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DESCRIPTION

TITLE SHEET LEGEND (SOIL & ROCK)

SITE PLAN

BORE LOGS SOIL TEST RESULTS

SITE PHOTOGRAPHS

HF-0005**REFERENCE**.

> 49864 . • • PROJECT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** 

GEOTECHNICAL ENGINEERING UNIT

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY CLAY

PROJECT DESCRIPTION BRIDGE NO. 63 OVER BLAIR CREEK ON SR 1140 (MYERS CHAPEL ROAD)

SITE DESCRIPTION <u>-L1-STATION</u> 14+65

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HF–0005	1	7

#### **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 REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL LENGMEERING UNIT AT 1991 707-6860. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GENERAL 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 UNI-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST WEITHO. THE OBSERVED WATER LEVELS OR SOLI MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE 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 MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MODE, OR OPHIONO OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATION AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THA CAULAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

#### NOTES:

- ١.
- TES: 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. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAVES ANY CLAIMS FOR INCREASED COMPENSATION OR SITEMISSION OF NO INFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. 2.

	PERSONNEL
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	C. OSBORNE
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—DS	DRAWN BY <u>A. SUTTLE, P.G.</u>
ÐCE	CHECKED BY <u>M. WALKO, P.E.</u>
	SUBMITTED BY <u>ECS SOUTHEAST, LLP</u>
	14 434 2022
	DATE <u>MAY 2023</u>
	ECS SOUTHEAST. LLP 1812 CENTER PARK DRIVE, SUITE D CHARLOTTE, NC 28217 (704) 357-0323 [FAX] NC REGISTERED ENGINERING FIRM # F-1078
	SEAL 2768
(	Signed by:
	nda koth Suttle 05/24/2023
	BE42974A494 SIGNATÜRE DATE
	CUMENT NOT CONSIDERED FINAL ESS ALL SIGNATURES COMPLETED

