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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5703	1	33

REFERENCE: R-5703

PROJECT: 46375

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

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

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 (919) 707-6850. 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 LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT 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 NECESSARY 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.

NOTES:

1. 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.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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SUBMITTED BY *S&ME, INC.*

DATE *FEBRUARY, 2017*

NORTH CAROLINA PROFESSIONAL SEAL 031013 ENGINEER STEWART S. LANEY

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5703	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1			A-3	A-2			A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b			A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX			— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0			0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND					SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD								FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER ____ HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-750
- [X] D-50

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	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 CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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 PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-42

N 578,979.2720 E 2,441,651.4540 ELEVATION: 74.53 FEET

NOTES:
FIAD - FILLED IMMEDIATLEY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
R-5703	3

SITE PLAN

0 40 80

FEET

SKEW 105°
SITE 5

-L- POT Sta. 281+39.19 =
-Y6- POT Sta. 11+64.76

NC GRID
NAD 83/NSRS 2007

TO SR 1720

BL42

279 280 281 282 283 284

END BENT #1

END BENT #2

-Y6-

SR 1735 (FERRELL RD) 18' BST

13

12

10

BRIDGE 216

BRIDGE 217

EB1-A Lt. Ln.

EB2-A Lt. Ln.

B1

B2

105°47'56"

EB1-B Rt. Ln.

EB2-B Rt. Ln.

SR 1733 -L-

SR 1720

TO NC HWY 11

PROJECT REFERENCE NO.	SHEET NO.
R-5703	4

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

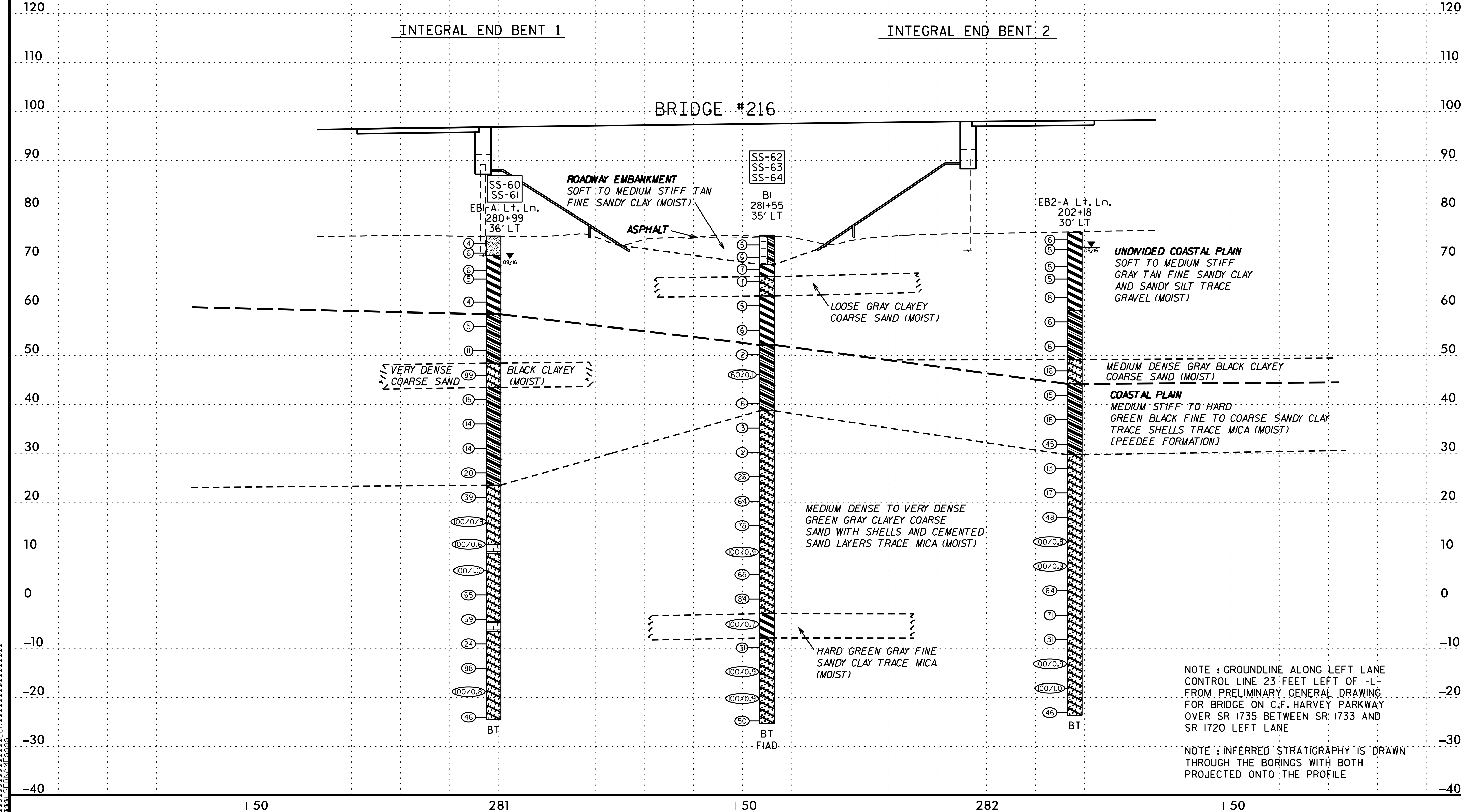
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-60	36' LT	280+99	0.5 – 2.0	A-4 (1)	19	8	12	45	23	20	100	99	88	48.7	13.6	ND
SS-61	36' LT	280+99	47.5 – 49.0	A-6 (4)	30	13	9	39	22	30	100	96	71	55.3	17.5	ND
SS-62	35' LT	281+55	3.5 – 5.0	A-6 (5)	34	19	13	43	19	25	100	99	87	48.3	22.5	ND
SS-63	35' LT	281+55	6.0 – 7.5	A-7-6 (6)	45	27	6	55	7	32	100	99	94	41.4	24.7	ND
SS-64	35' LT	281+55	13.5 – 15.0	A-7-6 (4)	42	19	3	55	18	24	100	98	97	43.4	51.5	ND

PROFILE THROUGH BORINGS PROJECTED ALONG LEFT LANE CONTROL LINE

VE 1:1



NOTE : GROUNDLINE ALONG LEFT LANE CONTROL LINE 23 FEET LEFT OF -L- FROM PRELIMINARY GENERAL DRAWING FOR BRIDGE ON C.F. HARVEY PARKWAY OVER SR 1735 BETWEEN SR 1733 AND SR 1720 LEFT LANE

NOTE : INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

5/14/99

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
SS-65	43' RT	280+75	0.5 – 2.0	A-4 (2)	22	10	8	47	23	22	100	99	92	50.3	15.8	1.4
SS-66	38' RT	281+81	0.5 – 2.0	A-2-4 (0)	21	7	30	44	8	18	100	83	70	29.1	22.1	ND
SS-67	38' RT	281+81	32.2 – 33.7	A-2-6 (1)	31	18	49	23	9	19	99	70	50	30.3	17.9	ND
ST-8	43' RT	280+75	15.0 – 17.0	A-6 (0)	37	11	4	67	8	21	100	97	96	36.0	36.7	ND

PROJECT REFERENCE NO.	SHEET NO.
R-5703	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROFILE THROUGH BORINGS PROJECTED ALONG RIGHT LANE CONTROL LINE

VE 1:1

INTEGRAL END BENT 1

INTEGRAL END BENT 2

BRIDGE #217

UNDIVIDED COASTAL PLAIN
VERY SOFT TO MEDIUM STIFF TAN FINE SANDY SILT TRACE ROOTLETS WITH MICA (MOIST)

SS-65
ST-8
EB1-B Rt. Ln.
280+75
43' RT

UNDIVIDED COASTAL PLAIN
SOFT TO STIFF TAN GRAY FINE SANDY CLAY (MOIST)

ASPHALT

B2
281+38
25' RT

ROADWAY EMBANKMENT
MEDIUM STIFF TAN FINE SANDY CLAY (MOIST)

SS-66
SS-67
EB2-B Rt. Ln.
281+81
37' RT

UNDIVIDED COASTAL PLAIN
LOOSE TAN GRAY SILTY FINE SAND (MOIST)

LOOSE GRAY CLAYEY COARSE SAND (MOIST TO WET)

COASTAL PLAIN
MEDIUM STIFF TO VERY STIFF BLACK FINE SANDY CLAY WITH MICA TRACE SHELLS (MOIST) [PEEDEE FORMATION]

MEDIUM DENSE TO DENSE GREEN GRAY CLAYEY COARSE SAND WITH SHELLS TRACE MICA (WET TO MOIST)

STIFF TO VERY STIFF GREEN GRAY FINE SANDY CLAY WITH MICA WITH SHELLS (MOIST)

MEDIUM DENSE TO VERY DENSE GREEN GRAY CLAYEY FINE TO COARSE SAND, WITH SHELL FRAGMENTS AND CEMENTED SAND LAYERS (MOIST)

BT

BT
FIAD

BT

NOTE : GROUNDLINE ALONG RIGHT LANE CONTROL LINE 23 FEET LEFT OF -L- FROM PRELIMINARY GENERAL DRAWING FOR BRIDGE ON C.F. HARVEY PARKWAY OVER SR 1735 BETWEEN SR 1733 AND SR 1720 LEFT LANE

NOTE : INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 –10 –20 –30 –40

+50 281 +50 282 +50

$$$$$$$$SYSTIME$$$$$$$$ $$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$ $$$$$$$$FILENAME$$$$

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB1-A Lt. Ln.	**STATION** 280+99	**OFFSET** 36 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.5 ft	**TOTAL DEPTH** 99.0 ft	**NORTHING** 578,803	**EASTING** 2,441,586	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/13/16	**COMP. DATE** 09/16/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
75										
	74.0	0.5	2	2	2	4 6				74.5 / 0.0 GROUND SURFACE
	72.0	2.5	3	3	3		SS-60	14%		**UNDIVIDED COASTAL PLAIN** Tan Gray Fine Sandy SILT
70								M		70.5 / 4.0
	68.5	6.0	2	3	3	6				Tan Grey Fine Sandy CLAY
	66.7	7.8	2	2	3	5		M		
65								M		
	62.0	12.5	2	2	2	4				
60								M		
	57.0	17.5	2	2	3	5				58.5 / 16.0 **COASTAL PLAIN** Black Fine Sandy CLAY, Trace Shells, Trace Mica [Peedee Formation]
55								M		
	52.0	22.5	3	4	7	11				
50								M		48.5 / 26.0
	47.0	27.5	11	11	78	89				Black Clayey Coarse SAND
45								M		43.5 / 31.0
	42.0	32.5	6	7	8	15				Black Green-Gray Fine Sandy CLAY, Trace Shells, Trace Mica
40								M		
	37.0	37.5	5	7	7	14				
35								M		
	32.0	42.5	5	6	8	14				
30								M		
	27.0	47.5	5	10	10	20	SS-61	18%		
25								M		23.5 / 51.0
	22.0	52.5	14	12	27	39				Green Gray Clayey Coarse SAND with Shells and cemented sand layers
20								M		
	17.0	57.5	7	44	56/0.3	100/0.8				
15								M		
	12.0	62.5	79	21/0.1		100/0.6				11.4 / 63.1
10								M		9.5 / 65.0
	7.0	67.5	11	22	78/0.5	100/1.0				
5								M		
	2.0	72.5	20	28	37	65				
0								M		
	-3.0	77.5	20	21	38	59				-4.5 / 79.0
-5								M		

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB1-A Lt. Ln.	**STATION** 280+99	**OFFSET** 36 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.5 ft	**TOTAL DEPTH** 99.0 ft	**NORTHING** 578,803	**EASTING** 2,441,586	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/13/16	**COMP. DATE** 09/16/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5						Match Line				
	-8.0	82.5	7	10	14	24		M		-6.5 / 81.0
-10										
	-13.0	87.5	25	38	50	88		M		
-15										
	-18.0	92.5	44	56/0.3		100/0.8		M		
-20										
	-23.0	97.5	24	26	20	46		M		-24.5 / 99.0
										Boring Terminated at Elevation -24.5 ft in Dense Clayey Coarse SAND

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. B1	**STATION** 281+55	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.7 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 578,817	**EASTING** 2,441,641	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HPC0279 Diedrich D50 88% 12/09/2015		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Cain, J.	**START DATE** 08/17/16	**COMP. DATE** 08/17/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
75										
	73.7	1.0	2	2	3	5		M		74.7 / 0.0 GROUND SURFACE
										74.5 / 0.2 ASPHALT
										ROADWAY EMBANKMENT Tan Fine Sandy CLAY
70	71.2	3.5	3	2	4	6	SS-62	23%		
	68.7	6.0	3	3	4	7	SS-63	25%		68.7 / 6.0 **UNDIVIDED COASTAL PLAIN** Grey Fine Sandy CLAY
	66.2	8.5								66.2 / 8.5 Grey Clayey Coarse SAND
65			2	3	4	7		M		
	61.2	13.5								62.2 / 12.5 Tan to Black Silty CLAY with Mica
60			2	2	3	5	SS-64	52%		
	56.2	18.5								
55			2	3	3	6		M		
	51.2	23.5								52.2 / 22.5 **COASTAL PLAIN** Black Coarse Sandy CLAY with Shells [Peedee Formation]
50			5	5	7	12		M		
	46.2	28.5								
45			60/0.1			60/0.1		M		
	41.2	33.5								
40			6	6	9	15		M		
	36.2	38.5								38.7 / 36.0 Green Grey Clayey Coarse SAND with Shells, Trace Mica, with cemented sand layers
35			6	6	7	13		M		
	31.2	43.5								
30			6	5	7	12		M		
	26.2	48.5								
25			16	12	14	26		M		
	21.2	53.5								
20			15	27	37	64		M		
	16.2	58.5								
15			26	28	47	75		M		
	11.2	63.5								
10			19	37	63/0.4	100/0.9		M		
	6.2	68.5								
5			19	31	34	65		M		
	1.2	73.5								
0			26	39	45	84		M		
	-3.8	78.5								-2.8 / 77.5 Green Grey Fine Sandy CLAY, Trace Mica
-5			30	36	64/0.2			M		

