STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–5980	1	15

REFERENCE: B–5980

PROJECT: 47617

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *NASH*

PROJECT DESCRIPTION *I–95 INTERCHANGE IMPROVEMENTS AT HALIFAX RD (SR 1522)*

SITE DESCRIPTION *BRIDGE ON –Y1– (SR 1544) OVER –L1– AND –L2– (I–95)*

CONTENTS

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.

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DATE *JUNE 2019*

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5980	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
PLASTIC RANGE (PI): LL — LIQUID LIMIT		
	- 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
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME 450 ATV
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 4" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [X] 2-1/4" ID HOLLOW-STEM AUGER

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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: BM-4
N: 842477.22; E: 2345412.50
ELEVATION: 151.38 FEET

NOTES:

ADDITIONAL ABBREVIATIONS:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

ROADWAY BORING ELEVATIONS BASED OFF b5980_ls_tin.tin FILE DATED 8/17/2018

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5980	3

SITE PLAN

0 50 100
FEET

BRIDGE ON SR 1544 (HALIFAX RD.) OVER I-95 BETWEEN SR 1528 & NC 4 /NC 48

REPLACEMENT OF BRIDGE NO. 630221

RPB-2235

FIELD

50' GREU TL-2

TO SR 1528

8:1

8' FDPS

41

UNDIVIDED COASTAL PLAIN

BEGIN BRIDGE
STA. 41+71.27

EBI-B

EBI-A

EIP

R/W MON

SEAT

SEAT=154.94'

SEAT=152.00'

MTL

UNDIVIDED COASTAL PLAIN

INV=131.44'

INV=125.64'

-LI- +89.96
42.00' LT

-LI- +70.56
42.00' LT

12:1

-Y1- SR 1544

48" CONC C&G

LANDSCAPE AREA

LANDSCAPE AREA

24" RCP

30" RCP

-LI-

TL-3

ROADWAY EMBANKMENT

BI-B

BI-A

43

ROADWAY EMBANKMENT

SKEW = 97°21'35.49

-L2-

DI
TOP=135.35'
24" IN=131.90'
24" OUT=131.73'

DI
TOP=133.73'
18" IN=128.22'
30" IN=128.1'
30" OUT=127.99'

POSSIBLE JB

-L2- +88.07
42.00' RT

EB2-B

-L2- +67.47
42.00' RT

44

SEAT=154.83'

SEAT=152.22'

UNDIVIDED COASTAL PLAIN

END BRIDGE
STA. 44+03.26

SCATTERED TREES

TO NC 4/ NC 48

8' FDPS

45

6" CONC

SCATTERED TREES

PROJECT REFERENCE NO.	SHEET NO.
B–5980	4

PROFILE ALONG BRIDGE ON –Y1– (SR 1544) OVER –L1– AND –L2– (I-95) REPLACEMENT OF BRIDGE NO. 630221

0 50 100
FEET
VE = 5

PROPOSED GRADE

BEGIN BRIDGE
STA. 41+72 +/–

END BRIDGE
STA. 44+03 +/–

EXISTING GROUND

EB1-A
41+40
20' LT
SS-149

B1-B
42+88
17' RT
SS-174, SS-179
RS-1, RS-2

EB2-B
44+03
17' RT
ST-1, SS-214
SS-217, SS-219

UNDIVIDED COASTAL PLAIN, BROWN, MOIST, LOOSE, SILTY SAND (A-2-4)

GRAY, DRY TO MOIST, MEDIUM STIFF TO VERY STIFF, SANDY CLAY (A-6), MODERATELY PLASTIC

LIGHT GRAY, MOIST TO WET, LOOSE TO MEDIUM DENSE, CLAYEY AND SILTY SAND TO SAND WITH TRACE CLAY (A-2-6, A-2-4, A-1-B)

COASTAL PLAIN, BROWN TO GRAY, MOIST TO WET, SOFT TO STIFF, SILTY CLAY (A-7), HIGHLY PLASTIC (YORKTOWN FORMATION)

RESIDUAL, WHITE AND GRAY, MOIST, VERY DENSE, SILTY SAND (A-2-4)

WEATHERED ROCK, WHITE AND GRAY, GRANITE

CRYSTALLINE ROCK, GRANITE, GRAY TO RED

COASTAL PLAIN, BROWN TO GRAY-BLUE, MOIST TO WET, SOFT TO STIFF, SILTY CLAY (A-7), MODERATELY TO HIGHLY PLASTIC (YORKTOWN FORMATION)

RESIDUAL, LIGHT GRAY TO BLACK, DRY, VERY DENSE, CLAYEY SAND (A-2-6)

WEATHERED ROCK, GRANITE, BROWN TO RED

10/18

60/0.2 BT

BT FIAD

100/0.8

100/0.9

60/0.0 BT
DRY 11/18

(A) UNDIVIDED COASTAL PLAIN, GRAY TO YELLOW-BROWN, MOIST, STIFF, SANDY SILT (A-4)
(B) GRAY AND BROWN, DRY, HARD, CLAYEY SILT WITH SOME SAND (A-5)
(C) GRAY, WET, SOFT, CLAY WITH SOME SAND (A-6)
(D) RESIDUAL, RED-BROWN, WET, LOOSE, GRAVELLY SAND WITH SOME CLAY (A-1-B)
(E) ROADWAY EMBANKMENT, BROWN TO RED TO GRAY, MOIST, MEDIUM DENSE, CLAYEY SAND (A-2-6) TO SOFT TO MEDIUM STIFF, SANDY CLAY TO SANDY SILT TO SILTY CLAY (A-6, A-4, A-7-6), MODERATELY PLASTIC
(F) UNDIVIDED COASTAL PLAIN, GRAY TO BROWN, MOIST, MEDIUM STIFF TO VERY STIFF, SANDY TO SILTY CLAY (A-6, A-7), MODERATELY TO HIGHLY PLASTIC
(G) LIGHT GRAY, MOIST TO WET, LOOSE TO MEDIUM DENSE, CLAYEY AND SILTY SAND TO SAND WITH TRACE CLAY (A-2-6, A-2-4, A-1-B)

