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5839

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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_HAYWOOD

PROJECT DESCRIPTION RUSS AVE - US 276 FROM US 23/74 (GREAT SMOKY MOUNTAINS EXPWY) TO US 23 BUS (N MAIN ST) SITE DESCRIPTION BRIDGE NO. 184 ON US 276 OVER BLUE RIDGE SOUTHERN RAILROAD

50230 **PROJECT:**

STATE PROJECT REFERENCE NO. STATE TOTAL SHEETS NO 22 U-5839 N.C. 1

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOL 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE 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 TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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- 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 REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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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			1	GR	RADATION					ROCK DE	SCRIPTION	
BE PENET ACCORDI IS B	RATED WITH NG TO THE BASED ON TH	H A CONTINUOUS FLIGHT P STANDARD PENETRATION 1 HE AASHTO SYSTEM, BASIC	DNSOLIDATED, OR WEATHERED OWER AUGER AND YIELD LES IEST (AASHTO T 206, ASTM [DESCRIPTIONS GENERALLY	S THAN 100 BLOWS PE D1586). SOIL CLASSIFIC INCLUDE THE FOLLOWIN	R FOOT CATION NG:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	NDICATES THAT SOIL	PARTICLES ARE ALL FORM PARTICLE SIZE	_ APPROXIMATI	ELY THE SAME SIZE.	ROCK LINE I SPT REFUSA BLOWS IN N	INDICATES THE L IS PENETRA ION-COASTAL I	AL PLAIN MATERIAL THAT E LEVEL AT WHICH NON-COA TION BY A SPLIT SPOON S	WOULD YIELD SPT REFUSAL 1 ASTAL PLAIN MATERIAL WOUL AMPLER EQUAL TO OR LESS ANSITION BETWEEN SOIL AN	.D YIELD SPT RE THAN 0.1 FOOT F
A	S MINERALO	GICAL COMPOSITION, ANGUL	TO CLASSIFICATION, AND OTH ARITY, STRUCTURE, PLASTICIT	TY, ETC. FOR EXAMPLE,	S SULH		Y OR ROUNDNESS OF	SOU GRAINS IS DES		THE TERMS.			PICALLY DIVIDED AS FOLLON	NS:	
			AASHTO CLASSIF				IGULAR, SUBROUNDED, (OR <u>ROUNDED</u> .		THE TERMS:	WEATHERED ROCK (WR)		NON-COASTAL PLA 100 BLOWS PER FI	IN MATERIAL THAT WOULD Y OOT IF TESTED.	IELD SPT N VAL
GENERAL CLASS.	(Granular Materials ≤ 35% Passing ≢200)	SILT-CLAY MATERIALS (> 35% PASSING =200)	ORGANIC MATERIA	ALS		MINERALUGI MES SUCH AS QUARTZ		ALC, KAOLIN, E		CRYSTALLINE ROCK (CR)			GRAIN IGNEOUS AND METAMOP REFUSAL IF TESTED, ROCK CHIST, ETC.	
GROUP CLASS.	A-1 A-1-a A-1-b	A-3 A-2 A-2-4 A-2-5 A-2-6 A-	-2-7 A-4 A-5 A-6 A-7 -2-7 A-7-5 A-7-6	A-1, A-2 A-4, A-5 A-3 A-6, A-7		HILE USED IN		RESSIBILITY		IT ICHNCE.	NON-CRYSTA		FINE TO COARSE	GRAIN METAMORPHIC AND NON	
SYMBOL			A76				HTLY COMPRESSIBLE		LL < 31		ROCK (NCR)		ROCK TYPE INCLU	K THAT WOULD YEILD SPT R DES PHYLLITE, SLATE, SANDSI	TONE, ETC.
Ō	000000000000000000000000000000000000000						RATELY COMPRESSIBL LY COMPRESSIBLE	.E	LL = 31 - 5 LL > 50	50	COASTAL PL SEDIMENTAR	AIN Y ROCK		EDIMENTS CEMENTED INTO RO CK TYPE INCLUDES LIMESTON	
% PASSING #10	50 MX			GRANULAR SILT- CLAY	MUCK,			GE OF MATERI			(CP)		SHELL BEDS, ETC.		
	30 MX 50 MX		5 MX 36 MN 36 MN 36 MN 36 MN	SOILS SOILS	PEAT		GRANULAR	SILT - CLAY SOILS		MATERIAL	 			HERING	
MATERIAL	10 114 20 114					ORGANIC MATERIAL TRACE OF ORGANIC M	<u>SOILS</u> ATTER 2 - 3%	3 - 5%	TRACE	1 - 10%	FRESH	HAMMER IF C		TS MAY SHOW SLIGHT STAININ	IG. RUCK RINGS U
PASSING 40				SOILS WITH		LITTLE ORGANIC MAT MODERATELY ORGANIC		5 - 12% 12 - 20%	LITTLE	10 - 20% 20 - 35%	VERY SLIGHT			SOME JOINTS MAY SHOW THIN	
LL PI	- 6 MX		1 MN 40 MX 41 MN 40 MX 41 MN 1 MN 10 MX 10 MX 11 MN 11 MN	LITTLE OR	HIGHLY	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE	(V SLI.)		N A BROKEN SPECIMEN FACE	SHINE BRIGHTLY. ROCK RINGS	UNDER HAMMER E
GROUP INDEX	0	Ø Ø 4 MX		. MODERATE AMOUNTS OF	ORGANIC		GROL	JND WATER			SLIGHT			AND DISCOLORATION EXTENDS	INTO ROCK UP T
USUAL TYPES	STONE FRAGS.	FINE SILTY OR CLAYEY	SILTY CLAYEY	ORGANIC MATTER	SOILS	∇	WATER LEVEL IN E	BORE HOLE IMMEDIAT	TELY AFTER D	RILLING	(SLI.)	1 INCH. OPEN	JOINTS MAY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OF	CCASIONAL FELDS
OF MAJOR MATERIALS	GRAVEL, AND SAND	SAND GRAVEL AND SAND	SOILS SOILS	MATTER		▼	STATIC WATER LEV	VEL AFTER 24 HO	IOURS		MODERATE			RYSTALLINE ROCKS RING UNDEF SCOLORATION AND WEATHERING	
GEN. RATING				FAIR TO BOOD		∇ PW	PERCHED WATER, S	ATURATED ZONE, OR	WATER BEARI	NG STRATA	(MOD.)	GRANITOID R	OCKS, MOST FELDSPARS ARE	DULL AND DISCOLORED, SOME S	SHOW CLAY. ROCK
AS SUBGRADE		EXCELLENT TO GOOD	FAIR TO POOR	POOR	UNSUITABLE		SPRING OR SEEP					DULL SOUND WITH FRESH		SHOWS SIGNIFICANT LOSS OF S	STRENGTH AS COM
			L - 30 ; PIOF A-7-6 SUBGROUP IS								MODERATELY	ALL ROCK E	CEPT QUARTZ DISCOLORED O	R STAINED. IN GRANITOID ROC	KS, ALL FELDSPAR
		CONSISTEN	CY OR DENSENESS				MISCELLA	NEOUS SYMBOL	LS		SEVERE (MOD. SEV.)			KAOLINIZATION. ROCK SHOWS S ST'S PICK. ROCK GIVES "CLUNK	
PRIMARY S	OIL TYPE	COMPACTNESS OR	RANGE OF STANDARD PENETRATION RESISTENCE	RANGE OF UNCO	ONFINED TRENGTH		ANKMENT (RE) 25/02	25 DIP & DIP DIRE	ECTION		(1100. 324.)		OULD YIELD SPT REFUSAL	SI S FICK. NUCK DIVES CEUNK	SUCIND WHEN ST
		CONSISTENCY	(N-VALUE)	(TONS/FT		WITH SOIL DE	SCRIPTION	OF ROCK STRUC	TURES		SEVERE			R STAINED. ROCK FABRIC CLEA	
GENERAL		VERY LOOSE LOOSE	< 4 4 TO 10			SOIL SYMBOL		OPT DAT TEST BORI	ING	SLOPE INDICATOR	(SEV.)			IN GRANITOID ROCKS ALL FEL	
GRANULA MATERIA		MEDIUM DENSE	10 TO 30	N/A			ILL (AF) OTHER (CONE PENETROMETER			YOULD YIELD SPT N VALUES		
(NON-CO		DENSE VERY DENSE	30 TO 50 > 50			THAN ROADWA		AUGER BORING		TEST	VERY SEVERE			R STAINED. ROCK FABRIC ELEN SOIL STATUS, WITH ONLY FRAG	
		VERY SOFT	< 2	< 0.25		INFERRED SOI	L BOUNDARY -	- CORE BORING	•	SOUNDING ROD	(V SEV.)	REMAINING. S	SAPROLITE IS AN EXAMPLE O	F ROCK WEATHERED TO A DEGR	REE THAT ONLY M
GENERAL SILT-CL		SOFT MEDIUM STIFF	2 TO 4 4 TO 8	0.25 TO 0 0.5 TO 1		INFERRED ROOM	CKLINE MWC) MONITORING WEL		TEST BORING				IAIN. IF TESTED, WOULD YIELD	
MATERIA		STIFF	8 TO 15	1 TO 2		-///_/_ INFERRED ROD			Ψ	WITH CORE	COMPLETE			IT DISCERNIBLE, OR DISCERNIBL Y BE PRESENT AS DIKES OR S	
(COHESI)	VE)	VERY STIFF HARD	15 TO 30 > 30	2 TO 4		ALLUVIAL SOI	L BOUNDARY	PIEZOMETER INSTALLATION	\bigcirc -	SPT N-VALUE		ALSO AN EXA			
			OR GRAIN SIZE				RECOMMEN	DATION SYMBC	DLS					IARDNESS	
U.S. STD. SIE	VE SIZE	4 10	40 60 200	270			UNCLASSIFIED E	xCAVATION - P		FIED EXCAVATION -	VERY HARD		SCRATCHED BY KNIFE OR SHA RD BLOWS OF THE GEOLOGIST	RP PICK. BREAKING OF HAND S	SPECIMENS REQUIF
OPENING (MM		4.76 2.0					🖾 UNSUITABLE WAS	STE 🛃		BLE, BUT NOT TO BE THE TOP 3 FEET OF	HARD			NLY WITH DIFFICULTY. HARD H	AMMER BLOWS RE
BOULDER	R CO	BBLE GRAVEL	COARSE FINE SAND SAN		CLAY	UNDERCUT	ACCEPTABLE DEG	RADABLE ROCK		ENT OR BACKFILL			HAND SPECIMEN.		
(BLDR.)	0	COB.) (GR.)	(CSE, SD.) (F SE		(CL.)		ABBF	REVIATIONS			MODERATELY HARD			OUGES OR GROOVES TO 0.25 I IST'S PICK, HAND SPECIMENS C	
GRAIN MM	305	75 2.0	0.25	0.05 0.005		AR - AUGER REFUSAL	MED	MEDIUM	VST - V	VANE SHEAR TEST		BY MODERATE			
SIZE IN.	12	3				BT - BORING TERMINATED CL CLAY		MICACEOUS MODERATELY		WEATHERED NIT WEIGHT	MEDIUM HARD			5 DEEP BY FIRM PRESSURE OF PEICES 1 INCH MAXIMUM SIZE	
	S		CORRELATION OF	TERMS		CPT - CONE PENETRATIO		ION PLASTIC		RY UNIT WEIGHT	THIND		GEOLOGIST'S PICK.	LICES I INCH MEXIMON SIZE	DI TIAND DECKS
	MOISTURE		MOISTURE RIPTION GUIDE FOR	FIELD MOISTURE DES	CRIPTION	CSE COARSE DMT - DILATOMETER TES		ORGANIC PRESSUREMETER TES	ST SAME	LE ABBREVIATIONS	SOFT			KNIFE OR PICK. CAN BE EXCAN BY MODERATE BLOWS OF A P	
						DPT - DYNAMIC PENETRA	TION TEST SAP	SAPROLITIC	S - BUL	ΓK			BE BROKEN BY FINGER PRESS		TUK PUINT. SMALI
		- SATU (SA)		IQUID; VERY WET, USUA W THE GROUND WATER		e – VOID RATIO F – FINE		SAND, SANDY SILT, SILTY		PLIT SPOON HELBY TUBE	VERY			AVATED READILY WITH POINT	
		LIMIT				FOSS FOSSILIFEROUS	SL1 9	SLIGHTLY	RS - R0	DCK	SOFT	FINGERNAIL.	THICKNESS CAN BE BROKEN	BY FINGER PRESSURE. CAN BE	SCRAICHED REAL
RANGE <		- WET		REQUIRES DRYING TO IMUM MOISTURE		FRAC FRACTURED, FRAC FRAGS FRAGMENTS		TRICONE REFUSAL DISTURE CONTENT		ECOMPACTED TRIAXIAL		FRACTURE	SPACING	BED	DING
(PI) PL		C LIMIT		India noisione		HI HIGHLY	V - VE		F	RATIO	TERM		SPACING	TERM	THICKNE
	0.007.04	M MOISTURE - MOIS	T - (M) SOLID; AT C	R NEAR OPTIMUM MO	ISTURE		UIPMENT USED	ON SUBJECT			VERY WID	Æ	MORE THAN 10 FEET 3 TO 10 FEET	VERY THICKLY BEDDED THICKLY BEDDED) 4 FEE 1.5 - 4 F
		M MOISTURE - MOIS				DRILL UNITS:	ADVANCING TOOLS:		HAMMER TY		MODERAT	ELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5
		- DRY		DDITIONAL WATER TO	1	CME-45C	CLAY BITS			MATIC MANUAL	CLOSE VERY CLO	JSE	0.16 TO 1 FOOT LESS THAN 0.16 FEET	VERY THINLY BEDDED THICKLY LAMINATED	0.03 - 0.16 0.008 - 0.0
			ATTAIN OPT	IMUM MOISTURE		Х СМЕ-55		5 FLIGHT AUGER	CORE SIZE:	_	L			THINLY LAMINATED	< 0.008
		PL	ASTICITY				8" HOLLOW AU		Ш-в	∐-+				RATION	
		PLAS	TICITY INDEX (PI)	DRY STRENG		CME-550			X-N Q					NING OF MATERIAL BY CEMEN FINGER FREES NUMEROUS GF	
	PLASTIC GHTLY PLAS	STIC	0-5 6-15	VERY LOW SLIGHT		VANE SHEAR TEST			HAND TOOLS	S:	FRIAB	LE		BY HAMMER DISINTEGRATES	
MOD	ERATELY P	LASTIC	16-25	MEDIUM				W/ ADVANCER		HOLE DIGGER	MODE	RATELY INDUR		E SEPARATED FROM SAMPLE	WITH STEEL PRO
HIGH	HLY PLASTI	ic	26 OR MORE	HIGH		PORTABLE HOIST	TRICONE		HAND	AUGER	MODE	WILL' INDUR	BREAKS EASIL	Y WHEN HIT WITH HAMMER.	
L			COLOR			X CME-750		TUNGCARB.	SOUND	DING ROD	INDUF	ATED		IFFICULT TO SEPARATE WITH BREAK WITH HAMMER.	STEEL PROBE:
			R COMBINATIONS (TAN, RED				X CORE BIT			SHEAR TEST				BLOWS REQUIRED TO BREAK	
мо	DIFIERS SL	JCH AS LIGHT, DARK, STRE	EAKED, ETC. ARE USED TO D	DESCRIBE APPEARANCE			X 3 1/4" HOLL	OW AUGERS			EXTRE	EMELY INDURA		S ACROSS GRAINS.	· JHIN LEI

SHEET NO.

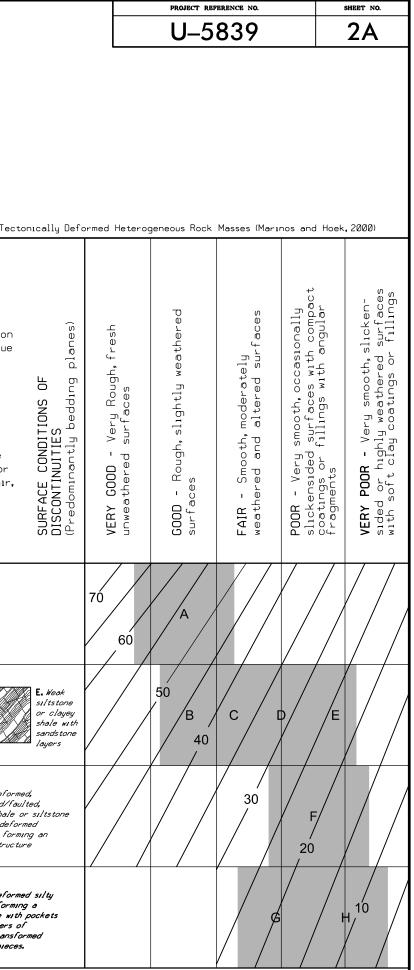
PROJECT REFERENCE NO. U-5839

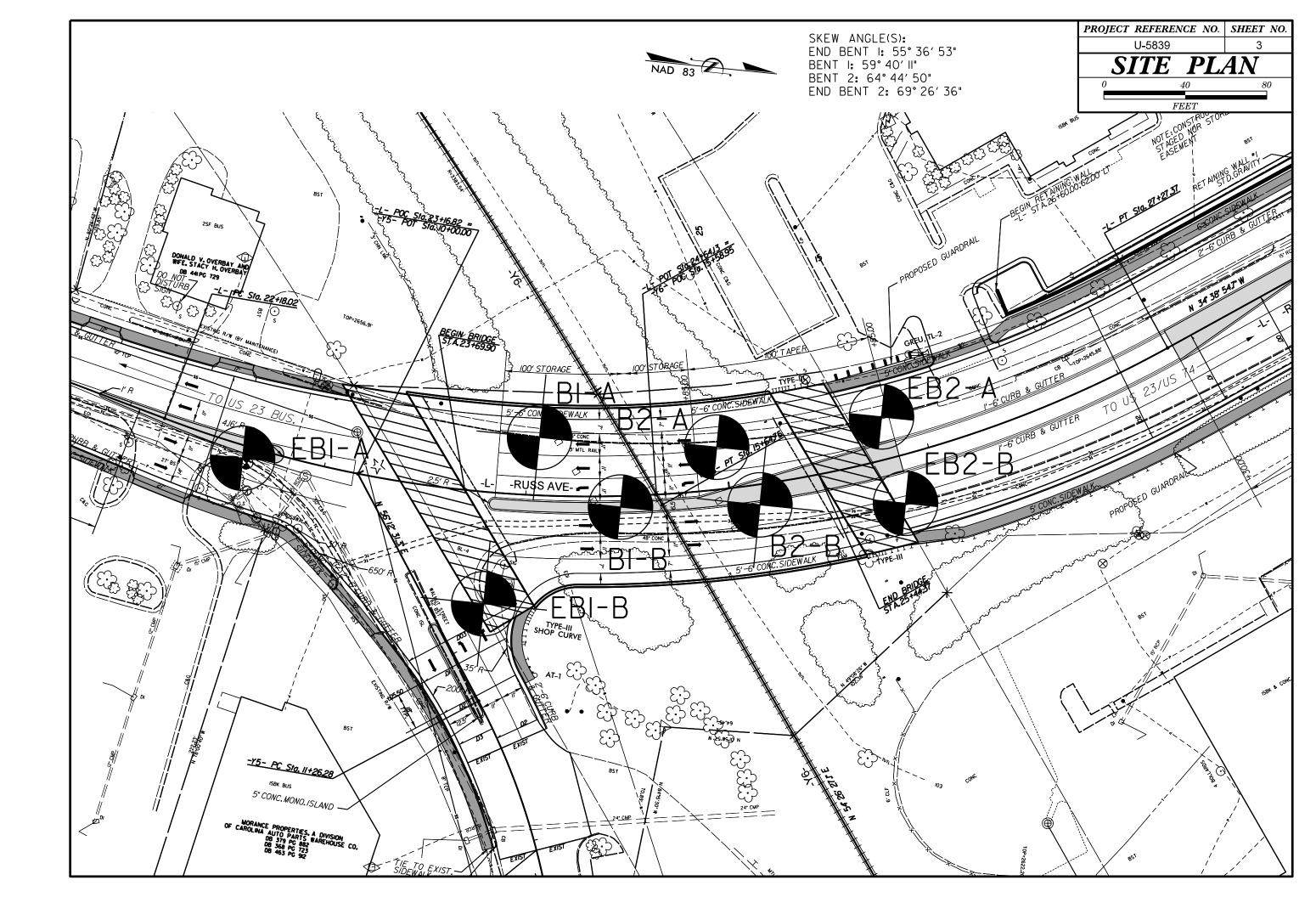
TERMS AND DEFINITIONS D AN INFERRED ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ED. AN INFERRED SPT REFUSAL. 1 FOOT PER 60 IS OFTEN AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. N VALUES > ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CLUDES GRANITE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. AL PLAIN IF TESTED. MAY NOT YIELD STONE, CEMENTED CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED 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 ROCKS OR CUTS MASSIVE ROCK. RINGS UNDER $\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DATINGS IF OPEN. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. AMMER BLOWS IF FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE СК ИР ТО SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FELDSPAR FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. BLOWS. $\underline{\mathsf{FLOAT}}$ - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. ROCK HAS AS COMPARED FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. FELDSPARS DULL OSS OF STRENGTH 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 VIDENT BUT ITS LATERAL EXTENT. ARE KAOLINIZED 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 USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. E DISCERNIBLE STRONG ROCK PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE ONLY MINOR OF AN INTERVENING IMPERVIOUS STRATUM. ALUES < 100 BPF RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. IN SMALL AND 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 SAPROLITE IS RUN AND EXPRESSED AS A PERCENTAGE. $\underline{\mathsf{SAPROLITE}}$ (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. REQUIRES <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO LOWS REQUIRED THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. $\underline{\text{SLICKENSIDE}}$ - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. EEP CAN BE TACHED STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL B PICK POINT WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL BLOWS OF THE TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. FRAGMENTS T. SMALL, THIN 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. PIECES 1 INCH ED READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: BORING EB2-B, N: 659930, E: 814171 THICKNESS 4 FEET 1.5 - 4 FEET ELEVATION: 2653.00 FEET 16 - 1.5 FEFT NOTES 3 - 0.16 FEE 98 - Ø.Ø3 FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING 0.008 FEET AT. PRESSURE. ETC. EEL PROBE:

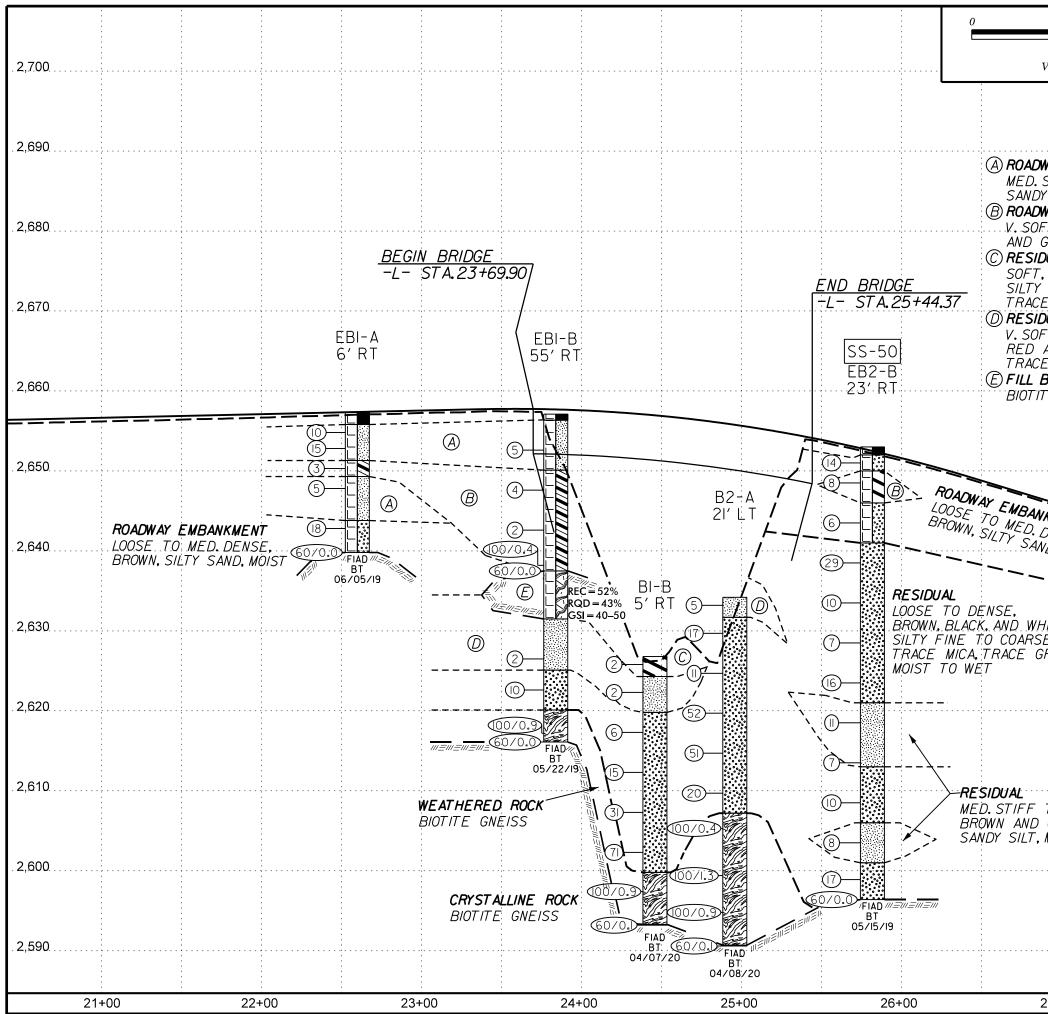
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

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

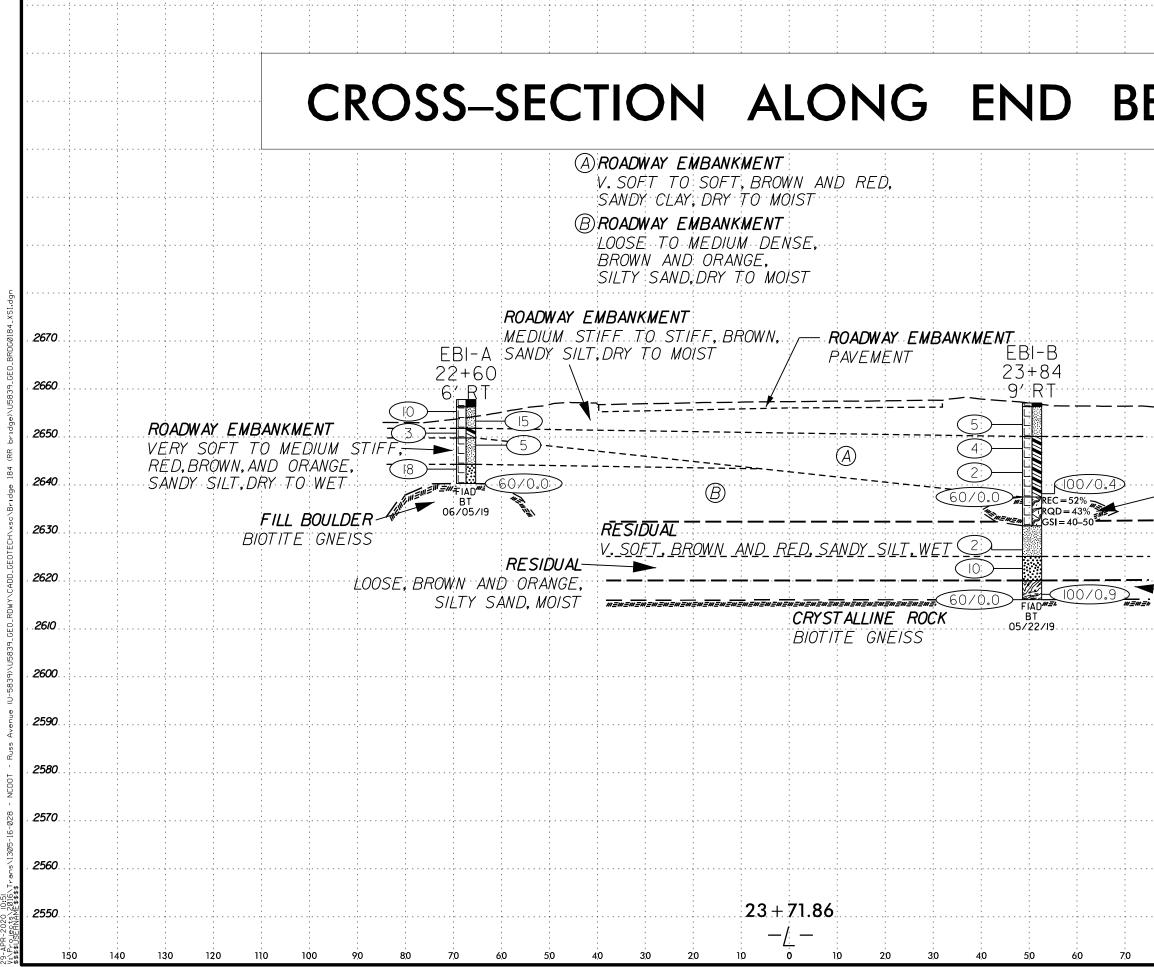
AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed F	Rock Mass (Marı	nos and Hoek,2	2000)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for T
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, 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	unweathered surfaces	Iron stained	weathered and	athered surfaces or fillings	weathered surfaces ings 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 valu of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more
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.	0D 1gh, fresh	GOOD Rough, slightly weathered, surfaces	FAIR Smooth, moderately wea altered surfaces	POOR Slickensided, highly we with compact coatings or angular fragments	VERY POOR Slickensided, highly we with soft clay coating	realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fai poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
STRUCTURE	DEC	CREASING SU	JRFACE QUA		⇒	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 stone layers
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass			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	Manual into small rock pi



