SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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# STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY **LENOIR** 

PROJECT DESCRIPTION C.F. HARVEY PARKWAY AND NC 58 TO INTERSECTION OF NC 11 AND GRANGER STATION ROAD GRADING, PAVING, DRAINAGE, STRUCTURES AND SIGNALS SITE DESCRIPTION BRIDGE NO. 216 AND NO. 217 ON -L-(FELIX HARVEY PARKWAY) OVER -Y6- (FERRELL ROAD)

#### **INVENTORY**

STATE PROJECT REFERENCE NO. 33 R - 5703

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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 1999 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE, INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVEL OS 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 HOLD WATER LEVELS OF SOIL MOISTURE CONDITION. 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 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 DES ON TO WARRANT OR GUARANTEE 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 NICESSARY TO SATISFY 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 WAIVES ANY CLAIMS
  FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASSED ON DIFFERENCES BETWEEN THE
  CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

K. HILL S. MITCHELL S. TIERNAN C. CHANDLER F. WRIGHT E. BLONSHINE J. PEELE M. RAWLS INVESTIGATED BY \_S&ME, INC. DRAWN BY C. CHANDLER CHECKED BY S. MITCHELL SUBMITTED BY \_S&ME, INC. DATE \_FEBRUARY, 2017

S. LANEY



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED** 

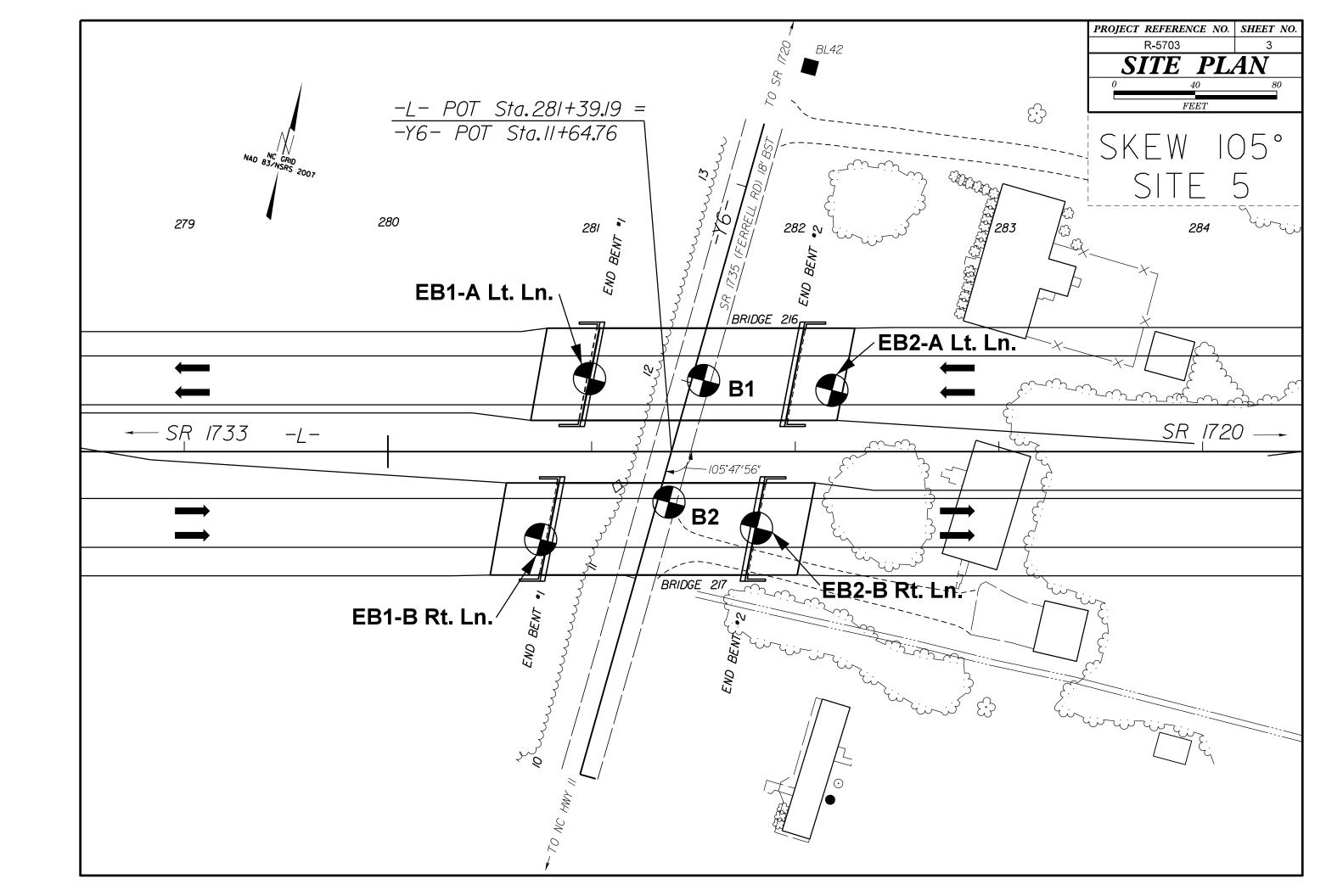
PROJECT REFERENCE NO. SHEET NO. 2

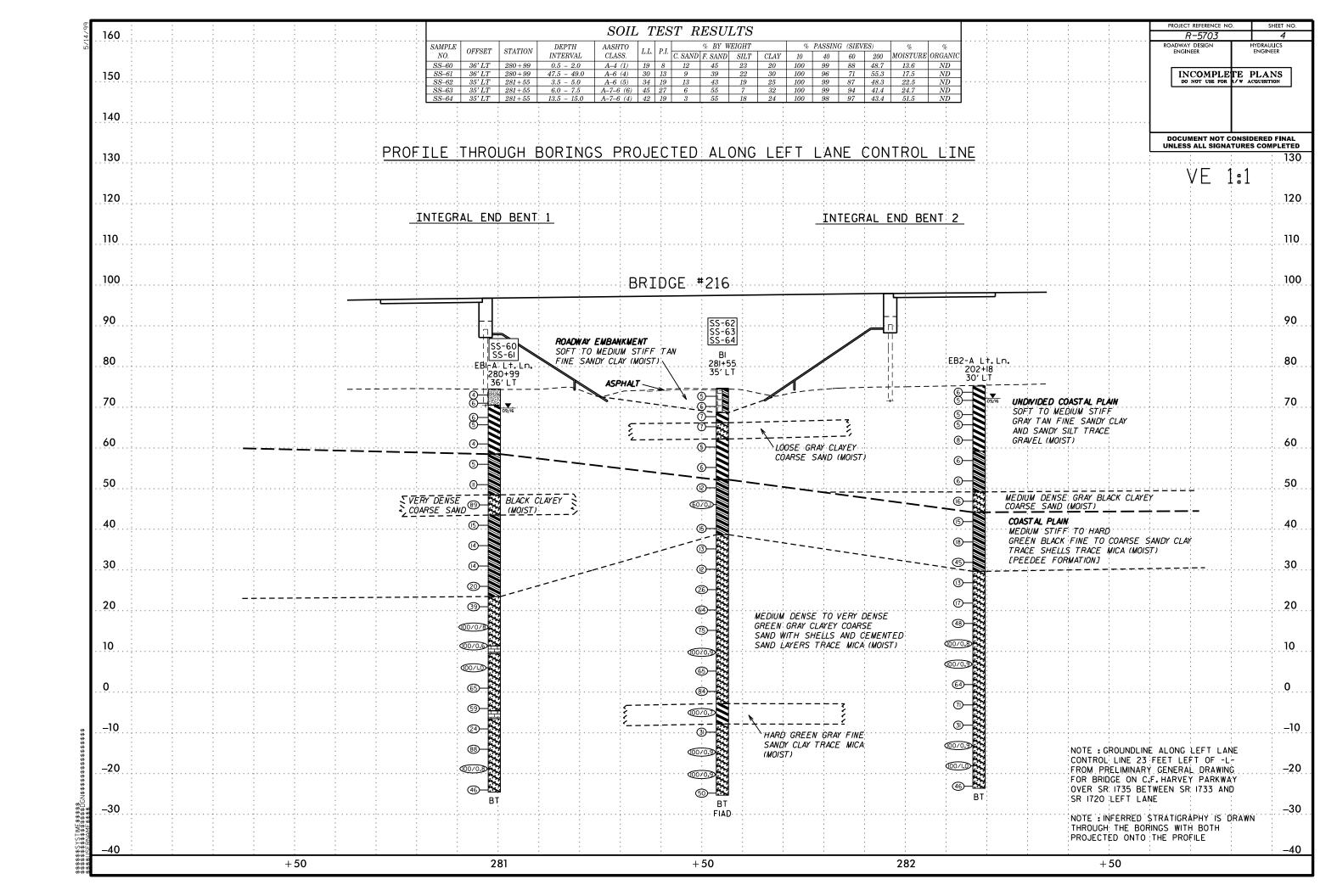
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

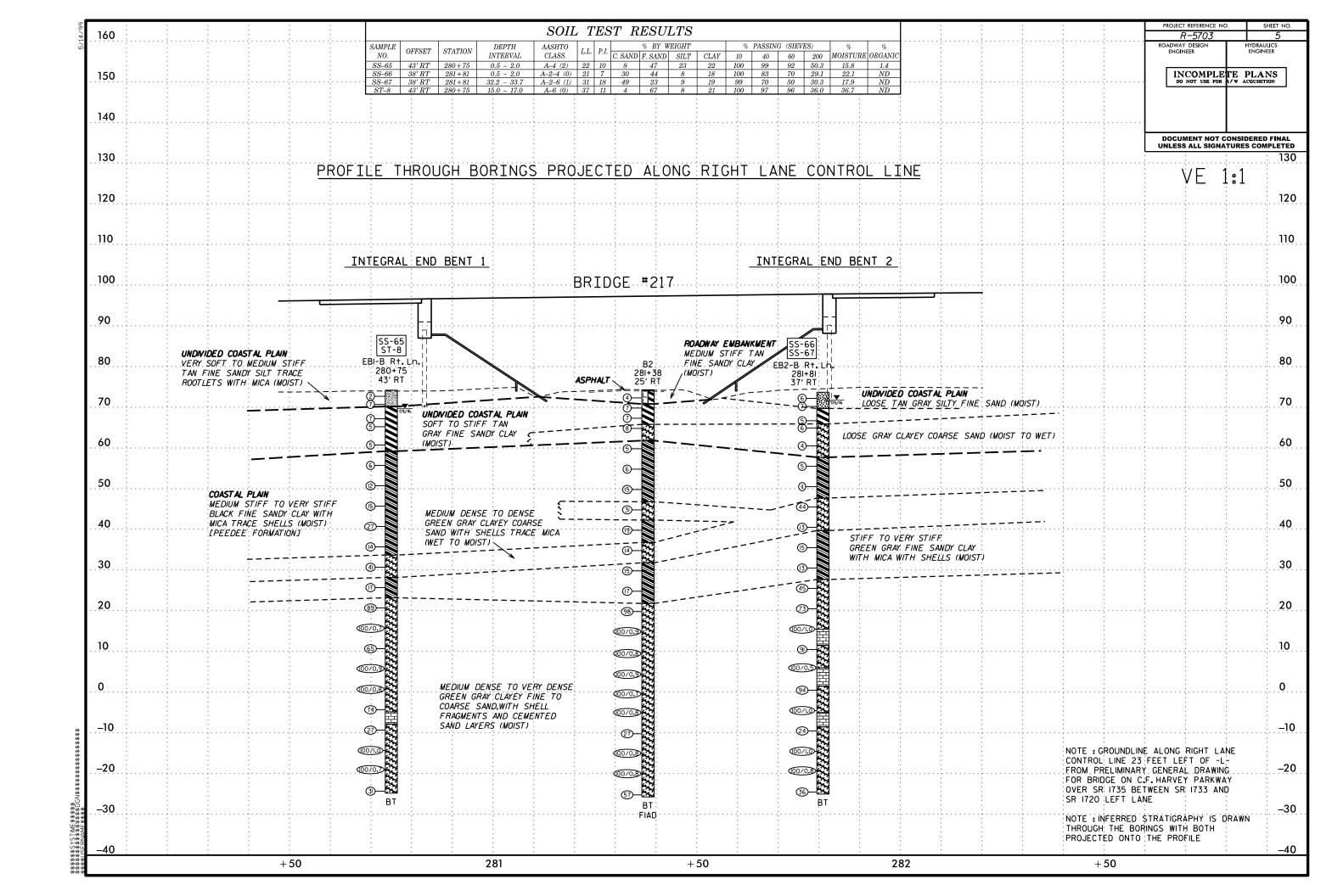
# SUBSURFACE INVESTIGATION

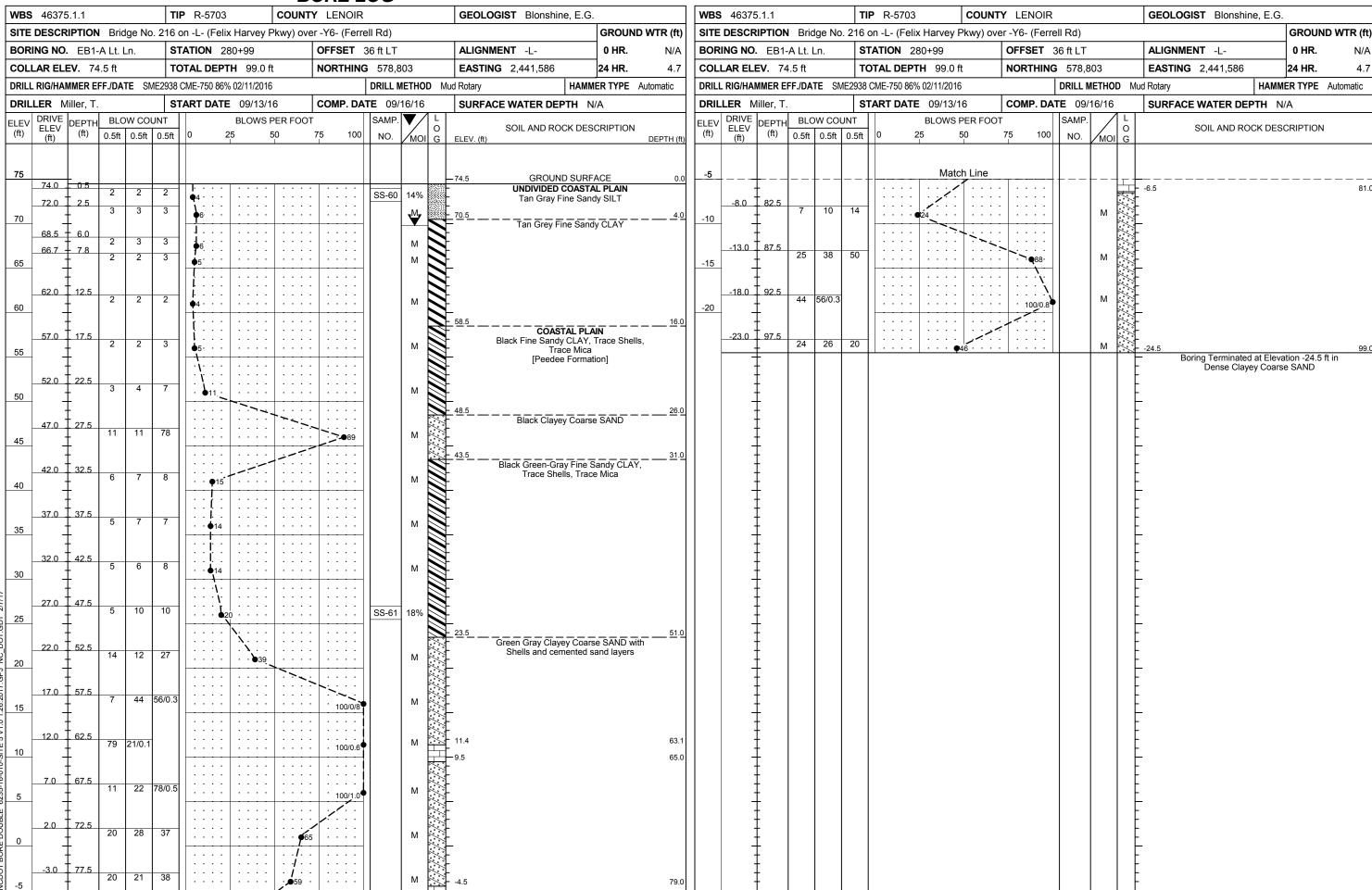
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

