REFERENCE

CONTENTS

DESCRIPTION

TITLE SHEET LEGEND (SOIL & ROCK)

CROSS SECTIONS

SITE PLAN

BORE LOGS SITE PHOTOGRAPH

SHEET NO.

5-7

992 2 ∞ B

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY RANDOLPH

PROJECT DESCRIPTION BRIDGE NO. 38 ON SR 3255 (FARMER RD) OVER CEDAR FORK CREEK

STATE PROJECT REFERENCE NO. 17BP.8.R.992 8

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-6850. 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 BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (MIN-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 MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS NCLUDING 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 WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE TO MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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 WAVIES 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

C. BRUINSMA, LG

PAUL WEAVER, LG

C. PASTRANA

TRIGON

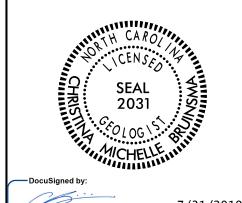
INVESTIGATED BY ESP Associates, P.A.

DRAWN BY _C. BRUINSMA, LG

CHECKED BY C. BRUINSMA, LG

SUBMITTED BY __C. YOUNGBLOOD, LG

DATE **JULY** 2019



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7/31/2019 DATE

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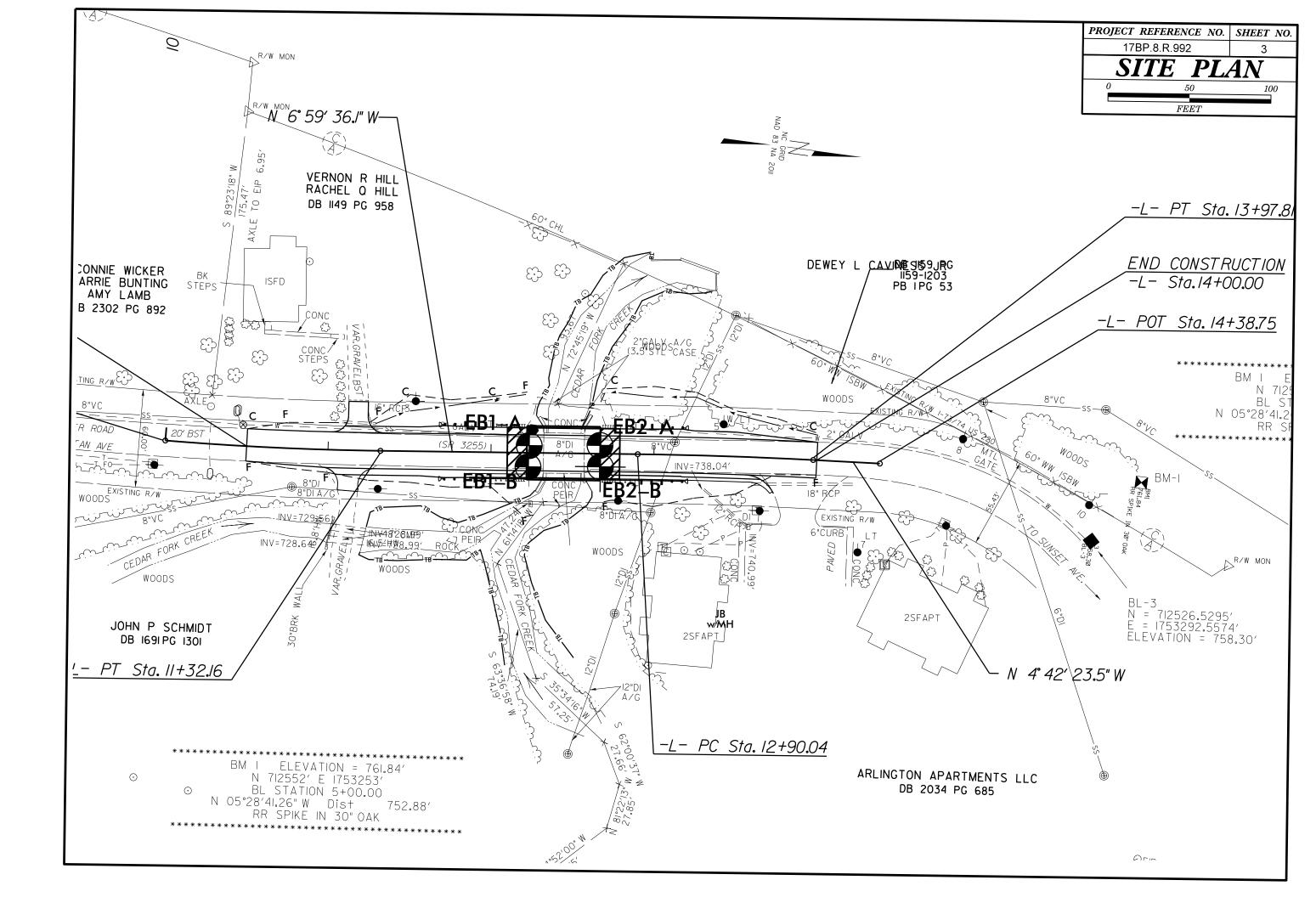
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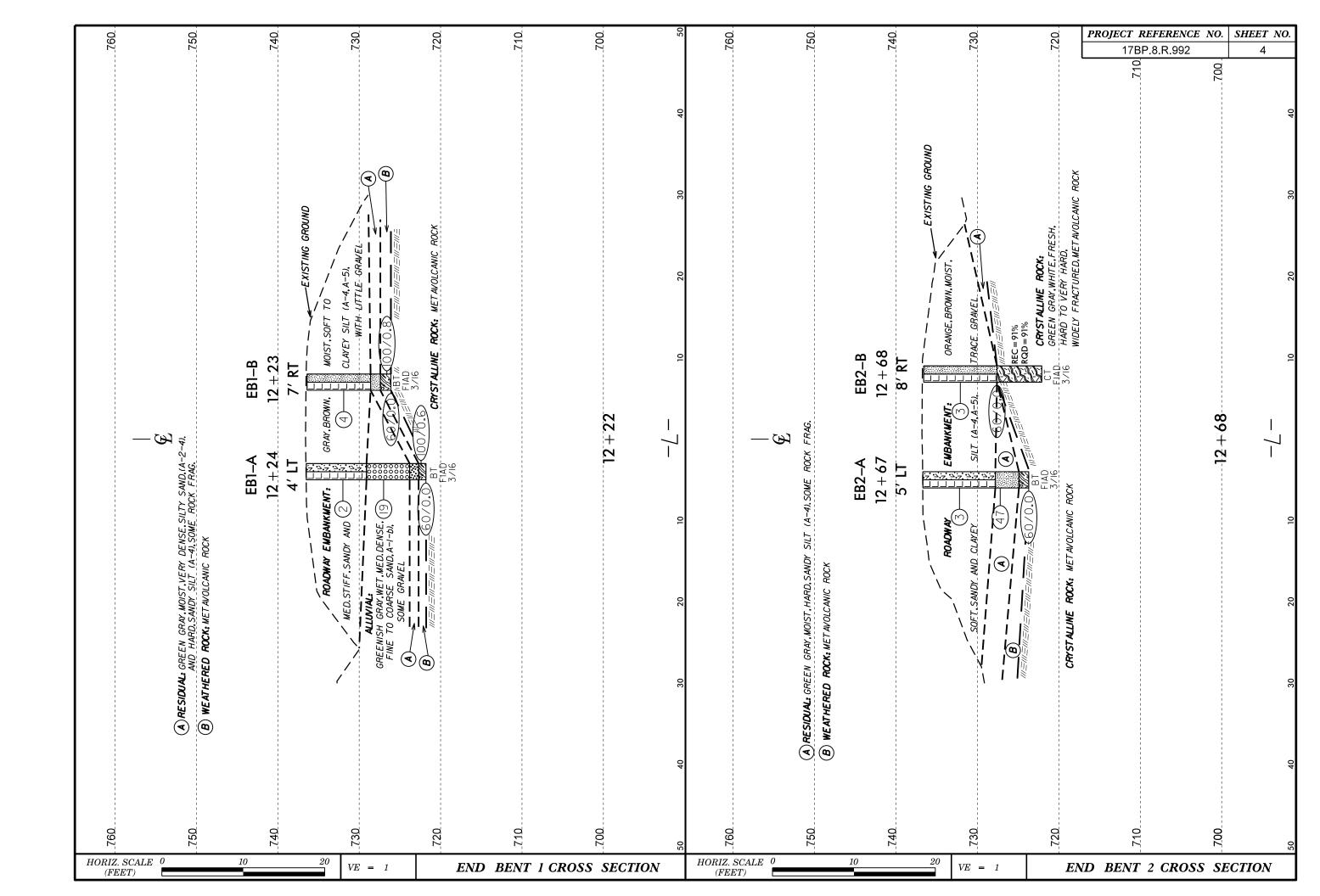
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

