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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4405	1	7

REFERENCE: U-4405

PROJECT: 39049

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND

PROJECT DESCRIPTION US 401 (RAEFORD RD.) FROM WEST OF HAMPTON OAKS DR. TO EAST OF FAIRWAY DR.

SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- (ALL AMERICAN FREEWAY) OVER ABERDEEN AND ROCKFISH RAILROAD AT STA. 26+78

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PERSONNEL

CONSULTANT: S&ME

INVESTIGATED BY S&ME

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CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE NOVEMBER 2016

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

DocuSigned by: Jaime Love Pedro 12/8/2016
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SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	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	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	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	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 24 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:
- [X] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" 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:

ELEVATION: FEET

NOTES:

BORINGS ELEVATIONS AND PROFILE GROUNDLINE TAKEN FROM ROADWAY TIN FILE DATED 7/27/2016.

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-4405	3

SITE PLAN

0 50 100

FEET

SKEW ANGLE = 131°

-AA- TS Sta. 53+25.18

-AA-

NBL ALL AMERICAN EXPRESSWAY BST

SBL ALL AMERICAN EXPRESSWAY BST

BEGIN BRIDGE
-RPB STA 26+36

END BRIDGE
-RPB STA 27+20

EB1-A

EB2-A

-RPB-

TO SR 1400

TO RAEFORD RD.

END NOISE WALL
-NW1- STA 28+30.00 =
-RPB- STA 25+81.07
OFF 26.00' RT

BEGIN RETAINING WALL 2
-WALL2- STA 10+00.00 =
-RPB- STA 27+39.19
OFF 18.00' RT

END RETAINING WALL 2
-WALL2- STA 12+75.86 =
-RPB- STA 30+07.92
OFF 34.00' RT

END RETAINING WALL 1
-WALL1- STA 14+87.28 =
-RPB- STA 25+90.87
OFF 18.00' RT

ABERDEEN & ROCKINGHAM RAILROAD

15" CMP

15" RCP

18" RCP

CB

2SBK BUS

2SFD

CONC

BST

30" C&G

24" C&G

25

30

20

PROJECT REFERENCE NO.	SHEET NO.
U-4405	4

FENCE DIAGRAM OF BORINGS PROJECTED ALONG –RPB– CENTERLINE

0 10 20
FEET
VE = 2:1

EB1–A
26+05
18' LT

EB2–A
27+90
22' RT

COASTAL PLAIN, ORANGE–TAN, LOOSE TO MED. DENSE, MOIST, CLAYEY AND SILTY SAND

ORANGE, TAN, RED, AND GRAY, MEDIUM STIFF TO HARD, MOIST TO WET, SANDY CLAY

TAN, RED, WHITE, GRAY, AND ORANGE, LOOSE TO DENSE, WET TO SATURATED, SILTY AND CLAYEY SAND

DARK GRAY, MEDIUM STIFF TO VERY STIFF, MOIST, SILTY CLAY WITH SOME THIN SEAMS OF SAND (BLACK CREEK FORMATION)

TAN, ORANGE, RED, GRAY, AND WHITE, MEDIUM DENSE TO VERY DENSE, SATURATED, SILTY AND CLAYEY SAND (MIDDENDORF FORMATION)

GRAY, HARD, MOIST TO SATURATED, SANDY AND SILTY CLAY

GRAY, MEDIUM DENSE TO DENSE, WET TO SATURATED, CLAYEY SAND

EB1–A: 9, 8, 10, 23, 20, 24, 9, 6, 7, 8, 12, 13, 12, 14, 14, 41, 57, 44, 21
06/15

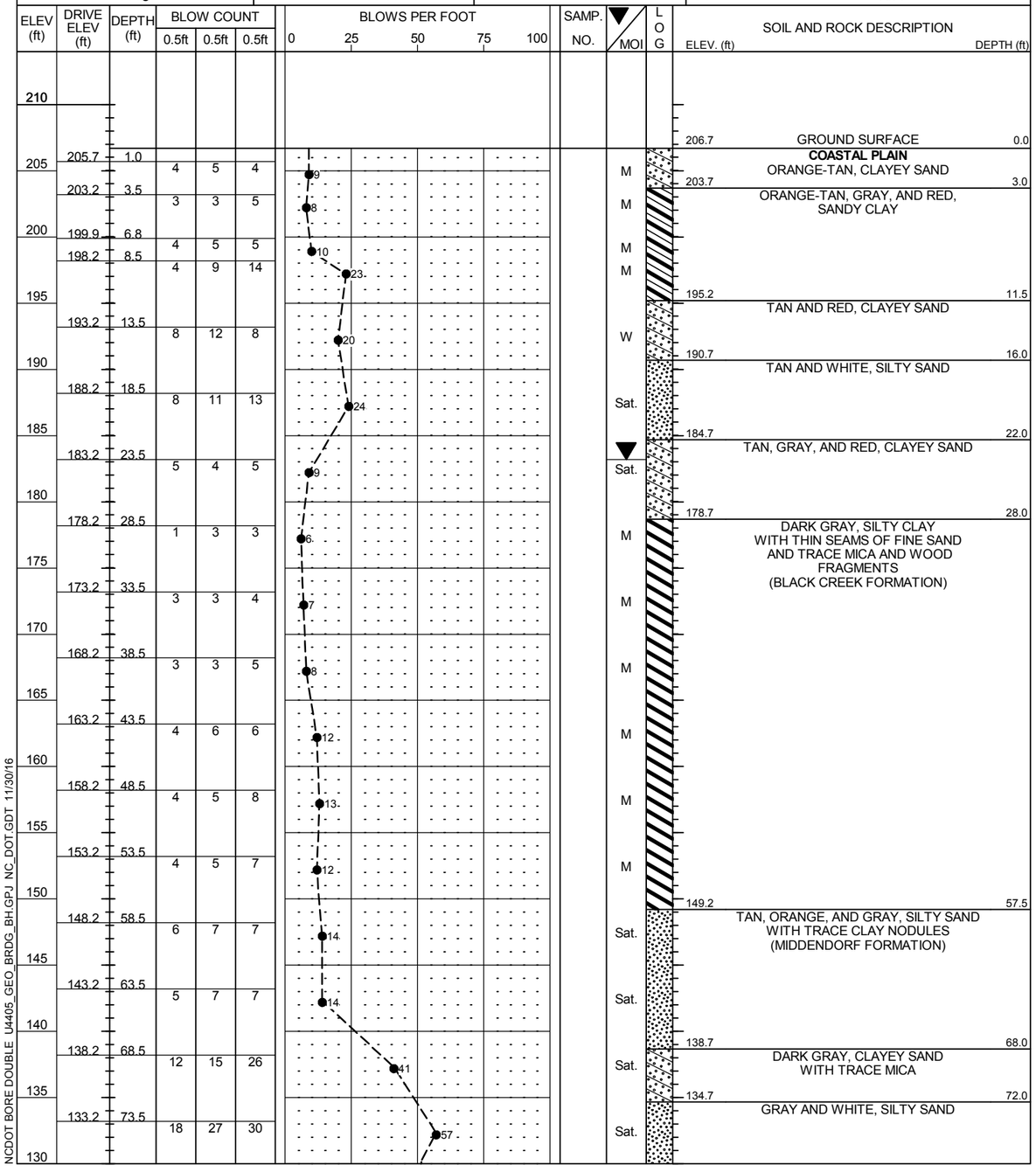
EB2–A: 18, 19, 19, 39, 30, 27, 14, 4, 9, 7, 16, 24, 13, 21, 100/0.6, 100/0.9, 41
07/15

