5898 3186/B Ŕ REFERENCE

332/48030 38. PROJEC

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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_HAYWOOD

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (CRABTREE RD.) TO EAST OF RUSS AVE. SITE DESCRIPTION BRIDGE NO. 168 ON -YIRT- (US 19) OVER -L-, -L LT- AND -L RT- (US 74 /US 23) BETWEEN US 276 AND NC 209



CAUTION NOTICE

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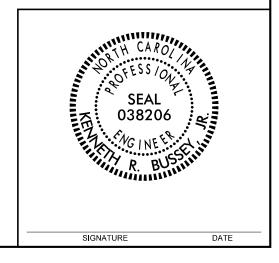
INVESTIGATED BY _____. **C. SWAFFORD**

DRAWN BY <u>*T.LYNN*</u>

CHECKED BY K. BUSSEY

SUBMITTED BY _______

DATE NOVEMBER 2021



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

	SOIL D	ESCRIPTION			GRADATION				SCRIPTION
	UNCONSOLIDATED, SEMI-CONS A CONTINUOUS FLIGHT POW				NTES A GOOD REPRESENTATION OF PARTIC INDICATES THAT SOIL PARTICLES ARE AL				WOULD YIELD SPT REFUSAL IF TESTE ASTAL PLAIN MATERIAL WOULD YIELD
ACCORDING TO THE	STANDARD PENETRATION TES	ST (AASHTO T 206,ASTM D1	586). SOIL CLASSIFICATION		ES A MIXTURE OF UNIFORM PARTICLES ARE AL		SPT REFUSAL IS	S PENETRATION BY A SPLIT SPOON S COASTAL PLAIN MATERIAL, THE TR	SAMPLER EQUAL TO OR LESS THAN 0.1
CONSISTENCY, COLOR,	E AASHTO SYSTEM, BASIC D TEXTURE, MOISTURE, AASHTO	CLASSIFICATION, AND OTHER	R PERTINENT FACTORS SUCH		ANGULARITY OF GRAIN	١S	REPRESENTED B	BY A ZONE OF WEATHERED ROCK.	
	SICAL COMPOSITION, ANGULAR RAY, SILTY CLAY, MOIST WITH INTE			THE ANGULARI	TY OR ROUNDNESS OF SOIL GRAINS IS DE			S ARE TYPICALLY DIVIDED AS FOLLO	
	OIL LEGEND AND			ANGULAR, SUBA	NGULAR, SUBROUNDED, OR ROUNDED.		WEATHERED ROCK (WR)	100 BLOWS PER F	AIN MATERIAL THAT WOULD YIELD SPT FOOT IF TESTED.
	GRANULAR MATERIALS	SILT-CLAY MATERIALS	ORGANIC MATERIALS		MINERALOGICAL COMPOSI		CRYSTALLINE		GRAIN IGNEOUS AND METAMORPHIC RO
	≤ 35% PASSING #200)	(> 35% PASSING *200)	URGANIC MATERIALS		AMES SUCH AS QUARTZ, FELDSPAR, MICA, T IN DESCRIPTIONS WHEN THEY ARE CONSID		ROCK (CR)	WOULD YIELD SPT	FREFUSAL IF TESTED. ROCK TYPE INC
GROUP A-1 CLASS. A-1-a A-1-b	A-3 A-2 A-2-4 A-2-5 A-2-6 A-2-	A-4 A-5 A-6 A-7 7 A-7-5 A-7-6	A-1, A-2 A-4, A-5 A-3 A-6, A-7	HILL USED	COMPRESSIBILITY	ENED OF SIGNIFICANCE.	NON-CRYSTALLIN	FINE TO COARSE	GRAIN METAMORPHIC AND NON-COASTA
000000000	H-2-4 H-2-5 H-2-6 H-2-	A-7.6		SLIC	GHTLY COMPRESSIBLE	LL < 31	ROCK (NCR)	ROCK TYPE INCLU	CK THAT WOULD YEILD SPT REFUSAL I JDES PHYLLITE, SLATE, SANDSTONE, ETC
000000000					ERATELY COMPRESSIBLE HLY COMPRESSIBLE	LL = 31 - 50 LL > 50	COASTAL PLAIN SEDIMENTARY R		SEDIMENTS CEMENTED INTO ROCK,BUT ICK TYPE INCLUDES LIMESTONE,SANDS
2 PASSING *10 50 MX			GRANULAR SILT- MUCK		PERCENTAGE OF MATER		(CP)	SHELL BEDS, ETC.	-
*40 30 MX 50 MX 5			SOILS CLAY PEAT				1	WEAT	HERING
	10 MX 35 MX 35 MX 35 MX 35 M	X 36 MN 36 MN 36 MN 36 MN		ORGANIC MATERIA TRACE OF ORGANIC		OTHER MATERIAL TRACE 1 - 10%		OCK FRESH, CRYSTALS BRIGHT, FEW JOIN AMMER IF CRYSTALLINE.	NTS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING #40				LITTLE ORGANIC MA	TTER 3 - 5% 5 - 12%	LITTLE 10 - 20%			,SOME JOINTS MAY SHOW THIN CLAY CO
LL –		N 40 MX 41 MN 40 MX 41 MN	SOILS WITH LITTLE OR	MODERATELY ORGANI HIGHLY ORGANIC	C 5 - 10% 12 - 20% > 10% > 20%	SOME 20 - 35% HIGHLY 35% AND ABOVE	(V SLI.) CF	RYSTALS ON A BROKEN SPECIMEN FACE	SHINE BRIGHTLY. ROCK RINGS UNDER H
PI 6 MX GROUP INDEX Ø	0 0 4 MX	N 10 MX 11 MN 11 MN 8 MX 12 MX 16 MX ND MX	MODERATE ORGAN		GROUND WATER			F A CRYSTALLINE NATURE.	
	0 0 4 MX	6 MX 12 MX 16 MX NU MX	AMOUNTS OF SOILS			TELY AFTER ORIGING) AND DISCOLORATION EXTENDS INTO RO . IN GRANITOID ROCKS SOME OCCASIONAL
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND	FINE SILTY OR CLAYEY SAND GRAVEL AND SAND	SILTY CLAYEY SOILS SOILS	MATTER		WATER LEVEL IN BORE HOLE IMMEDIA		CF	RYSTALS ARE DULL AND DISCOLORED. C	RYSTALLINE ROCKS RING UNDER HAMMER
MATERIALS SAND	SHNU GRAVEL HNU SHNU	50115 50115			STATIC WATER LEVEL AFTER 24 H				ISCOLORATION AND WEATHERING EFFECTS DULL AND DISCOLORED, SOME SHOW CLA
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR UNSUITA	BLE VPW	PERCHED WATER, SATURATED ZONE, OR	WATER BEARING STRATA			SHOWS SIGNIFICANT LOSS OF STRENGTH
	PIOF A-7-5 SUBGROUP IS ≤ LL ·	30 + PLOF A-7-6 SUBCROUP IS >			SPRING OR SEEP			ITH FRESH ROCK.	
r		Y OR DENSENESS	- LL - 30		MISCELLANEOUS SYMBO				DR STAINED. IN GRANITOID ROCKS, ALL F KAOLINIZATION. ROCK SHOWS SEVERE LO
		RANGE OF STANDARD	RANGE OF UNCONFINED			20	(MOD. SEV.) AN	ND CAN BE EXCAVATED WITH A GEOLOGI	IST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	PENETRATION RESISTENCE (N-VALUE)	COMPRESSIVE STRENGT (TONS/FT ²)	H L ROADWAY EM	BANKMENT (RE) 25/025 DIP & DIP DIR DESCRIPTION DF ROCK STRU		_	F TESTED, WOULD YIELD SPT REFUSAL	
	VERY LOOSE	< 4			- SPT				OR STAINED. ROCK FABRIC CLEAR AND E IN GRANITOID ROCKS ALL FELDSPARS A
GENERALLY GRANULAR	LOOSE	4 TO 10		SOIL SYMBOL		ING VINSTALLATION		O SOME EXTENT. SOME FRAGMENTS OF S F TESTED, WOULD YIELD SPT N VALUES	
MATERIAL	MEDIUM DENSE DENSE	10 TO 30 30 TO 50	N/A		FILL (AF) OTHER AUGER BORING	CONE PENETROMETER			DR STAINED. ROCK FABRIC ELEMENTS AR
(NON-COHESIVE)	VERY DENSE	> 50				U lest	SEVERE BU	UT MASS IS EFFECTIVELY REDUCED TO	SOIL STATUS, WITH ONLY FRAGMENTS OF
	VERY SOFT	< 2	< 0.25	- INFERRED SC	DIL BOUNDARY - CORE BORING	SOUNDING ROD			OF ROCK WEATHERED TO A DEGREE THAT MAIN. <u>IF TESTED, WOULD YIELD SPT N V</u>
GENERALLY SILT-CLAY	SOFT MEDIUM STIFF	2 TO 4 4 TO 8	0.25 TO 0.5 0.5 TO 1.0	INFERRED RO	DCK LINE MW MONITORING WE	ILL + TEST BORING WITH CORE			OT DISCERNIBLE, OR DISCERNIBLE ONLY
MATERIAL	STIFF VERY STIFF	8 TO 15 15 TO 30	1 TO 2 2 TO 4				SC	CATTERED CONCENTRATIONS. QUARTZ MA	AY BE PRESENT AS DIKES OR STRINGERS
(COHESIVE)	HARD	> 30	> 4	TTTTT ALLUVIAL SC	INSTALLATION	- SPT N-VALUE	HL	LSO AN EXAMPLE.	
	TEXTURE	OR GRAIN SIZE			RECOMMENDATION SYMB	OLS	VERY HARD CA		HARDNESS
U.S. STD. SIEVE SIZE	4 10	40 60 200	270		UNCLASSIFIED EXCAVATION -	UNCLASSIFIED EXCAVATION -		EVERAL HARD BLOWS OF THE GEOLOGIST	ARP PICK. BREAKING OF HAND SPECIMENS T'S PICK.
OPENING (MM)	4.76 2.00	0.42 0.25 0.075	0.053	SHALLOW	UNSUITABLE WASTE	USED IN THE TOP 3 FEET OF			ONLY WITH DIFFICULTY. HARD HAMMER BL
	BBLE GRAVEL	COARSE FINE SAND SAND	SILT CLAY	UNDERCUT	ACCEPTABLE DEGRADABLE ROCK	EMBANKMENT OR BACKFILL		O DETACH HAND SPECIMEN.	GOUGES OR GROOVES TO 0.25 INCHES DE
(BLDR.) (CO	0B.) (GR.)	(CSE. SD.) (F SD.)	(SL.) (CL.)		ABBREVIATIONS				BIST'S PICK. HAND SPECIMENS CAN BE DE
GRAIN MM 305	75 2.0	0.25	0.05 0.005	AR - AUGER REFUSAL	MED MEDIUM	VST - VANE SHEAR TEST		Y MODERATE BLOWS.	
SIZE IN. 12	3			BT - BORING TERMINATE CL CLAY	ED MICA MICACEOUS MOD MODERATELY	WEA WEATHERED γ - UNIT WEIGHT			S DEEP BY FIRM PRESSURE OF KNIFE O PEICES 1 INCH MAXIMUM SIZE BY HARD
	<u>OIL MOISTURE - (</u>		TERMS	CPT - CONE PENETRATI	DN TEST NP - NON PLASTIC	$\dot{\gamma}_{ m d}$ - dry unit weight		OINT OF A GEOLOGIST'S PICK.	
SOIL MOISTURE S (ATTERBERG LIM			IELD MOISTURE DESCRIPTIO	N CSE COARSE DMT - DILATOMETER TE	ORG ORGANIC ST PMT - PRESSUREMETER TE	ST SAMPLE ABBREVIATIONS		AN BE GROVED OR GOUGED READILY BY	KNIFE OR PICK. CAN BE EXCAVATED IN E BY MODERATE BLOWS OF A PICK POIN
				DPT - DYNAMIC PENETR	ATION TEST SAP SAPROLITIC	S - BULK		IECES CAN BE BROKEN BY FINGER PRES	
	- SATURA (SAT.)		UID; VERY WET, USUALLY THE GROUND WATER TABLE	e - VOID RATIO F - FINE	SD SAND, SANDY SL SILT, SILTY	SS - SPLIT SPOON ST - SHELBY TUBE		AN BE CARVED WITH KNIFE. CAN BE EX	
	LIMIT			FOSS FOSSILIFEROUS	SLI SLIGHTLY	RS - ROCK		R MORE IN THICKNESS CAN BE BROKEN INGERNAIL.	BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC RANGE <	- WET -		EQUIRES DRYING TO MUM MOISTURE	FRAC FRACTURED, FRA FRAGS FRAGMENTS	CTURES TCR - TRICONE REFUSAL W - MOISTURE CONTENT	RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING		ACTURE SPACING	BEDDING
	CLIMIT	HITHIN OFTI	NUM MUISTORE	HI HIGHLY	V - VERY	RATIO	TERM	SPACING	TERM
	- MOIST		NEAR OPTIMUM MOISTURE	EC	DUIPMENT USED ON SUBJECT	PROJECT	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED THICKLY BEDDED 1.
OM OPTIMUN SL SHRINKA	M MUISTURE	SOLID, HI ON	NEAR OF THOSE HOISTONE	DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	WIDE MODERATELY	3 TO 10 FEET CLOSE 1 TO 3 FEET	THICKLY BEDDED 0.1
		REQUIRES AD	DITIONAL WATER TO	CME-45C	CLAY BITS	X AUTOMATIC MANUAL	CLOSE VERY CLOSE	0.16 TO 1 FOOT LESS THAN 0.16 FEET	VERY THINLY BEDDED 0.0 THICKLY LAMINATED 0.00
	- DRY - (MUM MOISTURE	CME-55	6 CONTINUOUS FLIGHT AUGER	CORE SIZE:	VENT CLUSE	LESS THEN 0.16 FEET	THINLY LAMINATED 4.40
	PLA	STICITY			X 8" HOLLOW AUGERS	вн		INDU	RATION
		CITY INDEX (PI)	DRY STRENGTH	X CME-550X	HARD FACED FINGER BITS	X-N Q2	FOR SEDIMENTA		NING OF MATERIAL BY CEMENTING, HE
NON PLASTIC		Ø-5	VERY LOW		TUNGCARBIDE INSERTS		FRIABLE		FINGER FREES NUMEROUS GRAINS;
SLIGHTLY PLAS MODERATELY PL		6-15 16-25	SLIGHT MEDIUM	VANE SHEAR TEST	CASING W/ ADVANCER	HAND TOOLS:			BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC		S OR MORE	HIGH	PORTABLE HOIST	TRICONE ·STEEL TEETH	POST HOLE DIGGER	MODERATI		BE SEPARATED FROM SAMPLE WITH ST Y WHEN HIT WITH HAMMER.
		COLOR			TRICONE 'TUNGCARB.	HAND AUGER	THOUD 17	GRAINS ARE [DIFFICULT TO SEPARATE WITH STEEL
DESCRIPTIONS MAY T			(ELLOW-BROWN, BLUE-GRAY).	X <u>CME-75</u>	X CORE BIT	VANE SHEAR TEST	INDURATE	DIFFICULT TO	BREAK WITH HAMMER.
	CH AS LIGHT, DARK, STREA				X MUD ROTARY		EXTREME		R BLOWS REQUIRED TO BREAK SAMPLE KS ACROSS GRAINS.
								SAMPLE BREA'	NA HURUDO URHUNO.

