15
WBS	48042	.1.1			TIP	b-591	0	C	TNUC	Y J	ACKSO	N		GEOLOGIST N/A			
SITE	DESCR	IPTION	N/A													GROUN	ID WTR (ft)
BORI	NG NO.	B2-B			STAT	ΓΙΟΝ	N/A			OF	FSET N	N/A		ALIGNMENT N/A		0 HR.	N/A
COLI	AR ELE	V. N/.	A		TOT	AL DE	PTH 19.	7 ft		NO	RTHING	N/A		EASTING N/A		24 HR.	N/A
DRILL	RIG/HAI	/IMER E	FF./DA	TE N/A								DRILL ME	THOD NA		HAMM	ER TYPE	Automatic
DRIL	LER N	/A			STAF	RT DA	TE N/A			СО	MP. DA	Γ E 02/07	/19	SURFACE WATER DEP	TH N/	A	
CORI	E SIZE	NXWL			TOTA	AL RU	N 11.3 f	t									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RL REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	L O G			DE	ESCRIPTION AND REMARKS	3		
	(10)			(141111/12)				70	70				Cor	ntinued from previous pa	ge		
		8.4 9.7	1.3 5.0		(1.0) \ 77% /	(0.5) \ 38% /											
					(5.0) 100%	(5.0) 100%											
		14.7			10070	10070											
			5.0		(4.9) 98%	(4.7) 94%											
					0070	0170											
		19.7										(GSI: 50 -	- 85			
												`	001. 00				

											D	JIN		٠,	JG					
WBS 4	48042	.1.1			TI	P B-	5910			COL	JNTY	' JA	CKSC	DΝ				GEOLOGIST Johnson, C. D.		
SITE DE	ESCR	IPTION	N/A		•														GROUN	D WTR (ft)
BORING	G NO.	EB2-	A		SI	ΓΑΤΙΟ	N 2	5+71				OFF	SET	19	9.9 ft L	т.		ALIGNMENT L	0 HR.	FIAD
COLLAI	R ELE	V. 2,0	032.61	ft	т	OTAL	DEP1	TH ²	10.6 ft	i		NOR'	THING		604,7	80		EASTING 736,860	24 HR.	N/A
ORILL RI	IG/HAN	/IMER E	FF./DA	TE AF	-08963	CME-5	50X 7	77% 0	7/31/2	017				1	DRILL N	IETHO) N	V Casing W/SPT & Core HAMM	ER TYPE	Automatic
DRILLE	R CI	heek, D). O.		ST	TART	DATE	E 02	2/07/1	9		СОМ	P. DA	\TE	E 02/0	7/19		SURFACE WATER DEPTH N/	A	
/ DI	RIVE	DEPTH		W COL	'				OWS F					_	SAMP.		L	1		
/ft\	(ft)	(ft)	0.5ft	0.5ft		0		25 	Ę	50		75 	100	11	NO.	MOI	O G	SOIL AND ROCK DESC	CRIPTION	DEPTH (ft
	-	- - -						1		1							-	2,032.6 GROUND SURFA		0.
2030	1	-								: :		1						ROADWAY EMBANI 2,030.2 Brown gray silty S		2.4
	7	-					7	ļ.,						11			_	ALLUVIAL Brown gray silty SAND wi	th boulders	
2,0	027.0	5.6	10	12	4		 										-	biomi gray only of the m	ar bodicoro	
020	7	-					1.			: :	: :			1			_	-		
2,0	022.0	10.6	60/0				1-	<u></u>		L		<u> </u>		Ы				2,022.0 CRYSTALLINE RO	оск	10.0
																		Gneiss Boring Terminated at Elevation CRYSTALLINE RO	n 2,022.0 f	t ON

EB1-ABOX 1 OF 1: 10.9 - 19.8 FEET
GSI 70 - 90

EB1-BBOX 1 OF 1: 9.2 - 14.2 FEET
GSI 60 - 90





B1-BBOX 1 OF 2: 10.7 - 19.8 FEET
GSI 40 - 80

B1-BBOX 2 OF 2: 19.8 - 24.8 FEET
GSI 40 - 80





B1-CBOX 1 OF 2: 12.3 - 21.3 FEET
GSI 40 - 80

B1-CBOX 2 OF 2: 21.3 - 25.5 FEET
GSI 40 - 80





B2-ABOX 1 OF 2: 10.3 - 20.1 FEET
GSI 40 - 90

B2-ABOX 2 OF 2: 20.1 - 25.1 FEET
GSI 40 - 90





B2-BBOX 1 OF 2: 8.4 - 17.7 FEET
GSI 50 - 85

B2-BBOX 2 OF 2: 17.7 - 19.7 FEET
GSI 60 - 85