–Y1–

160 150 140 130 120 110 100 90 80 70

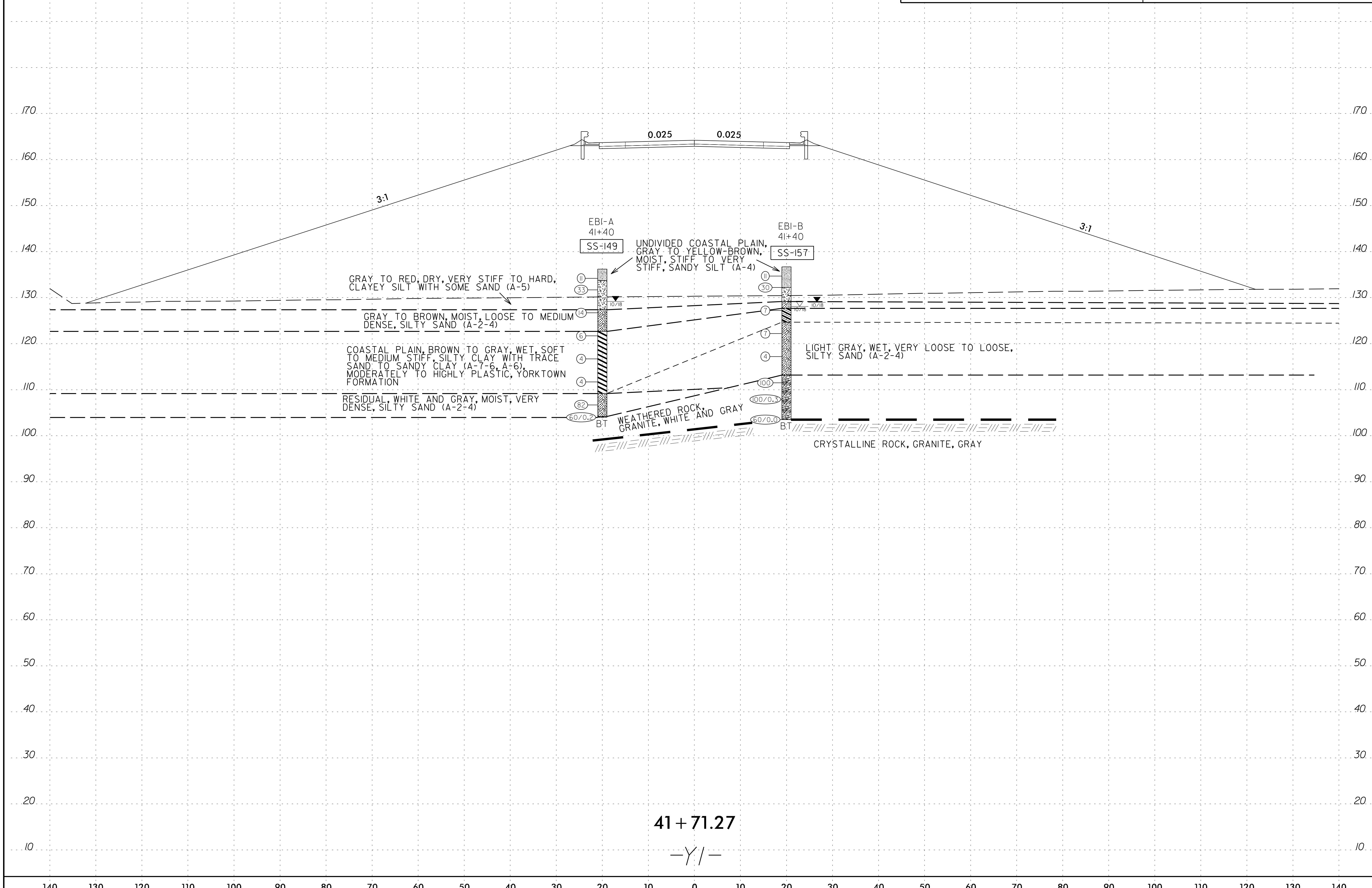
40+00 41+00 42+00 43+00 44+00 45+00 46+00