SHEET NO.

project reference no. **B-3186 / B-5898**

2

	TERMS AND DEFINITIONS
ED. AN INFERRED) SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
T N VALUES N	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
T N VALUES >	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
DCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
NCLUDES GRANITE,	SURFACE.
	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED.	
С.	OF SLOPE.
MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
STONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
NINUS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
COATINGS IF OPEN.	HORIZONTAL.
HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ОСК ИР ТО	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
AL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AY. ROCK HAS H AS COMPARED	PARENT MATERIAL.
	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
OSS OF STRENGTH	FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
EVIDENT BUT ARE KAOLINIZED	ITS LATERAL EXTENT.
THE RECEIPTIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
T ONLY MINOR VALUES < 100 BPF	OF AN INTERVENING IMPERVIOUS STRATUM.
IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
S. 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
	RUCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
	ROCK.
NS REQUIRES	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
DETACHED	OR SLIP PLANE.
	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
OR PICK POINT.	A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EDUAL
BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPITT SPOUN SAMPLER. SPITREFUSAL IS PENETRATION EDUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
NT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
HED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: N/A
THICKNESS	
4 FEET 1.5 - 4 FEET	ELEVATION: FEET
1.5 - 4 FEET .16 - 1.5 FEET	
03 - 0.16 FEET	NOTES:
08 - 0.03 FEET	BORING ELEVATIONS OBTAINED FROM GPS UNIT
< 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
	THE THE MULTIATEL ATTEN DIVILLING
EAT, PRESSURE, ETC.	
•	
TEEL PROBE;	
PROBE:	
E;	
	DATE: 8-15-14

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	inos and Hoek, 2000)			AASHTO LRFD Figure 10.4.6.4–2 $-$ Determination of GSI for T
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.	VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces FAIR Smooth, moderately weathered and altered 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	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 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	DEC	CREASING SURFACE QU			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		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.
discontinuity sets. Persistence of bedding planes or schistosity			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	Means deformation after tectonic disturbance

Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

PROJECT REFERENCE NO.

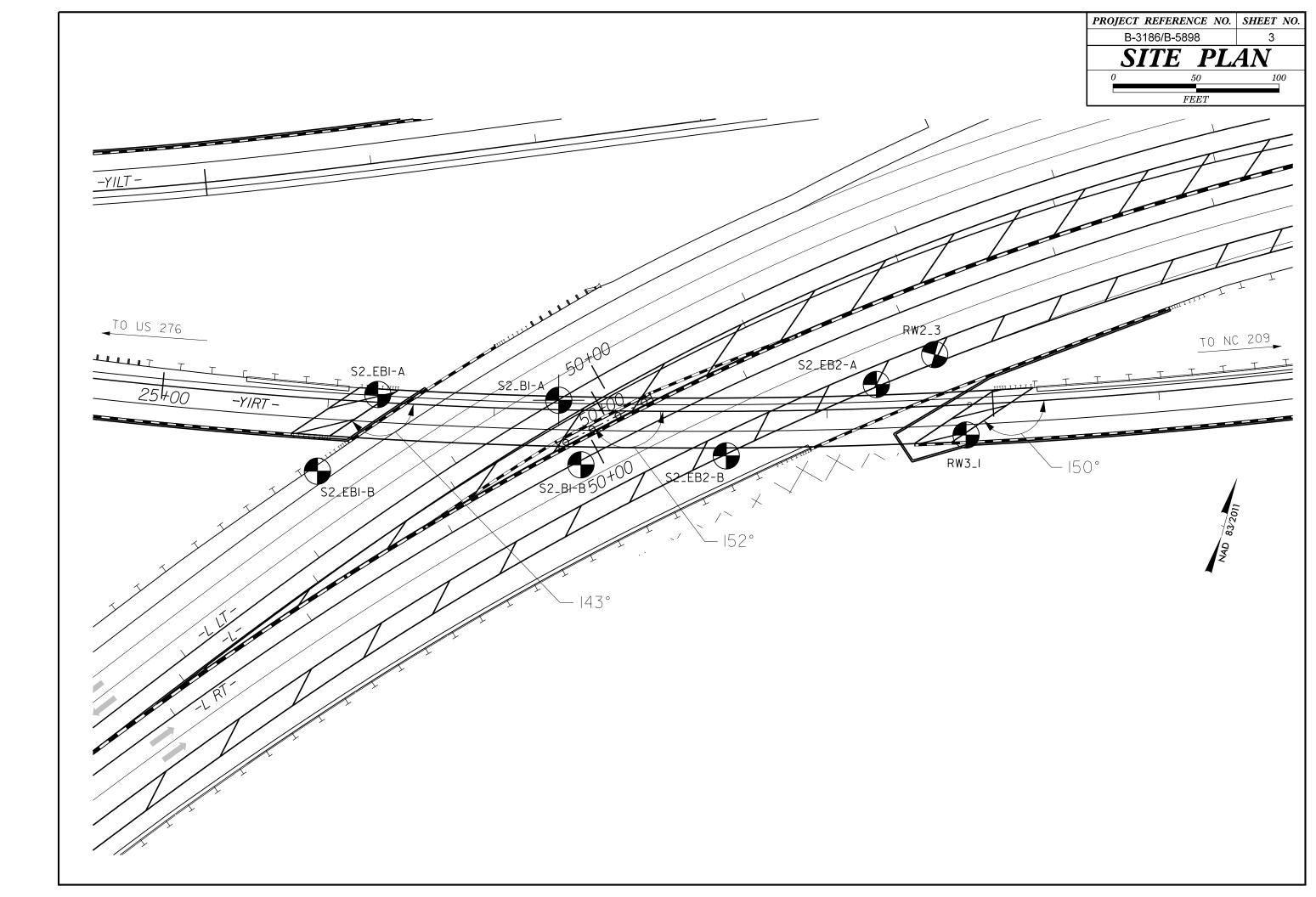
B-3186/B-5898

SHEET NO.

