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AASHTO CLASSIFICATION AND GRADATION SHEET

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38440.1.1 (B-4623) F.A. PROJ. *BRZ-1128(6)* COUNTY ROCKINGHAM PROJECT DESCRIPTION BRIDGE NO. 47 ON SR 1128 OVER HOGAN'S CREEK

STATE STATE PROJECT REFERENCE NO. SHEET NO. SHEETS N.C. 38440.1.1 (B-4623) 1 10

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 BORNING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 707-6850, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTURE CONDITIONS SINDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND 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 SUBSUBFACE 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 PINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO GE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSUBFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HUNSLE AS TO CONDITIONS TO GE ENCOUNTERED. TO ACTIVE THE DEFINITION OF THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR MAY PRESON RESULT HOR FROM THE ACTUAL CONDITIONS TO RECOUNTERED OF THE STREET FROM THE STREET. ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

> PERSONNEL C. V. NORVILLE

J. R. HAMM

T. E. EVANS

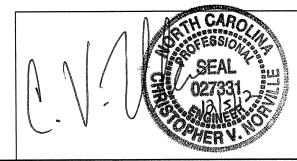
AMERIDRILL, INC

INVESTIGATED BY_T. E. EVANS

CHECKED BY_____C. V. NORVILLE

SUBMITTED BY FALCON ENG.

DECEMBER 2012



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PROJECT REFERENCE NO. SHEET NO. 2