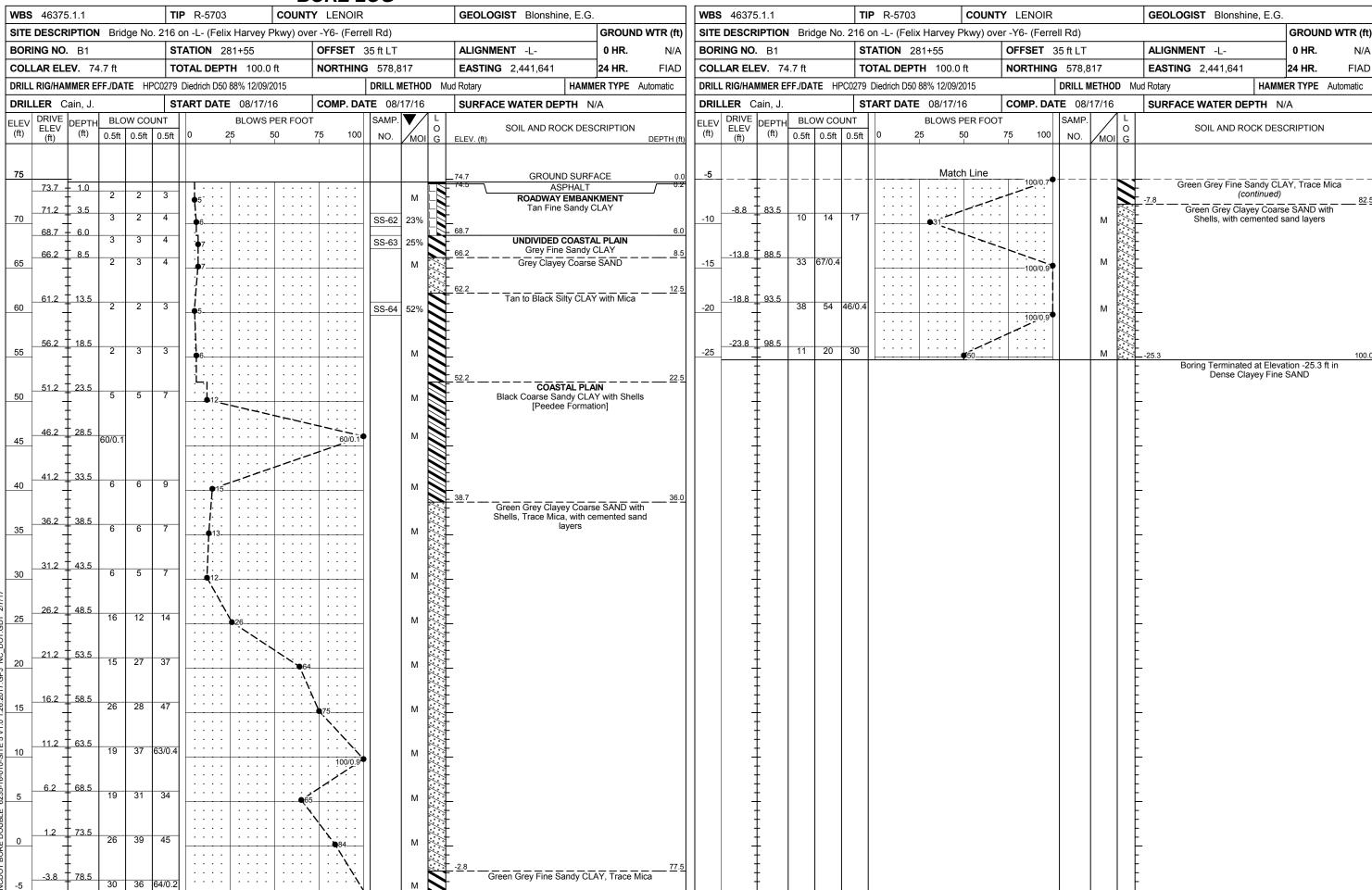
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. 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 INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER 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, ETC. FOR EXAMPLE,  VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS OPERANC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. (\$\(\sigma\) 95/ PASSING "200) (> 35/, PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD FIELD SPI REFUSAL IF TESTED, ROCK TIPE INCLUDES GRANTE,	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1 A-2 A-4 A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-5 A-6 A-7 A-1 A-2 A-4 A-5 A-6 A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK (NCR)  ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN  COASTAL PLAIN  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	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.
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. 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 S6 MN	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.
MATERIAL DAGGIO MA	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 48 MX 41 MN LITTLE OR	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, (V SLI.) CRYSTALS 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
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 11 MN 11 MN MODERATE OPENALS	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
URUUP INUEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMUUNIS UF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAIOR GRAVEL AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	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 SOILS SOILS	STATIC WATER LEVEL AFTER 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 SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE		(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.  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 > LL - 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	FIELO.
COMPACTNIESS OF RANGE OF STANDARD RANGE OF UNCONFINED	III 25 / 25 / 25 / 25 / 25 / 25 / 25 / 2	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,  IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  ROADWAY EMBANKMENT (RE)  DIP & DIP DIRECTION  OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL  SPT DATE TEST BORING  SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LUUSE 4 10 10 10 N/A	APTICION CILL (ACLOTHER C	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL DENSE 30 TO 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	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY DENSE         > 50           VERY SOFT         < 2	INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE 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 0.5	TECT PODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2	WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ 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 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	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	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCOT UNSUITABLE WASTE	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
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE 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	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  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
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\dot{\gamma}_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS 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	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	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
(SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           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	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 PLASTIC PROVIDE ADVING 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.
RANGE - WET - (W) SEMISULID; REUDIRES DRYING TO	FRAGS FRAGMENTS $w$ - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BL-42
(PI) PL PLASTIC LIMITATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM         SPACING         TERM         THICKNESS           VERY WIDE         MORE THAN 10 FEET         VERY THICKLY BEDDED         4 FEET	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N 578,979.2720 E 2,441,651.4540 ELEVATION: 74.53 FEET
SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATLEY AFTER DRILLING
	CME-55	THINLY LAMINATED < 0.008 FEET  INDURATION	1
PLASTICITY	<b>-</b>	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1
PLASTICITY INDEX (PI) DRY STRENGTH  NON PLASTIC 0-5 VERY LOW	TUNG-CARRIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS:	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST Y CASING WY ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG-CARB.	CRAING ARE DISCIPLE TO SERARATE WITH STEEL BRODE.	
	X   _CME-750	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT   VANE SHEAR TEST   X D-50	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

