REFERENCE: BR-0098

PROJECT: 67098

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	13+00 TO 27+00	4	5
-RPA-	27+00 TO 39+00	4	-
-RPB-	27+00 TO 39+00	4	-
-RPC-	27+00 TO 39+00	4	-

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	19+50, 20+50	6
-L-	21+50	7
-L-	22+50, 25+50	8

BORE LOGS AND LABORATORY RESULTS

DESCRIPTION	SHEETS
HAND AUGER BORE LOGS	9-11
SUMMARY OF LAB TEST RESULTS	12

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *ROCKINGHAM*

PROJECT DESCRIPTION *BRIDGE 780183 ON SR 1767 (MAYFIELD ROAD) OVER US 29 BYPASS*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0098	1	12

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

J. ROWENHORST

C.T. TANG

E. OSWALD

J. WHITE

S. PUGH

D. STEWART

INVESTIGATED BY *WSP E&I*

DRAWN BY *C.T. TANG*

CHECKED BY *J. ROWENHORST*

SUBMITTED BY *C.T. TANG*

DATE *SEPTEMBER 2024*

NORTH CAROLINA PROFESSIONAL SEAL 047389 ENGINEER CHIEN-TING TANG

DocuSigned by:
Chien-Ting Tang
4071910370EE41F...
SIGNATURE

10/04/2024
DATE

PROJECT REFERENCE NO.	SHEET NO.
BR-0098	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/FT²)
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:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] B-57
- [ ] _____

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

HAMMER TYPE:
- [ ] 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: BY-12 (N:985483, E:1840037)
ELEVATIONS OF ROADWAY BORINGS BASED ON PROVIDED ELECTRONIC FILES (BR0098_IS_TIN.TIN) ELEVATION: 667.98 FEET

NOTES:

FIAD: FILLED IMMEDIATELY AFTER DRILLING

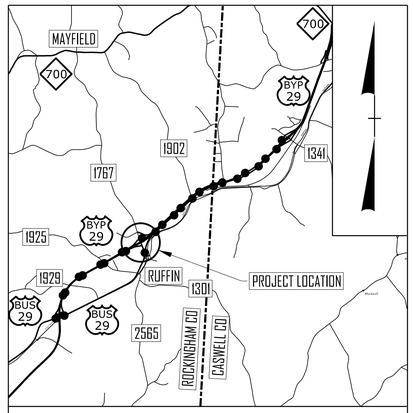
DATE: 8-15-14

01/16/24

TIP PROJECT: BR-0098

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

DETOUR

DESIGN RECOMMENDAITON PLAN SET

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

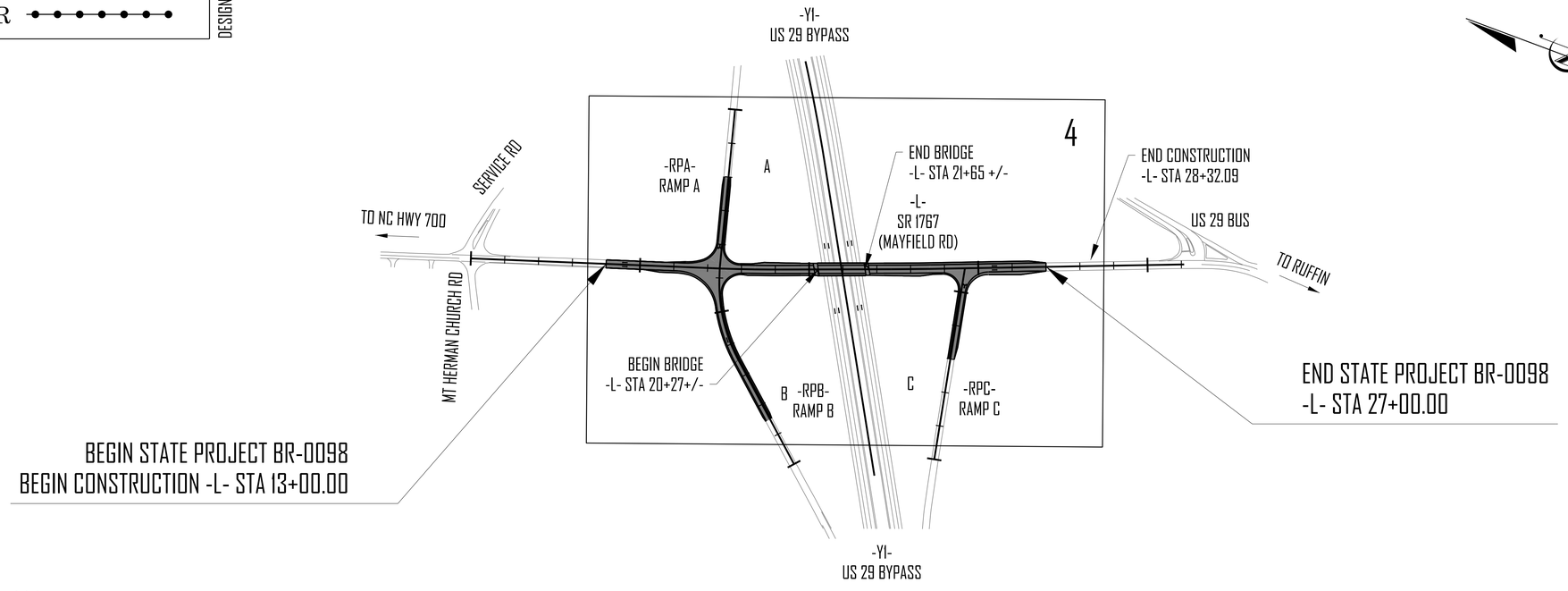
ROCKINGHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0098	3	12