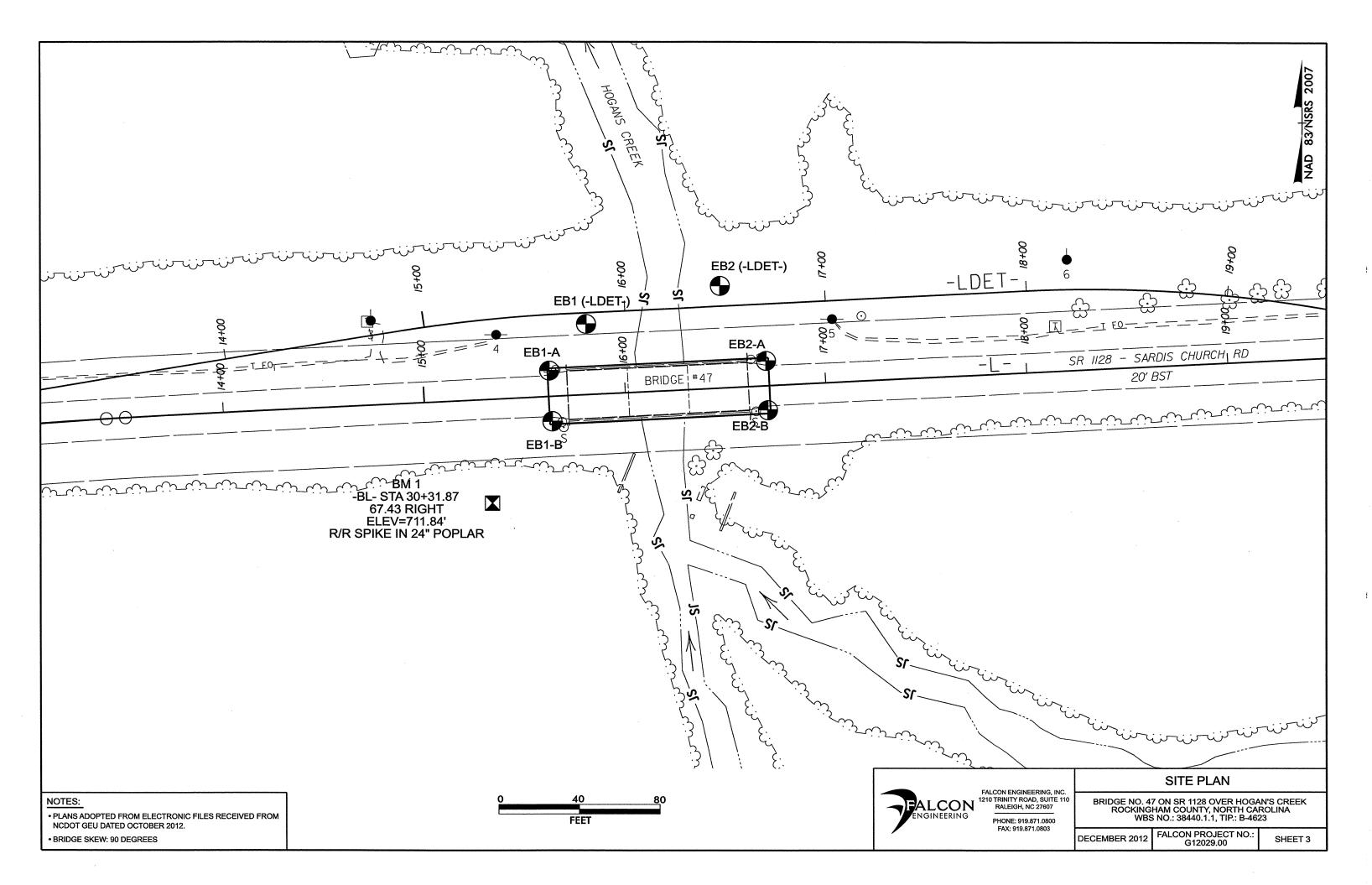
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