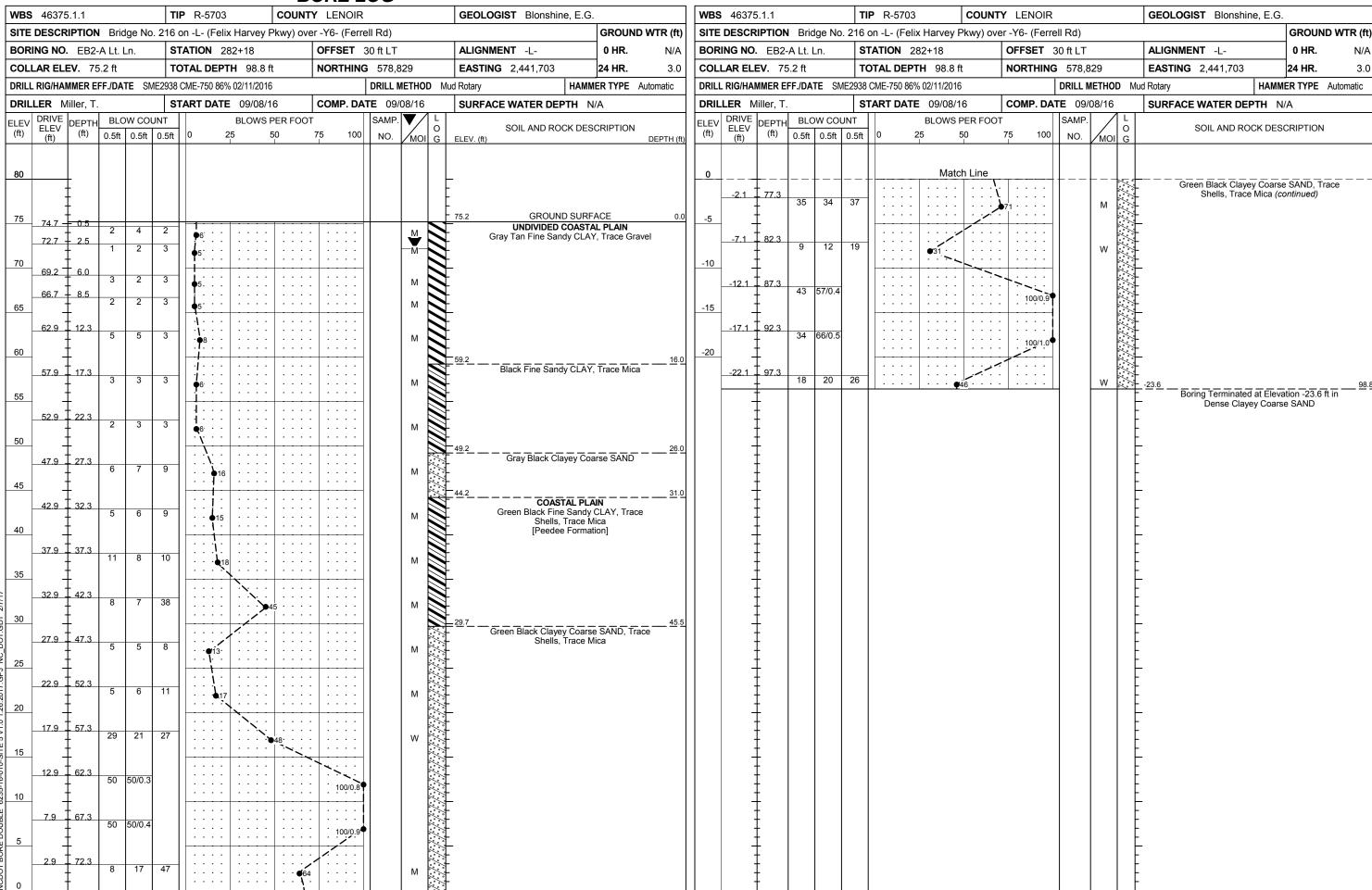


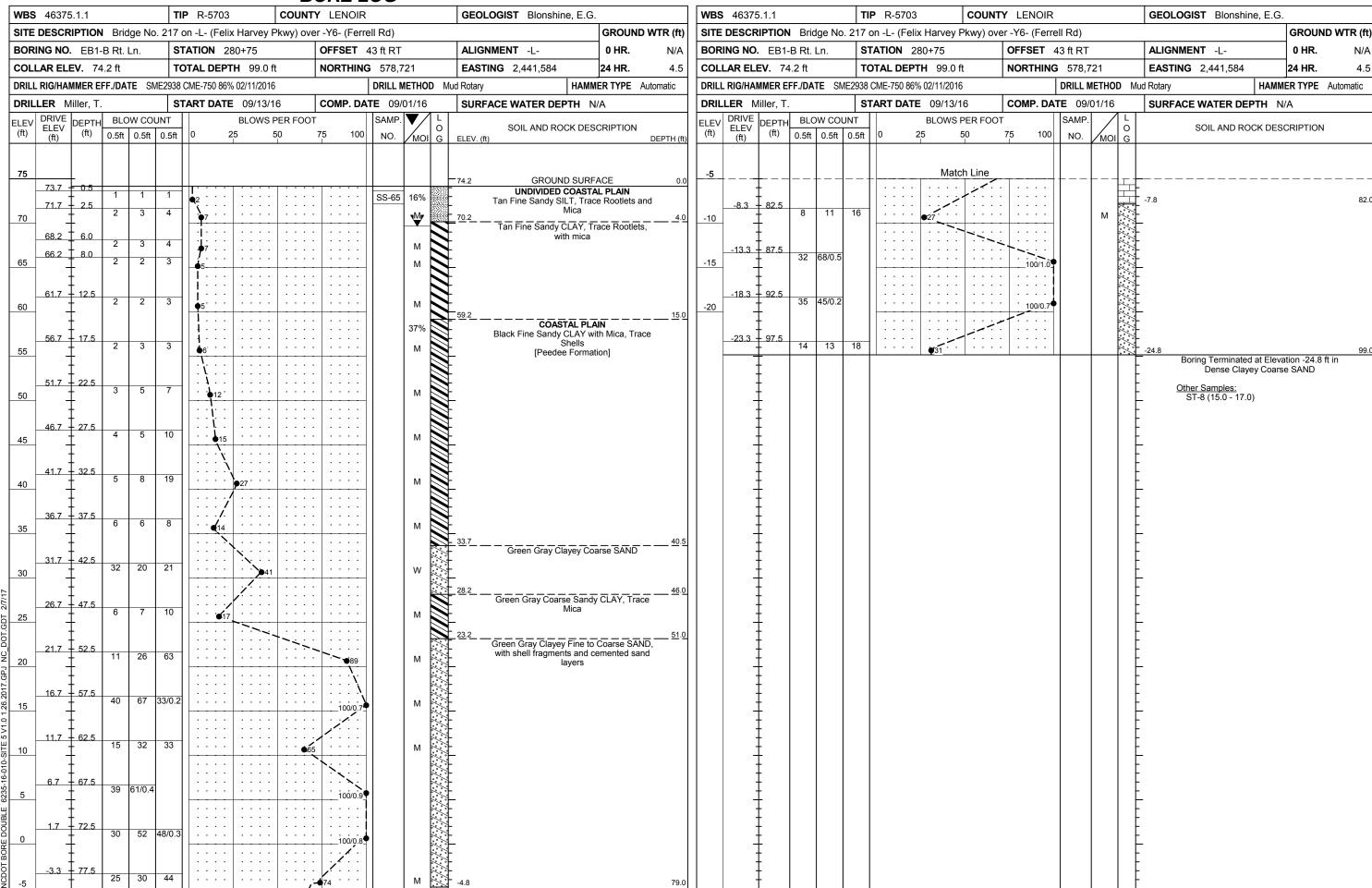


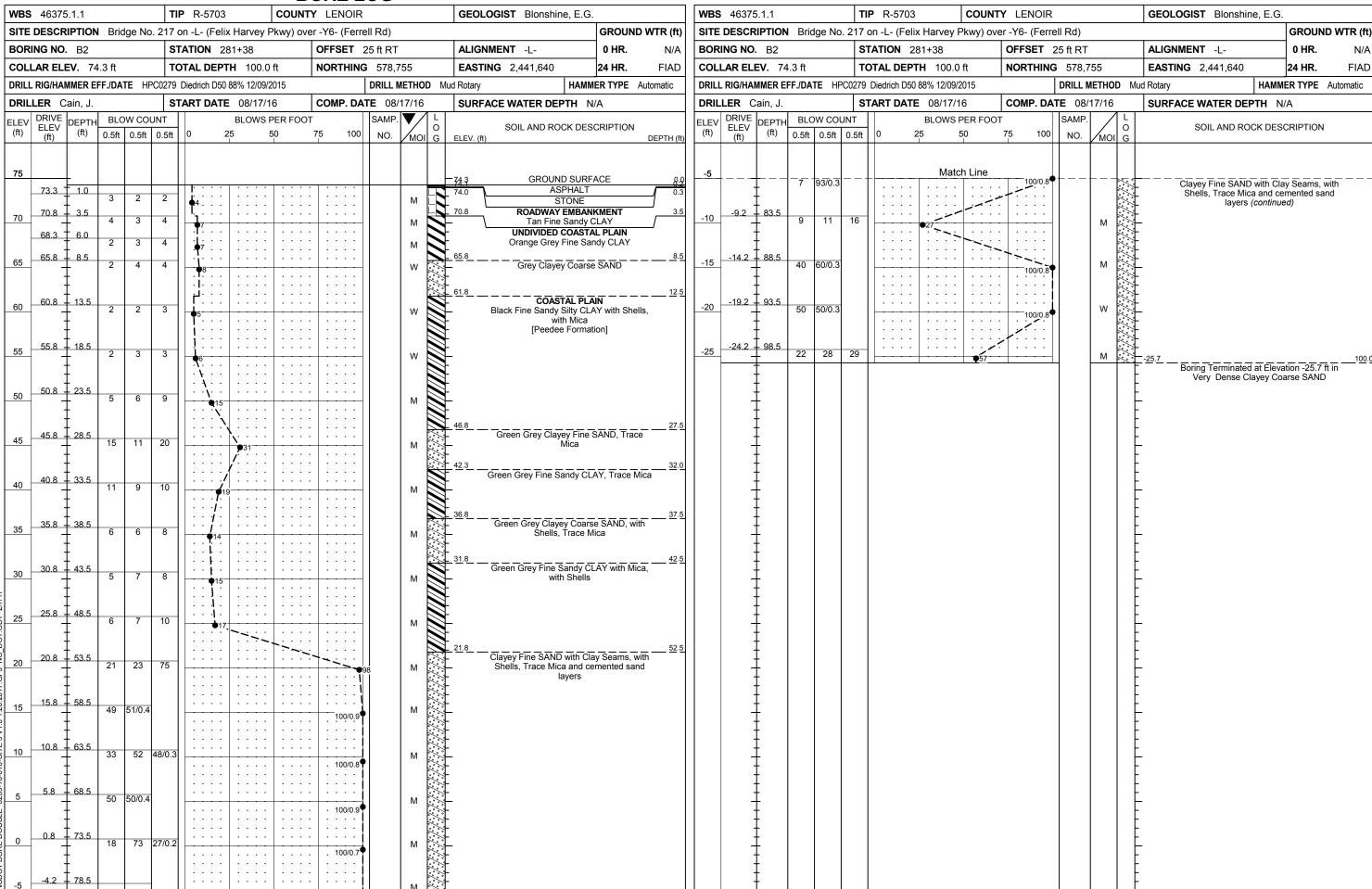












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<b>WBS</b> 46375.1.1	TIP R-5703 COUNTY LENOIR	GEOLOGIST Blonshine, E.G.	WBS 46375.1.1	TIP R-5703 COUNTY		GEOLOGIST Blonshine, E.G.
	17 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)	GROUND WTR (ft)		217 on -L- (Felix Harvey Pkwy) over -		GROUND WTR (ft)
BORING NO. EB2-B Rt. Ln.	STATION 281+81 OFFSET 38 ft RT	ALIGNMENT -L- 0 HR. N/A	BORING NO. EB2-B Rt. Ln.		OFFSET 38 ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 73.7 ft	<b>TOTAL DEPTH</b> 98.7 ft <b>NORTHING</b> 578,754	<b>EASTING</b> 2,441,685 <b>24 HR.</b> 1.9	COLLAR ELEV. 73.7 ft	TOTAL DEPTH 98.7 ft	<b>IORTHING</b> 578,754	<b>EASTING</b> 2,441,685 <b>24 HR.</b> 1.9
DRILL RIG/HAMMER EFF./DATE SME2	938 CME-750 86% 02/11/2016 DRILL METHO	Mud Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME	E2938 CME-750 86% 02/11/2016	DRILL METHOD N	Mud Rotary HAMMER TYPE Automatic
DRILLER Miller, T.	<b>START DATE</b> 09/12/16 <b>COMP. DATE</b> 09/12/16	SURFACE WATER DEPTH N/A	DRILLER Miller, T.	<b>START DATE</b> 09/12/16	COMP. DATE 09/12/16	SURFACE WATER DEPTH N/A
ELEV (ft)   DRIVE   DEPTH   BLOW COUNT   (ft)   0.5ft   0.5ft	0	L         O         SOIL AND ROCK DESCRIPTION           G         ELEV. (ft)         DEPTH (ft)	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		5 100 SAMP. L NO. MOI G	SOIL AND ROCK DESCRIPTION
75		73.7 GROUND SURFACE 0.0	5	Match Line		
73.2 + 0.5   2   3   3	3   1. · · · · · · · · · · · · · · · · · ·	UNDIVIDED COASTAL PLAIN	11			<del>}</del> <del>}</del>
70 71.2 7 2.5 4 3 4	4   10 · · ·   · · · ·   · · · ·     60 60   22 %	Tan Grey Fine Silty SAND		14	M	1 - 8.5 82.2 1 - 8.5 82.2
	7	69.7 Tan Gray Fine Sandy CLAY				-
67.7 + 6.0   2   2   3	$\overline{3}$ $\left  \begin{array}{c} \vdots \\ \vdots \\ 5 \end{array} \right  \cdot \left  \begin{array}{c} \cdot \\ \cdot $	65.9 7.8	-13.5 <del>+</del> 87.2			-
65 2 3	3 6 W	Gray Clayey Coarse SAND	1 -15 7 24 44 5		100/1.0	_
1   ‡						-
60 1.5 + 12.2 2 2 2	$\frac{2}{2}$		-18.5 + 92.2   52   48/0.3		100/0.8	-
+						<del>-</del>
56.5 + 17.2		57.7 <u>COASTAL PLAIN</u> <u>16.0</u>				
55 2 2 3	3	Black Fine Sandy CLAY with Mica, Trace Shells	-23.5 + 97.2	21	· · · ·   M	-25.0 98.7
		[Peedee Formation]				Boring Terminated at Elevation -25.0 ft in Dense Clayey Coarse SAND
51.5 + 22.2	<del>-</del>   :\sum_{\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot					t
50	/ 11 M					-
<del> </del>		47.7				F
45 46.5 + 27.2 5 10 3	144   · · · · ·   · · · · · ·   · · · · ·	Balck Clayey Coalse SAND Will Wild				F
<del>                                      </del>						-
41.5 + 32.2						-
40 5 6	7 . • 13					_
		Black Fine Sandy CLAY with Shells, Trace Mica				_
36.5 + 37.2						t
35 7 8	M		+			-
<del>                                </del>						F
31.5 + 42.2   6   5   8	8   · · · · · · · · · · · · · · · · · ·					F
		077				-
26.5 + 47.2		Green Gray Clayey Fine SAND, Trace				-
25 7 15 3	00 M	Shells, Trace Mica and cemented sand layers				<u> </u>
9.1						‡
راً <u>21.5 † 52.2   17   21   4</u>						‡
20						<u> </u>
16.5 + 57.2						ţ
8 15 10.5 57.2 38 62/0.5		15.5 58.2				Ł
70.		<u>+</u>				Ŀ
11.5 + 62.2   35   53   3	· · · · ·   · · · ·   · · · ·   · · · · <b>/</b> ·	11.5 62.2				F
	88					<u> </u>
<u> </u>						-
6.5 + 67.2 100/0.5	100/0.5	6.0 67.7				ļ-
						<b>F</b>
1.5 + 72.2		1.5 72.2				ţ
0 + 42 53 4	11					L
	$ \cdot \cdot\cdot\cdot\cdot \cdot\cdot\cdot\cdot \cdot\cdot\cdot\cdot\lambda $					Ŀ
-3.5 77.2 14 14 86/	0.5					Ŀ
2 -5 T 14 14 86/	100/1.0	-5.0 78.7				

Revision Date: 12/20/09

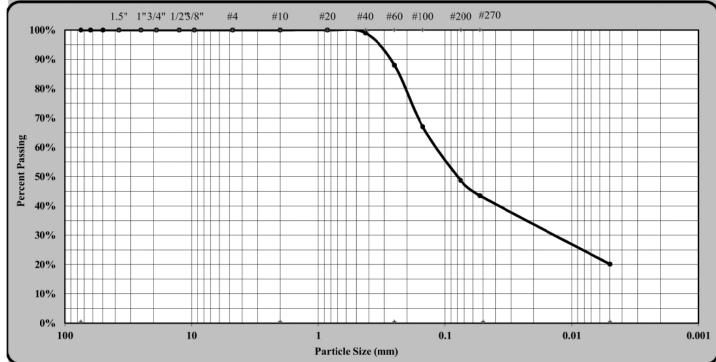
#### **Particle Size Analysis of Soils**

AASHTO T88 as Modified by NCDOT



Quality Assurance

					Quan	y Assurance
S&	ME, Inc. Raleigh,	3201 Spring For	est Road, Ra	leigh, North Carolina 2	7616	
S&ME Project #:	6235-16-010			Report Date:		11/8/16
Project Name:	C.F. Harvey Parkv	vay Extension R-	5703	Test Date(s):		11/1-8/16
State Project #:	N/A	F.A. Project No:	N/A	TIP NO:	N/A	
Client Name:	Michael Baker En	gineering				
Address:	Raleigh, NC					
Boring #:	EB1-A Lt. Ln.	Sample #:	SS-60	Sample D	Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth	(ft):	0.5-2.0'
Sample Description:	Tan gray fine sand	y SILT	·		0	A-4 (1)



As Define	ed by NCDOT			Fine Sand	< 0.25 n	nm and > (	0.05 mm
Gravel	< 75 mm ar	nd > 2.00 mm		Silt	< 0.05	< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm a	and >0.25 mm		Clay	<	0.005 mr	n
Maximum Particle Size	#20	Coarse S	Sand	12%	Silt		23%
Gravel	0%	Fine San	ıd	45%	Clay		20%
Apparent Relative Density	2.650	Moisture	e Content	13.6%	% Passing	#200	48.7%
Liquid Limit	19	Plastic L	imit	11	Plastic Inde	X	8
		Soil Mortar	(-#10 Siev	/e)			
Coarse Sand	12%	Fine Sand	45%	Silt	23%	Clay	20%
Description of Sand & Grav	el Particles:	Rounded			Angula	ar	X
Hard & Durable	$\boxtimes$	Soft		Weat	hered & Friab	le	
References / Comments / Deviation	ons: ND=Ne	ot Determined.					
Karen Warner		118-06-0305		Laboratory Tec	<u>hnician</u>	<u>11</u>	/8/2016
Technician Name		Certification No.		Position			Date
Stewart Laney, P.E			_	Senior Engi	neer		
Technical Responsibility		Signature		Position			Date
This	s report shall not be	reproduced, except in f	full, without th	e written approval of So	&ME, Inc.		

3201 Spring Forest Road Raleigh, NC 27616 Form No. TR-T88
Revision No. 0

S&ME, Inc.

Revision Date: 12/20/09

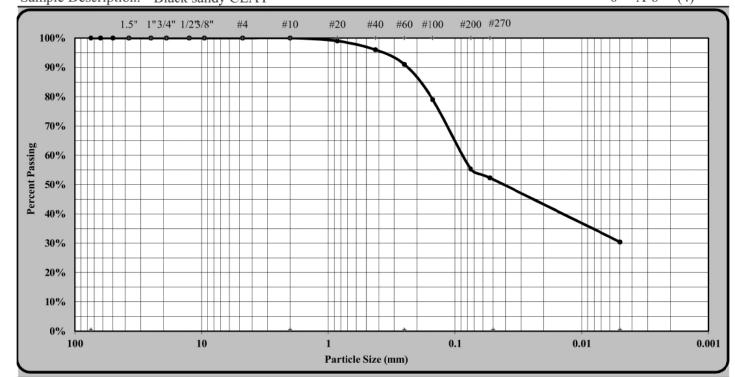
#### Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

				2	
S&	ME, Inc. Raleigh, 32	01 Spring For	est Road, Rale	eigh, North Carolina 27616	5
S&ME Project #:	6235-16-010			Report Date:	11/8/16
Project Name:	C.F. Harvey Parkwa	y Extension R-	5703	Test Date(s):	11/1-8/16
State Project #:	N/A F	A. Project No:	N/A	TIP NO: N/A	
Client Name:	Michael Baker Engi	neering			
Address:	Raleigh, NC				
Boring #:	EB1-A Lt. Ln.	Sample #:	SS-61	Sample Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth (ft):	47.5-48.0
Sample Description:	Black sandy CLAY			0	A-6 (4)



As Defin	ed by NCDOT		]	Fine Sand	< 0.25 mr	m and > 0	0.05 mm
Gravel	< 75 mm and	d > 2.00 mm	Silt		< 0.05 and > 0.005 mm		)5 mm
Coarse Sand	< 2.00 mm ar	nd >0.25 mm		Clay	< (	0.005 mm	ı
Maximum Particle Size	#10	Coarse S	and	9%	Silt		22%
Gravel	0%	Fine San	d	39%	Clay		30%
Apparent Relative Density	2.650	Moisture	Content	17.5%	% Passing #	200	55.3%
Liquid Limit	30	Plastic L	imit	17	Plastic Index		13
		Soil Mortar	(-#10 Siev	re)			
Coarse Sand	9%	Fine Sand	39%	Silt	22%	Clay	30%
Description of Sand & Grav	el Particles:	Rounded			Angular	r	X
Hard & Durable	$\boxtimes$	Soft		Weat	hered & Friable	•	
References / Comments / Deviati	ons: ND=No	t Determined.					
Karen Warner		118-06-0305		Laboratory Tec	hnician	11	/8/2016
Technician Name		Certification No.		Position			Date
Stewart Laney, P.E				Senior Engir	neer		
Technical Responsibility		Signature	_	Position			Date
Thi	s report shall not be re	eproduced, except in f	full, without th	e written approval of Se	&ME, Inc.		

S&ME, Inc.

Revision Date: 12/20/09

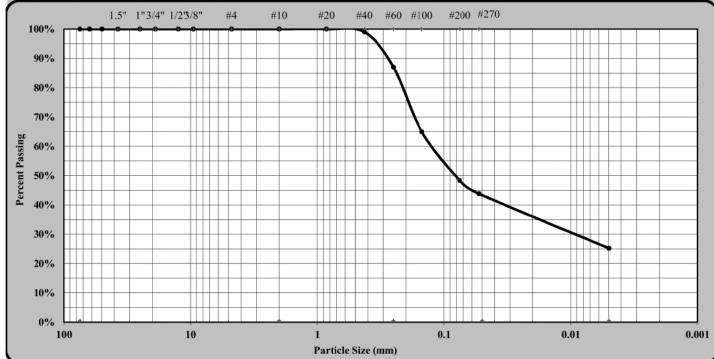
#### Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



**Quality Assurance** 

					Quan	y Assurance
S	&ME, Inc. Raleigh,	3201 Spring Fore	est Road, Ral	eigh, North Carolina 2	7616	
S&ME Project #:	6235-16-010			Report Date:		11/8/16
Project Name:	C.F. Harvey Park	way Extension R-5	5703	Test Date(s):		11/1-8/16
State Project #:	N/A	F.A. Project No:	N/A	TIP NO:	N/A	
Client Name:	Michael Baker Ei	ngineering				
Address:	Raleigh, NC					
Boring #:	B-1	Sample #:	SS-62	Sample I	Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth	(ft):	3.5-5.0'
Sample Description	: Tan fine sandy CL	AY			0	A-6 (5)



As Define	ed by NCDOT			Fine Sand	< 0.2	5 mm and >	0.05 mm
Gravel	< 75 mm a	nd > 2.00 mm		Silt	< 0.	< 0.05 and > 0.005 mm	
Coarse Sand	< 2.00 mm	and >0.25 mm		Clay		< 0.005 m	m
Maximum Particle Size	#20	Coarse S	Sand	13%	Silt		19%
Gravel	0%	Fine Sar	nd	43%	Clay		25%
Apparent Relative Density	2.650	Moistur	e Content	22.5%	% Passing	g #200	48.3%
Liquid Limit	34	Plastic I	Limit	15	Plastic In	dex	19
		Soil Mortar	· (-#10 Siev	re)			
Coarse Sand	13%	Fine Sand	43%	Silt	19%	Clay	25%
Description of Sand & Grav	el Particles:	Rounded			Ang	ular	X
Hard & Durable	$\boxtimes$	Soft		Weat	thered & Fri	able	
References / Comments / Deviation	ons: ND=N	ot Determined.					
Karen Warner		118-06-0305		Laboratory Tec	chnician	11	1/8/2016
Technician Name		Certification No.		Position			Date
Stewart Laney, P.E				Senior Engi	neer		
Technical Responsibility		Signature		Position			Date