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67098.1.1	N/A	PE

LOCATION: *REPLACE BRIDGE #780183 ON SR 1767 (MAYFIELD RD) OVER US 29 BYPASS*

TYPE OF WORK: *PAVING, GRADING, DRAINAGE AND STRUCTURES*



NAD 83/NA 2011

NCDOT CONTACT : XXXXXXXX - DIVISION 7
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD __
THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2019 = 1,600
ADT 2040 = 1,800
K = 8 %
D = 55 %
T = 3 % *
V = 45 MPH
* TTST =1% DUAL 2%
FUNC CLASS =
MINOR ARTERIAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BR-0098 = 0.239 MILES
LENGTH OF STRUCTURE TIP PROJECT BR-0098 = 0.026 MILES
TOTAL LENGTH OF TIP PROJECT BR-0098 = 0.265 MILES

Prepared in the Office of:
moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NO.: F-0105

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 14, 2024

LETTING DATE: OCTOBER 21, 2025

TRENT E. HUFFMAN, P.E.
PROJECT ENGINEER

GRAY MODLIN, P.E.
PROJECT DESIGN ENGINEER

LINDSAY CROCKER
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

August 5, 2024

WBS Number: 67098.1.1
TIP Number: BR-0098
COUNTY: Rockingham
DESCRIPTION: Replacement of Bridge No. 183 on US 29 Bus over US 29 Bypass

WSP Number: US0037375.9748

SUBJECT: Geotechnical Inventory Report

Project Description

The project area lies on the existing SR 1767 (Mayfield Road) alignment on both sides of Bridge No. 183 over US-29 and is also located approximately 0.3 miles to the north of Ruffin, NC. The proposed construction is associated with the replacement of Bridge No. 183 and will consist of a 0.3-mile roadway.

The geotechnical field investigation for the project was conducted from July 8 to July 11, 2021. The subsurface investigation was performed using hand auger tools and a Mobile Drill B-57 drill rig equipped with an automatic hammer. Hollow-stem auger and mud-rotary drilling procedures were used to advance borings to the required depths. Standard Penetration Tests (SPT) were performed at approximately 2.5-foot to 5.0-foot intervals to termination in selected borings. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis.

The following alignments, totalling approximately 2,420 feet, were explored. Subsurface profile and representative cross sections of main alignment, -L-, is included in this report.

Alignment	Station (±)
-L-	13+00 to 27+00
-RPA-	12+00 to 14+71
-RPB-	11+50 to 16+28
-RPC-	13+00 to 15+71

Physiography and Geology

The project site is located within the Piedmont Physiographic Province. Topography in the region is typified by northeast–southwest trending ridges that exhibit structural control and are cut by trellis drainage pattern. The project area is on a ridge between two creeks of the Dan River sub-basin of the Roanoke River Basin. Elevations along the project alignments range from a low of 667± feet below Bridge No. 183 to a high of 693.66± at the high point of Bridge No. 183. A mixture of small commercial farms, a substation and wooded areas are present along the project corridor.