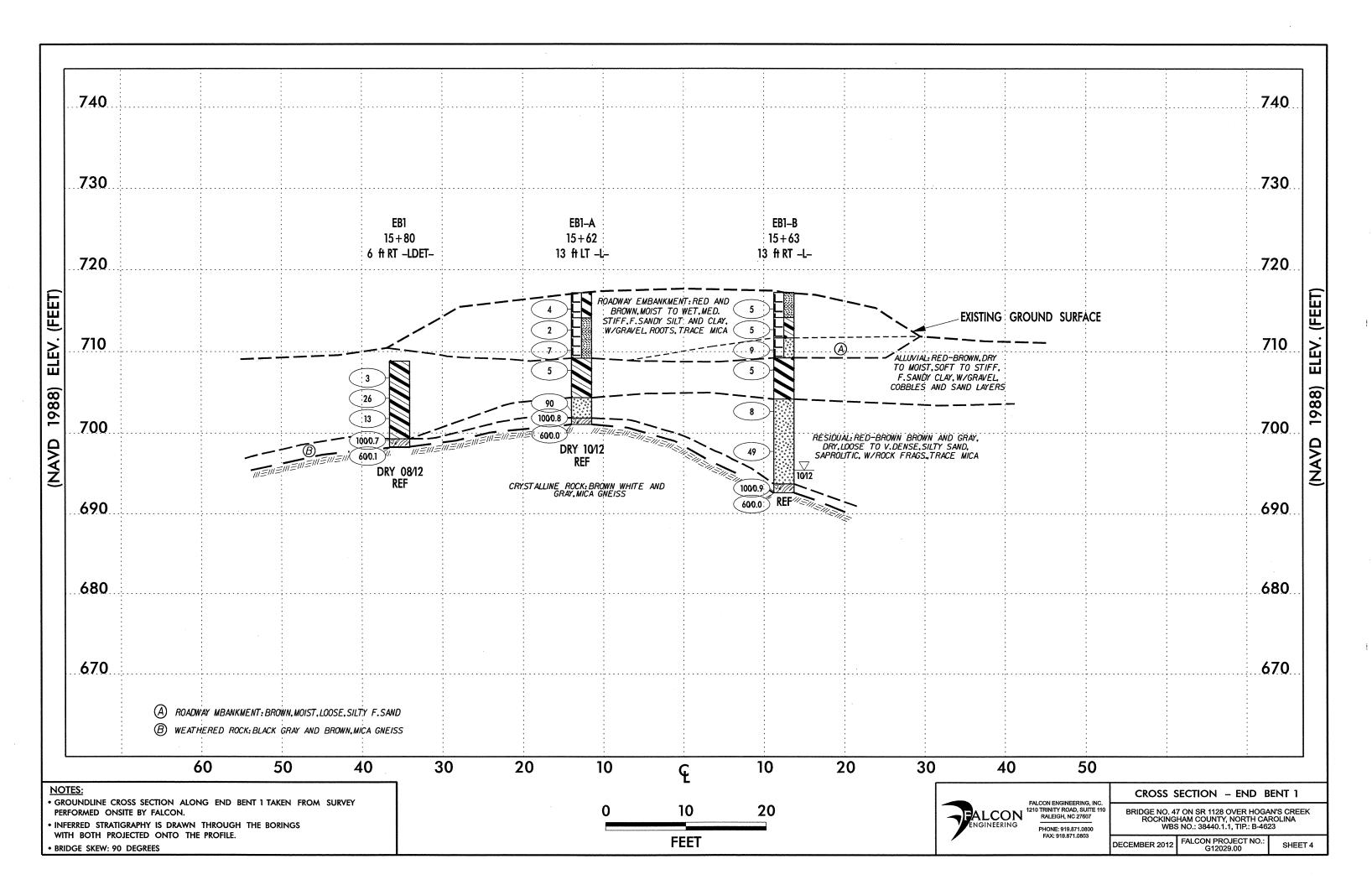
DIVISION OF HIGHWAYS