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Form No. TR-T88

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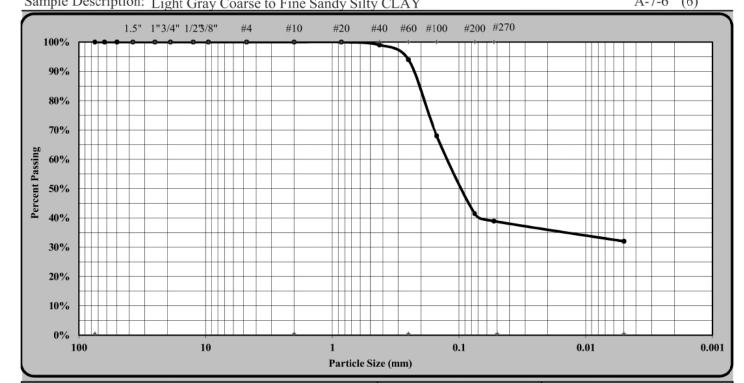
#### Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



B1 SS-63 (6 - 7.5 ft) Classification

			Q	Quality Assurance
Se	&ME, Inc. Raleigh	, 3201 Spring Forest Road, Rale	eigh, North Carolina 270	516
S&ME Project #:	6235-16-010		Report Date:	9/20/16
Project Name:	C.F. Harvey Park	cway Extension R-5703	Test Date(s):	9/12 - 9/20/16
State Project #:	N/A	F.A. Project No: N/A	TIP NO:	J/A
Client Name:	Michael Baker E	ngineering		
Address:	Raleigh, NC			
Boring #:	B1	Sample #: SS-63	Sample Da	ite: N/A
Location:	Site-Borehole	Offset: N/A	Depth (	ft): 6 - 7.5
Sample Description	Light Gray Coarse	to Fine Sandy Silty CLAV		A-7-6 (6)



As Delli	ea by NCDO		1	ine Sand	< 0.23	mm and >	U.U5 mm
Gravel	< 75 m	nm and > 2.00 mm		Silt	< 0.0	05  and > 0.0	005 mm
Coarse Sand	< 2.00 1	mm and >0.25 mm		Clay		< 0.005 m	m
Maximum Particle Size	#4	Coarse S	and	6%	Silt		7%
Gravel	0%	Fine San	d	55%	Clay		32%
Apparent Relative Density	ND	Moisture	Content	25%	% Passing	g #200	41.4%
Liquid Limit	45	Plastic L	imit	18	Plastic Inc	dex	27
		Soil Mortar	(-#10 Siev	e)			
Coarse Sand	6%	Fine Sand	55%	Silt	7%	Clay	32%
Description of Sand & Gra	vel Particles:	Rounded			Ang	ular	X
Hard & Durable	X	Soft	X	Wea	thered & Fria	able	X
References / Comments / Deviate	ions: NI	D=Not Determined.					
Mal Krajan, ET		104-01-0703		Laboratory M	Ionagar	0	/12/2016
				•		9/	
Technician Name		Certification No.	25.25	Position			Date
Mal Krajan, ET		N. C.	>	Laboratory M	<u>lanager</u>	9/	/26/2016
Technical Responsibility		Signature		Position			Date
Th	is report shall no	ot be reproduced, except in t	full without the	written approval of	S&ME_Inc.		

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Raleigh, NC 27616

Revision Date: 12/20/09

S&ME Project #:

Project Name:

State Project #:

Client Name:

Address:

#### **Particle Size Analysis of Soils**

AASHTO T88 as Modified by NCD

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Rale

C.F. Harvey Parkway Extension R-5703

Michael Baker Engineering

6235-16-010

Raleigh, NC

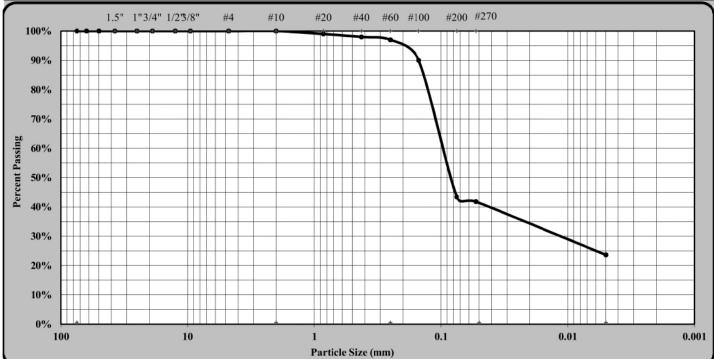
N/A



OOT			CIVIL
		Quali	ty Assurance
igh, I	North Carolina	27616	
	Report Date:		11/8/16
	Test Date(s):		11/1-8/16
	TIP NO:	N/A	

Boring #: B-1 Sample #: SS-64 N/A Sample Date: Site-Borehole N/A 13.5-15.0 Location: Offset: Depth (ft): Sample Description: Tan Black Silty CLAY 0 A-7-6 (4)

F.A. Project No: N/A



()										
As Defined by NCDOT				Fine Sand	< 0.25 mm and > 0.05 mm					
Gravel	< 75 mm a	nd > 2.00 mm		Silt	< 0.05 an	d > 0.00	)5 mm			
Coarse Sand	< 2.00 mm	and >0.25 mm		Clay	< 0.	.005 mn	n			
Maximum Particle Size	#20	Coarse	Sand	3%	Silt		18%			
Gravel	0%	Fine Sa	nd	55%	Clay		24%			
Apparent Relative Density	2.650	Moistu	re Content	51.5%	% Passing #200		43.4%			
Liquid Limit	42	Plastic Limit		23	Plastic Index		19			
Soil Mortar (-#10 Sieve)										
Coarse Sand	3%	Fine Sand	55%	Silt	18%	Clay	24%			
Description of Sand & Grav	vel Particles:	Rounded			Angular		X			
Hard & Durable	X	Soft		Weat	hered & Friable					
References / Comments / Deviati	ons: ND=N	lot Determined.								
Karen Warner		118-06-0305		Laboratory Tec	hnician	<u>11</u>	/8/2016			
Technician Name		Certification No.		Position			Date			

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3201 Spring Forest Road

Raleigh, NC 27616

Signature

Senior Engineer

Position

Form No. TR-T88

Revision Date: 12/20/09

Revision No. 0

#### **Particle Size Analysis of Soils**

AASHTO T88 as Modified by NCDOT



Quality Assurance

				,					
S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616									
S&ME Project #:	6235-16-010		Report Date:	11/14/16					
Project Name:	C.F. Harvey Park	tway Extension R-5703	Test Date(s):	10/7 - 11/14/16					
State Project #:	N/A	F.A. Project No: N/A	TIP NO:	J/A					
Client Name:	Michael Baker Er	ngineering							
Address:	Raleigh, NC								
Boring #:	EB1-B Rt. Ln.	Sample #: SS-65	Sample Da	ite: N/A					
Location:	Site-Borehole	Offset: N/A	Depth (	ft): 0.5 - 2					
Sample Description:	Tan Coarse to Fin	e Sandy Clavey SILT		A-4 (2)					



As Defined by NCDOT			Fine Sand < 0			< 0.25 mm and > 0.05 mm			
Gravel	< 75 mm ar	nd > 2.00 mm	S	ilt	< 0.05 and > 0.005 mm		05 mm		
Coarse Sand	< 2.00 mm	and >0.25 mm	C	lay	< 0.005 mn		n		
Maximum Particle Size	#10	Coarse S	Sand	8%	Silt		23%		
Gravel	0%	Fine San	47%	Clay		22%			
Apparent Relative Density	ND	Moisture Content		15.8%	% Passing #200		50.3%		
Liquid Limit	22	Plastic Limit		12	Plastic Index		10		
Soil Mortar (-#10 Sieve)									
Coarse Sand	8%	Fine Sand	47%	Silt	23%	Clay	22%		
Description of Sand & Gravel Particles: Rou		Rounded			Ang	gular			
Hard & Durable	□ Soft			Weath	thered & Friable				
D.C. /C. /D.	· ND N	· D · · · 1		•					

References / Comments / Deviations: ND=Not Determined.

> Mal Krajan, ET 104-01-0703 Laboratory Manager 11/14/2016 Technician Name Certification No. Position Date Mal Krajan, ET Laboratory Manager 11/14/2016 Technical Responsibility Position Date Signature

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Date

Stewart Laney, P.E

Technical Responsibility

Revision No. 0

Revision Date: 07/10/08

Moisture, Ash, and Organic Matter



AASHTO T-267

Quality Assurance

		111111111111111111111111111111111111111						2	1 200111 111100
	S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616								
Project #:	6235-16-0	10				Report	Date:	10	/21/16
Project Name:	C.F. Harvey	C.F. Harvey Parkway Extension R-5703			Test Date(s):		10/18	- 10/21/16	
Client Name:	Michael Ba	ker Engin	eering						
Client Address:	Raleigh, NO	C							
Boring #:	EB1-B Rt. L	n.	Sample #:	SS	-65		Sample	Date:	N/A
Location:	Site-Boreho	ole	Offset:	N	/A		Dep	th (ft):	0.5 - 2
Sample Description: Tan Coarse to Fine Sandy Clayey SILT (A-4) (2)									
Equipment: Balance: 0.01 g.Readability, 500g. Minimum Capaccity									
Balance: S	&ME ID #:	1024	Cal. Date:	11/06/16	Due:	11/06	5/17		

#### Method A: Moisture Content Determination

Required Oven Temperature: 105 ± 5° C

	-		
	Oven Temperature: 105 °C	Tare #	p
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	45.69
а	Mass of <i>As-Received</i> Specimen + Tare Wt.	grams	92.40
b	Mass of Oven Dry Specimen + Tare Wt.	grams	86.03
w	Water Weight	(a-b)	6.37
A	Mass of As-Received Specimen	(a-t)	46.71
В	Mass of Oven Dry Specimen	(b-t)	40.34
% Moi	sture Content as a % of As Received or Total Mass	(w/A)*100	13.6%
%	Moisture Content as a % of Oven-dried Mass	(w/B)*100	15.8%
S&ME	ID #: 1454 Cal. Date: 10/7/16 Due:	10/7/17	

Method C (440° C) or D (750° C): Ash Content and Organic Matter Determination

	Muffle Furnace: 455 °C	Tare #	104
t	Tare Weight (Dish plus Aluminum Foil Cover)	grams	50.17
b	Mass of Oven Dry Specimen + Tare Wt.	grams	86.05
c	Ash Weight + Tare Wt.	grams	85.56
C	Ash Weight	c-t	35.39
В	Mass of Oven Dry Specimen	(b-t)	35.88
D	% Ash Content	(C/B)*100	98.6%
	% Organic Matter	100-D	1.4%

Muffle Furnace: S&ME ID #: 00261

Notes / Deviations / References:

Oven

Mal Krajan, ET

Technical Responsibility

Signature

<u>Laboratory Manager</u>

Position

11/14/2016 Date

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15 of 33

Form No: TR-T289-1

Revision No. 0

Revision Date: 07/10/08

#### pH of Soil



AASHTO T289 Quality Assurance

	S&ME, Inc.	S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616							
Project #:	6235-16-01	0			Report Date:		11/7/16		
Project Name	: C.F. Harvey	Parkway Extension l	R-5703		Test Date(s):	11/	/5 - 11/7/16		
Client Name:	Michael Bak	Michael Baker Engineering							
Client Addres	ss: Raleigh, NC								
Boring #: EB1-B Rt. Ln. Sample #: SS-65				Sample D	ate:	N/A			
Location:	Site-Borehole	Offs	set: N/A		Depth (ft): 0.5 - 2				
Sample Descr	ription: Tai	n Coarse to Fine Sand	dy Clayey S	SILT (A-4) (2)					
Equipment:									
Balance		S&ME ID#	1024	Cal. Date:	11/6/16	Due:	11/6/17		
Sieve:	#10	S&ME ID#	13223	Cal. Date:	6/11/16	Due:	6/11/17		
pH Meter:		S&ME ID#	1365	Cal. Date:	11/7/16	Due:	NA		

#### pH Meter Calibration

Buffer Solution	Results
pH buffer 7.0	7.02
pH buffer 4.01	4.01
pH buffer 10.0	10.03
Buffer Temperature <sup>0</sup> C	22.4

#### Measuring pH of Soil

Measurements							
Weigtht of Air Dry Soil (g)	30.02						
Distilled Water (g)	30.01						
Temperature <sup>0</sup> C	22.4						
pH Readings	5.61						

Notes / Deviations / References: AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

Mal Krajan, ET
Technical Responsibility

<u>Laboratory Manager</u> <u>Position</u> 11/14/2016 Date

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Revision Date: 12/20/09

#### Particle Size Analysis of Soils

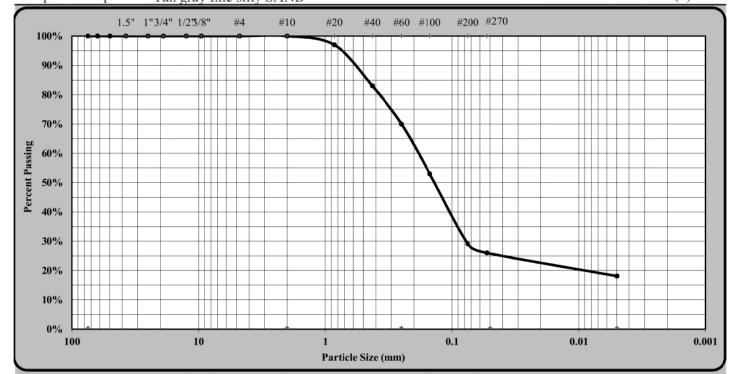
AASHTO T88 as Modified by NCDOT



<b>♦S&amp;ME</b>	
~	

Quality Assurance

				~						
S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616										
S&ME Project #:	6235-16-010			Report Date:	11/8/16					
Project Name:	C.F. Harvey Parky	way Extension R-	Test Date(s):	11/1-8/16						
State Project #:	N/A	F.A. Project No:	N/A	TIP NO: N/A						
Client Name:	Michael Baker En	gineering								
Address:	Raleigh, NC									
Boring #:	EB2-B Rt. Ln.	Sample #:	SS-66	Sample Date:	N/A					
Location:	Site-Borehole	Offset:	N/A	Depth (ft):	0.5-2.0'					
Sample Description:	Tan grav fine silty	SAND		0	A-2-4 (0)					



As Defined by NCDOT			Fine Sand		< 0.25 mr	< 0.25 mm and > 0.05 mm	
Gravel	< 75 mm a	and > 2.00 mm		Silt	< 0.05 and > 0.005 mm		05 mm
Coarse Sand	< 2.00 mm	and >0.25 mm		Clay	< (	0.005 mn	n
Maximum Particle Size	#20	Coarse S	and	30%	Silt		8%
Gravel	0%	Fine San	d	44%	Clay		18%
Apparent Relative Density	2.650	Moisture	Content	22.1%	% Passing #	200	29.1%
Liquid Limit	21	Plastic L	imit	14	Plastic Index		7
Soil Mortar (-#10 Sieve)							
Coarse Sand	30%	Fine Sand	44%	Silt	8%	Clay	18%
Description of Sand & Grav	el Particles:	Rounded			Angular		X
Hard & Durable	$\boxtimes$	Soft	X	Weat	hered & Friable	;	X
References / Comments / Deviation	ons: ND=N	Not Determined.					
Karen Warner		118-06-0305		Laboratory Tec	hnician	<u>11</u>	/8/2016
Technician Name		Certification No.		Position			Date
Stewart Laney, P.E			_	Senior Engi	neer		
Technical Responsibility		Signature		Position			Date
This	s report shall not be	reproduced, except in f	full, without th	e written approval of S	&ME, Inc.		

Form No. TR-T88

Revision Date: 12/20/09

Revision No. 0

S&ME, Inc.

