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REFERENCE

<u>SHEET NO.</u>	DESCRIPTION
	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE
5-8	CROSS SECTIONS
9-15	BORE LOGS & CORE REPORTS
16-17	ROCK TEST RESULTS
18-20	CORE PHOTOGRAPHS
21	SITE PHOTOGRAPH

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY **HAYWOOD**

PROJECT DESCRIPTION **REPLACE BRIDGE 430095 ON** US 74 OVER SOUTHERN RAILROAD

SITE DESCRIPTION <u>STA. 20+37.51 -L</u>-

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STATE N.C.

STATE PROJECT REFERENCE NO.

NO.

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TOTAL SHEETS 22



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 (99) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAIL

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 BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNI-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 VARY CONSIDERABLY WITH THE 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 NON CLIMATIONE THEORS. 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION WADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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: I. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR CUARANTEED 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 REDUCETED 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

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DCE CHECKED BY <u>H. HANCOCK, EI</u>	
SUBMITTED BY D. BROWN, PE	
DATE <i>FEBRUARY 2023</i>	
STEWART	
SEAL 028422 W. BROMMAN DocuSigned by:	
Lonald N. Br. Jr. 03/14/2023 <u>CO6817F6F770411</u> SIGNATURE DATE	_
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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	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 ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	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	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	SPT REFUSAL INDICATES THE LEVEL HI WHICH NUNTCONSTAL FLAIN MHIERTHAL WOLD TIELD SPT REFUSAL.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
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.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. 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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	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	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
	MINERALOGICAL COMPOSITION	CONCEAN UNE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	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 (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	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE 10 CUARSE GRAIN METAMORPHIC AND NUNCLOSSIAL PLAIN ROCK (NCR) FINE 10 CUARSE GRAIN METAMORPHIC AND NUNCLOSSIAL FIELD.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL SYMBOL STORE STOR	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SANDSTONE, CEMENTED SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT- 10 50 MX GRANULAR SILT-	PERCENTAGE OF MATERIAL	(CP)	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
		WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
100 15 MX 25 MX 10 MX 35 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 <u>SOILS</u> <u>OTHER MATERIAL</u>	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%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING #40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% 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,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL — — — 4/9 MX 41 MN LITTLE OR	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
MUDERATE OPCANIC	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS		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.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	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
GEN. RATING FUEL TO COOL FUEL TO COOL FAIR TO COOL FAIR TO	∇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 UNSUITABLE	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.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
		(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES SCIUNK'SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR 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 (N-VALUE) (TONS/FT ²)	WITH 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 < 4	SOIL SYMBOL	(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.
GRANIII AR LUUSE 4 TU 10		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
MATERIAL MEDIUM DENSE 10 TO 30 N/A		VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-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	I INFERRED SOIL BOUNDARY	(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		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	TEST BURING WELL	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	ALLUVIAL SOIL BOUNDARY A PIEZOMETER SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTALLATION		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 ROCK.
	XX UNCLASSIFIED EXCAVATION - TOTAL UNCLASSIFIED EXCAVATION -	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	
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	UNDERCUI UNSUITABLE WASTE	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
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE OP 3 FEEL OF	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.
BUULDER CUBBLE GRAVEL SAND SAND SILI CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK	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
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 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	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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 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 TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
	_ CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\rm d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	
(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.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	
- 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	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE S - WEI - (W)	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: GPS-122 (G122)
(PI) PL PLASTIC LIMIT	HIHIGHLY V-VERY RATIO	TERM SPACING TERM THICKNESS	
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: 2583.10 FEET
OM _ OPTIMUM MOISTURE - MOIST - MOIST - MOIST - MOISTORE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINKET BEDDED 0.16 - 1.5 FEET	NOTEO
	CME-45C CLAY BITS AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER	. VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD = FILLED IMMEDIATELY AFTER DRILLING
			4
PLASTICITY			1
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550 HARD FACED FINGER BITS X -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING X W/ ADVANCER HAND TOOLS:		
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR			
CULUR		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		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
			DHTE: 8-13-14

PROJECT REFERENCE NO.