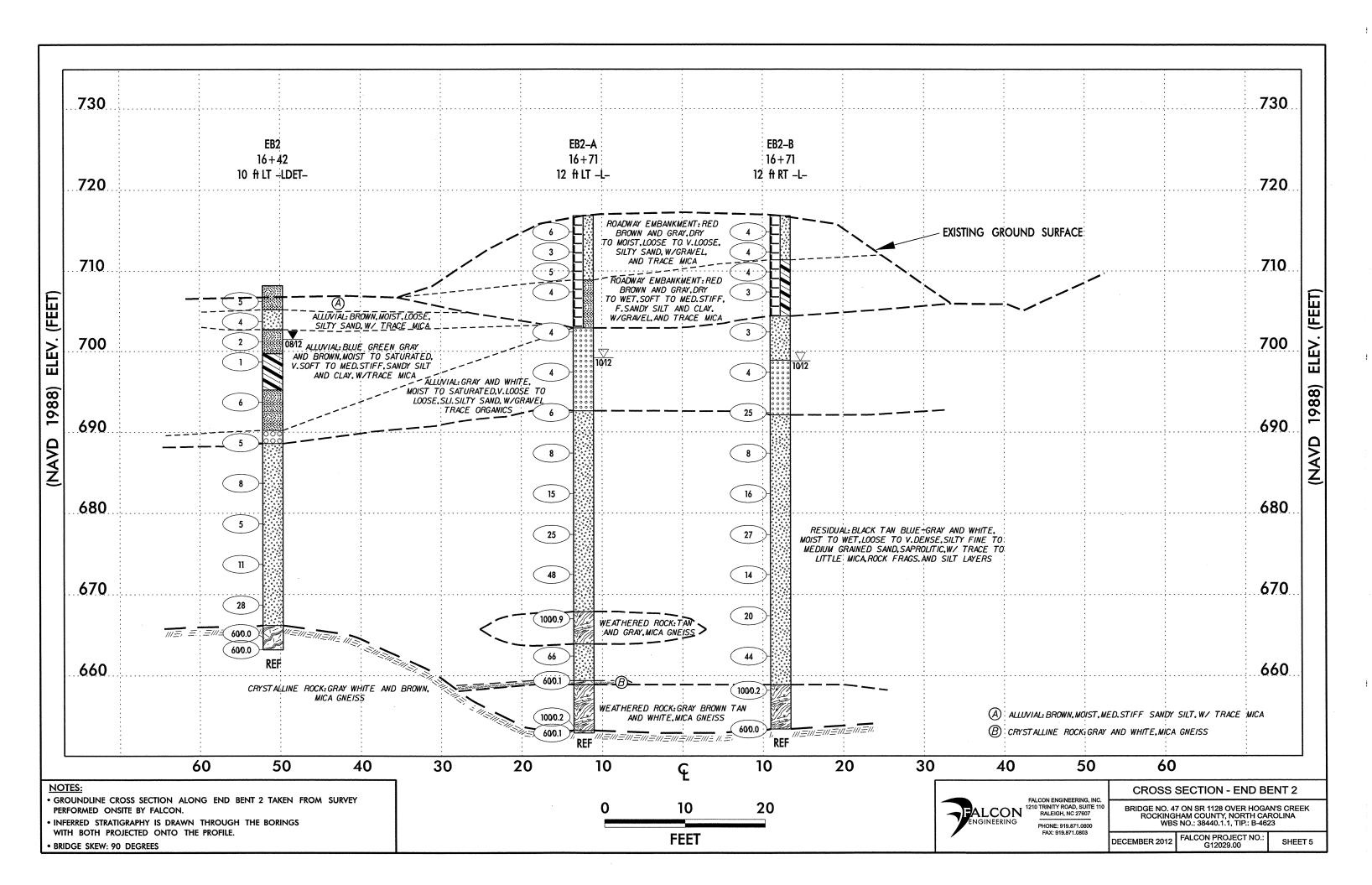
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TERM	S, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586), SOIL	POORLY GRADED: GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY, SUTY CLAY, WOIST WITH INTERBEDDED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERAL OGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC, ARE USED IN DESCRIPTIONS	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-8 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, 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.
Z PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 40 30 MX GRANULAR CLAY PEAT	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL		ROCKS OR CUTS MASSIVE ROCK.
# 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	LITTLE ORGANIC MATTER	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OS MA TOP CRAYEL AND FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLIJ) 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SUILS SUILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE POOR POOR HOUSE UNSUITABLE	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
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 FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAQLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
COMPACTATION OF RANGE OF STANDARD RANGE OF UNCONFINED		(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.
PRIMARY SOIL TYPE COMPRETATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION POPULATION SPT. VEST BORING W/ CORE	IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE (4	AUGER BORING SPT N-VALUE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANULAR LUUSE 4 TO 10	m [±] 1	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N. VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER ————————————————————————————————————	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - TRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY DENSE >50	INFERRED SOIL BOUNDARY MONITORING WELL	(V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	PIE 70ME TER	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED YIELDS SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INSTALLATION	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATOR INSTALLATION	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/825 DIP & DIP DIRECTION OF ROCK STRUCTURES CONE PENETROMETER TEST	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	- LUNE PENETAUPIETER TEST	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12 3	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7/4- DRY UNIT WEIGHT	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD 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
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK • - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GOIDE TO A TIEED POISTONE DESCRIPTION	F - FINE SL SILT, SILTY ST - SHELBY TUBE	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL_ LIQUID LIMIT	FRAGS FRAGMENTS # - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY Y - VERY RATIO	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY 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.
PLASTIC SEMISOLID; REQUIRES DRYING TO	HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT	FINGERNAIL. FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT		TERM SPACING TERM THICKNESS	BENCH MARK:
OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	UNITED AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET	BM-I: R/R SPIKE IN 24' POPLAR (BL STA 30+32.00, 67'RT)
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	MOBILE B-	MODE AT 1 10 2 SEET THINLY BEDDED 0.16 - 1.5 FEET	N: 943242, E: 1716388 ELEVATION: 711.84 FT.
REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SIZE.	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8* HOLLOW AUGERS -B	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 FEET THINLY LAMINATED 4 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	CME-45C HARD FACED FINGER BITS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	TUNG -CARRIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	X CME-550X CASING W/ ADVANCER	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
MED. PLASTICITY 16-25 MEDIUM	HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDUBATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
HIGH PLASTICITY 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNGCARB. HAND AUGER SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY),	CORE BIT	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REDUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
		1 Oran de Grenta Honosa Onthins.	1

