STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CONTENTS

24012

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SHEET DESCRIPTION

I TITLE SHEET

2 LEGEND

3 SITE PLAN

4 PROFILE

5 BORE LOGS

## STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>17BP.2.R.56 (SF-240124)</u> F.A. PROJ. COUNTY <u>CRAVEN</u>
PROJECT DESCRIPTION <u>CULVERT NO. 124 ON SR 1433 (ANTIOCH</u>
RD.) OVER MILLS BRANCH AT -L- STA. 14+76

N.C. SF-240124 1 5

## 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 LOSS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN PALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 TOT-080, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOSS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CECTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUBFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BRINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN STIL WIN-PLACEITEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INNERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOSITURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND VARY CONSIDERABLY WITH TWA ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

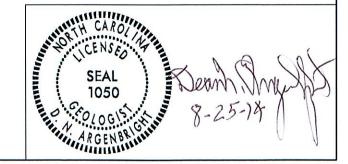
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSUPFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PLANS REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS 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 AN THE SITE OFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

-	J.L. STUNE
	J.K. CRENSHAW
	R.E. SMITH
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INVESTIGATED B	Y_D.N. ARGENBRIGHT
CHECKED BY	D.N. ARGENBRIGHT

D.N. ARGENBRIGHT

AUGUST 2014

**PERSONNEL** 



SUBMITTED BY

DRAWN BY: C.P. TURNER

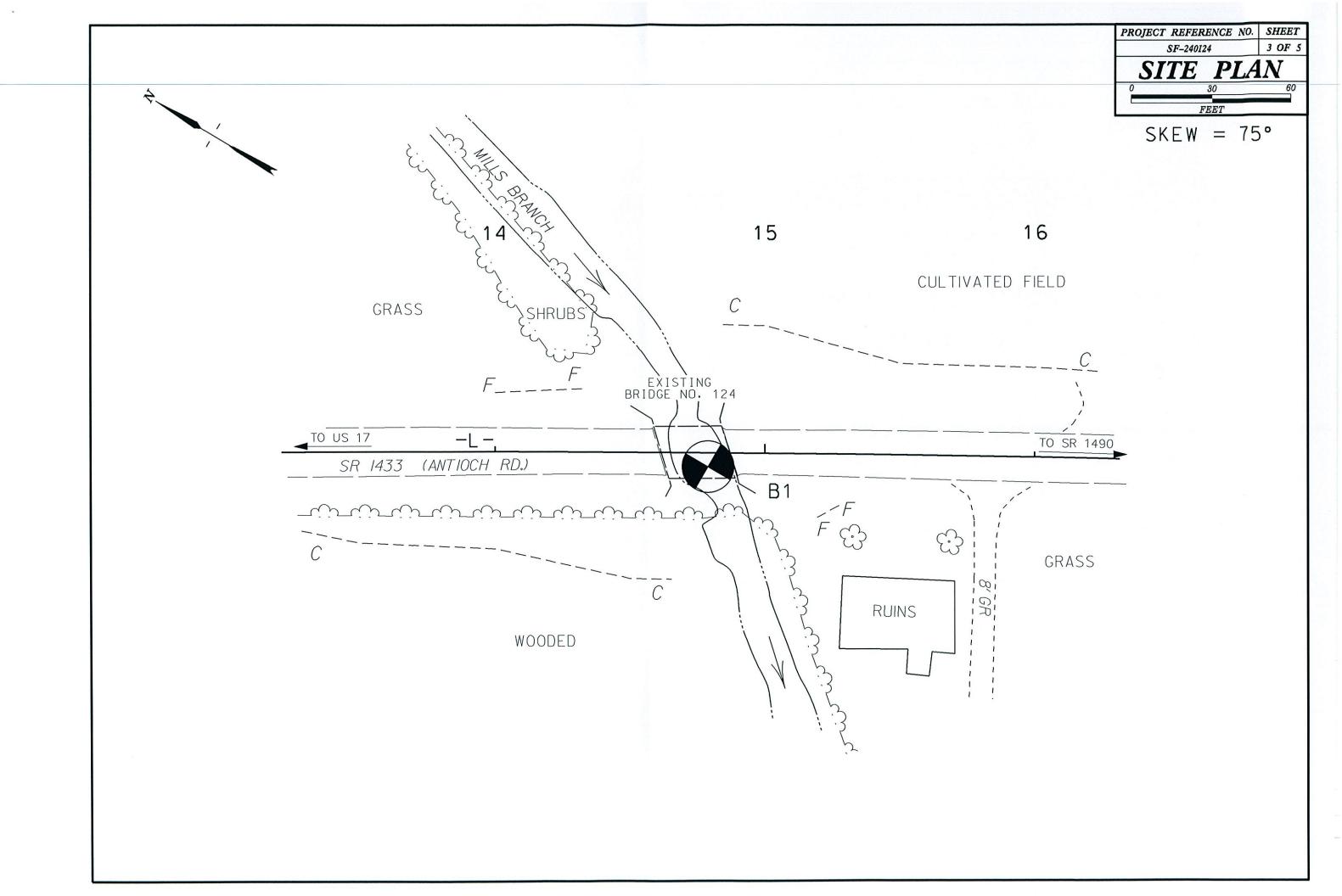
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FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