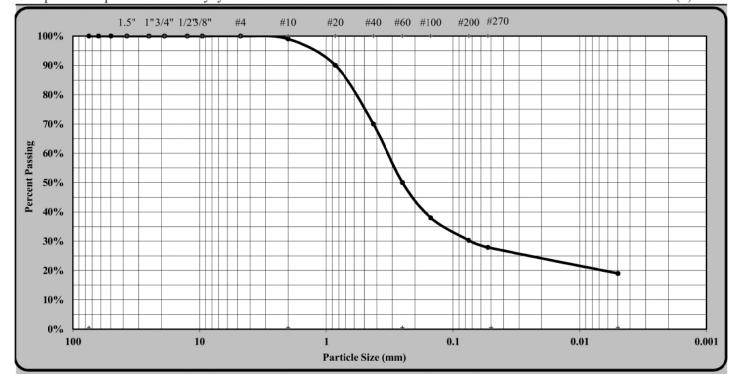
#### Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT



Quality Assurance

			~	
Se	&ME, Inc. Raleigh,	3201 Spring Forest Road,	Raleigh, North Carolina 2761	6
S&ME Project #:	6235-16-010		Report Date:	11/8/16
Project Name:	C.F. Harvey Park	way Extension R-5703	Test Date(s):	11/1-8/16
State Project #:	N/A	F.A. Project No: N/A	TIP NO: N/A	A
Client Name:	Michael Baker E	ngineering		
Address:	Raleigh, NC			
Boring #:	EB2-B Rt. Ln.	Sample #: SS-67	Sample Date	: N/A
Location:	Site-Borehole	Offset: N/A	Depth (ft)	: 32.3-33.7'
Sample Description	: Black clayey coars	se SAND		0 A-2-6 (1)



As Defined by NCDOT				Fine Sand	< 0.25 mm and > 0.05 mm		
Gravel	< 75 mm an	d > 2.00 mm		Silt	< 0.05 and > 0.005 mm		
Coarse Sand	< 2.00 mm a	nd >0.25 mm		Clay	< 0	0.005 mm	
Maximum Particle Size	#10	Coarse S	Sand	49%	Silt	9%	
Gravel	1%	Fine San	ıd	22%	Clay	19%	
Apparent Relative Density	2.650	Moisture	e Content	17.9%	% Passing #2	200 30.3%	
Liquid Limit	31	Plastic L	imit	13	Plastic Index	18	
		Soil Mortar	(-#10 Siev	ve)			
Coarse Sand	49%	Fine Sand	23%	Silt	9%	Clay 19%	
Description of Sand & Grav	el Particles:	Rounded			Angular	$\boxtimes$	
Hard & Durable	X	Soft		Weat	hered & Friable		
References / Comments / Deviation	ons: ND=No	ot Determined.					
Karen Warner		118-06-0305		Laboratory Tec	<u>hnician</u>	11/8/2016	
Technician Name		Certification No.		Position		Date	
Stewart Laney, P.E			_	Senior Engir	<u>neer</u>		
Technical Responsibility		Signature		Position	<del>-</del>	Date	
Thi	s report shall not be	reproduced, except in j	full, without th	ne written approval of Se	&ME, Inc.		

Revision Date: 12/20/09

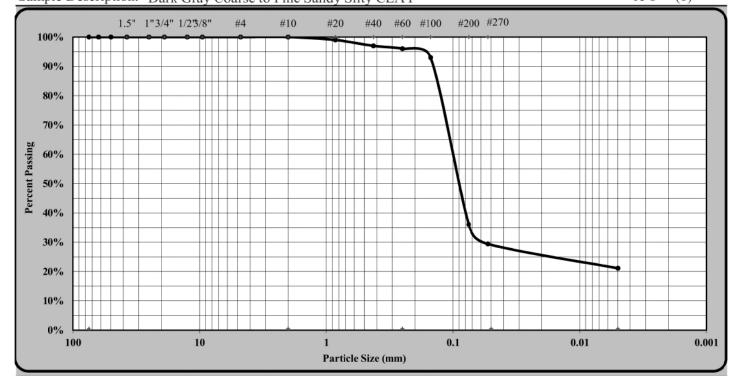
#### **Particle Size Analysis of Soils**



AASHTO T88 as Modified by NCDOT

Quality Assurance

			~	
S	&ME, Inc. Raleigh,	3201 Spring Forest Road, Ra	aleigh, North Carolina 2761	6
S&ME Project #:	6235-16-010		Report Date:	12/27/16
Project Name:	C.F. Harvey Parky	way Extension R-5703	Test Date(s):	12/24 - 12/27/16
State Project #:	N/A	F.A. Project No: N/A	TIP NO: N/A	A
Client Name:	Michael Baker En	gineering		
Address:	Raleigh, NC			
Boring #:	EB1-B Rt. Ln.	Sample #: ST-8	Sample Date	: N/A
Location:	Site-Borehole	Offset: N/A	Depth (ft)	: 15.0 - 17.0 ft.
Sample Description	: Dark Gray Coarse t	o Fine Sandy Silty CLAY		A-6 (0)



As Define	ed by NCDOT		F	ine Sand	< 0.25 n	nm and > (	0.05 mm	
Gravel	< 75 mm a	nd > 2.00 mm		Silt	< 0.05 and > 0.005 mm			
Coarse Sand	< 2.00 mm	and >0.25 mm		Clay	<	< 0.005 mm		
Maximum Particle Size	#4	Coarse S	Sand	4%	Silt		8%	
Gravel	0%	Fine San	ıd	67%	Clay		21%	
Apparent Relative Density	ND	Moisture	e Content	ND	% Passing #200		36.0%	
Liquid Limit	37	Plastic Limit		26	Plastic Inde	X	11	
		Soil Mortar	(-#10 Sieve	e)				
Coarse Sand	4%	Fine Sand	67%	Silt	8%	Clay	21%	
Description of Sand & Grav	vel Particles:	Rounded			Angula	ar	X	
Hard & Durable	X	Soft		Weat	hered & Friab	le		
References / Comments / Deviati	one: ND=N	ot Determined						

References / Comments / Deviations: ND=Not Determined

104-01-0
Certification
N S

Laboratory Manager Position

12/27/2016 Date

Laboratory Manager 9/26/2016 Position Date

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3201 Spring Forest Road Raleigh, NC 27616

EB1-B Rt. Ln. ST-8 (15.0 - 17.0 ft) Classification

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#### **Oedometer Settlement Tests**

Sketch showing specimen location in original Sample

Sample details

Depth 15.0 - 17.0 ft.

Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0) Description:

Undisturbed Height H<sub>0</sub> (in) 0.998 2.501 Diameter D<sub>0</sub> (in) Weight W<sub>0</sub> (gr) 146.57 Bulk Density p (PCF) 113.89 Particle Density Ps 2.661 (measured)

Initial Conditions

Settlement Channel 1001 Moisture Content w<sub>0</sub>% 34.1 Dry Density Pd (PCF) 84.95 Voids Ratio e<sub>0</sub> 0.9546 Deg of Saturation So% 94.9 Swelling Pressure Ss (TSF) 0.000

Final Conditions

Moisture Content w<sub>f</sub>% 33.4 Dry Density Pd (PCF) 86.77 Voids Ratio e. 0.9137 Deg of Saturation S<sub>f</sub>% 97.16 Settlement: (in) 0.021 Compression Index C 0.085

Notes:

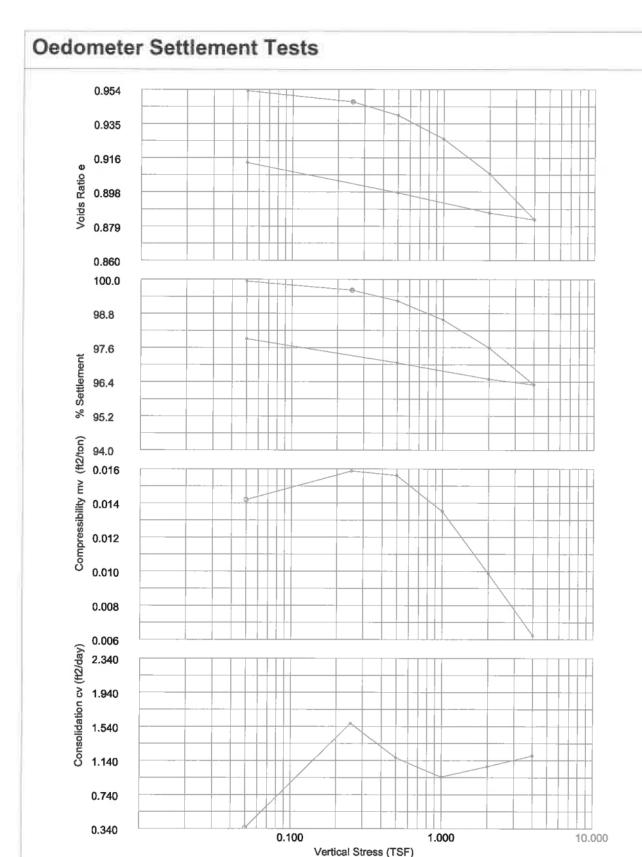
Test specimen taken from the middle portion of UD tube.



ASTM D2435-96 Consolidation Test name 12-7-16 Date of Test Site Reference: C.F. Harvey ST-8 Sample: EB1-B Rt. Ln. Jobfile: E:\16010.JOB Borehole:

Operator: MC Checked: NIC Approved.

Technical Responsibility



<b>\$S&amp;ME</b>	00
A	1

ASTM D2435-96

Test name Consolidation
Date of Test: 12-7-16

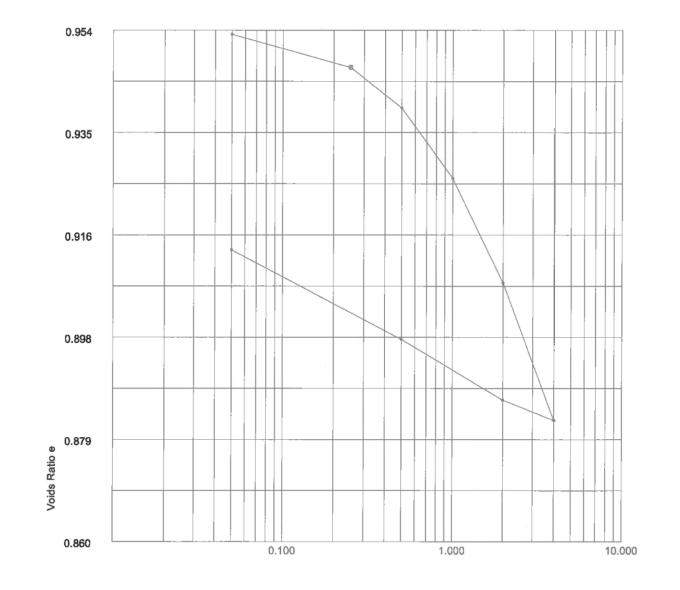
Site Reference: C.F. Harvey Sample: ST-8
Jobfile: E:\16010.JOB Sorehole: EB1-B Rt. Ln.

Operator MC

Checked: MC

Approved:







Sample:

Borehole:

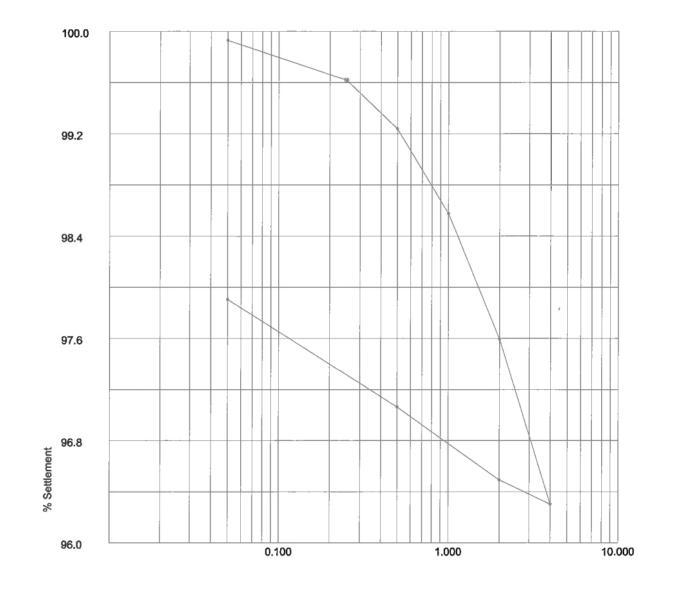
	ASTM D2435-96	
S&ME	Site Reference: Jobfile:	C.F E:\1

-		
i	Date of Test:	12-7-16
	Test name	Consolidat

Site Reference: C.F. Harvey
Jobfile: E:\16010.JOB Bo

Operator: Checked: MC

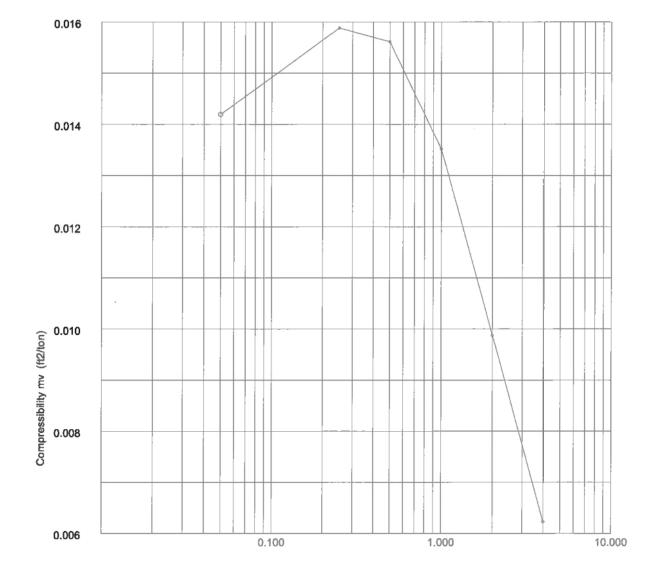
ST-8 EB1-B Rt. Ln.



Vertical Stress (TSF)

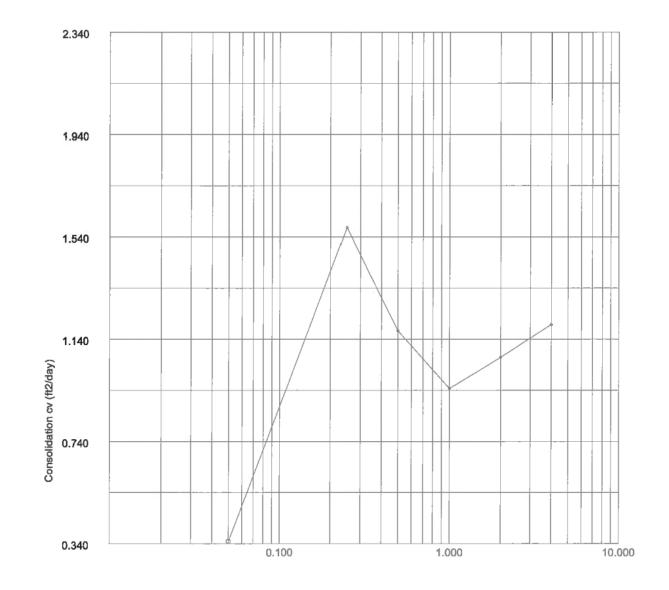
ASTM D2435-96				Test name Date of Test:			
Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB			Sample: Borehole:	ST-8 EB1-B	Rt. Ln.	
Operator:		Checked:	M	14		Approved:	
	Site Reference: Jobfile:	Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Date of Test:  Site Reference: C.F. Harvey Sample: Jobfile: E:\16010.JOB Borehole:	Date of Test: 12-7-   Site Reference: C.F. Harvey   Sample: ST-8     Jobfile: E:\16010.JOB   Borehole: EB1-B	Date of Test:         12-7-16           Site Reference:         C.F. Harvey         Sample:         ST-8           Jobfile:         E:\16010.JOB         Borehole:         EB1-B Rt. Ln.