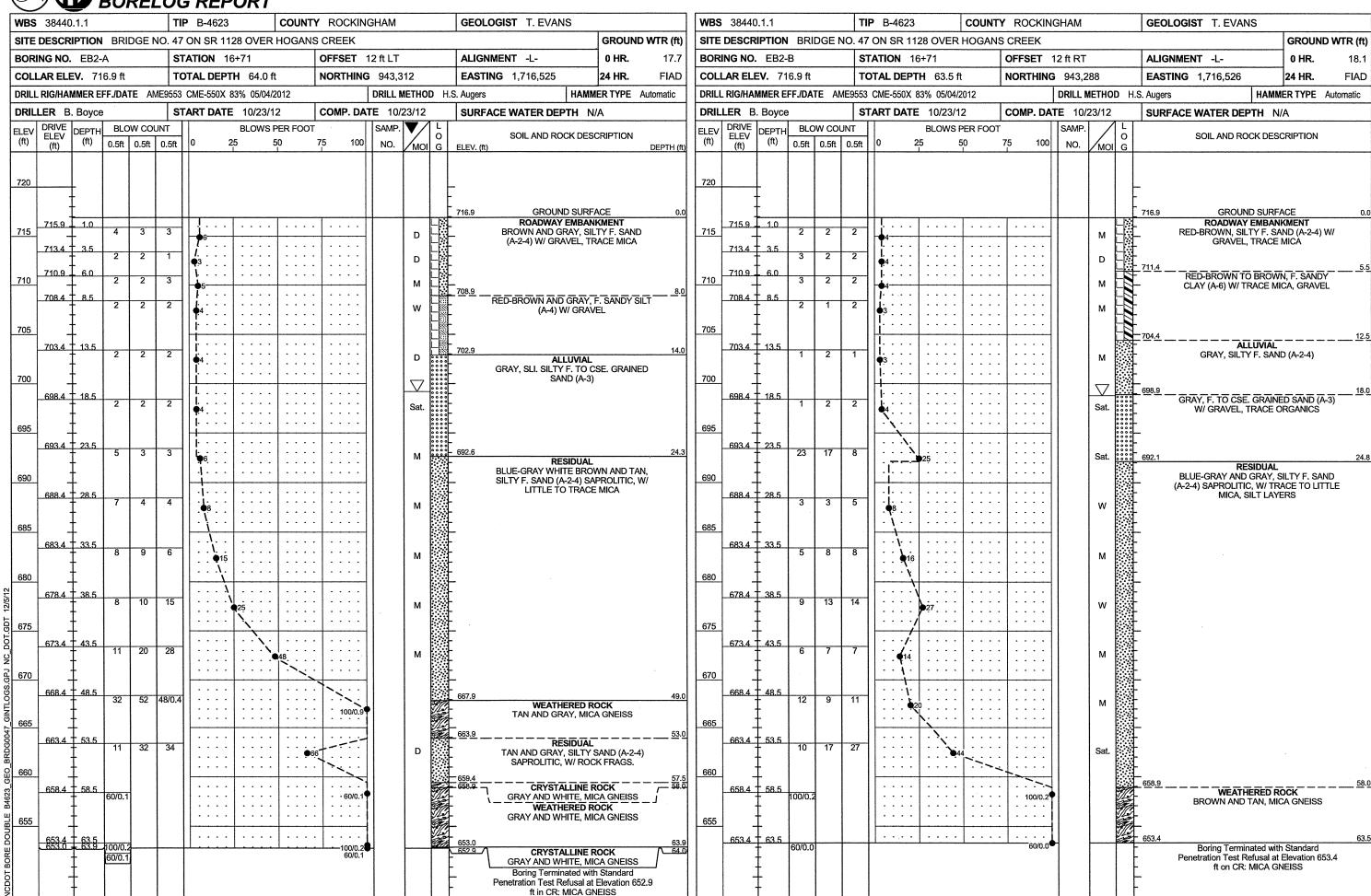






NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

S 38440.1.1			B-4623		L	Y ROCKI	NGHAM			GEOLO	GIST T. E\	/ANS	·		WBS	3844	0.1.1			TIF	P B-4623		COUNT	Y ROCK	INGHAM	1		GEOLOGIST T. EVAN	S	
E DESCRIPTION	BRIDGE NO). 47 ON	N SR 112	28 OVER	HOGANS	S CREEK	····	·		-			GROUND WT	'R (ft)	SITE	DESCF	RIPTION	BRID	DGE N	10. 47	ON SR 1	128 OVEF	R HOGAN	S CREEK					GRO	JND WT
RING NO. EB1-A		STATI	ION 15	+62		OFFSET	13 ft LT			ALIGNM	MENT -L-		0 HR.	Dry	BOR	ING NO	. EB1-	В		ST	TATION 1	5+63		OFFSET	13 ft R	T		ALIGNMENT -L-	0 HF	. .
LAR ELEV. 717.	2 ft	TOTA	L DEPTI	H 16.1 ft	t	NORTHIN	IG 943,3	308		EASTIN	G 1,716,41	17	24 HR.	Dry	COL	LAR EL	EV. 71	7.2 ft		то	TAL DEP	TH 24.6	ft	NORTHI	NG 943	,282		EASTING 1,716,418	24 HF	L. 1
L RIG/HAMMER EFF	./DATE AME	9553 CM	E-550X 8	3% 05/04/2	2012		DRILL	METHO	D H.S	S. Augers		HAMM	ER TYPE Auton	natic	DRIL	L RIG/HA	MMER E	FF./DAT	TE AM	/E9553	CME-550X	83% 05/04	/2012		DRILL	METHO	OD H.	S. Augers	HAMMER TYP	E Autom
LLER B. Boyce		STAR	T DATE	10/22/1:	2	COMP. D	ATE 10	/22/12		SURFAC	CE WATER I	DEPTH N	'A		DRIL	LER E	. Boyce)		ST	ART DAT	E 10/23/	12	COMP. D	DATE 10	0/23/12	2	SURFACE WATER DEF	TH N/A	
1 FIFV 1	BLOW COUN		25	BLOWS F		75 10	SAMP.		0	ELEV. (ft)	SOIL AND	ROCK DES		:PTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W COU		0	BLOWS 25	PER FOO		SAMF	1/	L O Ol G	SOIL AND RO	CK DESCRIPTION	N
										717.2	GP(OUND SURFA	ACE.	0.0	720													- . 717.2 GROUN	O SURFACE	
716.2 1.0			• • • • •		 		+	-	世		ROADV	VAY EMBAN	KMENT	0.0		716.2	1.0				11 * * *	T · · · ·	7				L	ROADWAY	EMBANKMENT	
4	1 2	2	14	· · · ·			41	М		714.2		I, F. SANDY (GRAVEL, TRA	CLAY (A-7) W/ ACE MICA		715		Į.	2	2	3	5	ļ · · · ·	<u> </u>			М		RED-BROWN ANI 714.2 (A-4) W/ GRA) TAN, F. SAND /EL, TRACE MIC	
713.7 + 3.5	1 1 1	1 1	; · · · ; · · ·		: : : :	: : : : :		w			RED-BROWN	I, F. SANDY	SILT (A-4) W/	3.0		713.7	3.5	2	2	3	<u> </u>		: : :	.	:	l M		RED-BROWN, F.	SANDY CLAY (A	-6) W/
711.2 6.0		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						"			GRA	VEL, IKACE	IVIICA			711.2	6.0				7 5			.	·	'''		. /11./	CE MICA	<u></u>
4 I	4 4	3	7		ļ		\parallel	w	F	709.2				8.0	710		‡	4	5	4	9	 				М		BROWN, SILT	. 1. UNINU (M-2	7)