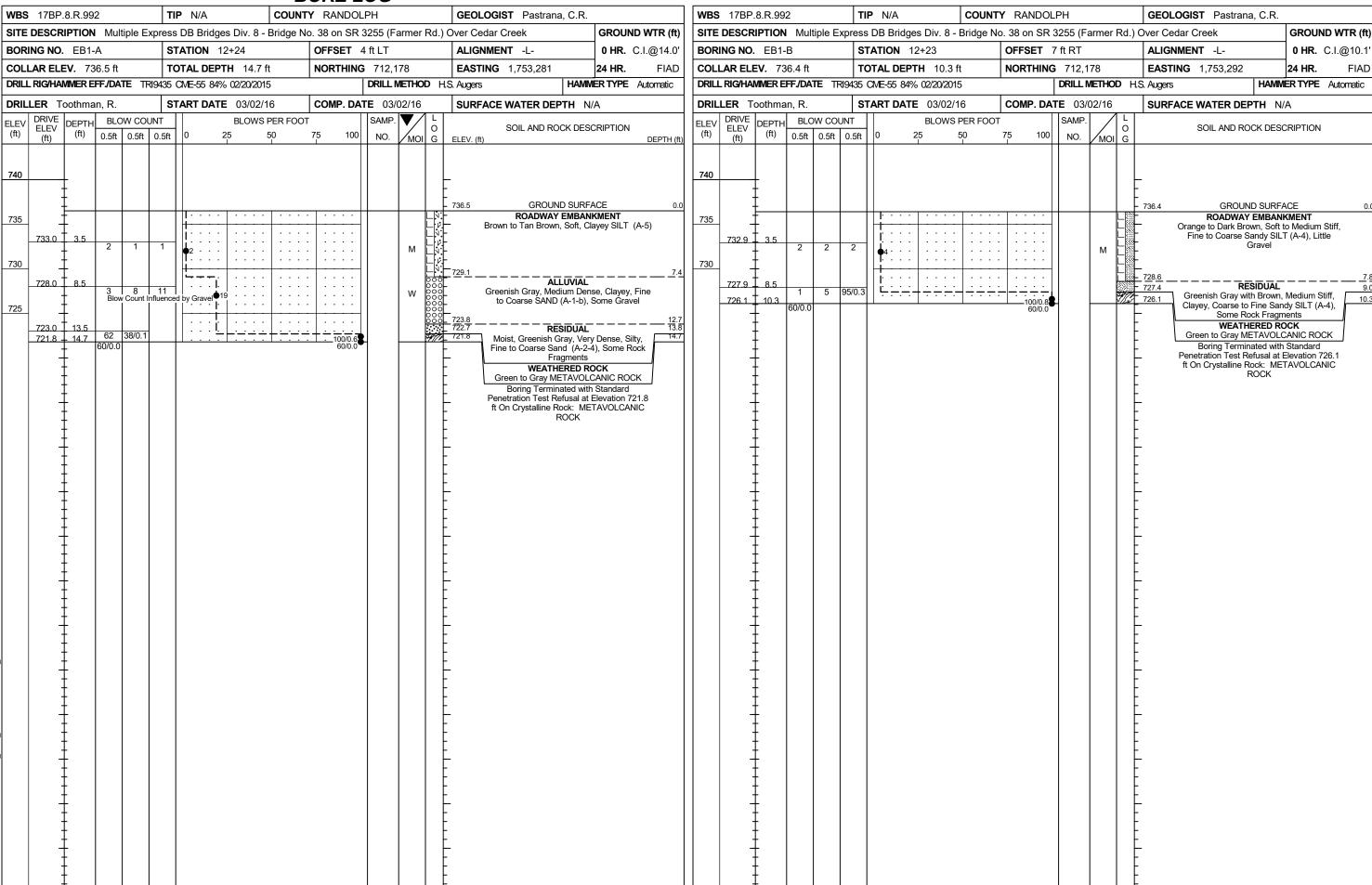
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	·	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EAF BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS T		<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.			
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D158	36). SOIL CLASSIFICATION	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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	AQUIFER - A WATER BEARING FORMATION OR STRATA.			
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCL CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER I	PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND			
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, E VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIC		THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVI			
SOIL LEGEND AND AASHTO CLASSIFICA		ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VILLE NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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 OF			
ENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS		MINERALOGICAL COMPOSITION	THE TO COARSE CRAIN ICNEOUS AND METAMORPHIC POCK THAT	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			
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	BOCK (CB) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	SURFACE.			
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A		ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	FINE TO COADE CRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6	A-3 A-6, A-7	COMPRESSIBILITY	NON-CHTSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTC OF SLOPE.			
SYMBOL 000000000000000000000000000000000000		SLIGHTLY COMPRESSIBLE LL $<$ 31 MODERATELY COMPRESSIBLE LL $=$ 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVI			
PASSING	SII T-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.			
	RANULAR CLAY MUCK.	PERCENTAGE OF MATERIAL	- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT			
200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	SOILS FEHT	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.			
TERIAL		TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.			
SING =40	SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE			
LL	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.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.			
OUP INDEX	AMOUNTS OF ORGANIC	GROUND WATER	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			
IAI TYPES STONE EPACS	ORGANIC SUILS		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.			
MAJOR GRAVEL, AND SAND CRAVEL AND SAND SOLIS SOLIS	MATTER	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.			
RIEMIALS SANU			MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.			
N. RATING EXCELLENT TO GOOD FAIR TO POOR F	POOR POOR UNSUITABLE	<u>VPW</u> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > L	11 - 30	SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE			
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.			
DANCE OF CTANDARD	RANGE OF UNCONFINED	_	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.			
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE	COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) DIP & DIP DIRECTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED			
(N-YALUE)	(TONS/FT ²)	┫ ╚ ╵	SEVERE ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.			
GENERALLY VERY LOOSE 4 TO 10		SOIL SYMBOL OPT ONT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.			
MATERIAL MEDIUM DENSE 10 TO 30	N/A	I 附	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.			