210 200 190 180 170 160 150 140 130

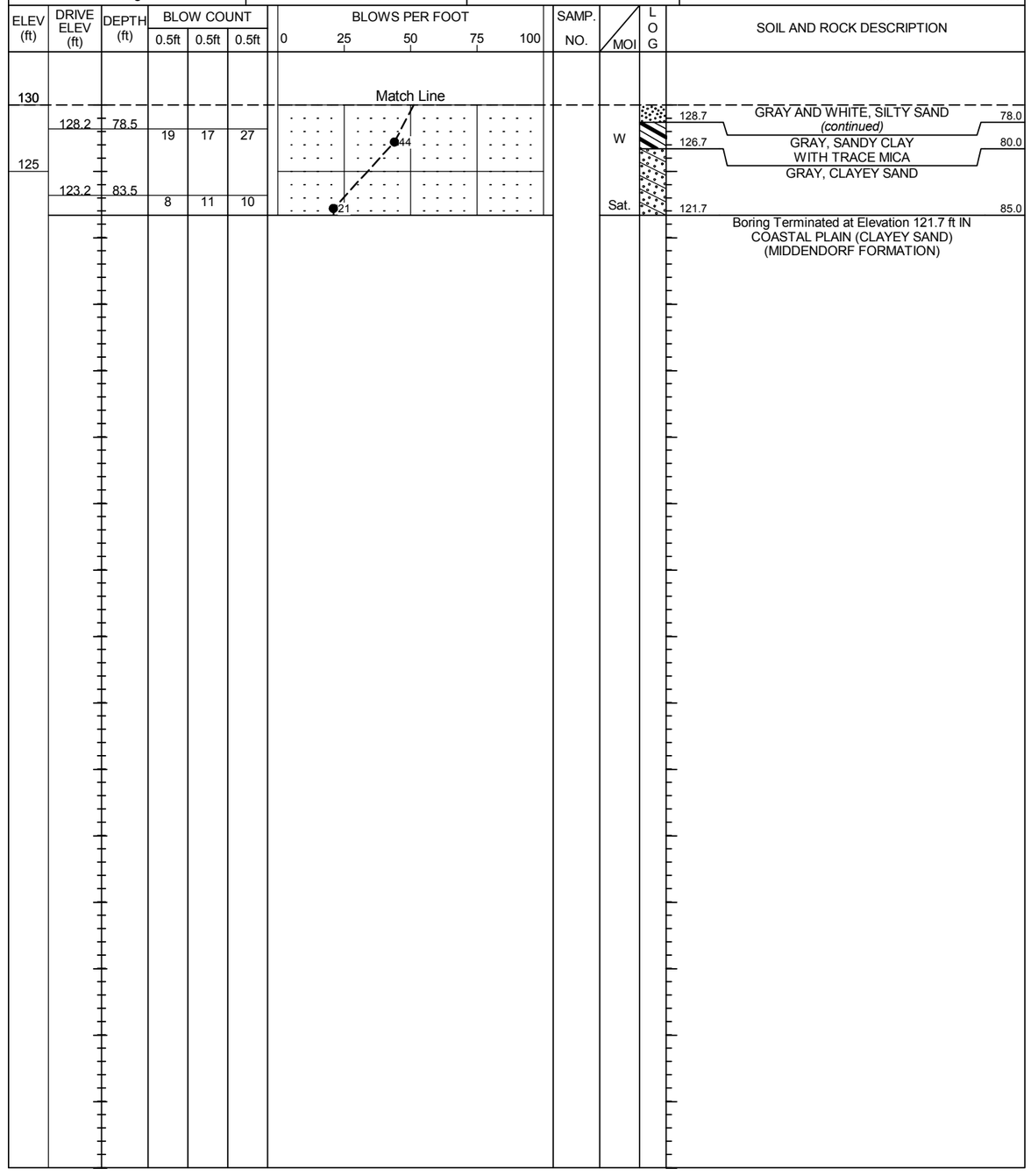
+80 26+00 +20 +40 +60 +80 27+00 +20 +40 +60 +80 28+00 +20 +40

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Riggs, A.	
SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- OVER ABERDEEN AND ROCKFISH RAILROAD				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 26+05	**OFFSET** 18 ft LT	**ALIGNMENT** -RPB-	**0 HR.** N/A
COLLAR ELEV. 206.7 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 471,807	**EASTING** 2,017,711	**24 HR.** 23.5 Caved
DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 83% 08/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER M. Coogan	**START DATE** 06/30/15	**COMP. DATE** 06/30/15	**SURFACE WATER DEPTH** N/A	



WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Riggs, A.	
SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- OVER ABERDEEN AND ROCKFISH RAILROAD				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 26+05	**OFFSET** 18 ft LT	**ALIGNMENT** -RPB-	**0 HR.** N/A
COLLAR ELEV. 206.7 ft	**TOTAL DEPTH** 85.0 ft	**NORTHING** 471,807	**EASTING** 2,017,711	**24 HR.** 23.5 Caved
DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 83% 08/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER M. Coogan	**START DATE** 06/30/15	**COMP. DATE** 06/30/15	**SURFACE WATER DEPTH** N/A	



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Riggs, A.	
SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- OVER ABERDEEN AND ROCKFISH RAILROAD				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+90	**OFFSET** 22 ft RT	**ALIGNMENT** -RPB-	**0 HR.** N/A
COLLAR ELEV. 206.7 ft	**TOTAL DEPTH** 75.0 ft	**NORTHING** 471,639	**EASTING** 2,017,790	**24 HR.** 19.3
DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 83% 08/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER M. Coogan	**START DATE** 07/01/15	**COMP. DATE** 07/01/15	**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)
215											
210											
										206.7	0.0
										GROUND SURFACE	
205	205.7	1.0	3	6	12	18		M		**COASTAL PLAIN** TAN, SILTY SAND	
	203.2	3.5								203.7	3.0
			7	9	10	19		M		TAN-GRAY, SANDY CLAY	
200	200.2	6.5	6	8	11	19		M			
	198.2	8.5	7	17	22	39		W			
195										194.7	12.0
	193.2	13.5	11	15	15	30		Sat.		TAN, GRAY, AND RED, CLAYEY SAND	
190											
	188.2	18.5	8	13	14	27				189.7	17.0
185										TAN AND WHITE, SILTY SAND	
	183.2	23.5	6	6	8	14		Sat.			
180											
	178.2	28.5	2	2	2	4		Sat.			
175											
	173.2	33.5	3	4	5	9		Sat.			
170											
	168.2	38.5	3	3	4	7		Sat.			
165											
	163.2	43.5	7	7	9	16		Sat.			
160											
	158.2	48.5	6	11	13	24				184.2	22.5
155										TAN-ORANGE AND RED, CLAYEY SAND WITH TRACE OF PARTIALLY CEMENTED SANDS	
	153.2	53.5	3	5	8	13		M			
150											
	148.2	58.5	11	11	10	21		M		158.7	48.0
145										DARK GRAY, SILTY CLAY WITH THIN SEAMS OF FINE SAND (BLACK CREEK FORMATION)	
	143.2	63.5	77	23/0.1		100/0.6		Sat.			
140										152.2	54.5
	138.2	68.5	37	63/0.4		100/0.9		M		TAN, ORANGE AND RED, CLAYEY SAND WITH TRACE OF PARTIALLY CEMENTED SAND FRAGMENTS (MIDDENDORF FORMATION)	
135								M		144.2	62.5
										GRAY, SILTY CLAY (MUDSTONE)	

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Riggs, A.	
SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- OVER ABERDEEN AND ROCKFISH RAILROAD				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+90	**OFFSET** 22 ft RT	**ALIGNMENT** -RPB-	**0 HR.** N/A
COLLAR ELEV. 206.7 ft	**TOTAL DEPTH** 75.0 ft	**NORTHING** 471,639	**EASTING** 2,017,790	**24 HR.** 19.3
DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 83% 08/07/2014		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER M. Coogan	**START DATE** 07/01/15	**COMP. DATE** 07/01/15	**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
135						Match Line				
	133.2	73.5	12	17	24	41		Sat.		134.7 72.0 GRAY, CLAYEY SAND 131.7 75.0 Boring Terminated at Elevation 131.7 ft IN COASTAL PLAIN (CLAYEY SAND) (MIDDENDORF FORMATION)

SITE PHOTOGRAPH

Bridge No. 440 on –RPB– (All American Expressway) over Aberdeen & Rockfish Railroad

Looking West towards Proposed New Location

REFERENCE: U-4405

PROJECT: 39049

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4405	1	23

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND

PROJECT DESCRIPTION US 401 (RAEFORD ROAD) FROM WEST OF HAMPTON OAK DRIVE TO EAST OF FAIRWAY DRIVE IN FAYETTEVILLE

SITE DESCRIPTION NOISE WALLS 1 AND 2 AND RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3 AT -L- STATION 257+70

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-5	SITE PLAN
6-7	PROFILE - SOUND BARRIER WALL 1
8-10	PROFILE - RETAINING WALL 1
11-12	PROFILE - RETAINING WALL 2
13	PROFILE - RETAINING WALL 3
14-18	PROFILE - SOUND BARRIER WALL 2
19-21	BORING LOGS (NW1-1 TO NW1-6)
22-23	LABORATORY TESTING SUMMARY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (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.

PERSONNEL

SCHLEMM, T. S.	BUNCH, C. M.
RIGGS, Jr., A. F. (S&ME)	TURNAGE, J. R.
ROUSH, J. K.	COOGAN, M. (MAD)
KINTER, A. N. (NCDOT)	PINTER, D. G. (NCDOT)

INVESTIGATED BY TERRACON CONSULTANTS

DRAWN BY FIELDS, W. D.

CHECKED BY NASH, A. A.

SUBMITTED BY RIGGS, Jr., A. F.