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

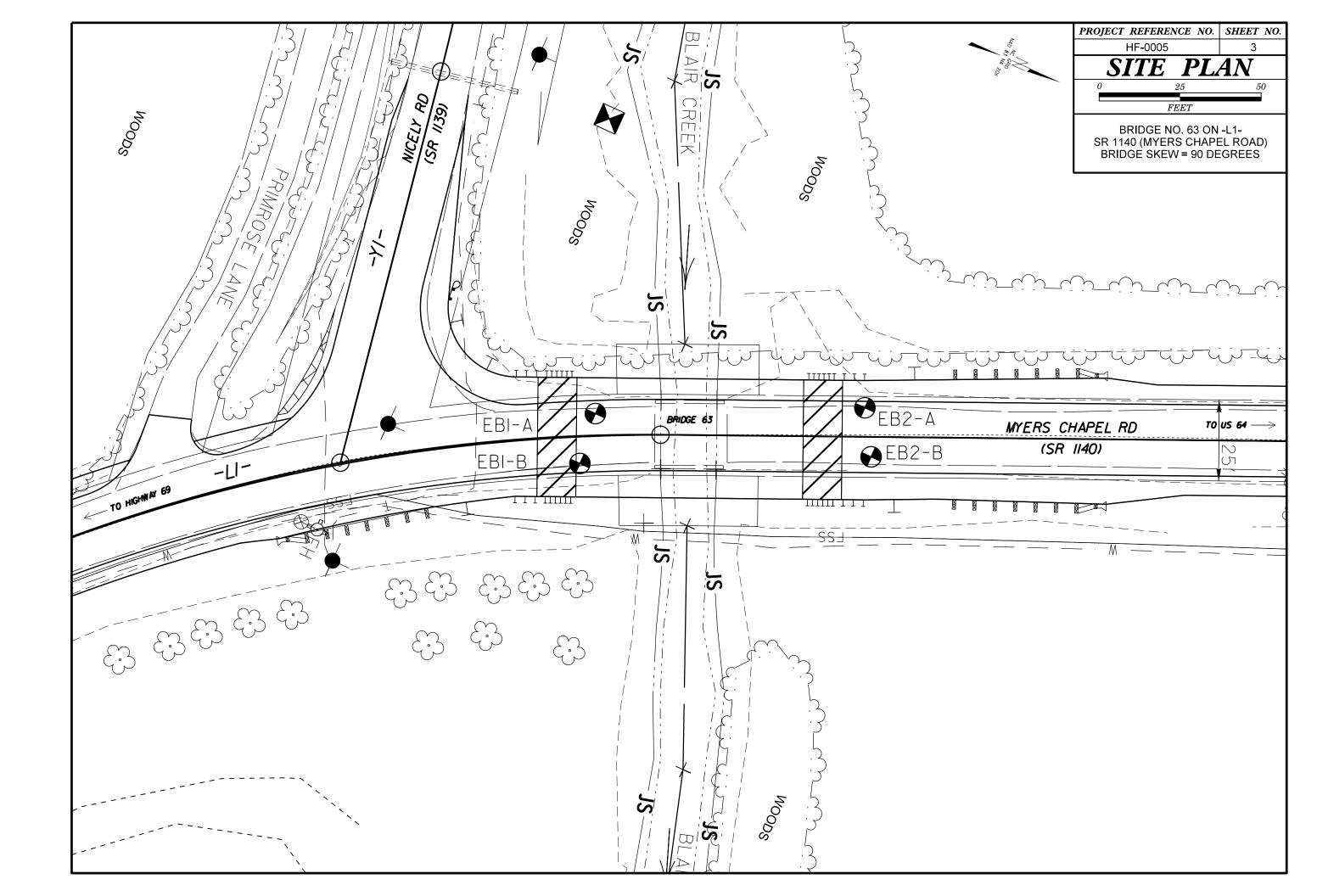
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOTU	DESCE	IPTION					<u> </u>		GRADATION					F	ROCK DES	
		ED UNCONSOLID	TED. SEMI-CO	SOLIDAT	ED, OR WE	ATHERED E				WELL GRADED - INDICAT			ICLE SIZES FR	OM FINE TO COARSE.			AL PLAIN MATER	RIAL THAT WO	OULD YIELD SPT REFUSAL IF TESTED
		TH A CONTINUC E STANDARD PE								UNIFORMLY GRADED - IN									TAL PLAIN MATERIAL WOULD YIELD IPLER EQUAL TO OR LESS THAN 0.1
IS E	BASED ON 1	THE AASHTO ST	STEM. BASIC	DESCRIP	TIONS GEN	ERALLY IN	CLUDE THE	OLLOWING:		GAP-GRADED - INDICATES				UR MURE SIZES.			PLAIN MATERIA		SITION BETWEEN SOIL AND ROCK I
		R, TEXTURE, MO .OGICAL COMPO							ULH			ARITY OF GRA					ICALLY DIVIDED		:
		GRAY, SILTY CLAY						C.A-7-6			IGULAR, SUBROUNDE		DESIGNATED B	THE LERMS:	WEATHERED				MATERIAL THAT WOULD YIELD SPT
	ç	SOIL LEG					CATION					GICAL COMPOS			ROCK (WR)		100	_OWS PER FOO	
GENERAL CLASS.		GRANULAR MATE (≤ 35% PASSING			.T-CLAY MATE 35% PASSING		ORGAN	ic materials		MINERAL NAM		RTZ, FELDSPAR, MICA.		ETC.	CRYSTALLINE				AIN IGNEOUS AND METAMORPHIC ROC REFUSAL IF TESTED. ROCK TYPE INC
GROUP	A-1	A-3	A-2			6 A-7	A-1. A-2	A-4. A-5				HEN THEY ARE CONS			ROCK (CR)	L.	GNEISS	S, GABBRO, SCH	IST, ETC.
	A-1-a A-1-b		-2-5 A-2-6 A-2	-7		A-7-5, A-7-6		A-6, A-7			COM	IPRESSIBILITY			NON-CRYSTALL	INE			AIN METAMORPHIC AND NON-COASTAL THAT WOULD YEILD SPT REFUSAL IF
SYMBOL	000000000000000000000000000000000000000									SLIG	HTLY COMPRESSIBL	E	LL < 31	50	ROCK (NCR)	. = -	ROCK 1	TYPE INCLUDES	S PHYLLITE, SLATE, SANDSTONE, ETC.
% PASSING	0000000000				11					HIGHL	RATELY COMPRESS	IBLE	LL = 31 - LL > 50	שכ	COASTAL PLA SEDIMENTARY			EFUSAL, ROCK	IMENTS CEMENTED INTO ROCK, BUT N TYPE INCLUDES LIMESTONE, SANDST
	50 MX						GRANULAR	SILT- CLAY	MUCK,		PERCENT	AGE OF MATE	RIAL		(CP)		SHELL	BEDS, ETC.	-DINC
	30 MX 50 MX						SOILS	SOILS	PEAT		GRANULAF	R SILT - CLAY SOILS	o					WEATHE	
*200 MATERIAL	10 MX 20 MX	X 10 MX 35 MX 3	5 MA 35 MA 35	אויי סכ אויי	36 MM 36	MN 36 MN				ORGANIC MATERIAL TRACE OF ORGANIC MA	<u>SOILS</u> ATTER 2 - 3%	<u>SUILS</u> 3 - 5%	TRACE	MATERIAL 1 - 10%		ROCK FRESH.C HAMMER IF CR		IT, FEW JOINTS	S MAY SHOW SLIGHT STAINING. ROCK R
PASSING #40										LITTLE ORGANIC MATT	TER 3 - 5%	5 - 12%	LITTLE	10 - 20%				NTS STAINED. S	OME JOINTS MAY SHOW THIN CLAY CO
LL	-		1 MN 40 MX 411				SOILS WI LITTLE	ne l		MODERATELY ORGANIC HIGHLY ORGANIC	5 - 10% > 10%	12 - 20% > 20%	SOME HIGHLY	20 - 35% 35% AND ABOVE	(V SLI.)	CRYSTALS ON	A BROKEN SPEC		INE BRIGHTLY. ROCK RINGS UNDER HA
PI	6 MX		2 MX 11 MN 11 I	_		_	MODERA	יב וי	HIGHLY DRGANIC			OUND WATER				OF A CRYSTAL			
GROUP INDEX	0	0 0	4 MX	8 MX	12 MX 16 M		amounts Organi		SOILS										ND DISCOLORATION EXTENDS INTO ROC N GRANITOID ROCKS SOME OCCASIONAL
USUAL TYPES S OF MAJOR	STONE FRAGS. GRAVEL, AND	, FINE   SIL	TY OR CLAYEY			CLAYEY	MATTER					N BORE HOLE IMMED		DRILLING					STALLINE ROCKS RING UNDER HAMMER
MATERIALS	SAND	SAND GRA	vel and sand	SO	DILS	SOILS				▼	STATIC WATER	LEVEL AFTER 24	HOURS						OLORATION AND WEATHERING EFFECTS.
GEN. RATING		EXCELLENT TO	000		FAIR TO PO	NR	Fair to	POOR UN	SUITABLE	<u>∑pw</u>	PERCHED WATER	, SATURATED ZONE, C	OR WATER BEAR	RING STRATA					ILL AND DISCOLORED, SOME SHOW CLAY OWS SIGNIFICANT LOSS OF STRENGTH
AS SUBGRADE							POOR		JOINDEL		SPRING OR SEEF	P				WITH FRESH R		520110 1110 011	
		PI OF A-7-5 SUE					> LL - 30												STAINED. IN GRANITOID ROCKS, ALL FE
			NSISTENC							<u> </u>	MISLELL	ANEOUS SYME	JULS						AOLINIZATION. ROCK SHOWS SEVERE LO 'S PICK. ROCK GIVES 'CLUNK' SOUND W
PRIMARY S	SOIL TYPE		NESS OR		NGE OF STA			OF UNCONF SSIVE STRE			ANKMENT (RE) 25	5/025 DIP & DIP DI	IRECTION				OULD YIELD SPT		S FICK HOCK SITES CEDIK SOOND W
		LUNSI	STENCY		(N-VALUE		(	(ONS/FT <sup>2</sup> )		WITH SOIL DE	SCRIPTION	OF ROCK STR	UCTURES						STAINED. ROCK FABRIC CLEAR AND EV
GENERAL	LY		LOOSE		< 4					SOIL SYMBOL		OPT DAT TEST BO	DRING	SLOPE INDICATOR					I GRANITOID ROCKS ALL FELDSPARS AF RONG ROCK USUALLY REMAIN.
GRANUL			OSE 1 DENSE		4 TO 10 10 TO 3			N/A			ILL (AF) OTHER	VST PMT		CONE PENETROMETER			OULD YIELD SPT		
MATERIA (NON-CO			NSE		30 TO 5	Ø					Y EMBANKMENT	AUGER BORIN	G 🙆	TEST					STAINED. ROCK FABRIC ELEMENTS ARE
			DENSE		> 50								•						IL STATUS, WITH ONLY FRAGMENTS OF ROCK WEATHERED TO A DEGREE THAT
GENERAL	_LY		SOF T DF T		< 2 2 TO 4		0	< 0.25 25 TO 0.5		- INFERRED SOI		- CORE BORING		SOUNDING ROD					N. IF TESTED, WOULD YIELD SPT N VA
SILT-CL	AY.	MEDIU	1 STIFF		4 TO 8		e	.5 TO 1.0		INFERRED ROC	K LINE	MONITORING N	WELL 🕂	TEST BORING WITH CORE					DISCERNIBLE, OR DISCERNIBLE ONLY IN
MATERIA (COHESI)			IFF STIFF		8 TO 15 15 TO 3			1 TO 2 2 TO 4		ALLUVIAL SOI			Ť	- SPT N-VALUE		SCATTERED CC ALSO AN EXAM		QUARTZ MAY F	BE PRESENT AS DIKES OR STRINGERS.
100/1201			ARD		> 30	•		> 4			- BOUNDART			- SFT N-VHLUE		HESO HIN EXHIP			PONESS
			EXTURE	OR G	RAIN S	IZE					RECOMME	NDATION SYM	BOLS					ROCK HAI	
U.S. STD. SIE	EVE SIZE		4 10	40	60	200	270							SIFIED EXCAVATION -			D BLOWS OF THE		PICK. BREAKING OF HAND SPECIMENS PICK.
OPENING (MM			4.76 2.00	0.4							UNSUITABLE W			ABLE, BUT NOT TO BE I THE TOP 3 FEET OF					Y WITH DIFFICULTY. HARD HAMMER BLI
BOULDE	R C	OBBLE	RAVEL	COAR		FINE	SIL	тс	LAY		UNCLASSIFIED ACCEPTABLE D	DEGRADABLE ROCK		MENT OR BACKFILL		TO DETACH HA	AND SPECIMEN.		
(BLDR.)		(COB.)	(GR.)	SAN (CSE.		SAND (F SD.	(SL		CL.)			BREVIATIONS							JGES OR GROOVES TO 0.25 INCHES DEE T'S PICK. HAND SPECIMENS CAN BE DE
GRAIN MM	305	75	2.0		0.25		0.05	0.005		AR - AUGER REFUSAL		MEDIUM	vst -	VANE SHEAR TEST		BY MODERATE		H GEOLOGISI	S FICK. HHND SPECIMENS CHN DE DE
SIZE IN.		3	2.0		0.23		0.05	0.000		BT - BORING TERMINATED		A MICACEOUS	WEA	WEATHERED	MEDIUM	CAN BE GROOV	VED OR GOUGED	0.05 INCHES [	DEEP BY FIRM PRESSURE OF KNIFE OR
		SOIL MOI	STURE -	CORRI		N OF	TERMS			CL CLAY CPT - CONE PENETRATION		- MODERATELY - NON PLASTIC	$\chi$ -	JNIT WEIGHT DRY UNIT WEIGHT					ICES 1 INCH MAXIMUM SIZE BY HARD E
SOIL	MOISTURE		FIELD M							CSE COARSE		- ORGANIC	/d- 1	JRT UNIT WEIGHT			GEOLOGIST'S PIC		IFE OR PICK. CAN BE EXCAVATED IN F
	ERBERG L		DESCR	PTION	GUI	DE FOR F	IELD MOIST	JRE DESCRI	PTION	DMT - DILATOMETER TES		- PRESSUREMETER		MPLE ABBREVIATIONS					BY MODERATE BLOWS OF A PICK POINT.
			- SATUR	ATED -	USU	ALLY LIG	UID; VERY W	ET. USUALL	Y	DPT - DYNAMIC PENETRA e - VOID RATIO		- SAPROLITIC - SAND, SANDY	S - B SS -	ULK SPLIT SPOON			BE BROKEN BY F		
			(SAT				THE GROUN			F - FINE	SL.	- SILT, SILTY		SHELBY TUBE					VATED READILY WITH POINT OF PICK. F FINGER PRESSURE. CAN BE SCRATCHE
PLASTIC		D LIMIT								FOSS FOSSILIFEROUS FRAC FRACTURED, FRAC		- SLIGHTLY - TRICONE REFUSAL	RS -			FINGERNAIL.		DE DROKEN DI	The source of the second
RANGE <			- WET -	(W)			EQUIRES DR MUM MOISTL			FRAGS FRAGMENTS		MOISTURE CONTENT		RECOMPACTED TRIAXIAL CALIFORNIA BEARING	F	RACTURE	SPACING		BEDDING
(PI) PL		TIC LIMIT								HI HIGHLY	v -	VERY		RATIO	TERM		SPACINO	<u>.</u>	TERM T
			- MOIST	- (M)	501	ID. AT 05	NEAR OPTI		IDE	EQI	JIPMENT USE	ED ON SUBJEC	TPROJEC	T	VERY WIDE		MORE THAN 10		VERY THICKLY BEDDED THICKLY BEDDED 1.5
		IUM MOISTURE	110131	(1-17	301	10, 41 01		1011	UNL	DRILL UNITS:	ADVANCING TOOL	S:	HAMMER	YPE:	WIDE MODERATEL	Y CLOSE	3 TO 10 FI 1 TO 3 FE		THICKLY BEDDED 1.5 THINLY BEDDED 0.16
52	T 51				PEO		DITIONAL W			CME-45C	CLAY BITS		X AUT	OMATIC MANUAL	CLOSE	-	0.16 TO 1 F		VERY THINLY BEDDED 0.03
	1		- DRY -	(D)			MUM MOISTL				6" CONTINU	OUS FLIGHT AUGER	CORE SIZ	5:	VERY CLOS	E.	LESS THAN 0.1	.0 FEEI	THICKLY LAMINATED 0.008 THINLY LAMINATED < (
	1		DI .	ASTIC	ITY					CME-55	X 8" HOLLOW	AUGERS	-в					INDURA	
							00:1	CTRENCT		Х СМЕ-750		D FINGER BITS			FOR SEDIMEN	ARY ROCKS, I	INDURATION IS		NG OF MATERIAL BY CEMENTING, HEA
NON	PLASTIC		PLAST	0-5	NDEX (PI)			STRENGTH				BIDE INSERTS	<u>□-</u> • _		FRIABL		RUE	BBING WITH FI	INGER FREES NUMEROUS GRAINS;
SLI	GHTLY PLA	ASTIC		6-15			9	GLIGHT		VANE SHEAR TEST			HAND TOO	LS:	FRIABL	L	GEI	NTLE BLOW B	Y HAMMER DISINTEGRATES SAMPLE.
	ERATELY F			16-25 6 OR M				1EDIUM HIGH				X W/ ADVANCER		T HOLE DIGGER	MODERA	TELY INDURA			SEPARATED FROM SAMPLE WITH STE
										PORTABLE HOIST		STEEL TEETH		D AUGER			BRI		WHEN HIT WITH HAMMER.
				LULU	٦							• TUNGCARB.	SOU	NDING ROD	INDURA	TED			FICULT TO SEPARATE WITH STEEL P REAK WITH HAMMER.
		' INCLUDE COL							RAY).		CORE BIT			E SHEAR TEST			CU/		BLOWS REQUIRED TO BREAK SAMPLE:
мо	DIFIERS S	SUCH AS LIGH	, DARK, STRE	KED, ET	C. ARE US	ED TO DE	SCRIBE APP	EARANCE.			🗆		.   🗆 🗕		EXTREM	ELY INDURATI			ACROSS GRAINS.