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50		ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRES			
VERY SOFT < 2	< 0.25	INFERRED SOIL BOUNDARY CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.			
GENERALLY SOFT 2 TO 4	0.25 TO 0.5	MW TEST BODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.			
SILT-CLAY MEDIUM STIFF 4 TO 8 MATERIAL STIFF 8 TO 15	0.5 TO 1.0 1 TO 2	MONITORING WELL WITH CORE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH			
(COHESIVE) VERY STIFF 15 TO 30	2 TO 4	PIEZOMETER SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF COR RUN AND EXPRESSED AS A PERCENTAGE.			
HARD > 30	> 4	INSTHEEHTION	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PAR			
TEXTURE OR GRAIN SIZE		RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.			
	270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND			
PENING (MM) 4.76 2.00 0.42 0.25 0.075	0.053	SHALLOW INCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.			
BOULDER COBBLE GRAVEL SAND SAND	SILT CLAY	UNDERCUT ONCEHOSIFIED EXCHANTION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAUL			
(BLDR.) (COB.) (GR.) (GSE. SD.) (F SD.)	(SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.			
RAIN MM 305 75 2.0 0.25	0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) O			
IZE IN. 12 3		BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO S			
SOIL MOISTURE - CORRELATION OF TE	ERMS	CL CLAY MOD MODERATELY γ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\rm d}$ - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.			
SOIL MOISTURE SCALE FIELD MOISTURE CUIDE FOR FIE	ELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY			
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIE	LD MOISTONE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.			
- SATURATED - USUALLY LIQUI	ID: VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	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			
(SAT.) FROM BELOW T	THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.			
LL _ LIOUID LIMIT	DUIDEC DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
ANGE Z SEMISULID; REU	DUIRES DRYING TO JM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: BMI, N 712552' E 1753253' BL STATION 5+00.00			
(PI) PL PLASTIC LIMITATTAIN OPTIMU		HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	SENSON THIRTING DIMING IT THE SEE E 1133233 DE STATION 3100:00			
- MOIST - (M) COLID. AT OR A	NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 761.84' FE			
OM _ OPTIMUM MOISTURE SL _ SHRINKAGE LIMIT	or rander motorone	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTEC.			
PEOLITIES ADDI	ITIONAL WATER TO	CME-45C CLAY BITS AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:			
- DRY - (D) ATTAIN OPTIMU		X 6° CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING			
PLASTICITY		X CME-55 CORE SIZE: -B -H	INDURATION				
	DDV CTDCNCT!!	!	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				
PLASTICITY INDEX (PI) NON PLASTIC 0-5	DRY STRENGTH VERY LOW	CME-550 HARD FACED FINGER BITS TUNG,-CARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS:				
SLIGHTLY PLASTIC 6-15	SLIGHT	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MODERATELY PLASTIC 16-25 HIGHLY PLASTIC 26 OR MORE	MEDIUM HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;				
	.,,,,,	PORTABLE HOIST TRICONESTEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.				
COLOR		TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YE	LLOW-BROWN, BLUE-GRAY).	X CORE BIT VANE SHEAR TEST					
MODIFIEDS SHOW AS A FOUR DADY STREAMED FIRE ARE HOLD TO DESC	CRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:				
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESC		I	SAMPLE BREAKS ACROSS GRAINS.	DATE: 8			