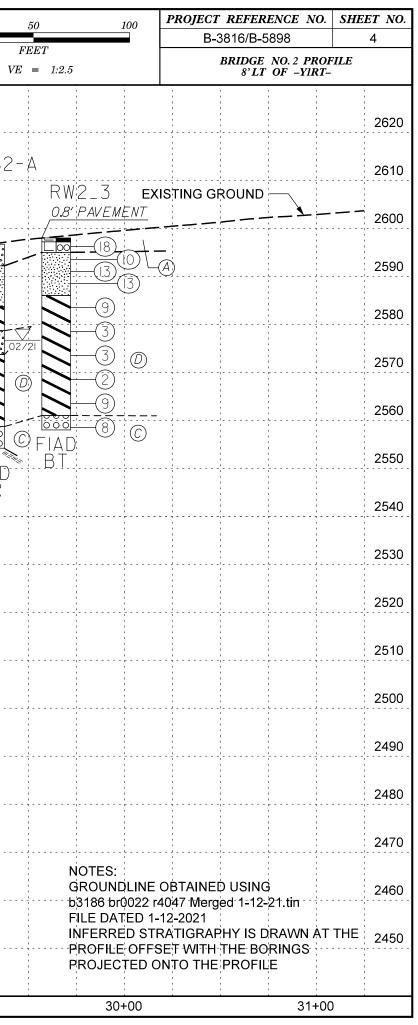
2A

SURFACE CONDITIONS OF 53 DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	600D - 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	С	D E	
eformed, d/faulted, hale or siltstone deformed forming an tructure			30	F 20	
eformed silty forming a e with pockets vers of eansformed pieces.			¢	H	+ ¹⁰

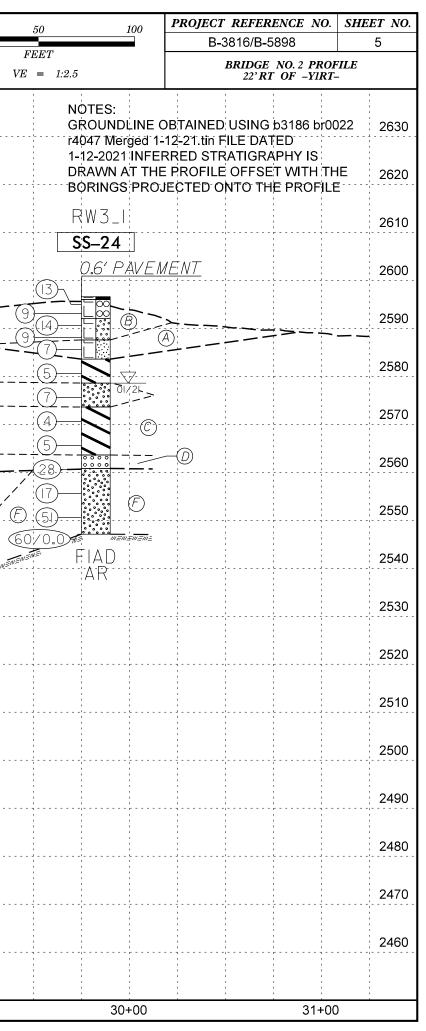
DATE: 8-19-16



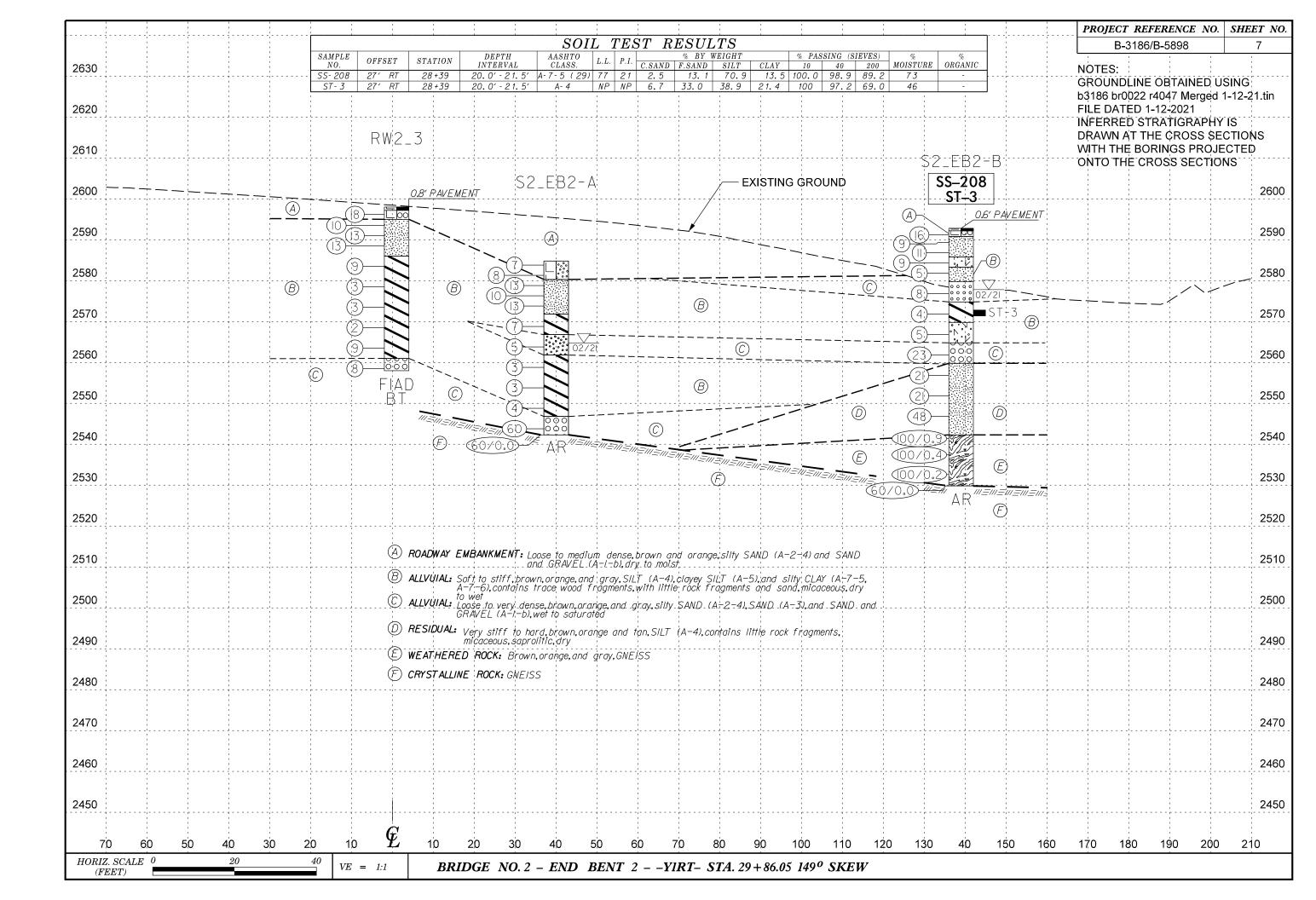
1	1	25-	+00	1	:	26	+00			27	+00			28	+00	· · ·		29+	-00	
		· • • • • •	, , , , , ,	, ,								· • • • •								
2450								· · · · · · · · · · · · ·												
2460		1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1							1 1 1 1 1	1 1 1 1 1	1 1 1 1							
2470				1			R (Quart													· · · · ·
2480						ind white,		itic Rioti	te GNE/SS		 	, , ,			, , ,					
2490									(A-4), mico											
2490	1	1	1	1	1	1	1	1	S'AND (A- 1/LT (A-4	1	1		1	-b), micace	bus,wet to	o saturated				
2500					1	1	:	1	1	1	1					avel, micace		tled, mois	t 	
2510		OADWAY	EMBANKI	MENT: L	bose fo m	edium de	inse, brow	h,orange	and gray	F-c SAN	D (A-2-		race to 1	iftle grave	l, moist to	saturated				
2520		1 1 7 1 1 1		- - - - -							 	FIAD AR								
2530		1 1 1 1 1 1 1 1 1		1 1 1					· · · · · · · · · · · · · · · · · · ·		1 			/=						
2540		 	 	 				₩17 	(60/0.0		REC	= ====================================						
		1 1 1 1 1 1 1			Ē	<u></u> 60	F	iad Ar	nenenenenen		100/0.		Ē			n=m=m=m=m= G		<u>ma 60/</u>	<u>لرں ں</u> ا	=1A[AR
2550		L	J			Ē				Ē	29						Ċ	((60/		
2560		1 1 1 1 1 1	1 1 1 1 1 1 1	1 1 1 1 1 1 1	\bigcirc				st-4	D	3-		(H	\bigcirc		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		() 3)— 1)	
2570		- - - - - -	- - - - 		•	A 4					<u>5</u>		02//21		<u>D</u>	=	====		<u>5) </u>	
2580 — —										B				B)				13)— 	
2590		1 1 1 1 1 1 1	, , , , , ,	1 1 1 1 1 1 1		, , , , ,		5–513 5T–4	A		S	2_BI-	- A						<u> </u>	
2600		1 1 1 1 1 1 1	, , , , , , , , , , , , , , , , , , , ,	1 1 1 1 1 1 1 1		· · ·		EBI-	4			, , , ,	· · · ·		· · ·				~	
2610		1 1 1 1 1 1 1	1 1 1 1 1 1 1	· · · ·								· · · ·			- - 				S2_	EB2
2620		1 1 1 1 1 1 1	 	1 1 1 1 1 1 1				· · · · · · · · · · · · · · · · · · ·			1 1 1 1 1 1 1				· · · · ·					
2630	NO. SS-513 ST-4	5' L 5' L	T 26	+29	INTERVA 10. 0' - 1 15. 0' - 17	1.5′ A	CLASS. - 5 (9) - 2- 4	48 10 27 6	C.SAND 4.1 41.2	F.SAND 32.5 30.8	49.9	CLAY 13.5 10 21.0 9	0.0 98	40 200 3.0 74. 5.3 31.2		RE ORGANI		L		
	SAMPLE	OFFSE	T STA	TION	DEPTH	A	ASHTO	L TE	ST R	% BY W				G (SIEVES)	%	%				