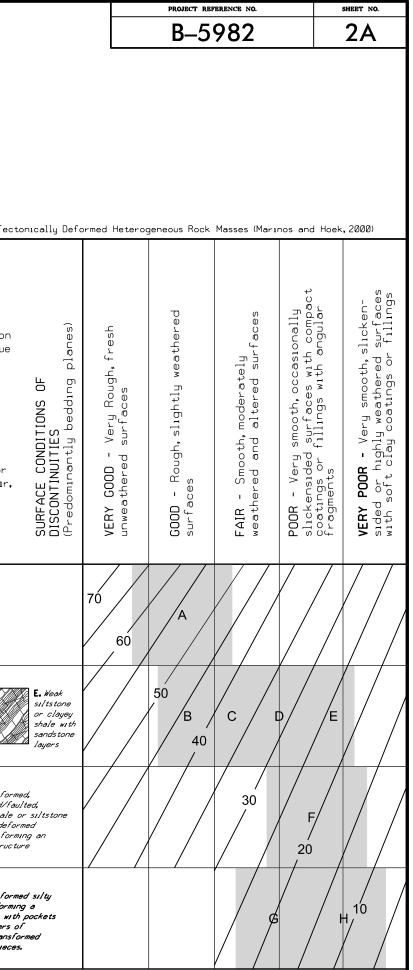


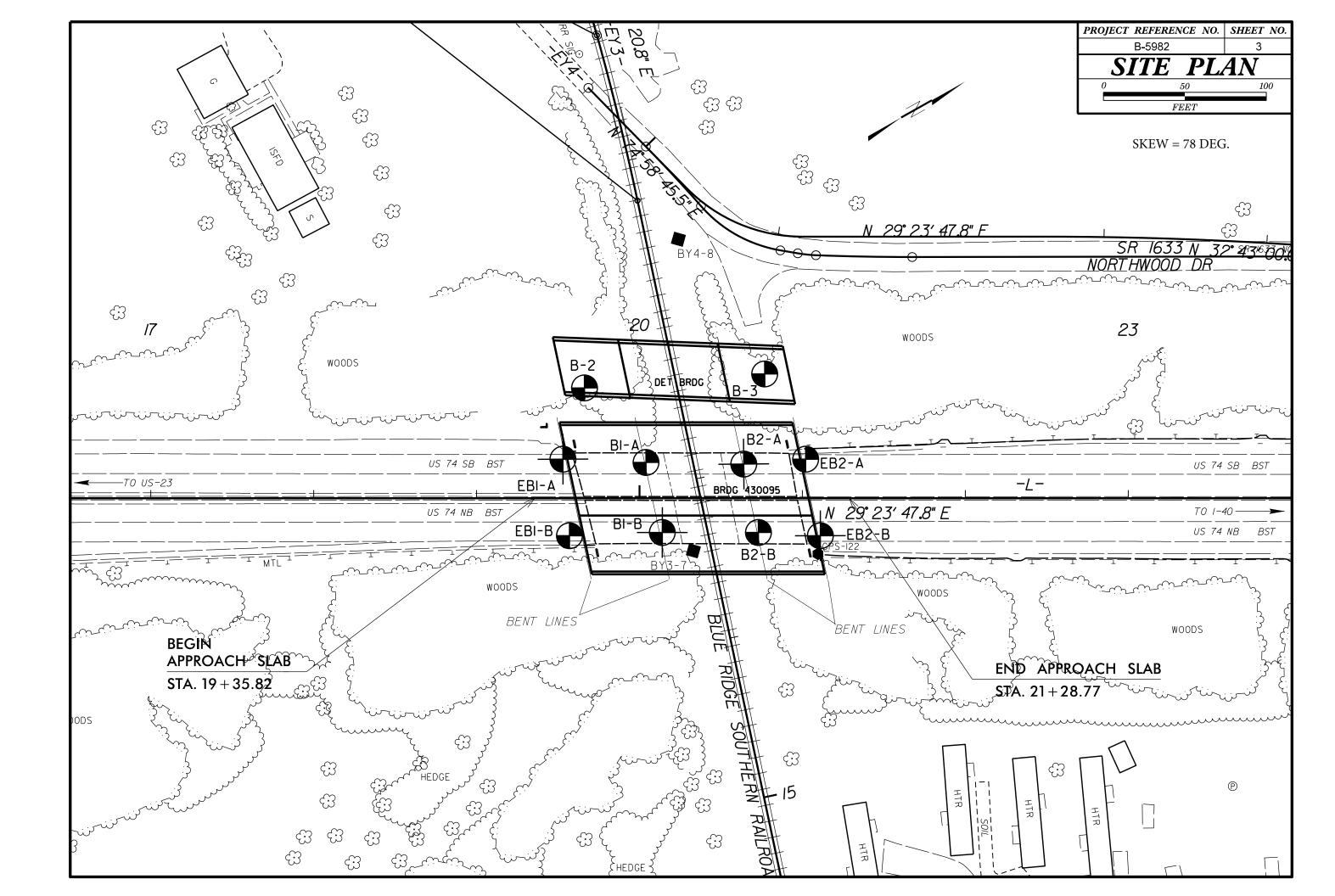
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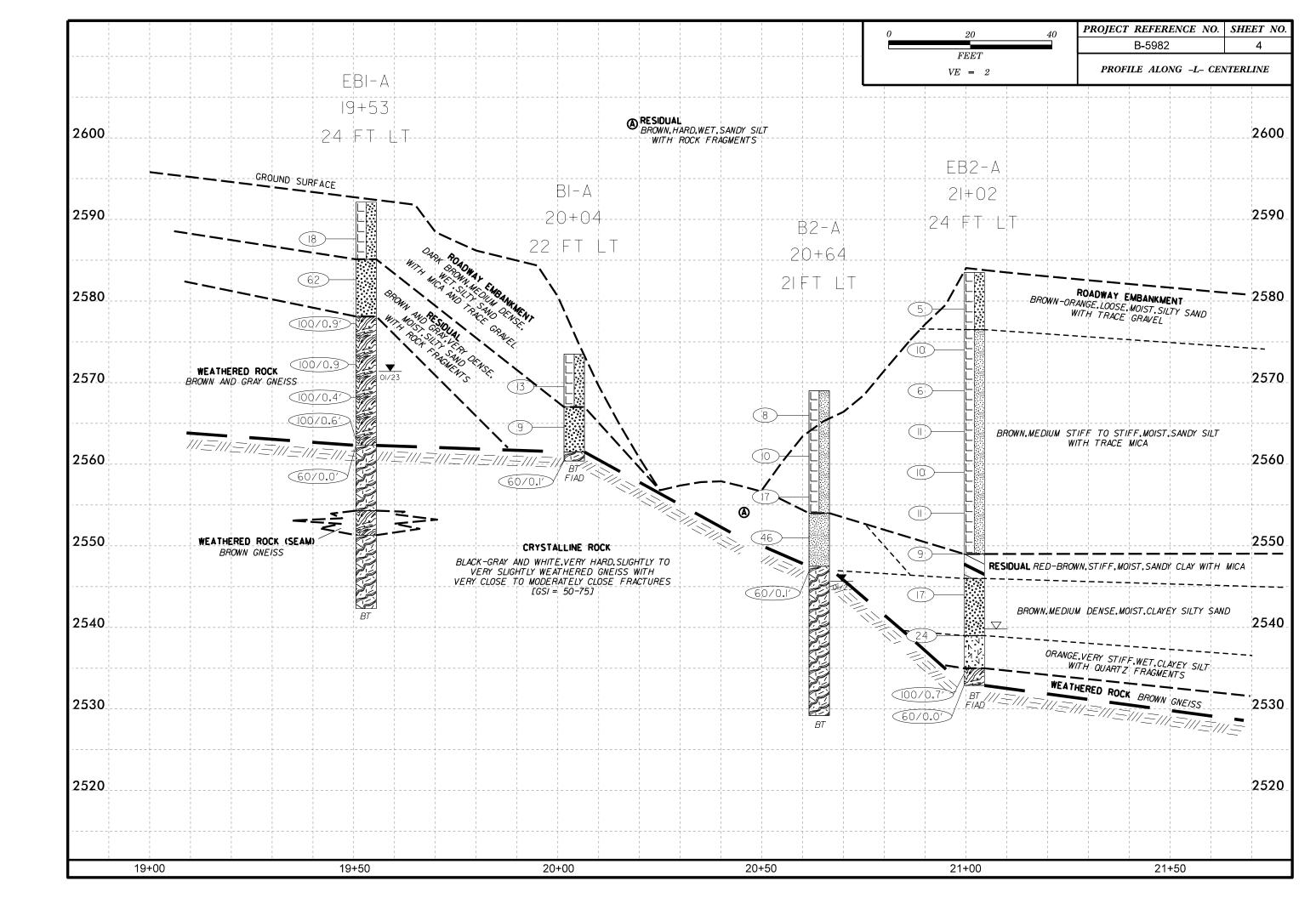
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

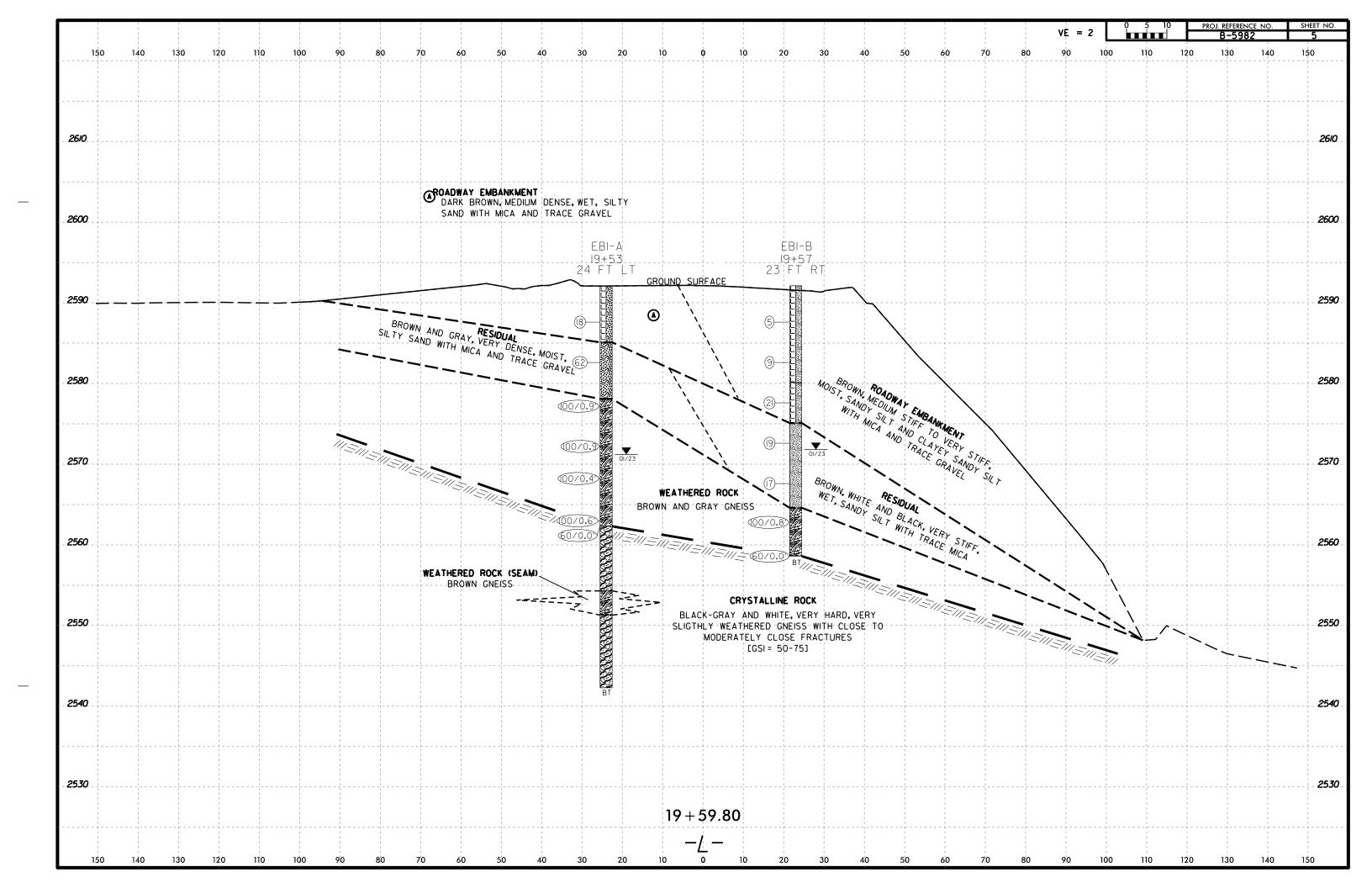
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

