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SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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5703

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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. 210 AND NO. 211 ON -L-(FELIX HARVEY PARKWAY) OVER -Y3- (HUGO ROAD)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5703	1	43

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 REVEMED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919/107-6850. 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 RELIABULTY INHERENT IN THE STADNARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL WOISTURE CONDITIONS. BINICATED 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 THMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE 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 ADDITIONS TO BE ENCOUNTERED ON THE EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SIDER FRING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION,

- NOTES: I. 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. PERSONNEL

PERSONNEL

S. LANEY K. HILL S. MITCHELL S. TIERNAN C. CHANDLER F. WRIGHT E. BLONSHINE J. PEELE M. RAWLS

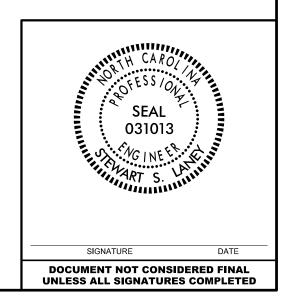
INVESTIGATED BY ______.

DRAWN BY _C. CHANDLER

CHECKED BY S. MITCHELL

SUBMITTED BY S&ME, INC.

DATE ______ 2017



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

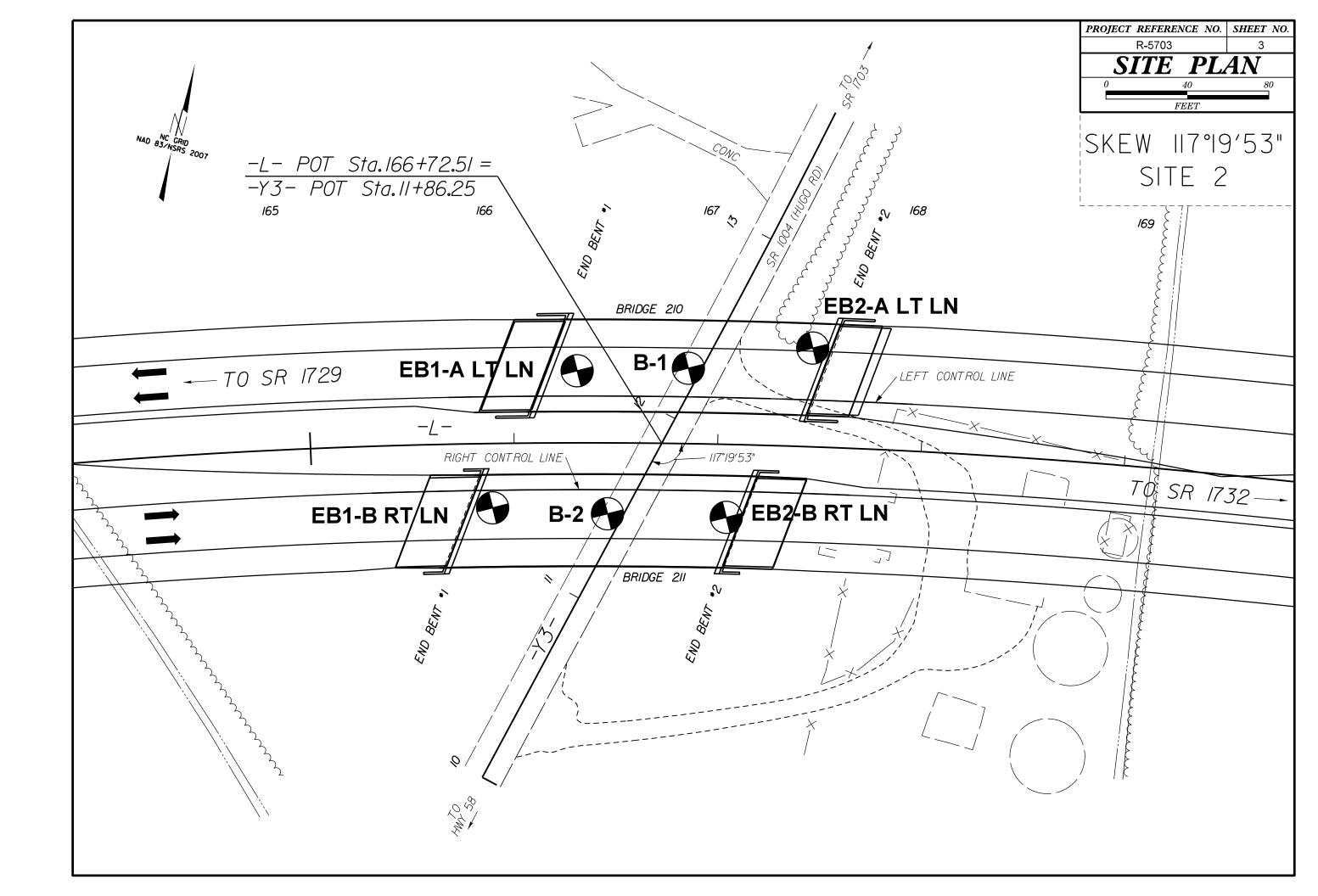
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

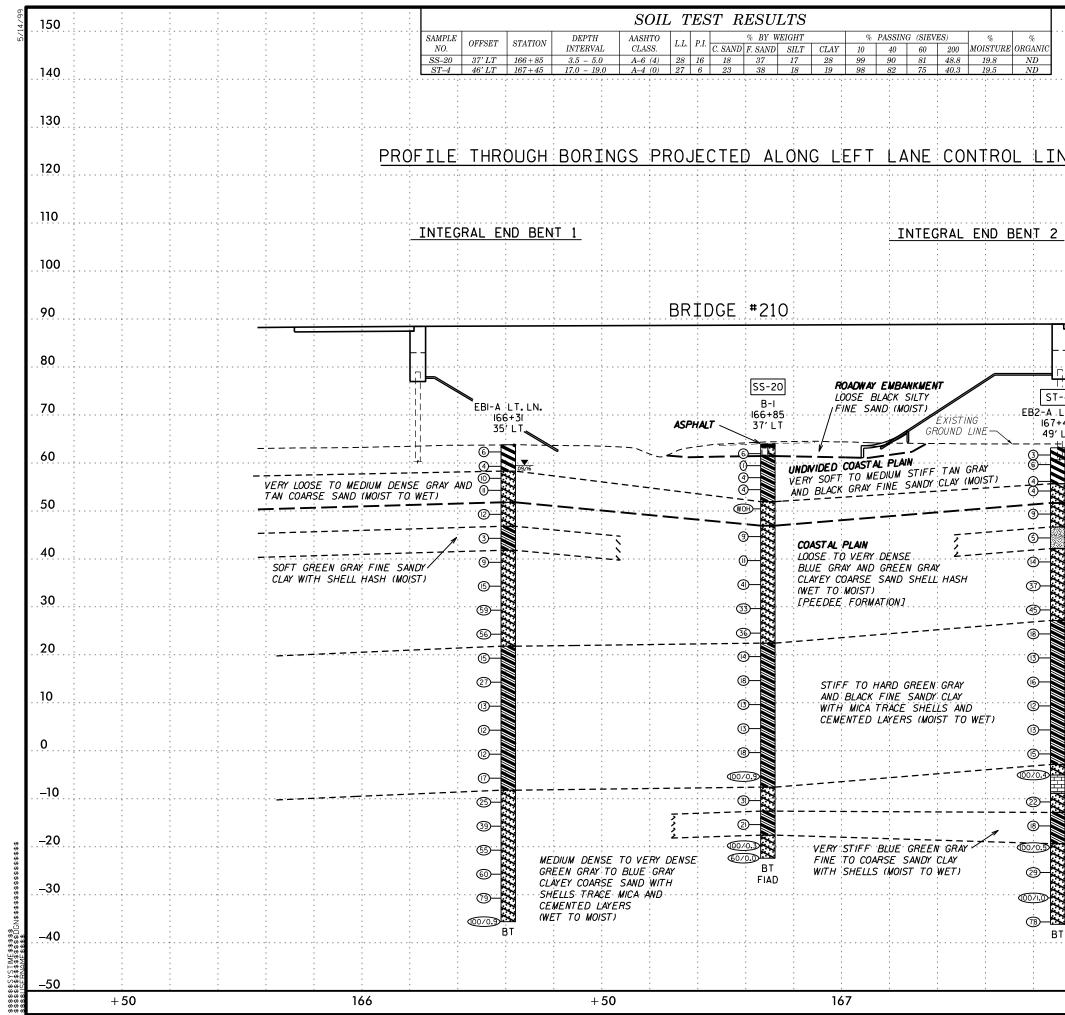
	SOIL	DESCRIPTION			GRADATION				ROCK DESCR	RIPTION
BE PENETRATED ACCORDING TO IS BASED O	DERED UNCONSOLIDATED, SEMI-CO WITH A CONTINUOUS FLIGHT PO THE STANDARD PENETRATION TH ON THE AASHTO SYSTEM. BASIC	DWER AUGER AND YIELD LESS EST (AASHTO T 206, ASTM DI DESCRIPTIONS GENERALLY IN	THAN 100 BLOWS PER FOOT 586). SOIL CLASSIFICATION ICLUDE THE FOLLOWING:	UNIFORMLY GRADED - IN	TES A GOOD REPRESENTATION OF PARTICI NDICATES THAT SOIL PARTICLES ARE ALL S A MIXTURE OF UNIFORM PARTICLE SIZ	APPROXIMATELY THE SAME SIZE. ES OF TWO OR MORE SIZES.	ROCK LINE INDIC SPT REFUSAL IS BLOWS IN NON-C	CATES THE LEVEL AT PENETRATION BY A S COASTAL PLAIN MATER	WHICH NON-COASTAL PLIT SPOON SAMPL RIAL, THE TRANSI	D YIELD SPT REFUSAL IF TESTED. L PLAIN MATERIAL WOULD YIELD S ER EQUAL TO OR LESS THAN 0.1 F TION BETWEEN SOIL AND ROCK IS
	OLOR, TEXTURE, MOISTURE, AASHT RALOGICAL COMPOSITION, ANGULA				ANGULARITY OF GRAIN		REPRESENTED BY ROCK MATERIALS	Y A ZONE OF WEATHER G ARE TYPICALLY DIVIO	ED ROCK. DED AS FOLLOWS:	
	TIFF.GRAY.SILTY CLAY.MOIST WITH IN	TERBEDDED FINE SAND LAYERS	HIGHLY PLASTIC.A-7-6		Y OR ROUNDNESS OF SOIL GRAINS IS DE NGULAR, SUBROUNDED, OR ROUNDED.	SIGNATED BY THE TERMS:	WEATHERED			ATERIAL THAT WOULD YIELD SPT N
GENERAL	SOIL LEGEND AND GRANULAR MATERIALS	AASHTO CLASSIFI	CATION	-	MINERALOGICAL COMPOSI	TION	ROCK (WR)	100 100	BLOWS PER FOOT	IF TESTED. N IGNEOUS AND METAMORPHIC ROCK
CLASS.	$(\leq 35\% \text{ PASSING } = 200)$	(> 35% PASSING *200)	ORGANIC MATERIALS		MES SUCH AS QUARTZ, FELDSPAR, MICA, TA		CRYSTALLINE ROCK (CR)	UN WOL	JLD YIELD SPT REF	USAL IF TESTED, ROCK TYPE INCL
GROUP A-1 CLASS. A-1-a A-		A-4 A-5 A-6 A-7	A-1, A-2 A-4, A-5 A-3 A-6, A-7	ARE USED IN	N DESCRIPTIONS WHEN THEY ARE CONSIDE COMPRESSIBILITY	ERED OF SIGNIFICANCE.	NON-CRYSTALLIN			N METAMORPHIC AND NON-COASTAL
0000000			H-3 H-6, H-7	SLIG	HTLY COMPRESSIBLE	LL < 31	ROCK (NCR)		K TYPE INCLUDES	AT WOULD YEILD SPT REFUSAL IF PHYLLITE, SLATE, SANDSTONE, ETC.
SYMBOL 00000000				MODE HIGH	RATELY COMPRESSIBLE LY COMPRESSIBLE	LL = 31 - 50 LL > 50	COASTAL PLAIN SEDIMENTARY RO		STAL PLAIN SEDIME REFUSAL, ROCK T	ENTS CEMENTED INTO ROCK, BUT MA YPE INCLUDES LIMESTONE, SANDSTO
% PASSING ■10 50 MX			GRANULAR SILT- MUCK,		PERCENTAGE OF MATER		(CP)		LL BEDS, ETC.	
	i0 MX 51 MN 5 MX 10 MX 35 MX 35 MX 35 MX 35	MX 36 MN 36 MN 36 MN 36 MN	SOILS SOILS PEAT	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL	FRESH RO		WEATHER	AINO MAY SHOW SLIGHT STAINING. ROCK RI
MATERIAL				TRACE OF ORGANIC M	ATTER 2 - 3% 3 - 5%	TRACE 1 - 10%		MMER IF CRYSTALLINE.	IOHI, FEW JUINIS M	HI SHOW SEIGHT STHINING, NUCK HI
PASSING #40 LL - PI 6 MX		MN 40 MX 41 MN 40 MX 41 MN MN 10 MX 10 MX 11 MN 11 MN	SOILS WITH LITTLE OR MODERATE	LITTLE ORGANIC MAT MODERATELY ORGANIC HIGHLY ORGANIC	5 - 10% 12 - 20% > 10% > 20%	LITTLE 10 - 20% SOME 20 - 35% HIGHLY 35% AND ABOVE	(V SLI.) CR		PECIMEN FACE SHINE	E JOINTS MAY SHOW THIN CLAY COA E BRIGHTLY. ROCK RINGS UNDER HAM
GROUP INDEX Ø	0 0 4 MX	8 MX 12 MX 16 MX NO MX	AMOUNTS OF URGANIL		GROUND WATER					DISCOLORATION EXTENDS INTO ROCK
USUAL TYPES STONE FR OF MAJOR GRAVEL, 4 MATERIALS SAND	AND SAND GRAVEL AND SAND	SILTY CLAYEY SOILS SOILS	ORGANIC SOLES MATTER	∇	WATER LEVEL IN BORE HOLE IMMEDIA STATIC WATER LEVEL AFTER H		CR	YSTALS ARE DULL AND	DISCOLORED. CRYSTA	GRANITOID ROCKS SOME OCCASIONAL ALLINE ROCKS RING UNDER HAMMER E ORATION AND WEATHERING EFFECTS.
GEN. RATING		5410 70 0000	FAIR TO DOOD UNDUTTED		PERCHED WATER, SATURATED ZONE, OR	WATER BEARING STRATA	(MOD.) GR	ANITOID ROCKS, MOST F	ELDSPARS ARE DULL	AND DISCOLORED, SOME SHOW CLAY.
AS SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	POOR POOR UNSUITABL		SPRING OR SEEP			LL SOUND UNDER HAMME TH FRESH ROCK.	R BLUWS AND SHUW	S SIGNIFICANT LOSS OF STRENGTH A
		- 30 ; PI OF A-7-6 SUBGROUP IS	> LL - 30	0.00						AINED. IN GRANITOID ROCKS, ALL FEL
		RANGE OF STANDARD	RANGE OF UNCONFINED		MISCELLANEOUS SYMBO	L5	(MOD. SEV.) AN	D CAN BE EXCAVATED W	ITH A GEOLOGIST'S	INIZATION, ROCK SHOWS SEVERE LOS PICK, ROCK GIVES "CLUNK" SOUND WH
PRIMARY SOIL TY	YPE COMPACTNESS OR CONSISTENCY	PENETRATION RESISTENCE (N-VALUE)	COMPRESSIVE STRENGTH (TONS/FT ²)	L ROADWAY EME	ANKMENT (RE) 25/025 DIP & DIP DIRE		_	TESTED, WOULD YIELD		
	VERY LOOSE	< 4		╡╚╁	577 ST					AINED. ROCK FABRIC CLEAR AND EVI RANITOID ROCKS ALL FELDSPARS ARE
GENERALLY GRANULAR	LOOSE MEDIUM DENSE	4 TO 10 10 TO 30	NZA	SOIL SYMBOL	DPT DMT TEST BOR			SOME EXTENT. SOME F TESTED, WOULD YIELD		NG ROCK USUALLY REMAIN. 7 <i>BPF</i>
MATERIAL (NON-COHESIVE)	DENSE	30 TO 50	N/A		ILL (AF) OTHER AUGER BORING	CONE PENETROMETER				AINED. ROCK FABRIC ELEMENTS ARE
	VERY DENSE	> 50	(0.05		IL BOUNDARY					STATUS, WITH ONLY FRAGMENTS OF S CK WEATHERED TO A DEGREE THAT O
GENERALLY	VERY SOFT SOFT	< 2 2 TO 4	< 0.25 0.25 TO 0.5	- INFERRED SO						IF TESTED, WOULD YIELD SPT N VAL
SILT-CLAY MATERIAL	MEDIUM STIFF STIFF	4 TO 8 8 TO 15	0.5 TO 1.0 1 TO 2	INFERRED ROOM	CK LINE MONITORING WE					SCERNIBLE, OR DISCERNIBLE ONLY IN PRESENT AS DIKES OR STRINGERS. S
(COHESIVE)	VERY STIFF HARD	15 TO 30 > 30	2 TO 4 > 4	ALLUVIAL SO	IL BOUNDARY A PIEZOMETER	- SPT N-VALUE		SO AN EXAMPLE.		
		OR GRAIN SIZE	74		RECOMMENDATION SYMB	S S			ROCK HAR	DNESS
U.S. STD. SIEVE SIZ		40 60 200	270		UNCLASSIFIED EXCAVATION -			NNOT BE SCRATCHED BY VERAL HARD BLOWS OF		ICK. BREAKING OF HAND SPECIMENS F
OPENING (MM)	4.76 2.00				UNSUITABLE WASTE	ACCEPTABLE, BUT NOT TO BE	HARD CA	N BE SCRATCHED BY KN	IFE OR PICK ONLY W	WITH DIFFICULTY. HARD HAMMER BLO
BOULDER	COBBLE GRAVEL	COARSE FINE SAND SAND	SILT CLAY	UNDERCUT	ACCEPTABLE DEGRADABLE ROCK	EMBANKMENT OR BACKFILL		DETACH HAND SPECIME		
(BLDR.)	(COB.) (GR.)	(CSE. SD.) (F SD.			ABBREVIATIONS		HARD EX	CAVATED BY HARD BLOW		S OR GROOVES TO 0.25 INCHES DEEF PICK. HAND SPECIMENS CAN BE DET
GRAIN MM 305 SIZE IN. 12		0.25	0.05 0.005	AR - AUGER REFUSAL BT - BORING TERMINATE	MED MEDIUM D MICA MICACEOUS	VST - VANE SHEAR TEST WEA WEATHERED		MODERATE BLOWS.		
SIZE IN. 12			TEDMC	CL CLAY	MOD MODERATELY	γ - unit weight	HARD CA	N BE EXCAVATED IN SM	ALL CHIPS TO PEICE	EP BY FIRM PRESSURE OF KNIFE OR ES 1 INCH MAXIMUM SIZE BY HARD BL
SOIL MOISTU		CORRELATION OF		CPT - CONE PENETRATIO CSE COARSE	N TEST NP - NON PLASTIC ORG ORGANIC	$\gamma_{ m d}$ - dry unit weight		INT OF A GEOLOGIST'S		
(ATTERBERG			TELD MOISTURE DESCRIPTION	DMT - DILATOMETER TES	T PMT - PRESSUREMETER TE		FR	OM CHIPS TO SEVERAL	INCHES IN SIZE BY	E OR PICK. CAN BE EXCAVATED IN FF MODERATE BLOWS OF A PICK POINT.
	- SATUF		UUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRA e - VOID RATIO	TION TEST SAP SAPROLITIC SD SAND, SANDY	S - BULK SS - SPLIT SPOON		ECES CAN BE BROKEN B		TED READILY WITH POINT OF PICK. PI
	(SAT	.) FROM BELOW	THE GROUND WATER TABLE	F - FINE FOSS FOSSILIFEROUS	SL SILT, SILTY SLI SLIGHTLY	ST - SHELBY TUBE RS - ROCK	SOFT OR	MORE IN THICKNESS C		INGER PRESSURE. CAN BE SCRATCHED
PLASTIC RANGE <		SEMISOLID; R	EQUIRES DRYING TO	FRAC FRACTURED, FRAC	TURES TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL		NGERNAIL.	<u> </u>	DEDDING
(PI)	- WET -	ATTAIN OPTI	MUM MOISTURE	FRAGS FRAGMENTS HI HIGHLY	w - MOISTURE CONTENT V - VERY	CBR - CALIFORNIA BEARING RATIO	TERM	ACTURE SPACIN		<u>BEDDING</u>
			R NEAR OPTIMUM MOISTURE	EQ	UIPMENT USED ON SUBJECT	PROJECT	VERY WIDE	MORE THAN	N 10 FEET	VERY THICKLY BEDDED
	TIMUM MOISTURE - MOIST RINKAGE LIMIT	- (M) SOLID; HT OF	NEHR OF IMOM MOISIONE	DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	WIDE MODERATELY	3 TO 10 CLOSE 1 TO 3		THICKLY BEDDED 1.5 THINLY BEDDED 0.16
		REQUIRES AD	DITIONAL WATER TO	CME-45C	CLAY BITS	X AUTOMATIC MANUAL	CLOSE VERY CLOSE	0.16 TO LESS THAN		VERY THINLY BEDDED 0.03 THICKLY LAMINATED 0.008
	- DRY -		MUM MOISTURE	CME-55	6. CONTINUOUS FLIGHT AUGER	CORE SIZE:		2200 1111		THINLY LAMINATED < 0.
	PL	ASTICITY			8" HOLLOW AUGERS	В			INDURAT	
		TICITY INDEX (PI)	DRY STRENGTH	X CME-550	HARD FACED FINGER BITS	-N				OF MATERIAL BY CEMENTING, HEAT GER FREES NUMEROUS GRAINS:
NON PLAST SLIGHTLY F		Ø-5 6-15	VERY LOW SLIGHT	VANE SHEAR TEST	TUNGCARBIDE INSERTS	HAND TOOLS:	FRIABLE			HAMMER DISINTEGRATES SAMPLE.
	LY PLASTIC	16-25 26 OR MORE	MEDIUM HIGH		X CASING W/ ADVANCER	POST HOLE DIGGER	MODERATE			PARATED FROM SAMPLE WITH STEE
		COLOR		PORTABLE HOIST	X TRICONE 2 15/16" STEEL TEETH	HAND AUGER				EN HIT WITH HAMMER.
				X	TRICONE TUNGCARB.	SOUNDING ROD	INDURATE		GRAINS ARE DIFFIC DIFFICULT TO BREA	CULT TO SEPARATE WITH STEEL PR AK WITH HAMMER.
	MAY INCLUDE COLOR OR COLOF RS SUCH AS LIGHT,DARK,STRE			 X D-50		VANE SHEAR TEST	FXTREME			DWS REQUIRED TO BREAK SAMPLE;
•				X <u>D-50</u>			1		SAMPLE BREAKS AC	HUSS GRAINS.