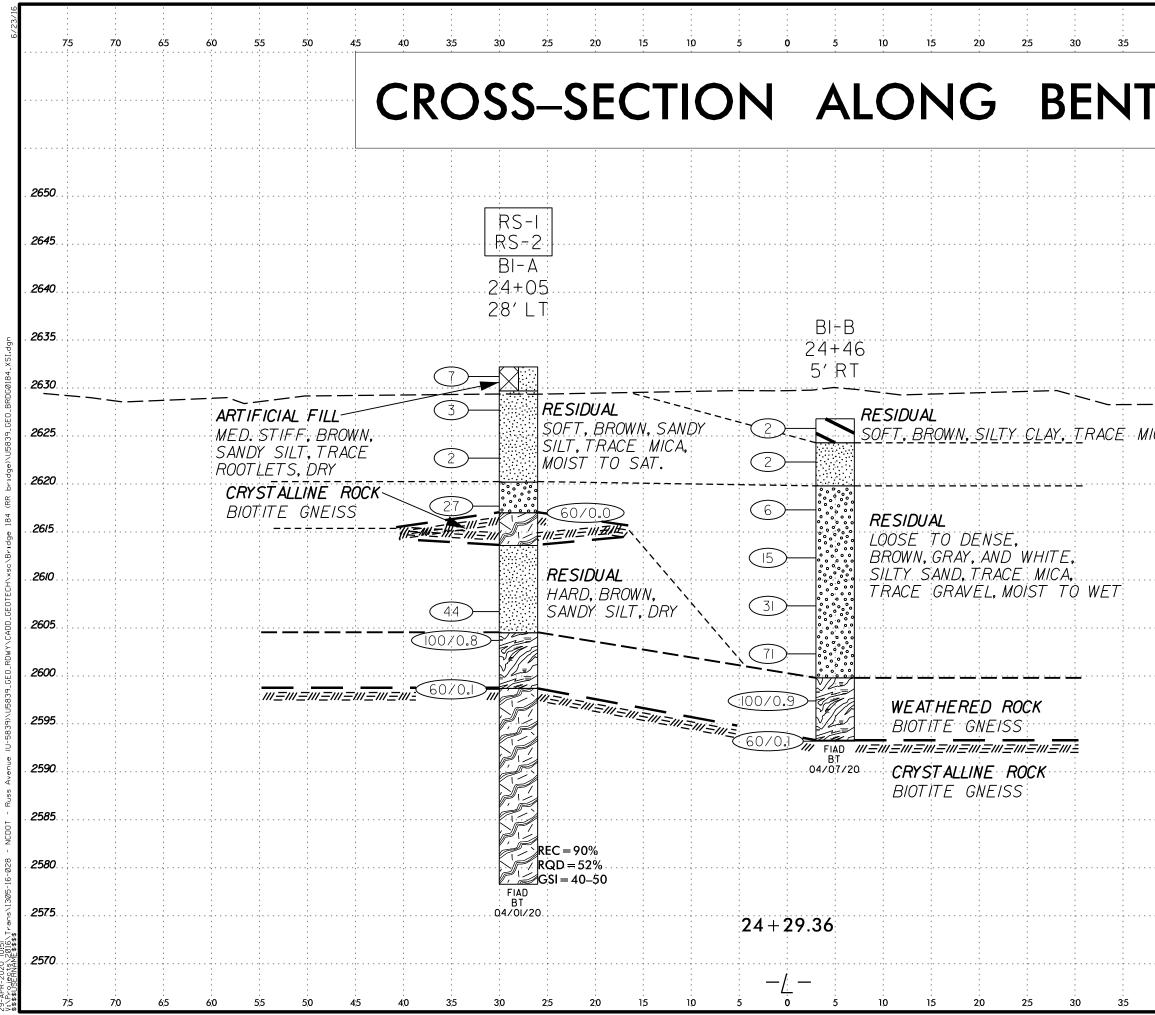




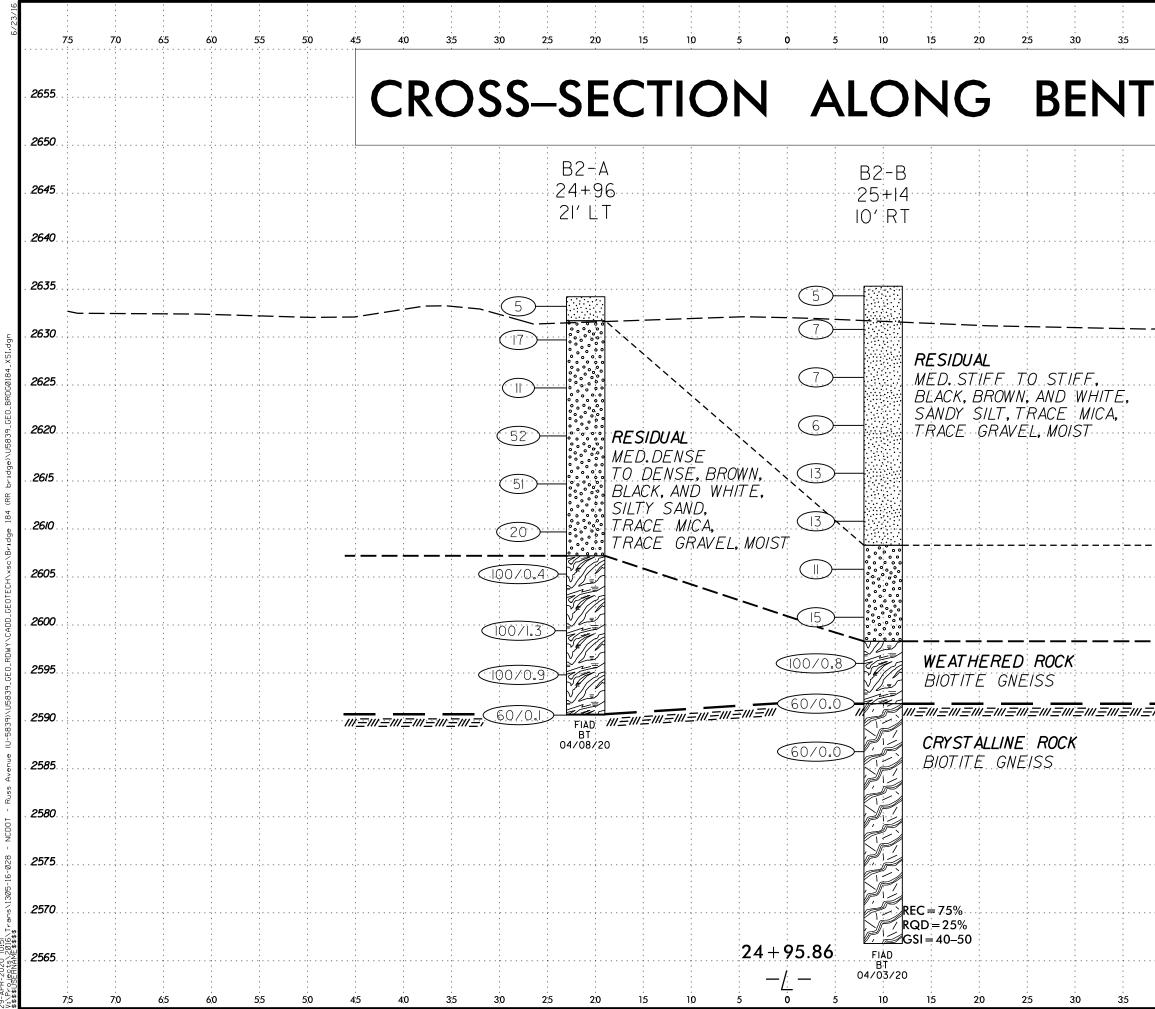
60 1	20 P R	OJECT REFER	ENCE NO.	SHEET NO.						
		U-5839 4								
FEET V. E. =5:1	E	BRIDGE NO. 184 OVER BLUE RIDGE SOUTHERN RAILROAD PROFILE ALONG -L-								
		• •								
		4 4 4								
			; ;	2,690						
WAY EMBANKMENT		1 1 1								
STIFF TO STIFF, SY SILT, TRACE GR		Y TO MOIST								
WAY EMBANKMENT										
FT TO MED. STIFI				2,680						
GRAY, MOD. PLASTI DUAL	CSILIT	LAT, MUIST	1 1 1							
, BROWN AND REL	D ,	• • •								
r CLAY,		• • •								
CE MICA, MOIST TO DUAL	VV [] /									
FT TO MED. STIF	Ξ,		- - 							
AND BROWN, SAND	DY SILT,	• • •	•							
CE MICA, MOIST TO BOULDER	SAL.	1 1 1	- - -							
ITE GNEISS		• • • • • • • • • • • • • • • • • • •		2,660						
		1 1 1	1 1 1							
		• • •								
				0.050						
			, ,	2,650						
NKMENT										
DENSE, ND, MOIST			· · ·	2,640						
ND, MOIST			/							
		1 1 1								
HITE,		· ·		2,630						
SE SAND,										
GRAVEL,										
		• • •	· ·	2,620						
		•								
		, , ,		2,610						
TO STIFF,										
) GRAY,										
, MOIST		1 1 1	• • •							
		, , ,		2,600						
		1 1 1	• • •							
		• •	•							
				2,590						
		• • •								
27+00	28+	-00	2	9+00						



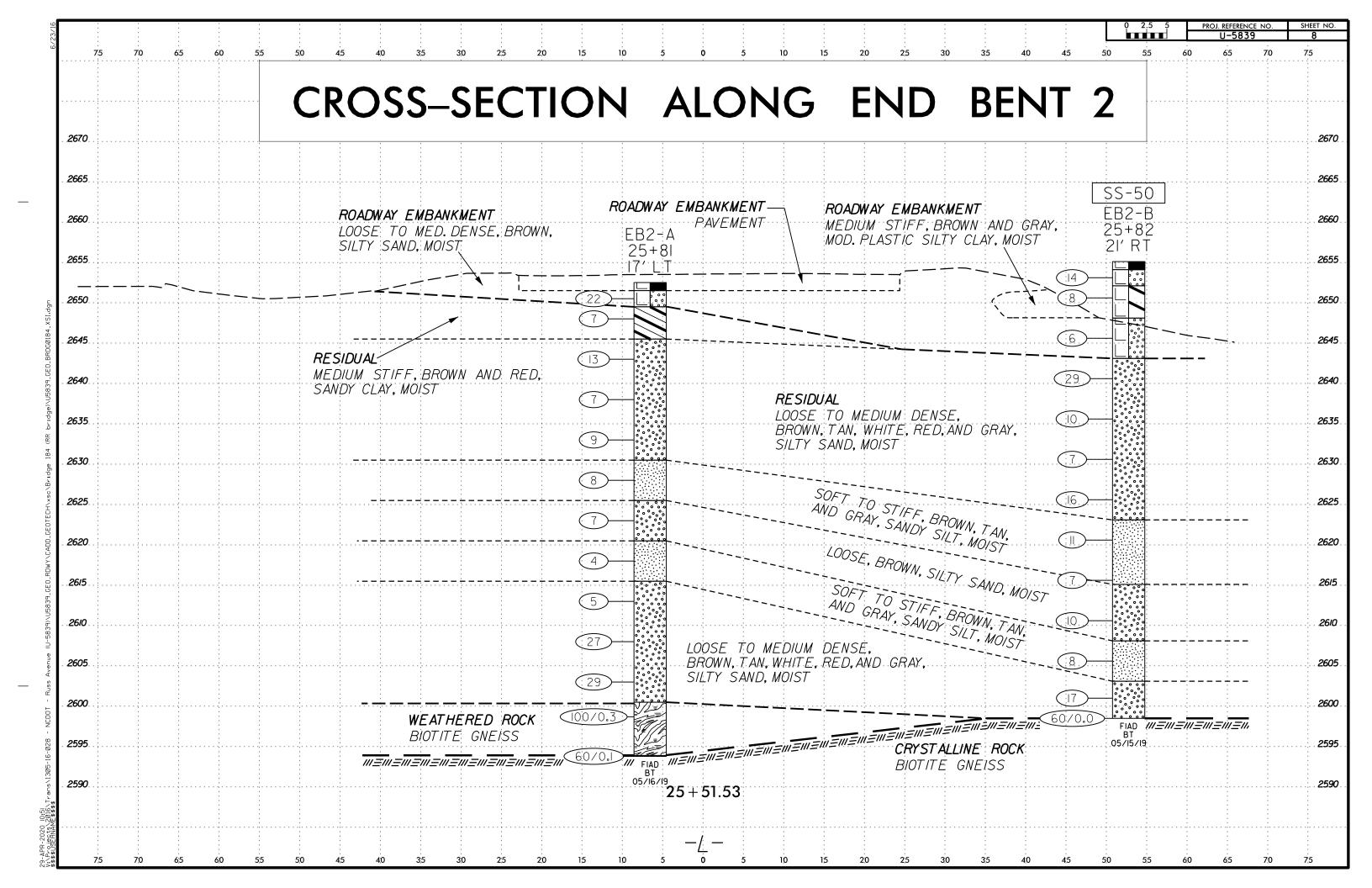
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RI	FILL E OTITE	GNE	- R 55			•		
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	WEAT			κ				2620
	BIOT IT	E GN	E155					
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								. 2565
4	0 4	5 5	0 5	5 6	; 50 6	5 7	0 75	



BORE LOG

								B
WBS	50230).1.1			Т	P U-5839		COUNT
SITE	DESCR	IPTION	BR	DGE I	10.18	4 ON US 27	6 OVER	BR SOL
BOR	NG NO.	EB1-	A		S	ration 22-	+60	
COL	LAR ELE	EV. 2,	657.3	ft	т		l 17.5 fl	t
DRILL	RIG/HAI	MMER E	FF./DA	TE SI	/IE2938	CME-750 84%	6 4/25/201	9
DRIL	LER G	iowan,	S. L.		S	FART DATE	06/05/1	9
ELEV	DRIVE ELEV	DEPTH	BLC	W CO	JNT		BLOWS F	PER FOO
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25		50 I
2660		L						
	-	ł						
	- - -	1.5				· · · · ·		
2655	2,655.8-	F	4	4	6			+ • • •
	2,653.8-	+ <u>3.5</u>	6	9	6	· · · • 15	· · · · ·	
2650	2,651.3	6.0	1	1	2		· · · · · · · ·	· · · ·
2000	2,648.8-	8.5				¶ ³		
	-	t	1	2	3	5	· · · · ·	
2645	-	Ł				.\		
	2,643.8-	13.5	6	8	10	\		
	-	F	-	-		· · · • 18		
2640	2.639.8	17.5	60/0.0					
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GEOTECHNICAL BORING REPORT

TY HAYWOOD **GEOLOGIST** Verdicchio, T. THERN RAILROAD GROUND WTR (ft) OFFSET 6ft RT ALIGNMENT -L-0 HR. Dry **NORTHING** 659,604 **EASTING** 814,182 24 HR. FIAD HAMMER TYPE Automatic DRILL METHOD H.S. Augers **COMP. DATE** 06/05/19 SURFACE WATER DEPTH N/A SAMP. MOIG SOIL AND ROCK DESCRIPTION 75 100 NO. ELEV. (ft) DEPTH (ft) GROUND SURFACE 2.657.3 ROADWAY EMBANKMENT 2,655.8 (PAVEMENT) D STIFF, BROWN, SANDY SILT, TRACE GRAVEL D . . . - 2.651.3 SOFT, RED AND BROWN, SANDY CLAY D 8. . . . D SANDY SILT <u>-8</u>2,643.8 -. . . . <u>13.5</u> MEDIUM DENSE, SILTY FINE TO COARSE SAND, SOME ROCK PIECES D · · · · · 2 639.8 60/0.0 FILL BOULDER - BIOTITE GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,639.8 ft ON A BOULDER (BIOTITE GNEISS)

GEOTECHNICAL BORING REPORT BODEIOG

								B	<u>ORE L</u>	OG						
WBS	50230	.1.1			TI	P U-5839		COUNTY	HAYWO	DD			GEOLOGIST Patton,	P.		
SITE	DESCR	PTION	BR	DGE	NO. 18	4 ON US 27	6 OVER E	BR SOUT	HERN RAI	ROAD					GROUN	ID WTR (ft)
BOR	ING NO.	EB1	-B		S	TATION 23	+84		OFFSET	55 ft RT			ALIGNMENT -L-		0 HR.	N/A
COLL	_AR ELE	E V. 2,	657.1	ft	т	OTAL DEPTH	1 41.0 ft		NORTHING	659,7	29		EASTING 814,241		24 HR.	FIAD
DRILL	RIG/HAI	MMER E	FF./DA	TE S	ME8245	CME-55 90%	09/06/2018	B		DRILL	/IETHO	D H.:	S. Augers	HAMIN	ER TYPE	Automatic
DRIL	LER M	liller, R	.т.		S	FART DATE	05/22/19	9	COMP. DA	TE 05/2	22/19		SURFACE WATER DEF	PTH N	/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	' <u> </u>	OW CO 0.5ft	UNT 0.5ft	0 25	BLOWS P		75 100 I	SAMP. NO.	моі	L O G	SOIL AND RC	OCK DES	CRIPTION	DEPTH (f
2660		-												ID SURF/		0.
2655	-												2,656.4 ROADWAY (PA'	⊂ EMBAN √EMENT)		0.
	<u>2,653.6</u> - -	- <u>3.5</u> -	2	2	3	• • • • • • 5 [•] • • •	· · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·		М		MEDIUM STIFF,	BROWN	SANDY SI	_1
2650	2,648.6	8.5	1	2	2		· · · · ·	· · · · ·	· · · · ·				<u>2,650.1</u> SOFT TO VERY SO SAN	OFT, BRO		RED7.
2645	-				2	∮ 4 	· · · · ·				М		-			
	<u>2,643.6 -</u> - -	- <u>13.5</u> -	1	1	1	•? • • • •	· · · · ·	· · · · ·	· · · · · · · · · · · · · · · · · · ·		м					
2640	2,638.6-		100/.4				· · · · ·						-			10
2635	2,637.5-	<u>- 19.6</u> -	60/0.0				· · · · ·	· · · · ·	· · 100/.4 · · 60/0.0						E GNEISS	<u> </u>
	-	-				· · · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · ·					2,631.5			25
2630	-						· · · · ·	· · · · ·	· · · · ·			L L	- VERY SOFT, BRC	SIDUAL WN ANE SILT	RED SAN	DY
2625	2,627.5-	<u>29.6</u>	2	1	1						W	-				<u> 32</u> .
	2,623.6- - -	- <u>33.5</u> -	1	4	6	· · · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		М			IE SAND	ANGE SIL	ΙŤ
2620	2,618.6	- - <u>38.5</u>	21	23	77/.4	· · · · · ·	· · · · ·	· · · · ·	· · · · ·						<mark>оск</mark> SS	<u>37</u>
	2,616.1	41.0	00/0.0						· 100/0.9				2,616.1		<u></u>	41
		+ - - - - - - -	60/0.0						0000				Boring Termir Penetration Tes 2,616.1 ft ON C (BIOTT	t Refusa	at Elevatio _INE ROCł	n K
	-	- - -											-			
	-												-			
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	-												-			
	-															

									С	O	
WBS	50230	.1.1			TIP	U-583	39	C	OUNT	Y⊦	1
SITE	DESCR	PTION	BR	DGE NO.	184 (ON US	3 276 OVI	ER BI	R SOU	THE	2
	NG NO.						23+84			OF	1
							PTH 41.			NO)
				TE SME8							
	LER M		Т.				TE 05/2			CO)
	E SIZE	NQ		DRILL		AL RU			RATA		Г
ELEV (ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP NO	REC. (ft) %	RATA RQD (ft) %	Ö G	
2637.5	2,637.5-	- 19.6	5.0	N=60/0.0	(4.5)	(3.6)		(5.2)	(4.3)		
2635	-	-	0.0	1:53 1:34 1:33 1:37 1:37 1:15	90%	72%		87%			
	2,632.5-	- 24.6 -	5.0	1:36	(0.7)	(0.7)				LĽ	
2630	-	-		0:05 0:30	14%	14%					ŀ
	- 2,627.5-	- 29.6		0:10 0:20							ŀ
2625		-		N=2							ŀ
		F									F
	-	-		N=10							ŀ
2620	-	-								971	
	-	-		N=100/0.9							
				N=60/0.0							
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SHEET 10

GEOTECHNICAL BORING REPORT CORE LOG

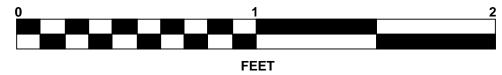
IAYWOOD	GEOLOGIST	Patton, P			
				GROUN	D WTR (ft)
FSET 55 ft RT	ALIGNMENT	-L-		0 HR.	N/A
PRTHING 659,729	EASTING 81			24 HR.	FIAD
DRILL METHOD H.S			HAMM		Automatic
	-				, ator ato
MP. DATE 05/22/19	SURFACE WA	ATER DEP	TH N/	A	
·					
D	ESCRIPTION AN	D REMARKS	5		
ELEV. (ft)					DEPTH (ft)
	Begin Coring				
2,637.5 <u>BOULDER - BIC</u> WEATHERED, HARI	DTITE GNEISS- D, CLOSE TO MO				19.6 NG
	,				
L 2 631 5					25.0
- 2,631.5	RESID			_	25.6
- VERY S	OFT, BROWN AI	ND RED SAN	IDY SILT	ſ	
► ►					
2,625.1					
	ROWN AND ORA	NGE SILTY	FINE SA		
F F					
2,620.1					<u> </u>
F	BIOTITE G				
2,616.1					41.0
Boring Terminated v					
2,616.1 ft ON	N CRYSTALLINE	ROCK (BIOT	TE GN	EISS)	
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CORE PHOTOGRAPHS

EB1-B BOX 1: 19.6 – 29.6 FEET





SHEET 11

50230.1.1/U-5839 Bridge No. 184 over Southern Railroad Haywood County, North Carolina

GEOTECHNICAL BORING REPORT BORF I OG

							<u> </u>	<u>ORE L</u>	ÜĞ				
WBS	50230.	1.1			Т	P U-5839	COUNT	Y HAYWO	DC			GEOLOGIST B. Kebea	
SITE	DESCRIF	PTION	BR	DGE I	NO. 18	84 ON US 276 C	OVER BR SOU	THERN RAIL	ROAD			1	
BOR	NG NO.	B1-A			S	TATION 24+05	5	OFFSET 2	28 ft LT			ALIGNMENT -L-	0 HR. N
COLL	AR ELE	/. 2,6	532 . 2	ft	т	OTAL DEPTH	53.9 ft	NORTHING	659,7	48		EASTING 814,157	24 HR. N
DRILL	RIG/HAM	MER EI	FF./DA	TE SI	VE8245	6 CME-55 90% 09	/06/2018		DRILL	/IETHO	D M.	ud Rotary w/ NQ Core HAMIN	ERTYPE Automatic
DRIL	L ER Mil	ler, R.	т.		S	TART DATE 04	4/01/20	COMP. DA	TE 04/	02/20		SURFACE WATER DEPTH N	/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	1	BL 0 25	OWS PER FOOT	75 100	SAMP. NO.	моі	L O G	SOIL AND ROCK DES ELEV. (ft)	CRIPTION DEPTH
2635													
-	2,632.2	0.0	3	3	4					D	X	2,632.2 GROUND SURF.	LL
2630	2.628.7	3.5									ЙŁ	_2,629.7 MED. STIFF, BROWN SAND ROOTLETS	
Ì	2,020.7 T	5.5	1	2	1	• 3 · · · ·				М	E	RESIDUAL SOFT, BROWN SANDY SIL	
2625	Ŧ										F		
	2,623.7	8.5	2	1	1						F	-	
	Ŧ		2	1	1		· · · · · · ·			М	li i i		
2620	- ‡						· · · · · · ·	· · · · · ·				2,620.2 MED. DENSE, BROWN AND	
	2,618.7		3	6	21		· · · · · · ·	· · · · ·		м		FINE SAND, TRACE MI 2,617.0 GRAVEL	
2615	2,617.0	15.2	60/0.0						2			CRYSTALLINE R	OCK
2015	+						· · · · · · · · ·					_ BIOTITE GNEI	551
	1											RESIDUAL HARD, BROWN SAN	IDY SILT
2610	±						· · • • • • • • • • • •					-	
	2.607.7+	24.5									l -		
	1	24.0	6	14	30		• • • • • • • • • • • • • • • • • • •			D	Ŀ		
2605	2,604.5	27.7	45	55/0.3	-		- L				an	-2,604.5	2
	Ŧ		45	55/0.3				100/0.8				WEATHERED R BIOTITE GNEI	
2600	Ŧ										4		
	2,598.7	33.5	<u> </u>								4	- 2,598.6	3
	‡		60/0.1				· · · · · · ·					CRYSTALLINE R BIOTITE GNE	
2595	+						· · · · · · ·		RS-1			-	
	‡						· · · · · · ·		1.0-1		S\$		
	1												
2590	+											-	
	t												
2585	Ŧ								RS-2			_	
	Ŧ						• • • • • • •						
	Ŧ										67		
2580	Ŧ										RA	-	
-	‡							• • • • •			F#	2,578.3 Boring Terminated at Elevati	on 2,578.3 ft IN
	‡											CRYSTALLINE ROCK (BIO	TITE GNEISS)
	+											- Topsoil 0.2 f	t
	‡												
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									С	:0	RE L	OG						
	50230					U-583					HAYWO		G	EOLOGIS	ST B. Kebe	а	T	
				RIDGE NC	1			ER BF	R SOL	1				1011151				D WTR (ft)
	NG NO.		-				24+05			-	FSET 2		_				0 HR.	N/A
		,		2π ATE SME			PTH 53				DRIHING	659,748		ASTING			24 HR. IER TYPE	N/A
				AIE SIVE										-				ALIOTELIC
	LER M		. I.				TE 04/0				DMP. DA	TE 04/02/20	ุรเ	JRFACE	WATER DEI	PTH N	/A	
	E SIZE RUN					AL RU	N 28.71		RATA									
ELEV (ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	G	ELEV. (f	t)	DESC	CRIPTION	AND REMARK	Ś		DEPTH (ft
2617	2,617.0	15.2	3.4	1:30/0.4	(1.4)	(0.9)		(1.4)	(0.4)		ļ		Be		ng @ 15.2 ft LINE ROCK			
2615	-	ļ.	5.4	1:15 1:00 1:30	41%	26%		(1.4) 41%	12%			BIOTITE GNEISS		Y AND PIN		/. HARD,	SLI. TO MO	
	2,613.6-	- 10.0	5.0	1:45	(0.0)	(0.0)					<u>- 2,613.6</u> -			RES	DUAL		10	18.6
2610	-	F		1:00 1:00	0%	0%					F		HA	RD, BROV	VN SANDY SII	_1		
	2,608.6-	23.6		0:45 1:15			-				F							
	-	-		N=44							F							
2605	-	È									- 							27.7
	-	F		N=100/0.8	я I						F	W	VEATHE		RED ROCK CK – BIOTITE (GNEISS		
2600	-	F									-							
2000	2,598.6-	33.6									2,598.6							33.6
	- 2,596.3	35.9	2.3	<u>N=60/0.1</u> 1:00 2:30	/ (2.1) 91%	(0.0) 0%		(18.3) 90%	(10.6) 52%			BIOTITE GNEIS	<u>55-</u> GR/	ay, white				
2595	-	-	5.0	2:30 <u>1:15/0.3</u> 2:30	/ (5.0) 100%	(3.7) 74%	RS-1	-		S.	-	SLIGHTLY TO M	MOD. W	/EATHERE	D, V. CLOSE	FRACTU	RE SPACIN	IG
	-	-		2:30 2:00 1:45				1										
2590	2,591.3-	- 40.9 -	5.0	1:45 1:45 2:00	(3.6)	(0.0)					ŧ.							
2000	-	-		1:15 1:00 2:15	72%	0%					F							
	- 2,586.3	- 45.9		3:00 2:30														
2585	-	-	5.0	1:45 1:45	(5.0) 100%	(4.5) 90%	RS-2				F							
	-	-		2:00 1:45							F							
2580	2,581.3	- 50.9 -	3.0	1:45	(2.6)	(2.4)	-											
2300	 2,578.3	- 53.9		1:30 2:30	87%	80%					2,578.3							53.9
	-	-									F	Boring Termina	nated at		2,578.3 ft IN C E GNEISS)	RYSTALL	INE ROCK	
	-	-									F				oil 0.2 ft			
	-	F									F							
	-	-									F							
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SHEET 12

GEOTECHNICAL BORING REPORT



CORE PHOTOGRAPHS

B1-A BOXES 1 & 2: 15.2 – 49.6 FEET











SHEET 13

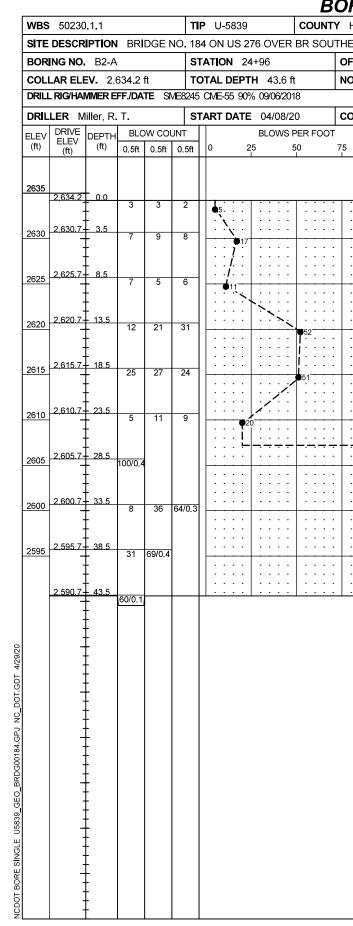
50230.1.1/U-5839 Bridge No. 184 over Southern Railroad Haywood County, North Carolina