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. B1	**STATION** 281+55	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.7 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 578,817	**EASTING** 2,441,641	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HPC0279 Diedrich D50 88% 12/09/2015		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Cain, J.	**START DATE** 08/17/16	**COMP. DATE** 08/17/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5						Match Line				
	-8.8	83.5	10	14	17	31		M		-7.8 / 82.5 Green Grey Fine Sandy CLAY, Trace Mica *(continued)*
-10										Green Grey Clayey Coarse SAND with Shells, with cemented sand layers
	-13.8	88.5	33	67/0.4		100/0.9		M		
-15										
	-18.8	93.5	38	54	46/0.4	100/0.9		M		
-20										
	-23.8	98.5	11	20	30	50		M		-25.3 / 100.0 Boring Terminated at Elevation -25.3 ft in Dense Clayey Fine SAND
-25										

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB2-A Lt. Ln.	**STATION** 282+18	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 75.2 ft	**TOTAL DEPTH** 98.8 ft	**NORTHING** 578,829	**EASTING** 2,441,703	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/08/16	**COMP. DATE** 09/08/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
80										
75	74.7	0.5	2	4	2	6		M		75.2 GROUND SURFACE 0.0
	72.7	2.5	1	2	3	5		M		**UNDIVIDED COASTAL PLAIN** Gray Tan Fine Sandy CLAY, Trace Gravel
70	69.2	6.0	3	2	3	5		M		
	66.7	8.5	2	2	3	5		M		
65	62.9	12.3	5	5	3	8		M		
60	57.9	17.3	3	3	3	6		M		59.2 16.0 Black Fine Sandy CLAY, Trace Mica
55	52.9	22.3	2	3	3	6		M		
50	47.9	27.3	6	7	9	16		M		49.2 26.0 Gray Black Clayey Coarse SAND
45	42.9	32.3	5	6	9	15		M		44.2 31.0 **COASTAL PLAIN** Green Black Fine Sandy CLAY, Trace Shells, Trace Mica [Peedee Formation]
40	37.9	37.3	11	8	10	18		M		
35	32.9	42.3	8	7	38	45		M		
30	27.9	47.3	5	5	8	13		M		29.7 45.5 Green Black Clayey Coarse SAND, Trace Shells, Trace Mica
25	22.9	52.3	5	6	11	17		M		
20	17.9	57.3	29	21	27	48		W		
15	12.9	62.3	50	50/0.3		100/0.8				
10	7.9	67.3	50	50/0.4		100/0.9				
5	2.9	72.3	8	17	47	64		M		
0										

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 216 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB2-A Lt. Ln.	**STATION** 282+18	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 75.2 ft	**TOTAL DEPTH** 98.8 ft	**NORTHING** 578,829	**EASTING** 2,441,703	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/08/16	**COMP. DATE** 09/08/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
0						Match Line				
-5	-2.1	77.3	35	34	37	71		M		Green Black Clayey Coarse SAND, Trace Shells, Trace Mica *(continued)*
-10	-7.1	82.3	9	12	19	31		W		
-15	-12.1	87.3	43	57/0.4		100/0.9				
-20	-17.1	92.3	34	66/0.5		100/1.0				
	-22.1	97.3	18	20	26	46		W		-23.6 98.8 Boring Terminated at Elevation -23.6 ft in Dense Clayey Coarse SAND

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 217 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB1-B Rt. Ln.	**STATION** 280+75	**OFFSET** 43 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.2 ft	**TOTAL DEPTH** 99.0 ft	**NORTHING** 578,721	**EASTING** 2,441,584	**24 HR.** 4.5
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/13/16	**COMP. DATE** 09/01/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
75										
	73.7	0.5	1	1	1	2				74.2 GROUND SURFACE 0.0
	71.7	2.5	2	3	4	7	SS-65	16%		**UNDIVIDED COASTAL PLAIN** Tan Fine Sandy SILT, Trace Rootlets and Mica
70								M		70.2 4.0
	68.2	6.0	2	3	4	7				Tan Fine Sandy CLAY, Trace Rootlets, with mica
	66.2	8.0	2	2	3	5		M		
65								M		
	61.7	12.5	2	2	3	5				
60								M		59.2 15.0
	56.7	17.5	2	3	3	6		37%		**COASTAL PLAIN** Black Fine Sandy CLAY with Mica, Trace Shells [Peedee Formation]
55								M		
	51.7	22.5	3	5	7	12				
50								M		
	46.7	27.5	4	5	10	15				
45								M		
	41.7	32.5	5	8	19	27				
40								M		
	36.7	37.5	6	6	8	14				
35								M		
	31.7	42.5	32	20	21	41				33.7 40.5
30								W		Green Gray Clayey Coarse SAND
	26.7	47.5	6	7	10	17				28.2 46.0
25								M		Green Gray Coarse Sandy CLAY, Trace Mica
	21.7	52.5	11	26	63	89				23.2 51.0
20								M		Green Gray Clayey Fine to Coarse SAND, with shell fragments and cemented sand layers
	16.7	57.5	40	67	33/0.2	100/0.7				
15								M		
	11.7	62.5	15	32	33	65				
10								M		
	6.7	67.5	39	61/0.4		100/0.9				
5										
	1.7	72.5	30	52	48/0.3	100/0.8				
0										
	-3.3	77.5	25	30	44	74		M		-4.8 79.0
-5										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5						Match Line				
	-8.3	82.5	8	11	16	27		M		-7.8 82.0
-10										
	-13.3	87.5	32	68/0.5		100/1.0				
-15										
	-18.3	92.5	35	45/0.2		100/0.7				
-20										
	-23.3	97.5	14	13	18	31				-24.8 99.0
										Boring Terminated at Elevation -24.8 ft in Dense Clayey Coarse SAND
										Other Samples: ST-8 (15.0 - 17.0)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 217 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. B2	**STATION** 281+38	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.3 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 578,755	**EASTING** 2,441,640	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HPC0279 Diedrich D50 88% 12/09/2015		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Cain, J.	**START DATE** 08/17/16	**COMP. DATE** 08/17/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
75											
	73.3	1.0	3	2	2	4		M		74.3 GROUND SURFACE	0.0
										74.0 ASPHALT	0.3
										STONE	
70	70.8	3.5	4	3	4	7		M		70.8 **ROADWAY EMBANKMENT** Tan Fine Sandy CLAY	3.5
	68.3	6.0	2	3	4	7		M		**UNDIVIDED COASTAL PLAIN** Orange Grey Fine Sandy CLAY	
65	65.8	8.5	2	4	4	8		W		65.8 Grey Clayey Coarse SAND	8.5
60	60.8	13.5	2	2	3	5		W		61.8 **COASTAL PLAIN** Black Fine Sandy Silty CLAY with Shells, with Mica [Peedee Formation]	12.5
55	55.8	18.5	2	3	3	6		W			
50	50.8	23.5	5	6	9	15		M			
45	45.8	28.5	15	11	20	31		M		46.8 Green Grey Clayey Fine SAND, Trace Mica	27.5
40	40.8	33.5	11	9	10	19		M		42.3 Green Grey Fine Sandy CLAY, Trace Mica	32.0
35	35.8	38.5	6	6	8	14		M		36.8 Green Grey Clayey Coarse SAND, with Shells, Trace Mica	37.5
30	30.8	43.5	5	7	8	15		M		31.8 Green Grey Fine Sandy CLAY with Mica, with Shells	42.5
25	25.8	48.5	6	7	10	17		M			
20	20.8	53.5	21	23	75	98		M		21.8 Clayey Fine SAND with Clay Seams, with Shells, Trace Mica and cemented sand layers	52.5
15	15.8	58.5	49	51/0.4		100/0.9		M			
10	10.8	63.5	33	52	48/0.3	100/0.8		M			
5	5.8	68.5	50	50/0.4		100/0.9		M			
0	0.8	73.5	18	73	27/0.2	100/0.7		M			
-5	-4.2	78.5						M			

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 217 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. B2	**STATION** 281+38	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 74.3 ft	**TOTAL DEPTH** 100.0 ft	**NORTHING** 578,755	**EASTING** 2,441,640	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HPC0279 Diedrich D50 88% 12/09/2015		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Cain, J.	**START DATE** 08/17/16	**COMP. DATE** 08/17/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5			7	93/0.3		Match Line 100/0.8		M		Clayey Fine SAND with Clay Seams, with Shells, Trace Mica and cemented sand layers *(continued)*
-10	-9.2	83.5	9	11	16	27		M		
-15	-14.2	88.5	40	60/0.3		100/0.8		M		
-20	-19.2	93.5	50	50/0.3		100/0.8		W		
-25	-24.2	98.5	22	28	29	57		M		-25.7 Boring Terminated at Elevation -25.7 ft in Very Dense Clayey Coarse SAND 100.0

NCDOT BORE DOUBLE 6235-16-010-SITE 5 V1.0 1.26.2017.GPJ NC_DOT.GDT 2/7/17

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 217 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB2-B Rt. Ln.	**STATION** 281+81	**OFFSET** 38 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 73.7 ft	**TOTAL DEPTH** 98.7 ft	**NORTHING** 578,754	**EASTING** 2,441,685	**24 HR.** 1.9
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/12/16	**COMP. DATE** 09/12/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
75											
	73.2	0.5	2	3	3	6				73.7 GROUND SURFACE	0.0
	71.2	2.5					SS-66	22%		**UNDIVIDED COASTAL PLAIN** Tan Grey Fine Silty SAND	
70			4	3	4	7		M		69.7 Tan Gray Fine Sandy CLAY	4.0
	67.7	6.0	2	2	3	5		M			
65	65.9	7.8	2	3	3	6		W		65.9 Gray Clayey Coarse SAND	7.8
	61.5	12.2	2	2	2	4		M			
60											
	56.5	17.2	2	2	3	5		M		57.7 **COASTAL PLAIN** Black Fine Sandy CLAY with Mica, Trace Shells [Peedee Formation]	16.0
55											
	51.5	22.2	3	4	7	11		M			
50											
	46.5	27.2	5	10	34	44		M		47.7 Balck Clayey Coarse SAND with Mica	26.0
45											
	41.5	32.2	5	6	7	13	SS-67	18%			
40										39.7 Black Fine Sandy CLAY with Shells, Trace Mica	34.0
	36.5	37.2	5	7	8	15		M			
35											
	31.5	42.2	6	5	8	13		M			
30											
	26.5	47.2	7	15	30	45		M		27.7 Green Gray Clayey Fine SAND, Trace Shells, Trace Mica and cemented sand layers	46.0
25											
	21.5	52.2	17	31	42	73		M			
20											
	16.5	57.2	38	62/0.5		100/1.0				15.5	58.2
15											
	11.5	62.2	35	53	38	91		M		11.5	62.2
10											
	6.5	67.2	100/0.5			100/0.5				6.0	67.7
5											
	1.5	72.2	42	53	41	94		M		1.5	72.2
0											
	-3.5	77.2	14	14	86/0.5	100/1.0				-5.0	78.7
-5											

WBS 46375.1.1	**TIP** R-5703	**COUNTY** LENOIR	**GEOLOGIST** Blonshine, E.G.	
SITE DESCRIPTION Bridge No. 217 on -L- (Felix Harvey Pkwy) over -Y6- (Ferrell Rd)				**GROUND WTR (ft)**
BORING NO. EB2-B Rt. Ln.	**STATION** 281+81	**OFFSET** 38 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 73.7 ft	**TOTAL DEPTH** 98.7 ft	**NORTHING** 578,754	**EASTING** 2,441,685	**24 HR.** 1.9
DRILL RIG/HAMMER EFF./DATE SME2938 CME-750 86% 02/11/2016		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 09/12/16	**COMP. DATE** 09/12/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-5						Match Line				
	-8.5	82.2	7	10	14	24		M		-8.5 82.2
-10										
	-13.5	87.2	24	44	56/0.5	100/1.0				
-15										
	-18.5	92.2	52	48/0.3		100/0.8				
-20										
	-23.5	97.2	12	15	21	36		M		-25.0 98.7
										Boring Terminated at Elevation -25.0 ft in Dense Clayey Coarse SAND

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

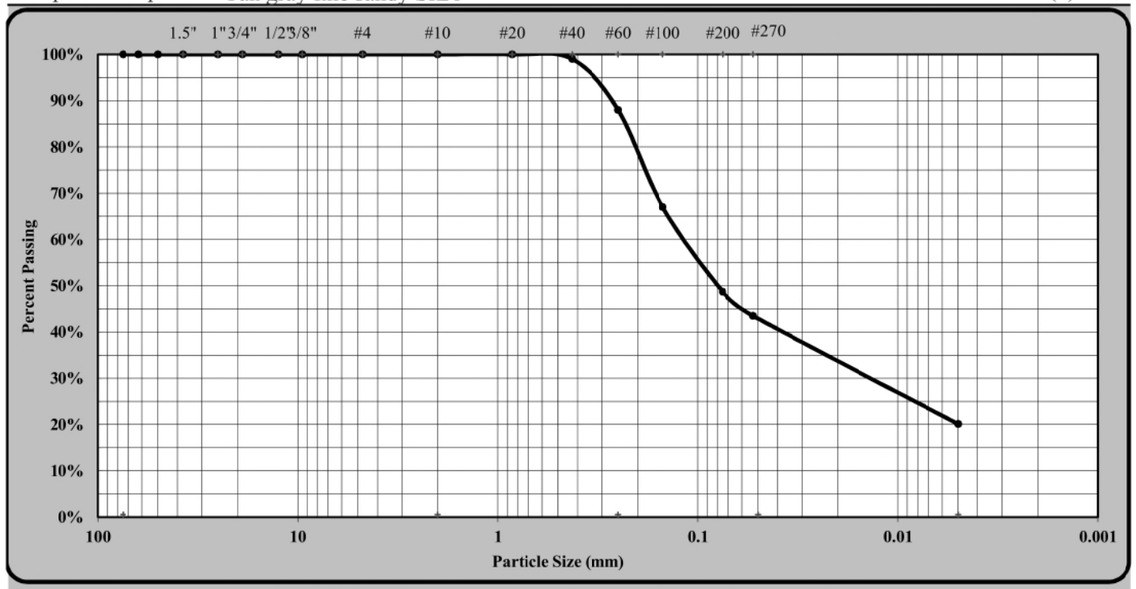
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway 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 Engineering		
Address:	Raleigh, NC		
Boring #:	EB1-A Lt. Ln. Sample #: SS-60	Sample Date:	N/A
Location:	Site-Borehole Offset: N/A	Depth (ft):	0.5-2.0'
Sample Description:	Tan gray fine sandy SILT	0 A-4 (1)	