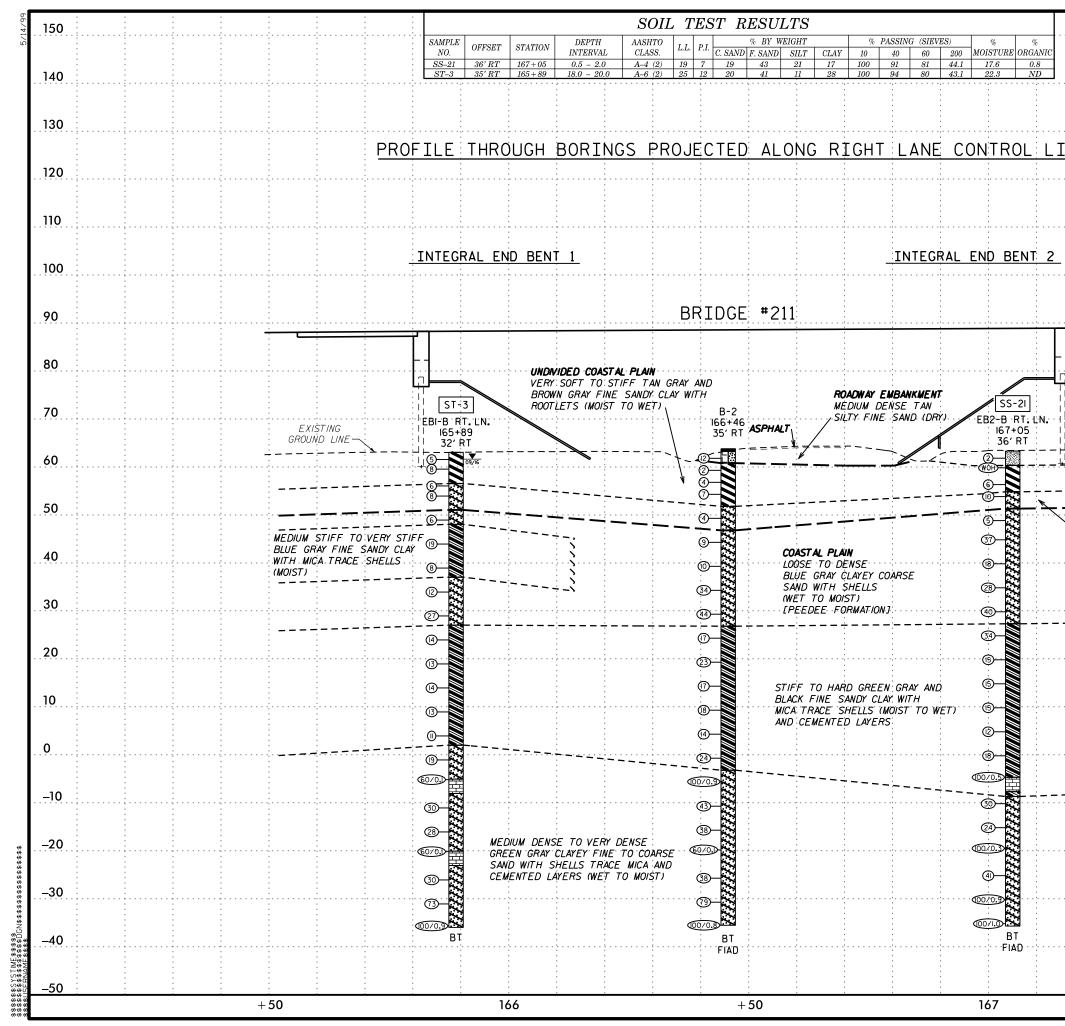


	TERMS AND DEFINITIONS
TED. AN INFERRED D SPT REFUSAL. 11 FOOT PER 60 IS OFTEN	<u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <u>ADUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
PT N VALUES >	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
ROCK THAT NCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
TAL PLAIN IF TESTED. TC.	<u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
T MAY NOT YIELD DSTONE, 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.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO AL FELDSPAR ER BLOWS.	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.
TS. IN AY. ROCK HAS	<u>FIGATE</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	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
FELDSPARS DULL LOSS OF STRENGTH WHEN STRUCK.	FIELD. J <u>DINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT ARE KAOLINIZED	<u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOLL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
RE DISCERNIBLE	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
OF STRONG ROCK MT ONLY MINOR VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
' IN SMALL AND RS. SAPROLITE IS	<u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <u>ROCK QUALITY DESIGNATION (RQD)</u> - 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
NS REQUIRES	RUN AND EXPRESSED AS A PERCENTAGE. <u>SAPPOLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS REQUIRED	<u>SILL</u> - 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.
DEEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. D BLOWS OF THE	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.
N FRAGMENTS NT. SMALL, THIN	<u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
K. PIECES 1 INCH CHED READILY BY	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SECMENTS 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.
THICKNEES	BENCH MARK: 538.99 FEET RIGHT -L- 168+93 BM 13 RR SPIKE IN BASE
THICKNESS 4 FEET 1.5 - 4 FEET	OF 24* CYPRESS N 580,461.7410 E 2,430,741.9690 ELEVATION: 68.35 FEET
0.16 - 1.5 FEET 03 - 0.16 FEET 008 - 0.03 FEET < 0.008 FEET	NOTES: FIAD - FILLED IMMEDIATLEY AFTER DRILLING
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE:	





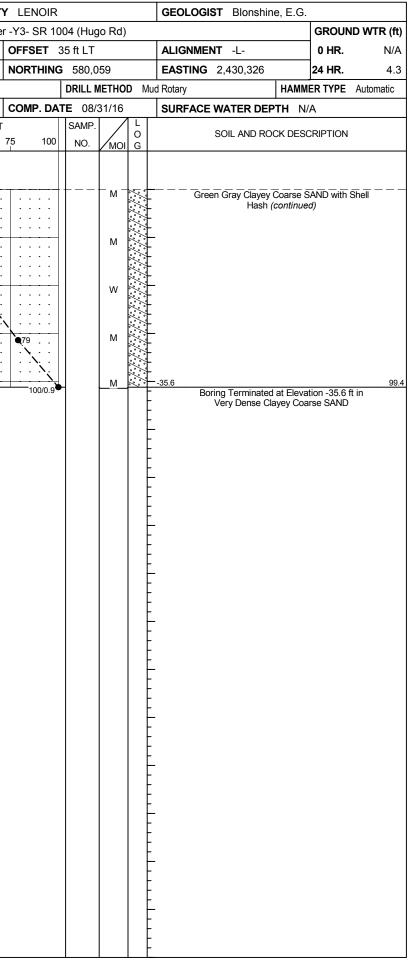
	1 1 1 1 1 1	PROJECT REFERENCE N	0. SHEET NO. 4
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MEDIUM STIFF GREEN SANDY SILT WITH SHE			
SANDY SILT WITH SHE	<u>LLS (WET)</u>	÷	40
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		NE ALONG LEFT LA	
		FEET LEFT OF -L	
	FOR BRIDGE ON C	LF. HARVEY PARKWA TWEEN SR 1729 AN	ΔY
3	SR 1732 LEFT LA		
		STRATIGRAPHY IS	DRAWN -40
	THROUGH THE BO PROJECTED ONTO	RINGS WITH BOTH	
			-50
+ 50		168	



						REFERENCE NO).	SHEET NO.
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	46375.					IP R-5703		Y LENOIR				GEOLC	GIST Blonshine, E.G.			5 4637					P R-5703		COUNTY
				-	. 210	on -L- (Felix Harvey	Pkwy) ove		-	- ·		,		GROUND WTR (ft)					-		on -L- (Felix	-	kwy) over
BORIN	ig no.	EB1-	A Lt. I	_n.	S	TATION 166+31		OFFSET	35 ft LT			ALIGN	MENT -L-	0 HR. N/A	BOF	RING NO	. EB1	-A Lt. I	_n.	SI	TATION 16	66+31	
COLLA	AR ELEN	V . 63	8.8 ft		т	OTAL DEPTH 99.4	ft	NORTHIN	G 580,0	059		EASTIN	IG 2,430,326	24 HR. 4.3	COL	LAR EL	EV. 63	3.8 ft		т	OTAL DEPT	r H 99.4 ft	۱ I
DRILL F	rig/hami	MER E	FF./DA	TE SM	/IE2938	3 CME-750 86% 02/11/20	16		DRILL	METHO	D Mu	d Rotary	HAMM	ER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE SM	ME2938	CME-750 86%	% 02/11/2016	6
DRILLI	ER Mill	ler, T.			S	TART DATE 08/31/	16	COMP. DA	ATE 08/	/31/16		SURFA	CE WATER DEPTH N	/Α	DRII	LLER N	liller, T			ST	TART DATE	E 08/31/16	6
ELEV		DEPTH	BLC	OW CO	JNT	BLOWS	PER FOOT	T	SAMP	. 💙/		1			ELEV	, DRIVE ELEV	DEPTH	BLC	W CO	UNT		BLOWS P	PER FOOT
(ft)		(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	мо	O G	ELEV. (ft)	SOIL AND ROCK DES	DEPTH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50 7
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45	45.3	18.5	3		- 1	1 1						_	Green Gray Fine Sandy CL Hash	AY with Shell	-35	-34.7	98.5	40	60/0.4				
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SHEET 6 OF 43



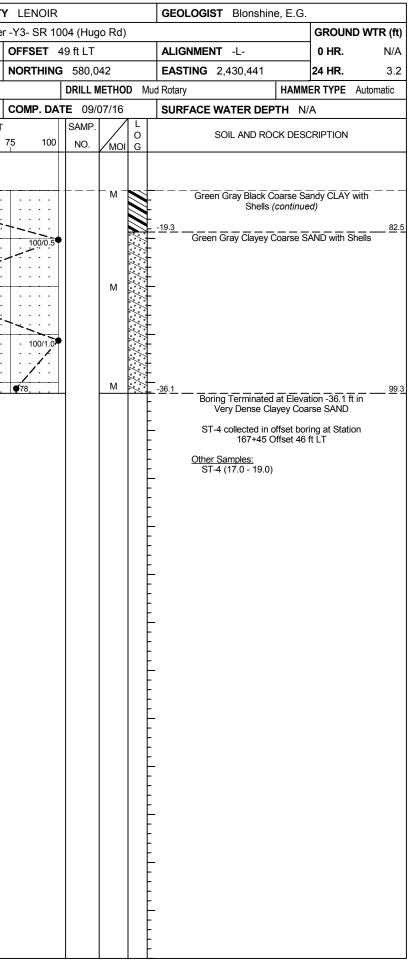
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	46375						R-5							NOIR					GEOLO	DGIST Blo	nshine, E.G				46375					IP R-5703		COUN	
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BOR	NG NO	. B-1				STA	TION	N 16	6+8	5			OFF	SET	37 ft L	Т			ALIGN	MENT -L-		0 HR.	N/A	BOR	NG NO.	B-1			S	TATION 1	66+85		_
COLI	AR ELI	EV. 63	3.9 ft			тот	TAL C	DEPT	Ή	36.3 f	ť		NOR	THING	G 580	,047	7		EASTI	IG 2,430,	379	24 HR.	FIAD	COLI	AR ELE	EV. 63	3.9 ft		Т(OTAL DEP	TH 86.3	ft	N
DRILL	. RIG/HA	MMER E	FF./DA	ATE H	PC247	73 C	CME-5	50 92	% 12/	09/20	15				DRILL	ME1	THOD	М	ud Rotary		HAM	MER TYPE	Automatic	DRILL	. RIG/HAI	MMER E	FF./DA	TE H	PC2473	3 CME-550 92	2% 12/09/20	015	
DRIL	LER V				:	STA	ART D	DATE	80	3/04/1	6		CON	IP. DA	TE 0	8/04/	/16		SURFA	CE WATER		N/A		DRIL	LER W	/hite, J			S	TART DAT	E 08/04/	/16	C
ELEV	DRIVE ELEV		·	ow co	-			-				FOOT			SAM	P.		L O		SOIL AN	D ROCK DE	SCRIPTION		ELEV	DRIVE ELEV	DEPTH	·⊢	w co				PER FOC	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5f	ft	0	2	25		50		75	100	NO.			G	ELEV. (ft)				DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75
65		ł																-	63.9	G	ROUND SURI	FACE	0.0	-15					-13 -		Mat	tch Line	
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60	60.4	3.5					_ _ 6 [.]	· · · ·		· · · · · ·		· · · · · ·		· · ·			М	Š	<u>- 61.4</u>	BI	DWAY EMBA	SAND		-20	- 19.4 -	- 83.3	100/0.3					• • • • •	<u> </u>
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25	25.5	+ 38.4 -	8	22	14			• •		●36	:-	· · · · · ·		· · ·		,	w %	\sim	-						-								
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5 0 -5	5.6	_ _ <u>58.3</u> _					• •	· ·		 		 							-						-	Ł							
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222	-14.4	78.3					•••		1.	· · ·		· · ·		· · · · · ·				Ì	<u>i2.0</u> E	Blue Gray Fin	e Sandy CLA	7, with Shell	<u>76.5</u> Hash		-	Ł							
-15	-14.4	T /0.3	1	1	1			· ·/										N	-						-	Γ				<u> </u>			

SHEET 7 OF 43

LENOIR				GEC	DLOGI	ST E	Blonshine	e, E.G.		
-Y3- SR 100)4 (Hug	o Rd)							GROUN	ID WTR (ft)
OFFSET 3	7 ft LT			ALIO	GNME	NT -			0 HR.	N/A
NORTHING	580,0	47		EAS	TING	2,43	0,379		24 HR.	FIAD
	DRILL N	IETHO	D Mu	d Rota	у			HAMME	R TYPE	Automatic
COMP. DAT	E 08/0	04/16		SUF	FACE	WAT	ER DEP	TH N/	۹	
	SAMP.		L O			SOIL	AND ROC			
75 100	NO.	моі				OOIL		N DLOC		
		- w -								
		vv		-17.6				tinued)		81.5
		w	~		Blue	e Gray Ha	Clayey Co sh and Ce	parse SA	ND with S Lavers	ihell
100/0.3		vv		-					Lajoro	
60/0.0			<u>-</u>	-22.4	Bo	ring Te	rminated	at Elevat	ion -22.4 1	86.3 t in
				-	Very	Dense Ha	e Clayey C sh and Ce	Coarse S.	AND with Lavers	Shell
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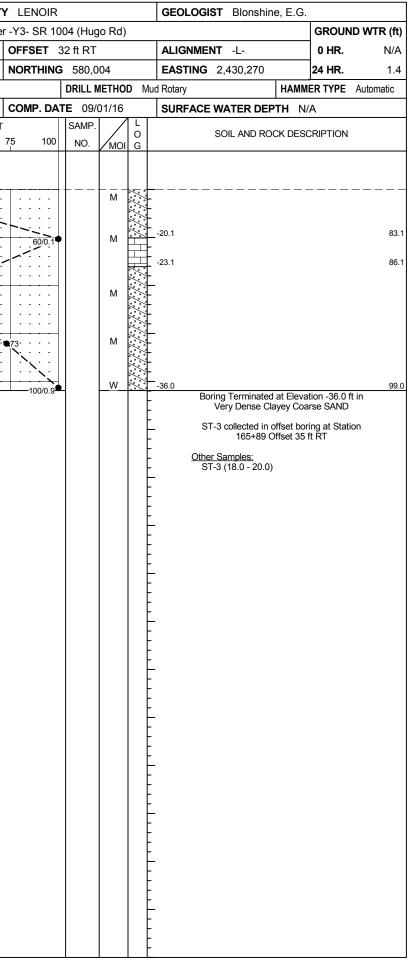
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	4637					IP R						LEN					GE	OLOGIST Blonshine, E.G	-			3 46375					IP R-5703		COUNTY
		RIPTION		-	. 210	on -L·	- (Feli	x Ha	rvey F	Pkwy					-	d)				R (ft)					-				Pkwy) over
BORI	NG NO	. EB2	-A Lt.	Ln	s	TATIO	DN 1	67+4	45			OFFS	ET	49 ft L	Т		AL	GNMENT -L-	0 HR.	N/A	BOR	ING NO	. EB2	-A Lt.	Ln	S	TATION 1	167+45	
COLL	AR EL	EV. 63	3.2 ft		Т	OTAL	DEP	тн	99.3 f	ft		NOR	THING	3 580	,042		EA	STING 2,430,441	24 HR.	3.2	COL	LAR EL	EV. 6	3.2 ft		т	JTAL DEP	PTH 99.3	ft
DRILL	RIG/HA	MMER E	FF./DA	TE SM	ME2938	3 CME-	750 86	6% 02	/11/201	6				DRILL	. METH	IOD	Mud Rot	ary HAMN	MER TYPE Autor	natic	DRIL	L RIG/HA	MMER E	EFF./DA	TE SM	ME2938	CME-750 86	6% 02/11/20 [,]	16
DRIL	LER N	liller, T	-		S	TART	DAT	E 0	9/07/1	16		сом	P. DA	TE 09	9/07/1	6	SU	RFACE WATER DEPTH N	I/A		DRIL	LER N	1iller, T	-		S	FART DAT	re 09/07/ ⁻	/16
ELEV	DRIVE ELEV		BLC	ow co	UNT			BL	LOWS	PER I	-00T			SAM	P. 🔻			SOIL AND ROCK DES	CRIPTION		ELEV	DRIVE ELEV		BLC	ow co	UNT		BLOWS	PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25		50		75	100	NO.	М					PTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50
65		Ļ															L				-15		L					Mat	ch Line
	62.7	- - 0.5															63.2	GROUND SURF		0.0			ł	6	8	10	● 1	18	
-	60.7	2.5	1	2	1	•3					· · ·	· ·	•••		м		1	UNDIVIDED COAST Tan Gray Fine Sandy CLAY					<u>+</u>						
60	- 00.7	T2.5	4	3	3	1	3	+							—м		F				-20	-19.6	<u>T 82.8</u> T	100/0.	5			+	
	57.2	Ŧ 6.0				i		.		.							}						Ŧ						· · · · · · · · ·
55	55.2	Ι	2	2	2] ∳4	· · ·	:	· · ·	.	· · ·				М		55.7			7.5	-25	-24.3	87.5		40	47		· · · · · ·	
		+	2	2	2	•4		1.		·		1			W		<u> </u>	Tan Gray Clayey Coa	Irse SAND			-	ŧ	9	12	17		6 29	
		‡				1 1	· · · · · ·		· · · · · ·		· · · · · ·					/~/~	<u>51.7</u>			11.5			ŧ						
50	50.4	12.8	2	4	5	<u> '</u>	· · ·	:		·	· · ·		•••		w	<i>***</i>	_ الم	COASTAL PL Blue Gray Clayey Coarse S			-30	-29.6	92.8	37	63/0.5			· · · · ·	· · · · · ·
		ŧ	-			:1	<u>9</u>	:	· · ·		· · ·	· ·			**	~~~	, ,	Blue Gray Clayey Coarse S Hash [Peedee Format	tion				ŧ		00,010				
		±				. 						· ·				~	<u>46.7</u>	Green Gray Fine Sandy S		<u> </u>			<u>+</u>						
45	45.4	<u>† 17.8</u> 	2	3	2			+-	· · · ·	+					w	, 🎆		Creen Gray Time Gardy G			-35		<u> </u>	19	31	47			
		Ŧ						.		.							42.2			21.0			Ŧ				[
40	40.4	22.8] :	λ	:	· · ·		· · · · · ·					/:/:	•	Dark Green Gray Clayey	Coarse SAND				Ŧ						
	-	ŧ	4	5	9		•14					1			W	/~~	<u>}</u>					-	ŧ						
		‡				1 1	· · `		· · · · · ·		· · · · · ·					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	} }						ŧ						
35	35.4	27.8	11	17	20	Li			· · ·	·	· · ·		•••		М	·/~?	* *					-	‡						
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25	25.4	37.8					· · ·	/	· · ·	.	· · ·						1	Black Fine Sandy CLAY	, Trace Mica				Ŧ						
	-	ŧ	9	10	8		•1	8		1.					M		1					-	ŧ						
		‡				:	: :		· · · · · ·		· · · · · ·	· · · ·					1						‡						
20	20.4	42.8	5	6	7	┨┝╧		<u> </u>		·	· · ·	· ·	•••		Тм							-	‡						
		ŧ				:	.¶13. • •		· · · · · ·		· · ·	· ·											ŧ						
	45.4	1 47.0				:	: † :		· · ·		· · ·												ŧ						
15	15.4	<u>† 47.8</u> 1	5	7	9	11	. • 16	; -				<u> </u>			м							-	ŧ						
		t				11	. į . . į																ŧ				1		
10	10.4	52.8		<u> </u>	_		· [· ·				•••												f				1		
	-	Ŧ	5	5	'										M		F					-	Ŧ				1		
5		‡				:		.	· · · · · ·		· · · · · ·						1						ŧ				1		
	5.4	57.8	4	5	8		· · · ·	·		·	· · ·				Тм							-	‡				1		
		‡				:	.¶13.	:	· · · · · ·	.	· · · · · ·						\$						‡				1		
	0.4	- - 62.8				:	. .		· · · · · ·		· · ·	· · · ·											‡				1		
0	0.4	+ 02.0	5	7	8	1 .	. •15			<u> </u>		<u> </u>			w		1					-	ŧ				1		
		t						-				· ·	•••				-2.8			66.0			ŧ				1		
-5	-4.6	67.8	100/2	-		11		:		.	. .	+				<i>%</i> %,	-5.0	Green Gray Clayey Fine SA with Cemented Sand	ND, Trace Mica d Layers	68.2			f				1		
	-	Ŧ	100/0.4	1				-				1	00/0.4	 		Ë	Ŧ					-	Ŧ				1		
		‡				.	· · · · · ·		· · · · · ·			1	••• •••			_ <u> </u>				72.0			ŧ				1		
-10 -	-9.6	72.8	7	9	13	╢└╴		<u> </u>	///	Ţ.	· · ·	• •	•••		М	<i>%</i> .,	ŧ			, 2.0		-	‡				1		
-10 -		‡						22	· · · · · ·	:	 	· ·				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	*			76 0			‡				1		
		+ ^					· · /		· · ·		· · ·	· ·					<u>-12.8</u>	Green Gray Black Coarse S	andy CLAY with	<u>76.0</u>			t				1		
-15	-14.6	77.8	-				ŗ										<u> </u>	Shells					Ľ				L		

SHEET 8 OF 43



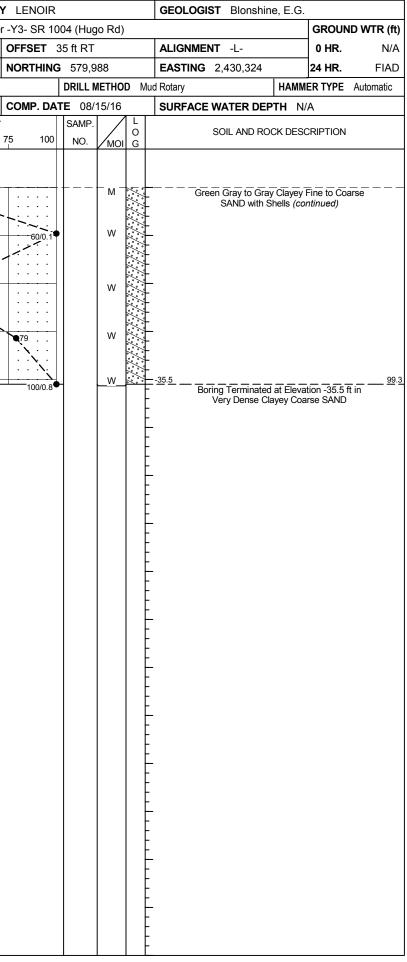
	4637					IP R-5703			Y LEN					GEOL	OGIST Blonshine,	, E.G.		-	S 4637					P R-5703		COUNTY
SITE	DESCR	RIPTION	Bric	lge No	. 211	on -L- (Felix	k Harvey	Pkwy) ove	er -Y3- S	R 1004	4 (Hug	jo Rd)					GROUND WTR (ft)					-). 211 c	on -L- (Felix	Harvey P	'kwy) over
BOR	ing no	. EB1-	-B Rt.	Ln.	S	TATION 1	65+89		OFFSE	T 32	ft RT			ALIG	IMENT -L-		0 HR. N/A	BOF	ring no	. EB1	-B Rt.	Ln.	SI	TATION 16	5+89	(
COL	LAR EL	EV. 63	3.0 ft		т	OTAL DEPI	FH 99.0	ft	NORTH	HING	580,0	04		EAST	ING 2,430,270		24 HR. 1.4	COL	LAR EL	EV. 6	3.0 ft		т	OTAL DEPTH	H 99.0 ft	t 1
DRILI	RIG/HA	MMER E	FF./DA	TE SN	/IE2938	8 CME-750 869	% 02/11/20	16		0	ORILL N	IETHO	DM	ud Rotary	I	HAMME	RTYPE Automatic	DRIL	.L RIG/HA	MMER I	EFF./DA	TE SM	ME2938	CME-750 86%	02/11/201	6
DRIL	LER N	/liller, T.			s	TART DATE	E 09/01/	16	COMP	DATE	E 09/0	01/16		SURF	ACE WATER DEPT	H N/A	۹	DRI	LLER N	/liller, T			ST	TART DATE	09/01/1	16 0
ELEV	DRIVE ELEV		BLC	ow cor	JNT		BLOWS	PER FOO	Г		SAMP.	$\mathbf{\nabla}$	L		SOIL AND ROCK			ELEV	/ DRIVE ELEV		H BLC	ow co	UNT		BLOWS F	PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25	50	75	100	NO.	моі		ELEV. (ft		(DL00	DEPTH (ft	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	5 5	50 7
1																										
65		ļ												-				-15							Matc	ch Line
	62.5	+											-	63.0	GROUND			0	-15.1	<u>† 78.1</u>	7	11	17		28:	
		+ 0.5 	2	2	3	- •			. .			M	\mathbb{N}	-	UNDIVIDED CC Tan Gray Fine Sandy					Ŧ]
60	60.5	<u>+ 2.5</u> +	3	4	4				· · · ·			м	\mathbf{N}	_		-		-20	-20.1 .	83.1	60/0.1	-				+
	57.0	Ŧ 6.0											\mathbf{N}	- - 56.5			6.5			Ŧ						
55	54.9	I	3	3	3							м		- 50.5	Gray Clayey	Fine S		-25	-25.1	T 88.1						
	01.0 -	+	4	4	4	. • • 8						м		-						+	10	11	19		•30 · ·	
		Ŧ							.				$\langle \rangle \rangle$	- 51.0			12.0			Ŧ						
50	49.9	13.1	3	2	4				· · · ·				/./		Blue Gray Clayey Coa		N	-30	-30.1	93.1	18	33	40			
		ŧ	ľ			$\begin{bmatrix} \bullet 6 & \cdot & \cdot \\ \cdot & \cdot & \cdot \end{bmatrix}$.			М		48.0	Ha	ash				ŧ					· · · · ·	
45		†												-	[Peedee F Blue Gray Fine Sandy	CLAY	with Shells and	-35	05.4	‡					· · · · · · · ·	· · · · ·
	44.9	<u> </u>	5	5	14	· · • • 1!	9					м		-	Trace	Mica		-55	-35.1 .	98.1	71	29/0.4			· · · ·	+
		‡							· · · · ·					-						‡						
40	39.9	23.1							· · · ·	•••				-					-	‡						
		ŧ	4	3	5							м		-						ŧ						
		ŧ												<u>37.0</u>	Blue Gray Clayey Coa		ND with Shell 26.0			ŧ						
35	34.9	28.1	5	6	6				· · · ·			м	///		Ha	ish			-	Ŧ						
		ł											$\langle \cdot \rangle$	-						Ŧ						
30	29.9	I 33.1											///	-						Ŧ						
		+	9	12	15		27 · · ·					м	/./.	-						Ŧ						
		Ŧ					1		.					27.0	Green Gray Fine Sar	ndv CLA	<u>36.0</u>	4		Ŧ						
25	24.9	38.1	7	7	7	<i>-/</i>			· · · ·			м		-	and Tra	ice Mica	l		-	Ŧ						
		Ŧ							.					-						Ŧ						
20	19.9	<u>+</u> 43.1												-						Ŧ						
	10.0	+ +	5	6	7	· · • 13·						м		-					-	Ŧ						
		ŧ	1						.					-						Ŧ						
15	14.9	48.1	5	6	8			_ · · ·	· · · ·					-						‡						
		‡			5	• 14			.			M		-						‡						
10		‡	1											-						‡						
10	9.9 -	53.1 	4	6	7	· · • 13·						м		-					-	‡						
5		‡				:::::								-						‡						
	4.9	58.1	<u> </u>						· · · · ·	· ·				-					.	‡						
		‡	5	5	6	• • 11 •						м		-						‡						
0		±	1			::'\:			. .	::				2.0	Green Gray Clayey Fi	ine SAN	ID with Shells, 61.0	41		±						
0	-0.1	63.1	8	7	12			+				м	<u>////</u>		Trace Mica and Cen	mented	Sand Layers		-	t						
		Ŧ	1						.	::			\sim	-						Ŧ						
-5	-5.1	<u> </u>	1											5.1			68.1			Ŧ						
	0.1	+	60/0.1]						0/0.1		M	日	-					-	Ŧ						
10		Ŧ							1				Ţ.	-8.1			71.1			Ŧ						
-10	-10.1 -	73.1	8	12	18				· · · · ·				~~~	-					.	‡						
-10		‡		'-	10		● 30 · ·					W		-						‡						
1		‡	1				i		· · · · · · · ·					-						‡						
-15		1	1				LI						.~~							1		1				