1	25+00	26+00		27+00		28+00	2	9+00
2460								
2470								
2470	() CRYSTALLINE ROCK: Gray a			wiili illieridyered i	micaceous S	ILI (A-4) SEUMS		
2480	WEATHERED ROCK: Brown, g (H) CRYSTALLINE ROCK: Light g			with intariantation	minandarum	-// T/- At abome		· · · · · · · · · · · · · · · · · · ·
2490	(F) RESIDUAL: Medium dense fo	very dense, brown, orange	and tan, silty SAND		1	1 1 1	1 I I I I I I I I I I I I I I I I I I I	
2400	 (D) ALLUVIAL: Very loose to media (E) RESIDUAL: Very stiff to hard 		1 1 1			1 1 1		dry to wet
2500	C ALLUVIAL: Very soft to stiff, gravel,micaceous,o	rganic odor,wet	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;				 	///Ţ/Ċ
	B ROADWAY EMBANKMENT: LO	1 I I I I I I I I I I I I I I I I I I I	i i i		1	1 I I		1 I I
2510	Sai	ndy SILT (A-4), clayey SIL nce gravel, micaceous, mottl	T (A-5), and CLAY (4–7), with	BT	\bigcup		
2520	(A) ROADWAY EMBANKMENT: Me	dium stiff to very stiff	rown aray and orang	e with black	D FIAD	REC%=100 RQD%=76	FIAD AR	
							EIAD 60/0.0)
2530		FIAD BT	<u>THENENENENENENENENEN</u>	=m=m==================================		_ REC%=100 ROD%=85		<u>≣III¥III≡III</u> ≡III (17)
2540		0.0/0.5	6			 (6)		
	G	(00/0.8 7777 (00/0.5 7777	 @			Ē		
2550	<u>(E)</u>		Ē			 E	() () () () () () () () () () () () () (
2560	· · · · · · · · · · · · · · · · · · ·		© ``				23	
	Ć)			C		S:T-2 ©	4) N 5	C
2570				8			21	
2580 —~				$= -\frac{1}{B} \frac{(9)}{34}$				©
			A		ST-2			
2590			\L		SS-222	2	0.6' PAVEMENT	
2600				1 1	S2_BI-		ST–3	
2610		SS-3009 <u></u>	ENT	— EXISTING GR			S-EB2-B	
		S2_EBI-B						
2620								
2630	ST-3 27' RT 28+39 20	D. O' - 21. 5' A- 4	NP NP 6.7 33	3. 1 70. 9 13 . 0 38. 9 21. . 5 23. 6 35.	4 100	98.9 89.2 73 97.2 69.0 46 79.1 58.5 26		
	SS-222 33' RT 27 +53 15 ST-2 33' RT 27 +53 15	. 0' - 16. 5' A- 5 (13) 5. 0' - 17. 0' A- 7- 5 (16)	51 10 1.1 2 57 11 1.3 14	5.0 25.4 71. 1.2 59.5 18. .3 66.8 17.	2 100.0	99.5 85.8 62 99.6 87.3 68		
2640		NIERVAL CLASS.	L.L. P.I. C.SAND F.S	BY WEIGHT AND SILT CLA 5.0 25.4 11.	Y 10	ING (SIEVES) % 40 200 MOISTUR 72.3 36.7 43	RE ORGANIC	
		0011	L TEST RES					



		©			(A)			— — —	- 0		02/21	\bigcirc	0570	0.00						+ — — 5)—-[-	<u> </u>	· <u> </u>			
 2580							B)	(5) (7)			(B)	2580	2590						S2_	B¦−A*			SS-22 ST-2		2590
2570						Г-4 <u>С</u>) (D (C) 	<u>(4)</u> (6)				2570	2580				A	20(1)		-	(A)		(B)		<u>B</u> 2580
2560		C)-	Ē				Ē		3				2560	2570							0.2/2				 (2) S†	2570 2
2550		Đ	0/0.0	0.6 <i>M=</i> //	R		Ē					<u>) </u>	2550	2560				© 	607	3)	Ē					 256(
2540	· · ·						G				Ē		2540	2550				<i>(F)</i>	2	9			Ē		<u>-30</u> -29 F	- — – 2550
2530	· · · · ·					, , , , , , ,		····		. D			2530	2540				<u> </u>	60/	/0.4		<u>(</u>)	11=111=111.		100/0.5 * 60/0.0	_/
2520						1 1 1 1 1 1							2520	2530				Ĥ				Ĥ			REC%=100 RQD%=85	(H) 253(
2510	A	ROADWAY	EMBANK	MENT:LO	ose to d _!_b),ma	ense, bro pist_to_so	wh and sturated.	orange, S	AND (A-2	2–'4) and	I GRAVEL	<u>/</u>	2510	2520					RQD%=8	85				- .		 252(
2500	C .	ALLVUIAL:	<u>Very</u> so trace w	MENT: So an t to_soft, ood_fragn	gray, sar nents, mio	ndy_SILT caceous,	(A−4,A organic c	5) and s	andy CLA	Y_(A-7),	<u>contains</u>		2500	2510	····· (A ⁻) ⁻ ROADWA	Y EMBAI	NKMENT:		1	B Very sfift (A-7) with	, brown, gi	ray, and or a	ήġē, SILT (ts. micaceou	A-4), člayey SIL is, mottled, moist	2510
2490	ż	1		se to loos iff-to har ontains tr			1	1	1	1	1		2490	2500	(C)	; ROADWA	Y EMBAI :	NKMENT:	Medium a ŞAND (A	dense to ÷2−4),w	dense,br vițh trace	own and to little g	gray,clayey aravel,micace	SAND (A- eous,dr <u>y</u>	2–6), and silty	2500
2480	Ē	VEATHER	ED ROC	K: Brown, K: GNEIS	orange, d	1			1	7/ , , , , , , , , , , , , ,			2480	2490		ALLUVIA	L: Loose (A-I-b	to dense,t),dry to s	prown, whi	ițe, tan, a	nd gray,s	ility SAND			and GRAVEL	2490
2470			, noc	UNE UNE IS		, , , , ,							2470	2480	-) NON-CR) RESIDU	1	-		F	1	1		nins little r	ock fragments,	2480
2460													2460	2470	G	WEATHE	RED RO	CK: Brow	n,gray,ta	in, and w	hite,GNEI	ss	otite GNEISS			247(
2450													2450	2460				1	(QUART ZIT E			2460
- 1 00		1 7		6	 בי								243U	240U				1 1 1 1	1 1		Ē					2400



WPC	20220	2.1.FS1					106 /	B-5898	00		HAYWO				CEO	.OGIST C. Swafford			3 38332	1 5 64					2106	B-5898	COUNT	v
		RIPTION	115.2	3/119							HATWO	OD			GEO	C. Swallord	GROUND WTR (ft)				115.2	2/119				D-0090 Nountain I		T
		. S2_E		.5/ 03	`				riigiiw		OFFSET	5 ft I T				MENT -Y1RT-	0 HR. 13.0		ING NO.			.5/ 03	— È				ligi iway)	OF
		EV. 2,5		+				H 34.5	ft		NORTHIN		17			ING 819,274	24 HR. FIAD	I —	LAR EL			4				H 60.4 f		
		MIMER EF												DD ⊢	LS. Augers		MERTYPE Automatic									9/15/2020)		
		Wansti						02/25/			COMP. DA					ACE WATER DEPTH N			LER K							02/27/2	1	C
				W CO				BLOWS						7-			A				1	w co			DATE		PER FOO	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	·		0.5ft	0	25		50		75 100		1 1	O DI G	ELEV. (1	SOIL AND ROCK DES	CRIPTION DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	·	0.5ft		0	2		50	75
								-	•		•				` ``	/											•	
2585		\bot													2,584.6	GROUND SURF	ACE 0.0	2605		L								
	2,584.6	Ť	5	7	4		11			• •			м		2,583.6	ROADWAY EMBAN Medium dense, brown, f SA	KMENT1.0			ł								
	2,582.1	<u> </u>	3	4	4					•••			м		ł	trace gravel	1			Ŧ								
2580	2,579.6	- 5.0	6	5	6	- T									2,580.1	Soft, brown and orange, Loose to medium dense, g	<u>CLAY (A-7)</u> <u>4.5</u> prav. f-c SAND	2600	2,599.4	1.0								Ŧ
	2,577.1	T 7.5		5	0	ĺ	11			•••			M	L	F	(A-2-4)	<i>,</i> ,			Ŧ	11	20	16			. 36		-
0575		Ŧ	3	3	3	• 6			.				Sat.	. L	F			2595	2,596.5	ŧ	6	4	4		8			-
	2,574.6	+ 10.0 +	3	2	2	•4						SS-51	3 51%	ر بر ا	2,574.6	ALLUVIAL			2,594.6	<u>+ 5.8</u> +	6	3	3					
		ŧ				ļį	::		.	· · · ·			\Box	' N V V	2,571.6	Soft, gray, SILT (A-5)(9)	13.0		2,591.5	8.9						· · · · ·		:
2570	2,569.6	+ 15.0				1										Very loose, gray, f silty S micaceous	AND (A-2-4),	2590		ŧ	4	3	4					· -
		‡	1	WOH	1	• <u>1</u>			· · · · · ·	••• •••	· · · · ·		W 28%	ά	¦⊢ ¦−				· ·	‡					· · ·	· · · · ·	· · ·	•
2565		‡					::		: : :	::					2,566.6	Soft, gray, f sandy SILT (A	-4), micaceous 18.0	2585	2,586.5	13.9	3	2	3	<u>i</u> :		· · · · ·		:
2000	2,564.6	+ 20.0 +	1	1	2			· · · ·				11	w		-			2000	-	‡								.+
		ŧ							· · ·	· · · ·					- - 2,561.6		<u>23.0</u>		2.581.5	+					· · ·	· · · · ·	· · ·	:
2560	2 550 6	+ 25.0				<u> </u>	- <u>-</u> -	<i>.</i>							E	RESIDUAL Very stiff, brown and orang		2580		10.3	3	3	4					·
	2,000.0		4	7	11	· · ·	•18		.	· ·	· · · ·		w		L	(A-4), micaceous, s	aprolitic			ŧ					 	· · · ·		•
		ł				 	::::		.	•••					L				2,576.5	23.9	4	4	5	•				
2555	2,554.6	30.0	90	10/0.1						<u></u>					2,554.6	WEATHERED R	<u> </u>	2575	-	Ŧ		-		 •	9		· · · ·	+
		Ŧ		10/0.1			• •		.	•••	100/0.6	T I				Brown, orange, and whi				-								•
	2.550.1	T 34.5								• •					2,550.1		34.5	2570	2,571.5	<u>- 28.9</u>	3	3	1	 ↓				-
	,	Ŧ	60/0.0								60/0.0				F	Boring Terminated wit Penetration Test Refusa				Ŧ								.
		Ŧ													F	2,550.1 ft on Crystalline R	ock (GNEISS)		2,566.5	33.9				[-
	-	Ŧ													F	<u>Other Samples:</u> ST-4 (15.0 - 17.0)		2565		ŧ		3	3	9 6				
		ŧ													F	31-4 (15.0 - 17.0)				ŧ				;	· · ·	· · · · ·		:
		ŧ													Ę			2560	2,561.5	+ 38.9 +	WOH	1	2			· · · · ·		
	-	+													-			2000	-	ŧ								.
		ŧ													Ę				2.556.5	+ + 43.9				11				
	-	‡													È.			2555		ŧ	18	27	33		· · ·		60	
		‡													Ę				· ·	‡				11	· · ·	· · · · ·		•
		‡													Ę			2550	2,551.5	48.9	32	68/0.3	-	11		· · · · ·	:! <u>-</u> -	<u>-</u> +
	-	‡													-			2550	-	‡								.+
		ŧ													È				2.546.5	- 53.9				11	· · ·	· · · · ·	· · ·	:
	-	‡													Ł			2545		-	86	14/0.0			· · ·			<u> </u>
		ŧ													E					ŧ				11	· · ·	· · · ·	· · ·	
		ŧ													E				2,541.5	58.9	79	21/0.0	-					
		+													-			2540				2.70.0						