#### PROJECT REFERENCE NO. HF-0005



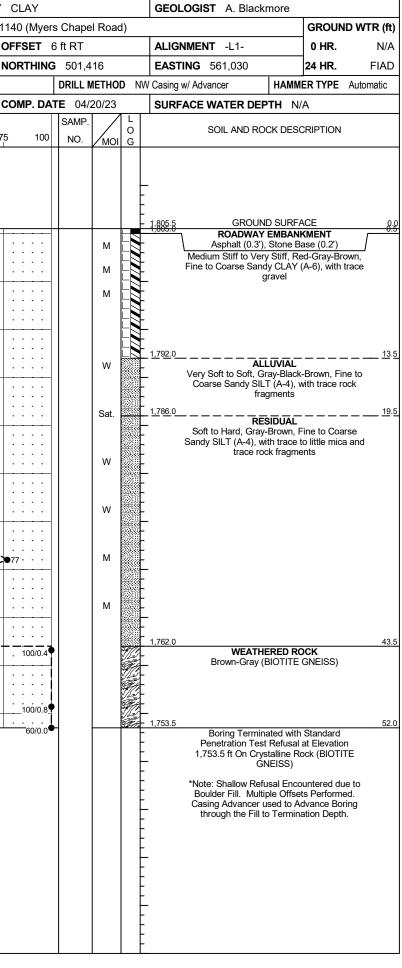
ED. AN INFERRED	TERMS AND DEFINITIONS ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
SPT REFUSAL. FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
CK THAT CLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
L PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED. C.	$\underline{\text{COLLUVIUM}}$ - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD TONE, 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
RINGS UNDER	DIRE - H HADLING BUT OF LONGUUS KULK THAT LOTS HURDS THE STRUCTURE OF HUDHLENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
DATINGS IF OPEN.	HORIZONTAL.
AMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
CK UP TO L FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
5. IN Y. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
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
ELDSPARS DULL OSS OF STRENGTH	FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VIDENT BUT ARE KAOLINIZED	ITS LATERAL EXTENT.
	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 F 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 S. SAPROLITE IS	ROCK DUALITY DESIGNATION (RDD) - A MEASURE OF ROCK DUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
S REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS REQUIRED	<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 THE BEODING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
ETACHED	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF
R PICK POINT. BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS T. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PIECES 1 INCH ED READILY BY	STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK DUALITY 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.
CO NEHVIE! DI	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BM-2 (N 501299 E 560968) -LI- 14+72, 98' LT
THICKNESS	- SENAN THINK BIM 2 NY SOLESS E SOOSOOF EL 19172, SO ET
4 FEET	ELEVATION: 1797.03 FEET
.5 - 4 FEET 16 - 1.5 FEET	NOTEC.
3 - 0.16 FEET	NOTES:
08 - 0.03 FEET 0.008 FEET	BORINGS LOCATED USING TRIMBLE TDC600.
	ROADWAY DESIGN FILES PROVIDED BY NCDOT.
AT, PRESSURE, ETC.	ELEVATION FOR BRIDGE BORINGS OBTAINED USING BENCHMARK BM-2 (N 501299 E 560968)
	FIAD = FILLED IN AFTER DRILLING
EEL PROBE:	
PROBE:	



SITE D BORIN			l Rer			IP H				COUN	TY (	CLAY				GEO	LOGIST A. Blackm	ore		WBS	<b>3</b> 49864	1 1				P HF-000	)5	COUNTY
BORIN		IPTION	l Rer																	┥┝───								
									Cree	k on S	-		rs Chape	el Roa	ad)				GROUND WTR (ft)					blace B		No. 63 ove		ek on SR
	10 110.	EB1-	A		s	TATIC	<b>DN</b> 14	4+36			OF	FSET	7 ft LT			ALIG	NMENT -L1-		<b>0 HR.</b> 18.3	BOF	Ring No.	EB1	-В		S	TATION 1	14+30	
COLL	AR ELE	<b>EV.</b> 1,8	806.2	ft	Т	OTAL	DEPT	<b>FH</b> 31	1.0 ft		NC	ORTHIN	<b>G</b> 501,3	327		EAS	<b>FING</b> 561,053	2	<b>4 HR.</b> FIAD	COL	LAR ELE	<b>EV.</b> 1,	805.5	ft	<b>T</b>	OTAL DEP	<b>TH</b> 33.5 f	ť
DRILL I	RIG/HAM	MMER E	FF./DA	TE E	CS0888	B CME 7	750X 93	3% 12/0	)2/2022	2			DRILL I	METHO	DD H	.S. Auger	s	HAMMEF	R TYPE Automatic	DRIL	L RIG/HAI	MMER E	FF./DA	TE EC	CS0888	CME 750X 9	93% 12/02/20	22
DRILL	ER C	. Osboi	rne		S	TART	DATE	E 04/	19/23	3	CC	omp. Da	<b>TE</b> 04/	19/23	3	SUR	FACE WATER DEPT	H N/A		DRI	LLER C	. Osbo	rne		S	TART DAT	<b>E</b> 04/18/2	23
	DRIVE ELEV	DEPTH		ow co						ER FOO			SAMP.	▼∕			SOIL AND ROCI	<pre>&lt; DESCR</pre>	RIPTION	ELEV	, DRIVE ELEV	DEPTH	· – – – – – – – – – – – – – – – – – – –	ow col				PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	25	50	0	75	100	NO.	/мс		ELEV. (	ft)	-	DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50
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-	1,802.7-	- 3.5	3	2	3	-			· ·	· · · ·				м		-	Soft to Stiff, Red-Gra Moderately Plastic Silty	CLAY (A	4-7-6(8)), with		1,802.0	3.5	2	2	3			· · · ·
1800 -	1,800.2	6.0	3	7	3		· · ·		•••		• •	· · · ·				-	trace mica	and grav	rel	1800	- 1,799.5	- 6.0		2	3	• <u></u> 5····		
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	- 1.775.2	31.0	12	88/0.4		1 1	· · · · · ·		· ·	· · · · · ·		100/0.9				- 1,775.2	WEATHER Brown-Gray (Blue			1775			WOH	WOH	2			
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	1	ŧ.														-	1,775.2 ft On Crysta	Illine Rock	k (BIOTITE		1,772.0	33.5	60/0.0			<u> </u>		
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CLAY			<b>GEOLOGIST</b> A. Blackmore	<u> </u>	
1140 (Myers Chape	Road	)		GROUN	D WTR (ft)
OFFSET 8 ft RT			ALIGNMENT -L1-	0 HR.	17.3
NORTHING 501,3	35		EASTING 561,069	24 HR.	FIAD
DRILL		) Н.	S. Augers HAMM	ER TYPE	Automatic
	18/23			A	
SAMP.		L			
75 100 NO.	моі	O G	SOIL AND ROCK DESC	CRIPTION	
	м		1.805.5 GROUND SURFA	KMENT ase (0.2')	0.0 0. <del>0</del>
	м		Medium Stiff, Brown-Red, F Sandy CLAY (A-6), with t		1
	M		1,800.0 Soft, Brown-Gray-Red, Fine to SILT (A-4), with trac	o Coarse S e mica	5.5 andy
	М	E			
	м		- <u>1,792.5</u> Soft, Brown, Fine to Coarse (A-6), with trace n	Sandy CL	<u> 13.0</u> AY
	w		1,787.5		<u>18.0</u>
+			Medium Stiff, Brown, Fine to CLAY (A-6)	JUDISE SE	анчу
	w		1,782.5 Soft to Medium Stiff, Gray-C Fine to Coarse Sandy SILT ( to little mica	Drange-Bro A-4), with t	<u>23.0</u> wn, race
	w				
60/0.0			1,772.0 Boring Terminated with	Standard	33.5
			Penetration Test Refusal 1,772.0 ft On Crystalline Re GNEISS)	at Elevatio	n TE