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-	46375					TIP R-5703			Y LENOIF				GEOLO	DGIST Blonshine, E.G.			BS 4637					P R-5703		COUNTY
			Brid	dge No	. 211	on -L- (Felix Ha	arvey P	kwy) ove			-)			GROUND WTR (f				N Brid	lge No		on -L- (Felix	-	kwy) over -
BOR	ING NO	. B-2			5	STATION 166+	46		OFFSET	35 ft RT	-		ALIGN	MENT -L-	0 HR. N//	В	DRING NO). В-2			ST	T ATION 16	6+46	c
COLI	LAR ELI	EV. 63	3.8 ft		1	TOTAL DEPTH	99.3 ft	t	NORTHIN	G 579,9	988		EASTI	NG 2,430,324	24 HR. FIAI	C	OLLAR EL	EV. 6	3.8 ft		тс	OTAL DEPT	H 99.3 ft	t N
DRILL	RIG/HA	MMER E	FF./DA	TE H	PC027	9 Diedrich D50 88%	% 12/09/2	2015		DRILL I	METHO	DD M	ud Rotary	HAMM	IER TYPE Automatic	DF	RILL RIG/HA	MMER	EFF./DA	TE HF	PC0279	Diedrich D50	88% 12/09/	2015
DRIL	LER C	ain, J.			5	START DATE 0)8/15/1	6	COMP. DA	ATE 08/	/15/16	6	SURFA	CE WATER DEPTH N	/A	D	RILLER	Cain, J.			ST	ART DATE	08/15/1	6 C
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT	В	LOWS F	PER FOOT		SAMP.	. 🔨 /		•	SOIL AND ROCK DES		EL		DEPTI	H BLC	w co	JNT		BLOWS F	PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5f	0 25	5	50	75 100	NO.	Имо		ELEV. (ft)	SOIL AND NOON DES	DEPTH	t) (f	t) (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50 75
65													_				5			$\lfloor _$				h Line
	62.8	- 1.0											63.8 63.2	GROUND SURF/ ASPHALT		0		+	8	15	23		•38.	
		ł	8	7	5						D		- - 60.8	ROADWAY EMBAN				Ŧ						
60	60.3	<u>† 3.5</u>	WOH	1	1			· · · ·			м	N		Tan Silty Fine SA			0 -19.7	+ 83.5 +	60/0.1	-				
	57.8	6.0	1	2	-								-	Tan Gray Fine Sand	y CLAY			Ŧ						
55	55.3	+ 8.5	1	2	2	4	· · · · · ·				M		-				5 -24.7	+ + - 88.5						
- 55		- 0.0	2	3	4					11	м		-				<u> </u>	+	9	13	25		. @38	
	-	t					· · · · · ·	· · · ·					51.8		12	D		ŧ						\ .::
50	50.3	13.5	3		2								-	Black Clayey Coarse	e SAND	-3	0 -29.7	93.5	16	35	44			
	-	ł	3	2		• 4					W	///	-					ł	16	35	44			
		Ŧ											46.8	COASTAL PLA	<u> </u>			Ŧ						
45	45.3	T 18.5	3	2	7	┨┝╍┟╍		· · · ·	+ • • • •		W		-	Gray Clayey Coarse SAND	with Shell Hash	-3	5 -34.7	98.5	53	47/0.3				
	-	ŧ					· · · · · ·					///	-	[Peedee Formati	ionj			ŧ						
40	40.3	+ 23.5					· · · · · ·	· · · ·				///	-					‡						
40		- 20.0	1	4	6						w		-					ŧ						
		ł					· · ·	· · · ·					-					ŧ						
35	35.3	28.5				<u> </u>							-					ł						
		Ŧ	10	12	22		34				W		-					Ŧ						
		Ŧ					Ň.						-					Ŧ						
30	30.3	33.5	15	21	23		· \ ·	· · · ·			w	/./.	-					‡						
	-	ŧ					· · · • • • • • • • • • • • • • • • • •	4				///	-					‡						
							· · · ·	· · · ·					26.8	Black Fine Sandy CLAY with	h Shells, Trace 37			ŧ						
25	25.3		7	8	9						м		-	Mica				ŧ						
		ŧ				· · · \ · ·	· · ·	 					-					Ŧ						
20	20.3	43.5				1 1 1 1	• • •						-					Ŧ						
	-	Ŧ	6	8	15]	M		-					Ŧ						
		Ŧ					· · · · · ·						-					Ŧ						
15	15.3	48.5	6	8	9				· · · ·	41			-					‡						
	-	‡					· · · · · ·	 					-					‡						
	10.0	±					· · ·						-					±						
10	10.3	<u>53.5</u>	6	8	10						м		-					Ŧ						
		F				$ \cdot \cdot \cdot \cdot \cdot$							-					Ŧ						
5	5.3	- 58.5					· · · · · ·						-					Ŧ						
	-	Ŧ	6	6	8					1	W		-					Ŧ						
	-	ŧ					· · · · · ·	· · · · ·					-					‡						
0	0.3	63.5	8	10	14		· · ·		· · · ·				-					‡						
	-	‡						 			W		-					‡						
		±				.	· · · ·	<u> </u>					-3.2	Green Grav to Grav Clavev	Fine to Coarse	익		t						
-5	-4.7	<u>† 68.5</u>	83	17/0.4					100/0.9	•	w		_	Green Gray to Gray Clayey SAND with She	ells		.	Ŧ						
		Ŧ										///	-					Ŧ						
-10	-9.7	735					· · · · · ·	· · · · /				/./.	-					‡						
-10		‡ ^{, , ,} , ,	10	16	27	1	•43	<u> </u>		11	w	~~~~	-					‡						
2		‡					. 	 				/./.	-					‡						
-15	-14.7	78.5					• <u>;</u> •											+						

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WBS 46375.1.1		TIP R-5703	3	-	Y LENOIF			GE	OLOGIST Blonshine, E.G.		WB	S 4637	511			TIP	P R-5703	COUNT	Y LENOIR			GEOLOGIST Blonshine,	FG
SITE DESCRIPTION Bri	idge No. 2						o Rd)			GROUND WTR (ft)				N Brid	lge No		n -L- (Felix Harve			04 (Hu	go Rd)		GROUND WTR (ft)
BORING NO. EB2-B Rt	-	STATION 1	-	• /	OFFSET				IGNMENT -L-	0 HR. N/A		RING NO			-		ATION 167+05		OFFSET 3			ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 63.3 ft		TOTAL DEP	TH 99.0	ft	NORTHIN	G 579,9	72	EA	STING 2,430,380	24 HR. FIAD	COL	LAR EL	.EV. 6	3.3 ft		то	TAL DEPTH 99	.0 ft	NORTHING	5 579,9	972	EASTING 2,430,380	24 HR. FIAD
DRILL RIG/HAMMER EFF./D	ATE SME	1 2938 CME-750 86	5% 02/11/20	16	I		IETHO	D Mud Rota	ary HAMN	MER TYPE Automatic	DRIL	L RIG/HA	AMMER E	EFF./DA	TE SN	/E2938 C	CME-750 86% 02/11	/2016	·	DRILL	METHOD M	ud Rotary	HAMMER TYPE Automatic
DRILLER Miller, T.		START DAT	E 09/06/	16	COMP. D	ATE 09/	06/16	SU	RFACE WATER DEPTH N	I/A	DRI	LLER I	Miller, T			ST	ART DATE 09/0	06/16	COMP. DAT	TE 09/	06/16	SURFACE WATER DEPT	H N/A
	OW COUN			PER FOOT 50	75 100	SAMP.			SOIL AND ROCK DES		ELEV (ft)	/ DRIVE ELEV (ft)	DEPTH (ft)	·	OW COU 0.5ft		BLO ¹ 0 25	NS PER FOOT 50	75 100	SAMP. NO.	MOI G	SOIL AND ROCK	
65 62.8 0.5 60.8 2.5 1 60	1	1 • 2 · · · ·	· · · · ·	· · · ·	· · · · · · · · · · · · · · · · · · ·	SS-21	18%	- 63.3 - 60.3	UNDIVIDED COAST	AL PLAIN	-15 -20	-19.2	- 82.5				▲ 		· · · · · · · · · · · · · · · · · · ·		Market Ma	Green Gray Clayey F	ine to Coarse SAND
57.3 6.0 57.3 6.0 55 54.8 8.5 50 49.8 13.5 50 49.8 2	3	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				-	M W W	548 513	Gray Clayey Coarse	CLAY, Trace	-25	-24.2	+	100/0.3	16	25			100/0.3		м <i>1,1,2,2,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,</i>	-	
45 45.8 17.5 2	6	31	• • • • • • • • • • • • • • • • • • • •				w		Pash [Peedee Format	tion]	-35	34.2	+ + 97.5 + +	21	26	74/0.5			100/1.0) 	M M M M M M M M M M M M M M M M M M M	 	Elevation -35.7 ft in ey Coarse SAND
	6	12 12 12 12 12 12 12 12 12 12	8 				W M															- - - - - -	
30 30.8 32.5 30 25.8 37.5	19	21	· · · · · · · · · · · · · · · · · · ·				М	27. 	Black Fine Sandy CLAY, Ti				+ + + + + +									- - - - -	
25 25.8 37.3 27 20 20.8 42.5 5		9 15 15 15 15 15 15 15 15 15 15	• 34 • ·				M M		Cemented Sand I	layers												- 	
15.8 47.5 5	6	9				_	м															-	
10 10.8 = 52.5 5 5 5 5 5 5 5 5 5 5 5 5 5					· · · · · ·	_	м						+ + + +									- - - - -	
	7		8.				м	4.7		68.0													
-10 -9.2 - 72.5 -9.2 - 72.5 -9.2 - 72.5 		18	• • • • • • • • • • • • • • • • • • •				w	-7.7 -7.7 -7.7 -7.7 -7.7 -7.7 -7.7 -7.7	Green Gray Clayey Fine to with Shells	71.0 72.0 O Coarse SAND			+ + + + + + + + + + + + + + + + + + + +									- - - - - -	

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Revision No. 0

Particle Size Analysis of Soils



Form No. TR-T88

Revision No. 0 Revision Date: 12/20/09

Revision Date: 12	2/20/09			AASHT	9 T88 as	Modified	by NCI	DOT				
	S&ME.	, Inc. Ra	leigh.	3201 Sp	ring Fo	est Roa	d, <u>R</u> ale	eigh, North	Carolina 2	<i>Quality</i> 2 7616	Assura	ince
S&ME Project #		35-16-01		I ,					ort Date:		9/20/1	6
Project Name:		F. Harve	y Parkv	way Exte	nsion R	-5703		Test	t Date(s):	9/12	2 - 9/2	20/16
State Project #:	463	375.1.1		F.A. Pr	oject No	N/A		T	IP NO:	R-5703		
Client Name:	Mi	chael Ba	ıker En	gineerin	g							
Address:	Ral	leigh, NO	2									
Boring #:	B-1	1		Sa	ample #:	SS-20			Sample I	Date:	8/4/	16
Location:	166	6+85			Offset:	37 LT			Depth	(ft):	3.5	- 5.0
Sample Descript	tion:					Gray	Coarse	e to Fine Sa	ndy Silty Cl	LAY A	4-6	(4)
100%	1.5" 1"3/4"	1/2'3/8"	#4	#10	#20	#40 #60	#100	#200 #270				
90%						\mathbf{N}						
80%			+++-									
70%							\mathbf{N}				_	
bercent Passing A 50%												
50%								N				
			+++-									
й 40%												
30%												
			+++									
20%												
10%												
						<u> </u>						
0%		10		*	1	*	0).1	0.01			0.0
					Particle	Size (mm)						
		ined by NO	CDOT					~ .	$< 0^{\prime}$	25 mm and	> 0.05	mm
Gravel	1							Sand				
Coorse Se	nd			and > 2.00			S	silt).05 and >	0.005 n	nm
Coarse Sa Maximum Partic		<	2.00 mm	and > 2.00 n and >0.2	5 mm	Sand	S	ilt lay	< (0.005 n mm	
Maximum Partic		< #4	2.00 mn 1		5 mm Coarse		S	ilt lay 18%	<(Silt).05 and >	0.005 n mm	17%
Maximum Partic Gravel	cle Size	< #4 19	2.00 mm 4 %		5 mm Coarse Fine Sa	and	S C	ilt lay 18% 37%	<pre> < (Silt Clay</pre>	0.05 and > < 0.005	0.005 n mm	17% 28%
Maximum Partic Gravel Apparent Relativ	cle Size	< #4 19 y N	2.00 mm 4 % D		5 mm Coarse Fine Sa Moistu	and re Conte	S C	ilt lay 18% 37% 20%	Silt Clay % Passin	0.05 and > < 0.005 ng #200	0.005 n mm	17% 28% \$8.8%
Maximum Partic Gravel Apparent Relativ	cle Size	< #4 19	2.00 mm 4 % D	n and >0.2	5 mm Coarse Fine Sa Moistu Plastic	and re Conte	s C	ilt lay 18% 37%	<pre> < (Silt Clay</pre>	0.05 and > < 0.005 ng #200	0.005 n mm	17% 28%
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S	cle Size ve Density Sand	 #4 19 y N1 28 	2.00 mm 4 % D 3	n and >0.2.	5 mm Coarse Fine Sa Moistu Plastic	and re Conte Limit	s C	ilt lay 18% 37% 20%	Silt Clay % Passin	0.05 and > < 0.005 ng #200	0.005 n mm 4	17% 28% \$8.8%
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S	cle Size ve Density Sand Sand & Gra	 #4 19 y N1 28 	2.00 mm 4 % D 3	n and >0.2 So Fine	5 mm Coarse Fine Sa Moistu Plastic pil Morta e Sand unded	and re Conte Limit ar (-#10 S	s C	Silt lay 18% 37% 20% 12 Silt	<pre>< (Silt Clay % Passin Plastic In 17% An</pre>	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4	17% 28% 48.8% 16 28%
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S	cle Size ve Density Sand Sand & Gra	 #4 19 y N1 28 	2.00 mm 4 % D 3 cles:	n and >0.2 So Fine Rou	5 mm Coarse Fine Sa Moistu Plastic Dil Morta Sand unded Soft	and re Conte Limit ar (-#10 \$ 37%	s C	Silt lay 18% 37% 20% 12 Silt	Silt Clay % Passin Plastic In 17%	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4	17% 28% 48.8% 16 28% ≰
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S Hard & D	cle Size ve Density Sand Sand & Gra Durable	<pre> <</pre>	2.00 mm 4 % D 3 cles:	n and >0.2 So Fine	5 mm Coarse Fine Sa Moistu Plastic Dil Morta Sand unded Soft	and re Conte Limit ar (-#10 \$ 37%	s C	Silt lay 18% 37% 20% 12 Silt	<pre>< (Silt Clay % Passin Plastic In 17% An</pre>	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4 y [>	17% 28% 48.8% 16 28% ≰
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S Hard & D References / Comm	cle Size ve Density Sand Sand & Gra Durable Gents / Devia		2.00 mm 4 % D 3 cles:	n and >0.2. Sc Fine Rou	5 mm Coarse Fine Sa Moistu Plastic Dil Morta e Sand unded Soft mined.	and re Conte Limit ar (-#10 \$ 37%	s C nt Sieve)	silt lay 18% 37% 20% 12 Silt We	Silt Clay % Passin Plastic In 17% An athered & Fr	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4 y ∑	17% 28% 48.8% 16 28% ≰ ≰
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S Hard & D References / Comm	cle Size ve Density Sand Sand & Gra Durable		2.00 mm 4 % D 3 cles:	n and >0.2 Sc Fine Rou Not Deterr	5 mm Coarse Fine Sa Moistu Plastic Dil Morta Sand unded Soft	and re Conte Limit ar (-#10 \$ 37%	s C nt Sieve)	Silt lay 18% 37% 20% 12 Silt	Silt Clay % Passin Plastic In 17% An athered & Fu	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4 y [>	17% 28% 48.8% 16 28% ∝ ∞ /2016
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S Hard & D References / Comm <u>Mal K</u>	cle Size ve Density Sand Sand & Gra Durable tents / Devia Krajan, ET		2.00 mm 4 % D 3 cles:	n and >0.2 Sc Fine Rou Not Deterr	5 mm Coarse Fine Sa Moistu Plastic Dil Morta e Sand unded Soft mined.	and re Conte Limit ar (-#10 \$ 37%	s C nt Sieve)	ilt lay 18% 37% 20% 12 Silt We Laboratory M	Silt Clay % Passin Plastic In 17% An athered & Fu	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4 y <u>y</u> <u>9/12/</u>	17% 28% 48.8% 16 28% ∝ ∞ /2016
Maximum Partic Gravel Apparent Relativ Liquid Limit Coarse S Description of S Hard & D References / Comm <u>Mal K</u> Techni	cle Size ve Density Sand Sand & Gra Durable tents / Devia Krajan, ET	44 19 28 28 18% avel Partic X titions: 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 2 3 2 8 3 8 3	2.00 mm 4 % D 3 cles:	n and >0.2 Sc Fine Rou Not Deterr	5 mm Coarse Fine Sa Moistu Plastic Dil Morta e Sand unded Soft mined.	and re Conte Limit ar (-#10 \$ 37%	s C nt Sieve)	ilt lay 18% 37% 20% 12 Silt We Laboratory M	Silt Clay % Passin Plastic In 17% An athered & Fi Manager n Manager	0.05 and > < 0.005 ng #200 ndex Cla gular	0.005 n mm 4 y <u>y</u> <u>9/12/</u>	17% 28% 48.8% 16 28% ≰ ≰ <u>⁄2016</u> ute

S&ME,	, Inc. Raleigh,	3201 Spring Fore	st Road, Ral	eigh, North C	arolina 2761	6	
S&ME Project #: 62.	35-16-010			Repor	rt Date:	12/27	
Project Name: C.I	F. Harvey Park	way Extension R-5		Test I	Date(s):	12/24 - 12	2/27/16
State Project #: 46.	375.1.1	F.A. Project No:	N/A	TIP	NO: R-	5703	
Client Name: Mi	chael Baker E	ngineering					
Address: Ra	leigh, NC						
Boring #: EB	2-A LT LN	Sample #:	ST-4		Sample Date	: 9/7/	16
Location: 16	7+45	Offset:	46 LT		Depth (ft)	: 17.0 -	19.0 ft
Sample Description:			Gray Coarse	to Fine Sandy	y Clayey SIL	Г А-4	(0)
1.5" 1"3/4"	' 1/2'3/8" #4	#10 #20 #	\$40 #60 #100	#200 #270			
	• • • • • • • • • • • • • • • • • • •		+ + + +			1 1 1]
90%							
80%		 					
70%							
			\				
60%							
te 50%							
40%							
30%							
20%							
20%							
10%							
0%							
100	10	1).1	0.01		0.0
		Particle Si	ze (mm)				
As Defi	ined by NCDOT		Fine	e Sand	< 0.25 m	m and > 0.0	5 mm
Gravel		and $> 2.00 \text{ mm}$	<u>s</u>	Silt		and > 0.005	
Coarse Sand		m and >0.25 mm		Clay	-	0.005 mm	
Maximum Particle Size	3/8"	Coarse S		23%	Silt		18%
Gravel	2%	Fine San	nd	38%	Clay		19%
Apparent Relative Density	y ND	Moisture	e Content	19%	% Passing	#200	40.3%
Liquid Limit	27	Plastic L	.imit	21	Plastic Inde	x	6
		Soil Mortar	(-#10 Sieve)				
Coarse Sand	23%	Fine Sand	39%	Silt	19%	Clay	19%
Description of Sand & Gra	avel Particles:	Rounded			Angula		X
Hard & Durable	X	Soft		Weat	hered & Friabl	e	
References / Comments / Devia	tions: ND	=Not Determined.					
<u>Mal Krajan, ET</u>		<u>104-01-0703</u>		Laboratory M	anager		7/2016
Technician Name		Certification No.		Position		Ľ	Date
		Mar	>	Laboratory M	onogor	0/24	5/2016
<u>Mal Krajan, ET</u> Technical Responsibilit		Signature		Laboratory Ma Position	allager	-	Date

3201 Spring Forest Road Raleigh, NC 27616

B-1 SS-20 (3.5 - 5 ft) Classification.xls

S&ME, Inc.