PROJECT REFERENCE NO.	SHEET NO.
B-5980	5

END BENT 1 CROSS SECTION

0 20 40 FEET

VE = 1

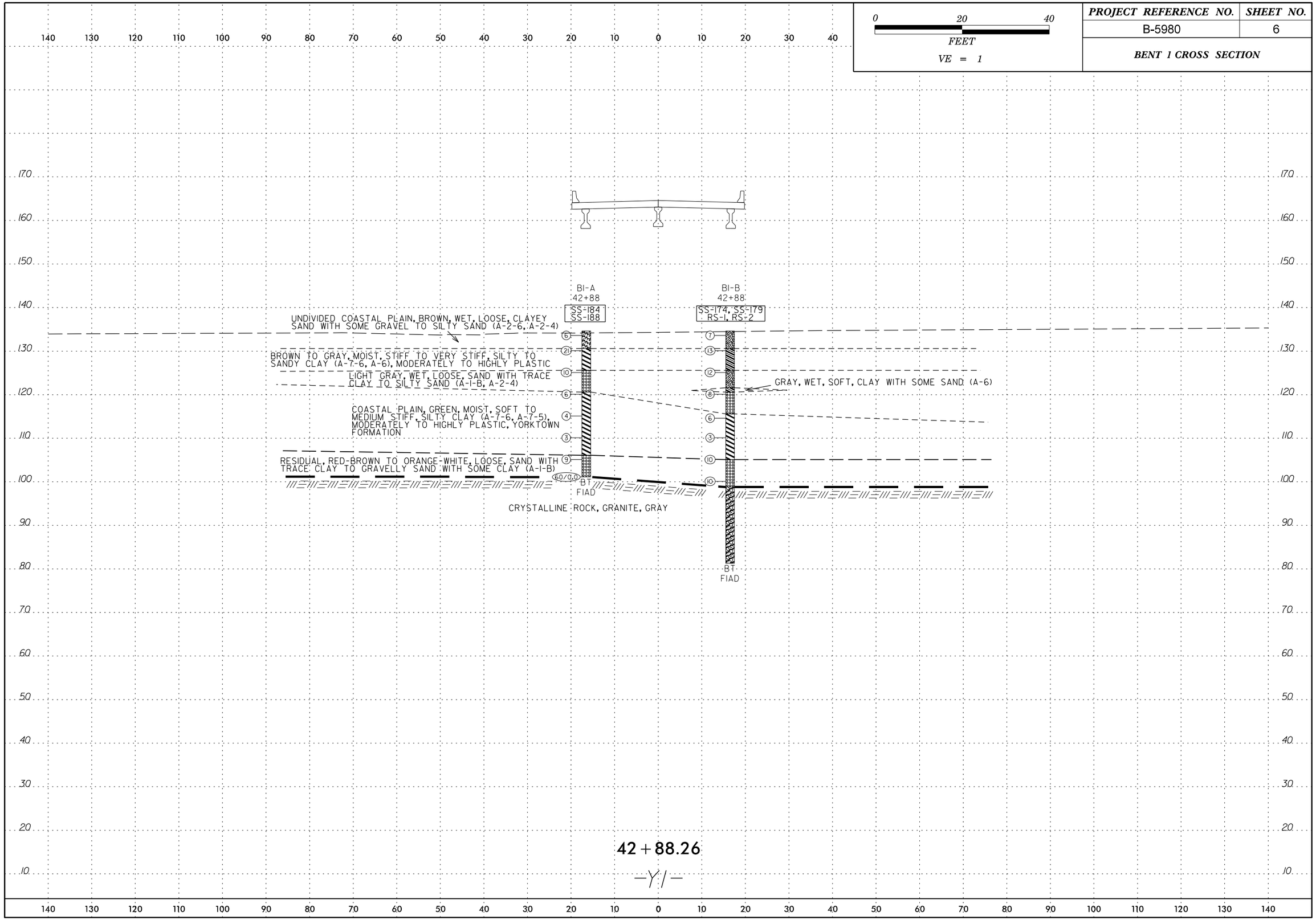


EBI-A
41+40
SS-149
EBI-B
41+40
SS-157
0.025
0.025
3:1
3:1
GRAY TO RED, DRY, VERY STIFF TO HARD, CLAYEY SILT WITH SOME SAND (A-5)
UNDIVIDED COASTAL PLAIN, GRAY TO YELLOW-BROWN, MOIST, STIFF TO VERY STIFF, SANDY SILT (A-4)
GRAY TO BROWN, MOIST, LOOSE TO MEDIUM DENSE, SILTY SAND (A-2-4)
COASTAL PLAIN, BROWN TO GRAY, WET, SOFT TO MEDIUM STIFF, SILTY CLAY WITH TRACE SAND TO SANDY CLAY (A-7-6, A-6), MODERATELY TO HIGHLY PLASTIC, YORKTOWN FORMATION
RESIDUAL, WHITE AND GRAY, MOIST, VERY DENSE, SILTY SAND (A-2-4)
LIGHT GRAY, WET, VERY LOOSE TO LOOSE, SILTY SAND (A-2-4)
WEATHERED ROCK, GRANITE, WHITE AND GRAY
CRYSTALLINE ROCK, GRANITE, GRAY
BT
BT
10/18
10/18
11
33
14
6
4
4
82
60/0.2
11
30
7
7
4
100
100/0.3
60/0.0
41+71.27
-Y1-

PROJECT REFERENCE NO.	SHEET NO.
B-5980	6

BENT 1 CROSS SECTION

0 20 40
FEET
VE = 1



PROJECT REFERENCE NO.	SHEET NO.
B-5980	7

END BENT 2 CROSS SECTION

0 20 40
FEET
VE = 1

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

170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20

0.025 0.025

4:1

ROADWAY EMBANKMENT, RED TO GRAY TO BROWN, MEDIUM DENSE, CLAYEY SAND (A-2-6), TO VERY SOFT, SANDY CLAY (A-6), MODERATELY PLASTIC