Geologically, the project is located in the central Piedmont physiographic region and is underlain by residual soils and rocks of the Milton Belt. Residual soils within the Milton Belt are derived from in-situ weathering of the underlying Palaeozoic aged gneiss and schist.

Soil Properties

Soils encountered during this investigation have been divided into two categories based on origin, including roadway embankment and residual soils.

Roadway embankment soils were observed along the entire project corridor. The soils for the existing roadway embankment generally consist of brown, light brown, red-brown, and tan, soft to very stiff, dry to wet, sandy silt, silt, clayey silt and clay (A-4, A-5, A-7). These soils typically contain some gravel near surface, and trace mica in most samples. The roadway embankment clays exhibit low to medium plasticity with plastic indices ranging from 9 to 24. A layer of asphalt fragments was observed in roadway borings L_1960 and L_2240, at elevations close to top of current US-29, which indicates the layer may be the pavement of old Mayfield Road.

Milton Belt residual soils are derived from the weathering of the underlying crystalline rocks. Milton Belt residual soils were encountered underlying roadway embankment. These soils primarily consist of Light brown, brown, dark brown, red brown, and gray, soft to hard, moist to wet, sandy silt, silt, and sandy/silty clay (A-4, A-5, A-7). Lesser amount of coarse-grained soil was encountered near the transition to Weathered Rock, consists of light brown, brown, dark brown, gray, and tan, very dense, moist, silty, fine sand (A-2-4). The Milton Belt residual clayey soils exhibit medium to high plasticity with plastic indices ranging from 13 to 41.

Rock Properties

Weathered rock and crystalline rock occur in several areas of the project. The weathered rock and crystalline rock encountered on this project were identified by SPT sampling and SPT refusal. Where encountered, the depths to weathered rock ranged from approximately 26± to 39± feet below existing ground surface (Elevations of approximately 630.2 to 642.8 feet MSL). Crystalline rock was encountered in boring EB2-A, at an approximate depth of 33.5 feet below existing ground surface (Elevation of approximately 635.3 feet MSL). Where encountered, the weathered rock and crystalline rock consists of gray to gray-brown schist belonging to the Milton Belt.

Groundwater

Ground water data was collected at the time of the geotechnical field investigation (July 8 to July 11, 2024). Stabilized ground water level (after 24-hours stabilization period) was measured in four bridge end bent borings, ranging from approximately 8.6± to 10.0± feet below existing ground surface (Elevations of approximately 658.4 to 660.2 feet MSL)

Prepared By

Jack Rowenhorst
Geotechnical Engineer

Reviewed By

Chien-Ting Tang
Senior Engineer -Geotechnical

PROJECT REFERENCE NO.	SHEET NO.
BR-0098	4

SITE PLAN

0 100 200

FEET

15

20

RPA_1300

L_1500

RESIDUAL

ROADWAY EMBANKMENT

L_1960

EB1-A

EB2-A

L_2240

ROADWAY EMBANKMENT

L_2550

TO HWY 70

-L- SR 1767 (WAYFIELD RD)

TO US 29 BUS.

EB1-B

EB2-B

RESIDUAL

RPC_1500

ROADWAY EMBANKMENT

RPC_1400

RPB_1500

RESIDUAL

ROADWAY EMBANKMENT

RPB_1300

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BR-0098	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-L-

Ⓐ **ROADWAY EMBANKMENT** MEDIUM STIFF TO STIFF, BROWN AND RED-BROWN, MOIST, SANDY AND CLAYEY SILT, AND SILTY CLAY, WITH TRACE GRAVEL AND MICA