B1-A BOX 3: 49.6 – 53.9 FEET

FEET

GEOTECHNICAL BORING REPORT BORE LOG

									BC	DRE L	UG							
WBS	50230	0.1.1			TI	P U-5839)	COU	JNTY	HAYWO	OD			GEOLOG	ST B. Keb	ea		
SITE	DESCR		BR	IDGE I	NO. 18	4 ON US	276 OVE	R BR S		IERN RA I I	ROAD			1			GROUN	ID WTR (ft)
BOR	ING NO	. B1-E	3		S	TATION 2	24+46			OFFSET	5 ft RT			ALIGNME	NT -L-		0 HR.	N/A
COLL	LAR ELI	EV. 2,	626.8	ft	т	OTAL DEP	TH 33.	6 ft	1	NORTHING	659,7	91		EASTING	814,187		24 HR.	N/A
DRILL	RIG/HA	MMER E	FF./DA	TE S	VE8245	CME-55 90	0% 09/06/2	2018			DRILL	IETHO	DM	ud Rotary		HAMIN	VIER TYPE	Automatic
DRIL	LER M	liller, R	.т.		S	TART DAT	E 04/07	7/20	0	COMP. DA	TE 04/	07/20		SURFACE	WATER DE	PTH N	I/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	DW CO 0.5ft	UNT 0.5ft	0	BLOW 25	/S PER FC 50	TOC 7!	5 100	SAMP. NO.	моі	L O G	ELEV. (ft)	SOIL AND R	OCK DES	CRIPTION	DEPTH (f
2630		ļ ļ												<u>-</u>				
2625	2,626.8		3	1	1	• <u>2</u> · · ·	· · · ·					W		2,024.5	R T, BROWN S		Y, TRACE N	۷.,
2620	2,623.3	<u>3.5</u>	2	1	1	¢2	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · · · · · · · · · · · · · · · ·		Sat.		2,619.8	T, BROWN S			7.
2615	2,618.3	8.5 -	2	2	4		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · ·	· · · · · ·	· · · · · · · · · · · · · · ·		w			DSE TO DENS TE SILTY SAN			
	_2,613.3	13.5	4	5	10		· · · · · · · · · · · · · · · · · · ·	· · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		w		—				
2610	2,608.3	- 18.5	10	14	17		• • • • • • • • • 31 •	 	· · · · ·	· · · · ·		м						
2605	2,603.3	- - - - -	10	24	47		· · · ·		· · ·	· · · · · · · · · · · · · · ·		м						
2600	2,598.3	28.5	17	83/0.4	-	· · · · · ·	· · · ·	· · · · · · · ·	· • • • • • • • • • • • • • • • • • • •	· · · · ·				2,599.8		HERED R ITE GNEI		27.
<u>2595</u>	2.593.3	- - - <u>33.5</u>	60/0.1					· · · ·	 	60/0.1	•			 	CRYST		ROCK	33.
		+ + + + + + + + + + + + + + + + + + + +													BIOT Boring Term Penetration Te 2,593.2 ft IN (ITE GNEI inated with st Refusa	SS n Standard I at Elevatio LINE ROCK	
	- - - - - - -	+ + + + + + + + + + + +												- - - - -				
		+ + + +																
	- - - - -	+ + + + + + + + + +												· · · ·				
	- - - - - - -																	



GEOTECHNICAL BORING REPORT

BORE LOG

				GEOLOGIST	D. Kahaa			
HAYWO				GEOLOGIST	B. Kebea		00010	
				A. 10				D WTR (ft)
	21 ft LT	0.5			-L-		0 HR.	N/A
IORTHING			<u> </u>	EASTING 81	14,153		24 HR.	N/A
			עוע	lud Rotary				Automatic
OMP. DA	-	08/20		SURFACE W	ATER DEP	TH N/	A	
5 100	SAMP.		L O	SC	IL AND ROC	K DESC	RIPTION	
5 100	NO.	/моі	G	ELEV. (ft)				DEPTH (ft)
				-2,634.2	GROUNE) SURFA	CE	0.0
		м			RES TIFF, BLACK		ROWN SAI	
				- 2,001.7	SILT, TR	ACE MI	CA	
		м		- BROWI	DENSE TO I N SILTY FIN	E TO CO	DARSE SA	
				- TF -	RACE MICA,	TRACE	GRAVEL	
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		м		-				
				-				
			<i>77</i>	2,607.2	WEATHE			27.0
				-	BIOTITI	E GNEIS	S	
				-				
				-				
· 100/1.3	•			-				
				-				
				-				
100/0.9				-				
: : : :				- 2,590.7				43.5
60/0.1				_2,590.6	CRYSTAL BIOTITI	LINE RO E GNEIS		
				- <u>Bo</u>	ring Termina	ted with	Standard	
					etration Test 0.6 ft IN CR	YSTALL	NE ROCK	
				-	(BIOTITI	E GNEIS	iS)	
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GEOTECHNICAL BORING REPORT BORF I OG

								<u>SORE L</u>	UG			
WBS	5023	0.1.1			Т	P U-5839	COUN	FY HAYWO	OD		GEOLOGIST B. Kebea	
SITE	DESCR		BR		NO. 18	84 ON US 27	6 OVER BR SOL	JTHERN RAI	LROAD			GROUND WTR (ft)
BOR	ING NO	. B2-E	3		S	TATION 25-	+14	OFFSET	10 ft RT		ALIGNMENT -L-	0 HR. N/A
COLI	LAR EL	EV. 2,	635.3	ft	т	OTAL DEPTH	l 68.5 ft	NORTHING	659,859)	EASTING 814,179	24 HR. N/A
DRILI	_ RIG/HA	MMER E	FF./DA	TE SI	VE8245	6 CME-55 90%	09/06/2018	•	DRILL MET	THOD N	ud Rotary w/ NQ Core HAM	MER TYPE Automatic
DRIL	LER N	liller, R	. Т.		S	TART DATE	04/03/20	COMP. DA	TE 04/06/	/20		N/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC	OW COU	UNT 0.5ft	0 25	BLOWS PER FOO 50	T 75 100	SAMP.	MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft
												DEFTH (it
2640		+									-	
2635	2,635.3	+ - - 0.0	3	2	3						- - - 2,635.3 GROUND SURF - RESIDUAL	
		ŧ			5	● ⁵	· · · · · · ·	· · · · · ·		м	MED. STIFF TO STIFF, WHITE SANDY SILT, TRAC	BROWN AND
2630	2,631.8	<u>3.5</u>	2	3	4	$\bullet_7 \cdot \cdot \cdot$	· · · · · · · · · · · ·	· · · · · ·		м	GRAVEL	JE MICA, TRACE
	2,626.8	- - 8.5					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			-	
2625	-	+	3	3	4		· · · · · · · · · · · · · · · · · · ·	· · · · · ·		M	-	
2620	2,621.8	+ - 13.5 -	2	2	4		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		м	-	
.020		‡ 				· \ · \	· · · · · · · · · · · ·	 				
2615	2,616.8	<u>- 18.5</u> - -	3	5	8	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · ·	· · · · · ·		м	-	
	2,611.8	- - 23.5	2	4	9		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			-	
2610	-	Ŧ			5		· · · · · · · · · · · · · · · · · · ·	· · · · · ·		M		27.
2605	2,606.8	28.5	3	3	8		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		м	MED. DENSE, BROWN AN SAND, TRACE MICA, TR	
	2.601.8	- 33.5					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			-	
2600	-	‡	8	6	9	· · • •15	· · · · · · · · · · · · · · · · · · ·	· · · · · ·		м	- 	
2595	2,596.8	- - 38.5 -	53	47/0.3	-	.		· · · · · · ·			BIOTITE GNE	ROCK
	2.591.8	43.5					· · · · · · · · · · · · · · · · · · ·	· · · · · ·				43.
2590		+ 43.3 - -	60/0.0				· · · · · · · · · · · · · · · · · · ·	60/0.0			CRYSTALLINE I BIOTITE GNE	ROCK
	2,586.8	- - 48.5	60/0.0	_		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · ·			- - -	
2585	-	ŧ					· · · · · · · · · · · ·	 			 - -	
2580	-	ŧ				· · · · ·	· · · · · · · · · · · ·	· · · · · ·			- - 	
		+					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			-	
2575	-	ŧ					· · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			- 	
2570		Ŧ					· · · · · · · · · · · · · · · · · · ·				-	
							· · · · · · · · · · · · · · · · · · ·	· · · · · ·			 	68.
	-	ł									Boring Terminated at Eleva CRYSTALLINE ROCK (BIO	tion 2,566.8 ft IN
		Ŧ									-	

									С	OF	RE L	OG					
	50230				_	U-583					IAYWO			GEOLOGIST B. Kel	bea	1	
SITE	DESCR	IPTION	I BR	DGE NO	. 184 (ON US	276 OV	ER BF	R SOL	JTHE	RN RA	LROAD		I		GROUN	D WTR (ft
BOR	NG NO	B2-E	8		STA	TION	25+14			OF	FSET	10 ft RT		ALIGNMENT -L-		0 HR.	N/A
COL	LAR ELI	E V. 2,	635.3	ft	тот	AL DE	PTH 68	.5 ft		NO	RTHING	659,859		EASTING 814,179		24 HR.	N/A
DRILL	RIG/HA	MMER E	FF./DA	NTE SME	245 CI	VE-55 9	90% 09/06	/2018				DRILL MET	THOD Muc	d Rotary w/ NQ Core	HAMIN	IER TYPE	Automatic
DRIL	LER M	liller, R	т.		STA	rt da	TE 04/0	3/20		СО	MP. DA	TE 04/06/	20	SURFACE WATER D	EPTH N	/A	
COR	e size	NQ			тоти	AL RU	N 23.4 f	ť									
ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	RATA RQD	L				ESCRIPTION AND REMA	DKS		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	ELEV. (ft)	D		RN3		DEPTH (f
2591.8														Begin Coring @ 43.5			
2590	2,591.8	43.5	3.4	1:45 0:30	(0.0) 0%	(0.0)		(18.7)	(6.2) 25%	R	_ 2,591.8	BIOTITE	GNEISS- G	CRYSTALLINE ROCI GRAY AND WHITE, SOFT	(TO VERY H	HARD. SLI.	43. TO
	2,588.4-	46.9		0:30						R	-	SE\	ERELY WE	EATHERED, V. CLOSE FF	RACTURE S	SPACING	
	2,586.8		1.7		(1.1)	(0.0)				R	-						
2585	2,585.1	50.2	5.0	<u>W=60/0.0</u> 2:30 2:30/0.7	65%	0%					_						
	-	Ŧ		3:15 3:30	(5.0) 100%	(1.7) 34%					-						
2580	- 2,580.1	55 2		3:15 3:30 2:45 2:00 3:15							-						
2000	_	Γ	2.2	2:45 2:45	(1.6) 73%	(0.0)				Ø	-						
	2,577.9	<u> </u>	3.4	1 0.45/0 2	(3.4)	0% (1.4)				Ø	-						
2575	2,574.5-	60.8		3:15/0.8 2:10 2:30 1:00/0.6	100%	41%					-						
		1	5.0	1: <u>00/0.6</u> / 4:00	(4.9) 98%	(1.5) 30%					-						
	-	Ł		4:00 4:00 3:30 2:30 3:30	90 /0	30 %				B	-						
2570	2,569.5	65.8	2.7	2:30	(0.7)	(1.0)					_						
	2,566.8	68.5	2.1	1:30/0.7 2:30 3:00	(2.7) 100%	(1.6) 59%					2,566.8						68.
	-			0.00							-	Boring	Terminated	d at Elevation 2,566.8 ft IN (BIOTITE GNEISS)	CRYSTAL	INE ROCK	
	-	Ŧ									-						
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SHEET 15

GEOTECHNICAL BORING REPORT CODELOC



CORE PHOTOGRAPHS

B2-B BOXES 1 & 2: 48.5 – 68.5 FEET







SHEET 16

50230.1.1/U-5839 Bridge No. 184 over Southern Railroad Haywood County, North Carolina

GEOTECHNICAL BORING REPORT BORE LOG

								B	<u>ORE L</u>	OG							
WBS	50230).1.1			TI	P U-5839		COUNT	HAYWO	DD			GEOLOGI	ST Patton	, P .		
SITE	DESCR	IPTION	BR		NO. 18	84 ON US 276	6 OVER E	BR SOUT	HERN RAIL	ROAD						GROUN	ID WTR (ft)
BOR	ing no.	EB2	A		S	TATION 254	-81		OFFSET 2	21 ft LT			ALIGNME	NT -L-		0 HR.	31.8
COL	LAR ELI	EV. 2,	652.0	ft	т	OTAL DEPTH	58.7 ft		NORTHING	659,9	14		EASTING	814,130		24 HR.	FIAD
DRILI	RIG/HA	MMER E	FF./DA	TE SI	VE8245	6 CME-55 90%	09/06/2018	3		DRILL	/IETHO	D H.S	S. Augers		HAMIN	ER TYPE	Automatic
DRIL	LER M	liller, R	.т.		S	TART DATE	05/16/19)	COMP. DAT	FE 05/ ⁻	16/19		SURFACE	WATER D	EPTH N	/Α	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	OW COU 0.5ft	UNT 0.5ft	0 25	BLOWS P 5		75 100	SAMP. NO.	моі	L O G	ELEV. (ft)	SOIL AND F	OCK DES	CRIPTION	DEPTH (ft
2655													-				
2650	2,651.0	1.0	6	10	12	22		· · · · ·			м		2,652.0 2,651.0 	ROADWA	JND SURFA	KMENT	
0045	2,648.4	<u>+ 3.6</u>	3	3	4		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			м		MED		RESIDUAL		NDY
2645	2,643.4	8.6	2	5	8	· · · · ·	· · · · ·	· · · · ·			D		_2,645.0 LO	OSE TO MED RED			<u>7.c</u> ND
2640	2,638.4	13.6	4	3	4	· / · · · / · · · ·/· · ·	· · · · ·	· · · · ·	· · · · ·		D		-				
2635	2.633.4	- - - 18.6			-		· · · · ·	· · · · ·	· · · · ·		D		-				
2630	-	- 10.0 	4	4	5	· • • · · ·	· · · · ·	· · · · ·	· · · · ·		D		_2,630.0	EDIUMSTIFF	BROWN		<u>22.0</u>
2625	2,628.4	<u>23.6</u>	3	4	4	 . • 8 	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		м		2,625.0		, BROWN,		27.0
	2,623.4	28.6	3	3	4	. 1 . ↓ . ↓	· · · · ·		· · · · · · · · · · · · · · · · · · ·		м			LOOSE, BF	ROWN, SIL	TY SAND	
2620	2,618.4	33.6	1	2	3	$\begin{array}{c c} & 1 & 1 \\ \hline 1 & 1 \\ 1 & 1 \\ 9 \\ 9 \\ 5 \\ 1$	· · · · ·	· · · · · ·			м		_2,620.0 MI	EDIUM STIFF	, BROWN,	SANDY SI	<u>32.0</u> LT
2615	2,613.4	38.6	2	3	2		· · · · ·	· · · · ·	· · · · ·		w	-	_ <u>2,615.0</u> LOC	DSE TO MED	DENSE, E SAND	ROWN, SI	LTY <u>37.0</u>
2610	2.608.4	43.6					· · · · ·	· · · · ·	· · · · ·				-				
2605		+ + + +	5	15	12			· · · · ·			м		_				
2600	2,603.4	<u>48.6</u>	8	10	19		29 -				D		_ <u>2,600.</u> 0				<u>52.0</u>
0505	2,598.4	53.6	100/0.3	3			· · · · ·		· 100/0.3♥						TITE GNE		
2595	2.593.4	<u>58.6</u>	60/0.1						60/0.1	-			- 2,593.4 2,593.3		T ALLINE R FITE GNEIS		58.6
														Boring Term Penetration Te 2,593.3 ft ON	ninated with est Refusal	Standard at Elevatio _INE ROCł	
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WBS	5023	0.1.1			Т	I P U-5839		ORE L				GEOLOGIST Patton, P.		
SITE	DESCF	RIPTION	BR	IDGE I	. 18	34 ON US 276 OVER	BR SOU	THERN RA	LROAD				GROUN	id wtr (f
BOR	ing no	EB2	в		S	TATION 25+82		OFFSET 2	23 ft RT			ALIGNMENT -L-	0 HR.	35.
COL	LAR EL	EV. 2,	653.0	ft	Т	OTAL DEPTH 56.6 f	t	NORTHING	659,9	930		EASTING 814,171	24 HR.	FA
DRIL	RIG/HA	MMER E	FF./DA	TE S	ME8245	5 CME-55 90% 09/06/20	8	1	DRILL	VIETHO	D H.S	S. Augers H	IAMMER TYPE	Automatic
DRIL	LER N	/liller, R	. т.		S	TART DATE 05/15/1	9	COMP. DA	TE 05/	15/19		SURFACE WATER DEPTI	I N/A	
ELEV	DRIVE	DEPTH		ow co		BLOWS	PER FOOT		SAMP.	▼/	1-1			
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	мо	O G	SOIL AND ROCK	DESCRIPTION	DEPTH
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	2,010.0	1	2	4	4				SS-50	м	EN	MEDIUM STIFF, BR MOD. PLASTIC		Υ, ΄
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	2,004.0	1 10.3	5	5	5					м	Ŀ			
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625		‡									1			
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		Ŧ									F			
615	2,614.5	+ <u>38.5</u>										_		
		‡	2	3	4					W				:
040		‡										LOUSE, BROW	N SILI Y SAND	
610	2,609.5	43.5	2	4	6	$\left \left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right \left \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right $						-		
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600	2,599.5	+ 53.5				\ -	· · · ·				-	MEDIUM DENSE, BI		AY
		‡	2	5	12	· · → 17 · · · · ·	· · · ·			м		SILTY		
	2,596.4	<u>+ 56.6</u>	60/0.0					<u> </u>	,			2,596.4 Boring Terminate	d with Standard	
	-	ŧ	00/0.0								E	 Penetration Test Re 	fusal at Elevatio	
		Ŧ									l F	2,596.4 ft ON CRY (BIOTITE		<
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GEOTECHNICAL BORING REPORT BODEIOG

Form No. TR-T88 Revision No. 0 Revision Date: 8/28/17

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Project #:	130	5-16-02	8 Pha	se 03							Repo	ort Date:			8/	2/19	
Project Name:	Rus	s AveL	JS 276	from U	S 23/74	to U	S 23 B	JS.		Т	est Da	te(s):			7/23	-8/2/	′19
State Project #:	502	30.1.1		F.A. P	Project N	lo:	N/A				TI	P NO:	ι	J-58	39		
Client Name:	Caly	ух															
Address:	675	0 Tryon	Road,	Cary, N	IC 27518	8											
Boring #:	EB2	2-B1			Sample		SS-50					Samp	le Da	ate:		5/20	19
Station #:	25+	-82			Offse	t: 7	21' RT						pth			3.5-5	
Sample Descriptio	n:								RE	D A	ND GF	RAY SILT	'Y CL	.AY	A-7	-6 ((14)
	.5" 1"3/4"	1/2'3/8"	#4	#10	#20	#40	#60	#100	#200) #	270						
						\square			Щ.								
90%																	-
80%																	
									\blacksquare								_
70%										\blacktriangleright							_
÷ii 60%																	
bercent Passing %00 in the second passing %0																	_
50%														\mathbf{h}			
La 40%																	_
																	-
30%																	
20%																	_
100/																	-
10%																	
0%																	
100		10			I Parti	cle Size	e (mm)		0.1			(0.01				0.00
												_					
Gravel	As Defir	1		and > 2	00 mm				<u>e Sar</u> Silt	nd					and > 1 > 0.		<u>5 mm</u>
Coarse Sar	nd			n and > 2					Clav						<u>1 > 0</u>)05 n		
Maximum Particle		#4			Coar		nd			1	5%	Silt					21%
Gravel		29	6		Fine	Sand				1	5%	Clay				2	17%
Apparent Relative	Density	N	D		Mois	ture	Contei	nt		29	.7%	% Pas	sing	#2(00	7	0.8%
Liquid Limit		45	5		Plast	ic Lin	nit			2	24	Plastic	: Ind	ex			21
					Soil Mo			ieve)									
Coarse Sar		15%			ne Sand		16%			S	Silt	22%			Clay		48%
Description of Sa			icles:	Ro	unded								Angu			X	
Hard & Dur		X			Soft							hered &	Fria	ble			
References / Commo	ents / Dev	viations:	ND	=Not Det	termined		NI: No	Infor	matio	on F	Provide	ed					
Karen	Warner			NCDOT	118-06-	-0305	5		Ŀ	ah 1	[echnie	cican			۶	8/6/2	019
	an Name		-		fication N		<u>-</u>		<u> </u>		Position				<u> </u>	Dat	
Joey D	aily, P.E.								<u>Pı</u>	roje	ct Mar	<u>nager</u>			<u>8</u>	8/6/2	<u>019</u>
Technical R	esponsibility	У									Position					Dat	е

SHEET 18

Form No. TR-43-D7012C-02 Revision No.: 0 Revision Date: 08/22/18

UNCONFINED COMPRESSION (ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: NCDOT Division 14, Project U-5839 Project Number: 1305-16-028

Report Date: April 17, 2002 Reviewed By: N. Randy Rainwater

Poring No.	Sample	Depth	Dimens	sions, in.	Shape	Area	Unit Weight	Loading Rate	Maximum	Strength	Moisture
Boring No.	No.	(ft)	Length	Diameter	(See Key)	(in ²)	(lbs/ft ³)	(psi/sec)	Load (lbs)	(psi)	(%)
B1-A	RS-1	36.9	4.42	1.99	А	3.11	190.4	99	72,097	23,182	0.1
B1-A	RS-2	46.5	4.05	1.98	В	3.08	187.6	81	38,614	12,537	0.1

NOTES: Effective (as received) unit weight as determined by RTH 109-93.

Loading rates were selected to target reaching failure between 2 and 15 minutes.

Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

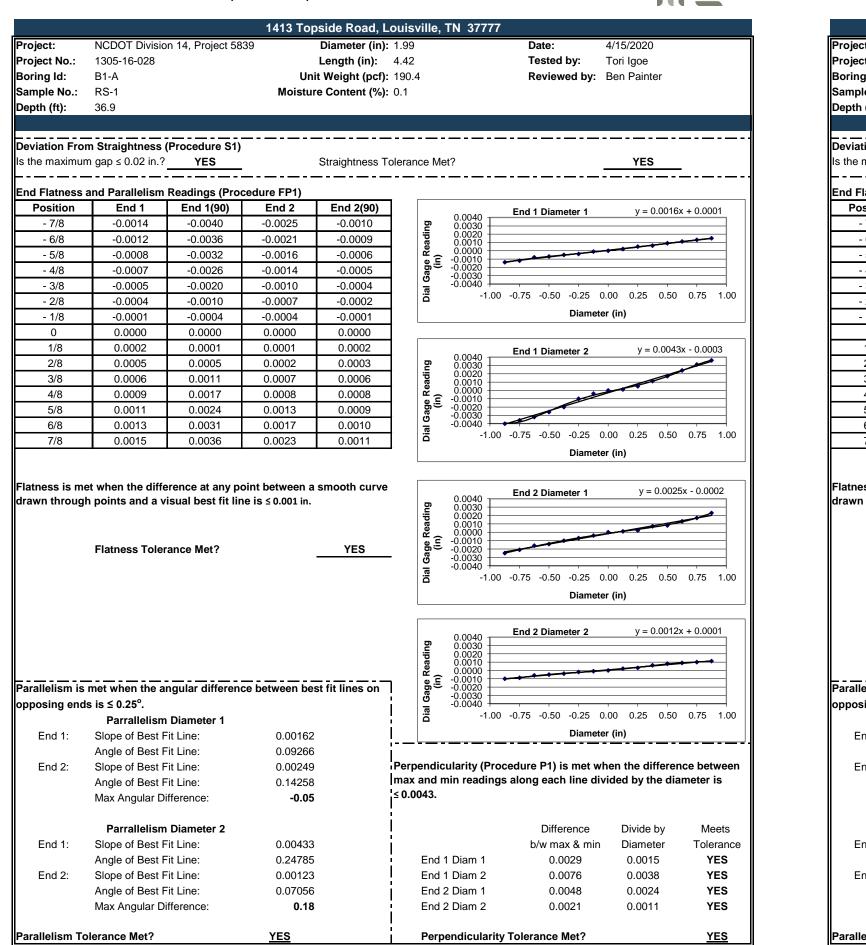
- Α Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)
- В Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.
- Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end С perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end D perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- Е Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable

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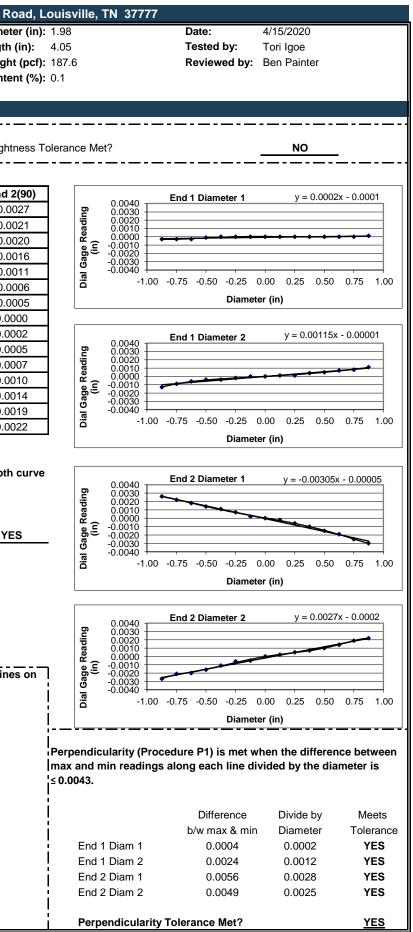
PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)





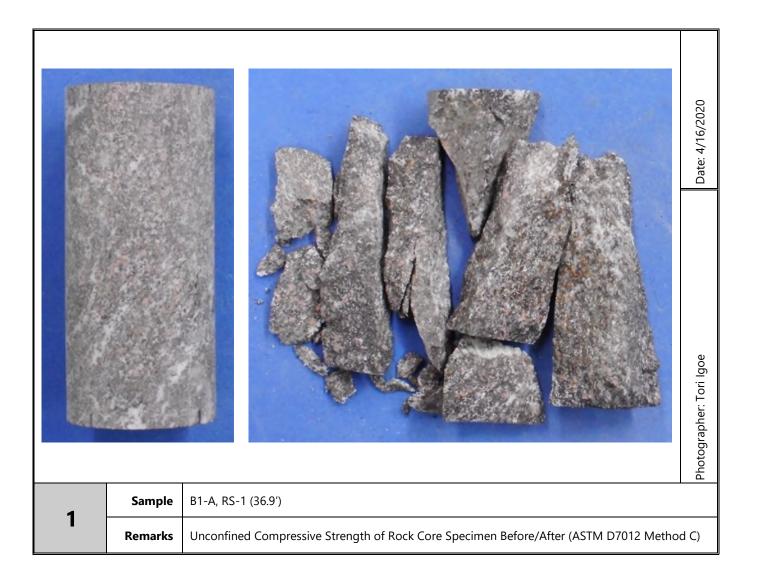
PREPARING ROCK CORE AS CYLINDRICAL TEST SPECIMENS AND VERIFYING CONFORMANCE TO DIMENSIONAL AND SHAPE TOLERANCES (ASTM D4543)

Project: Project No.: Boring Id: Sample No.:	1305-16-028 B1-A RS-2	n 14, Project 583		Diame Lengt it Weig
Depth (ft):	46.5			
Deviation Fro	m Straightness	(Procedure S1)		
	m gap ≤ 0.02 in.?	• •		Straigh
End Flatness	and Parallelism	Readings (Proc		
Position	End 1	End 1(90)	End 2	Enc
- 7/8	-0.0003	-0.0013	0.0026	-0.
- 6/8	-0.0003	-0.0009	0.0022	-0.
- 5/8	-0.0003	-0.0006	0.0018	-0.
- 4/8	-0.0001	-0.0004	0.0014	-0.
- 3/8	0.0000	-0.0004	0.0011	-0.
- 2/8	0.0000	-0.0002	0.0007	-0.
- 1/8	0.0000	0.0000	0.0002	-0.
0	0.0000	0.0000	0.0000	0.
1/8	0.0000	0.0001	-0.0002	0.
2/8	0.0000	0.0001	-0.0006	0.
3/8	0.0000	0.0004	-0.0010	0.
4/8	0.0000	0.0005	-0.0015	0.
5/8	0.0000	0.0007	-0.0019	0.0
6/8 7/8	0.0000	0.0008	-0.0025	0. 0.
	et when the diffe h points and a v			smoot
		isual best fit line		
drawn throug Parallelism is	h points and a v Flatness Tole Flatness Tole met when the a Is is $\leq 0.25^{\circ}$.	isual best fit lin	e is ≤ 0.001 in.	<u> </u>
drawn throug Parallelism is	h points and a v Flatness Tole Flatness Tole met when the a Is is $\leq 0.25^{\circ}$.	isual best fit lin ance Met? ngular differenc	e is ≤ 0.001 in.	Y
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Parallelism is opposing end	h points and a v Flatness Toler Flatness Toler met when the a Is is ≤ 0.25°. Parrallelism Slope of Best F Angle of Best F Slope of Best F	isual best fit line rance Met? ngular differenc Diameter 1 Fit Line: Fit Line: Fit Line:	e is ≤ 0.001 in. e between be 0.00019 0.01069 -0.00305	Y
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Parallelism is opposing end End 1:	In points and a vertical structure of the points and a vertical structure of the point of th	isual best fit line rance Met? ngular difference Diameter 1 Fit Line: Fit Line: Fit Line: Fit Line: Fit Line: Fit Line: Fit Line: Fit Line: Fit Line:	e is ≤ 0.001 in. e between be 0.00019 0.01069 -0.00305 -0.17483	st fit lir
Parallelism is opposing end End 1: End 2:	In points and a vertical structure of the points and a vertical structure of the point of th	isual best fit line rance Met? ngular differenc Diameter 1 Tit Line: Tit Line:	e is ≤ 0.001 in. e between be 0.00019 0.01069 -0.00305 -0.17483 0.19	st fit lir
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ROCK BREAK PHOTOGRAPHS





2	Sample	B1-A, RS-2 (46.5')
2	Remarks	Unconfined Compressive Strength

SHEET 21

50230.1.1/U-5839 Bridge No. 184 over Southern Railroad Haywood County, North Carolina

SITE PHOTOGRAPH

Bridge No. 184 on -L- (US 276) over Blue Ridge Southern Railroad

Looking North Toward End Bent 2



SHEET 22

50230.1.1/U-5839 Bridge No. 184 over Southern Railroad Haywood County, North Carolina 5839

REFERENCE

CONTENTS SH

HEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE(S)
5 TO 8	CROSS SECTION(S)
9 TO I2	BORE LOG(S) & CORE REPORT(S)
13	SOIL TEST RESULTS
14 TO 15	CORE PHOTOGRAPH(S)
16	SITE PHOTOGRAPH(S)

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _HAYWOOD

PROJECT DESCRIPTION RUSS AVE - US 276 FROM US 23/74 (GREAT SMOKY MOUNTAINS EXPWY) TO US 23 BUS (N MAIN ST) SITE DESCRIPTION BRIDGE NO. 186 ON US 276 OVER RICHLAND CREEK

50230 PROJEC

STATE PROJECT REFERENCE NO. STATE SHEETS NO. 16 N.C U-5839 1

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-8050. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-FLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE ONSERVED WATER LEVELS OR SOL MOISTURE CONDITIONS MOLATED IN THE SUBSURFACE RELIVESTIGATIONS AND REAS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOISTURE CONDITIONS MAY LARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS NICLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY INVESTIGATIONS TO CONTINNS TO BE ENCOUNTERED. THE GIDDER OR CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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PERSONNEL

P. PATTON

A. VERDICCHIO

S. GOWAN

T. MILLER

A. MORGAN

L. GREENE

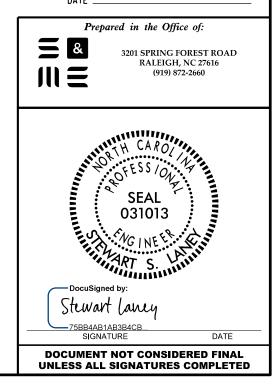
INVESTIGATED BY <u>S&ME</u>, INC.