EB2-B
44+03
ST-1, SS-214
SS-217, SS-219

11
7
20
16
9
11
7
4
63
100/0.8
100/0.9
60/0.0
BT

UNDIVIDED COASTAL PLAIN, GRAY, MOIST, MEDIUM STIFF TO VERY STIFF, SILTY CLAY WITH SOME SAND (A-7-6), HIGHLY PLASTIC

GRAY, MOIST, MEDIUM DENSE, CLAYEY SAND WITH GRAVEL (A-2-6)

COASTAL PLAIN, BROWN TO GRAY-BLUE, MOIST TO WET, SOFT TO STIFF, SILTY CLAY (A-7-6), HIGHLY PLASTIC, YORKTOWN FORMATION

RESIDUAL, LIGHT GRAY TO BLACK, DRY, VERY DENSE, CLAYEY SAND (A-2-6)

WEATHERED ROCK, GRANITE, BROWN TO RED

CRYSTALLINE ROCK, GRANITE, GRAY

44+03.26

-Y1-

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** ZAHRA AGHAZADEH	
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 41+40	**OFFSET** 20 ft LT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 136.2 ft	**TOTAL DEPTH** 32.2 ft	**NORTHING** 844,268	**EASTING** 2,347,894	**24 HR.** 7.0
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA	**HAMMER TYPE** Automatic	
DRILLER MIKE MOSELEY	**START DATE** 10/29/18	**COMP. DATE** 10/29/18	**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)
										136.2	0.0
										GROUND SURFACE	
	135.2	1.0	3	4	7	11 33		M		**UNDIVIDED COASTAL PLAIN** GRAY TO YELLOW-BROWN, STIFF, SANDY SILT (A-4), TRACE ROOTS	
	132.7	3.5	9	13	20	14		D		133.7 GRAY AND BROWN, HARD, CLAYEY SILT WITH SOME SAND (A-5)	2.5
	127.7	8.5	5	6	8	6		M		127.4 LIGHT GRAY, MEDIUM DENSE, SILTY SAND (A-2-4)	8.8
	122.7	13.5	2	2	4	4	SS-149	M		122.7 **COASTAL PLAIN** BROWN TO GRAY, SOFT TO MEDIUM STIFF, SILTY CLAY WITH TRACE SAND (A-7-6), HIGHLY PLASTIC (YORKTOWN FORMATION)	13.5
	117.7	18.5	1	2	2	4		W			
	112.7	23.5	2	2	2	4		W			
	107.7	28.5	17	33	49	82		M		109.2 **RESIDUAL** WHITE AND GRAY, VERY DENSE, SILTY SAND (A-2-4), COARSE GRAINED	27.0
	104.2	32.0	60/0.2			60/0.2				104.2 **WEATHERED ROCK** 104.0 GRANITE, WHITE AND GRAY Boring Terminated at Elevation 104.0 ft IN WEATHERED ROCK	32.0 32.2

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** ZAHRA AGHAZADEH	
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 41+40	**OFFSET** 20 ft RT	**ALIGNMENT** -Y1-	**0 HR.** 8.6
COLLAR ELEV. 136.7 ft	**TOTAL DEPTH** 33.2 ft	**NORTHING** 844,224	**EASTING** 2,347,865	**24 HR.** 7.7
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA	**HAMMER TYPE** Automatic	
DRILLER MIKE MOSELEY	**START DATE** 10/29/18	**COMP. DATE** 10/29/18	**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
										136.7 GROUND SURFACE 0.0
	135.7	1.0	2	5	6	11 30		M		**UNDIVIDED COASTAL PLAIN** GRAY, STIFF TO VERY STIFF, SANDY SILT (A-4), SOME ROOTS
	133.2	3.5	13	12	18	7		D		132.2 RED, VERY STIFF, CLAYEY SILT (A-5) 4.5
	128.2	8.5	3	3	4	7	SS-157	M		129.2 GRAY TO BROWN, LOOSE, SILTY SAND (A-2-4) 7.5
	123.2	13.5	2	4	3	7		W		127.7 LIGHT GRAY, MEDIUM STIFF, SANDY CLAY (A-6), MODERATELY PLASTIC 9.0
	118.2	18.5	2	2	2	4		W		124.7 LIGHT GRAY, VERY LOOSE TO LOOSE, SILTY SAND (A-2-4), MEDIUM TO COARSE GRAINED 12.0
	113.2	23.5	32	58	42	100		W		113.2 **WEATHERED ROCK** GRANITE, LIGHT GRAY 23.5
	108.2	28.5	100/0.3			100/0.3		W		
	103.5	33.2	60/0.0			60/0.0				Boring Terminated BY AUGER REFUSAL at Elevation 103.5 ft ON CRYSTALLINE ROCK