HAYWOOD)		GEOLO	GIST C. Swaffo	ord		
			1			GROUN	D WTR (ft)
OFFSET 44	ft RT		ALIGN	MENT -Y1RT-		0 HR.	22.0
	666,863		EASTIN	G 819,251		24 HR.	FIAD
	DRILL METHOD) Mud	Rotary	010,201	HAMIME	RTYPE	Automatic
		TVIAG					7 101011 1010
COMP. DATE			SURFA	CE WATER DEP	TH N/A	<u>م</u>	
75 100	SAMP.	0		SOIL AND RO	CK DESC	RIPTION	
5 100	NO. MOI	G					
· · · · ·			2,600.4 2,599.4	ROADWAY		MENT	0.0
	М		2,596.9	ROADWAY	AVEMEN EMBANK		
	м			Dense, brown			
	м		N	Aedium stiff, orang clayey SILT (A-	e and bro -5), with t	wn with b race sand	аск,
· · · · ·	М						
	м						
	м						
	∇		2,578.4				22.0
 	w		2,310.4	Very loose to loos	LUVIAL se, gray, s aceous		
· · · ·		****	0.570.4	IIIC	aceous		07.0
	w		2 <u>,573.4</u> S co	oft to medium stiff, ontains trace wood orga	, gray, sai I fragmen inic odor	ndy SILT (ts, micace	A-4), eous,
· · · · · · · · · · · · · · · · · · ·	w						
		t.					
· · · · s	S-3009 43%	₿₽ L					
		SF.	2,558.4		SIDUAL		<u> </u>
	w		С	Hard, tan and brov ontains trace rock sa	wn, sandy fragment prolitic	CLAY (A s, micace	-7), eous,
L		X	2,551.5				48.9
100/0.8 				WEATH Brown, GNE	E RED RC EISS, mica		
- 100/0.5 •			2,540.0				60.4
			В	oring Terminated a Weathered	at Elevati Rock (Gf	on 2,540.(NEISS)	J tt in

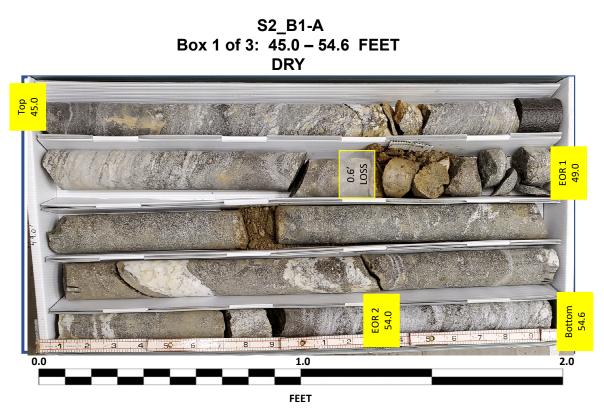
COF

		SURE LUG			1	JURE LUG	
WBS 38332.1.FS1		ry haywood	GEOLOGIST C. Swafford	WBS 38332.1.FS1		TY HAYWOOD	GEOLOGIST C. Swafford
	JS 74 (Great Smoky Mountain Highway)	1	GROUND WTR (ft)	SITE DESCRIPTION US 23/ US 7			GROUND WTR (ft)
BORING NO. S2_B1-A	STATION 27+39	OFFSET 6 ft LT	ALIGNMENT -Y1RT- 0 HR. 13.0	BORING NO. S2_B1-A	STATION 27+39	OFFSET 6 ft LT	ALIGNMENT -Y1RT- 0 HR. 13.0
COLLAR ELEV. 2,586.8 ft	TOTAL DEPTH 65.0 ft	NORTHING 666,942	EASTING 819,380 24 HR. FIAD	COLLAR ELEV. 2,586.8 ft	TOTAL DEPTH 65.0 ft	NORTHING 666,942	EASTING 819,380 24 HR. FIAD
	STC9083 CME-550X 80% (11/24/2020)	DRILL METHOD SP		DRILL RIG/HAMMER EFF/DATE GTCS			-
DRILLER L. Wanstrath	START DATE 02/26/21	COMP. DATE 02/27/21	SURFACE WATER DEPTH N/A	DRILLER L. Wanstrath	START DATE 02/26/21	COMP. DATE 02/27/21	SURFACE WATER DEPTH N/A
ELEV DRIVE ELEV (ft) 0.5ft 0.5			SOIL AND ROCK DESCRIPTION	CORE SIZE NQ2	TOTAL RUN 20.0 ft		
(ft) (ft) (ft) 0.5ft 0.5		75 100 NO. MOI G	ELEV. (ft) DEPTH (ft)	ELEV RUN (ft) ELEV DEPTH RUN (ft) (ft) (ft) (ft) (ft) (ft)	REC. RQD SAWF. REC. RQD		DESCRIPTION AND REMARKS
						G ELEV. (ft)	DEPTH (f
2590			-	2541.8 2.541.8 45.0 4.0 2:07	(3.4) (2.6) (19.4) (17.0	0) - 2,541.8 6 Light gray, black a	Begin Coring @ 45.0 ft CRYSTALLINE ROCK 45.0
2,586.8 0.0			2,586.8 GROUND SURFACE 0.0	<u>2540</u> <u>1:47</u> 2:06			and white, Migmatitic Biotite GNEISS, slight weathering, ard, very close to close fracture spacing
2585 3 3	3	· · · · · · M L	ROADWAY EMBANKMENT <u>_2,584.8</u> Medium stiff, brown and orange, CLAY <u>2.0</u>	2,537.8 49.0 2:00 2,537.8 49.0 5.0 1:39 49.0 5.0 4:00	(5.0) (4.3)	Very severe v	weathering, highly micaceous; 0.6' core loss at 48.0' t weathering, close fracture spacing at 49.0'
2,584.3 2.5		: : : : : М Ц	(A-7), micaceous/		100% 86%		
2,581.8 5.0 10 6	7	· · · · · -[]]-	SILT (A-4) with trace clay and gravel,	2535 1:44 2,532.8 54.0 2:03			
2580 2,579.3 7.5 2 1			_2,579.87.0 Medium stiff, orange, CLAY (A-7) with trace	2530 2,527.8 59.0 2:22	(5.0) (4.8) 100% 96% RS-14	Very severe v Slight	RS-14 54.6' - 55.2' GSI= 75 - 85
2.576.8 10.0			sand, mottled				Qu= 16,778 psi
2575 1 2	3		_	2,527.8 59.0 2:22 5.0 1:46	(5.0) (4.3)		
			ALLUVIAL	2525 2:15 2:24	100% 86%		
2,571.8 15.0 1 WO	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Very soft to soft, gray and brown, sandy CLAY (A-7), micaceous	2525 5.0 1:46 2525 2:52 2:24 2,522.8 64.0 1:54 2,521.8 65.0 1.0			
			-		(1.0) (1.0) (100%/100%/	2,321.0	ed at Elevation 2,521.8 ft in Crystalline Rock (Migmatitic
2,566.8 20.0							Biotite GNEISS)
2565	2		_				NOTES 0.5' topsoil
2,561.8 25.0 60/0.1	'++						
			Light gray, BOULDER (Quartz fragments) <u>2,558.8</u> 2				
2,556.8 30.0			RESIDUAL Very stiff, brown, tan, and white, sandy SILT				
2555 11 13	¹ 6 <u>••••</u> ²⁹ ••••	· · · · · · · M	(A-4), micaceous, saprolitic				
		853553					
2,551.8 <u>35.0</u> 2550 14 40			_2,551.8WEATHERED ROCK35.0				
-			Brown, tan, and white, GNEISS				
2,546.8 40.0		· · · · · · · · · · · · · · · · · · ·					
2545			-				
		977	2.541.8 45.0				
2,541.8 45.0 60/0.0		60/0 0	CRYSTALLINE ROCK			[
		· · · · · ·	Light gray, black, and white, Migmatitic Biotite GNEISS			-	
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			-			[
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						[
			-			E	
		· · · · ·				I E	
			-				
			2.521.8 65.0				
			Boring Terminated at Elevation 2.521.8 ft in				
			Crystalline Rock (Migmatitic Biotite GNEISS)			<u>E</u>	
			NOTES 0.5' topsoil				
			U.5' TOPSOII				
· · ·				· · · ·	· · · · ·		