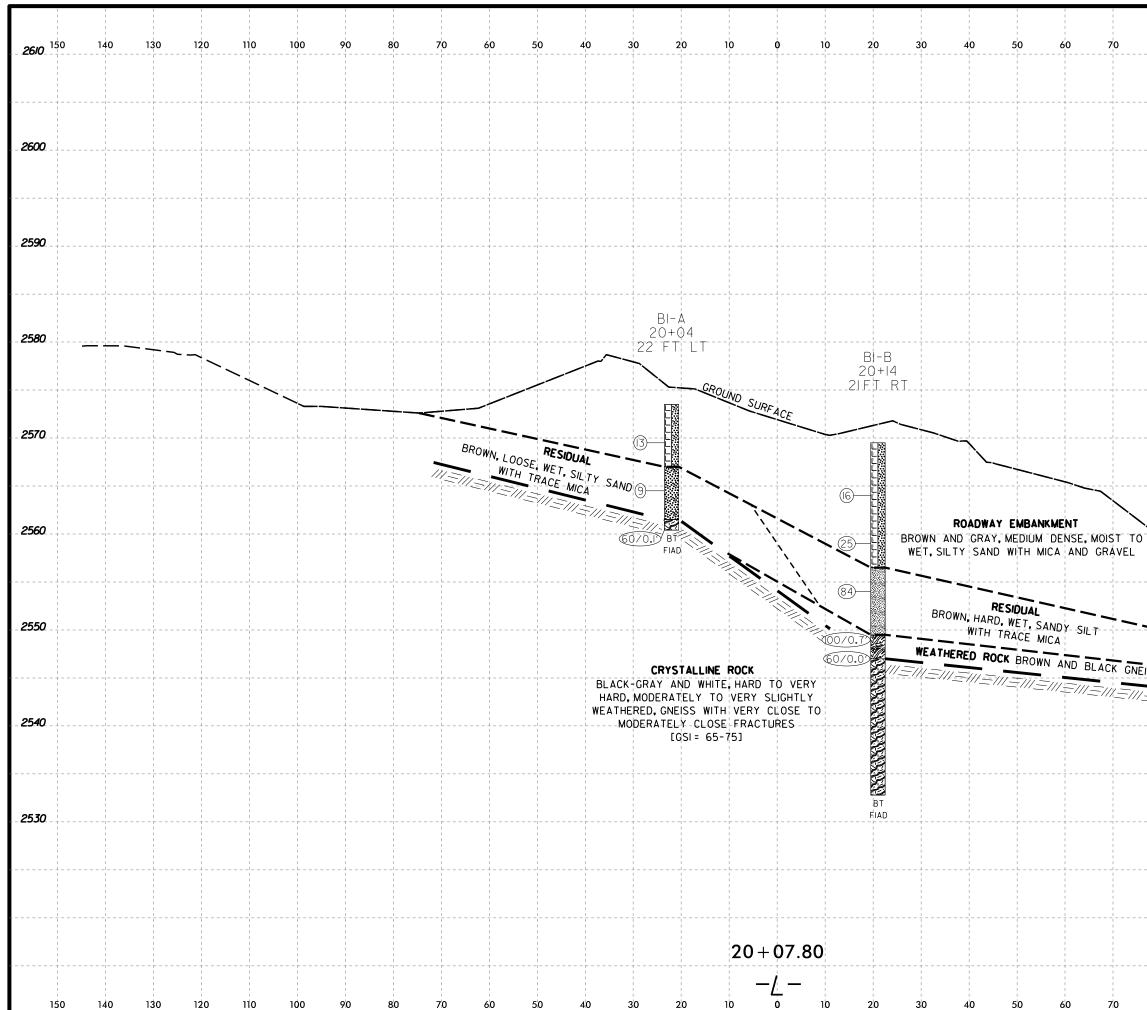
AASHTO LRFD Figure 10.4.6.4-1 $-$ Determination of GSI for Jointed F	Rock Mass (Marı	nos and Hoek,2	2000)			AASHTO LRFD Figure 10.4.6.4–2 $-$ Determination of GSI for Te
GEOLOGICAL STRENGTH INDEX (GSI)FOR JOINTED ROCKS (Hoek and Marinos,2000) From the lithology,structure and surface	faces	staıned		faces	faces Js	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and
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.	VERY GOOD Very rough, fresh unweathered sur	GOOD Rough, slightly weathered, iron sta surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surf with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surf with soft clay coatings or fillings	surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the conditio of the discontinuities and estimate the average valu 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 fail poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
STRUCTURE		REASING SU	•		-	COMPOSITION AND STRUCTURE
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.
BLOCKY - well interlocked un- disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 60				B. Sand- stone with thin inter-
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		5	50			layers of siltstone 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 .
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	Into small rock pu Into small rock pu