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#20	Coarse Sand	12%	Silt	23%
Gravel	0%	Fine Sand	45%	Clay	20%
Apparent Relative Density	2.650	Moisture Content	13.6%	% Passing #200	48.7%
Liquid Limit	19	Plastic Limit	11	Plastic Index	8

Soil Mortar (-#10 Sieve)

Coarse Sand	12%	Fine Sand	45%	Silt	23%	Clay	20%
Description of Sand & Gravel Particles:		Rounded	☐			Angular	☒
Hard & Durable	☒	Soft	☐			Weathered & Friable	☐

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E		Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

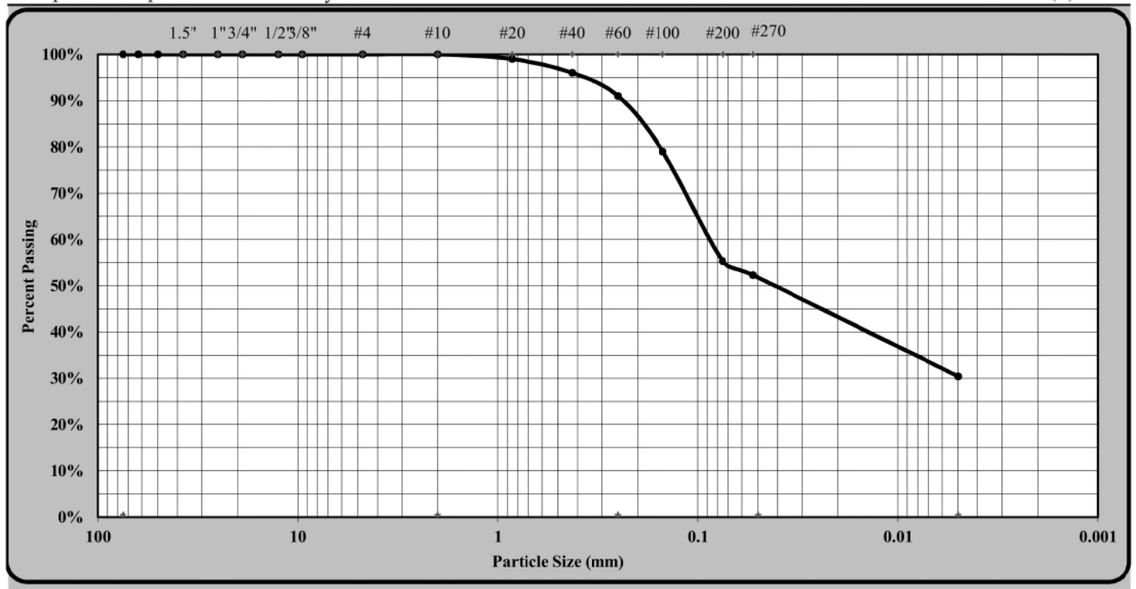
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway 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 Engineering		
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 Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#10	Coarse Sand	9%	Silt	22%
Gravel	0%	Fine Sand	39%	Clay	30%
Apparent Relative Density	2.650	Moisture Content	17.5%	% Passing #200	55.3%
Liquid Limit	30	Plastic Limit	17	Plastic Index	13

Soil Mortar (-#10 Sieve)

Coarse Sand	9%	Fine Sand	39%	Silt	22%	Clay	30%
Description of Sand & Gravel Particles:		Rounded	☐			Angular	☒
Hard & Durable	☒	Soft	☐			Weathered & Friable	☐

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E		Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

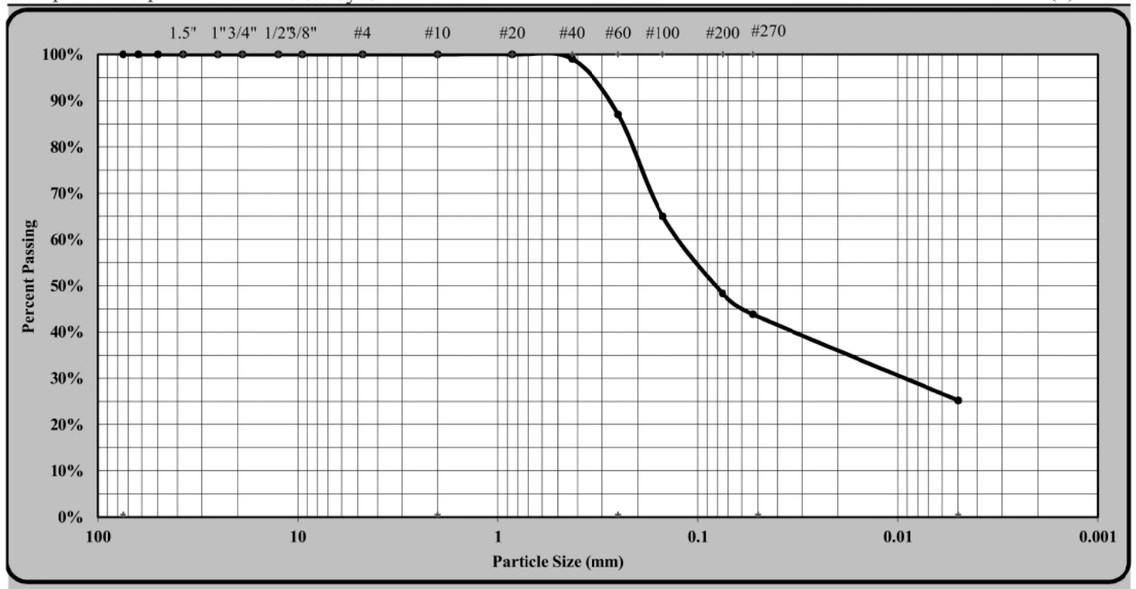
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway 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 Engineering				
Address:	Raleigh, NC				
Boring #:	B-1	Sample #:	SS-62	Sample Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth (ft):	3.5-5.0'
Sample Description:	Tan fine sandy CLAY			0	A-6 (5)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#20	Coarse Sand	13%	Silt	19%
Gravel	0%	Fine Sand	43%	Clay	25%
Apparent Relative Density	2.650	Moisture Content	22.5%	% Passing #200	48.3%
Liquid Limit	34	Plastic Limit	15	Plastic Index	19

Soil Mortar (-#10 Sieve)

Coarse Sand	13%	Fine Sand	43%	Silt	19%	Clay	25%
Description of Sand & Gravel Particles:		Rounded	☐		Angular		☒
Hard & Durable	☒	Soft	☐		Weathered & Friable		☐

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E		Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

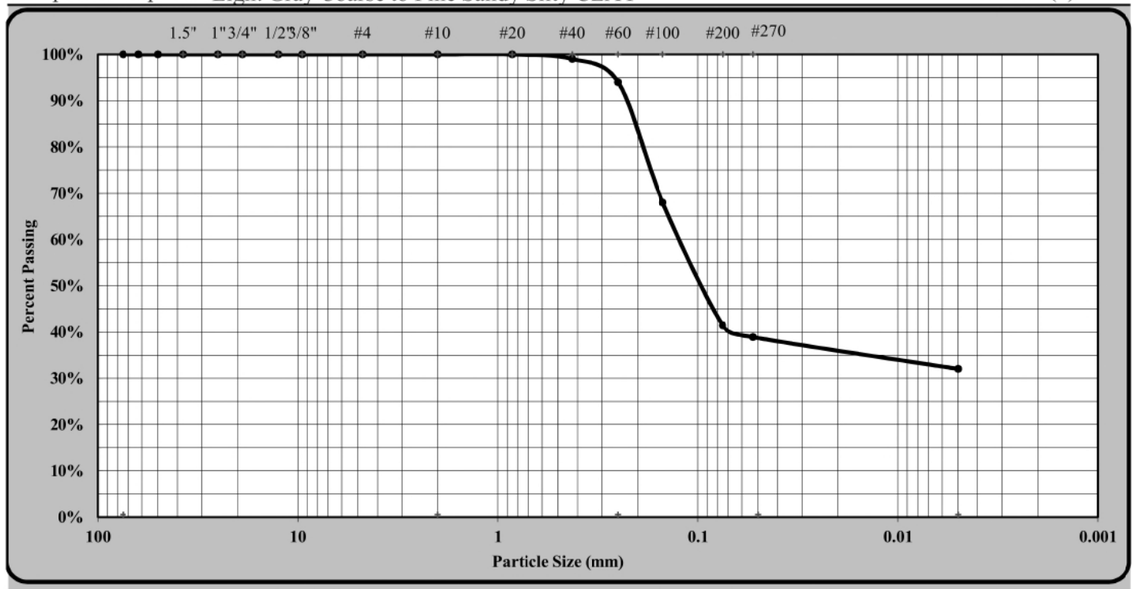
AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-16-010			Report Date:	9/20/16
Project Name:	C.F. Harvey Parkway Extension R-5703			Test Date(s):	9/12 - 9/20/16
State Project #:	N/A	F.A. Project No:	N/A	TIP NO:	N/A
Client Name:	Michael Baker Engineering				
Address:	Raleigh, NC				
Boring #:	B1	Sample #:	SS-63	Sample Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth (ft):	6 - 7.5
Sample Description:	Light Gray Coarse to Fine Sandy Silty CLAY				A-7-6 (6)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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 Sand	6%	Silt	7%
Gravel	0%	Fine Sand	55%	Clay	32%
Apparent Relative Density	ND	Moisture Content	25%	% Passing #200	41.4%
Liquid Limit	45	Plastic Limit	18	Plastic Index	27

Soil Mortar (-#10 Sieve)

Coarse Sand	6%	Fine Sand	55%	Silt	7%	Clay	32%
Description of Sand & Gravel Particles:		Rounded	☐		Angular		☒
Hard & Durable	☒	Soft	☒		Weathered & Friable		☒

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	9/12/2016
Technician Name	*Certification No.*	*Position*	*Date*
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

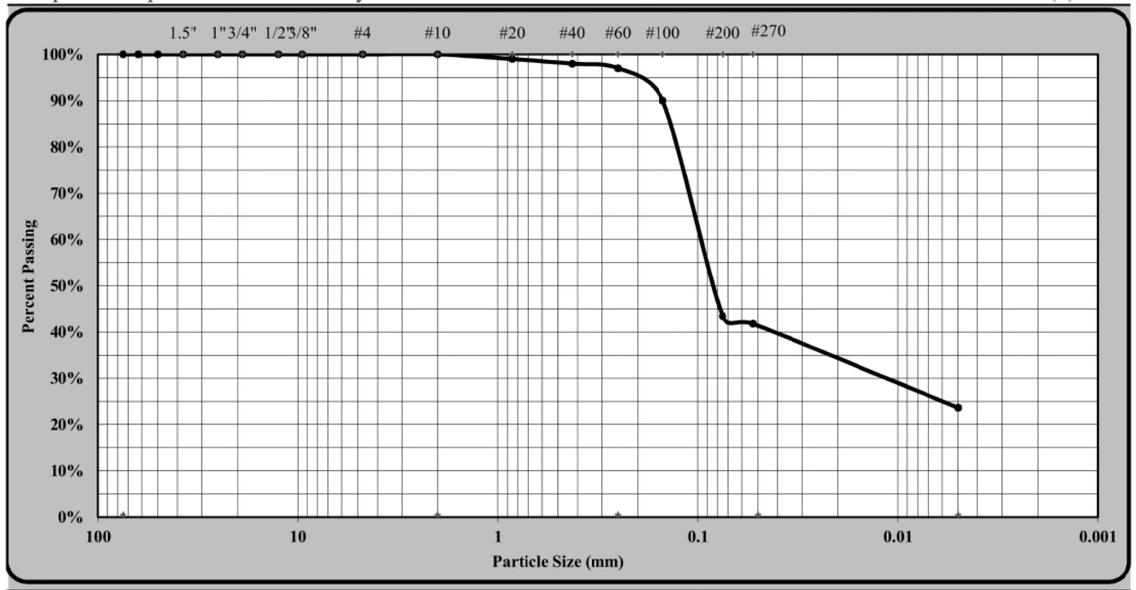
AASHTO T88 as Modified by NCDOT

S&ME

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



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#20	Coarse Sand	3%	Silt	18%
Gravel	0%	Fine Sand	55%	Clay	24%
Apparent Relative Density	2.650	Moisture 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 & Gravel Particles:		Rounded	☐		Angular		☒
Hard & Durable	☒	Soft	☐		Weathered & Friable		☐

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E	_____	Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