Vertical Stress (TSF)

<b>A</b>	ASTM D2435-96				Test name Date of Test:	Cons 12-7-	olidation 16	
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB			Sample: Borehole:	ST-8 EB1-B	3 Rt. Ln.	
	Operator: MC-		Checked:	^	lc_		Approved:	



Vertical Stress (TSF)

Test name

Consolidation

Approved:

Date of Test: 12-7-16 Site Reference: C.F. Harvey Jobfile: E:\16010.JOB Sample: EB1-B Rt. Ln. Borehole: Operator: NL Checked:

ASTM D2435-96

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# **Oedometer Settlement Tests**

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e <sub>f</sub>	t <sub>sû</sub> (mins)	Secondary Compr C <sub>sec</sub>	c <sub>v</sub> (ft2/day)	m <sub>v</sub> (ft2/ton)
0.050	21.6	0.0007	0.0	21.6	0.9532	1.430	0.00	0.348	0.014
0.250	21.6	0.0038	0.0	21.6	0.9472	0.314	0.0001	1.577	0.016
0.500	21.6	0.0076	0.0	21.6	0.9397	0.420	0.00	1.173	0.015
1.000	21.6	0.0142	0.0	21.6	0.9268	0.514	0.00	0.948	0.013
2.000	21.6	0.0240	0.0	21.6	0.9076	0.448	0.0003	1.069	0.010
4.000	21.6	0.0369	0.0	21.6	0.8823	0.391	0.0004	1.197	0.007
2.000	21.6	0.0350	0.0	21.6	0.8861				0.001
0.500	21.6	0.0293	0.0	21.6	0.8972				0.004
0.050	21.6	0.0209	0.0	21.6	0.9137				0.019

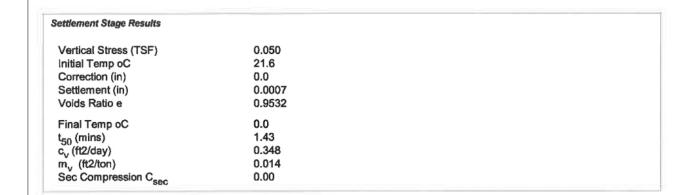
	ASTM D2435-96			Test name Date of Test:	Cons 12-7-	olidation 16	
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-E	3 Rt. Ln.	
	Operator: MLC		Checked: ~	دلح		Approved	

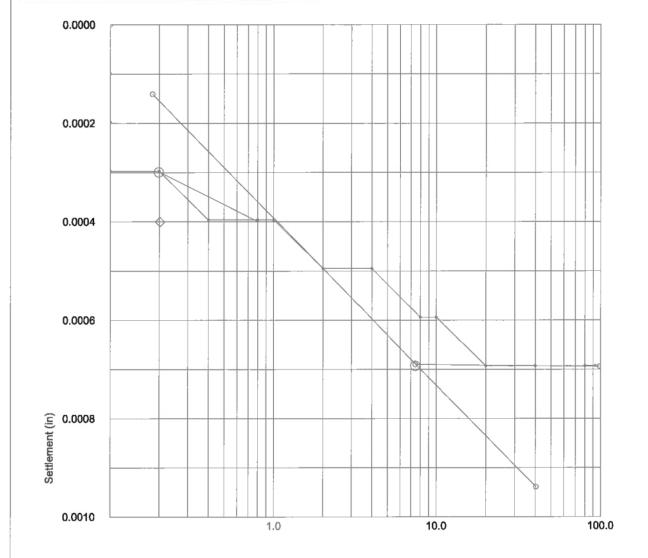
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.033	1	0.0001	0.0001
4	0.050	2	0.0002	0.0002
5	0.067	2	0.0002	0.0002
6	0.083	2	0.0002	0.0002
7	0.100	3	0.0003	0.0003
8	0.200	3	0.0003	0.0003
9	0.400	4	0.0004	0.0004
10	0.800	4	0.0004	0.0004
11	1.000	4	0.0004	0.0004
12	2.000	5	0.0005	0.0005
13	4.000	5	0.0005	0.0005
14	8.000	6	0.0006	0.0006
15	10.000	6	0.0006	0.0006
16	20.000	7	0.0007	0.0007
17	40.000	7	0.0007	0.0007
18	80.000	7	0.0007	0.0007
19	93.330	7	0.0007	0.0007

	ASTM D2435-96			Test name Date of Test:	Consol 12-7-16	lidation Load: 0.050 (TSF) 6
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B F	Rt. Ln.
	Operator: MUC		Checked: AL	L	19	Approved

21 of 33

# **Oedometer Settlement Tests**





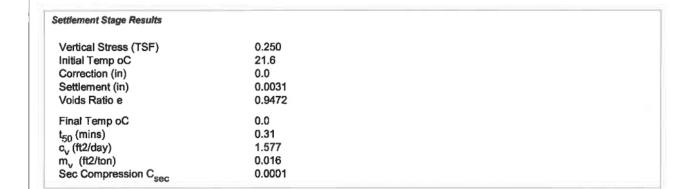
<b>♦S&amp;ME</b>	ASTM D2435-96			Test name Date of Test:	Consolidation 12-7-16	
	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
	Operator: MLC	•	Checked:	MC	Approved:	

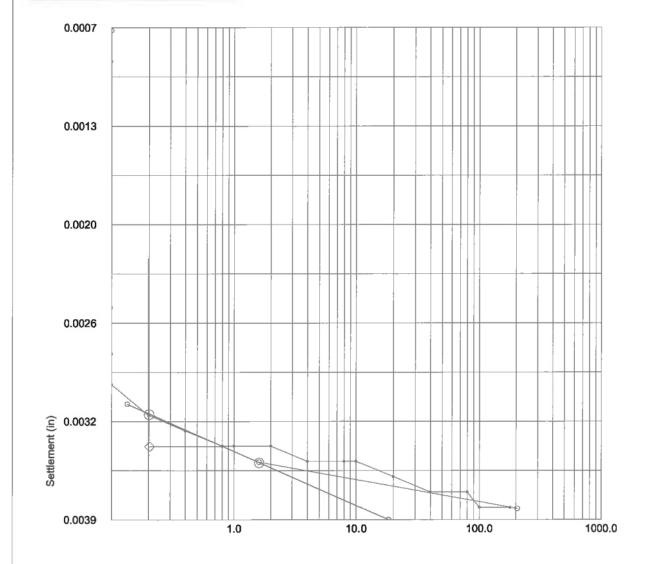
No.		Time	Displacement	Displacement	Settlement
		(mins)	(divs)	Displacement (in)	(in)
		0.000	7	0.0007	0.0007
	1				
	2	0.017	9	0.0009	0.0009
	3	0.033	9	0.0009	0.0009
	4	0.050	25	0.0025	0.0025
	5	0.067	28	0.0028	0.0028
	6	0.083	30	0.0030	0.0030
	7	0.100	30	0.0030	0.0030
	8	0.200	32	0.0032	0.0032
	9	0.400	33	0.0033	0.0033
	10	0.800	34	0.0034	0.0034
	11	1.000	34	0.0034	0.0034
	12	2.000	34	0.0034	0.0034
	13	4.000	35	0.0035	0.0035
	14	8.000	35	0.0035	0.0035
	15	10.000	35	0.0035	0.0035
	16	20.000	36	0.0036	0.0036
	17	40.000	37	0.0037	0.0037
	18	80.000	37	0.0037	0.0037
	19	100.000	38	0.0038	0.0038
	20	178.550	38	0.0038	0.0038

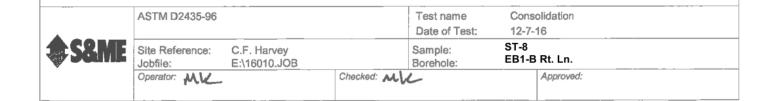
A51M U2435-96			Date of Test:	12-7-16	
Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
Operator: MVC	•	Checked M	4	Approved:	
	Site Reference: Jobfile:	Site Reference: C.F. Harvey	Site Reference: C.F. Harvey Jobfile: E.\16010.JOB	Site Reference: C.F. Harvey Sample: Borehole:	Date of Test: 12-7-16

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# **Oedometer Settlement Tests**





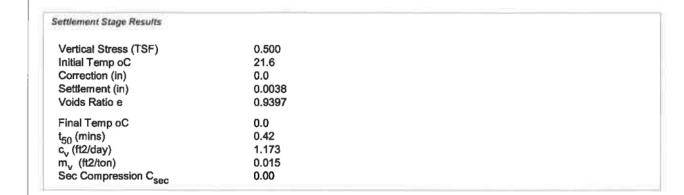


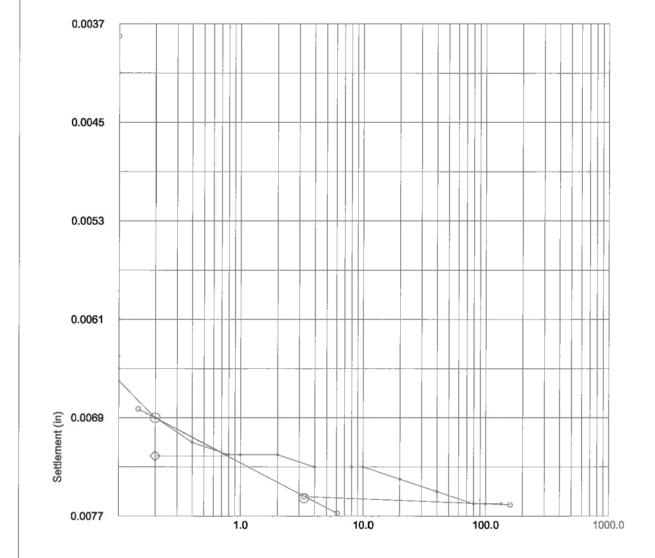
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	38	0.0038	0.0038
2	0.017	41	0.0041	0.0041
3	0.033	41	0.0041	0.0041
4	0.050	61	0.0061	0.0061
5	0.067	64	0.0064	0.0064
6	0.083	65	0.0065	0.0065
7	0.100	66	0.0066	0.0066
8	0.200	69	0.0069	0.0069
9	0.400	71	0.0071	0.0071
10	0.800	72	0.0072	0.0072
11	1.000	72	0.0072	0.0072
12	2.000	72	0.0072	0.0072
13	4.000	73	0.0073	0.0073
14	8.000	73	0.0073	0.0073
15	10.000	73	0.0073	0.0073
16	20.000	74	0.0074	0.0074
17	40.000	75	0.0075	0.0075
18	80.000	76	0.0076	0.0076
19	100.000	76	0.0076	0.0076
20	135.067	76	0.0076	0.0076
17 18 19	40.000 80.000 100.000	75 76 76	0.0075 0.0076 0.0076	0.0075 0.0076 0.0076

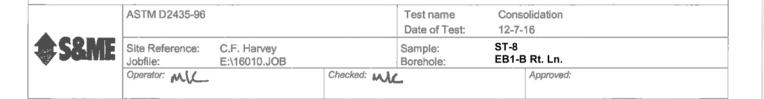
	ASTM D2435-96			Test name Date of Test:	Consolidation 12-7-16	Load: 0.500 (TSF)
<b>\$S&amp;ME</b>	Site Reference; Jobfile:	C.F. Harvey E.\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
	Operator MK		Checked: M	K	Approved	1

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#### **Oedometer Settlement Tests**







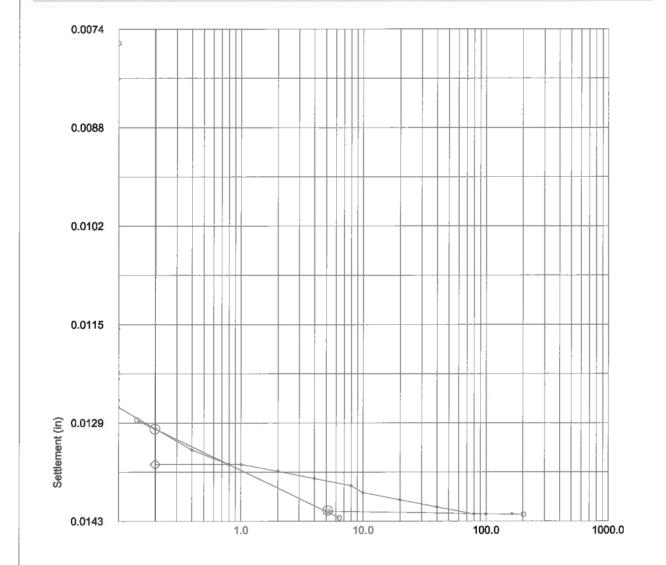
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	76	0.0076	0.0076
2	0.017	81	0.0081	0.0081
3	0.033	116	0.0116	0.0116
4	0.050	122	0.0122	0.0122
5	0.067	123	0.0123	0.0123
6	0.083	126	0.0126	0.0126
7	0.100	127	0.0127	0.0127
8	0.200	130	0.0130	0.0130
9	0.400	133	0.0133	0.0133
10	0.800	135	0.0135	0.0135
11	1.000	135	0.0135	0.0135
12	2.000	136	0.0136	0.0136
13	4.000	137	0.0137	0.0137
14	8.000	138	0.0138	0.0138
15	10.000	139	0.0139	0.0139
16	20.000	140	0.0140	0.0140
17	40.000	141	0.0141	0.0141
18	80.000	142	0.0142	0.0142
19	100.000	142	0.0142	0.0142
20	163.330	142	0.0142	0.0142

A	ASTM D2435-96			Test name Date of Test:	Cons 12-7-	solidation Load: 1.000 (TSF) -16
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.
	Operator: WL		Checked: A	4		Approved:

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# **Oedometer Settlement Tests**

# Settlement Stage Results Vertical Stress (TSF) 1.000 Initial Temp oC 21.6 Correction (in) 0.0 Settlement (in) 0.0066 Voids Ratio e 0.9268 Final Temp oC 0.0 t<sub>50</sub> (mins) 0.51 c<sub>V</sub> (ft2/day) 0.948 m<sub>V</sub> (ft2/ton) 0.013 Sec Compression C<sub>sec</sub> 0.00



	ASTM D2435-96			Test name Date of Test:	Consc 12-7-	olidation 16
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole;	ST-8 EB1-B	Rt. Ln.
	Operator: MV_		Checked: NK	-		Approved:

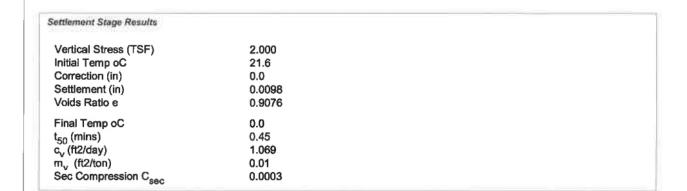
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	142	0.0142	0.0142
2	0.017	144	0.0144	0.0144
3	0.033	171	0.0171	0.0171
4	0.050	201	0.0201	0.0201
5	0.067	209	0.0209	0.0209
6	0.083	211	0.0211	0.0211
7	0.100	213	0.0213	0.0213
8	0.200	218	0.0218	0.0218
9	0.400	223	0.0223	0.0223
10	0.800	225	0.0225	0.0225
11	1.000	225	0.0225	0.0225
12	2.000	227	0.0227	0.0227
13	4.000	230	0.0230	0.0230
14	8.000	231	0.0231	0.0231
15	10.000	232	0.0232	0.0232
16	20.000	233	0.0233	0.0233
17	40.000	234	0.0234	0.0234
18	80.000	235	0.0235	0.0235
19	100.000	235	0.0235	0.0235
20	200.000	238	0.0238	0.0238
21	400.000	239	0.0239	0.0239
22	800.000	240	0.0240	0.0240
23	948.650	240	0.0240	0.0240

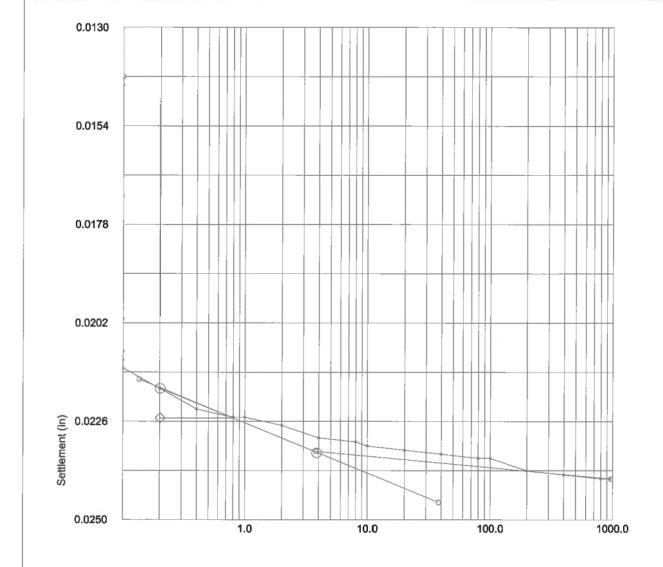
<b>♣C2ME</b>	5
ACTIL	

	ASTM D2435-96			Test name Date of Test:	Consolidation 12-7-16	Load: 2.000 (TSF)	
Ė	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.		
	Operator: MK	-	Checked: M	K	Approve	di .	