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

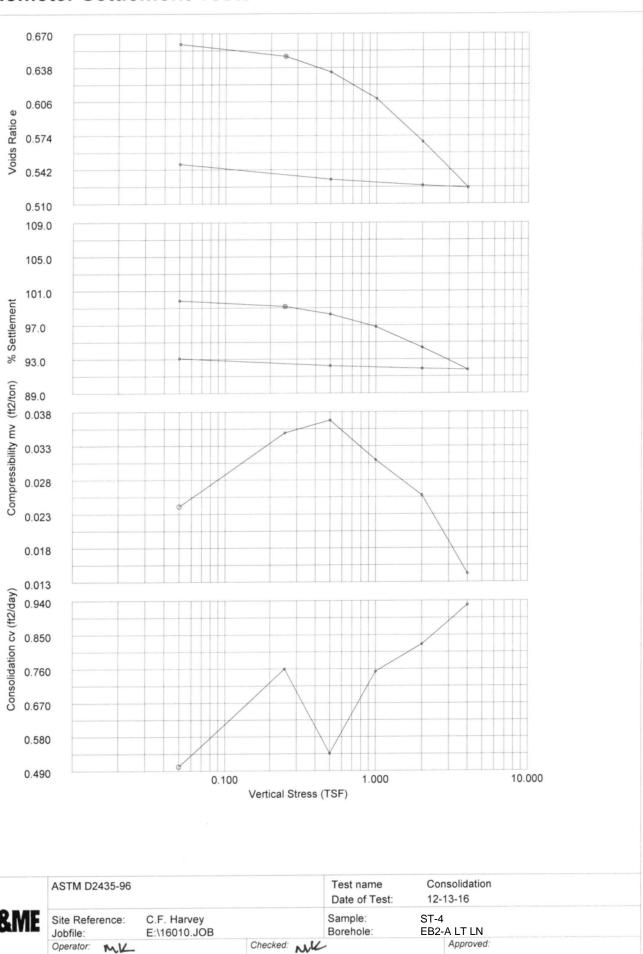
Quality Assurance

3201 Spring Forest Road Raleigh, NC 27616

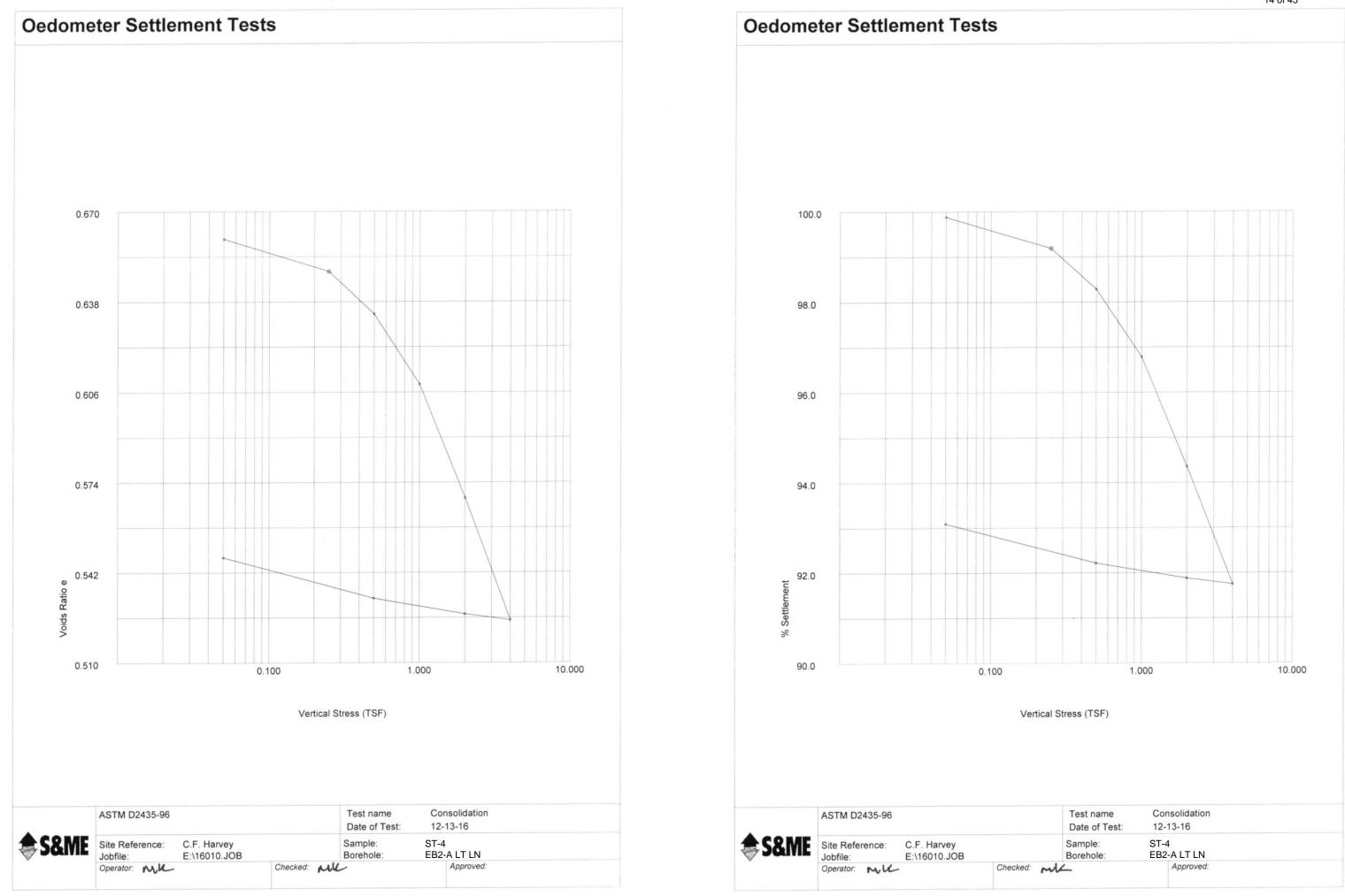
EB2-A Lt Ln ST-4 (17.0 - 19.0 ft) Classification.xls

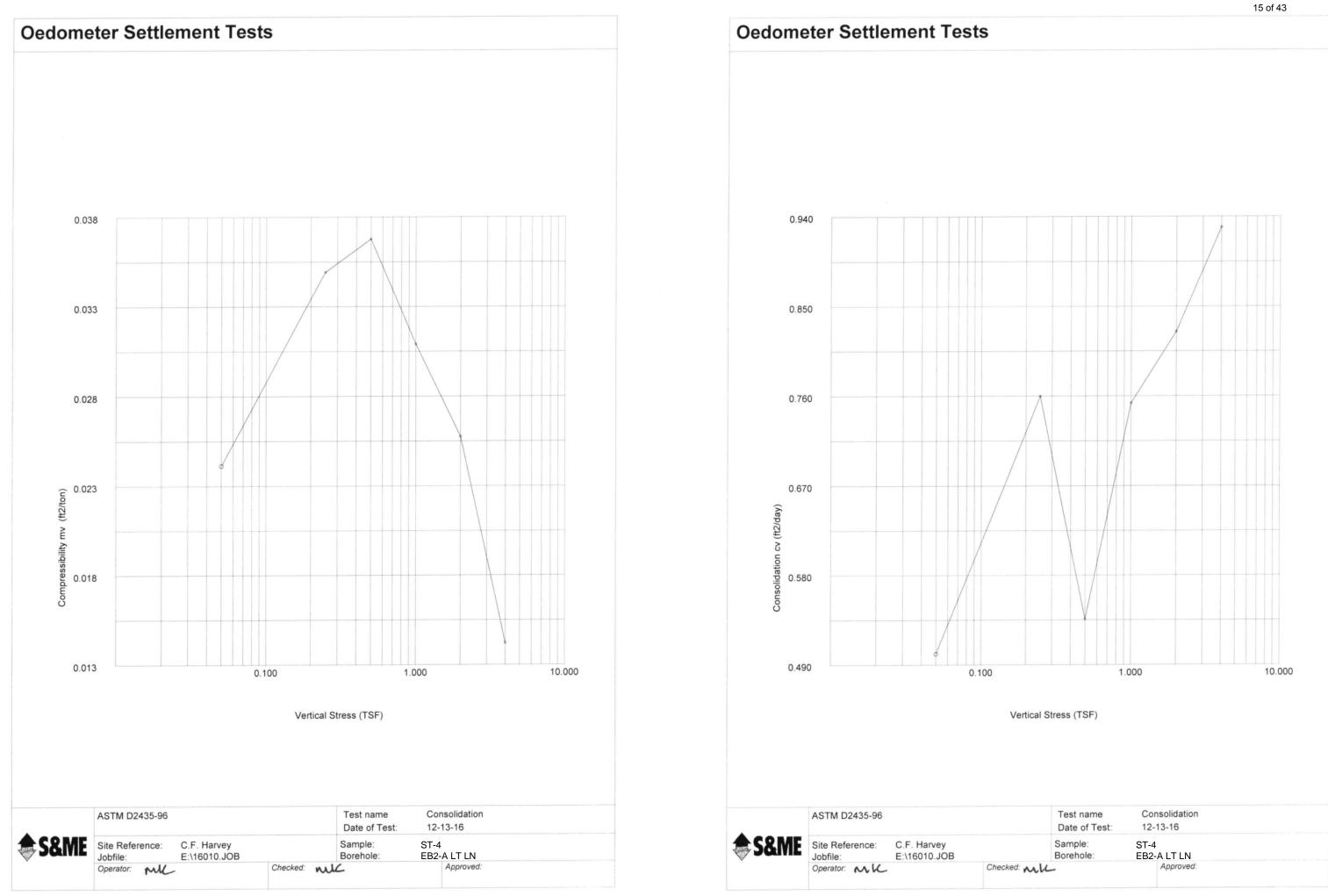
Sample details Sketch showing specime location in original Samp			17 - 19 ft. Gray Coarse to Fine	Sandy Clayey	SILT (A-4) (0))	
	Diame Weigh Bulk D	t H_0 (in) eter D_0 (in) t W_0 (gr) Density ρ (PCF) le Density ρ_S	Undisturbed 0.996 2.501 153.13 119.22 2.658 (assumed)				
Initial Conditions							
Settlement Channel Moisture Content w_0 % Dry Density ρ_d (PCF) /oids Ratio e_0 Deg of Saturation S $_0$ % Swelling Pressure Ss (TS	SF)	1066 19.5 99.78 0.6622 78.2 0.000					
Final Conditions							
Moisture Content w _f % Dry Density _{Pd} (PCF) Voids Ratio e _f Deg of Saturation S _f %		23.5 107.19 0.5474 100.00 0.069					
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c		107.19 0.5474 100.00 0.069 0.149		iddle portion of			
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c		107.19 0.5474 100.00 0.069 0.149	n taken from the mi	iddle portion of	UD tube.		
Moisture Content w _f % Dry Density ρ_d (PCF) /oids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c		107.19 0.5474 100.00 0.069 0.149	n taken from the mi	ddle portion of	UD tube.		
Moisture Content w _f % Dry Density ρ_d (PCF) Voids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c		107.19 0.5474 100.00 0.069 0.149	n taken from the mi	ddle portion of	UD tube.		
Moisture Content w _f % Dry Density _{Pd} (PCF) Voids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c Notes:		107.19 0.5474 100.00 0.069 0.149					
Final Conditions Moisture Content w _f % Dry Density ρ _d (PCF) Voids Ratio e _f Deg of Saturation S _f % Settlement: (in) Compression Index C _c Notes: ASTM D2 SS&NE	435-96	107.19 0.5474 100.00 0.069 0.149	Т	ddle portion of est name Date of Test:	UD tube. Consolida 12-13-16	tion	

Set



	ASTM D2435-96		
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB	
	Operator: MK		(





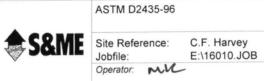
	Test name Date of Test:	Consolidation 12-13-16	
	Sample: Borehole:	ST-4 EB2-A LT LN	
checked:	nik	Approved:	

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	0.0012	0.0	21.6	0.6602	0.989	0.0001	0.501	0.024
0.250	21.6	0.0081	0.0	21.6	0.6487	0.647	0.0008	0.760	0.035
0.500	21.6	0.0171	0.0	21.6	0.6337	0.902	0.0009	0.536	0.037
1.000	21.6	0.0320	0.0	21.6	0.6088	0.627	0.0006	0.753	0.031
2.000	21.6	0.0562	0.0	21.6	0.5684	0.549	0.0011	0.825	0.026
4.000	21.6	0.0822	0.0	21.6	0.5250	0.462	0.0019	0.929	0.014
2.000	21.6	0.0809	0.0	21.6	0.5272				0.001
0.500	21.6	0.0775	0.0	21.6	0.5329				0.002
0.050	21.6	0.0688	0.0	21.6	0.5474				0.021

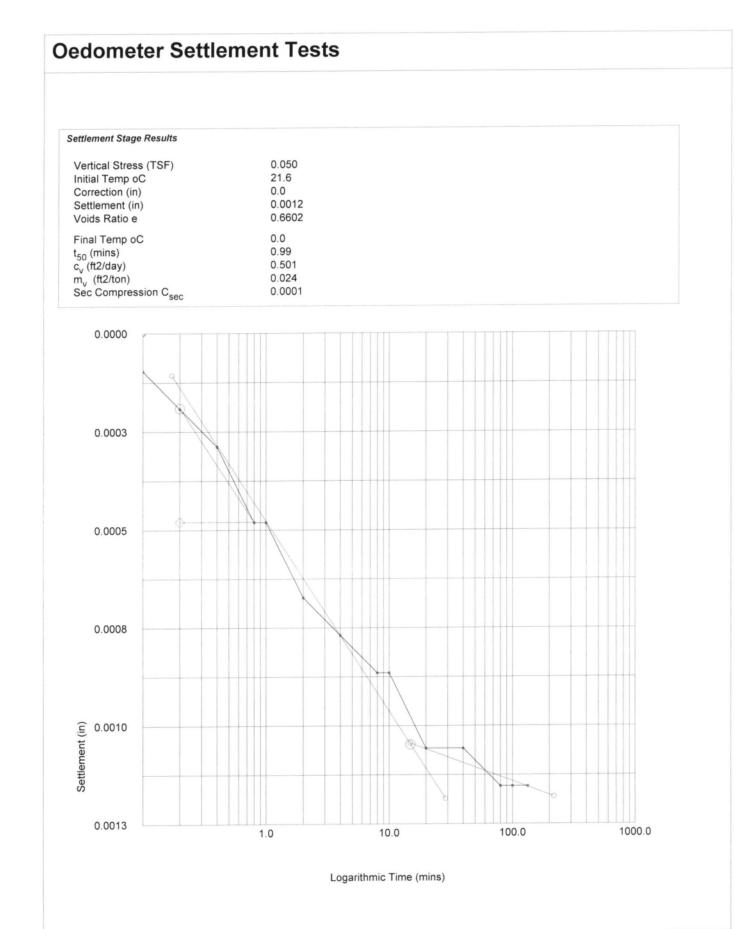
Oedometer Settlement Tests

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	1	0.0001	0.0001
5	0.067	1	0.0001	0.0001
6	0.083	1	0.0001	0.0001
7	0.100	1	0.0001	0.0001
8	0.200	2	0.0002	0.0002
9	0.400	3	0.0003	0.0003
10	0.800	5	0.0005	0.0005
11	1.000	5	0.0005	0.0005
12	2.000	7	0.0007	0.0007
13	4.000	8	0.0008	0.0008
14	8.000	9	0.0009	0.0009
15	10.000	9	0.0009	0.0009
16	20.000	11	0.0011	0.0011
17	40.000	11	0.0011	0.0011
18	80.000	12	0.0012	0.0012
19	100.000	12	0.0012	0.0012
20	133.330	12	0.0012	0.0012

🗢 S&ME	ASTM D2435-96			Test name Date of Test:	Consolidation 12-13-16	
	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-4 EB2-A LT LN	
	Operator: ML	-	Checked: M	12	Approved:	



Checked: M	le	Approved:	
	Sample: Borehole:	ST-4 EB2-A LT LN	
	Test name Date of Test:	Consolidation 12-13-16	Load: 0.050 (TSF)



Test name

Sample:

Checked: ML

Borehole:

Date of Test:

ASTM D2435-96

Jobfile:

Site Reference: C.F. Harvey

Operator: MC

E:\16010.JOB

Consolidation

Approved:

12-13-16

ST-4 EB2-A LT LN

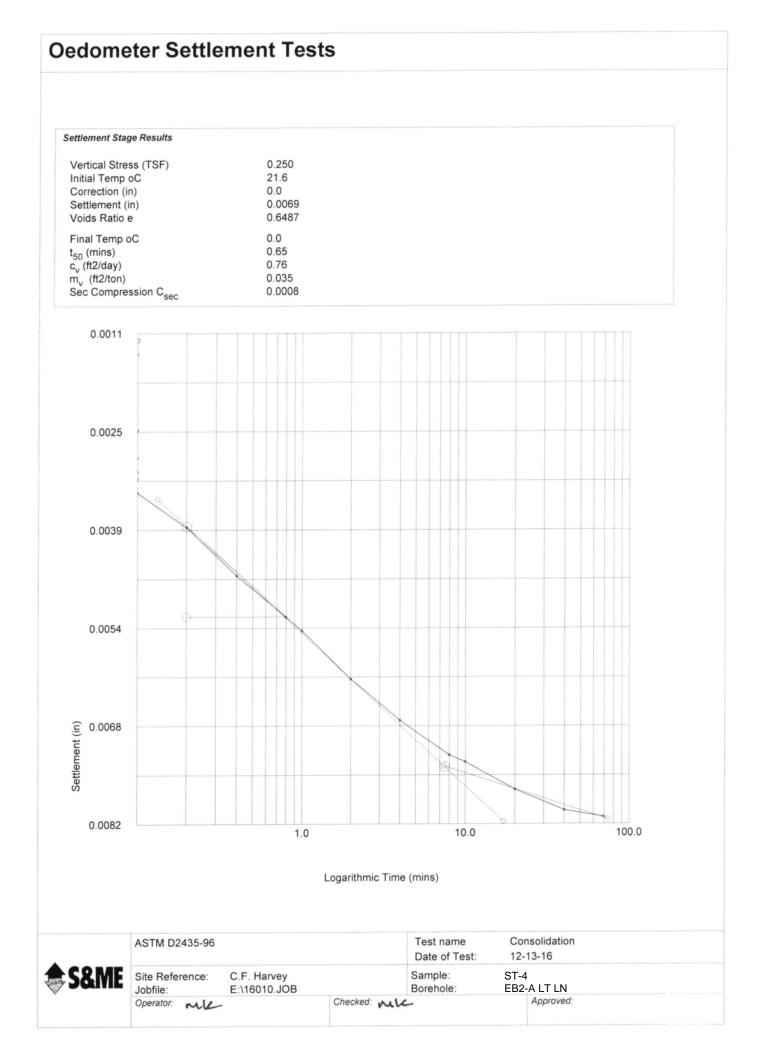
Oedometer Settlement Tests

No.	Time	Displacement	Displacement	Settlement
NO.	(mins)	(divs)	(in)	(in)
1	0.000	12	0.0012	0.0012
2	0.017	14	0.0014	0.0014
3	0.033	25	0.0025	0.0025
4	0.050	29	0.0029	0.0029
5	0.067	31	0.0031	0.0031
6	0.083	32	0.0032	0.0032
7	0.100	34	0.0034	0.0034
8	0.200	39	0.0039	0.0039
9	0.400	46	0.0046	0.0046
10	0.800	52	0.0052	0.0052
11	1.000	54	0.0054	0.0054
12	2.000	61	0.0061	0.0061
13	4.000	67	0.0067	0.0067
14	8.000	72	0.0072	0.0072
15	10.000	73	0.0073	0.0073
16	20.000	77	0.0077	0.0077
17	40.000	80	0.0080	0.0080
18	69.817	81	0.0081	0.0081

ASTM	D2435-96

Same Site Reference: C.F. Harvey Jobfile: Operator: ML

Checked: MLC		Approved:	
	Sample: Borehole:	ST-4 EB2-A LT LN	
	Test name Date of Test:	Consolidation 12-13-16	Load: 0.250 (TSF)



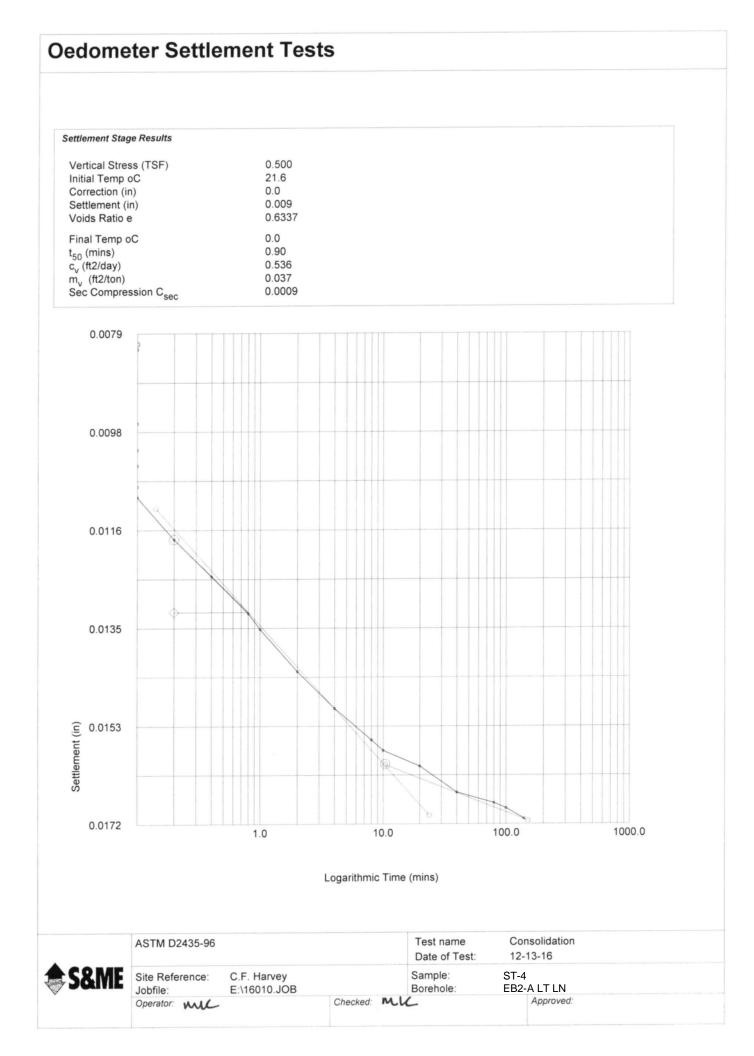
	_		Disalasant	Cattlement
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	81	0.0081	0.0081
2	0.017	82	0.0082	0.0082
3	0.033	96	0.0096	0.0096
4	0.050	101	0.0101	0.0101
5	0.067	104	0.0104	0.0104
6	0.083	108	0.0108	0.0108
7	0.100	110	0.0110	0.0110
8	0.200	118	0.0118	0.0118
9	0.400	125	0.0125	0.0125
10	0.800	132	0.0132	0.0132
11	1.000	135	0.0135	0.0135
12	2.000	143	0.0143	0.0143
13	4.000	150	0.0150	0.0150
14	8.000	156	0.0156	0.0156
15	10.000	158	0.0158	0.0158
16	20.000	161	0.0161	0.0161
17	40.000	166	0.0166	0.0166
18	80.000	168	0.0168	0.0168
19	100.000	169	0.0169	0.0169
20	139.583	171	0.0171	0.0171

ASTM D2435-96

S&ME Jobfile: Operator: ML

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

	Test name Date of Test:	Consolidation 12-13-16	Load: 0.500 (TSF)
	Sample: Borehole:	ST-4 EB2-A LT LN	
Checked: MLC		Approved:	

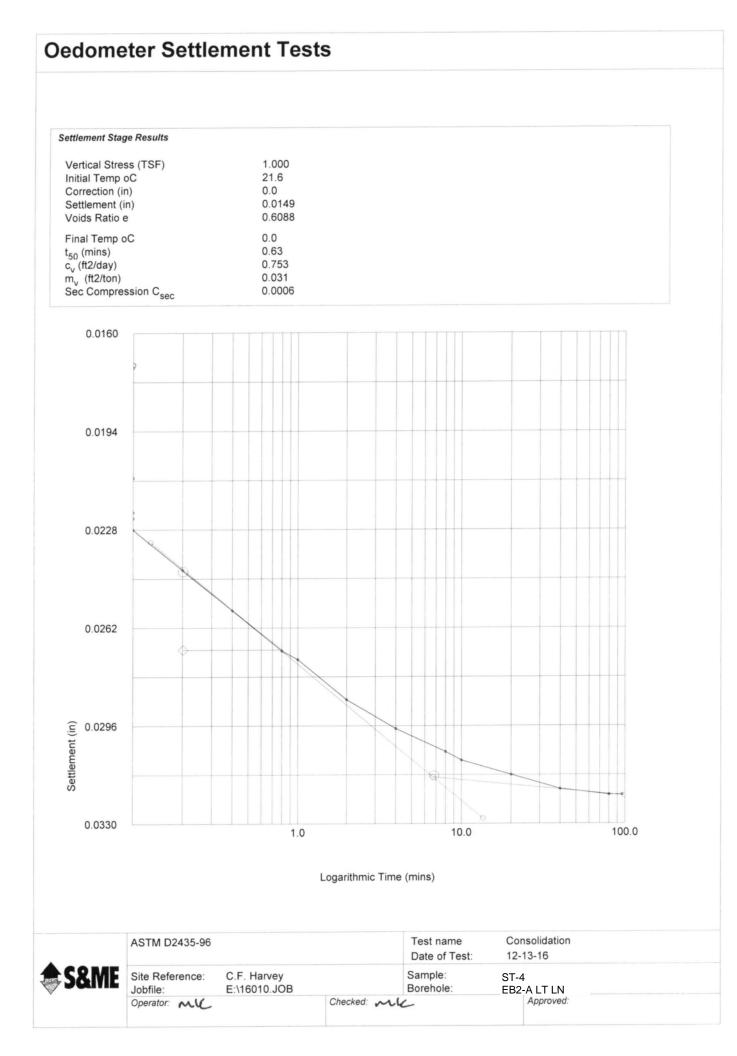


No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	171	0.0171	0.0171
2	0.017	172	0.0172	0.0172
3	0.033	172	0.0172	0.0172
4	0.050	210	0.0210	0.0210
5	0.067	222	0.0222	0.0222
6	0.083	224	0.0224	0.0224
7	0.100	228	0.0228	0.0228
8	0.200	242	0.0242	0.0242
9	0.400	256	0.0256	0.0256
10	0.800	270	0.0270	0.0270
11	1.000	273	0.0273	0.0273
12	2.000	287	0.0287	0.0287
13	4.000	297	0.0297	0.0297
14	8.000	305	0.0305	0.0305
15	10.000	308	0.0308	0.0308
16	20.000	313	0.0313	0.0313
17	40.000	318	0.0318	0.0318
18	80.000	320	0.0320	0.0320
19	96.330	320	0.0320	0.0320