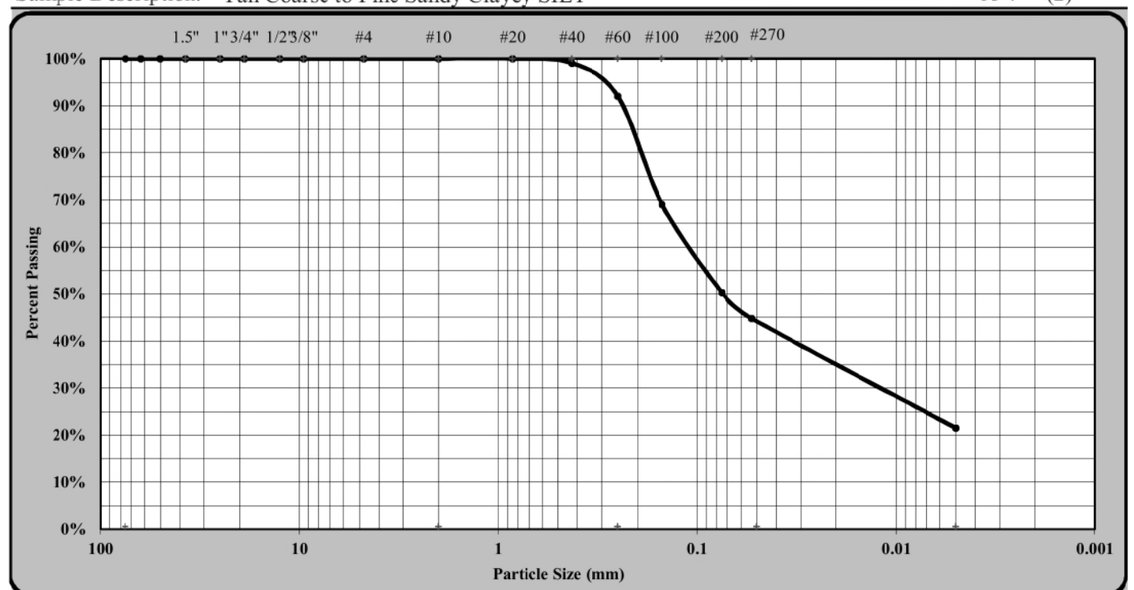
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway Extension R-5703	Test Date(s):	10/7 - 11/14/16
State Project #:	N/A F.A. Project No: N/A	TIP NO:	N/A
Client Name:	Michael Baker Engineering		
Address:	Raleigh, NC		
Boring #:	EB1-B Rt. Ln. Sample #: SS-65	Sample Date:	N/A
Location:	Site-Borehole Offset: N/A	Depth (ft):	0.5 - 2
Sample Description:	Tan Coarse to Fine Sandy Clayey SILT		A-4 (2)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#10	Coarse Sand	8%	Silt	23%
Gravel	0%	Fine Sand	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:		Rounded	☐		Angular		☐
Hard & Durable	☐	Soft	☐		Weathered & Friable		☐

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	*Signature*	*Position*	*Date*

Form No: TR-T267
Revision No. 0
Revision Date: 07/10/08

Moisture, Ash, and Organic Matter

AASHTO T-267 — ***Quality Assurance***

S&ME, Inc. Raleigh, 3201 Spring Forest Raod, Raleigh, North Carolina 27616

Project #:	**6235-16-010**	Report Date:	10/21/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	10/18 - 10/21/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		

Boring #:	EB1-B Rt. Ln.	Sample #:	SS-65	Sample Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth (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:* ***11/06/17***

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
a	Mass of ***As-Received*** 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
B	Mass of Oven Dry Specimen	*(b-t)*	40.34
	% Moisture 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%**

Oven 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
B	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:

Mal Krajan, ET — *Technical Responsibility*
Signature
Laboratory Manager — *Position*
11/14/2016 — *Date*

Form No: TR-T289-1
Revision No. 0
Revision Date: 07/10/08

pH of Soil

AASHTO T289 — ***Quality Assurance***

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	**6235-16-010**	Report Date:	11/7/16
Project Name:	C.F. Harvey Parkway Extension R-5703	Test Date(s):	11/5 - 11/7/16
Client Name:	Michael Baker Engineering		
Client Address:	Raleigh, NC		

Boring #:	EB1-B Rt. Ln.	Sample #:	SS-65	Sample Date:	N/A
Location:	Site-Borehole	Offset:	N/A	Depth (ft):	0.5 - 2

Sample Description: Tan Coarse to Fine Sandy Clayey 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 °C	***22.4***

Measuring pH of Soil

Measurements	
Weigtht of Air Dry Soil (g)	***30.02***
Distilled Water (g)	***30.01***
Temperature °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*
Signature
Laboratory Manager — *Position*
11/14/2016 — *Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

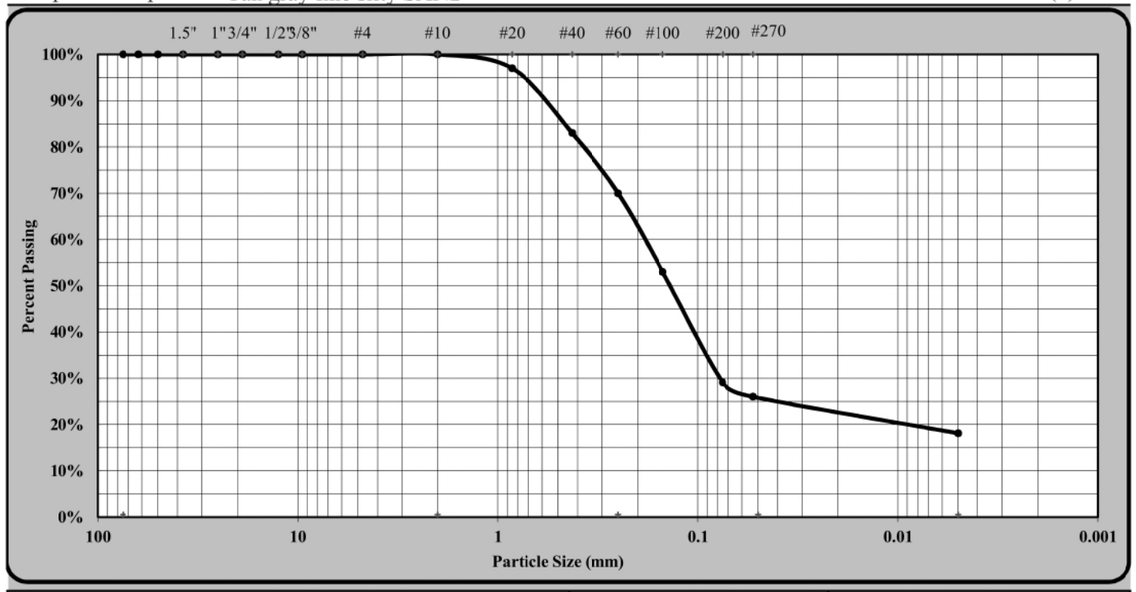
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway 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 Engineering		
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 gray fine silty SAND	0	A-2-4 (0)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#20	Coarse Sand	30%	Silt	8%
Gravel	0%	Fine Sand	44%	Clay	18%
Apparent Relative Density	2.650	Moisture Content	22.1%	% Passing #200	29.1%
Liquid Limit	21	Plastic Limit	14	Plastic Index	7

Soil Mortar (-#10 Sieve)

Coarse Sand	30%	Fine Sand	44%	Silt	8%	Clay	18%
Description of Sand & Gravel Particles:		Rounded	☐		Angular		☒
Hard & Durable	☒	Soft	☒		Weathered & Friable		☒

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E	_____	Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

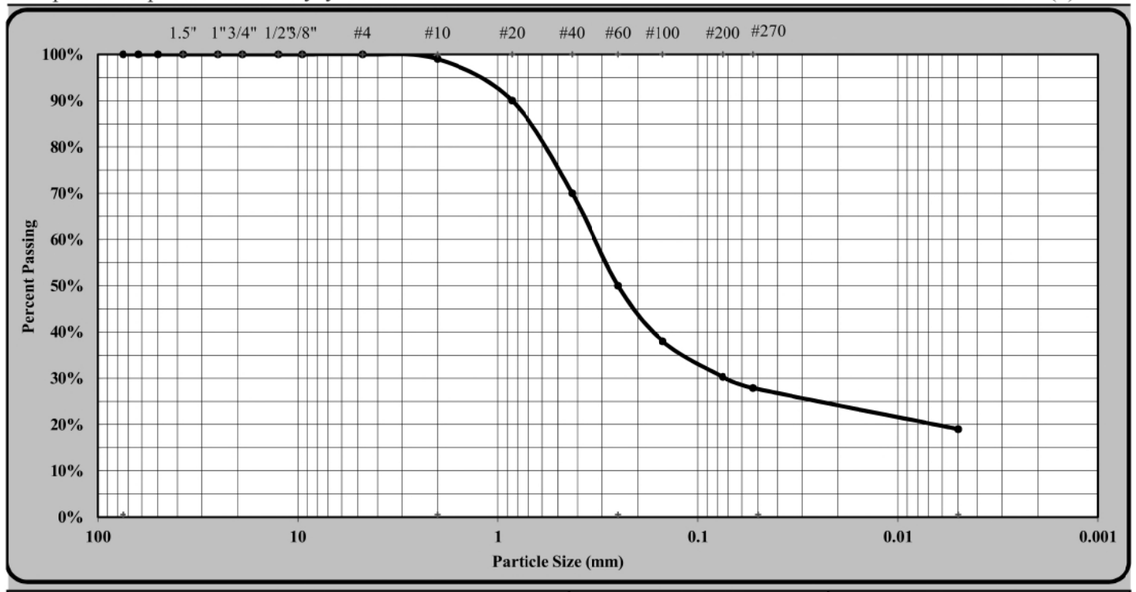
AASHTO T88 as Modified by NCDOT

S&ME

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 Parkway 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 Engineering		
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 coarse SAND	0	A-2-6 (1)



As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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	#10	Coarse Sand	49%	Silt	9%
Gravel	1%	Fine Sand	22%	Clay	19%
Apparent Relative Density	2.650	Moisture Content	17.9%	% Passing #200	30.3%
Liquid Limit	31	Plastic Limit	13	Plastic Index	18

Soil Mortar (-#10 Sieve)

Coarse Sand	49%	Fine Sand	23%	Silt	9%	Clay	19%
Description of Sand & Gravel Particles:		Rounded	☐		Angular		☒
Hard & Durable	☒	Soft	☐		Weathered & Friable		☐

References / Comments / Deviations: ND=Not Determined.

Karen Warner	118-06-0305	Laboratory Technician	11/8/2016
Technician Name	*Certification No.*	*Position*	*Date*
Stewart Laney, P.E	_____	Senior Engineer	
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

Particle Size Analysis of Soils

AASHTO T88 as Modified by NCDOT

S&ME

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-16-010	Report Date:	12/27/16
Project Name:	C.F. Harvey Parkway 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
Client Name:	Michael Baker Engineering		
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 to Fine Sandy Silty CLAY		A-6 (0)

As Defined by NCDOT		Fine Sand	< 0.25 mm and > 0.05 mm
Gravel	< 75 mm and > 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 Sand	4%	Silt	8%
Gravel	0%	Fine Sand	67%	Clay	21%
Apparent Relative Density	ND	Moisture Content	ND	% Passing #200	36.0%
Liquid Limit	37	Plastic Limit	26	Plastic Index	11

Soil Mortar (-#10 Sieve)

Coarse Sand	4%	Fine Sand	67%	Silt	8%	Clay	21%
Description of Sand & Gravel Particles:		Rounded	☐			Angular	☒
Hard & Durable	☒	Soft	☐			Weathered & Friable	☐

References / Comments / Deviations: ND=Not Determined.

Mal Krajan, ET	104-01-0703	Laboratory Manager	12/27/2016
Technician Name	*Certification No.*	*Position*	*Date*
Mal Krajan, ET		Laboratory Manager	9/26/2016
Technical Responsibility	*Signature*	*Position*	*Date*

Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample

Depth	15.0 - 17.0 ft.
Description:	Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)
Type	Undisturbed
Height H_0 (in)	0.998
Diameter D_0 (in)	2.501
Weight W_0 (gr)	146.57
Bulk Density ρ (PCF)	113.89
Particle Density ρ_s	2.661 (measured)

Initial Conditions

Settlement Channel	1001
Moisture Content w_0%	34.1
Dry Density ρ_d (PCF)	84.95
Voids Ratio e_0	0.9546
Deg of Saturation S_0%	94.9
Swelling Pressure Ss (TSF)	0.000