708.7 + 8.5	2 2	3			: : : :	: : : : :		м			BDOWN	ALLUVIAL F. SANDY C				708.7	8.5	2	2	3	<i>i</i>		: : :		-	М		RED-BROWN, F.	LUVIAL	7) \//
			Š			.		"			DITOVIA,	I. JANDI O	LAT (A-0)				İ				T °			· · · · · ·	11			SANE	LAYERS	-1) **/
		<u> </u>			<u> </u>					704.4				12.8	705		Ŧ						-					- - _{704.2}		
	32 45	45 .				•90		D		E		RESIDUAL GRAY, SILTY	' SAND (A-2-4)			703.7	13.5	5	5	3	-7	: : : :		: : : : :	.	D		RED-BROWN AN	SIDUAL GRAY SILTY	SAND
701.9 - 15.3 701.1 16.1	71 28/0.3				1	100/0.8	.[]		977	701.9		SAPROLITIC		15.3 16.1			‡					1::::		.	-			(A-2-4) W/ TRACE		
+ 60	0/0.0					60/0.0	3		-	· /w	HITE GRAY A	ND BROWN	, MICA GNEISS		700	600.7	+ 40.5											_		
Į l									1 F	P		rminated with st Refusal at I	Standard Elevation 701.1			698.7	18.5	33	29	20	: : : :	: : : : : : :	49	.	.	D		•		
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<u>†</u>									1 -	•					695	693.7	23.5					 	 		\exists	<u> </u>	:::	_ - 693.7		
Ŧ	.								1 F							692.6	24.6	65 60/0.0	35/0.4		1	1	1	100/0	.9				RED ROCK	NEICO
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<u> </u>									1	•						-	<u> </u>										<u> </u>	 Penetration Test Reference ft on CR: 	fusal at Elevatio MICA GNEISS	า 692.6
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WBS 38440.1.1	TIP B-4623	COUNTY RO	CKINGHA	М		GEOLOGIST T. EVANS		WBS	S 38440.1.1			TIF	P B-4623	·····	COUNTY	r ROCKING	GHAM		GE	OLOGIST T. EVANS		
SITE DESCRIPTION BRIDGE NO	D. 47 OVER HOGANS	CREEK ON SR 1	28			_	GROUND WTR (ft)	SITE	E DESCRIPTI	ON BF	RIDGE	NO. 47	OVER HO	GANS CF	REEK ON	SR 1128				· · · · · · · · · · · · · · · · · · ·	GROUND WT	rr (ft
BORING NO. EB1	STATION 15+80	OFF	ET 6ftR	RT		ALIGNMENT -LDET-	0 HR. Dry	BOF	RING NO. E	B2		ST	ATION 16	5+42		OFFSET 1	10 ft LT			GNMENT -LDET-	0 HR.	9.7
COLLAR ELEV. 708.8 ft	TOTAL DEPTH 10	0.6 ft NOR	THING 94	13,331	·····	EASTING 1,716,435	24 HR. FIAD	COL	LAR ELEV.	708.2 f	t	TC	TAL DEPT	H 45.0 f	t	NORTHING	943,3	340	EAS	STING 1,716,496	24 HR.	6.7
DRILL RIG/HAMMER EFF./DATE TRI8	3016 MOBILE B-57 93%	12/08/2011	DRII	LL METH	H.S	S. Augers HAM	MER TYPE Automatic	DRIL	L RIG/HAMME	R EFF./D	ATE T	RI8016 N	OBILE B-57	93% 12/08	8/2011		DRILL N	METHOD	H.S. Auge	ers	HAMMER TYPE Autom	natic