ASTM D2435-96

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

	Test name Date of Test:	Consolidation 12-13-16	Load: 1.000 (TSF)
	Sample: Borehole:	ST-4 EB2-A LT LN	
Checked: MLC		Approved:	

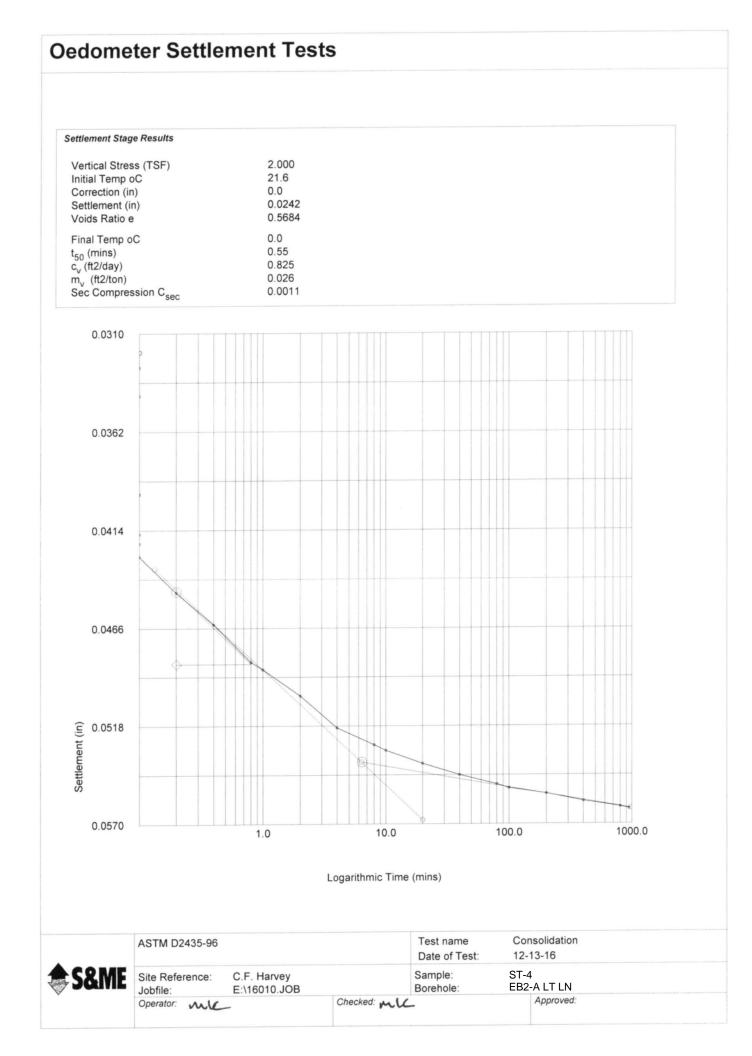


No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	320	0.0320	0.0320
2	0.017	328	0.0328	0.0328
3	0.033	343	0.0343	0.0343
4	0.050	395	0.0395	0.0395
5	0.067	416	0.0416	0.0416
6	0.083	421	0.0421	0.0421
7	0.100	428	0.0428	0.0428
8	0.200	447	0.0447	0.0447
9	0.400	464	0.0464	0.0464
10	0.800	484	0.0484	0.0484
11	1.000	488	0.0488	0.0488
12	2.000	502	0.0502	0.0502
13	4.000	519	0.0519	0.0519
14	8.000	528	0.0528	0.0528
15	10.000	531	0.0531	0.0531
16	20.000	538	0.0538	0.0538
17	40.000	544	0.0544	0.0544
18	80.000	549	0.0549	0.0549
19	100.000	551	0.0551	0.0551
20	200.000	554	0.0554	0.0554
21	400.000	558	0.0558	0.0558
22	800.000	561	0.0561	0.0561
23	950.200	562	0.0562	0.0562

ASTM D2435-96

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

	Test name Date of Test:	Consolidation 12-13-16	Load: 2.000 (TSF)
	Sample: Borehole:	ST-4 EB2-A LT LN	
Checked: MLC		Approved:	



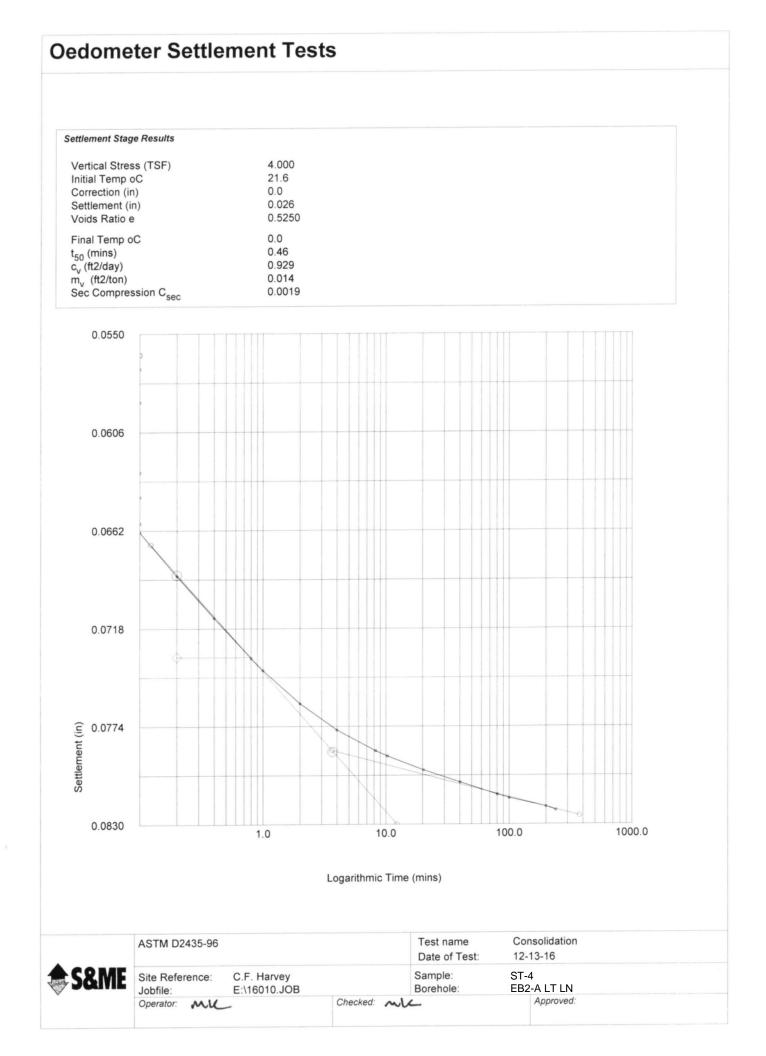
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	562	0.0562	0.0562
2	0.017	570	0.0570	0.0570
3	0.033	589	0.0589	0.0589
4	0.050	629	0.0629	0.0629
5	0.067	643	0.0643	0.0643
6	0.083	658	0.0658	0.0658
7	0.100	663	0.0663	0.0663
8	0.200	688	0.0688	0.0688
9	0.400	712	0.0712	0.0712
10	0.800	735	0.0735	0.0735
11	1.000	742	0.0742	0.0742
12	2.000	761	0.0761	0.0761
13	4.000	776	0.0776	0.0776
14	8.267	788	0.0788	0.0788
15	10.267	791	0.0791	0.0791
16	20.267	799	0.0799	0.0799
17	40.267	806	0.0806	0.0806
18	80.267	813	0.0813	0.0813
19	100.267	815	0.0815	0.0815
20	200.267	820	0.0820	0.0820
21	240.767	822	0.0822	0.0822

ASTM D2435-96

S&ME Jobfile: Operator: MK

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

Checked: MLC		Approved:	
	Sample: Borehole:	ST-4 EB2-A LT LN	
	Test name Date of Test:	Consolidation Load: 4.000 (TSF) 12-13-16	



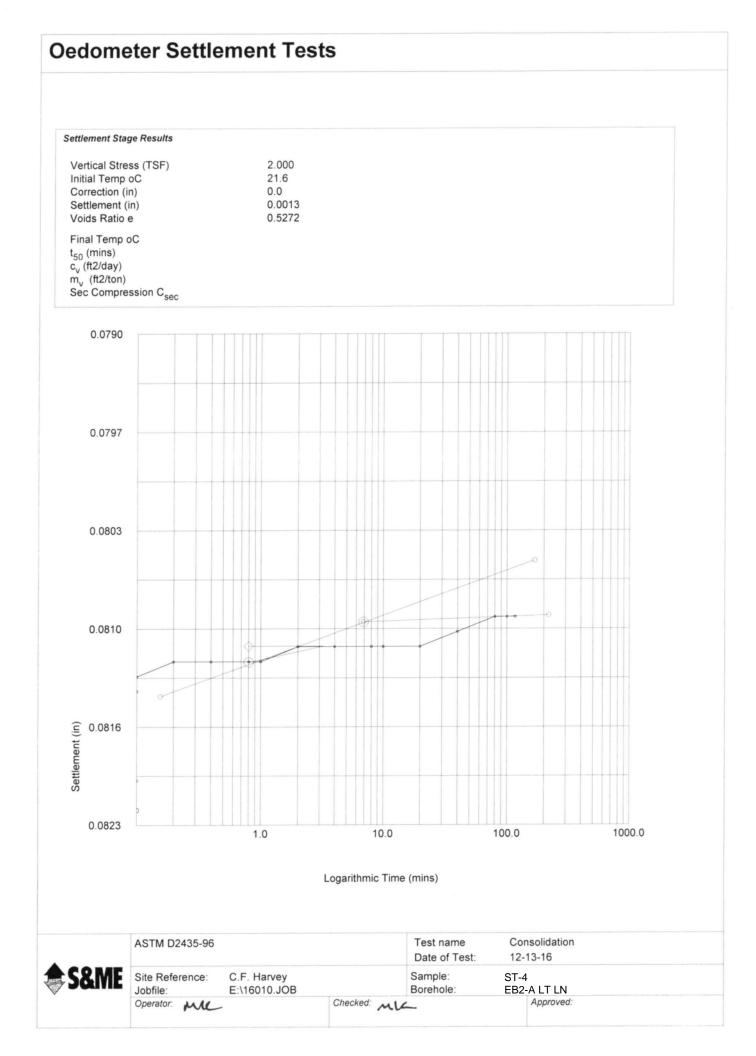
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	822	0.0822	0.0822
2	0.017	820	0.0820	0.0820
3	0.033	814	0.0814	0.0814
4	0.050	813	0.0813	0.0813
5	0.067	813	0.0813	0.0813
6	0.083	813	0.0813	0.0813
7	0.100	813	0.0813	0.0813
8	0.200	812	0.0812	0.0812
9	0.400	812	0.0812	0.0812
10	0.800	812	0.0812	0.0812
11	1.000	812	0.0812	0.0812
12	2.000	811	0.0811	0.0811
13	4.000	811	0.0811	0.0811
14	8.000	811	0.0811	0.0811
15	10.000	811	0.0811	0.0811
16	20.000	811	0.0811	0.0811
17	40.000	810	0.0810	0.0810
18	80.000	809	0.0809	0.0809
19	100.000	809	0.0809	0.0809
20	117.150	809	0.0809	0.0809

ASTM D2435-96

Same Site Reference: Jobfile: Operator:

C.F. Harvey E:\16010.JOB 22 of 43

Checked: MK		Approved	
	Sample: Borehole:	ST-4 EB2-A LT LN	
	Test name Date of Test:	Consolidation 12-13-16	n Load: 2.000 (TSF)



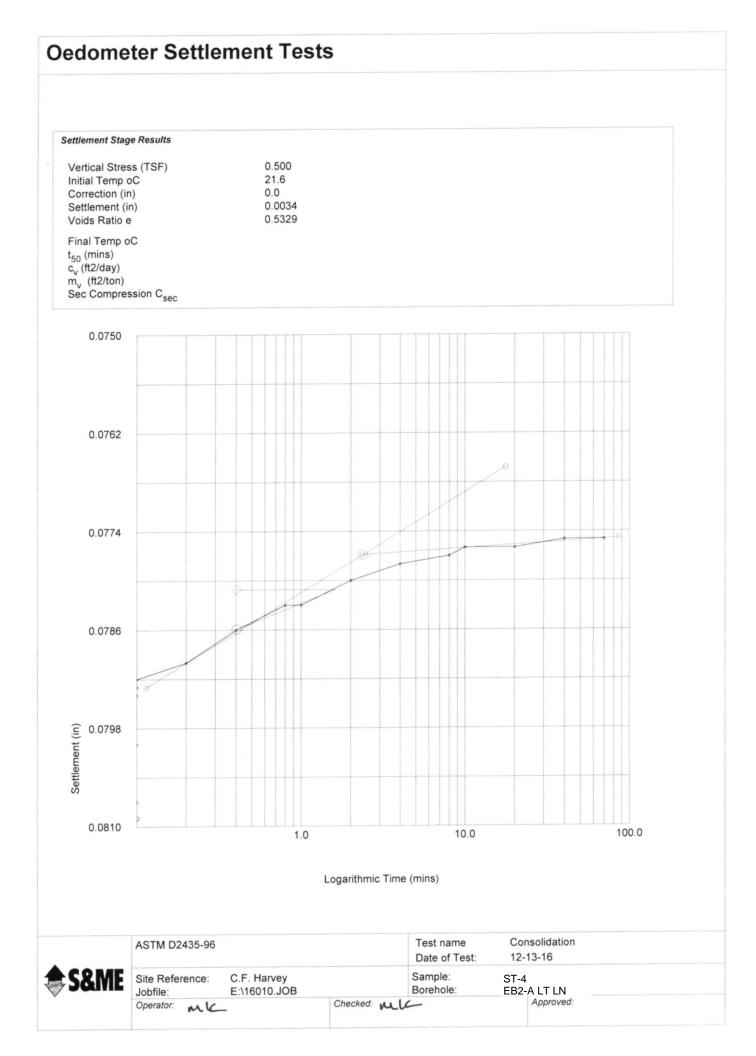
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	809	0.0809	0.0809
2	0.017	807	0.0807	0.0807
3	0.033	800	0.0800	0.0800
4	0.050	794	0.0794	0.0794
5	0.067	793	0.0793	0.0793
6	0.083	792	0.0792	0.0792
7	0.100	792	0.0792	0.0792
8	0.200	790	0.0790	0.0790
9	0.400	786	0.0786	0.0786
10	0.800	783	0.0783	0.0783
11	1.000	783	0.0783	0.0783
12	2.000	780	0.0780	0.0780
13	4.000	778	0.0778	0.0778
14	8.000	777	0.0777	0.0777
15	10.000	776	0.0776	0.0776
16	20.000	776	0.0776	0.0776
17	40.000	775	0.0775	0.0775
18	69.850	775	0.0775	0.0775

ASTM D2435-96

S&ME Jobfile: Operator: MLC

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

	Test name Date of Test:	Consolidation 12-13-16	Load: 0.500 (TSF)
	Sample: Borehole:	ST-4 EB2-A LT LN	
Checked:	nic	Approved:	

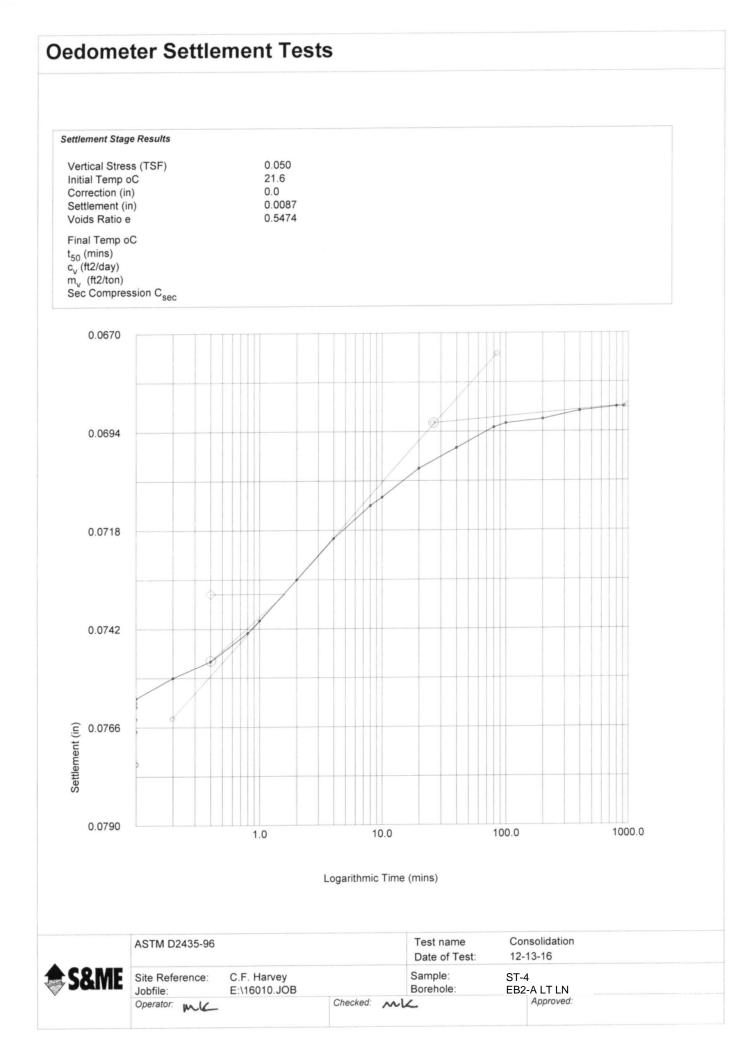


No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	775	0.0775	0.0775
2	0.017	767	0.0767	0.0767
3	0.033	764	0.0764	0.0764
4	0.050	761	0.0761	0.0761
5	0.067	760	0.0760	0.0760
6	0.083	760	0.0760	0.0760
7	0.100	759	0.0759	0.0759
8	0.200	754	0.0754	0.0754
9	0.400	750	0.0750	0.0750
10	0.800	743	0.0743	0.0743
11	1.000	740	0.0740	0.0740
12	2.000	730	0.0730	0.0730
13	4.000	720	0.0720	0.0720
14	8.000	712	0.0712	0.0712
15	10.000	710	0.0710	0.0710
16	20.000	703	0.0703	0.0703
17	40.000	698	0.0698	0.0698
18	80.000	693	0.0693	0.0693
19	100.000	692	0.0692	0.0692
20	200.000	691	0.0691	0.0691
21	400.000	689	0.0689	0.0689
22	800.000	688	0.0688	0.0688
23	925.633	688	0.0688	0.0688

ASTM D2435-96

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

	Test name Date of Test:	Consolidation 12-13-16	Load: 0.050 (TSF)
	Sample: Borehole:	ST-4 EB2-A LT LN	
hecked:	ule	Approved:	



Form No. TR-T88

Revision Date: 12/20/09

Revision No. 0

a c		2201 0 • E				uality Assur	rance
S&ME Project #:	6235-16-010	a, 3201 Spring For	est Koad, Ka	0.	rt Date:	12/27	/16
Project Name:		kway Extension R-	5703	-	Date(s):	12/24 - 12	
State Project #:	46375.1.1	F.A. Project No:			. ,	-5703	2/2//10
Client Name:	Michael Baker H	Ų	11/71		110. 1	5705	
Address:	Raleigh, NC	mgmoormg		_			
Boring #:	EB1-B RT LN	Sample #:	ST-3		Sample Da	te: 9/1	/16
Location:	165+89	Offset:	35 RT		Depth (f		20.0 ft.
Sample Description:				se to Fine Sand	▲ ·		(2)
	1"3/4" 1/2'3/8" #4	#10 #20	#40 #60 #100	#200 #270	· ·		
1.5	1"3/4" 1/2'3/8" #4	#10 #20	#40 #60 #100	#200 #270			
90%							
80%							
70%							
60%							
ä 50%				X			
erce							
[₽] 40%							
30%							
20%							
10%							
0%	10	1	+	0.1	0.01		0.0
		Particle S					
A	As Defined by NCDOT	1	Fin	e Sand	< 0.25	mm and > 0.0)5 mm
Gravel		m and > 2.00 mm		Silt	-	5 and > 0.005	mm
Coarse Sand		nm and >0.25 mm		Clay 2004		< 0.005 mm	110/
Aaximum Particle S		Coarse		20%	Silt		11%
Gravel	0%	Fine San		41%	Clay	112 00	28%
Apparent Relative D	•		e Content	22%	% Passing		43.1%
Liquid Limit	25	Plastic I	_1mit (-#10 Sieve)	13	Plastic Ind	ex	12
Coarse Sand	20%	Fine Sand	41%	Silt	11%	Clay	28%
Description of Sand		Rounded		biit	Angu	-	X
Hard & Durab		Soft		Weat	thered & Frial		
References / Comments /		Not Determined.					_
		104.01.0702			r	10/0	7/2016
<u>Mal Kraja</u> Technician I		<u>104-01-0703</u> Certification No.		Laboratory M Position	anager		7/2016
recnnicián I	vuille	Certification No.		rosition		L	Date
	ГЛ	N	>	Laboratory M	anager	9/26	5/2016
Mal Kraia	n, El			Laborator			
<u>Mal Kraja</u> Technical Respo		Signature		Position	unuger		Date

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

Quality Assur	rance
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3201 Spring Forest Road Raleigh, NC 27616

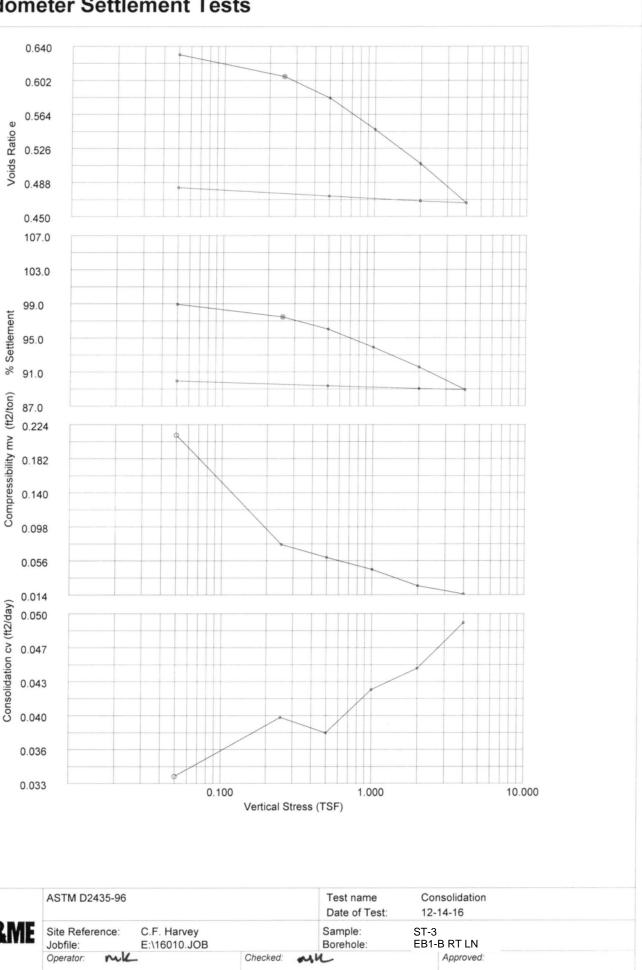
EB1-B Rt Ln ST-3 (18.0 - 20.0 ft) Classification.xls