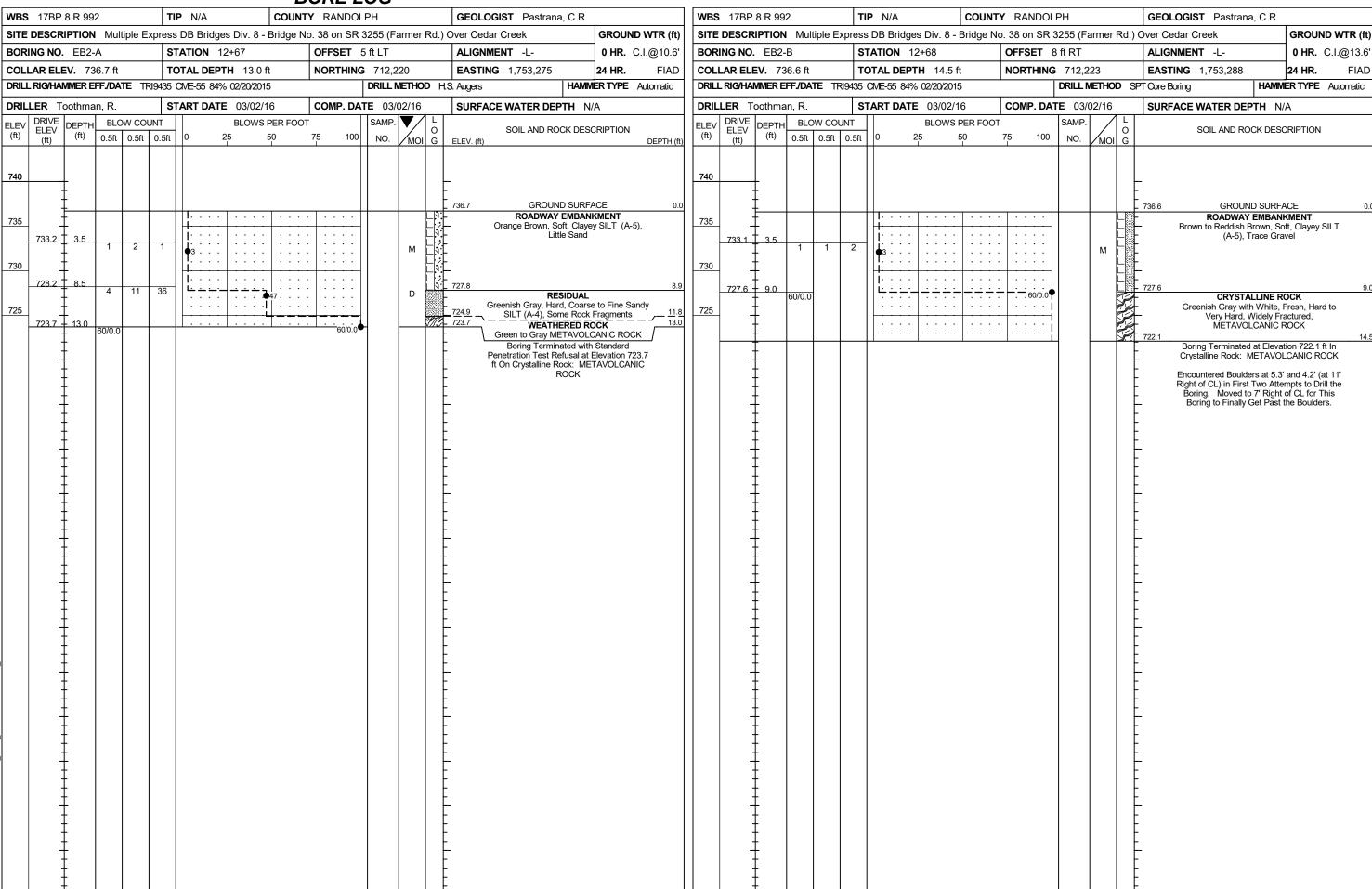




GEOTECHNICAL BORING REPORT BORE LOG



GEOTECHNICAL BORING REPORT BORE LOG



GEOTECHNICAL BORING REPORT CORE LOG

COLLAR ELEV. 736.6 ft TOTAL DEPTH 14.5 ft NORTHING 712,223 EASTING 1,753,288 24 HR. FI DRILL RIG/HAMMER EFF/DATE TRI9435 CWE-55 84% 02/20/2015 DRILL METHOD SPT Core Boring HAMMER TYPE Automa DRILLER Toothman, R. START DATE 03/02/16 COMP. DATE 03/02/16 SURFACE WATER DEPTH N/A CORE SIZE NQ2 TOTAL RUN 5.5 ft TOTAL RUN 5.5 ft DESCRIPTION AND REMARKS ELEV (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)										L	<u>UI</u>	RE LOG					
BORING NO. EB2-B STATION 12+68 OFFSET 8 ft RT ALIGNMENT -L- 0 HR. C.I.@1:	WBS	NBS 17BP.8.R.992				TIP N/A COUNT				OUNT	ΥF	ANDOLPH	GEOLOGIST Pastrana, C.R.				
COLLAR ELEV. 736.6 ft TOTAL DEPTH 14.5 ft NORTHING 712,223 EASTING 1,753,288 24 HR. FI	SITE	SITE DESCRIPTION Multiple Exp					B Brid	ges Div. 8	3 - Bri	dge N	o. 38	on SR 3255 (Farmer Rd.)	Over Cedar Creek			GROUN	ND WTR (ft)
DRILL RIG/HAMMER EFF/DATE TRI9435 CME-55 84% 02/20/2015 DRILL METHOD SPT Core Boring HAMMER TYPE Automate A	BORING NO. EB2-B					STA	ΓΙΟΝ	12+68			OF	FSET 8 ft RT	ALIGNMENT -L-			0 HR.	C.I.@13.6