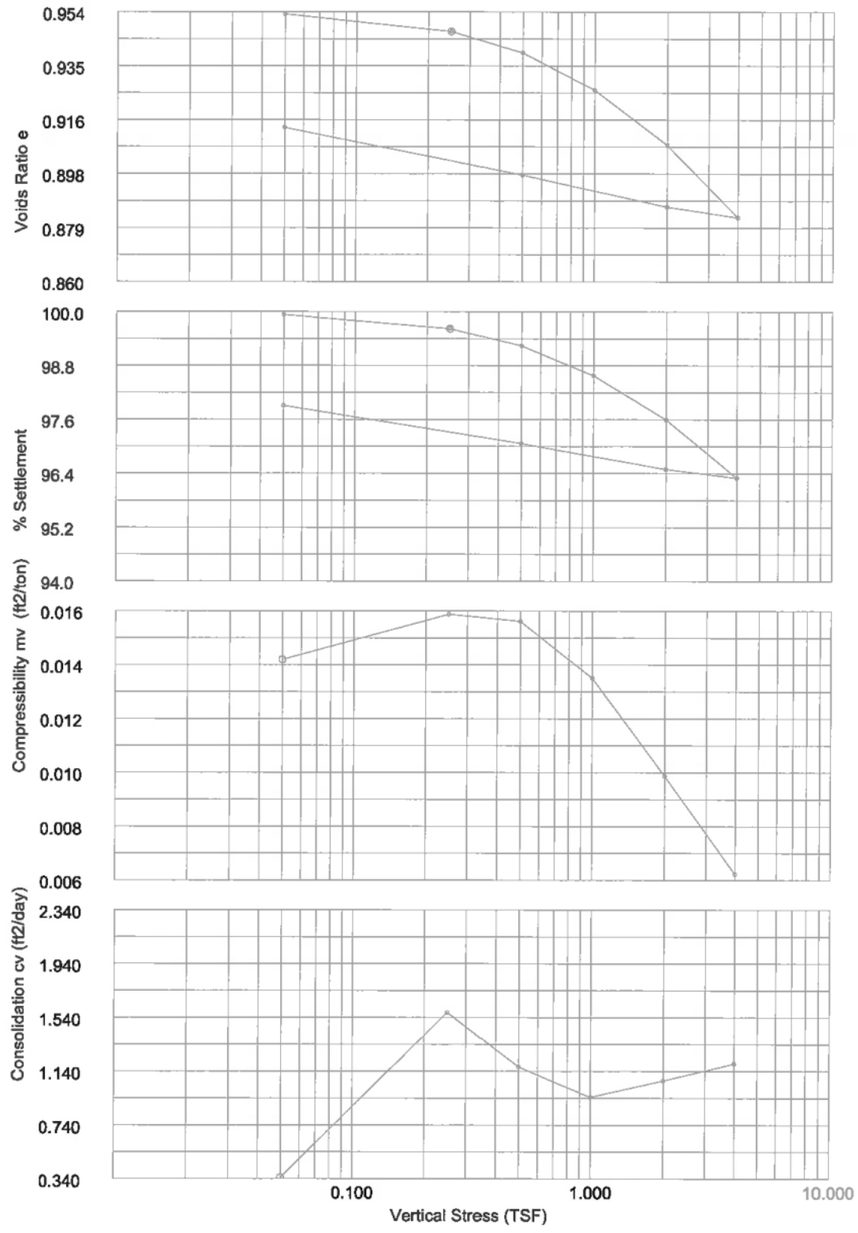
Final Conditions

Moisture Content w_f%	33.4
Dry Density ρ_d (PCF)	86.77
Voids Ratio e_f	0.9137
Deg of Saturation S_f%	97.16
Settlement: (in)	0.021
Compression Index C_c	0.085
Notes:	Test specimen taken from the middle portion of UD tube.

S&ME

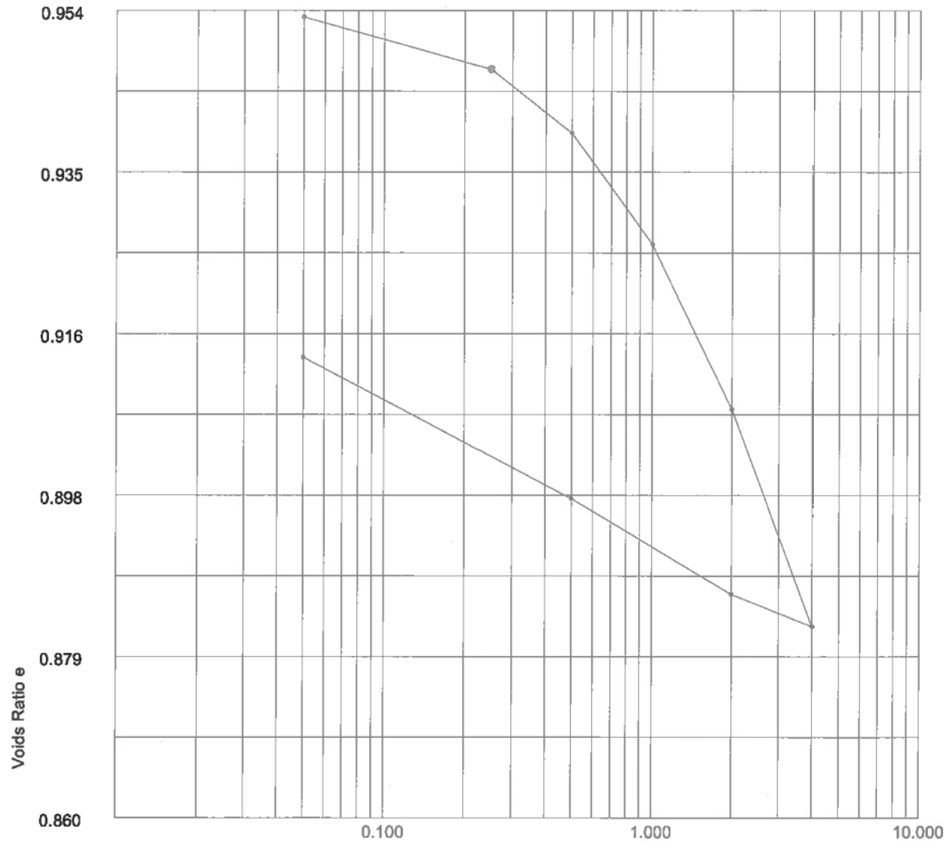
ASTM D2435-96		Test name	Consolidation
		Date of Test:	12-7-16
Site Reference:	C.F. Harvey	Sample:	ST-8
Jobfile:	E:\16010.JOB	Borehole:	EB1-B Rt. Ln.
Operator: MK	Checked: MK	Approved:	

Oedometer Settlement Tests



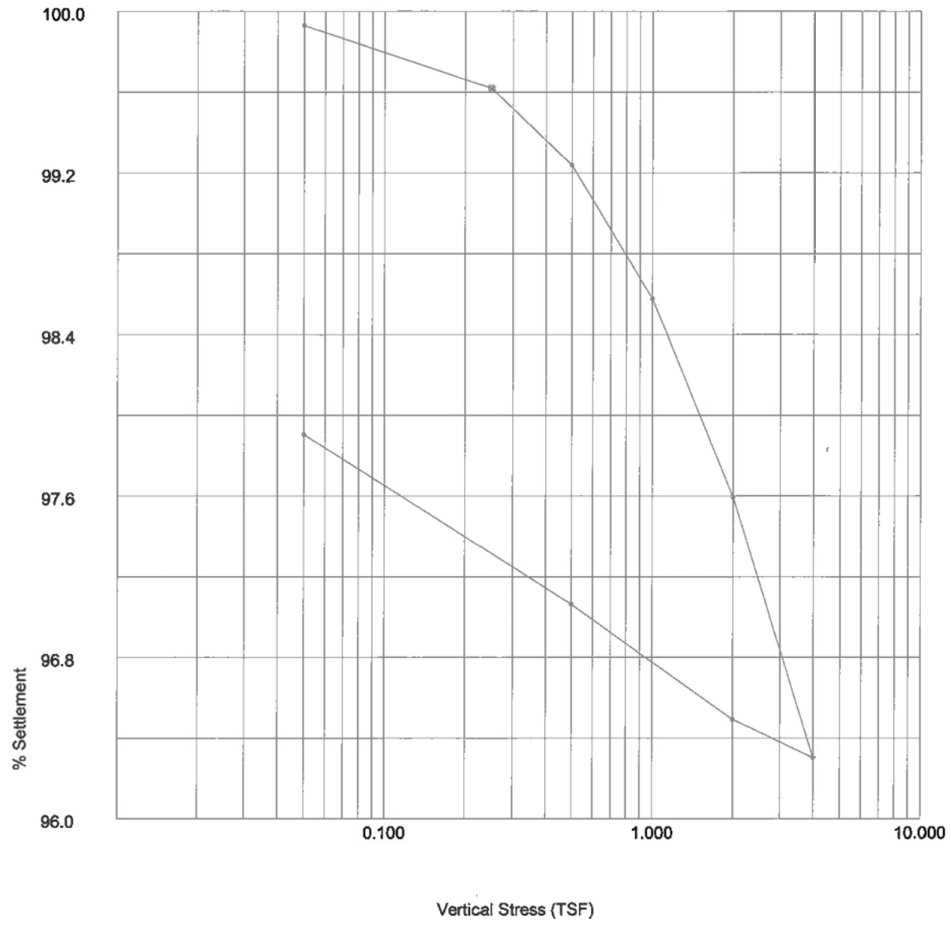
S&ME	ASTM D2435-96	Test name	Consolidation
		Date of Test:	12-7-16
	Site Reference: C.F. Harvey	Sample:	**ST-8**
	Jobfile: E:\16010.JOB	Borehole:	**EB1-B Rt. Ln.**
	Operator: MK	Checked: MK	Approved:

Oedometer Settlement Tests



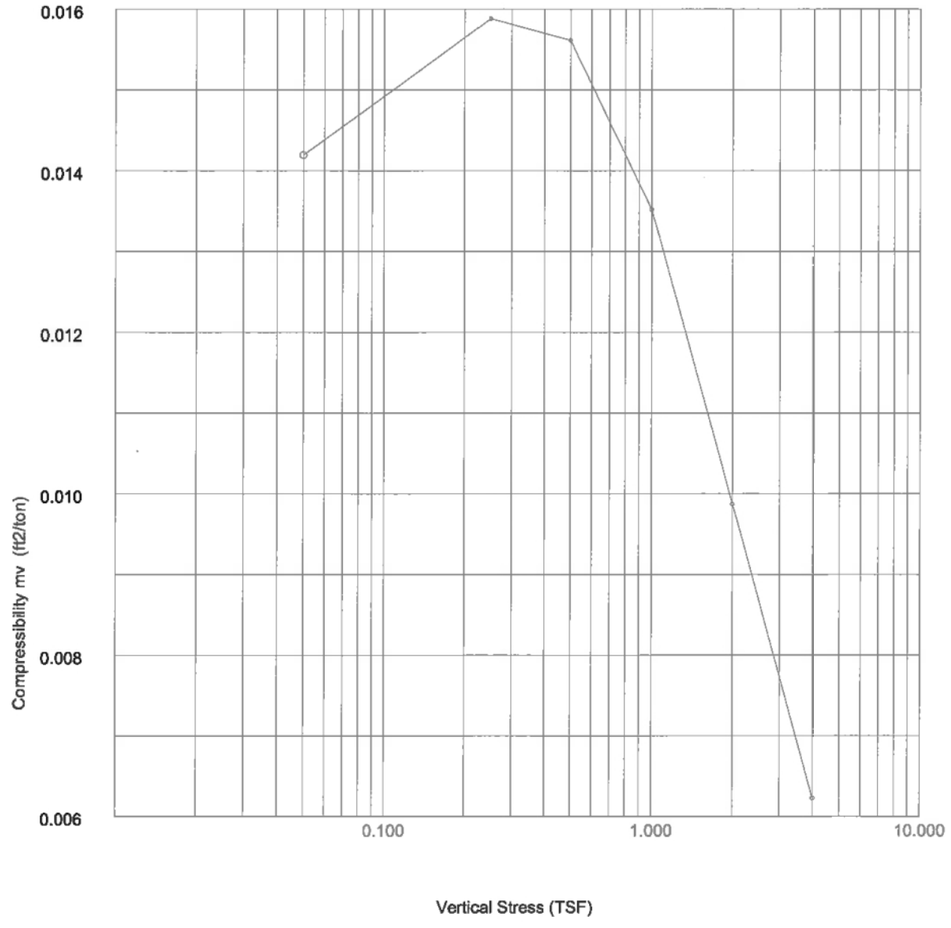
S&ME	ASTM D2435-96	Test name	Consolidation
		Date of Test:	12-7-16
	Site Reference: C.F. Harvey	Sample:	**ST-8**
	Jobfile: E:\16010.JOB	Borehole:	**EB1-B Rt. Ln.**
	Operator: MK	Checked: MK	Approved:

Oedometer Settlement Tests



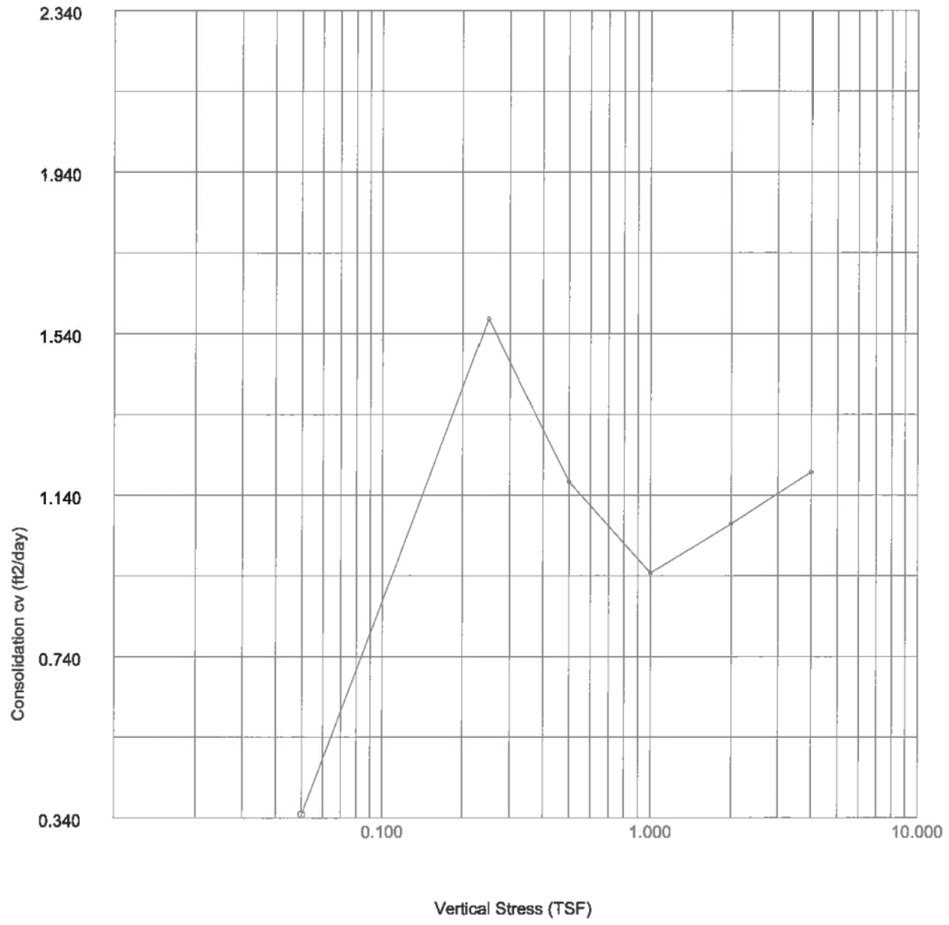
S&ME	ASTM D2435-96	Test name: Consolidation Date of Test: 12-7-16	
	Site Reference: C.F. Harvey Jobfile: E:\16010.JOB	Sample: **ST-8** Borehole: **EB1-B Rt. Ln.**	
	Operator: MLC	Checked: MLC	Approved:

Oedometer Settlement Tests



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

Oedometer Settlement Tests



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

Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e_f	t_{50} (mins)	Secondary Compr C_{sec}	c_v (ft2/day)	m_v (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

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

Oedometer Settlement Tests

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

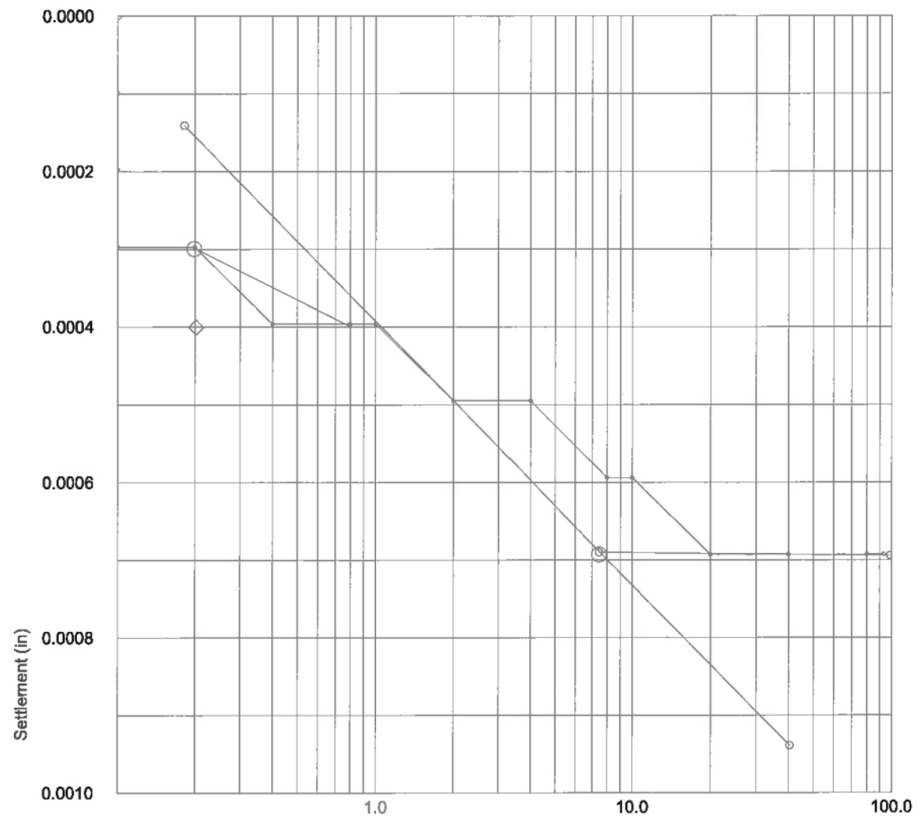
S&ME

ASTM D2435-96		Test name: Consolidation Load: 0.050 (TSF)	
Site Reference: C.F. Harvey		Sample: **ST-8**	
Jobfile: E:\16010.JOB		Borehole: **EB1-B Rt. Ln.**	
Operator: MLC	Checked: MLC		Approved

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.050
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0007
Voids Ratio e	0.9532
Final Temp oC	0.0
t_{50} (mins)	1.43
c_v (ft2/day)	0.348
m_v (ft2/ton)	0.014
Sec Compression C_{sec}	0.00



S&ME

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

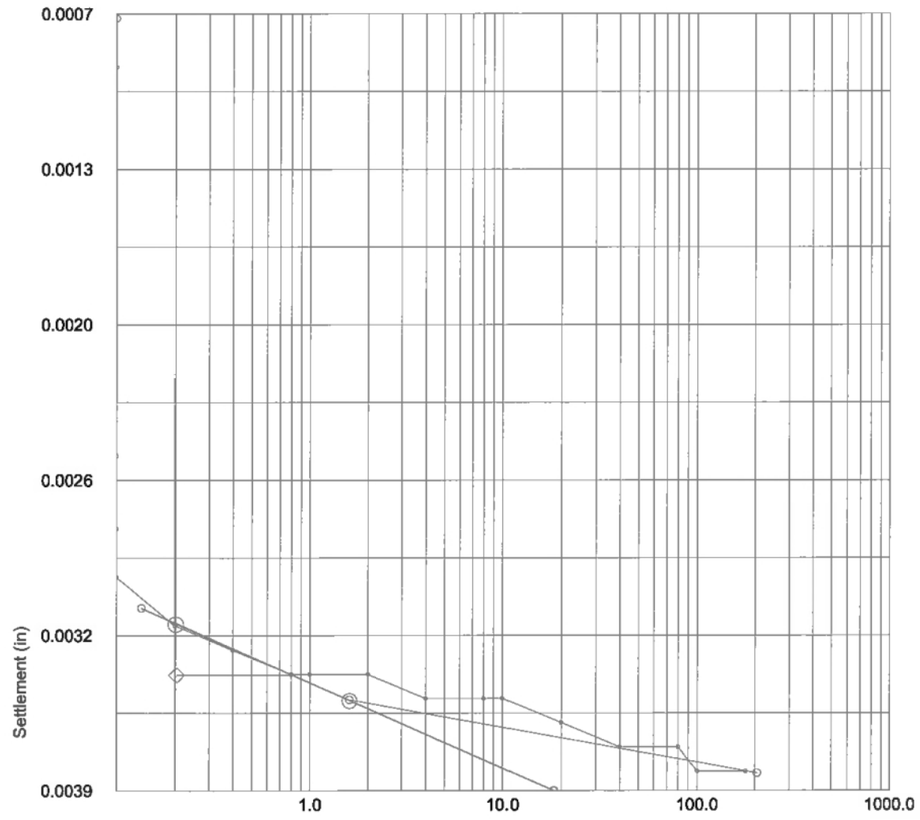
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	7	0.0007	0.0007
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

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0031
Voids Ratio e	0.9472
Final Temp oC	0.0
t_{50} (mins)	0.31
c_v (ft2/day)	1.577
m_v (ft2/ton)	0.016
Sec Compression C_{sec}	0.0001



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

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

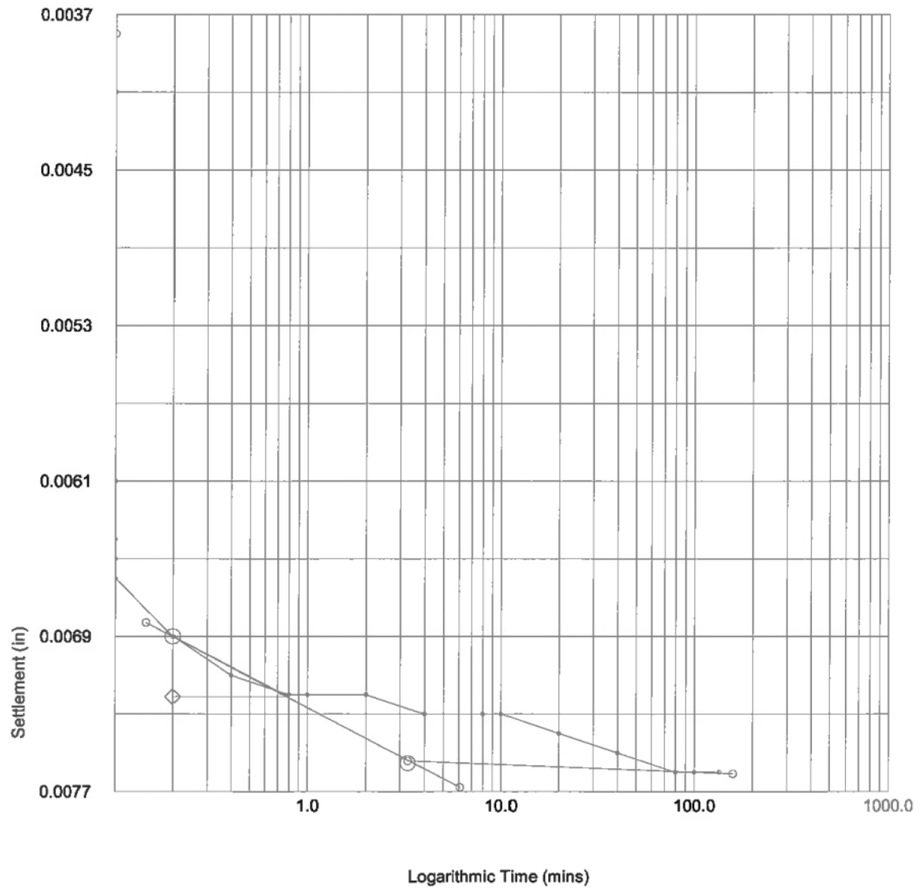
S&ME

ASTM D2435-96		Test name: Consolidation Load: 0.500 (TSF)	
Site Reference: C.F. Harvey		Sample: ST-8	
Jobfile: E:\16010.JOB		Borehole: EB1-B Rt. Ln.	
Operator: MK	Checked: MK		Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0038
Voids Ratio e	0.9397
Final Temp oC	0.0
t_{50} (mins)	0.42
c_v (ft2/day)	1.173
m_v (ft2/ton)	0.015
Sec Compression C_{sec}	0.00



S&ME

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

Oedometer Settlement Tests

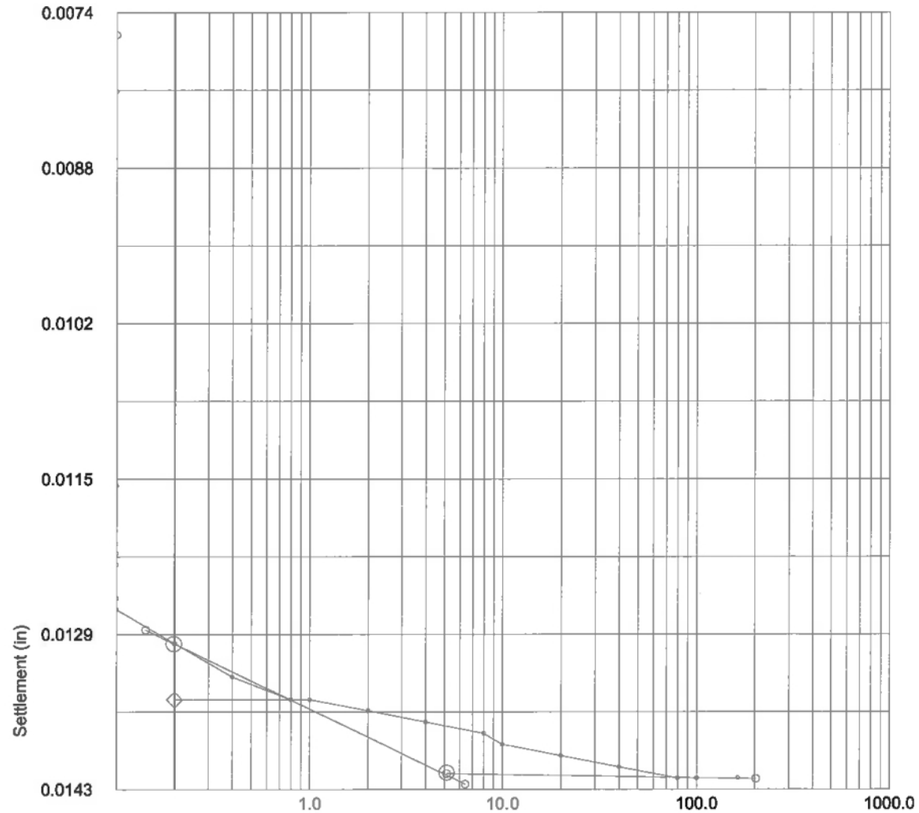
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	76	0.0076	0.0076
2	0.017	81	0.0081	0.0081
3	0.033	116	0.0116	0.0116
4	0.050	122	0.0122	0.0122
5	0.067	123	0.0123	0.0123
6	0.083	126	0.0126	0.0126
7	0.100	127	0.0127	0.0127
8	0.200	130	0.0130	0.0130
9	0.400	133	0.0133	0.0133
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

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

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_{50} (mins)	0.51
c_v (ft2/day)	0.948
m_v (ft2/ton)	0.013
Sec Compression C_{sec}	0.00