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** ZAHRA AGHAZADEH
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 42+88	**OFFSET** 17 ft LT	**ALIGNMENT** -Y1-	**0 HR.** N/A
COLLAR ELEV. 134.6 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 844,201	**EASTING** 2,348,018	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA	**HAMMER TYPE** Automatic	
DRILLER MIKE MOSELEY	**START DATE** 10/31/18	**COMP. DATE** 10/31/18	**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)
135										
	134.6	0.0	1	3	3	6 21		W		134.6 / 0.0 GROUND SURFACE
										UNDIVIDED COASTAL PLAIN BROWN, LOOSE, CLAYEY SAND WITH SOME GRAVEL (A-2-6)
130	131.1	3.5	6	9	12			M		130.6 / 4.0
										BROWN AND GRAY, STIFF TO VERY STIFF, SILTY CLAY (A-7-6), HIGHLY PLASTIC
125	126.1	8.5	6	6	4	10	SS-184	M W		125.6 / 9.0
										LIGHT GRAY, LOOSE, SAND WITH TRACE CLAY (A-1-B), MEDIUM TO COARSE GRAINED
120	121.1	13.5	2	3	3	6		W M		120.6 / 14.0
										COASTAL PLAIN GREEN, SOFT TO MEDIUM STIFF, SILTY CLAY (A-7-6), TRACE MICA, HIGHLY PLASTIC (YORKTOWN FORMATION)
115	116.1	18.5	3	2	2	4	SS-188	M		
110	111.1	23.5	WOR	1	2	3		M		
105	106.1	28.5	7	4	5	9		W		106.1 / 28.5 **RESIDUAL** ORANGE-WHITE, LOOSE, SAND WITH TRACE CLAY (A-1-B), LITTLE ROCK FRAGMENTS, MEDIUM TO COARSE GRAINED
	101.1	33.5	60/0.0			60/0.0				101.1 / 33.5 Boring Terminated BY AUGER REFUSAL at Elevation 101.1 ft ON CRYSTALLINE ROCK

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** ZAHRA AGHAZADEH
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 42+88	**OFFSET** 17 ft RT	**ALIGNMENT** -Y1-	**0 HR.** N/A
COLLAR ELEV. 134.6 ft	**TOTAL DEPTH** 53.3 ft	**NORTHING** 844,171	**EASTING** 2,348,004	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA / CORE BORING	**HAMMER TYPE** Automatic	
DRILLER MIKE MOSELEY	**START DATE** 10/30/18	**COMP. DATE** 10/31/18	**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
135										
	134.6	0.0	3	3	4	7		M		134.6 / 0.0 GROUND SURFACE
										UNDIVIDED COASTAL PLAIN BROWN AND GRAY, LOOSE, SILTY SAND (A-2-4)
130	131.1	3.5	4	5	8	13		D		130.6 / 4.0 GRAY, STIFF, SANDY CLAY (A-6), WITH IRON OXIDE STAINS, MODERATELY PLASTIC
125	126.1	8.5	4	6	6	12	SS-174	M W		125.6 / 9.0 GRAY, MEDIUM DENSE, SILTY SAND (A-2-4)
										121.6 / 13.0
120	121.1	13.5	WOR	3	5	8		W		120.6 / 14.0 GRAY, SOFT, CLAY WITH SOME SAND (A-6) LIGHT GRAY, LOOSE, SAND WITH TRACE CLAY (A-1-B), COARSE GRAINED
115	115.6	19.0	13	3	3	6		W		115.6 / 19.0 **COASTAL PLAIN** GREEN-GRAY, SOFT TO MEDIUM STIFF, SILTY CLAY (A-7-5), TRACE TO SOME SAND, MODERATELY PLASTIC (YORKTOWN FORMATION)
110	111.1	23.5	1	2	1	3	SS-179	M		
105	106.1	28.5	6	4	6	10		W		105.1 / 29.5 **RESIDUAL** RED-BROWN, LOOSE, GRAVELLY SAND WITH SOME CLAY (A-1-B)
	101.1	33.5	5	7	3	10		W		98.8 / 35.8
100							RS-1			**CRYSTALLINE ROCK** GRAY TO BLACK, WEATHERED TO FRESH, HARD, CLOSELY TO MODERATELY FRACTURED, NO BEDDING APPARENT, GRANITE SOME IRON OXIDE STAINING
95										STRATA REC = 86% STRATA RQD = 57% GSI = 50-55%
90							RS-2			
85										81.3 / 53.3 Boring Terminated at Elevation 81.3 ft IN CRYSTALLINE ROCK

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** ZAHRA AGHAZADEH
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 42+88	**OFFSET** 17 ft RT	**ALIGNMENT** -Y1-	**0 HR.** N/A
COLLAR ELEV. 134.6 ft	**TOTAL DEPTH** 53.3 ft	**NORTHING** 844,171	**EASTING** 2,348,004	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA / CORE BORING	**HAMMER TYPE** Automatic	
DRILLER MIKE MOSELEY	**START DATE** 10/30/18	**COMP. DATE** 10/31/18	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
98.79											Begin Coring @ 35.8 ft
95	98.8	35.8	4.6	2:00/1.0 2:00/1.0 4:00/1.0 2:50/1.0 2:20/0.6	(2.8) 61%	(0.9) 20%	RS-1	(15.0) 86%	(9.9) 57%		ELEV. (ft) 98.8 DEPTH (ft) 35.8 **CRYSTALLINE ROCK** GRAY TO BLACK, WEATHERED TO FRESH, HARD, CLOSELY TO MODERATELY FRACTURED, NO BEDDING APPARENT, GRANITE SOME IRON OXIDE STAINING
	94.2	40.4									
90			5.0	3:38/1.0 4:06/1.0 2:55/1.0 4:05/1.0 5:00/1.0	(5.0) 100%	(3.2) 64%	RS-2				
	89.2	45.4									
85			5.0	2:50/1.0 3:33/1.0 6:14/1.0 10:22/1.0 6:13/1.0	(4.3) 86%	(3.6) 72%					
	84.2	50.4									
			2.9	7:48/1.0 16:00/1.0 47:30/0.9	(2.9) 100%	(2.2) 76%					
	81.3	53.3									ELEV. (ft) 81.3 DEPTH (ft) 53.3
											Boring Terminated at Elevation 81.3 ft IN CRYSTALLINE ROCK