L BORING REF	PORT
RE LOG	

38330.1.FS1 (B-3186/B-5898)

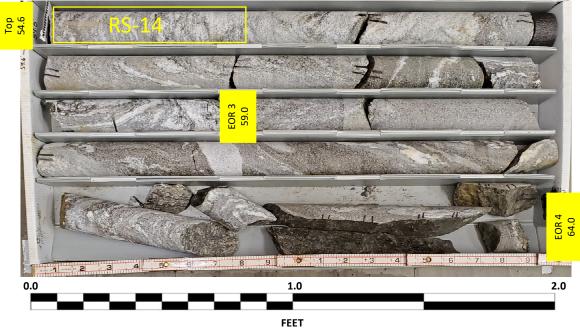
US 23/ US 74 Great Smokey Mountain Highway



S2_B1-A Box 1 of 3: 45.0 – 54.6 FEET WET



S2_B1-A Box 2 of 3: 54.6 – 64.0 FEET DRY



S2_B1-A Box 2 of 3: 54.6 – 64.0 FEET WET

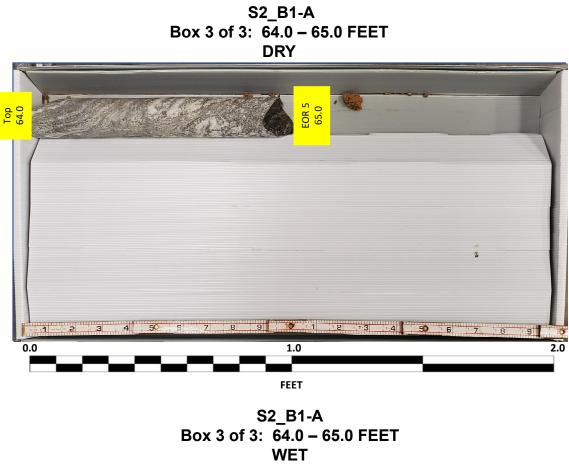




FEET

38330.1.FS1 (B-3186/B-5898)

US 23/ US 74 Great Smokey Mountain Highway





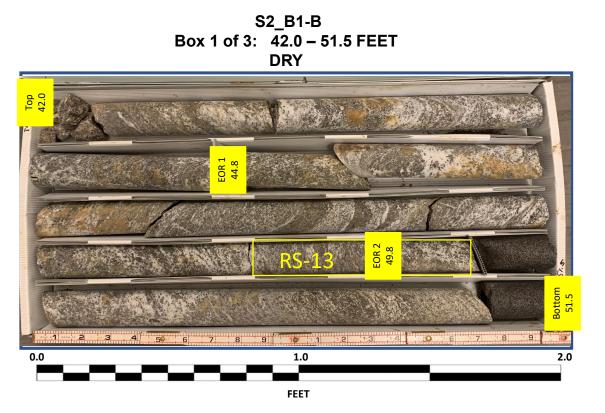
									E	SORE	LOC	5																	(
WBS	38332	.1.FS1			Т	IP B-3186	/ B-58	898	COUNT	Y HAYW	DOD				GEOLOGIST	R. Dugger				WBS	3 8332	2.1.FS1			TIP	B-318	86 / B-589)8 (COUN	ΤY
SITE	DESCR	IPTION	US :	23/ US	574 (G	ireat Smoky	Mour	ntain H	lighway)									GROUND	NTR (ft)	SITE	DESCR	RIPTION	US	23/ US 74	1 (Grea	t Smol	ky Mounta	ain Hig	ghway)
BOR	ing no.	S2_B	1-B		s	TATION 2	27+53			OFFSET	33 ft F	RΤ			ALIGNMENT	-Y1RT-		0 HR.	N/A	BOR	ING NO	. S2_E	31-B		STA	TION	27+53			
COL	LAR ELI	EV. 2,5	584.7	ft	Т	OTAL DEP	тн ө	62.8 ft		NORTHI	IG 666	6,908			EASTING 81	19,403	2	24 HR.	FIAD	COL	LAR EL	EV. 2,	584.7	ft	Тот	AL DE	EPTH 62	.8 ft		
DRILL	RIG/HAN	IMER EF	F./DAT	E GT	C9083 (OME-550X 809	%(11/2	24/2020)	•	DRIL	LMETH	-IOD	SPT	Core Boring		HAMME	RTYPE Au	tomatic	DRIL	RIG/HAI	VIMER EF	FF./DAT	E GTC9	183 CME	-550X 8	80%(11/24	/2020)		_
DRIL	LER L.	Wanst	rath		S	TART DAT	E 02	2/10/21		COMP. D	ATE ()2/27/2	21		SURFACE WA	ATER DEPT	H N/A			DRIL	LER L	. Wanst	trath		STA	rt da	ATE 02/1	10/21		
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLO	OWS F	PER FOC	т	SAN	1P. 🔻		5	so	IL AND ROCH				COR	E SIZE	NQ2			Тот	AL RU	JN 20.8 f	ft		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	i0	75 10	0 NC). 🕢			ELEV. (ft)		IN DEOOI		DEPTH (ft)	ELEV	RUN ELEV	DEPTH		DRILL RATE		UN RQD	SAMP.	REC.	RATA	DI
1																				(ft)	(ft)	(ft)	(ft)	(Min/ft)		(ft) %	NO.	(ft) %	(ft) %	\square
2585	9 6 9 4 7														2,584.7	GROUND	SURFA	CE	0.0	2542.7		120		0.00/0.0			<u> </u>			_
	2,584.7	t i	2	4	5			· · ·	· · · ·			N	ΛL	2	ا 2 <u>,582.7</u> Stiff, bro	ROADWAY EI own and orand	MBANKI ge, clave	WENT ev SILT (A-5),2.0	2540	2,542.7 2,539.9		2.8	0:36/0.8 N=60/0. 1:43/1.0 2:21/1.0	3 (2.8) 0 100%	(2.6) 93%		100%) (13. 6 85%	7) 6
0500	2,582.2	Į.	7	12	11	1 :: `` \	23		· · ·				b L	N	1		ceous			2010	2,000.0	+ ++.0	5.0	<u>2:21/1.0</u> 1:41/1.0	(5.0)	(5.0)	-			
2580	2,579.7	5.0	18	18	16		- - -	i34					, H			(A-2-6) with	i trace gr	avel	<u>ل</u> ار م			ŧ		1:41/1.0 1:30/1.0 1:39/1.0 1:29/1.0	{ 100%	100%				
1	2,577.2	7.5	4		4		1.		· · ·							brown and gra with little grav	/el, mica		⁺⁾ 7.0	2535	2,534.9	49.8	5.0	2:20/1.0		(0,0)	RS-13	-		
2575	2,574.7	10.0	4	4	4)	Ŀ	Loose b	brown and gra	JVIAL av. silty S	AND (A-2-4				‡	5.0	1:55/1.0) 100%	(2.8) 56%		1		
			2	2	3	∮ 5∵∵∶			· · ·			N	Λ		, _		ceous		,,	2520	2,529.9	‡ _ 4 @		1:45/1.0						
	-					::::			· · ·						2,571.7 Verv so	oft, gray, silty C	CLAY (A-	-7-5)(16) an	13.0 d	2000	2,529.9	<u> </u>	5.0) (5.0)	(4.5)	-			
2570	2,569.7	15.0	1	1	1		+					222 62		1		SILT (A-5)(13	3), micac	eous	-			‡		2:04/1.0		90%				
	-	Ľ		·	·	$\P^2 \cdot \cdot \cdot$					33-2	68	3%	N.	2,566.7				18.0	2525	2,524.9	59.8		2:38/1.0 2:46/1.0	;			(4.5) 100%) (3.4)
2565	2.564.7-														Very lo	oose, brown a	and gray, 2-4)	silty SAND				±	3.0	3:15/1.0) (3.0)) 100%	(2.4) 80%) (3.4 % 76%	-
	-2,304.7	- 20.0	wон	WOH	1	↓ ↓1 <u>-</u> · · ·						v	v 🗸	Æ	2,563.6	oft, brown and	,		<u> 21.1</u>		2,521.9	<u> 62.8 </u>		2:30/1.0	<u>'</u>		-			-
	-	F							· · · ·	· · · · ·			00		2.561.7	, gray, SAND a			23.01		-	ŧ								
2560	2,559.7	25.0	7	5	2						-11		. 00		Loose,	gray, SAND a		VEL (A-1-D	,			ŧ								
	-	F	'			₩ 7						Sa	at. ōc oc		2,556.7				28.0			ŧ								
2555		F				· <u>L·</u> · · · · ·	-			· · · · ·			م				DUAL					ŧ								
2000	2,554.7-	- <u>30.0</u>	9	16	14	1	•30	· · ·)	-		n dense to den silty SAND (A-	-2-4) with		d			Ŧ								
	-	ŧ					1	· · ·	· · · ·						2,551.7	0	ments — — — –		<u>33.0</u>		-	Ŧ								
2550	2,549.7	- 35.0						· · ·			_11			۶Ł	Very st SILT	tiff, brown, ora (A-4) with litt	tle rock f	ragments,				Ŧ								
l	-	ŧ	15	15	14		\$ 29	2	· · · ·	· · · · ·			D 🔯			micaceous	s, saproli	itic				Ŧ								
2545	-	ł								 											-	Ŧ								
2545	2,544.7	- 40.0 -	100/0.	5			+!=	<u> </u>		· · · 100/0	5			74	2,544.7	WEATHER		ск	<u>40.0</u>			ŧ								
	2,542.2	42.5	60/0.0					· · ·	· · · ·		11				2,542.7 Bro	own, gray, and CRYSTALL			42.0		-	ŧ								
2540	-	Ļ	100/0.0	Ί											No Re	ecovery, begin dark gray and	n rock co	ring at 42.0'	k			ŧ								
	-	L						· · ·	· · ·						Light to t	Migmatic Bic	otite GNE	EISS	ς,			ŧ								
0505	-	ŧ							· · ·												-	ŧ								
2535		ŧ			1		+				RS-	13										ŧ						1		
	-	ŧ			1			· · ·	· · ·												-	‡						1		
2530		ŧ			1									土								‡						1		
	-	ŧ			1			· · ·	· · ·													‡						1		
055-	-	ŧ			1				· · ·						2,526.6 Grev an	nd white, MET	FAGRAY	WACKF and	58.1	I	-	‡						1		
2525	-	L									-11		N.		City al		RTZITE		-			‡								
	-														2,521.9				62.8		-	‡								
	-	L												E		Γerminated at ine Rock (ME⁻						ŧ								
	-	L												F	,		TZITE)					‡								
	-													E	15 (<u>NO</u> 0- 17.0': ST-2	TES lab clas	sified as			-	ŧ								
	-	F												F	(A-7-5	5)(16) in offse - 16.5': SS-22	et hole ~3	3' upstation				ŧ								
	-	F			1									F	15.0		22 lab cla 5)(13)	assineu as			-	‡						1		
	-	F			1									F	Other Sa							ŧ						1		
	-	F			1									F	ST-2 ((15.0 - 17.0)						t						1		
	-	F												F							-	ŧ						1		
	-	t												E								<u> </u>					<u> </u>	\bot		