DRILLER S. Gower	START DATE 08/2	28/12 COM	P. DATE	08/28/12	2	SURFACE WATER DEPTH	N/A		LLER S. Go			ST	ART DATE	08/27/1	2	COMP. DA	TE 08/3	28/12	SUF	RFACE WATER DEPT	H N/A	
ELEV DRIVE DEPTH BLOW COUN		WS PER FOOT	11	MP.	101	SOIL AND ROCK DE	SCRIPTION	ELEV		TH BL	ow co				PER FOOT	1	SAMP.		L	SOIL AND ROCH	K DESCRIPTION	
(ft) (ft) (ft) 0.5ft 0.5ft 0	0.5ft 0 25	50 75	100 N	0. MC) G	ELEV. (ft)	DEPTH (ft)	(ft)	(ft) (ff	0.5f	t 0.5ft	0.5ft	0 2	25	50 	75 100	NO.	MOI				
710						•		710											L			
707.8 + 1.0						708.8 GROUND SUR ALLUVIAI			<u> </u>										708.2	GROUND	SURFACE	0
	1 3			М		RED-BROWN, F. SANDY	' CLAY (A-6) W/		707.2 1	0 1	2	3	1					М	ΨĮ.		JVIAL ILT (A-4) W/ TRACE	
705 705.3 + 3.5 WOH 19	7			١		GRAVEL/COBBLES FRO	JIVI 7.5 - 6.5 F1	705	704.7 + 3.	5			9 5			1		"	705.2		CA	3
702.8 + 6.0	26 .		::	M					+	2	3	1 1	4					М	702.7	MI	CA	5
6 5	8 • 13			М					702.2 T 6.	0 WOI	 1	11	<i>j</i>				SS-4		-	GRAY AND BROWN,	F. SANDY SILT (A-4)	
700 700.3 8.5 14 22 78	8/0.2			D		⁻ 699.3	0.5	700	699.7 + 8.	5			P 2				00-4	38%	699.7			8
698.3 + 10.5	0'0.2 '=		00/0.7		411	698.3 WEATHERED I	ROCK 10.5		1	1	WOH	1 1	1					Sat.		GRAY AND BROWN,	F. SANDY CLAY (A-6)	
60/0.1			60/0.1		F	698.2 BROWN BLACK AND GRA							\\						3			
					<u> </u>	BROWN BLACK AND GRA	Y, MICA GNEISS	695	694.7 + 13	.5			<i>i</i> · · · ·						695.2	BLUE-GREEN AND D	OK CDAY E CANDY	13
					1 E	Boring Terminated wi Penetration Test Refusal a	t Elevation 698.2		<u> </u>	2	3	3	∳ 6					М	% -		(A-4)	
					F	ft in CR: MICA G	SNEISS		 				}						X F			
					-	•		690	689.7 18				1		<u> </u>				690.2	CRAY AND WHITE	, SLI. SILTY SAND	18
					1 -				1 1	5	3	2	6 5		1::::			Sat.	688.6	(A-1-b) W	/ GRAVEL	19
					F				 				1								DUAL TAN, SILTY F. SAND	
			į	1		•		685	684.7 + 23				1		<u> </u>					(A-2-4) SAPROLITION ROCK I	C, W/TRACE MICA,	
1			.	1	1				1 1	2	4	4	. 98		1::::			М		1100111		
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					1	-		665	664.7 43	.5	_				<u> </u>			W			LINE ROCK TE, MICA GNEISS	
					1 E				663.2 1 45	60/0.			<u> </u>	<u> </u>	<u> </u>	60/0.0			663.2			45
					1 -				1 +	60/0.	.0					60/0.0			F	Boring Terminat Penetration Test Refu	usal at Elevation 663.2	
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SHEET 9