## 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 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			NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ICATES 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 188 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T285, 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. AL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE					
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		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,				
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,		WEATHERED	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.				
VERY STIFF, GRAY, SUTY CLAY, WORST WITH WITERBEDGED FAME SAMO LAVERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR)	BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL				
SOIL LEGEND AND AASHTO CLASSIFICATION  SENERAL GRANNI OR MATERIALS SILT-CLAY MATERIALS MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS		CRYSTALLINE	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	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)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR)	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 ROCK (NCR)	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				
000000000	A-6, A-7 SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIDUID LIMIT EDUAL TO 31-50 HIGHLY COMPRESSIBLE LIDUID LIMIT GREATER THAN 50		INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.  CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL				
SYMBOL 5000000000000000000000000000000000000			K SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.				
Z PASSING SILT- SILT- PERCENTAGE OF PIATEMAL		(CP)	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.				
* 10 58 MX   GRANULAR CLAY   MUCK, SOILS   SOILS   SOILS	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL	FRESH RO	CK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE				
■ 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER         2 - 3%         3 - 5%         TRACE         1 - 10%           LITTLE ORGANIC MATTER         3 - 5%         5 - 12%         LITTLE         10 - 20%	HA	MMER IF CRYSTALLINE.	HORIZONTAL.				
LIOUJO LIMIT 48 MX 41 MN 50 ILS WITH PLASTIC INDEX 6 MX NP 18 MX 18 MX 18 MX 18 MX 18 MX 11 MN 11 MN 11 TITLE OR	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT RO	CK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, YSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.				
GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX No MX LITTLE OR HIGHLY ORGANIC	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND AI GROUND WATER	OF OF	A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE				
USUAL TYPES STONE FRACS. AMOUNTS OF SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		CK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO NCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.				
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS		YSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.				
MATERIALS SANU			SNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN ANITOID 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.				
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DU	LL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY				
P1 OF A-7-5 SUBGROUP IS ≤ LL - 30 ; P1 OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP		TH FRESH ROCK. L ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.				
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AN	DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.				
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	PI NORDWAY ENDARKNERY WAS DET DRI DET DET BURING	TEST BORING IF	D CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.  TESTED, WOULD YIELD SPI REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.				
CONSISTENCY (N-VALUE) (TONS/F12 )	- LII		L ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO				
GENERALLY VERY LOOSE 4  CRANN OR LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING		STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME TENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.				
MATERIAL MEDIUM DENSE 10 TO 30 N/A		SPT REFUSAL IF	TESTED, YIELDS SPT N VALUES > 100 BPF	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				
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	THAN ROADWAY EMBANKMENT		L ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT E 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 (2 (0.25	- INFERRED SOIL BOUNDARY "O MONITORING WELL	RE	MAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.				
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	INFERRED ROCK LINE  A PIEZOMETER INSTALLATION		STIGES OF THE ORIGINAL ROCK FABRIC REMAIN. 15 TESTED, YIELDS SPT N VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.				
MATERIAL STIFF 8 TO 15 1 TO 2	***** ALLUVIAL SOIL BOUNDARY SLOPE INDICATOR		CK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND ATTERED CONCENTRATIONS, DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF				
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 INSTALLATION  HARD >30 >4 25/825 DIP & DIP DIRECTION OF		ALS	SO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND				
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES CONE PENETROMETER TEST		ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.				
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD		ANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES EVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.				
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS		AN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REDUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH JTS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL				
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL MED MEDIUM VST - VANE S	SHEAR TEST	D DETACH HAND SPECIMEN.	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.				
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEDUS WEA WEATH	HERED MODERATELY C	AN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE XCAVATED 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				
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MOD MODERATELY 7 - UNIT WE CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT	NIT WEIGHT B	Y MODERATE BLOWS.	SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (\$PT) - NUMBER OF BLOWS (N OR BPF) OF				
SIZE IN. 12 3 CSE COARSE ORG ORGANIC		All the contract of the contra	AN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  AN BE EXCAVATED IN SMALL CHIPS TO PEICES I 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				
SOIL MOISTURE - CORRELATION OF TERMS  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP, - SAPROLITIC S - BULK		P	DINT OF A GEOLOGIST'S PICK.	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 GUIDE FOR FIELD MOISTURE DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION	# - VOID RATIO SD SAND, SANDY SS - SPLIT S F - FINE SL SILT, SILTY ST - SHELBY	Control Contro	AN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS ROM 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				
- SATURATED - USUALLY LIDUID; VERY WET, USUALLY	FOSS FPSSILIFEROUS SLI SLIGHTLY RS - ROCK	P	IECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY				
(SAT.) FROM BELOW THE GROUND WATER TABLE			AN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH R 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				
PLASTIC SEMISOLID, REDUIRES DRYING TO	HI HIGHLY V - VERY RATIO	10 F	INGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.				
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT		CTURE SPACING BEDDING  SPACING IERM IHICKNESS					
PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM	SERVINO VERY THICKLY PERPER	BENCH MARK: NCGS MONUMENT "CRA 142" AT -L- STA. 12+74.48, 98.12' LT				
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	CLAY BITS X AUTOMATIC		MORE THAN 10 FEET THICKLY BEDDED 1.5 - 4 FEET THICKLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 12.60 FT.				
SL _ SHRINKAGE LIMIT	- I MOBILE 8	MODERATELY CLOSE	VERY THINLY BEDDED 0.03 - 0.16 FEET					
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		VERY CLOSE	LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTES:				
PLASTICITY	S HOLLOW HODERS		INDURATION					
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH	_ CME-45C	FOR SEDIMENTARY	ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.					
NONPLASTIC 0-5 VERY LOW	X CME-550 TUNG,-CARBIDE INSERTS	FRIAB	RUBBING WITH FINGER FREES NUMEROUS GRAINS;					
LOW PLASTICITY 6-15 SLIGHT	X CASING W/ ADVANCER HAND TOOLS:		GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.					
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2 15/16 STEEL TEETH POST HOLE	PACE 1	ATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.					
COLOR	TRICONE TRUCONE TOURGCARB. HAND AUGE	THE PARTY OF THE P	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;					
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING I	100	DIFFICULT TO BREAK WITH HAMMER.					
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTRE	MELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.					