DRILLER Toothman, R. START DATE 03/02/16 COMP. DATE 03/02/16 SURFACE WATER DEPTH N/A	COLLAR ELEV. 736.6 ft					тот	AL DE	PTH 14.	.5 ft		NO	RTHING 712,223	EASTING 1,753,288 24 HR			24 HR.	FIAD
CORE SIZE NQ2 TOTAL RUN 5.5 ft	DRILL RIG/HAMMER EFF/DATE TRI9 DRILLER Toothman, R.										•	DRILL METHOD SI	PT Core Boring HAMI			ER TYPE	Automatic
RUN C(ft) RUN C(ft) RUN C(ft) RUN C(ft) RATE											СО	MP. DATE 03/02/16	SURFACE	WATER DEF	PTH N/	A	
727.6 9.0 2.5 3:34/0.5 (2.1) (2.1) (5.0) 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91%	COR	E SIZE	NQ2			тот	AL RU	N 5.5 ft					1				
727.6 9.0 2.5 3:34/0.5 (2.1) (2.1) (5.0) 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91%	ELEV		DUN DUN RUN						STF REC.	RATA	L DESCRIPTION AND DEMARKS						
727.6 + 9.0 2.5 3:34/0.5 (2.1) (2.1) (2.1) (5.0) 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91%	(ft)		(ft)	(ft)		(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ		DECORUT FICIA	7 UVD TYLIVI7 UV			DEPTH (f
Encountered Boulders at 5.3' and 4.2' (at 11' Right of CL) in First Two Attempts to Drill the Boring. Moved to 7' Right of CL for This Boring	727.6	727.6	90	2.5	2:24/0 5	(2.1)	(2.1)		(F.O)	(5.0)		707.6					9.