										-			LÜG																		
	4986					<b>IP</b> H						CLAY					GEOLOGIST A. Blac	kmore	1			49864					IP HF			COUN	
SITE	DESC	RIPTION	l Rep	lace	Bridge	No. 6	3 ove	r Blair	Cree	ek on S		. ,	ers Chap	el Ro	oad)					VTR (ft)	SITE	DESCF	RIPTIO	N Rep	place E	Bridge	No. 63	over	Blair Cr	eek on S	<del>२</del> 11
BOR	ING NC	<b>).</b> EB2-	-A		s	TATIO	<b>DN</b> 1	5+19			0	FFSET	9 ft LT				ALIGNMENT -L1-		0 HR.	N/A	BOR	ING NO	. EB2	-В		s	TATIO	<b>1</b> 15	+21		0
COL	LAR EL	. <b>EV.</b> 1,	805.7	ft	Т	OTAL	DEP	<b>TH</b> 4	8.6 ft		N	ORTHI	<b>IG</b> 501,	,408			EASTING 561,017		24 HR.	FIAD	COL	LAR EL	<b>EV.</b> 1	,805.5	ft	Т	OTAL D	)EPTI	<b>H</b> 52.0	ft	N
DRILI	RIG/HA	MMER E	FF./DA	TE E	CS0888	B CME	750X 9	3% 12/	02/202	2			DRILL	METH	IOD	NW C	asing w/ Advancer	HAMM	ER TYPE Aut	tomatic	DRIL	L RIG/HA	MMER E	EFF./DA	TE E	CS0888	3 CME 75	0X 93°	% 12/02/2	022	
DRIL	LER (	C. Osbo	rne		S	TART	DATI	E 04/	/19/23	3	C	omp. d	<b>ATE</b> 04	/20/2	23		SURFACE WATER DE	PTH N/	/Α		DRIL	LER C	. Osbo	orne		s	TART	DATE	04/18/	23	С
ELEV	DRIVE ELEV	DEPTH	BLC	ow cc	UNT			BLC	)WS P	ER FO	ОТ		SAMF	P. ▼			SOIL AND R	OCK DES	CRIPTION		ELEV	DRIVE ELEV	DEPTH	H BLC	ow co	UNT			BLOWS	PER FOC	т
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25	5	0	75	10	0 NO.	<u>/</u> M			.EV. (ft)			DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	;	50	75
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1005		±														L 1,	305.7 GROU	IND SURFA	ACE	0.0 0.5	1005		ŧ								
1805	1,804.7	- 1.0	7	4	2	┤┤╁	· · ·	<u> </u>					-	м		, ,	ROADWA Apshalt (0.3	Y EMBAN		0.5	1805	1,804.5	1.0	4	4	3					
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1800	1,799.7	+ 6.0				<b>•</b> 3		· ·	• •		•••			M			Sandy CEAT (A	gravel			1800	1,799.5	+ 60	2	4	15		19	· · · ·		·
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		+							· · ·	· · ·						8  - 1,	787.7			18.0			ŧ				::	::			:
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	1,782.2	23.5			3	./	' 		· · ·	· · ·						<u> 1,</u>	782.7Mediu	m Stiff to S		23.0		1,782.0	23.5								:
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		ł					· · ·		· · ·	· · ·						8 		), war ado					ŧ					::			:
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	1,757.2	<u>48.5</u>	60/0.1									60/0.	₁	_	<u> </u>					48.5		1,757.0	48.5	37	28	72/0.3					
		Ŧ														F	Brown-Tan Boring Term		,	] ]	1755		Ŧ								-+-
		Ŧ														E	Penetration Te 1,757.1 ft In Cr	est Refusal	at Elevation			1,753.5	<u>T 52.0</u> T	60/0.0	2		<u>  · · ·</u>				<u>.</u>
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		Ŧ														F	*Note: Shallow Re Boulder Fill. Mu	afusal Enco	ountered due to	)			Ŧ								
		Ŧ														F	Casing Advance	r used to A	dvance Boring				Ŧ								
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							SO	IL TEST	RESULT	rs			
L	BORING	SAMPLE	OFFSET	STATION	DEPTH	AASHTO	L.L.	P.I.		% BY V	/EIGHT		
	NO.	NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.1.	C. SAND	F. SAND	SILT	CLAY	
	EB1-A	SS-17	7' LT	14+36 -L1-	8.5-10.0	A-7-6(8)	47	22	16.7	32.3	24.5	26.4	2
	EB2-A	SS-27	9' LT	15+19 -L1-	13.5-15.0	A-4(7)	38	9	11.0	31.1	33.5	24.4	(

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO. 135-03-0816

		PROJEC	T REFERENCE N	IO. SHEET NO
			HF-0005	6
% PA	ASSING (SIE	VES)	%	%
% P/ 10	ASSING (SIE 40	VES) 200	% MOISTURE	% ORGANIC



PHOTO 1: VIEW FACING BRIDGE 63 FROM -L1- ALIGNMENT, FACING DOWNSTATION.



PHOTO 3: VIEW FACING UPSTREAM FROM BRIDGE.





PHOTO 4: VIEW FACING DOWNSTREAM FROM BRIDGE.

PHOTO 2: VIEW FACING BRIDGE 63 FROM -L1- ALIGNMENT, FACING UPSTATION.

#### **CONTENTS**

<u>SHEET NO.</u>	<b>DESCRIPTION</b>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-9	BORE LOGS, CORELOGS, AND CORE PHOTOGRAPHS
10	SOIL TEST RESULTS
II	ROCK TEST RESULTS
12	SITE PHOTOGRAPHS

#### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY CLAY

PROJECT DESCRIPTION BRIDGE NO. 88 OVER HYATT CREEK ON SR 1140 (MYERS CHAPEL ROAD)

SITE DESCRIPTION  $\_-L2-$  STATION 14+39

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HF–0005	1	12

#### **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 REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL LENGMEERING UNIT AT 1991 707-6860. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GENERAL 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 UNI-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST WEITHO. THE OBSERVED WATER LEVELS OR SOLI MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE 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 MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MODE, OR OPHIONO OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATION AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THA CAULAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

#### NOTES:

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- TES: 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. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAVES ANY CLAIMS FOR INCREASED COMPENSATION OR SITEMISSION OF NO INFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. 2.

A. BLACKMORE C. OSBORNE C. OSBORNE DISCOMPTION OF CONTRACT OF C		PERSONNEL
NVESTIGATED BY <u>ECS SOUTHEAST, LLP</u> DRAWN BY <u>A. SUTTLE, P.G.</u> DRAWN BY <u>A. SUTTLE, P.G.</u> CHECKED BY <u>M. WALKO, P.E.</u> SUBMITTED BY <u>ECS SOUTHEAST, LLP</u> DATE <u>MAY 2023</u> Prepared in the Office of: ECS SOUTHEAST, LLP B12 CENTER PARK DRIVE, SUITE D CHARLOTE, R. 2823 NC REGISTERED FIRM # F-1078 DOCUSIGNED BY DOCUSIGNED BY DOCUSIGNED BY MANDA KOLL SUTHLO5/24/2023		A. BLACKMORE
DRAWN BY <u>A. SUTTLE, P.G.</u> DRAWN BY <u>M. WALKO, P.E.</u> CHECKED BY <u>M. WALKO, P.E.</u> SUBMITTED BY <u>ECS SOUTHEAST, LLP</u> DATE <u>MAY 2023</u> Prepared in the Office of: ECS SOUTHEAST, LLP BECS SOUTHEAST, LLP BECS SOUTHEAST, LLP DATE <u>MAY 2023</u> Prepared in the Office of: CHARLOTTE, NC 28217 (704) 355-70023 [FAX] NC REGISTERD ENGINERING FIRM # F-1078 SEAL 2768 SEAL 2768 COLOG S		C. OSBORNE
DRAWN BY <u>A. SUTTLE, P.G.</u> DRAWN BY <u>M. WALKO, P.E.</u> CHECKED BY <u>M. WALKO, P.E.</u> SUBMITTED BY <u>ECS SOUTHEAST, LLP</u> DATE <u>MAY 2023</u> Prepared in the Office of: ECS SOUTHEAST, LLP BECS SOUTHEAST, LLP BECS SOUTHEAST, LLP DATE <u>MAY 2023</u> Prepared in the Office of: CHARLOTTE, NC 28217 (704) 355-70023 [FAX] NC REGISTERD ENGINERING FIRM # F-1078 SEAL 2768 SEAL 2768 COLOG S		
DRAWN BY <u>A. SUTTLE, P.G.</u> DRAWN BY <u>A. SUTTLE, P.G.</u> CHECKED BY <u>M. WALKO, P.E.</u> SUBMITTED BY <u>ECS SOUTHEAST, LLP</u> DATE <u>MAY 2023</u> Prepared in the Office of: ECS SOUTHEAST, LLP B12 CENTER PARK DRIVE, SUITE D CHARLOTTE, NC 28217 (704) 557-0023 [FAX] NC REGISTERD ENGINERING FIRM # F-1078 DOCUSIGNED by: Jonarda Koth Suttle05/24/2023		
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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