25 of 33

# **Oedometer Settlement Tests**







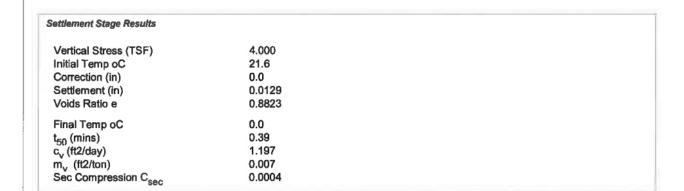
	ASTM D2435-96		Test name Date of Test:	Conso 12-7-	olidation 16
=	Site Reference: C.F. Harvey Jobfile: E:\16010.JOB		outilpio.	ST-8 EB1-B	Rt. Ln.
	Operator: MLC	Checked: ML	_		Approved:

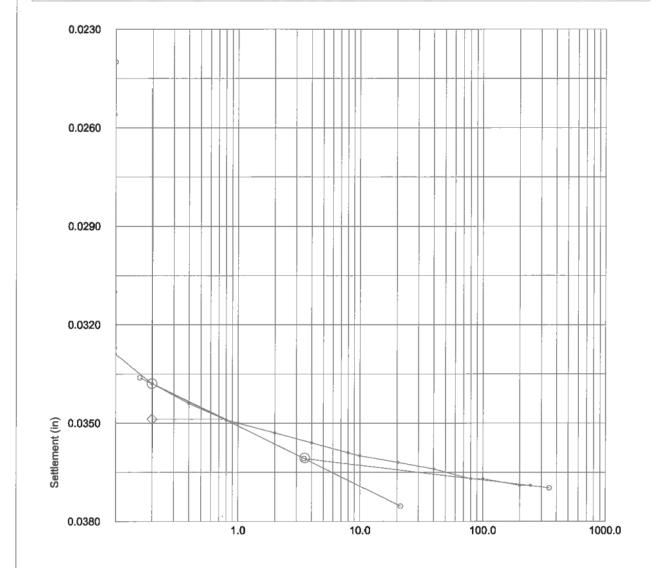
	_			
No.	Time (mins)	Displacement (divs)	Displacement (In)	Settlement (in)
1	0.000	240	0.0240	0.0240
2	0.017	256	0.0256	0.0256
3	0.033	256	0.0256	0.0256
4	0.050	310	0.0310	0.0310
5	0.067	320	0.0320	0.0320
6	0.083	327	0.0327	0.0327
7	0.100	329	0.0329	0.0329
8	0.200	338	0.0338	0.0338
9	0.400	344	0.0344	0.0344
10	0.800	349	0.0349	0.0349
11	1.000	350	0.0350	0.0350
12	2.000	353	0.0353	0.0353
13	4.000	356	0.0356	0.0356
14	8.000	359	0.0359	0.0359
15	10.000	360	0.0360	0.0360
16	20.333	362	0.0362	0.0362
17	40.333	364	0.0364	0.0364
18	80.333	367	0.0367	0.0367
19	100.333	367	0.0367	0.0367
20	200.333	369	0.0369	0.0369
21	244.517	369	0.0369	0.0369

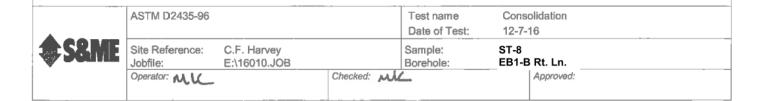
<b>A</b>	ASTM D2435-96			Test name Date of Test:	Consolidat 12-7-16	ion Load: 4.000 (TSF)
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. L	n.
	Operator: MVC	-	Checked: M	lc	Appr	oved:

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# **Oedometer Settlement Tests**







No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	369	0.0369	0.0369
2	0.017	361	0.0361	0.0361
3	0.033	354	0.0354	0.0354
4	0.050	353	0.0353	0.0353
5	0.067	353	0.0353	0.0353
6	0.083	353	0.0353	0.0353
7	0.100	353	0.0353	0.0353
8	0.200	353	0.0353	0.0353
9	0.400	352	0.0352	0.0352
10	0.800	352	0.0352	0.0352
11	1.000	352	0.0352	0.0352
12	2.000	352	0.0352	0.0352
13	4.000	352	0.0352	0.0352
14	8.000	351	0.0351	0.0351
15	10.000	351	0.0351	0.0351
16	20.000	351	0.0351	0.0351
17	40.000	351	0.0351	0.0351
18	80.000	350	0.0350	0.0350
19	100.000	350	0.0350	0.0350
20	117.767	350	0.0350	0.0350

A	ASTM D2435-96			Test name Date of Test:	Conso 12-7-1	olidation Load: 2.000 (TSF) 16
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.
	Operator: MLL		Checked Al	<u>_</u>		Approved

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# **Oedometer Settlement Tests**

#### Settlement Stage Results

 Vertical Stress (TSF)
 2.000

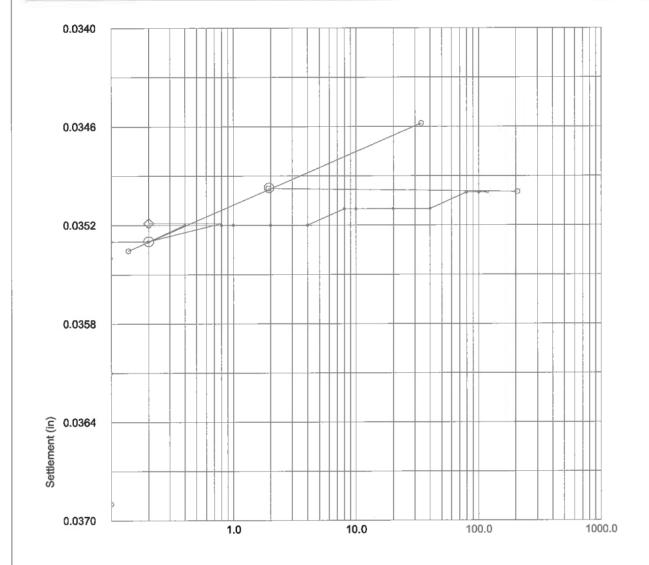
 Initial Temp oC
 21.6

 Correction (in)
 0.0

 Settlement (in)
 0.0019

 Voids Ratio e
 0.8861

Final Temp oC t<sub>50</sub> (mins) c<sub>v</sub> (ft2/day) m<sub>v</sub> (ft2/ton) Sec Compression C<sub>sec</sub>





No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	350	0.0350	0.0350
2	0.017	342	0.0342	0.0342
3	0.033	335	0.0335	0.0335
4	0.050	333	0.0333	0.0333
5	0.067	314	0.0314	0.0314
6	0.083	311	0.0311	0.0311
7	0.100	310	0.0310	0.0310
8	0.200	305	0.0305	0.0305
9	0.400	302	0.0302	0.0302
10	0.800	298	0.0298	0.0298
11	1.000	298	0.0298	0.0298
12	2.000	297	0.0297	0.0297
13	4.000	296	0.0296	0.0296
14	8.000	295	0.0295	0.0295
15	10.000	295	0.0295	0.0295
16	20.000	294	0.0294	0.0294
17	40.000	294	0.0294	0.0294
18	80.000	293	0.0293	0.0293
19	100.000	293	0.0293	0.0293
20	196.130	293	0.0293	0.0293

<b>\$S&amp;ME</b>	£ 10
*	100

	ASTM D2435-96			Test name Date of Test:	Consolidation 12-7-16	n Load: 0.500 (TSF)	
E	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln		
	Operator: MLC		Checked: M	L.	Appro	ved .	

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# **Oedometer Settlement Tests**

Settlement Stage Results

 Vertical Stress (TSF)
 0.500

 Initial Temp oC
 21.6

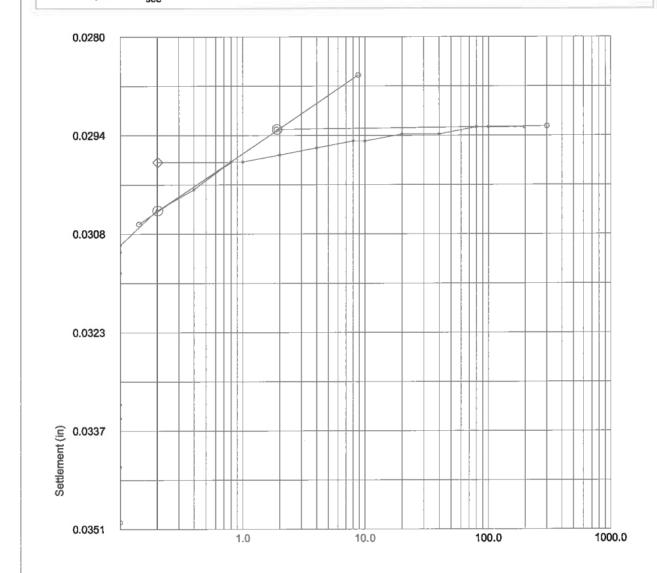
 Correction (in)
 0.0

 Settlement (in)
 0.0057

 Voids Ratio e
 0.8972

 Final Temp oC
 to (mins)

t<sub>50</sub> (mins) c<sub>v</sub> (ft2/day) m<sub>v</sub> (ft2/ton) Sec Compression C<sub>sec</sub>





ASTM D2435-96			Test name Date of Test:	Consolidation	
Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
Operator: AAI		Checked: AA I		Approved:	

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	293	0.0293	0.0293
2	0.017	291	0.0291	0.0291
3	0.033	274	0.0274	0.0274
4	0.050	260	0.0260	0.0260
5	0.067	257	0.0257	0.0257
6	0.083	256	0.0256	0.0256
7	0.100	253	0.0253	0.0253
8	0.200	246	0.0246	0.0246
9	0.400	238	0.0238	0.0238
10	0.800	232	0.0232	0.0232
11	1.000	230	0.0230	0.0230
12	2.000	225	0.0225	0.0225
13	4.000	221	0.0221	0.0221
14	8.000	218	0.0218	0.0218
15	10.000	217	0.0217	0.0217
16	20.000	215	0.0215	0.0215
17	40.000	213	0.0213	0.0213
18	80.000	212	0.0212	0.0212
19	100.000	211	0.0211	0.0211
20	200.000	211	0.0211	0.0211
21	400.000	210	0.0210	0.0210
22	800.000	209	0.0209	0.0209
23	930.983	209	0.0209	0.0209

A	ASTM D2435-96			Test name Date of Test:	Consolidation Load: 0.050 (TSF) 12-7-16
<b>\$S&amp;ME</b>	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.
	Operator: MC		Checked: M	L	Approved:

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# **Oedometer Settlement Tests**

#### Settlement Stage Results

 Vertical Stress (TSF)
 0.050

 Initial Temp oC
 21.6

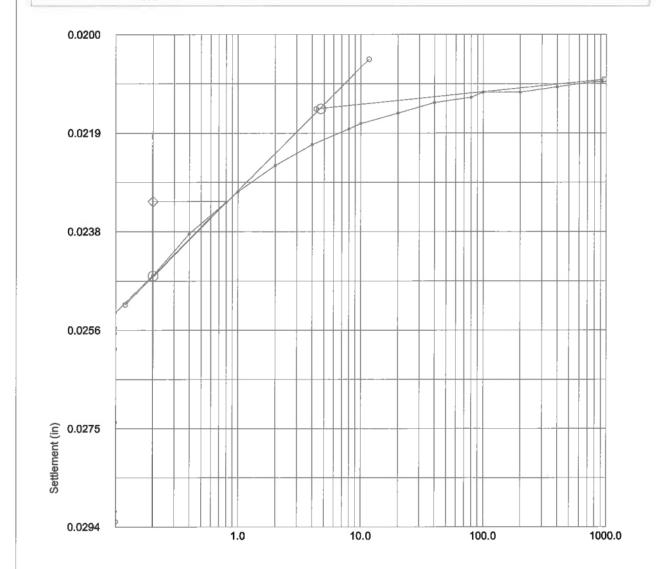
 Correction (in)
 0.0

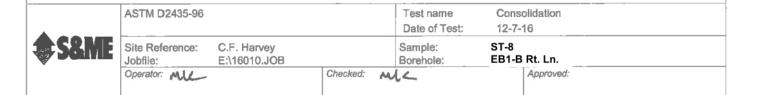
 Settlement (in)
 0.0084

 Voids Ratio e
 0.9137

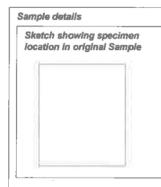
 Final Temp oC

t<sub>50</sub> (mins) c<sub>v</sub> (ft2/day) m<sub>v</sub> (ft2/ton) Sec Compression C<sub>sec</sub>





#### **Consolidated Undrained**



Depth 15.0 - 17.0 ft.

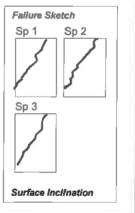
Description: Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)

Height H<sub>0</sub> (in) 5.974 Diameter D<sub>0</sub> (in) 2.864 Weight W<sub>0</sub> (gr) 1167.6 Bulk Density p (PCF) 115.58 Particle Density Ps 2.661

Specimen 1 Specimen 2 Specimen 3 Undisturbed Undisturbed Undisturbed 5.951 5.863 2.864 2.865 1176 1170.8 116.86 118.00 2.661 2.661 (measured) (measured) (measured)

Initial Conditions			
	Specimen 1	Specimen 2	Specimen 3
Cell Pressure o3 (lbf/in2)	7.0	16.0	26.0
Pore Pressure u (lbf/in2)	0.0	0.0	0.0
Machine Speed d <sub>r</sub> (in/min)	0.0079	0.0091	0.0068
No. of Membranes	1	1	1
Total Thickness (in)	0.012	0.012	0.012
Strain Channel	1798	1798	1798
Load Channel	1776	1776	1776
Pore P. Channel	1779	1779	1779
Volume Channel	Volume Chang	Volume Chang	Volume Chang
Moisture Content w <sub>0</sub> %	36.9	35.7	37.6
Dry Density <sub>Pd0</sub> (PČF)	84.45	86.12	85.76
Voids Ratio e₀	0.97	0.93	0.94
Deg of Saturation S <sub>0</sub> %	100.00	100.00	100.00
Final B Value	0.98	0.97	0.98

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Moisture Content w <sub>f</sub> %	33.8	31.8	31.5
Dry Density ρ <sub>d</sub> (PCF)	86.50	88.85	89.27
Voids Ratio e,	0.92	0.87	0.86
Deg of Saturation S <sub>f</sub> %	97.93	97.53	97.61
Failure Criteria	Mx Stress Ra	tioMx Stress Ra	tioMx Stress Ratio
Axial Strain 84%	4.0	4.0	4.0
Corr Dev Stress (01 - 03)f (lbf/in2)	14.9	30.2	47.1
Minor Stress o <sub>3f</sub> (lbf/in2)	3.8	7.3	13.5
Major Stress of (lbf/in2)	18.7	37.5	60.6
Stress Ratio ( $\sigma_1/\sigma_3$ ) <sub>f</sub>	4.9	5.1	4.5
Notes:			