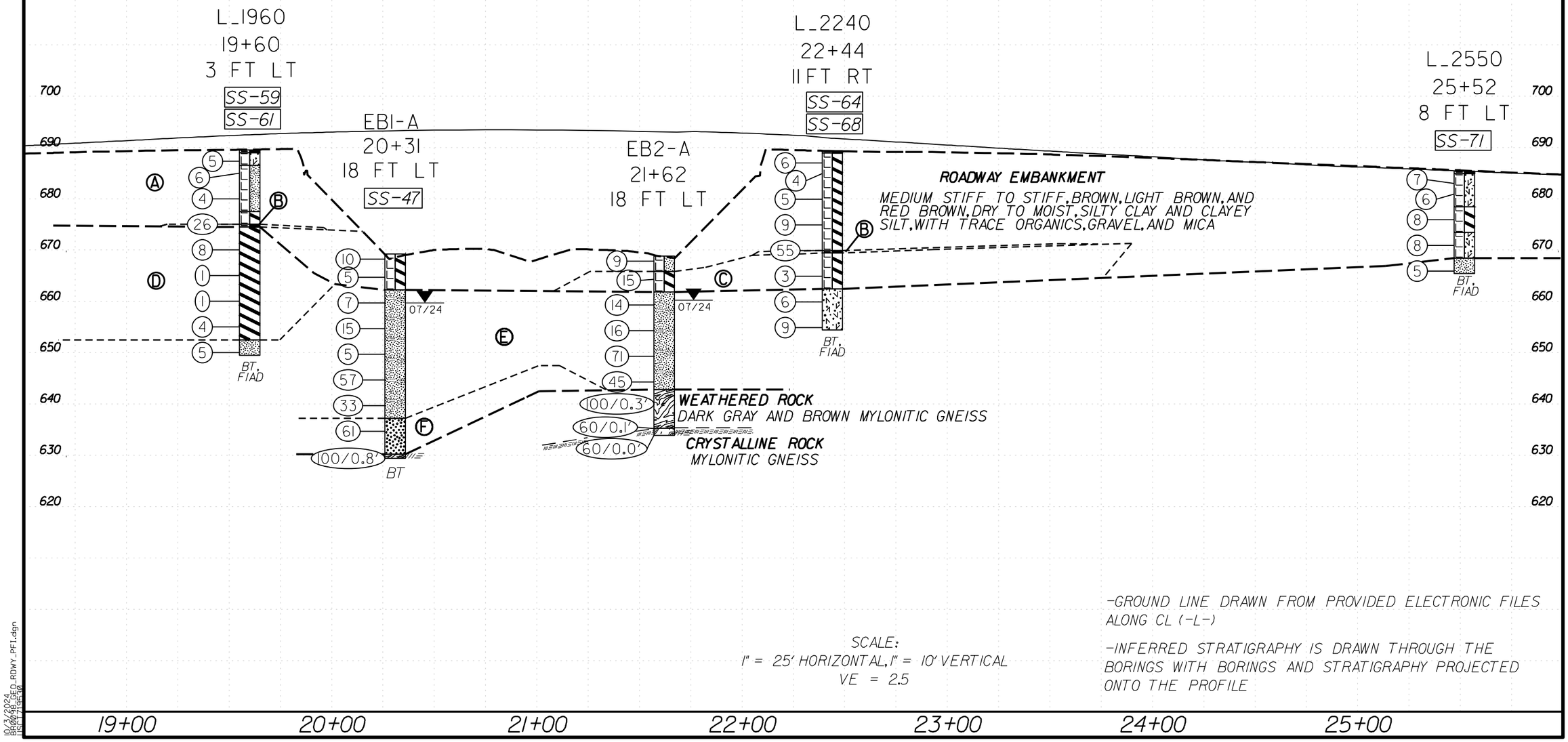
Ⓑ **ROADWAY EMBANKMENT** OLD ASPHALT

Ⓒ **ROADWAY EMBANKMENT** SOFT TO STIFF, LIGHT BROWN AND BROWN, MOIST, SILTY CLAY, WITH TRACE MICA, MODERATELY PLASTIC

Ⓓ **RESIDUAL** VERY SOFT TO MEDIUM STIFF, RED-BROWN TO TAN, MOIST TO WET, SILTY CLAY, WITH TRACE MICA, HIGHLY TO SLIGHTLY PLASTIC

Ⓔ **RESIDUAL** MEDIUM STIFF TO HARD, BROWN, LIGHT BROWN, AND TAN, MOIST TO WET, SANDY AND CLAYEY SILT, WITH TRACE MICA AND ROCK FRAGMENTS

Ⓕ **RESIDUAL** VERY DENSE, LIGHT BROWN, MOIST, SILTY SAND, WITH TRACE MICA



SCALE:
1" = 25' HORIZONTAL, 1" = 10' VERTICAL
VE = 2.5

-GROUND LINE DRAWN FROM PROVIDED ELECTRONIC FILES ALONG CL (-L-)

-INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BORINGS AND STRATIGRAPHY PROJECTED ONTO THE PROFILE

10/3/2024
BR0098_GEO_RDWY_PF1.dgn
USER: rgross

6/23/16

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
BR-0098	6

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

690
680
670
660
650

L_1500
15+00
30 FT LT

ROADWAY EMBANKMENT
STIFF, REDDISH BROWN, DRY, SANDY SILT WITH SOME GRAVEL

RESIDUAL
SOFT TO HARD, BROWN TO LIGHT BROWN, MOIST, SANDY SILT, WITH TRACE MICA

15+00.00

690
680
670
660
650

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

10/1/2024
BR0098_050_RDWY_XS1.dgn
USER: 74930

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BR-0098	7

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

700 690 680 670 660 650 640 630 620

Ⓐ **ROADWAY EMBANKMENT** *MEDIUM STIFF TO STIFF, LIGHT BROWN AND TAN, DRY TO MOIST, SILTY CLAY AND SANDY SILT, WITH SOME GRAVEL AT TOP 1 FOOT AND TRACE ROCK FRAGMENTS*

EBI-A
20+31
18 FT LT
SS-47

EBI-B
20+33
30 FT RT

10 5 7 15 5 57 33 61 100/0.8"

07/24

RESIDUAL
SOFT TO HARD, BROWN TO LIGHT BROWN, MOIST, SANDY SILT, WITH TRACE MICA

VERY DENSE, LIGHT BROWN, MOIST, SILTY SAND, WITH TRACE MICA

BT

WEATHERED ROCK
GRAY AND BROWN MYLONITIC GNEISS

14 12 4 8 13 23 54 100/0.8" 100/0.3"

07/24

BT

20+00.00

Ⓐ **ROADWAY EMBANKMENT** *OLD ASHPHALT LAYER*

L_1960
19+60
3 FT LT
SS-59
SS-61

PAVEMENT

5 6 4 26 8 1 1 4 5

ROADWAY EMBANKMENT
MEDIUM STIFF, RED-BROWN AND BROWN TO TAN, MOIST, CLAYEY AND SANDY SILT, AND SILTY CLAY, WITH TRACE GRAVEL AND MICA

RESIDUAL
VERY SOFT TO MEDIUM STIFF, RED-BROWN TO TAN, MOIST TO WET, SILTY CLAY, WITH TRACE MICA, HIGHLY TO SLIGHTLY PLASTIC

MEDIUM STIFF, LIGHT BROWN TO TAN, MOIST, SANDY SILT, WITH TRACE MICA

BT, FIAD

19+50.00

—L—

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BR-0098	8

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

Ⓐ **ROADWAY EMBANKMENT** *STIFF, BROWN TO RED-BROWN, DRY, SANDY SILT, WITH TRACE MICA, GRAVEL, AND ROOTS*

Ⓑ **ROADWAY EMBANKMENT** *VERY SOFT TO STIFF, BROWN, MOIST TO WET, SILTY CLAY, WITH TRACE MICA, MODERATELY PLASTIC*

Ⓒ **RESIDUAL** *STIFF, BROWN TO LIGHT BROWN, MOIST, SILTY CLAY, WITH TRACE MICA*

700
690
680
670
660
650
640
630
620

EB2-A
21+62
18 FT LT

EB2-B
21+66
29 FT RT
SS-2

9 15 14 16 71 45 — 07/24

100/0.3" 60/0.1" 60/0.0"

10 1 11 26 58 71 — 07/24

100/0.3" 100/0.4" 100/0.4"

BT

RESIDUAL
STIFF TO HARD, BROWN TO LIGHT BROWN, MOIST, SANDY SILT, WITH TRACE MICA

WEATHERED ROCK
GRAY AND BROWN MYLONITIC GNEISS

CRYSTALLINE ROCK
MYLONITIC GNEISS

VERY DENSE, BROWN TO GRAY, MOIST, SILTY SAND, WITH TRACE MICA, SAPROLITIC

22 + 00.00

-L-

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

10/3/2024
BR0098_DEP_RDWY_XS1.dgn
USER: TYSON

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	BR-0098	9

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

700 690 680 670 660 650 640

L_2550
25+52
8 FT LT
SS-71

PAVEMENT

(7) (6) (8) (8) (5)

ROADWAY EMBANKMENT
MEDIUM STIFF,BROWN,MOIST, SANDY SILT,WITH TRACE MICA

MEDIUM STIFF,BROWN,MOIST,SILTY CLAY, WITH TRACE ORGANICS AND MICA

MEDIUM STIFF,RED-BROWN,MOIST,CLAYEY SILT,WITH TRACE SAND AND MICA

RESIDUAL
MEDIUM STIFF,LIGHT BROWN AND TAN,MOIST,SANDY SILT, WITH TRACE MICA

BT
FIAD

25+50.00

L_2240
22+44
11 FT RT
SS-64
SS-68

OLD ASPHALT LAYER

PAVEMENT

(6) (4) (5) (9) (55) (3) (6) (9)