GEOTECHNICAL BORING REPORT

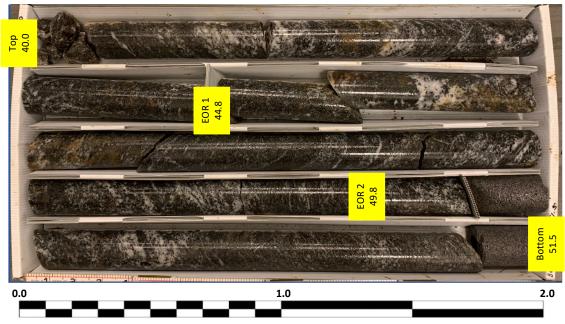
C	OUNT	YН	AYWOOI	C	GEOLOGI	ST R. Du	ıgger		
ligh	iway)							GROUND	WTR (ft
		OF	FSET 33	3 ft RT	ALIGNME	NT -Y1R	т-	0 HR.	N/A
		-	RTHING	666,908	EASTING			24 HR.	FIAD
))					SPT Core Boring	019,403		IER TYPE A	
<i>,</i>					-				
1		co	MP. DAT	E 02/27/21	SURFACE	WATER	DEPTH N	/A	
TD		 .							
C.		L O			DESCRIPTION	I AND REM	ARKS		
6	(ft) %	G	ELEV. (ft))					DEPTH (1
1)	(12.7)		0.540.7		Begin Cori	ng @ 42.0			
.1))%	(13.7) 85%		- 2,542.7 -		ey and white with	trace pink,	Migmatitic B		
					et porphyroblasts, noderately close to				,
			-				tare spacing)	
			-						
			-			49.5' - 50.2 = 75 - 85			
			-			17,889 psi			
			-	Moderately se	evere to severe we	athering, ve	ery close frac	cture spacing	
			-)° joint), with trace light to slight weat				
			- 2,526.6		0 0	0.	•	0	58.
5) 1%	(3.4) 76%	R	-		METAGRAYWA				
, ,0	1070		-		ures (variable orie				
		F.	2,521.9	Dering To	rminated at Eleva	ion 2 521 0	ft In Crustel	line Deels	62.
			-		(METAGRAYWA				
			-		N	OTES			
			-		2 lab classified as .0 - 16.5': SS-222	(A-7-5)(16)			n
			-		.0 - 10.5 . 33-222		u as (A-5)(1	3)	
			-	Other Samples: ST-2 (15.0 - 1)	7.0)				
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38330.1.FS1 (B-3186/B-5898)

US 23/ US 74 Great Smokey Mountain Highway

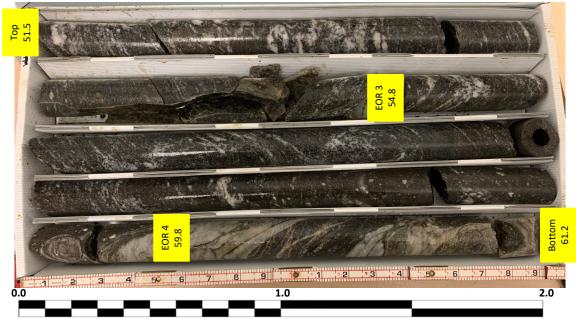


S2_B1-B Box 1 of 3: 42.0 – 51.5 FEET WET



Box 2 of 3: 51.5 – 61.2 FEET DRY 2 3 4 5 6 7 8 9 1 1 12 13 14 5 6 7 8 9 0.0 1.0 FEET

S2_B1-B Box 2 of 3: 51.5 – 61.2 FEET WET



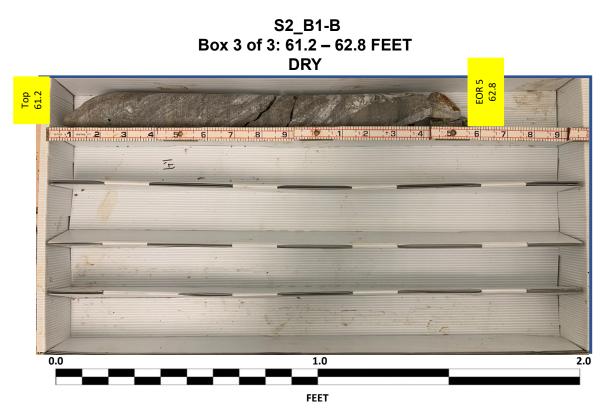
SHEET 13

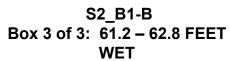
S2_B1-B



38330.1.FS1 (B-3186/B-5898)

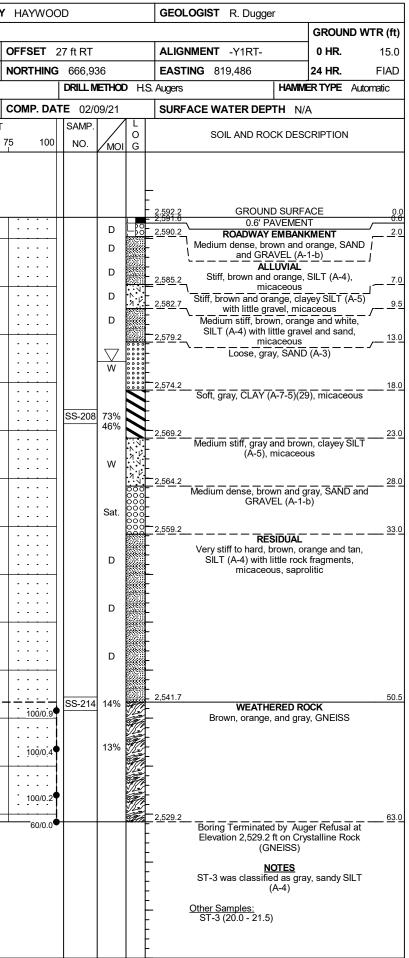
US 23/ US 74 Great Smokey Mountain Highway