DRAWN BY __M. HARTMAN

CHECKED BY J. DAILY

SUBMITTED BY <u>S. LANEY</u>

DATE _____SEPTEMBER 2019



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL D	ESCR	IPTION				T	GF	RADATION					ROCK DES	CRIPTION
							ARTH MATERIALS T THAN 100 BLOWS P		WELL GRADED - INDICAT	TES A GOOD REPRESE	INTATION OF PARTIC			ROCK LINE	INDICATES THE LEVEL A	T WHICH NON-COAS	OULD YIELD SPT REFUSAL IF TESTE
ACCORDIN	G TO THE S	TANDARD PEN	TRATION TES	ST (AASH	ITO T 206.	ASTM D15	86). SOIL CLASSIF LUDE THE FOLLOW	ICATION	GAP-GRADED - INDICATE					BLOWS IN N	NON-COASTAL PLAIN MAT	ERIAL, THE TRAN	MPLER EQUAL TO OR LESS THAN 0.1 NSITION BETWEEN SOIL AND ROCK
CONSISTEN	ICY, COLOR,	EXTURE, MOIS	URE, AASHTO	CLASSI	FICATION, A	ND OTHER	PERTINENT FACTO ETC. FOR EXAMPLE	RS SUCH			RITY OF GRAIN				ED BY A ZONE OF WEATH RIALS ARE TYPICALLY DI		5:
	ERY STIFF.GR	AY, SILTY CLAY, M	DIST WITH INTE	ERBEDDEL	D FINE SAND	D LAYERS, H	IGHLY PLASTIC, A-7-6			TY OR ROUNDNESS OF NGULAR, <u>SUBROUNDED</u> , (ESIGNATED BY	THE TERMS:	WEATHERED			N MATERIAL THAT WOULD YIELD SPT
GENERAL		IL LEGEN RANULAR MATERIA	<u>ND AND 1</u> NS		IU LLAS				-	MINERALOGI	ICAL COMPOSI	ITION		ROCK (WR)	5.5	00 BLOWS PER FOU	UT IF TESTED. RAIN IGNEOUS AND METAMORPHIC RO
CLASS.	(-	35% PASSING 2	00)	(>3	35% PASSING	200)	ORGANIC MATER	RIALS		MES SUCH AS QUARTZ N DESCRIPTIONS WHEN				CRYSTALLIN ROCK (CR)	E LINE W		REFUSAL IF TESTED. ROCK TYPE INC
GROUP CLASS. A	A-1	A-3 A-2-4 A-2	A-2 -5 A-2-6 A-2-	A-4	A-5 A-6	A-7 A-7-5 A-7-6	A-1, A-2 A-4, A-5 A-3 A-6, A-7				RESSIBILITY		in ionice.	NON-CRYSTA		INE TO COARSE GF	THAT WOULD YELLD SPT REFUSAL
SYMBOL 8										HTLY COMPRESSIBLE		LL < 31 LL = 31 -	50	COASTAL PL	R	OCK TYPE INCLUDE	ES PHYLLITE, SLATE, SANDSTONE, ETC DIMENTS CEMENTED INTO ROCK, BUT
2 PASSING	0000000		<u></u>	S ame						LY COMPRESSIBLE		LL > 50	90	SEDIMENTAR (CP)	RY ROCK		TYPE INCLUDES LIMESTONE, SANDS
	3 MX 3 MX 50 MX 5	1 MN					RANULAR SILT- SOILS CLAY	MUCK, PEAT			GE OF MATER	RIAL		(CP)	5	WEATH	ERING
		2 MX 35 MX 35	4X 35 MX 35 M	IX 36 MN	36 MN 36 MN		SOILS		ORGANIC MATERIAL		SILT - CLAY		MATERIAL	FRESH			S MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING #40									TRACE OF ORGANIC MATT	TER 3 - 5%	3 - 5% 5 - 12%	TRACE LITTLE	1 - 10% 10 - 20%	VERY SLIGHT	HAMMER IF CRYSTALLIN		SOME JOINTS MAY SHOW THIN CLAY CO
LL PI	- 6 MX		MN 40 MX 41 M MX 11 MN 11 MI				SOILS WITH LITTLE OR	HIGHLY	MODERATELY ORGANIC HIGHLY ORGANIC	5 - 10% > 10%	12 - 20% > 20%	SOME HIGHLY	20 - 35% 35% AND ABOVE	(V SLI.)	CRYSTALS ON A BROKEN	SPECIMEN FACE S	HINE BRIGHTLY. ROCK RINGS UNDER H
GROUP INDEX	0	0 0	4 MX	-	12 MX 16 MX		MODERATE AMOUNTS OF	ORGANIC		GROL	UND WATER			SLIGHT	OF A CRYSTALLINE NAT		AND DISCOLORATION EXTENDS INTO RO
	ONE FRAGS.		OR CLAYEY	SIL		AYEY	ORGANIC MATTER	SOILS	∇	WATER LEVEL IN F	BORE HOLE IMMEDIA	ATELY AFTER	DRILLING	(SLI.)			IN GRANITOID ROCKS SOME OCCASIONAL (STALLINE ROCKS RING UNDER HAMMER
of Major G Materials	SAND		L AND SAND	SOI		DILS			▼	STATIC WATER LEV	VEL AFTER 24	HOURS		MODERATE	SIGNIFICANT PORTIONS	OF ROCK SHOW DISC	COLORATION AND WEATHERING EFFECTS
GEN. RATING	E	XCELLENT TO GO		-	FAIR TO POOR	, I	FAIR TO POOR	UNSUITABLE	P₩	PERCHED WATER, S	SATURATED ZONE, OR	R WATER BEAR	ING STRATA	(MOD.)			ULL AND DISCOLORED, SOME SHOW CLA HOWS SIGNIFICANT LOSS OF STRENGTH
AS SUBGRADE		OF A-7-5 SUBGE					POOR		- U-U-	SPRING OR SEEP					WITH FRESH ROCK.		
			SISTENC							MISCELLA	NEOUS SYMBO	OLS		MODERATELY SEVERE			STAINED. IN GRANITOID ROCKS, ALL F AOLINIZATION. ROCK SHOWS SEVERE LO
PRIMARY SC		COMPACTN			GE OF STAN RATION RESI		RANGE OF UNI			3ANKMENT (RE) 25/02	¹²⁵ DIP & DIP DIR	RECTION		(MOD. SEV.)	AND CAN BE EXCAVATED IF TESTED, WOULD YIEL		T'S PICK. ROCK GIVES "CLUNK" SOUND N
		CONSIST	ENCY		(N-VALUE)	ISTENCE	(TONS/F				OF ROCK STRU			SEVERE			STAINED. ROCK FABRIC CLEAR AND E
GENERALI		VERY L			< 4 4 TO 10				SOIL SYMBOL	6	OPTONT TEST BOP	RING	SLOPE INDICATOR	(SEV.)	TO SOME EXTENT. SOME	FRAGMENTS OF ST	N GRANITOID ROCKS ALL FELDSPARS A RONG ROCK USUALLY REMAIN.
GRANULAR	-	MEDIUM			10 TO 30 30 TO 50		N/A						CONE PENETROMETER	VERY	IF TESTED, WOULD YIELD		<u>100 BPF</u> STAINED. ROCK FABRIC ELEMENTS AR
(NON-COH	ESIVE)	VERY D			> 50					ـــــــــــــــــــــــــــــــــــــ		D	TEST	SEVERE	BUT MASS IS EFFECTIVE	ELY REDUCED TO SO	DIL STATUS, WITH ONLY FRAGMENTS OF
GENERALI	_Y	VERY SOF			< 2 2 TO 4		< 0.25 0.25 TO		- INFERRED SOI	L BOUNDARY -)- CORE BORING	•	SOUNDING ROD	(V SEV.)			ROCK WEATHERED TO A DEGREE THAT IN. IF TESTED, WOULD YIELD SPT N V
SILT-CLA MATERIAL	Y	MEDIUM STIF			4 TO 8 8 TO 15		0.5 TO 1 TO 2		INFERRED ROC	C INE) MONITORING WE	ELL 🔶	TEST BORING WITH CORE	COMPLETE			DISCERNIBLE, OR DISCERNIBLE ONLY BE PRESENT AS DIKES OR STRINGERS
(COHESIV		VERY S	TIFF		15 TO 30 > 30		2 TO > 4	4	ALLUVIAL SOI	L BOUNDARY	PIEZOMETER INSTALLATION	Ò-	- SPT N-VALUE		ALSO AN EXAMPLE.	TONS: GOARTZ THE	BE THESENT HS BIKES ON STRINGENS
				OR GF		ZE	/4			RECOMMEN	DATION SYMB	BOLS				ROCK HA	
U.S. STD. SIEV	E SIZE		4 10	40	60	200	270			UNCLASSIFIED E	XCAVATION -		IFIED EXCAVATION -	VERY HARD	CANNOT BE SCRATCHED SEVERAL HARD BLOWS C		P PICK. BREAKING OF HAND SPECIMENS S PICK.
OPENING (MM)		4	.76 2.00			0.075	0.053			UNSUITABLE WAS		USED IN	BLE, BUT NOT TO BE THE TOP 3 FEET OF	HARD			Y WITH DIFFICULTY. HARD HAMMER BL
BOULDER (BLDR.)	COB (CC		AVEL	COARS SANE	D	F INE SAND	SILT (SL.)	CLAY (CL.)		ACCEPTABLE DEG	GRADABLE ROCK	EMBANKN	MENT OR BACKFILL	MODERATELY	TO DETACH HAND SPECI CAN BE SCRATCHED BY		UGES OR GROOVES TO 0.25 INCHES DE
				(CSE. S		(F SD.)					REVIATIONS	VCT		HARD	EXCAVATED BY HARD BL BY MODERATE BLOWS.	OW OF A GEOLOGIS	T'S PICK. HAND SPECIMENS CAN BE DE
GRAIN MM SIZE IN.	305 12	75 3	2.0		0.25		0.05 0.00	5	AR - AUGER REFUSAL BT - BORING TERMINATED	D MICA	MEDIUM - MICACEOUS	WEA	VANE SHEAR TEST WEATHERED	MEDIUM	CAN BE GROOVED OR GO		DEEP BY FIRM PRESSURE OF KNIFE O
	S	DIL MOIS	URE - (CORRE		I OF T	ERMS		CL CLAY CPT - CONE PENETRATION		MODERATELY NON PLASTIC		NIT WEIGHT RY UNIT WEIGHT	HARD	CAN BE EXCAVATED IN POINT OF A GEOLOGIST		EICES 1 INCH MAXIMUM SIZE BY HARD
	NOISTURE S		FIELD MC DESCRI		GUIDE	E FOR FIE	ELD MOISTURE DE	SCRIPTION	CSE COARSE DMT - DILATOMETER TES		ORGANIC PRESSUREMETER TE	ŭ	IPLE ABBREVIATIONS	SOF T			NIFE OR PICK. CAN BE EXCAVATED IN
									DPT - DYNAMIC PENETRA	TION TEST SAP	SAPROLITIC	S - BL	JLK		PIECES CAN BE BROKEN		BY MODERATE BLOWS OF A PICK POIN JRE.
			- SATURA (SAT.)				ID: VERY WET, USU THE GROUND WATE		e – VOID RATIO F – FINE		SAND, SANDY SILT, SILTY		SPLIT SPOON SHELBY TUBE	VERY SOF T			WATED READILY WITH POINT OF PICK. Y FINGER PRESSURE. CAN BE SCRATCH
PLASTIC	L LIQUID I	.IMIT _			SEMI		QUIRES DRYING T	0	 FOSS FOSSILIFEROUS FRAC FRACTURED, FRAC 		SLIGHTLY TRICONE REFUSAL	RS - F RT - F	ROCK RECOMPACTED TRIAXIAL		FINGERNAIL.		TIMENTRESSORE, CAN BE SCRATCH
RANGE <			- WET -	(W)			UM MOISTURE	0	FRAGS FRAGMENTS HI HIGHLY		DISTURE CONTENT	CBR -	CALIFORNIA BEARING RATIO		FRACTURE SPACE		BEDDING
PLL_	_ PLASTIC									UIPMENT USED				VERY WI	DE MORE TH	ACING AN 10 FEET	TERM VERY THICKLY BEDDED
OM _ SL _	_ OPTIMUM _ SHRINKA	MOISTURE	- MOIST	- (M)	SOLI	D;AT OR	NEAR OPTIMUM M	OISTURE	DRILL UNITS:	ADVANCING TOOLS:		HAMMER T		WIDE MODERAT		10 FEET 3 FEET	THICKLY BEDDED 1. THINLY BEDDED 0.1
5L _					REQU	IRES ADD	ITIONAL WATER T	0	CME-45C	CLAY BITS		X AUTO	DMATIC MANUAL	CLOSE VERY CL	0.16 T	TO 1 FOOT AN 0.16 FEET	VERY THINLY BEDDED 0.0 THICKLY LAMINATED 0.00
			- DRY - 1	(U)	ATTA	IN OPTIM	UM MOISTURE		Х СМЕ-55		S FLIGHT AUGER	CORE SIZE	ii				THINLY LAMINATED <
			PLA	ASTICI	[TY					8" HOLLOW AU		∐-в	∐-н	FOR CERINE			
	PLASTIC		<u>PLASTI</u>	<u>ICITY IN</u> Ø-5	DEX (PI)		DRY STREN		CME-550	HARD FACED F		X-N Q					ING OF MATERIAL BY CEMENTING, HE FINGER FREES NUMEROUS GRAINS;
SLIG	TLY PLAS			6-15			SLIGHT		VANE SHEAR TEST		W/ ADVANCER	HAND TOOL		- FRIA	BLE	GENTLE BLOW B	BY HAMMER DISINTEGRATES SAMPLE.
	RATELY PL Y PLASTIC		2	16-25 6 OR MC			MEDIUM HIGH		PORTABLE HOIST		•STEEL TEETH		HOLE DIGGER	MODE	RATELY INDURATED		SEPARATED FROM SAMPLE WITH ST WHEN HIT WITH HAMMER.
			(COLOR	}						TUNGCARB.) AUGER NDING ROD	INDU	RATED	GRAINS ARE DIF	FICULT TO SEPARATE WITH STEEL
DESCRIPTI	ONS MAY I	CLUDE COLOF	OR COLOR	COMBIN	ATIONS (TA	N, RED, YE	ELLOW-BROWN, BLL	JE-GRAY).	X <u>CME-750</u>	X CORE BIT	_		SHEAR TEST				BREAK WITH HAMMER.
							CRIBE APPEARANC			X <u>3 1/4" HOLL</u>	LOW AUGERS			EXTR	EMELY INDURATED		BLOWS REQUIRED TO BREAK SAMPLE ACROSS GRAINS.

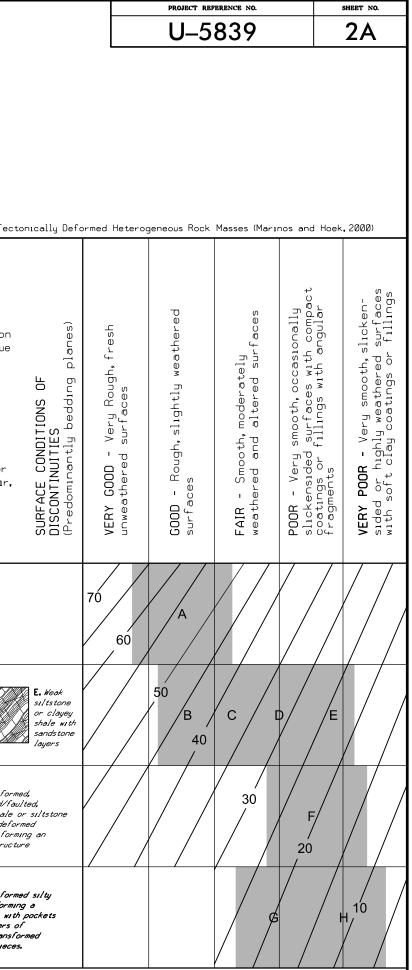
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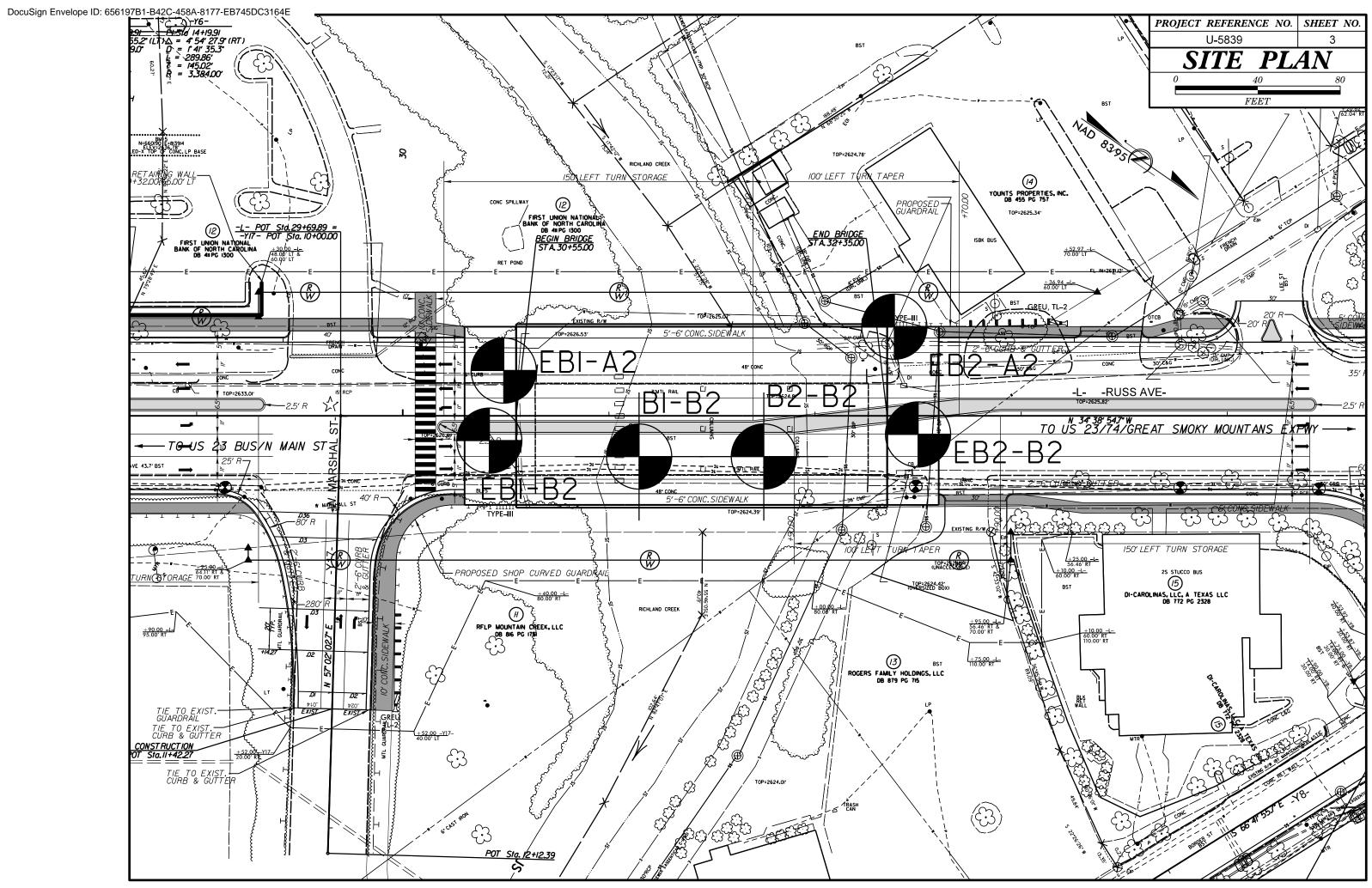
TERMS AND DEFINITIONS D AN INFERRED ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. SPT REFUSAL. FOOT PER 60 SPTEN AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. N VALUES > ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND СК ТНАТ SURFACE. CLUDES GRANITE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. _ PLAIN F TESTED. MAY NOT YIELD CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED 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 ROCKS OR CUTS MASSIVE ROCK. RINGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DATINGS IF OPEN. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. MMER BLOWS IF FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE СК ИР ТО SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FELDSPAR FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. BLOWS. $\underline{\mathsf{FLOAT}}$ - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. IN ROCK HAS AS COMPARED FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. ELDSPARS DULL OSS OF STRENGTH 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 VIDENT BUT ITS LATERAL EXTENT. ARE KAOLINIZED 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 USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. E DISCERNIBLE STRONG ROCK PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE ONLY MINOR OF AN INTERVENING IMPERVIOUS STRATUM. ALUES < 100 BPF RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. 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 IN SMALL AND SAPROLITE IS RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. REQUIRES <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO LOWS REQUIRED THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. $\underline{\text{SLICKENSIDE}}$ - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. EP CAN BE TACHED STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL PICK POINT WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL BLOWS OF THE TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. FRAGMENTS T. SMALL, THIN 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. PIECES 1 INCH ED READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: N: 660190, E: 813914 (CHISELED-X TOP OF CONC. LP BASE) THICKNESS 4 FEET 1.5 - 4 FEET ELEVATION: 2636.78 FEET 16 - 1.5 FEET NOTES - 0.16 FEET 98 - Ø.Ø3 FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING 0.008 FEET AT. PRESSURE. ETC. EEL PROBE: PROBE:

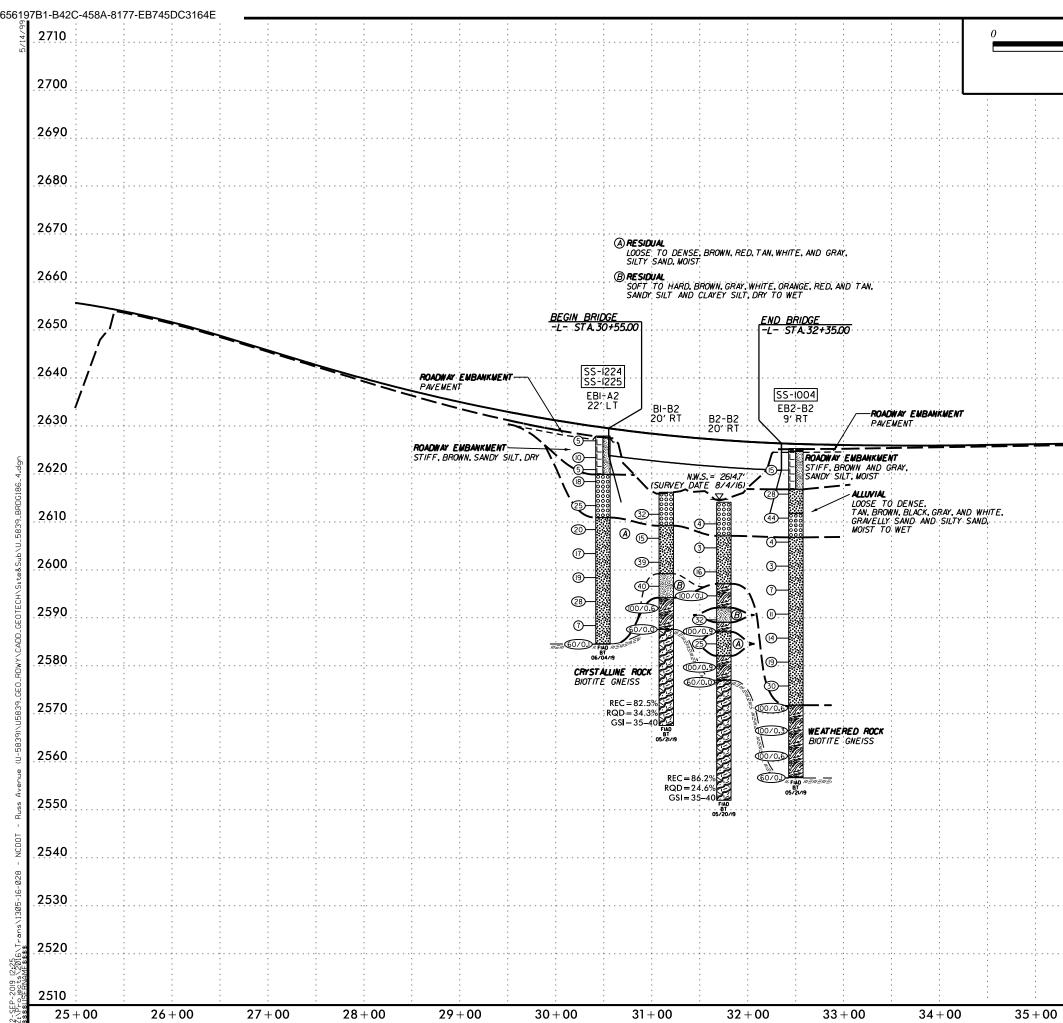
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

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	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 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	82 69 COOD 21 Rough, slightly weathered, iron stained 6 surfaces	PL PAIR D Smooth, moderately weathered and altered surfaces	<pre>PDOR POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments</pre>	V 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 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 fai poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis. 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.
disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 60	0			B. Sand- stone with thin inter- layers of siltstone amounts B. Sand- C. Sand- stone and siltstone in similar amounts
multi-faceted angular blocks YO formed by 4 or more joint sets J BLOCKY/DISTURBED/SEAMY - J folded with angular blocks I formed by many intersection I			40	30		C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.
discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces				20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10	