ROADWAY EMBANKMENT
MEDIUM STIFF TO STIFF,BROWN AND RED- BROWN,MOIST,SILTY CLAY, WITH TRACE MICA

SOFT,BROWN,MOIST,SILTY CLAY,WITH TRACE MICA

RESIDUAL
MEDIUM STIFF TO STIFF,BROWN, WET,CLAYEY SILT,WITH TRACE MICA

BT
FIAD

22+50.00

—L—

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67098.1.1	**TIP** BR-0098	**COUNTY** ROCKINGHAM	**GEOLOGIST** J. Rowenhorst	
SITE DESCRIPTION Bridge 780183 on SR 1767 (Mayfield Road) over US 29 Bypass				**GROUND WTR (ft)**
BORING NO. RPA_1300	**STATION** 13+00	**OFFSET** 30 ft RT	**ALIGNMENT** -RPA-	**0 HR.** Dry
COLLAR ELEV. 684.2 ft	**TOTAL DEPTH** 5.0 ft	**NORTHING** 985,863	**EASTING** 1,840,139	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Rowenhorst	**START DATE** 07/11/24	**COMP. DATE** 07/11/24	**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
685										ELEV. (ft) / DEPTH (ft)
										684.2 — GROUND SURFACE — 0.0
										RESIDUAL Red-Brown, Moist, Silt (A-4), with Trace Sand and Mica
680										679.2 — 5.0
										Boring Terminated at Elevation 679.2 ft In Residual Soil (A-4)

WBS 67098.1.1	**TIP** BR-0098	**COUNTY** ROCKINGHAM	**GEOLOGIST** J. Rowenhorst	
SITE DESCRIPTION Bridge 780183 on SR 1767 (Mayfield Road) over US 29 Bypass				**GROUND WTR (ft)**
BORING NO. RPB_1300	**STATION** 13+00	**OFFSET** 50 ft LT	**ALIGNMENT** -RPB-	**0 HR.** Dry
COLLAR ELEV. 668.5 ft	**TOTAL DEPTH** 4.5 ft	**NORTHING** 985,640	**EASTING** 1,839,678	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Rowenhorst	**START DATE** 07/10/24	**COMP. DATE** 07/10/24	**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
670										
										668.5 — GROUND SURFACE — 0.0
										ROADWAY EMBANKMENT Medium Stiff, Reddish Brown, Moist, Sandy Silt (A-4), with Trace Roots
665										665.5 — 3.0
										664.0 — **RESIDUAL** Stiff to Very Stiff, Red, Moist, Sandy Silt (A-4) — 4.5
										Boring Terminated at Elevation 664.0 ft In Residual Soil (A-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67098.1.1	**TIP** BR-0098	**COUNTY** ROCKINGHAM	**GEOLOGIST** J. Rowenhorst	
SITE DESCRIPTION Bridge 780183 on SR 1767 (Mayfield Road) over US 29 Bypass				**GROUND WTR (ft)**
BORING NO. RPB_1500	**STATION** 15+00	**OFFSET** 50 ft LT	**ALIGNMENT** -RPB-	**0 HR.** Dry
COLLAR ELEV. 675.8 ft	**TOTAL DEPTH** 1.4 ft	**NORTHING** 985,782	**EASTING** 1,839,839	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Rowenhorst	**START DATE** 07/10/24	**COMP. DATE** 07/10/24	**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)
680											
675										675.8 GROUND SURFACE	0.0
										674.8 **ROADWAY EMBANKMENT** Medium Stiff, Reddish Brown, Dry to Moist, Sandy Silt (A-4)	1.0
										674.4 **RESIDUAL** Stif to Very Stiff, Red-Brown, Moist, Sandy Silt (A-4)	1.4
										Boring Terminated at Elevation 674.4 ft In Residual Soil (A-4)	