DATE APRIL 2018

Prepared in the Office of:

Terracon

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NC REGISTERED GEOLOGIC FIRM: C-367

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DocuSigned by:
Abner F. Riggs Jr. 4/30/2018
5228073BBA4F482...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-4405	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 SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- 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 24 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:
- [X] CME-45C (MID39674)
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-45B (TER1974)
- [X] D-50 (TER373)

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [X] 3¼" HOLLOW STEM AUGER

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] 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: N/A

ELEVATION: FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

PROJECT WAS DRAFTED USING NCDOT PROVIDED TIN FILE
FILE: u4405_ls_tin.tin (DATED: 10/03/2017)

BORINGS EB1-A, EB2-A, RW3-1 AND RW3-2 WERE PERFORMED BY OTHERS AND ARE INCLUDED IN THIS REPORT

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U–4405	3

0 100 200
FEET

Terracon
Consulting Engineers and Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F–0869
NC REGISTERED GEOLOGIC FIRM: C–367

JEAN PHARR LYNCH LIVING TRUST
MOHAMMED W. RAHMAN
TIMOTHY R. GODWIN DB 5945 PG76 PB 63 PG 93
SUSAN C. SERANO
BEVAN E. GRICE
JEFFREY REITZEL
CRAIG L. JOHNSON
RROBERT B DB 840 PB 86
EXISTING R/W
30' UTILITY EASEMENT

40+00 -NW2-
35+00 -NW2-
70+00 -AA-
65+00 -AA-
75+00 -AA-

END SOUND BARRIER WALL 2
41+35 -NW2- =
75+03.34 -AA-
68.6' RT

NW2-30 NW2-29 NW2-28 NW2-27 NW2-26 NW2-25 NW2-24 NW2-23 NW2-22 NW2-21 NW2-20

NW1-1 NW1-2 NW1-3 NW1-4 NW1-5 NW1-6 NW1-7 NW1-8 NW1-9 NW1-10 NW1-11 NW1-12 NW1-13

BEGIN SOUND BARRIER WALL 1
10+00 -NW1- =
71+66.92 -AA-
75.7' LT

MATCHLINE STA. 64+25 -AA- SEE SHEET 4

JERUBY M LANGDON LIFE ESTATE
BOBBILI V. WILLIAMS
JOSE A. GONZALEZ
KISHORKUMAR P. KANERIA
STEVEN C. DAVIES
30' DRAINAGE EASEMENT
30' UTILITY EASEMENT
10+00 -RR-
10+00 -NW1-
15+00 -NW1-

PROJECT REFERENCE NO.	SHEET NO.
U–4405	4

0 100 200
FEET

Terracon
Consulting Engineers and Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F–0869
NC REGISTERED GEOLOGIC FIRM: C–367

MATCHLINE STA. 64+25 -AA- SEE SHEET 3

MATCHLINE STA. 50+50 -AA- SEE SHEET 5

BEGIN RETAINING WALL 2
10+00 -WALL2- =
27+64.73 -RPB-
62' LT

END RETAINING WALL 1
16+20.43 -WALL1- =
26+91.03 -RPB-
54' LT

BEGIN RETAINING WALL 1
8+60 -WALL1- =
22+21.03 -NW1-
10.5' RT =
19+71.99 -RPB-
36.6' RT

END SOUND BARRIER WALL 1
28+30 -NW1- =
14+68.94 -WALL1-
10.5' LT =
25+81.07 -RPB-
26' RT

NW2-19 NW2-18 NW2-17 NW2-16 NW2-15 NW2-14 NW2-13 NW2-12 NW2-11 NW2-10 NW2-9 NW2-8 NW2-7

NW1-14 NW1-15 NW1-16 NW1-17 NW1-18 RW1-1 RW1-2 RW1-4 RW1-6 RW1-8 RW1-10 RW1-12 RW1-13 RW1-11 RW1-9 RW1-7 RW1-5

EB1-A EB2-A RW2-2 RW2-1

2SBK CHURCH
VILLAGE DRIVE BAPTIST CHURCH
RROBERT B TAYLOR DB 8409 PG 15 PB 86 PG 175
2SBK FIELD HOUSE
BK DUGOUTS
MC PHERSON GREEN INC.
2SF APT
25' SANITARY SEWER EASEMENT
NON W/L
ALL AMERICAN EXPRESSWAY
NBL
SBL
BST
CALVIN NGUYEN
LOUIS W. HACKETT
RICKY TORRES
DONALD DEITZ BELL
KYAW KHINE
CHRISTOPHER COLAVITA
BETTY M. REEVES
ISFD
2SBKD
ISBKD
2SFD
FERNCREEK DR
LARKFIELD CT
ABERDEEN & ROCKFISH RAILROAD
2SBK BUS
BUCKHEAD PLAZA INC.

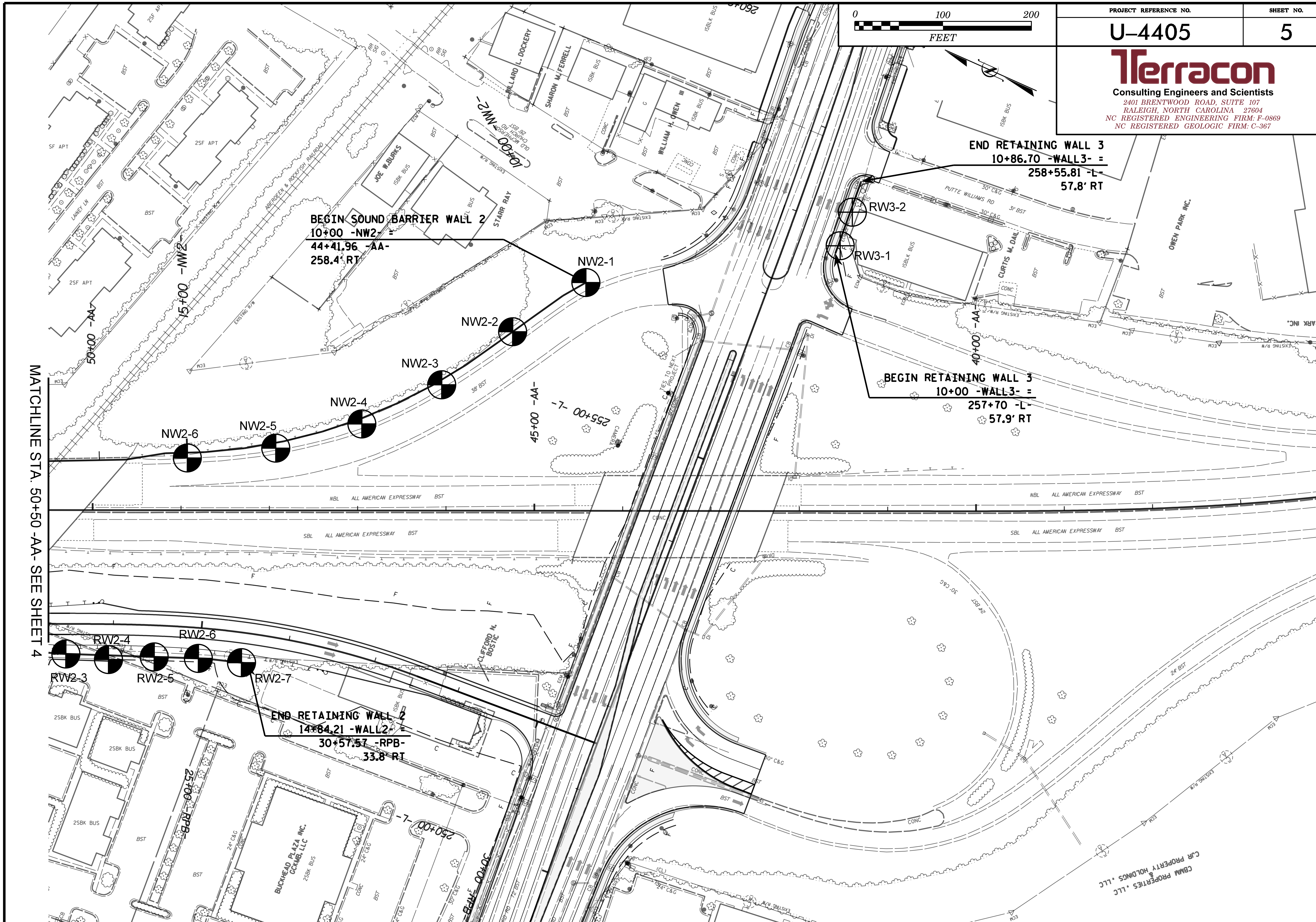
PROJECT REFERENCE NO. U-4405

SHEET NO. 5

Terracon

Consulting Engineers and Scientists

2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	6

PROFILE ALONG SOUND BARRIER WALL 1

250 240 230 220 210 200 190 180 170 160

NW1-7 10+75 -NW1- CL

SS-1011 NW1-8 11+76 -NW1- CL

SS-1012 NW1-9 12+75 -NW1- CL

SS-1013 NW1-10 13+75 -NW1- CL

SS-1014 NW1-11 14+76 -NW1- CL

SS-1015 NW1-12 15+90 -NW1- CL

TOP OF SOUND BARRIER WALL

EXISTING GROUND

PROPOSED GROUND AT FACE OF NOISE WALL

ROADWAY EMBANKMENT, RED-BROWN, LIGHT RED, BROWN, TO WET, COARSE TO FINE SAND, FINE TO COARSE MEDIUM STIFF TO STIFF, MOIST TO FINE SANDY CLAY (A-6)

UNDIVIDED COASTAL PLAIN, WHITE, GRAY BROWN, MOIST COARSE SAND BROWN-GRAY, WHITE, COARSE TO FINE ORANGE, BROWN, FINE TO COARSE SAND LOOSE TO MEDIUM (A-2-6, A-2-4, A-1-b) RED, BROWN, GRAY, SANDY CLAY RED-ORANGE, GRAY, MEDIUM DENSE, MOIST (A-2-4, A-3, A-1-b)