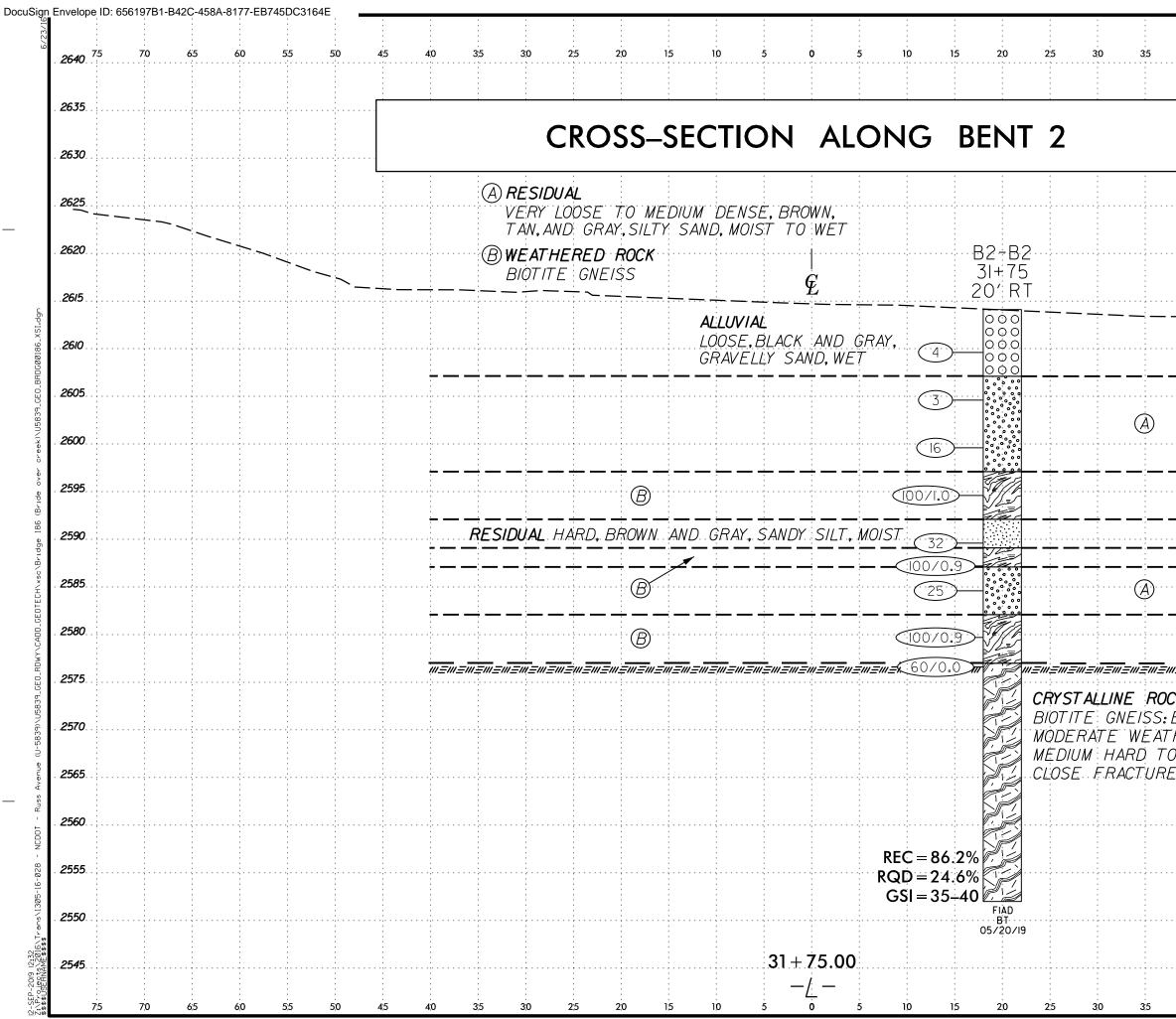
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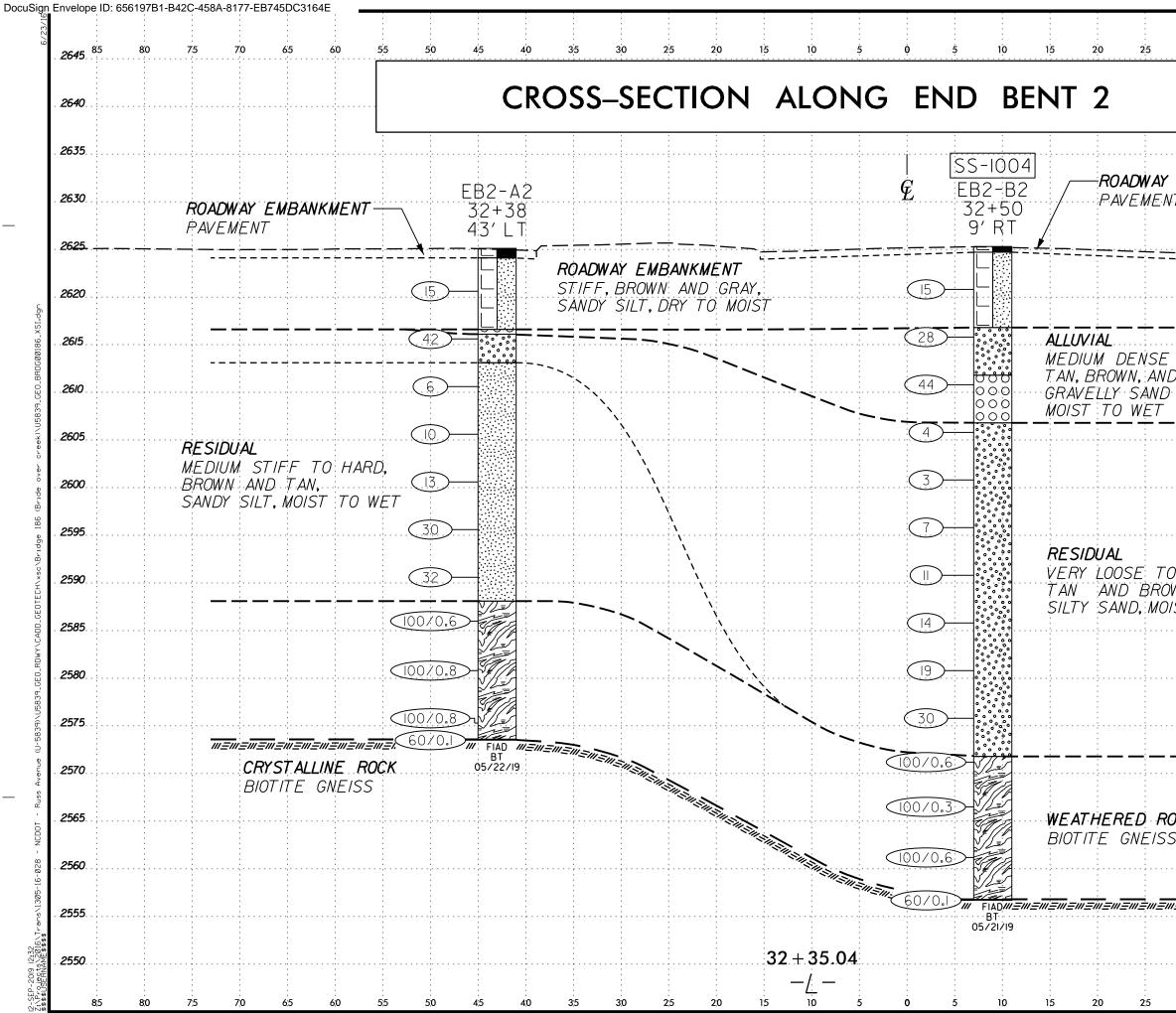
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2575							CLOSE FRACTURE
					REC = 82.5°	%	
2570					$RQD = 34.3^{\circ}$ GSI = 35-4		
2565					031-00-4	FIAD BT 05/21/19	
				81+15.00		03721713	
2560			ر	1113.00			

				0	2.5 5	Pi	ROJ. REFEREN	ICE NO.	sheet no. 6
30	35	40	45	50	55	60	65	70	75
÷									
									2640
									2635
:		:							2630
÷									
			:						2625
-			:						2620
									26/5
4<u>/</u> <i>T</i> Λ Λ/	BROW	N/ N/	D WHI			·	• • • • • • • • • • • • • • • • • • •		
, 1 AN, <u>' L</u> Y S.	AND, N	IV, ANI ET							2610
				· —	•				2010
			NCE						
AND	SE T(GRAY) DE1	NSE,						2003
	NOIST	,	÷						2600
4 <u>/</u>					-				2000
	. GRAY	AND	W:HIT	E,SAN	DY SII	T.MO	IST		2595
<u> </u>	— <u>;</u> — —				-				
	ROCK								
GNE	:		<u> </u>						
- <u> = =</u>	<u>, </u>	=///_///_	- <i>M_M_M_</i>	<u>=#=#</u> =#	/				2585
	ROC								
				, AND		9			2580
	ND TO			HERIN	G,				
	TURE								2575
									2570
									2565
30	35	40	45	50	55	60	65	70	75



		0	2.5 5	PI	roj. referen U-583	CE NO.	SHEET NO. 7
40	45	50	55	60	65	70	⁷⁵ 2640
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							2000
	•••		· · · · · <u>.</u> · · · · · ·		· · · · · <u>.</u> · · · · ·		
	· <u> </u>		-				0005
	· <u> </u>		-				
	· <u> </u>		-				
			-				230
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<u>, _, _, _, _, _, _, _, _, _, _, _, _, _,</u>	<u>, , , , , , , , , , , , , , , , , , , </u>	<u>, =,,, =,, =,,</u>	//				257.5
СК							
BLACK, HERING	WHIT G	E, AND	GRAY,				
o Mode	RAT	ELY HA	ARD,				0505
e spac	,1NG						
							2550
40	45	50	55	6:0	65	7:0	7.5



	0	2.5 5	PF	OJ. REFEREN	ce no. 9	SHEET NO.
30 35	40	45	50	55	60	⁶⁵ 2645
						2635
EMBANKME	./v/					
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						2620
TO DENSE D GRAY,						
AND SILTY	ŚAND,					
				· · · · · · · · · · · · · · · · · · ·		
) DENSE,						
WN, IST TO WET	Γ					
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9CK S						
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"_'''_'''_'''_'''_'''_''	·=///=///	' -				
						2550
				· · · · · · · · · · · · · · · · · · ·		
30 35	40	45	50	55	60	65

GEOTECHNICAL BORING REPORT

WBS	50230).1.1			Т	P U-583	9	COUNT			OG DD			GEOLO	GIST Verdic	chio, T.		
			BR	DGE I	NO. 18	6 ON US	276 OVE	R RICHLA	ND CR	EEK				1			GROUN	OWTR (ft)
	NG NO.								1		22 ft LT				IENT -L-		0 HR.	N/A
COLI	LAR ELE	EV. 2.	627.9	ft	т	DTAL DEP	TH 43.4	4 ft	NOR	THING	660,3	02		EASTIN	G 813,881		24 HR.	FIAD
					ME2938	CME-750	34% 4/25/2	2019	1				DН	I.S. Augers	,	HAMIN	J NER TYPE	Automatic
DRIL	LER G	iowan,	S. L.		S		E 06/04	4/19	сом	P. DA	TE 06/0	04/19		SURFA	CE WATER DE	PTH N	/A	
ELEV	DRIVE	DEPTH	BLC	OW CO	UNT		BLOW	S PER FOOT	r		SAMP.	▼/	L					
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75	100	NO.	мо	O G	ELEV. (ft)	SOIL AND R	OCK DES	CRIPTION	DEPTH (1
2630														_				
	2.627.9	0.0												2,627.9		IND SURF		0.
0005	-	ł	2	2	3	4 5		· · · · ·	· · ·	::		D	L	-		Y EMBAN N, SANDY		
2625	2,624.4	3.5	4	6	4	· <u> </u>	<u> </u>					D		-				
	2,621.9	6.0				.) 10 .	· · · · · ·	· · · · ·	. .	· ·				-				
2620	- 2.619.4	85	2	2	3	• <u></u> 5····				• •		D		2,619.9				8.
		- 0.0	9	10	8	:::•	18	· · · · ·	· · · · · ·	::		D	0000	-	BROWN AND T		SAND WITH	4
2615	-	ŧ						· · · · ·	· · · · · ·	::			000	-		GRAVEL		
2013	2,614.4	13.5	4	10	15							w		-				
	-	ŧ					• ²⁵	· · · · ·	.	· ·				-				47
2610	- 2.609.4	18.5					-		· · ·	· ·			مَمَمَ	2,610.9		ESIDUAL		<u> </u>
	-	- 10.0	5	8	12		20	· · · ·	. .	· ·	SS-1224	м		- I	BROWN, TAN, A	ND WHITE	E, SILTY SAM	ND
2605	-	ŧ						· · · · ·	· · · · · ·	::				-				
2005	2,604.4	23.5	7	9	8	<u> i</u>					SS-1225	м		-				
	-	ŧ				♥ ¹ . .	' · · · · · ·	· · · · ·	· · ·	::	00-1220			-				
2600	- 2.599.4	28.5				· · · · · ·	· · ·	· · · ·	· · ·	• •				-				
	- 2,000.4	- 20.0	7	9	10		19	· · · · ·	· · · · · ·	: :		м		-				
2505	-	ł					\ :::	· · · · ·		::				-				
2595	2,594.4	33.5	5	13	15		1					м		-				
	-	ł					▶ ²⁸	· · · ·	. .	· ·				-				
2590	- 2.589.4	38.5				· · ·/·		· · · ·	· · ·	• •				-				
	-	-	2	3	4	•7		· · · · ·	: : : .	::		м		-				
2585	-	ŧ				. .		· · · ·	. .	· ·				-				
2000	2.584.6	<u>- 43.3</u>	60/0.1					<u> </u>	· _ · · ·	60/0.1			<u></u>	2,584.6				$-\frac{43}{43}$
	-	+													BIOT Boring Term	TTE GNE		
	-	ŧ												-	Penetration Te 2,584.5 ft IN	est Refusal	at Elevation	
	-	ł												-	2,004.01010			
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WBS	50230	0.1.1			T	P U-5839	COUNT	Y HAYWO	OD			GEOLOG	ST Patton,	Ρ.		
SITE	DESCR	RIPTION	N BR	DGE	NO. 18	6 ON US 276 OVER	RICHLA	ND CREEK				1			GROUN	ID WTR (f
BOR	NG NO	EB1	-B2		S	TATION 30+42		OFFSET	12 ft RT			ALIGNME	NT -L-		0 HR.	26.
	_AR ELI					OTAL DEPTH 38.6 f		NORTHING				EASTING	813,913		24 HR.	FIA
DRILL	RIG/HA	MMER E	FF./DA	TE S	ME8245	6 CME-55 90% 09/06/20	18	-	DRILL	METHO	NDH.	S. Augers		HAMME	ERTYPE	Automatic
DRİLI	LER N	liller, R	.т.		S	TART DATE 05/22/1	9	COMP. DA	TE 05/	22/19		SURFACE	WATER DE	PTH N//	4	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	I BLC 0.5ft	OW CO	1		PER FOOT 50	75 100	SAMP. NO.	мо	L O G	ELEV. (ft)	SOIL AND RC	OCK DESC	RIPTION	DEPTH
<u>2630</u> 2625	2,624.4	3.5	4	3	7			· · · · · ·				2,627.9	ROADWAY (PA)	ID SURFA EMBANK VEMENT) , SANDY S	MENT	
<u>2620</u>	2,619.4	8.5	9	9	8	•10 • • • • • • • • • • • • • • • • • • •		· · · · · · · · · · · · · · · · · · ·		D			AL BROWN AND	LUVIAL GRAY, SIL		
<u>2615</u> 2610	2,614.4		8	7	18	••••••••••••••••••••••••••••••••••••••				w			BROWN SAN	NTH C	GRAVEL	
2605	2,609.4 2,604.4		1	3	6				<u>SS-112</u>	M	0000	2,608.9	BROWN AND	SIDUAL TAN, SILI		
<u>2600</u>	2,599.4	- - - 28.5	23	71	29/0.3			· · · · · · · · · · · · · · · · · · ·		м				ERED RO TE GNEIS		
2595	2,594.4	- - - - -	5	11	21	••••••••••••••••••••••••••••••••••••••		· · · · ·		м			BROWN AND	SIDUAL GRAY, SA	— — — – NDY SILT	·
2590	2.589.4 - - - - - - - - - - - - - - - - - - -	- 38.5 - 38.5 	60/0.1					60/0.1						t Refusal a	S) Standard at Elevatio	
												· - - - - - - -				

SHEET 9

GEOTECHNICAL BORING REPORT

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GEOTECHNICAL BORING REPORT POPEIOC

							B	ORE L	OG				
WBS	50230).1.1			TI	P U-5839	COUNT	Y HAYWO	DD			GEOLOGIST Patton, P.	
SITE	DESCR	IPTION	N BR	IDGE I	NO. 18	6 ON US 276 OVER	RICHLAI	ND CREEK				•	GROUND WTR (ft)
BOR	ING NO.	B1-E	32		ST	TATION 31+15		OFFSET	20 ft RT			ALIGNMENT -L-	0 HR. N/A
	LAR ELE					OTAL DEPTH 48.6 f		NORTHING				EASTING 813,878	24 HR. FIAD
DRILL	l Rig/Hai	MMERE	eff./Da	TE S	ME8245	CME-55 90% 09/06/201	8		DRILL N	/IETHC	ND N	W Casing w/ Advancer HAM	MER TYPE Automatic
DRIL	LER M	liller, R	.т.		S	TART DATE 05/21/1	9	COMP. DA	TE 05/2	21/19		SURFACE WATER DEPTH	V/A
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	۱ <u> </u>		-		PER FOOT		SAMP.	17		SOIL AND ROCK DES	SCRIPTION
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0 25	50 I	75 100	NO.	/мо	G	ELEV. (ft)	DEPTH (ft)
2620	-	ŧ										-	
	-	ŧ										- 2,616.2 GROUND SURF	-ACE 0.0
2615						· · · · · · · · · · · ·						BROWN, TAN AND WHIT	
	- 2,612.6-	- 3.6						· · · · · ·			000	GRAVEL	E, SAND WITT
2610	-	ŧ	5	20	12	· · · · · · · · · · • 32 · ·		· · · · · ·		W	000		
2010		ŧ									ŏŏŏ		
	2,607.6-	- <u>8.6</u>	3	6	9			.		м		GRAY AND WHITE, S	
2605	-	ŧ										- 	
	- 2,602.6-	+ - 13.6						 					
2600	-	ŧ	7	16	23	39				М			
		ŧ											ANDY SILT 17.0
	2,597.6-	<u>+ 18.6</u> T	6	16	24					м		•	
2595		ŧ						· · · · ·				- 2,594.2	22.0
	2,592.6-	23.6	- 20	70/0 4	_							WEATHERED F	юск
2590	-	Ŧ	30	70/0.1				100/0.6	'			- (,
		F										- 2,587.6	28.6
	2,587.6-	- 28.6 	60/0.0					60/0.0	2			- CRYSTALLINE	ROCK
2585	-	Ŧ										- (BIOTITE GNE	155)
	-	E											
2580	-	E											
	-	L.											
	-	ŧ											
2575		ŧ										-	
	-	ŧ									R		
2570		ŧ				 					R	-	
	-	+				· · · · · · · · · · · ·					R.	- 2,567.6	48.6
	-	<u> </u>							1			- Boring Terminated at Eleva - CRYSTALLINE F	tion 2,567.6 ft IN
	-	ŧ										_ ·	
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BORING NO. B1-B2 **STATION** 31+15 **COLLAR ELEV.** 2,616.2 ft TOTAL DEPTH 48.6 ft **NORTHING** 660,381 EASTING 813,878 24 HR. FIAD DRILL RIG/HAMMER EFF./DATE SME8245 CME-55 90% 09/06/2018 HAMMER TYPE Automatic DRILL METHOD NW Casing w/ Advancer DRILLER Miller, R. T. **START DATE** 05/21/19 **COMP. DATE** 05/21/19 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 20.0 ft DRILL RATE (Min/ft) RUN REC. RQD (ft) (ft) % % STRATA L REC. RQD O (ft) (ft) % % G RUN ELEV (ft) ELEV (ft) DEPTH RUN (ft) (ft) SAMP. DESCRIPTION AND REMARKS NO. ELEV. (ft) DEPTH (ft) Begin Coring @ 28.6 ft CRYSTALLINE ROCK WHITE, GRAY, AND BLACK, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY WEATHERED, BIOTITE GNEISS WITH CLOSE 2587.6 N=60/0.0 (3.0) (0.5) 1:33 1:33 60% 10% 2.587.6 28.6 5.0 28.6 2,587.6 2585 FRACTURE SPACING 1:56 2,582.6 33.6 1:16 1:01 1:19 REC: 83% RQD: 35% GSI: 35-40 (4.1) (1.2) 82% 24% 5.0 2580 1:32 1:20 1:40 1:20 1:42 1:58 2,577.6 38.6 (4.5) (2.3) 90% 46% 5.0 2575 1:30 1:32 2:39 1:35 1:27 1:30 2,572.6 43.6 (4.9) (2.9) 98% 58% 5.0 2570 2,567.6 48.6 2:14 2,567.6 48 6 Boring Terminated at Elevation 2,567.6 ft IN CRYSTALLINE ROCK

TIP U-5839

WBS 50230.1.1

GEOTECHNICAL BORING REPORT CORE LOG

COUNTY HAYWOOD GEOLOGIST Patton, P. GROUND WTR (ft) SITE DESCRIPTION BRIDGE NO. 186 ON US 276 OVER RICHLAND CREEK OFFSET 20 ft RT ALIGNMENT -L-0 HR. N/A

GEOTECHNICAL BORING REPORT BORFIOG

								<u> </u>	<u>ORE L</u>	OG							
WBS	50230	0.1.1			Т	P U-5839		COUNT	HAYWO	OD		0	GEOLOGIS	ST Patton,	, P .		
SITE	DESCR	RIPTION	BR	DGE I	NO. 18	6 ON US 2	76 OVER	RICHLAN	ID CREEK							GROUN	D WTR (f
BOR	NG NO	. B2-B	2		S	TATION 3	1+75		OFFSET	20 ft RT		4	LIGNMEN	IT -L-		0 HR.	N/
COLI	LAR ELI	EV. 2,	614.1	ft	т	OTAL DEPT	H 62.1 ft		NORTHING	660,4	30	E	ASTING	813,844		24 HR.	FIA
DRILL	RIG/HA	MMER E	FF./DA	TE SI	VE8245	CME-55 90%	6 09/06/201	8		DRILLN	IETHOD	Mud F	Rotary		HAMIN	ER TYPE	Automatic
DRIL	LER M	/liller, R	.т.		S	TART DATE	05/20/1	9	COMP. DA	TE 05/2	20/19	s	URFACE	WATER DE	EPTH N	/Α	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	OW CO 0.5ft		0 2		PER FOOT	75 100 I	SAMP. NO.		L O G EL	EV. (ft)	SOIL AND R	OCK DES	CRIPTION	DEPTH
2615		-										2,6	614.1		IND SURF	ACE	
		ŧ						· · · ·					BLA	A CK AND GRA	ALLUVIAL	NITH GRA	/EL
2610	2,610.6	3.5	3	2	2												
		Ŧ			2	4					W						
		Ŧ									0 	2,6	<u>1 </u>				
2605	2,605.6	T 0.0	WOH	1	2	4 3				SS-96	w	-	GR	AY AND TAN	N, SILTY S/ MICA	AND, TRAC)E
		Ŧ															
2600	2,600.6	13.5	L														
	-	ŧ	7	8	8	16					м	;;; -					
	· ·	‡				:::::-						2,5	9 <u>7.</u> 1		HEREDRO		
2595	2,595.6	+ 18.5 +	11	40	60						×an ₹<				TITE GNE		
		‡							. 100/1.0		21122		592.1				
0500	2,590.6	+ 23.5					: <u>[</u> :	+	+		, in the second s	<u> </u>			ESIDUAL		2
2590	2,588.6	+	12	15	17		4 32				м	2,5	8 <u>9.</u> 1	BROWN AND			2
		1	18	66	34/0.4		· · · ·	· · · · ·			1	2,5		(BIOT	HERED RO		
2585	2,585.6	28.5	7	9	16						м	Ŀ			ESIDUAL N, SILTY S		
		ŧ				'	25				IVI .	ŧ			,		
		Ŧ						+	+			<u>2,5</u>	82.1	WEAT	HEREDRO	оск — — —	3
2580	2,580.6	<u>- 33.5</u>	22	78/0.4					100/0.9		2			(BIOT	FITE GNEIS	SS)	
	2.577.0	T 37 1									2	2,5	577.0				3
2575		+	60/0.0						60/0.0	'		R-			TALLINE R		
		Ŧ										R		(510)		,	
		ŧ										R					
2570	-	ŧ															
		‡									k	<u>A</u>					
2565		ŧ										Ĵ.					
		ŧ									k	F.					
		‡										A					
2560	· -	‡				• • • •					k	7					
		‡									k.	A					
0555		‡										A					
2555	-	‡							· · · ·		l.						
	· ·	<u>†</u>					• • • •					2,5	52.0				6
	-	‡										F	Borir	ng Terminateo CRYST	d at Elevati FALLINE R	on 2,552.0 OCK	πIN
		‡										Ę					
		‡										F					
	-	ŧ										F					
	.	Ŧ										E					
		Ŧ										F					
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WDG	50230	11			тір	U-583	20					. <u>OG</u>				SIST P	atton E	<u> </u>		
				DGE NO								55					a, r	•	GROUN	ID WTR (f
					r		31+75			1		20 ft RT				ENT -L			0 HR.	N/.
	LAR ELI			ft			PTH 62	1 ft				660,4	30			G 813,8			24 HR.	FIA
				TE SME								,	/IETHOD			9 013,0	044			Automatic
										0					-	-				
		-	1.				TE 05/2				IP. DA	TE 05/2	20/19	15	URFAC	EWAT	ER DEP	IH N/	A	
	E SIZE			DRILL		JN	N 25.01		ATA											
ELEV (ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	0 G	ELEV. (ft)		DES	CRIPTIC	N AND F	REMARK	S		DEPTH
2577	2,577.0	37.1	5.0	N-60/0 0	(2.8)	(0.8)		(21.6)	(6.2)		2,577.0			В		oring @				3
2575	2,572.0		5.0	N=60/0.0 2:07/1.0 2:00/1.0 2:31/1.0 1:36/1.0 1:30/1.0	56%	16%		86%	25%		-	BLAC			Gray, Me Ered, Bi	EDIUM H/	ARD TO NEISS V		ATELY HA OSE FRAT	RD,
2570		+	5.0	1:30/1.0 2:05/1.0 1:34/1.0 2:24/1.0 1:47/1.0	(4.5) 90%	(1.1) 22%					-				R	REC: 86% RQD: 25% SSI:-35-40)			
2565	2,567.0	47.1	5.0	1:44/1.0 2:22/1.0 1:40/1.0	(4.8) 96%	(2.6) 52%					_									
	2,562.0	52.1	5.0	1:34/1.0 1:50/1.0 1:40/1.0 2:24/1.0	(4.7)	(0.5)														
2560	2,557.0	57.1		1:19/1.0 2:09/1.0 2:30/1.0 1:47/1.0	94%	10%					-									
2555	-		5.0	1:45/1.0 2:01/1.0 1:46/1.0 1:22/1.0	(4.8) 96%	(1.2) 23%					-									
	2,552.0	62.1		1:28/1.0				<u> </u>		P2	2,552.0		ring Termi	inated a	t Elevatio	on 2,552.0	D ft IN CF	RYSTALL	INE ROCK	62
											-									

GEOTECHNICAL BORING REPORT

GEOTECHNICAL BORING REPORT

NG NO. AR ELE RIG/HAI .ER G	EB2- EV. 2,	A2	IDGE I	-	86 ON US 2	276 OVER I						•			CROUN	
AR ELE RIG/HAI .ER G	EV. 2,							ND CREEK							GROUN	ID WTR (ft)
RIG/HAI		625 1		S	TATION 3	32+38		OFFSET	43 ft LT			ALIGNM	ENT -L-		0 HR.	N/A
ER G	VIMER E	020.1	ft	т	OTAL DEP	TH 51.6 ft		NORTHIN	G 660,4	446		EASTIN	G 813,756		24 HR.	F I AD
		FF./DA	TE SI	VE2938	3 CME-750 8	4% 4/25/2019	9	1	DRILL	METHO	DM	lud Rotary		HAMIN	ER TYPE	Automatic
DRIVE	iowan, i	S. L.		S	TART DAT	E 05/22/1	9	COMP. DA	TE 05/	/22/19		SURFAC	E WATER DEF	TH N	/A	
ELEV	DEPTH	BLC	ow co	UNT		BLOWS F	PER FOOT		SAMP.	. 🔨	L O		SOIL AND RO			
ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25 5	50	75 100	NO.	мо		ELEV. (ft)	SOIL AND RU		SKIPTION	DEPTH (ff
	Ļ															
-	ł											-				
-	ł											- 2,625.1	GROUN	D SURF	ACE	0.0
-	-											2,624.1	ROADWAY	EMBAN	KMENT	<u></u>
- 2.621.6-	- 3.5						· · · ·					_ _	BROWN	/EMENT		/
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2,616.6- -	8.5	30	20	22	. L.		 			\w/		- 2,616.6				
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- 2 611 6-	13.5				· · · · /		 					<u></u>	BROWN	SILTY S		
-		3	3	3	6 · · ·					м		-	BROWN AND	TAN, SA	NDY SILT	
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2,606.6-	18.5	4	4	6	.\							-				
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2,601.6-	<u>- 23.5</u>	6	6	7	· · · • 13·					м		-				
-	F								1			-				
- 2,596.6-	28.5	22	12	17								-				
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-	F											-				
2,591.6-	<u>- 33.5</u>	9	10	22						D		-				
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- 2,586.6-	38.5			-					1			 -				
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2,581.6-	<u>- 43.5</u>	66	44/0.3					100/0.8				-				
-	+								1			-				
- 2 <u>,576.6</u> -	- 48.5											-				
-	ŧ	43	50	50/0.3		· · · ·		100/0.8	♦			-				
<u>2.573.6-</u> -	<u>- 51.5</u>	60/0.1						60/0.1	┥		Gen.	- 2,573.6 - 2,573.5				$\frac{51}{51}$
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WBS	5023	0.1.1			Т	IP U-5839		COUNT	Y HAYWO	OD			GEOLOGIST Verdicchio, T.	
SITE	DESCF	RIPTION	BR	DGE N	NO. 18	86 ON US 2	76 OVER	RICHLA	ND CREEK				1	GROUND WTR (
BOR	NG NO	. EB2-	-B2		s	TATION 3	2+50		OFFSET	9 ft RT			ALIGNMENT -L-	0 HR. N/
		EV. 2,				OTAL DEPT			NORTHING				EASTING 813,792	24 HR. FIA
DRILL	. Rig/Ha	MMER E	FF./DA	TE SN	VIE2938	8 CME-750 84	1% 4/25/201	9		DRILL N	IETHO	DM	lud Rotary HAM	MER TYPE Automatic
DRIL		Gowan,	S. L.		S	TART DATE	05/21/1	9	COMP. DA	TE 05/2	21/19		SURFACE WATER DEPTH	N/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	-	0.5ft	UNT 0.5ft	0 2		PER FOOT	75 100 	SAMP. NO.	моі	L O G	SOIL AND ROCK DE ELEV. (ft)	SCRIPTION DEPTH
2630		+ + +												54.05
2625	2.621.8	- - - 3.5					· · · · ·	· · · · ·	· · · · ·				- <u>2,625.3</u> GROUND SUR -2,624.7 ROADWAY EMBA (PAVEMEN BROWN AND GRAY,	T)
2620	-	+ + +	8	6	9	· · • •15	· · · · ·	· · · · ·	· · · · ·		D		- 	
2615	2,616.8	<u>- 8.5</u> - - -	5	11	17	· · ·	28 				м		ALLUVIAI BROWN AND GRAY,	
<u>2610</u>	2,611.8	+ - 13.5 - -	30	29	15		44	· · · · · 4 · · · · ·	· · · · · · · · · · · · · · · · · · ·		м	0000		WITH GRAVEL
2605	2,606.8	 <u>18.5</u>	1	2	2	4 · · ·		· · · · ·	· · · · ·	SS-1004	м			 / SAND, TRACE
2600	2,601.8	+ - - 23.5 -	1	1	2	$ \begin{vmatrix} 1 & \cdots & \cdots \\ 1 & \cdots & \cdots \\ 1 & \cdots & \cdots \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 &$			· · · · · · · · · · · · · · · · · · ·		м		- MICA -	
	2,596.8	- - 28.5	3	4	3			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		м		-	
2393	2,591.8	+ - - 33.5	3	5	6		· · · · ·		· · · · · · · · · · · · · · · · · · ·				- - - -	
2590	2.586.8	- - - - 38.5									м		- - -	
2585	-	+ + +	5	6	8		· · · · ·	· · · · ·	· · · · ·		м		- -	
2580	2,581.8	<u>+ 43.5</u> + + +	8	9	10			· · · · ·	· · · · · ·		м		- - 	
2575	2,576.8	48.5 -	10	14	16		• • • • • • 30 • •		· · · · · · · · · · · · · · · · · · ·		м			
2570	2,571.8	<u> </u>	75	25/0.1					· · · · · · · · · · · · · · · · · · ·					ROCK EISS)
2565	2,566.8	- - <u>58.5</u> -	100/0.3										-	
2560	2,561.8	+ - - 63.5 -	80	20/0.1					 - 100/0.6				-	
	2.556.8	- - 68.5 -	60/0.1				· · · · ·	· · · · · · · · · ·	60/0.1					
	-	+											Boring Terminated wi Penetration Test Refus 2,556.7 ft ON CRYSTA	th Standard al at Elevation