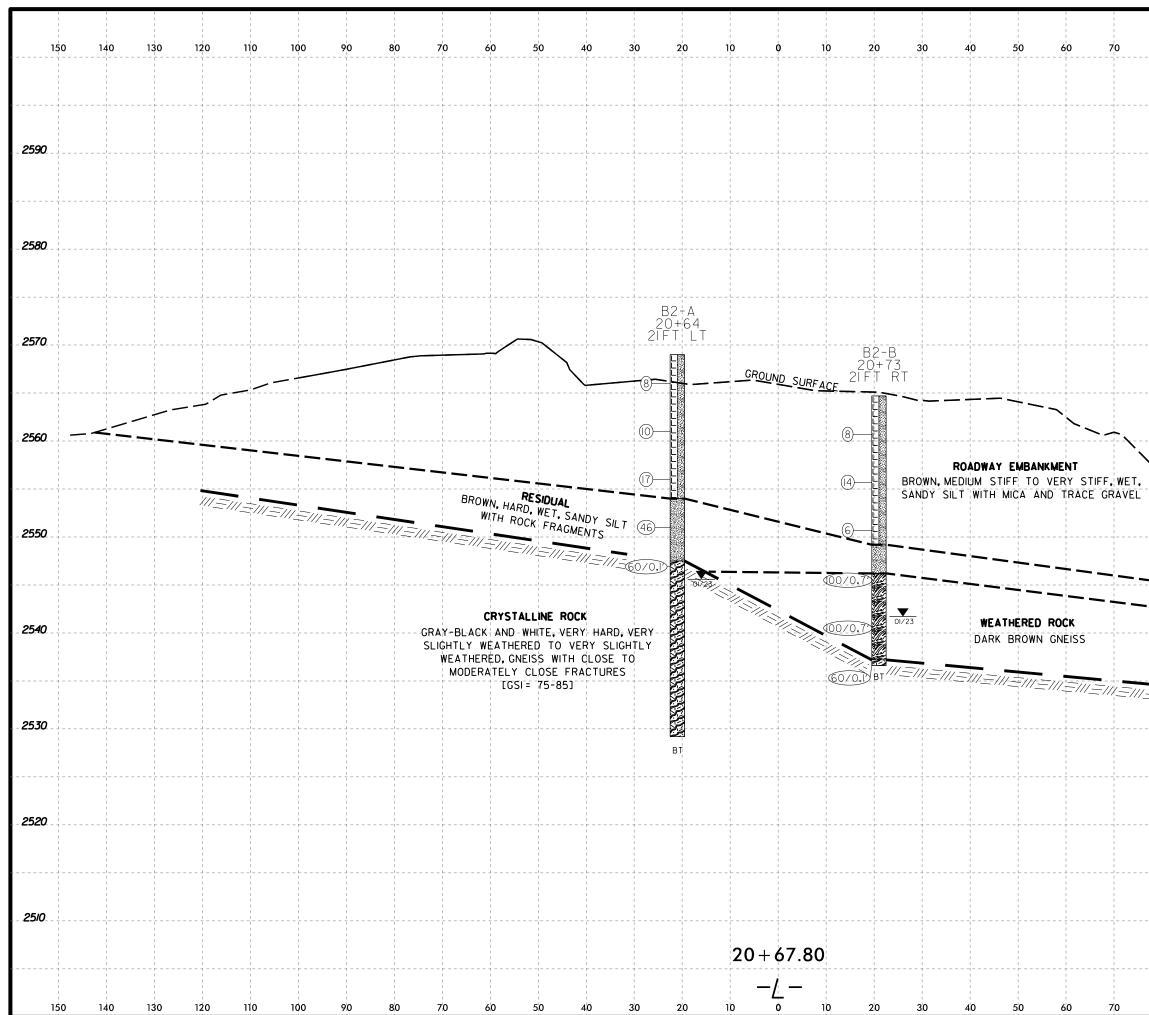




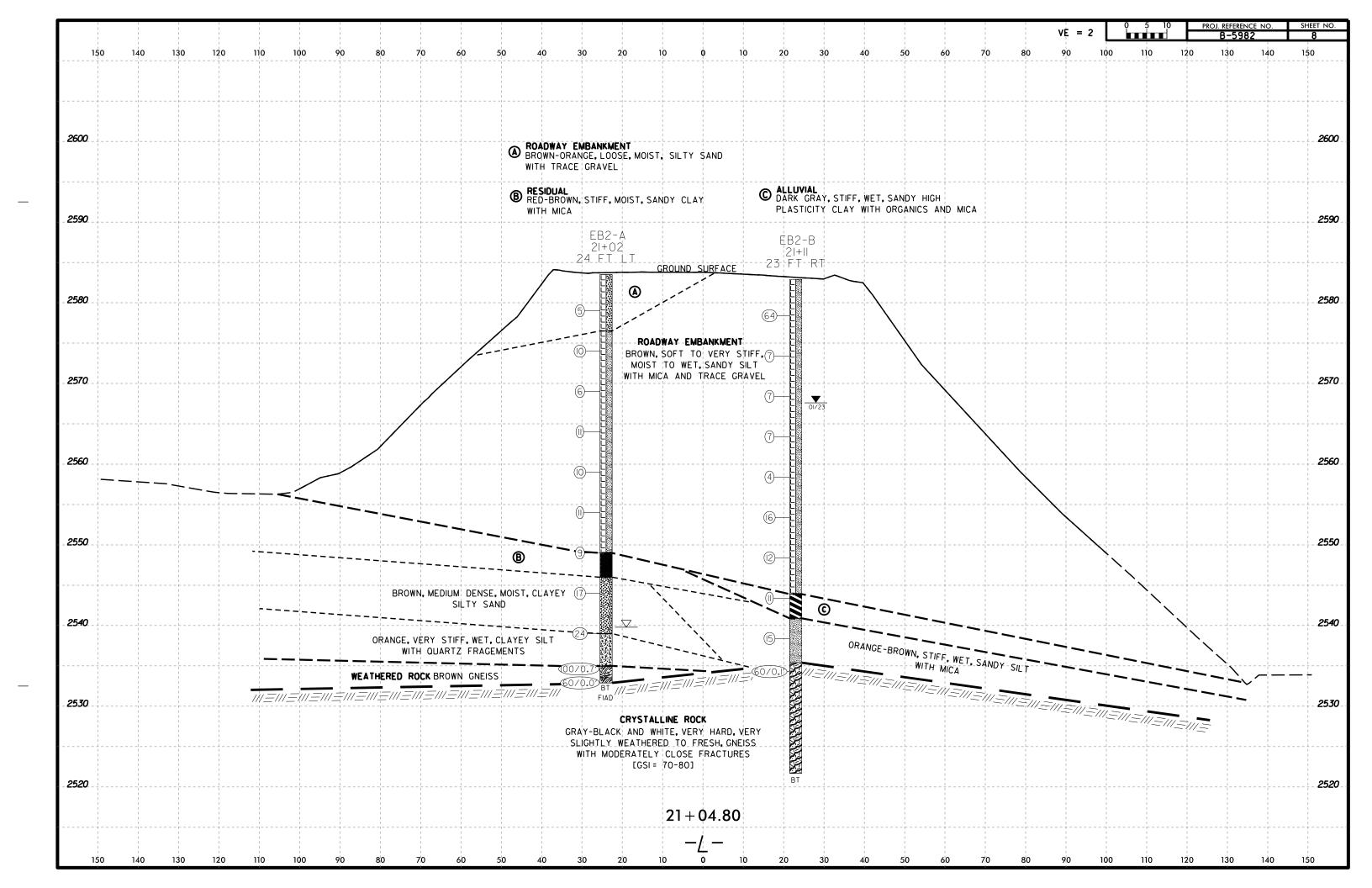




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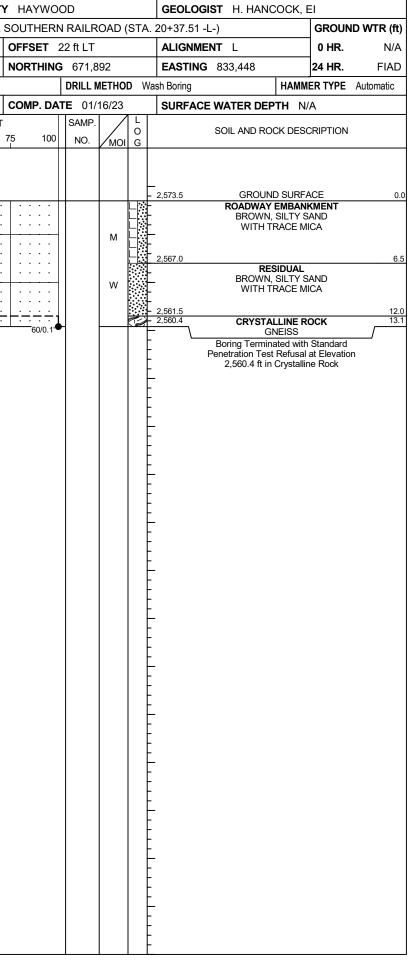
GEOTECHNICAL BORING REPORT

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OLLAR E	ELEV.	2,592	2.1 ft		тот	AL DE	РТН	49.8	3 ft		NO	RTHIN	IG 67	71,84	8		EAS	TING	833,	,421			24 HR.		20.9	со	LLAF	R ELE	/. 2,5	592.1 f	ft	Т	OTAL	DEP1	FH 49	9.8 ft		N	ORT	HING	671	,848		EAST	TING	833,4	21		24 H	२ .	20
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RILLER	•				STA	RT DA	TE	01/17	/23		СО	MP. D	ATE	01/1	8/23		SUR	RFACE	E WAT	FER D	DEPTH	H N/A	Ą			DR	ILLEI	R Est	tep, J.	E.		S	TART	DATE	E 01/	17/23		С	OMF	. DAT	E 01	1/18/23		SURF	FACE	WATE	R DEP	TH N	I/A		
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GEOTECHNICAL BORING REPORT

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BOF	RING NO). EB1-	-B		S	TATION 1	9+57		OFFSET	23 ft RT	-		ALIGN	MENT L	0 HR	. Dry	BOF	ring no	. B1-A	4		ST	ATION 2	20+04	
COL	LAR E	L EV. 2,	592.1	ft	Т	OTAL DEP	FH 33.5 f	t	NORTHIN	G 671,8	828		EASTI	IG 833,464	24 HR	. 20.3	COL	LAR EL	EV. 2,	573.5	ft	тс	OTAL DEP	TH 13.1	ft
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DRI	LER	Estep, J	. E.		S	TART DATE	E 01/30/2	3	COMP. DA	TE 01/	/30/23		SURFA	CE WATER DEPTH	N/A		DRI	L LER E	step, J	. E.		ST	ART DAT	E 01/16/2	23
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			REP	LACE					4 OVE) (STA		37.51 -L-)			JND WTR (ff	·				PLACE B	_				OVER	_	THERN RAILROAD (ST	,		GROUND W	• • •
BORIN					_	ATION				_	FSET				_	IGNMENT L		0 HR.			RING NO.				-		20+14				FSET 21 ft RT			0 HR.	N/A
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				E TRI	-	ME-55 87										ng w/ Advancer			E Automatic	DRII	LL RIG/HA	MMER E	FF./DAT	TE TRI94	435 CN	ME-55 8	7% 05/0	9/2022				NW Casing w/ Advancer	HAMMER	RTYPE Auto	omatic
DRILL		tep, J.			_						MP. DA				SU	RFACE WAT	ER DEPTH	N/A		_	LLER E	•	. E.		STA	RT DA	TE 01	/31/23		co	MP. DATE 01/31/23	SURFACE WATER DEP	TH N/A		
ELEV	ELEV	DEPTH							ER FOC			SAMF				SOIL	AND ROCK [DESCRIPTIO	N	CO		N/A			_		N 14.2								
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	0	75	100	NO.	<u>/</u> M	OI G	ELE\	′. (ft)			DEPTH (V RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	RUN RQD (ft) %	SAMP	P. REC.	RATA RQD (ft) %			DESCRIPTION AND REMARKS	s		
																				(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G					
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	f					· · · ·			· · · · · ·		· · · ·				Ļ.,		ADWAY EME OWN AND G	BANKMENT RAY SILTY S	SAND	2545	5 2,047.0	+ ^{22.0}	4.2	1:11/0.2 5:10/1.0 2:55/1.0	88%	50%		95%	5) (8.8) 5 62%			ND WHITE, HARD TO VERY HAP			22.5
2565	‡						· · · · · ·		· · ·		· · · · · ·							D TRACE MIC			2,542.8	26.7		5:10/1.0 2:55/1.0 4:17/1.0 6:02/1.0							- VERY SLIGH	'LY WEATHERED GNEISS WITH MODERATELY CLOSE FRACTU		USE IU	
2565 2	2,565.0	4.5	7	8	8					. .			N		<u> </u>					0540		ŧ	5.0	5:20/1.0 4:27/1.0	(5.0) 100%	(2.9) 58%					-	[GSI = 65-75]			
	1						• · · • · ·		· · ·		· · · · · ·									2540		ŧ		6:50/1.0 6:49/1.0							-				
2560 2	2,560.0	9.5					· <u>`</u>								Ł						2,537.8	31.7	1 1	9.40/1 0		(3.8)	RS-3	_			-				
	Ŧ		9	14	11		· •25 ·		· · ·		· · ·		W							2535	5 -	Ł		6:14/1.0 6:47/1.0 7:38/1.0	96%	76%	1.0-0	_1			-				
	Ŧ										- -				2,556	.5	RESIDU	<u> </u>	13	<u>o</u>	2,532.8	36.7		7:12/1.0 6:43/1.0						R	- 2,532.8				36.3
2555 2	2,555.0	14.5	14	14	70		<u> </u>			<u> </u>	•84		l v		F		BROWN SAN	IDY SILT				ł		2			1					ninated at Elevation 2,532.8 ft in	Crystalline	Rock	
	Ŧ						.				4 84 • •				F		WITH TRAC	E MICA			-	É									-				
2550 2	.550 n	19.5								. .	j. · ·				E	F			~~		-	Ŧ									-				
	+	10.0	30	19 8	1/0.2'						100/0.7				<u>- 2,549</u>		WEATHERE		20	0	-	Ŧ									-				
2	2,547.0	22.5	60/0'			· · · ·	.		· · ·	: :	· · · ·	•				.0	WN AND BL	ACK GNEISS	22	5	-	Ŧ									-				
2545	+	.								· ·					F	BLACK-0	GRAY, AND V	VHITE, HARE			-	ŧ									-				
	ŧ					· · · ·	.		· · · · · ·		· · · ·				F	SLIGHTL	Y WEATHER	ED GNEISS V	WITH		-	ŧ									-				
2540	‡					· · · ·	.		· · · ·		· · · · · ·				F	VERY CLO	FRACTU		LUSE		-	‡									- -				
2040	+									. .					-		[GSI = 68	5-75]			-	‡									-				
	‡					· · · ·			· · ·		· · ·	RS-3										ŧ									-				
2535	1					· · ·	· · ·			· ·			1		1						-	ţ													
	±						· _ · ·		· · ·	<u> </u>					2,532				36	7	-	ŧ									-				
	Ŧ														È	Boring Ter	minated at El Crystalline	evation 2,532 Rock	2.8 ft in		-	ŧ									-				
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GEOTECHNICAL BORING REPORT CORE LOG