(A) DENSE, MOIST TO WET, MEDIUM STIFF TO VERY TO WET, SILTY (A-7-6, A-6)

(B) CLAYEY FINE TO COARSE STIFF, MOIST, TO WET, FINE TO COARSE SAND, SAND, SILTY SILTY CLAY, FINE SAND,

BT CAVED DRY @ 6.0' 02/18

BT FIAD 02/18

BT CAVED DRY @ 8.0' 02/18

BT CAVED DRY @ 7.8' 02/18

BT CAVED DRY @ 9.2' 02/18

BT CAVED DRY @ 7.0' 02/18

10+00 11+00 12+00 13+00 14+00 15+00 16+00

(A) ROADWAY EMBANKMENT, BROWN, GRAY-BROWN, VERY STIFF, MOIST, FINE SANDY CLAY (A-6)

(B) UNDIVIDED COASTAL PLAIN, RED, BROWN, GRAY, MEDIUM DENSE, MOIST, CLAYEY COARSE TO FINE SAND (A-2-6)

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0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	7

PROFILE ALONG SOUND BARRIER WALL 1

250 240 230 220 210 200 190 180 170 160

SS-1016 SS-1017 SS-1018 SS-1019 SS-1020 SS-1021

NW1-13 16+75 -NW1- CL

NW1-14 17+75 -NW1- 14' LT

NW1-15 18+75 -NW1- 1' LT

NW1-16 19+75 -NW1- CL

NW1-17 20+75 -NW1- CL

NW1-18 21+75 -NW1- CL

TOP OF SOUND BARRIER WALL

PROPOSED GROUND AT FACE OF NOISE WALL

EXISTING GROUND

02/18

BT

UNDIVIDED COASTAL PLAIN, LIGHT BROWN, MOIST TO WET, DENSE TO VERY DENSE, COARSE TO FINE SANDY CLAY, SILTY CLAY

PLAIN, BROWN, ORANGE-BROWN, GRAY, MOIST TO WET, COARSE TO FINE SANDY CLAY, SILTY CLAY

UNDIVIDED COASTAL PLAIN, YELLOW-BROWN, DENSE, MOIST TO WET, SILTY FINE TO COARSE SAND INTERBEDDED

RED, WHITE, MEDIUM STIFF TO VERY STIFF, ORANGE-BROWN, RED, MOIST, SILTY CLAY (A-7-6, A-6)

STIFF, WHITE, BROWN, MEDIUM DENSE, MOIST, SILTY FINE TO COARSE SAND (A-2-4, A-3, A-1-b)

ORANGE-BROWN, RED, LOOSE, MOIST, COARSE SAND, SILTY FINE TO COARSE SAND (A-1-b, A-2-4)

COASTAL PLAIN, BROWN, RED, VERY SATURATED, CLAYEY SAND (A-2-6) (MIDDENDORF FORMATION)

CAVED DRY @ 9.5' 02/18

CAVED DRY @ 10.0' 02/18

CAVED DRY @ 9.0' 02/18

CAVED DRY @ 13.5' 02/18

MATCHLINE STA. 22+21.03 -NW1- SEE SHEET 8 = BEGIN RETAINING WALL 1 STA. 8+60.00 -WALL1-

Ⓒ ROADWAY EMBANKMENT, BROWN, GRAY, LOOSE, MOIST TO WET, COARSE SAND, SILTY FINE TO COARSE SAND (A-1-b, A-2-4)

Ⓓ ROADWAY EMBANKMENT, BROWN, ORANGE-BROWN, MEDIUM STIFF, WET, COARSE TO FINE SANDY CLAY (A-6)

Ⓔ UNDIVIDED COASTAL PLAIN, LIGHT BROWN, ORANGE-BROWN, MEDIUM DENSE, MOIST, COARSE SAND, CLAYEY SAND SEAMS (A-1-b)

17+00 18+00 19+00 20+00 21+00 22+00 23+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 20 40 FEET VERTICAL

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
U-4405	8

PROFILE ALONG RETAINING WALL 1

MATCHLINE STA. 22+21.03 -NW1- SEE SHEET 7 =
BEGIN RETAINING WALL 1 STA. 8+60.00 -WALL1-

SS-1030
RW1-1
8+64 -RW1-
CL

SS-1031
RW1-2
9+13 -RW1-
11' LT

RW1-3
9+71 -RW1-
23' LT

SS-1032
RW1-4
10+14 -RW1-
11' LT

SS-1033
RW1-5
10+64 -RW1-
11' LT

TOP OF SOUND BARRIER WALL

BOTTOM OF SOUND BARRIER WALL

FINISHED GRADE BEHIND RETAINING WALL

TOP OF RETAINING WALL

FINISHED GRADE IN FRONT OF RETAINING WALL

EXISTING GROUND

UNDIVIDED COASTAL COARSE TO FINE

PLAIN, RED-BROWN, BROWN, ORANGE-BROWN, SANDY CLAY

GRAY, MEDIUM STIFF TO HARD, MOIST TO WET, SILTY CLAY, (A-7-5, A-7-6, A-6)

BROWN, GRAY, YELLOW-BROWN, COASTAL PLAIN, CLAYEY COARSE

RED, MEDIUM DENSE TO DENSE, MOIST ORANGE-BROWN, RED, GRAY, PURPLE, TO FINE SAND, INTERBEDDED

TO WET, FINE SAND, BROWN, WHITE, VERY LOOSE SANDY CLAY, TRACE MICA

CLAYEY COARSE TO FINE SAND (A-3, A-2-6) TO LOOSE, SATURATED TO WET, (MIDDENDORF FORMATION) (A-2-6)

BT CAVED DRY @ 14.5' 02/18

BT CAVED DRY @ 13.5' 02/18

BT CAVED DRY @ 13.0' 02/18

BT FIAD 02/18

BT CAVED DRY @ 18.0' 02/18

–RW1–		8+60	9+00		10+00	
–NW1–	22+00	22+21.03		23+00		24+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 20 40 FEET VERTICAL

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
U-4405	9

PROFILE ALONG RETAINING WALL 1

300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110

SS-1034
RW1-6
11+14 -RW1-
4' LT

SS-1035
SS-1036
RW1-7
11+64 -RW1-
18' LT

SS-1037
SS-1038
RW1-8
12+14 -RW1-
17' LT

RW1-9
12+64 -RW1-
3' RT

RW1-10
13+14 -RW1-
5' RT

BOTTOM OF SOUND BARRIER WALL

TOP OF SOUND BARRIER WALL

FINISHED GRADE BEHIND RETAINING WALL

TOP OF RETAINING WALL

EXISTING GROUND

FINISHED GRADE IN FRONT OF RETAINING WALL

ARTICIAL FILL, DARK BROWN, MEDIUM STIFF, WET, COARSE TO FINE SANDY CLAY, CLAYEY SAND LAYERS (A-6)

UNDIVIDED COASTAL PLAIN, BROWN, RED-BROWN, YELLOW-BROWN, ORANGE-BROWN, GRAY, SOFT TO HARD, DRY TO WET, SILTY CLAY, FINE SANDY CLAY

INTERBEDDED YELLOW-BROWN, ORANGE-BROWN, GRAY, RED, VERY COARSE SAND, SANDY CLAYEY FINE SAND LOOSE TO DENSE, MOIST TO (A-7-6, A-6)

COASTAL PLAIN, BLACK, DARK BROWN, RED, ORANGE, DARK GRAY, VERY LOOSE TO MEDIUM DENSE, WET TO SATURATED, CLAYEY FINE SAND, CLAYEY CLAY SEAMS (A-3, A-2-6, A-1-b, A-2-4) FINE SAND, FINE TO COARSE SAND, SILTY FINE TO

BROWN, DARK RED, DARK GRAY, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, SILTY CLAY, (A-7-6) (BLACK CREEK FORMATION)

SATURATED, CLAYEY COARSE SAND, SILTY FINE TO COARSE SAND, TRACE MICA (A-2-6, A-2-4)

(MIDDENDORF FORMATION)

DARK GRAY, MEDIUM STIFF TO VERY STIFF, WET, SILTY CLAY (A-7-6)

BT
CAVED DRY @ 12.0' 02/18

BT
CAVED DRY @ 23.0' 02/18

BT
CAVED WET @ 25.0' 02/18

02/18

02/18

(A) COASTAL PLAIN, BROWN, SOFT, WET, FINE SANDY SILT, TRACE MICA, CLAY SEAMS (A-4)

(B) COASTAL PLAIN, DARK GRAY, MEDIUM DENSE, SATURATED, CLAYEY COARSE SAND, INTERBEDDED SILTY COARSE SAND LAYERS (A-2-6) (BLACK CREEK FORMATION)

–RW1– 11+00 12+00 13+00

–NW1– 25+00 26+00 27+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 20 40 FEET VERTICAL

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
U-4405	10

PROFILE ALONG RETAINING WALL 1

310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120

SS-1039

SS-1040

RW1-11
13+64 -RW1-
5' LT

RW1-12
14+14 -RW1-
5' LT

RW1-13
14+64 -RW1-
CL

EB1-A
15+37 -RW1-
42' LT

TOP OF SOUND BARRIER WALL

BOTTOM OF SOUND BARRIER WALL

TOP OF RETAINING WALL

FINISHED GRADE BEHIND RETAINING WALL

ARTIFICIAL FILL, DARK BROWN, MEDIUM STIFF, WET, COARSE TO FINE SANDY CLAY (A-6)

FINISHED GRADE IN FRONT OF RETAINING WALL

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, TAN, ORANGE-TAN, LOOSE TO MEDIUM DENSE, MOIST, SILTY FINE SAND, CLAYEY FINE SAND (A-2-4, A-2-6)

UNDIVIDED COASTAL PLAIN, ORANGE, TAN, RED, YELLOW-BROWN, TO COARSE SAND, CLAY SEAMS.