FALCON

1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE NO. 47 ON SR 1128 OVER HOGAN'S CREEK

WBS NO.: 38440.1.1, TIP NO.: B-4623

ROCKINGHAM COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G12029.00

BOR	ING	SAMPLE	Т	OTAL SAMP	LE	Δtterhe	Results	Natural Moisture					
AAS	SHTO Classifica	tion	PEI	RCENT PAS	SING	,		Content					
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	Pl	%				
E	32	SS-4											
	A-4		100	99	66	30	N/A	N/A	37.6				
-DET- 16+42	CL	6.0-7.5											

NOTE: ABOVE SAMPLE TESTED FROM BORING ORIGINALLY PERFORMED FOR -LDET- ROADWAY SUBSURFACE INVESTIGATION.





PHOTO TAKEN FROM NEAR END BENT 2 LOOKING AT EB2 (-LDET-) BEING DRILLED.



FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607

PHONE: 919.871.0800 FAX: 919.871.0803

SITE PHOTOGRAPHS

BRIDGE NO. 47 ON SR 1128 OVER HOGAN'S CREEK ROCKINGHAM COUNTY, NORTH CAROLINA WBS NO.: 38440.1.1, TIP.: B-4623

DECEMBER 2012

FALCON PROJECT NO.: G12029.00

SHEET 10