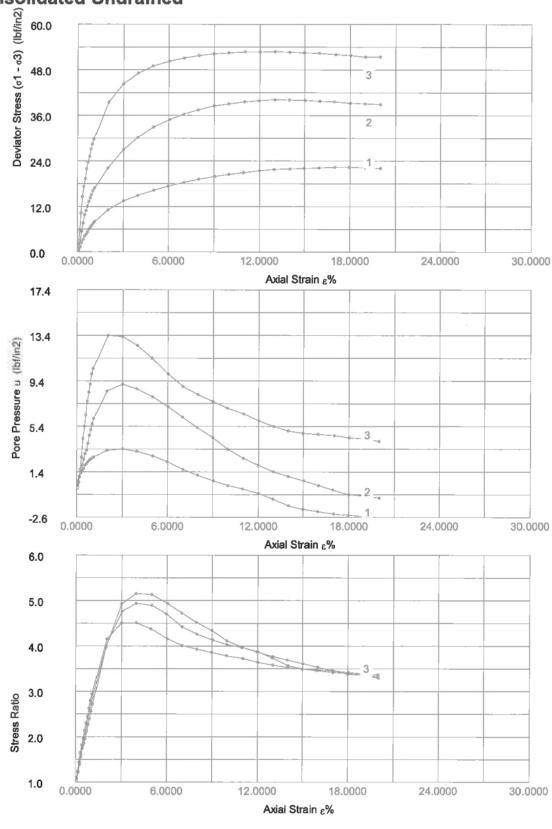


Test Method: AST		Test name Date of Test:		CU Triaxial (SS, MS) 12-7-16		
Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.	
Operator: MV		Checked:	K		Approved:	

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# **Effective Stress Triaxial Compression**

### **Consolidated Undrained**

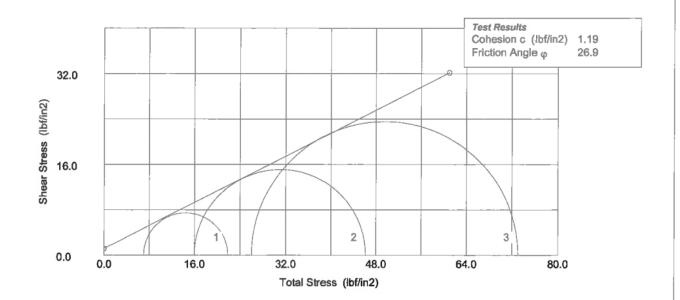




Test Method: ASTM D4767-95			Test name Date of Test:	CU Triaxial (SS, MS) 12-7-16
Site Reference: C.F. Harvey Jobfile: E:\16010.JOB			Sample: Borehole:	ST-8 EB1-B Rt. Ln.
Operator: MLC		Checked: ML	_	Approved:

#### **Consolidated Undrained**



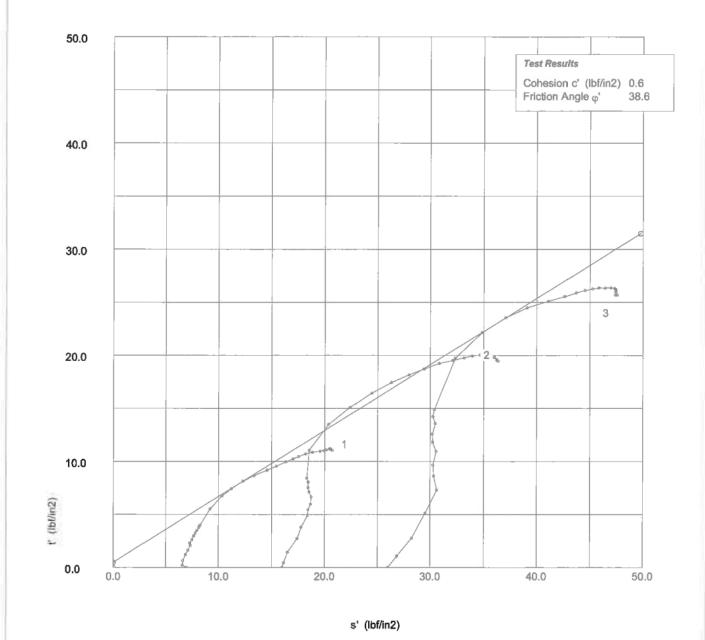


A	Test Method: AST	M D4767-95			Test name  Date of Test:	CU Ti 12-7-	naxial (SS, MS) 16	
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB			Sample: Borehole:	ST-8 EB1-B	Rt. Ln.	
	Operator: NL		Checked:	M	IL.		Approved:	

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# **Effective Stress Triaxial Compression**

# Consolidated Undrained



\$S&ME	Test Method: AST	TM D4767-95		Test name Date of Test:	CU Triaxial (SS, MS) 12-7-16	
	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.	
	Operator: MUC	-	Checked: N	uc_	Approved:	

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No.	Strain (divs)	Strain 8%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress $(\sigma_1 - \sigma_3)_m$ (lbf/in2)	D. Stress $(\sigma_1 - \sigma_3)_c$ (lbf/in2)	Minor Str σ <sub>3</sub> ' (lbf/in2)	Major Str σ <sub>1</sub> (lbf/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	95	0.00	503	0.0	0	0.0	0.0	0.0	7.00	7.00	1.00
2	148	0.09	530	2.7	6	0.6	0.4	0.4	6.40	6.83	1.07
3	207	0.19	586	8.3	10	1.0	1.3	1.3	6.00	7.31	1.22
4	260	0.28	658	15.5	13	1.3	2.4	2.4	5.70	8.14	1.43
5	314	0.37	711	20.8	15	1.5	3.3	3.3	5.50	8.77	1.59
6	372	0.47	767	26.4	17	1.7	4.1	4.1	5.30	9.45	1.78
7	426	0.56	808	30.5	20	2.0	4.8	4.6	5.00	9.63	1.93
8	480	0.65	847	34.4	21	2.1	5.4	5.2	4.90	10.13	2.07
9	538	0.75	894	39.1	23	2.3	6.1	6.0	4.70	10.66	2.27
10	593	0.84	928	42.5	24	2.4	6.6	6.5	4.60	11.09	.2.41
11	648	0.93	961	45.8	25	2.5	7.2	7.0	4.50	11.50	2.56
12	706	1.03	997	49.4	26	2.6	7.7	7.6	4.40	11.96	2.72
13	760	1.12	1025	52.2	27	2.7	8.1	8.0	4.30	12.29	2.86
14	1263	1.97	1236	73.3	33	3.3	11.3	11.1	3.70	14.76	3.99
15	1883	3.02	1406	90.3	34	3.4	13.8	13.5	3.60	17.06	4.74
16	2444	3.96	1517	101.4	32	3.2	15.4	14.9	3.80	18.69	4.92
17	3067	5.02	1625	112.2	28	2.8	16.8	16.3	4.20	20.46	4.87
18	3633	5.97	1714	121.1	23	2.3	18.0	17.3	4.70	22.03	4.69
19	4258	7.03	1803	130.0	16	1.6	19.1	18.4	5.40	23.76	4.40
20	4825	7.98	1876	137.3	11	1.1	19.9	19.1	5.90	25.04	4.24
21	5449	9.04	1951	144.8	6	0.6	20.8	19.9	6.40	26.31	4.11
22	6017	9.99	2012	150.9	2	0.2	21.4	20.5	6.80	27.28	4.01
23	6584	10.95	2067	156.4	-1	-0.1	22.0	20.9	7.10	28.04	3.95
24	7212	12.01	2126	162.3	-5	-0.5	22.5	21.4	7.50	28.92	3.86
25	7778	12.97	2173	167.0	-10	-1.0	22.9	21.8	8.00	29.76	3.72
26	8409	14.03	2212	170.9	-16	-1.6	23.2	21.9	8.60	30.53	3.55
27	8976	14.99	2245	174.2	-19	-1.9	23.4	22.1	8.90	30.95	3.48
28	9545	15.95	2279	177.6	-21	-2.1	23.6	22.2	9.10	31.28	3.44
29	10174	17.01	2320	181.7	-23	-2.3	23.8	22.3	9.30	31.65	3.40
30	10745	17.97	2348	184.5	-24	-2.4	23.9	22.4	9.40	31.77	3.38
31	11351	19.00	2365	186.2	-25	-2.5	23.8	22.2	9.50	31.75	3.34
32	11958	20.02	2379	187.6	-27	-2.7	23.7	22.1	9.70	31.78	3.28

<b>♣C2ME</b>	
♣ 3011IE	ŀ

	Test Method: AST	TM D4767-95		Test name Date of Test	CU Triaxial (SS, MS) Shear (Specimen 1) 12-7-16
Ē	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B Rt. Ln.
	Operator: M IC	•	Checked: A	W	Approved:

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# **Effective Stress Triaxial Compression**

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Consolidated	<b>Undrained</b>	Shear	(Specimen 2)
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No.	Strain (divs)	Strain 8%	Load (divs)	Load (lbs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>c</sub> (lbf/ln2)	Minor Str	Major Str σ <sub>1</sub> ' (lbf/in2)	Ratio o <sub>1</sub> '/o <sub>3</sub> '
1	82	0.00	683	0.0	0	0.0	0.0	0.0	16.00	16.00	1.00
2	136	0.09	739	5.6	3	0.3	0.9	0.9	15.70	16.59	1.06
3	190	0.18	864	18.1	9	0.9	2.9	2.9	15.10	17.96	1.19
4	245	0.28	1028	34.5	13	1.3	5.5	5.5	14.70	20.15	1.37
5	297	0.37	1164	48.1	20	2.0	7.6	7.6	14.00	21.60	1.54
6	351	0.46	1303	62.0	25	2.5	9.8	9.8	13.50	23.28	1.72
7	409	0.56	1384	70.1	30	3.0	11.1	10.9	13.00	23.89	1.84
8	461	0.64	1453	77.0	33	3.3	12.1	12.0	12.70	24.67	1.94
9	515	0.74	1539	85.6	39	3.9	13.5	13.3	12.10	25.41	2.10
10	575	0.84	1600	91.7	46	4.6	14.4	14.3	11.40	25.66	2.25
11	626	0.92	1653	97.0	51	5.1	15.2	15.1	10.90	25.98	2.38
12	682	1.02	1720	103.7	56	5.6	16.3	16.1	10.40	26.51	2.55
13	739	1.12	1767	108.4	61	6.1	17.0	16.8	9.90	26.73	2.70
14	1239	1.96	2123	144.0	85	8.5	22.4	22.1	7.50	29.60	3.95
15	1849	3.00	2459	177.6	91	9.1	27.3	27.0	6.90	33.85	4.91
16	2409	3.95	2695	201.2	87	8.7	30.6	30.2	7.30	37.46	5.13
17	3022	4.99	2904	222.1	80	8.0	33.5	32.9	8.00	40.90	5.11
18	3641	6.04	3065	238.2	71	7.1	35.5	34.8	8.90	43.74	4.92
19	4201	6.99	3196	251.3	62	6.2	37.1	36.3	9.80	46.14	4.71
20	4766	7.95	3304	262.1	53	5.3	38.2	37.5	10.70	48.15	4.50
21	5380	9.00	3413	273.0	44	4.4	39.4	38.5	11.60	50.11	4.32
22	5946	9.96	3485	280.2	34	3.4	40.0	39.0	12.60	51.64	4.10
23	6562	11.00	3560	287.7	26	2.6	40.6	39.6	13.40	52.96	3.95
24	7129	11.97	3621	293.8	20	2.0	41.0	39.9	14.00	53.89	3.85
25	7746	13.01	3677	299.4	14	1.4	41.3	40.1	14.60	54.71	3.75
26	8314	13.98	3710	302.7	10	1.0	41.3	40.0	15.00	55.02	3.67
27	8934	15.03	3746	306.3	6	0.6	41.3	39.9	15.40	55.35	3.59
28	9501	15.99	3771	308.8	2	0.2	41.1	39.7	15.80	55.55	3.52
29	10066	16.95	3799	311.6	-2	-0.2	41.0	39.6	16.20	55.78	3.44
30	10689	18.01	3818	313.5	-6	-0.6	40.7	39.2	16.60	55.84	3.36
31	11264	18.99	3846	316.3	-7	-0.7	40.6	39.1	16.70	55.77	3.34
32	11866	20.01	3877	319.4	-9	-0.9	40.5	38.9	16.90	55.81	3.30

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<b>4</b> C914	Е.
48- 30-M	E.
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	Test Method: AST	M D4767-95		Test name Date of Test:	CU Triaxial (SS, MS) Shear (Specimen 2) 12-7-16		
Julin	Site Reference: Jobfile: Operator:	C.F. Harvey E:\16010.JOB	.Checked: M	Sample: Borehole:	ST-8 EB1-B Rt. Ln.		

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# Consolidated Undrained Shear (Specimen 3)

No.	Strain (divs)	Strain ε%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>m</sub> (lbf/in2)	D. Stress $(\sigma_1 - \sigma_3)_c$ (ibf/in2)	Minor Str σ <sub>3</sub> ' (lbf/in2)	Major Str σ <sub>1</sub> (lbf/in2)	Ratio σ <sub>1</sub> '/σ <sub>3</sub> '
1	0	0.00	708	0.0	0	0.0	0.0	0.0	26.00	26.00	1.00
2	41	0.07	842	13.4	2	0.2	2.1	2.1	25.80	27.93	1.08
3	86	0.15	1056	34.8	5	0.5	5.5	5.5	25.50	31.04	1.22
4	136	0.24	1353	64.5	16	1.6	10.3	10.3	24.40	34.66	1.42
5	185	0.32	1628	92.0	27	2.7	14.6	14.6	23.30	37.92	1.63
6	236	0.41	1795	108.7	43	4.3	17.3	17.3	21.70	38.95	1.80
7	293	0.51	1937	122.9	54	5.4	19.5	19.3	20.60	39.93	1.94
8	345	0.60	2101	139.3	64	6.4	22,1	21.9	19.60	41.51	2.12
9	399	0.69	2212	150.4	76	7.6	23.8	23.6	18.40	42.04	2.29
10	456	0.79	2312	160.4	84	8.4	25.4	25.2	17.60	42.80	2.43
11	509	0.88	2437	172.9	91	9.1	27.3	27.2	16.90	44.05	2.61
12	561	0.97	2523	181.5	100	10.0	28.6	28.5	16.00	44.49	2.78
13	619	1.07	2607	189.9	105	10.5	29.9	29.8	15.50	45.28	2.92
14	1175	2.03	3254	254.6	134	13.4	39.8	39.5	12.60	52.07	4.13
15	1735	3.00	3596	288.8	133	13.3	44.6	44.3	12.70	56.99	4.49
16	2302	3.98	3816	310.8	125	12.5	47.6	47.1	13.50	60.58	4.49
17	2866	4.95	3979	327.1	114	11.4	49.5	49.0	14.60	63.59	4.36
18	3488	6.03	4105	339.7	100	10.0	50.9	50.2	16.00	66.24	4.14
19	4053	7.01	4205	349.7	89	8.9	51.8	51.1	17.10	68.21	3.99
20	4624	7.99	4294	358.6	82	8.2	52.6	51.8	17.80	69.59	3.91
21	5191	8.97	4369	366.1	76	7.6	53.1	52.2	18.40	70.63	3.84
22	5756	9.95	4433	372.5	70	7.0	53.5	52.5	19.00	71.50	3.76
23	6384	11.04	4499	379.1	65	6.5	53.8	52.7	19.50	72.22	3.70
24	6950	12.01	4546	383.8	59	5.9	53.8	52.7	20.10	72.80	3.62
25	7524	13.01	4599	389.1	54	5.4	53.9	52.8	20.60	73.37	3.56
26	8092	13.99	4641	393.3	50	5.0	53.9	52.7	21.00	73.66	3.51
27	8661	14.97	4677	396.9	48	4.8	53.8	52.5	21.20	73.67	3.48
28	9232	15.96	4719	401.1	47	4.7	53.7	52.3	21.30	73.65	3.46
29	9858	17.04	4756	404.8	46	4.6	53.5	52.1	21.40	73.47	3.43
30	10433	18.04	4789	408.1	44	4.4	53.3	51.8	21.60	73.40	3.40
31	10996	19.01	4811	410.3	43	4.3	53.0	51.4	21.70	73.11	3.37
32	11561	19.99	4862	415.4	41	4.1	53.0	51.4	21.90	73.28	3.35

A	Test Method: ASTM D4767-95			Test name Date of Test:	CU Triaxial (SS, MS) Shear (Specimen 3) 12-7-16		
\$S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-8 EB1-B	Rt. Ln.	
	Operator: M/2-		Checked: M.C.			Approved:	

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