GRAY, ORANGE, BROWN, BLACK, CLAY, INTERBEDDED WHITE, LOOSE TO DENSE, FINE TO COARSE SAND

02/18

TAN, RED, SOFT TO HARD, MOIST TO WET, FINE TO CLAYEY SAND (A-6, A-7-6)

WET TO SATURATED, FINE SAND, SILTY FINE TO COARSE SAND, CLAYEY (A-3, A-2-4, A-2-6)

02/18

07/15

COARSE SANDY CLAY, SILTY

COARSE SAND, CLAYEY

FINE SAND LAYERS

(B) COASTAL PLAIN, DARK GRAY, BROWN, DARK GRAY, MEDIUM DENSE, SATURATED, CLAYEY COARSE SAND, INTERBEDDED SILTY COARSE SAND LAYERS (A-2-6) (BLACK CREEK FORMATION)

(C) COASTAL PLAIN, BROWN, DARK GRAY, VERY SOFT TO HARD, MOIST, SILTY CLAY, INTERBEDDED SILTY COARSE TO FINE SAND (A-7-6) (MIDDENDORF FORMATION)

COASTAL PLAIN, DARK GRAY, BLACK, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, SILTY CLAY, INTERBEDDED (A-7-5, A-7-6) (BLACK CREEK FORMATION)

WHITE, ORANGE, TAN, GRAY, CLAYEY FINE TO COARSE

LOOSE TO VERY DENSE, WET TO SATURATED, SAND, TRACE MICA (A-1-b, A-2-4, A-2-6)

COARSE SAND, SILTY FINE (MIDDENDORF FORMATION)

GRAY, HARD, WET, SANDY CLAY, TRACE MICA (A-6)

GRAY, MEDIUM DENSE, SATURATED, CLAYEY SAND (A-2-6)

BT

BT FIAD 02/18

BT

BT

BT

–RW1– 14+00 15+00 16+00

–NW1– 28+00 28+30 END SOUND BARRIER WALL 1

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 20 40 FEET VERTICAL

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
U-4405	11

PROFILE ALONG RETAINING WALL 2

EB2-A
10+14 -RW2-
45' LT

SS-1022
RW2-1
11+71-RW2-
CL

SS-1023
RW2-2
12+28-RW2-
5 RT

FINISHED GRADE BEHIND WALL

TOP OF WALL

FINISHED GRADE IN FRONT OF WALL

EXISTING GROUND

PAVEMENT, ASPHALT, ABC

UNDIVIDED COASTAL PLAIN, TAN-GRAY, BROWN, ORANGE-BROWN, STIFF TO HARD, MOIST TO WET, FINE TO COARSE SANDY CLAY (A-6)

07/15

TAN, GRAY, RED, WHITE, ORANGE-BROWN, LOOSE TO DENSE, WET TO SATURATED, FINE SAND, SILTY COARSE TO FINE SAND.

MOTTLED, CLAYEY FINE SAND, TRACE PARTIALLY CEMENTED SANDS (A-3, A-2-4, A-2-6)

COASTAL PLAIN, GRAY, DARK GRAY, STIFF TO VERY STIFF, MOIST TO WET, SILTY CLAY, THIN SEAMS OF FINE SAND (A-7-6)
(BLACK CREEK FORMATION)

COASTAL PLAIN, TAN, ORANGE, RED, BROWN, ORANGE-BROWN, MEDIUM DENSE, MOIST TO SATURATED, CLAYEY SAND, PARTIALLY CEMENTED SAND FRAGMENTS (A-2-6, A-2-4, A-1-b) (MIDDENDORF FORMATION) SILTY COARSE SAND, COARSE SAND.

GRAY, HARD, MOIST, SILTY CLAY (A-7-6) (MUDSTONE)

GRAY, DENSE, SATURATED, CLAYEY SAND (A-2-6)

BT

BT FIAD 02/18

BT FIAD 02/18

Ⓐ UNDIVIDED COASTAL PLAIN, TAN, MEDIUM DENSE, MOIST, SILTY FINE SAND (A-2-4)

Ⓑ ROADWAY EMBANKMENT, BROWN, MEDIUM DENSE, MOIST, FINE TO COARSE SAND (A-1-b)

Ⓒ COASTAL PLAIN, LIGHT GRAY, HARD, DRY, SILTY CLAY (A-7-5) (MIDDENDORF FORMATION)

300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100

10+00 11+00 12+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 20 40 FEET VERTICAL

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
U-4405	12

PROFILE ALONG RETAINING WALL 2

SS-1024

RW2-3
12+78-RW2-
CL

SS-1025

RW2-4
13+26-RW2-
5' RT

SS-1026

RW2-5
13+78-RW2-
CL

SS-1027
SS-1028

RW2-6
14+28-RW2-
CL

SS-1029

RW2-7
14+77 -RW2-
CL

TOP OF WALL

FINISHED GRADE BEHIND WALL

PAVEMENT, ASPHALT, ABC

FINISHED GRADE IN FRONT OF WALL

PAVEMENT, ASPHALT, ABC

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, YELLOW-BROWN, ORANGE-BROWN, SILTY COARSE TO FINE SAND,

BROWN, ORANGE-BROWN, GRAY, WHITE, TAN, BROWN, VERY CLAYEY COARSE TO FINE SAND,

RED, STIFF TO HARD, MOIST TO LOOSE TO DENSE, MOIST TO TRACE MICA, INTERBEDDED SANDY

WET, FINE TO COARSE SANDY INTERBEDDED SILTY SAND SATURATED, FINE SAND, FINE TO COARSE SAND,

CLAY, SILTY CLAY, (A-6, A-7-6)

CLAY (A-3, A-1-b, A-2-4, A-2-6)

02/18

MEDIUM TO FINE SAND, INTERBEDDED TRACE MICA

BROWN, RED, LOOSE TO DENSE, SATURATED, SILTY COARSE SAND, COARSE SANDY SILT, (A-2-4, A-1-b)

COASTAL PLAIN, LIGHT GRAY, GRAY, HARD, MOIST TO WET, SILTY SOME MUDSTONE (A-7-6)

CLAY, INTERBEDDED SANDY (MIDDENDORF FORMATION)

CLAY.

BT FIAD 02/18

BT FIAD 02/18

BT CAVED DRY @ 28.0' 02/18

BT FIAD 02/18

Ⓓ ROADWAY EMBANKMENT, LIGHT GRAY, BROWN, MEDIUM DENSE, MOIST, FINE TO COARSE SAND (A-1-b)

Ⓔ UNDIVIDED COASTAL PLAIN, BLACK, BROWN, DARK BROWN, VERY SOFT TO SOFT, MOIST, FINE SANDY SILT (A-4)

Ⓕ ARTIFICIAL FILL, DARK BROWN, BROWN, LOOSE TO MEDIUM DENSE, MOIST, CLAYEY FINE TO COARSE SAND, INTERBEDDED SAND, BRICK DEBRIS (A-2-6)

Ⓖ COASTAL PLAIN, GRAY, DARK GRAY, STIFF TO VERY STIFF, MOIST TO WET, SILTY CLAY, THIN SEEMS OF FINE SAND (A-7-6) (BLACK CREEK FORMATION)

Ⓗ COASTAL PLAIN, BROWN, MEDIUM DENSE, MOIST TO SATURATED, SILTY COARSE SAND, COARSE SAND, SILT LAYERS (A-2-4, A-1-b) (MIDDENDORF FORMATION)

Ⓘ UNDIVIDED COASTAL PLAIN, RED, ORANGE, GRAY, STIFF, WET TO SATURATED, SILTY CLAY, INTERBEDDED COARSE TO FINE SAND LAYERS, COARSE TO FINE SANDY CLAY (A-7-6, A-6)

Ⓙ UNDIVIDED COASTAL PLAIN, LIGHT BROWN, RED, ORANGE, MEDIUM STIF TO VERY STIFF, WET TO SATURATED, COARSE TO FINE SANDY SILT, LITTLE MICA, INTERBEDDED SILTY SAND (A-4)

310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110

13+00 14+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -RW3- TAKEN FROM THE PROJECT TIN FILE (u4405_ls_tin.tin) DATED 10/03/2017.