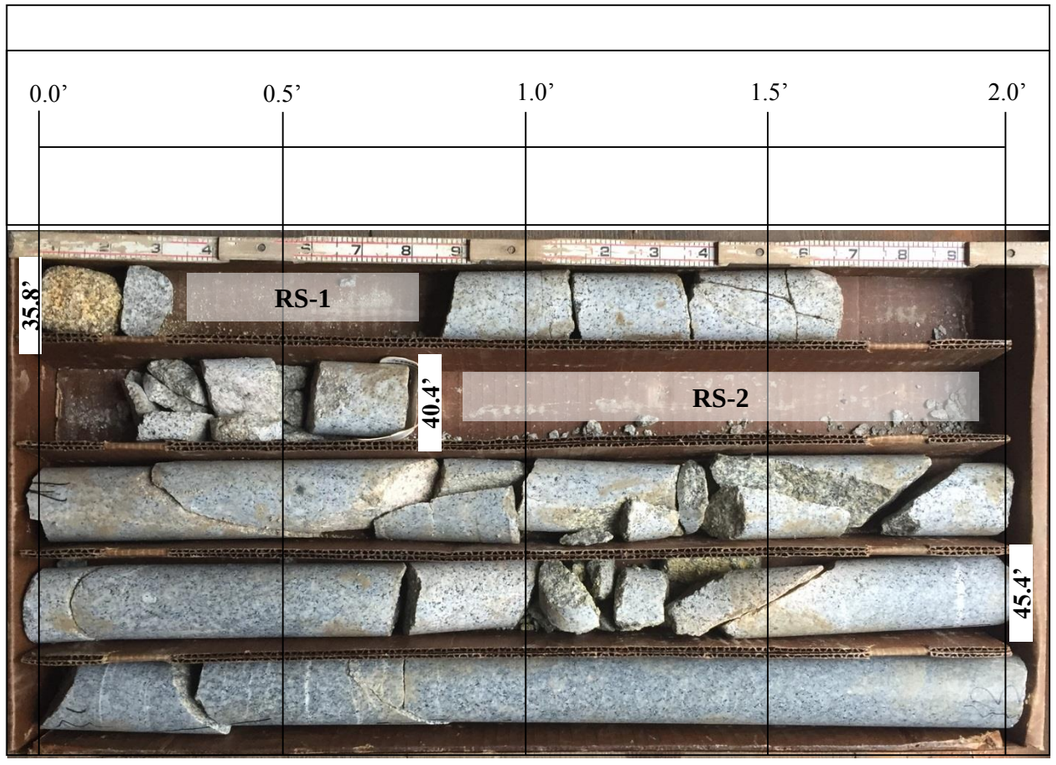
GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47617.1.1	**TIP** B-5980	**COUNTY** NASH	**GEOLOGIST** RYAN DOYLE	
SITE DESCRIPTION BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 44+03	**OFFSET** 17 ft RT	**ALIGNMENT** -Y1-	**0 HR.** Dry
COLLAR ELEV. 138.3 ft	**TOTAL DEPTH** 53.0 ft	**NORTHING** 844,122	**EASTING** 2,348,108	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/19/2018		**DRILL METHOD** 2 1/4" ID HSA		**HAMMER TYPE** Automatic
DRILLER MIKE MOSELEY	**START DATE** 11/02/18	**COMP. DATE** 11/02/18	**SURFACE WATER DEPTH** N/A	