GEOTECHNICAL BORING REPORT

BORF I OG

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

				S&ME,	Inc. Raleigh, 32	01 Sprin	ng Forest	: Road, R	aleigh, No	rth Caroli	na 2761	5					
S&ME Proj	ect #:			1305-16-0	28		5		J				Date	Report:		8/6/201	9
State Proje	ct No.:			50230.1.1				County:		Haywoo	od		Date	Tested:	7/23	/19 to 8	3/2/19
Federal ID	No.:							TIP No.:		U-5839							
		Avenue U	S 276 from l	JS 23/74 to	US 23 Business	5											
Client Nam	ne: CALYX							Clie	nt Address	: Cary, N	С					-	
				Sample	AASHTO		Total	% Passin	g	Tota	l Mortar	Fraction	n (%)				
Sample				Depth	Classification		Si	eve #		Coarse	Fine						Moist.
No.	Station	Offset	Alignment	(ft)		10	40	60	200	Sand	Sand	Silt	Clay	LL	PL	PI	%
SS-96	31+75	20 RT	-L-	8.5-10.0	A-2-4 (0)	98	70	58	33.1	41	31	21	7	34	31	3	31.1
SS-112	30+42	29 RT	-L-	19.0-20.0	A-2-4 (0)	96	71	53	16.9	45	38	16	2	NP	NP	NP	22.4
SS-1004	32+50	29 RT	-L-	18.5-20.0	A-2-4 (0)	98	79	66	35.3	33	37	24	7	NP	NP	NP	23.0
SS-1224	30+49	22 LT	-L-	18.5-20.0	A-2-4 (0)	81	63	49	21.5	40	39	17	4	29	28	1	14.4
SS-1225	30+49	22 LT	-L-	23.5-25.0	A-2-4 (0)	97	71	54	22.4	45	38	16	2	NP	NP	NP	19.0
References /	/ Comments	/ Deviatio	ons:	ND=Not De	etemined. NP=	Non-Plas	stic.										
AASHTO T88	8: Particle Si	ze Analysis	s of Soils as M	odified by th	ne NCDOT				AASHTO T8	9: Determ	ining the	Liquid Li	mit of So	ils			
AASHTO T90	0: Determini	ng the Pla	stic Limit & Pl	asticity Index	of Soils				AASHTO TZ	265: Labor	atory Det	erminati	on of Mo	isture Co	ntent of	Soils	
AASHTO M1	145: The Clas	ssification	of Soils and So	oil Aggregate	e Mixtures for Hig	ghway Co	onstructio	on Purpos	es								
		<u>Karen</u>	Warner					NCDOT '	18-06-030	<u>)(</u>	Joey Da	ily, P.E.		ļ	Project	Manage	<u>er</u>
		Technici	an Name:			Signatur	e	Certi	fication #	Τe	chnical Re	sponsibili	ty:		Pos	ition	
				This repo	ort shall not be repi	roduced, e	except in f	ull, without	the written a	approval of	S&ME, Inc						

SHEET 13



CORE PHOTOGRAPHS

B1-B2

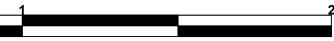
BOXES 1 & 2: 28.6 - 48.6 FEET







SHEET 14 50230.1.1 (U-5839)/BRIDGE NO. 430186



FEET

CORE PHOTOGRAPHS

B2-B2 BOXES 1 & 2: 37.1 - 57.1 FEET





B2-B2





SHEET 15 50230.1.1 (U-5839)/BRIDGE NO. 430186

BOX 3: 57.1 - 62.1 FEET

SITE PHOTOGRAPH



Bridge No. 186 on –L– (US 276) over Richland Creek

SHEET 16 50230.1.1 / U-5839 Haywood Co. 5839

REFERENCE

CONTENTS SHEET NO.

- 11 22

LEGEND (SOIL & ROCK)
SITE PLAN(S)
PROFILE(S)
BORE LOG(S)
SOIL TEST RESULTS

TITLE SHEET

DESCRIPTION

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _HAYWOOD

PROJECT DESCRIPTION RUSS AVE - US 276 FROM US 23/74 (GREAT SMOKY MOUNTANS EXPWY) TO US 23 BUS (N MAIN ST) SITE DESCRIPTION <u>RETAINING</u> WALLS 1, 2, 3, 4, 5, 6, *AND* 7

50230 PROIEC

STATE PROJECT REFERENCE NO. STATE SHEETS NO. 22 N.C U-5839 1

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-8050. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-FLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE ONSERVED WATER LEVELS OR SOL MOISTURE CONDITIONS MOLATED IN THE SUBSURFACE RELIVESTIGATIONS AND REAS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOISTURE CONDITIONS MAY LARY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS NICLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY INVESTIGATIONS TO CONTINNS TO BE ENCOUNTERED. THE GIDDER OR CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES: I. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT. 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

P. PATTON

A. VERDICCHIO

S. GOWAN

T. MILLER

A. MORGAN

L. GREENE

INVESTIGATED BY <u>S&ME</u>, INC.

DRAWN BY __M. HARTMAN

CHECKED BY J. DAILY

SUBMITTED BY <u>S. LANEY</u>

DATE _____SEPTEMBER 2019

Prepared in the Office of: 3201 SPRING FOREST ROAD RALEIGH, NC 27616 ШΞ (919) 872-2660 MILL CARO CAROZ SEAL 031013 ART S LATIN DocuSigned by: Stewart Laney 75BB4AB1AB3B4CE SIGNATURE DATE DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

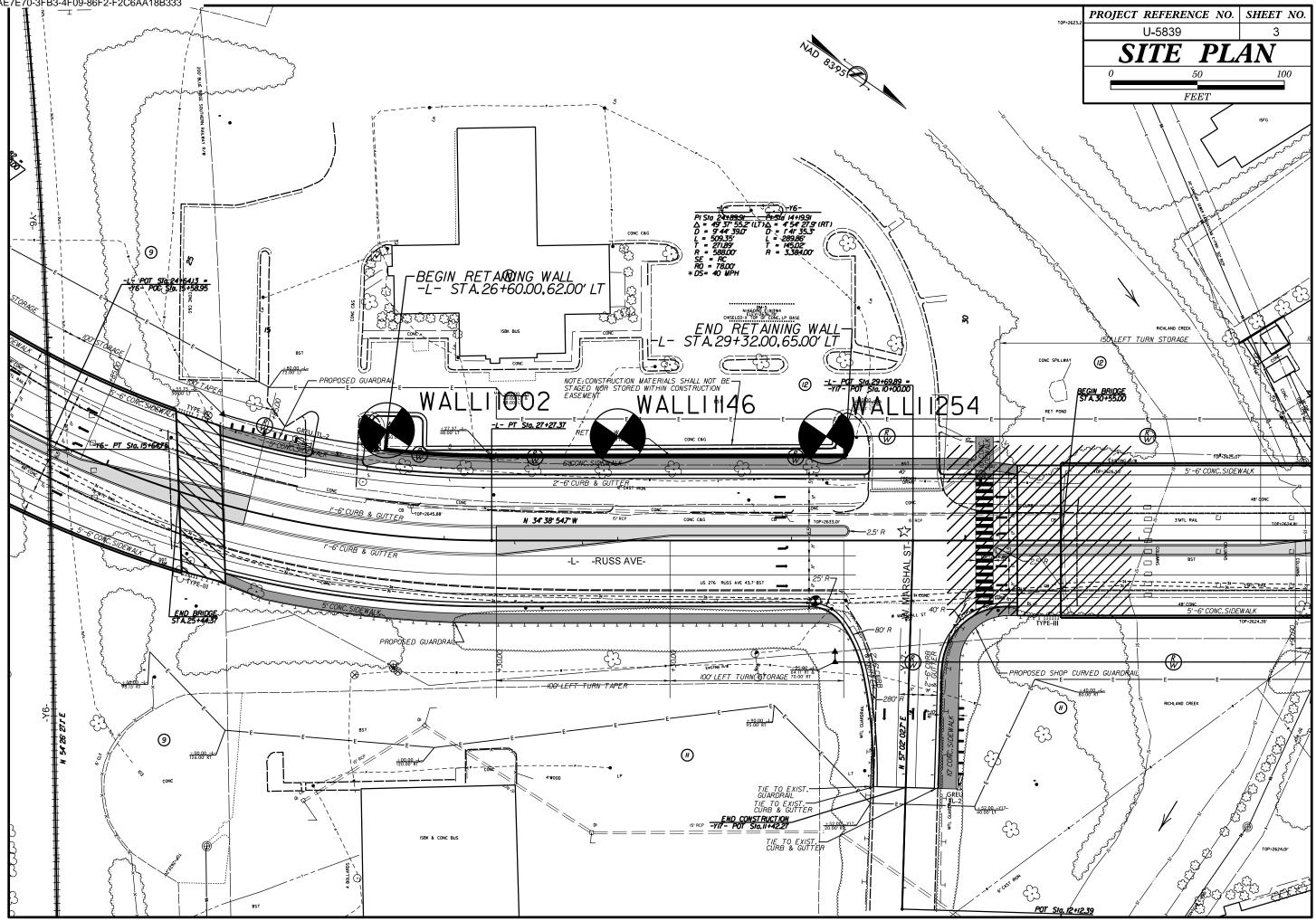
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

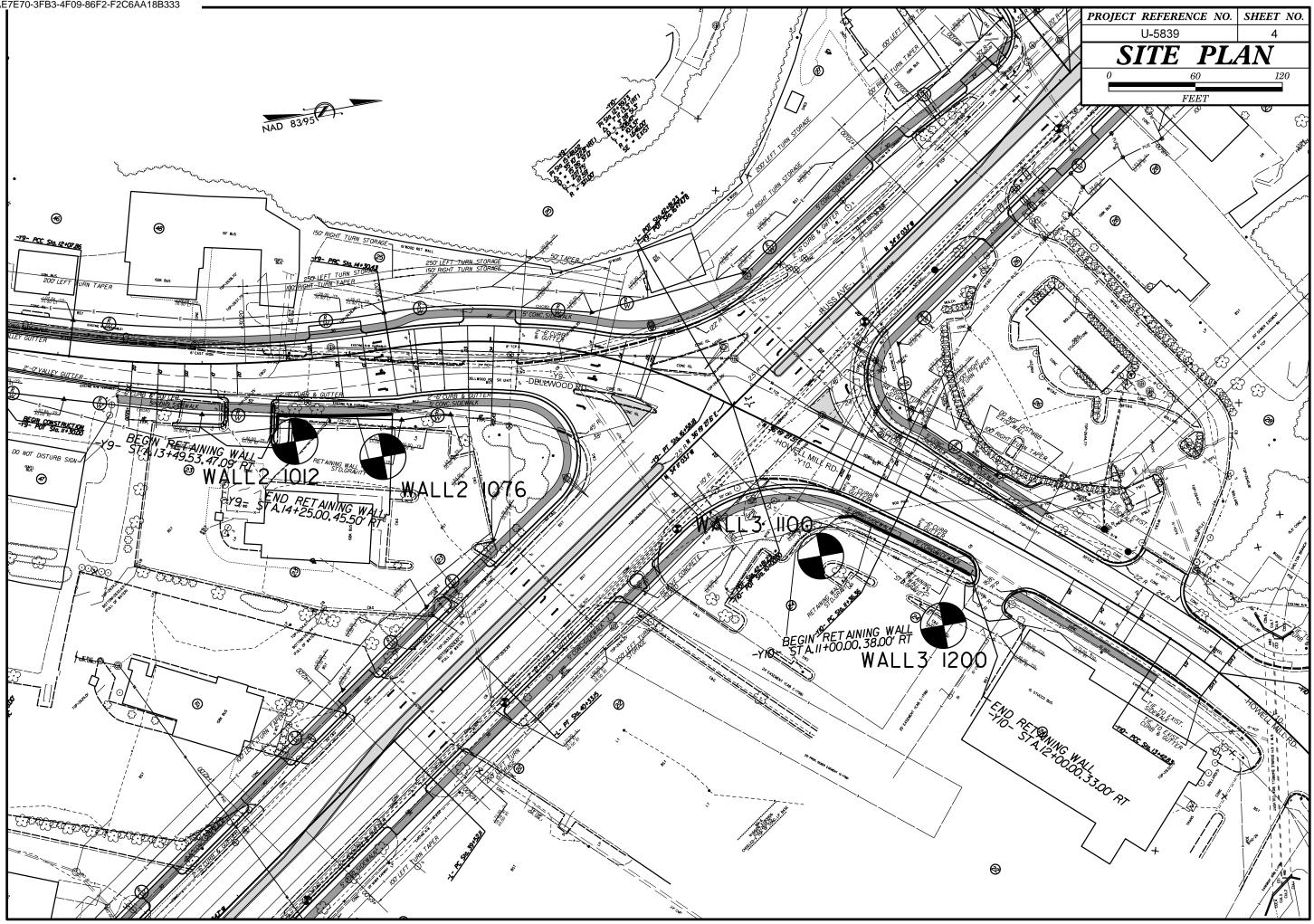
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK
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:
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: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YELD SPT REFUSAL IF TESTED, ROCK TYPE INC GNEISS, GABBRO, SCHIST, ETC.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-b A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC
2 000000000 00000 00000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDS
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	
*40 30 MX 50 MX 51 MN *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LS WITH LL 40 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 2 - 20% SOME 20 - 35% HIGHLY ORGANIC 5 - 10% 2 20% HIGHLY 35% AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CC (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HA
	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS S	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS
		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE EXCELLENT TO GUOD FAIR TO POUR POOR POOR ONSUTTABLE	OAULT SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LO
COMPACTNESS OR BANGE OF STANDARD RANGE OF UNCONFINED	-	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SUIL ITPE CONSISTENCY PENELIKALIUM RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²) CENERALLY VERY LOOSE < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
GRANULAR LOOSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
(NON-COHESIVE) UENSE VERY DENSE > 50 VERY SOFT < 2	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMEMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>JF IESTED, WOULD VIELD SPT N V</i>
GENERALLY SOFT 2 T0 4 0.25 T0 0.5 SILT-CLAY MEDIUM STIFF 4 T0 8 0.5 T0 1.0 MATERIAL STIFF 8 T0 15 1 T0 2 (COHESIVE) VERY STIFF 15 T0 30 2 T0 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TTALE ALLUVIAL SOIL BOUNDARY A PIEZOMETER	COMPLETE ROCK REDUCED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4		ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BL
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'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	BY MODERATE BLOWS.
	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 2 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD
SOIL MOISTURE CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	$\begin{array}{c} \mbox{CPT} - \mbox{CONP} \mbox{PRETRATION TEST} & \mbox{NP} \mbox{-} \mbox{NON} \mbox{P4.SSIC} & \mbox{γ_d-} \mbox{DRY UNIT WEIGHT} \\ \mbox{CSE COARSE} & \mbox{ORGANIC} \\ \mbox{DMT} \mbox{-} \mbox{DILATOMETER TEST} & \mbox{PMT} \mbox{-} \mbox{PRESSURETER TEST} & \mbox{SAMPLE ABBREVIATIONS} \end{array}$	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	DPT - DYNAMIC PENETRATION TEST SAP, - SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE CACAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC SEMISOLIDA REQUIRES DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING
OMOPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE;	TERM SPACING TERM VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED WIDE 3 TO 10 FEET THICKLY BEDDED MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C CLAY BITS X AUTOMATIC MANUAL G'CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.0 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	X CME-55 B HOLLOW AUGERS CORE SIZE: B	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC Ø-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST CASING V ADVANCER	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
COLOR	X CME-750 TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT VANE SHEAR TEST X 3 1/4" HOLLOW AUGERS	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

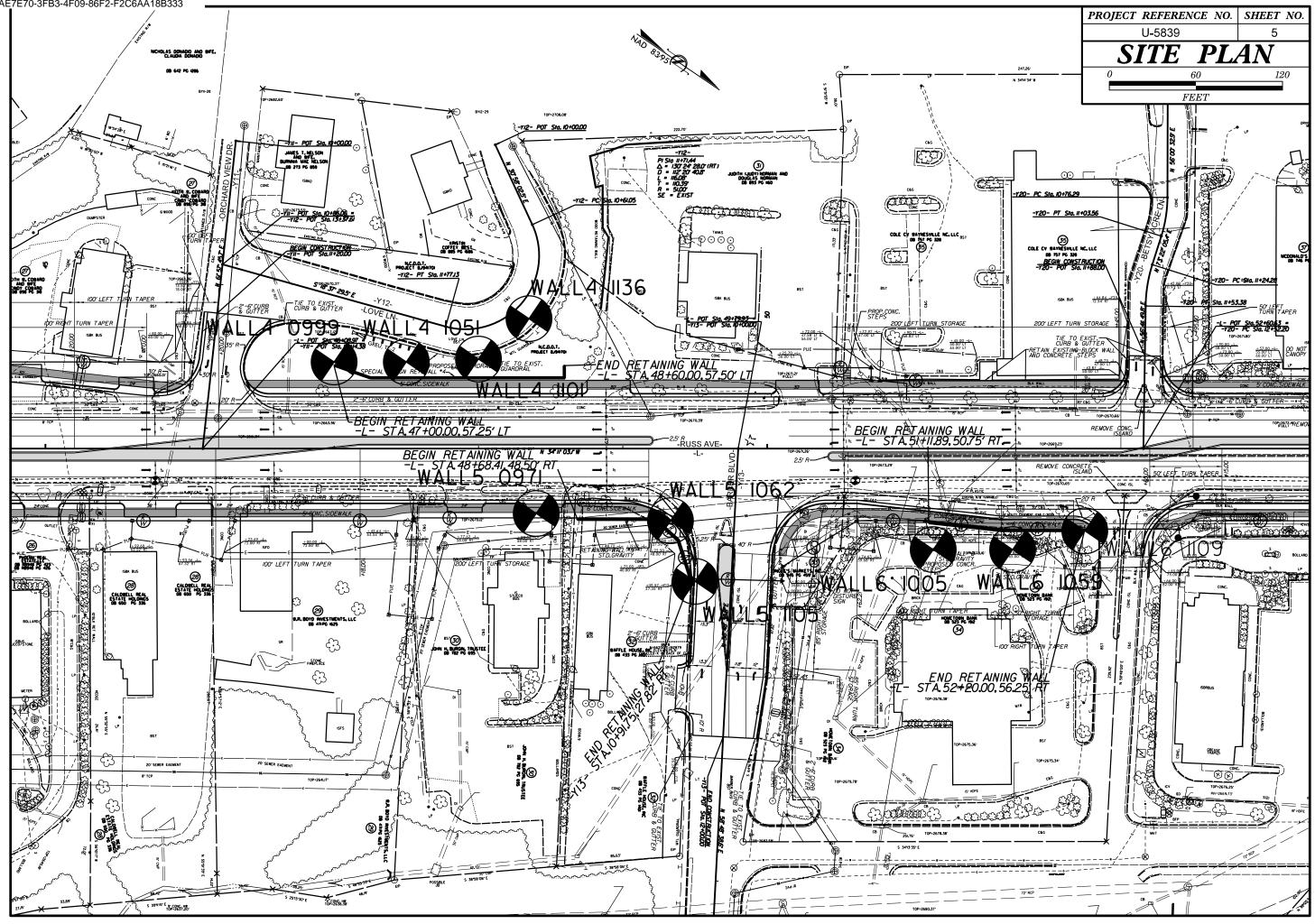
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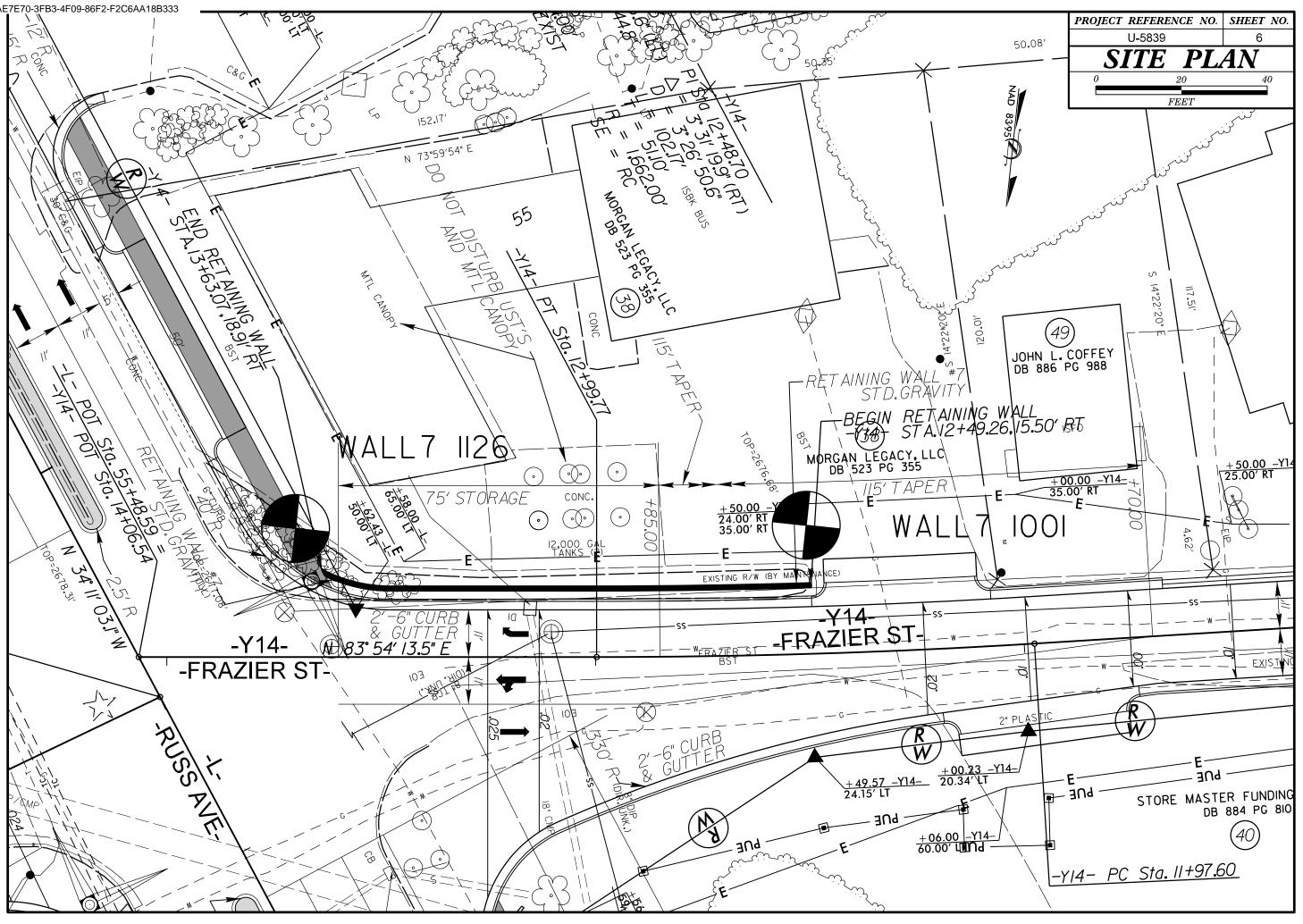
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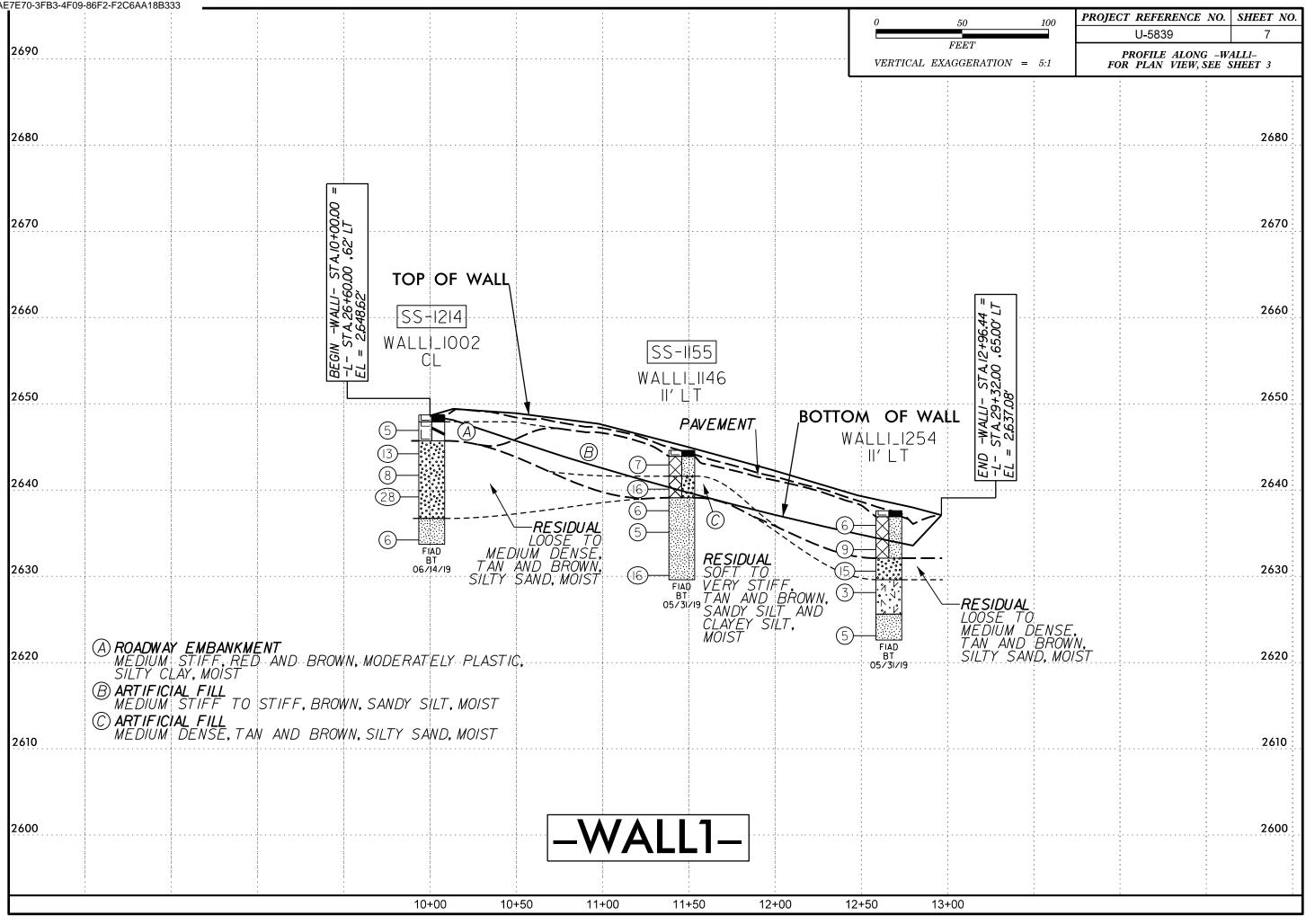
TERMS AND DEFINITIONS D AN INFERRED ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. SPT REFUSAL. FOOT PER 60 SPTEN AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. N VALUES > ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND СК ТНАТ SURFACE. CLUDES GRANITE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. _ PLAIN F TESTED. MAY NOT YIELD CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED 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 ROCKS OR CUTS MASSIVE ROCK. RINGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DATINGS IF OPEN. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. MMER BLOWS IF FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE СК ИР ТО SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FELDSPAR FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. BLOWS. $\underline{\mathsf{FLOAT}}$ - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. IN ROCK HAS AS COMPARED FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. ELDSPARS DULL OSS OF STRENGTH 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 VIDENT BUT ITS LATERAL EXTENT. ARE KAOLINIZED 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 USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. E DISCERNIBLE STRONG ROCK PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE ONLY MINOR OF AN INTERVENING IMPERVIOUS STRATUM. ALUES < 100 BPF RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. 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 IN SMALL AND SAPROLITE IS RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. REQUIRES <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO LOWS REQUIRED THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. $\underline{\text{SLICKENSIDE}}$ - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. EP CAN BE TACHED STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL PICK POINT WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL BLOWS OF THE TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. FRAGMENTS IT. SMALL, THIN 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. PIECES 1 INCH ED READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: ELEVATIONS TAKEN FROM TIN FILE "u5839_Is_tin.tin", THICKNESS DATED 03/19/2019 4 FEET 1.5 - 4 FEET ELEVATION: N/A FEET 16 - 1.5 FEET NOTES: - 0.16 FEET 98 - Ø.Ø3 FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING 0.008 FEET AT. PRESSURE. ETC. EEL PROBE: PROBE:

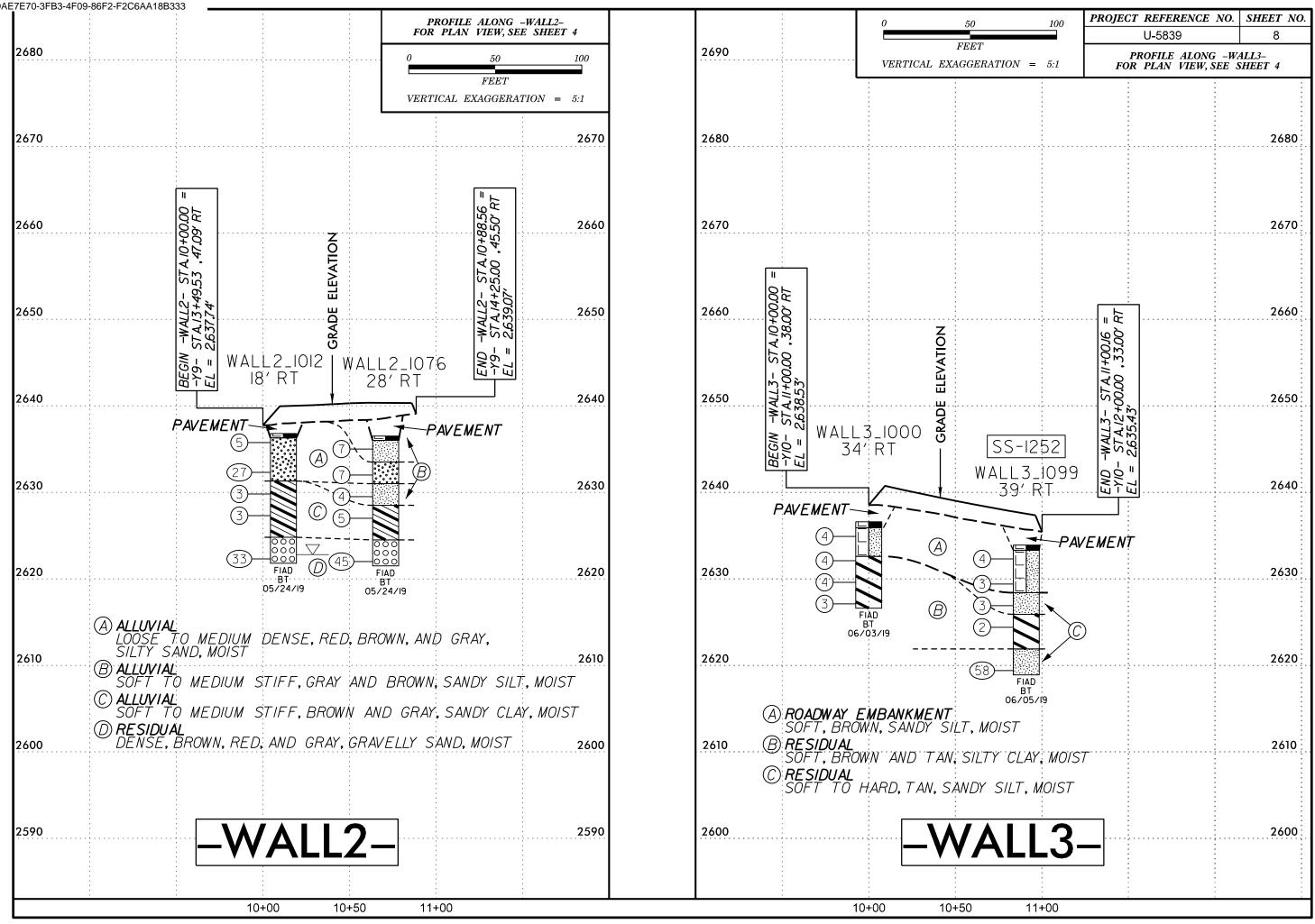


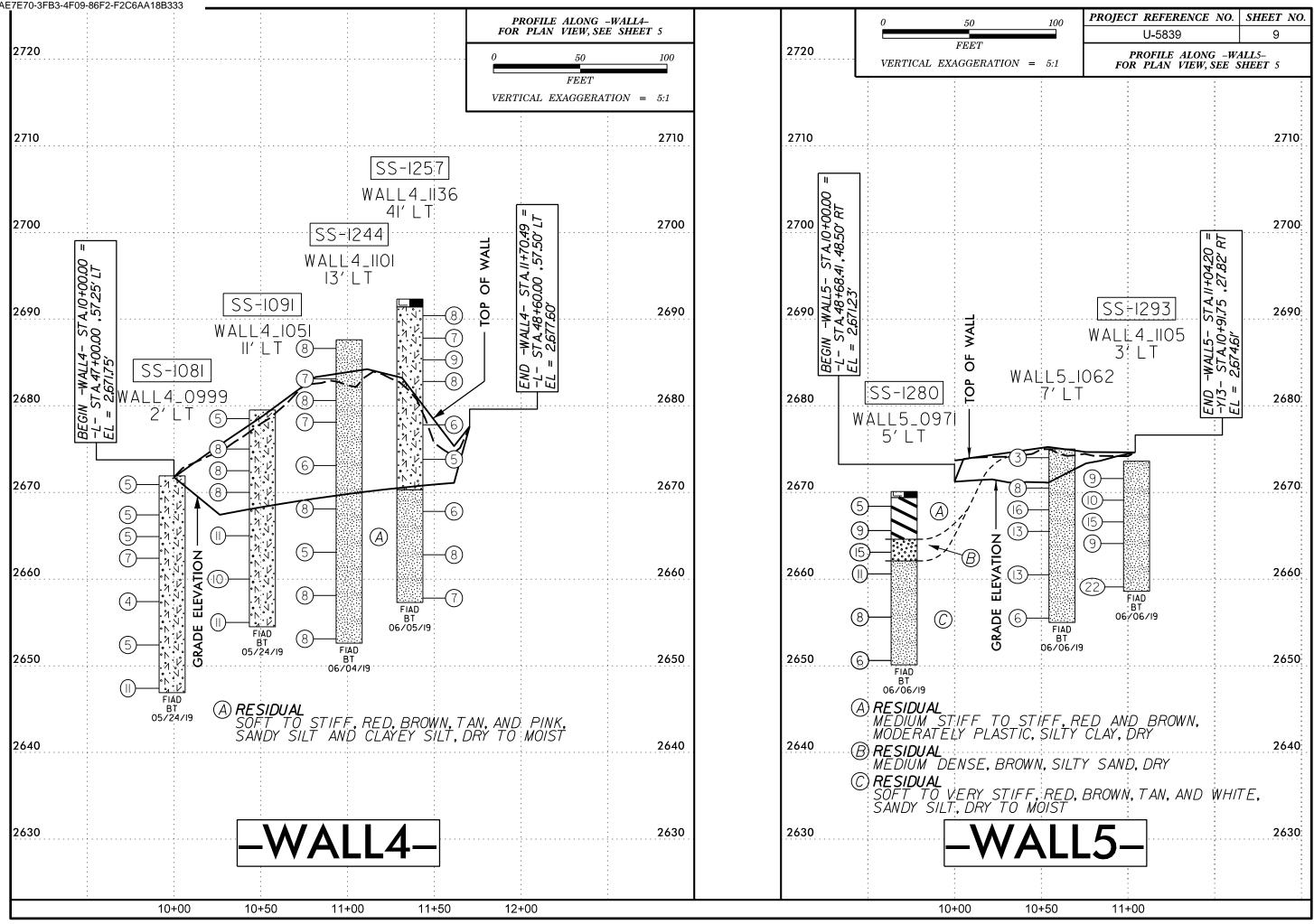


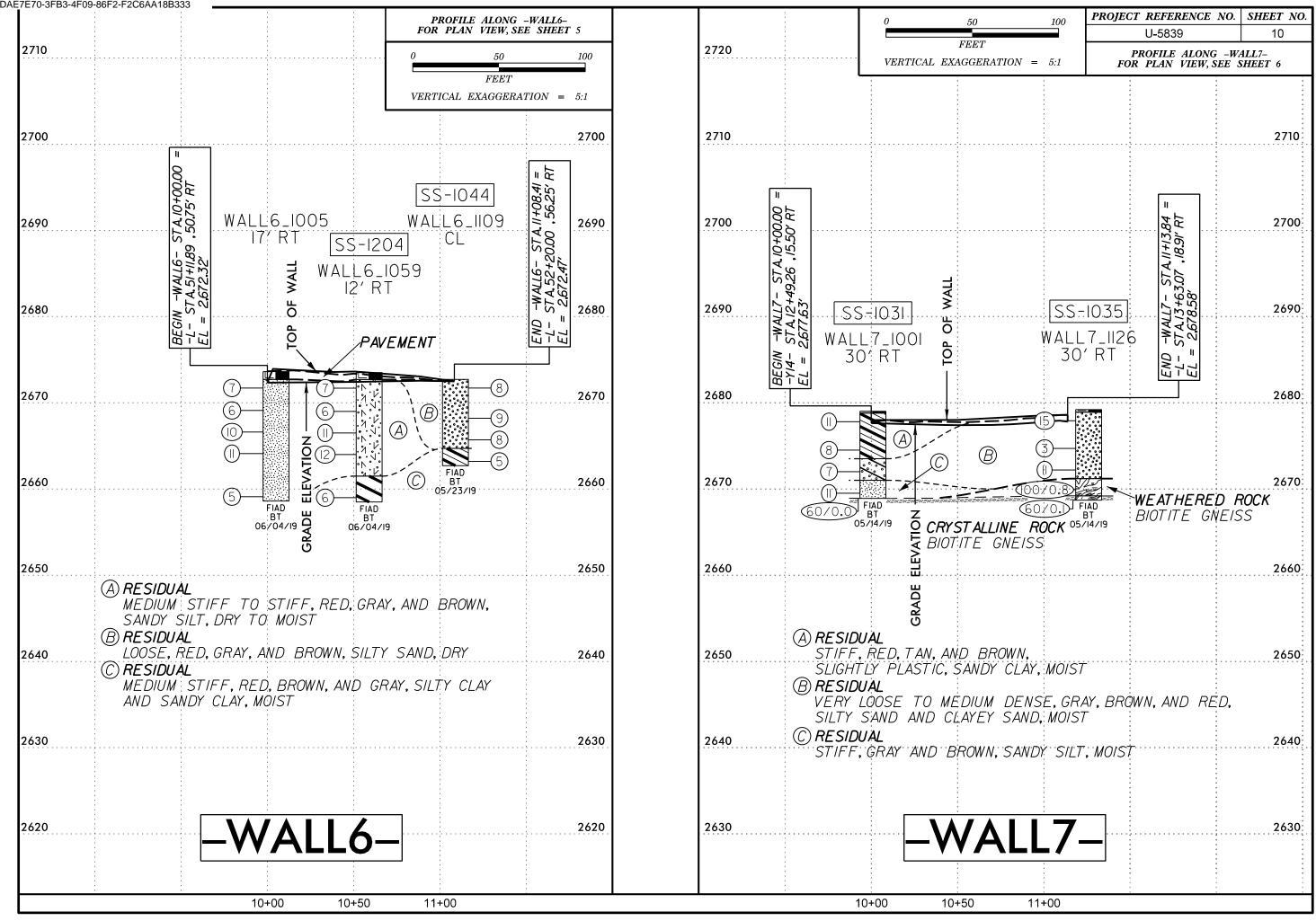












GEOTECHNICAL BORING REPORT BODEIOG

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WBS	50230	.1.1			TI	P U-5839		COUNT	Y HAYWO	DD			GEOLOGIST Verdicchi	o, T .		
SITE	DESCR	IPT I ON	I RUS	SS AV	E - US	276 FRO	M US 23/74	4 (GREA	T SMOKY M	OUNTA	NS E	XPW	Y) TO US 23 BUS (N MAIN	IST)	GROUN	ND WTR (ft)
BOR	ING NO.	WAL	.L1_10	02	ST	TATION 1	0+02		OFFSET	CL			ALIGNMENT -WALL1-		0 HR.	Dry
COLI	LAR ELE	V. 2,	648.7	ft	т	DTAL DEP	TH 15.0 f	t	NORTHING				EASTING 814,064		24 HR.	F I AD
DRILI	RIG/HAI	/IMER E	FF./DA	TE SI	VE2938	CME-750 8	4% 4/25/201	9	_	DRILL	/IETHO	DH.	S. Augers	HAMIV	ER TYPE	Automatic
DRIL	LER G	owan,	S. L.		ST	ART DAT	E 06/04/1	9	COMP. DA	TE 06/	04/19		SURFACE WATER DEP	TH N	/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0		PER FOOT 50	- 75 100	SAMP. NO.	моі	L O G	SOIL AND ROC	CK DES	CRIPTION	DEPTH (ft)
2650		-												SURE		0.0
	2,647.9	-	1	2	3	• · · · ·			· · · · · ·	SS-1214	D		2,647.9 ROADWAY I	E MBAN EMENT)	KMENT	0.8
2645	2,645.2	-	5	7	6	•13.					D			SILTY C	CLAY	Y J
2640	2,640.2	-	3	3	5 14				· · · · · ·		D		TAN AND BRO	WN, SIL	TY SAND	
	-	- -		14	14		•28 		· · · · · · · · · · · · · · · · · · ·		D		2,636.7			12.0
2635	2,635.2	13.5	3	3	3	• • • • •	· · · · ·		· · · · · ·		D		TAN AND BRO - 2,633.7 Boring Terminated at			15.0

								B	ORE L	OG						
WBS	50230).1.1			Т	P U-5839		COUNT	1 HAYWO	OD			GEOLOGIST Ver	dicchio, T.		
SITE	DESCR	IPTION	I RUS	SS AV	/E - US	5 276 FRO	N US 23/7	4 (GREAT	SMOKY N	IOUNTA	INS E	EXPV	VY) TO US 23 BUS (N	MAIN ST)	GROUN	D WTR (ft)
BOR	NG NO	. WAL	.L1_11	46	S	TATION 1	1+46		OFFSET	11 ft LT			ALIGNMENT -WA	LL1-	0 HR.	Dry
COLL	AR ELI	EV. 2,	644.6	ft	Т	OTAL DEP	FH 15.0 f	t	NORTHING	660,0	76		EASTING 813,997	1	24 HR.	FIAD
DRILL	. RIG/HA	MMER E	FF./DA	TE S	ME8245	5 CME-55 90	% 09/06/201	18		DRILL N	NETHC	D H	I.S. Augers	HAMIN	ER TYPE	Automatic
DRIL	LER №	liller, R	т.		S	TART DATE	E 05/31/1	9	COMP. DA	TE 05/3	31/19		SURFACE WATER	DEPTH N	/A	
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT			PER FOOT		SAMP.	▼∕		SOIL AN	D ROCK DES	CRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25 I	50	75 100	NO.	мо		ELEV. (ft)			DEPTH (
2645														OUND SURF.		0
	2,643.9.	<u>+ 0.7</u>	3	3	4	$ \cdot \cdot \cdot \cdot \cdot \\ \bullet_7 \cdot \cdot \cdot$	· · · · ·	· · · ·	· · · · ·	SS-1155	D	k	2,643.9 ROAD	WAY EMBAN (PAVEMENT		0
2640	2,641.1	3.5	7	6	10		· · · · ·							RTIFICIAL FI	LL	
2640	2,638.6-	+ 60	<i>'</i>			16					D	\square	2,639.1 TAN ANE	BROWN, SI	TY SAND	J <u>5</u>
	-	t	5	3	3	6	· · · ·	· · · ·			D		- BRC	OWN, SANDY	SILT	
2635	2,636.1	8.5	2	2	3	 					м		-			
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	2,631.1	13.5														
2630		<u> </u>	5	7	9	1 6					М		2,629.6 Boring Termina	ated at Flevati	ion 2 629 6 1	15.
		E												STIFF SAND		
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SHEET 11

BORE LOG

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WBS	50230	.1.1			Т	Ρ	U-	583	39				С	ου	NT	Υ	F
SITE	DESCR	IPTION	RUS	SS AV	E - US	5 2	276	FR	ON	เบร	5 23	3/7	4 (0	GR	ΕA	Т	SN
BOR	NG NO.	WAL	L1_12	:54	S	TΑ	TIC	N	12	+54	ŀ					0	OFI
COLI	LAR ELE	EV. 2,0	637.6	ft	т	от	AL	DE	PT	Н	15.	0 ft				1	NO
DRILL	RIG/HAI	VIMER E	FF./DA	TE SM	NE824 5	5 C	ME-	55	90%	6 09	/06/	201	8				
DRIL	LER M	iller, R.	т.		S	TA	RT	DA	TE	0	5/3	1/1	9			0	co
LEV	DRIVE ELEV	DEPTH	BLC	w cou	JNT						.OV			R FC	00		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	\square	0		2	5		5	50			7	5
2640		-															
	-																
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:035	2,634.1	3.5	3		E	╏┟	- Ť						1.	:			
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SHEET 12

BORE LOC	3			
TY HAYWOOD			ST Verdicchio, T.	
AT SMOKY MOUN	ITAINS EXPWY	() TO US 23	BUS (N MAIN ST)	GROUND WTR (ft)
OFFSET 11 ft			T -WALL1-	0 HR. Dry
NORTHING 66		EASTING		24 HR. FIAD
DRIL	LL METHOD H.S	6. Augers	HAMM	ER TYPE Automatic
COMP. DATE	05/31/19	SURFACE	WATER DEPTH N/	A
DT SAM 75 100 NO		ELEV. (ft)	SOIL AND ROCK DESC	RIPTION DEPTH (ft)
		2,637.6	GROUND SURFA	
· · · · · ·		2,636.9	ROADWAY EMBANK (PAVEMENT) ARTIFICIAL FIL	
· · · · · · · · · · · · · · · · · · ·		2,632.1	BROWN, SANDY	
		2,629.6	BROWN AND TAN, SIL	
· · · · · · · · · · · · · · · · · · ·	M		BROWN, CLAYEY	
· · · · · ·		2,625.6	BROWN, SANDY	
<u>· · · · · </u>	- WI 8388	2,622.6 Borin	ng Terminated at Elevation MED. STIFF SANDY	15.0 on 2,622.6 ft IN

GEOTECHNICAL BORING REPORT POPEIOC

								E	ORE L	.0G							
	50230					P U-583			Y HAYWC					OGIST Patton, I		1	
								/74 (GREA	1			XPW	-	S 23 BUS (N MAI		-	ND WTR (ft)
BOR	ING NO	WAL	_L2_10)12	S	TATION	10+12		OFFSET	18 ft RT			-	MENT -WALL2	-	0 HR.	14.0
	LAR ELI					OTAL DEP			NORTHIN					NG 813,170		24 HR.	FIAD
DRIL	l Rig/Hai	MMERE	FF./DA	TE SI	VE8245	CME-55 9	0% 09/06/	2018		DRILL	NETHC	ND H	I.S. Augers		HAMIN	IER TYPE	Automatic
DRIL	LER N	liller, R				TART DAT			COMP. DA		-	<u> </u>	SURF	ACE WATER DEF	PTH N	/A	
ELEV (ft)	DRIVE	DEPTH (ft)	'⊢			0	BLOW 25	S PER FOO	T 75 100	SAMP.	1.7			SOIL AND RO	CK DES	CRIPTION	
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft			50	100	NO.	/мо	G	ELEV. (ft)			DEPTH (ft)
2640		ŧ											-				
	2,636.8-												2,636.8		ID SURF.		0.0
2635	· -	ŧ.	2	3	2	• <u>5</u> .					м		-	ROADWAY (PA)	EMBAN /EMENT		<u> </u>
	2,633.3	3.5	4	9	18	::``		· · · · ·					-	AL RED AND BRO	LUVIAL		
2630	2,630.8	6.0				· · · ·	• 27	· · · · ·	· · · · · ·		М		2,631.3	GRAY, S			<u>5.5</u>
2030	2,628.3	ł	1	2	1	¶ <u>3</u>	+				М		-				
		+ 0.0	1	1	2	• ●3					м		-				
2625	-	‡				-` <u>`</u> ,	· · ·		· · · · ·				2,624.8				<u>12.0</u>
	2,623.3	13.5	8	10	23	$\left \left \begin{array}{c} \cdot \cdot \cdot \end{array} \right \right $		· · · · ·	· · · · · ·			000	-	RE BROWN AND RED	SIDUAL , SAND	WITH GRA	VEL
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WBS	50230).1.1			Т	P U-583	39	COUNT	Y HAYWO	DOD			GEOLOGIST Patton,	Ρ.		
SITE	DESCR	IPTION	I RUS	SS AV				4 (GREA	T SMOKY	NOUN	TAINS E	EXPV	VY) TO US 23 BUS (N MA	IN ST)	GROUN	ID WTR (
BOR	NG NO.	WAL	L2_10	76	S	TATION	10+76		OFFSET	28 ft F	۲۲		ALIGNMENT -WALL2	-	0 HR.	D
	AR ELE						PTH 15.01		NORTHIN		·		EASTING 813,191		24 HR.	FIA
DRILL	RIG/HA	MMER E	FF./DA	TE S	ME8245	5 CME-55	90% 09/06/20	18		DRIL	L METHO)D ⊦	I.S. Augers	HAMM	ER TYPE	Automatic
DRIL	LER M	liller, R.	. т.		S	TART DA	TE 05/24/1	9	COMP. D	ATE C	5/24/19	4	SURFACE WATER DE	PTH N/	A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	1	0		PER FOOT 50	75 100	SAN NC		/ L 0 I G	SOIL AND RC ELEV. (ft)	OCK DESC	CRIPTION	DEPTH
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2635	2,636.0	0.5	3	4	3	<u> </u>	· · · · ·						- 2,636.5 GROUN	ID SURFA		
	-					• • 7				11	м			VEMENT)		
	2,633.0	ł	1	3	4	$ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot$	· · · · · ·				м		GRAY,	SANDY S		
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	2,628.0	8.5				1								GRAY SA		<u>_</u>
	-	ŧ	1	2	3	•5 <u>-</u>	· · · · · ·				М			51011, 67		•
2625	-	ŧ					<u> </u>					000	2,624.5	SIDUAL		
	2,623.0	13.5	3	28	17			 15			м	000		N, SAND	WITH GR/	AVEL
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GEOTECHNICAL BORING REPORT BODEIOG

GEOTECHNICAL BORING REPORT BORE LOG

WBS	50230	.1.1			TI	P U-5839			ORE L				GEOLOGIST Verdicc	hio, T .		
SITE D	DESCR	PTION	RUS	SS AVE	E - US	276 FROM	US 23/7	4 (GREAT	SMOKY M	OUNTA	INS E	XPW	Y) TO US 23 BUS (N MA	IN ST)	GROUN	D WTR (
BORIN	IG NO.	WAL	L3_10	99	S	TATION 10	+99		OFFSET 3	39 ft RT			ALIGNMENT -WALLS		0 HR.	7
	AR ELE				т	OTAL DEPT	H 15.0 fl		NORTHING	661,4	45		EASTING 813,376		24 HR.	FIA
					1E2938	CME-750 84	% 4/25/201	9		DRILL	/IETHO	DDH.	S. Augers	HAMM	ER TYPE	Automatic
DRILLI	ER G	owan, S	S. L.		S	FART DATE	06/05/1	9	COMP. DAT	TE 06/	05/19		SURFACE WATER DE	PTH N/	'A	
		DEPTH		W COU	INT		BLOWS F	PER FOOT		SAMP.	▼/	1				
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5 5	50 I	75 100	NO.	мо	O G	SOIL AND RO	OCK DESC	CRIPTION	DEPTH
2635		-											-2,633.9 GROUN	ND SURFA	ACE	
2	2,633.3	0.6	2	2	2	! ●4				SS-1252	м	L∭	2,833.3 ROADWA	EMBAN		
2630 2	2,630.4	- - 3.5			-	1							BROWN	, SANDY	SILT	
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	· 4	-	1	2	1	$\bullet_3 \cdot \cdot \cdot$	· · · · ·				_м_			SIDUAL	SILT	
2625 2	2,625.4	- 8.5	WOH	1	1						м			SILTY CL	AY	
	1	-										N	2,621.9			1
2620 2	- 2,620.4	- - 13.5				· · · · ·							<u>-2,021.9</u> TAN, 3	SANDY SI		
	-	-	8	33	25			58	<u> </u>		w		Boring Terminated			
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WBS	50230	.1.1			Т	P	U-5839	9		C	OUNT	YH,	AYWC	DOD					GEOLOG	ST Verdico	hio, T .	_	
SITE	DESCR	IPTION	I RU	SS AV	E - US	5 27	6 FRO	мu	S 23/7	74 (0	GREA	T SM		1001	ITA	INS E	XPW	VY)	TO US 23	BUS (N MA	IN ST)	GROUN	ID WTR (ft)
BOR	ING NO.	WAL	.L3_10	000	S	TAT	ION 1	10+0	00			OFF	SET	34 ft	RT				ALIGNME	NT -WALL	3-	0 HR.	Dry
COL	LAR ELE	V. 2,	636.6	ft	Т	ΟΤΑ	L DEP	тн	10.0	ft		NOF	RTHIN	G 6	61,3	71		\uparrow	EASTING	813,314		24 HR.	FIAD
	RIG/HAN																DD H		Augers		HAMIN		Automatic
	LER G				1							CO	/IP. D/					_		WATER DE		/^	
ELEV (ft)		DEPTH (ft)		OW CO	UNT				BLOWS		R FOOT		100	SA	00/0 MP. 10.	V			ELEV. (ft)	SOIL AND R			DEPTH (ft
2640	-	-																E					
2635	2,635.9	- 3.5	2	2	2		 4 	-			· · ·	· · ·	· · · ·	-		D		2 	,636.6 ,635.9	ROADWA (PA BROWN	ND SURF Y EMBAN VEMENT J, SANDY ESIDUAL	KMENT) SILT	0.0 0.7
2630	2,630.6	t	2 WOH	2	2		 3 <u></u>						· · · ·			M M		- - - 2,	,626.6 Bori		N, SILTY (CLAY	10.0
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GEOTECHNICAL BORING REPORT BORE LOG

											В	<u>U</u>	RE L	-0	G							
WBS	50230	.1.1			TI	IP U	-5839)		C	DUNT	Y⊦	IAYWO	OD)			GEOLOG	ST Verdi	cchio, T.	1	
					-					74 (G	GREA	-				NS EX	KPW	Y) TO US 23				D WTR (ft)
BORIN					_		DN 9						FSET					ALIGNME		.L4-	0 HR.	Dry
COLLA									25.0			NO	RTHIN					EASTING	812,916		24 HR.	F I AD
DRILL R	rig/hai	MMER E	FF./DA	TE SI	VE2938	3 CME	-750 8	4%	4/25/20)19					RILL M	ETHO	DH	.S. Augers		HAMM	ER TYPE	Automatic
DRILLE		owan,	S. L.		S	TART	DAT)5/24/				MP. D/			4/19	.	SURFACE	WATER D	DEPTH N/	A	
ELEV E	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	JNT 0.5ft	0		25 	LOWS	PER 50	FOOT	75	100		amp. No.	моі	L O G	ELEV. (ft)	SOIL AND	ROCK DESC	RIPTION	DEPTH (fi
2675																		-				
2670	- - - -	<u>0.0</u>	2	2	3	•	;	-		•						D	х л - У - У	2,671.9 		DUND SURFA RESIDUAL BROWN, CLA		0.
2	,668.4 ,665.9	ļ.	2	3	2		· · · ·	. . .	· · · · · · · · · · · · · · · · · · ·	· · ·	· · · ·		· · · · · · · · · ·	s	S-1081	D	レイトレ	-				
2665	 663.4	<u> </u>	2 2	2	3 4		5 07	-					· · · ·			D D	7 7 7 7 7 7 7 7					
2 <u>660</u>		- - - 13.5	2	1	3		· · ·		· · · ·				· · · ·			5	2 7 7 7 7 2 7	-				
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2	648.4	23.5	3	5	6		• 11 • 11	-	· · · ·		· · ·		· · · · · · ·			М	アレン		ing Terminat	ed at Elevatio	on 2,646.9	25.0 ft IN