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

Oedometer Settlement Tests

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

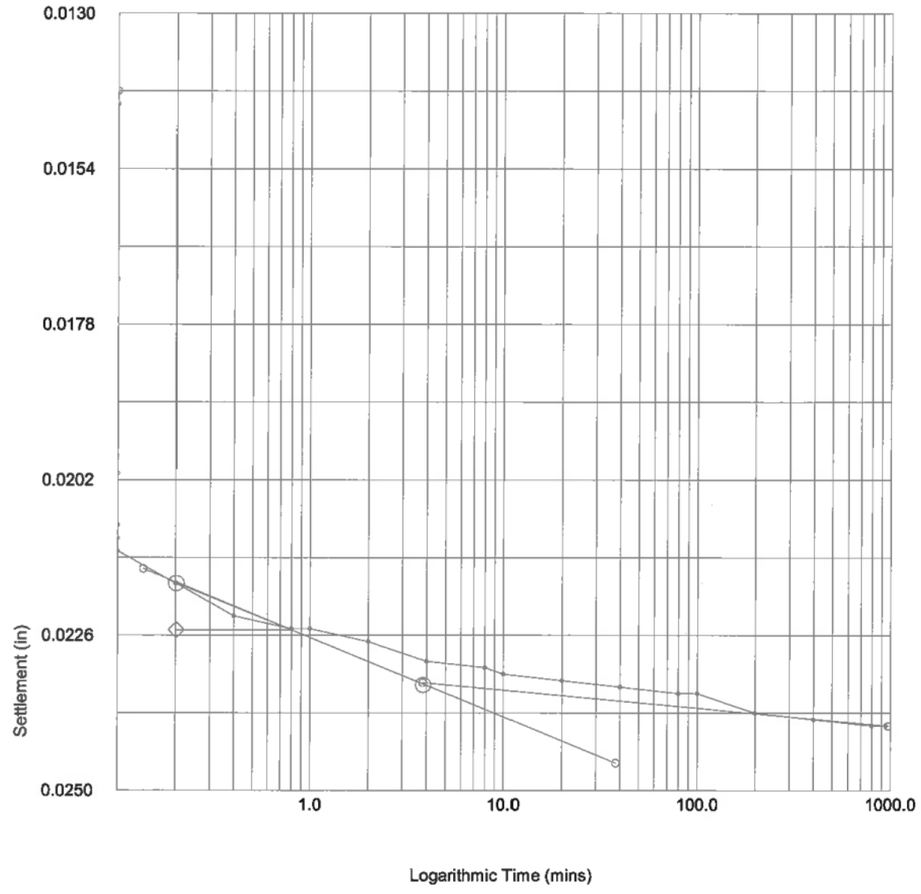
S&ME

ASTM D2435-96		Test name: Consolidation Load: 2.000 (TSF)	
Site Reference: C.F. Harvey		Sample: **ST-8**	
Jobfile: E:\16010.JOB		Borehole: **EB1-B Rt. Ln.**	
Operator: MK	Checked: MK		Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0098
Voids Ratio e	0.9076
Final Temp oC	0.0
t_{50} (mins)	0.45
c_v (ft2/day)	1.069
m_v (ft2/ton)	0.01
Sec Compression C_{sec}	0.0003



S&ME

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

Oedometer Settlement Tests

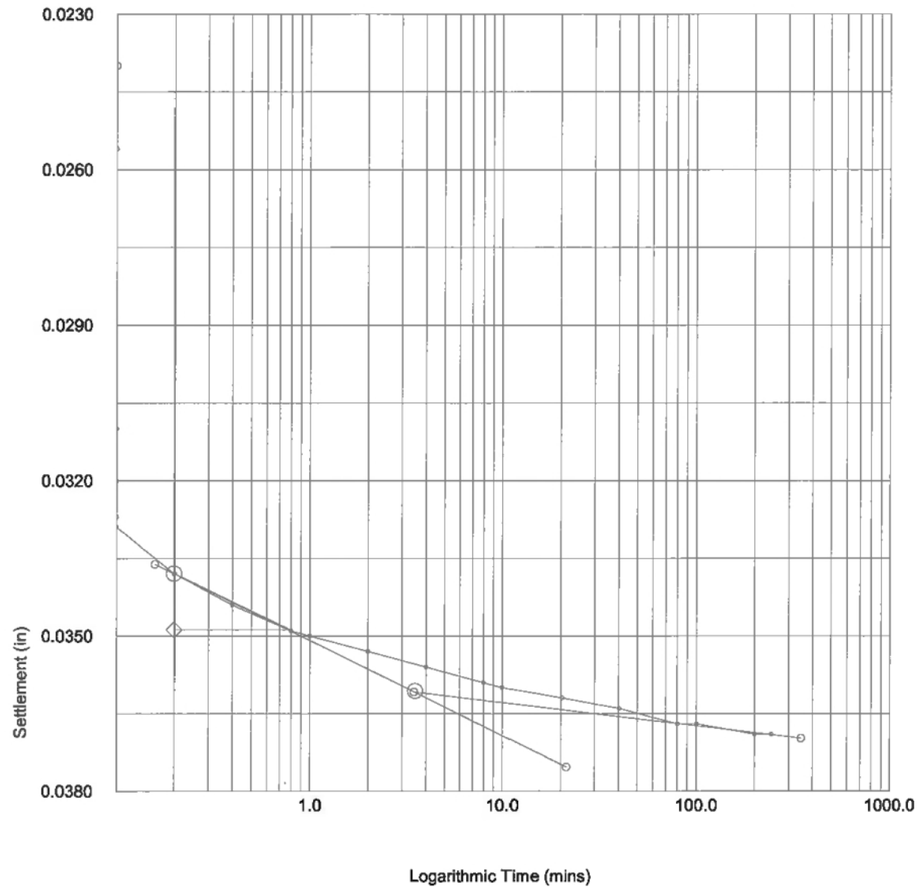
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	240	0.0240	0.0240
2	0.017	256	0.0256	0.0256
3	0.033	256	0.0256	0.0256
4	0.050	310	0.0310	0.0310
5	0.067	320	0.0320	0.0320
6	0.083	327	0.0327	0.0327
7	0.100	329	0.0329	0.0329
8	0.200	338	0.0338	0.0338
9	0.400	344	0.0344	0.0344
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

S&ME	ASTM D2435-96	Test name: Consolidation Load: 4.000 (TSF)	
	Site Reference: C.F. Harvey	Sample: **ST-8**	
	Jobfile: E:\16010.JOB	Borehole: **EB1-B Rt. Ln.**	
	Operator: MK	Checked: MK	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.6
Correction (in)	0.0
Settlement (in)	0.0129
Voids Ratio e	0.8823
Final Temp oC	0.0
t_{50} (mins)	0.39
c_v (ft2/day)	1.197
m_v (ft2/ton)	0.007
Sec Compression C_{sec}	0.0004



S&ME	ASTM D2435-96	Test name: Consolidation	
	Site Reference: C.F. Harvey	Sample: **ST-8**	
	Jobfile: E:\16010.JOB	Borehole: **EB1-B Rt. Ln.**	
	Operator: MK	Checked: MK	Approved:

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

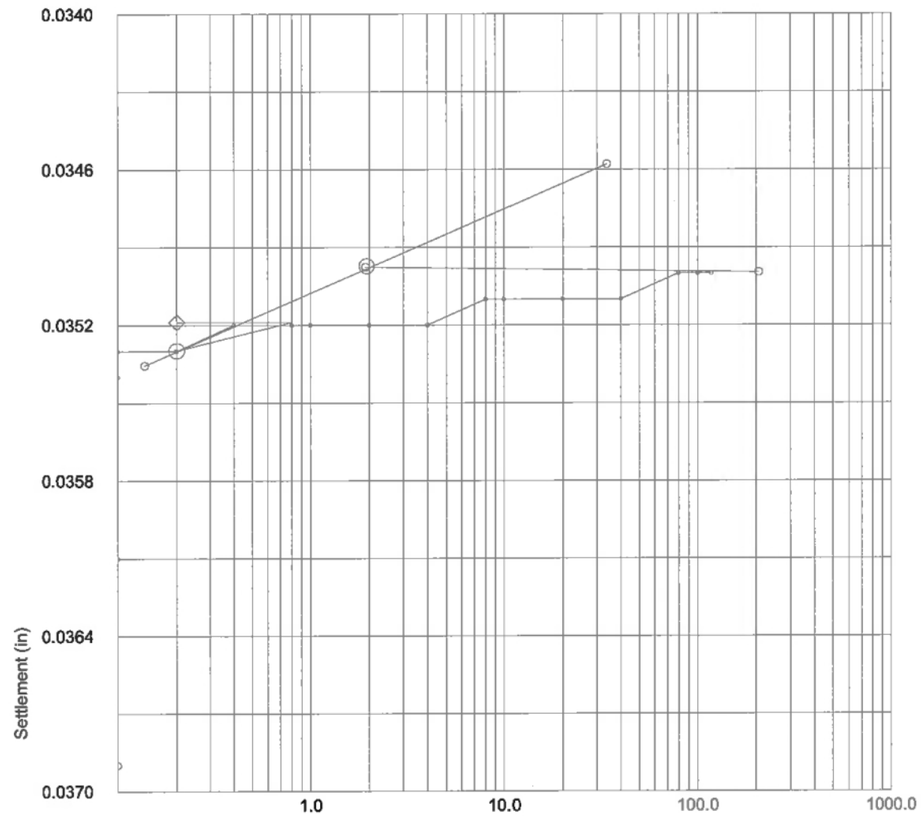
S&ME

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

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_{50} (mins)	
c_v (ft2/day)	
m_v (ft2/ton)	
Sec Compression C_{sec}	



S&ME

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

Oedometer Settlement Tests

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

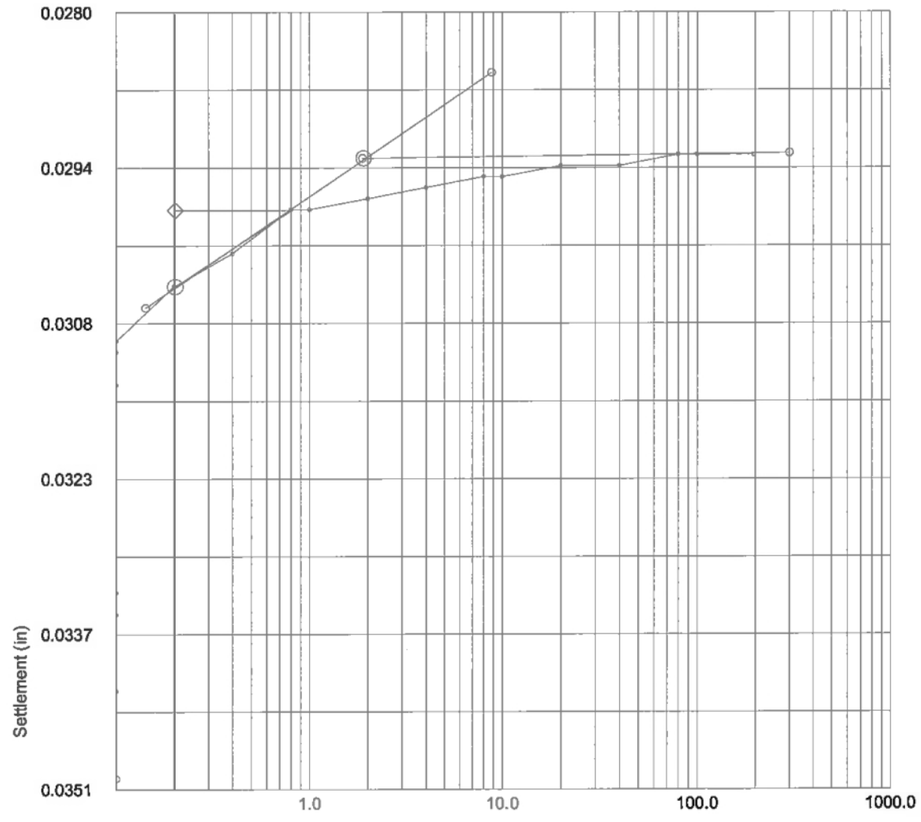
S&ME

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

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	
t_{50} (mins)	
c_v (ft2/day)	
m_v (ft2/ton)	
Sec Compression C_{sec}	



S&ME

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

Oedometer Settlement Tests

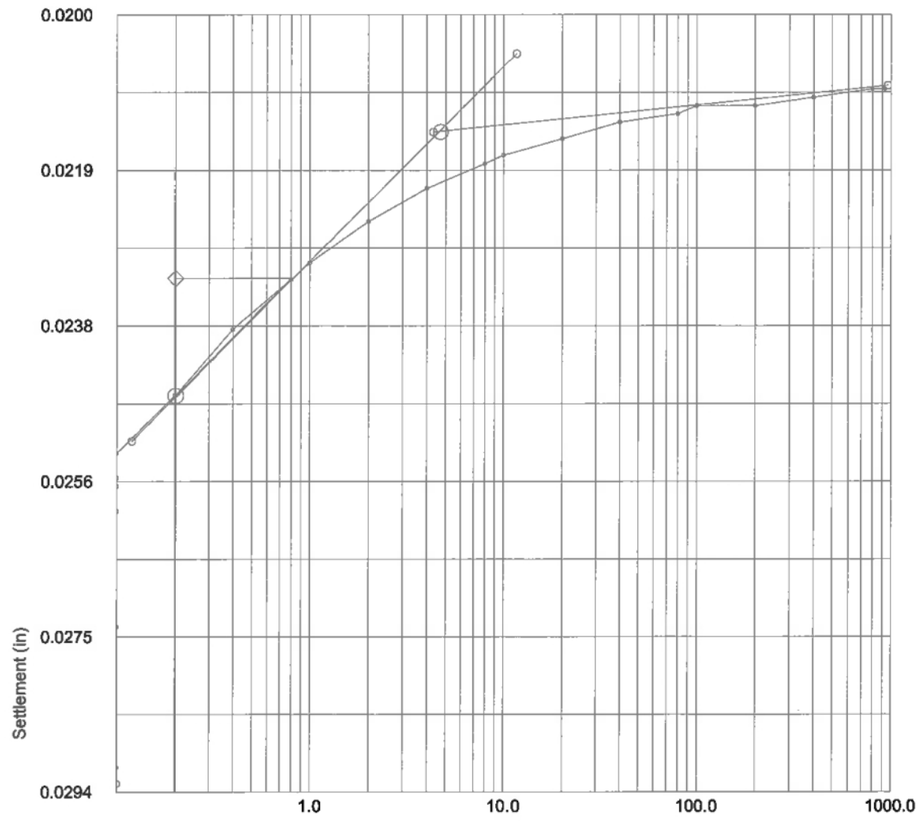
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	293	0.0293	0.0293
2	0.017	291	0.0291	0.0291
3	0.033	274	0.0274	0.0274
4	0.050	260	0.0260	0.0260
5	0.067	257	0.0257	0.0257
6	0.083	256	0.0256	0.0256
7	0.100	253	0.0253	0.0253
8	0.200	246	0.0246	0.0246
9	0.400	238	0.0238	0.0238
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