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45	PROI	FILE THE	ROUGH	BORING	S PRO	<b>JECTE</b>	D ALO	NG $-L$ -		INCOMPLETION OF THE PROPERTY O	E PLANS
.40										PRELIMINAR DO NOT USB FOLCE	CONSTRUCTION
.35										VE =	5.0
.30											
.25					31 - 79 RT						
20											
. 15			WATER SUF	RFACE 03/14 —							
_10					V	— PROPOSED	CULVERT				
.5.				4	7						
.0.				DOSE TO (13)	000	M DENSE					
-5			1 1 1	ND-IV-IDED	SS COAST-A	RATED PLA-IN					
-IO				( <del>5</del> )	0000						
-15			VER WET		GRAY S	ANDY SILT,	-				
-20			; ; ;+		<del></del>	IMESTONE	-				
-25				(RIVER BEND	FORMATION	)					
-30											
-35 A LOC	OSE TAN SAND, SATURA	TED (ALLUVIAL)									
-40								NOTE: GROUN FROM B DESIGN	DLINE PROFILE RIDGE SURVEY REPORT DATE	ALONG -L- TAKE AND HYDRAULIC 0 06/12/14.	EN C
-45								NOTE: INFERRED THROUGH PROJECTE			
-50	12+00	13+00	14+	+00	15+00		16+00		-00	18+(	00

BORELOG REPORT TIP SF-240124 COUNTY CRAVEN GEOLOGIST Stone, J. L. WBS 17BP.2.R.56 **GROUND WTR (ft)** SITE DESCRIPTION CULVERT NO. 124 ON -L- (SR 1433) OVER MILLS BRANCH ALIGNMENT -L-N/A BORING NO. B1 STATION 14+79 OFFSET 5 ft RT 0 HR. N/A COLLAR ELEV. 5.9 ft TOTAL DEPTH 26.4 ft **NORTHING** 525,155 **EASTING** 2,581,465 24 HR. DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550X 89% 05/19/2014 DRILL METHOD Mud Rotary HAMMER TYPE Automatic **START DATE** 08/22/14 COMP. DATE 08/22/14 SURFACE WATER DEPTH 1.3ft DRILLER Smith, R. E. ELEV DRIVE SAMP. **BLOW COUNT** DEPTH SOIL AND ROCK DESCRIPTION ELEV (ft) NO. MOI G (ft) 0.5ft 0.5ft 0.5ft 75 100 DEPTH (ft) 10 WATER SURFACE (08/22/14) \_\_\_\_\_\_ V ALLUVIAL TAN SAND, SAT. UNDIVIDED COASTAL PLAIN GRAY SAND, SAT. -9.0 -10 . . . . COASTAL PLAIN
GRAY SANDY SILT, WET
(RIVER BEND FORMATION) -14.0 19.9 . . . . 13 18 4 . . . . COASTAL PLAIN . . . . -19.0 7 24.9 **GRAY LIMESTONE** (RIVER BEND FORMATION) Boring Terminated at Elevation -20.5 ft in Limestone

SHEET 5 OF 5