0 20 40 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 2

PROJECT REFERENCE NO.	SHEET NO.
U-4405	13

PROFILE ALONG RETAINING WALL 3

260 250 240 230 220 210 200 190 180 170

FINISHED GRADE BEHIND WALL

FINISHED GRADE IN FRONT OF WALL

TOP OF WALL

RW3-1
10+10 -WALL3-
2' RT

RW3-2
10+51 -WALL3-
2' RT

EXISTING GROUND

ROADWAY EMBANKMENT, DARK BROWN, TAN, GRAY, UNDIVIDED COASTAL PLAIN, ORANGE, MEDIUM DENSE, MOIST, TAN-ORANGE, LOOSE TO MEDIUM DENSE, DRY TO MOIST, SILTY SAND (A-2-4)

CLAYEY SAND, TRACE GRAVEL (A-2-6)

BT FIAD 11/17

BT FIAD 11/17

10+00 11+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	14

PROFILE ALONG SOUND BARRIER WALL 2

270 260 250 240 230 220 210 200 190 180

SS-1000

SS-1001

NW2-1 10+00 CL

NW2-2 11+00 CL

NW2-3 12+00 5' LT

NW2-4 13+00 6' LT

NW2-5 14+00 6' LT

NW2-6 15+00 6' LT

TOP OF SOUND BARRIER WALL PANEL

PAVEMENT, ASPHALT

12 33 22 19 5 12 23

UNDIVIDED TO TO COARSE

ROADWAY EMBANKMENT, MOIST FINE SAND, COASTAL PLAIN, MEDIUM DENSE, SAND, CLAYEY FINE SAND, SANDY (A-2-6, B)

BT

CAVED DRY @ 15.8' 01/18

15 35 34 16 35 6 11

EMBANKMENT, TO WET, SANDY CLAY

GRAY-BROWN, MOIST TO WET, TO COARSE SAND, CLAY LAYERS A-2-4, A-1-b)

BT

FIAD 01/18

16 13 22 19 16 21 6

BROWN, GRAY, SILTY LAYERS

GRAY-BROWN, SILTY FINE FINE

BT

CAVED DRY @ 16.5' 01/18

8 7 14 17 20 19 6

WHITE, ORANGE, COARSE TO

ORANGE-BROWN, (A) (B)

BT

FIAD 01/18

10 17 31 18 9 44 26

LOOSE TO FINE SAND, (A-2-4, A-2-6)

LOOSE

BT

CAVED DRY @ 15.8' 01/18

10 19 24 18 17 38 19

DENSE, CLAYEY COARSE TO

BT

FIAD 01/18

EXISTING GROUND AT FACE OF SOUND BARRIER WALL

(A) ROADWAY EMBANKMENT, BROWN, WHITE, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, COARSE TO FINE SANDY CLAY, COARSE SAND LAYERS (A-6)

(B) UNDIVIDED COASTAL PLAIN, GRAY, RED, ORANGE-BROWN, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, COARSE TO FINE SANDY CLAY (A-6)

-SWAL2- 10+00 11+00 12+00 13+00 14+00 15+00 16+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	15

PROFILE ALONG SOUND BARRIER WALL 2

SS-1002

SS-1003

NW2-7 18+00 12' LT

NW2-8 19+00 8' LT

NW2-9 20+00 8' LT

NW2-10 21+00 10' LT

NW2-11 22+00 13' LT

NW2-12 23+00 8' LT

TOP OF SOUND BARRIER WALL PANEL

PAVEMENT, ASPHALT

ROADWAY EMBANKMENT, BROWN, WHITE, ORANGE-BROWN, BLACK, GRAY-BROWN, LOOSE TO DENSE, MOIST TO WET, CLAYEY COARSE TO FINE SAND, LAYERS, SOME ASPHALT DEBRIS

(A-2-6, A-2-4)

01/18

UNDIVIDED COASTAL PLAIN, BROWN, STIFF, MOIST, CLAY (A-6)

SILTY FINE TO COARSE SAND, UNDIVIDED GRAY-BROWN, MOIST TO WET, COARSE TO FINE SAND

COASTAL PLAIN, LOOSE, CLAYEY (A-2-6)

BT FIAD 01/18

EXISTING GROUND AT FACE OF SOUND BARRIER WALL

Ⓒ ROADWAY EMBANKMENT, BROWN, STIFF, MOIST, COARSE TO FINE SANDY CLAY (A-6)

Ⓓ UNDIVIDED COASTAL PLAIN, GRAY, BROWN-ORANGE, MEDIUM STIFF, WET, FINE SANDY CLAY (A-6)

260 250 240 230 220 210 200 190 180 170

–SWAL2– 17+00 18+00 19+00 20+00 21+00 22+00 23+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	16

PROFILE ALONG SOUND BARRIER WALL 2

260 250 240 230 220 210 200 190 180 170

SS-1004

NW2-13 24+00 6' LT

NW2-14 25+15 2' RT

NW2-15 26+00 CL

NW2-16 27+00 CL

NW2-17 28+00 CL

NW2-18 29+00 CL

NW2-19 30+00 CL

EXISTING GROUND AT FACE OF SOUND BARRIER WALL

TOP OF SOUND BARRIER WALL PANEL

PAVEMENT, ASPHALT

ROADWAY EMBANKMENT, TO DENSE, DRY SAND, SANDY CLAY

UNDIVIDED WHITE, TO WET, COASTAL LAYERS

ORANGE-BROWN, SILTY FINE TO COARSE PLAIN, GRAY, STIFF TO

BROWN, GRAY-BROWN, VERY STIFF, TO FINE

RED-BROWN, SAND, CLAYEY RED-BROWN, MOIST TO WET, SANDY CLAY, (A-6, A-7-6)

LOOSE COARSE TO (A-2-4, ORANGE-BROWN, SILTY CLAY, HIGHLY

FINE A-2-6) RED, COARSE PLASTIC

(15) (20) (31) (31) (21) BT FIAD 01/18

(7) (8) (15) (19) (24) (6) BT CAVED DRY @ 11.2' 01/18

(13) (14) (28) (21) (22) (8) BT CAVED DRY @ 11.2' 02/18

(12) (17) (30) (14) (9) (11) (21) BT CAVED DRY @ 11.2' 02/18

(19) (20) (30) (21) (9) (19) (15) BT CAVED DRY @ 8.9' 02/18

(8) (16) (31) (21) (9) (18) (19) BT CAVED DRY @ 8.9' 02/18

(12) (16) (27) (16) (20) (16) (19) BT CAVED DRY @ 9.0' 02/18

(E) ROADWAY EMBANKMENT, GRAY, BROWN, RED, STIFF TO VERY STIFF, COARSE TO FINE SANDY CLAY (A-6)

(F) UNDIVIDED COASTAL PLAIN, GRAY, ORANGE, BROWN, RED, MEDIUM DENSE, MOIST, COARSE SAND, SILTY COARSE TO FINE SAND, CLAYEY FINE TO COARSE SAND, INTERBEDDED SAND, CLAYEY SAND (A-2-4, A-1-b, A-2-6)

-SWAL2- 24+00 25+00 26+00 27+00 28+00 29+00 30+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	17

PROFILE ALONG SOUND BARRIER WALL 2

250 240 230 220 210 200 190 180 170 160

SS-1005

NW2-20 31+00 CL

NW2-21 32+00 CL

SS-1006

NW2-22 33+00 CL

NW2-23 34+00 CL

NW2-24 35+00 CL

NW2-25 36+00 CL

NW2-26 37+00 CL

TOP OF SOUND BARRIER WALL PANEL

EXISTING GROUND AT FACE OF SOUND BARRIER WALL

ROADWAY EMBANKMENT, DENSE, MOIST TO WET, SILTY CLAY, GRAY-BROWN, (H)

UNDIVIDED COASTAL PLAIN, MEDIUM STIFF TO STIFF, SILTY CLAY, COARSE TO FINE SANDY CLAY, (J)

BROWN, WHITE, FINE TO COARSE SAND, RED, RED-BROWN, BROWN, LIGHT GRAY, SANDY CLAY, HIGHLY PLASTIC

LIGHT BROWN, ORANGE-BROWN, CLAYEY SAND TO LOOSE TO LAYERS (A-2-4) GRAY, ORANGE, MOTTLED, MOIST TO WET, (A-6, A-7-6)

(H) ROADWAY EMBANKMENT, BROWN, RED-BROWN, WHITE, STIFF, MOIST, COARSE TO FINE SANDY CLAY, SILTY CLAY (A-6, A-7-5)

(I) ROADWAY EMBANKMENT, BROWN, MEDIUM DENSE, MOIST, CLAYEY FINE TO COARSE SAND, COARSE SAND LAYERS (A-2-6)

(J) UNDIVIDED COASTAL PLAIN, GRAY, RED, ORANGE, BROWN, MEDIUM DENSE, MOIST TO WET, CLAYEY COARSE TO FINE SAND, INTERBEDDED SANDY CLAY (A-2-6)

CAVED DRY @ 9.4' 02/18

CAVED DRY @ 9.2' 02/18

CAVED DRY @ 9.8' 02/18

FIAD 02/18

CAVED DRY @ 6.4' 02/18

FIAD 02/18

FIAD 02/18

–SWAL2– 31+00 32+00 33+00 34+00 35+00 36+00 37+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