Encountered Boulders at 5.3' and 4.2' (at 11' Right of CL) in First Two Attempts to Drill the Boring. Moved to 7' Right of CL for This Boring	725		l	2.5	N=60/0.0 3:34/0.5	84%	(2.1) (2.1) (84% 94% 9			91%			h White, Fresh,	Hard to Very H		ely Fractur	
Encountered Boulders at 5.3' and 4.2' (at 11' Right of CL) in First Two Attempts to Drill the Boring. Moved to 7' Right of CL for This Boring		-		3.0	3:43/1.0 3:42/1.0	(2.9) 97%						-	METAVOL	CANIC ROCK			
Encountered Boulders at 5.3' and 4.2' (at 11' Right of CL) in First Two Attempts to Drill the Boring. Moved to 7' Right of CL for This Boring		722.1	14.5		3:26/1.0 4:14/1.0 4:35/1.0	_							inated at Elevat	ion 722.1 ft In	Crystalline	Rock:	14.
Attempts to Drill the Boring. Moved to 7' Right of CL for This Boring		_	-		1.00/ 1.0							_	METAVOL	CANIC ROCK	-		
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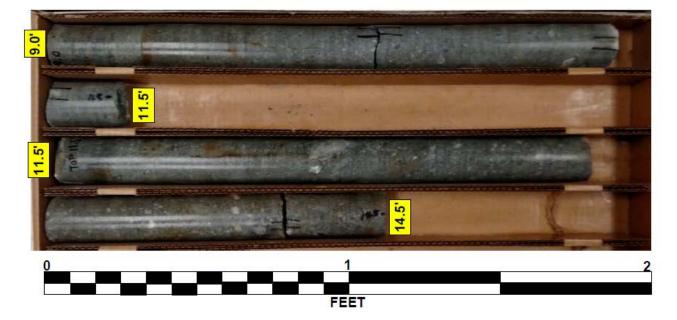
SHEET 7

CORE PHOTOGRAPH

WBS No. 17BP.8.R.992
Bridge No. 38 on SR 3255 (Farmer Rd.) over Cedar Fork
Creek

EB2-B

9.0 Feet to 14.5 Feet



SITE PHOTO

BRIDGE NO. 0038 ON SR 3255 (FARMER ROAD) OVER CEDAR FORK CREEK



Looking Upstation from Sta. 12+00, -L-