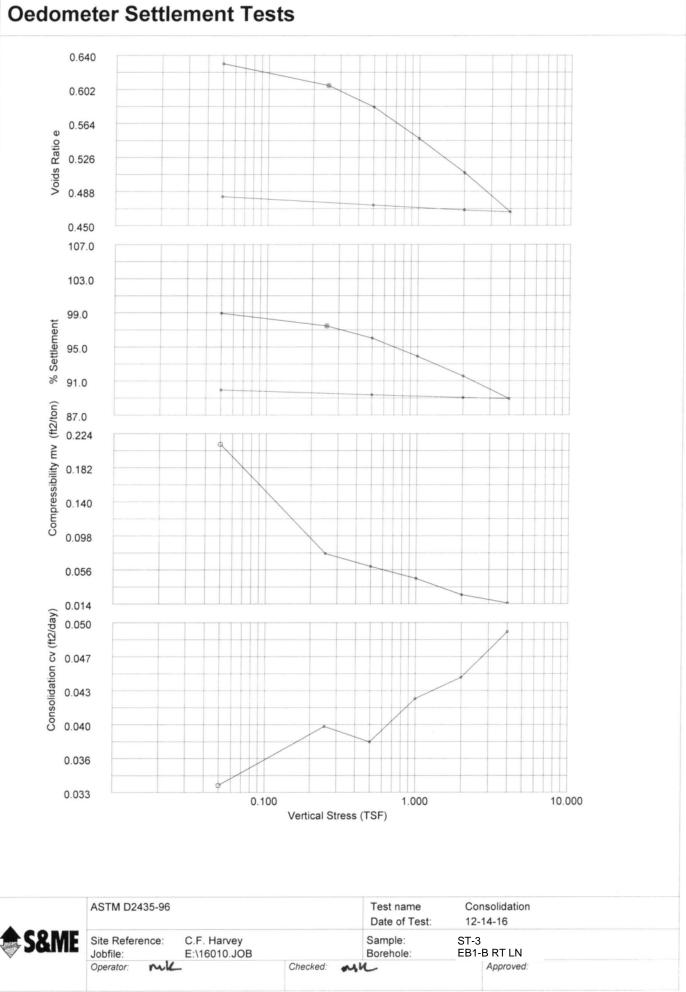
Sample details			
Sketch showing specimen location in original Sample	Depth 18.0 - 20. Description: Gray Coa	0 ft. rse to Fine Sandy Silty C	LAY (A-6) (2)
	$\begin{array}{llllllllllllllllllllllllllllllllllll$	1 9	
nitial Conditions			
Settlement Channel Moisture Content $w_0^{\%}$ Dry Density ρ_d (PCF) /oids Ratio e_0 Deg of Saturation S $_0^{\%}$ Swelling Pressure Ss (TSF)	1942 23.8 100.84 0.6478 98.0 0.000		
loisture Content w _f % Dry Density p _d (PCF) oids Ratio e _f beg of Saturation S _f %	19.5 112.10 0.4824 100.00		
Moisture Content $w_f\%$ Dry Density ρ_d (PCF) Voids Ratio e_f Deg of Saturation $S_f\%$ Settlement: (in)	112.10 0.4824 100.00 0.10		
Final Conditions Moisture Content w_f % Dry Density ρ_d (PCF) /oids Ratio e_f Deg of Saturation S_f % Settlement: (in) Compression Index C_c Notes:	112.10 0.4824 100.00 0.10 0.162	om the middle portion of	UD tube.
Moisture Content $w_f\%$ Dry Density ρ_d (PCF) Yoids Ratio e_f Deg of Saturation $S_f\%$ tettlement: (in) compression Index C_c	112.10 0.4824 100.00 0.10 0.162	om the middle portion of	UD tube.
Moisture Content $w_f\%$ Dry Density ρ_d (PCF) Yoids Ratio e_f Deg of Saturation $S_f\%$ tettlement: (in) compression Index C_c	112.10 0.4824 100.00 0.10 0.162 Test specimen taken fr	rom the middle portion of Test name Date of Test:	UD tube.

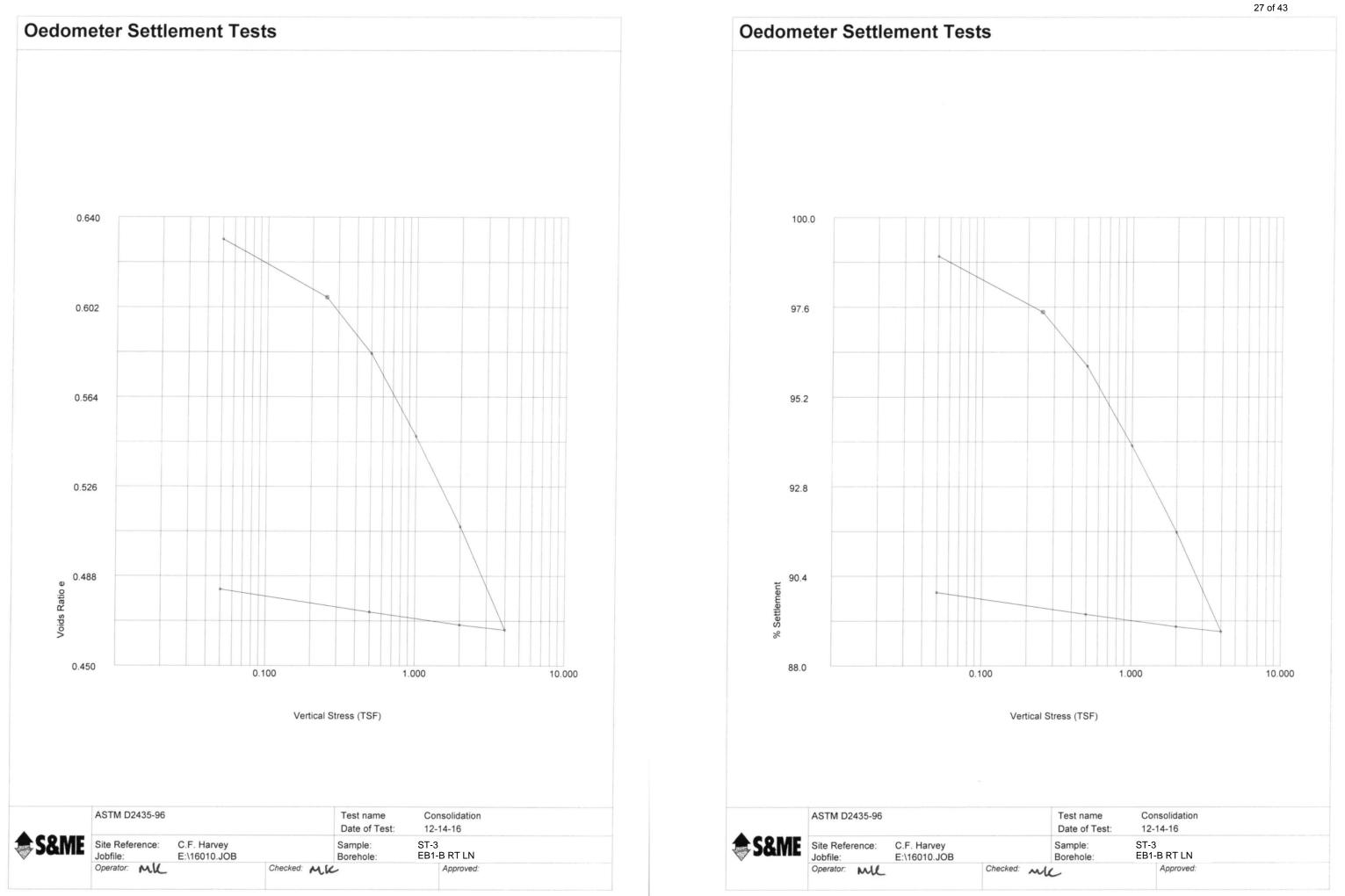
Checked: ML

Approved:

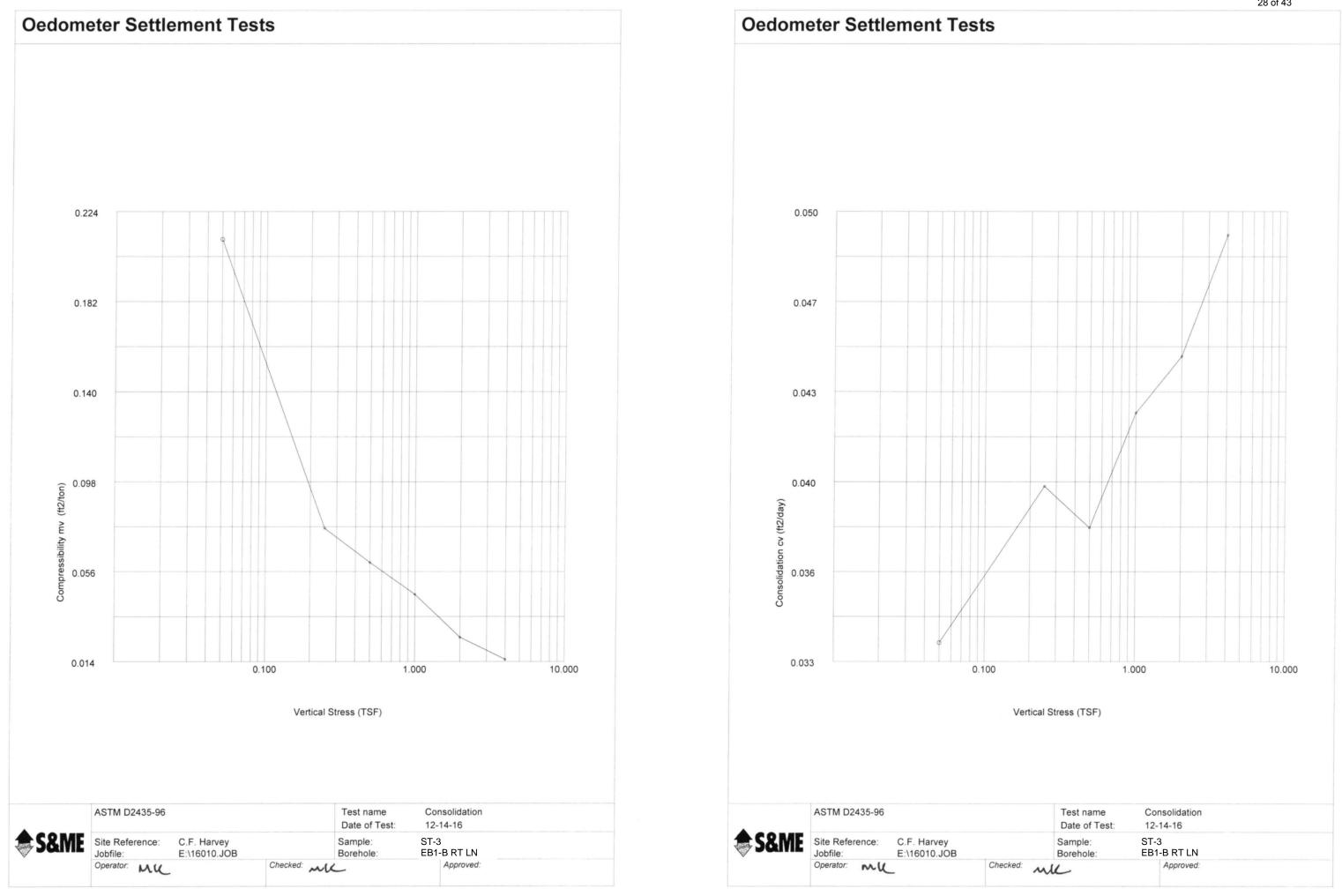
Operator: MK







	Test name Date of Test:	Consolidation 12-14-16	
	Sample: Borehole:	ST-3 EB1-B RT LN	
hecked: 🔨	nic	Approved:	



	Test name Date of Test:	Consolidation 12-14-16	
	Sample: Borehole:	ST-3 EB1-B RT LN	
hecked:	ne	Approved:	

	ress SF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e _f	t ₅₀ (mins)		c _v (ft2/day)	m _v (ft2/ton)
0.0	050	21.6	0.0104	0.0	21.6	0.6306	14.559	0.0005	0.034	0.211
0.2	250	21.6	0.0252	0.0	21.6	0.6061	12.073	0.0074	0.040	0.076
0.5	500	21.6	0.0396	0.0	21.6	0.5823	12.195	0.0023	0.038	0.060
1.0	000	21.6	0.0608	0.0	21.6	0.5472	10.547	0.0107	0.042	0.045
2.0	000	21.6	0.0839	0.0	21.6	0.5090	9.578	0.0022	0.045	0.025
4.0	000	21.6	0.1104	0.0	21.6	0.4652	8.227	0.0027	0.049	0.015
2.0	000	21.6	0.1091	0.0	21.6	0.4673				0.001
0.5	500	21.6	0.1058	0.0	21.6	0.4728				0.002
0.0	050	21.6	0.1000	0.0	21.6	0.4824				0.014

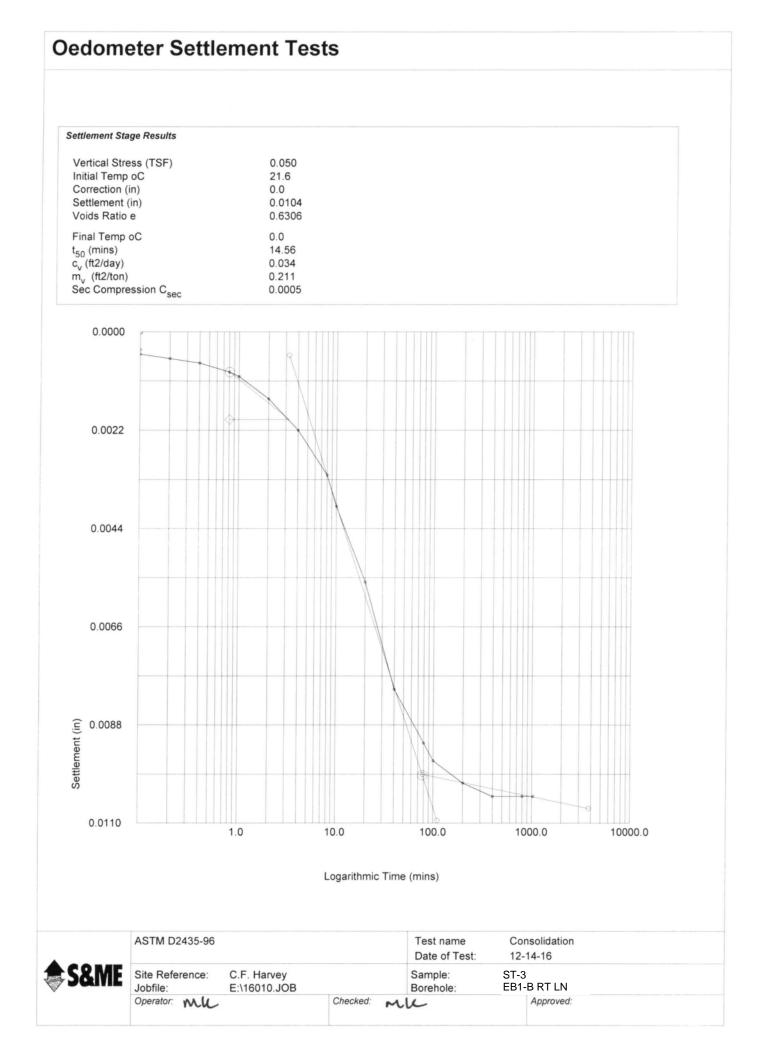
Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	4	0.0004	0.0004
3	0.033	4	0.0004	0.0004
4	0.050	5	0.0005	0.0005
5	0.067	5	0.0005	0.0005
6	0.083	5	0.0005	0.0005
7	0.100	5	0.0005	0.0005
8	0.200	6	0.0006	0.0006
9	0.400	7	0.0007	0.0007
10	0.800	9	0.0009	0.0009
11	1.000	10	0.0010	0.0010
12	2.000	15	0.0015	0.0015
13	4.000	22	0.0022	0.0022
14	8.000	32	0.0032	0.0032
15	10.000	39	0.0039	0.0039
16	20.000	56	0.0056	0.0056
17	40.000	80	0.0080	0.0080
18	80.000	92	0.0092	0.0092
19	100.000	96	0.0096	0.0096
20	200.000	101	0.0101	0.0101
21	400.000	104	0.0104	0.0104
22	800.000	104	0.0104	0.0104
23	1028.783	104	0.0104	0.0104

	ASTM D2435-96			Test name Date of Test:	Consolidation 12-14-16	
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-3 EB1-B RT LN	
	Operator: MU	L	Checked: M	K	Approved:	



Checked: mlc		Approved:	
	Sample: Borehole:	ST-3 EB1-B RT LN	
	Date of Test:	12-14-16	
	Test name	Consolidation	Load: 0.050 (TSF)



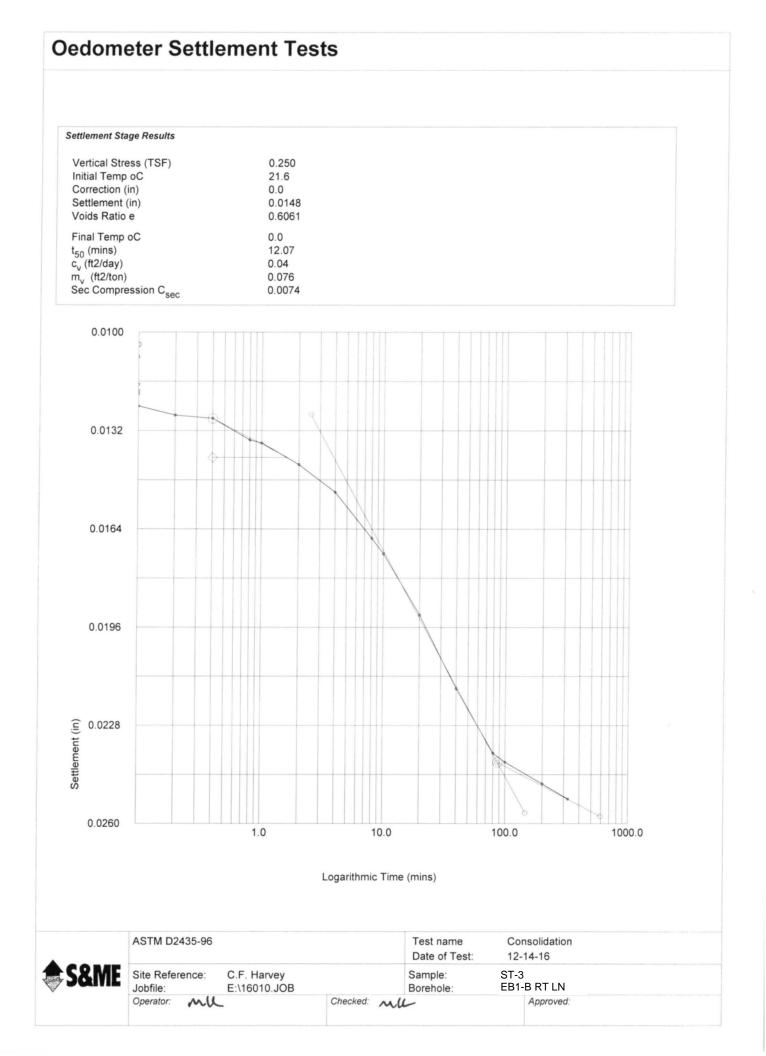
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	104	0.0104	0.0104
2	0.017	108	0.0108	0.0108
3	0.033	117	0.0117	0.0117
4	0.050	119	0.0119	0.0119
5	0.067	120	0.0120	0.0120
6	0.083	120	0.0120	0.0120
7	0.100	124	0.0124	0.0124
8	0.200	127	0.0127	0.0127
9	0.400	128	0.0128	0.0128
10	0.800	135	0.0135	0.0135
11	1.000	136	0.0136	0.0136
12	2.000	143	0.0143	0.0143
13	4.000	152	0.0152	0.0152
14	8.000	167	0.0167	0.0167
15	10.000	172	0.0172	0.0172
16	20.000	192	0.0192	0.0192
17	40.000	216	0.0216	0.0216
18	80.000	237	0.0237	0.0237
19	100.000	240	0.0240	0.0240
20	200.000	247	0.0247	0.0247
21	324.600	252	0.0252	0.0252

ASTM D2435-96

S&ME Site Reference: C.F. Harvey Jobfile: E:\16010.JOB Operator: ML

30 of 43

Checked: MLC		Approved:	
	Sample: Borehole:	ST-3 EB1-B RT LN	
	Test name Date of Test:	Consolidation 12-14-16	Load: 0.250 (TSF)



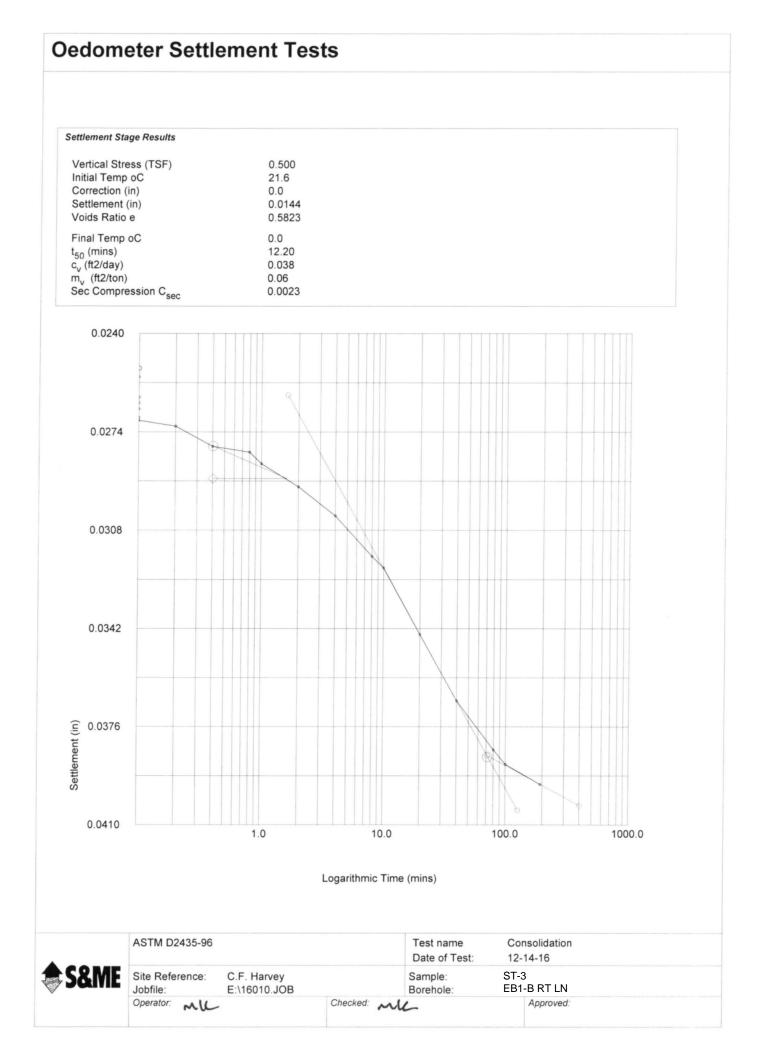
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	252	0.0252	0.0252
2	0.017	255	0.0255	0.0255
3	0.033	262	0.0262	0.0262
4	0.050	264	0.0264	0.0264
5	0.067	266	0.0266	0.0266
6	0.083	269	0.0269	0.0269
7	0.100	270	0.0270	0.0270
8	0.200	272	0.0272	0.0272
9	0.400	279	0.0279	0.0279
10	0.800	281	0.0281	0.0281
11	1.000	285	0.0285	0.0285
12	2.000	293	0.0293	0.0293
13	4.000	303	0.0303	0.0303
14	8.000	317	0.0317	0.0317
15	10.000	321	0.0321	0.0321
16	20.000	344	0.0344	0.0344
17	40.000	367	0.0367	0.0367
18	80.000	384	0.0384	0.0384
19	100.000	389	0.0389	0.0389
20	193.133	396	0.0396	0.0396

ASTM D2435-96

S&ME Site Reference: Jobfile:

C.F. Harvey E:\16010.JOB Operator: MU

	Test name Date of Test:	Consolidation 12-14-16	Load: 0.500 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
Checked: ML		Approved:	