0 50 100 FEET HORIZONTAL

0 5 10 20 FEET VERTICAL

VE = 5

PROJECT REFERENCE NO.	SHEET NO.
U-4405	18

PROFILE ALONG SOUND BARRIER WALL 2

260 250 240 230 220 210 200 190 180 170

SS-1007

NW2-27 38+00 CL

NW2-28 39+00 CL

NW2-29 40+00 CL

NW2-30 41+00 CL

TOP OF SOUND BARRIER WALL PANEL

EXISTING GROUND AT FACE OF SOUND BARRIER WALL

11 15 10 13 26 13 — BT — CAVED DRY @ 6.5' 02/18

14 11 22 21 22 20 — BT — CAVED DRY @ 5.8' 02/18

12 11 16 17 18 17 — BT — FIAD 02/18

14 7 18 19 19 18 — BT — CAVED DRY @ 7.0' 02/18

Ⓗ UNDIVIDED GRAY, RED, Ⓘ COASTAL MEDIUM STIFF WET, SILTY CLAY, Ⓕ Ⓘ PLAIN, BROWN, TO VERY STIFF, COARSE TO FINE (A-7-6, Ⓘ ORANGE-BROWN, MOIST TO SANDY CLAY, A-6)

Ⓕ UNDIVIDED COASTAL PLAIN, GRAY, ORANGE, BROWN, RED, MEDIUM DENSE, MOIST, COARSE SAND, SILTY COARSE TO FINE SAND, CLAYEY COARSE TO FINE SAND, INTERBEDDED CLAYEY SAND (A-2-4, A-1-b, A-2-6)

Ⓗ ROADWAY EMBANKMENT, BROWN, RED-BROWN, WHITE, STIFF, MOIST, COARSE TO FINE SANDY CLAY, SILTY CLAY (A-6, A-7-6)

Ⓘ ROADWAY EMBANKMENT, BROWN, MEDIUM DENSE, MOIST, CLAYEY FINE TO COARSE SAND, COARSE SAND LAYERS (A-2-6)

Ⓚ ROADWAY EMBANKMENT, BROWN, MEDIUM DENSE, MOIST, SILTY COARSE TO FINE SAND (A-2-4)

-SWAL2- 38+00 39+00 40+00 41+00

Terracon
Consulting Engineers and Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-1	**STATION** 76+92	**OFFSET** 75 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 215.0 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,705	**EASTING** 2,016,312	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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)
215										215.0 GROUND SURFACE	0.0
	214.0	1.0	4	6	6	12		M		**ROADWAY EMBANKMENT** BROWN AND ORANGE-BROWN, CLAYEY COARSE TO FINE SAND	
										212.0	3.0
210	211.0	4.0	2	5	7	12		W		**UNDIVIDED COASTAL PLAIN** GRAY-BROWN AND ORANGE-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	
	208.5	6.5	2	5	10	15		W			
	206.0	9.0									
205			8	10	12	22		M			
										203.0	12.0
	201.0	14.0								GRAY AND LIGHT BROWN, COARSE TO FINE SANDY CLAY, INTERBEDDED SILTY CLAY LAYERS	
200			5	6	10	16		W			
										198.0	17.0
	196.0	19.0								RED, ORANGE, AND GRAY, SILTY CLAY, INTERBEDDED COARSE SAND, CLAYEY SAND, AND SANDY CLAY LAYERS	
195			7	10	10	20		M		194.5	20.5
										Boring Terminated at Elevation 194.5 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY	
										24 Hr. Water Level Caved Dry At 6.0'	

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-2	**STATION** 75+92	**OFFSET** 75 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 214.9 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,636	**EASTING** 2,016,385	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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	
215										214.9 GROUND SURFACE	0.0
	213.9	1.0	4	2	2	4		W		213.4 **ROADWAY EMBANKMENT** BROWN AND GRAY, COARSE TO FINE SANDY CLAY	1.5
										211.4	3.5
210	210.9	4.0	3	4	5	9		W		**UNDIVIDED COASTAL PLAIN** BROWN AND DARK GRAY, SILTY COARSE TO FINE SAND, INTERBEDDED CLAYEY SAND	
	208.4	6.5	5	6	7	13	SS-1008	18%			
	205.9	9.0								BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	
205			8	10	12	22		M		205.4	9.5
										ORANGE-BROWN AND GRAY, COARSE TO FINE SANDY CLAY, INTERBEDDED CLAYEY SAND LAYERS	
	200.9	14.0								201.9	13.0
200			5	6	6	12		W		LIGHT TO DARK GRAY, LIGHT RED TO RED, AND ORANGE-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	
	195.9	19.0									
195			8	9	11	20		W		194.4	20.5
										Boring Terminated at Elevation 194.4 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY	
										24 Hr. Water Level Caved Dry At 6.0'	

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-3	**STATION** 74+92	**OFFSET** 75 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 214.6 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,567	**EASTING** 2,016,458	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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)
215										GROUND SURFACE	214.6	0.0
	213.6	1.0	4	5	2	7		W		**ROADWAY EMBANKMENT** BROWN AND GRAY, COARSE TO FINE SANDY CLAY	213.1	1.5
210	210.6	4.0	5	7	10	17		M		**UNDIVIDED COASTAL PLAIN** BROWN AND DARK GRAY, SILTY COARSE TO FINE SAND, INTERBEDDED COARSE SAND AND CLAYEY SAND LAYERS	211.1	3.5
	208.1	6.5	10	12	12	24		M		BROWN AND RED-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	207.6	7.0
205	205.6	9.0	7	8	9	17		M		BROWN, GRAY, RED, AND ORANGE-BROWN, COARSE TO FINE SANDY CLAY, INTERBEDDED SILTY CLAY, CLAYEY SAND, AND COARSE SAND LAYERS		
200	200.6	14.0	7	9	10	19		M		RED, DARK GRAY, AND YELLOW-BROWN, SILTY CLAY	198.6	16.0
195	195.6	19.0	4	6	7	13		W			194.1	20.5
										Boring Terminated at Elevation 194.1 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY		
										0 Hr. Water Level Caved Dry At 7.3'		

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-4	**STATION** 73+92	**OFFSET** 76 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 214.1 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,498	**EASTING** 2,016,530	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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
215										GROUND SURFACE 214.1 0.0
	213.1	1.0	5	5	6	11		M		**ROADWAY EMBANKMENT** BROWN AND RED-BROWN, CLAYEY COARSE TO FINE SAND, SANDY CLAY LAYERS 210.6 3.5
210	210.1	4.0	3	4	5	9		W		**UNDIVIDED COASTAL PLAIN** BROWN, RED, AND RED-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS
	207.6	6.5	7	10	12	22		M		
205	205.1	9.0	7	8	8	16		M		
200	200.1	14.0	10	15	15	30		M		RED, SILTY COARSE TO FINE SAND 202.1 12.0
195	195.1	19.0	4	5	7	12		M		RED, GRAY, AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY AND CLAYEY SAND LAYERS 198.1 16.0
										193.6 20.5
										Boring Terminated at Elevation 193.6 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY
										24 Hr. Water Level Caved Dry At 7.0'

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-5	**STATION** 72+92	**OFFSET** 76 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 213.5 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,429	**EASTING** 2,016,603	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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)
215										213.5 GROUND SURFACE	0.0
	212.5	1.0	6	6	6	12	SS-1009	M		212.0 **ROADWAY EMBANKMENT** BROWN, CLAYEY COARSE TO FINE SAND	1.5
210	209.5	4.0	7	17	15	32		M		RED-BROWN AND BROWN, SILTY COARSE TO FINE SAND, COARSE SAND LAYERS	
	207.0	6.5	7	9	10	19		M		207.5 **UNDIVIDED COASTAL PLAIN** BROWN AND RED, SILTY CLAY, INTERBEDDED SANDY CLAY	6.0
205	204.5	9.0	5	6	9	15		M			
200	199.5	14.0	9	12	16	28		M		201.5 RED, SILTY FINE TO COARSE SAND	12.0
195	194.5	19.0	6	10	15	25		M		197.5 RED, GRAY, AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED CLAYEY SAND AND SANDY CLAY LAYERS	16.0
										193.0 Boring Terminated at Elevation 193.0 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY	20.5
										0 Hr. Water Level Caved Dry At 7.0'	

WBS 39049.1.1	**TIP** U-4405	**COUNTY** CUMBERLAND	**GEOLOGIST** Schlemm, T. S.	
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3				**GROUND WTR (ft)**
BORING NO. NW1-6	**STATION** 71+92	**OFFSET** 76 ft LT	**ALIGNMENT** -AA-	**0 HR.** Caved
COLLAR ELEV. 213.4 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 473,361	**EASTING** 2,016,675	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 02/08/18	**COMP. DATE** 02/08/18	**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)
215										213.4 GROUND SURFACE	0.0
	212.4	1.0	5	8	9	17		M		211.9 **ROADWAY EMBANKMENT** RED-BROWN, SILTY CLAY	1.5
210	209.4	4.0	4	6	9	15	SS-1010	12%		209.9 LIGHT GRAY, COARSE SAND	3.5
	206.9	6.5	4	5	9	14		M		BROWN, RED-BROWN, AND DARK GRAY, COARSE TO FINE SANDY CLAY, SILTY CLAY AND COARSE SAND LAYERS	
205	204.4	9.0	4	5	9	14		M		207.4	6.0
										204.9 **UNDIVIDED COASTAL PLAIN** LIGHT TO DARK GRAY, COARSE TO FINE SAND	8.5
200	199.4	14.0	6	7	8	15		M		BROWN, COARSE TO FINE SANDY CLAY	
										200.4 LIGHT BROWN, FINE TO COARSE SAND	13.0
195	194.4	19.0	5	7	10	17		M		195.4	18.0
										RED, YELLOW-BROWN, AND GRAY, SILTY CLAY	
										192.9 Boring Terminated at Elevation 192.9 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY	20.5
										0 Hr. Water Level Caved Dry At 5.0'	