WBS 67098.1.1	**TIP** BR-0098	**COUNTY** ROCKINGHAM	**GEOLOGIST** J. Rowenhorst	
SITE DESCRIPTION Bridge 780183 on SR 1767 (Mayfield Road) over US 29 Bypass				**GROUND WTR (ft)**
BORING NO. RPC_1400	**STATION** 14+00	**OFFSET** 50 ft RT	**ALIGNMENT** -RPC-	**0 HR.** Dry
COLLAR ELEV. 670.0 ft	**TOTAL DEPTH** 5.0 ft	**NORTHING** 985,028	**EASTING** 1,840,078	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Rowenhorst	**START DATE** 07/11/24	**COMP. DATE** 07/11/24	**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	
670										670.0 GROUND SURFACE	0.0
										669.0 **ROADWAY EMBANKMENT**	1.0
										668.0 Light Brown, Moist, Silty Sand (A-2-4), with Trace Gravel and Mica	2.0
665										**RESIDUAL**	
										665.0 Light Brown to Light Gray, Moist, Sandy Clay (A-7), with Trace Mica	5.0
										Light Gray, Moist, Silty Sand (A-2-4), with Trace Mica	
										Boring Terminated at Elevation 665.0 ft In Residual Soil (A-4)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 67098.1.1	**TIP** BR-0098	**COUNTY** ROCKINGHAM	**GEOLOGIST** J. Rowenhorst	
SITE DESCRIPTION Bridge 780183 on SR 1767 (Mayfield Road) over US 29 Bypass				**GROUND WTR (ft)**
BORING NO. RPC_1500	**STATION** 15+00	**OFFSET** 58 ft RT	**ALIGNMENT** -RPC-	**0 HR.** Dry
COLLAR ELEV. 670.0 ft	**TOTAL DEPTH** 5.0 ft	**NORTHING** 985,040	**EASTING** 1,840,177	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger		**HAMMER TYPE** N/A
DRILLER J. Rowenhorst	**START DATE** 07/11/24	**COMP. DATE** 07/11/24	**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)
670										670.0 GROUND SURFACE	0.0
										RESIDUAL 668.5 Brown, Moist, Sandy Silt (A-4)	1.5
										666.5 Tan, Moist, Sandy Clay (A-7), with Trace Mica	3.5
665										665.0 Light Gray, Moist to Wet, Sandy Silt (A-4), with Trace Mica	5.0
										Boring Terminated at Elevation 665.0 ft In Residual Soil (A-4)	

PROJECT REFERENCE NO.	SHEET NO.
BR-0098	13

LABORATORY TESTS COMPLETED ON 7-29-2024

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE NO.	BORING	STATION	OFFSET	ALIGN-MENT	NORTHING	EASTING	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% BY PASSING SEIVES			% MOISTURE	% ORGANIC
											GRAVEL	SAND	SILT	CLAY	10	40	200		
SS-59	L_1960	19+60	3 FT LT	-L-	985,579	1,840,060	23.5'-25.0'	A-7-6	69	41	0	7	64	29	100	98	93	77.9	-
SS-61	L_1960	19+60	3 FT LT	-L-	985,579	1,840,060	33.5'-35.0'	A-7-6	51	13	0	37	63	0	100	97	63	59.4	-
SS-64	L_2240	22+44	11 FT RT	-L-	985,308	1,840,147	5.0'-5.4'	A-7-5	51	14	0	30	64	6	99	96	70	34.5	-
SS-68	L_2240	22+44	11 FT RT	-L-	985,308	1,840,147	23.5'-25.0'	A-7-6	47	24	2	36	18	44	96	91	62	25.1	-
SS-71	L_2550	25+52	8 FT RT	-L-	985,022	1,840,262	1.5'-3.0'	A-5	41	9	1	34	48	17	97	93	65	22.3	-
SS-2	EB2-B	21+66	29 FT RT	-L-	985,376	1,840,103	3.5'-5.0'	A-7-6	45	24	0	37	55	18	100	95	73	26.8	-
SS-47	EB1-A	20+31	18 FT LT	-L-	985,518	1,840,099	3.5'-5.0'	A-7-5	60	14	n/a*	n/a*	n/a*	n/a*	n/a*	n/a*	n/a*	n/a*	-

**DUE TO INSUFFICIENT SAMPLE AMOUNT, ONLY ATTERBERG LIMIT TEST WAS PERFORMED. BASED ON VISUAL CLASSIFICATION THAT INDICATES SS-47 BEING FINE MATERIAL, THE AASHTO SOIL CLASSIFICATION TYPE OF SS-47 IS LIKELY A-7.*