S&ME	ASTM D2435-96	Test name: Consolidation Load: 0.050 (TSF)	
	Site Reference: C.F. Harvey	Sample: **ST-8**	
	Jobfile: E:\16010.JOB	Borehole: **EB1-B Rt. Ln.**	
	Operator: MLC	Checked: MLC	Approved:

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_{50} (mins)	
c_v (ft2/day)	
m_v (ft2/ton)	
Sec Compression C_{sec}	



S&ME	ASTM D2435-96	Test name: Consolidation	
	Site Reference: C.F. Harvey	Sample: **ST-8**	
	Jobfile: E:\16010.JOB	Borehole: **EB1-B Rt. Ln.**	
	Operator: MLC	Checked: MLC	Approved:

Effective Stress Triaxial Compression

Consolidated Undrained

Sample details

Sketch showing specimen location in original Sample

Depth 15.0 - 17.0 ft.
Description: Dark Gray Coarse to Fine Sandy Silty CLAY (A-6) (0)

	Specimen 1	Specimen 2	Specimen 3
Type	Undisturbed	Undisturbed	Undisturbed
Height H_0 (in)	5.974	5.951	5.863
Diameter D_0 (in)	2.864	2.864	2.865
Weight W_0 (gr)	1167.6	1176	1170.8
Bulk Density ρ (PCF)	115.58	116.86	118.00
Particle Density ρ_s	2.661 (measured)	2.661 (measured)	2.661 (measured)

Initial Conditions

	Specimen 1	Specimen 2	Specimen 3
Cell Pressure σ_3 (lbf/in2)	7.0	16.0	26.0
Pore Pressure u (lbf/in2)	0.0	0.0	0.0
Machine Speed d_r(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_0%	36.9	35.7	37.6
Dry Density ρ_{d0} (PCF)	84.45	86.12	85.76
Voids Ratio e_0	0.97	0.93	0.94
Deg of Saturation S_0%	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_f%	33.8	31.8	31.5
Dry Density ρ_d (PCF)	86.50	88.85	89.27
Voids Ratio e_f	0.92	0.87	0.86
Deg of Saturation S_f%	97.93	97.53	97.61
Failure Criteria	Mx Stress Ratio	Mx Stress Ratio	Mx Stress Ratio
Axial Strain ε_f%	4.0	4.0	4.0
Corr Dev Stress $(\sigma_1 - \sigma_3)f$ (lbf/in2)	14.9	30.2	47.1
Minor Stress σ_{3f} (lbf/in2)	3.8	7.3	13.5
Major Stress σ_{1f} (lbf/in2)	18.7	37.5	60.6
Stress Ratio $(\sigma_1/\sigma_3)_f$	4.9	5.1	4.5

Notes:

Failure Sketch

Sp 1 Sp 2 Sp 3

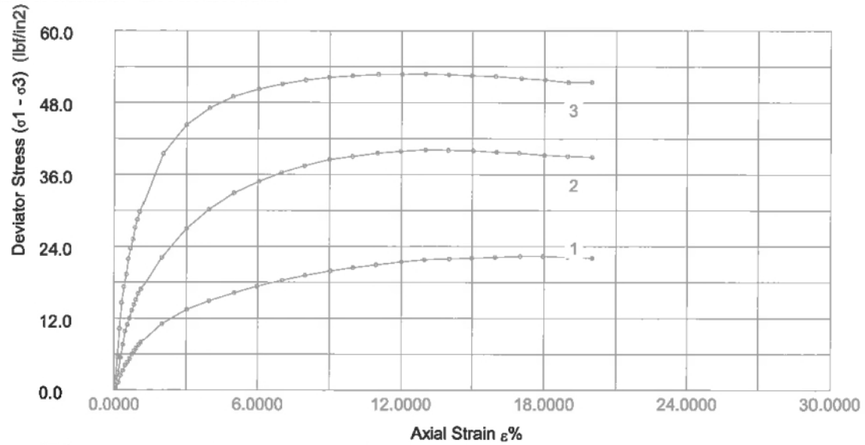
Surface Inclination

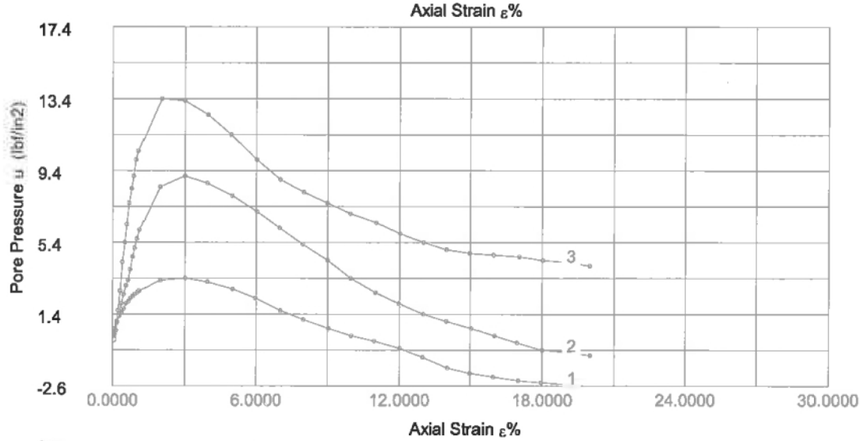
S&ME

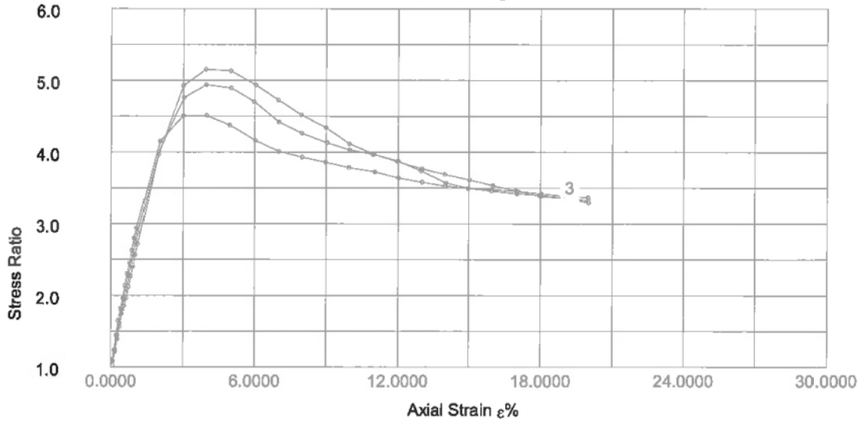
Test Method: ASTM D4767-95		Test name	CU Triaxial (SS, MS)
		Date of Test:	12-7-16
Site Reference: C.F. Harvey		Sample:	ST-8
Jobfile: E:\16010.JOB		Borehole:	EB1-B Rt. Ln.
Operator: MLC	Checked: MLC		Approved:

Effective Stress Triaxial Compression

Consolidated Undrained





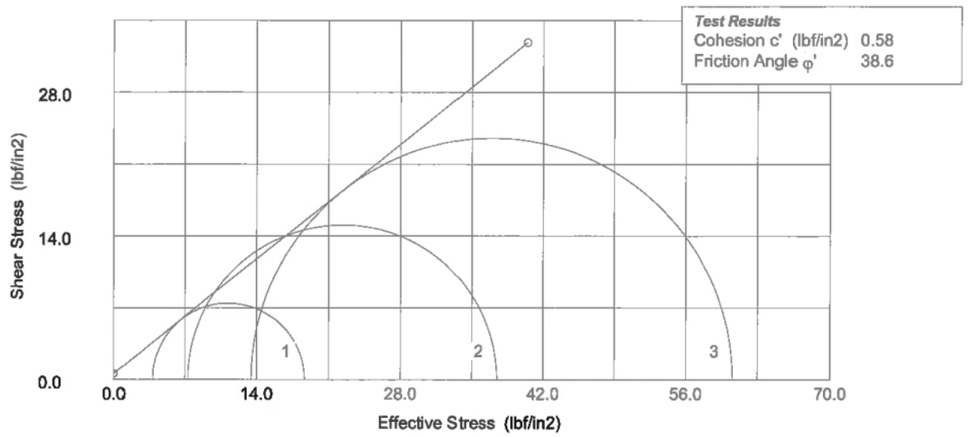


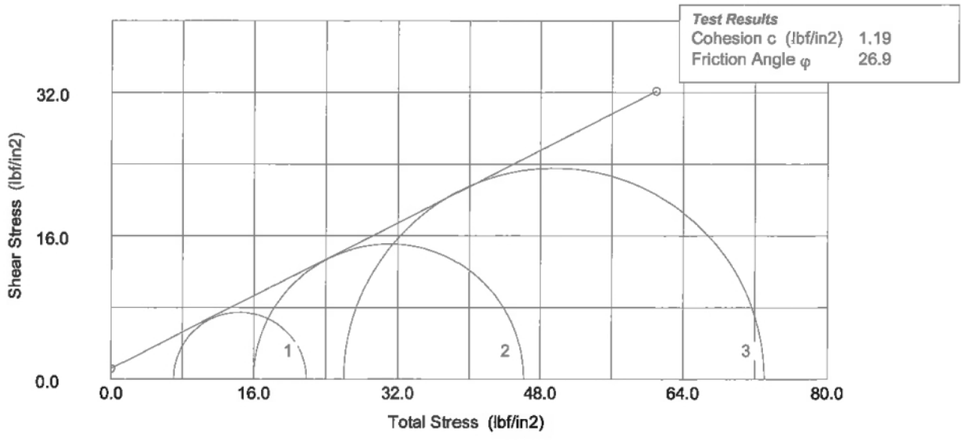
S&ME

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

Effective Stress Triaxial Compression

Consolidated Undrained

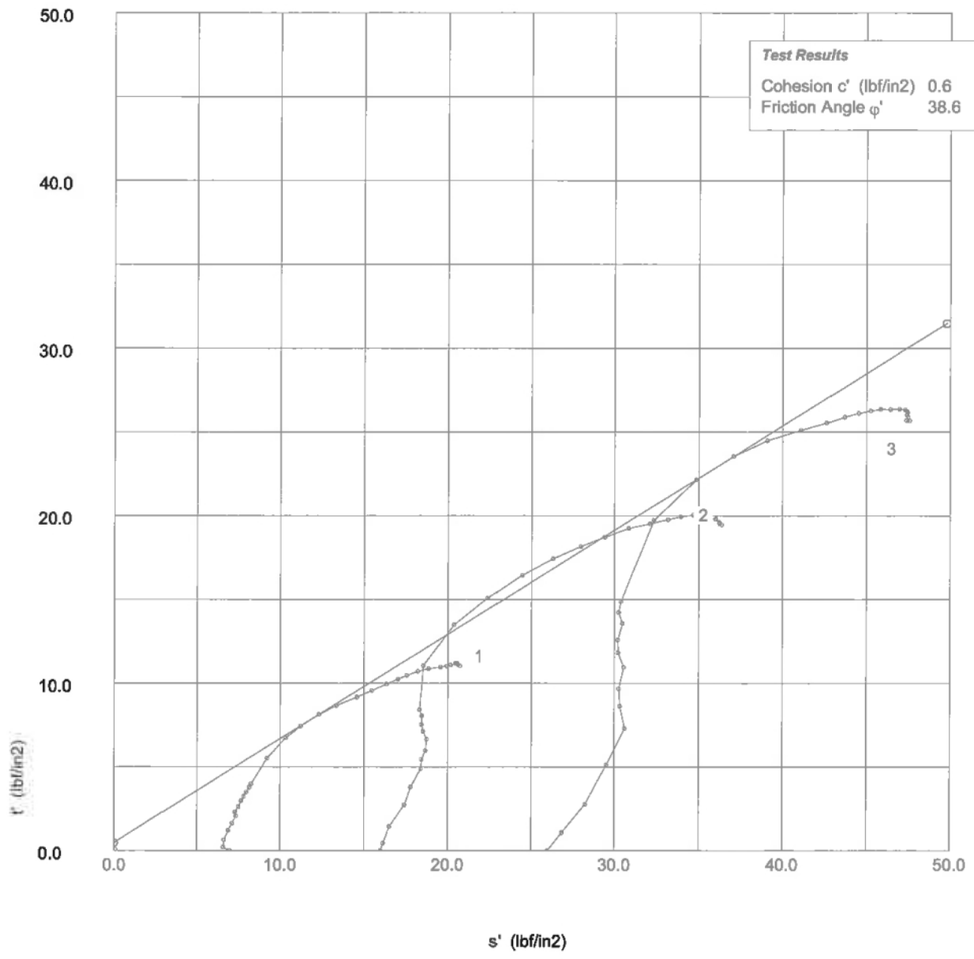




S&ME	Test Method: ASTM D4767-95	Test name	CU Triaxial (SS, MS)
		Date of Test:	12-7-16
	Site Reference: C.F. Harvey	Sample:	**ST-8**
	Jobfile: E:\16010.JOB	Borehole:	**EB1-B Rt. Ln.**
	Operator: MLC	Checked: MLC	Approved:

Effective Stress Triaxial Compression

Consolidated Undrained



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

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 1)

No.	Strain (divs)	Strain ε%	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_3' (lbf/in2)	Major Str σ_1' (lbf/in2)	Ratio σ_1'/σ_3'
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

S&ME

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

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 2)

No.	Strain (divs)	Strain ε%	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_3' (lbf/in2)	Major Str σ_1' (lbf/in2)	Ratio σ_1'/σ_3'
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

S&ME

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

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 3)

No.	Strain (divs)	Strain ε%	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_3' (lbf/in2)	Major Str σ_1' (lbf/in2)	Ratio σ_1'/σ_3'
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

S&ME

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