								1																	-	
	38332					IP B-3186			Y HAYWO	OD			GEOL	OGIST R. Dugger	1		WBS	38332.	1.FS1			TI	P B-3186	/ B-5898	COUN	ΤY
SITE	DESCR	IPTION	US 2	23/ US	74 (G	Great Smoky	Mountain	Highway)							GROUN	D WTR (ft)	SITE	DESCRI	PTION	US 2	23/ US	74 (Gr	reat Smoky	Mountain I	Highway)
BORI	ng no.	S2_E	B2-A		s	STATION 2	29+30		OFFSET	14 ft LT			ALIGN	MENT -Y1RT-	0 HR.	20.0	BOR	ing no.	S2_E	B2-B		S	TATION 2	8+39		0
COLI	AR ELE	EV. 2,	596.7	ft	т	OTAL DEP	TH 42.5 f	ť	NORTHING	G 667,0	01		EAST	NG 819,562	24 HR.	FIAD	COL	LAR ELE	V. 2,	592.2 f	ft	т	OTAL DEP	TH 63.0 f	ť	N
DRILL	RIG/HAN	MER EF	-F./DAT	E GTO	29083	CME-550X 80	%(11/24/202	20)	•	DRILL	VIETHOD	D HS	S. Augers	HAMIN	IER TYPE	Automatic	DRILL	_ RIG/HAM	MEREF	-F./DATE	E GTO	C9083 C	ME-550X 80	%(11/24/202	20)	-
DRIL	LER L.	Wanst	trath		s	TART DAT	E 02/10/2	21	COMP. DA	TE 02/	10/21		SURF	ACE WATER DEPTH N	/A		DRIL	LER L.	Wanst	trath		S	TART DAT	E 02/09/2	21	С
ELEV	DRIVE	DEPTH	BLC	ow co				PER FOO	T	SAMP.		L	-				ELEV	DRIVE	DEPTH	BLO	w co			BLOWS		 от
(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	0	25	50	75 100	NO.	мо	O G	ELEV. (ft)	SOIL AND ROCK DES	SCRIPTION	DEPTH (ft)	(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	0	25	50	75
							•	•	•																-1	
2600																	2595									
2000		F											-				2090		-							
1	- 2.596.7-	0.0											2,596.7	GROUND SURF	ACE	0.0		2,591.6-								
2595	-	+	2	3	4	• ₇ • •					м	-	-	ROADWAY EMBAN			2590			12	10	6	1 6	; · · · · ;		•
	2,594.2	2.5	3	4	4	1					D		-	Loose, brown and orange, (A-2-4), with little	gravel			- 2,589.7-	• 2.5 ·	3	5	4	· •9 · ·			-
1	- 2,591.7-	5.0			_								2,592.2			<u> </u>		2,587.2	5.0	3	5	6				:
2590	-	<u> </u>	3	6	7	9 13					D		-	Stiff, brown and orange	, SILT (A-4)	,	2585	2,584.7	- 7.5		Ŭ	Ŭ		· · · ·		•
	2,589.2	 	4	4	6						D		-	micaceous					•	2	4	5	: • <mark>•</mark> 9 : :			:
	2,586.7-	10.0	7	6	7								-					2,582.2	10.0	2	2	3	∮ ●5			
2585	-	F	'	ľ	'	13	+ • • • •				D		-			10.0	2580		-					+	+ • • •	
	-	ŧ				: <i>i</i> ::						\square	<u>2,583.7</u>	Medium stiff, brown and gr	ay, f silty Cl	_AY <u>13.0</u>		2.577.2	15.0				1:::			:
0500	2,581.7-	- 15.0	3	3	4						м		-	(A-7-6), micace	eous		0575	1	. 13.0	2	4	4	 .∳8			:
2580	-	Ł								- 1		N	- 2,578.7			18.0	2575							+ • • • •	+ • • •	-+
	- 2.576.7-	20.0				{ · · ·					∇		-	Loose, brown and gray, f (A-2-4), micace		D		2,572.2	20.0							•
2575	2,570.7-	<u> </u>	3	3	2	- 6 5					M		-	(A-2-4), Micace	-0u5		2570	ļ		1	2	2				:
20.0	-	ŧ											2,573.7			23.0	20.0						 			
	- 2.571.7-	25.0				_ <u>;</u> :::			· · · · · ·			N	-	Soft to medium stiff, gray, contains trace wood fragme	CLAY (A-7- ents, micace	-6), eous		2,567.2	25.0	2	2	3				:
2570	-	ŧ	1	1	2	• 3 · · ·					м		-	Ũ			2565				2		•5			•
	-	ł										N	-						•							•
	2,566.7-	30.0			2	· · · · ·			.				-					2,562.2	30.0	13	12	11				
2565	-	Ŧ	'	'		• 3	+ • • • •			- 1	M	N	-				2560	4								<u> </u>
	-	ŧ							· · · · ·			N	-					2,557.2						/ · · · · ·		:
0500	2,561.7-	- 35.0	1	2	2						м		-				0555	I I		5	9	12		21		
2560	-	Ł								- 1		N	- 2,558.7			38.0	2555		-				 j	+ • • • •	<u> </u>	<u> </u>
	- 2,556.7-	+					[.					Very dense, gray, SAND (A-1-b)	and GRAVE	L		2,552.2	40.0							•
2555	2,556.7-	- 40.0 -	9	25	35	+ ::::					w		-	(A-1-D)			2550	I T		11	10	11		21		:
2000	2,554.2	42.5	60/0.0			+			60/0.0				2,554.2	Boring Terminated wit	h Standard	42.5	2000							<u> </u>		-
	-	ţ											-	Penetration Test Refusa	I at Elevatio			2,547.2	45.0	12	13	35				:
	-	Ł											-	2,554.2 ft on Crystalline R A.R. at a depth of	оск (GNEIS 42.5'.	5).	2545			12	15				●48	•
	-	Ł											-													•
	-	F										F	-					2,542.2	50.0	37	48	52/0.4			4	
	-	Ŧ											-				2540		-					+ • • • •		
	-	‡											-					2,537.2								
	-	ŧ											-				0505	I I		100/0.4	1					
	-	Ł											-				2535		-					+	+	
	-	+											-					2,532.2	60.0						· · ·	
	-	F										F	-				2530			100/0.2	2					
	-	ŧ											-				2000	2,529.2	63.0	60/0.0				<u>+</u>		
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	38332		Data	ining 1		P B-3186			Y HAYWO	UD			GE	OLOGIST N. Yacobi	GROUND WTR (ft)		38332			ining \		P B-3186	6 / B-5898 (1RT- STA)		
	ING NO.			uning v		D. 2 from -L <u></u> TATION 5		J I TOJ (O	OFFSET	28 ft DT				IGNMENT -RW2-	$\begin{array}{c} GROUND WTR(\pi) \\ 0 HR. Dry \end{array}$		ING NO.			uuung \		TATION 2		∠୬≁ᲐᲣ (0	40+
	LAR ELE			ft	_			ft	NORTHING					STING 819,591	24 HR. FIAD		LAR EL			ft			29+84 TH 49.5 ft	+	
						ME-7583%(DD H			ERTYPE Automatic								11/24/202		
	LER K						,		COMP. DA					RFACE WATER DEPTH N/			LER L						E 01/28/2	-	C
ELEV		DEPTH		w co				PER FOO		SAMP.			130			ELEV				W CO				PER FOO	
(ft)	ELEV (ft)	(ft)		0.5ft	-	0		50	75 100		1 7	O DI G	ELEV	SOIL AND ROCK DES	CRIPTION DEPTH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft		0.5ft	0		50	75
2600	-	Ļ											-	.0 GROUND SURF		2600		ŧ							
	2,597.2	0.8	9	12	6						$\frac{1}{5}$		2,598	.2 0.8' PAVEMEN	0.8		0.500.0	<u>+</u>							
2595	2,594.5	3.5		12	0	· ·	8				D		2,595		ID and GRAVEL ,— _ ^{3.0}	2595	2,596.0	\perp	8	7	6	· · · · · ·			
l	-	t	5	5	5	. ∳ 10 .					D		ł	(<u>A-1-b), micace</u> ALLUVIAL			2,594.1	Ŧ	3	4	5				:
2590	2,592.0	F	5	6	7	• • 13					D		-	Stiff, brown and tan, SILT (sand and gravel, mid	A-4), with trace caceous	2590	2,591.6	+ 5.0 +	7	7	7	•14			:
	2,589.5	- 8.5 -	7	6	7	· · · · · · · · · · · · · · · · · · ·			· · · · · ·	1	D		-				2,589.1	7.5	6	5	4				
	-	F				:::::			· · · · · ·				2,586	.0	<u>12.0</u>		2,586.6	10.0	3	3	4				
2585	2,584.5	13.5	4	4	5								Ē	Soft to stiff, gray, silty CLA trace sand, micad	Y (A-7-6), with	2585		Ŧ		5	-	•			+
	-		1	4	5	. ∮ 9					M		Ŧ				2,581.6	I 15.0							•
2580	2,579.5	- 18 5											Ł			2580			3	2	3	• 5			•
	- 2,579.5	- 10.5	2	1	2	↓ 3 : : :					м		ł					ŧ						· · · ·	:
2575	-	+				 							\$			2575	2,576.6	+ 20.0 +	3	3	4	· · · ·			:
2575	2,574.5	23.5	1	1	2		<u> </u>			1	М		+			2575	-	ŧ				Ţ			:+
	-	+							· · · · · ·				\$				2,571.6	+ 25.0							:
2570	2,569.5	28.5											+			2570		ŧ	1	2	2	4			·+
Ì	-	÷	1	1	1				· · · · · ·		M		4					ŧ							:
2565	-	-											Ŧ			2565	2,566.6	+ 30.0 T	WOH	2	3	↓ ↓ 5			:
	2,564.5	<u>- 33.5</u>	0	4	5	· • • •			· · · · · ·	1	м		E					Ī							·
		L.				.							2,561		<u>37.0</u>		2,561.6	35.0	4	15	13	 <u></u>			:
2560	2,559.5	38.5	0	3	5		· · · · ·		<u></u>	-	w	000	2,558	Loose, brown, orange, and GRAVEL (A-1-	-b)	2560	-	ŧ					28		+
					Ŭ	<u></u> 8				1	VV	-000	2,558	Boring Terminated at Eleval	40.0 tion 2,558.0 ft in		2,556.6	+ + 40.0					/		:
Ì		÷											F	SAND and GRA	VEL	2555	· ·	+	5	7	10	6 1	7	· · ·	÷
	-	ł											F					ŧ						· · · ·	•
	-	+											F			2550	2,551.6	+ 45.0 +	18	19	32			51	•
		÷											F			2000	-	ŧ							
	-	F											F				2,547.1	49.5	60/0.0				••••		÷
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HAYWOOD		GEOLOGIST R. Dugger	
0+54			GROUND WTR (ft)
OFFSET 7 ft LT		ALIGNMENT -RW3-	0 HR. 18.0
NORTHING 666,9	986	EASTING 819,622	24 HR. FIAD
	METHOD H.	,	MIMER TYPE Automatic
COMP. DATE 01		SURFACE WATER DEPTH	N/A
			17/0
75 100 NO.	MOI G	SOIL AND ROCK D	ESCRIPTION
		-	
			REACE 0.0
· · · ·			/ENT
		- ROADWAY EMB	
		2,592.1 orange, SAND and G micaced	
		Loose to medium dens	e, brown, tan and
	D L	orange, silty SAND (A 2,587.6 gravel, mica	-2-4), with trace ceous
::::		- Medium stiff to stiff, bro (A-4), with trace sar	wn and tan, SILT
+ • • • • • • • • • • • • • • • • • • •		- 2,583.6	13.0
			AL
SS-24	1 26%	- Medium stiff, tan and g - (A-7-6)(ray, sandy CLAY 11)
<u> </u>			, <u>18</u> .0
		- Loose, brown and gray, s micaced	
	W	-	
		2,573.6 Soft to medium stiff, bro	$\frac{23.0}{2}$
		- micaceo	
		- -	
<u> </u>		- 2,563.6	33.0
	0000	Medium dense, gra	y, SAND (A-3)
	W		35.8 AL
		Medium dense to ver orange, and tan, silty	y dense, brown,
		 contains trace rock fragr 	nents, micaceous,
	M	- saprolit	IC
		• •	
::::	м	- -	
+		-	
60/0.0		2,547.1 Boring Terminated	49.5
		Penetration Test Refu 2,547.1 ft on Crystalline A.R. at a depth	e Rock (GNEISS).

FC

REPORT ON SAMPLES OF: Rock For Quality

PROJECT:	B-3186 / B-5898	COUNTY:	Haywood
DATE SAMPLED:	05/11/2021	RECEIVED:	5/11/2021
SAMPLED FROM:	Test Borings	REPORTED:	5/12/2021
SUBMITTED BY:	HDR	BY / CERT NO:	Kevin E. Walker

BORING NO	SAMPLE NO	DEPTH (FT)	ROCK TYPE	LENGTH (IN)	DIAMETER (IN)	UNIT WEIGHT (PCF)	UNCONFI STF
S2_B1-A	RS-13	49.5-50.2	Migmatitic Biotite Gneiss	4.20	1.86	177.20	
S2_B1-B	RS-14	54.6-55.2	Migmatitic Biotite Gneiss	4.22	1.86	171.90	

FINED COMPRESSIVE
TRENGTH (PSI)
17,889
16,778