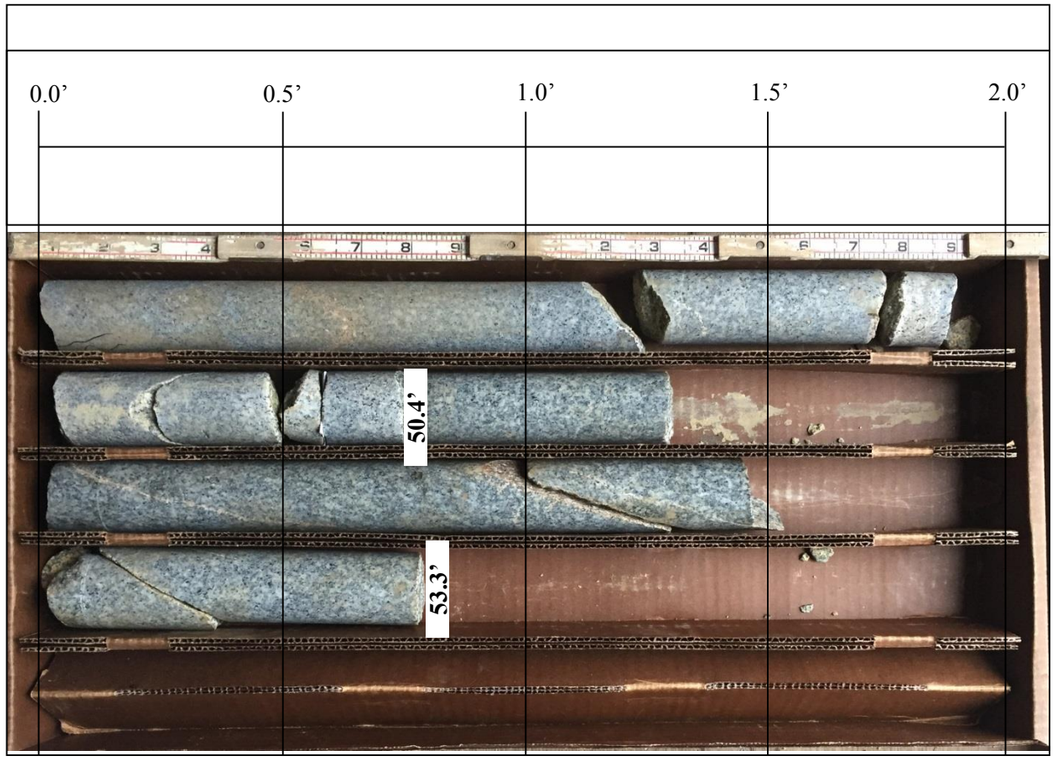
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
140										ELEV. (ft) DEPTH (ft)
	138.3	0.0								138.3 GROUND SURFACE 0.0
			4	5	6	11		D		136.8 **ROADWAY EMBANKMENT** ORANGE-BROWN, MEDIUM DENSE, CLAYEY SAND (A-2-6), 1.5
135	134.8	3.5								**UNDIVIDED COASTAL PLAIN**
			5	3	4	7		M		GRAY, MEDIUM TO VERY STIFF, SILTY CLAY (A-7-6), TRACE SAND, HIGHLY PLASTIC
130	129.8	8.5								
			5	8	12	20	SS-214	M		
125	124.8	13.5								126.3 12.0
			4	9	7	16		W		LIGHT GRAY TO TAN, MEDIUM DENSE, CLAYEY SAND (A-2-6)
120	119.8	18.5								121.3 17.0
			2	4	5	9		M		**COASTAL PLAIN**
115	114.8	23.5						66%		GRAY-BLUE, SOFT TO STIFF, SILTY CLAY (A-7-6), HIGHLY PLASTIC (YORKTOWN FORMATION)
			4	5	6	11	SS-217	W		
110	109.8	28.5								
			2	3	4	7		W		
105	104.8	33.5								
			2	2	2	4	SS-219	W		
100	99.8	38.5								100.3 38.0
			15	24	39	63		D		**RESIDUAL** LIGHT GRAY TO BLACK, VERY DENSE, CLAYEY SAND (A-2-6), LEAD/GRAPHITE APPEARANCE
95	94.8	43.5								95.3 43.0
			26	46	54/0.3	100/0.8		D		**WEATHERED ROCK** GRANITE, BROWN TO RED
90	89.8	48.5								
			15	85/0.4		100/0.9		D		
	85.3	53.0	60/0.0			60/0.0				85.3 53.0 Boring Terminated BY AUGER REFUSAL at Elevation 85.3 ft ON CRYSTALLINE ROCK

Other Samples:
ST-1 (20.0 - 22.0)

NCDOT BORE DOUBLE HALIFAX RD - UPDATE .GPJ NC_DOT.GDT 6/5/19



Sta. 42+88 -Y1-, 17-ft RT, Box 1 of 2, 35.8-ft to 47.4-ft



Sta. 42+88 -Y1-, 17-ft RT, Box 2 of 2, 47.4-ft to 53.3-ft

SCALE 1:40 (1”=4”)

ROCK CORE PHOTOGRAPHS

BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)
NASH COUNTY, NORTH CAROLINA
WBS NO.: 47617.1.1, TIP NO.: B-5980

AECOM– North Carolina
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560
Tel: 919-461-1100 Fax: 919-46-1415

PROJECT REFERENCE NO.	SHEET
B-5980	13

SOIL TEST RESULTS

BORING NO.	SAMPLE NO.	OFFSET	STATION	ALIGNMENT	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
									GRAVEL	C. SAND	F. SAND	FINES	10	40	200	
EB1-A	SS-149	20' LT	41+40	-Y1-	13.5-15.0	A-7-6(56)	77	54	0.00	0.87	6.75	92.38	100.0	99.13	92.38	47.7
EB1-B	SS-157	20' RT	41+40	-Y1-	9.0-10.0	A-6(9)	39	18	0.00	2.45	34.46	63.09	100.0	97.55	63.09	21.2
B1-A	SS-184	17' LT	42+88	-Y1-	8.5-9.0	A-7-6(19)	67	47	0.00	24.99	23.19	51.83	100.0	75.01	51.83	17.2
B1-A	SS-188	17' LT	42+88	-Y1-	18.5-20.0	A-7-6(29)	54	30	0.67	3.16	8.70	87.46	99.33	96.16	87.46	51.9
B1-B	SS-174	17' RT	42+88	-Y1-	8.5-9.0	A-6(7)	35	20	1.48	15.70	28.57	54.25	98.52	82.82	54.25	16.6
B1-B	SS-179	17' RT	42+88	-Y1-	23.5-25.0	A-7-5(17)	47	16	0.00	1.37	11.29	87.34	100.0	98.63	87.34	69.5
EB2-B	SS-214	17' RT	44+03	-Y1-	8.5-10.0	A-7-6(29)	68	50	0.66	8.07	28.48	62.8	99.34	91.28	62.80	18.9
EB2-B	ST-1	17' RT	44+03	-Y1-	20.0-22.0	A-7-6(41)	58	39	2.32	0.24	2.62	94.83	97.68	97.44	94.83	65.8
EB2-B	SS-217	17' RT	44+03	-Y1-	23.5-25.0	A-7-6(41)	66	45	0.36	6.86	8.22	84.56	99.64	92.78	84.56	49.1
EB2-B	SS-219	17' RT	44+03	-Y1-	33.5-35.0	A-7-6(46)	70	50	0.05	3.32	11.46	85.17	99.95	96.64	85.17	68.4