WBS 50230.1.1 TIP U-5839 COUNT SITE DESCRIPTION RUSS AVE - US 276 FROM US 23/74 (GREA BORING NO. WALL4_1051 STATION 10+51 COLLAR ELEV. 2,679.5 ft TOTAL DEPTH 25.0 ft DRILLER Gowan, S. L. START DATE 05/24/19 DRILLER Gowan, S. L. START DATE 05/24/19 BLOWS PER FOO 0 25 50 2680 2,676.0 3.5 3 3 5 -	OFFSET NORTHING COMP. DA T 75 100	10UNTA 11 ft LT 3 661,6 DRILL N	884 METHC 24/19 MOI D M D M M		ALIGNMENT -WALL4 EASTING 812,888 I.S. Augers SURFACE WATER DEF ELEV. (ft) -2,679.5 GROUN RED AND BRC	IN ST) GROU - 0 HR. 24 HR. HAMMER TYPE	FIAE Automatic
BORING NO. WALL4_1051 STATION 10+51 COLLAR ELEV. 2,679.5 ft TOTAL DEPTH 25.0 ft DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 84% 4/25/2019 DRILLER Gowan, S. L. START DATE 05/24/19 ELEV DEPTH (ft) BLOW COUNT (ft) BLOW SPER FOO 2680 2,676.0 3.5 3 3 5 2670 2,676.0 3.5 3 3 5 2665 2,671.0 8.5 2 4 4 2666 13.5 4 5 6 4 6 2660 2,661.0 18.5 6 4 6 4 6 2660 2,661.0 18.5 6 4 6 10 10 10 10 2,661.0 18.5 2 4 5 6 11 11 11 11 2,661.0 18.5 6 4 6 4 6 <th>OFFSET NORTHING COMP. DA T 75 100</th> <th>11 ft LT 3 661,6 DRILL N TE 05/2 SAMP. NO.</th> <th>884 METHC 24/19 MOI D M D M M</th> <th></th> <th>ALIGNMENT -WALL4 EASTING 812,888 I.S. Augers SURFACE WATER DEF SOIL AND RC ELEV. (ft) -2,679.5 GROUN RED AND BRC (74.0% P.</th> <th>D SURFACE</th> <th>Dr FIA[Automatic</th>	OFFSET NORTHING COMP. DA T 75 100	11 ft LT 3 661,6 DRILL N TE 05/2 SAMP. NO.	884 METHC 24/19 MOI D M D M M		ALIGNMENT -WALL4 EASTING 812,888 I.S. Augers SURFACE WATER DEF SOIL AND RC ELEV. (ft) -2,679.5 GROUN RED AND BRC (74.0% P.	D SURFACE	Dr FIA[Automatic
COLLAR ELEV. 2,679.5 ft TOTAL DEPTH 25.0 ft DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 84% 4/25/2019 DRILLER Gowan, S. L. START DATE 05/24/19 ELEV (ft) DEPTH (ft) BLOW COUNT (ft) BLOW SPER FOO 2680 2,678.5 0.0 10 3 2 2675 2,676.0 3.5 3 3 5 2676 2,671.0 8.5 2 4 4 2665 2,666.0 13.5 4 5 6 2660 2,661.0 18.5 6 4 6 4 6 2660 2,666.0 23.5 6 4 6 4 6 2660 2,661.0 18.5 6 4 6 6 10 2,666.0 23.5 6 4 6 6 10 10 10 10 10 10 10 10 10 10 10	NORTHING COMP. DA 75 100	661,6 DRILL N TE 05/2 SAMP. NO.	иетно 24/19 Мо D М М		EASTING 812,888 I.S. Augers SURFACE WATER DEF SOIL AND RC ELEV. (ft) CRED AND BRC (74.0% P. CRED AND BRC CRED	24 HR. HAMMER TYPE PTH N/A DCK DESCRIPTION	FIAI
DRILL RIG/HAMMER EFF./DATE SME2938 CWE-750 84% 4/25/2019 DRILLER Gowan, S. L. START DATE 05/24/19 ELEV (ft) DEPTH ELEV (ft) BLOW COUNT (ft) BLOWS PER FOO 0 0 25 50 2680 2,679.5 0.0 10 3 2 6 1 <th1< th=""> 1 1 <th< th=""><th>COMP. DA T 75 100</th><th>DRILL N TE 05/2 SAMP. NO.</th><th>иетно 24/19 Мо D М М</th><th></th><th>LS. Augers SURFACE WATER DEF SOIL AND RC ELEV. (ft) CLEV. (ft) CLE</th><th>HAMMER TYPE PTH N/A DCK DESCRIPTION DO SURFACE SIDUAL DWN, CLAYEY SIL</th><th>Automatic</th></th<></th1<>	COMP. DA T 75 100	DRILL N TE 05/2 SAMP. NO.	иетно 24/19 Мо D М М		LS. Augers SURFACE WATER DEF SOIL AND RC ELEV. (ft) CLEV. (ft) CLE	HAMMER TYPE PTH N/A DCK DESCRIPTION DO SURFACE SIDUAL DWN, CLAYEY SIL	Automatic
DRILLER Gowan, S. L. START DATE 05/24/19 ELEV (ft) DEPTH ELEV (ft) DEPTH (ft) BLOW COUNT 0.5ft 0.5ft 0.5ft 0 25 50 2680 2,679.5 0.0 10 3 2 5 1 </th <th>T 75 100</th> <th>TE 05/2 SAMP. NO.</th> <th>24/19 MO D M M</th> <th></th> <th>SURFACE WATER DEF</th> <th>PTH N/A DCK DESCRIPTION ND SURFACE SIDUAL DWN, CLAYEY SIL</th> <th>1 DEPTH (</th>	T 75 100	TE 05/2 SAMP. NO.	24/19 MO D M M		SURFACE WATER DEF	PTH N/A DCK DESCRIPTION ND SURFACE SIDUAL DWN, CLAYEY SIL	1 DEPTH (
ELEV (ft) DRIVE ELEV (ft) DEPTH (ft) BLOW COUNT 0.5ft BLOWS PER FOO 0 2680 0.5ft	T 75 100	SAMP. NO.	MO D M D M	→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→ ×→	SOIL AND RC <u>ELEV. (ft)</u> <u>RED AND BRC</u> (74.0% P. (74.0% P. 	DCK DESCRIPTION	DEPTH (
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GEOTECHNICAL BORING REPORT POPEIOC

0) CELEV (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV. (ft) DEPTH (ft) 2687.6 0.0 -								B	ORE L	OG			T			
DRING NO. WALL4_1101 STATION 11+01 OFFSET 13 ft LT ALIGNMENT WALL4_1 DILAR ELEV. 2,887.6 ft TOTAL DEPTH 35.0 ft NORTHING 661,724 EASTING 812,858 24 HR FIAD BILL RGAMAMEREF.DATE SME283 CME270 BMCM283 COMP. DATE 06/04/19 SURFACE WATER DEPTH N/A SV DFRU DEV DFRIT BLOW PER FOOT 0 25 50 75 100 SAMP. V L SOIL AND ROCK DESCRIPTION SV DFRU DEV DEPTH BLOW SPER FOOT NO. MOI ELEV. (%) SOIL AND ROCK DESCRIPTION S0 2.687.6 0.0 1 3 5 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>																
DLLAR ELEV. 2,887.6 ft TOTAL DEPTH 35.0 ft NORTHING 661,724 EASTING 812,858 24 HR FIAD BILL RGHAMMEREFF/DATE SME238 CME-750 84%, 4/25/2019 DRILL METHOD HS. Augors HAMMERTYPE Automatic BILLER Gowan, S. L. START DATE 06/04/19 COMP, DATE 06/04/19 SURFACE WATER DEPTH N/A V DPR/V DEPTH BLOW COUNT BLOWS PER FOOT NO. MIOI G ELEV. (n) SOIL AND ROCK DESCRIPTION 00 2.687.6 0.0 1 3 5 1 0 25 50 75 100 SAMP. MIOI G ELEV. (n) SOIL AND ROCK DESCRIPTION DEPTH (n) 2.687.6 0.0 1 3 4 <td< th=""><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th><th>4 (GREA</th><th>1</th><th></th><th>INS EX</th><th>۲PW</th><th>1</th><th>ST)</th><th></th><th>. ,</th></td<>						-		4 (GREA	1		INS EX	۲PW	1	ST)		. ,
BLL RGHAMMER EFFJDATE SME2308 CME, 750 84% 4/25/2019 DRILL METHOD HS. Augers HAMMER TYPE Automatic RILLER Gowan, S. L. START DATE 06/04/19 COMP, DATE 06/04/19 SURFACE WATER DEPTH N/A V ELEV (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75 100 SAMP NO. G ELEV. (ft) SOIL AND ROCK DESCRIPTION DEPTH (ft) DEPTH (ft) SOIL AND ROCK DESCRIPTION DEPTH (ft) SOIL AND ROCK DESCRIPTION DEPTH (ft) DEPTH (ft)						_										
SILLER Gowan, S, L. START DATE 06/04/19 COMP. DATE 06/04/19 SURFACE WATER DETH N/A V PEEV (ft) 0.5ft													,			
EV DRIVE LEV DEPTH (ft) BLOW COUNT BLOWS PER FOOT SAMP. NO. Mol L SOIL AND ROCK DESCRIPTION DEPTH (ft) 40 4 5 50 75 100 No. No. C G ELEV. (ft) SOIL AND ROCK DESCRIPTION DEPTH (ft) D 2.687.6 GROUND SURFACE 0.0 2 2.687.6 0.0 1 3 5 4 <t< th=""><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th><th></th><th></th><th></th><th></th><th>U n.</th><th>1</th><th></th><th></th><th>Automatic</th></t<>						-						U n.	1			Automatic
7 (ft) (10) 0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV. (ft) DEPTH (ft) 30 - <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>I</td><td>1</td><td>04/19</td><td></td><td>SURFACE WATER DEPT</td><td>I N//</td><td>A</td><td></td></td<>									I	1	04/19		SURFACE WATER DEPT	I N//	A	
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LLEV (ft) LEV (ft) Lev (ft) O.5ft 2695 0.5ft 2695 3 2696 3 2697 2.686.3 2.686.3 6.0 2686.3 4 2.688.8 8.5 2686.3 4 2.683.8 8.5 2680 2 2675 2.674.8 2670 2	E SMEZ	- (] =29	STATIO TOTAL 338 CME	6 FROM US ION 11+36 L DEPTH 3	35.0 ft	SMOKY N OFFSET	41 ft LT	INS E	XPW	Y) TO US 23 BUS (N ALIGNMENT -WA		GROUND WTR (fi
BORING NO. WALL4_113 COLLAR ELEV. 2,692.3 ft DRILL RIG/HAMMER EFF./DAT DRILL RIG/HAMMER EFF./DAT DRILLER Gowan, S. L. ELEV DRIVE (ft) DEPTH (ft) BLOV (ft) 2695 2,691.4 0.9 2,691.4 0.9 3 2,686.3 6.0 4 2,686.4 8.5 3 2680 2,678.8 13.5 2675 2,674.8 17.5 2670 2 2	E SMEZ	=29	STATIO TOTAL 338 CME	ION 11+36 L DEPTH 3	35.0 ft	OFFSET	41 ft LT			-		-
COLLAR ELEV. 2,692.3 ft DRILL RIG/HAMMER EFF./DATI DRILLER Gowan, S. L. ELEV DRIVE ELEV (ft) DEPTH (ft) BLOV 0.5ft 2695 2,691.4 0.9 3 2696 2,688.8 3.5 2 2680 2,688.8 8.5 3 2680 2,688.8 13.5 2 2675 2,674.8 17.5 2 2670 2 2 2		=29	TOTAL 938 CME	L DEPTH	35.0 ft							
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DRIVE (ft) DEPTH (ft) BLOW 0.5ft 2695		١T			/25/2019				D H.	S. Augers		IER TYPE Automatic
DRIVE (ft) DEPTH (ft) BLOW 0.5ft 2695		١T	START	T DATE 06	6/05/19	COMP. DA				SURFACE WATER	DEPTH N	/Α
(ft) ELEV (ft) (ft) 0.5ft 2695	0.5ft 0.	0.5			OWS PER FOOT		SAMP.	▼/	1-1			
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GEOTECHNICAL BORING REPORT BODEIOG

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				-		74 (GREA	1		NS E	XPW	Y) TO US 23 BUS (N MAIN ST)	GROUND WTR (ft)
	NG NO. WA				FATION 9+71	-	OFFSET				ALIGNMENT -WALL5-	0 HR. Dry
	LAR ELEV. 2				OTAL DEPTH 20.0		NORTHING			<u> </u>	EASTING 812,924	24 HR. FIAD
			IE S		CME-750 84% 4/25/20					ЮН		MER TYPE Automatic
	LER Gowan		ow co			19 PER FOOT	COMP. DA	SAMP.	_	1 - 1	SURFACE WATER DEPTH	I/A
ELEV (ft)	ELEV (ft)	0.5ft	-	0.5ft	0 25	50	75 100	NO.	мо	0	SOIL AND ROCK DES	CRIPTION DEPTH (ft)
	(,											
2675												
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2670	‡										_ 	ACE 0.0
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	2,666.6 3.5			_			 			\square	RESIDUAL	
2665	2,664.1 6.0	2	4	5	· • • • • • • • • • • • • • • • • • • •		· · · · · ·		D		ED AND BROWN, MC 2,664.6 PLASTIC SILTY	CLAY 5.5
	I I	5	6	9	· · · · · · · · · · · · · · · · · · ·		· · · · · ·		D		BROWN, SILTY 3	8.0
2660	2,661.6 + 8.5	3	5	6	• • • • • • • • • • • •				м		TAN AND WHITE, SA	NDY SILT
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0055	2,656.6 13.5	; 3	4	4	: <u> </u> :: :::				м		-	
2655											-	
	+ 2.651.6 + 18.5	;				· · ·	 				-	
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										4 (G	REA					S E>	XPM	/Y) TO US 2:					ID WTR (ft
	NG NO.						ON 1							7 ft LT								0 HR.	Dŋ
	AR ELI						L DEP					NOF	THIN	3 661				EASTING	812,8	76		24 HR.	FIAD
	. RIG/HAI			IE SI													рн	.S. Augers					Automatic
DRIL	LER G	iowan, 3					T DAT						1P. DA	TE 00	- 1	19		SURFACE	WATE	R DEP	TH N/	A	
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	BLC 0.5ft	0.5ft	1			BL 25	ows	PER 50		75	100	SAMI NO.		/	0		SOIL A	ND RO	CK DESC	CRIPTION	
()	(ft)		0.511	0.51	0.51	\mathbb{H}^{\bullet}				<u> </u>		<u> </u>				NOI	G	ELEV. (ft)					DEPTH
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2675	2,675.0	0.0	1	1	2	╎┥	3	Τ.				Τ.				D		-		RES	SIDUAL		
	- 2,671.5	- 3.5] `			· · · · · ·	:	· · ·	1:	· · ·					-	RED A		JVVIN SAI	NDY SILT	
2670	2,669.0	6.0	3	4	4		<u>8</u>	<u> </u> .		·		<u> </u> .				D		-					
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	SITE	DESCR	IPTION	RUS	SS AV	E - US	6 276	FRO	DM	US 2	23/7	4 (G	REA	T SM
	BOR	NG NO.	WAL	L5_11	05	S	ΓΑΤΙΟ	NC	11+	05				OFF
Γ	COLI	LAR ELE	EV. 2,	673.6	ft	т	DTAL	. DEI	ртн	15	5.0 f	t		NO
F	DRILL	RIG/HAI	MMER E	FF./DA	TE SI	/E2938	CME	-750	84%	5 4/2	5/201	9		
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Ī	ELEV	DRIVE	DEPTH	BLC	w co	JNT				BLO	WSI	PERI	=00T	-
	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25			50		75
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	2675													
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		2,672.6-	<u>+ 1.0</u>	2	5	4		••••	:		•••	1	· · ·	
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T١	/ HAY	'WO	O	D				GEOL	ogis	ST Verd	icchi	o, T .		
A٦	SMO	KY N	10	UNTA	INS E	XPV	٧Y) TO U	S 23	BUS (N	MA	N ST)	GROUN	D WTR (ft)
	OFFSI	ET	3 1	ft LT				ALIGN	MEN	T -WAI	LL5-		0 HR.	Dry
	NORT	HINC	3	661,9	35			EAST	NG	812,901			24 HR.	FIAD
			1	ORILL N	IETHO	D F	I.S.	Augers				HAMM	ER TYPE	Automatic
	COMP	. DA	TE	E 06/0	06/19			SURFA	\CE	WATER	DEP	TH N/	A	
т				SAMP.	▼/	L O				SOIL AND				
	75	100		NO.	моі		6	ELEV. (ft)		SOIL AND				DEPTH (ft
								2,673.6		GRO		SURFA	CE	0.0
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SITE	DESCR	PTION	I RUS	SS AV	E - US	S 2	76 FROM	US 23/7	4 (GREA ⁻	г ѕмо	KY M	OUNTA	INS E	XPW	Y) TO US :	23 BUS (N MAI	N ST)	GROUM	ND WTR (ft)	
BORI	NG NO.	WAL	.L6_10	05	S	ТА	TION 10	+05		OFFS	SET [·]	17 ft RT			ALIGNN	IENT -WALL6	-	0 HR.	Dry	
COLL	AR ELE	V. 2,	673.6	ft	Т	от	AL DEPTI	H 15.0 f	ït	NORT	THING	662,0)59		EASTIN	G 812,790		24 HR.	FIAD	
DRILL	RIG/HAN	/IMER E	FF./DA	TE SI	VE2938	3 C	ME-750 849	% 4/25/201	19			DRILLI	VIETHO	NDH.	S. Augers		HAMIM	ER TYPE	Automatic	
DRILI	L ER G	owan, s	S. L.		S	TA	RT DATE	06/04/1	9	сом	P. DA	TE 06/	04/19		SURFAC	CE WATER DEF	PTH N/	Ά		
ELEV	DRIVE ELEV	DEPTH			1				PER FOOT			SAMP.	▼∕			SOIL AND RC	OCK DESC	RIPTION		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	\prod°	0 2	5	50	75	100	NO.	Имо		ELEV. (ft)				DEPTH (ft)	
2675		-													-					
	- 2,672.7 -	- - 0.9				╂┼		• • • •			• •				2,673.6	ROADWAY		KMENT	0.0	
2670	2,670.1	- - 3.5	2	4	3		. ∳ 7 : :	· · · · ·			::		D		: L		VEMENT)			
2010	<u>, 2,070. </u> -	- 3.5	2	2	4	11	6						D		_	RED AND BRO		NDY SILT		
ŀ	2,667.6-	- <u>6.0</u> -	4	4	6	$\left\{ \right\}$	· \. · ·	· · · · ·					м							
2665	2,665.1	8.5	5	5	6	┨┝	· 1 · ·	· · · ·			•••				_					
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2660	- 2,660.1_	- - 12 E					·/· · · ·/· · ·	· · · · ·												
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								B	<u>ORE L</u>	OG						
	50230					P U-5839			Y HAYWO				GEOLOGIST Verdicchi			
SITE	DESCR	IPTION	I RUS	SS AV				4 (GREA			INS E	XPW	Y) TO US 23 BUS (N MA l i	N ST)		D WTR (i
BOR	NG NO	. WAL	L6_10	59	ST	TATION 10)+59		OFFSET				ALIGNMENT -WALL6-		0 HR.	D
	_AR ELI					OTAL DEPT			NORTHING				EASTING 812,759		24 HR.	FIA
				TE SI	VIE2938	CME-750 84	1% 4/25/201	19				DDH.	.S. Augers	Hammi	ER TYPE	Automatic
DRIL	LER G	owan,				FART DATE			COMP. DA			.	SURFACE WATER DEP	TH N/	A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft		0 2		PER FOOT	75 100	SAMP. NO.	моі	C C G	SOIL AND ROC ELEV. (ft)	K DESC	RIPTION	DEPTH
2675																
	2,672.7	<u>+ 0.8</u> +	2	3	4	 	· · · · ·	· · · · ·		SS-1204	D		- 2,672.7 ROADWAY E - (PAVE	E MBAN EMENT)	MENT	\int
2670	2,670.0	3.5	2	3	3				+ • • • •			N V	RED AND BROW			
	2,667.5	+ - <u>6.0</u>										NV	-	, OE		
665	2,665.0	‡	4	5	6		· · · · ·	· · · · ·			D	1 V				
.005	2,665.0	<u> 8.5 </u>	4	5	7	• • 12 •					D	1 V V	_			
	-	ŧ											- - 2,661.5			
660	2,660.0	13.5				$i \cdot j \cdot \cdot \cdot$						N	BROWN AND G	RAY, SI	LTY CLAY	
	-	<u> </u>	2	3	3	∮ 6 [.] • •					М	N	- 2,658.5 - Boring Terminated at	Elevatio	on 2.658 5	ft IN

GEOTECHNICAL BORING REPORT BODEIOG

							B	OF
WBS	50230).1.1			TI	P U-5839	COUNT	YН
SITE	DESCR	IPTION	I RUS	SS AV	E - US	6 276 FROM US 23/7	4 (GREA	T SM
BOR	ING NO.	WAL	.L6_11	09	S	TATION 11+09		OF
COL	LAR ELE	EV. 2,	672.7	ft	т	OTAL DEPTH 10.0	ft	NO
DRILI	RIG/HA	MMER E	FF./DA	TE SI	VIE2938	3 CME-750 84% 4/25/20	19	
DRIL	.LER G	iowan,	S. L.		S	TART DATE 05/23/	19	со
ELEV	DRIVE ELEV	DEPTH	BLC	w co	JNT	BLOWS	PER FOOT	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 I
2675								
	-	F						
	2,672.7-	<u> </u>	2	3	5			•
2670	2,669.2	T <u>3.5</u>					+	+:
	-	F	2	4	5			.
2665	2,666.7-	<u> 6.0 </u>	4	4	4			
2005	2,664.2	8.5	2	2	3			1:
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GEOTECHNICAL BORING REPORT BORE LOG

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T		YWO							IST Verdic			
			10	DUNTA	NS E	XPV	V١		3 BUS (N M		GROUN	ID WTR (ft)
	OFFS	ET	С	L				ALIGNM	ENT -WALL	-6-	0 HR.	Dry
	NOR	THING		662,1					812,720		24 HR.	FIAD
				DRILL N	/IETHO	D F	l.S	6. Augers		HAMM	ER TYPE	Automatic
	COM	P. DA	Т	E 05/2	23/19		_	SURFAC	E WATER DI	EPTH N/	Ą	
ЭΤ				SAMP.	▼∕	L O			SOIL AND F	ROCK DESC	RIPTION	
	75	100		NO.	/моі	G		ELEV. (ft)				DEPTH (ft)
							L					
							È	2,672.7		JND SURFA	CE	0.0
:		•••		SS-1044	D		E	R	ED. GRAY. AN	RESIDUAL D BROWN,	SILTY SA	ND,
	1				_		F		TRACE	GRAVEL, I	ЛСА	
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·	· · ·	•••			D		Ŀ	2,664.7				8.0
•		•••			м	\boldsymbol{m}	E	2,662.7	RED AND B			10.0
							E	Bo	ring Terminate MED. ST	d at Elevatio		ft IN
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GEOTECHNICAL BORING REPORT

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BORE LOG WBS 50230.1.1 TIP U-5839 COUNTY HAYWOOD									GEOLOGIST Verdicchio, T.				WBS				50230 1 1					со						
					<u> </u>					TY HAYWOOD AT SMOKY MOUNTAINS EXPWY							JND WTR (ft)			WBS 50230.1.1 SITE DESCRIPTION RUSS AVE -								
									/4 (GRE/				XPVV	ALIGNMENT -WALL													4 (G	
BORING NO. WALL7_1001 STATION 10+01 COLLAR ELEV. 2,679.0 ft TOTAL DEPTH 10.1 ft											-	0 HR.	Dry		BORING NO. WALL7_1126 COLLAR ELEV. 2,679.2 ft						STATION 11+26							
COLLAR ELEV. 2,679.0 ft TOTAL DEPTH 10.1 ft DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 84% 4/25/2019									<u>н</u> а	EASTING 812,337 S. Augers		24 HR. WER TYPE	FIAD								TOTAL DEPTH 10.5 ft 8245 CME-55 90% 09/06/2018							
																	Automatic											
			Gowan,	1	ow cc		TART DAT		PER FOO		SAMP.		X	SURFACE WATER DE		I/A					DEPTH		W COL	_		BLOWS		
	LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	' <u> </u>	-	0.5ft	0	25	50	75 100			0 G	SOIL AND RO	DCK DES	CRIPTION	DEPTH (ft)		(ff) -	ELEV (ft)	DEPTH (ft)		0.5ft		0 25		50	
		(11)						_										F		(19								
2	680																	2	2680									
		2,678.8	0.2	10			<u> </u>			· · · · · · ·				<u>- 3,878.8</u> GROU			0.9			,678.9_	- 0.3	7	6	9	$+ \cdots + \cdots$		<u> </u>	
			ŧ	12	6	5	:•11:		.		SS-103	1 D		(PA	VEMENT)				-	-	([']	0	9	· · • • 15	· · · · · · · · ·	•	
2	675	2,675.5	+ <u>3.5</u>	6	5	3				· · · · ·		D		– RED, TAN, ANI	SIDUAL	N, SLIGHTLY	(2	2675 2,	-675.7, 	- 3.5	1	1	2			<u> </u>	
		2,673.0	6.0	6	4	3	. T ^o							2,673.5 PLASTIC SANDY GRAY	CLAY, T	RACE GRAV	ÉL5.5		2,	673.2	6.0	7	5	6		· · · · · · · · ·		
2	670	2,670.5	+ + 8.5						. .			м	\sim				<u> </u>	2	2670 2,	- 670.7-	- 8.5			•			+-	
		2,668.9		9 60/0.0	5	6	• <u>1</u> 1-	+		<u></u> 60/0.0		D		 2,668.9 Boring Termi			10.1			.668.8-			76/0.3				1.	
			ŧ	00/0.0	ή					00,010				Penetration Tes	st Refusa	at Elevation				-	-	60/0 <u>.</u> 1						
		-	ŧ											2,668.9 ft ON (RISTAL	LINE ROCK				-	-							
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COUNTY

AL BORING REPORT BORE LOG

- US S T(28245 S JT 0.5ft	S 276 FROM US 23/74 (GREAT TATION 11+26 TOTAL DEPTH 10.5 ft		GEOLOGIST Verdicchio, T. Y) TO US 23 BUS (N MAIN ST)	
S T(8245 IT).5ft	TATION 11+26 OTAL DEPTH 10.5 ft		Y) TO US 23 BUS (N MAIN ST)	
T (8245 8245 IT 0.5ft	OTAL DEPTH 10.5 ft		1	GROUND WTR (ft)
8245 S IT 0.5ft		OFFSET 4 ft RT	ALIGNMENT -WALL7-	0 HR. Dry
S JT 0.5ft 9		NORTHING 662,345	EASTING 812,455	24 HR. FIAD
1 J.5ft 9	5 CME-55 90% 09/06/2018	DRILL METHOD H.S	S. Augers HAMM	ER TYPE Automatic
9.5ft	TART DATE 05/22/19	COMP. DATE 05/22/19	SURFACE WATER DEPTH N/	A
	BLOWS PER FOOT	75 100 NO. MOI G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)
2	BLOWS PER FOOT	SAMP.		DEPTH (ft) ACE <u>8.9</u> KMENT .TY SAND .TY SAND .CK
			-	

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME Project #: 1305-16-028													Date	Report:	8/6/2019			
State Project No.: 50230.1.1							County: Haywood								7/23/19 to 8/2/19			
Federal ID	No.:			TIP No.: U-5839														
		Avenue U	IS 276 from L	JS 23/74 to	US 23 Busines	5												
Client Nam	e: CALYX							Clie	nt Address	: Cary, N	C							
Sample AASI					AASHTO	AASHTO Total % Passing Total Morta							ortar Fraction (%)					
Sample				Depth	Classification		Si	ieve #		Coarse	Fine						Mois	
No.	Station	Offset	Alignment	(ft)		10	40	60	200	Sand	Sand	Silt	Clay	LL	PL	PI	%	
SS-1031	12+50	30 RT	Y14	0.2-1.7	A-6 (3)	76	64	59	45.8	23	22	25	31	36	22	14	16.8	
SS-1035	13+70	30 RT	Y14	0.3-1.8	A-2-4 (0)	67	51	44	28.5	35	28	20	17	30	24	6	10.7	
SS-1044	52+20	57 RT	-L-	0-1.5	A-2-4 (0)	69	56	49	30.2	29	33	23	14	32	28	4	34.7	
SS-1081	47+00	60 LT	-L-	3.5-5.0	A-5 (3)	100	94	86	57.0	14	39	32	15	46	40	6	32.7	
SS-1091	47+50	60 LT	-L-	3.5-5.0	A-5 (9)	100	97	92	74.0	8	27	46	19	52	43	9	39.6	
SS-1155	28+00	60 LT	-L-	0.7-2.2	A-4 (0)	89	72	55	43.9	28	28	27	16	30	24	6	13.9	
SS-1204	51+70	70 RT	-L-	0.8-2.3	A-5 (5)	97	90	84	61.8	14	30	36	20	41	33	8	24.0	
SS-1214	26+60	60 LT	-L-	0.8-2.3	A-7-6 (14)	100	89	84	71.2	14	17	17	53	42	21	21	24.5	
SS-1244	48+00	73 LT	-L-	3.5-5.0	A-4 (1)	100	88	79	51.5	21	37	34	8	39	35	4	21.8	
SS-1252	12+00	72 RT	Y10	0.6-2.1	A-4 (0)	95	76	65	41.3	31	31	24	13	29	27	2	21.9	
SS-1280	48+40	45 RT	-L-	0.7-2.2	A-7-5 (10)	100	90	82	60.5	18	26	19	37	52	35	17	25.9	
SS-1293	49+50	92 RT	-L-	3.5-5.0	A-4 (0)	95	82	73	47.0	23	34	29	14	34	30	4	19.6	
References /	' Comments	/ Deviatio	ons:	ND=Not De	etemined. NP=	Non-Plas	stic.											
AASHTO T88	AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT							AASHTO T89: Determining the Liquid Limit of Soils										
AASHTO T90): Determini	ng the Pla	stic Limit & Pl	asticity Inde	x of Soils				AASHTO T2	265: Labor	atory Det	erminati	on of Mo	isture Co	ntent of	Soils		
AASHTO M1	45: The Cla	ssification	of Soils and So	oil Aggregat	e Mixtures for High	ghway Co	onstructio	on Purpos	es									
		<u>Karen</u>	<u>Warner</u>			VCDOT 118-06-030 <u></u>						aily, P.E.	<u>y, P.E.</u>			Project Manager		
		Technici	ian Name:		Signature Certification #				Technical Responsibility:				Position					

SHEET 22