		BORE LOG				CORE LOG	
WBS 47814.1.1	TIP B-5982 COUN	ITY HAYWOOD	GEOLOGIST H. HANCOCK, EI	WBS 47814.1.1	TIP B-5982 COUN	TY HAYWOOD GEOLOGIST H. HANCOC	K, El
SITE DESCRIPTION REPLACE	BRIDGE 430095 ON US 74 OVE	R SOUTHERN RAILROAD (STA. 2	0+37.51 -L-) GROUND WTR (ft)	SITE DESCRIPTION REPLACE	BRIDGE 430095 ON US 74 OVE	R SOUTHERN RAILROAD (STA. 20+37.51 -L-)	GROUND WTR (ft)
BORING NO. B2-A	STATION 20+64	OFFSET 21 ft LT	ALIGNMENT L 0 HR. N/A	BORING NO. B2-A	STATION 20+64	OFFSET 21 ft LT ALIGNMENT L	0 HR. N/A
COLLAR ELEV. 2,569.0 ft	TOTAL DEPTH 39.8 ft	NORTHING 671,944	EASTING 833,478 24 HR. 23.4	COLLAR ELEV. 2,569.0 ft	TOTAL DEPTH 39.8 ft	NORTHING 671,944 EASTING 833,478	24 HR. 23.4
DRILL RIG/HAMMER EFF./DATE TRI	9435 CME-55 87% 05/09/2022	DRILL METHOD NW	Casing w/ Advancer HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI	9435 CME-55 87% 05/09/2022	DRILL METHOD NW Casing w/ Advancer HA	AMMER TYPE Automatic
DRILLER Estep, J. E.	START DATE 01/18/23	COMP. DATE 01/19/23	SURFACE WATER DEPTH N/A	DRILLER Estep, J. E.	START DATE 01/18/23	COMP. DATE 01/19/23 SURFACE WATER DEPTH	N/A
ELEV DRIVE DEPTH BLOW COU	NT BLOWS PER FOO		SOIL AND ROCK DESCRIPTION	CORE SIZE NQ	TOTAL RUN 17.7 ft		
(ft) ELEV (ft) 0.5ft 0.5ft	0.5ft 0 25 50	75 100 NO. MOI G E		ELEV RUN DEPTH RUN DRILL	REC. ROD (ft) (ft) (ft) NO. (ft) (ft) (ft)) % %		
				(ft) ELEV (ft) (ft) (Min/ft)	REC. RQD SAMP. REC. RQD (ft) (ft) (ft) NO. (ft) %	G DESCRIPTION AND REMARKS	
2570				2546.9			
			,569.0 GROUND SURFACE 0.0 ROADWAY EMBANKMENT	2,546.9 22.1 2.7 5:14/0.1 2545 5:30/1.0	7 (2.7) (2.7) 0 100% 100%	CRYSTALLINE ROCK GRAY-BLACK AND WHITE, VERY HARD, SLIGHTLY T	O VERY SLIGHTLY
2,567.0 2.0 3 3	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		BROWN,SANDY SILT WITH MICA AND TRACE GRAVEL	T 5.0 6:17/1.0	0 (5.0) (2.7)	WEATHERED GNEISS WITH CLOSE TO MODER	ATELY CLOSE
2565		- <mark>-</mark> _		T 3:55/1.0	0 100% 54% 0	[GSI = 75-85]	
2,562.0 7.0				2540 4:30/1.1 2,539.2 29.8 6:02/1.1	0		
2,562.0 7.0 4 4	6				0 (5.0) (5.0) 0 100% 100%		
				2535	0		
2,557.0 12.0 5 9	8			2,534.2 34.8 6:21/1.0	0 0 (5.0) (5.0) RS-2		
2555			554.0		0 100% 100%		
	· · · · · · · · · · · · · · · · · · ·	·· · · · ·		<u>2530</u> <u>+</u> 5:39/1.1 2,529.2 39.8 5:45/1.1		Begin Coring @ 22.1 ft CRYSTALLINE ROCK GRAY-BLACK AND WHITE, VERY HARD, SLIGHTLY T WEATHERED GNEISS WITH CLOSE TO MODER FRACTURES [GSI = 75-85]	<u>39</u> .
2,552.0 17.0 7 17	29 · · · · · · · · · · · · •	: : : : : w =	BROWN, SANDY SILT WITH ROCK FRAGMENTS AT ~18 FEET			Boring Terminated at Elevation 2,529.2 ft in Crys	stalline Rock
2550							
2,547.0 22.0			<u>.547.5</u> 21.5 CRYSTALLINE ROCK				
2545		€ 60/0.1'●	GRAY-BLACK AND WHITE, VERY HARD, SLIGHTLY TO VERY SLIGHTLY				
			WEATHERED GNEISS WITH CLOSE TO				
			MODERATELY CLOSE FRACTURES [GSI = 75-85]				
2540							
2535							
2530		2	,529.2 39.8				
			Boring Terminated at Elevation 2,529.2 ft in Crystalline Rock				
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GEOTECHNICAL BORING REPORT CORE LOG

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	4781						B-5982				UNTY									HANCOCK, E	-			3 478					IP B-5			COUN	
				PLAC						74 O\) (S	TA. :	20+37.51	-		GROUND	• • •					PLAC				ON US 7	74 OVE	
) . B2-					ION 2							21 ft R				ALIGNN			0 HR.	N/A). EB				TATION				OF
		_EV . 2					AL DEP					NOR	THING	G 671,					G 833,51		24 HR.	23.0			LEV. 2						1 50.6 f		NC
		AMMER		TE '	rri943	5 CME	E-55 879	% 05/	09/202	2							Muo	d Rotary		HAMM	IER TYPE	Automatic					ATE T				05/09/2022		
DRIL		Estep, .	-			STAR	RT DAT					COM	P. DA	TE 01		3		SURFA		R DEPTH N/	/A		DRIL		Estep,						01/16/2		CC
ELEV (ft)	DRIVE ELEV (ft)	DEPTI (ft)	· —	OW C(DUNT	it 0		BL 25	LOWS	PER F 50		75	100	SAMF NO.	17			ELEV. (ft)	SOIL AN	ID ROCK DESC	CRIPTION	DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPT (ft)	···	OW CC 0.5ft	_	0	25	BLOWS	PER FOC 50 1	OT 75
2565		<u> </u>			_			1.		1.					_			2,564.7		ROUND SURFA		0.0	2585		$\frac{1}{2}$								
2560	_2,561.7	7 <u>3.0</u>	3	4	4		• • • • • • • • • • • • • • • • • • •	· ·	· · · · · · · ·		· · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		w			-		OWN, SANDY WITH MICA	SILT		2580	2,580.	0 3.5	3	3	2	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	· · · · ·		· · ·
2555		+	5	6	8				· · · ·		· · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·		w								2575	2,575.	- 0- 8.5 -	5	5	5		10 -	· · · · ·	· · · · · · · · · · · · · · · · · · ·	· · ·
2550	2,551.7	7 <u>+ 13.0</u> + + +	3	3	3			· – 1	· · · ·	· ·	· · · ·	· · ·	· · · ·		w			2,549.2		RESIDUAL		15.5	2570	2,570.	0 13.5	3	3	3 • • •	· · · · · · · · · · · · · · · · · · ·	· · · · ·		· ·
2545	2,546.7	7 <u>+ 18.0</u> + + +	30	64	36/0.	.2'	· · · · ·		· · · ·	+ -	· · · ·	1(2,546.2	w	BROWN, SAN E ATHERED RC K BROWN, GN	оск	18.5	2565	2,565.	0 18.5	3	5	6		· · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·
2540	2,541.7	7 <u> </u>	36	60	40/0.	.2'	· · · · ·	· ·	· · · ·		· · · ·	· · · · · · · 10	· · 00/0.7'										2560	2,560.	0 23.5	3	5	5	T T	 10 ·	· · · · ·	· · · · · · ·	· · · · ·
	2.536.7	$\frac{7}{28.0}$	60/0.1				· · · · ·		· · · ·		 		 60/0.1'					2,537.2	Boring T	YSTALLINE R GNEISS erminated with	n Standard	27.5 28.1	2555	2,555.	0 28.5	3	4	7		· · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · ·
																				n Test Refusal 6 ft in Crystallir			2550	2,550.	0 33.5	3	3	6		· · ·	· · · · · · · · · · · · · · · · · · ·		· · ·
																							2545	2,545.	0 38.5	5	7	10		· · · · ·	· · · · · · · · · · · · · · · · · · ·	
																							2540	2,540.	43.5					€17 : \` : \`	· · · · ·	· · · · · · · · · · · · · · · · · · ·	. .
																								2,535.			7	17		· · 1	24 • • • • • • • • • • • • •		· ·
																		_						2,532.	9 <u>+ 50.6</u>			-		· · · ·	 		· ·
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SHEET 13