TESTED BY: Michael P. Sm

NCDOT NO.: 129-03-0411

UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE SPECIMENS

ASTM D 7012-14 Method C
This method does not report strain rate or deformation

Client: AECOM
Client Project: Halifax Rd. Interchange
Project No.: R-2018-313-001
Lab ID No.: R-2018-313-001-044

Boring No.: Y1-4288-R
Depth (ft): 36-37
Sample ID: RS-1
Moisture Condition: As Received-Unpreserved

Specimen Weight (g): 482.95

SPECIMEN LENGTH (in)

Reading 1:	4.06
Reading 2:	4.04
Reading 3:	4.07
Average:	**4.06**

SPECIMEN DIAMETER (in):

Reading 1:	1.87
Reading 2:	1.87
Average:	**1.87**
Area (in^2):	2.75
L/D:	2.17

MOISTURE CONTENT

Tare Number:	860.00
Wt. of Tare & Wet Sample (g):	336.57
Wt. of Tare & Dry Sample (g):	336.10
Weight of Tare (g):	135.06
Weight of Wet Sample (g):	201.51
Sample Volume (cm^3):	182.58
Moisture Content (%):	0.23
Unit Wet Weight (g/cm^3):	2.645
Unit Wet Weight (pcf):	165.1
Unit Dry Weight (g/cm^3):	**2.639**
Unit Dry Weight (pcf):	**164.7**

Total Load (lb):	44,075
Uniaxial Compressive Strength (psi):	**16,050**
Fracture Type:	Shear
Rate of Loading (lb/sec):	233
Time to Break (min:sec):	3:8.96
Deviation From Straightness[2]:	Pass

AXIAL: *Pass* TOP: *Pass* BOTTOM: *Pass*

Physical Description: Rock Core

Notes:
1) Moisture conditions at time of the test are: As Received-Unpreserved
2) Sample prep conforms to ASTM D4543-08 "best effort" if applicable
3) Deviation from straightness, Procedure A of ASTM D 4543-08
   Pass/Fail criteria: gap < 0.02 = Pass, gap > 0.02 = Fail
4) Temperature is laboratory room temperature.
5) D4543 Prep and D7012 Testing Equipment Used:
   R176 Compression Machine,
   R525 Digital Calipers,
   R148 Feeler Gauge, R419 Scale
   R512 Rock Saw
   R148 Straight Edge
   R582 V-Block, R585 Dial Gauge

Tested By: SFS Date: 12/6/18 *Checked By:* GEM *Date:* 12/7/18

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE SPECIMENS

ASTM D 7012-14 Method C
This method does not report strain rate or deformation

Client: AECOM
Client Project: Halifax Rd. Interchange
Project No.: R-2018-313-001
Lab ID No.: R-2018-313-001-045

Boring No.: Y1-4288-R
Depth (ft): 40.4-41.8
Sample ID: RS-2
Moisture Condition: As Received-Unpreserved

Specimen Weight (g): 504.66

SPECIMEN LENGTH (in)

Reading 1:	4.23
Reading 2:	4.22
Reading 3:	4.22
Average:	**4.22**

SPECIMEN DIAMETER (in):

Reading 1:	1.87
Reading 2:	1.87
Average:	**1.87**
Area (in^2):	2.75
L/D:	2.26

MOISTURE CONTENT

Tare Number:	859.00
Wt. of Tare & Wet Sample (g):	255.79
Wt. of Tare & Dry Sample (g):	255.46
Weight of Tare (g):	134.20
Weight of Wet Sample (g):	121.59
Sample Volume (cm^3):	190.08
Moisture Content (%):	0.27
Unit Wet Weight (g/cm^3):	2.655
Unit Wet Weight (pcf):	165.7
Unit Dry Weight (g/cm^3):	**2.648**
Unit Dry Weight (pcf):	**165.2**

Total Load (lb):	39,265
Uniaxial Compressive Strength (psi):	**14,300**
Fracture Type:	Shear
Rate of Loading (lb/sec):	202
Time to Break (min:sec):	3:14.06
Deviation From Straightness[2]:	Pass

AXIAL: *Pass* TOP: *Pass* BOTTOM: *Fail*

Physical Description: Rock Core

Notes:
1) Moisture conditions at time of the test are: As Received-Unpreserved
2) Sample prep conforms to ASTM D4543-08 "best effort" if applicable
3) Deviation from straightness, Procedure A of ASTM D 4543-08
   Pass/Fail criteria: gap < 0.02 = Pass, gap > 0.02 = Fail
4) Temperature is laboratory room temperature.
5) D4543 Prep and D7012 Testing Equipment Used:
   R176 Compression Machine,
   R525 Digital Calipers,
   R148 Feeler Gauge, R419 Scale
   R512 Rock Saw
   R148 Straight Edge
   R582 V-Block, R585 Dial Gauge

Tested By: SFS Date: 12/6/18 *Checked By:* GEM *Date:* 12/7/18

page 1 of 1 DCN: CT45A; Revision No.: 1e3 Revision Date: 4/5/17
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PHOTO TAKEN FROM Y1-4403 LOOKING UP STATION

PHOTO TAKEN NEAR RPC-2000 LOOKING ALONG BRIDGE SPAN

SITE PHOTOGRAPHS

BRIDGE ON -Y1- (SR 1544) OVER -L1- AND -L2- (I-95)
WBS NO.: 47617.1.1, TIP NO.: B-5980

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