		SO	IL DESCRIPT	ION			T	GRA	ADATION					ROCK DE	SCRIPTION	
BE PENET ACCORDIN	TRATED WITH	A CONTINUOUS FLIG	HT POWER AUGER A ON TEST (AASHTO	ND YIELD LESS 7 206,ASTM D	EARTH MATERIALS TH THAN 100 BLOWS PE 586). SOIL CLASSIFI	R FOOT	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	NDICATES THAT SOIL PA	ARTICLES ARE ALL	APPROXIMATE	LY THE SAME SIZE.	ROCK LINE IN SPT REFUSAL	DICATES THE LEVE IS PENETRATION	EL AT WHICH NON-COA BY A SPLIT SPOON SA	WOULD YIELD SPT REFUSAL ISTAL PLAIN MATERIAL WO IMPLER EQUAL TO OR LESS	ULD YIELD SP
CONSISTE	NCY, COLOR,	TEXTURE, MOISTURE, 4	ASHTO CLASSIFICA	TION, AND OTHE	NCLUDE THE FOLLOWI R PERTINENT FACTOR	IS SUCH			TY OF GRAIN		HORE SIZES.	REPRESENTED	BY A ZONE OF W	EATHERED ROCK.	NSITION BETWEEN SOIL 4	AND ROCK IS
		ICAL COMPOSITION, A RAY, SILTY CLAY, MOIST WI			.ETC. FOR EXAMPLE, HIGHLY PLASTIC.A-7-6			Y OR ROUNDNESS OF SUNDLAR, SUBROUNDED, OR		SIGNATED BY 1	THE TERMS:	WEATHERED		NON-COASTAL PLA	IN MATERIAL THAT WOULD	YIELD SPT N
0515041		DIL LEGEND A			CATION			MINERALOGIC		TION		ROCK (WR)		100 BLOWS PER FO	DOT IF TESTED.	
GENERAL CLASS. GROUP	( <	GRANULAR MATERIALS ≤ 35% PASSING ■200) A-3 A-2	( > 35% P	Y MATERIALS ASSING =200) A-6 A-7	ORGANIC MATERI	ALS		MES SUCH AS QUARTZ, F	FELDSPAR, MICA, TA	ALC, KAOLIN, ET		CRYSTALLINE ROCK (CR)		WOULD YIELD SPT		K TYPE INCLU
	A-1-a A-1-b	A-2-4 A-2-5 A-2	-6 A-2-7	A-7-5 A-7-6	A-3 A-6, A-7				ESSIBILITY			NON-CRYSTALI ROCK (NCR)	.INE	SEDIMENTARY ROCH	GRAIN METAMORPHIC AND N < THAT WOULD YEILD SPT	REFUSAL IF 1
SYMBOL % PASSING							MODE	HTLY COMPRESSIBLE RATELY COMPRESSIBLE Y COMPRESSIBLE		LL < 31 LL = 31 - 50 LL > 50	2	COASTAL PLA SEDIMENTARY		COASTAL PLAIN SE	DES PHYLLITE, SLATE, SAND EDIMENTS CEMENTED INTO CK TYPE INCLUDES LIMESTI	ROCK, BUT MAY
<b>1</b> 0 5	50 MX				GRANULAR SILT- CLAY	MUCK,		PERCENTAGE	E OF MATERI	IAL		(CP)		SHELL BEDS, ETC.	HERING	
	30 MX 50 MX 5 15 MX 25 MX 1	51 MN ØMX 35 MX 35 MX 35 I	MX 35 MX 36 MN 36 M	N 36 MN 36 MN	SOILS SOILS	PEAT	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY	OTHER M	ATERIAL	FRESH	ROCK FRESH. CRYS		TS MAY SHOW SLIGHT STAIN	VING. ROCK RING
MATERIAL PASSING #40 LL	-		MX 41 MN 40 MX 41 M		SOILS WITH LITTLE OR		TRACE OF ORGANIC MA LITTLE ORGANIC MATT MODERATELY ORGANIC HIGHLY ORGANIC	TER 3 - 5%	3 - 5% 5 - 12% 12 - 20% > 20%	TRACE LITTLE SOME HIGHLY	1 - 10% 10 - 20% 20 - 35% 35% AND ABOVE		HAMMER IF CRYSTA ROCK GENERALLY F CRYSTALS ON A BF	ALLINE. FRESH, JOINTS STAINED, ROKEN SPECIMEN FACE :	SOME JOINTS MAY SHOW TH SHINE BRIGHTLY. ROCK RING	HIN CLAY COATI
PI GROUP INDEX			1N 11 MN 10 MX 10 M 4 MX 8 MX 12 M	X 11 MN 11 MN X 16 MX NO MX	MODERATE AMOUNTS OF	HIGHLY ORGANIC			ND WATER			SLIGHT	OF A CRYSTALLINE		AND DISCOLORATION EXTEND	DS INTO ROCK
USUAL TYPES S	STONE FRAGS.	FINE SILTY OR CLA	AYEY SILTY	CLAYEY	ORGANIC	SOILS	⊻	WATER LEVEL IN BO			RILLING	(SLI.)	1 INCH. OPEN JOIN	ITS MAY CONTAIN CLAY.	IN GRANITOID ROCKS SOME RYSTALLINE ROCKS RING UND	OCCASIONAL FE
MATERIALS	SAND	SAND GRAVEL AND	SAND SOILS	SOILS				STATIC WATER LEVEL			C CTDATA	MODERATE (MOD.)			SCOLORATION AND WEATHERIN DULL AND DISCOLORED, SOME	
GEN. RATING AS SUBGRADE		XCELLENT TO GOOD		to poor	FAIR TO POOR POOR	UNSUITABLE	\\ \\\\ \\\\\ \\\\	PERCHED WATER, SAT SPRING OR SEEP	TURATED ZUNE, UR	WATER BEARIN	G SIRATA			r hammer blows and s	SHOWS SIGNIFICANT LOSS OF	
	P	I OF A-7-5 SUBGROUP IS	≤ LL - 30 ;PIOF A-		> LL - 30			MISCELLAN	EOUS SYMBOL	15		MODERATELY SEVERE			R STAINED. IN GRANITOID RO KAOLINIZATION. ROCK SHOWS	
		COMPACTNESS C	RANGE O	F STANDARD	RANGE OF UNC		<u> </u>	25 (825				(MOD. SEV.)	AND CAN BE EXCAN	VATED WITH A GEOLOGIS	ST'S PICK. ROCK GIVES "CLU	
PRIMARY SI		CONSISTENCY VERY LOOSE	(N-	N RESISTENCE	COMPRESSIVE S (TONS/FT		L ROADWAY EMB	SCRIPTION	DIP & DIP DIRE		SLOPE INDICATOR	SEVERE (SEV.)	ALL ROCK EXCEPT REDUCED IN STREN	NGTH TO STRONG SOIL.	R STAINED. ROCK FABRIC CL IN GRANITOID ROCKS ALL FE TRONG ROCK USUALLY REMA:	ELDSPARS ARE
GRANULA MATERIA	AR	LOOSE MEDIUM DENSE	10	TO 10 TO 30	N/A						INSTALLATION CONE PENETROMETER			YIELD SPT N VALUES		IN.
(NON-COF		DENSE VERY DENSE VERY SOFT	,	TO 50 50 < 2	< 0.25		ARTIFICIAL FI THAN ROADWAY		AUGER BORING	Ð	TEST SOUNDING ROD	VERY SEVERE (V SEV.)	BUT MASS IS EFFE REMAINING. SAPROL	ECTIVELY REDUCED TO S LITE IS AN EXAMPLE OF	R STAINED. ROCK FABRIC EL SOIL STATUS, WITH ONLY FRA ROCK WEATHERED TO A DE	AGMENTS OF SI EGREE THAT ON
GENERAL SILT-CLA MATERIAL	AY AL	SOFT MEDIUM STIFF STIFF	4	TO 4 TO 8 TO 15 TO 30	0.25 TO 1 0.5 TO 1 1 TO 2	.0			MONITORING WEL PIEZOMETER	$\Psi$	TEST BORING WITH CORE	COMPLETE	ROCK REDUCED TO SCATTERED CONCEN	SOIL. ROCK FABRIC NO	AIN. <i>IF TESTED, WOULD YIEL</i> T DISCERNIBLE, OR DISCERNI 7 BE PRESENT AS DIKES OR	IBLE ONLY IN S
(COHESIV	VE)	VERY STIFF HARD	>	- 30	2 TO 4 > 4		ALLUVIAL SOI		INSTALLATION		SPT N-VALUE		ALSO AN EXAMPLE.		ARDNESS	
		TEXTL	IRE OR GRAI	N SIZE					ATION SYMBO			VERY HARD	CANNOT BE SCRAT		RP PICK. BREAKING OF HAND	) SPECIMENS RE
U.S. STD. SIE OPENING (MM		4 4.76	10 40 2.00 0.42	60 200 0.25 0.075	270 0.053			UNCLASSIFIED EXC UNSUITABLE WASTE		🖾 ACCEPTABL	IED EXCAVATION - _E,BUT NOT TO BE			OWS OF THE GEOLOGIST		
BOULDER	R СОВ	BLE GRAVEL	COARSE	FINE	SILT	CLAY	SHALLOW UNDERCUT	UNCLASSIFIED EXC ACCEPTABLE DEGRA			HE TOP 3 FEET OF NT OR BACKFILL	HARD MODERATELY	TO DETACH HAND S	SPECIMEN.	NLY WITH DIFFICULTY. HARD	
(BLDR.) GRAIN MM		75 (GR.)	(CSE. SD.)	(F SD.		(CL.)	AR - AUGER REFUSAL	ABBRE MED ME	EVIATIONS	VST - V	ANE SHEAR TEST	HARD		RD BLOW OF A GEOLOGI	ST'S PICK. HAND SPECIMENS	
SIZE IN.	12	3					BT - BORING TERMINATED CL CLAY	D MICA M MOD MO	MICACEOUS 10DERATELY	WEA W $\gamma$ - UNI	EATHERED T WEIGHT	MEDIUM HARD			DEEP BY FIRM PRESSURE ( PEICES 1 INCH MAXIMUM SIZE	
SOIL	MOISTURE S		LD MOISTURE				CPT - CONE PENETRATION CSE COARSE	N TEST NP - NON ORG OF	N PLASTIC IRGANIC	$\gamma_{ m d}$ - DRY	UNIT WEIGHT	SOFT	POINT OF A GEOLO		KNIFE OR PICK. CAN BE EXC	AVATED IN EPA
	ERBERG LIM	ITS) D	ESCRIPTION		TELD MOISTURE DES		DMT - DILATOMETER TES DPT - DYNAMIC PENETRAI	TION TEST SAP SA	RESSUREMETER TES	S - BULI		SUFT	FROM CHIPS TO SE		BY MODERATE BLOWS OF A	
LL			SATURATED - (SAT.)		DUID; VERY WET, USU THE GROUND WATE		e - VOID RATIO F - FINE FOSS FOSSILIFEROUS		ND, SANDY LT, SILTY LIGHTLY		LIT SPOON ELBY TUBE	VERY SOFT	OR MORE IN THICK		AVATED READILY WITH POIN BY FINGER PRESSURE. CAN B	
PLASTIC RANGE <		- 1	VET - (W)		EQUIRES DRYING TO MUM MOISTURE		FRAC FRACTURED, FRAC FRAGS FRAGMENTS	TURES TCR - TF	RICONE REFUSAL	RT - RE	COMPACTED TRIAXIAL ALIFORNIA BEARING	F	FINGERNAIL.	PACING	BE	
		LIMIT					HI HIGHLY				ATIO	TERM VERY WIDE	мог	SPACING RE THAN 10 FEET	TERM VERY THICKLY BEDDI	<u>THI</u> DED 4
OM . SL .		1 MUISTURE	10IST - (M)	SOLID;AT OF	R NEAR OPTIMUM MO	ISTURE	DRILL UNITS:	ADVANCING TOOLS:	UN SUBJECT	HAMMER TYP		WIDE MODERATEI	LY CLOSE	3 TO 10 FEET 1 TO 3 FEET	THICKLY BEDDED THINLY BEDDED	1.5 - 0.16 -
		- 0	)RY - (D)		DITIONAL WATER TO MUM MOISTURE	)	CME-45C	CLAY BITS	FLIGHT AUGER	CORE SIZE:	ATIC MANUAL	CLOSE VERY CLOS		0.16 TO 1 FOOT S THAN 0.16 FEET	VERY THINLY BEDDEN THICKLY LAMINATED THINLY LAMINATED	
			PLASTICITY				CME-55	X 8" HOLLOW AUGE	ERS	в					RATION	
			PLASTICITY INDEX	(PI)	DRY STRENG		Х СМЕ-750	HARD FACED FIN		X-N Q2	_	FOR SEDIMEN	ARY ROCKS, INDUP		NING OF MATERIAL BY CEM FINGER FREES NUMEROUS	
SLIG	PLASTIC SHTLY PLAST		Ø-5 6-15		VERY LOW SLIGHT		VANE SHEAR TEST			HAND TOOLS	:	FRIABL	E		BY HAMMER DISINTEGRATE	
	ERATELY PL HLY PLASTIC		16-25 26 OR MORE		MEDIUM HIGH		PORTABLE HOIST		W/ ADVANCER STEEL TEETH	X HAND	HOLE DIGGER AUGER	MODER	ATELY INDURATED		E SEPARATED FROM SAMPL Y WHEN HIT WITH HAMMER.	
<u> </u>			COLOR				4 🗖		TUNGCARB.		ING ROD	INDURA	TED	GRAINS ARE DI	FFICULT TO SEPARATE WI BREAK WITH HAMMER.	TH STEEL PRO
					YELLOW-BROWN, BLUE SCRIBE APPEARANCE			X CORE BIT			SHEAR TEST	EXTREM	MELY INDURATED	SHARP HAMMER	BLOWS REQUIRED TO BREAST	AK SAMPLE:

#### PROJECT REFERENCE NO. HF-0005



TERMS AND DEFINITIONS D. AN INFERRED SPT REFUSAL. FOOT PER 60 S OFTEN ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. 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 WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND K THAT LUDES GRANITE, SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. PLAIN TESTED. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. . MAY NOT YIELD TONE, 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. INGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. TINGS IE 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 UP TO 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. LDSPARS DULL SS OF STRENGTH HEN 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 IDENT BUT ITS LATERAL EXTENT. E 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. DISCERNIBLE PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. STRONG ROCK ONLY MINOR LUES < 100 BPF  $\underline{\text{RESIDUAL}} \ (\text{RES.}) \ \text{SOIL} \ \text{-} \ \text{SOIL} \ \text{FORMED} \ \text{IN} \ \text{PLACE} \ \text{BY} \ \text{THE} \ \text{WEATHERING} \ \text{OF} \ \text{ROCK}.$ 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. 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 WS 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. P 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 WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL PICK POINT. LOWS 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. RAGMENTS SMALL, THIN STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. PIECES 1 INCH D READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER BENCH MARK: BM-I (N 496693 E 563158) -L2- 13+49, 24' RT HICKNESS 4 FEET ELEVATION: 1854.04 FEET - 4 FEET - 1.5 FEET NOTES: - Ø.16 FEET - 0.03 FEET BORINGS LOCATED USING TRIMBLE TDC600. 0.008 FEET ROADWAY DESIGN FILES PROVIDED BY NCDOT. ELEVATION FOR BRIDGE BORINGS OBTAINED USING BENCHMARK BM-I (N. 496693 E 563158) T, PRESSURE, ETC. FIAD = FILLED IN AFTER DRILLING EL PROBE: ROBE:

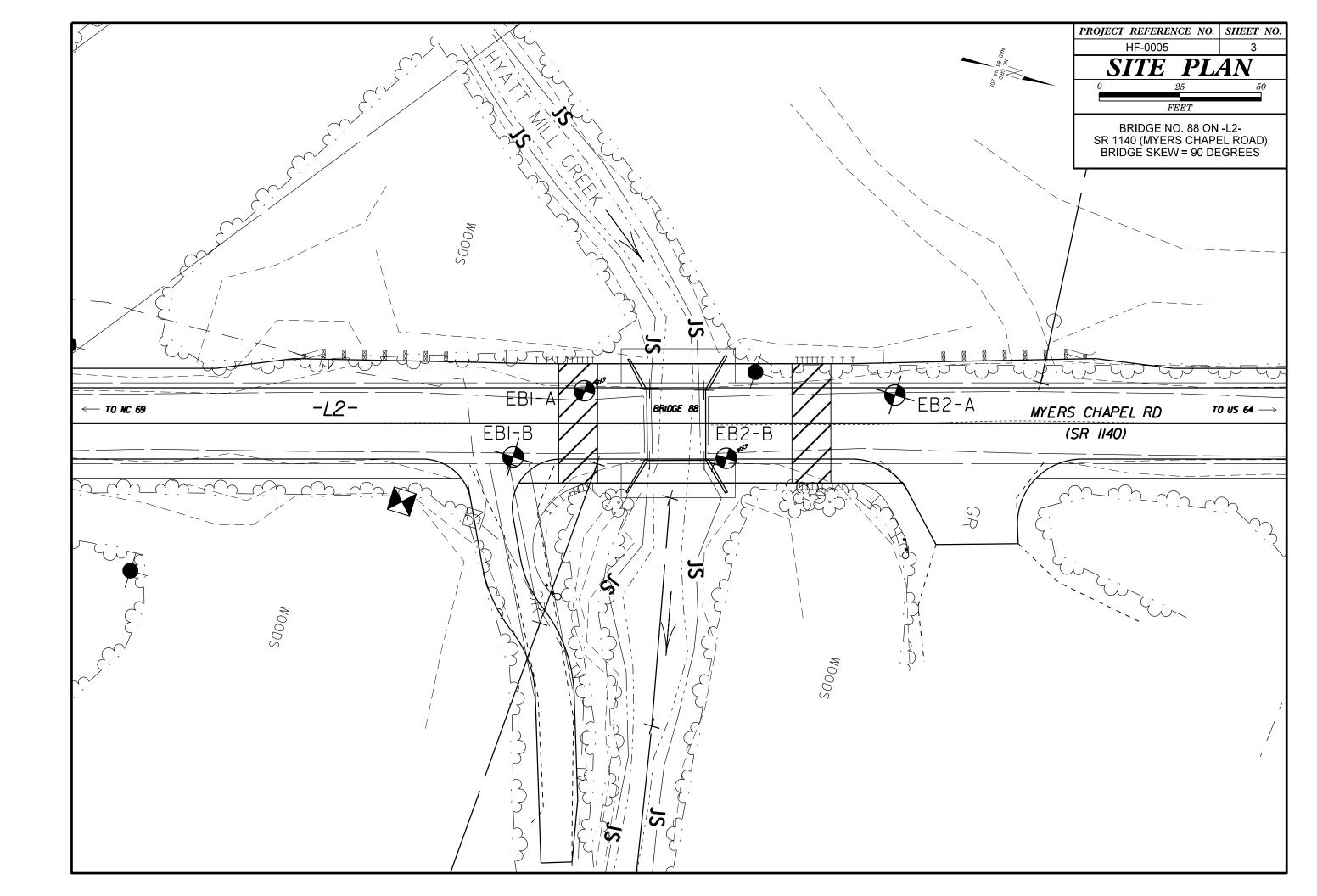
#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT \_\_\_\_\_\_ SUBSURFACE INVESTIGATION

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		AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Defo	
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.	<b>GOOD</b> rough, fresh unweathered surfaces , slightly weathered, iron stained ces h, moderately weathered and ed surfaces ensided, highly weathered surfaces compact coatings or fillings igular fragments	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, 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	VERY GOOD - Very Rough, fresh unweathered surfaces unweathered surfaces GOOD - Rough, slightly weathered surfaces surfaces BOOR - Very smooth, occasionally slickensided surfaces POOR - Very smooth, occasionally slickensided surfaces fragments VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
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.	70 A 60
BLOCKY - well interlocked un- disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		B. Sand- stone with thin inter- layers of un similar in similar stone layers	
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets	50	layers of siltstone amounts stone layers stale with amounts amounts layers	40
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		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.       F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure	30 F 20
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces		<b>G.</b> Undisturbed silty or clayey shale with or without a few very thin sandstone layers <b>H.</b> Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed used users	с H <sup>10</sup>
LAMINATED/SHEARED - Lack of V blockiness due to close spacing of weak schistosity or shear planes	N/A N/A	Means deformation after tectonic disturbance	DATE: 8-19-16