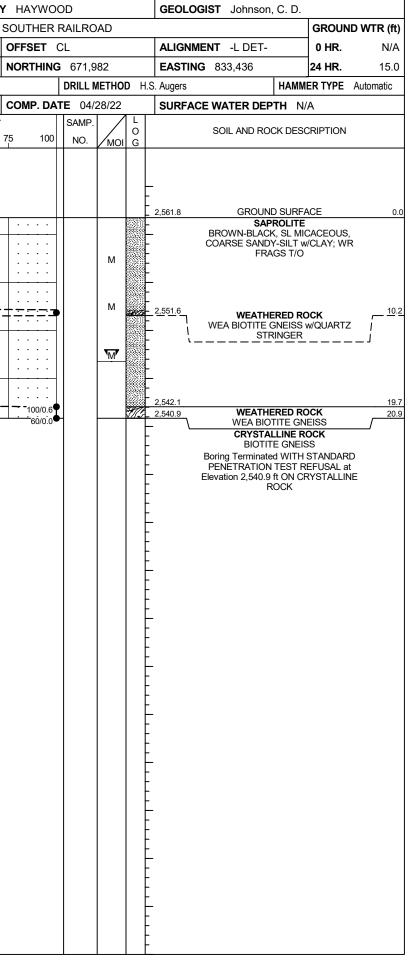
IT	HAYWO	0	D			GEOLC	GIST H. HA	ANCOCK, E	El	
R	SOUTHERI	Ν	RAILR	OAD (STA.	20+37.5	-L-)		GROUN	ID WTR (ft)
	OFFSET	24	4 ft LT			ALIGN	MENT L		0 HR.	43.7
	NORTHING	G	671,9	78		EASTIN	IG 833,495		24 HR.	FIAD
			DRILL N	IETHO	D H.S	S. Augers		HAMM	ER TYPE	Automatic
	COMP. DA	T	E 01/ ⁻	16/23		SURFA		DEPTH N/	A	
тс			SAMP.		L O	•		ROCK DESC		
	75 100		NO.	моі	G			NOOK DEG		
						_				
	1				-	2,583.5		UND SURFA		0.0
•							BROWN-C	RANGE, SIL	TY SAND	
				М		-	WITH	TRACE GRA	AVEL	
						0.570.5				7.0
						2,576.5	BRO	WN, SANDY	SILT	7.0
				М	L))-	- \	WITH TRACE G	GRAVEL AND	TRACE N	/ICA
						-				
				М						
				м		-				
•					LW					
					LWF					
				М		-				
						-				
				М						
				м		2,549.0				34.5
•								RESIDUAL OWN, SAND	Y CLAY	
•						2,546.0		WITH MICA CLAYEY SIL	TY SAND	37.5
•				М	L		,			
_				-	Ĺ	2,539.0				44.5
	• • • •				N V			GE, CLAYEY JARTZ FRAG		
					Ň	2,535.0				48.5
-	• 100/0.7'				Ø	2,532.9		THERED RO		50.6
•	60/0.0'				-		Boring Ter	minated with	Standard	
						-	Penetration 2,532.9 f	Test Refusal t on Crystallii	ai ⊨levatio ne Rock	11
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WBS 47814 1 1	TIP B-5982 COUNTY HAYWOOD			WBS 47814.1.1		TY HAYWOOD	GEOLOGIST H. HANCOCK, EI
	RIDGE 430095 ON US 74 OVER SOUTHERN F		GEOLOGIST H. HANCOCK, EI . 20+37.51 -L-) GROUND WTR (ft)	WBS 47814.1.1 SITE DESCRIPTION REPLACE E			, , , , , , , , , , , , , , , , , , , ,
			· · · · · · · · · · · · · · · · · · ·			,	, , , , , , , , , , , , , , , , , , , ,
	STATION 21+11 OFFSET 23 TOTAL DEPTH 21 - 21		ALIGNMENT L 0 HR. N/A	BORING NO. EB2-B	STATION 21+11	OFFSET 23 ft RT	ALIGNMENT L 0 HR. N/A
	TOTAL DEPTH 61.2 ft NORTHING			COLLAR ELEV. 2,582.9 ft	TOTAL DEPTH 61.2 ft	NORTHING 671,963	EASTING 833,539 24 HR. 15.3
DRILL RIG/HAMMER EFF./DATE TRI94	,			DRILL RIG/HAMMER EFF./DATE TRI9			W Casing w/ Advancer HAMMER TYPE Automatic
· · · · · · · · · · · · · · · · · · ·	START DATE 01/20/23 COMP. DATE		SURFACE WATER DEPTH N/A	DRILLER Estep, J. E.	START DATE 01/20/23	COMP. DATE 01/30/23	SURFACE WATER DEPTH N/A
ELEV DRIVE (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.5		SAMP. U C NO. MOL G	SOIL AND ROCK DESCRIPTION		TOTAL RUN 12.6 ft		
		NO. MOI G	ELEV. (ft) DEPTH (ft)	(ff) ELEV (ff) (ff) RATE	RUN REC. RQD (ft) SAMP. STRATA REC. (ft) (ft) NO. (ft) (ft) (ft) % % % % % %		DESCRIPTION AND REMARKS
					<u>%</u> % <u>%</u> % <u>%</u>		
2585			-	2534.3 2,534.3 48.6 2.6 3:00/0.6	6 (2.6) (2.6)		Begin Coring @ 48.6 ft CRYSTALLINE ROCK
			2,582.9 GROUND SURFACE 0.0 ROADWAY EMBANKMENT 0.0		6 (2.6) (2.6) 0 100% 100% 0 (4.6) (4.5)	GRAY-BLACK, ANL	O WHITE, VERY HARD, VERY SLIGHTLY WEATHERED NEISS WITH MODERATELY CLOSE FRACTURES
2580 - 2,579.4 3.5			BROWN SANDY SILT	<u>2530</u> <u>-</u> 5.0 6.51/1.0 6:53/1.0 6:55/1.0			[GSI = 70-80]
	10	w L		2,526.7 56.2 0.05/1.0 9:26/1.0 11:35/1.0			
			:	2525 5.0 15:45/1.0 9:15/1 0	0 (5.0) (5.0) 0 100% 100% RS-4 /	GRAY-BLACK, AND TO FRESH G	
2575 2,574.4 8.5 3 3 4	4		-			R .	
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $:	2,521.7 61.2 8:15/1.0 7:31/1.0		2,321.7	ninated at Elevation 2,521.7 ft in Crystalline Rock
2570 2.569.4 13.5			<u> </u>				ft at 24 hr. Water depth not true GW (likely drill mud).
	3		:				ת מו ביד הוו. זיזמנסו עסףוה חטר וו עם שזיז (ווגפוץ ערווו חועע).
			<u> </u>			I E	
2565 2,564.4 18.5 2 3 4	4 · · · · · · · · · · · · · · · · · ·		-			F	
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $:			[
2560 2,559.4 23.5			-				
	2	w L					
			-				
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	′ . ● 11		ALLUVIAL DARK GRAY SANDY HIGH PLASTICITY				
2540 0 500 + 40 5			<u>2.540.9</u> WITH ORGANICS AND MICA				
2,539.4 43.5 4 6 9	9	w	- RESIDUAL ORANGE-BROWN SANDY SILT				
			- 2,535.4				
2535 2,534.4 48.5 60/0.1	60/0.1 ¹					E	
			VERY SLIGHTLY WEATHERED TO FRESH GNEISS WITH MODERATELY CLOSE			[
2530 -	····		GNEISS WITH MODERATELY CLOSE FRACTURES [GSI = 70-80]			[-	
		RS4	[USI = 70-80]				
			:	$ \pm $		I E	
		RS-4	-				
			- 2,321.7				
			- Boring Terminated at Elevation 2,521.7 ft in - Crystalline Rock				
			- Caved at 15.5 ft at 24 hr. Water depth not				
			true GW (likely drill mud).			ΙE	
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GEOTECHNICAL BORING REPORT CORE LOG