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 39049.1.1 **TIP:** U-4405 **COUNTY:** CUMBERLAND

DESCRIPTION: NOISE WALLS 1 & 2 AND RETAINING WALLS 1 & 2 ALONG -RPB- AND RETAINING WALL 3 AT -L- STATION 257+70

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	-AA-SHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1008	-AA-	75+92	75' LT	6.5'-8.0'	A-7-6 (14)	56	37	30.9	21.1	3.8	44.2	0	100	82	51	17.7	ND
SS-1009	-AA-	72+92	76' LT	1.5'-2.5'	A-2-4 (0)	23	9	40.9	33.8	1.6	23.9	0	99	77	28	ND	ND
SS-1010	-AA-	71+92	76' LT	4.0'-5.5'	A-6 (2)	31	18	38.3	28.7	5.7	27.3	0	100	78	38	12.2	ND
SS-1011	-NW1-	11+76	CL	6.5'-8.0'	A-2-4 (0)	17	NP	44.2	35.8	2.8	17.2	0	100	77	24	ND	ND
SS-1012	-NW1-	12+75	CL	19.0'-20.5'	A-2-4 (0)	19	NP	4.4	81.3	1.1	13.2	0	100	99	15	ND	ND
SS-1013	-NW1-	13+75	CL	5.7'-7.2'	A-7-6 (11)	51	34	28.8	26.9	5.2	39.1	0	100	84	48	17.8	ND
SS-1014	-NW1-	14+76	CL	1.0'-2.5'	A-2-6 (1)	30	19	41.2	31.6	4.0	23.2	0	100	78	30	ND	ND
SS-1015	-NW1-	15+90	CL	18.1'-19.6'	A-2-4 (0)	20	NP	24.1	58.1	0.9	16.9	0	100	91	19	ND	ND
SS-1016	-NW1-	17+75	14' LT	8.2'-9.7'	A-6 (4)	37	25	37.2	28.9	9.7	24.2	0	100	78	39	16.1	ND
SS-1017	-NW1-	18+75	1' LT	18.2'-19.7'	A-3 (0)	19	NP	14.9	78.4	2.8	3.9	0	100	93	8	ND	ND
SS-1018	-NW1-	19+75	CL	3.7'-5.2'	A-7-5 (31)	64	34	8.9	13.0	17.8	60.3	0	100	94	82	33.9	ND
SS-1019	-NW1-	19+75	CL	13.7'-15.2'	A-2-4 (0)	19	NP	15.3	75.0	1.2	8.5	0	100	94	11	ND	ND
SS-1020	-NW1-	21+75	CL	3.5'-5.0'	A-7-6 (36)	66	38	7.0	8.7	8.9	75.4	0	100	95	85	30.4	ND
SS-1021	-NW1-	21+75	CL	13.5'-15.0'	A-3 (0)	18	NP	6.8	85.8	0.5	6.9	0	100	98	8	ND	ND
SS-1030	-RW1-	8+64	CL	13.5'-15.0'	A-2-4 (0)	20	NP	1.3	85.6	5.8	7.3	0	100	100	14	ND	ND
SS-1031	-RW1-	9+13	11' LT	3.5'-5.0'	A-7-5 (35)	68	37	8.1	9.3	16.0	66.6	0	100	95	84	30.1	ND
SS-1032	-RW1-	10+14	11' LT	13.5'-15.0'	A-3 (0)	20	NP	7.7	85.7	1.5	5.1	0	100	97	8	ND	ND
SS-1033	-RW1-	10+64	11' LT	1.0'-2.5'	A-7-6 (20)	47	29	12.7	16.5	16.1	54.7	0	100	93	74	24.0	ND
SS-1034	-RW1-	11+14	4' LT	33.5'-35.0'	A-2-4 (0)	29	4	41.7	39.5	4.4	14.4	0	100	92	20	ND	ND
SS-1035	-RW1-	11+64	18' LT	1.0'-2.5'	A-7-6 (23)	56	32	14.3	15.0	14.9	55.8	0	100	91	73	30.6	ND
SS-1036	-RW1-	11+64	18' LT	8.5'-10.0'	A-2-6 (2)	39	23	0.0	68.1	6.1	25.8	0	100	100	34	ND	ND
SS-1037	-RW1-	12+14	17' LT	6.0'-7.5'	A-7-6 (26)	66	43	15.0	23.0	8.0	54.0	0	100	92	64	27.4	ND
SS-1038	-RW1-	12+14	17' LT	13.5'-15.0'	A-3 (0)	21	NP	6.3	85.8	1.9	6.0	0	100	98	9	ND	ND
SS-1039	-RW1-	14+14	5' LT	18.0'-19.5'	A-3 (0)	20	NP	33.8	59.9	0.2	6.1	0	100	84	7	ND	ND
SS-1040	-RW1-	14+64	CL	28.4'-29.9'	A-7-6 (45)	66	39	1.3	2.7	28.2	67.8	0	100	100	98	38.9	ND
SS-1022	-RW2-	11+71	CL	4.0'-5.5'	A-6 (7)	37	25	16.1	40.4	9.6	33.9	0	100	94	48	12.0	ND
SS-1023	-RW2-	12+28	5' RT	14.0'-15.5'	A-3 (0)	18	NP	6.8	86.4	0.4	6.4	0	100	99	8	ND	ND
SS-1024	-RW2-	12+78	CL	8.5'-10.0'	A-7-6 (9)	50	33	35.5	21.7	6.3	36.5	0	100	79	45	20.6	ND
SS-1025	-RW2-	13+26	5' RT	13.5'-15.0'	A-7-6 (8)	42	29	9.7	47.7	7.5	35.1	0	100	94	46	19.3	ND
SS-1026	-RW2-	13+78	CL	5.8'-7.3'	A-7-6 (20)	50	27	9.2	20.7	19.3	50.8	0	100	95	74	22.3	ND
SS-1027	-RW2-	14+28	CL	5.9'-7.4'	A-7-6 (17)	44	29	8.7	30.1	13.2	48.0	0	100	96	68	20.2	ND
SS-1028	-RW2-	14+28	CL	33.4'-34.9'	A-2-4 (0)	22	NP	57.9	27.6	4.3	10.2	0	100	73	16	ND	ND
SS-1029	-RW2-	14+77	CL	8.4'-9.9'	A-7-6 (25)	51	32	7.5	19.8	19.8	52.9	0	100	96	78	28.4	ND

NP - NON-PLASTIC
ND - NOT DETERMINED

Stephanie H. Huffman
Certified Lab Technician Signature

114-01-1203
Certification Number

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 39049.1.1 **TIP:** U-4405 **COUNTY:** CUMBERLAND

DESCRIPTION: NOISE WALLS 1 & 2 AND RETAINING WALLS 1 & 2 ALONG -RPB- AND RETAINING WALL 3 AT -L- STATION 257+70

Sample No.	Alignment	Station	Offset	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1000	-NW2-	10+00	CL	3.9'-5.4'	A-2-4 (0)	17	NP	46.7	42.5	0.9	9.9	0	99	72	12	ND	ND
SS-1001	-NW2-	13+00	6' LT	13.9'-15.4'	A-2-4 (0)	24	6	35.2	46.2	0.6	18.0	0	99	80	21	ND	ND
SS-1002	-NW2-	20+00	8' LT	9.0'-10.5'	A-2-4 (0)	14	1	49.8	32.1	2.9	15.2	0	100	72	20	ND	ND
SS-1003	-NW2-	22+00	13' LT	24.0'-25.5'	A-6 (14)	38	21	11.8	18.9	18.5	50.8	0	100	93	73	23.1	ND
SS-1004	-NW2-	26+00	CL	19.0'-20.5'	A-6 (10)	39	22	14.2	34.8	17.4	33.6	0	100	93	58	21.6	ND
SS-1005	-NW2-	31+00	CL	1.0'-2.5'	A-2-4 (0)	20	4	46.2	33.0	0.6	19.9	0	99	77	23	ND	ND
SS-1006	-NW2-	33+00	CL	14.0'-15.5'	A-7-6 (6)	42	23	27.0	33.5	4.7	34.8	0	100	86	46	15.8	ND
SS-1007	-NW2-	41+00	CL	6.5'-8.0'	A-7-6 (14)	57	36	27.0	25.6	3.8	3.6	0	100	84	52	19.7	ND

NP - NON-PLASTIC
ND - NOT DETERMINED

Stephanie H. Huffm

Certified Lab Technician Signature

114-01-1203

Certification Number