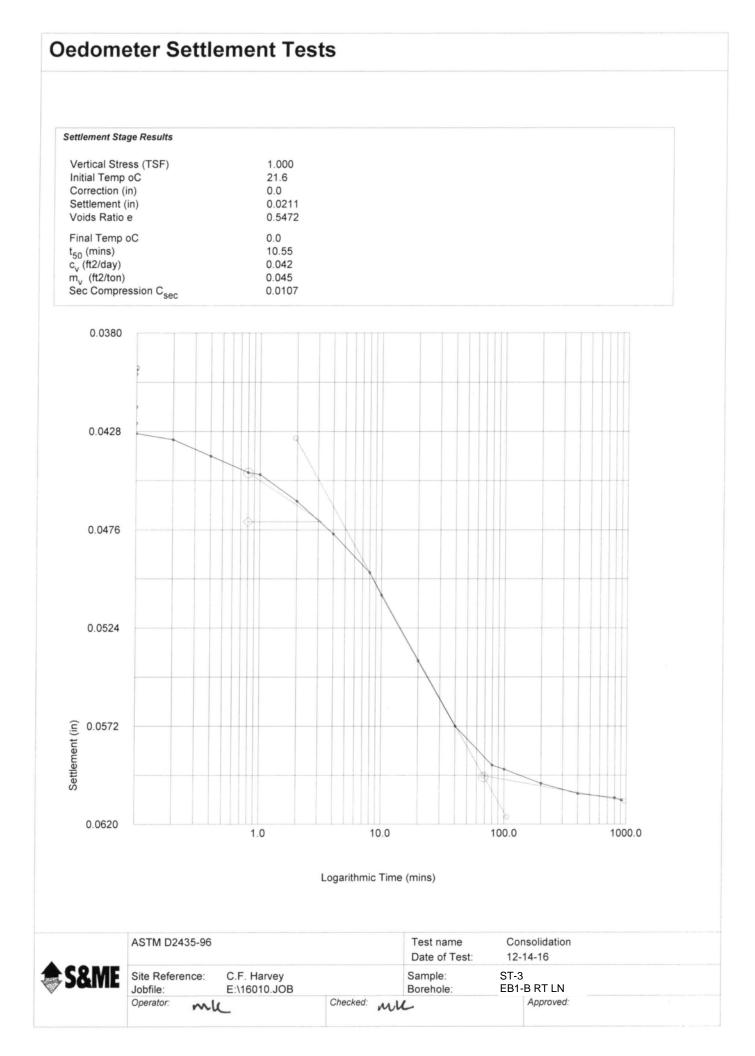
Oedometer Settlement Tests						
	No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)	
	1	0.000	397	0.0397	0.0397	
1	2	0.017	398	0.0398	0.0398	
:	3	0.033	398	0.0398	0.0398	
	4	0.050	400	0.0400	0.0400	
1	5	0.067	416	0.0416	0.0416	
6	6	0.083	424	0.0424	0.0424	
7	7	0.100	429	0.0429	0.0429	
8	8	0.200	432	0.0432	0.0432	
9	Э	0.400	440	0.0440	0.0440	
1	10	0.800	448	0.0448	0.0448	
1	11	1.000	449	0.0449	0.0449	
1	12	2.000	462	0.0462	0.0462	
1	13	4.000	478	0.0478	0.0478	
1	14	8.000	497	0.0497	0.0497	
1	15	10.000	508	0.0508	0.0508	
1	16	20.000	540	0.0540	0.0540	
1	17	40.000	572	0.0572	0.0572	
1	8	80.000	591	0.0591	0.0591	
1	19	100.000	593	0.0593	0.0593	
2	20	200.000	600	0.0600	0.0600	
2	21	400.000	605	0.0605	0.0605	
2	22	800.000	607	0.0607	0.0607	
2	3	917.267	608	0.0608	0.0608	

/	0.100	429	0.04
8	0.200	432	0.043
9	0.400	440	0.044
10	0.800	448	0.044
11	1.000	449	0.044
12	2.000	462	0.046
13	4.000	478	0.047
14	8.000	497	0.049
15	10.000	508	0.050
16	20.000	540	0.054
17	40.000	572	0.057
18	80.000	591	0.059
19	100.000	593	0.059
20	200.000	600	0.060
21	400.000	605	0.060
22	800.000	607	0.060
23	017 267	609	0.060



S&ME Site Reference: C.F. Harvey Jobfile: E:\16010.JOB Operator: ML

	Test name Date of Test:	Consolidation 12-14-16	Load: 1.000 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
checked: MC		Approved:	



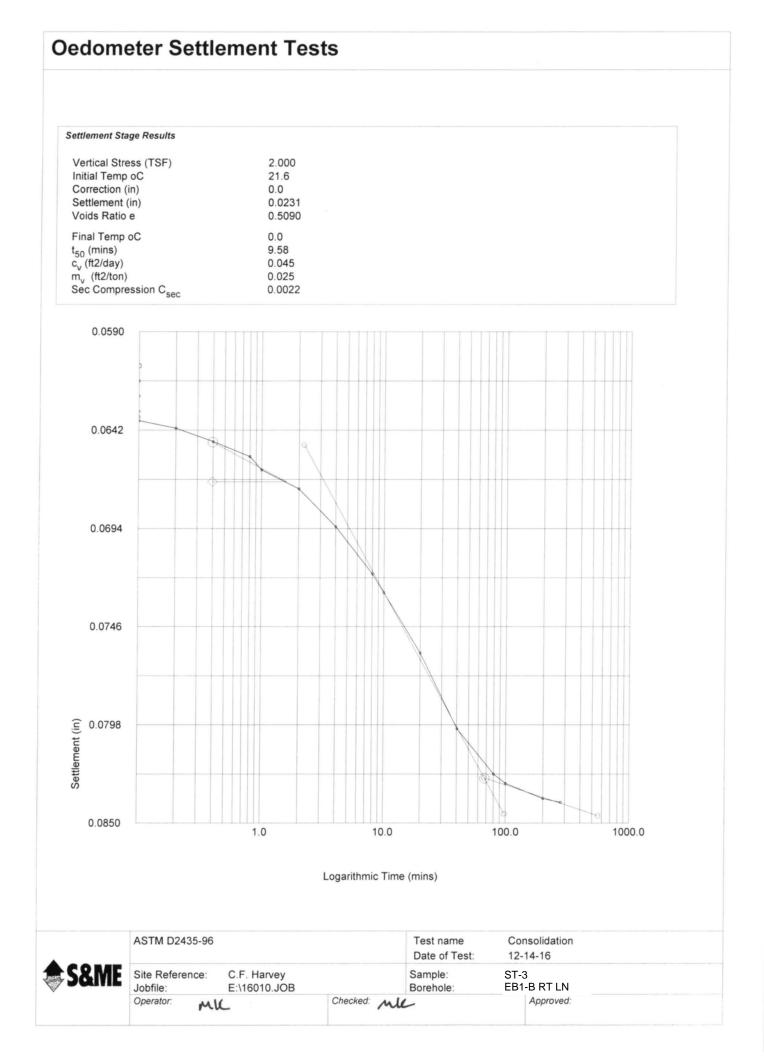
Oedometer Settlement Tests						
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)		
1	0.000	608	0.0608	0.0608		
2	0.017	616	0.0616	0.0616		
3	0.033	616	0.0616	0.0616		
4	0.050	624	0.0624	0.0624		
5	0.067	632	0.0632	0.0632		
6	0.083	635	0.0635	0.0635		
7	0.100	637	0.0637	0.0637		
8	0.200	641	0.0641	0.0641		
9	0.400	648	0.0648	0.0648		
10	0.800	656	0.0656	0.0656		
11	1.000	663	0.0663	0.0663		
12	2.000	673	0.0673	0.0673		
13	4.000	693	0.0693	0.0693		
14	8.000	718	0.0718	0.0718		
15	10.000	728	0.0728	0.0728		
16	20.000	760	0.0760	0.0760		
17	40.283	800	0.0800	0.0800		
18	80.283	824	0.0824	0.0824		
19	100.283	829	0.0829	0.0829		
20	200.283	837	0.0837	0.0837		
21	278.583	839	0.0839	0.0839		



Operator:

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

	Test name Date of Test:	Consolidation 12-14-16	Load: 2.000 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
Checked: ML		Approved:	

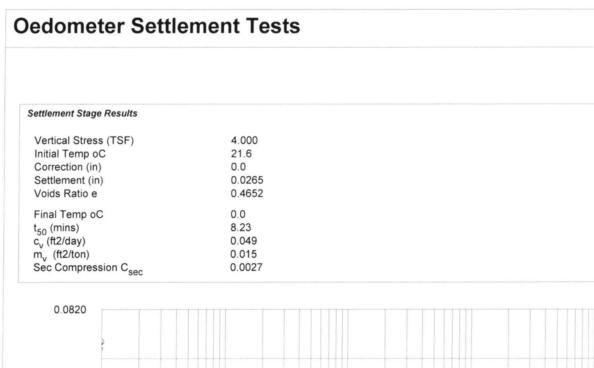


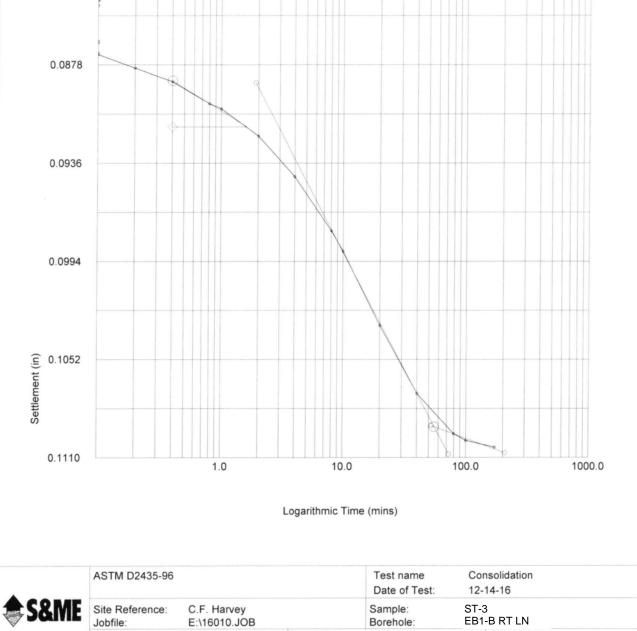
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	839	0.0839	0.0839
2	0.017	840	0.0840	0.0840
3	0.033	843	0.0843	0.0843
4	0.050	864	0.0864	0.0864
5	0.067	865	0.0865	0.0865
6	0.083	871	0.0871	0.0871
7	0.100	872	0.0872	0.0872
8	0.200	880	0.0880	0.0880
9	0.400	888	0.0888	0.0888
10	0.800	901	0.0901	0.0901
11	1.000	904	0.0904	0.0904
12	2.000	920	0.0920	0.0920
13	4.000	944	0.0944	0.0944
14	8.000	976	0.0976	0.0976
15	10.000	988	0.0988	0.0988
16	20.000	1032	0.1032	0.1032
17	40.000	1072	0.1072	0.1072
18	80.000	1096	0.1096	0.1096
19	100.000	1100	0.1100	0.1100
20	171.167	1104	0.1104	0.1104

ASTM D2435-96

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

	Test name Date of Test:	Consolidation 12-14-16	Load: 4.000 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
hecked:	ulc	Approved:	





EB1-B RT LN

Approved:

Borehole:

Checked: ML

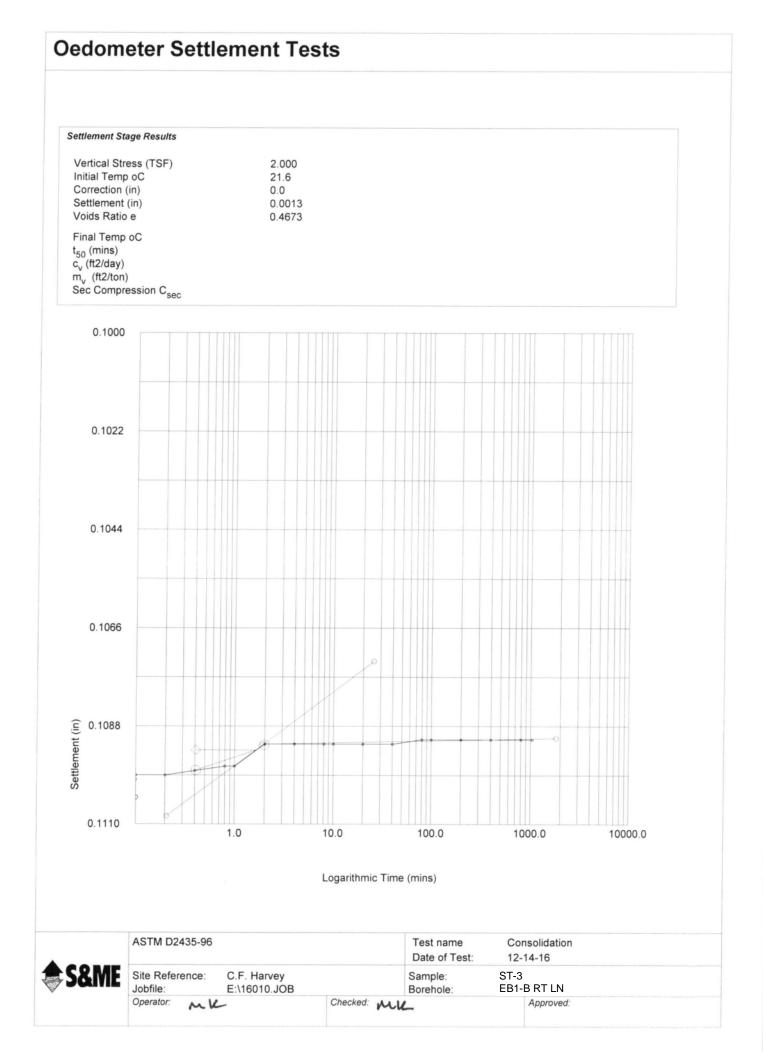
Operator:

MK

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1104	0.1104	0.1104
2	0.017	1100	0.1100	0.1100
3	0.033	1100	0.1100	0.1100
4	0.050	1100	0.1100	0.1100
5	0.067	1099	0.1099	0.1099
6	0.083	1099	0.1099	0.1099
7	0.100	1099	0.1099	0.1099
8	0.200	1099	0.1099	0.1099
9	0.400	1098	0.1098	0.1098
10	0.800	1097	0.1097	0.1097
11	1.000	1097	0.1097	0.1097
12	2.000	1092	0.1092	0.1092
13	4.000	1092	0.1092	0.1092
14	8.000	1092	0.1092	0.1092
15	10.000	1092	0.1092	0.1092
16	20.000	1092	0.1092	0.1092
17	40.000	1092	0.1092	0.1092
18	80.000	1091	0.1091	0.1091
19	100.000	1091	0.1091	0.1091
20	200.000	1091	0.1091	0.1091
21	400.000	1091	0.1091	0.1091
22	800.000	1091	0.1091	0.1091
23	1042.500	1091	0.1091	0.1091

	ASTM D2435-96	
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB
	Operator: M	16

	Test name Date of Test:	Consolidation 12-14-16	Load: 2.000 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
Checked:	rk	Approved:	



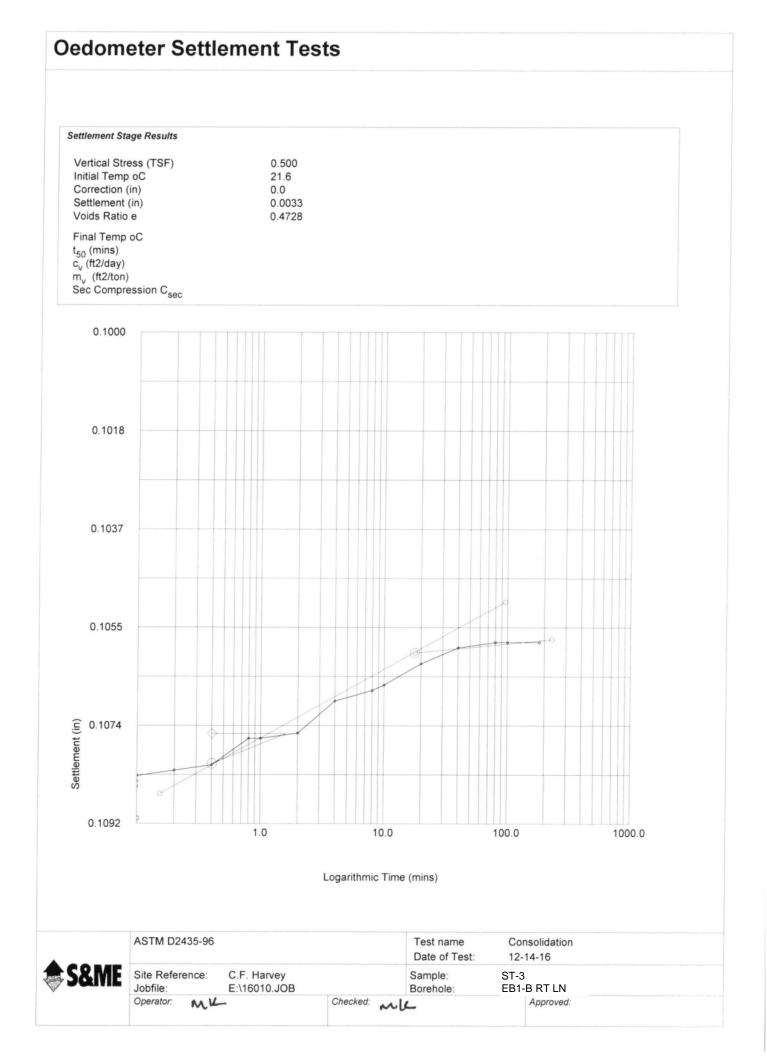
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1091	0.1091	0.1091
2	0.017	1084	0.1084	0.1084
3	0.033	1085	0.1085	0.1085
4	0.050	1084	0.1084	0.1084
5	0.067	1083	0.1083	0.1083
6	0.083	1083	0.1083	0.1083
7	0.100	1083	0.1083	0.1083
8	0.200	1082	0.1082	0.1082
9	0.400	1081	0.1081	0.1081
10	0.800	1076	0.1076	0.1076
11	1.000	1076	0.1076	0.1076
12	2.000	1075	0.1075	0.1075
13	4.000	1069	0.1069	0.1069
14	8.000	1067	0.1067	0.1067
15	10.000	1066	0.1066	0.1066
16	20.000	1062	0.1062	0.1062
17	40.000	1059	0.1059	0.1059
18	80.000	1058	0.1058	0.1058
19	100.000	1058	0.1058	0.1058
20	182.140	1058	0.1058	0.1058

ASTM D2435-96

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

С

	Test name Date of Test:	Consolidation 12-14-16	Load: 0.500 (TSF)
	Sample: Borehole:	ST-3 EB1-B RT LN	
hecked:	me	Approved:	



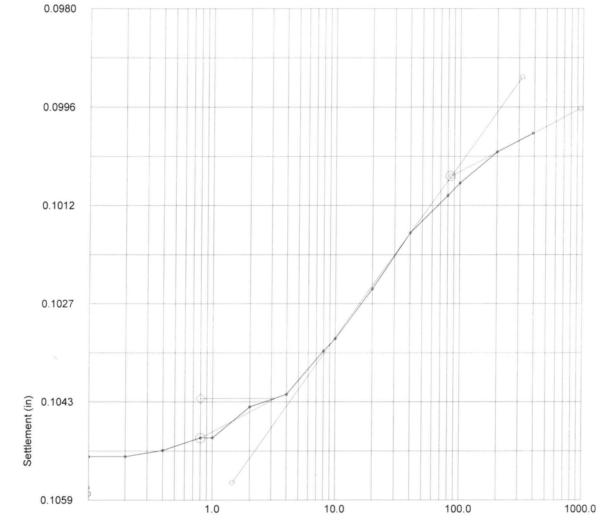
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	1058	0.1058	0.1058
2	0.017	1057	0.1057	0.1057
3	0.033	1052	0.1052	0.1052
4	0.050	1052	0.1052	0.1052
5	0.067	1052	0.1052	0.1052
6	0.083	1052	0.1052	0.1052
7	0.100	1052	0.1052	0.1052
8	0.200	1052	0.1052	0.1052
9	0.400	1051	0.1051	0.1051
10	0.800	1049	0.1049	0.1049
11	1.000	1049	0.1049	0.1049
12	2.000	1044	0.1044	0.1044
13	4.000	1042	0.1042	0.1042
14	8.000	1035	0.1035	0.1035
15	10.000	1033	0.1033	0.1033
16	20.000	1025	0.1025	0.1025
17	40.000	1016	0.1016	0.1016
18	80.000	1010	0.1010	0.1010
19	100.000	1008	0.1008	0.1008
20	200.000	1003	0.1003	0.1003
21	391.230	1000	0.1000	0.1000

ASTM D2435-96

Site Reference: & ME C.F. Harvey E:\16010.JOB Jobfile: Operator: MR

	Test name Date of Test:	Consolidation Load: 0.050 (TSF) 12-14-16
	Sample: Borehole:	ST-3 EB1-B RT LN
Checked:	ice	Approved:





Logarithmic Time (mins)

		1 D2435-96				Test name Date of Test:		nsolidation -14-16	
\$ \$&	Site Jobfi	Reference: e:	C.F. Harvey E:\16010.JOB			Sample: Borehole:	ST-: EB1	3 I-B RT LN	
	Opera	tor: M	k	Checked:	M	2		Approved:	

Effective Stress Triaxial Compression

Consolidated Undrained

Sample details	Depth	18.0 - 20.0 ft.		
Sketch showing specimen location in original Sample		Gray Coarse to F	ine Sandy Silty (CLAY (A-6) (2)
		Specimen 1	Specimen 2	Specimen 3
	Туре	Undisturbed	Undisturbed	Undisturbed
	Height H ₀ (in)	5.952	5.801	5.814
	Diameter D ₀ (in)	2.861	2.864	2.864
	Weight W ₀ (gr)	1275	1236.8	1226.3
	Bulk Density p (PCF	126.94	126.08	124.73
	Particle Density ps	2.663	2.663	2.663
		(measured)	(measured)	(measured)

Initial Conditions				
	Specimen 1	Specimen 2	Specimen 3	
Cell Pressure σ_3 (lbf/in2)	8.0	15.0	22.0	
Pore Pressure u (lbf/in2)	0.0	0.0	0.0	
Machine Speed d _r (in/min)	0.0081	0.0079	0.0104	
No. of Membranes	1	1	1	
Total Thickness (in)	0.012	0.012	0.012	
Strain Channel	1798	1798	1798	
oad Channel	1776	1776	1776	
Pore P. Channel	1779	1779	1779	
/olume Channel		Volume Chang		
Moisture Content w ₀ %	21.3	23.8	21.9	
Dry Density pd0 (PCF)	104.62	101.88	102.28	
/oids Ratio e ₀	0.59	0.63	0.62	
Deg of Saturation S ₀ %	96.56	100.00	93.55	
Final B Value	0.95	0.95	0.98	

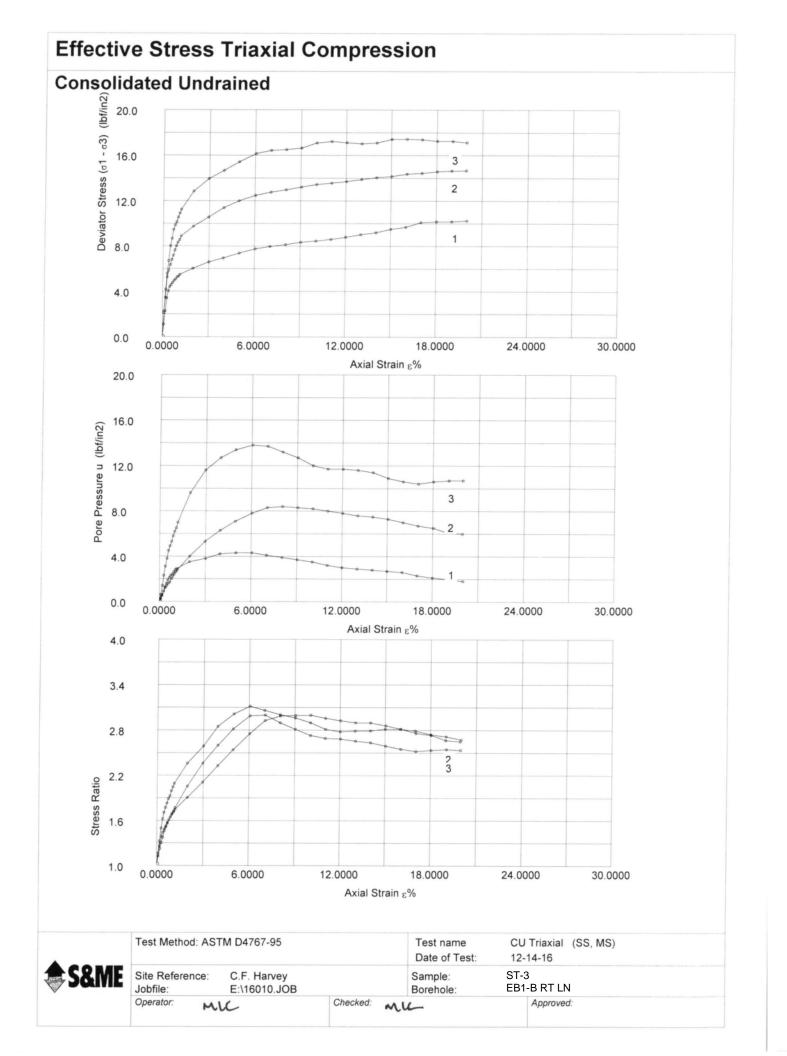
Final Conditions		
	Specimen 1	Specime
Moisture Content w _f %	19.7	20.1
Dry Density pd (PCF)	108.32	107.07
Voids Ratio e _f	0.53	0.55
Deg of Saturation S _f %	98.02	96.91
Failure Criteria	Mx Stress Ra	tioMx Stres
Axial Strain _{Ef} %	6.0	10.0
Corr Dev Stress $(\sigma_1 - \sigma_3)f$ (lbf/in2)	7.8	13.4
Minor Stress ogf (lbf/in2)	3.7	6.8
Major Stress of (lbf/in2)	11.5	20.2
Stress Ratio $(\sigma_1/\sigma_3)_f$	3.1	3.0
Notes:		