WBS	478	14.1.1			ТІ	P B-598	2	COUNT	ry haywc	OD			GEO	.OGIST Johns	on, C. D.	1			47814					Р В-5			COUN	
SITE	DESC	RIPTIC	N RE	PLACE	BRID	GE 4300	95 ON US	S-74 OVEF	R SOUTHER	RAILRC	DAD						(ft)	SITE	DESCR		REF	PLACE	BRID	GE 43	0095 0	ON US-7	74 OVER	۲S
BOR	ING NO) . B-2			SI	TATION	17+70		OFFSET	12 ft RT			ALIG	MENT -L DE	т-	0 HR.	Dry	BOR	ING NO	В-3			ST		N 18+	81		C
COL	LAR EI	LEV.	2,587.0	ft	т	DTAL DEP	PTH 23.6	6 ft	NORTHIN	G 671,8	381		EAST	ING 833,389		24 HR.	Dry	COL	LAR ELI	EV. 2,	561.81	ft	тс	OTAL D	DEPTH	20.9 f	t	N
DRILL	RIG/H	AMMER	EFF./D/	ATE A	-06744	CME - 45C	96% 04/08	/2019		DRILL	METH	OD H	I.S. Augers		НАММ	IER TYPE Automa	tic	DRIL	L RIG/HA	MMER E	FF./DA	TE AF	-06744	CME - 4	5C 96%	04/08/20	19	
DRIL	LER	Coffey	Jr., C.		ST		FE 05/02	2/22	COMP. DA	TE 05/	02/55	5	SURF	ACE WATER D				DRIL	LER C	offev.	Jr., C.		ST		DATE	04/28/2	2	
ELEV	DRIVE			ow co				S PER FOO		SAMP.		_ / L	1001.					ELEV	DRIVE	DEPTH	1	W CO					PER FOO	_
elev (ft)	ELEV (ft)	(ft)	···	0.5ft		0	25	50	75 100		17	O DI G	ELEV. (f		ROCK DES	CRIPTION DEP1	ГЦ <i>(</i> 1)	(ft)	ELEV (ft)	(ft)		0.5ft		0	25		50	7
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SHEET 15







Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 01/25/2023

 Sample No.:
 RS-1
 Location:
 Boring EB1-A
 Depth (ft):
 46.3

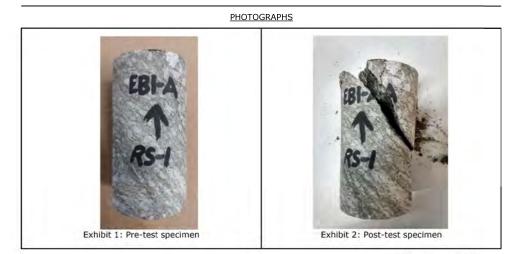
 Test Specimen Weight (lb):
 1.21
 Calc. Unit Weight (lb/CF):
 172.7

Cor	e Diameter, D	(in)	
#1	#2	Average	#1
1.982	1.982	1.982	3.92

Core Length, L (in)				
#1	#2	#3	Average	
3.920	3.920	3.930	3.923	

		Compressive Strength	
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.979	3.09	5,807	1,880
			Test Method: C

Comments:





Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 02/07/2023

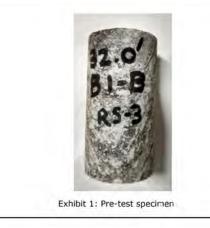
Sample No.: <u>RS-3</u> Location: <u>Boring B1-B</u> Depth (ft): <u>32.0</u>

Test Specimen Weight (lb): <u>1.21</u>

Core Diameter, D (in)						
#1	#2	Average				
1.971	1.972	1.972				

L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.995	3.05	8,815	2,890
			Test Method: C

<u>Comments:</u> Specimen broke along seam



B-5982

16

Rock Core Compressive Strength (ASTM D7012)

Calc. Unit Weight (lb/CF): <u>174.1</u>

	Core Leng	gth, L (in)	
#1	#2	#3	Average
3.934	3.927	3.938	3.933

Comprossive Strength

PHOTOGRAPHS Exhibit 2: Post-test specimen





Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 01/25/2023

Sample No.: RS-2 Location: Boring B2-A Depth (ft): 34.3

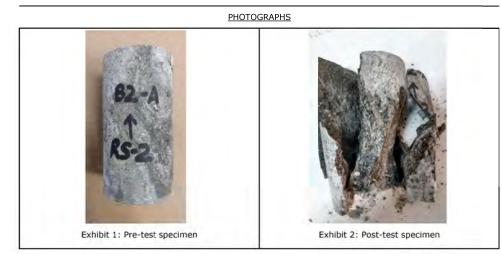
 Test Specimen Weight (lb):
 1.21
 Calc. Unit Weight (lb/CF):
 172.1

Cor	e Diameter, D	(in)	_	
#1	#2	Average		
1.982	1.984	1.983		

Core Length, L (in)				
#1	#2	#3	Average	
3.930	3.930	3.940	3.933	

		Compressive Strength	
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.984	3.09	20,278	6,560
			Test Method: C

Comments:





Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 02/07/2023

Sample No.: <u>RS-4</u> Location: <u>Boring EB2-B</u> Depth (ft): <u>57.3</u>

Test Specimen Weight (lb): <u>1.19</u>

Core Diameter, D (in)						
#1	#2	Average				
1.956	1.957	1.957				

L/D Ratio	tio Cross-Sectional Area (in ²) Applied Load (lbf) Compressive Strength		Compressive Strength (psi)
2.042	3.01	24,567	8,160
			Test Method: C

Comments:



B-5982

17

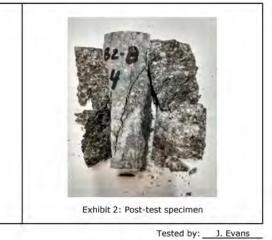
Rock Core Compressive Strength (ASTM D7012)

Calc. Unit Weight (lb/CF): <u>171.2</u>

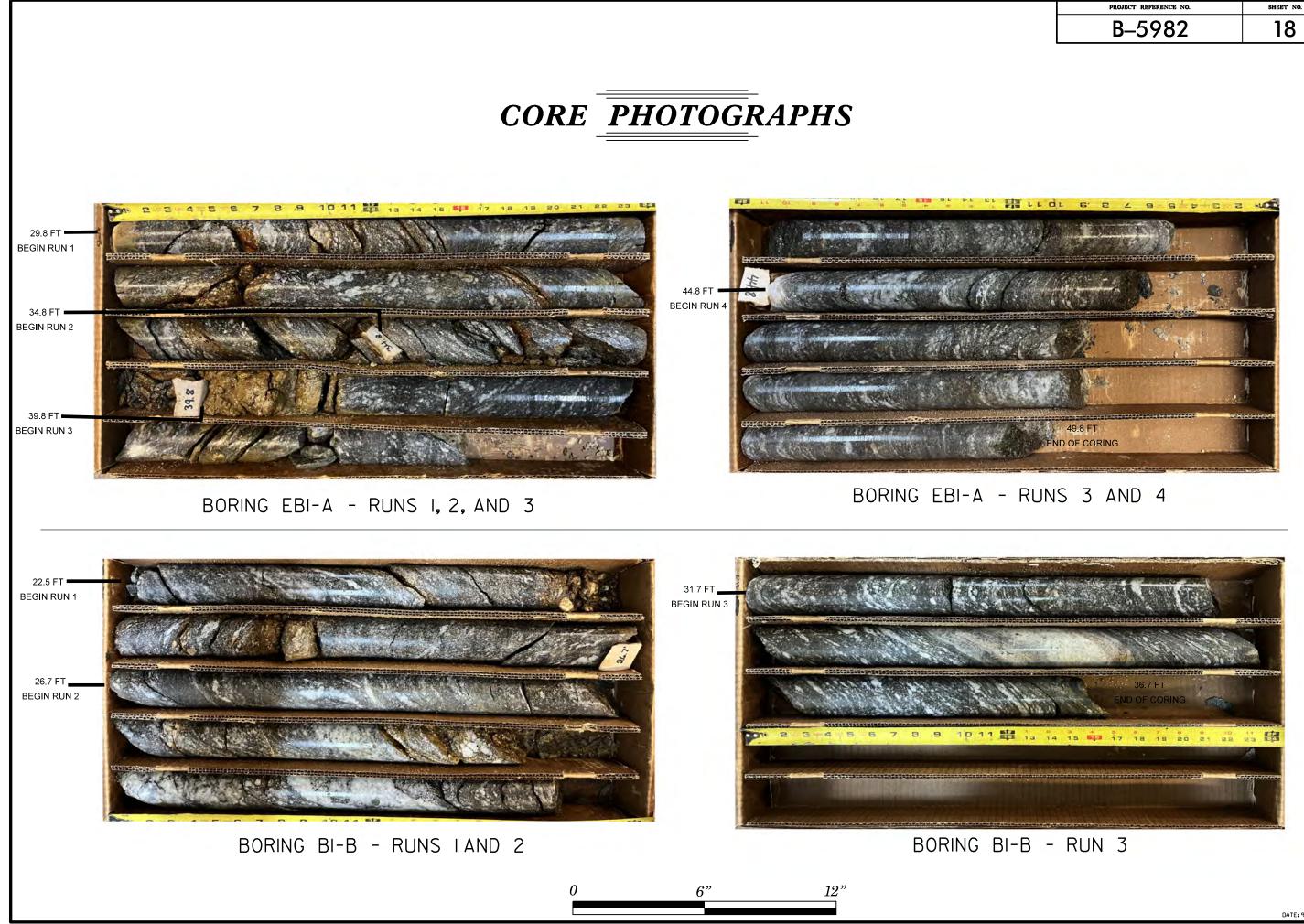
Core Length, L (in)						
#1	#2	#3	Average			
3.994	3.994	4.000	3.996			