PROJECT REFERENCE NO. HF-0005

SHEET NO. 2A



								D	<u>URE L</u>	.00				
WBS	49864	4.1.1			<u></u> Т	IP HF-000	5	COUNTY	CLAY				GEOLOGIST A. Blackmore	
SITE	DESCR	RIPTION	Repl	ace Br	idge N	lo. 88 over	-Iyatt Mill C	reek on SF	R 1140 (Mye	rs Chape	el Road	d)	- ·	GROUND WTR (f
	ING NO.					TATION 1	•		OFFSET			,	ALIGNMENT -L2-	0 HR. N/
	LAR EL			ft		OTAL DEP			NORTHING		27		EASTING 563,109	<b>24 HR.</b> FIAI
						OTAL DEP	<b>IH</b> 0.5 II		NORTHING					
	. Rig/Hai		-F./DAT	E N/A								) Ha		MER TYPE N/A
DRIL	LER N				S	TART DAT			COMP. DA	TE 05/0	)3/23		SURFACE WATER DEPTH	J/A
LEV	DRIVE ELEV		' <b> </b>		1			PER FOOT		SAMP.		L O	SOIL AND ROCK DE	SCRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	<u>/ MOI</u>	G	ELEV. (ft)	DEPTH
855														
		Ť											-	
		t											-	
		ŧ											-	
		+											-	
850	<u>1,850.1</u>	0.0	N/A	4	3	┼┝╍┲╍╍							1,850.1 GROUND SUR	
	1,849.1	1.0	N/A	5	2	-  .∳7						L	Medium Stiff, Brown-Gray Sandy SILT (A-4), with	, Fine to Coarse
	1,848.1	2.0	N/A	4	5						M		Sandy SiLT (A-4), with 1,847.6	i ade gravel
	1,847.1	3.0		7		. <b>↓</b>							RESIDUAI	
	1,846.1	4.0	N/A		6	<b>b</b> 13.							Stiff to Very Stiff, Browr Coarse Sandy CL	n-Red, Fine to AY (A-6)
45	1.845.1	Ť	N/A	7	9	$   = \chi$			• • • •		м			
	1,844.1	Ť	N/A	8	5				1				1,844.1	
		<u>†                                    </u>	N/A	7	7	•13.					_M_		1,843.6 Stiff, Brown, Fine to Coa	rse Sandy SILT
	1,843.1	Ť	N/A	9	8	- • 14							(A-4) Boring Terminated at Eleva	/ ation 1,843.6 ft In
	1,842.1	t	N/A	6	7	-  <b>,</b> ^1	7						_ Residual Sandy S	ILT (A-4)
	1,841.1	Т	N/A	7	9	<b>•</b> 13							- Notes:	
	<u>1,840.1</u>	10.0	N/A	6	6		i						- Hand Auger Refusal er	ncountered at
	1,839.1	11.0	N/A	10	12	<b>1</b> 2							Elevation 1843.6 feet. T - subsurface conditions bel continued until Elevatio	o evaluate the ow, DCP testing
	1,838.1	12.0	N/A	25	12	`\	22						continued until Elevatio	n 1835.1 feet.
	1,837.1	13.0			25		22 Q37						_	
	1,836.1	14.0	N/A	25				<b>9</b> 50						
		T	N/A	25	25								-	
	-	Ť						●50					=	
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#### **GEOTECHNICAL BORING REPORT** CORE LOG

										<u>DRE L</u>	UG																
WBS	49864	.1.1			TI	IP HF-00	005	(	COUNTY	CLAY				GEO	LOGIST A. Blackmore			ļ	WBS	49864	4.1.1			TIP	HF-00	05	
				lace E				1ill Cre		R 1140 (My			ad)			GROU	IND WTR (ft)	ļ		DESCR			lace Brid	-		•	Vill Ci
	NG NO.					TATION				OFFSET				_	NMENT -L2-	0 HR.		ļ		ING NO.					TION		
COL	LAR ELI	<b>EV.</b> 1,	850.7	ft	Т	OTAL DE	<b>PTH</b> 23	.0 ft		NORTHING	496,7	22		EAS	<b>ING</b> 563,135	24 HR	. FIAD	ļ	COL	LAR EL	<b>EV.</b> 1	,850.7	ft	тот	AL DEI	<b>PTH</b> 23	3.0 ft
	. RIG/HAN			E E		CME 750X					DRILL N			PT Core	-		Automatic	ļ		RIG/HAN			E ECSO			93% 12/0	
	LER C									COMP. DA	-		<u> </u>	SUF	ACE WATER DEPTH	N/A		ļ		LER (		rne		L		<b>FE</b> 04/	
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	·	W CO	0.5ft	0	BLOV 25	VS PE 50	ER FOOT	75 100	SAMP. NO.	· /	0		SOIL AND ROCK DES	SCRIPTIO		-					DRILL			10.0	
. ,	(ft)	. ,	0.01	0.011	0.011		ī				110.		G	ELEV.	t)		DEPTH (ft)		ELEV (ft)		DEPTH (ft)	H RUN (ft)	RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	S RE( (ft)
4055																		ł		(ft)			(10111/10)	%	%		%
1855		F												-				f	1837.7	1,837.7	13.0	2.0	N=60/0.0	(1.7)	(1.5)		(9.
	-	ł												-				-	1835	- 1,035.7	<u> </u>	5.0	N=60/0.0 2:17/1.0 2:04/1.0 2:33/1.0 1:40/1.0 2:54/1.0 1:03/1.0	(5.0)	(5.0)		97
1850	1,849.7	- 1.0												_ 1,850. 	GROUND SURF	KMENT	0.0				ŧ		1:40/1.0	100%	100%	RS-1	
	1,847.2	35	1	2	4	•6.	-   -		· · · · ·			M		-	Asphalt (0.2'), Stone Medium Stiff, Brown-Red				1830	1,830.7	20.0		1:20/1.0				
845	-	Į.	2	3	4	↓ · · · · · · · · · · · · · · · · · · ·	·   · · ·		· · · · ·		SS-45	29%		- 1,845.:	Silty CLAY (A-7-		5.5	Ī		1,827.7	+ + - - - -	3.0	2:05/1.0	100%	(3.0) 100%		
045	1,844.7	- <u>6.0</u>	4	4	5	<b></b>						м			RESIDUAL Stiff, Brown, Fine to Coar	 se Sandv	с			1,027.7	<u>+ 23.0</u> +		1.40/1.0				
	1,842.2	8.5	13	20	17				· · · · · · · ·			м		<u> </u>	1(A-4)(A-4) Dense, Brown-White-Ta		ı — — <u> </u>			-	Ŧ						
840		+					·   · ·							-	Coarse SAND (A-2-4), with	n trace mi	ca and				Ŧ						
	1,837.7-	13.0	60/0.0				·   · ·Ľ	<u>.</u> - +	· · · · ·					- - 1,837.	rock fragmer		13.0				Ŧ						
1835	-	+	00/0.0						· · · · ·					-	CRYSTALLINE I Fresh, Hard, White-Gray B	IOTITE G	ŅEISS,				Ŧ						
		F												-	with Close to Wide Frac	·	ů.				ŧ						
	-	F					· · · ·		· · · · ·		RS-1	1		-	REC = 97%, RQD = 95%	5, GSI = 7	5-80			-	ŧ						
1830	-	F												-							ŧ						
		<u> </u>					· · · · · ·						X	_ 1,827.	Boring Terminated at Eleva	tion 1 82	23.0 7.7.ft.lp				ŧ						
	-	F												-	Crystalline Rock (BIOT)	TE GNE	SS)				ŧ						
	-	F												-							ŧ						
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	-	ł												-  -				NCDOT CORE DOUBLE BRIDGE 088 ON SR 1140 OVER HYATT MILL CREEK.GPJ NC_DOT.GDT		-	ŧ						
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	-	t																NCD			‡						

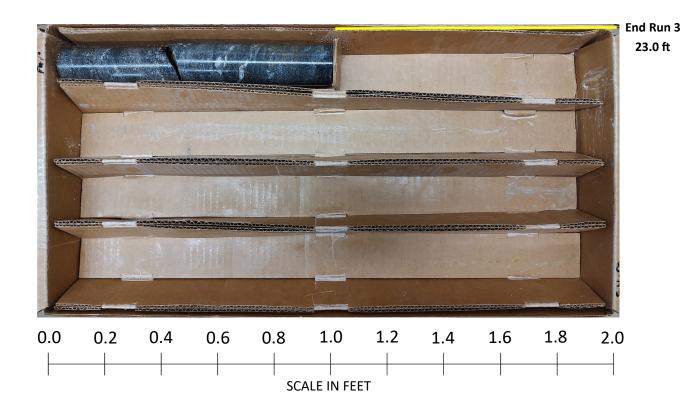
COUNTY CLAY GEOLOGIST A. Blackmore Replace Bridge No. 88 over Hyatt Mill Creek on SR 1140 (Myers Chapel Road) GROUND WTR (ft) OFFSET 10 ft RT ALIGNMENT -L2-0 HR. N/A **NORTHING** 496,722 EASTING 563,135 24 HR. FIAD DRILL METHOD SPT Core Boring HAMMER TYPE Automatic COMP. DATE 04/24/23 SURFACE WATER DEPTH N/A STRATA REC. RQD (ft) (ft) % % L 0 G DESCRIPTION AND REMARKS ELEV. (ft) DEPTH (ft) Begin Coring @ 13.0 ft CRYSTALLINE ROCK Fresh, Hard, White-Gray BIOTITE GNEISS, with Close to Wide Fracture (9.7) (9.5) 97% 95% 13. Spacing REC = 97%, RQD = 95%, GSI = 75-80 RS-1: 17.2' - 17.6' Unconfined Compressive Strength = 8,490 psi / 1,223 ksf 1,827.7 23.0 Boring Terminated at Elevation 1,827.7 ft In Crystalline Rock (BIOTITE GNEISS)