	Test Method: AST	TM D4767-95
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB

C.F. Harvey E:\16010.JOB Operator: MIC

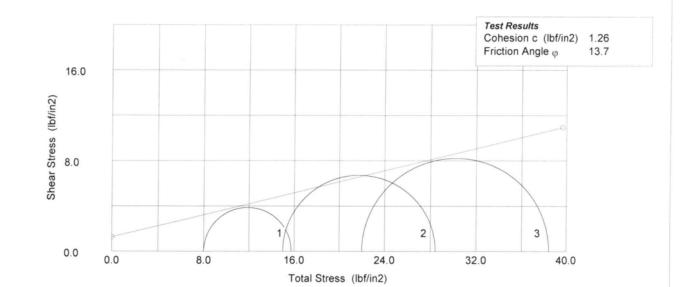
en 2	Specimen 3 18.7	Failure Sketch
	109.24	Sp 1 Sp 2
	0.52	ک کے
	95.79	1 1
ss Rat	tioMx Stress Ratio	· _ >
	7.0	
	16.4	Sp 3
	8.3	5
	24.7	1
	3.0	
		Surface Inclination

	Test name Date of Test:	CU Triaxial (SS, MS) 12-14-16	
	Sample: Borehole:	ST-3 EB1-B RT LN	
Checked: M	K	Approved:	



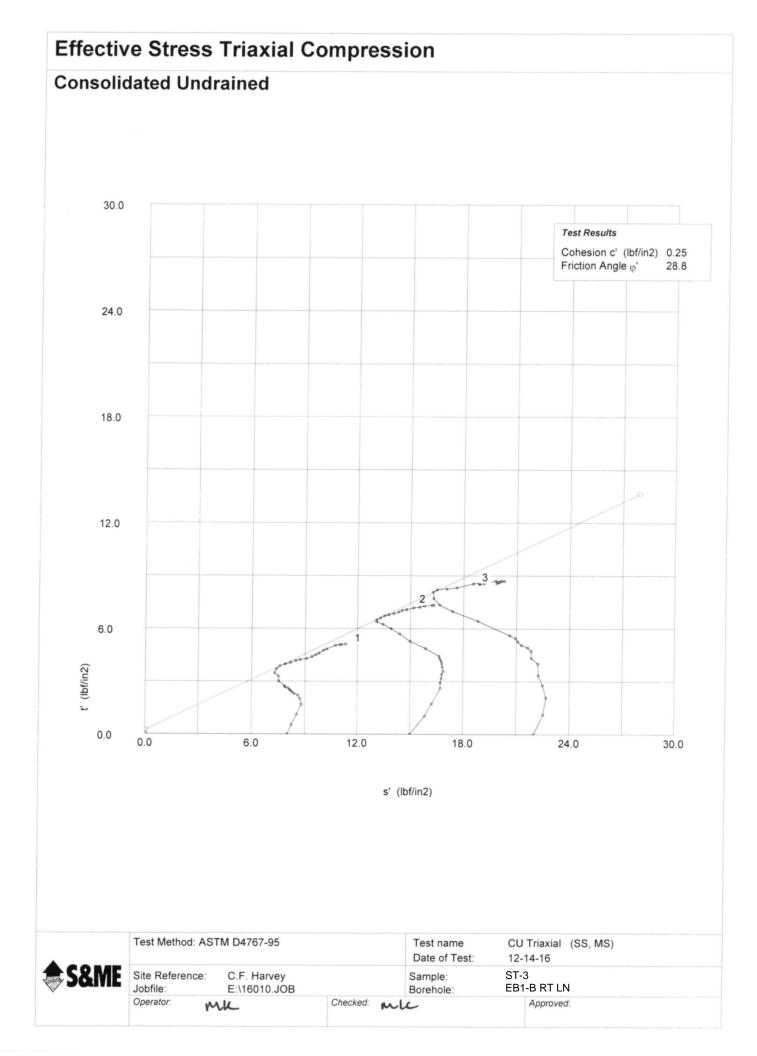






	Test Method: AS	TM D4767-95		Test name Date of Test:	CU Triaxial 12-14-16	(SS, MS)
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-3 EB1-B RT LN	I
	Operator: MU	-	Checked:	me	Approved	1:

J.



Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 1)

No.	Strain (divs)	Strain ε%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (lbf/in2)	D. Stress (σ ₁ - σ ₃) _m (lbf/in2)	D. Stress $(\sigma_1 - \sigma_3)_c$ (Ibf/in2)	Minor Str oʻʻ (lbf/in2)	Major Str σ ₁ ΄ (Ibf/in2)	Ratio $\sigma_1'' \sigma_3'$
1	24	0.00	589	0.0	0	0.0	0.0	0.0	8.00	8.00	1.00
2	73	0.08	658	6.9	3	0.3	1.1	1.1	7.70	8.80	1.14
3	128	0.18	732	14.3	6	0.6	2.3	2.3	7.40	9.67	1.31
4	183	0.27	803	21.4	9	0.9	3.4	3.4	7.10	10.50	1.48
5	240	0.37	844	25.5	13	1.3	4.0	4.0	6.70	10.74	1.60
6	294	0.46	867	27.8	16	1.6	4.4	4.4	6.40	10.80	1.69
7	346	0.55	889	30.0	19	1.9	4.7	4.6	6.10	10.69	1.75
8	405	0.65	901	31.2	21	2.1	4.9	4.8	5.90	10.67	1.81
9	458	0.74	913	32.4	23	2.3	5.1	5.0	5.70	10.66	1.87
10	513	0.83	920	33.1	24	2.4	5.2	5.1	5.60	10.66	1.90
11	572	0.93	933	34.4	26	2.6	5.4	5.3	5.40	10.66	1.97
12	625	1.02	938	34.9	28	2.8	5.5	5.3	5.20	10.54	2.03
13	680	1.11	947	35.8	29	2.9	5.6	5.5	5.10	10.57	2.07
14	1177	1.96	993	40.4	35	3.5	6.3	6.0	4.50	10.52	2.34
15	1793	3.01	1039	45.0	38	3.8	6.9	6.6	4.20	10.79	2.57
16	2348	3.95	1075	48.6	42	4.2	7.4	7.0	3.80	10.75	2.83
17	2966	5.00	1114	52.5	43	4.3	7.9	7.4	3.70	11.08	2.99
18	3582	6.05	1150	56.1	43	4.3	8.4	7.8	3.70	11.45	3.09
19	4150	7.01	1175	58.6	41	4.1	8.7	8.0	3.90	11.85	3.04
20	4752	8.03	1199	61.0	39	3.9	8.9	8.1	4.10	12.23	2.98
21	5340	9.03	1226	63.7	37	3.7	9.2	8.3	4.30	12.64	2.94
22	5930	10.04	1246	65.7	35	3.5	9.4	8.4	4.50	12.95	2.88
23	6518	11.03	1269	68.0	32	3.2	9.6	8.6	4.80	13.39	2.79
24	7096	12.02	1297	70.8	30	3.0	9.9	8.8	5.00	13.80	2.76
25	7684	13.02	1326	73.7	29	2.9	10.2	9.0	5.10	14.12	2.77
26	8273	14.02	1354	76.5	28	2.8	10.5	9.2	5.20	14.41	2.77
27	8857	15.01	1389	80.0	27	2.7		9.5	5.30	14.81	2.79
28	9437	16.00	1416	82.7	26	2.6		9.7	5.40	15.08	2.79
29	10026	17.00	1463	87.4	23	2.3	11.5	10.1	5.70	15.79	2.77
30	10622	18.01	1484	89.5	21	2.1		10.2	5.90	16.06	2.72
31	11218	19.02	1499	91.0	20	2.0		10.2	6.00	16.17	2.70
32	11807	20.02	1519	93.0	18	1.8		10.2		16.44	2.65

Test Method: ASTM	D4767-95
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&ME C.F. Harvey E:\16010.JOB Site Reference: Jobfile: Operator: mle

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Page 1/3

	Test name Date of Test:	CU Triaxial (SS, MS) Shear (Specimen 1) 12-14-16
	Sample: Borehole:	ST-3 EB1-B RT LN
Checked: M	le	Approved:

Effective Stress Triaxial Compression

Consolidated Undrained Shear (Specimen 2)

	No.	Strain (divs)	Strain ε%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (Ibf/in2)	D. Stress (σ ₁ - σ ₃) _m (lbf/in2)	D. Stress (σ ₁ - σ ₃) _c (lbf/in2)	Minor Str σ ₃ ΄ (lbf/in2)	Major Str σ ₁ ΄ (Ibf/in2)	Ratio $\sigma_1'' \sigma_3'$
	1	70	0.00	666	0.0	0	0.0	0.0	0.0	15.00	15.00	1.00
	2	118	0.08	797	13.1	2	0.2	2.1	2.1	14.80	16.90	1.14
	3	175	0.18	883	21.7	5	0.5	3.5	3.5	14.50	17.98	1.24
	4	230	0.28	994	32.8	9	0.9	5.2	5.2	14.10	19.35	1.37
L	5	286	0.38	1031	36.5	12	1.2	5.8	5.8	13.80	19.64	1.42
	6	345	0.48	1064	39.8	14	1.4	6.4	6.4	13.60	19.96	1.47
	7	399	0.58	1102	43.6	16	1.6	7.0	6.8	13.40	20.20	1.51
	8	454	0.67	1126	46.0	17	1.7	7.3	7.2	13.30	20.47	1.54
	9	514	0.78	1156	49.0	20	2.0	7.8	7.6	13.00	20.64	1.59
	10	567	0.87	1180	51.4	22	2.2	8.2	8.0	12.80	20.82	1.63
	11	622	0.97	1199	53.3	24	2.4	8.5	8.3	12.60	20.91	1.66
	12	684	1.08	1216	55.0	26	2.6	8.7	8.6	12.40	20.97	1.69
	13	739	1.17	1236	57.0	28	2.8	9.0	8.9	12.20	21.08	1.73
	14	1191	1.96	1303	63.7	40	4.0	10.0	9.7	11.00	20.74	1.89
	15	1757	2.96	1367	70.1	53	5.3	10.9	10.6	9.70	20.26	2.09
	16	2325	3.95	1436	77.0		6.3	11.9	11.4	8.70	20.09	2.31
	17	2894	4.95	1489	82.3		7.1	12.6	12.0	7.90	19.90	2.52
	18	3518	6.04	1536	87.0	78	7.8	13.1	12.5	7.20	19.68	2.73
	19	4091	7.05	1569	90.3	83	8.3	13.5	12.8	6.70	19.46	2.90
	20	4659	8.04	1599	93.3	84	8.4	13.8		6.60	19.57	2.97
	21	5227	9.04	1631	96.5	83	8.3	14.1		6.70	19.91	2.97
	22	5800	10.04	1663	99.7		8.2	14.4		6.80	20.24	2.98
	23	6367	11.04	1688			8.0	14.6		7.00	20.56	2.94
	24	6937	12.04	1716	105.0		7.8	14.8	13.7	7.20	20.91	2.90
	25	7510	13.04	1745	107.9	76	7.6	15.1	13.9	7.40	21.28	2.88
	26	8079	14.04	1776	111.0	75	7.5	15.3				2.87
	27	8647	15.03	1800	113.4	73	7.3	15.5	14.2			2.84
	28	9222	16.04	1834	116.8	70	7.0	15.7	14.4			2.80
	29	9791	17.04	1859	119.3	67	6.7	15.9	14.4	8.30	22.74	2.74
	30	10362	18.04	1889	122.3	65	6.5	16.1	14.6	8.50		2.71
	31	10906	18.99	1912			6.1	16.2				2.65
	32	11456	19.96	1932	126.6	60	6.0					2.63

Effective Stress Tri	axiai	Com
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Consolidated Undrained Shear (Specimen 3)

		onidatio	u onu	annou	oncui							
	No.	Strain (divs)	Strain ε%	Load (divs)	Load (Ibs)	Pore Prs (divs)	Pore Prs (Ibf/in2)	D. Stress (σ ₁ - σ ₃) _m (lbf/in2)		Minor Str σ ₃ ' (Ibf/in2)	Major Str ^σ 1΄ (Ibf/in2)	Ratio $\sigma_1'' \sigma_3'$
	1	72	0.00	689	0.0	0	0.0	0.0	0.0	22.00	22.00	1.00
	2	126	0.09	828	13.9	6	0.6	2.3	2.3	21.40	23.65	1.11
	3	184	0.20	947	25.8	14	1.4	4.2	4.2	20.60	24.78	1.20
	4	237	0.29	1034	34.5	23	2.3	5.6	5.6	19.70	25.28	1.28
	5	290	0.38	1103	41.4	31	3.1	6.7	6.7	18.90	25.59	1.35
	6	350	0.49	1186	49.7	38	3.8	8.0	8.0	18.20	26.22	1.44
	7	403	0.58	1236	54.7	45	4.5	8.8	8.7	17.50	26.16	1.50
	8	458	0.68	1286	59.7	49	4.9	9.6	9.5	17.10	26.56	1.55
	9	518	0.78	1311	62.2	53	5.3	10.0	9.9	16.70	26.55	1.59
	10	571	0.88	1329	64.0	58	5.8	10.3	10.1	16.20	26.33	1.63
	11	625	0.97	1355	66.6	62	6.2	10.7	10.5	15.80	26.34	1.67
	12	685	1.08	1379	69.0	65	6.5	11.1	10.9	15.50	26.41	1.70
	13	739	1.17	1400	71.1	70	7.0	11.4	11.2	15.00	26.24	1.75
	14	1193	1.97	1514	82.5	96	9.6	13.1	12.8	12.40	25.24	2.04
	15	1756	2.96	1598	90.9	116	11.6	14.3	14.0	10.40	24.35	2.34
	16	2320	3.95	1662	97.3	127	12.7	15.2	14.7	9.30	23.98	2.58
	17	2889	4.95	1726	103.7	134	13.4	16.0	15.4	8.60	24.03	2.79
	18	3510	6.04	1790	110.1	138	13.8	16.8	16.1	8.20	24.34	2.97
	19	4080	7.05	1826	113.7	137	13.7	17.1	16.4	8.30	24.73	2.98
	20	4645	8.04	1848	115.9	132	13.2	17.3	16.5	8.80	25.29	2.87
	21	5210	9.03	1876	118.7	127	12.7	17.5	16.6	9.30	25.94	2.79
	22	5782	10.04	1926	123.7	120	12.0	18.1	17.1	10.00	27.10	2.71
	23	6349	11.03	1954	126.5	117	11.7	18.3	17.2	10.30	27.52	2.67
	24	6916	12.03	1967	127.8	117	11.7	18.2	17.1	10.30	27.42	2.66
	25	7487	13.03	1979	129.0	116	11.6	18.2	17.0	10.40	27.42	2.64
	26	8055	14.03	2006	131.7	114	11.4	18.4	17.1	10.60	27.71	2.61
	27	8623	15.03	2048	135.9	109	10.9	18.7	17.4	11.10	28.52	2.57
1	28	9194	16.04	2070	138.1	106	10.6	18.8	17.4	11.40	28.83	2.53
	29	9762	17.03	2089	140.0	104	10.4	18.8	17.4	11.60	28.99	2.50
	30	10331	18.03	2101	141.2	106	10.6	18.8	17.3	11.40	28.66	2.51
	31	10905	19.04	2120	143.1	107	10.7	18.8	17.2	11.30	28.54	2.53
	32	11433	19.97	2131	144.2	107	10.7	18.7	17.1	11.30	28.43	2.52

	Test Method: AS	TM D4767-95		Test name Date of Test:	CU Triaxial 12-14-16	(SS, MS) Shear (Specimen 2)
S&ME	Site Reference: Jobfile:	C.F. Harvey E:\16010.JOB		Sample: Borehole:	ST-3 EB1-B RT LI	N
	Operator: MK	-	Checked: M	4	Approve	ed:



S&ME Site Reference: C.F. Harvey E:\16010.JOB Jobfile: Operator: MLC

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Page 3 / 3

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	Test name Date of Test:	CU Triaxial (SS, MS) Shear (Specimen 3) 12-14-16
	Sample: Borehole:	ST-3 EB1-B RT LN
Checked: M	IL	Approved:

Form No: TR-T289-1

Revision No. 0

Revision Date: 07/10/08

pH of Soil



		A	ASHTO T2	89		Quality	Assurance
	S&ME, Inc. R	aleigh, 3201 Sprin	ng Forest H	Road, Raleigh,	, North Caroli	na 27616	
Project #:	6235-16-010				Report Date:	1	1/7/16
Project Name:	C.F. Harvey Pa	arkway Extension I	R-5703		Test Date(s):	11/5	- 11/7/16
Client Name:	Michael Baker	Engineering					
Client Address:	Raleigh, NC						
Boring #: EE	B2-B RT LN	Sample	e #: SS-2	1	Sample D	ate:	9/6/16
Location: 16	7+05	Offs	set: 36 RT		Depth	(ft):	0.5 - 2.0
Sample Descript	tion: Light	Gray Coarse to Fin	ne Sandy C	layey SILT (A	-4) (0)		
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 ⁰ C	22.4

Measuring pH of Soil

Measurement	S
Weigtht of Air Dry Soil (g)	30.02
Distilled Water (g)	30.04
Temperature ⁰ C	21.7
pH Readings	5.43

Notes / Deviations / References:

AASHTO T-289: Determining pH of Soil for Use in Corrosion Testing

<u>Mal Krajan, ET</u>	M	Laboratory Manager	<u>11/14/2016</u>
Technical Responsibility	Signature	Position	Date
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Form No. TR-T88
Revision No. 0
Revision Date: 12/20/09

	&ME. Inc. Ra	aleigh, 3201 Sr	oring Fore	st Road I	Raleigh, North	Carolina 276	16		
S&ME Project #:	6235-16-01		ing rore	st Roau, I	0,	ort Date:		4/16	
Project Name:		-	ay Extension R-5703		1	1		10/7 - 11/14/16	
State Project #:	46375.1.1		F.A. Project No: N/A			× /	-5703		
Client Name:		aker Engineerir	5						
Address:	Raleigh, N	Ű,	0						
Boring #:	EB2-B RT		Sample #:	SS-21		Sample Dat	e:	9/6/16	
Location:	167+05		Offset:	36 RT		Depth (f).5 - 2.0	
Sample Description	1:		Ligh	t Gray Coa	arse to Fine Sand	A		(0)	
1.5	" 1"3/4" 1/2'3/8"	#4 #10		40 #60 #1		<u> </u>			
100%	• • • • •	***	#20 #	+	······································				
90%									
80%									
70%									
.ig 60%				+	-				
beccent bassing					<u> </u>				
50%									
40%									
30%									
20%									
10%									
0%									
100	10		1 D. C. L. S'		0.1	0.01		0.0	
			Particle Si	ze (mm)					
	As Defined by N				Fine Sand		mm and > 0		
Gravel Coarse Sand		< 75 mm and > 2.0 2.00 mm and >0.2			Silt Clay		$\frac{5 \text{ and } > 0.00}{< 0.005 \text{ mm}}$		
Maximum Particle		10	Coarse S	and	19%	Silt	< 0.005 mm	21%	
Gravel	09		Fine San		43%	Clay		17%	
Apparent Relative I				e Content	18%	% Passing	#200	44.1%	
Liquid Limit	19 19		Plastic L		12	Plastic Inde		7	
	1,		oil Mortar			- lastic ind		,	
Coarse Sand	1 19%		e Sand	43%	Silt	21%	Clay	17%	
Description of San			ounded			Angu			
Hard & Dura			Soft		Wea	athered & Friat			
References / Comments	s / Deviations:	ND=Not Deter	mined.						
<u>Mal Kraj</u>			01-0703		Laboratory N	-	<u>11/</u>	14/2016	
Techniciar	n Name	Certifi	ication No.		Position	ı		Date	
Mal Krai	an FT	M	the second	>	Laboratory	lanager	11/	/14/2016	
<u>Mal Krajan, ET</u>							11/	14/2010	
Technical Res		Sie	gnature		Position	-		Date	

3201 Spring Forest Road Raleigh, NC.. 27616

EB2-B Rt Ln SS-21 (0.5 - 2 ft) pH.xls Page 1 of 1

Particle Size Analysis of Soils



AASHTO T88 as Modified by NCDOT

Quality Assurance	Ou	ality	Assu	rance
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EB2-B Rt Ln SS-21 (0.5 - 2 ft) Classification.xls

Form No: TR-T267

Revision No. 0

Revision Date: 07/10/08

Moisture, Ash, and Organic Matter



				O T-267		Quality As	ssurance
Ducient #			h, 3201 Spring Fore	st Raod, Raleigh		27616 10/2	1/16
Project #		235-16-010	Extension D 5702		Report Date:		
Project N Client Na		Iichael Baker Eng	ay Extension R-5703		Test Date(s):	10/18 - 1	0/21/10
Client Ad		aleigh, NC	meering				
Boring #:		B2-B RT LN	Sample #:	SS-21	Sample	e Date:	9/6/16
Location:		67+05	Offset:	36 RT	<u>^</u>	oth (ft):	0.5 - 2.0
	Description:		arse to Fine Sandy Cla		-	, iii (11).	0.5 2.0
Equipmen	1		ability, 500g. Minimum		(*)		
Balance:		E ID #: 1024		1/06/16 Due:	11/06/17		
Metho	od A: Mois	sture Content De	etermination	Required	Oven Temperatur	e:105 <u>+</u> 5°	С
Γ		Oven Tempe	rature: 105 °C		<i>Tare</i> #	V	
	t	Tare Weight (1	Dish plus Aluminum F	oil Cover)	grams	47.97	
	а	Mass of As-Re	ceived Specimen + T	are Wt.	grams	99.48	
-	b	Mass of Oven	Dry Specimen + Tare	Wt.	grams	91.78	
-	W	Water Weight			(<i>a</i> - <i>b</i>)	7.70	
-	Α	Mass of As-Re	ceived Specimen		(<i>a</i> - <i>t</i>)	51.51	
	В	Mass of Oven	Dry Specimen		(<i>b</i> - <i>t</i>)	43.81	
% Moisture Content as a % of As Received or Total Mass			(w/A)*100	14.9%			
Γ	%	6 Moisture Conter	nt as a % of Oven-dri	ed Mass	(w/B)*100	17.6%	
Oven	S&ME	E ID #: 1454	Cal. Date: 1	0/7/16 Due:	10/7/17		<u> </u>
	Me	thod C (440° C) a	or D (750° C): Ash Co	ontent and Organ	nic Matter Detern	nination	
Γ		Muffle Fu	rnace: 455 °C		<i>Tare</i> #	30	
Γ	t	Tare Weight (1	Dish plus Aluminum F	oil Cover)	grams	49.02	
	b	Mass of Oven	Dry Specimen + Tare	Wt.	grams	87.18	
			Tare Wt		grams	86.87	
ŀ	с	Ash Weight +			Ũ		
-	c C	Ash Weight + Ash Weight			c-t	37.85	
-						37.85 38.16	
-	С	Ash Weight			c-t		_
-	C B	Ash Weight	Dry Specimen		<i>c-t</i> (<i>b-t</i>)	38.16	

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EB2-B Rt Ln SS-21 (0.5 - 2 ft) Organic.xls Page 1 of 1 43 of 43