Compressive Strength

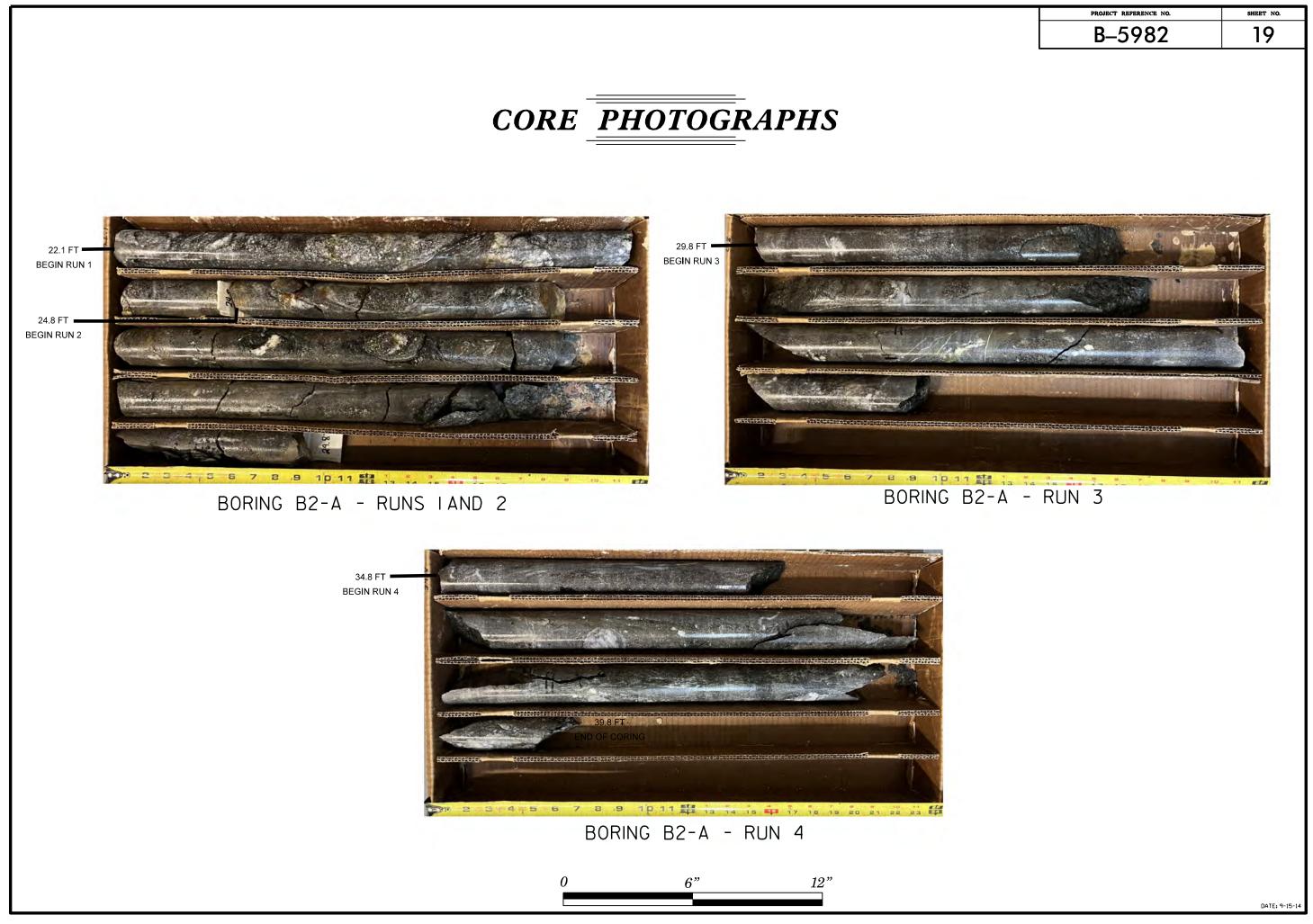
PHOTOGRAPHS

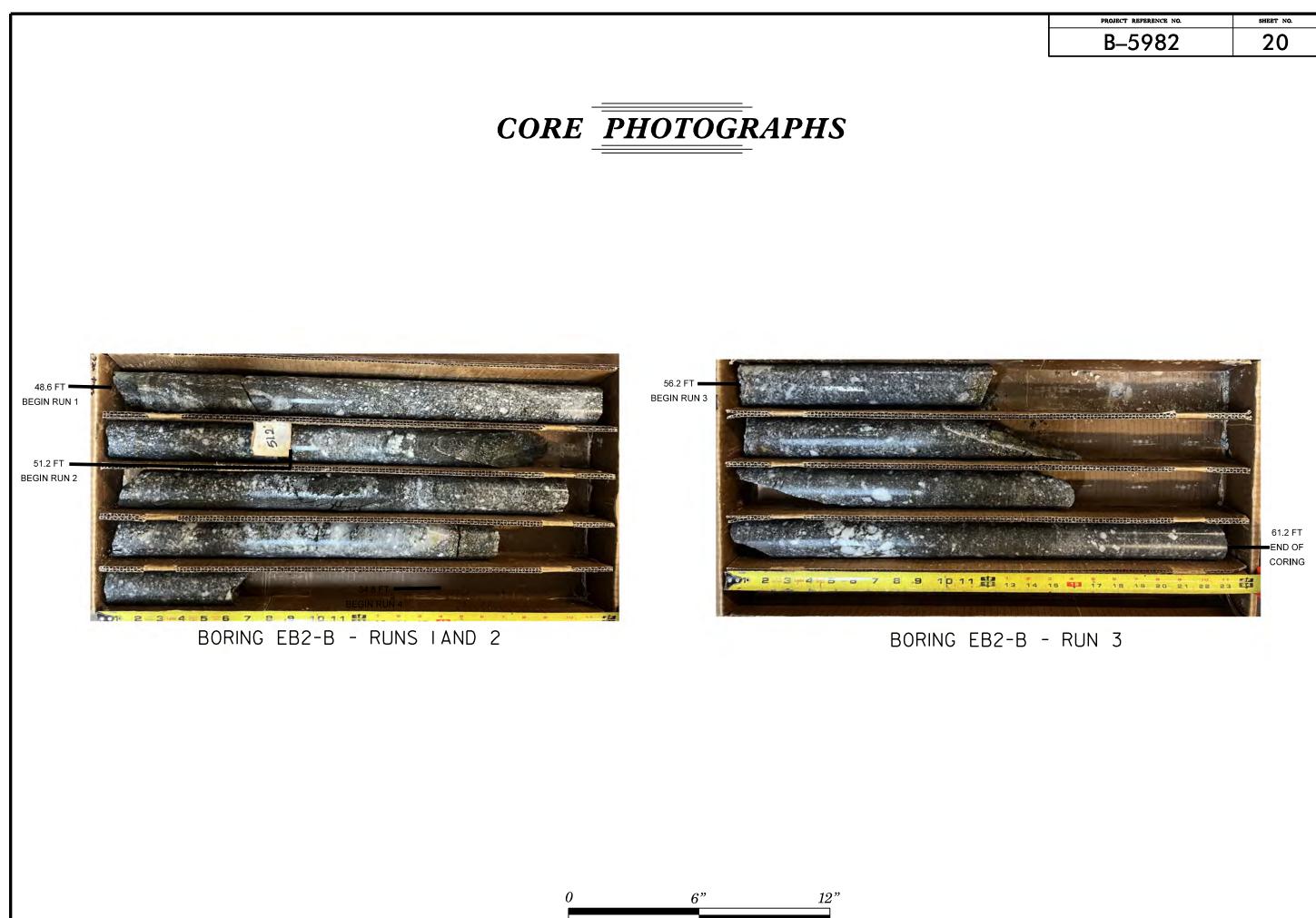


DATE: 9-15-14

















21