## Bridge No. 88 over Hyatt Mill Creek on SR 1140 (Myers Chapel Road)

WBS - 49864.1.1 TIP No. HF-0005 Rock Core Photographs: Boring - EB1-B Station: 13+84 Offset: 10 ft RT





<b>WBS</b> 49864.1.1		TY CLAY	GEOLOGIST A. Blackmore		<b>WBS</b> 49864.1.1		TY CLAY	GEOLOGIST A. Blackmore
SITE DESCRIPTION Replace Bridg				ROUND WTR (ft)	SITE DESCRIPTION Replace Bri			
BORING NO. EB2-A	STATION 15+01	OFFSET 9 ft LT		HR. N/A	BORING NO. EB2-A	STATION 15+01	OFFSET 9 ft LT	ALIGNMENT -L2- 0 HR. N/A
<b>COLLAR ELEV.</b> 1,850.6 ft	TOTAL DEPTH 16.5 ft	<b>NORTHING</b> 496,829	EASTING 563,082 24 H		COLLAR ELEV. 1,850.6 ft	TOTAL DEPTH 16.5 ft	<b>NORTHING</b> 496,829	<b>EASTING</b> 563,082 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF./DATE ECS0		DRILL METHOD SF		YPE Automatic	DRILL RIG/HAMMER EFF./DATE ECS			SPT Core Boring HAMMER TYPE Automatic
DRILLER C. Osborne	<b>START DATE</b> 04/24/23	COMP. DATE 04/24/23	SURFACE WATER DEPTH N/A		DRILLER C. Osborne	<b>START DATE</b> 04/24/23	COMP. DATE 04/24/23	SURFACE WATER DEPTH N/A
ELEV DRIVE DEPTH BLOW COUN					CORE SIZE NO	TOTAL RUN 10.0 ft		
(ft) ELEV (ft) 0.5ft 0.5ft 0.	.5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROCK DESCRIPT	DEPTH (ft)	ELEV RUN DEPTH RUN DRILL (ft) (ft) (ft) (ft) (ft) (Min/ft)	RUN SAMP. STRATA		DESCRIPTION AND REMARKS
					(ft) ELEV (ft) (ft) (ft) (Min/ft	) $\begin{pmatrix} (ii) \\ \% \\ \% \end{pmatrix}$ $\begin{pmatrix} (ij) \\ \% \\ \% \\ \% \end{pmatrix}$	G ELEV. (ft)	DEPTH (ft)
1855		М Ц	1.850.6       GROUND SURFACE         1,850.0       ROADWAY EMBANKMEN         Asphalt (0.2'), Stone Base (f         1,846.6       Soft, Brown, Fine to Coarse Sar         1,844.1       Gray-Tan (BIOTITE GNEIS         1,844.1       Gray-Tan (BIOTITE GNEIS), white-Gray BIOTITE GNEISS, white-Gray BIOTITE	NT 0.6 (0.4')	1844.1         1,844.1         6.5         4.0         N=60/0           1:23/1.         1:23/1.         1:58/1.         1:58/1.           1840         1,840.1         10.5         1:22/1.           5.0         2:10/1.         2:22/1.           1835         1,835.1         15.5         2:03/1.           1,834.1         16.5         1.0         1:52/1.	XO         RS-2           0         (4.7)         (4.5)           0         94%         90%	- - 1.834.1 Unconfi	Begin Coring @ 6.5 ft       6.5         CRYSTALLINE ROCK       6.5         hered to Fresh, Hard, White-Gray BIOTITE GNEISS, with Close to Wide Fracture Spacing       6.5         REC = 97%, RQD = 83%, GSI = 65-70       RS-2: 9.2' - 9.6'         Unit Weight = 170.3 pcf       11,807 ksf         ined Compressive Strength = 12,550 psi / 1,807 ksf       16.5         hated at Elevation 1,834.1 ft in Crystalline Rock (BIOTITE GNEISS)       6.5
2DOT BORE DOUBLE BRIDGE 088 ON SR 1140 OVER HYATT MILL CREEK.GPJ NC_DOT.GDT 5/22/23								

#### IICAL BORING REPORT CORE LOG



# Bridge No. 88 over Hyatt Mill Creek on SR 1140 (Myers Chapel Road)

WBS - 49864.1.1 TIP No. HF-0005 Rock Core Photographs: Boring - EB2-A Station: 15+01 Offset: 9 ft LT



									<u>ORE L</u>	.00					
WBS	49864	.1.1			T	IP HF-000	)5	COUNT	Y CLAY				GEOLOGIST A. Blackmore		
SITE	DESCR	IPTION	Repl	ace Br	idge N	lo. 88 over	Hyatt Mill (	Creek on Sl	R 1140 (Mye	ers Chape	el Road	d)		GROUND W	TR (ft)
BOR	NG NO.	EB2-I	B		S	TATION	4+49		OFFSET	11 ft RT			ALIGNMENT -L2-	0 HR.	N/A
	LAR ELE			ft		OTAL DEF		•	NORTHING		85		<b>EASTING</b> 563,116	24 HR.	FIAD
	. RIG/HAM									1		) На		MERTYPE N/A	
			1.JBAII			TART DAT	E 05/02/	22	COMP. DA				SURFACE WATER DEPTH		
				w co				23 9 PER F001		SAMP.		1 L	SORFACE WATER DEPTH	I/A	
ELEV (ft)		DEPTH (ft)	·	0.5ft	1		25	50	75 100		17	0	SOIL AND ROCK DE		
()	(ft)	()	0.51	0.51	0.511		20	50	100	NO.	И	G	ELEV. (ft)	C	DEPTH (f
1850	1,849.6												-1,849.6 GROUND SUR	FACE	0
			N/A	2	2	<u> </u>							ROADWAY EMBA	NKMENT	
	1,848.6		N/A	4	2	-					м	L	Soft to Medium Stiff, Brow Coarse Sandy SIL		
	1,847.6	2.0	N/A	2	2	•6									
	1,846.6	3.0	N/A	4	2	4							1,846.1		3.
	1,845.6	4.0	N/A	3	3	• • 6							Boring Terminated at Eleva	ation 1,846.1 ft In	1
	1,844.6	5.0				- 6							Residual Sandy Sl	LT (A-4)	
	1,843.6	6.0	N/A	7	8		●36						Notes:		
	1,842.6		N/A	25	11								Hand Auger Refusal er Elevation 1846.1 feet. T	countered at	
		-	N/A	25	25	1	•36						subsurface conditions bel	ow, DCP testing	
	-	Ļ						●50					continued until Elevatio	n 1841.6 feet.	
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l							SO	IL TEST	RESULT	rs			
I	BORING	SAMPLE	OFFSET	STATION	DEPTH	AASHTO		P.I.		% BY V	VEIGHT		
I	NO.	NO.	UFFJEI	STATION	INTERVAL	CLASS.	L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	
I	EB1-B	SS-45	10' RT	13+84 -L2-	3.5-5.0	A-7-6(13)	55	29	21.3	27.0	21.3	30.4	5

LAB TECHNICIAN: DANIEL REEVE NCDOT CERTIFICATION NO. 135–03–0816

HF-0005         10           % PASSING (SIEVES)         %           % DASSING (SIEVES)         %			HF-0005	10
				1
	% DASSING (SIEV		0/	0/
	F 1		4	1 1
10 40 200 WOISTORE ORGANIC	10 40	200	MOISTURE	ORGANIC
97.7 85.6 54.9 29.3 -	97.7 85.6	54.9	29.3	-

					RO	CK TEST RE	ESULTS		
SAMPLE NO.	BORING	STATION -L2-	OFFSET	DEPTH INTERVAL	RUN REC (%)	RUN RQD (%)	R	ock Type	U
RS-1	EB1-B	13+84	10' RT	17.2-17.6	100	100	Bio	tite Gneiss	
RS-2	EB2-A	15+01	9' LT	9.2-9.6	100	70	Bio	tite Gneiss	
	Core Barrel Sample								

RS = NQ2 Rock Core Barrel Sample (ASTM D-2113)

	PROJECT REFERENCE NO. SHEET N
	HF-0005 11
Unit Weight	Unconfined Compressive Strength
Unit Weight	Unconfined Compressive Strength
LB/FT <sup>3</sup>	(PSI/KSF)
-	
LB/FT <sup>3</sup>	(PSI/KSF)
LB/FT <sup>3</sup> 171.3	(PSI/KSF) 8,490 psi / 1,223 ksf



PHOTO 1: VIEW FACING BRIDGE 88 FROM -L2- ALIGNMENT, FACING DOWNSTATION.



PHOTO 3: VIEW FACING UPSTREAM FROM BRIDGE.



PHOTO 2: VIEW FACING BRIDGE 88 FROM -L2- ALIGNMENT, FACING UPSTATION.



PHOTO 4: VIEW FACING DOWNSTREAM FROM BRIDGE.